



POSITION PAPER

In reaction to:

BETTER APARTMENTS DRAFT DESIGN STANDARDS
VICTORIA STATE GOVERNMENT, 2016

As at:
19 September 2016

Prepared by:

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INTRODUCTION

GIW Environmental Solutions Pty Ltd, (“GIW”) is a specialist Environmentally Sustainable Design (ESD) consultancy. We provide the development industry with innovative sustainable solutions for new development projects and existing building retrofits.

In this position paper, we provide our reaction to the “Better Apartments Draft Design Standards” published by the Victorian State Government – Environment, Land, Water and Planning on 15 August 2016. GIW has reviewed this draft document from an ESD perspective and based on extensive building industry knowledge and practical experience. The following categories apply:

- ✖ Building Setback
- ✖ Light Wells
- ✖ Room Depth
- ✖ Windows
- ✖ Storage
- ✖ Noise Impacts
- ✖ Energy Efficiency
- ✖ Solar access to communal open space
- ✖ Natural Ventilation
- ✖ Private Open Space
- ✖ Communal Open Space
- ✖ Landscaping
- ✖ Accessibility
- ✖ Dwelling Entry and Internal Circulation
- ✖ Waste
- ✖ Water Management

Noise impacts and accessibility have been excluded as they are best responded to by the relevant specialist consulting disciplines.

We thank the Victorian State Government for the opportunity to respond to the proposed Standard and trust that our input will be of value.

Attached find our company profile detailing our relevant experience and credentials.

EXECUTIVE SUMMARY

GIW has reviewed the “Better Apartments Draft Design Standards” from an ESD perspective. In summary our review has determined the following:

- ☒ In essence we agree with the intent of the “Better Apartments Draft Design Standards”
- ☒ Objectives and functional outcomes need to be clearly defined to ensure consistent application.
- ☒ In its current form we are not convinced that the “Better Apartments Draft Design Standards” achieves an acceptable compromise between provided amenity and affordability.
- ☒ It is important that the Standard does not constrain architectural innovation.
- ☒ The Standard should encourage excellence and reward projects through quantifiable gains.

Specifically we recommend the following amendments:

GENERAL COMMENTS	<ul style="list-style-type: none"> ▪ Frame and contextualise the “Better Apartments Draft Design Standards” in consideration of the broader State planning context and existing urban street scape ▪ Building checkpoint to be undertaken by independent third party ESD Consultant ▪ Introduce predetermined yield outcomes for achieving excellence
BUILDING SETBACK	<ul style="list-style-type: none"> ▪ Determine appropriate setback distances based on human wellbeing parameters ▪ Give ample consideration for narrow sites and setbacks between buildings on-site
LIGHT WELLS	<ul style="list-style-type: none"> ▪ Staggering of frosted glazing to maintain full width windows adjacent to light well ▪ Provide clarification on application in equitable development right scenario ▪ Changing the parameter from building height to light well height, in determining light well dimensions
ROOM DEPTH	<ul style="list-style-type: none"> ▪ Increase maximum apartment depth of south facing apartments to 8m ▪ Allow for alternative assessment methodologies
WINDOWS	<ul style="list-style-type: none"> ▪ Exclude studies from habitable rooms ▪ Confirm the use of BESS in determining appropriate daylight ▪ Consider introduction of daylight autonomy and / or daylight factor calculations based on specific geographic location ▪ Amend definition of ‘snorkel bedrooms’ to allow for daylight compliant outcomes
STORAGE	<ul style="list-style-type: none"> ▪ Implementation of allotment system for storage to avoid increased basement size
ENERGY EFFICIENCY	<ul style="list-style-type: none"> ▪ Increasing maximum cooling load to achieve an equivalent average 6.5 stars rating ▪ Require the average in lieu of all apartments to comply with maximum cooling load ▪ Outline parameters for sample selection for preliminary ratings
NATURAL VENTILATION	<ul style="list-style-type: none"> ▪ Allow for single sided ventilation where adequate air changes can be justified
COMMUNAL OPEN SPACE	<ul style="list-style-type: none"> ▪ Introduce a scoring system to assess amenity provided to communal open space
LANDSCAPING	<ul style="list-style-type: none"> ▪ Address ESD value of deciduous planting in relation to thermal comfort ▪ Specify optimal ratio for rainwater collection area in relation to treatment surface
DWELLING ENTRY AND INTERNAL CIRCULATION	<ul style="list-style-type: none"> ▪ Natural ventilation to communal areas to be provided via either manual window devices or automated systems
WASTE	<ul style="list-style-type: none"> ▪ Reintroduction of hard waste for large developments

GENERAL COMMENTS

Before addressing the content of the “Better Apartments Draft Design Standards”, we would like to raise the following remarks in relation to Broader Context, Implementation and Performance based assessment:

BROADER CONTEXT

- (1) Broader State Planning context
 - a. The “Better Apartments Draft Design Standards” needs to be framed with ample consideration for the recently implemented residential zones in Victoria. These zones have seen large tracts of inner city land locked from future medium rise development. This in combination with the implementation of the proposed Standard will result in less development, less jobs, increased urban sprawl and higher cost of new inner city apartment developments.
 - b. We recommend that further discretionary height be made available where a BESS ‘Excellence’ performance rating of 70% and higher is achieved. This will apply within all General Residential and Growth Zones, Mixed Use Zones and Commercial zones.
- (2) Urban Street Scape
 - a. A clear challenge exists to ensure that the proposed Standards do not stifle the natural cohesion of urban street scapes.

IMPLEMENTATION OF THE “BETTER APARTMENTS DRAFT DESIGN STANDARDS”

Step 1 of the implementation plan describes that an advanced training course for registered architects and registered building practitioners will be developed. As ESD Consultants are at the front in delivering on the proposed Standard, we believe the Victorian Building Authority should introduce registration for ESD consultants thus resulting in better ESD outcomes and more technically appropriate design solutions.

Step 4 proposes to introduce a checkpoint at the building permit stage. We suggest that this assessment be independent by way of third party verification. This should extend to onsite verification during the construction phase to ensure installations accord with the manufacturer’s instructions and design intent.

INTRODUCTION OF PERFORMANCE BASED ASSESSMENT

Architecture devised through a highly prescriptive Standard should be viewed with caution. On one hand it will present designers with an opportunity to respond creatively to a predefined set of parameters; however it may also stifle innovation.

Progressive solutions not necessarily complying with the Standard but meeting the objectives should be assessable under a merits based system. More work will need to be done in this area to devise a suitable framework; however we feel that this pathway is essential to delivering architectural excellence in Victoria.

CONTENT REVIEW

BUILDING SETBACK

In principle we agree with the notion of setbacks for high rise buildings. It is thought that setbacks will result in better apartment amenity outcome, increased use of private open space and social cohesion amongst residents due to available communal areas.

In our opinion, the proposed setbacks appear to be somewhat aggressive and may have unintentional and negative impacts resulting in the reintroduction of wide spread urban sprawl and low-density dispersed cities. This assertion should be investigated further as the ESD industry has long encouraged inner city urban consolidation which has been a largely successful strategy of late.

One of the primary considerations for the proposed setbacks is to mitigate privacy concerns between buildings. We would argue that from a human comfort perspective there will be minimal difference in psychological response between a 6 and a 12 meter setback. As such we recommend that the proposition of increased setbacks be tested further in determining what constitutes appropriate setback requirements.

In addition, the Standard should be expanded to give ample consideration for narrow sites and setbacks between buildings on-site.

- ✖ **Narrow sites:** areas such as Bridge Road, Richmond and Johnston Street, Fitzroy are subject to restricted development potential. When applying the proposed building setbacks to these sites, development potential will be further diminished. We propose the introduction of customized building setbacks for narrow building sites.
- ✖ **Allow for linkages between buildings:** when linking buildings on site, as shown in the example of Interlace Apartments in Singapore, refer figure 1 below, the building setbacks between buildings on-site should no longer be applicable since this type of building configuration will allow for increased communal open space and social cohesion. This example if provided to demonstrate where a merit based assessment system might be appropriate.



Figure 1: Interlace Apartments, Singapore (source: www.dailymail.co.uk)

LIGHT WELLS

In practice light wells are applied to developments on sites where the adjoining building(s) or equitable development rights do not allow for windows on the site boundary. When it is avoidable to introduce light wells we highly recommend this pathway, since light wells have a significant impact on daylight levels to bedrooms served (specifically when taking into account equitable rights development).

We provide the following comments and suggestions in relation to the light well Standards:

- ✖ The “Better Apartments Draft Design Standards” proposes to stagger bedroom windows located in the light well to avoid direct views. In practice this will result in bedroom windows with a maximum width of 1.5m, which will achieve non-compliant daylight levels to these bedrooms. Therefore, we propose to apply full width windows to bedrooms adjacent to the light well, with one side of the glazing to be frosted. The frosted glazing is to be appropriately staggered to avoid direct views.
- ✖ We seek clarification on the application of these Standards to account for future equitable development rights. Our experience has been one of adhoc application of future equitable development rights in consideration of daylight assessments.
- ✖ *Table 1: “Light Wells”* specifies building height as the parameter dictating minimum light well area. We suggest changing the parameter that dictates light well area to “light well height” in lieu of “building height”. This will account for the apartments served relative to the level on which they occur. It should be noted that in a mixed use development the residential component may commence above ground floor level.

ROOM DEPTH

We believe prescribing a ceiling height to room depth ratio to achieve compliant daylight levels is rudimentary and limited. This ratio ignores variables including total window surface, window visual light transmittance (VLT) and external shading devices. We have modelled a single aspect south facing apartment (ceiling height 2.70m) with different shading devices, to show the impact on “appropriate” room depth. Refer Figure 2.

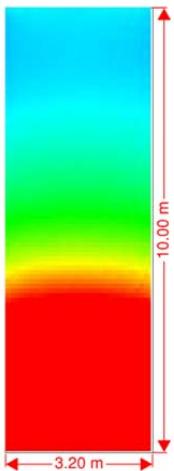
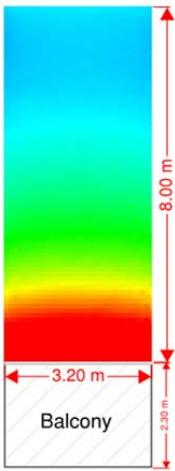
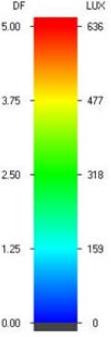
	SCENARIO 1	SCENARIO 2	KEY
Parameters	<ul style="list-style-type: none"> ▪ South facing apartment ▪ Full width / full height window ▪ 10m D x 3.2 m W ▪ No balcony 	<ul style="list-style-type: none"> ▪ South facing apartment ▪ Full width / full height window ▪ 8m D x 3.2 m W ▪ Balcony 2.3m deep x 3.2m wide (incl. wingwalls 2.7m and overhang 2.3m) 	
Model			
Results	99% of the floor area at a depth of 10m achieves a DF of 1%	96% of the floor area at a depth of 8m achieves a DF of 1%	

Figure 2: Daylight modelling living area south facing apartment

As shown above the prescribed room depth of 5.4m for south facing apartments based on 2.7m high ceilings and a ratio of 2:1 height to depth is an overly conservative Standard. A compliant result is achieved at 8m depth under scenario 1 & 2 respectively. We suggest increasing maximum apartment depth of south facing apartments to 8m.

WINDOWS

Windows Standard Objective

We highlight and support the strategy position of having a window in an external wall of a habitable room that is visible from any point in the room and no habitable area relying on borrowed light arrangements. Access to daylight has great impact on overall apartment amenity and resident health and well-being.

We provide the following comments / suggestions to the window Standard:

- ✖ The “Better Apartments Draft Design Standards” Report defines a habitable room as a bedroom, living room, dining room, kitchen area and study. We propose to exclude studies from the habitable room definition. Natural daylight to a study is a ‘nice to have’, but not necessarily needed since this area will mainly be used during night time. Furthermore, we believe that studies (especially small study nooks) will be deleted or made into storage area altogether should an external window be mandatory.

Proposed deletion of snorkel bedrooms

The definition provided for a 'snorkel bedroom' is unclear. We would suggest providing a definition as follows: "a bedroom in an apartment where the bedroom is connected to a window via a narrow passageway less than 1.2m in width and greater than 1.75m in length within the room, located between the adjacent SOU or common area, and second bedroom within the assessed apartment."

'Snorkel bedrooms' with dimensions that exceed the minimum width and depth and include a cut out will likely comply with the daylight requirements for bedrooms prescribed under BESS. We believe these bedrooms should be included in the Standard as an acceptable outcome given that they provide usable study or break-out space. Refer Figure 3 for daylight modelling results.

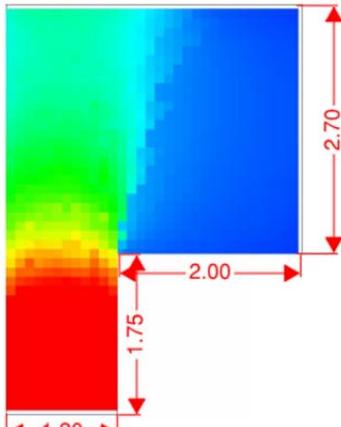
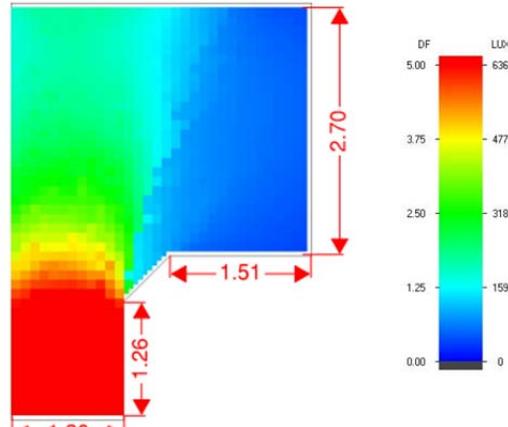
	SCENARIO 1	SCENARIO 2
Parameters	<ul style="list-style-type: none"> ▪ 2.7m floor-to-ceiling height ▪ Full width / full height window to snorkel ▪ South facing ▪ 1.5m deep x 9m high wing walls to window 	<ul style="list-style-type: none"> ▪ 2.7m floor-to-ceiling height ▪ Full width / full height window to snorkel ▪ South facing ▪ 1.5m deep x 9m high wing walls to window ▪ Cut out provided
Model		
Results	78% of the floor area achieves a DF of 0.5%	90% of the floor area achieves a DF of 0.5% thereby achieving a BESS compliant outcome.

Figure 3: Daylight modelling 'snorkel bedroom'

Clarification Adequate Daylight Levels

The adequacy of daylight under the proposed Victorian Standard is (as we understand) to be benchmarked against the best practice requirements as set out under the Built Environment Sustainability Scorecard (BESS) tool: Indoor Environment Quality (IEQ) – Daylight Access Living Areas and Bedrooms. These levels are as follows:

80% of dwellings should achieve the following daylight factors (DF):

- ≥1.0% for living areas for 90% of the habitable floor area
- ≥0.5% for bedrooms for 90% of the habitable floor area".

This assumption needs to be confirmed in the Standard.

Assessment Methodology – Daylight Autonomy / Daylight Factors

We recommend that the Victorian Standard take consideration for the recently released draft European Standard - 'Daylight of Buildings' (EN17037) August 2016. The methodologies and stringencies applied within this Standard should be reviewed and further considered in determining the metrics calculation for daylight in apartments.

The draft European Standard includes two options for compliance:

- Daylight Autonomy calculation; or
- Daylight factor calculation with target daylight factor modified depending on European location.

In addition to the above two options, the daylight allowances are split between 50% and 100% of the room area with varied daylight requirements respectively.

We recommend either the introduction of a daylight autonomy calculation for assessment of daylight adequacy or when the use of daylight factor with an overcast sky condition is applied that sky conditions with specific sky lux level be determined based on location for accuracy and relevance of result. These methods more accurately account for orientation, time of year, actual sky conditions and climate data.

STORAGE SPACE

The storage sizes proposed in the draft Standard appear to be arbitrary nominations. In our opinion this does not reflect the actual use of storage space outside of apartments. As depicted in the image below, our experience having audited a number of inner city multi-unit developments reflects that only a small proportion of storage cages are used at capacity.

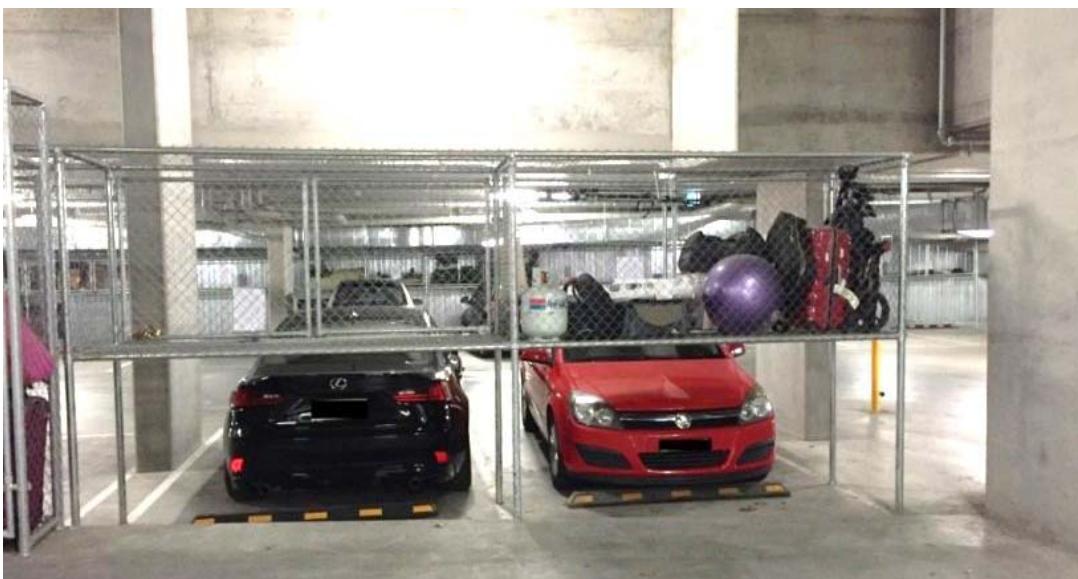


Figure 4: Typical basement storage

The proposed increase in storage sizes will invariably lead to deeper basement excavations, significantly increasing construction costs, exacerbating landfill with the associated excavation and embodied energy associated with the additional reinforced concrete structure.

We recommend the implementation of an allotment system for storage space with space rented by the owners corporation to residents on an as need basis.

ENERGY EFFICIENCY

The “Better Apartments Draft Design Standards” states that each dwelling should not exceed the maximum cooling load specified in Table 1. Based on the maximum cooling load per year and the assumption that cooling typically contributes 30% to the total heating and cooling load, the following equivalent star ratings can be calculated. Refer Table 1.

NatHERS Climate Zone	Maximum Cooling Load MJ/m ² per annum	Maximum Heating & Cooling Load (assuming cooling contributes 30% to total load)	Equivalent NatHERS Star Rating
Melbourne Central (Climate Zone 21 – Melbourne)	30	100	★★★★★☆ 6.4 - 6.5
Melbourne North and West (Climate Zone 60 – Tullamarine)	22	73.3	★★★★★☆ 7.2 – 7.3
Melbourne South and East (Climate Zone 62 – Moorabbin)	21	70	★★★★★☆ 7.1 – 7.2

Table 1: Maximum heating and cooling load and equivalent NatHERS star rating

We believe that the maximum cooling loads prescribed are unrealistic, should all apartments in a development need to achieve these values. We suggest increasing the maximum cooling load per annum of climate zones 60 and 62 to achieve an equivalent of 6.5 Stars (an equivalent to 10% improvement on current BCA provisions). The average of all dwellings should not exceed this value in lieu of applying the requirement to each and every apartment.

Furthermore, typically a sample of apartments is assessed in FirstRate during the town planning phase. Since the cooling load is highly dependent on the orientation of the apartment, the selection of only south facing apartments in the sample should be prevented since they will have a lower cooling load. We suggest outlining parameters in the Standard for selecting a representative sample group of apartments used for preliminary ratings.

SOLAR ACCESS TO COMMUNAL OUTDOOR OPEN SPACE

We agree with the proposed Standard. In order for communal space to be used on a frequent basis, high amenity levels need to be provided to the space.

NATURAL VENTILATION

Whilst we agree with the intent of the Standard, we believe the deletion of Standards for single sided ventilation is limiting the prospect of larger developments to comply with the 60% natural ventilation Standard.

Single aspect apartments are unavoidable in larger developments. The natural ventilation Standard presented in the “Better Apartments Draft Design Standards” does not allow or stimulate the implementation of natural ventilation in these types of apartments. We suggest including requirements for single sided ventilation, which should consider window operability and sizing, apartments depth and / or trickle ventilation.

PRIVATE OPEN SPACE

We agree in principle with the Standard in respect to private open spaces and whilst the numerous options go some way to address the varied site configurations a further option should be made available which allows for an alternate solution demonstrating compliance with the objectives.

COMMUNAL OPEN SPACE

While the Standard discusses communal open space, there is no clear definition provided. What characteristics or parameters distinguish a communal open space from a landscaped, open or indoor area. In our opinion a communal open space should offer a certain level of amenity and usefulness to the residents to secure use and stimulate social cohesion.

We suggest introducing a scoring system that will determine the amenity provided to a communal space. This scoring system would include a list of possible facilities to be offered at a communal space. In order to comply with the amenity Standard, a prescribed number of facilities, either on the list or otherwise justified, would need to be included.

The prescriptive list will include both outdoor and indoor facilities. Examples of outdoor facilities are: seating area, barbecue(s) and vegetable gardens. Examples of indoor facilities are: pool, gym, spa and cinema.

LANDSCAPING

Most of the proposed guidelines addressed in the landscaping Standard are for the review of landscape architects. We do have the following remarks where landscaping interfaces with ESD:

- ✖ We would like to stress the ESD value of deciduous planting. Use of deciduous plant species for natural shading in summer and optimal solar heat gains in winter is both a low cost and attractive solution.
- ✖ The optimal and efficient application of raingardens or other landscaping related water treatment options specified in the STORM tool are currently not addressed. The STORM tool does not specify an optimal ratio for the rainwater collection area in relation to applied treatment area. In the current situation this could lead to overflowing and insufficient treatment of stormwater. We recommend specifying an optimal ratio and preferably including this feature in the STORM tool.

DWELLING ENTRY AND INTERNAL CIRCULATION

We agree with the proposed provision of at least one source of natural light and natural ventilation to corridors and common areas. This Standard will provide communal areas and corridors with better amenity and will increase resident satisfaction and well-being. Natural ventilation should be provided either via manually operable or automated windows adjoining a corridor or common area.

WASTE

In general we agree with the proposed Standard, but do query the deletion of hard waste in the dedicated areas. Specifically, larger developments will benefit from having an assigned hard waste area, where residents can place their discarded furniture for other residents to reuse. We suggest adding hard waste, but only requiring implementation in larger development (more than 30 units).

WATER MANAGEMENT

We agree with the proposed Standard, for remarks in relation to raingardens and other stormwater treatment options refer landscaping review.

CONCLUSION

In essence we agree with the intent of the “Better Apartments Draft Design Standards”, which seeks to protect and enhance Victoria’s reputation for liveability and good design; and ensure that as our cities grow sustainably they leave positive legacies for future generations.

It is important that the Standard maintains a strategic standpoint and not constrain architectural innovation.

The application of BESS should be directly linked to assess performance against the Standard. Notwithstanding the Relevant Authority should have the power to approve proposals which may not meet every category criteria under the Standard, but do uphold the objectives.

We believe that this Standard should strive to achieve an acceptable compromise between provided amenity and affordability. In its current form we are not convinced that the “Better Apartments Draft Design Standards” achieves this balance. The financial review of the “Better Apartments Draft Design Standards” published by Plus Architecture (19th August, 2016) indicates that implementation of the proposed Standards will result in a \$62,500 increase in construction cost for each apartment. The report goes on to state that this increase in construction cost in combination with increased land pricing will lead to approximately \$100,000 additional cost for the buyer. This is unacceptable in our opinion and does not comply with the intent of the Standard of enhancing the liveability and sustainable growth of the city.

The Standard should be formulated to actively encourage and reward ‘excellence’; defined under the BESS tool as achieving a score of 70% and higher. A viable solution will be to offer discretionary height. This will reward innovative projects and bring a positive dynamic into play.

RECOMMENDATIONS

- (1) Undertake detailed financial modelling to assess the impact of the proposed Standards on apartment prices and the implications to the development industry. The findings should directly influence the final Standard.
- (2) Clear definitions are required for the objectives and functional outcomes to ensure clarity and consistency of application.
- (3) Clarify the use of alternative solutions available to achieve the objectives of the Standard and devise suitable protocols for software and methodologies.
- (4) Consider establishment of a panel of experts to assess solutions which do not accord with the prescriptive pathway but represent innovative architectural outcomes.
- (5) Reward projects with achieve a BESS Score of 70% and higher with discretionary building height.

Should you have any queries, comments or remarks please be in contact via 03 9044 5111 or info@giw.com.au.

Sincerely,

Gary Wertheimer

Director



GIW Environmental Solutions Pty Ltd



Delivering ✕ ESD ✕ Excellence



GIW Environmental Solutions' mission is to transition the building industry towards a sustainable future.
We approach every project with the utmost professionalism, diligence and commitment in the delivery of ESD services.



Who we are

GIW Environmental Solutions Pty Ltd, ("GIW") is a specialist Environmentally Sustainable Development (ESD) consultancy. We support our clients by providing innovative sustainability solutions for new development projects and existing building retrofits.

Our service gives our clients peace of mind knowing that their project objectives will be achieved via a strategic and accountable approach. GIW provides advice backed by extensive project experience, technical and practical know how.

Delivering + ESD + Excellence

GIW is committed to the provision of high quality, imaginative and purposeful outcomes in everything we do. We seek to champion the environmental credentials of building projects whilst providing optimum design responses.

Our project experience spans all phases of the development lifecycle including concept design for new multilevel residential developments; ESD optimisation for both new and existing buildings; and compliance reporting for all Building Classifications.

Industry Associations

GIW is a member of the Green Building Council of Australia and has Accredited Green Star professionals on our staff. We are FirstRate Accredited and undertake NatHERS House Energy Ratings.

GIW is NABERS Accredited to undertake energy and environmental assessments including mandatory disclosure of energy efficiency for commercial buildings.



Our Team



GARY WERTHEIMER | Director

BApp.Sci (Construction Management).
MSc. Renewable Energy & Architecture. (UK)

Gary Wertheimer is an ESD consultant with broad experience in the areas of statutory planning ESD Reporting submissions, Regulatory compliance reporting and existing building retrofits. Gary has built up a wealth of knowledge, experience and industry rapport based on a proven track record of delivering ESD excellence.

He has solid working knowledge of the Building Act, Regulations and NCC, and is well attuned to delivering consulting services to the highest professional standard. He leads a multi-disciplinary ESD consultancy passionate about delivering tangible expressions of ESD within the built environment.



NIRAJ PATEL | ESD Engineer

B.Eng (Mechanical).
M. Eng. (Sustainable Energy).

Niraj Patel is an ESD Engineer with experience in services engineering on large scale commercial building projects. He is driven by a passion for energy efficiency and green building technologies. Niraj has developed an expertise in building simulation energy modelling including JV3, energy auditing, NABERS assessments and existing buildings retrofit design solutions.

He offers a technical expertise in research, analysis and appropriate adoption of innovative engineering design solutions and system technologies.



INES BUSKERMOLEN | ESD Consultant

B.Sc. (Science, Business and Innovation).
M.Sc. (Sustainable Development).

Ines Buskermolen is an ESD consultant with experience in sustainability consulting, renewable energy technologies, lifecycle assessments and innovation management. Ines brings to the team an expertise in state-of-the-art and future ESD technologies.

Ines has worked on multiple European projects delivering sustainability initiatives. Her knowledge of technical feasibility, economic and financial feasibility and social sustainability leads to well-considered sustainable development solutions.



NATALIA ENRIQUEZ | ESD Consultant

B.Arch Design, M.Arch.
M. Energy Efficient and Sustainable Building [Current]

Natalia Enriquez is an ESD consultant that brings an architects perspective to our multi disciplinary consulting team.

She is committed to environmental design and passionate about context analysis and bio-climatic design, passive design strategy and material technologies. Natalia brings new ideas to build upon our projects, creating stronger links with our clients and stakeholders via the medium of design.



Services and Projects



Comprehensive Planning

- ❖ Sustainable Management Plans
- ❖ Green Star Project Delivery
- ❖ Water Sensitive Urban Design Reports
- ❖ Conceptual Building Services Design
- ❖ VCAT Submissions / Presentations
- ❖ ESD Masterplanning

Existing Building Retrofitting

- ❖ NABERS Assessments and BEEC
- ❖ Building Energy & Water Audits
- ❖ Building Improvement Plan

Code Compliance

- ❖ NCC Section (Part J) Compliance Reporting
- ❖ NCC Section J Alternative Solution
- ❖ Reporting including JV3 Energy
- ❖ Modelling and Expert Judgment
- ❖ Nationwide House Energy Rating NATHERS

Metrics/Modelling

- ❖ Energy / Thermal Modelling
- ❖ Ventilation / Air Quality (CFD)
- ❖ Daylight Modelling
- ❖ Life Cycle Assessments / Value Engineering

Projects

ARK, RICHMOND
FENDER KATSALIDIS

TERRI APARTMENTS, SOUTH MELBOURNE
POINT ARCHITECTS

RICHMOND ICON, RICHMOND
ARMSBY ARCHITECTS

249-261 QUEEN PDE, CLIFTON HILL
FIELDWORK PROJECTS

50 ALBERT RD, SOUTH MELBOURNE
ELENBERG FRASER

KALKALO NEIGHBORHOOD ACTIVITY CENTRE
CLARKE HOPKINS CLARKE

WYNDHAM HARBOUR, APT BUILDING 1&2
SJB ARCHITECTS

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ROTHELOWMAN

160 WILLIAMS RD, PRAHRAN
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