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GREEN BUILDING CERTIFICATIONS STUDY FOR NOOCITY



7 de outubro de 2022

INDEX

- 1 Introduction 3
 - 1.1 Scope of works..... 3
 - 1.2 Information received..... 3
- 2 Methodology 3
- 3 Noocity product description..... 4
- 4 Green building certifications - New construction 5
 - 4.1 BREEAM International New Construction 5
 - 4.2 LEED v4.1 Building Design + Construction 7
 - 4.3 WELL v2 Building Standard 9
- 5 Green building certifications – Existing Buildings 13
 - 5.1 BREEAM International In-Use V6 13
 - 5.2 LEED v4.1 for Operations and Maintenance 15
 - 5.3 WELL v2 for existing buildings 16
- 6 Improvement opportunities on the product development 17
- 7 Conclusion 18
- 8 Summary tables 19

1 Introduction

1.1 Scope of works

Sonae Sierra was appointed by Noocity to undertake an analysis of the main Green Building Certifications technical guidelines and to understand the positive impact that Noocity's product may have on the rating certification of each certification scheme. Additionally, to this analysis we will evaluate if there is any requirement in the guidelines, related with Noocity's product, that may be important to the product development.

The certifications schemes to be analysed are:

New Construction

- BREEAM International New Construction V6
- LEED v4.1 Building Design + Construction
- WELL v2 Building Standard

Existing Buildings

- BREEAM International In-Use V6
- LEED v4.1 for Operations and Maintenance
- WELL v2 for existing buildings

1.2 Information received

The outcomes of this analysis exercise are based on a meeting clarification session and on the information obtained from the Client. The documentation provided was the following:

- Commercial presentation of the product;
- NOOCITY GROWBED –Technical information;
- Activities and workshops organized;
- Examples of the product implementation.

2 Methodology

- Kick-off & Information request;
- Study and analysis of how the Noocity product meets the Green Building Certifications technical guidelines;
- Identify improvement measures to upgrade the product contribution to the certification rating levels;
- Prepare and present the final report.

3 Noocity product description

Noocity Ecologia Urbana is a Portuguese start-up with head office in Porto (Portugal), focused on developing intelligent services and products for domestic Urban Agriculture. The main goal is to enable Urban Farmers to plant more and better produce, anywhere, and in a practical, efficient and ecological manner. With this, it will be encouraged the social interactions, promote the well-being, learn how to cultivate and support biodiversity.

The main product includes a garden kit, for home or corporate buildings, in different sizes that includes:

- 1 Noocity vegetable garden bed 100% natural substrate for the size of the vegetable garden bed;
- Expanded clay pebbles for the area of the chosen vegetable garden bed;
- Organic fertiliser;
- Selection of the season’s plants and/or seeds.

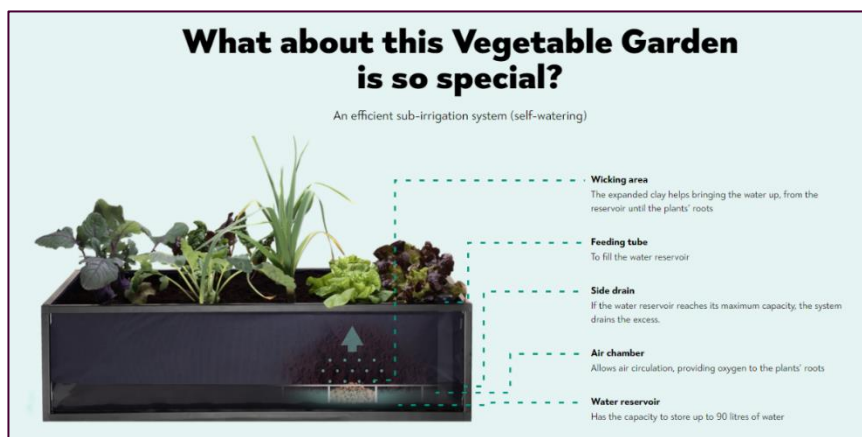


Image 1 – Noocity vegetable Garden

Noocity has also a trained team of ‘growers’ that are passionate about urban agriculture. They are responsible for periodically visiting the Corporate Vegetable Gardens, ensuring that they are suitably maintained, and for preparing regular activities. In order to get employees also involved on the process, Noocity has also developed regular workshops and activities for such easy and intuitive involvement.

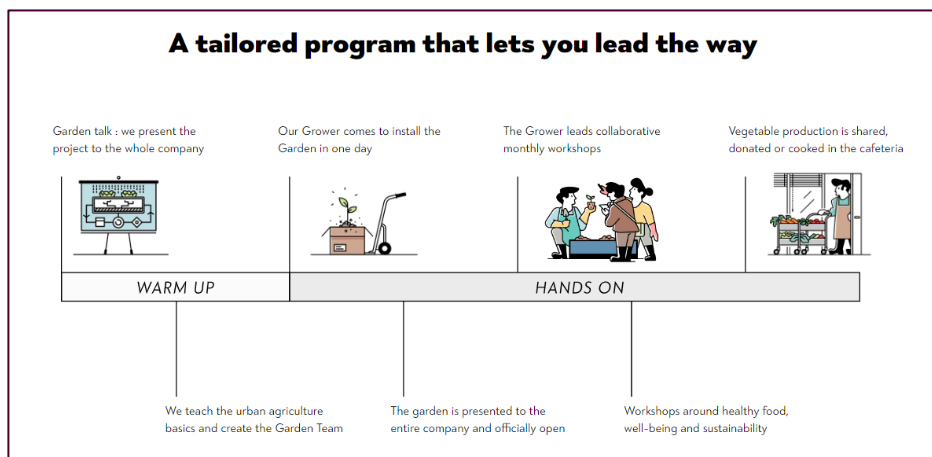


Image 2 – Noocity tailored program

4 Green building certifications - New construction

4.1 BREEAM International New Construction

4.1.1 Standard description

The BREEAM New construction standards provide a framework to deliver high performing, and sustainable, newly built assets that support commercial success, whilst also creating positive environmental and social impact. Each standard uses a common framework that is adaptable to the asset’s location, allowing for international consistency and comparability.

The sustainability framework is underpinned by credible science, allowing the assessment process to identify valuable insights on the asset’s performance. The internationally recognised and third-party certification provides assurance and validation of the data collated throughout the assessment.

The actual version of the Standard, on which bases this report has been created, is BREEAM International New Construction v6, released in 2021.

The BREEAM sections are weighted differently according to their importance within the scheme:

Environmental section	Weighting						
	Non-residential			Single residential dwellings		Multiple residential dwellings	
	Fully fitted	Shell only	Shell and core	Partially fitted	Fully fitted	Partially fitted	Fully fitted
Management	11.00%	11.13%	10.64%	9.58%	9.10%	11.18%	10.57%
Health and wellbeing	19.00%	12.66%	13.87%	21.64%	21.70%	21.58%	21.49%
Hazards	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Energy	20.00%	20.07%	19.09%	19.03%	21.23%	17.98%	19.97%
Transport	6.00%	8.50%	6.77%	5.74%	6.13%	6.10%	6.41%
Water	7.00%	3.30%	7.90%	6.69%	6.36%	6.32%	6.73%
Materials	13.00%	18.41%	14.67%	13.98%	13.29%	13.21%	12.50%
Waste	6.00%	7.43%	6.77%	5.65%	5.37%	6.10%	5.77%
Land use and ecology	8.00%	9.02%	9.02%	8.60%	8.18%	8.13%	7.69%
Pollution	10.00%	6.54%	12.28%	9.10%	8.65%	9.38%	8.87%
Total	100.00%	100%	100%	100%	100%	100%	100%
Innovation (additional)	10.00%	10%	10%	10%	10%	10%	10%

4.1.2 Noocity product score

In the table below are presented the standard credits where the Noocity product/program has a contribution.

Standard category	Credit	Nº of points	Description
Management	-	-	-
Health and Wellbeing	Hea 08 - Private space	1	<p>In residential buildings, it is valued to have an external space which gives occupants privacy and a sense of wellbeing.</p> <p>The following are representative examples of outdoor spaces:</p> <ul style="list-style-type: none"> • A private garden; • A communal garden or courtyard, providing a pleasant and secluded environment large enough for all occupants of designated dwellings to share and designed in a way that makes it clear that the space is only to be used by occupants of designated dwellings; • Balconies; • Terraces (roof or other); • Patios. <p>Noocity product can classify for this credit, if the location where it is placed (e.g. roof) complies with the standard requirements in terms of space and accesibility.</p>
Energy	-	-	-
Transport	-	-	-
Water	-	-	-
Materials	-	-	-
Waste	-	-	-
Land Use and Ecology	-	-	-
Pollution	-	-	-
Innovation	-	-	-

4.2 LEED v4.1 Building Design + Construction

4.2.1 Standard description

LEED for Building Design and Construction (LEED BD+C) provides a framework for building a holistic green building, giving the chance to nail down every sustainability feature, maximizing the benefits.

LEED BD+C has options to fit every project. Use a specialty option for unique needs or use New Construction and Major Renovations for everything else.

- **New Construction and Major Renovation:** Addresses design and construction activities for both new buildings and major renovations of existing buildings that do not primarily serve the uses below. (Teams using LEED v4 may also use this option for multifamily residential projects of four or more occupiable stories above grade).
- **Core and Shell Development:** For projects where the developer controls the design and construction of the entire mechanical, electrical, plumbing and fire protection system but not the design and construction of the tenant fit-out.
- **Data Centers:** Specifically designed and equipped to meet the needs of high-density computing equipment, such as server racks, used for data storage and processing.
- **Healthcare:** For hospitals that operate twenty-four hours a day, seven days a week and provide inpatient medical treatment, including acute and long-term care.
- **Hospitality:** Dedicated to hotels, motels, inns or other businesses within the service industry that provide transitional or short-term lodging with or without food.
- **Retail:** Addresses the unique needs of retailers—from banks, restaurants, apparel, electronics, big box and everything in between.
- **Schools:** For buildings made up of core and ancillary learning spaces on K-12 school grounds. Can also be used for higher education and non-academic buildings on school campuses.
- **Warehouses and Distribution Centers:** For buildings used to store goods, manufactured products, merchandise, raw materials or personal belongings, like self-storage.

LEED also works for existing buildings and interior spaces, homes, communities and cities.

The LEED BD+C sections are weighted differently according to their importance within the scheme:

Category	Maximum number of points
Integrative Process	1
Location and Transportation	16
Sustainable Sites	10
Water Efficiency	11
Energy and Atmosphere	33
Materials and Resources	13
Indoor Environmental Quality	16
Innovation	6
Regional Priority	4

Note: the points presented in the table are considering the type of building “New construction”.

4.2.2 Noocity product score

Standard category	Credit	Nº of points	Description
Integrative Process	-	-	-
Location and Transportation	-	-	-
Sustainable Sites	SS Credit: Open Space	1 (indirect)	<p>The objective of this credit is to create exterior open space that encourages interaction with the environment, social interaction, passive recreation, and physical activities. The outdoor space must be greater than or equal to 30% of the total site area (including building footprint) and at least 25% of the calculated outdoor open space must be vegetated space planted with two or more types of vegetation or have overhead vegetated canopy.</p> <p>The outdoor space must also be physically accessible.</p> <p>The Noocity product can contribute to the achievement of this credit, if the requirements of minimum area are attended.</p>
Water Efficiency	-	-	-
Energy and Atmosphere	-	-	-
Materials and Resources	-	-	-
Indoor Environmental Quality	EQ Credit: Quality Views	1 (indirect)	<p>This credit aims to give building occupants a connection to the natural outdoor environment by providing quality views. To comply with it occupants in the building must be provided with a view to the outdoor natural or urban environment for 75% of all regularly occupied floor area. Views must include at least one of the following:</p> <ul style="list-style-type: none"> • nature, urban landmarks, or art; or

			<ul style="list-style-type: none"> objects at least 7.5 m from the exterior of the glazing. <p>The Noocity product can contribute to the achievement of this credit (in the nature category), if the remaining requirements of the building as minimum area with a view and distance are attended.</p>
Innovation	-	-	-
Regional Priority	-	-	-

4.3 WELL v2 Building Standard

4.3.1 Standard description

The WELL Building Standard™ version 2 (WELL v2™) is a vehicle for buildings and organizations to deliver more thoughtful and intentional spaces that enhance human health and well-being. WELL v2 includes a set of strategies—backed by the latest scientific research—that aim to advance human health through design interventions and operational protocols and policies and foster a culture of health and well-being. The standard WELL v2 draws expertise from a diverse community of WELL users, practitioners, public health professionals and building scientists around the world.

WELL v2 projects fall into one of two main groups, determined primarily by ownership type:

- **Owner-occupied:** The project is mainly occupied by the project owner (which may be different than the building owner).
- **WELL Core:** The project owner occupies a small portion of the project area and rents/leases most of the space to one or more tenants.

There are ten concepts in WELL v2. Each concept consists of features with distinct health intents. These features are either preconditions or optimizations. Preconditions are mandatory, defining the fundamental components of a WELL Certified space and serving as the foundation of a healthy building. WELL v2 offers a universal set of preconditions for all projects. Optimizations are optional pathways for projects to meet certification requirements in WELL. Project teams may select which optimizations to pursue and which parts to focus on within each optimization.

WELL v2 operates on a points-based system, with 110 points available in each project scorecard. All optimizations are weighted with varying point values. The maximum point value of a feature is determined by the sum of its parts. A part is weighted by its potential for impact, defined as the extent to which a feature addresses a specific health and well-being concern or opportunity for health promotion, and the potential impact of the intervention.

4.3.2 Noocity product score

Standard category	Credit	Nº of points	Description
Air	-	-	-
Water	-	-	-
Nourishment	N01 - Fruits and Vegetables	Pre-requirement	<p>This pre-requirements is achieved if each food outlet available at the building meets one of the following requirements:</p> <ul style="list-style-type: none"> • The selection includes at least two varieties of fruits (containing no added sugar) and at least two varieties of non-fried vegetables. • At least 50% of available food options are fruits (containing no added sugar) and/or non-fried vegetables. <p>The Noocity product can contribute to the achievement of this pre-requirement by providing fruits and vegetables to be sold or provided in the site.</p>
	N07 - Nutrition Education	1	<p>The workshops organized in the scope of the Noocity program, can contribute to the achievement of this credit in the topic “Gardening or planting workshops focused on edible plants that integrate hands-on learning opportunities”, as long as the workshops are given in the established periodicity.</p> <p>Those workshops shall be offered in-person or virtually to regular occupants, at no cost on a quarterly basis at minimum.</p>
Nourishment	N12 - Food Production	2	<p>This optimization requires the existence of a local or near garden space for food production. The requirements established by the WELL Standard are:</p> <ul style="list-style-type: none"> • The space is open to regular occupants during regular building hours and

			<p>is accessible the majority of the days in the operating year.</p> <ul style="list-style-type: none"> • Foods grown are made available to regular occupants. • The space is at least 0.09 m² per regular occupant or 0.05 m² per student, whichever area is greater (up to a maximum of 140 m² and not less than 18.5 m²). The area calculated is the actual growing area (vertical or horizontal) used for the production of food-bearing plants. For hydroponic and aeroponic farming systems, the project may halve the growing area calculations, given higher yield. • The space includes planting supplies, including planting medium, watering system, lighting (interior spaces only), plants and gardening tools. <p>The Noocity product, contributes entirely to this credit achievement as long as the projects is design to allow the Noocity product to meet the area required.</p>
	N13 - Local Food Environment	1	<p>In this optimization, one point is awarded if the project serves as a distribution point for a community-based agriculture program that delivers fruits and vegetables to regular occupants at least twice a month for at least four months of the year.</p> <p>The Noocity product provides fruits and vegetables to the building occupants. If the providing periodicity can be assured, the one point can be considered.</p>
Light	-	-	-
Movement	-	-	-
Thermal Comfort	-	-	-

Sound	-	-	-
Materials	-	-	-
Mind	M07 - Restorative Spaces	1 (indirect)	<p>In this credit, one point is awarded if a restorative space is available to all regular occupants and they are encouraged to use it. The space may be indoor or outdoor and may be made up of a single space or multiple spaces that meet several requirements (e.g. area, light, sound, thermal comfort, furniture, etc.). One of those requirements is the nature incorporation.</p> <p>It is precisely in this point, where the Noocity product can contribute.</p>
	M09 - Enhanced Access to Nature	1	<p>In this credit, one point is awarded if the outdoor nature access is facilitated by the conditions below:</p> <ul style="list-style-type: none"> • Outdoor space of an area of at least 5% of the project interior area must be accessible to all regular occupants. • At least 70% of the accessible outdoor space as viewed from above must include plants or natural elements, including tree canopies; • Occupants are encouraged to access outdoor nature. <p>The Noocity product, contributes to this credit by adding outdoor nature access to the building.</p>
Community	-	-	-
Innovation	-	-	-

5 Green building certifications – Existing Buildings

5.1 BREEAM International In-Use V6

5.1.1 Standard description

The BREEAM In-use standard provides a framework to enable property investors, owners, managers and occupiers to determine and drive sustainable improvements in the operational performance of their assets, leading to benchmarking, assurance and validation of operational asset data.

The standards can be used to assess and benchmark the operational sustainability of all operational asset types. Each standard uses a common framework that is adaptable, allowing for international consistency and comparability.

The sustainability framework is underpinned by credible science, allowing the assessment process to identify valuable insights on the asset’s performance. The internationally recognised and third-party certification provides assurance and validation of the data collated throughout the assessment.

The actual version of the Standard, on which bases this report has been created, is BREEAM In-Use International v6 (BREEAM In-Use International Technical Manual: Commercial), released in 2020.

The BREEAM In-Use International assessment process is broken down into two Parts:

- **Part 1 - Asset Performance:** benchmarking the performance of the asset, outlining areas of best practice, as well as potential scope for improvement.
- **Part 2 - Management Performance:** benchmarking the building management processes used within an asset, outlining areas of best practice, as well as potential to reach optimal asset performance.

The BREEAM sections are weighted differently according to their importance within the scheme:

Environmental Category	Weighting	
	1: Asset Performance	2: Management Performance
Management	0%	11%
Health and Wellbeing	20%	17%
Energy	25%	27%
Transport	5%	0%
Water	11%	9%
Resources	13%	11%
Resilience	13%	11%
Land Use and Ecology	4%	7%
Pollution	9%	7%
Total	100%	100%
Exemplary (additional)	10%	9%

5.1.2 Noocity product score

In the table below are presented the standard credits where the Noocity product/program has a contribution.

Standard category	Credit	Nº of points	Description
Management	-	-	-
Health and Wellbeing	-	-	-
Energy	-	-	-
Transport	-	-	-
Water	-	-	-
Resources	-	-	-
Resilience	-	-	-
Land Use and Ecology	Lue 01 - Planted area	1 to 4	In this credit it is assessed the percentage of the asset's footprint that has been planted. As bigger the percentage, also higher the points awarded. The Noocity product, contributes to this credit by adding planted area to the building.
	Lue 02 - Ecological features of planted area	1	This credit assess the ecological features that have been planted or installed in the planted areas of the asset's footprint. The Noocity product, contributes to this credit by adding planters (containing living plants) outside and features to assist local fauna (e.g. bees, butterflies, birds, insects).
Pollution	-	-	-

5.2 LEED v4.1 for Operations and Maintenance

5.2.1 Standard description

LEED for Operations and Maintenance (O+M) offers existing buildings an opportunity to pay close attention to building operations, by supporting whole buildings and interior spaces that have been fully operational and occupied for at least one year. The project may be undergoing improvement work or little to no construction.

By focusing on both performance oriented sustainable strategies and outcomes, LEED helps build high performing buildings. Consider that it can take up to 80 years to make up for the impacts of demolishing an existing building and constructing a new one, even if the resulting building is extremely energy efficient. However, many older buildings around the world are inefficient and resource-depleting, but with keen attention to building operations that can be turned around by using LEED O+M.

LEED O+M has options to fit every project:

- **Existing Buildings.** Existing whole buildings.
- **Existing Interiors.** Existing interior spaces that are contained within a portion of an existing building. Interior spaces may serve commercial, retail or hospitality purposes.

The LEED O+M sections are weighted differently according to their importance within the scheme:

Category	Maximum number of points
Location and Transportation	14
Sustainable Sites	4
Water Efficiency	15
Energy and Atmosphere	35
Materials and Resources	9
Indoor Environmental Quality	22
Innovation	1

5.2.2 Noocity product score

In the table below are presented the standard credits where the Noocity product/program has a contribution.

Standard category	Credit	Nº of points	Description
Location and Transportation	-	-	-
Sustainable Sites	Heat Island Reduction	1 (indirect)	As larger is the area of Vegetated Roof and the area of Nonroof Measures (where planters are included), lower will be the heat island effect of the building. The Noocity product, contributes to this credit by adding planters outside and reducing the heat island effect of the building.
Water Efficiency	-	-	-
Energy and Atmosphere	-	-	-
Materials and Resources	-	-	-
Indoor Environmental Quality	-	-	-
Innovation	-	-	-

5.3 WELL v2 for existing buildings

5.3.1 Standard description

The same standard is applicable to the new developed buildings and buildings in use. See chapter 4.3 for reference.

6 Improvement opportunities on the product development

Nº	Action	Schemes that benefit from this improvement
1	Develop the concept of garden in a <u>green wall or green roof</u> .	BREEAM In-Use (LUE 02, RSL 02)
2	Add to the program a <u>waste composting unit</u> .	BREEAM New Cosntruction (Wst 03 Operational waste)
3	<p>Obtain a recognized certification of <u>Sustainable agriculture</u> (e.g. USDA Organic, Food Alliance Certified, Rainforest Alliance Certified, Protected Harvest Certified, Fair Trade, or Marine Stewardship Council's Blue Eco-Label, or labeled with the European Community Organic Production logo in accordance with Regulations (EC) No. 834/2007 and (EC) No. 889/2008). If the food and beverages sell on site is at least 15% (by cost) from these certified sources, there is one more point awarded.</p> <p>Alternatively, if at least 15% (by cost), of the food and beverages sell on site is from a local production (160 kilometers of the site), also one point is awarded.</p>	LEED O+M (MR Credit: Purchasing, Option 4 Food and Beverage)
4	<p>Obtain a recognized certification of <u>certified organic</u> to the food produced on site.</p> <p>If at least 50% of the total product line (fruits and vegetables) is certified organic and Sustainable and humane agriculture is promoted at point-of-decision (e.g. labelled or advertisement), one point is awarded.</p>	WELL (N11 - Responsible Food Sourcing)

7 Conclusion

The Noocity products are focused on developing intelligent services and products for Urban Agriculture. The main goal is to enable urban farmers to plant more and better products, anywhere, and in a practical, efficient and ecological manner. With this, it will be encouraged the social interactions, promote the well-being, learn how to cultivate and support biodiversity.

The product has a positive impact in all assessed green-building certification rates (BREEAM, LEED and WELL), both in design & construction phase, as in operations phase. In some standards, the product by itself does not allow the immediate acquisition of points, since there are associated requirements, such as area or distance, that must be considered during the credit assessment.

From all the analysed certification schemes, the standard that is more aligned with Noocity products and programs is WELL, since this is essentially focused on people's health and well-being. It could be interesting for Noocity to present their product to projects pursuing this certification (directory of projects here: <https://account.wellcertified.com/directories/projects>).

There are some improvement development opportunities to the product, as presented in the chapter 6, that goes from product design, connection with waste management processes and product certifications. These developments can increase the rate of the product in the several certification schemes, making its implementation even more relevant.

8 Summary tables



New Construction

BREEAM International New Construction V6

- ✓ Hea 08 - Private space (1 point)



New Construction

LEED v4.1 Building Design + Construction

- ✓ SS Credit: Open Space (1 point, indirect)
- ✓ EQ Credit: Quality Views (1 point, indirect)



New Construction

WELL v2 Building Standard

- ✓ N01 - Fruits and Vegetables (Pre-requirement)
- ✓ N07 - Nutrition Education (1 point)
- ✓ N12 - Food Production (2 point)
- ✓ N13 - Local Food Environment (1 point)
- ✓ M07 - Restorative Spaces (1 point, indirect)
- ✓ M09 - Enhanced Access to Nature (1 point)



Existing Buildings

BREEAM International In-Use V6

- ✓ Lue 01 - Planted area (1 to 4 point)
- ✓ Lue 02 – Ecological features of planted area (1 point)



Existing Buildings

LEED v4.1 for Operations and Maintenance

- ✓ Heat Island Reduction (1 point, indirect)



Existing Buildings

WELL v2 for existing buildings

- ✓ N01 - Fruits and Vegetables (Pre-requirement)
- ✓ N07 - Nutrition Education (1 point)
- ✓ N12 - Food Production (2 point)
- ✓ N13 - Local Food Environment (1 point)
- ✓ M07 - Restorative Spaces (1 point, indirect)
- ✓ M09 - Enhanced Access to Nature (1 point)

Note: WELL certification uses the same standard for existing buildings and new construction.