Review of health and well-being aspects in Green Certification Protocols

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Abstract. Over the past decades, the world-leading Green Certification Protocols have paid increasing attention to health-related aspects of buildings. However, the way and the extent to which green certifications currently account for these aspects vary largely. This paper aims to review and compare four certification protocols, namely LEED v4, BREEAM 2018, WELL v2, and MINERGIE-ECO v1.4, and to provide insights on how aspects related to occupants' health and well-being and their influencing factors are accounted for and assessed. To that scope, indicators used to assess the users' health and well-being are extracted from each certification and compared. Indicators traditionally used to evaluate IEQ in buildings (thermal, indoor air quality, visual and acoustic) based on international or national standards were found in all certifications. However, the analysis highlights that their assessment and verification stage (e.g., pre- vs. post-occupancy) significantly differs from one label to another. More "advanced" indicators, which are related to mind, promotion of physical activities, and community engagement, have come to light. While a comprehensive approach to the evaluation of well-being might include a combination of objective (e.g., measurement-based evaluations) and subjective components (e.g., people's subjective evaluation), the review highlighted that only in one protocol (i.e., WELL), direct feedback from occupants is kept in the loop for further optimization of the building management during operation. Otherwise, indicators are mainly verified through quantitative measurements, reports, or implemented policies.

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1. Introduction

As stated in the ASHRAE guidelines, humans spend up to 90% of their day inside buildings [1]. Providing an adequate level of indoor environment quality (IEQ) is then crucial to the users' health and well-being. As demonstrated by past studies, a low IEQ can trigger a range of negative effects, from loss of productivity to illnesses such as Sick Building Syndromes (SBS). Buildings should then not only be designed to be energy efficient but to provide a positive impact on their occupants. In this context, well-being and health-related aspects are becoming a growing concern in Green Certifications. However, the notions of health and well-being are complex to measure as they can differ from one person to another. For this reason, there is growing attention in shifting from traditional Key Performance Indicators (KPIs) of buildings behaviour to Health Performance Indicators (HPIs) of the whole occupant-building system. HPI can be defined as "quantifiable measures of human health that can be used to identify drivers of negative and positive impacts of buildings on health, productivity and well-being of occupants." [2] They can be direct or indirect, depending on whether they measure people or the building, respectively. Indeed, the experience of users is considerably impacted by the quality of the indoor environment that depends on air quality, sound protection, thermal comfort, lighting, security, water quality, and view quality. The current study aims to identify the various indicators influencing the user well-being that are deployed in Green Certifications schemes. To do so, a review of three main certifications used worldwide, BREEAM v3 2018 [3], LEED v4 2014 [4-5], WELL V2.2018 [6] was done. Additionally, a national certification Minergie-Eco v1.4 2018 [7-8] was also reviewed as it is the main one used in Switzerland. The indicators to assess the users' health and well-being were extracted from each certification and compared. Traditional indicators related to indoor air quality, sound protection, thermal comfort, lighting were

found in all certifications. Advanced categories such as mental health, promotion of physical activities, and support of the users, were introduced to a different extent in LEED v4 2014, BREEAM v3 2018, and mostly in WELL V2.2018. A comparison of how each indicator is meant to be assessed in each label and at which stage was also done. The methodology of the review approach is described in Section 2. Individual protocols are critically described in Section 3, and Section 4 reports the main results. Finally, the main conclusions are outlined in Section 5.

2. Methodology

This study was performed in two stages. Firstly, an analysis of individual certificates was done to better understand each of the selected Green Protocols. The individual analysis allowed to compare the assessment method, rating system, and references used by the certifications (Section 3). Additionally, all health-related categories and indicators were extracted from the protocols. The list of indicators was classified into different categories and indicators individually studied to assess how (e.g., type of evidence needed) and at which stage (e.g., pre- vs. post-occupancy) they were treated in each protocol (Section 4). Two different levels of comparison were, thus, used to explore the similarities and differences of the health and well-being approach of studied protocols:

- *Large scale (Section 3):* it assesses the different health-related categories included in each protocol, their rating method, and, finally, the main standards and references used by the certification schemes.

- *Indicator Scale (Section 4)*: it highlights the different ways performances indicators were treated in each protocol and at which stage.

It must be mentioned that only online open-source descriptions of selected Protocols were used for the review. Additional information can be provided once the project is launched. It is the case, for example, for the LEED certificate where an additional guide is obtained when a project is launched and gives all the information for the project team to achieve the credits. [9]

3. Overview of selected Green Protocols

BREEAM v3 2018

Launched in 1990 by the Building Research Establishment (BRE), this label represents the world's first sustainability rating scheme for the built environment. It proposes an environmental assessment method to optimize and reduce the impact of the built environment. This protocol is mainly based on International, European and British Standards. The version studied is the third one set in 2018 for New Constructions. It is composed of 9 categories: Management, Health & Well-being, Energy, Transport, Water, Resources, Resilience, Land Use & Ecology, and Pollution. Overall, 49 issues are treated, 6 of them concern Well-being. Then, each issue is decomposed into different criteria and linked to a number of credits. The six health issues are linked to the following credits: visual comfort (5 credits), indoor air quality (6 credits), thermal comfort (3 credits), acoustic performance (3 credits), security (1 credit), and safe & healthy surroundings (2 credits). Four of the six issues deal with the environmental hazard, with special importance given to the visual comfort and indoor air quality, representing 11 of the 20 available credits. The other two issues are more advanced by dealing with the security on-site and the surroundings of the project (outdoor space and site access). Overall, the health and well-being category is the third most important category with a weight of 14% behind the energy (16%) and material (15%) ones. Nevertheless, to obtain the certificate, a project must achieve a certain number of points and respect 11 minimum criteria. However, none of them are health-related, and no minimum amount of points is required per category. Hence, even if the weighting of the health category is important, a project could obtain the certification without dealing with many health-related criteria.

The assessment method is composed of two main phases, one at the design stage and a final one at the post-construction stage, during which the final grade is given. For each stage, the project team has to provide diverse evidence. The final grade is calculated as the sum of the ratio between the number of credits achieved and available ones in each category times the weight of the category. Then, according to the grade, a certain level of certification is reached: Pass (30-45%), Good (45-55%), Very Good (55-70%), Outstanding (>85%)

LEED v4 2014

The first pilot of LEED was launched in 1998 by the US Green Building Council, created in 1993. LEED is the most used green building rating system. The certification focuses not only on the building energy performance but also on its surroundings and sustainability. The aim is to realize healthy, highly efficient, and cost-saving green buildings. A variety of protocols have been developed through the years dealing, for instance, with Building Design and Constructions, Interior Design and Construction, Operations and Maintenance. In the current review work, the protocol V4 launched in 2014 for Building Design and Construction was studied.

The protocol includes 6 main categories divided into mandatory prerequisites and optimizations, which provide a certain amount of points. Tab. 1 describes the distribution of preconditions (P), optimizations (O), and the available points, respectively, for each concept of the LEED v4. Specific evidence is required for each criterion to obtain the credits. The

assessment method is divided into two phases: an intermediate evaluation at the design stage and a final evaluation post-construction.

There is a significant difference in points granted per category. The Location & Transportation category, as well as the Energy & Atmosphere category, contribute 28.7% each to the global weighting, while the other categories do not exceed 10%. The Indoor Environmental Quality (IEQ) is only composed of two prerequisites dealing with the minimum indoor air quality performance and tobacco smoke control. However, IEQ category is also composed of 8 optimizations. Its total weight is around 14%, which shows fewer points are granted for these optimizations compared to the ones from other categories. Other well-being and health-related aspects are found, for instance, in the Sustainable Site category (e.g., environmental site assessment, outdoor thermal comfort, access to nature) or the Location & Transportation category (e.g., promotion of walking and cycling, site location).

Tab.1 – LEED distribution of precondition (P), optimization (O), points, and weight [4]

	P	O	Points	Weight
Integrative process	1	1	1	0,87%
Location & Transportation	0	8	33	28,70%
Sustainable Site	2	6	10	8,70%
Water Efficiency	3	4	11	9,57%
Energy and Atmosphere	4	7	33	28,70%
Materials and Resources	3	5	11	9,57%
IEQ	2	8	16	13,91%

As for BREEAM, the rating system is point-based and different levels of certification are granted according to the number of points achieved: Bronze (40), Silver (50), Gold (60), Platinum (80). Additionally, all prerequisites are mandatory and should be respected. However, conversely to BREEAM, the weight of each category does not interfere with the final grade. This has a consequent impact on how health and well-being could be considered by the rating system in each protocol. Indeed, the point-based rating system presents a strong disadvantage that the different categories could be unequally treated in a project. By introducing, the weight of each category in the final grade, the project team is encouraged to treat all the categories to not strongly diminish its final grade. Nevertheless, the project could still obtain the certificate. Besides this difference, the two protocols appear very similar (see Tab 4) as they present the same assessment methods, which are mostly based on national and international standards.

WELL V2.2018

The certification was first introduced in 2014 by the International WELL Building Institute (IWBI). A second version was launched in 2018, and it is the one used for the current review. WELL proposes a unique scheme with a human-focused approach. The protocol does not only aim at providing a healthy and comfortable environment to building occupants but also at influencing them to adopt healthier behaviour. It is based on the expertise of WELL users, practitioners, public health professionals, and building scientists around the world. Therefore, it is established not only on international, national standards or regulations but also on a large pool of scientific research.
The protocol is divided into 10 concepts. Each of them is a combination of *mandatory preconditions* (P) and *optimizations* (O) that provide a certain amount of points. The distribution is shown in Tab 2. A visible concern is given to more advanced concepts as they represent almost 50% of the weights: community (19,4%), mind (9,7%), nourishment (8,2%), and movement (10,7%). Conversely, less weight is given to more established in other schemes categories such as water quality. This might be explained by the fact that in many countries, several conditions on different concepts would be already met by international and national regulations. Hence, the protocol gives more importance to health-related aspects not or little present in standards.

Tab.2 – WELL distribution of precondition (P), optimization (O), points and weight [2]

	P	O	Points	Weight
Air	4	10	18	9,2%
Water	3	6	14	7,1%
Nourishment	2	12	16	8,2%
Light	2	7	18	9,2%
Movement	2	9	21	10,7%
Thermal Comfort	1	8	18	8,2%
Sound	1	8	18	9,2%
Material	3	9	19	9,2%
Mind	2	9	19	9,7%
Community	4	14	38	19,4%

The rating system is point-based. However, in order to assure the project team does not focus on specific concepts only, a maximum and a minimum level of points can be achieved in each category. A maximum of 12 points is set for all the categories. All mandatory preconditions should be achieved as well. Then, according to the number of points obtained, the following level of certification is given (Tab 3).

Tab. 3 - WELL level attainment according to the number of points and minimum points per concept achieved [2]

Points achieved	Minimum Points per concept	Level
40	0	Bronze
50	1	Silver
60	2	Gold
80	3	Platinum

The grade is granted after the final assessment, at which the project team must provide evidence foreach optimization pursued. However, conversely

Tab. 4 – Large scale comparison of the 4 green certifications

	HEALTH AND WELL-BEING DOMAINS											Method	References
	Visual	IAQ	Water	Acoustic	Thermal Comfort	Material	Safety	Movement	Nourishment	Mind	Community		
BREEAM	x	x	x	x	x	x	x					Point – based system Category weighting Mandatory criteria	British (BS), European (EN) and International (ISO) Standards, CIBSE
WELL	x	x	x	x	x	x	x	x	x	x	x	Point – based system Minimum points per concept Mandatory criteria	British(BS), European (EN) and International (ISO) Standards, CIBSE World Health Organisation, ASHRAE, US Green Council LEED and scientific researches
MINERGIE-ECO	x	x	x	x	x	x						Traffic light system Mandatory criteria	SIA, MoPEC
LEED	x	x	x	x	x	x	x					Point – based system Mandatory criteria	ASHRAE, European (EN) and International (ISO) Standards, CEN, ASTM

to other schemes such as Minergie-Eco, even after the certification, spot or annual measures, reports, monitoring data, or even surveys should be reported. In all aspects presented (see Tab 4), WELL appears more advanced on the approach of health and well-being related aspects. Indeed, almost all "advanced" domains (Movement, Nourishment, Mind, Community) are only included in WELL. Additionally, the protocol differentiates itself by including scientific research and requiring minimum points per concept, thus, balancing the treatment of each category.

MINERGIE-ECO v1.4 2018

Minergie is a Swiss Label launched in 1998 which focuses on the building's energy efficiency. Through the years, different versions of the certification appeared: Minergie P (2003), Minergie A (2011). These versions treat the building performances and hence, in a certain way, users' comfort. The studied protocol is the extension Minergie-Eco, which was created in 2006 to deal with specific aspects of health (optimized daylight condition, low noise emissions) and ecology of the construction. Conversely to the other protocols, the label is mostly based on the Swiss norms SIA and the national regulations such as MoPEC [7]. Therefore, the Green Protocol could be seen as a continuation of the Swiss regulations and is focused on the Swiss-built environment.

As for the other labels, the protocol includes minimal criteria, called *excluding criteria*, needed to be respected to obtain the certifications. The Green Protocol is then divided into two main categories dealing with health and building ecology. Each of these categories is then divided into different sub-categories. The health sub-categories deal with daylight, noise protection, and indoor climate. Each of these subsections includes diverse criteria. Overall, the certification includes 81 criteria, with 12 excluding ones and 69 non-prerequisites.

The latter ones are distributed in two categories, with 36 in the health category and 33 dealing in the building construction ecology one. Most of the health criteria deal with indoor climate and noise protection. [8] The assessment method consists of two stages, one during the design phase and one in the post-construction phase. During the design phase, a provisional certificate is given, and it lasts for 3 years. After the construction, an evaluation of the project is done, and a permanent certificate is granted. Conversely to other protocols, the system is not point-based but uses a traffic light system. For each subcategory, a colour is given according to the percentage of requirements achieved: Red: ≤50%, Orange: 50-70%, Green: ≥70%. To obtain the certification, all *excluding criteria* should be fulfilled, and the colour obtained by the subcategory should not be red and at least 3 of them should obtain a green colour. This rating system differentiates from the point-based one used in all the other studied certificates as all the criteria must be treated to a certain extent. It represents an upgrade for health and well-being as energy efficiency categories are usually prioritized.

4. Indicators scale critical review

By extracting well-being and health-related indicators from the analysed Green Protocols, an important diversity of health-related aspects could be observed. Indeed, these ones were considered differently and at different stages by the Green Certifications. Therefore, a final table (Tab.6) was designed to report all the health-related indicators organised in different categories, indicate the type of evidence required, and whether it was verified at pre- or/and post-occupancy. The different types of evidence are summarized in Tab.5; mandatory requirements are highlighted in orange (e.g., o).

The extracted list of indicators could be divided into three main groups: Environmental Hazard, Building

and Architectural Design, and Social Factor. Environmental Hazard is addressed in all the studied certifications, while the other two groups seem more advanced. This can be explained by the fact that the former concerns traditional and well-known health and comfort aspects such as indoor air quality, thermal comfort, or acoustic.

Concerning the identified HPIs, with regard to the Building and Architectural Design, they can be grouped into three sub-categories, namely material selection, physical activities promotion, and site environment. The material selection takes part of the pollutant source management approach present in all the studied Green Protocols. Most of its indicators are related to lowering the exposure to pollutants and material transparency. The other two sub-categories are less represented in the certification as they are included in an approach of not only considering the design of the building itself but also its surroundings and how to influence the users to increase their physical activities. This approach is mostly embodied by the WELL certification. The most innovative group observed is the Social Factor one, as it considers how to improve the users' behaviour and mental health thanks to supporting, programs, or prevention. It considers the daily life in the building and not only the design and operation of the building.

This observation represents a key point as two distinct approaches are taken by the certifications. The first approach is focused on the building characteristics and how they directly impact the occupants. For instance, indoor air quality is provided thanks to source control of pollutants (e.g., material selection) and efficient management of pollutants (e.g., ventilation design, pollutant concentration monitoring). However, a complementary second approach observed is rather human-focused and consists in how the occupant could be influenced to adopt healthier behavior. For instance, the practice of physical activities could be encouraged by promoting the use of stairs but also cycling thanks to the presence of bike storage, on-site showers, or the connection to a qualitative bicycle network. This second approach also inspects how the user will behave and feel in the building; mental as well as physical well-being are both considered. This mix of approaches is characteristic of the WELL label, which is human-focused and even integrates the implementation of policies to increase the occupants' well-being. Conversely, the other certifications BREEAM, Minergie-Eco, and LEED seem more traditional as they focus mostly on the building itself. LEED mostly focuses on the site environment and connection to mobility, such as access to mass transit or bicycle/pedestrian access. BREEAM as well considers the safety and quality of the access to the project. These criteria are mostly concerned the users' arrival and departure from the building. No specific regulations or policies are planned for the post-occupancy and how the users will feel or act in the building. This difference is also stressed by the fact that WELL is the only protocol assessing the post-occupancy stage. As WELL is a more human-centered protocol, it highlights certain limits of Green Certifications when it comes to measuring and assessing people's health and well-being in buildings. Focusing on *when* (pre/post occupancy) and *how* (i.e., types of evidence) health and well-being are assessed, a lack of post-occupancy management and subjective measures such as occupants' feedback or surveys is observed through most of the protocols. Several reasons could explain this as Minergie-Eco tends to be a continuity of the Swiss norms and focuses on the building performances. The label only requests reports or measurement types of evidence. No post-occupancy management is considered, however, the protocol reserves the right to proceed to a spontaneous evaluation during the 5 years of post-certification. Concerning BREEAM and LEED, other schemes could be available to assess the post-occupancy stage, but it would mean for the project team additional work and costs. On another level, BREEAM does not require specific evidence for each criterion but proposes a list of evidence possible to the project team that could also show a will to simplify the procedure for the project team.

Tab. 5 - Legend used in the tables Tab. 6 to distinguish the different type of evidence

Type of Evidence	Frequency: Punctual	Frequency: Multiple
Report (photo, document, calculations, simulations, maintenance report)	o	oo
Measure (data report)	x	xx
Subjective measure (survey)	§	§§
Implemented policy and schedule		Δ

5. Conclusions

A distinct list of Health Performance Indicators was extracted from the review of four selected Green Certification Schemes in this work. The list was organised into 3 main domains, with a traditional one concerning the Environmental Hazard treated by all protocols. Fewer protocols consider Building and Architectural Design as this domain is mostly assessed with material selection in BREEAM and Minergie-Eco. Finally, only WELL treats the Social Factor domain.

Even though health-related aspects are a growing concern in Green Certifications, improvements still need to be done. Important limits could be pointed out concerning the point-based rating systems. Indeed, even if preconditions are mandatory, they do not necessarily concern health-related aspects (e.g., BREEAM). Furthermore, conversely to WELL, BREEAM and LEED protocols do not set a minimum and maximum amount of points achieved by

categories. Therefore, a project team could mainly focus on building energy efficiency and cost savings. However, a minimum of points required per category only interferes when at least the silver level of WELL is reached. Additionally, only 1 to 3 points are required per concept, which seems little considered to the number of points available through all the concepts. Regardless, WELL seems more user-centered, and more explicitly focused on health and well-being aspects. A lack of post-occupancy management, as well as subjective measurements, are also pointed out. The impact of this lack should be further studied. As this study only used open-source documents, the present review can be complemented with more details once the full text of the certification documents are available (for example, for a specific project going after green certification). Finally, since BREEAM and LEED certifications both include a post-occupancy scheme, a further analysis of these ones should be done.

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Tab 6 - List of health-related indicators present in the selected Green Certifications Protocols. The types of evidence needed to assess the different indicators are listed in table 5.

		Indicators	Required evidence							
			BREEAM		MINERGIE - ECO		WELL		LEED	
			Pre	Post	Pre	Post	Pre	Post	Pre	Post
Environmental Hazard	Visual- Lighting	Visual lighting design (light level, illuminance)	o				o		o	
		Natural daylight design (illuminance, daylight factor, circadian rhythm)	o		o		o		o	
		Design - Building : enveloppe glazing area Interior : distance between individual units and enveloppe glazing	o				o		o	
		Internal and external lighting - illuminance, comfort level	o				o		o	
		Internal lighting - light color rendering	o				o		o	
		Glare control	o				o		o	
		Electric light quality	o				o			
		Circadian lighting design					o,x			
		Lighting control	o				x,o		o	
	Visual - View	Window / Opening surface and room depth	o						o	
		Adequate view out								
		Direct sky view, visual balance	o							
		Direct sight to outdoor	o		o				o	
	IAQ	IAQ Plan	o						o	
		Ventilation rate	o				o		o	
		Air filtration	o				o	oo	o	
		Ventilation pathway	o				o		o	
		Natural Ventilation - Openess of the windows and vents considered for ventilation requirements					o			
		Outdoor Particulate Matter level (PM2.5,PM10)					x			
		Natural Ventilation - Outdoor conditions PM level, temperature, humidity					o,x	o		
		Enhanced ventilation design: displacement / personalized					o			
		CO2 level			x		x	xx	o	
		VOC - Formaldehyde concentration	x		x		x	xx	x	
		VOC - Benzene , Toluene					x	xx	x	
		Other individual VOC							x	
		TVOC concentration	x		x		x	xx	x	
		Radon concentration			x		x	xx		
		Ozone, Carbon monoxide, Particulate Matter (PM2.5,PM10) concentration					x	xx	x	
		Building flush-out							o	
		Monitoring of 3 indoor air pollutant					o	xx		
		Monitoring of IAQ - accuracy of sensors					o			
		Ventilation system cleaning and hygene inspection and maintenance			x		o	o		
		Non-Ionizing Radiation			x					
		Air treatment - humidification, dehumidification			x					
		Air treatment - Carbon filters, media filters , UVGI					o	oo		
		Prohibition of indoor and outdoor smoking			x		o,Δ	Δ	o	
		Protection of the ventilation system during construction					o		o	
		IAQ management plan during construction							o	
		Operable windows					o		o	
	Acoustic	Sound Insulation	x		x		x,o		o	
		Indoor ambient and airborn noise level	x		x		x			
		Impact noise level	x		x		x	§		
		Room acoustic	x		x		x,o			
		Technical installation noise			x				x	
		Outdoor noises			x					
		Sound mapping					o			
		Sound reducing surfaces	x				o			
		Hearing health conservation						Δ,§		
		Speech intelligibility					o	Δ,§	x	
		Reverberation time	x		x		x,o		x	
	Thermal Comfort	Thermal modelling	o		x				o	
		PMV , PPD	x				x		o	
		Thermal comfort survey						§		
		Thermal zoning	o				o			
		Temperature control	o		x		o			
		Summer heat protection			x					
		Overheating hours	o		x					
		Thermal parameter monitoring: dry-bulb temperature, relative humidity					o	xx		
		Individual heating and cooling control	o				o	Δ		
		Radiant heating and cooling					o			
		Manage relative humidity					o	xx		
		Windows with multiple opening modes					o	§		
		Outdoor thermal comfort					o	§	o	
		Adptability of the building design to adapt with futur outdoor conditions	o							
	Water Quality	Legionella risk management	o		o		x,o	xx,oo		
		Turbidity and coliforms level					x			
		Chemical composition of drinking water					x/o			
		Drinking water taste and quality management					x			
		Drinking water promotion					o	Δ		
		On site non-potable water reuse					o	oo, §		
		Moisture management					o	oo, Δ		
		Quality of water in cooling towers							o	

Tab 6 - List of health-related indicators present in the selected Green Certifications Protocols. The types of evidence needed to assess the different indicators are listed in table 5.

		Indicators	Required evidence							
			BREEAM		MINERGIE - ECO		WELL		LEED	
			Pre	Post	Pre	Post	Pre	Post	Pre	Post
Building and Architectural Design	**Material selection**	Emission limit of TVOC or VOC , Formaldehyde for: wood based products , paints and coating, floor emission, insulation material	x		o		o		o	
		Interior adhesive emission limit of TVOC or VOC , Formaldehyde	x				o		o	
		Emission limit of carcinogens for: wood based products , paints and coating, floor emission, insulation material, interior adhesive	x							
		Mineral fibers			o					
		Transparency of the materials and products used			o		o			
		Construction material restriction of solvant			o					
		Reduce exposure from entryways					o		o	
		Emission limit - Asbestos, Lead, Mercury					o			
		Manage Polychlorinated Biphenyl (PCB) and CCA					o			
		Pesticide management						Δ		
		Contact reduction					o	§		
	Physical activities Promotion	Ergonomic workstation					o	Δ		
		Ergonomic program						Δ,§		
		Circulation network. visibility and promotion of staircases					o			
		Cycling infrastructure (storage , showers ...)					o		o	
		Site with pedestrian friendly access					o			
		Offer physical activities opportunities and promote health self-monitoring						Δ		
		Access to a space dedicated to physical activities					o	Δ		
		Physical Activity Incentives (use of the incentives have to exceed 50%/y or increase of 10% annualy)					o	oo		
	Site Environment	Environmental assessment	o				o		o	
		Monitoring and remediation of outdoor contaminant					oo		o	
		Waste management						Δ		
		Outdoor space with external amenity	o						o	
		Surrounding density and distance to other facilities (retail, service, community) ; connection to pedestrian and bicycle network							o	
		Site with access to mass transit					o		o	
		Reduce outdoor pollution exposure					o			
		Parking design - reduced capactity to encourage other transport modes and use of green cars							o	
Social Factor	**Security**	Security needs assessment	o				o		o	
		Implementation of security requirements for physical security, technological security(alarms, control system...)	o							
	Surrounding Safety	Safe access and pedestrian paths	o							
	Hygiene Accomodation	Bathroom and handwashing accomodation					o			
		Cleaning products and protocols						Δ		
	Nourishment	Fruit and vegetables provision and promotion, nutritional transperancy , food allergens					o,Δ	Δ		
		Special diets and composition of food (limitation of sugar, fired or artificial ingredients)					o,Δ	Δ		
		Promote healthy portions of food					o			
		Nutrition education					o,Δ	Δ		
		Space and time for eating					o,Δ	Δ		
		Space to prepare on-site meal					o			
		Local food sourcing					o	Δ		
		Food production - gardening space					o			
		Local food access					o	o		
		Limit red and processed meat					o	Δ, §		
	Mind	Promotion of mental health and well- being (courses, dedicated space for relaxation...)						Δ		
		Incorporate natural element in the design					o			
		Offer of mental health service						Δ,§		
		Mental health education and training for managers						Δ		
		Stress management plan					o			
		Restorative opportunities , programmes and dedicated spaces					o	Δ		
		Substance use / tabacco cessation policy , education					o	Δ		
		Nature access	o				o		o	
	Community	Quaterly communication about health resources, programs, amenities and policies available						Δ		
		Stakeholders engagement, promote health oriented project					o	Δ		
		Emergency preparedness plan					Δ			
		Occupant survey - experience and self-reported health/ well-being						§§		
		Support for new parents, new mother , family , victims of domestic violence					o	Δ		
		Promote community and diversity engagement					o	Δ		
		Universal design					o	Δ		
		Promote business continuity , emergency resilience , facilitate healthy re-entry						Δ,§		
		Promote housing equity					o	§		
		Responsible labor practises					o	Δ,§		
		Health service (free service health and health benefits plan, sick leave)						Δ		