City Centre Sustainable Housing Design Competition

Workshop 3: Sustainable Performance Criteria

Date: 3 April 2024
Time: 16:00-18:00
Venue: Online hosted by the CIH
Presenter: Jeremy Gibberd

Structure

- Sustainability Performance Criteria
- Sustainable Building Characteristics
- Sustainable Building Targets
- Sustainable Design Generation

Sustainable Performance Criteria

- Energy
- Water
- Waste
- Materials
- Biodiversity
- Transport
- Resource use
- Management
- Products and services
- Local economy
- Access
- Health
- Education
- Inclusion
- Social cohesion
**Energy**

- **Objective:** Energy consumption is minimized and renewable energy used.
  - Orientation
  - Building layout
  - Roof construction
  - Wall construction
  - Floor construction
  - Window to wall ratio
  - Ventilation opening
  - Internal lighting
  - Installed equipment power density
  - Food cooking
  - Water heating
  - Renewable energy

**Potential Targets:** Net positive energy (X%), Energy sources: X% renewable energy sources, Energy consumption: X kWh/m².year, Energy consumption: X kWh/person.year

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**Water**

- **Objective:** The consumption of mains potable water is minimized.
  - Toilets
  - Wash hand basins
  - Showers
  - Hot water
  - Landscape
  - Greywater
  - Rainwater harvesting

**Potential Targets:** Net positive water (X%), Water sources: X% water from rainwater harvesting, Water reuse: X% water recycled on site, Water

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**Waste and Emissions**

- **Objective:** Emissions, pollution and waste directed to landfill is minimized.
  - Reusable containers
  - Recycling area
  - Recycling collection
  - Organic waste
  - Sewage
  - Construction waste

**Potential Targets:** Net positive waste (X%), Waste production: X kg per person per day, Onsite organic waste recycling: X%, Metal/plastics/paper waste recycled: X%, Waste directed to landfill: X kg per person per day, Black/grey water recycling: X%, Construction waste reused/recycled (weight): X%
Materials

- **Objective:** Negative impacts of construction materials are minimized.

  - Area per person
  - Building reuse
  - Biobased materials
  - Recycled content
  - Local sourcing
  - Refrigerants
  - Volatile organic compounds
  - Formaldehyde

**Potential Targets:** Sufficiency: m²/person, Building reuse: % (area), Construction: % (weight) from biobased materials, Recycled content: % (weight), Harmful/hazardous materials: zero specified.

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Biocapacity

- **Objectives:** Biocapacity is supported.

  - Brownfield sites
  - Municipal boundary
  - Vegetation
  - Green roofs
  - Biodiversity
  - Ecosystems

**Potential Targets:** Net positive increase in vegetation on site, Site coverage with vegetation: %, Biodiversity: Species richness, Onsite carbon sequestration/carbon emissions: %, Ecosystems services: provisioning/regulating/supporting/cultural

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Transport

- **Objective:** Energy efficient transportation is supported.

  - Pedestrian routes
  - Cycling
  - Cargo bikes
  - Public transport
  - Non-motorised transport
  - Electric vehicles

**Potential Targets:** Safe walking routes: km/ha, Safe cycling routes: km/ha, Public transport: affordable, accessible and within 400m along safe walking route, Material and goods transportation: affordable cargo bikes / electric vehicles for moving goods.
Resource Use

- **Objective:** Efficient use of land and resources is made.
- Site density
- Building area per person
- Food production
- Renewable energy generation

**Potential Targets:** Site density: units/ha, people/ha, Sufficiency: area/person, Food production on site: % of requirements, Renewable energy on site: % of requirements

Management

- **Objective:** Management supports efficiency and sustainability.
- Building use guide
- Energy metering
- Water metering
- IEQ
- IOT
- AI
- Resident’s association


Services & Products

- **Objective:** Sustainable production and consumption are supported.
- Urban agriculture
- Local fresh produce markets
- Local manufacture and repair of clothing, furniture
- Building maintenance and repairs
- Equipment hire
- Product-as-a-service

**Potential Targets:** Sustainable services and products available within 400/800m walking distance from homes: food/clothing/furniture/repairs/equipment hire/library.
Local Economy

- Objective: The local economy is supported.
- Locally sourced materials and products
- Affordable small rental units
- Small enterprise support
- Access to
- Construction workers
- Notice board
- Local currency

Potential Targets: Local content: Value of construction materials from within 50km, Value of construction manpower from within 50km, Value of annual maintenance and repairs supported by contractors within 50km, Support for local economy: Notice boards, local currency, incentives

Access

- Objective: Easy access to everyday requirements is enabled.
- Work
- Creche
- Primary school
- Secondary school
- Library
- Internet access
- Banking
- Groceries
- Post office
- National and local government services

Potential Targets: Access to everyday requirements within 400m from homes: work, creche, schools, library, banking, groceries, post office, national and local government services (grants, passports, ID, rates and taxes).

Health

- Objective: Healthy and productive environments are provided.
- Clean water
- Healthy diets
- Thermal comfort
- Clean air
- Daylight
- External views
- Exercise
- Recreation
- Access to clinics
- No hazards

Potential Targets: Access to requirements for health within the environment/400m: clean water, healthy diet, thermal comfort, clean air, daylight, views, exercise, recreation, access to clinics, health education, no hazards.
### Education

- **Objective:** Access to education and ongoing learning is provided.
- Primary schools
- Secondary schools
- Ongoing learning
- Internet
- Noticeboards
- Space for learning
- Building User Manual
- Construction worker education

**Potential Targets:** Access to requirements for health: clean water, healthy diet, thermal comfort, daylight, views, exercise, recreation, access to clinics, health education, no hazards

### Inclusion

- **Objective:** Diversity, equity and inclusion are promoted.
- Public transport
- Accessible local facilities
- External routes
- Entrances and exits
- Lobby
- Window, door, lighting controls
- Doors
- Bathroom
- Kitchen
- Inclusive employment
- Affordability

**Potential Targets:** Accessible services within 400m of housing: public transport/schools/clinics/retail etc, Full accessible home: %, Affordable homes:

### Social Cohesion

- **Objective:** Social cohesion and belonging is promoted.
- Occupants
- Community spaces
- Shared spaces: parks, play areas
- Community communication
- Residents’ association

**Potential Targets:** Shared spaces within 400/800m of homes: play areas, parks, community halls, Community communication: Newsletter, social media, notice board, Residents association: Structure/communication/activities,
Sustainable building design performance criteria:
BEST, BREEAM, Greenstar, LEED, SBAT, WELL

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Analysis-Targets-Concepts-Test-Present

- Discover: Understand the problem – Analysis.
- Define: Set out the challenge - Targets
- Develop: Develop alternatives - Concepts
- Deliver: Test out solutions iteratively - Test
- Detail: Present solutions with performance data, evidence and rationale

Thank you, Questions?