The social foundation of the Doughnut for Urban Development

The social foundation of the Doughnut for Urban Development details 24 local and 24 global impact areas across the Doughnut's original 12 dimensions. Alongside the impact areas, we have mapped and listed impact methodologies and tools, and built a 'Doughnut for Urban Development Database', which we hope will enable the industry to advance its social impact strategies and make it easier to put value on and track social impact performance.

In some areas such as Health, the list of tools, indicators and benchmarks found in existing work is long and impossible to fully capture. In other areas such as Food or Political Voice, existing work is limited, and we have been challenged when developing the framework. The impact areas fall under the 12 dimensions of the Doughnut resulting in two local and two global impact areas for each dimension.

In the following pages we unroll the social foundation, to define the impact areas, and give an example of the type of indicator you can use to measure the impact areas. We use building cases to give an example of how you can apply impact areas in practice. None of these cases satisfy each and every one of the 48 impact areas, but all provide tangible evidence of how you can begin integrating Doughnut principles in your next project.

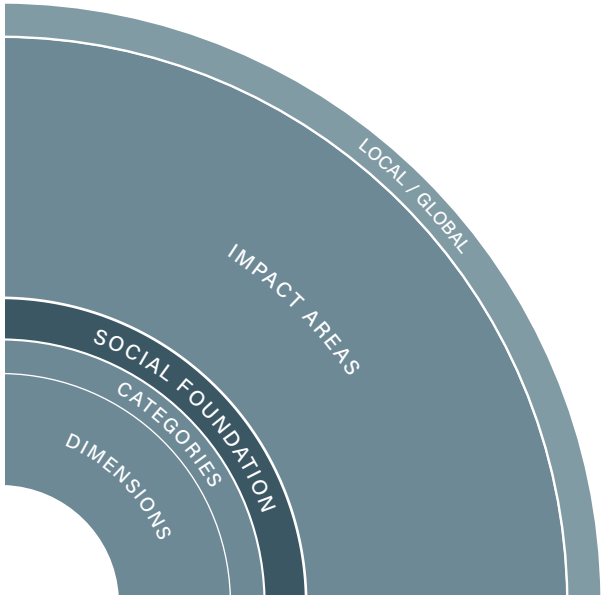
LOCAL / GLOBAL
In order to apply Doughnut principles we must oscillate between designing for social impact locally and social impact globally.

IMPACT AREAS
The 48 impact areas are a direct extension of the 12 dimensions. Each dimension has 2 local and 2 global impact areas.

SOCIAL FOUNDATION
The 12 dimension and 4 categories, together make up the social foundation of the Doughnut for Urban Development.

CATEGORIES
The 12 social dimensions are grouped into 4 categories: Connected, Inclusive, Equitable, and Responsible.

DIMENSIONS
The 12 social dimensions derive for the socio-economic SDGs.



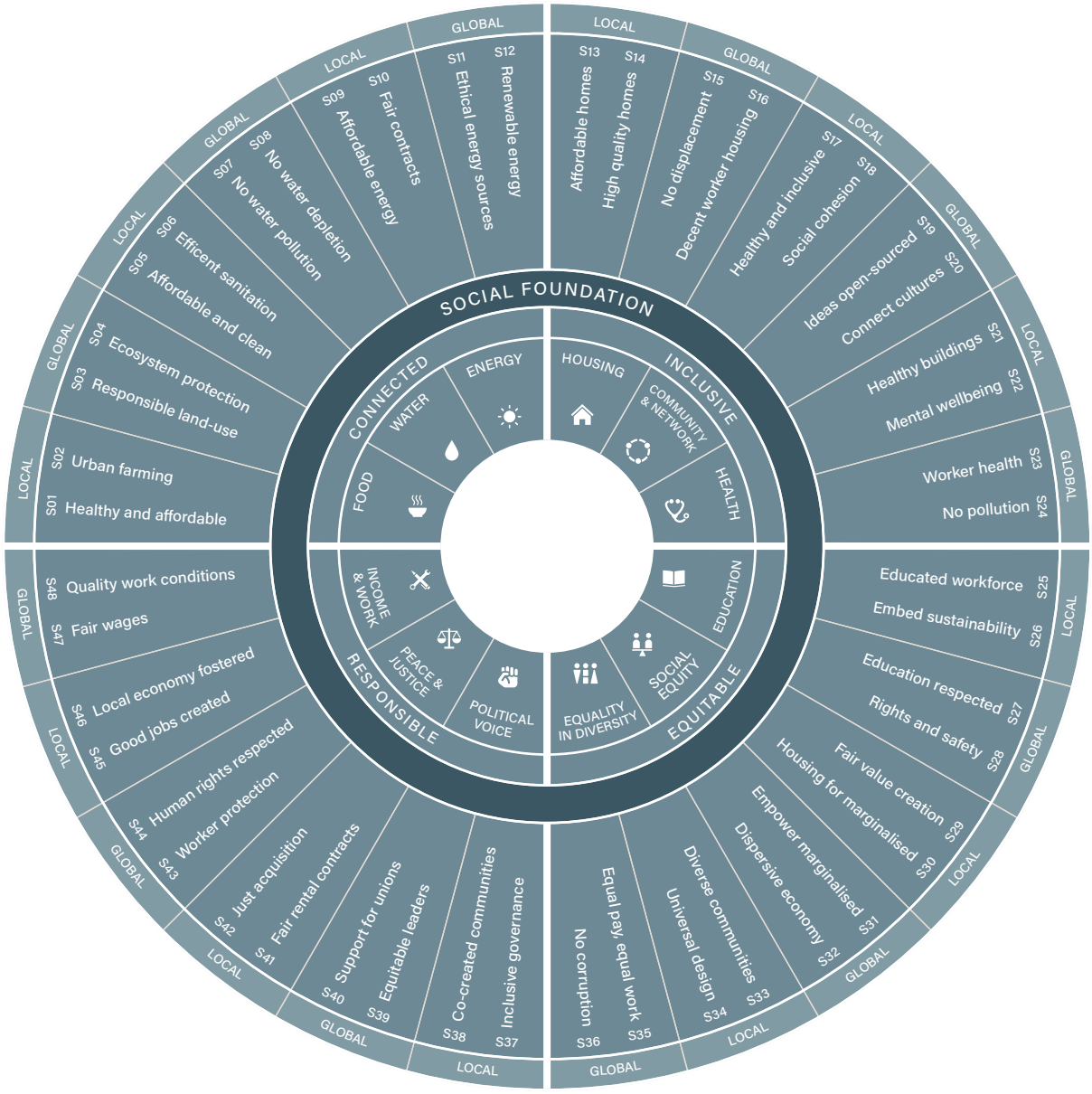
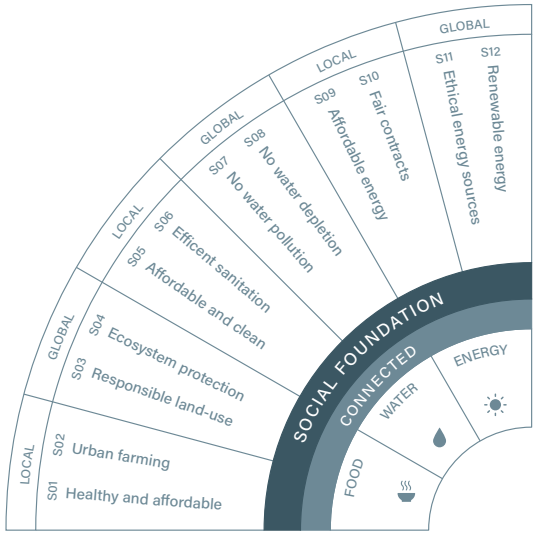


Figure 13: Local and global impacts areas in the social foundation of the Doughnut for Urban Development

SOCIAL FOUNDATION
CONNECTED / LOCAL & GLOBAL

Connected development

Recognising the interconnectedness of urban development and their ecosystems, we must consider areas such as water, food, and energy from a holistic standpoint. By ensuring sustainable access to clean water sources, promoting local and resilient food systems, and transitioning to renewable energy sources, urban development can not only enhance the well-being of their residents, but also contribute to the health of the planet. This interconnected approach between local and global aspirations strengthens the bonds between ecosystems, and the broader global community. The impact areas and example indicators presented here are some of the strategies that can be used to create connected developments.



Case Study: Hammarby Sjöstad

Impact Categories: S06, S12

Hammarby Sjöstad exemplifies the concept of "connected" urban development, with a particular focus on specific impact areas. The project prioritises water conservation by striving to halve residents' water consumption through integrated solutions, including wastewater treatment and management of natural water sources. This aligns with the indicator "S06 - Efficient Sanitation". Moreover, the project emphasises energy efficiency and incorporates solar panels, aligning with the indicator "S12 - Renewable Energy". Overall, Hammarby Sjöstad demonstrates a comprehensive approach to sustainable development by addressing key aspects of water conservation and renewable energy.

City: Stockholm. Developer: City of Stockholm. Masterplan: Stockholm City Planning Bureau Architect: Year: 2004 - 2016. Size: 150 ha

FOOD

Local

S01: Healthy and Affordable.
Developments should be near to and/ or provide healthy and affordable supermarkets and other necessary shops for the local community, working to mitigate food deserts and nutrient deficiencies in urban areas.

Example Indicator
Number of healthy and affordable supermarkets and shops within a 10 minute walk

S02: Urban Farming
Local communities should have access to participating in communal urban farming and / or access to purchasing affordable, locally grown produce. Such resources should be distributed in an equitable and just way.

Example Indicator
% of communities with access to urban farming initiatives or local produce

Global

S03: Responsible land-use
Land-use issues involving food production are monitored transparently and avoided. For example, construction materials should not displace or limit access to quality food options within supply chain communities or pollute local environments.

Example Indicator
Number of land-use issues identified and resolved

S04: Ecosystem Protection
Adverse impacts of food production on ecosystems are monitored transparently through adequate risk assessments throughout the supply chain. Adverse impacts on are monitored and eliminated.

Example Indicator
% suppliers screened for significant biodiversity impacts

WATER

Local

S05: Affordable and clean
Access to clean and affordable water is a human right and should be guaranteed to the community.

Example Indicator
% of community with access to affordable & clean water

S06: Efficient sanitation
All sanitation installations are sustainable and efficient, such as "low flow" sinks and toilets. Waste handling is managed in a sustainable way, in which nutrient rich waters are preserved and processed on-site.

Example Indicator
% of community with sustainable & efficient sanitation installations

Global

S07: No water pollution
Water pollution risks, related to the extraction of virgin resources and production of materials are monitored transparently and eliminated throughout the supply chain, including end-of-life scenarios. The creation of materials in faraway places should not leave local water supply polluted.

Example Indicator
% of suppliers implementation water management practices to avoid pollution in supply chain

S08: No water depletion
Water depletion risks, e.g. from virgin material extraction and production of materials are monitored transparently and eliminated throughout the supply chain, including end of life scenarios. The creation of materials in faraway places should not leave the local water supply depleted.

Example Indicator
% of water used that is returned to the environment sustainably

ENERGY

Local

S09: Affordable energy
Local communities should have access to affordable and renewable energy. Urban development should divest from fossil fuels, where alternative energy infrastructure is in place.

Example Indicator
% of community with access to affordable & renewable energy

S10: Fair contracts
Prepayment practices for energy should be transparent and fair to ensure consumer protection, informed decision making around energy usage and expenditure, avoidance of hidden costs, and promote financial inclusion by providing equitable energy services.

Example Indicator
Transparent and fair pre-payment practices

Global

S11: Ethical energy sources
Energy sourcing for building operations and supply chain activities should be ethical and monitored transparently. contributing to sustainable development, climate change mitigation, reduce reliance on fossil fuels, while protecting the environment.

Example Indicator
% of energy from ethical sources in supply chain activities

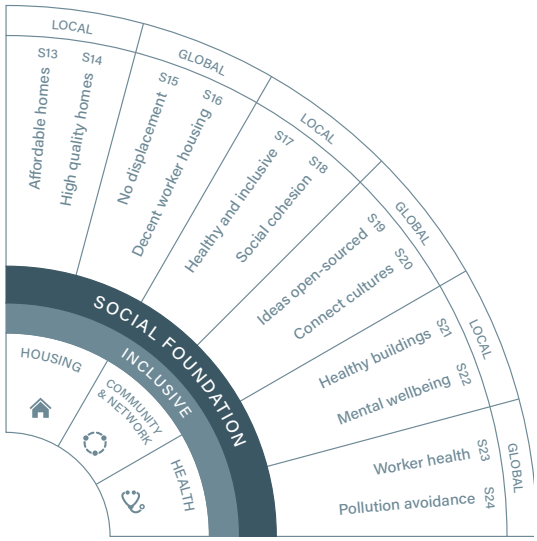
S12: Renewable energy
Where possible, supply chain activities should support the renewable energy transition. As such, building materials should be sourced from producers who's energy is supplied by renewable energy sources.

Example Indicator
% of renewable energy use in supply chain activities

SOCIAL FOUNDATION
INCLUSIVE / LOCAL & GLOBAL

Inclusive development

Housing, Community & Network, as well as Health, play crucial roles in building inclusive cities. By providing affordable housing options and promoting mixed-income neighbourhoods, urban development can cultivate diverse communities where people from different backgrounds can interact, learn from one another, and build social capital. Supporting community initiatives, fostering social networks, and ensuring healthy and accessible homes, not only benefit local residents but also contributes to the global aspirations of creating inclusive and interconnected societies. The impact areas and example indicators presented here are some of the strategies that can be used to create inclusive developments.



Case Study: The Tingbjerg Houses

Impact Categories: S17, S20

The Tingbjerg Houses serves as a prime example of "inclusive" urban development, placing a strong emphasis on creating inclusive neighbourhoods, as indicated by "S17 - Healthy and inclusive". The project focuses on revitalising the neighbourhood and constructing new homes in an area characterised by vulnerable residents facing challenges such as limited education, low incomes, high crime rates, and unemployment. The vision for The Tingbjerg Houses is to cultivate a diverse and lively community that celebrates diverse cultures, highlighting the indicator "S20 - Connect cultures". Additionally, The Tingbjerg Houses aims to attract residents who actively engage and contribute to shaping the neighbourhood, fostering social cohesion, and promoting inclusiveness.

City: Copenhagen. Developers: NREP, Copenhagen Municipality, fsb, SAB. Architect: Vandkunsten. Landscape: SLA Year: 2022. Size: 39.000 m2

HOUSING

Local

S13: Affordable homes
Housing should be economically accessible and affordable for tenants from all parts of society. As such, developments should reflect the needs and purchasing power of the local society including economically diverse units, such as social housing, affordable housing, student housing, and housing for the elderly.

Example Indicator
% of affordable housing units

S14: High quality homes
The design and construction of housing should be sustainable, healthy and of high material quality. As such, homes should be well-lit, properly ventilated, made of life-supporting, certified building materials, and connect tenants to natural environments and each other.

Example Indicator
Rate of achievement from recognised sustainability or certification standards

Global

S15: No displacement
Supply chain activities should not lead to the displacement of local communities. The housing we create here in a European context should not lead to the displacement of people in faraway places. Issues related to displacement should be monitored and documented transparently.

Example Indicator
Number of displacement incidents

S16: Decent worker housing
Workers across the supply chain should have access to decent, affordable, and stable housing to ensure the mental and physical well-being and a good quality of life while upholding the dignity and respect of supply chain workers.

Example Indicator
% of suppliers with decent worker housing policy

COMMUNITY & NETWORK

Local

S17: Healthy and inclusive
Create healthy and inclusive communities by including communal services and opportunities to participate and integrate socially. Encourage social inclusion by fostering a sense of belonging through the integration of accessible social spaces.

Example Indicator
User engagement in community health and inclusion programmes

S18: Social cohesion
Create social cohesion by providing tenants and other community members access to social infrastructure such as schools, childcare, sports facilities, and community spaces in close proximity to the home.

Example Indicator
% of community with easy access to social infrastructure facilities

Global

S19: Ideas open-sourced
Successful innovation, new knowledge and novel ideas should be shared open source in both local communities and global networks to promote the adoption of just development practices beyond the insular building project.

Example Indicator
Number of open-source projects or collaborations

S20: Connect cultures
Positive contributions are made in local communities where supply chain activities take place, that enhance, protect, and celebrate the local culture.

Example Indicator
Amount of financial and non-financial contributions to communities

HEALTH

Local

S21: Healthy buildings
Design buildings to promote the physical well-being of tenants. As such, building should be well day-lit, designed for thermal comfort throughout the year, designed for maximum natural ventilation, and designed for optimal acoustic transmission levels.

Example Indicator
Indoor climate score measuring e.g. carbon concentration, temperature and humidity

S22: Mental well-being
Design the building to promote the mental well-being of tenants including a feeling of trust and safety, culturally sensitive levels of privacy, and sense of belonging, enabled by design that includes natural and easy surveillance by tenants, strategic positioning of openings and windows, well-lit outdoor spaces, and active ground levels.

Example Indicator
Tenant satisfaction with safety and privacy

Global

S23: Worker health
Occupational health and safety of workers on site and across the supply chain is monitored and documented transparently for workers employed directly and indirectly across the supply chain. Working in healthy and safe environments is a human right that should be respected.

Example Indicator
Number of work-related injuries on site and monitoring of supplier policy

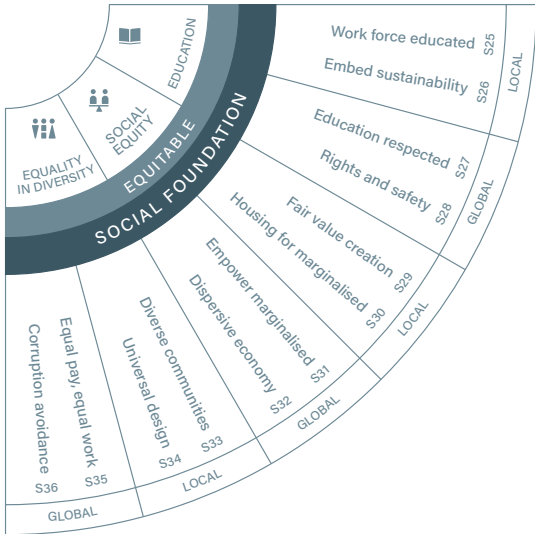
S24: No pollution
Minimise and mitigate through intervention the adverse impacts of environmental, noise, and light pollution on tenants and workers across the supply chain.

Example Indicator
% of suppliers implementing pollution management practices

SOCIAL FOUNDATION
EQUITABLE / LOCAL & GLOBAL

Equitable development

Focusing on education, social equity, and equality in diversity are crucial for addressing the needs of the most marginalised. Urban development must ensure the right to education and advocate for fair worker rights across the supply chain. By dismantling systemic barriers and providing housing for marginalised communities, urban development can play a vital role in fostering a more equitable ecosystem. This interconnected approach drives the pursuit of just and urban development, addressing local and global needs within the sector context. The impact areas and example indicators presented here are some of the strategies that can be used to create equitable developments.



Case Study: Venligbolig Plus
Impact Categories: S30, S33

Venligbolig Plus demonstrates an "equitable" approach to housing development by fostering affordable homes through active relationships. The project focuses on inclusive living arrangements, where two individuals, such as students or refugees, share a living space and provide mutual support. By implementing a mentor or buddy system, pairing students with refugees, the project promotes social responsibility and integration, aligning with indicators like "S33 - Diverse communities" and "S30 - Housing for marginalized". The Venligbolig Plus units, spanning 33 square metres, feature two private rooms, a shared kitchen/living area, bathroom, and terrace. Through the use of compact and innovative spaces, the project aims to provide affordable housing in densely populated areas, while prioritising social considerations and maintaining high-quality housing standards.

City: Frederiksberg. Developers: Frederiksberg Municipality FFB / KAB. Architect: ONV architects, We Do Democracy. Landscape: VEGA. Year: 2017. Size: 2500 m^2

EDUCATION

Local

S25: Educated workforce
The workforce associated with the construction and operation of buildings should be provided education and opportunities for up-skilling within their field, through accessible apprenticeship and traineeships.

Example Indicator
Number of employee training hours

S26: Embed sustainability
Sustainability education is embedded in the design of buildings and spaces e.g. through way-finding. The design should support sustainable behaviour, for example, waste management systems encourage re-use.

Example Indicator
Number of sustainability features incorporated in design

Global

S27: Education respected
The human right to education should be respected throughout the supply chain, to ensure equal opportunities, social and economic development to ensure empowerment and human dignity of workers while working towards inclusive and responsible communities.

Example Indicator
% suppliers screened for educational initiatives and respect for education

S28: Rights and safety
Workers across the supply chain should receive adequate education about their right to occupational health and safety and be educated transparently about the short-term and long-terms risks associated with their field of work.

Example Indicator
% of suppliers with right and safety policy

SOCIAL EQUITY

Local

S29: Fair value creation
Tenants, staff, and other key stakeholders should receive a meaningful share of the value created from the real estate activities concerning them through systems such as rent-sharing agreements, tenant cooperatives or ownership models and long-term lease incentives such as rent stabilisation.

Example Indicator
% of rental income shared with tenants

S30: Housing for marginalised
Developments should provide accessible and affordable quality housing for marginalised groups through the implementation of systems such as inclusive zoning, affordable housing partnerships, subsidised housing programmes, and long-term rent stabilisation.

Example Indicator
% of affordable housing units for marginalised groups

Global

S31: Empowerment of marginalised
Marginalized groups are empowered with rights and protections across the supply chain through inclusive hiring policies, training and capacity building, fair wages and working conditions, and transparent monitoring and reporting of such conditions.

Example Indicator
% suppliers screened for inclusive and empowering activities

S32: Dispersive economy
Value created from real estate activities is dispersed in an equitable way across the supply chain through fair compensation and profit-sharing, direct community initiative support, investment in training programmes, support worker advocacy groups, and transparent and fair bidding processes.

Example Indicator
Distribution of financial value to stakeholders

EQUALITY IN DIVERSITY

Local

S33: Diverse communities
Developers should create and maintain diverse and inclusive communities through inclusive marketing and outreach, culturally sensitive and co-created development, partnership with diverse community organisations, and fair and non-discriminatory tenant selection processes.

Example Indicator
Complience with diversity policy

S34: Universal design
Buildings should be designed after best universal design, accessibility and user-mobility practices, removing physical and environmental barriers, so that all tenants - regardless of age, ability and mobility level thrive at home.

Example Indicator
Compliance with universal design standards

Global

S35: Equal pay, equal work
Equal pay, for equal work is monitored across the supply chain so that all individuals are equaly compensated regardless of sexuality, gender, race, and ethnicity with the aim of creating a more equitable and inclusive society.

Example Indicator
% suppliers compliant with equal pay policy

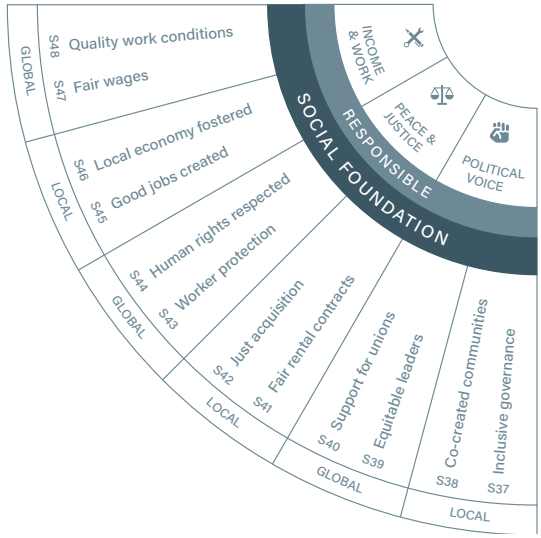
S36: No corruption
Proper efforts are made to create transparency around and eliminate supply chain corruption, such as conducting thorough due diligence before engaging with material suppliers, create transparent procurement processes, create code of conduct and ethical policies for supply chain stakeholders, and seek third-party certifications and audits.

Example Indicator
% suppliers compliant with anti bribery and corruption policy

SOCIAL FOUNDATION
RESPONSIBLE / LOCAL & GLOBAL

Responsible development

Responsible urban development places community prosperity at the forefront, achieved through citizen empowerment, inclusive governance, and the cultivation of co-created communities. It embraces principles of fair contracts, human rights, and fosters job growth, local economic vitality, and equitable wages. This comprehensive approach extends beyond the mentioned examples, emphasising the interconnected prosperity of communities at local and global levels throughout the real estate supply chain. It specifically addresses crucial areas of social advancement, such as promoting political voice, peace & justice, and ensuring income & work opportunities. The impact areas and example indicators presented here are some of the strategies that can be used to create responsible developments.



Case Study: Circl Pavillion

Impact Categories: S38, S45

The Circl Pavilion in Amsterdam Zuid is built to foster communities and bridge public and private space, and it is one of the first fully circular building projects in the Netherlands. It has a very strong social intent and exemplifies "responsible" urban development by creating meaningful employment opportunities, aligned with indicator "S45 - Good jobs". It fosters a co-created community, as seen in the employment of speechless staff in the café, in line with "S38 - Co-created communities". Through its welcoming space for collaboration, events, and cultural activities, Circl promotes engagement and interaction, contributing to a sustainable and vibrant urban ecosystem.

City: Amsterdam. Developer: ABN AMBRO. Architect: de Achitekten Cie, Landscape: Donkergroen. Year: 2017 Size: 3.350 m2

POLITICAL VOICE

Local

S37: Inclusive governance
Tenants and other stakeholders are empowered by and included in housing governance by way of board seats, voting rights, and transparent communication of policy matters concerning them.

Example Indicator
% of stakeholder representation on governance body

S38: Co-created communities
Relevant stakeholders such as tenants are given opportunities for co-creating and influencing their community through participatory decision-making processes, creation of social and cultural events, access to shared spaces and amenities, access to skill sharing / support networks and effective communication platforms.

Example Indicator
Number of co-creation initiatives

Global

S39: Equitable leaders
Building industry activity across the supply chain promotes and fosters equitable and non-discriminatory leadership and power structures.

Example Indicator
Representation of leadership diversity (gender, ethnicity, culture, age, education and more)

S40: Support for unions
Building industry activity across the supply chain promotes and fosters equitable and non-discriminatory leadership and power structures.

Example Indicator
% of workforce in unions

PEACE & JUSTICE

Local

S41: Fair rental contracts
Contracts between tenants and landlords are based on fair and transparent terms, and clearly define the responsibilities of and obligations of both parties, notice periods, provisions for dispute resolution, fair policies regarding security deposits and tenant privacy rights.

Example Indicator
Share of tenants on fair rental contracts

S42: Just acquisition
Acquisition and procurement processes related to the development of urban areas, such as acquisition of land, property evaluation, purchase agreements, closing, contract management and post-acquisition evaluations are just, ethical and transparent.

Example Indicator
% of suppliers assessed for ethical procurement

Global

S43: Worker protection
Workers across the supply chain are granted fundamental human rights and protections of those rights. Developers should not engage directly or indirectly with organisations that benefit from forced labour.

Example Indicator
% suppliers screened for respect of human rights and anti-slavery

S44: Human rights respected
Basic human rights such as such as education, health, water and sanitation, gender equality, decent work, housing, food, clean energy, and peace are monitored transparently and respected across the supply chain.

Example Indicator
Number of human rights breaches

INCOME & WORK

Local

S45: Good jobs created
Urban developments must evaluate the need for mixed-use programming to foster local economic activity - such as commercial units for small businesses, co-working facilities, cultural and creative activity, and public community services.

Example Indicator
% of workforce employed from local community

S46: Local economy fostered
Urban developments should include mixed-use programming to foster local economic activity - such as commercial units for small businesses, co-working facilities, cultural and creative activity, and public community services.

Example Indicator
Amount of space for commercial, co-working and other facilities

Global

S47: Fair wages
Equitable and fair wages should be secured for both employees and workers throughout the supply chain.

Example Indicator
% workers in supply chain paid above minimum wage

S48: Quality work conditions
Working conditions for workers across the supply chain should be of high quality, safe, and support well-being. Such conditions should be monitored and reported on transparently.

Example Indicator
% of suppliers assessed for labour practices

The ecological ceiling of the Doughnut for Urban Development

The ecological ceiling of the Doughnut for Urban Development details 24 local and 24 global impact areas across the two core Earth systems of climate stability and healthy ecosystems. Alongside the impact areas we have mapped and listed impact methodologies and tool, and built a 'Doughnut for Urban Development Database', which we hope will enable actors to create buildings with a more holistic and informed vision.

In some areas such as "E05 - Energy Efficiency" the list of tools, indicators and benchmarks found in existing work is long and impossible to fully capture. In other areas such as "E33 - Support biodiverse soil", existing work is limited and we have been challenged when developing the framework. This may be due to the novelty of including biodiversity in the scope of building design. The impact areas fall under the categories of climate stability and healthy ecosystems, each subdivided by local and global impact areas.

In the following pages we unroll the Ecological ceiling, to define the impact areas, and we give an example of the type of indicator you can use to measure this impact areas. We use building cases to give an example of how you can apply the design principles detailed in these impact areas. None of these cases hit each and every one of the 48 impact areas, but all provide tangible evidence of how you can begin integrating Doughnut principles in your next project.

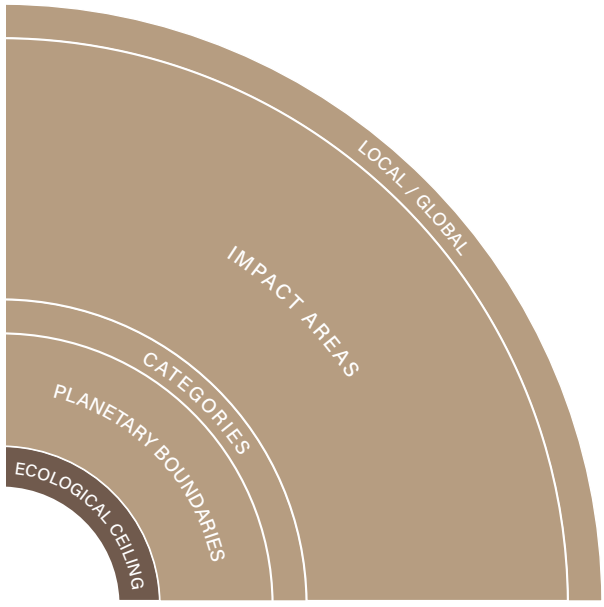
LOCAL / GLOBAL
In order to apply Doughnut principles we must oscillate between designing for ecological impact locally and ecological impact globally

IMPACT AREAS
The 48 impact areas organised by 12 climate stability local and 12 climate stability global, and 12 healthy ecosystems local and 12 healthy ecosystems global.

CATEGORIES
The ecological ceiling is organised by two categories: on top, climate stability and on the bottom, healthy ecosystems.

PLANETARY BOUNDARIES
The original 9 planetary boundaries are included in the ecological ceiling but do not relate directly to specific impact areas.

ECOLOGICAL CEILING
The 2 categories and 48 ecological impact areas make up the ecological ceiling of the Doughnut for Urban Development.



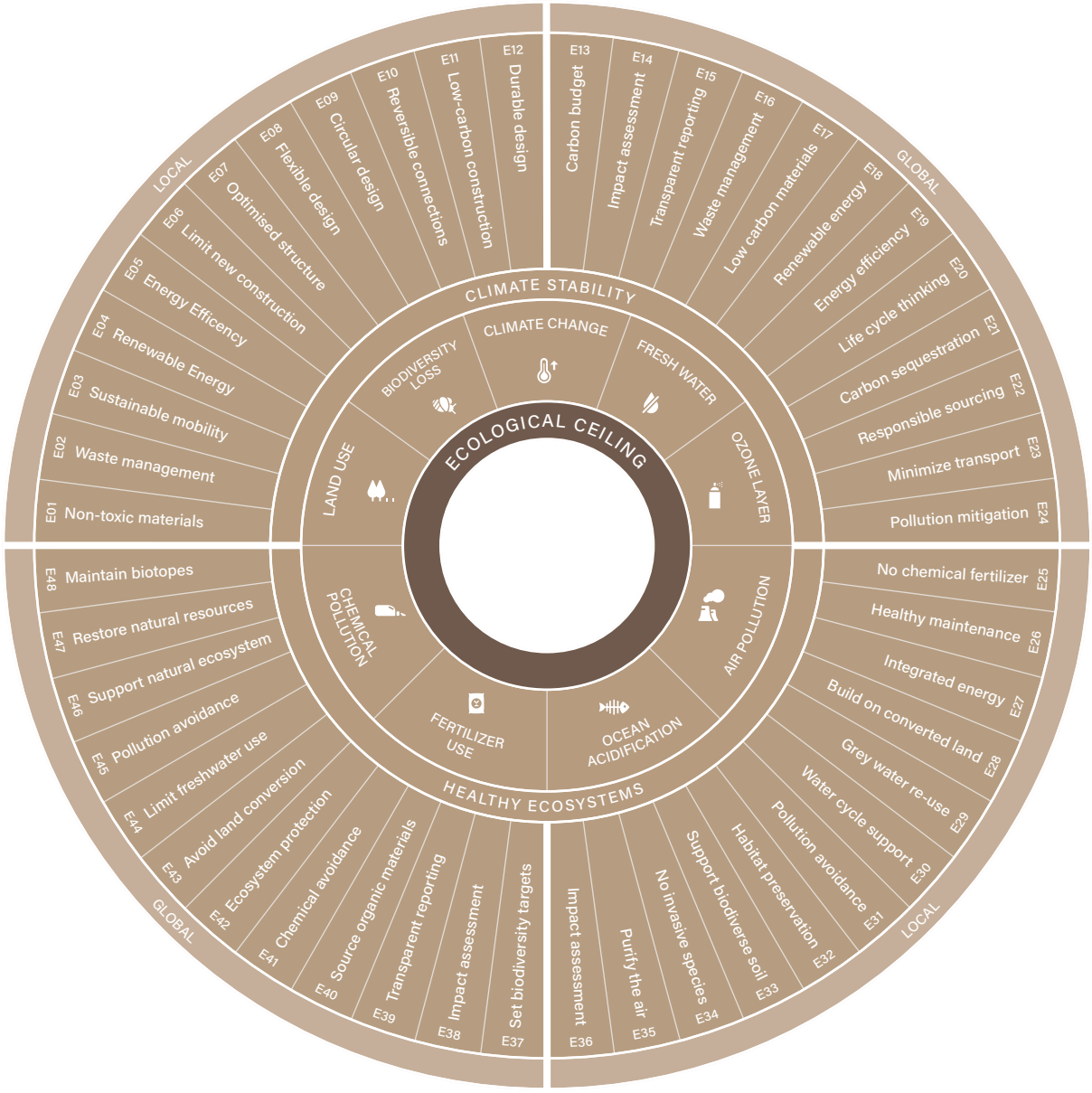
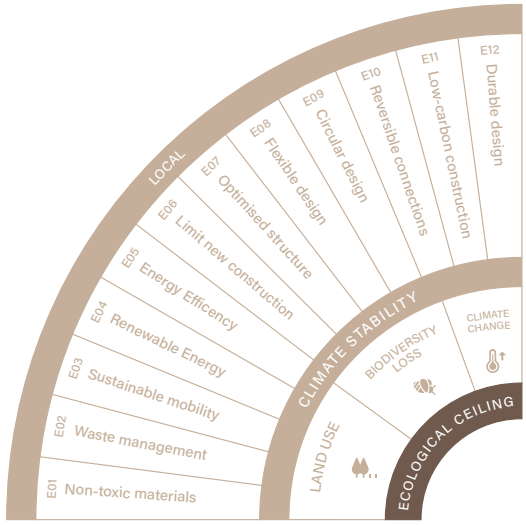


Figure 20: Local and global impact areas in the ecological ceiling of the Doughnut for Urban Development

ECOLOGICAL CEILING
CLIMATE STABILITY / LOCAL

Climate Stability Local

In the realm of urban development, achieving climate stability at the local level involves implementing various strategies on-site. This entails making well-informed procurement decisions, employing effective management practices, and incorporating thoughtful design choices that prioritise climate stability. Additionally, developing sustainable infrastructure and optimising operational energy design are essential components in ensuring climate stability throughout the project's lifetime. By integrating these measures into urban development projects can make significant contributions to mitigating climate impacts and fostering a resilient and sustainable future.



Case Study: The Swan
Impact Areas: E01, E02, E09

The Swan exemplifies responsible urban development with a strong focus on local climate stability. It embraces climate stability through the use of sustainable materials, circular design principles, waste management, and non-toxic materials. The project demonstrates a forward-thinking approach and aligns with indicators such as "E02 - Waste management" and "E09 - Circular design" by up-cycling old materials and giving them new value. Its reliance on recycled materials also enables the principles of "E01 - Non-toxic materials" and "E06 - Limit new construction" By adopting these strategies, The Swan effectively reduces waste, carbon emissions, and positively contributes to the local ecosystem.

City: Gladsaxe . Developer: Gladsaxe Municipality. Architect: Lendager
Year: 2022. Size: 1.436 m2

LOCAL

E01: Non-toxic materials
Use non-toxic, non-harmful building materials to ensure the long-term health and safety of labourers, tenants and natural environment. Specify low-voc and low off-gassing materials and when possible specify certified materials, such as 'Cradle to Cradle' and the 'Nordic Swan' label.

Example Indicator
% of low-VOC & certified materials

E02: Waste management
Specify products that are manufactured efficiently using additive design principles. Minimise on-site construction waste by designing with standard dimensions. Design a circular construction site to ensure material reuse.

Example Indicator
Amount of waste leaving site during construction

E03: Sustainable mobility
Develop on building sites that are well connected to public transportation to promote sustainable mobility practices such as walking, cycling, use of public transportation and ride-share options.

Example Indicator
Proximity to public transportation and alternative modes

E04: Renewable energy
Connect to renewable energy infrastructure for the construction site and the buildings operational phase to reduce dependency on fossil fuels. Where it makes sense from an LCA perspective, integrate energy production on-site.

Example Indicator
% of renewable energy and on-site production

E05: Energy efficiency
Reduce energy consumption in operation through design for passive heating and cooling, specify energy efficient, motion censored systems, and energy saving appliances. Design an active building envelope for heat retention and energy exchange. Use smart systems to identify areas of inefficiency with real-time data.

Example Indicator
Real-time energy measurement during operations

E06: Limit new construction
Limit new construction. Reduce dependency on virgin materials and minimise carbon emissions by utilising the existing building stock as a material bank. Maintain, preserve and re-use culturally significant and environmentally valuable buildings, elements and materials.

Example Indicator
Quantity of reused and preserved materials from existing buildings

E07: Optimised structure
Optimise structural dimensions and design to reduce material usage. Avoid over dimensioning and structural redundancy. Design the structure to have a long life, and loose fit.

Example Indicator
Reduction in materials achieved through optimized design

E08: Flexible design
Optimise building design for flexible use of space to reduce the need for new construction and allow for functional changes in use over time – in both short periods (daily, weekly) through shared spaces and double programming and longer periods where the buildings typology can change.

Example Indicator
Rate of building design flexibility for adaptable space

E09: Circular design
Design circular buildings to promote the preservation of material structural, thermal, environmental, and aesthetic value. Design with a digital twin and material passports to maintain material knowledge and accurately document lifespans.

Example Indicator
Ratio of projects with digital twins & material passports

E10: Reversible connections
Preserve material resources by designing for disassembly using reversible connections, circular building elements, and when possible, product service systems. When specifying technical (non-biogenic) elements use durable, high quality materials to ensure long lifespans.

Example Indicator
% of building elements designed for disassembly and durability

E11: Low-carbon construction
Promote circular and low-carbon construction sites by designing high quality waste handling practices and low-carbon machinery and construction techniques.

Example Indicator
Quantity of circular and low-carbon practices implemented on construction sites

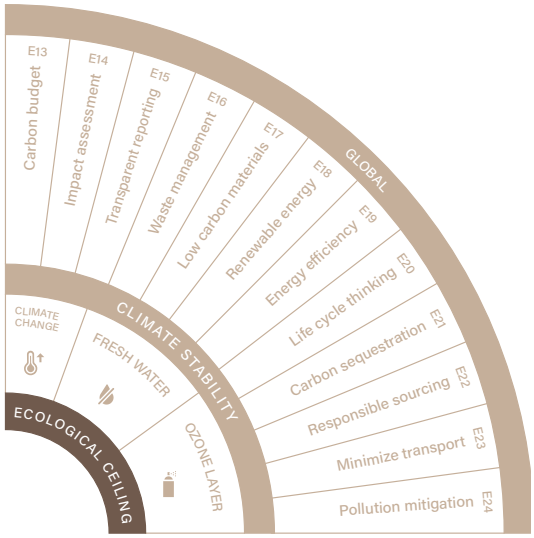
E12: Durable design
Design for durability, easy maintenance, and accessible repair to reduce the need for material exchange. Use appropriate and specific levels of material durability for the given function. For example, a high trafficked entrance will need a more durable material than a living space.

Example Indicator
Documentation rate of building projects with material durability and repair instructions

ECOLOGICAL CEILING
CLIMATE STABILITY / GLOBAL

Climate Stability Global

When it comes to global implications, climate stability in urban development reaches beyond the local scale. It requires taking into account global carbon budgets and targets, adhering to international agreements, embracing a life cycle thinking approach, and implementing strategies that extend beyond the immediate site. This entails considering off-site factors such as the production, procurement, and transportation of materials, as well as energy generation and waste management. By addressing these broader considerations, urban development can contribute to global efforts in achieving climate stability and support the transition to a more sustainable future.



Case Study: VELUX Living Places
Impact Categories: E13, E14, E15

VELUX Living Places is a pioneering initiative that places a strong emphasis on promoting healthy and sustainable living environments. With a global perspective on climate stability, this project strives to minimise its environmental impact by aligning with the Reduction Roadmap (2022) and specifically the "E13 - Carbon budget". To ensure a thorough analysis of its environmental footprint, the initiative incorporates industry standards like Building LCA and the "E14 - Impact assessment." Additionally, transparency is of great significance to VELUX Living Places as it actively promotes transparent reporting as per the "E15 - Transparent reporting" indicator to drive positive change within the industry. VELUX Living Places matches market price for single family home and row-houses and has a strong focus on indoor air quality and daylighting.

City: Copenhagen, Developer: VELUX Group, Architect: EFFEKT, Engineer: Artelia, Contractor: Enemaerke & Petersen, Year: 2023

GLOBAL

E13: Carbon budget
Set and comply with a carbon budget to ensure that your building project is within the planetary boundary for climate change. Use measurable targets to scale your building project within planetary limits.

Example Indicator
Compliance rate with carbon budget targets by assessing carbon footprint

E14: Impact assessment
Comply with relevant industry standards (such as Building LCA) for impact assessment. Relevancy is dependent on local / national frameworks for benchmarking building projects. Benchmarking building projects allows for project comparison and tracking of innovation progress.

Example Indicator
Achievement rate from recognized impact assessment standards and frameworks

E15: Transparent reporting
Be transparent in the documentation and reporting of the building impact assessment. Open source your novel innovations and best practice cases. Stay accountable and follow through on goals to scale building activity within planetary boundaries.

Example Indicator
Transparency rate in impact assessments

E16: Waste management
Promote resource reuse and efficient production to minimise supply chain waste in material extraction, production, and transportation to reduce negative environmental impacts.

Example Indicator
Quantity of reused resources and waste generated in the supply chain

E17: Low carbon materials
Source regional, low-carbon, biogenic, rapidly renewable, and regenerative building materials. Use reputable suppliers who comply with Environmental Product Declarations (EPD) standards.

Example Indicator
Ratio of low-carbon and renewable materials sourced from EPD-compliant suppliers

E18: Renewable energy
Specific building materials from suppliers who use renewable energy in extraction, manufacturing, and production processes across the supply chain to actively limit dependency on fossil fuel.

Example Indicator
% of building materials utilizing renewable energy in the supply chain

E19: Energy efficiency
Minimise energy consumption in extraction, manufacturing, and production processes. Identify energy- intensive processes across the supply chain and optimise those with energy-efficient equipment, efficient design process, waste reduction, automated systems, and smart controls.

Example Indicator
Rate of energy consumption reduction in extraction, manufacturing, and production

E20: Life cycle thinking
Adopt a life cycle perspective from the beginning of the design process by using LCA and LCCs to enable smart, qualified decision making to gain new knowledge about building design and ultimately lower building impact.

Example Indicator
Number of life cycle assessments and life cycle cost analysis conducted in design

E21: Carbon sequestering
Source materials with high-carbon sequestering qualities to use the building as a carbon sink, while minimising the buildings' carbon footprint.

Example Indicator
Quantity of carbon sequestered by building materials used in construction

E22: Responsible sourcing
Source certified and reputable materials that ensure long-term planetary health by minimising environmental impact such as deforestation, water pollution and resource exploitation.

Example Indicator
% of materials sourced from certified and reputable suppliers

E23: Minimise transportation
Minimise transportation impact through extraction, manufacturing, and production processes in the supply chain by specifying regional materials and working with suppliers whose operations are locally based. Specify light-weight materials, elements, and structural systems – transported with electric vehicles.

Example Indicator
Ratio of regional materials used and transportation-related emissions

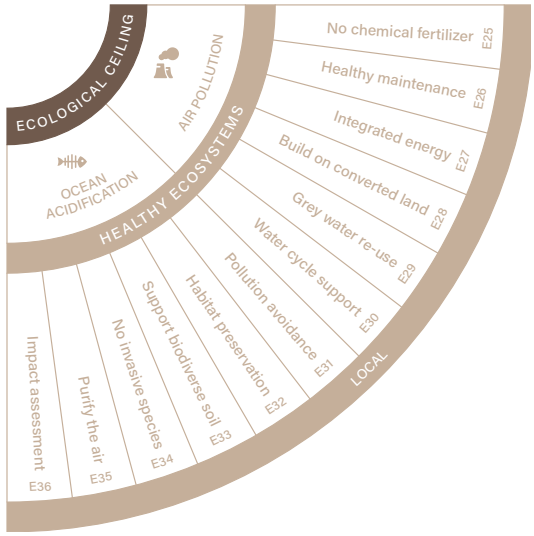
E24: Pollution mitigation
Mitigate pollution by avoiding the use of materials with dangerous chemical content, thereby ensuring the long-term health of workers and natural environments across the supply chain.

Example Indicator
Quantity of materials used with minimized dangerous chemical content

ECOLOGICAL CEILING
HEALTHY ECOSYSTEMS / LOCAL

Healthy Ecosystems Local

In the pursuit of promoting healthy ecosystems through local urban development, various strategies can be implemented to enhance and restore biodiversity and nature on-site. This involves making deliberate design decisions that minimise the use of chemical fertilisers, prioritize sustainable maintenance practices, re-purpose converted land for construction, safeguard existing habitats, and prevent pollution. By integrating these approaches into urban development projects, cities play a pivotal role in nurturing thriving ecosystems that support a wide array of plant and animal species. These strategies contribute to ecological equilibrium, enrich the natural environment, and yield numerous benefits, including improved air and water quality, heightened resilience to climate change, and enhanced overall well-being for both human inhabitants and wildlife populations.



Case Study: CPH Village Jernbanebyen
Impact Categories: E28, E36

CPH Village's new student housing in Jernbanebyen embodies a commitment to local healthy ecosystems, boasting wooden structure housing nestled amidst greenery and thriving wildlife vegetation. It is built in an area previously used for infrastructure logistics. The project site was covered by spontaneous vegetation and some large trees, partly planted, partly self-grown aligning with "E28 - Build on converted land." A biodiversity baseline survey was conducted, which guided the landscape design so that large trees were preserved where possible, living or lying for decomposition, and new vegetation established with native local species aligning with "E36 - Impact assessment."

City: Copenhagen. Developer: CPH Village. Architect: SLA, Arcgency, Year: 2020. Size: 4.100 m2

LOCAL

E25: No chemical fertilisers
Avoid the use of chemical fertilisers in the maintenance of open spaces and landscapes to stop eutrophication associated with runoff, thereby protecting the health of lakes, rivers, and other natural water resources.

Example Indicator
% of chemical fertiliser-free landscape maintenance practices

E26: Healthy maintenance
Avoid contaminants such as chemicals, plastics, NOx and SOx that harm on-site biodiversity and biosphere and fair.

Example Indicator
% of maintenance practices without contaminants harmful to on-site biodiversity

E27: Integrated energy
Avoid the use of land for local energy production and incorporate building-integrate renewable energy solutions such as solar PVCs on the buildings roof.

Example Indicator
% on-site energy from building-integrated renewableS, minimizing

E28: Build on converted land
Build high density developments, on already converted land. Do not develop greenfields, forests, or agricultural land suitable for natural restoration.

Example Indicator
Ratio of buildings on converted land vs. greenfields/agricultural land

E29: Grey water use
Conserve natural water resources by designing for the treatment and reuse of greywater on-site for purposes such as irrigation, toilet flushing, cooling systems, and watering non-edible plants.

Example Indicator
Quantity of greywater treated and reused on-site for various purposes

E30: Water cycle support
Support natural water cycles on-site by catching and cleaning water with permeable surfaces, natural cleansing systems such as reed beds, bioswales and "living machines" and redistributing clean water to the local water reserves.

Example Indicator
Quantity of water captured, cleaned, and redistributed on-site through natural systems

E31: Pollution avoidance
Avoid the pollution and disturbance of the local, natural ecosystem by avoiding artificial light pollution, noise pollution, and chemical pollution surrounding the building site.

Example Indicator
Compliance with pollution avoidance measures (light, noise, chemicals)

E32: Habitat preservation
Preserve and support the existing natural habitats and species diversity while designing new habitats that support local biodiversity. Use nature-based solutions in infrastructure such as parking, pathways, roofs, walls, water ways, gardens and the like.

Example Indicator
% of nature-based solutions integrated into infrastructure design

E33: Support biodiverse soil
Preserve natural, biodiverse soil on-site using phytoremediation and composting. By preserving soil, you contribute to maintaining a healthy ecosystems.

Example Indicator
Ratio of preserved biodiverse soil through phytoremediation and composting

E34: No invasive species
Maintain natural green spaces and monitor for invasive species. Work to remove non-locally adapted and invasive species when necessary.

Example Indicator
Compliance with invasive species monitoring and removal protocols

E35: Purify the air
Use photocatalytic coatings such as trees and other nature-based solutions to purify outdoor air quality, while improving thermal comfort and mitigating noise pollution.

Example Indicator
Rate of outdoor air purification using coatings and nature-based solutions

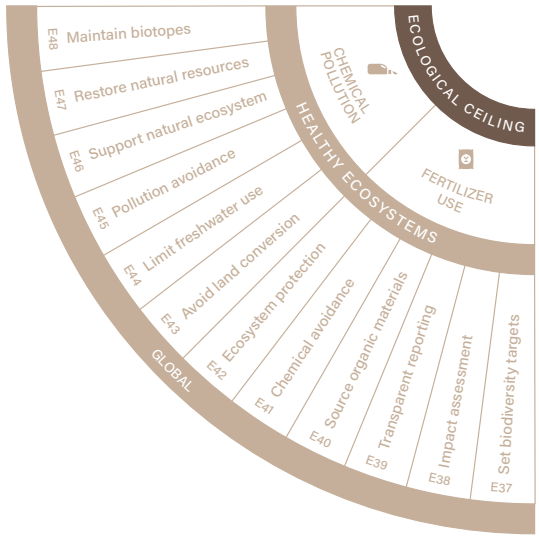
E36: Impact assessment
Engage with qualified, local, expert ecologist to conduct standardised and reputable biodiversity impact assessments on-site.

Example Indicator
Number of on-site biodiversity assessments conducted by qualified ecologists

ECOLOGICAL CEILING
HEALTHY ECOSYSTEMS / GLOBAL

Healthy Ecosystems Global

Promoting healthy ecosystems through urban development has a global impact that extends beyond local boundaries, considering off-site factors and adopting a life cycle thinking approach. It involves implementing strategies to enhance biodiversity and nature on a global scale by embracing sustainable practices, preserving natural resources, mitigating pollution, and setting biodiversity targets. By incorporating nature-based solutions like sustainable land use planning, urban development can contribute to the preservation and restoration of ecosystems worldwide. Urban development can play a crucial role in safeguarding biodiversity and fostering a sustainable planet. These actions have profound benefits, including climate regulation, water resource management, and the preservation of vital ecosystem services that support life on Earth.



Case Study: Kajstaden Tall Timber Building
Impact Categories: E40, E41

The Kajstaden Tall Timber Building prioritises the integration of healthy ecosystems in urban development with a global perspective. It showcases this commitment, by sourcing local organic materials, particularly timber, and promoting sustainable construction practices, aligning with the “E40 - Source organic materials” indicator. The project exemplifies the potential of tall timber buildings constructed mainly with wood as a sustainable alternative to conventional construction methods. It emphasises the use of locally available materials, in line with the principles of chemical avoidance during transportation as outlined in “E41 - Chemical avoidance”.

City: Västerås. Developer: Trenum Västerås AB. Architect: C.F. Møller.
Year: 2019. Size: 2.400 m2

GLOBAL

E37: Set biodiversity target
Set and comply with a biodiversity target to ensure your building project impact is within planetary limits for biodiversity and works towards the regeneration of a healthy ecosystems.

Example Indicator
Compliance with biodiversity targets for ecosystem regeneration

E38: Impact Assessment
Engage with qualified, local, expert ecologists to conduct standardised and reputable biodiversity impact assessments off-site.

Example Indicator
Number of off-site biodiversity assessments conducted by qualified ecologists

E39: Transparent reporting
Be transparent in the documentation and reporting of the building impact assessment. Share your novel innovations and good cases.

Example Indicator
Transparency in impact assessments and documentation of innovative practices

E40: Source organic materials
Source organic materials that are grown without the use of chemical fertilisers in the supply chain, to minimse impact on local ecosystems.

Example Indicator
% of organic materials sourced from chemical-free supply chains

E41: Chemical avoidance
Avoid pollution by limiting the use of chemicals and plastics in the production and transportation of building materials.

Example Indicator
Reduction in chemical and plastic usage in building material production

E42: Ecosystem protection
Reduce extraction of virgin materials such as rock, sand and timber for the construction of buildings and landscapes to protect natural and healthy ecosystems.

Example Indicator
Reduction in extraction of virgin materials for ecosystem protection

E43: Avoid land conversion
Avoid land conversion for energy production across the supply chain. Procure energy from production sites on already converted land, from suppliers who actively work to regenerate the land.

Example Indicator
Ratio of energy sourced from converted land and regenerative suppliers

E44: Limit freshwater use
Limit the use of groundwater and fresh surface water in the supply chain by using grey water to produce building materials.

Example Indicator
% reduction in freshwater consumption through greywater use

E45: Pollution avoidance
Reduce off-site artificial light, noise pollution, disturbance and chemical pollution of surrounding natural ecosystems across the supply chain.

Example Indicator
Compliance with measures to minimize off-site pollution

E46: Support natural ecosystems
Source building materials that do not reduce habitat quality, genetic diversity, or functional biodiversity.

Example Indicator
% of building materials sourced without compromising biodiversity and habitat quality

E47: Restore natural resources
Restore natural resources and avoid overexploitation by balancing the rate of natural material consumption with the ability of that material to regenerate at a natural rate.

Example Indicator
Ratio of restored resources to consumption considering regeneration capacity

E48: Maintain biotopes
Maintaining biotopes is essential for the preservation of biodiversity, ecological balance, and the sustainable provision of virgin resources, safeguarding unique species and ecological processes that they support, while promoting sustainable land and resource management.

Example Indicator
Compliance with biotope maintenance practices for biodiversity preservation and land management