

Dr hab. inż. arch. Marcin Goncikowski, prof. PW
Wydział Architektury Politechniki Warszawskiej
ul. Koszykowa 55, 00-659 Warszawa

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REVIEW

of the doctoral dissertation submitted by Mohammad Mahdi Mohammadi, MSc Eng Arch, entitled "*The Future of Housing Buildings; Optimizing Natural Ventilation Strategies in Polish Housing: Simulation-Based Design for Thermal Comfort in a Changing Climate*", prepared under the supervision of Maciej Janowski, DSc Eng Arch, Professor at PUT, at the Faculty of Architecture, Poznan University of Technology, in the academic discipline of architecture and urban planning.

1. Basis for the review

The basis for this review comprises:

- letter of 16 July 2026 from the Dean of the Faculty of Architecture, Poznan University of Technology, informing that the Reviewer had been appointed by the Council of the Discipline of Architecture and Urban Planning at Poznan University of Technology in the proceedings for the award of the doctoral degree to Mohammad Mahdi Mohammadi, MSc Eng Arch.
- the Act of 20 July 2018 – Law on Higher Education and Science (consolidated text: Journal of Laws of 2024, item 1571, as amended), in particular Article 187.
- the copy of the doctoral dissertation provided to the Reviewer as a single-volume, illustrated A4-format document comprising 193 numbered pages, together with a digital version (PDF), Poznan 2026.

The purpose of this review is to determine whether the submitted dissertation demonstrates the Candidate's general theoretical knowledge in the discipline of architecture and urban planning, confirms the ability to conduct scientific research, and constitutes an original solution to a scientific problem, in accordance with the criteria set out in Article 187(1)–(2) of the Act.

The dissertation lies at the intersection of architectural design, building physics and wind engineering. The Reviewer assesses the computational framework from the perspective of an architect and of research methodology within the discipline of architecture and urban planning: in terms of the adequacy of the methods to the research questions, transparency of assumptions, validation, consistency of documentation, reproducibility, and the justified scope of inference. The Reviewer does not, however, make assessments concerning the detailed numerical properties of individual turbulence models beyond what is necessary to assess the credibility of the architectural conclusions.

2. Formal description and assessment of the dissertation

The dissertation is written in English and is accompanied by abstracts in English (pp. 18–19) and Polish (pp. 20–21), a list of abbreviations (p. 22), and a statement of authorship contribution

together with a list of related publications (p. 23). The requirement of Article 187(4) of the Act to attach a Polish-language abstract to a dissertation prepared in a foreign language has therefore been satisfied.

The dissertation comprises six chapters: 1. Overview (pp. 25–29), 2. Natural ventilation (pp. 31–46), 3. Polish housing (pp. 48–62), 4. Methodology (pp. 64–89), 5. Results (pp. 91–150), and 6. Synthesis (pp. 152–177), followed by a bibliography containing 260 references (pp. 178–193). The structure is methodologically clear: from the formulation of the problem and its context, through the review of knowledge and development of the method, to the results, synthesis and conclusions. The review chapters essentially play a supporting role in relation to the Author's own research, which I assess positively.

A commendable aspect is the attempt to combine three strands that are often treated separately in architectural research: investigation of the actual housing stock, modelling of environmental conditions, and translation of the results into design decisions. As a result, the dissertation addresses a problem of clear relevance to housing design and the modernisation of the existing stock.

A minor reservation concerns the first part of the title – “*The Future of Housing Buildings*”. It is journalistic in tone and suggests a scope broader than that actually investigated. The second part of the title, concerning the optimisation of natural ventilation in Polish housing in the context of thermal comfort and climate change, describes the actual scope of the dissertation much more accurately. This reservation does not affect the formal assessment of the dissertation.

3. Substantive assessment of the dissertation

3.1. Research problem and disciplinary positioning

The dissertation concerns the assessment and optimisation of natural ventilation strategies – cross ventilation and corner ventilation – in multi-family residential buildings. The research problem is situated within the current and growing phenomenon of overheating in dwellings during summer heatwaves and the question of whether the need for mechanical cooling can be reduced. From an architect's perspective, the core of the study is the question of which decisions taken at an early design stage – orientation, size and arrangement of openings, solar-shading devices, balconies, and the location of the dwelling within the building – have a measurable impact on thermal conditions and air movement within the dwelling.

I consider the research gap to have been correctly identified. Corner ventilation is less extensively studied in the literature than conventional cross ventilation, while studies based on realistic apartment layouts embedded in an urban context are less common than experiments using simplified models. The hypothesis formulated on p. 25 is essentially testable; however, it contains an element of anticipating the result – the statement that larger windows “will reveal” an improvement in passive cooling. Methodologically, it would have been preferable to separate the general hypothesis from the expected outcomes or to formulate some of the assumptions as research questions.

The Candidate's critical discussion of shoebox models (pp. 129 and 145) is particularly important from the perspective of the architectural discipline. The Author indicates that simplified room geometry is insufficient for drawing reliable design conclusions because the outcome is jointly influenced by the actual apartment layout, internal partitions, inflow

direction, solar radiation and floor level. This is one of the strongest and most distinctly “architectural” theses of the dissertation and is supported by the material assembled.

3.2. Research design and empirical material

A valuable element of the dissertation is the Author’s original archival survey of more than 320 apartments in approximately 30 residential complexes in seven Polish cities, covering the period 1940–2020. The archival material was transformed into structured data concerning, *inter alia*, ventilation type, number of rooms, date and place of completion (pp. 65–69). This grounds the simulation cases in the real housing stock rather than in arbitrary geometric models.

The justification for selecting layouts with potential for cross ventilation and its coincidence with the refurbishment cycle of the housing stock (p. 69) is convincing as a basis for selecting the case studies. For further analyses, units from the Winnica Housing Estate in Warsaw were selected for cross ventilation and from the Cotton House building in Warsaw for corner ventilation. Both cases were embedded in models accounting for neighbouring buildings, which is important for shading and for shaping the wind field.

The research programme is clearly parameterised: it includes two window sizes (120×150 and 150×150 cm), three shading variants, and eight wind directions at 45° intervals. This yields 48 variants for each of the two case studies, *i.e.* 96 scenario combinations in the full matrix across both cases. Such a design allows the influence of architectural decisions to be compared systematically, although the scope of generalisation must remain proportionate to the number and character of the real typologies actually subjected to simulation.

3.3. Assessment of scientific methodology

The dissertation employs a coupled CFD model covering both the external environment and the interiors and performs calculations for a set of explicitly defined boundary conditions. From the standpoint of research methodology, a strong feature is the multi-stage credibility check: a grid-independence study, comparison with experimental wind-tunnel data, and comparison of selected cases between Autodesk CFD and OpenFOAM (pp. 92–100). The Candidate openly reports cross-platform discrepancies, including the least favourable ones, which is an important sign of reporting integrity.

Given the subject of the dissertation, such a validation scheme increases confidence in the qualitative ranking of variants and in the spatial flow patterns. A sound validation process should not, however, be equated with the automatic correctness of every numerical value subsequently reported in the tables.

3.4. Results and their relevance to architectural design

The greatest value of the results lies in their expression in terms of design decisions. The dissertation demonstrates the strong influence of the relationship between the orientation of openings, wind direction and the solar exposure of façades. In the conclusion to the first case, the Author distinguishes three regimes: directions 135°–225°, where inflow is associated with strongly sun-exposed façades and high temperatures; directions 90°/270°, with a weak driving force for ventilation; and directions 0°/45°/315°, where more favourable conditions are associated with inflow from the more shaded side (p. 128). From an architectural perspective, what matters here is the relationship to the location of openings, solar exposure and the surrounding built context.

The research also indicates that increasing the window width from 120 to 150 cm generally improves airflow and, in many of the variants studied, lowers the indoor temperature, while solar-shading devices – although having a smaller mean effect – become important under conditions of high solar exposure. Conclusions of directly applicable design relevance are also formulated for balconies. The Reviewer regards this translation of results into the language of architectural decisions as one of the principal strengths of the dissertation, subject to the reservation that the recommendations should be presented as conditional rules tied to the studied configurations rather than as “universal” design standards.

A valuable extension is the coupling of velocity fields obtained from CFD with the SET index. The comparison shows that assuming a uniform air velocity from the weather file does not capture variation within the apartment: it may both fail to reveal stagnant zones with high discomfort and fail to capture improvements in well-ventilated flow paths. This is an important methodological finding for design as it reveals the spatial non-uniformity of comfort, which is invisible in an assessment based on a single value for the entire interior.

The comfort analysis was extended to a 2050 climate scenario based on a morphed weather file and the RCP 8.5 pathway. The directional conclusion (that rising outdoor temperatures reduce the margin of effectiveness of passive strategies and increase the importance of solar control and airflow distribution) is important. Nevertheless, it should be noted that the quantitative comparison of the “climate window” for present-day and 2050 conditions may require interpretative correction.

On p. 23, the Candidate lists publications and presentations related to the dissertation topic, including an article in BUILDER (2023), an EACWE conference paper (2025), and a co-authored publication in Energy Reports (2025). This confirms the Author’s research activity and the prior dissemination of parts of the methodology and research problem. The Reviewer, however, does not treat it as independent validation of the entire doctoral material, since the scope of the individual publications is not identical to that of the full dissertation.

4. Issues requiring clarification

The following remarks do not undermine the positive assessment of the dissertation as a whole, but some of them (especially those concerning data consistency and the 2050 climate analysis) should be clarified during the public presentation and corrected before a publication of the dissertation.

4.1. Consistency of results documentation

In the section on corner ventilation there are shortcomings that prevent the reader from fully reconstructing the path from data to conclusions:

a. the ground-floor bedroom temperature table (p. 132) and the first-floor bedroom temperature table (p. 139) are identical in all 48 values, even though the accompanying velocity tables differ between floors.

b. the narrative on p. 133 does not correspond to the table on p. 132: the Author cites, inter alia, 45.9°C for SLO at 225°, 34.5°C for BSH at 0° and 34.8°C for BLO at 45°, whereas the table gives 43.7°C, 35.7°C and 35.2°C respectively, and the values cited in the narrative do not appear in the table at all.

The narrative for the first-floor bedrooms (p. 140) agrees with the table on p. 139 (e.g. 45.5°C for SSH at 270°, 34.7°C for BLO at 0°), and the table on p. 132 itself carries the heading “First Floor”. The ground-floor bedroom temperature table therefore appears to have been replaced by a copy of the first-floor table, while the narrative on p. 133 describes the missing dataset. This reading is reinforced by Chapter 6: the ground-floor bedroom values used in Table 6-2 (p. 157) and in the discussion of shading on p. 158 – e.g. 33.5°C (BBA, 90°), 40.1°C (SBA, 315°), 35.1°C (BLO, 135°) – do not appear in any table of Chapter 5. Consequently, the synthesis of the corner-ventilation case in Chapter 6 (sections 3.1–3.3) rests, as far as the ground-floor bedrooms are concerned, on data that are not reproduced in the dissertation. The Reviewer does not determine which set of values is correct. The Reviewer concludes that this part of the dissertation requires an audit of the source data and a clear statement by the Candidate as to which values are valid and whether the correction affects any comparison between floors, configurations or wind directions.

This shortcoming is, in the Reviewer’s assessment, a documentation issue. In a study based on quantitative modelling, accurate reporting of data is part of scientific credibility. At the same time, the discrepancies identified do not in themselves demonstrate a flaw in the simulation process, and the remaining parts of the dissertation display an above-average standard of quality control. The appropriate remedy is to explain the discrepancies during the defence and to correct them before any publication.

4.2. Imprecise use of the concept of “symmetry”

The Candidate refrains from separately discussing some directions above 180°, considering the results “very similar to their counterparts” (p. 107), and describes the two corner apartments as “highly symmetrical” (p. 130). This concept has not, however, been operationalised: neither the geometric transformation with respect to which the cases are compared (the pairs 45°/315° and 135°/225° are mirror images about the north–south axis, whereas 90°/270° are opposite directions) nor any measure or tolerance of similarity of the results is specified.

This matters as the dissertation itself shows symmetry breaking under the influence of solar exposure and context. On p. 128, the Author states that paired directions do not produce identical results, while in the corner case the western apartment is selected for detailed analysis precisely because of its greater solar exposure. Numerical data for the second apartment are not presented in a form that allows the reader to verify the claimed similarity.

From the perspective of architectural methodology, this is not an argument against the results, but against the way in which they are abbreviated in the narrative. An interesting result of the dissertation is precisely that geometrically similar configurations cease to be thermally equivalent once solar radiation and the surroundings are taken into account. Symmetry should therefore have been treated as a hypothesis to be tested, and the conditions under which it holds or breaks down should have been described, rather than using it as a basis for reducing the material presented.

4.3. Documentation of thermal conditions and comparison between floors

The dissertation specifies a constant air temperature of 35°C at the domain inlet, while the description of the ground on p. 85 is ambiguous: the ground is described both as adiabatic and as maintained at a constant summer temperature, without stating its value. Likewise, no values are given for surfaces described as isothermal. Yet the results include indoor temperatures

below 35°C (e.g. 32.2°C, p. 116). On the basis of the method description alone, the reader cannot unambiguously reconstruct the complete thermal balance leading to these values.

The dissertation correctly accounts for differences in solar exposure between floors – including shading of the ground floor by the surroundings and the greater thermal load on the roof above the upper floor – and differentiates the wind-speed profile with height. There is therefore no basis for claiming that floor-to-floor solar differentiation has been omitted. The issue is rather incomplete documentation of the thermal conditions and the absence of a discussion of the consequences of assuming a uniform inlet-air temperature for comparisons between the ground and first floors.

The narrative of the conclusions requires clarification. Chapter 5 makes the general statement that the ground floor is cooler due to protection from radiation (pp. 128–129), whereas the synthesis on p. 156 indicates that in most scenarios the first floor is cooler by approximately 0.5–2.0°C owing to higher air velocities, with exceptions for stagnation directions. These statements may be compatible if they refer to different configurations and mechanisms, but the dissertation does not consistently preserve their conditional character. The same applies to wind direction: on p. 128 the southerly direction (180°) belongs to the “scorching group”, while conclusion (1) on p. 166 lists it among the directions “most effective for cooling”. Both statements can be true only if the room is specified (the leeward bedrooms as against the windward living room), which the text does not do. It should be stated for which zones, directions and variants each conclusion applies.

Two further inconsistencies concern the boundary conditions as reported in different chapters. Chapter 4 specifies an outdoor air temperature of 35°C and a reference wind speed of 4 m/s (Tables 4-3 and 4-6), whereas Chapter 6 refers to 37°C as the outdoor temperature “in the present analysis” (pp. 166, 174 and 177), and Table 6-3 (p. 161) is described as computed for a “3 m/s boundary condition”, although p. 152 declares that all analyses in Chapter 6 use the boundary conditions of Chapter 4. The reader cannot tell whether these are different runs, different reference points or editorial slips. A terminological remark belongs here as well: the statement that the surrounding blocks represent, among other things, the urban heat island (p. 81) is imprecise, since a massing model without thermal properties reproduces wind sheltering and shading, not the thermal effect of the urban heat island.

The description of the radiation model perhaps needs to be supplemented before any publication: the date and time used for the solar calculations are not stated unambiguously, nor is the method by which radiation transmission through the glazing was accounted for. In a dissertation comparing window sizes and shading devices, these details are important for reproducibility and for assessing the extent to which the results can be transferred to other design situations.

4.4. Conclusions for 2050

The weakness in the current synthesis concerns the way annual hours favourable to natural ventilation are compared. For the present climate, the dissertation counts 2,087 hours within the range 15–33°C, corresponding to 23.8% of the year. For the 2050 scenario, it counts 3,011 hours within the range 15–37°C, i.e. 34.3% of the year (pp. 174–176). Comparing these two numbers is not a like-for-like comparison because both the climate and the upper limit of the measured range change simultaneously. Part of the 924-hour difference therefore results from redefining the metric rather than from climate change alone.

In the text, this difference is described as “an increase of 924 hours, or 10.5%”. Relative to the whole year, it is approximately 10.5 percentage points, whereas relative to the baseline of 2,087 hours the increase is about 44%. The distinction between a relative percentage and percentage points should, in the Reviewer’s opinion, be corrected. More importantly, to assess the effects of climate change reliably, the two weather files should first be compared using the same threshold; only then should it be investigated separately whether, and under what conditions, design strategies allow the practical operating range of natural ventilation to be extended.

The extension of the upper limit to 37°C is based on the assumption that the solutions applied reduce temperature by 3–4°C. However, this is an effect demonstrated for specific variants and specific flow conditions (a reference wind speed of 4 m/s), not a universal year-round temperature correction. A similar issue concerns the statement of “approximately 20 additional hours of comfort” in July and August (p. 175) – the figure appears without sufficient derivation: no histogram of hours is shown, nor assumptions concerning the availability of favourable wind, nor the proportion of the apartment area in which the assumed reduction actually occurs. In its present form, it could be treated as an estimate or design hypothesis rather than as a quantitative result equivalent to those derived from the CFD matrix.

The same distinction between demonstrated and estimated results should be applied consistently elsewhere in the synthesis. Conclusion (6) on p. 173 states that a combination of partition modification, louvre shading and a single ceiling fan is “estimated” to restore approximately current-climate comfort levels in 2050, although none of these measures was simulated. The balcony recommendations (windward position, depth of at least 1.5 m, parapet not exceeding 1.1 m, p. 156) are derived from one wind direction (180°) and from an “estimated” MRT reduction of 2–4°C. They are plausible design guidance, but they should be labelled as qualitative.

From an architectural perspective, the 2050 results are valuable primarily because they show a diminishing comfort margin and the growing importance of controlling solar gains and maintaining unobstructed airflow. The conclusion that “larger windows are generally better” should therefore be stated conditionally: a larger effective opening area can improve ventilation, but its benefit depends on solar exposure, outdoor air temperature, shading and inflow direction. The dissertation itself provides grounds for such a more mature conclusion. As a design consequence, further research should examine the separation of the functions of ventilation opening area and glazing area, as well as the role of shaded upstream areas from which air is drawn, but these solutions should not be presented as having been directly verified by the current research matrix.

4.5. Scope of applicability and generalisability of the results

The main CFD matrix was calculated for steady-state conditions and for highly specific summer conditions, with a reference wind speed of 4 m/s at a height of 10 m. This choice is justified as a test of extreme conditions and a basis for comparing variants, but it does not constitute a full diurnal or seasonal simulation. Outside the scope are, inter alia, night ventilation, the dynamics of heat storage in the building fabric, variability in occupant behaviour, and the full variability of wind speed. These limits should be linked more explicitly to the final recommendations, especially those concerning 2050.

Three further limits should be declared explicitly. Internal heat gains from occupants, lighting and equipment are not quantified: Table 4-7 mentions an “aggregated heat load”, but the boundary conditions of the cases (p. 85, Table 4-3) contain none, and all windows are fully open

in every scenario. Also, the assessment relies on air temperature and velocity. The air change rate, volume flow and age of air – indicators that the Author himself identifies as standard in the literature (Fig. 5-1) – are not reported, which limits comparability with other studies. The case studies are buildings completed in 1998–2001; the industrialised large-panel estates of the 1970s and 1980s, which form a quantitatively dominant part of the Polish multi-family stock and are among the most exposed to overheating, remain outside the simulated sample, and the recommendations should say so.

Similar caution is required when generalising to “Polish housing”. The broad typological survey provides a strong basis for case selection, but the actual simulation covers two Warsaw examples from a selected period. Thus, the dissertation provides well-documented relationships for the studied typologies and mechanisms, but it does not yet constitute a representative model of all periods, construction systems and layouts in the Polish housing stock. Further implementation-oriented conclusions should clearly distinguish between mechanisms of general relevance and numerical values dependent on specific geometry and boundary conditions.

The 2050 scenario uses the RCP 8.5 pathway. This is a high-emissions scenario, not a single “forecast” of the future. This does not invalidate the analysis – rather, it may be justified as a robustness test – but the language of the conclusions should consistently refer to a scenario and should not project its specific numerical values into the future as certainties.

In addition, the 33°C threshold adopted in the final analysis should be treated as an upper, context-dependent limit derived from the adaptive comfort literature, not as a universal comfort threshold for every user in Poland. For vulnerable groups and for regulatory assessments, a sensitivity analysis using several thresholds, or a clear distinction between “adaptive acceptability” and full comfort, would be more convincing.

4.6. Editorial and terminological remarks

The dissertation requires professional language and editorial proofreading before publication. Examples: typographical errors (“widow” for “window” and “awing” for “awning” in the caption of Fig. 2-8; “housing state” for “housing estate” in Fig. 4-2; “the I was able”, p. 71); the number Fig. 4-7 assigned to two different illustrations (p. 67); the validation model described as a “0.15 m³ cubic enclosure” (p. 93), whereas a cube with an edge of 0.15 m is meant; two parallel, partly repetitive summaries closing Chapter 2 (p. 46); subsection numbering restarting from 1 in every chapter, which hampers citation; and inconsistent authorial narration (first-person singular, impersonal forms and “the researchers”).

The number of apartments studied (“more than 300”, pp. 26 and 64, and “more than 320”, p. 65) should be standardised, and the number of scenarios stated unambiguously: 48 per individual case, 96 across the two cases combined (the abstract, p. 18, refers to 48 scenarios covering two typologies). The step-by-step guidance in Table 4-7 (p. 89) is presented without a source, although its content corresponds to external simulation guidelines; the attribution could be clarified. The Polish abstract (pp. 20–21) must be re-typeset with correct diacritics.

In the Reviewer’s opinion, final editing should include cross-checking of table and figure numbers, values cited in the narrative against those in the tables, boundary conditions declared in Chapters 4 and 6, and terminological consistency between Chapters 5 and 6.

5. Assessment of the originality of the solution to the scientific problem

In the Reviewer's assessment, the dissertation constitutes an original solution to a scientific problem within the meaning of Article 187(2) of the Act. In the Reviewer's opinion, its originality does not lie in the use of CFD itself, but in the way the research programme is constructed around an architectural problem: combining a survey of real housing typologies, realistic multi-room geometries embedded in an urban context, comparison of cross ventilation and the less-studied corner ventilation, systematic parameterisation of openings and shading devices, and translation of flow results into a spatial assessment of comfort using SET.

The contribution of the dissertation to the discipline of architecture and urban planning should be noted. It lies primarily in demonstrating that the effectiveness of natural ventilation cannot be reliably reduced to a single window parameter or an abstract room model. The outcome depends on the relationship between plan geometry, solar exposure, inflow direction, surroundings, shading devices and the location of the dwelling. The dissertation translates these relationships into design terms while retaining a quantitative basis for analysis. This is a methodological and applied contribution of significance to design research in architecture.

The Candidate has demonstrated a very good command of the relevant literature and the ability to construct a multi-stage research programme: from identifying the gap and surveying the housing stock, through case selection, model construction and validation, to the synthesis of results. The shortcomings I have identified indicate the need for greater rigour in documentation and more cautious formulation of the limits of generalisation. They do not negate the Candidate's ability to conduct independent scientific research. The material of the dissertation provides a sufficient basis for explaining them during the defence and correcting them in publication.

6. Conclusion

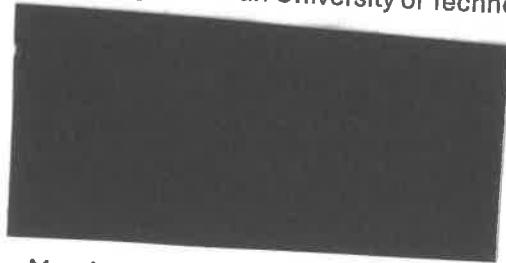
The submitted dissertation addresses a current, scientifically significant problem directly related to the practice of designing and modernising residential buildings. Its principal value lies in combining an architectural perspective with a quantitative simulation framework and consistently relating the results to the real geometry of apartments and their surroundings. The validation programme is extensive, and the results provide a valuable basis for discussion on the design of dwellings resilient to overheating.

The remarks concern primarily the reliability of documentation in selected tables, the imprecise use of the concept of symmetry, the completeness and consistency of the description of thermal and boundary conditions, the consistency of comparisons between floors, and the overly broad interpretation of some climate-related conclusions for 2050. I consider it particularly important to resolve the discrepancies in data on pp. 132–139 and 157 and, in the analysis of the "climate window", to separate the effect of climate change from the effect of changing the threshold from 33°C to 37°C. These are relevant issues, but they can be clarified on the basis of the material already collected and do not undermine the fundamental originality of the problem or the value of the main research programme.

The Reviewer states that the doctoral dissertation submitted by Mohammad Mahdi Mohammadi, MSc Eng Arch, entitled "*The Future of Housing Buildings; Optimizing Natural Ventilation Strategies in Polish Housing: Simulation-Based Design for Thermal Comfort in a Changing Climate*", prepared under the supervision of Maciej Janowski, DSc Eng Arch, Professor at PUT, at the Faculty of Architecture, Poznan University of Technology, meets the requirements applicable to doctoral dissertations set out in Article 187 of the Act of 20 July 2018 – Law on Higher Education and Science (consolidated text: Journal of Laws of 2024,

item 1571, as amended). The dissertation demonstrates the Candidate's general theoretical knowledge in the discipline of architecture and urban planning, confirms the ability to conduct independent scientific research, and presents an original solution to a scientific problem. I assess it positively and hereby request that the Council of the Discipline of Architecture and Urban Planning at Poznan University of Technology accept the dissertation and admit the Candidate to the public defence.

The dissertation is distinguished by the original combination of a typological survey of the real housing stock with realistic modelling of apartments in their urban context, the examination of the under-researched issue of corner ventilation and its quantitative comparison with cross ventilation, multi-stage verification of simulation credibility, reported with integrity and the clear translation of results into architectural decisions and into a spatially resolved assessment of comfort. Particularly valuable is the subordination of an advanced computational framework to questions proper to architecture. The indicated shortcomings concern the documentation and interpretation of results, are correctable within the material already collected, and do not affect the design of the research programme itself. On this basis I recommend that the doctoral dissertation be awarded a distinction by the Council of the Discipline of Architecture and Urban Planning at Poznan University of Technology.



Marcin Goncikowski, DSc Eng Arch, Professor at WUT

Statement on the use of AI tools

In preparing this review, I used generative AI tools as an aid for language editing, translation between Polish and English, and searching for and cross-checking references and regulations. The reading of the dissertation, all assessments, critical remarks, questions and the final recommendation are my own, and I take responsibility for the content of this review.