ABCB

Adequacy of Female Public Sanitary Facilities

Impact Analysis

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Australian Building Codes Board

The Australian Building Codes Board (ABCB) is a joint initiative of all levels of government in Australia, together with the building industry. Its mission is to oversee issues relating to health, safety, amenity, and sustainability in building. The ABCB promotes efficiency in the design, construction, and performance of buildings through the National Construction Code, and the development of effective regulatory and non-regulatory approaches. The Board aims to establish effective and proportional codes, standards and regulatory systems that are consistent between states and territories.

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Attribution

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Abbreviations

ABCB - Australian Building Codes Board

AUD – Australian dollar

BCA – Building Code of Australia

BCC – Building Codes Committee

BCR – Benefit Cost Ratio

DTS - Deemed-to-Satisfy

IPC – International Plumbing Code

NCC – National Construction Code

NZ – New Zealand

OIA – Office of Impact Analysis

PFCs – Proposals for Change

RIA – Regulatory Impact Analysis

UK – United Kingdom

UPC – Uniform Plumbing Code

USA – United States of America

Executive Summary

The minimum number of sanitary facilities for public buildings are specified in Volume One Table F4D4 of the National Construction Code (NCC). Observational and anecdotal evidence suggests there are long queueing times for female sanitary facilities during peak use periods. The Australian Building Codes Board (ABCB) has received multiple Proposals for Change (PFCs) expressing concern about the adequacy of the provisions for female sanitary facilities in public buildings. The PFCs specifically identify as unreasonable the queuing times for females, which are currently far longer than those for males.

Long queues for female public sanitary facilities have been an ongoing issue in Australia for many years. Long queues are most prominent where there are large peak use times, particularly in relation to intermission periods in theatres, cinemas, and stadiums. The analysis in this report has revealed that, in a mid-size theatre constructed in accordance with the NCC, queueing times for females are 13 minutes, compared to 9 minutes for males. This reflects community concern about the inequality resulting from the inadequate provision of public sanitary facilities for females. There is strong support for review of the NCC's provisions by the ABCB's technical committees and the Office for Women at the Department of the Prime Minister and Cabinet.

The ABCB has proposed Deemed-to-Satisfy (DTS) Provisions for inclusion in NCC 2025 to align with the outcomes of this study. The proposed provisions would apply to Class 9b buildings – single auditorium theatres and cinemas via updating Table F4D4i in Volume One. The proposed changes involve increasing the number of closet pans to female patrons.

This report examines the regulatory impact from the proposed NCC 2025 changes through a cost-benefit analysis. The cost-benefit analysis suggests that the proposed changes show a strong net benefit in all sizes of theatre. A larger size theatre benefits more from the increase in closet pans. The Benefit-to-Cost Ratio (BCR) is all above 1 for all sizes of theatre. The number of events held per year also positively impacts on the results, specifically higher number of events per year will result higher BCR. A comprehensive sensitivity analysis also shows positive outcomes (significant net benefits) in all scenarios. The benefits are at least 6 times greater than the costs. These results suggest that the proposed amendments to Table F4Di in Volume One will mitigate the problem of inequitable queueing times for female patrons in a manner where the benefits outweigh costs.

Introduction

Sanitary facility requirements in the NCC

Minimum sanitary facility numbers specified in NCC 2022 Volume One F4D4 are based on a study commissioned in 2001. At the time, that study was used as a basis for increased provisions of sanitary facilities for females in some public buildings. Nevertheless, unreasonable queuing times for females in single auditorium theatres and cinemas remain evident.

The ABCB received multiple PFCs seeking increased provision of sanitary facilities for females. These were considered by the Building Codes Committee (BCC) and the ABCB investigated the solutions to address the issue for the inclusion in NCC 2025.

The proposed amendments to Table F4D4i in NCC Volume One attempt to rectify the problem of unreasonable queuing times for females. The amendments increase the average ratio of male to female sanitary facilities to have sufficient facilities to serve peak periods in a single auditorium or theatre and cinemas.

Purpose and scope

The purpose of this impact analysis is to evaluate the regulatory impacts of proposed changes to increase the minimum required provisions for female public sanitary facilities. The proposed changes attempt to address unreasonable queuing times for females which are currently far longer than those for males.

The NCC currently requires a minimum specified number of closet pans in sanitary facilities for male and female patrons based on the occupancy of the buildings. As the queuing times for females has been identified as unreasonable, the proposed amendments attempt to rectify this issue by increasing the minimum numbers of closets for female patrons though the NCC.

The proposed amendments would introduce flexible options for venues subject to peak usage/peak demand periods during the period of audience access. The amendments reflect equal queuing times for males and females for single auditorium theatres and cinemas. These provisions are intended to become part of the NCC 2025, specifically addressing Class 9b building single auditoria.

The problem

Long queues for female public sanitary facilities have been an ongoing issue in society for many years. Long queues are most prominent where there are large peak use times, particularly related to intermission periods in theatres, cinemas, and stadiums. Analysis identified that in a mid-size theatre constructed in accordance with the NCC, queueing times for females are 13 minutes, as compared to queueing times for males (9 minutes). Community concerns have been raised about the inequality resulting from the inadequate provision of public facilities for females. A recent survey in live music events shows that 47 percent of female respondents listed toilet queues as their biggest annoyance, compared with just 27 percent of males[1].

From collating the findings of multiple literature pieces, including articles and research papers, the following key observations have shown the reason why the queues are longer for females than males.

At last census, the Australian population was 49.3% male and 50.7% female (Australian Bureau of Statistics, 2021). Therefore, it follows that female facilities would already be in higher demand than corresponding male facilities.

In addition to a higher number of females in the Australian population, studies suggest that females spend more time using sanitary facilities when compared to males. Female patrons used an average 80-97 seconds for voiding while male urination times average 32-45 seconds (Edwards & McKie, 1996). Furthermore, the total time females spent in a bathroom facility was estimated as 172 seconds on average, which is 47% longer than males (Gwynne, Hunt, Thomas, Thompson, & Séguin., 2019). From these statistics it is evident that female sanitary facilities are used for a larger amount of time than those for males.

In addition to the basic length of time females visit sanitary facilities for, Australian research has also shown that females visit sanitary facilities 1.3 times more than males with the length of visit being 1.6 times that of males (Royal Melbourne Institute of Technology, 1994). Females go to the bathrooms for reasons aside from urination. Such reasons include but are not limited to menstruation, pregnancy, or

[1] https://www.fmmedia.com.au/sectors/aussies-want-shorter-toilet-queues-and-better-accessibility-at-music-venues/.

accommodating the children or elderly. When accompanied by a child, the time spent in the bathroom can increase to 5-10 minutes.

The probability of queuing for females was 34 times that for males. For females, the longest average waiting times occurred in stadiums and department stores (Royal Melbourne Institute of Technology, 1994).

Females spend a significant amount of time in restrooms performing auxiliary activities, of which the three most common activities performed were urination, washing hands, and checking appearance. Females also tend to visit public toilets in pairs or groups, which had higher average dwell times. It is speculated that groups preferred to remain together (i.e., enter and leave together) and defaulting to the dwell time of the last person to leave, prolonging the overall process (Gwynne, Hunt, Thomas, Thompson, & Séguin., 2019). It should be noted that different studies have been shown to support varied conclusions, but behavioural patterns can be assumed to be commonly shared amongst most instances of bathroom usage.

As previously discussed, not only do females spend longer amounts of time in sanitary facilities compared to males, they also visit them more frequently for a number of reasons. Therefore, females incur a longer wait time. The net number of toilets provided for women is also smaller than that for men. This can be attributed to the more efficient spacing of urinals in bathrooms. Overall, an average toilet area can accommodate from 20-30% more fixtures for men than for women (Ghent University, 2017). In order to align the female waiting times with that of males, the amount of female sanitary facilities must be increased.

The inadequacy of female public sanitary facilities has been raised overtime

In the past, it had been proposed that an equal number of toilets and hand basins be provided for men and women. However, the imbalance of female and male facilities and the unacceptable queuing times experienced by females has been raised for many years.

The study, *'Provisions for Sanitary Facilities in the Building Code of Australia'*, reviewed the provision of sanitary facilities in the 1996 Building Code of Australia (BCA) to determine if they met current and future requirements of the community. The outcomes of the study were already considered at the 2002 and 2003 ABCB National Technical Summits, following which the BCA was amended to increase the number

of sanitary compartments for females in some public buildings. However, the issue with unacceptable queuing times experienced by females has still been evolving overtime.

Recently, there were PFCs which similarly claimed that the minimum requirements for female sanitary facilities were inadequate, and unequal provisions were provided for females in comparison to males. It was proposed that the minimum requirements of female sanitary facilities be tripled in all non-residential buildings.

There is strong support for review of the NCC's provisions by the ABCB's technical committees and the Office for Women at the Department of the Prime Minister and Cabinet. To develop the proposed changes, the ABCB has conducted a technical analysis of estimated queuing times in single auditorium cinemas and review the literature and search for available data.

International regulations

The ABCB compared the minimum provisions for female sanitary facilities in Australia against building/plumbing codes from other countries (UK, USA (International Plumbing Code (IPC) and Uniform Plumbing Code (UPC)), NZ). This was to determine if changing the NCC to match other international codes could improve the issue. The key takeaways:

- The UK building code is the most stringent for almost all building classes. This is attributed to their queue modelling criteria: 'At peak periods, the probability that a user would need to wait more than 60 seconds should be less than 1%'.
- The NZ building code and USA (UPC) code has similar stringencies to the NCC. These varied depending on the building types, of which some are subject to stricter requirements, while others are more lenient.
    - In the case of department stores, the NCC require considerably fewer closet pans and washbasins than the USA (UPC) and NZ codes.
    - In the case of sport venues, the minimum requirements in the NCC and NZ code are identical. The NCC requires more fixtures than the USA (UPC) code, but less than the UK code.
- The USA (IPC) building code is the least stringent. The minimum fixture requirements are less than the NCC's for most of the building types.

As the UK building code has provided far greater stringencies than required in the NCC, this suggests that similar quantities could feasibly be implemented for the NCC.

Objective

The intended outcome of the proposal is to reduce the queuing times for females accessing sanitary facilities in buildings with a single auditorium or theatre. The aim is to achieve parity with queuing times for males in the same building types. This objective aligns with the goals of the NCC, to ensure that new dwellings achieve an adequate level of health and amenity.

Options

Option 1 - Maintain the status quo

This option is self-explanatory in its heading. The status quo option is an option taking no further action beyond current regulatory requirements. It always is the benchmark (base case) to assess associated costs and benefits of other options.

The base case establishes the baseline against which the proposed changes are compared. The base case for this instance is NCC 2022 Volume One table F4D4i.

A key element of cost-benefit analysis is establishing a credible base case against which the benefits and costs of various options are assessed.

The base case implies Volume One Table F4D4i to remain as it currently applies. The quantitative method for determining the queue time is detailed below:

$$\text{Max expected waiting time} = \frac{\text{Line length} \times \text{Average time taken (female)}}{\text{Number of closet pans}}$$

For theatre has 300 seats, the gender viewership ratio is assumed to be 1:1 so this theatre has maximum of 150 female audience. As per NCC 2022 Volume One Table F4D4i, for 150 females, 4 closet pans will be required.

According to the survey by Royal Melbourne Institute of Technology in 1994, a 17.2% arrival rate for an average of 2 hours in a theatre will be utilised. In a 2-hour movie, approximately 26 females are estimated to use the bathroom during peak times. As the women enter the bathroom, 4 closet pans will immediately be occupied, which leaves 22 females in queue.

Barring other psychological aspects of queueing (e.g., leaving due to line length), the expected waiting time will be taken as the line length multiplied by the average time taken by women in using facilities.

From a survey by Royal Melbourne Institute of Technology, this analysis assumes that a woman takes 82 seconds on average in the bathroom (Royal Melbourne Institute of Technology, 1994). Therefore, the maximum expected waiting time for the last female in queue is 7 minutes. This is assuming that each occupant takes an exact time of 82 seconds in the bathroom, and the 4 closet pans are vacated simultaneously.

It is also observed the fact that females experienced 1.6 times longer in queue compared to males. Hence, the additional queuing time for females is 4 minutes.

Figure 1 summarizes the key estimates of waiting and additional queuing time for females with the current provisions of closet pan in NCC 2022 Volume One Table F4D4i for various sizes of single auditorium theatres and cinemas.

Figure 1 Waiting and queuing time in base case

Theatre capacity (seats)	Number of female audiences	Number of closet pans (NCC 2022)	Number of people waiting in line at peak	Maximum expected waiting time (minute)	Additional female queuing time (minutes)
300	150	4	22	7	4
550	275	6	41	9	6
1000	500	9	77	12	7
2500	1250	18	197	15	9
5000	2500	34	396	16	10

Option 2 - Regulatory options

The ABCB has proposed DTS Provisions for inclusion in NCC 2025 to align with the outcomes of this study. The proposed provisions would apply to Class 9b buildings – single auditorium theatres and cinemas via updating the Volume One table F4D4i in the NCC. The proposed changes are to increase the number of closet pans to female patrons (Please see Attachment A at the end of this document for more detail).

Option 3 - Non-regulatory options

Non-regulatory option often refers to educational materials such as a handbook. Educational materials may increase awareness of the issue but cannot reduce the queuing times for females and, therefore, would not solve the problem in this case.

Impact analysis

CBA parameters

Time period

Buildings are typically long-lived asset, with a life of 40 or more years. For this impact analysis report, this analysis will assume a building life of 50 years with 40 years and 60 years for the sensitivity analysis.

Discount rate

The Office of Impact Analysis (OIA) recommends typically a real discount rate of 7 per cent to be used in a RIS, with sensitivity analysis using 3 per cent and 10 per cent. This is intended to reflect the social discount rate. A 5 per cent sensitivity analysis also is used to reflect other states and territories' guidelines to cost benefit analysis[2].

Non-work-related labour costs

OIA has recommended the value of an individual's leisure time is based on average weekly earnings, which has been estimated at $36 per hour for individuals residing in Australia (OIA, 2023). It is a standard economic approach to consider the trade-off between work and leisure such that the marginal value of time spent working equals the marginal value of time spent at leisure. The marginal value of time spent working is approximated across the economy as the average hourly wage, including overtime, after tax.

Impact of the regulatory option

Estimated cost of the regulatory option

In present value terms, the unit cost of a closet pan in an existing toilet in a single auditorium is estimated at $11,400 per closet pan over the life of the building (50 years) using a discount rate of 7 per cent. This includes:

[2] NSW Treasury guidelines: cost-benefit analysis sets 5% for central case and 3% and 7% for sensitivity analysis. The Guidelines can be assessed: https://www.treasury.nsw.gov.au/finance-resource/guidelines-cost-benefit-analysis.

- Upfront costs for construction of around $4500, which this analysis assumes each of the closet pan is assumed to require 1.5-meter square of floor area and construction cost is $3000 per square metre[3].
- Although there is no data available on the maintenance costs, this analysis assumes annual maintenance costs of $500, which is $6,900 in present value terms over the 50-year life of the building, using a discount rate of 7 per cent.

The NCC 2025 proposal implies the construction cost of additional closet pans is presented in figure 2 below.

Figure 2: Unit cost of a closet pan

	Upfront cost (AUD)	Annual cost (AUD)	Present value of cost over building life (AUD)
Construction	$4,500	N/A	4,500
Maintenance	N/A	$500	6,900
Total	$4,500	$500	11,400

Figure 3 shows the present value of compliance cost for the increases of closet pans at each capacity level of theatres. For a theatre with the capacity of 300 people, which would require an increase of 2 closet pans, the cost is $22,800 while the cost for largest capacity of 5000 people is $136,804 to have an additional 12 closet pans for females.

Figure 3 Cost of the regulatory option

Theatre capacity (seats)	Number of female audiences	Number of closet pans increase	Present value of compliance cost (AUD)
300	150	2	22,800.75
550	275	3	34,201.12
1000	500	4	45,601.49
2500	1250	7	79,802.61
5000	2500	12	136,804.48

[3] Rawlinsons Australian Constuction Handbook 2021

Estimated benefits of regulatory option

The proposed provisions would apply to Class 9b buildings – single auditorium theatres and cinemas via updating the NCC Volume One table F4D4i. The proposed changes are to increase the number of closet pans to female patrons.

Figure 4 Waiting and queuing under proposed changes

Theatre capacity (seats)	Number of female audiences	Number of closet pans (NCC 2025)	Number of people waiting in line at peak	Maximum expected waiting time (minute)	Additional female queuing time (minutes)
300	150	6	20	5	3
550	275	9	38	6	3
1000	500	13	73	8	5
2500	1250	25	190	10	6
5000	2500	46	384	11	7

Compared figure 4 with figure 1, higher numbers of closet pans are required in the NCC 2025 proposed changes for all sizes of theatres compared to NCC 2022. It would result in a significant reduction to female waiting time and additional queuing time. At aggregate level, the total reduction in additional queuing time for an event is 3 hours for a 300-seated theatre while it is reduced 171 hours in the largest kind of theatre.

Figure 5 shows the aggregate benefit from reduction of addition queuing time in theatres with different capacities. The benefit was calculated in term of present value using 7% discount rate, $36 per hour non-work-related-labor rate to monetarize the benefit and the assumption that a theatre has 150 event per year on average. The benefit in terms of present value over building life of 50 years is $197,000 in a 300-seated theatre. This saving increases significantly for theatres with a larger capacity. At 5000 seats, the saving in terms of present value over building life for the theatre is more than $12 million.

Figure 5 Benefit from reduction of additional queuing

Theatre capacity (seats)	Reduction of additional queuing time per event (hour)	Benefit of reduced queuing time per event (AUD)	Benefit of reduced queuing time per year (AUD)	Present value of benefit over building life (AUD)
300	3	95.20	14,280.30	197,078.80
550	8	290.90	43,634.25	602,185.21
1000	22	775.72	116,358.00	1,605,827.24
2500	78	2,820.80	423,120.00	5,839,371.77
5000	171	6,160.13	924,019.41	12,752,157.47

CBA results

The CBA results in figure 6 is constructed from the estimated benefit in figure 5 and estimated cost in figure 3. The BCR is 8.64 for a theatre with a capacity of 300 people, whereas that number increases to 93.21 in the largest size of theatre. The benefit is at least 8 times outweighs the cost.

This analysis suggests that proposed changes show a strong net benefit in all sizes of theatre. A larger size of theatre benefits more from the increase of closet pans. BCR is all above 1 for all theatre.

Figure 6 Aggregate impact analysis

Theatre capacity (seats)	Number of female audiences	Cost (AUD)	Benefit (AUD)	BCR	Net impact (AUD)
300	150	22,801	197,079	8.64	174,278
550	275	34,201	602,185	17.61	567,984
1000	500	45,601	1,605,827	35.21	1,560,226
2500	1250	79,803	5,839,372	73.17	5,759,569
5000	2500	136,804	12,752,157	93.21	12,615,353

Sensitivity Analysis

The Royal Melbourne Institute of Technology's study compared the averages of two Canadian studies to the results from the Melbourne Arts Centre. The average from these three surveys gives the central case assumed value that a woman takes 82 seconds on average in the bathroom. For the sensitivity cases, 75 seconds and 92 seconds will be used as they are the lowest and highest values of the range given in the study (Royal Melbourne Institute of Technology, 1994).

The base case uses an assumed 150 events per year in this analysis. For sensitivity testing, additional values of 104 and 208 have been tested. The value of 104 assumes the theatre is holding an event only

every weekend. The value of 208 assumes that the theatre holds an event approximately four days a week.

The percentage of female patrons in the base case is assumed to be 50%. At last census, the Australian population was 49.3% male and 50.7% female (Australian Bureau of Statistics, 2021). As such, 50.7% has been used as a sensitivity for the percentage of female patrons.

Buildings are typically long-lived asset, with a life of 40 or more years. For the base case of this impact analysis report, a building life of 50 years was assumed. 40 years and 60 years are used for the sensitivity analysis.

A discount rate of 7 per cent was used in the base case and the sensitivity analysis uses 3 per cent and 10 per cent.

The sensitivity testing scenario described above are summarized in figure 7.

Figure 7 Sensitivity testing scenarios

Input	Central Case	Sensitivity inputs		
Average female spending time in toilet (seconds)	82	75	92	
Number of events per year	150	104	208	
Percentage of female patrons	50	50.7		
Discount rate (%)	7	3	10	5
Building life (years)	50	40	60	

Figure 8 shows the sensitivity analysis BCR results based on scenarios in Figure 7 for a theatre with a 300-seat capacity. Figure 9 shows the BCR results for a theatre with a 5000-seat capacity. Regardless of the sensitivity scenarios tested, the BCRs are at least at 6.

Figure 8 Sensitivities analysis results (300 capacity theatre)

Input	Sensitivity results					
	BCR	**NPV (AUD)**	**BCR**	**NPV (AUD)**	**BCR**	**NPV (AUD)**
Average female spending time in toilet (seconds)	7.9	157,454	9.7	198,312		
Number of events per year	6.0	113,841	12.0	250,482		
Percentage of female patrons	8.9	179,835				
Discount rate (%)	10.6	332,699	7.5	122,672	9.56	233,444
Building life (years)	8.5	168,049	8.7	177,445		

Figure 9 Sensitivities analysis results (5000 capacity theatre)

Input	Sensitivity results					
	BCR	**NPV (AUD)**	**BCR**	**NPV (AUD)**	**BCR**	**NPV (AUD)**
Average female spending time in toilet (seconds)	85.3	11,526,754	104.6	14,170,494		
Number of events per year	64.6	8,704,691	129.3	17,546,187		
Percentage of female patrons	88.5	12,963,512				
Discount rate (%)	114.1	23,566,423	80.7	9,047,992	103.15	16,705,294
Building life (years)	92.0	12,184,768	93.8	12,834,241		

In short, the results of the analysis remain stable under all sensitivity testing scenarios, suggest robust outcomes.

Consultation

Support for the proposal has been sought and received from both the Building Codes Committee and the Plumbing Code Committee.

Implementation and Review

If agreed by the Board and Building Ministers, this proposed amendment will be included in NCC 2025.

The review of the proposed changes will align with the NCC three-year amendment cycle. No transitional measures are proposed, although this is the prerogative of jurisdictions.

Conclusion

The cost-benefit analysis detailed in this report shows that the benefits of increasing the number of closet pans for female sanitary facilities in Class 9b buildings are substantially greater than the costs.

Maintaining the status quo would ensure the enduring inequality between male and female patrons when queuing for sanitary facilities. Non-regulatory options cannot reduce the queuing times for females and, therefore, would not solve the problem in this case. As such, Option 2, the regulatory option detailed in this document, is the recommended option on account of solving the problem of inequitable queueing in a manner where the benefits outweigh the costs.

The proposed provisions would apply to Class 9b buildings – single auditorium theatres and cinemas via updating the Volume One table F4D4i in the NCC. The proposed changes are to increase the number of closet pans to female patrons. These proposed changes show a strong net benefit in all sizes of theatre. A larger size of theatre benefits more from the increase in closet pans. BCRs are above 1 for all sizes of theatre.

Thus, the proposed amendments to Volume One table F4D4i will mitigate the problem of inequitable queueing for female patrons in a manner where the benefits outweigh the costs.

Attachment A

Proposed changes to the table F4D4i

Table F4D4i: Sanitary facilities in Class 9b buildings – single auditorium theatres and cinemas

User group	Facility type	Design occupancy	Number
Male patrons	Closet pans	1 – 50	0
		51 – 250	1
		251 – 500	2
		>500	Add 1 per 500
	Urinals	1 – 50	0
		51 – 100	1
		>100	Add 1 per 100
	Washbasins	1 - 50	0
		51 - 150	1
		>150	Add 1 per 150
Female patrons	Closet pans	1 - 50	0
		51 - ~~110~~75	~~3~~4
		76 - 110	5
		111 - 170	~~4~~6
		171 - 230	~~5~~7
		231 - 250	69

		>250	Add 1 per ~~8~~60
	Washbasins	1 - 50	0
		51 - 150	1
		>150	Add 1 per 150

References

Aotearoa., S. N. (2019). One in five homes damp.

Australian Building Codes Board, M. D.-G. (2016). *Scoping Study of Condensation in Residential Buildings.* Australian Building Codes Board.

Australian Bureau of Statistics. (2021). *Population: Census.* Retrieved from ABS: https://www.abs.gov.au/statistics/people/population/population-census/latest-release

Baker, E., Lester, L., Beer, A., & Bentley, R. (2019). An Australian geography of unhealthy housing. *Geographical Research*.

Bornehag, C., Sundell, J., & Sigsgaard, T. (2004). Dampness in buildings and health (DBH): Report from an ongoing epidemiological . *Indoor Air*.

Cox-Ganser, J. (2015). Indoor dampness and mould health effects—Ongoing questions on microbial exposures and allergic versus . *Clinical & Experimental Allergy*.

Edwards, J., & McKie, L. (1996). A Serious Issue for the Body Politic. *European Journal of Women's Studies 3*, 215-230.

Garrett, M., Rayment, P., Hooper, M., Abramson, M., & Hooper, B. (1998). Indoor airborne fungal spores, house dampness and associations with environmental factors and respiratory health in children. *Clinical & Experimental Allergy*.

Ghent University. (2017, July 14). No more queueing at the ladies' room. Ghent.

Gunnbjornsdottir, M. (2006). Prevalence and incidence of respiratory symptoms in relation to indoor dampness: The RHINE study. . *Thorax*.

Gwynne, S. M., Hunt, A. L., Thomas, J. R., Thompson, A. J., & Séguin., i. (2019). The toilet paper: Bathroom dwell time observations at an airport. *Journal of Building Engineering*, 100751.

Haverinen-Shaughnessy, U. (2012). Prevalence of dampness and mold in European housing stock. *Journal of Exposure Science & Environmental Epidemiology*.

House of Representatives Standing Committee on Health, Aged Care and Sport . (2018). *Report on the Inquiry into Biotoxin-Related Illnesses in Australia.* Canberra: Parliament of the Commonwealth of Australia.

Kowalik, C. G., Adam, D., Sophia, D., Melissa, R. K., Jay, F., Roger, R. D., & W. Stuart, R. (2019). Toileting behaviors of women—what is healthy? *The Journal of urology*, 129-134.

Lab., B. (2020). Prevalence of Building Dampness.

Mainey, A., Gilbert, B., Redman, A., Gunalan, S., & Bailleres, H. (2021). Time dependent moisture driven backout of nailplates: experimental investigations and numerical predictions. *European Journal of Wood and Wood Products* .

NATO, T. N. (2018). *Disrupted: The Consumer Experience of Renting in Australia.*

Norbäck, D., Zock, J., Plana, E., Heinrich, J., Tischer, C., Jacobsen Bertelsen, R., . . . Olivieri, M. (2017). Building dampness and mold in European homes in relation to climate, building characteristics and socio-economic status: . *Indoor Air*.

Office of Impact Analysis. (2023). *Regulatory Burden Measurement .*

Omebeyinje, M., Adeluyi, A., Mitra, C., Chakraborty, P., Gandee, G., Patel, N., . . . Basu. (2021). A case study of 28 moldy buildings. *Environmental Science: Processes & Impacts*.

Paevere, P., & Nguyen, M. (2008). Nailplate backout—Is it a problem in plated timber trusses? *10th World Conference on Timber Engineering*, (pp. pp. 1191–1197). Miyazaki, Japan .

Royal Melbourne Institute of Technology. (1994). *Female Toilet Facilities; Are There Enough in Public Theatres.* Australia.

Smith, L. D., Martin, P. G., Kuehl, C. R., & Kuehl, C. F. (1986). Determination of requirements for sanitation facilities at large gatherings. *Journal of Environmental Health*, 250-258.

WHO. (2009). *WHO guidelines for indoor air quality: dampness and mould.*

Yu, J., Xu, Z., & Feng, Y. (2019). Visualization Of Female Public Toilet Information Service Design And Research Based On Queuing And Waiting Psychology. *IOP Conference Series: Materials Science and Engineering.* IOP Publishing.