STARfish

The Net-Positive Design App

**NET-POSITIVE DESIGN ACTIONS and OUTCOMES
are now MEASURABLE with the 'STARfish' app**

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Download STARfish for free from http://netpositivedesign.org

BACKGROUND

There are myriad green building rating tools promulgated by national, state and local governments - as well as professional organizations. For instance:

LEED, BREEAM, Green Star, WELL, LBC, Green Mark, Estidama Pearl, GBI, CASBEE, Green Mark ,
EDGE, GreenPoint, LOTUS, GRESB, GBCR, GBCH, Nabers, NatHERS, Basix,

They exclude many sustainability issues, but also have basic structural flaws - which the STARfish resolves.

STARfish corrects 3 dozen fundamental flaws with standard certification tools, including LCA- based tools.
STARfish could integrate regulations such as OHS, Building and Planning Codes, etc. on one platform.

The STARFIsh can:

- *integrate the myriad regulations, standards and metrics of the various building approval authorities*
- *Display cumulative impacts from the earliest design stages and be refined as the design progresses*
- *Provide a collaborative platform for team members in different locations to work together on*
- *Stimulate multi-functional and socio-ecologically net-positive design for buildings, cities or products*
- *Provide an automatic, totally transparent report that all stakeholders can understand and learn from*
- *Calculate total scores for design elements and whole projects automatically while the design evolves*
- *Include nature-based low-cost solutions that are available but not compatible with prescriptive tools*
- *Relies upon reason and design thinking, not upon the imposition of values or belief systems.*

Basic STARfish (with a sample satellite diagram)
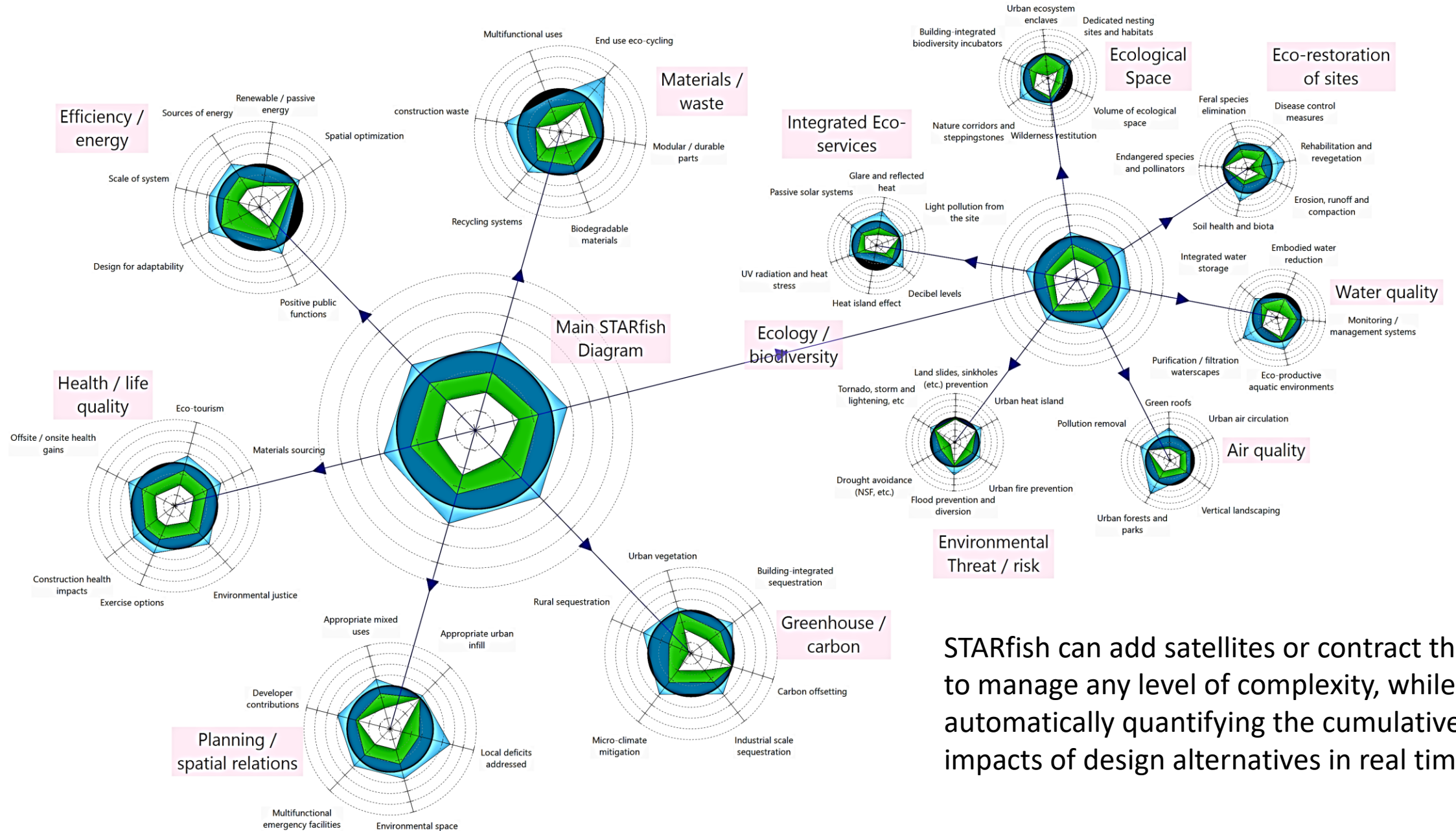
STARfish can add satellites or contract them to manage any level of complexity, while automatically quantifying the cumulative impacts of design alternatives in real time.

BACKGROUND to STARfish

DP (Dominant Paradigm) tools

*Design and assessment tools currently lock in the DP. They only aim for 'more good' or 'less bad'
- and only reduce their added negative impacts relative to typical buildings, practices and other norms.*

Zero impact goals ignore the central role the built environment plays in compounding, accelerating extinctions and ecosystem losses, discrimination, environmental risks, disparities of wealth, etc.

PD (Positive Development) theory and tools reverse the DP

PD theory reverses all aspects of contemporary sustainability thought: conceptual, institutional, practical, etc., including upending accreditation and assessment tools and metrics.

PD uses real world sustainability baselines

Net-positive *design sets zero at sustainable biophysical conditions. It makes increasing total social and natural life-support systems (increasing nature and justice) the central aim of design.*

Net zero *is only about impact reduction for efficiency when 'genuine efficiency' requires multifunctional, adaptable design that maximizes the public benefits of resources.*

Positive Development (PD) baselines

- ***For nature:*** *the* ***'ecological base'*** *- increasing nature beyond pre-urban or pre-industrial conditions*
- ***For environmental justice:*** *the* ***'public estate'*** *- Improving social conditions in the region.*

KEY POINTS reviewed

Positive Development *encompasses the basic principles of passive, adaptable, multifunctional and nature-based design (i.e. bioregional, permacultural, biomimetic, biophilia, etc.). These green design principles were around for decades but still need to be integrated into the design process.*

However, a net-positive development must achieve 'beyond zero' positive gains overall - where zero is sustainable conditions - not 'pre-construction' conditions.

> *Physical structures must address **overshoot**: whole-system (global) consumption, pollution, inequities, biodiversity losses, etc., while increasing social and natural life-support systems.*

STARfish *integrates the opposing and conflicting hard-v-soft or qualitative-v-quantitative paradigms (and other false dualisms of modernity) and resurrects reason as a method.*

- ***Rating tools:***

> ***Quantitative*** *rating tools measure things against rules derived from current best practices.*

> ***Qualitative*** *rating tools are just (old) design review processes with subjective awards schemes.*

- ***Assessment tools*** *(LCA, EIA, BIM, etc.) require basic designs to assess, so they forfeit design opportunities. STARfish can incorporate their criteria and calculations.*

PD REVERSES ALL BASIC CONCEPTS BEHIND RATING TOOLS

Some advantages of STARfish

See *Positive Development* (2008) and *Net-Positive Design* (2019) for more advantages -

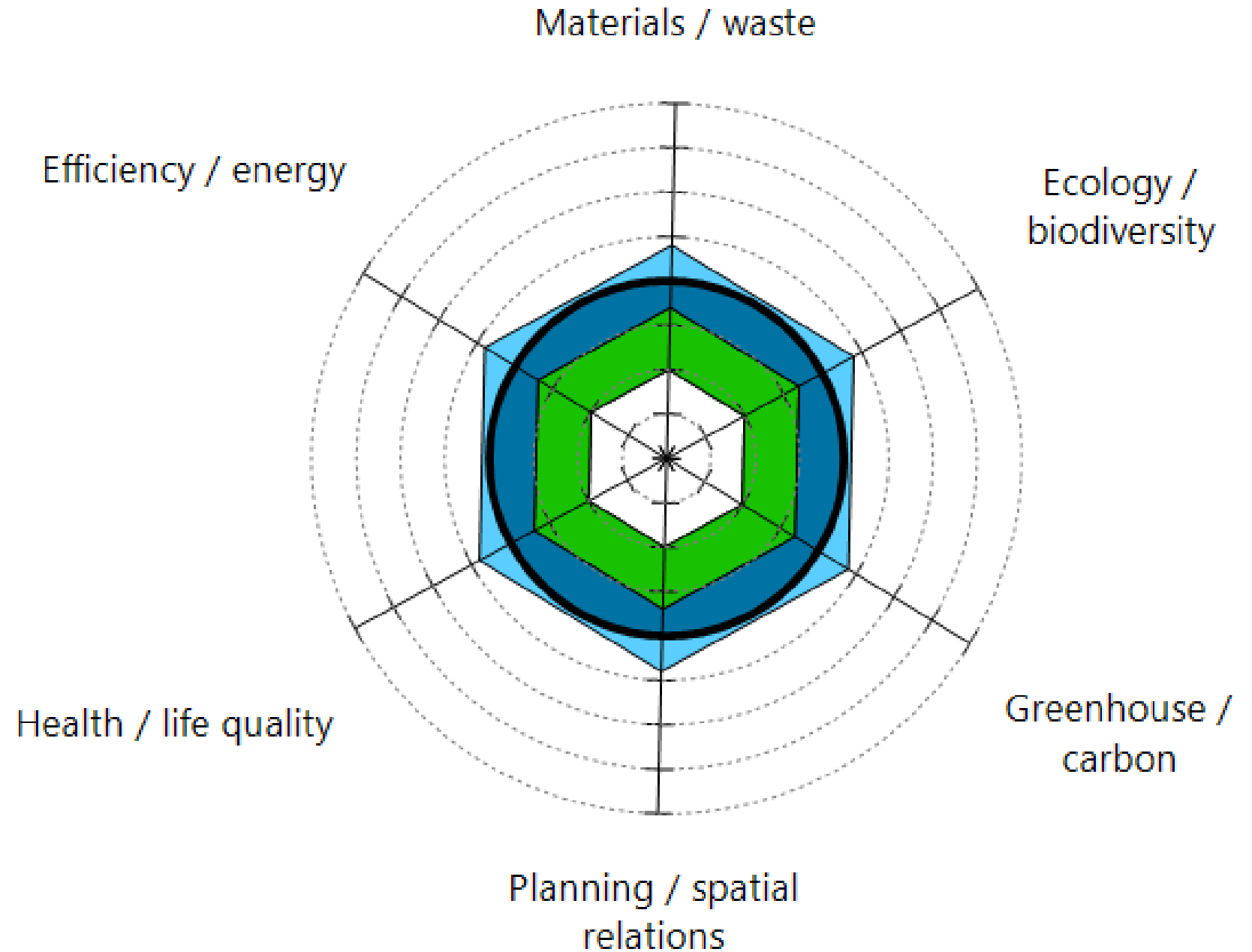As well as the theory, methods, processes and assessment of Positive Development

- Front-loads and guides design and is not a prescriptive, rule-based form of assessment.
- Encourages impact avoidance and product substitution by design not just reduction.
- Sets real whole-system sustainability standards not 'less bad than the norm' targets.
- Assesses net-positive as well as regenerative gains and does not label mitigation 'positive'.
- Sets benchmarks and redefines the 'zero' baseline as fixed, biophysical conditions.(v. current norms)..
- Incentivizes multifunctional or adaptable design, which are essential to 'genuine efficiency'.
- Avoids system boundaries, such as property lines, ownership, building envelopes or legal liability.
- Can respond to unique contexts, project scales, climates, building types, site conditions or briefs.
- Communicates visually and provides a 'gap analysis' to highlight unique problems and opportunities.
- Considers how design can affect global consumption, pollution, injustices in positive ways.
- Can be fun, cooperative, and promote interactive, participatory design (including online).
- Does not treat industry as the primary or more valued client and can respond to critique rapidly.
- Does not circulate case studies that make claims without any real evidence of actual gains.
- Helps to increase ecosystems or biodiversity in real terms beyond pre-urban conditions.
- Does not label actions that really only benefit humans as ecological or environmentally positive.
- Encourages design for potential future retrofitting to avoid long-term demolition waste.
- Includes provision for ecological uncertainty and provides safety factors, not just balancing risks.
- Being free, may also be used for ordinary projects that have no motivation to seek certification.
- Permanently displays visually where negative impacts were caused even if mitigated by design.
- Does not convert living things to surrogate 'dead' units as if they could be amortized or offset.
- Does not centre on mitigation (recycling, regeneration or reduction) and rewards synergistic design.
- Can assess highly complex projects, even cities, as it can expand infinitely in a fractal pattern.
- Forces transparency in criteria, scoring and assessment via to the automated 'Design Report'.
- Enables students, designers and developers to learn from the experiences and innovations of others.
- Can be modified for different codes, and can link to data, technical tools, precedents, or illustrations.
- Reminds designers of socio-ecological issues not yet included in assessment tools .... etc., etc., etc.

The Basic STARfish
(for simple projects)

The simple version of STARfish consists of 6 impact categories represented as Legs (radii).

Each of these 6 nodes shown have 6 sub-categories. These 36 sets of criteria show up via DATA in the menu.

More Legs or Satellites can be added to either the Main Diagram or any sub-categories.

Materials / waste

Ecology / biodiversity

Greenhouse / carbon

Planning / spatial relations

Health / life quality

Efficiency / energy

THE STARFISH

STARfish goes beyond radar or spider diagrams in **three** major ways.

1. the SATELLITES

More variables can be considered by adding Satellite diagrams. This enables assessing cumulative impacts.

A total score and scores for Satellites are automatically summed in real time.

2. Sustainability STANDARDS

The STARfish baselines and benchmarks are based on genuine sustainability standards.

Other assessment tools rate projects relative to the norm - current norms, exiting site conditions or best practices, etc.
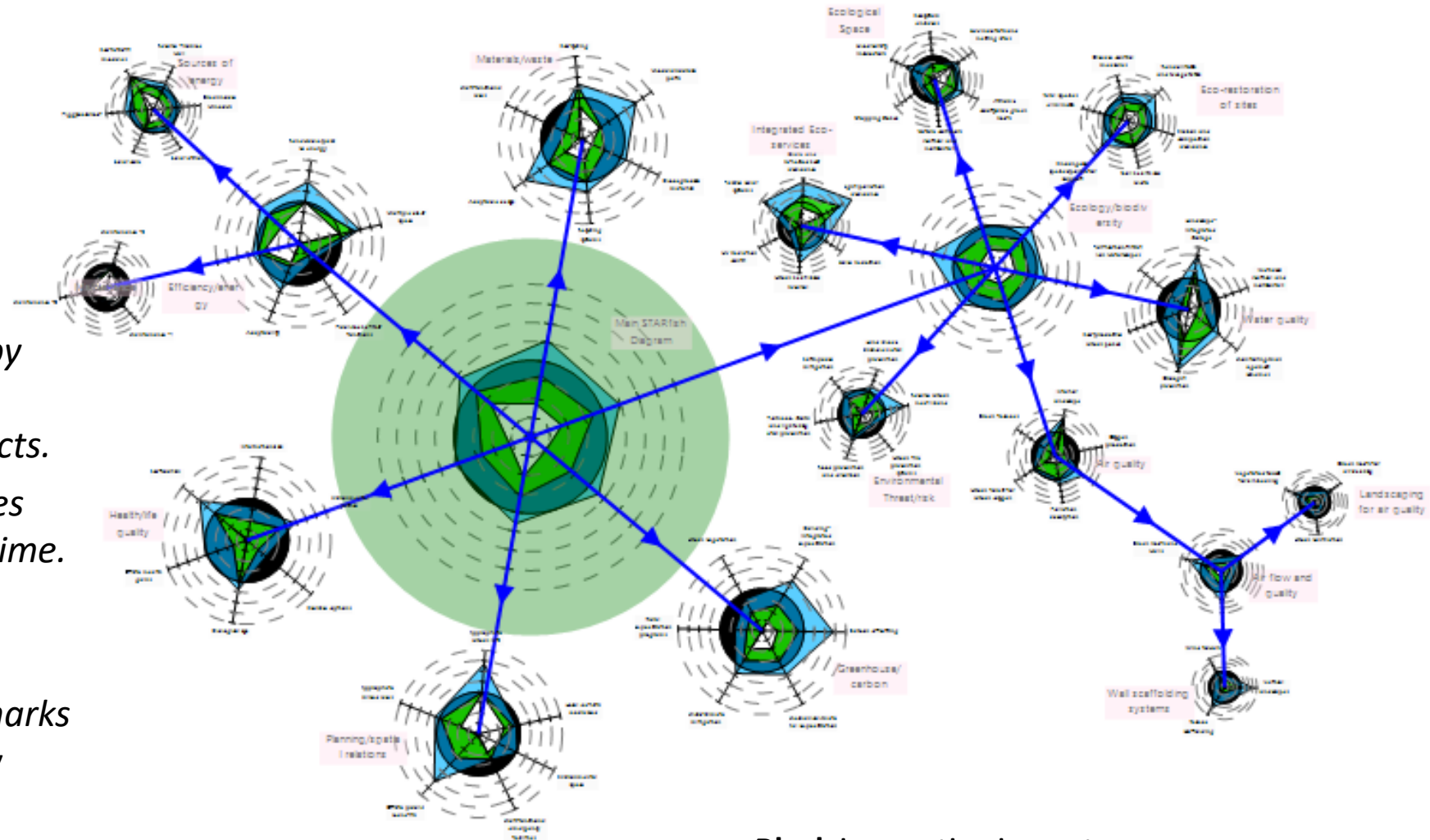
- **Black** is negative impact.
- **White** is reduction in negative impact.
- **Green** is restorative/regenerative impact.
- **Blue** is positive + net-positive impact.
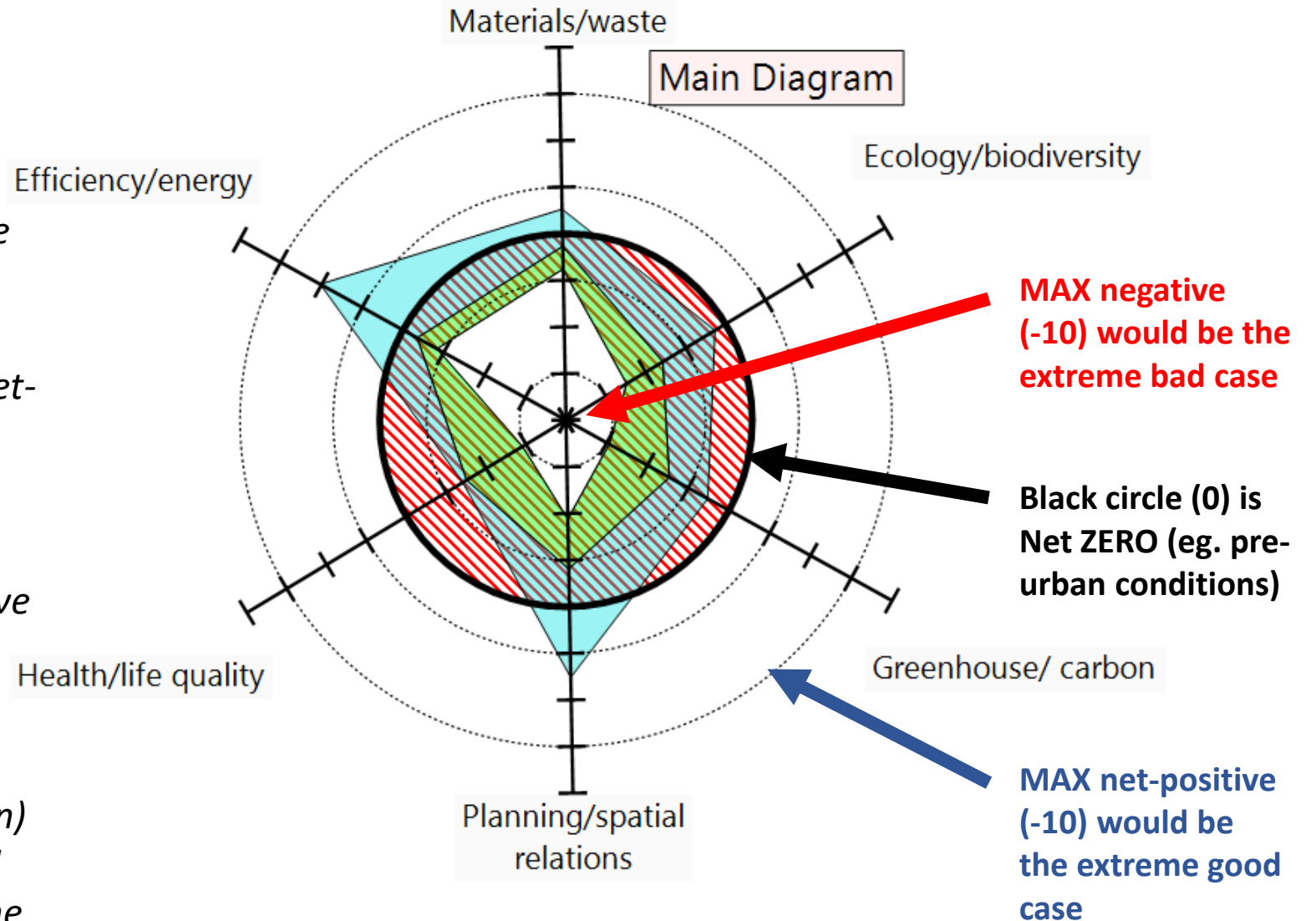
SCALE on STARfish

3. The SCALE

Radar diagrams avoid having to convert things to common units (energy, money, carbon, etc.).

However, they only go from 0 to +1 (more gain), or 0 to -1 (less harm).

This conceals negative and cumulative impacts behind remediation and omits net-positive impacts.

*The **STARfish** scale - from negative (-10 to 0) to regenerative '0' to net positive (0 to +10) distinguishes negative, regenerative, and net-positive impacts.*

*This '**ZeroStar**' diagram (preferred version) shows the objective is to achieve 'beyond net zero' outcomes - which are outside the red area in the dark '0' circle in the middle.*

Materials/waste

Main Diagram

Ecology/biodiversity

Efficiency/energy

MAX negative (-10) would be the extreme bad case

Black circle (0) is Net ZERO (eg. pre-urban conditions)

Health/life quality

Greenhouse/ carbon

Planning/spatial relations

MAX net-positive (-10) would be the extreme good case

SATELLITE DIAGRAMS

*New impact factors can be added as a new **Radii,** or as a new **Satellite** (set of related impact factors).*

This shows the Basic diagram with a sample Satellite attached to the Ecology/ biodiversity impact radii.

This Satellite can be expanded into any number of radii or sub-Satellites.

*Satellites accommodate ever more **specialist** site/project issues (transport, indigenous cultures, elderly access, endangered species, unique sites and conditions, etc.).*

*Since satellites could expand in a **fractal** pattern to infinity, a whole town, nation or the planet could theoretically be calculated.*
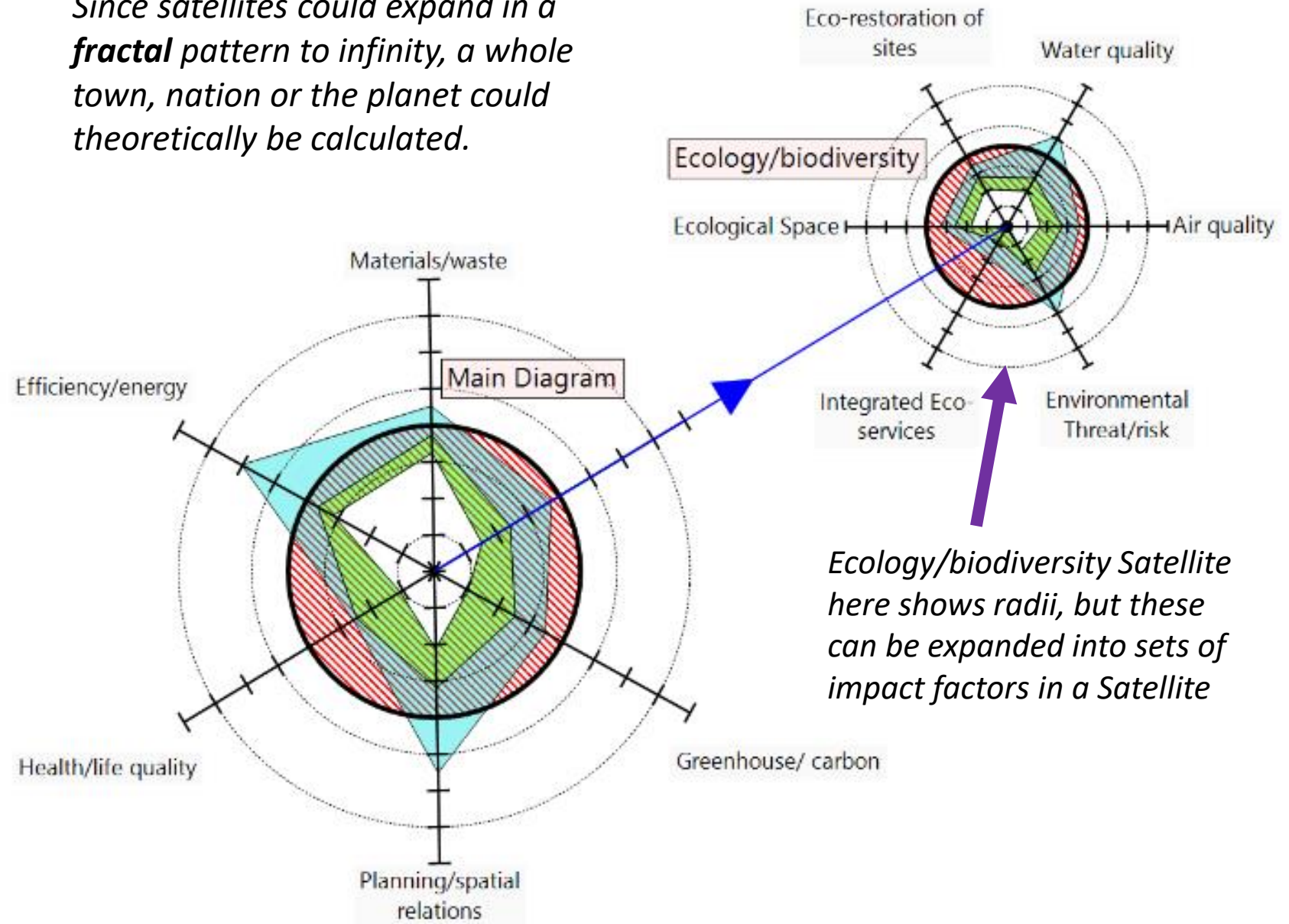
Ecology/biodiversity Satellite here shows radii, but these can be expanded into sets of impact factors in a Satellite

TO BEGIN

Download the free software from http://netpositivedesign.org

Select 'advanced STARfish', or, for a simple project, the 'basic STARfish'.

The ecological satellite is already prepared as an illustration. The other 5 main impact factors will have benchmarks added when time allows.

To add additional impact factors, follow the given rules for weightings and benchmarking. Instructions are on the website and in the tool itself.

NOTE: It is important to keep saving data when you enter them.

You will use the black menu at the top, and especially the 'DATA' function most often.

Instructions pop up automatically in red writing as reminders about what to do.

Settings | Data | Designer | Starfish | Closeup

No save file

New Advanced STARfish
New Basic STARfish
Save
Save As
Open
Export Image
Export Excel
Create Report
App Font Sizes
About

Data edit mode: Left click on a diagram to change focus to it. Right click to zoom in and out of focused diagram

Total Score

Total Score: 2.0

SELECT GRAPHIC PREFERENCES
(or simply use given ones)

*To change the diameters of, and distances between, diagrams, etc., select '**Designer**' in menu.*

*To change to graphics such as diagram type, line thickness, colors, patterns, etc., select '**Starfish**' in menu.*

Close up button (or right click and right click and scroll mouse).
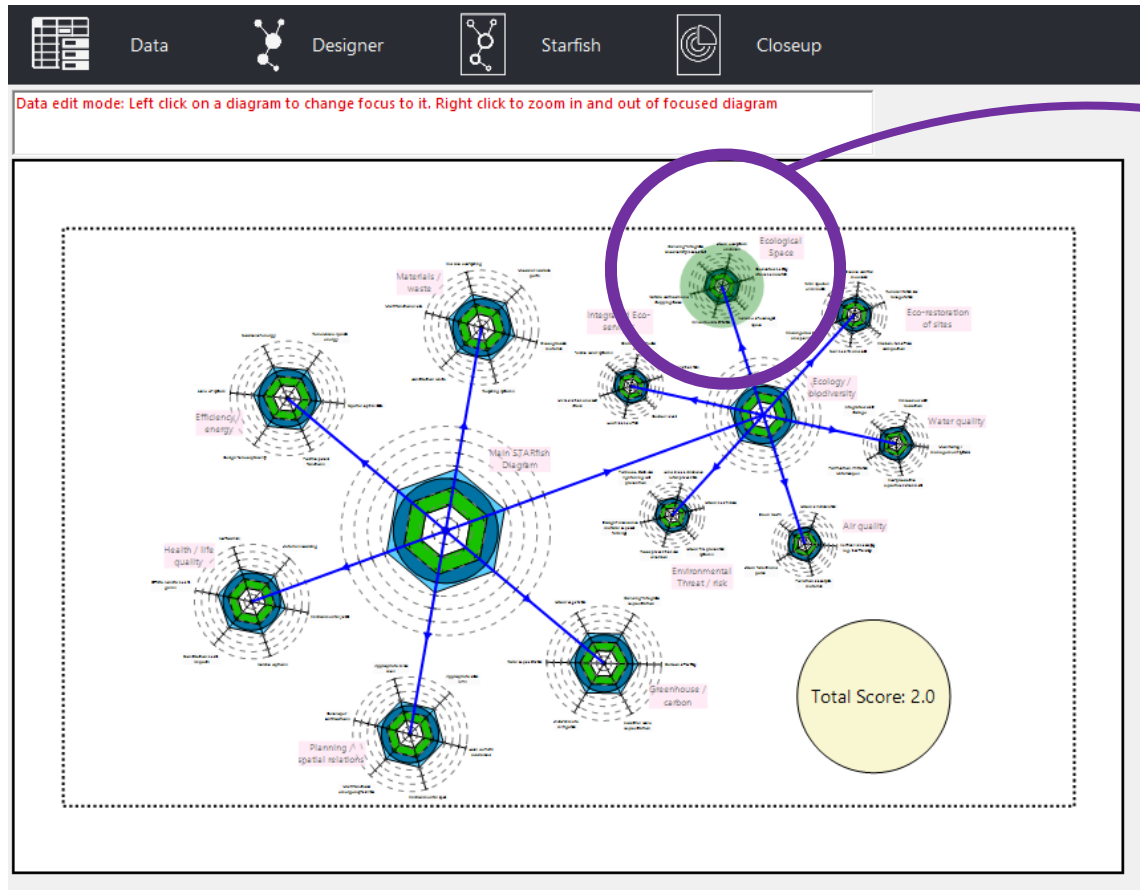
Data edit mode: Left click on a diagram to change focus to it. Right click to zoom in and out of focused diagram

Data | Designer | Starfish | Closeup

Total Score: 2.0

Building-integrated biodiversity incubators

Urban ecosystem enclaves

Dedicated nesting sites and habitats

Nature corridors and steppingstones

Volume of ecological space

Wilderness restitution

To zoom in or out with the mouse, be sure that the 'hover' is on in the mouse settings on your computer.

DIAGRAM ALTERNATIVES

*Choices of diagrams* include a bar diagram, a pie chart diagram, a diagram that just shows net impacts, etc.

All graphic features can be instantly modified for various communication or aesthetic purposes.

New impact factors, scores, weightings and benchmarks for new criteria must follow PD rules stated below, the website and book.

Select Starfish in the menu to choose different kinds of diagrams.

These are all the same impacts displayed in alternative ways.
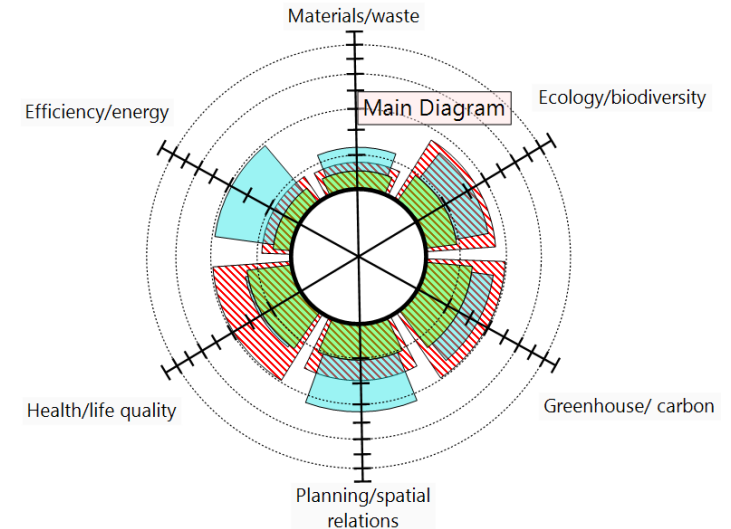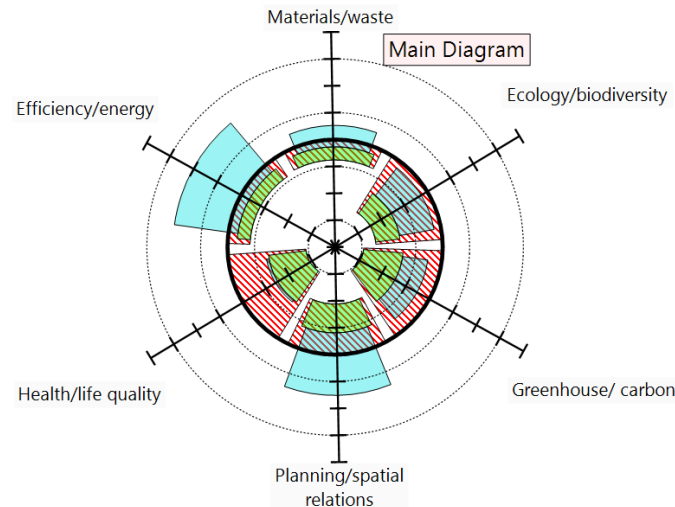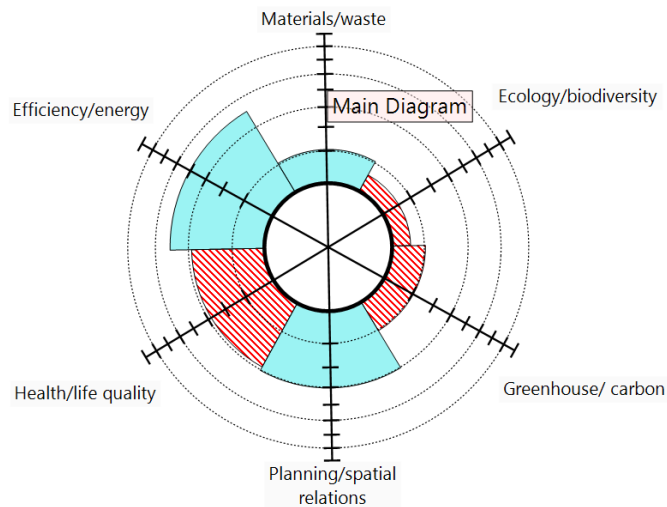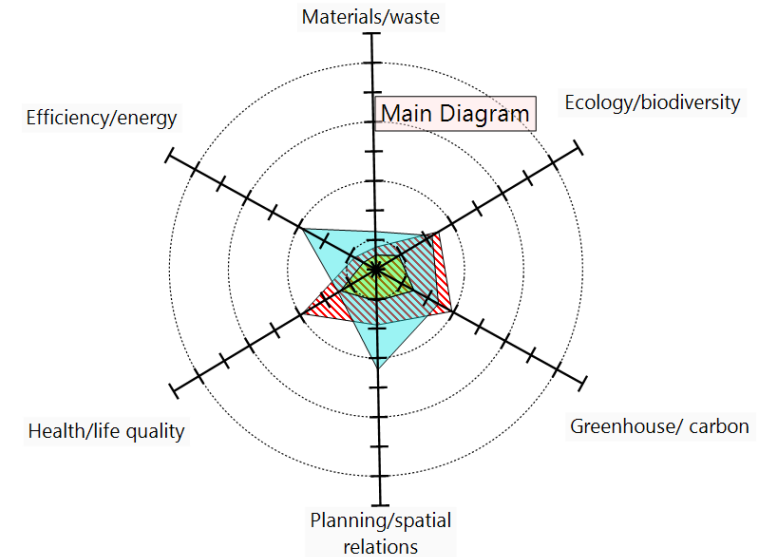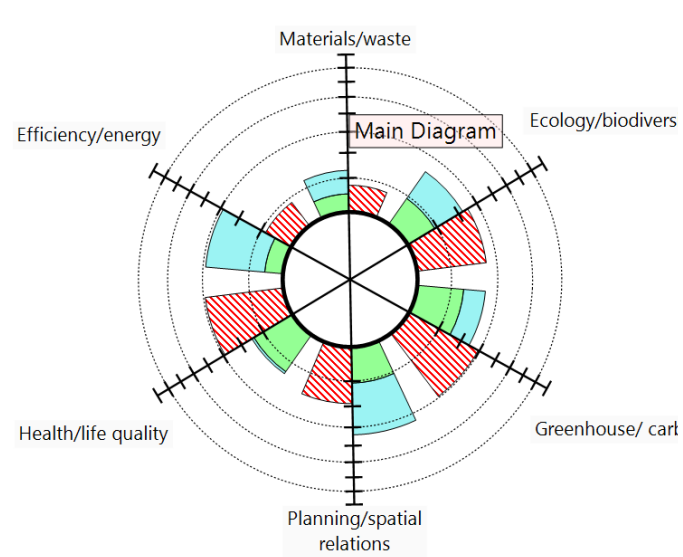
DATA BOX: IMPACT DEFINITIONS

*Select an impact category, go to **Data** and the corresponding impact sub-categories will pop up as shown.*

*When you click on one it high-lights, and the **definition** pops up in the box below.*

*A **scroll bar** saves space and allows longer explanations if necessary.*

The definition states the reason for having the criteria and the way it is measured.

*There is a place to attach **new sub-diagrams** to the Satellite if the impact factor calls for more in-depth analysis.*

The weighting for the impact factors is also shown here. (A later slide shows how to change weightings).

Ecological Space

Edit Ecological Space layout

Impact categories:

Urban ecosystem enclaves

Building-integrated biodiversity

Nature corridors and steppingstones

Wilderness restitution   Volume of ecological space

Dedicated nesting sites and habitats

Volume of ecological space

Ecological space refers to eco-productive spaces in the built environment that provide ecological functions and serve as a safety factor for biodiversity protection. For example, many important medicinal plants are becoming extinct globally, due to climate

No subdiagram attached: Attach new subdiagram
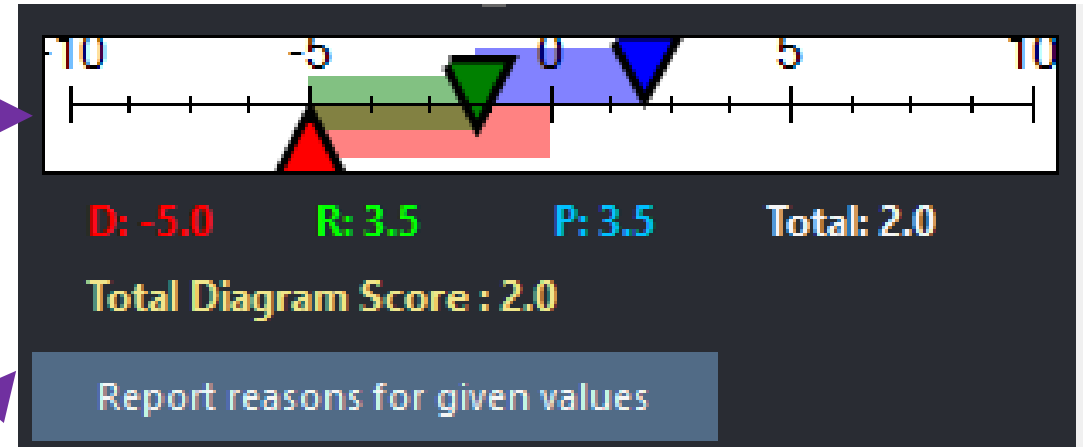
Category weight :   16.7%

SLIDERS

*A Slider is used to estimate the impact for each factor. The **Scores** are automatically calculated and displayed on the diagrams.*

*Estimate the **location** of each slider relative to basic (negative, restorative, and net-positive) benchmarks. The **benchmarks** appear instantly when you select and move the sliders: **Red** = negative, **Green** = restorative and **Blue** = net positive.*

*Then you select **'report reasons'**. This allows anyone to check the evidence and reasoning and to suggest improvements. It also serves to educate others (unlike most case studies that are only promotional).*

*New **benchmarks** can be added when you add new design criteria, want unique criteria for a particular project or want specific metrics (eg. kWh/sq.m).*

The main 36 benchmarks are locked in to avoid altering the basic PD principles. (Cheating on benchmarking evidence or rationales would be visible.)

D: -5.0   R: 3.5   P: 3.5   Total: 2.0

Total Diagram Score : 2.0

Report reasons for given values

Negative score : -5.0
Closest benchmarks...
-5 : The basic plan/concept is sited near a wilderness, ecologically valuable environment, a stream that feeds into these areas and so on, even if it does not damage such areas directly. .

Restoration score : 3.5 (70%)
Closest benchmarks...
2.50 (50%): The development is somewhat near a sensitive natural environment, but a buffer zone is

Edit benchmarks

SLIDERS

When the Sliders are moved for the impact factors shown, the diagram changes. This shows:

- **White**: *the reduction of (negative) impacts.*
- **Green**: *the restoration to sustainable conditions.*
- **Blue**: *the increase in ecological gains beyond zero*

The 'net net-pos diagram' sums the total negative and positive outcomes.

Axis and rulers | Global Starfish | Diagram Type

Select diagram type

ZeroCircle (Pie) | Overlap (Pie) | Net Neg-Pos
ZeroCircle (Star) | Overlap (Star) | Bar Chart

ZeroCircle-Star specific options

Trace edges :   On
Thick zero circle :   On
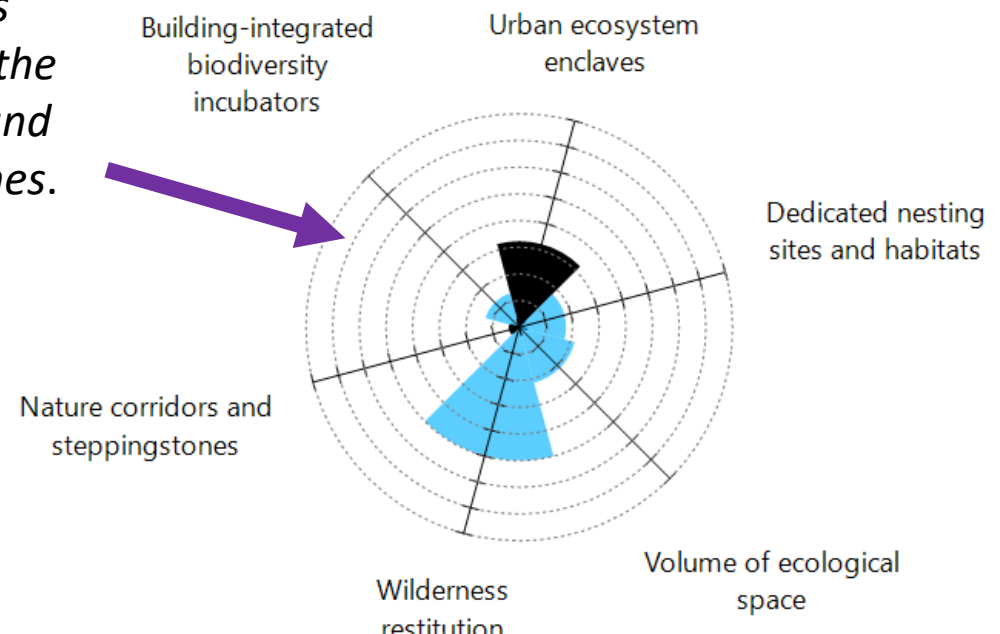
REPORT REASONS AND EVIDENCE

*The **reasons** and evidence can be typed into the boxes or prepared in word elsewhere and pasted in. The negative, restorative/regenerative and net-positive **impacts** must be stated.*

Ecological restoration and social revitalization are not counted as net positive. The Positive Development standards refer to whole-system sustainability.

*The STARfish is **transparent** in both the origin of the tool and what is assessed on how, what the user/designer claims and why. The assessment by any third party must also be totally transparent.*

*Evidence and reasons will all be automatically formatted in the **Design Report** with their separate diagrams.*

*Where any energy, carbon or resource efficiency targets are used that are not (yet) provided in the STARfish, the design team can add benchmarks, **provide links** to the relevant data set or ancillary assessment tools or product websites to back up their calculations in the report.*

Insert reasons for the scores given in the Data Panel. The text inserted here will appear in the final report when you export it.

Wilderness restitution

Insert reasons for the category weight here (W = 17%)

Insert reasons for negative score here (D = -5.0)

Insert reasons for restorative score here (R = 3.5)

Insert reasons for positive score here (P = 3.5)

Save & close   Save   Cancel

ATTACH NEW IMPACT FACTORS

Select the parent diagram to add a new Satellite.
*Then go to **Data** and select 'attach new sub-diagram'.*
Specify the number of impact factors (can add more later).

How many impact categories should the new diagram have?

3

Ok   Cancel

New sub-diagrams must have **at least 3** radii or impact factors.
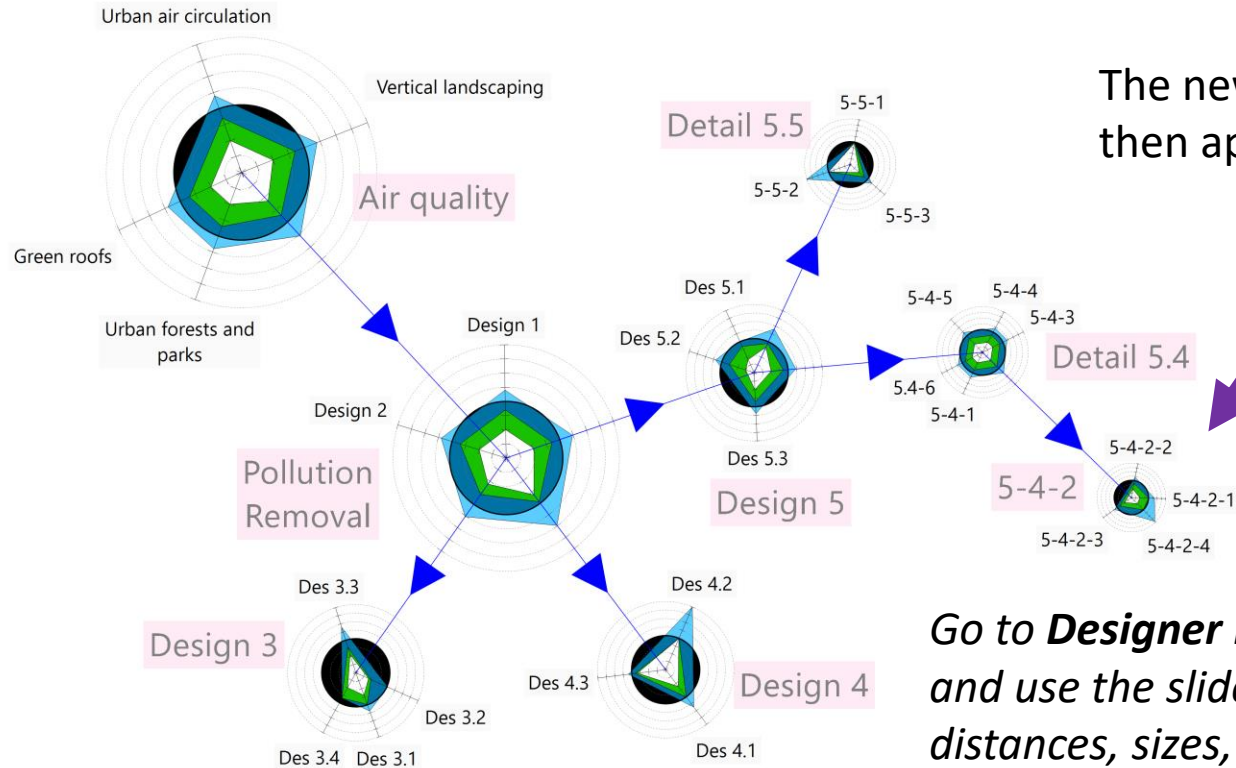
The new Satellite diagram then appears

Focus diagram settings:

Air quality

Distance :   100.0%

Radius :   75.0%

Child Distances :   100.0%

Child Radii :   100.0%

Rotation
57.0°

Include this diagram in STARfish?

Same as parent

Yes

No

*Go to **Designer** in the menu bar and use the sliders to adjust the distances, sizes, and so on.*

To rotate diagrams, select the parent diagram, and turn wheel.

Urban air circulation
Vertical landscaping
Air quality
Green roofs
Urban forests and parks
Pollution Removal
Design 1
Design 2
Design 3
Des 3.3
Des 3.2
Des 3.4   Des 3.1
Des 4.2
Des 4.3
Design 4
Des 4.1
Des 5.1
Des 5.2
Des 5.3
Design 5
Detail 5.5
5-5-1
5-5-2
5-5-3
5-4-5   5-4-4
5-4-3
5-4-6
5-4-1
Detail 5.4
5-4-2
5-4-2-2
5-4-2-1
5-4-2-3   5-4-2-4

ADD BENCHMARKS
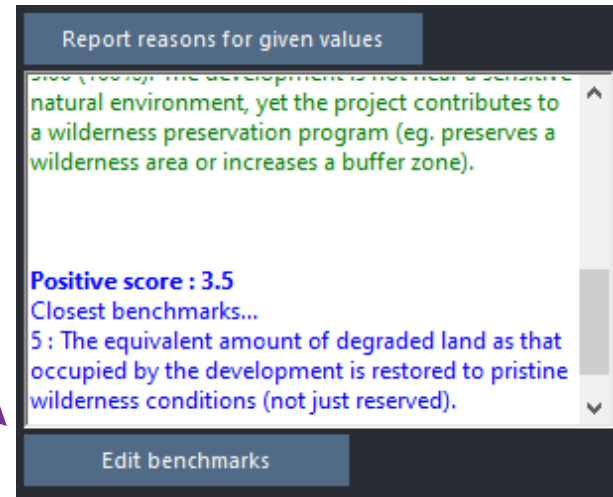
*Select '**Edit benchmarks'** and a box pops up. Add more nodes on the scale or criteria if this is helpful.*

These can be from other tools, such as Greenstar, LEED, BREAM, etc. or LCA criteria

*To create benchmarks for a new impact factor, **select** the logical place on the slider scale to and a bar appears. Be sure it corresponds to the STARfish rules and not the claims of the other tool.*

*State the description and the **logic** behind the benchmark. This will all appear in the automated Design Report.*

The benchmarks for new criteria must follow the rules on the website and fundamental baselines (later). This is self-policing due to the total transparency, again:

- *▪ **reasons** for the way the tool is designed*
- *▪ **reasons** given by the user for the scores*
- *▪ **reasons** by a third-party assessor for challenging any scores.*

Report reasons for given values

natural environment, yet the project contributes to a wilderness preservation program (eg. preserves a wilderness area or increases a buffer zone).

Positive score : 3.5
Closest benchmarks...
5 : The equivalent amount of degraded land as that occupied by the development is restored to pristine wilderness conditions (not just reserved).
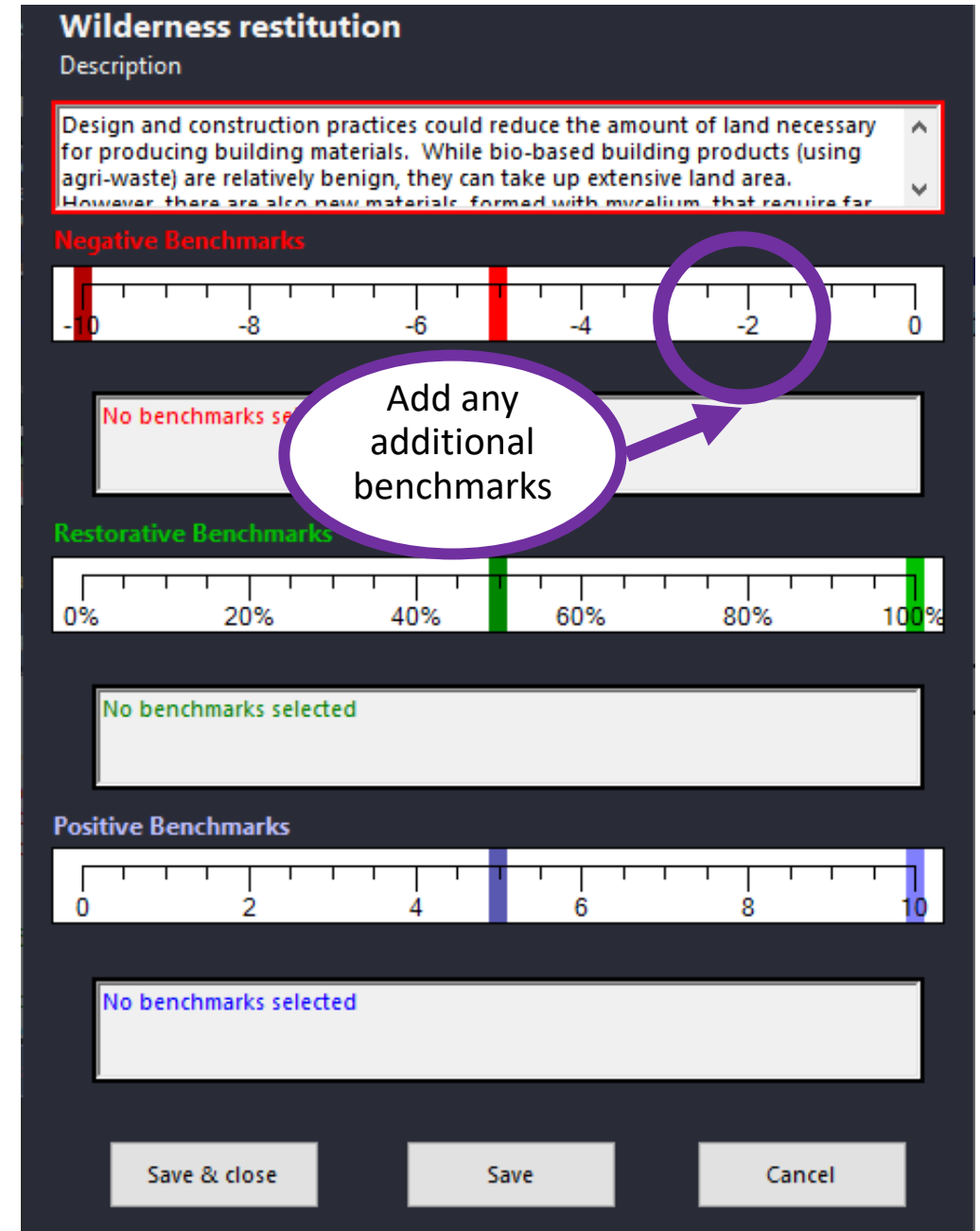
Edit benchmarks

Wilderness restitution
Description

Design and construction practices could reduce the amount of land necessary for producing building materials. While bio-based building products (using agri-waste) are relatively benign, they can take up extensive land area. However, there are also new materials, formed with mycelium, that require far

Negative Benchmarks

-10   -8   -6   -4   -2   0

No benchmarks se

Add any additional benchmarks

Restorative Benchmarks

0%   20%   40%   60%   80%   100%

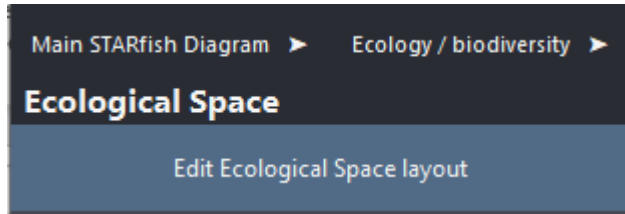No benchmarks selected

Positive Benchmarks

0   2   4   6   8   10

No benchmarks selected
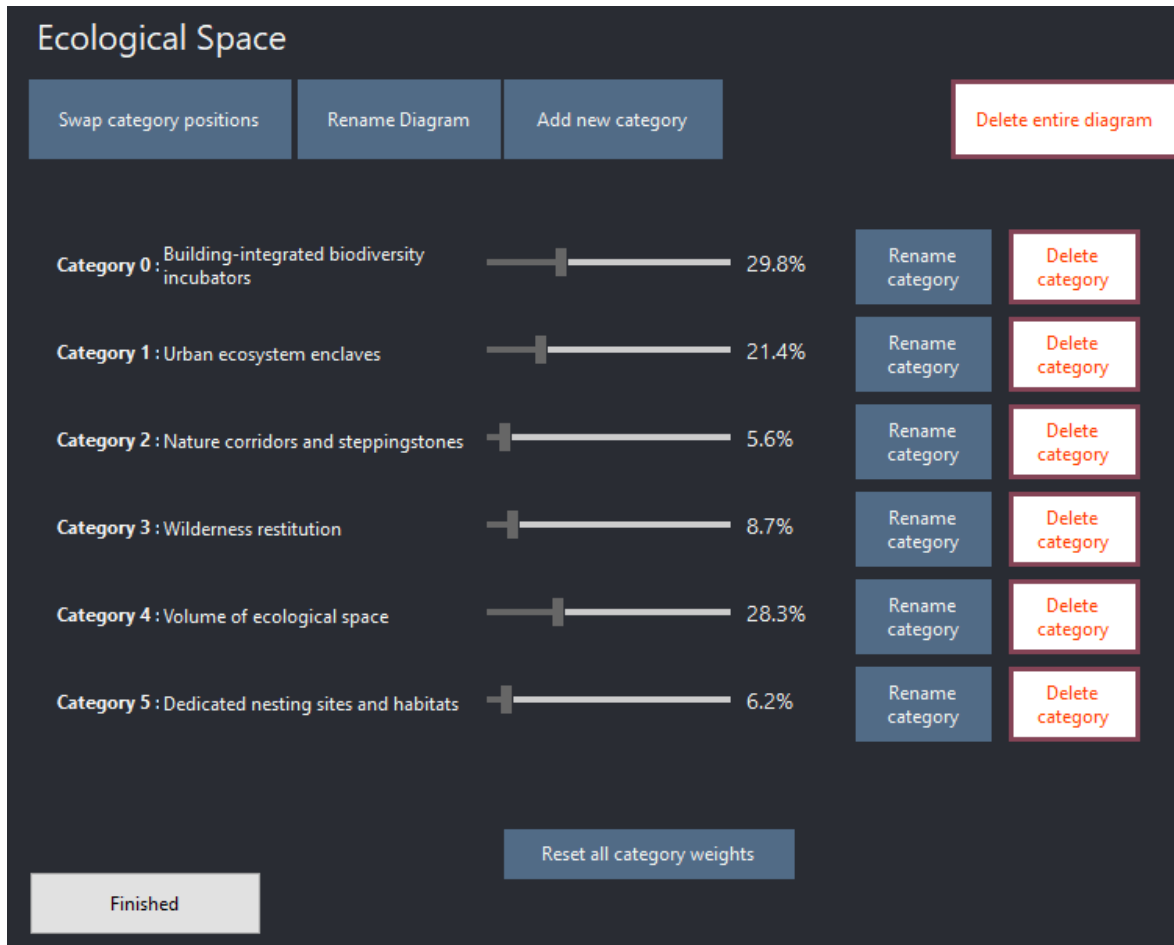
Save & close   Save   Cancel

WEIGHTINGS

*The weightings for criteria can be altered, but the rationale must be stated. In **Data**, click the **edit box** and the weightings box (below) pops up.*

Main STARfish Diagram ➤   Ecology / biodiversity ➤

Ecological Space

Edit Ecological Space layout

*Use **Sliders** In this pop-up box which set the weightings graphically and quantitatively instantly (as illustrated).*

Ecological Space

Swap category positions	Rename Diagram	Add new category		Delete entire diagram

Category 0 : Building-integrated biodiversity incubators — 29.8% — Rename category — Delete category

Category 1 : Urban ecosystem enclaves — 21.4% — Rename category — Delete category

Category 2 : Nature corridors and steppingstones — 5.6% — Rename category — Delete category

Category 3 : Wilderness restitution — 8.7% — Rename category — Delete category

Category 4 : Volume of ecological space — 28.3% — Rename category — Delete category

Category 5 : Dedicated nesting sites and habitats — 6.2% — Rename category — Delete category

Reset all category weights

Finished

Building-integrated biodiversity incubators

Urban ecosystem enclaves

Dedicated nesting sites and habitats

Nature corridors and steppingstones

Wilderness restitution

Volume of ecological space
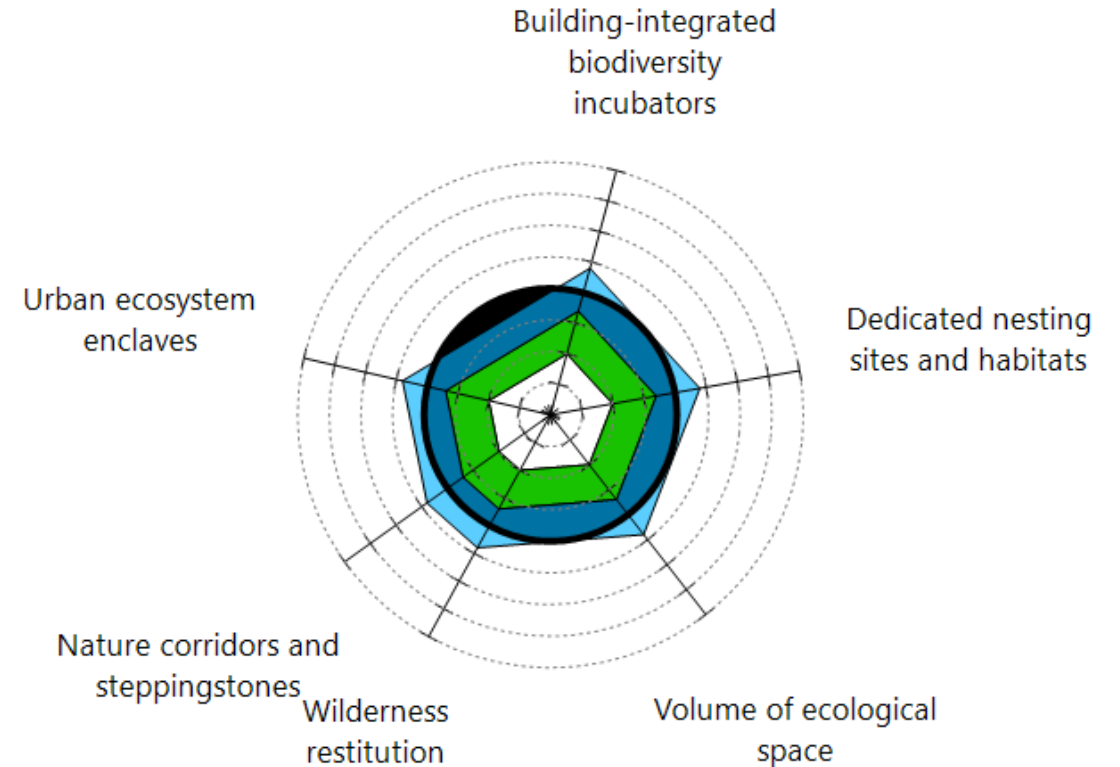
***New impact factors** can be added here, and the diagram legs or their weightings can be reset or deleted.*

GENERAL BASELINES (ecological)

Basic PD sustainability standards or baselines *apply to all STARfish criteria. Benchmarks are defined for each impact factor in the STARfish app and follow the basic logic set out in the book and on the website as summarized here:*

For ecological issues:

*A **'positive'** ecological gain would be, for instance, to regenerate the land damaged on the site, in the supply chain, and all other locations up to zero (pre-urban conditions, etc.). (This is the usual weak definition of 'nature positive' but is not 'net nature positive').*

*A **'net-positive'** ecological gain would be to increase nature (**beyond zero**) to improve the whole ecological base and increase ecological space beyond pre-industrial conditions.*

*Again, **beyond zero ecological gain** means increasing nature in absolute terms where zero is 'pre-development' (pre-urban, pre-industrial, pre-settlement) conditions - **not** 'pre-construction' which means (current) environmental conditions, best practices, etc.*

***NOTE**: Social or economic gains cannot 'offset' ecological damage as the latter is generally irreversible. Hence the tool does not erase any negative impacts. Net-positive offsetting is possible, however, as defined in the texts.*

GENERAL BASELINES (social and economic)

For social issues:

A *'positive'* social gain would be, for instance, a green co-housing development that creates a sense of community, social interaction and improves environmental and social justice for its residents.

A *'net-positive'* social gain would increase such benefits in the wider community (region or globe).

> That is, **beyond zero social gain** means improvements to regional social conditions, not just making stakeholders healthier and wealthier. It can, however, reduce inequities or disparities of wealth elsewhere, such as disadvantaged areas.

For economic issues (a subset of the social domain):

Some economic criteria could be added to the STARfish as impact factors within **social** categories (but only where relevant to PD).

A *'positive'* economic gain would be, for instance, to provide some low-cost housing units or send surplus rainwater and renewable energy to the grid - without causing inequities down the track.

A *'net-positive'* economic gain would make the wider economy more equitable and resilient, etc.

> That is, **beyond zero economic gain** means reducing disparities of wealth, not simply producing wealth that may trickle down to the local economy. Economics is subsidiary to social issues - and is a social construct - so any economic sustainability criteria would appear under social categories.
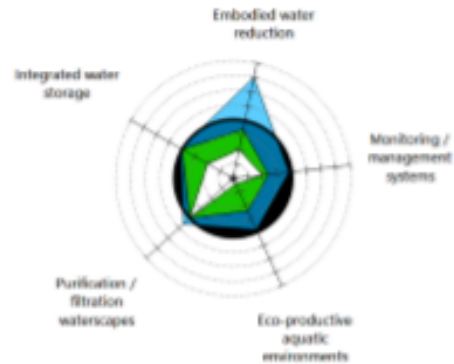
AUTOMATED DESIGN REPORT

*This is the template for the **Design Report.***
The reasons for new benchmarks, scores, and weightings appear automatically for each negative, positive and net positive impact.

In contrast, other tools are 'black boxes': their bases for rules and criteria are not transparent. One must rely on their claims to expertise.

WATER QUALITY

In the Ecological/biodiversity STARfish, water quality refers to the ecological health of outdoor ponds, natural waterways and the like. This includes preserving or enhancing biodiversity in streams, rivers and lakes, not just water pollution prevention or treatment. Water should be used for environmental functions (drinking water quality for building users would count in the health category). Water not recycled back to the environment has no ecological benefit.

INTEGRATED WATER STORAGE

Development involves substantial embodied water, which has only been appreciated in recent decades. Water quality in this category is not about drinking water. It is about the water quality and quantity needed to support appropriate biota in urban and regional streams, ponds, lakes or rivers, as determined by ecologists. Development should restore and return water quality/quantity for plant and animal communities as well as provide ecosystem services for people.

NODE WEIGHT : 0.20%

NEGATIVE SCORE : -5.0

BENCHMARKS

- -10.0 : The resulting development depletes local waterways (streams, lakes, water table, etc.) during its lifecycle, and/or water in the region is already depleted.
- -5.0 : The basic plan/concept reduces water quality and quantity over the development lifecycle, but it is in a region that has significant water storage in the landscape.

REASONING

RESTORATIVE SCORE : 5.0 (100%)

BENCHMARKS

- 50% : Natural water storage and treatment is provided for through design elements (eg. Living Machines, vertical wetlands or biofiltration ponds) that are adequate to support aquatic biodiversity in times of drought or heat waves.
- 100% : A natural water storage area is created onsite to support native aquatic species with a management plan for maintaining or enhancing water biota or biodiversity over time.

REASONING

POSITIVE SCORE : 0.3

BENCHMARKS

- 5.0 : Restorative actions (eg. stream lighting that expose previously covered streams) return water flows and storage ponds in the landscape to pre-urban conditions or as ecologically appropriate.
- 10.0 : In addition, new water ecosystems are created to address prior damage elsewhere in the watershed and support increased biodiversity, with plans in place for ongoing management, via net-positive offsetting.

REASONING

PURIFICATION / FILTRATION WATERSCAPES

Wetlands have been lost at a great cost to society. Artificial or engineered wetlands are seldom satisfactory substitutes, and should not be considered full offsets, even if the new area is much larger than the one that is damaged or destroyed. Nevertheless, new biodiverse wetlands in suitable places can provide many functions. Similarly, vertical wetlands in or around buildings can provide practical water treatment functions while supporting urban biodiversity.

NODE WEIGHT : 0.20%

NEGATIVE SCORE : 0.0

For questions, suggestions or criticisms please contact

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