NEV Stage 2 Building Standards Draft Recommendations v1.0

John Shiel, Andrew Dobson,

Michael Berney, Malay Dave,

Joanne Hunt

Retired: Tania Ferfolja; Pip Atkins; Mike Crawley; Grant Rickey

Please write questions into the chat

Slides are linked to this meeting minutes

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Purpose of this Presentation

- To deliver the recommendations of the Stage 2 Building Standards Review Working Group
  - Considered changes to NatHERS, BASIX, Stage 2 Lots, Hill Thalis, Council legislation (e.g. new LEP)
  - Obtained feedback from architects (Graham Hunt & DHW, Andy Marlow from Envirotecture, Rena Czaplinska-Archer, committee members), engineers, builders, members (stage 1 owner builders & others & stage 2)
- Next Steps
  - To socialise the recommendations to members – workshop? Wiki? Slack? Mtgs?
  - To complete the update of word document explaining the enw recommendations
  - Once finalised - implement
    - Update the scoresheet formulae, forms - wiki
    - Train SDAs and BRP in new standards

Proposed Building Standards

Agenda – Joanne Hunt

1. Definitions & legend
2. Scope, materials
3. Hill Thalis - Home size, setbacks for sunlight etc
4. Thermal Performance - Star rating etc.
5. Scoresheet – design & as-built
6. Neighbour consultation

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1. Definitions & Legend – by differences

Legend

If black – it was in our previous CA presentation – 6/5/21, or already NEV or std practice

If blue – it is changed from last CA presentation or otherwise different

NB: last time we showed 3 columns – 1. BRP current; 2. its feedback; 3. our draft recommendations.
This time we are only looking at changes to 3. our previous draft recommendations (the black).

Circles and teams

- **Sustainable Design Appraisers (SDAs)** – help with design and scorecard
- **Building Review Panel (BRP)** – if meets standard, stamp drawing
- **Member building meetings** - monthly forum for members to design home, learn, include experts and arrange speakers
  - With **Expert Building Group** – members, SDAs, experts to help members with designs
  - Members and non-members welcome

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2. Scope and Materials

- When do new standards apply?
  - When accepted by members at a **General Meeting** of **Community Association**
- Expand scope to
  - **Full home lifecycle** – education (bonds, costs), NEV optional standard contract (extra documents, maybe SDA help), design, build, monitoring, presentations (education days, Open Days) – As-Built scoresheet
    - Help with member designs at **meetings**, **member examples**, elected **Expert Building Group**
    - That shipping containers have same constraints as council, and do not interfere with road access
  - **Infrastructure**
    - Green materials e.g. **concrete** – eg. ENVIROCRETE® 30%/40% etc **at same price**
    - low maintenance, climate resilient and **non-plastic paving (save our topsoil);** locally sourced
    - NEV to provide **As-Built Lot drawings** with locations of **services**
  - **Tiny** houses & **existing** homes
  - Ensure **fences** for members with pets are built **before occupation** (As-Built)
  - Collaborative housing
    - Houses on larger lots, **Dual Occupancy** (may be allowed by council in new LEP)

Sustainable, non-toxic, low-carbon Materials* & Appliances

- Concrete **– low carbon** (see supplier list - eg. Boral ENVIROCRETE® 30%/40% etc. but also Hanson Green Concrete), reduce use, or use sustainable timber
- Minimise the amount of embodied carbon per person on the village site
  - to lower the per person impact of embodied energy, smart grid infrastructure (battery, wiring)
- Steel – **reduce** use, or use sustainable timber
- Timber (sustainable)
  - certified by the **Forest Stewardship Council (FSC)**
  - **recycled** timber where supplier **receipts** can prove it was used before, or **photos** of nail holes
  - **No timber with copper-chrome-arsenate (CCA)**
  - Manufactured wood products to have **low formaldehyde** emissions to E0 standard
- Timber-framed windows are preferable to aluminium- or plastic-framed
- Discourage Wood Fires (urban area), but where installed
  - Ensure in As-Built Scorecard they are installed and operating correctly
  - **Install fabric filters** on chimneys to lower the small cancerous particulate emissions -
- CA can limit operation of Wood Fires
  - during weather inversions notified by BoM, or
  - on complaints of any **member health issues**

*BASIX Materials Index
Also we may be able to use NatHERS Whole of House Embodied Energy, eTools to measure embodied energy)

*Mullum Creek Pty Ltd. (2016). *Mullum Creek | Mullum Creek Design Guidelines*. Mullum Creek Residential Community. https://mullumcreek.com.au/design-guidelines/mullum-creek-design-guidelines/

3. Hill Thalis – Definitions

Andrew Dobson/ Michael Berney

- Setbacks
  - Measured to roof overhang not to the wall location
- Building footprint and site coverage:
  - Area of hard surfaces of building, pavements, sheds etc
  - Excluding for Stage 2
    - Uncovered pervious outdoor living areas, e.g. decks and pervious paving
      - to a max of 10% of lot area - 1/4 of this may be covered
    - Eaves and awnings to a max overhang of 900mm
    - Water tanks (to a max of 15m2)
- Primary Dwelling
  - Main dwelling on a Single Occupancy lot
- Secondary Dwelling
  - Smaller dwelling (e.g. granny flat) on a Single Occupancy lot
- Street frontage
  - If over 12 m needs articulation (not a straight wall throughout)
- Fences
  - If pets approved, fences to be installed before occupation
  - Existing owners with pets - fences to be installed within 6 months

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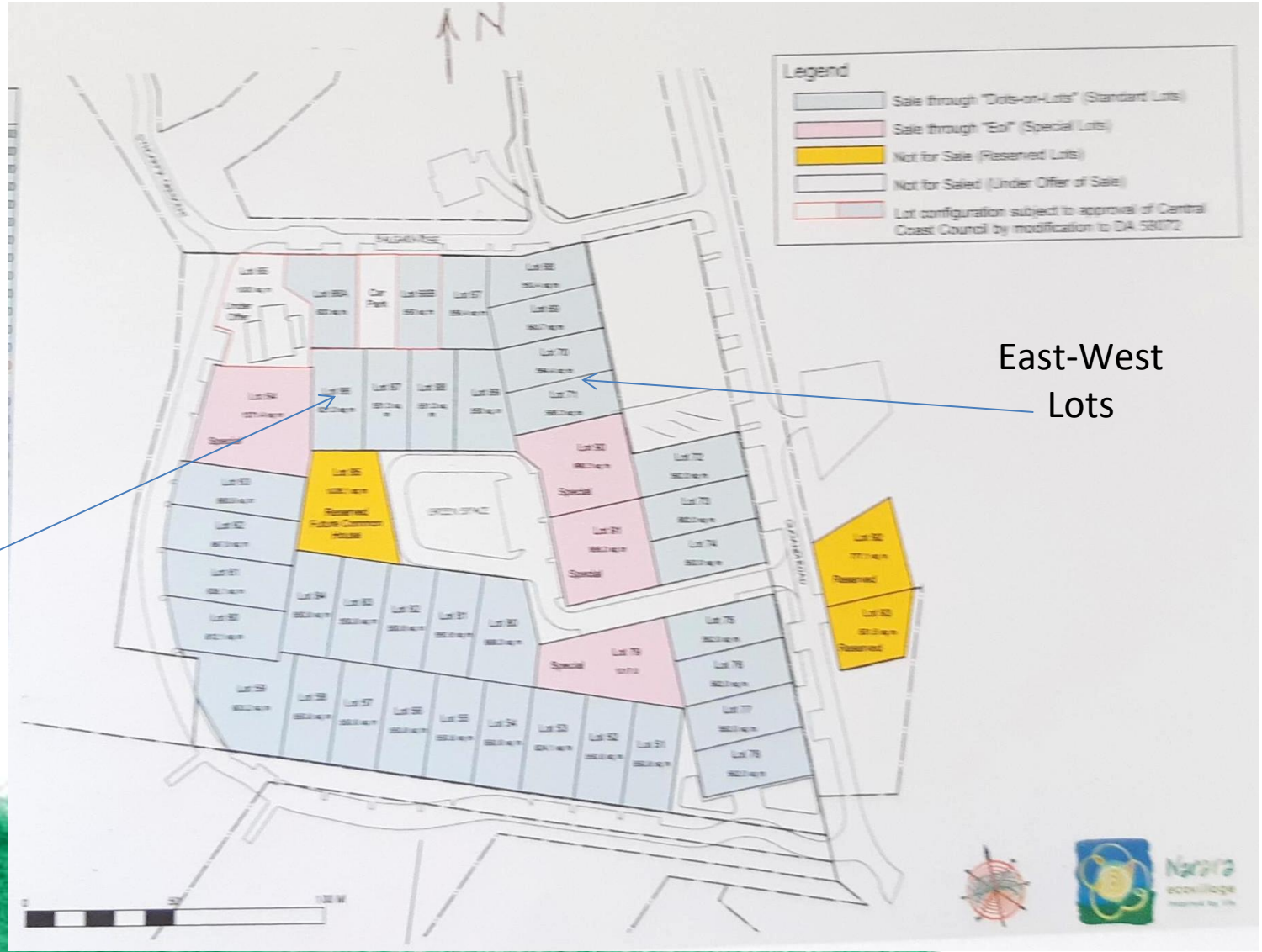
Lot definitions - North-South, East-West



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Single Occupancy

with Primary Dwelling or Primary & Secondary Dwelling

Control		Min/ Max/Av.	North-South Lots	East-West Lots	Special Lots (>900m²)
Setbacks	Front	Min.	3m		
	Rear	Min.	2m common garden + 1m = 3m total		
	Side	Min.	0.9m*	-	0.9m*
	Side (North)	Av.	-	3m	3m
		Min.	-	0.9m*	0.9m*
	Side (South)	Min.	-	0.9m*	0.9m*
Site Coverage		Max.	45%		50%
Building Footprint		Max.	35% preferred, 40% maximum		45%
Internal House Area	Primary Dwelling	Max.	150m² preferred, 180m² maximum		45% (to max 480m²)
	Secondary Dwelling	Max.	60m²		
Height		Max.	8m (minor encroachments up to 10m) No requirement for extra height to be concentrated towards the street		

*For any part of the building with a height of more than 4.5m—0.9m plus one-quarter of the height of the building above 4.5m **– Council rules**

Dual Occupancy – Michael Berney

Control		Min/ Max/Av.	North-South Lots	East-West Lots	Special Lots (>900m²)
Setbacks	Front	Min.	3m		
	Rear	Min.	2m common garden + 2.5m council = 4.5m total		
	Side	Min.	0.9m*	-	0.9m*
	Side (North)	Av.	-	3m	3m
		Min.	-	0.9m*	0.9m*
	Side (South)	Min.	-	0.9m*	0.9m*
Site Coverage		Max.	45%		50%
Building Footprint		Max.	40.0%		45%
Internal House Area	Primary Dwelling	Max.	45% (to max 300m²)		45% (to max 480m²)
	Secondary Dwelling		Secondary dwelling not permitted by council (But attached or detached dwellings allowed)		
Height		Max.	8m (minor encroachments up to 10m) No requirement for extra height to be concentrated towards the street		

*For any part of the building with a height of more than 4.5m—0.9m plus one-quarter of the height of the building above 4.5m- **council rules**

4. Thermal Performance – **New Homes – Malay Dave**

BASIX - NatHERS, but now has a Passive House pathway

- CMS has the value to use energy efficiently – including minimising greenhouse gas (clause 57.1). So we should prefer good house design over air conditioning.
- Our houses should remain safe and healthy during any extended heatwave and possible blackouts, with high overnight temperatures.
- Keep aspirational target of 8 stars as per Stage 1
- Obtain help of members and the **Expert Building Group** to obtain
- Minimum Pathways – **New Homes**
  - 7.5 stars
    - With **50% reduction** in BASIX maximum cooling cap (33/2 MJ/m2/a = 16.5 MJ/m2/a) – for heatwave protection
  - 7.5 stars
    - With **30% reduction** in cooling load if block orientation, shape, other difficulties justified
  - **Passive House Certified Design**; achieve 0.6 ACH50Pa on a blower door test; installed MVHR (Mechanical Ventilation with Heat Recovery) – new pathway now in BASIX
    - **If fails blower door test, have As Built NatHERS 7.5 star certificate for display** (extra scorecard points)

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Thermal Performance – **other Homes**

- For **existing** homes
  - > $50,000 renovations, or installing a pool or spa of more than 40,000 litres, **pass BASIX & 6 stars** (NSW reqmt)
  - < $50,000 retrofits & conversions (Scoresheet – Design and As-built – display results)
    - Obtain 70 points in scoresheet – **watch 2nd hand appliances**
    - Sufficient **solar panels** to cover use in year
    - Minimum star rating - either
      - Obtain **5.5 stars**, or
      - **5 stars with 50% of the BASIX cooling energy cap** (33/2 MJ/m2/a = 16.5 MJ/m2/a) – for heatwave protection
- For **Tiny** homes
  - No NatHERS requirement, but the tiny home:
    - **Area** shall be included in Hill Thalis **site coverage area** of the Lot
    - Needs to be **owned** by householder (NSW state regulations),
    - The **occupier needs to be related** to the household (NSW state regulations)
    - Must be included in **neighbour consultation** (arrival, installation, location, access, services etc)
    - Should **not use gas** as a fuel due to its poor environmental impact (worse than coal for electricity over 20 years)
    - Shall have **sufficient solar panels** to match the energy usage in year (on its roof, or by **renting a roof nearby**)
    - Other **services** – e.g. water, sewerage to be **independently maintained** or **connected to services of the Lot**
    - Meet scoresheet materials etc. (embodied energy/person, recycling)

Minimum PV/ house

- Stay with Houses to be net carbon neutral
  - Our network provider has imposed strict limitations on what we can export

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5. Scoresheet – John Shiel

- BASIX – Water Minimum
  - Can't use Narara postcode water treatment concession anymore
  - Include all BASIX water section in Scoresheet
  - Some extra water storage may be required
    - Audit & important survey currently underway
- Different weightings, not as easy to score points
- Recommend **town gas** is not permitted (change to the CMS)
  - Discourage gas
    - Methane with normal gas leakage rates has a worse impact over 20 years than coal-fired electricity
- Air Conditioners - scoresheet
  - Star rating range has now changed

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Scoresheet

Now has an **As-Built** section – check promises etc. after the build

- As-Built scoresheet points
  - **publishing** house results (for meetings, Open Days, publications)
    - As-built star rating, sustainability & indoor monitoring
  - Receipts/ photos
  - Blower Door test
    - Required for PassivHaus– if it fails do NatHERS star rating
  - Updated NatHERS (fast - could be same or even better, one of 3-4 NatHERS tests)

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Recommended Scoresheet Weightings

	Design		Design & As-Built	
Category	Previous CA Max Weightings	Re-estimated Max Weightings	Recommended weighting	Difference – recommended vs re-estimated
Water	19%	16%	**20%**	4%
Energy	44%	37%	**28%**	-9%
Materials	22%	18%	**18%**	0
Waste	11%	9%	**5%**	-4%
Indoor Environmental Quality (IEQ)	5%	4%	**15%**	11%
Management & Process - monitoring	14%		**10%**	10%
Other	1%	1%	**4%**	3%
Total	100%	100%	**100%**	0
Bonus Points - Innovation	16%	16%	**10%**	**-6%**

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As-Built Scoresheet

- Will be the **main result** quoted for the home
  - will include any improvements and changes made during the build
- Will give points if the Lot Owner
  - Publishes the house evaluation with the assistance of NEV
  - Participates in Owner home design meetings, Open Days and house sustainability monitoring.
- Requires **documentation (PTO)** and the SDA's may help

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As-built Documentation

Stage (Black – PCA existing stages)	Clusters (for example only)	As-Built Stage Documentation
At the start of building work - Process		SDA is assisting Designer, Assessor & Builder are coordinating
Throughout the building works		Materials receipts (or photos of secondhand); Waste disposal receipts; changes that affect thermal performance e.g. insulation, windows, air-tightness
After excavation for and prior to the placement of, any footings	Pier/Pad	
Prior to pouring any in-situ reinforced concrete building element	Slab on Ground	
Prior to the covering of any framework for any floor, wall, roof or other building element	• Frame • Fire Resistance Level Wall Inspection • Fire Penetrations (Floor & Wall) • Junctions (Abutting Fire Rated Walls)	Photos or receipts of type & location of insulation – ceiling, roof, underfloor, walls. Also for window systems
Prior to the covering of any waterproofing in any wet areas	Wet Area Flashing	
Prior to covering any storm water drainage connections	Storm water Drainage Connections	
After the building work has been completed and prior to any Occupation Certificate (OC) being issued in relation to the building.	Completion Inspection	
When the building is complete		Check list of design Scoresheet promises – peak energy; recycled materials etc.
		Blower door test-Passive House/ NatHERS test
		House monitoring – one-off or on-going (PTO)

As-Built Scoresheet - Monitoring

- Existing
  - Energy – already done for NEV billing, ARENA – (BMS)
  - Water (potable and recyclable) – already done for NEV billing
- Additional points
  - Waste – construction and domestic
  - Good home indoor environmental quality (IEQ) – Building Management System (BMS)?
    - Ventilation – Natural & fan Ventilation
    - Lighting - Daylight & Electric Lighting Levels
    - Thermal Comfort – humidity, temperature, air speed
    - Hazardous Materials
      - Volatile Organic Compounds
      - Formaldehyde Minimisation
    - Internal Noise Levels
    - Private External Space – also in Hill Thalis

6. Neighbour Consultation

BRP Feedback

- Owners **design at different speeds** and
- There has also been **turnover in lot owners**
- BRP not setup to mediate issues

- The purpose of this new Neighbour Consultation Process (PTO) is to **promote** our **capacity** to be the **best neighbours possible**.
  - to strengthen good neighbour **relationships**
- The consultation process is compulsory
  - If the process is not successfully completed, then BRP application fails
  - But a member can appeal to the Building Appeal Committee as per CMS

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Value of Creating "Community" – for resilience

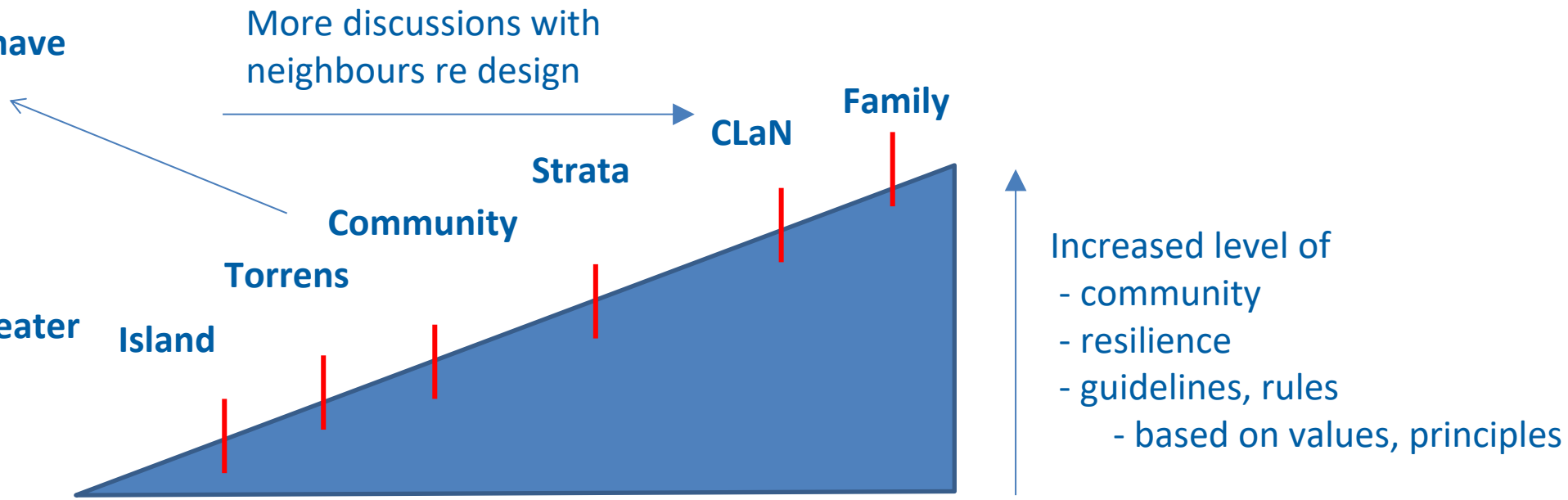
Co-housing type	Name	Community Bonding
Sustainable Eco-village, small lots, large land	**Shepherds Ground**, near Maitland	Working bees, small close-knit community
Spiritual Eco-village, small lots, large land	**Findhorn**, Scotland	Alternative lifestyles, fun and meditative working bees, communal eating
Sustainable Ecovillage, small lots, large land	**Cloughjordan,** Ireland	Working bees, employ farmer, Hostel, Baker, Building for activities, GFC hit hard, part of an established village
Sustainable Eco-village, small lots, large land	**Narara** Ecovillage	Many working bees, dinners, monthly mtgs, many sociocratic mtgs
Urban apartments	**The Commons** Melbourne	Little up front
Sustainable Ecovillage, small lots, large land	**Illabunda**, Sydney, Australia	Little (pay levies to get work done)

CMS – value – all members have agreed to this

"1.2 The Narara Ecovillage Community aspires:

…b) to promote and foster

…a willingness to balance individual needs with the greater good of the community"



Neighbour Consultation Process 1

- Share your house design with all your neighbours as soon as you feel ready, showing position of house on site and main materials etc.
- Share shadow diagrams when available
- Meet with your neighbours when appropriate to answer questions and clarify your design.
- If all neighbours agree:
  - neighbours sign the Neighbourhood ***Consultation Form*** and forward to the BRP
  - the BRP assesses the full application and if approved, stamps the drawings and
  - the Lot Owner lodges their Development Application
- Neighbours concerned with your design shall present any concerns,
  - 1) in writing (see a Neighbour ***Concern Form*** incl. your **issues**, **what design feature** you think your neighbour is trying to solve, and possible **alternative suggestions** to solve the issue) and
  - 2) send it to the Lot Owner concerned

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Neighbour Consultation Process 2

- After the ***Concern Form*** is received by the Lot Owner, it is given consideration and adjustments
- If possible, 3) the Lot Owner responds within 14 days
  - If the neighbour is ok, the ***Consultation Form*** is signed and goes to BRP.
  - 4) If concerns are still not resolved either party could ask the **Expert Building Group** to assist.
  - 5) If still not resolved, the neighbour can request support from the **Building Appeals Committee (BAC)** which is formed for the task, and which will propose a way forward within 14 days or an agreed timeframe
  - 6) If the design fits the guidelines and neighbours still have concerns, a ***Conflict Resolution Process*** can be initiated by contacting the Supporters Circle
- 7) As a last resort the Lot Owner can request the BRP to stamp drawings with a note that neighbour consultation was not successful and send to Council
- NB: NEV or the previous owner should handover any previous neighbour negotiations to a new Lot owner. Lot owners need to be aware of changes of ownership of a neighbouring lot.
  - When members have **purchased a Lot** that has already **been thru the** neighbourhood consultation **process**, and will use a new house design, the **process for their house needs to start again**.
  - But the new Lot owner needs to give consideration that neighbouring houses may have already locked in their designs, or even started to build, after previous negotiations.
- If at any time in the future you would like to **alter your design**, in a way that **impacts your neighbour, consultation** is required **before** any work commences

Neighbourhood Consultation Process 3

Draft Form

- We acknowledge that our meeting considered the following matters relating to and affecting each lot:
  - Footprint, size, shape and height of built structures
  - Overshadowing
  - Visual privacy
  - Sharing views
  - Materials used on facades, decks and roofs
  - Management and design of common boundaries
  - Street frontage and lot access
  - Car parking
  - Access to Common Gardens
  - Noise and light spillage across properties
  - Storm water management
  - Lot Access – construction
  - Other:

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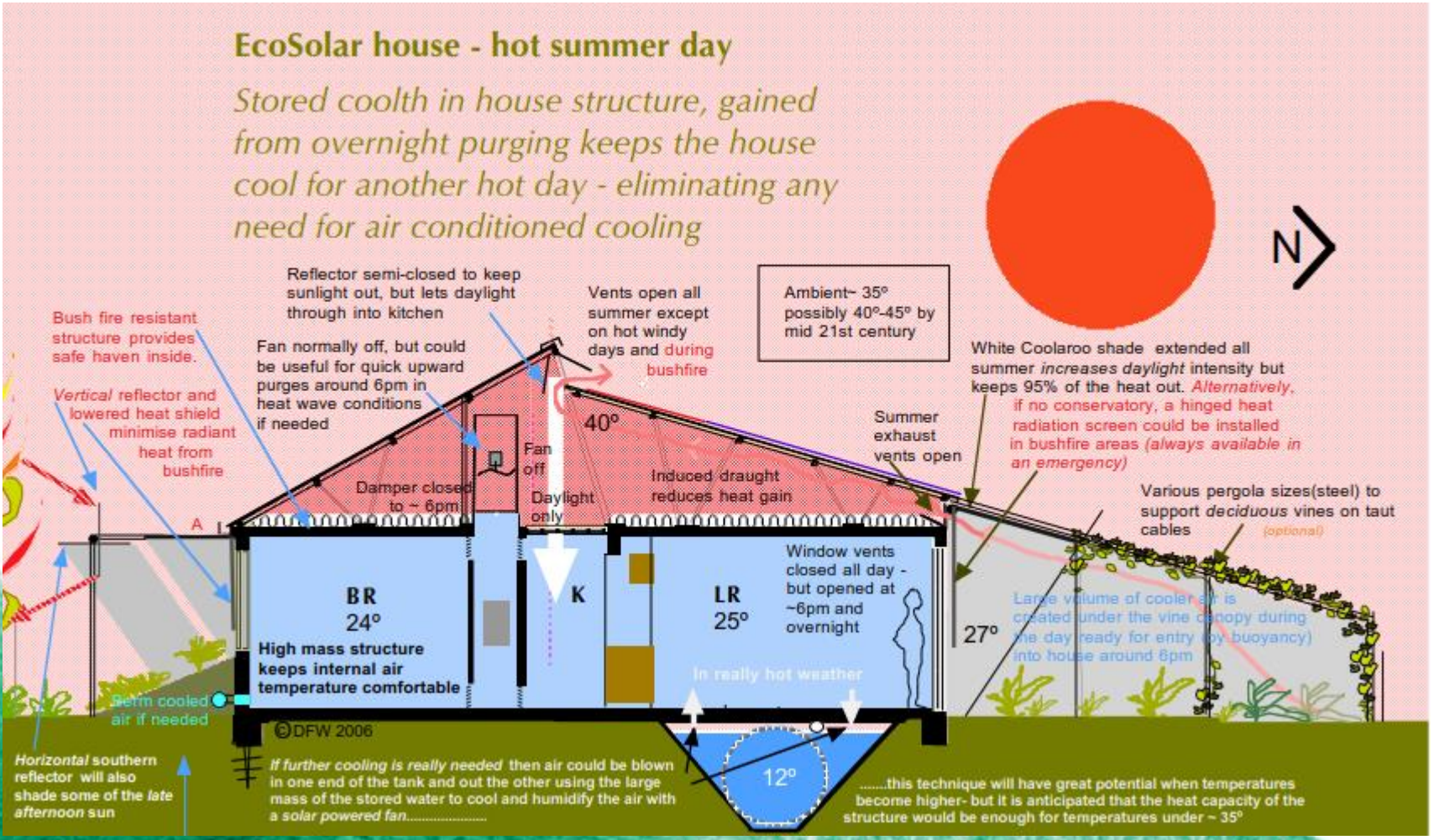
Neighbourhood Consultation Process 4

Draft Concern Form

- **Neighbour Concern Form – to Lot Owner**
  - I, the neighbour of <Name> of <Lot No.> have discussed my neighbour's design and have the following concern(s):
    - Concern 1: <concern summary name>
    - Details: <details>
    - What is the issue you think your neighbour is trying to solve with their design features:
      - <neighbour issue e.g. privacy, pet enclosure>
    - Alternative suggestions:
      - <what could assist to solve this concern e.g. smaller trees, wire fence with hedge>

Not so difficult - Prof. Derek Wrigley's EcoSolar Home

Free pdf copies to NEV members in Wiki (sells for $20) - https://bit.ly/3ogrxy3



8-9 star home

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Questions/ Feedback?

Place in chat

Or send to

jafshiel@outlook.com or

michaelxberney@gmail.com

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Existing Stage 1 status – from BRP

- Our building standards are key to delivering on our vision & mission
  - Our values include using energy efficiently (CMS) – better home, less air conditioning
  - We had an aim to reach 8 stars if possible
- NEV has a **7 star** NatHERS level
  - NSW and Australia has **6 stars now, soon to be 7 stars**
- 50 homes have achieved
  - **Average of 7.7 stars** NatHERS rating
  - Average of 82 points on the NEV sustainability scoresheet
  - Average of 6.2 kW of PV (Totaling <200 kW PV)
  - Floor area av. 129m2
    - 66% below 150m2 preferred maximum

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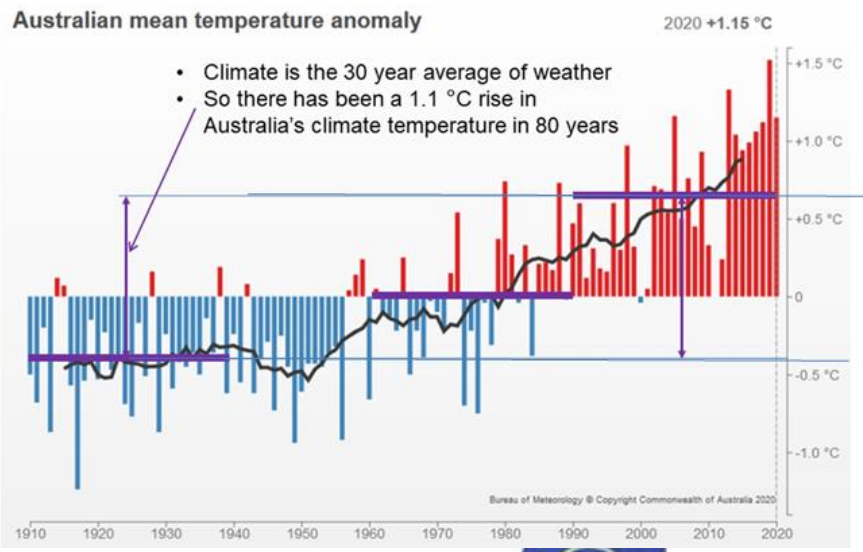
Why Update our Bldg Standards?

- Australian and NSW building standards (e.g. NatHERS, BASIX) are improving in 2022
  - NatHERS moving to 7 stars; can we still be called "eco" if we stay at 7 stars?
  - "whole of house" tools coming with embodied energy, appliances, PV and a net zero energy goal;
  - BASIX has energy caps (for summer & winter)
- Hotter climate in 2050 for a climate like Narara can reduce a 7 star house rating to 4 stars.
  - Houses last 50 to 100 years – costly to retrofit house later
  - Health issue – older persons die in heatwaves- 3-day power outages, > 24 °C nights, little sleep
- New council local environmental plan (LEP) which governs zoning is coming soon (dual occup.)
- Hill Thalis changes for new lot orientations and slopes



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Cost of 6 to 7.5 stars, & our building standards?

- Minor cost difference if an architect designed your new home
  - good orientation, insulation, air sealing, thermal mass and window sizing and treatment, less risk of mould issues
    - For a **150m² $400,000 home**, cost increase 1-2%. Say 1.5% = **$6,000** plus fees
- To increase a 6 star **project home** to 7.5 stars
  - Cost increase of 2-4%
    - Say 3% of a **$400,000 home = $12,000** plus design fees/royalties
- Cost increase for hot water heat pump & solar panels
  - **$7,000** – carbon neutral home, with central battery
- Total cost increase
  - **Architect** designed home say **$15,000**
  - **Project home** say **$20,000**

7.5 stars is not that high
Our **average is 7.7 already**

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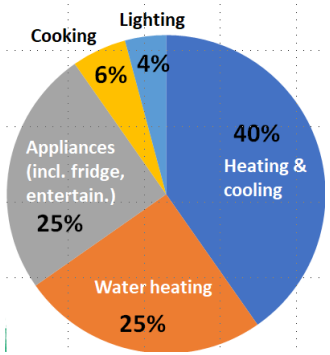
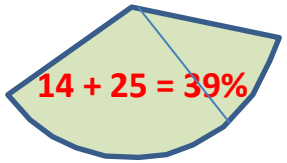
Benefits of our Building Standards

in the long term

- Resale value increases by 2% for every 1 star increase = $12,000 extra on $400,000 house – for 1.5 stars = **$18,000 /1.5 stars**
- Energy savings over 25 years – **150m² home**
  - 6 star home vs 7.5 star home
    - Heating and cooling energy saved – 14%
    - Hot water energy saved with heat pump and solar panels – 25%
    - With behaviour & solar panel rebates – say 50% energy cost saving
  - So for an $850 per year energy bill (no inflation etc.)
    - 50% saving can help pay a $320,000 mortgage
    - This saves **$40,000** over 25 years





- Total of $40k + 18k = **$60,000 benefits** compared with **$15-20,2000 Bldg Stds cost**)
- More comfortable, fewer greenhouse gases

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Saving capital & other costs

7.5 stars is not that high
Our **average is 7.7 already**

- **Cost** high on first design?
  - Lower size?
    - Work out space you will use
    - $3,000 saved per every m2 less
    - Use common houses for extra bedrooms
  - Difficult on steep slopes?
    - Use lightweight building – clay floors
  - Orientation
    - Lower glazing size, improve treatment?
- Green loans have lower interest rate
- **Large savings on small size, 7.5 stars**

8 star increase from **6 stars**

- adds **2-10%** cost

https://www.yourhome.gov.au/housing/affordability

It added **2-5%** for 2 Brisbane 8 star houses in 2011)

So increase in cost from 7 to 7.5 stars should be < 1.5%

Szatow, A. (2011). *Cape Paterson Ecovillage: Zero Carbon Study Peer Review*. Cape Paterson Partnership. http://www.energybydesign.com.au/wp-content/uploads/2012/01/Cape-Paterson-Eco-Village.pdf

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8.7 star lightweight NEV home design

Difficult site – Architect Graham Hunt

DHW – Delisle, Hunt, Wood
Lightweight, on a slope, awkward shape – Green – great tips

- **House** – 8.7 star
- **Granny Flat** – 7.9 star
- **Orientation** – **ideal** to NNE
- **Shape** – simple form
- **Thermal mass**
  - Clay floors on fibre cement (FC)
  - Cob walls

- Insulation
  - Straw panel walls – R4.1
  - R2.5 walls
  - R4.0 roof
  - **R5 under floor**
  - Breathable membranes
- Windows
  - **UPVC double glazed**
  - Mostly north facing
- Shading
  - sunhoods, eaves, carport

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