

Verbundvorhaben:

Standard Holzbausysteme mit nachwachsenden Rohstoffen zur Förderung der Verwendung von Holz plus nachwachsende Rohstoffe bei öffentlichen Gebäuden

Akronym: HO_SY

Anhang, 9. A-LCA – AP5.pdf

Hinweis zur Lebenszyklusanalyse (LCA)

Die durchgeführte Lebenszyklusanalyse (LCA) für den Schulcampus *UnseKinder* basiert auf einer konzeptionellen Untersuchung, die im Rahmen einer studentischen Studienarbeit an der Hochschule Wismar entstanden ist. Die Analyse wurde unter Anwendung der Bewertungsgrundlagen der Deutschen Gesellschaft für Nachhaltiges Bauen (DGNB) durchgeführt und orientiert sich am Bewertungssystem „Neubau Bildungsbauten“.

Wichtige Hinweise zur Bewertung und Einordnung:

- Die Analyse stellt eine konzeptionelle Vorstudie dar und ersetzt keine zertifizierungsrelevante Fachbewertung im Sinne einer offiziellen DGNB-Auditierung.
- Die LCA basiert auf dem Planungsstand vom 06.03.2024 und berücksichtigt ausschließlich ausgewählte Bauteilgruppen (u. a. Außenwände, Decken, Dach, Technikeinbauten).
- Eingabedaten wurden mit dem Online-Werkzeug *bauteileditor.de* modelliert. Dabei erfolgte teilweise eine vereinfachte Annahme von Kennwerten und Stoffströmen.
- Photovoltaiksysteme und technische Anlagen konnten aufgrund eingeschränkter Datenlage nur eingeschränkt in die Ökobilanz aufgenommen werden.
- Die Richtigkeit und Vollständigkeit der Ergebnisse ist dem Ausbildungsniveau und methodischen Rahmen geschuldet und wurde nicht durch eine externe Fachprüfung validiert.

Die Arbeit dient als orientierendes Konzept zur methodischen Integration von Ökobilanzierung im Kontext von schulischen Holzbauprojekten und bildet eine wichtige Grundlage für spätere vertiefte Untersuchungen im Rahmen des Forschungsprojekts HO_SY.



Unser Kinder

DGNB presentation

23.1.2024

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Project Description

The **Unser Kinder** is an architectural consideration aimed at the way of **sustainable teaching** and **learning concepts**. This project seeks to address a supportive foundation to the children and young people by connecting with the amenities, such as **parent's homes**, **daycare centers**, etc., and at the same time, learning by recognizing and exploring in combination with the conscious use of **existing resources** and **energies**.

The project want to prioritize the needs of the students, ensuring that the design enhances **functionality**, **user experience**, and **overall well-being**.

We are incorporating with the sustainable practices, materials, and technologies to **minimize the environmental impact** of the project.

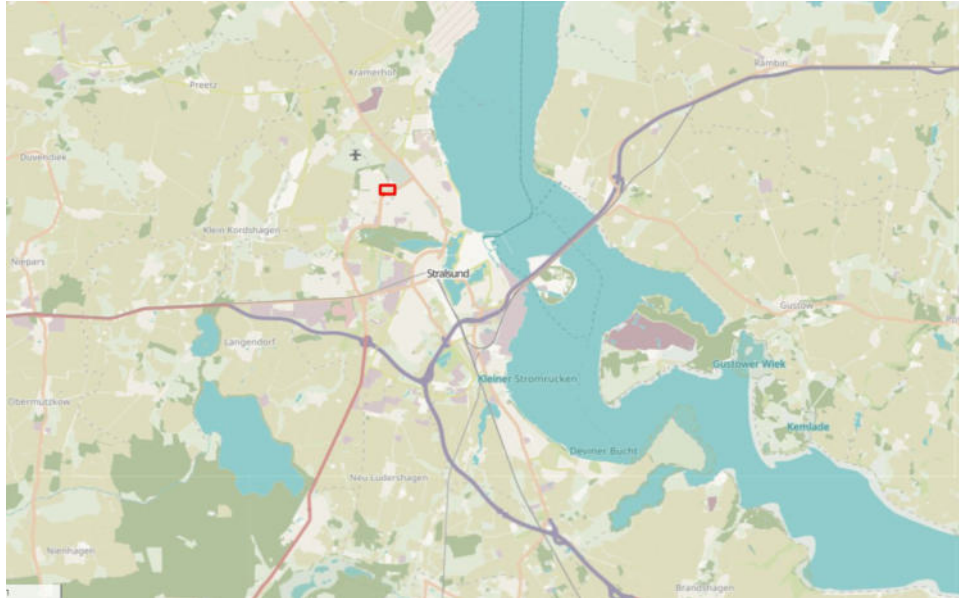
Project Location

City: Stralsund

54.327846, 13.059891

Building type: School

Name: CHILDREN AND YOUTH CAMPUS UNSEKINDER STRALSUND



Floor areas

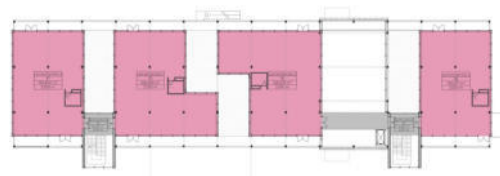
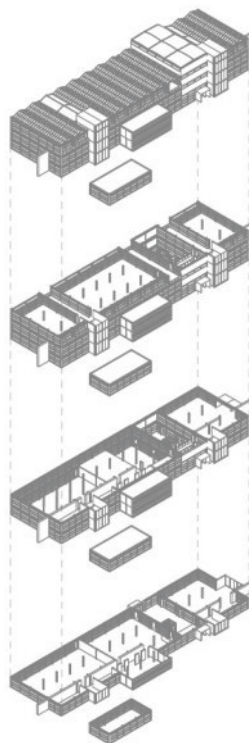
English	German	Square meters
1 Gross Floor Area (GFA): Sum of all floor areas within all floors of the building. The following areas are NOT included in the GFA: - areas within a floor plan that do not exist e.g. airspace area over atriums, galleries or ceiling openings - areas e.g. at the attic which do not have access, are not walkable or not being used because of other reasons - areas exclusively dedicated to servicing, maintenance, inspection and maintenance of structure and technical systems (e.g. unusable roofs, fixed access ladders and roof gangways, servicing gangways in suspended ceilings, crawl space, catwalks in suspended ceilings) - external parts of the building that are not structurally connected to the building (e.g. external stairs, external ramps, pergolas, outdoor sitting areas, terraces)	Brutto-Grundfläche - BGF	3560.3 m ²
2 Standard Gross Floor Area (SGFA): Includes those parts of GFA which are covered by a roof and fully enclosed (floor, ceiling and wall enclosure) (see Figure 2). Rooms that are partially enclosed by the waterproofed or open-work structures are not included (e.g. perforated garage gate, shutters)	Brutto-Grundfläche - Regelteil - BGF _R	1797.6 m ²
3 Special Gross Floor Area: Refers to all rooms and floor areas based on NFA and are structurally connected to the building but not fully enclosed such as loggias, balconies, terraces on flat roofs, courtyards, entrance areas, external stairs	Brutto-Grundfläche - Sonderfall - BGF _S	596.6 m ²
4 Structural Area (SA): All areas under the building structure in each level through which they lead as a construction. (e.g. walls, columns, pillars, chimneys)	Konstruktions-Grundfläche KGF	672.4 m ²
5 Net Floor Area (NFA): Sum of all useable areas within all floors of the building. It includes useable areas UA, technical plant areas TPA and circulation space CS. Following elements are included in the NFA: - exposed installations - objects that are permanently built-in (e.g. ovens, heating and air-conditioning appliances, baths and showers) - brick facing and cladding that is not floor to ceiling height - built-in furniture (e.g. built-in wardrobe, shelving) - movable partitions (e.g. curtains, folding partition walls) - areas of the walk-in installations and elevator shafts where clear cross section > 1,0m ² when not walkable, considered as part of SA	Netto-Raumfläche NRF	2887.9 m ²
6 Usable Area (UA): Part of the area used for the essential purpose of the works is determined as usable area (UA). The usable area (UA) can be further subdivided: 1 - Residential and common spaces (UA 1) 2 - Office space (UA 2) 3 - Production, manual and machine work, re-search and development (UA 3) 4 - Store, distribution and sale spaces (UA 4) 5 - Education, school and culture spaces (UA 5) 6 - Health care and nurse spaces (UA 6) 7 - Other uses (UA 7)	Nutzfläche NUP	2887.9 m ²
7 Technical plant area (TPA): Includes those parts of the NFA dedicated to accommodating technical plants. Exception: This does not apply to buildings whose primary purpose is to accommodate technical plants (e.g. boiler house). In this case, the area is defined as UA.	Technische Funktionsfläche TF	0.9 m ²
8 Circulation space (CS): Sub-area of the net floor area (NFA) for horizontal and vertical access of the building, includes spaces dedicated exclusively to circulation (e.g. roadways in parking between parking lots, lobbies, hallways, corridors, stairs, elevators) and technical plant areas (e.g. HVAC rooms etc.).	Verkehrsfläche VF	1566.4 m ²
9 Gross Volume (GV): Gross volume (GV) includes the volume of all rooms and building structures that are above the gross floor area (GFA) of the building. The gross volume (GV) is enclosed by the outer boundary surfaces formed by the structural building blocks, exterior walls and roofs including dormers or roof skylights.	Brutto-Rauminhalt BRI	12314.9 m ³

DG

2.OG

1.OG

0.EG



Structure concept

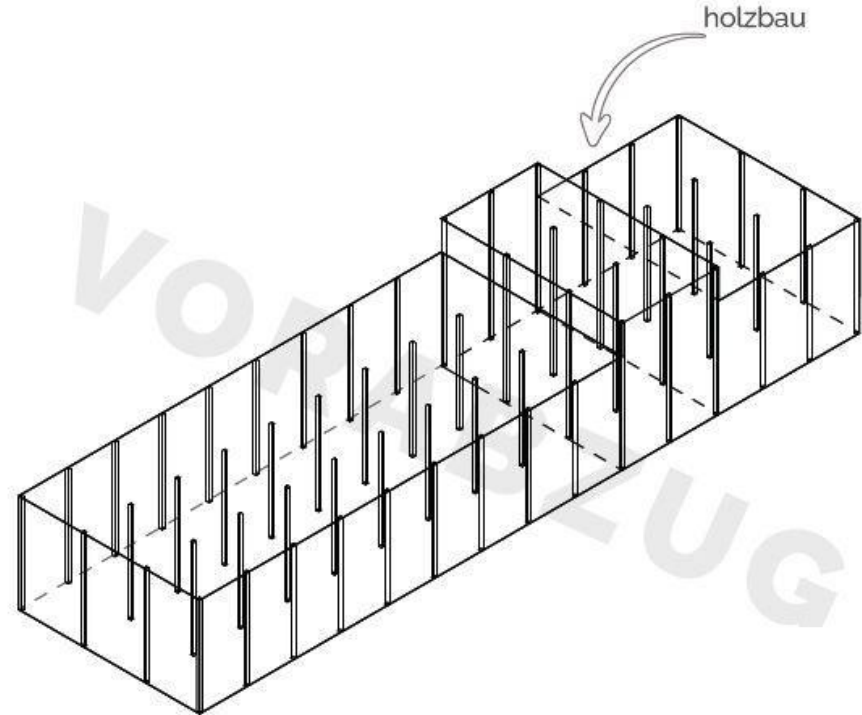
The school is mainly from renewable raw materials and recycled products recycled products (80%). This is rounded off by the use of rainwater and service water. The structural concept of the school was developed in a participatory involving teachers, pupils and parents. In addition the project is being carried out in conjunction with the Wismar University of Applied Sciences under the research project scientific support.

Load-bearing structure: Timber Skeleton

Walls: Demountable & expandable

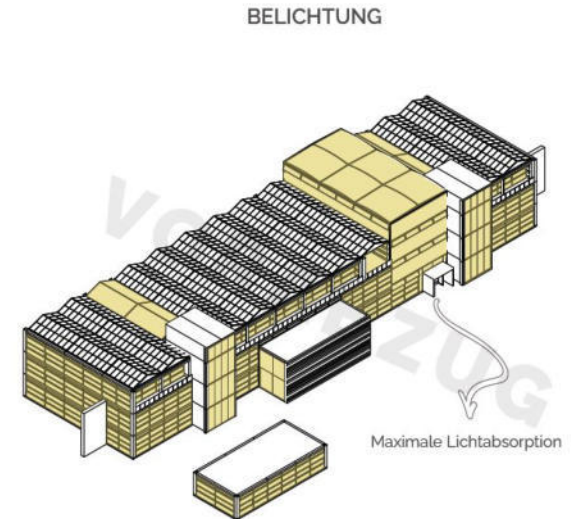
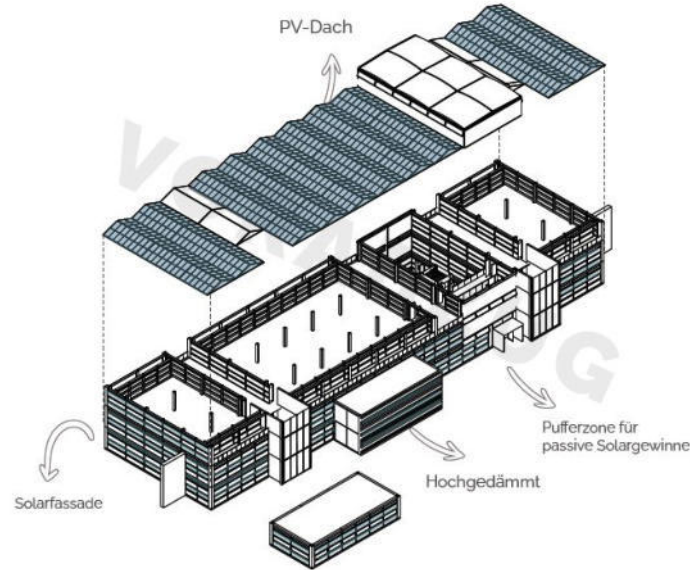
Foundations: Point foundations

Inside walls: Prefabricated/Reversible



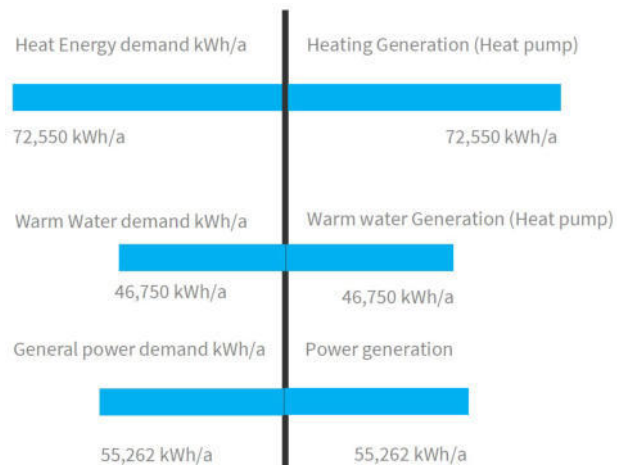
Energy concept

Heat transmission resistance
opaque AW 0.15 W/(m²K) (net
usable area) Passive house window
0.8 W/(m²K) Heating energy
requirement approx. 25 kWh/(m²a)
Unheated climate buffer as air
collector for preheating the outside
air the outside air in conjunction
with the exhaust air system Solar
shading south with dual function/
PV on south side south side Storage
wall/ clay (old recycling) for
time-delayed heat utilization heat
utilization Optional solar chimney
with heat collector - Library



Energy concept

Heat energy demand: 72,550 kWh/a
 Warm water demand: 46,750 kWh/a
 Power demand: generally: 55,262 kWh/a
 Weltotal : 90,218.6 kWh/a



Output	Input
Heat energy demand: 72,550 kWh/a	Heat energy generation <ol style="list-style-type: none"> Heat pump (cop=3) input from power-mix (24,183.3 kWh/a energy demand, 48,366.6 kWh/a renewable energy) Flat solar collector 181.3m² (72,550 kWh/a renewable energy) Distance heating (72,550 kWh/a energy demand)
Warm water demand: 46,750 kWh/a	<ol style="list-style-type: none"> Heating pump (cop=3) input from power-mix (15,583.3 kWh/a energy demand, 31,166.6 kWh/a renewable energy) Flat solar collector 116.8m² (46,750 kWh/a renewable energy) Distance heating (46,750 kWh/a energy demand)
Power demand: 55,262 kWh/a	Power Mix (55,262 kWh/a energy demand) <ol style="list-style-type: none"> Photovoltaic 319,9 m² (55,262 kWh/a renewable energy) Wind power wheels eg. 4 small wheels with 10kW (55,262 kWh/a renewable energy)


DGNB evaluation



The project is estimated to be eligible for a DGNB platinum certificate. Total performance scores are over 80%, and each individual topic is over 65%.

	 Platinum	 Gold	 Silver	 Bronze*
Total Performance Index	≥ 80%	≥ 65%	≥ 50%	≥ 35%
Min. Performance Index	65%	50%	35%	-- %
* this award is only valid for the passed certificate or for the certificate "Buildings in operation".				

<https://docs.google.com/spreadsheets/d/1XmKEX05iitlyT7tNbohGfhP3Wi5iTDNuEnGDeT5zGvo/edit?usp=sharing>

Contract no.	EDUCATION INT V2020 -	environmental	84.0%	technical	83.4%	total performance index	
Project name		economic	90.6%	process	65.4%		
DGNB Auditor:		sociocultural and functional	74.9%	site	73.1%	80.5%	
Key:		will be calculated automatically	fixed value		cells without content		

ENVIRONMENTAL QUALITY (ENV)



ENV 1.1 Building life cycle assessment

Objective:

The goal is to adopt a consistent life cycle approach in planning buildings to **minimize environmental impact** and reduce the consumption of non-renewable resources at every stage of a building's life.

Benefits:

When planning buildings, using a life cycle approach (like looking at the whole lifespan), called life cycle assessment, helps decision-makers make eco-friendly choices with all the necessary info. This method considers different environmental factors, locations, and times of impact to find optimized solutions. It's also handy for reporting key environmental stats like CO2 emissions and energy use throughout a building's entire life.

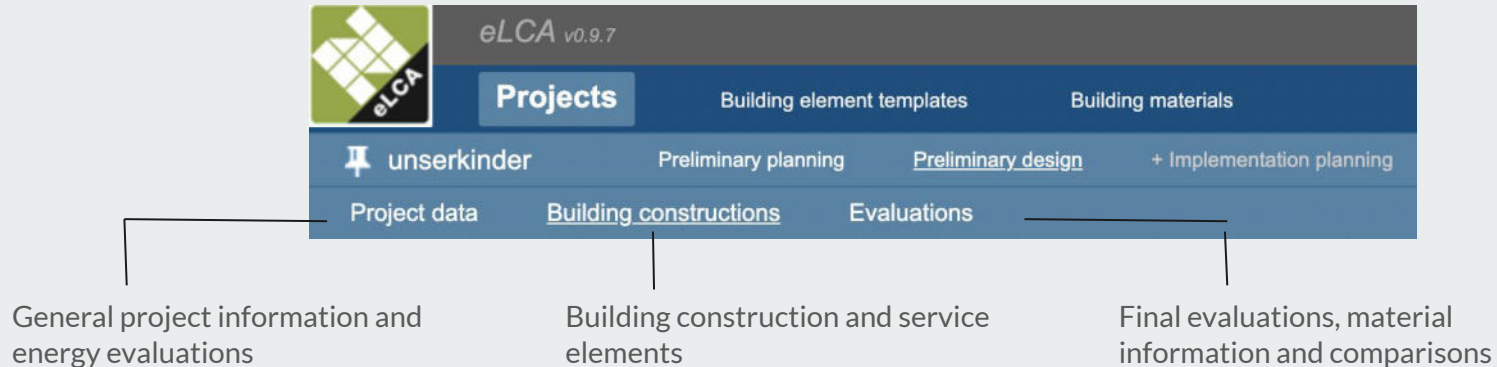
Bauteileditor.de Enhancing LCA in Sustainable Building



www.bauteileditor.de

eLCA allows for the easy and quick determination and evaluation of the **environmental impacts** of buildings, considering the **entire life cycle**. In the Bauteil Editor, the tool's core component, users can easily and visually model building components. The clear, graphically presented results facilitate detailed result analysis.

It is based on the Sustainable Building Assessment System (BNB) but can be integrated into DGNB standards

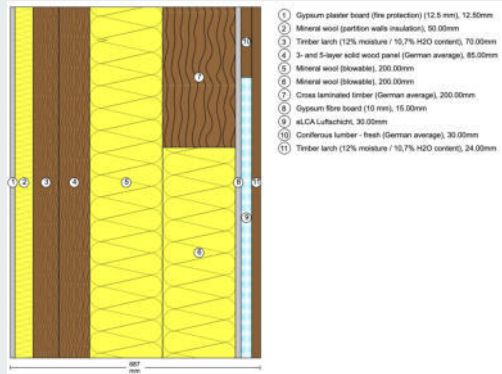


Our Process

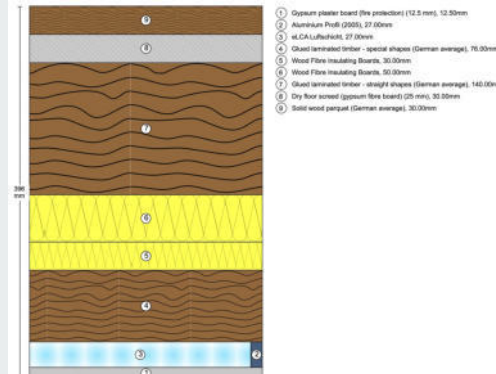
We inputted general building data such as NGF, BGF, and location. Subsequently, we examined the building's details and materials for inclusion in the website's life cycle assessment.

This involved calculating the area and materials of **foundation, walls, curtain walls, roof, and ceiling**. We then detailed these elements on the website to facilitate the calculation of emissions at various stages of the building's life cycle.

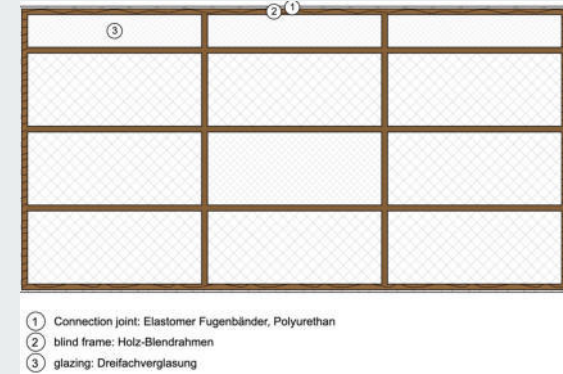
Examples:



Wall detail



Roof detail



Curtain wall

Challenges

Throughout this process, we encountered numerous challenges. Notably, a specific material essential for this area, namely Foil, was unavailable on the website. Consequently, we manually inputted the results to address this issue.



Bauteileditor		foil	Total
indicator	total / m ² NGFa	total / m ² NGFa	total / m ² NGFa
GWP	10.02637736	4.45	14.48
ODP	0.0000001708031116	0.00000019778049	0.0000002905811606
POCP	0.004601442315	0.0025067074	0.007108149715
AP	0.0325447581	-0.01130429105	0.02124046705

Another challenge arose with the absence of energy facility details for the building on the website. Subsequently, we had to substitute alternative information, which could impact our results negatively.

There were two variants in the building: "**all standard**" and "**standard plus**," for which we conducted life cycle assessments (LCA) and presented our results alongside benchmarks.

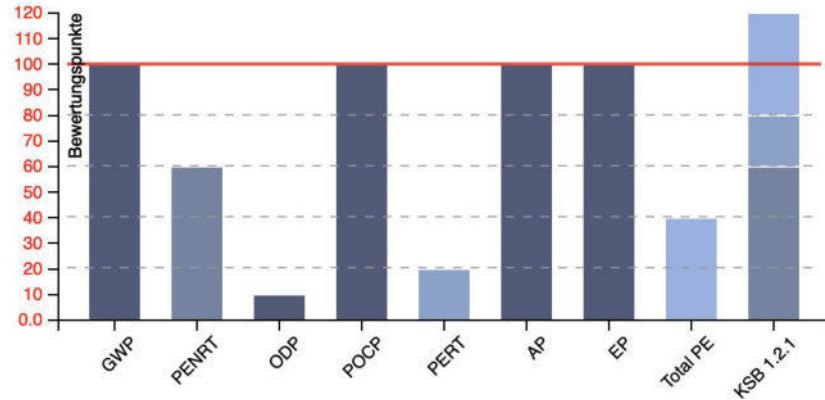
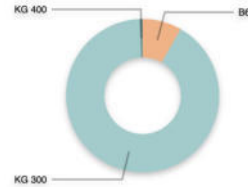


total INKL. A1 - A3, B6, C3, C4, INSTANDHALTUNG

indicator	unit	total / m ² NGF
GWP	kg CO2 equiv.	10.0263773646
ODP	kg R11 equiv.	1.7080311160E-7
POCP	kg ethene equiv.	4.6014423148E-3
AP	kg SO2 eqv.	0.0325447581
EP	kg PO4 equiv.	4.8520009522E-3
Total PE	MJ	264.3562686802
PENRT	MJ	147.2989613055
PENRM	MJ	3.6826810057
PENRE	MJ	141.9730147859
PERT	MJ	117.0573073748
PERM	MJ	22.4948208300
PERE	MJ	75.5799496351
ADP elem.	kg Sb equiv.	6.8075815331E-5
ADP fossil	MJ	125.6512563031
FW	m3	15.2237752503

GWP Anteile

Bereich	Prozent	total / m ² NGF
GWP	100.00	10.02637736
B6	8.28	0.83026174
KG 300	91.08	9.13189043
KG 400	0.64	0.06422520

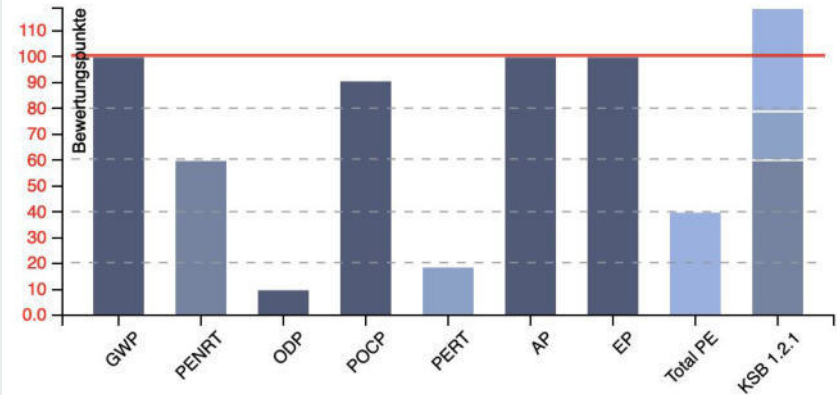
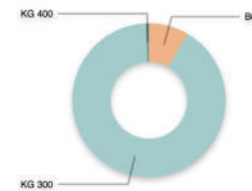


total INKL. A1 - A3, B6, C3, C4, INSTANDHALTUNG

indicator	unit	total / m ² NGF
GWP	kg CO2 equiv.	9.8182817085
ODP	kg R11 equiv.	2.4730094801E-7
POCP	kg ethene equiv.	6.7127442076E-3
AP	kg SO2 eqv.	0.0333264213
EP	kg PO4 equiv.	5.3536831043E-3
Total PE	MJ	264.3939362111
PENRT	MJ	155.4471988046
PENRM	MJ	6.5406322647
PENRE	MJ	147.4409080655
PERT	MJ	108.9467374065
PERM	MJ	23.2232813584
PERE	MJ	78.2387504857
ADP elem.	kg Sb equiv.	9.2720517680E-5
ADP fossil	MJ	128.3641396320
FW	m3	20.3931269556

GWP Anteile

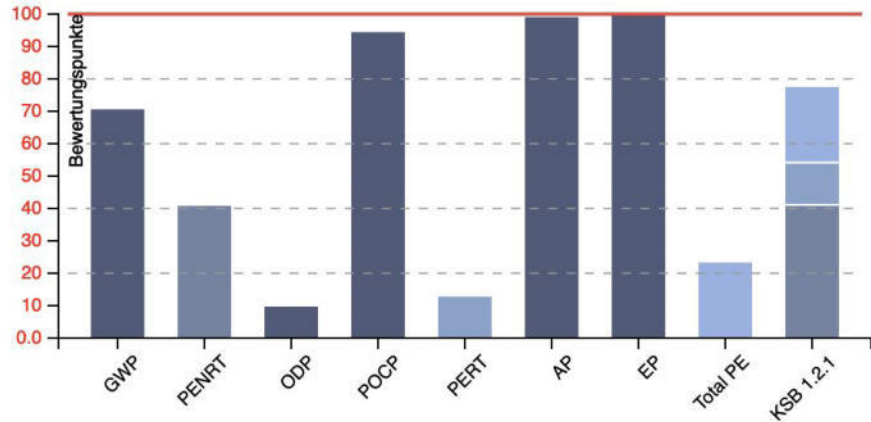
Bereich	Prozent	total / m ² NGF
GWP	100.00	9.81828171
B6	8.46	0.83026174
KG 300	90.89	8.92379478
KG 400	0.65	0.06422520



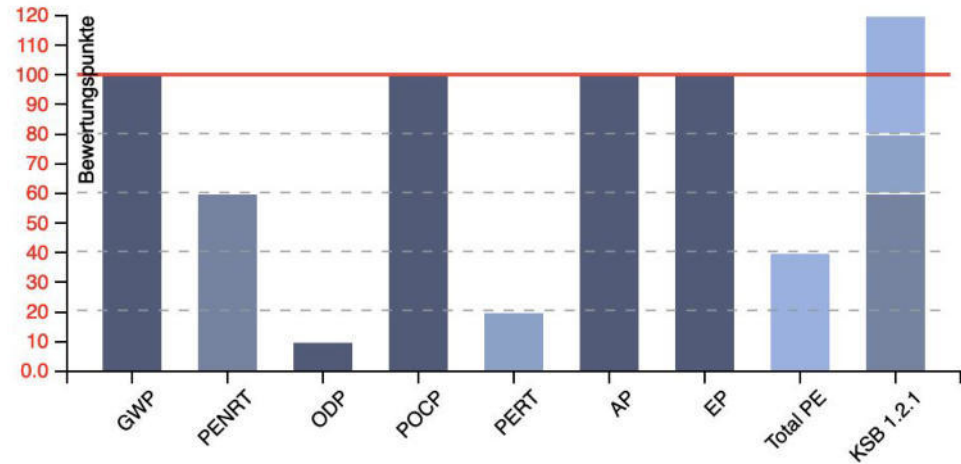
This result assumes, of course, that the energy is entirely renewable.




Without renewable energy



With renewable energy



Sadly, there was no info available on the photovoltaic LCA so technically it would affect the final results



Among the problematic materials employed in the construction was **aluminum profile**, significantly impacting the outcomes. To mitigate this, we transitioned all profiles to wood, though certain essential sections still required the use of the original material.

#	Baustoff	indicator	total / m ² _{NGFa}	unit
1	Aluminium Profil (2005)	GWP	1.6421366782	kg CO2 equiv.
2	Dreifachverglasung	GWP	1.3853720994	kg CO2 equiv.
3	Holz-Blendrahmen	GWP	0.9700400003	kg CO2 equiv.
4	Elastomer Fugenbänder, Polyurethan	GWP	0.8958369841	kg CO2 equiv.
5	Holzfaserdämmplatten	GWP	0.6944493048	kg CO2 equiv.

Using massive **glass panels** were also problematic

#	Baustoff	indicator	total / m ² _{NGFa}	unit
1	Brettschichtholz - Standardformen (Durchschnitt DE)	ODP	7.0808610561E-8	kg R11 equiv.
2	Brettschichtholz - Sonderformen (Durchschnitt DE)	ODP	4.2600822299E-8	kg R11 equiv.
3	Brettsperrholz (Durchschnitt DE)	ODP	3.4022280133E-8	kg R11 equiv.
4	3- und 5-Schicht Massivholzplatte (Durchschnitt DE)	ODP	1.0411258173E-8	kg R11 equiv.
5	Oriented Strand Board (Durchschnitt DE)	ODP	4.6810145778E-9	kg R11 equiv.

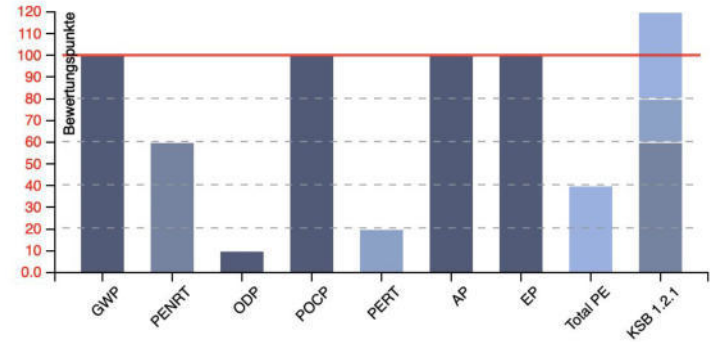
Extensive use of **wood** also had a detrimental effect on the ODP criteria

Subsequently, we opted to minimize the number of windows used in the building to optimize the GWP, POCP, EP, and AP indicators, as illustrated by the results.

Replacing the western and eastern curtain walls with timber walls

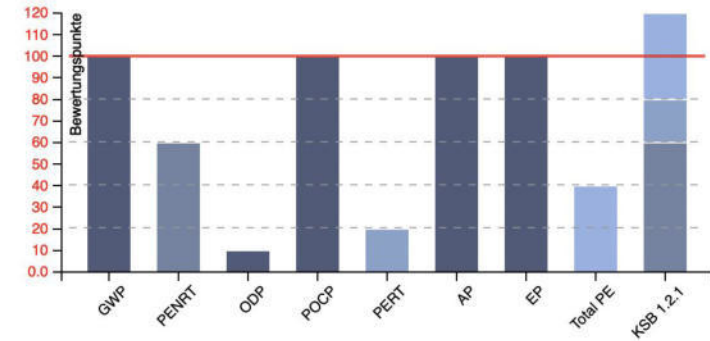
total INKL. A1-3, B6, C3, C4

indicator	unit	total / m ² _{NGFA}	Punktwert	Kriterium
GWP	kg CO2 equiv.	10.0263773646	100.00	1.1.1
ODP	kg R11 equiv.	1.7080311160E-7	10.00	1.1.2
POCP	kg ethene equiv.	4.6014423148E-3	100.00	1.1.3
AP	kg SO2 eqv.	0.0325447581	100.00	1.1.4
EP	kg PO4 equiv.	4.8520009522E-3	100.00	1.1.5
PENRT	kWh	40.916378140414	60.00	1.2.1
PERT	kWh	32.515918715208	20.00	1.2.1
PE Ges.	kWh	73.432296855622	40.00	1.2.1
KSB 1.2.1			100.00	



total INKL. A1-3, B6, C3, C4

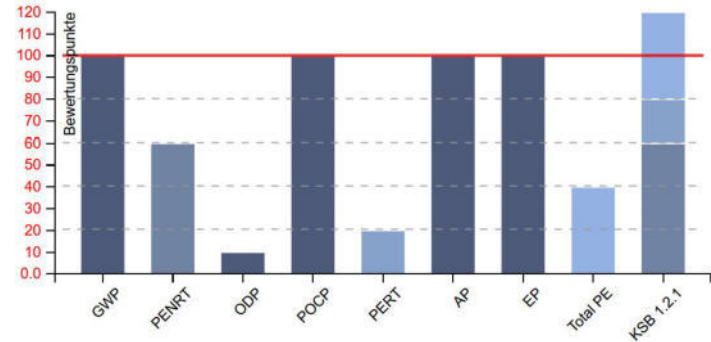
indicator	unit	total / m ² _{NGFA}	Punktwert	Kriterium
GWP	kg CO2 equiv.	9.8442055135	100.00	1.1.1
ODP	kg R11 equiv.	1.6196039031E-7	10.00	1.1.2
POCP	kg ethene equiv.	4.4386611290E-3	100.00	1.1.3
AP	kg SO2 eqv.	0.0319119043	100.00	1.1.4
EP	kg PO4 equiv.	4.7465034744E-3	100.00	1.1.5
PENRT	kWh	40.078200149339	60.00	1.2.1
PERT	kWh	31.97996231011	20.00	1.2.1
PE Ges.	kWh	72.058162459449	40.00	1.2.1
KSB 1.2.1			100.00	



Despite the results indicating no decline in the Ozone Depletion Potential (ODP) indicator, utilizing fewer glass elements in the building's interior and opting for wooden materials instead did not yield any discernible differences between the two. Therefore, there is no need to replace or alter the quantity of these materials.

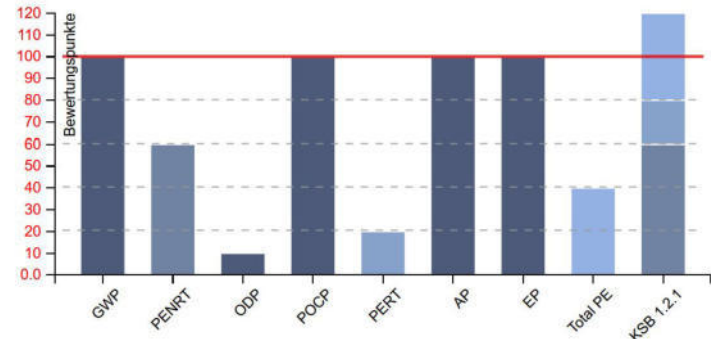
total INKL. A1-3, B6, C3, C4

indicator	unit	total / m ² NGFa	Punktwert	Kriterium
GWP	kg CO2 equiv.	9.2875353135	100.00	1.1.1
ODP	kg R11 equiv.	1.6871354447E-7	10.00	1.1.2
POCP	kg ethene equiv.	3.9274073316E-3	100.00	1.1.3
AP	kg SO2 eqv.	0.0295943748	100.00	1.1.4
EP	kg PO4 equiv.	4.4764583176E-3	100.00	1.1.5
PENRT	kWh	37.466389484139	60.00	1.2.1
PERT	kWh	28.458174565638	20.00	1.2.1
PE Ges.	kWh	65.924564049777	40.00	1.2.1
KSB 1.2.1			100.00	

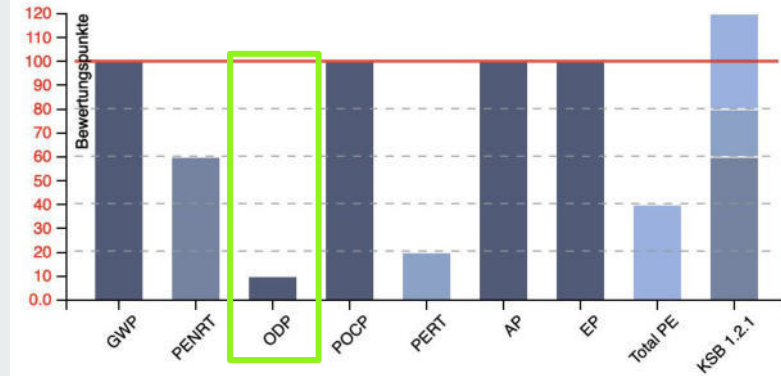


total INKL. A1-3, B6, C3, C4

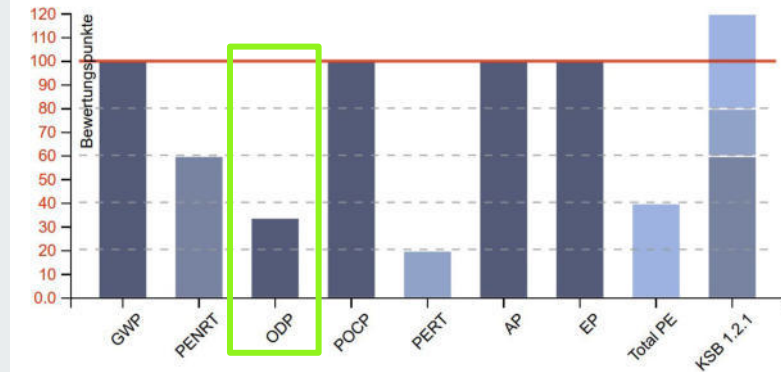
indicator	unit	total / m ² NGFa	Punktwert	Kriterium
GWP	kg CO2 equiv.	9.2875353135	100.00	1.1.1
ODP	kg R11 equiv.	1.6871354447E-7	10.00	1.1.2
POCP	kg ethene equiv.	3.9274073316E-3	100.00	1.1.3
AP	kg SO2 eqv.	0.0295943748	100.00	1.1.4
EP	kg PO4 equiv.	4.4764583176E-3	100.00	1.1.5
PENRT	kWh	37.466389484139	60.00	1.2.1
PERT	kWh	28.458174565638	20.00	1.2.1
PE Ges.	kWh	65.924564049777	40.00	1.2.1
KSB 1.2.1			100.00	



However, as evident from the results, there was still a decline in the ODP (Ozone Depletion Potential) indicator, attributed to the substantial use of wooden materials throughout the entire building.



To enhance optimization, we transformed the extensive wooden plates employed in the floors into wooden beams, yielding significant improvements.



Evaluation



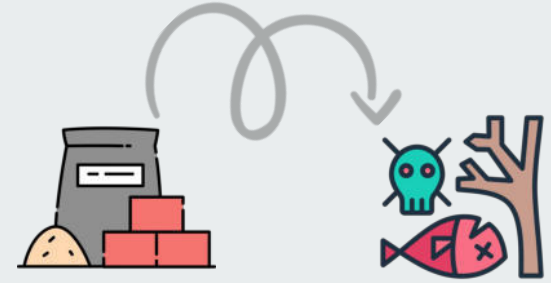
We would get all the 120 point for this part if:

- **Integration of life cycle assessments into the planning process should be** thoroughly executed, and a life cycle assessment model should be created in the early planning phase.
- **Comparison of building variants with life cycle assessment calculations should be** performed, and the potential environmental impacts from these variants should be evaluated.
- **Regular updates to the life cycle assessment results during the planning process should be** carried out, and the results should be communicated within the planning team.
- **Alternative approaches that accomplish optimization of the life cycle assessments should be** identified and credited.
- **Optimization of the life cycle assessment during the planning process should be** undertaken with full consideration of the entire building.
- **Significant alternative decisions on the expected life cycle assessment results should be** determined as part of a partial analysis for the relevant scope of analysis.
- **Life cycle assessment comparison calculations should be** conducted according to the partial calculation method (PCM), and the results should be provided.
- **Weighted environmental impacts should be** evaluated in accordance with the PCM to ensure they comply with the weighted reference value.
- **Climate protection goals as part of the Agenda 2030 bonus should be** targeted, aiming to achieve climate neutrality.
- **Use of reused components or structural elements should be** recorded in the life cycle assessment calculation.
- **Buildings that generate energy for "other users" should be** designed to contribute to the circular economy.
- **Refrigeration systems should be** free of halogenated hydrocarbons with high GWP factors, and refrigerants with a CO₂ equivalent greater than 150 kg should not be used.

ENV 1.2 Local Environmental Impact

Objective

Our objective is to reduce, avoid or substitute all dangerous or damaging materials, (construction) products or preparations that can adversely affect or cause short, medium or long-term damage to people, flora and fauna.



Benefits

The use of particularly environmentally friendly materials not only makes an important contribution to improving indoor air quality, but also helps limit the contamination risk of a building with regard to pollutants. Only a building elements catalogue, that is complete in terms of the environmental qualities of materials, can provide building owners with extensive information about construction products used in various parts of the building. This information is of key importance for the quality assurance in the building construction, for clarifying deficiencies and finding appropriate ways for eliminating them, simultaneously optimising the costs of maintenance. This provides an important contribution to the value stability of a building.



Evaluation

The Quality Levels (QL) named in the criteria matrix build upon each other. The quality level achieved is derived from the individual aspect that needs to be given the lowest evaluation. The requirements of a higher quality level in each case incorporate all requirements listed for the lower levels. A maximum of 100 points can be awarded for this criterion.



Evaluation for building typologies such as: Office, **education**, hotel, consumer market, Logistics, Production, Assembly buildings.

Sl.no	INDICATOR	POINTS
1	QL 0	10
2	QL 1	30
3	QL 2	50
4	QL 3	75
5	QL 4	100

Additional points for all quality levels: +10

Cooling is provided without halogenated/partially halogenated refrigerants 10

METHOD

The material choice of construction must be noted. . Auxiliary materials such as adhesive, primers, etc. must be added. Verifiable proof must be produced in accordance with the criteria matrix for all requirements that are to be verified at the target quality level, and as a result of this, the following surfaces must be considered:

- Ground structures including foundations
- External wall structures
- Internal wall structures
- Floor and ceiling structures
- Roof structures
- Underground garages (are considered separately)



Required documentation

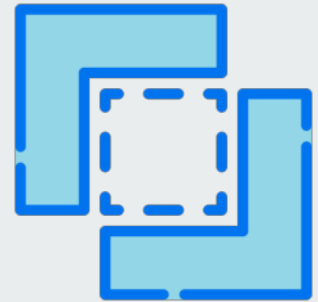
The documentation submitted must comprehensively and clearly demonstrate compliance with the requirements for the target evaluation of the individual indicators.

A range of different forms of documentation listed are to be collected.



Exceptions for the verification process:

- Quality levels 0 and 1
- Quality level 2
- Quality level 3
- Quality level 4
- Cut-off criteria of max 5%
- Technical and functional exceptions



Data for documentation

No.	RELEVANT COMPONENTS/ CONSTRUCTION MATERIALS/ SURFACES	SCOPE	SUBSTANCES/ASPECTS CONSIDERED	REFERENCE STANDARD	QUALITY LEVEL 0	QUALITY LEVEL 1	QUALITY LEVEL 2	QUALITY LEVEL 3	QUALITY LEVEL 4	TYPE OF DOCUMENTATION	SCOPE OF APPLICATION AND VERIFICATION	NOTES REGARDING DEFINITIONS/EXPLANATIONS/ FOOTNOTES	FOCUS OF IMPACT OF THE SUBSTANCES/ASPECTS CONSIDERED OVER THE INDIVIDUAL STAGES IN THE LIFE OF A BUILDING (MODULES IN ACCORDANCE WITH DIN EN 15978)					APPLICATION
	Where specifically does this apply?	Product type	Explanation	Definition	Limit value 10 points	Sub-Reference 30 points (verification via building elements catalogue)	Reference 50 points (verification via building elements catalogue)	Sub-target 75 points (verification via building elements catalogue)	Target value 100 points (verification via building elements catalogue)	Requirement for verification of the individual aspects (only documentation containing values that are to be verified should be submitted)	The requirement applies to the following components		Raw materials extraction (A1)	Production of the product (A3)	Construction of the building (A5)	Operation/use of the building (B1)	Dismantling of the building (C1-C4 and D)	Typical HOAI phase of implementation (German fee structure for architects and engineers)
General information: 1) For all standards, references, test seals, etc. listed below, legally valid proof of equivalence with regard to the substance or aspect considered (see column 4) will be accepted. This legally valid proof can be provided by the manufacturer or the authority responsible for awarding the test seal. 2) The requirements of the specified "reference standards" (see column 5) generally apply to the statutory requirements that are predominantly shown in quality level 0 and 1. Requirements outside of this do not always refer to the reference standard. The requirements of a higher quality level in each case incorporate all requirements listed for the lower levels: higher quality levels (QL) may require additional requirements and quality standards. The QLO is an absolute min. requirement for this criterion. Stockholm POP Convention (restrictions of substances listed under the Annex A, B and C) must be considered as the mandatory worldwide requirement .													Reference to the DGNB criterion					
													Legally valid proof	ENV 1.3 "Sustainable resource extraction"		SOC 1.2 "Indoor air quality"	TEC 1.6 "Ease of recovery and recycling"	
1	Coatings on non-mineral sub-surfaces: Metals, wood, plastics (Factory and building site)	This refers to decorative liquid coating materials: Paints/varnishes with primer coats. Effect coatings (such as metallic paints) are an exception to this	VOC/ heavy metals / hazardous substances	VOC definition in accordance with Directive 2004/42/EC VOC content: ISO 11890-2 Stockholm POP Convention	No use of lead and cadmium compounds, and no use of PCBs (polychlorinated biphenyl) or CE marking	< 300 g/l – (Category D - Solvent-borne coatings (SB) in accordance with Directive 2004/42/EC)	< 130 g/l – (Water-borne coatings (WB)/Cat. D in accordance with Directive 1004/42/EC)	< 100 g/l	< 100 g/l	Technical data sheet and/or SDS and/or manufacturer declaration and/or test certificate and/or reference product labels in the DGNB System: https://www.dgnb-system.de/de/system/tab/planner/kennung/	All relevant components and construction products	Please note: Coatings applied at the factory	Risk minimisation in solvent manufacturing			Indoor air hygiene		Work stage 5-9
2	Coatings on predominantly mineral interior sub-surfaces as well as on wallpaper, non-woven materials, plasterboard, etc. Floor areas with special resistance requirements (such as OS (surface protection) systems) and traffic routes such as underground garages and access roads are not taken into account	This refers to decorative paints, primers, decorative fillers (incl. Q-filler) and deep primer, floor coatings with no special resistance requirements, concrete glazes	VOC/SVOC/ heavy metals / hazardous substances	VOC definition in accordance with Directive 2004/42/EC VOC content: ISO 11890-2 Stockholm POP Convention	No use of lead and cadmium compounds and no use of PCBs (polychlorinated biphenyl) or CE marking	In accordance with the requirements for water-borne (WB) products in accordance with the Directive 2004/42/EC (Appendix II)	< 30 g/l	- Solvent-free (≤ 0.7 g/l) and - plasticiser-free (≤ 0.7 g/l)	- Solvent-free (≤ 0.7 g/l) and - plasticiser-free (≤ 0.7 g/l)	Technical data sheet and/or SDS and/or manufacturer declaration and/or test certificate and/or reference product labels in the DGNB System: https://www.dgnb-system.de/de/system/tab/planner/kennung/	All relevant components and construction products	For max. 5% of the GFA(S).				Indoor air hygiene		Work stage 5-9
3	Coatings on predominantly mineral interior sub-surfaces such as concrete, masonry, mortar and filler (e.g. concrete filler). Floor areas with special resistance requirements (such as OS (surface protection) systems) and traffic routes such as underground garages and access roads, as well as floor screed intended for use without additional coverings and decorative screeds are not taken into account.	This refers to dust-binding coatings and primer coats such as the 'Bet-onkontakt' or 'Aufbrennsperre' products	VOC/ heavy metals / hazardous substances	VOC definition in accordance with Directive 2004/42/EC VOC content: ISO 11890-2 Stockholm POP Convention	No use of lead and cadmium compounds and no use of PCBs (polychlorinated biphenyl) or CE marking	< 30 g/l	< 30 g/l	< 10 g/l	< 5 g/l	Technical data sheet and/or SDS and/or manufacturer declaration and/or test certificate	All relevant components and construction products	For max. 5% of the GFA(S).				Interior air hygiene		Work stage 5-9

Data Worksheet

						Requirements	Submitted data sheets					
Building Component	Optional	Product description and / or product type and / or function with, if necessary, (layer) assignment in the component	Product name	Manufacturer	Mounting place	Requirement according to criterion (the line number according to criteria matrix)	Achieved quality level DGNB	Proven attributes according to criteria matrix	Technical Sheet	Safety Data Sheet	Manufacturer's declaration	Link / Reference to submitted data sheets
ROOF STRUCTURE												
Extensive substrate		50 mm										
Filter fleece												
solid drainage		40 mm										
Storage fleece												
Sealing membrane	1		Rhepanol ftk	Rhepanol/Evacon	Roof	44	2	No SVHC	x	x		https://www.fht.de/products/rhepanol/ftk-membrane-system/membran-2-ftk-roof-membrane-ftk-sealant
Wood spruce full formwork		24 mm										
Wood spruce counter battens	2	30 mm (near ventilation)	THO MAX VARIO	Aegean	Roof	48	4	Formaldehyde Class E1 (<0.07 ppm)	x	x		https://www.saneas.eu/en/configuration/matrix/products/iso-aegean-nd-max-vario
Underlay membrane		as < 0.3m 22 mm wood fiber insulation board [045; 240] - Undercover plate 280 mm KVH										
Wood fiber insulation	3	22mm	Steco Universal	Steco	Roof	48	0	No Performance Determined	x	x		https://www.steco.com/en/products/insulation/insulation-systems-for-roofs/sarking-and-shaathing-boards/steco-universal
Timber beams	4		Glued solid timber	Mayer-Meinert Holz Wemar	Roof	48	4	Building authority evidence is not currently required under VOC Emissions/ Formaldehyde <0.095 mg/m³ (0.917mg/m³)	x	x		https://www.mm-holz.com/en/products/timber
cellulose fiber	5	230 mm [045; E]	isocell Cellulose Fiber	isocell/Climacell	Roof	45	2	"Noboron compounds" < 0.1%	x	x		https://www.isocell.com/en/products/cellulose
vapor barrier	6	as < 2m 50 mm	intello Plus	intello	Roof	9	4	Solvent < 0.1% (0.09%)	x	x	x	https://de.products.com/products/isocell/insulation/insulation-systems-for-roofs/sarking-and-shaathing-boards/steco-universal
wood spruce cross battens		/50/80; a=400										
cellulose fiber	7	50 mm [040; E]	isocell Cellulose Fiber	isocell/Climacell	Roof	45	2	"Noboron compounds" < 0.1%	x	x		https://www.isocell.com/en/products/cellulose
gypsum board	8	25 mm type DF (GKF)	Gypsum Fibre Board	Fermacell	Roof	48	0	formaldehyd emissions after 28 days < 10 µg/m³	x	x		https://www.fermacell.de/de/products/fermacell-gipsfaserplatten/gipsfaserplatten
CEILING STRUCTURE												
parquet		30 mm										
dry screed		25 mm										
impact sound insulation		30 mm VWF-T (s < 30 MN/m³)										
filling		40 mm										
trickle protection		0.2 mm										
280 mm KVH (Timber Beams)	9		Glued solid timber	Mayer-Meinert Holz Wemar	Ceiling	48	4	Building authority evidence is not currently required under VOC Emissions/ Formaldehyde <0.095 mg/m³ (0.917mg/m³)	x	x		https://www.mm-holz.com/en/products/timber
wood fiber insulation	10	200 mm [030; 45]	Therm dry	Steco	Ceiling	48	0	No Performance Determined	x	x		https://www.steco.com/en/products/insulation/insulation-systems-for-roofs/sarking-and-shaathing-boards/steco-universal
trickle protection		0.2 mm										
wood spruce		24 mm cost effective formwork										
gypsum fiber board	11	25 mm type DF (GKF)	Gypsum Fibre Board	Fermacell	Ceiling	48	0	formaldehyd emissions after 28 days < 10 µg/m³				https://www.fermacell.de/de/products/fermacell-gipsfaserplatten/gipsfaserplatten

ENV 1.3 Sustainable Resource Extraction

Objective

- to promote the use of products in buildings and their external installations that are transparent with regard to their environmental and social impacts
- utilise raw material extraction and processing methods that comply with recognised environmental and social standards.

Benefits

- helps to raise awareness regarding the sustainable resource extraction among all people
- leads to the further expansion and wider dissemination of experience gained about sustainable and socio-ecologically
- counteract environmental and social wrongs

Contributions to Overriding Sustainability goals

1. CONTRIBUTION TO SUSTAINABLE DEVELOPMENT GOALS (SDGS) OF UNITED NATIONS (UN)
2. CONTRIBUTION TO THE GERMAN SUSTAINABILITY STRATEGY

CONTRIBUTION TO SUSTAINABLE DEVELOPMENT GOALS (SDGS) OF UNITED NATIONS (UN)

Significant

Use of natural resources
Sustainable management of all forest types

Moderate

Global resource efficiency and decoupling
of economic development

Ending child labour

Reducing and eliminating waste

Sustainability reporting

CONTRIBUTION TO THE GERMAN SUSTAINABILITY STRATEGY

Significant

Sustainable Consumption
Forests

Moderate

Resource Conservation

Sustainable production

Low

Global Supply Chains

Outlook

- This criterion has been fundamentally revised in order to be able to reflect the modern reality of responsibility for raw materials extraction
- designed to enable the DGNB to further expand the scope of analysis and to enable the evaluation of the quality levels to correspond to developments in the industry

Share of total score

				SHARE ¹	WEIGHTING FACTOR
Office	Education	Residential	Hotel	2.4%	2
Consumer market					
Department store					
Logistics					
Production					
Shopping centre				2.3%	2
Assembly buildings				2.5%	2

Evaluation

- The use of products manufactured using raw materials that were extracted responsibly is evaluated positively if the products make up a relevant proportion of the structure, technical installations or external works in which they are used.
- The greater the proportion of raw materials extracted responsibly or replaced by secondary raw materials use in the building, the better the evaluation in this criterion.
- the maximum possible number of 100 points can be awarded across one or more indicators

1. Sustainably produced raw materials

1.1. Corporate responsibility for resource extraction (quality level 1.1)

(Max 12 points)

Products permanently installed inside the building or on its external surfaces which meet the requirements of quality level 1.1. and exceed the level of significance.

A single product	+3
Two products from two different manufacturers	+6
Three products from three different manufacturers	+9
At least four products from at least four different manufacturers	12

1.2. Certified sustainable resource extraction of a part of the value chain (quality level 1.2) (Max 100 points)

Method A – Quantitative assessment of entire material groups with moderate or minor relevance (0-10 points)

Method B – Quantitative assessment of entire material groups with high relevance (0-25 points)

Method C – Qualitative assessment of products with reference to their use in the building or on its external surfaces

(Max 80points)

1.3. Certified sustainable resource extraction (quality level 1.3) (Max 100 points)

Method A – Quantitative assessment of entire material groups with moderate or minor relevance (0-30 points)

Method B – Quantitative assessment of entire material groups with high relevance (0-70 points)

Method C – Qualitative assessment of products with reference to their use in the building or on its external surfaces (Max 100 points)

2. Secondary raw materials

2.1 Use of secondary raw materials with self-declaration (quality level 2.1) (Max 100 points)

Method A – Quantitative assessment of entire material groups with moderate or minor relevance (0-10 points)

Method B – Quantitative assessment of entire material groups with high relevance (0-25 points)

Method C – Qualitative assessment of products with reference to their use in the building or on its external surfaces (Max 80 points)

2.2 Use of certified secondary raw materials with self-declaration (quality level 2.2) (Max 100 points)

Method A – Quantitative assessment of entire material groups with moderate or minor relevance (0-30 points)

Method B – Quantitative assessment of entire material groups with high relevance (0-70 points)

Method C – Qualitative assessment of products with reference to their use in the building or on its external surfaces (Max 100 points)

Innovation Area

If it is not possible to represent sustainably extracted raw materials or secondary raw materials in accordance with the criterion and proof that all defined objectives have been achieved is available, these can, as an alternative, be credited in accordance with the evaluation scheme for indicators 1.2–1.3 and 2.1–2.2, subject to coordination and agreement with the DGNB.

APPENDIX A – DETAILED DESCRIPTION

COMPONENTS	POINTS FOR PRODUCTS IN QUALITY LEVELS 1.3 OR 2.2	POINTS FOR PRODUCTS IN QUALITY LEVELS 1.2 OR 2.1
External walls		
Non-load-bearing or prefabricated	5	2
Cladding units and internal linings (of external walls)	3	1
External doors and windows	3	1
Internal walls		
Non-load-bearing or prefabricated	8	3
Internal linings (of internal walls)	8	3
Internal doors and windows	7	3
Floors and ceilings		
Floorings	12	5
Ceiling linings	10	4
Roofs		
Roof coverings and roof linings	3	1
Load-bearing structures		
Load-bearing external walls	8	3
External columns	2	1
Load-bearing internal walls	6	2
Internal columns	2	1
Floor structures	8	3
Roof structures	4	2
Foundations		
Shallow or deep foundations	2	1
Subsoil and base slabs	2	1
Floorings	2	1
External works		
Ground surfaces, hard surfaces, external construction works	5	2

Wood Procurment from MM Holz

	No.of units	Volume,Area/unit		Total Volume/Area	Cost / Volume,Area	Total Cost
Columns	550	0,31 m ³		170,5	600	102300
Beams	160	0,57 m ³		91,2	600	54720
Total						157020

Wood Fibre insulation from Steico

Insulation material	4591	1 m ²		4591	23,1	106052,1
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Wood Spruce battens from Aegepan

Wood Spruce battens	1563	1 m ²		1563	21	32823
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DGNB Tool for the criterion ENV1.3 International Version 2020

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Total cost of the building structure and its external works

67.52.079 €

level of significance 1	2,3%
level of significance 2	1,6%
level of significance 3	0,5%
level of significance 4	0,0%

Material groups	Product description	Costs (€)	Quality level	Volume / Mass	Indicator 1 Points	Total Points ind. 1	6,00
Wood and wood materials	Timber Structural elements (MM Holz)	157020	Quality level 1.1	710	3,00		
Wood and wood materials	Wood Fibre Insulation (Steico)	106052	Quality level 1.1	918,2	3,00		
Wood and wood materials	Wood Spruce counter battens (Aegepan)	32823		125,04	0,00		
					0,00		

DGNB Tool for the criterion ENV1.3 International Version 2020

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Total cost of the building structure and its external works

67.52.079 €

	Total costs	Relevance	Volume/Mass	Unit	Points
Wood and wood materials	2.95.895 €	4,38%	1753,2 m³		0,00
Natural stone	0 €	0,00%	0,0 kg		0,00
Concrete	0 €	0,00%	0,0 m³		0,00
Metals	0 €	0,00%	0,0 kg		0,00
Cork	0 €	0,00%	0,0 kg		0,00
Glass	16.23.000 €	24,04%	3765,0 kg		25,00
The new product 1	0 €	0,00%	0,0	m³	0,00
The new product 2	0 €	0,00%	0,0		0,00
The new product 3	0 €	0,00%	0,0		0,00
The new product 4	0 €	0,00%	0,0		0,00
The new product 5	0 €	0,00%	0,0		0,00
The new product 6	0 €	0,00%	0,0		0,00
The new product 7	0 €	0,00%	0,0		0,00
The new product 8	0 €	0,00%	0,0		0,00
The new product 9	0 €	0,00%	0,0		0,00
The new product 10	0 €	0,00%	0,0		0,00

Material groups	Product description	Costs (€)	Quality level	Volume / Mass or method C	Method	Building components (Table 1) according to method C
Glass	Anonymous	1623000	Quality level 1.2	3765	B	



Project no.	xy-123
Project name	Unsere Kinder
DGNB Auditor	Group 2
Country	Germany

67.52.079 €

31,00

Points

[illegible]

ENV 2.2 Potable water demand and waste water volume

Division



Potable water demand
and waste water volume

ENV2.2



Land use

ENV2.3



Biodiversity at the site

ENV2.4

a.

Our objective is to maintain the natural water cycle and reduce potable water demand by recycling waste water and using local resources.

b.

Our objective is to reduce the excess use of land for building purposes and limit soil sealing in undeveloped areas.

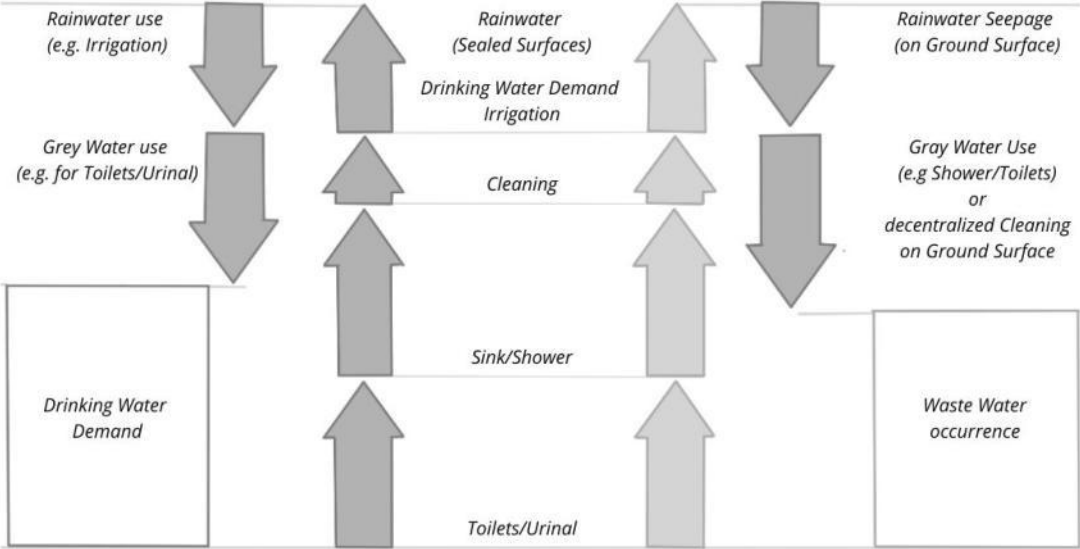
c.

Our objective is to maintain biodiversity in the local environment. The built environment has a significant influence on the diversity of the ecosystems (ecological communities, habitats and landscapes), the diversity of the species there and their genetic diversity. We want to encourage positive steps towards creating, maintaining and increasing biodiversity both on buildings themselves and in their environs.

ENV2.2 _ Potable water demand and waste water volume

System limits of the water use value calculation

Evaulation Drinking Water Demand



1 Potable water demand and waste water volume

1.1 Water use value

3764 m³/a W_{gr} Water use value

	Dynamic limit value	Dynamic reference value	Dynamic target value
Building without shower	4119 m ³ /a	2719 m ³ /a	1359 m ³ /a
Building with shower	5064 m ³ /a	3342 m ³ /a	1671 m ³ /a
Building with shower			
Building without shower	0,00	Checklist points (CLP)	
18,87 Checklist points (CLP)	0	Rounded CLP	
19 Rounded CLP			

Potable water demand

300 Number of users
1453 m² Parking area

	cvi	wdi
Hand washbasin (total)	0,15 l/s	425,3 m ³ /a
WC	6 l/flush	378,0 m ³ /a
Water-saving WC flush	3 l/flush	189,0 m ³ /a
Urinal (or Water-saving WC flush)	1,5 l/flush	94,5 m ³ /a
Shower	0,25 l/s	0,0 m ³ /a
Kitchen sink	0,25 l/s	315,0 m ³ /a
Total		1401,8 m ³ /a

cvi - Installation-specific factor for water use

wdi - Installation-specific factor for consumption use

1401,8 m³/a $\sum wdi$ Total specific potable water demand of installations in the building

1401,8 m³/a W_{Du} Water demand by users/residents/employees in m³/a

Waste water volume

1401,8 m³/a $\sum wdi$ Total specific potable water demand of installations in the building
0,0 m³/a minus P_{rw} amount of rainwater infiltrating into soil or diverted into rivers or canals
0,0 m³/a minus N_{ew} amount of rainwater used, e.g. flush toilets
1401,8 m³/a W_{Wu} Water water by users

Waste water due to rainwater diverted to the drain system

410 l/m²a S_{rw} Site-specific annual precipitation

Roof surface area	Surface area A _r	Yield coefficient E _r	N _p 961 m ³ /a
Total surface area	4006 m ²		
Extensive green roof	610 m ²	0,5	125,1 m ³ /a
Flat roof, gravelled	3396 m ²	0,6	835,4 m ³ /a
Total			960,5 m ³ /a

960,5 m³/a N_p

0,0 m³/a minus P_{rw} amount of rainwater infiltrating into soil or diverted into rivers or canals

0,0 m³/a minus N_{ew} amount of rainwater used, e.g. to flush toilets

960,5 m³/a W_{Ww} Waste water due to rainwater

2 External works

2.1 Watering and retention

Watering the outdoor facilities with potable water is not foreseen.



2,5/2,5

The outdoor facilities include rainwater retention devices.



2,5/2,5



Source: <https://www.roth-shop.sk/ploche-nadrze-roth-twinblokr0>

3 Integration into the district infrastructure

3.1 Level of integration

The rainwater and waste water disposal method is geared towards the existing infrastructure in the surrounding district and uses all available opportunities for separation, reduction, etc.

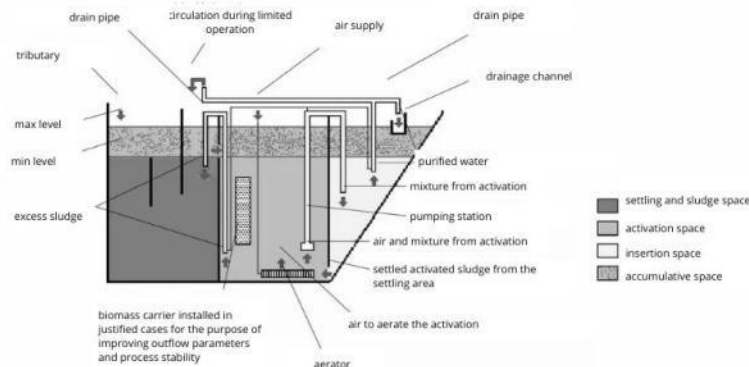


5/5



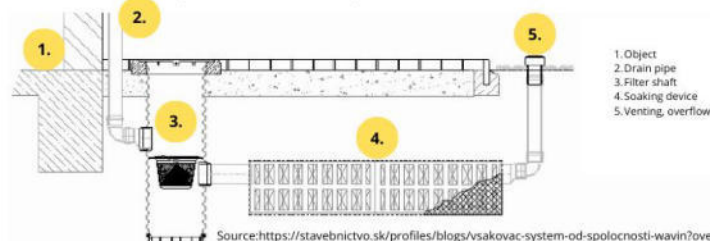
Source: <https://www.ekodren.sk/product/akumulacny-blok-drenblok-db40/>

The territory is equipped with rainwater collection, which is used for watering exterior surfaces. Not only a rainwater filtration system is used, but also a system of retention tanks that help collect rainwater.



Source: <https://www.cov.sk/cistiaren-odpadovych-vod-asvariocomp/?v=3a52f3c22ed6>

The excess rainwater will be absorbed by the infiltration devices. Under no circumstances is rainwater discharged into the sewer system



ENV2.3 _ Land use

1 Land use

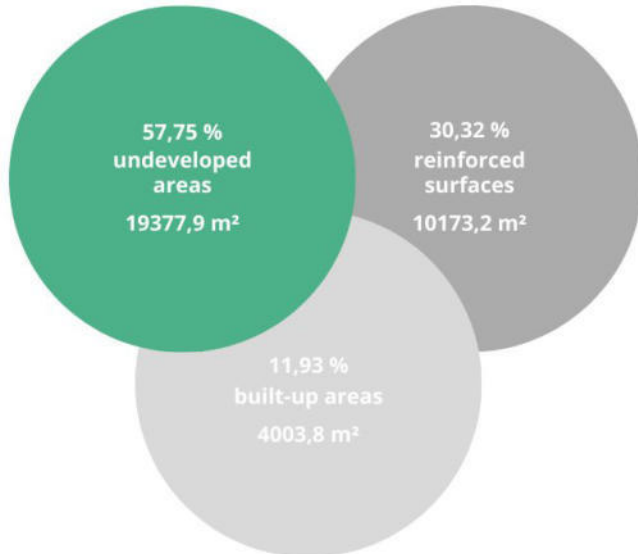
1.1 Extent of rededication

The resolved territory is included in the point

1.1.2 Inner development area – undeveloped

For building purposes, land is used that is within an existing settlement structure ("Inner area" in accordance with the local zoning codes e.g. "zoning ordinances" or "land use ordinances").

40/80



Indicator 2.1: Soil sealing factor and compensatory measures

The soil sealing factor of the undeveloped land must be determined. The soil sealing factor is calculated based on the amount of impervious/sealed, developed and undeveloped land as a proportion of the total land area.

Soil sealing factor = (sealed developed and undeveloped land area / total land area) * 100 [%]

The indicator is evaluated on the basis of the available documentation on calculating the soil sealing factor for the developed and undeveloped land. Soil sealing is the artificial separation of the soil from the atmosphere by covering the surface of the soil with materials that are virtually impenetrable to rainwater, especially by building roads, paths and buildings on this land. Sealing can be divided into the following types:

- Full sealing, e.g. with tarmac or concrete,
- Partial sealing, e.g. with flagstones, grass pavers and paving slabs,
- Underground sealing, e.g. by means of underground garages, etc.

2.1.1 Soil sealing factor

- The soil sealing factor of the total developed and undeveloped area is more than 80%
- The soil sealing factor of the total developed and undeveloped area is no more than 50% ✓

20/20

Soil sealing factor = (sealed developed and undeveloped land area / total land area) * 100 [%]

Soil sealing factor = (4003,83 + 10173,2 / 33555) * 100 [%] = 42,25 %

2.1.2 Implementation of compensatory measures



10/10



Crediting compensatory measures:

Compensatory measures implemented on the plot of land or in the immediate vicinity can be credited in the evaluation. These include all measures normally recognised under building and planning law. They encompass particular rainwater management and infiltration measures, green roofs and walls and landscaping.



rainwater management



green roofs



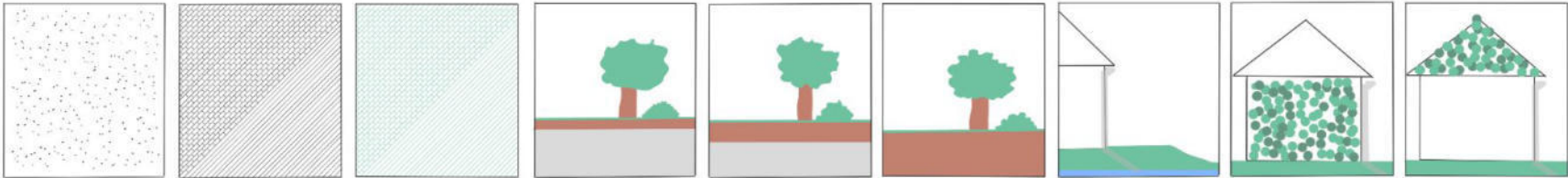
landscaping

ENV2.4 _ Biodiversity

1 Biotope area quality
1.1 Biodiversity index

Plot area: 33 555 m²

Points = $\frac{\sum (\text{Sub area} \times \text{Factor}) \times \text{Floor space index}}{\text{Plot area}}$ = 16,47/30



Land cover impervious to air and water without vegetative cover
Concrete, Asphalt
Land cover impervious to air and water, generally no vegetative cover
Mosaic pavement
Land cover impervious to air and water, infiltration, vegetative cover
Grass on gravel
Vegetated areas separate from ground, (ground fill less than 80cm deep)
Underground garages
Vegetated areas separate from ground, (ground fill more than 80cm deep)
Underground garages
Vegetated areas contiguous with the adjacent ground suitable for development of flora and fauna
Rainwater infiltration for groundwater recharge, infiltration of vegetated areas
Greening external walls; the real height up to max 10 m is included
Extensive or intensive greening of roof surfaces

Surface area 6754,8 m²	Surface area 8658,3 m²	Surface area 1515 m²	Surface area 0 m²	Surface area 0 m²	Surface area 14 880,4 m²	Surface area 21833,23 m²	Surface area 0 m²	Surface area 610,21 m²
Factor 0	Factor 0,3	Factor 0,5	Factor 0,5	Factor 0,7	Factor 1	Factor 0,2	Factor 0,5	Factor 0,7

Chosen floor space index 0,20
Property-specific biodiversity index 0,14
POINTS 16,47
AGENDA 2030 BONUS 0,00

If we want to achieve better results, we should maximize/strengthen areas whose index is from 0,5 - 1.

2 Diversity of animal species in the outdoor area

2.1 Specific measures for the active introduction of new and native animal species in the outdoor area

Species-specific design elements for birds



Mixed plantings including perennials, e.g., lavender, rosemary, coneflower, mullein, sunflowers, and globe thistles provide food in the form of seeds



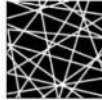
A border of shade perennials and grasses supplements the food supply



Possible additional feeding by residents at feeding stations in winter



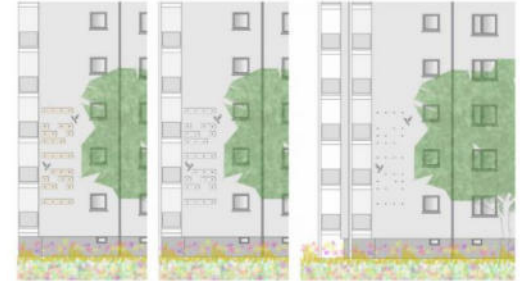
Berry-rich shrubs/hedges (Cornus mas) provide winter food



Tall field maples and hedges around the terraces and at the edges of the central open spaces offer protection and space in which to rest.



An outdoor faucet for the community garden with an overflow into a spill tray provides a shallow, open, and sunny water source



Source: https://animal-aided-design.de/wp-content/uploads/2021/12/BfN_Animal-Aided-Design-in-the-living-environment.pdf?fbclid=IwAR10tIjeOCnMo4zTMlobUMnYGaFs2h3yWYw4_QY-iHU4kdNmje3Ybh5120

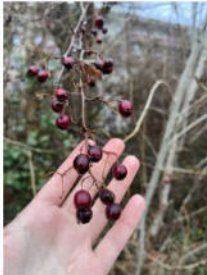
4 Invasive plant species

4.1 Avoidance of invasive plant species

Invasive and non-invasive species



WILD CARROT
non-invasive



HOWTHORN
non-invasive



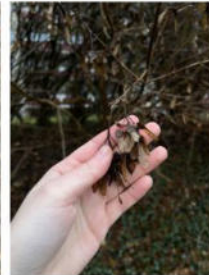
SHRUBBY BLACKBERRY
non-invasive



CORNUS ALBA
invasive



CAROLINA POPLAR
invasive



FIELD MAPLE
non-invasive



ENGLISH IVY
non-invasive



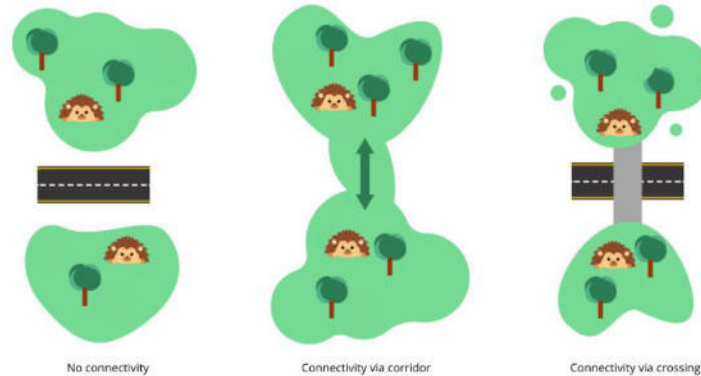
WHITE WILLOW
non-invasive

5 Habitat connectivity

5.1 Measures for habitat connectivity

In the treated area, there is no connection point for the movement of animals and a simple transfer from place to place.

The design of manicured lawns is against biodiversity. The concept of meadow vegetation, more fragmented areas of excavated soil, which would offer shelter for animals and faster percolation of rainwater, should be more incorporated in the proposal.



6 Development and maintenance care

6.1 Development agreement

6.2 Maintenance care

6.1 Development agreement

Once work has been completed to satisfy the initial-maintenance provisions, the outdoor area is tended for a further, limited period (generally 1 to 2 years) to encourage the growth of vegetation.

6.2 Maintenance care

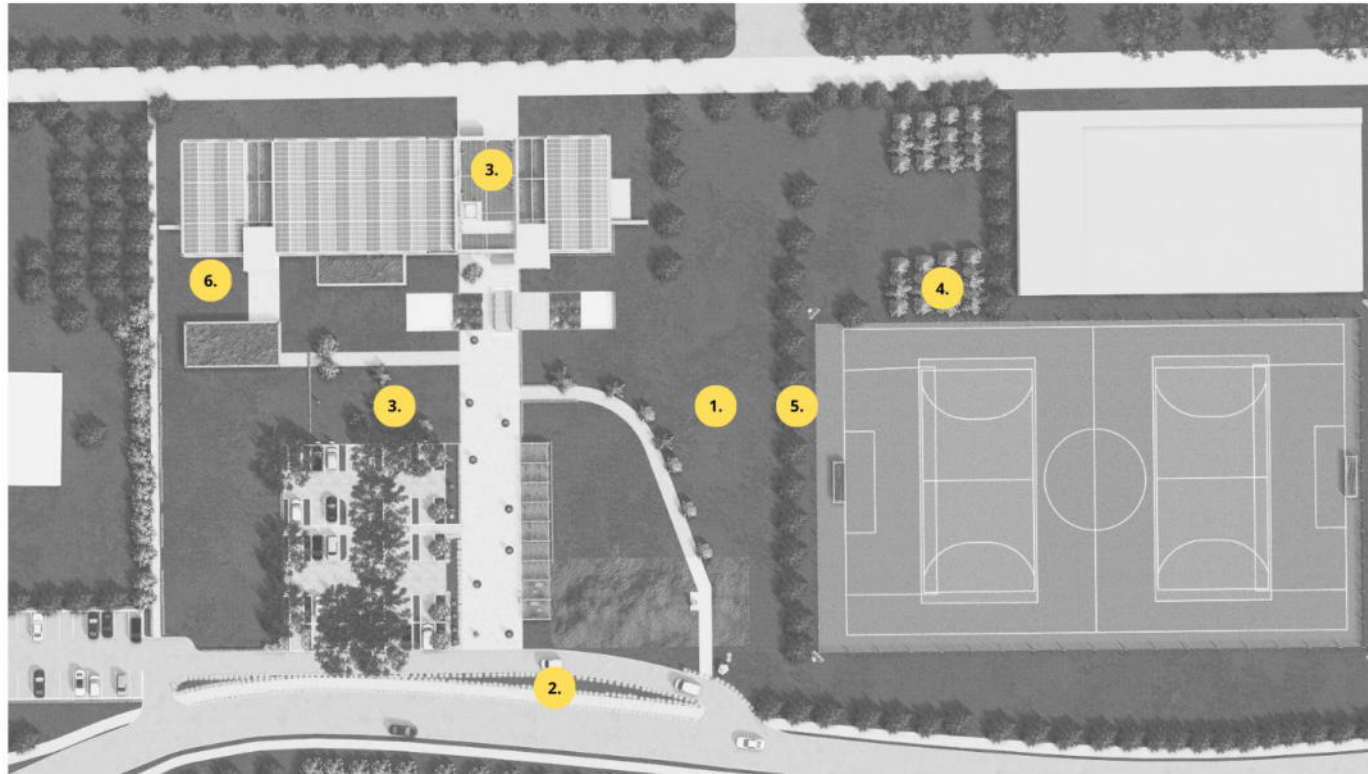
The outdoor area is tended to ensure that it remains operational and to maintain the environmental quality as part of the maintenance provisions. A contractually agreed inspection takes place once a year.



10/10

7 Biodiversity strategy

7.1 Devising and implementing a biodiversity strategy



1. Lawn allowing foraging for earthworms and serving as an open space for hedgehog mating rituals
2. Mixed plantings including perennials, e.g., lavender, rosemary, coneflower, mullein, sunflowers, and globe thistles provide food in the form of seeds.
3. Areas of perennials, green roofs, fruit trees, and low-maintenance wildflower meadows in the district serve as food sources for the adult insect.
4. Alternating areas of short and long grass and shrub-rich peripheral vegetation offer refuge and protection in the transitional area between dense and open vegetation.
5. A nettle border along the wildlife fence forms the basis of the caterpillars' diet.
6. An outdoor faucet for the community garden with an overflow into a spill tray provides a shallow, open, and sunny water source

ECONOMIC QUALITY (ECO)

ECO 1.1 Life cycle cost

Objective

Our objective is sensible and conscious use of economic resources throughout the entire life cycle of a building.

Benefits

LCC benefits in architecture involve calculating initial construction costs, estimating long-term operating expenses, and quantifying sustainable benefits. Financial metrics like NPV are used for economic analysis, while social and cultural factors are considered. Ongoing monitoring ensures adaptability to changing conditions, emphasizing a holistic approach for sustainable and economic success.

Contribution to overriding sustainability goals





EVALUATION

Regularly checking life cycle costs during the planning process is important (Indicator 1). Evaluating different cost scenarios (variants) is another key aspect (Indicator 2). The weighted life-cycle costs in €/m²GFAS for selected structural and technical building components (according to Appendix 1) and for selected costs of operation and maintenance (according to the Appendix 2, 3 and 4), based on a 50-years period (only for Logistics and Production = 20 years).

When life cycle costs follow a consistent method and are compared to a benchmark, a positive result, depending on the deviation, can contribute to a good evaluation (Indicator 3, maximum 80 points). Additionally, up to 10 points can be earned for circular economy practices (5 points per implemented solution). Without this bonus, a maximum of 100 points is achievable, or up to 110 points with bonuses (applies to consumer markets as well). Note that point distribution for assembly buildings differs due to limited benchmark data.

LCC focus on these 3 indicators:

1. **Calculations of the life cycle costs in the planning process**
2. **Life cycle cost optimisation**
3. **Building-related life cycle costs**

Methods for Indicators



Indicator 1 :

Clearly present life cycle costs in early planning, considering context and scope.

Indicator 1.1:

- Develop LCC model in early planning (service phase 2–3).
- Compare preferred building options for production and follow-up costs, including expected energy costs.

Evaluation:

- Gain points in service phase 4 if the LCC model covers key follow-up costs.

Extended Assessment (Service Phase 4 Onwards):

- Include broader follow-up costs and consider non-DGNB aspects like exterior spaces.

Target Values:

- Define tailored target values for assessing and communicating life cycle costs.

Calculation Method:

- Freely choose a method aligned with sub-indicator objectives.
- Initially, use simple tools like "Maklermethode" with energy costs.

Methods for Indicators



Indicator 2 : Life Cycle Cost Optimization

Optimize follow-up costs early in planning through variant calculations.

Optimization Scope:

- Investigate costs for significant alternatives affecting decisions.
- Consider A/V ratio variants, component use duration, and choice of materials.

Expanded Analysis:

- Beyond "cost comparison" scope (indicator 3), consider external installations, energy consumers, and more.

Decision Impact:

- Findings influence decision-making.
- Evaluate alternatives with life cycle cost calculations in planning phases.

Indicator 2.2: Circular Economy Bonus – Reuse

Bonus Criteria:

- Awarded if 80% or more of relevant building components are demonstrably reused or implemented with circular economy concepts.

Bonus Implementation:

- Achieved through strategies like performance contracting with recovery.
- Multiple solutions should differ significantly or involve different components.

Methods for Indicators

Indicator 3: Building-Related Life Cycle Costs

Assessment Method:

- Follows ISO 15686-5:2008 standards with additional specifications for DGNB documentation.

Incorporated Building Components:

- Structural Components (construction works)
- Technical Components (services per Appendix 3)

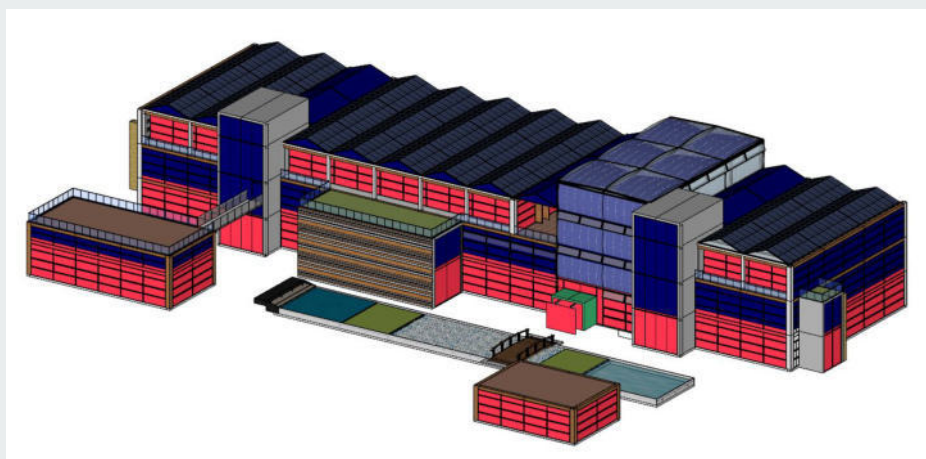
Selected Operation Costs:

- Supply and disposal costs
- Water, fuels, energy
- Sewerage
- Cleaning and maintenance
- Operation, inspection, servicing
- Inspection and servicing of structures
- Inspection and servicing of installations
- Repair costs (structural and installations)

Excluded Costs:

- Plot, planning, capital, taxes, insurance, demolition, and disposal costs are not considered in this indicator.

Measurements we used



Interior window	414 m ²
Interior Doors	761,5 m ²
Interior walls	1735,82 m ²
Excavation area	3.714 m ³
Exterior facade	2975 m ²
Exterior Walls	568 m ²
Easy Accessible	1821,53 m ²
Difficult to Access	1702,48 m ²
(include glass roof)	
Middle clay wall	385,26 m ²
Roof	1427 m ²
Terraces / open spaces	502 m ²
Ceiling	1257,42 m ²
Roof solar panels	794,77 m ²
Total glass roof (under pvs)	1508 m ²
Sanitary areas up to 10m ²	22.00 m ²
Sanitary areas up to 30m ²	61.73 m ²
Sanitary areas more than 30m ²	73.06 m ²



BKI Kostenplaner 2024

BKI Kostenplaner Statistik - C:\Users\berilf\Documents\son.bkikps

Datei Kostenplan Stammdaten Ansicht Hilfe

Projekteinstellungen

- Öffnen
- Kostenstand (BPI)
- Mehrwertsteuer
- Regionalfaktor
- Zusätzlicher Faktor

Grundlageschritte

- Gebäudearten nach BKI
- Projektbeschreibung
 - Projekt
 - Nutzung
 - Kosteneinflüsse
- Mengen DIN 277
 - DIN 277 kurz
 - DIN 277 lang
 - Sonstige
- Nutzenheiten
- Import Mengen
- Export Kostengruppen
- Export Leistungsbereiche
- Export Positionen
- Export Kostenplan
- Drucken
- Speichern unter...

Erweiterungsschritte

- Leistungsbereiche (Budgetierung)
 - Ausführungsorientierte Kosten
 - Übergabe an AIA* - Export
- Rundung
- Zuschläge (bei Druckausgabe)
- Masterkostenplan
- Kostenplanvergleich
- Rechenblatt für Kostengruppe
- Schnittstelle CAD

MEIN KOSTENPLAN - DIN 276:2018-12

Kostengruppen

Gesamtkosten

KG-Nr.	Status	Bezeichnung	Menge	Einheit	KKW [K]	Kosten [K]	% an 30...
300		Bauwerk - Baukonstruktionen	3.896,10	BGF	2.102,55	8.191.728,98	130,14
310		Bauwerk - Baukonstruktionen	3.896,10	BGF	1.091,74	4.253.541,80	67,58
311		Baugrube / Erdbau	3.714,00	m³	54,00	200.556,00	3,19
312		Herstellung	0,00	m³	0,00	0,00	0,00
313		Umschließung	0,00	m³	0,00	0,00	0,00
314		Wasserhaltung	0,00	m³	0,00	0,00	0,00
319		Vortrieb	0,00	m³	0,00	0,00	0,00
319		Sonstiges zur KG 310	0,00	m³	0,00	0,00	0,00
320		Gründung, Unterbau	1.857,00	m³	370,00	687.090,00	10,92
330		Außenwände/Vertikale Baukonstruktionen, außen	568,00	m²	710,00	403.280,00	6,41
340		Innenwände/Vertikale Baukonstruktionen, innen	1.735,82	m²	590,178,80	9,38	
350		Decken/Horizontale Baukonstruktionen	1.257,42	m²	1.093.955,40	17,38	
360		Dächer	1.427,00	m²	470,00	670.690,00	10,66
370		Infrastrukturanlagen	0,00		0,00	0,00	0,00
380		Baukonstruktive Einbauten	3.896,10	BGF	80,00	311.688,00	4,95
390		Sonstige Maßnahmen für Baukonstruktionen	3.896,10	BGF	76,00	296.103,60	4,70

Kostenstand: 3. Quartal 2023 (160,6) brutto (19,00 %) | Summe

Bauwerk (300+400): 1.615,54 €/m² BGF 6.294.318,98 €

DATENBANK

KG-Nr.	Kostengruppe	Einheit	€/Einheit	% an 300+...
100	Grundstück	m² GF	8	24
200	Vorbereitende Maßnahmen	m² GF	43	1,5
300	Bauwerk - Baukonstruktionen	m² BGF	2.107	72,8
400	Bauwerk - Technische Anlagen	m² BGF	588	17,2
500	Bauwerk 300+400	m² BGF	2.195	100,0
600	Außenanlagen und Freizeitanlagen	m² AF	126	6,4
600	Ausstattung und Kunstwerke	m² BGF	25	1,1

Vorpormern-Rügen: 0,944

Referenzobjekte

Planungskennwerte

4400-0364 Kindertagesstätte (5 Gruppen, 100 Kinder) Neubau

BRI 4.022m³

Kindertagesstätte mit 5 Gruppen für 100 Kinder, Holzbau

Land: Rheinland-Pfalz

Kreis: Aizew-Worms

Standard: Durchschn.

Bauzeit: 70 Wochen

BGF 2.933 €/m²

© Thomas Ott, www.rti.de

Kennwerte: bis 1. Ebene

BKI Kostenplaner

KG-Nr.	Status	Designation	Quantity	Unit	KKW [€]	Kosten [€]	% an 300...
Σ	■	Total cost	3.896,10	BGF	2.102,55	8.191.728,98	130,14
100	■	Property	0,00	GF	0,00	0,00	0,00
200	■	Preparatory actions	0,00	GF	0,00	457.760,00	7,27
300	■	Building constructions	3.896,10	BGF	1.091,74	4.253.541,80	67,58
400	■	Building technical system	3.896,10	BGF	523,80	2.040.777,18	32,42
500	■	Outdoor Facilities and open spaces	0,00	AF	0,00	1.070.180,00	17,00
600	■	Equipment and work of art	3.896,10	BGF	94,83	369.470,00	5,87
700	■	Additional construction costs	3.896,10	BGF	0,00	0,00	0,00
800	■	Financing	3.896,10	BGF	0,00	0,00	0,00

KG-Nr.	Status	Designation	Quantity	Unit	KKW [€]	Kosten [€]	% an 30...
Σ	■	Total cost	3.896,10	BGF	2.102,55	8.191.728,98	130,14
Σ 300	■	Building construction	3.896,10	BGF	1.091,74	4.253.541,80	67,58
310	■	Excavation pit/earthworks	3.714,00	m³	54,00	200.556,00	3,19
320	■	Foundation, substructure	1.857,00	m²	370,00	687.090,00	10,92
330	■	Exterior walls/ vertical building structures, exterior	568,00	m²	710,00	403.280,00	6,41
340	■	Interior walls/ vertical building structures, interior	1.735,82	m²	340,00	590.178,80	9,38
350	■	Ceilings/ horizontal building structures	1.257,42	m²	870,00	1.093.955,40	17,38
360	■	Roofs	1.427,00	m²	470,00	670.690,00	10,66
370	■	Infrastructure Facilities	0,00		0,00	0,00	0,00
380	■	Structural installations	3.896,10	BGF	80,00	311.688,00	4,95
390	■	Other measures for building structures	3.896,10	BGF	76,00	296.103,60	4,70

DGNB LCC Tool INT-V202022

Production Costs in accordance with Appendix 1

COST GROUPS / TRADES / COMPONENTS - PROJECT-SPECIFIC DESCRIPTION		COSTS [EUR]
Site		
Clearance and Development	457760,00	
Excavations	200556,00	
Foundations	687090,00	
External Walls	403280,00	
Internal Walls	590178,80	
Floors and Ceiling	1093955,40	
Roofs	670690,00	
Structural fitments	296103,60	
Other construction-related activities	311688,00	
Total of production costs	4.711.301,80	EUR
	Total	4.711.301,80 EUR

Production Costs in accordance with Appendix 1

COST GROUPS / TRADES / COMPONENTS		PROJECT-SPECIFIC DESCRIPTION	COSTS [EUR]
Technical building components			
Please enter the project-specific descriptions and costs in the blue fields.			
Total			2040777,18 EUR
Sewerage, water and gas systems			295.912,69 EUR
		Sewerage systems	
		Water supply systems	
		Gas supply systems	
		Fire-fighting installations	
		Sewerage, water and gas systems, other items	
Heat supply systems			285.708,81 EUR
		Heat generators	
		Heat distribution networks	
		Space heating	
		Heat supply systems, other items	
Air treatment systems			310.198,13 EUR
		Ventilation systems	
		Partial air conditioning systems	
		Air conditioning systems	
		Process air plants	
		Refrigerating plants	
		Air treatment systems, other items	
Power installations			626.518,59 EUR
		High and medium voltage plants	
		Independent power supply installations	
		Low-voltage switchgears	
		Low voltage installation equip- ment	
		Lighting systems	
		Lightning protection and earth- ing systems	
		Power installations, other items	
Telecommunications and other communications systems			163.262,17 EUR
Lifts			63.264,09 EUR
		Inspection and maintenance conveyors	
		Conveying plants	
		Transport systems, other items	
Building automation			136.732,07 EUR
Other services			2.040,78 EUR
Transport			159.180,62 EUR



Operating costs in accordance with Appendix 2

COST GROUPS / MEDIUM	PROJECT-SPECIFIC DESCRIPTION	AMOUNT
Cleaning		
General cleaning		
Internal doors ⁷		761,50 m²
Internal windows		m²
Floorings		
Wood		3.056,11 m²
Artificial stone, natural stone, screed, flexible floors		m²
Sanitary areas up to 10m²		22,00 m²
Sanitary areas up to 30m²		61,73 m²
Sanitary areas more than 30m²		73,06 m²
Textil		m²
		m²
		m²
		m²
		m²
Glass cleaning		
External doors and windows ⁸		
Easily accessible		1.821,53 m²
Average value		m²
Difficult to access		1.275,83 m²
Internal windows ⁷		m²
Facade cleaning		
Cladding units		
Aluminium, stainless steel, copper cladding, steel (corrosion-protected)		48,00 m²
Ceramics, artificial stone, ashlar, natural stone (hard)		m²
Natural stone (soft)		m²

Operation costs in accordance with Appendix 4

COST GROUPS / MEDIUM	PROJECT-SPECIFIC DESCRIPTION	AMOUNT
Supply and disposal		
Potable water⁹		
Fresh water		1.401,80 m³/a
Waste water⁹		
Used water		1.401,80 m³/a
Precipitation		960,50 m³/a
Energy (fuels)⁹		
Natural gas		kWh/a
Long-distance district heating / CHP - renewable		kWh/a
Long-distance district heating / CHP - fossil		0,00 kWh/a
Woodchips		0,00 kWh/a
Wood pellets		0,00 kWh/a
Oil		0,00 kWh/a
		kWh/a
		kWh/a
		kWh/a
		kWh/a
		kWh/a
Electricity⁹		
Final energy demand, total ⁹		105.227,40 kWh/a
User electricity (flat rate)	1	kWh/a
Independent power generation		
Generation total		166.377,82 kWh/a
Proportion of internal use ⁹		105.227,40 kWh/a
Proportion of feed into the grid ⁹		61.150,42 kWh/a

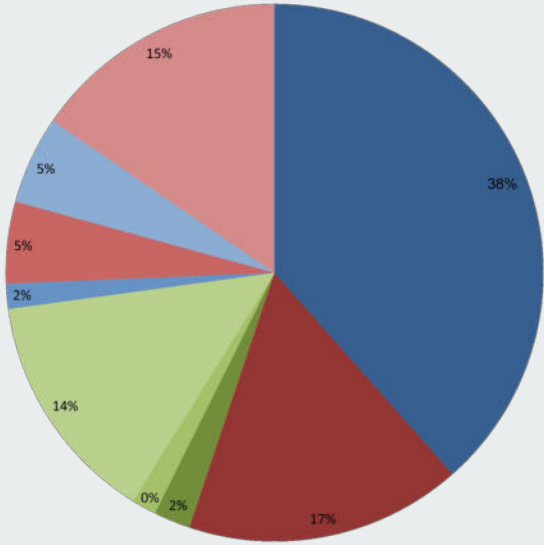
Results

COST GROUPS		COSTS [EUR]
Production costs		
Structural building components		4.711.301,80 EUR
Technical building components		2.040.777,18 EUR
Total production costs		6.752.078,98 EUR
Net present value of operation costs		
Operating costs		
Supply and disposal - water		270.664,75 EUR
Supply - energy		-181.952,77 EUR
Cleaning		1.714.426,68 EUR
Inspection and servicing of structural building components		185.507,65 EUR
Inspection and servicing of technical building components		602.225,53 EUR
Repair costs		
Repair of structural building components		649.276,79 EUR
Repair of technical building components		1.890.068,81 EUR
Total net present value of operation costs		5.130.217,45 EUR

Net present value of the entire building		
absolute		11.882.296,43 EUR
specific to price level	03/2017	3.049,79 EUR/m² GFAs
specific to price level	03/2017	3.049,79 €/m² GFAs
specific to price level	03/2017	3.049,79 EUR/m² GFAs
specific to price level	03/2017	3.049,79 €/m² GFAs

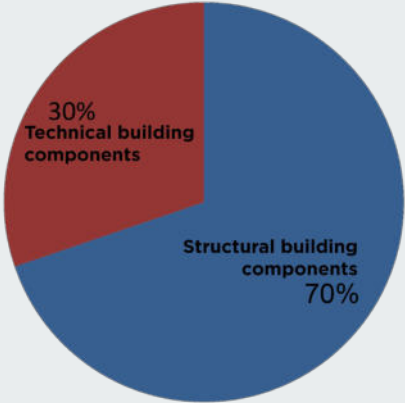
Evaluation

Distribution of the total investments

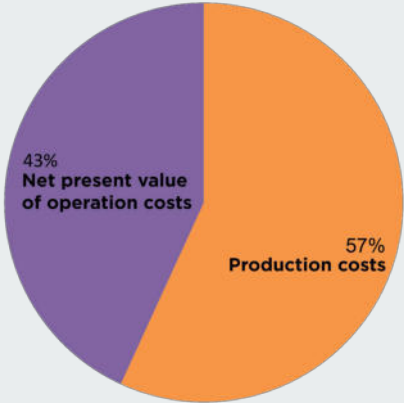


- Structural building components
- Technical building components
- Repair of technical building components
- Cleaning
- Repair of structural building components
- Inspection and servicing of technical building components
- Inspection and servicing of structural building components
- Supply and disposal - water
- Supply - energy

Production costs

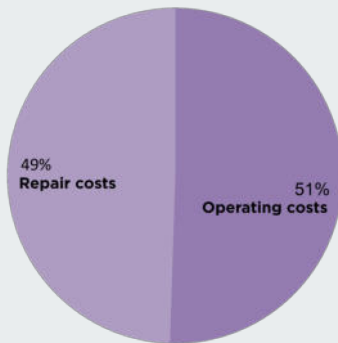
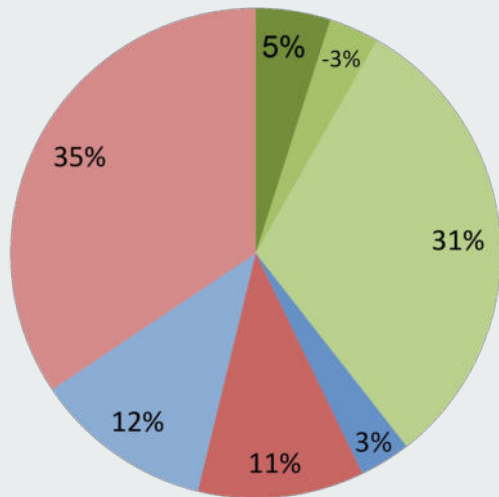


Production and operation costs

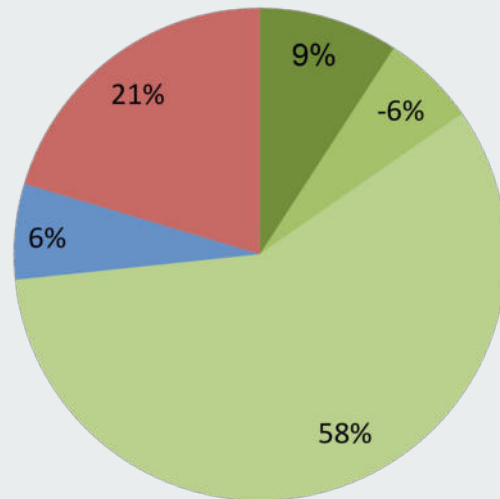


Operating and repair costs

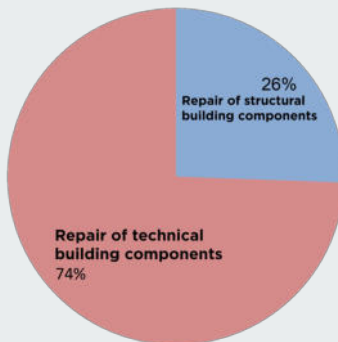
Operation costs



Operating costs



Repair costs



- Repair of technical building components
- Cleaning
- Repair of structural building components
- Inspection and servicing of technical building components
- Supply and disposal - water
- Inspection and servicing of structural building components
- Supply - energy

- Cleaning
- Inspection and servicing of technical building components
- Supply and disposal - water
- Inspection and servicing of structural building components
- Supply - energy



Life cycle cost				
1	Calculations of the life cycle costs in the planning process			
	1.1	Integration of life cycle costing into the planning process		
	1.1.1	A life cycle costs system/ LCC model is drawn up for the project in an early planning phase. The building variants included in the planning phase are compared with regard to their production costs and relevant follow-up costs, at minimum including the expected energy costs.	5	5
	1.1.2	The life cycle costs are determined at regular intervals during the planning process (adjusted to match the relevant planning status) and are communicated within the planning team. All relevant building-related follow-up costs are fully integrated into the calculations in work phase 4 at the latest.	0	5



2 Life cycle cost optimisation				
	2.1	Life cycle cost optimisation during the planning process (max 10 points)		
	2.1.1	The effects of significant alternative decisions on the expected life cycle costs are determined for the building. This process is carried out as an extensive full consideration of the entire building.	0	7
	2.1.2	The effects of significant decisions on the expected life cycle costs are determined for the building. This process is carried out as a partial analysis (section) for the relevant cost groups and follow-up costs.	0	3
	Re 2.1	INNOVATION AREA Explanation: Alternative approaches that achieve optimisation of the life cycle costs can also be selected and calculated.	10	10
	2.2	CIRCULAR ECONOMY BONUS Explanation: If a significant portion of the relevant reference value of components is demonstrably reused or implemented in or on the building via business models that conform to the circular/sharing economy concept and ensure or significantly support recyclability, the bonus can be awarded (e.g. performance contracting with recovery or reuse strategy). For each circular economy solution implemented, 5 bonus points can be awarded.	0	10



3	Building-related life cycle costs			
	3.1	Assessment and comparison of the building-related life cycle costs	80	80

absolute			11.882.296,43	EUR
specific to price level		03/2017	3.049,79	€/m² GFAs

3.1.2 Education

Day care facilities/kindergartens	Schools	Institutional buildings	10–80
≤ 6477	≤ 6700	≤ 8255	10
≤ 4986	≤ 5164	≤ 6578	40
≤ 3815	≤ 3992	≤ 5406	80



ECO 2.1 Flexibility and adaptability

Objectives:


Our criterion is aimed at making the building's design as flexible as possible and creating the greatest possible potential for conversion.

Benefits:

The benefits and ease with which a building can be adapted to changing requirements helps raise user satisfaction; it can prolong the building's service life and reduce costs incurred throughout its life cycle. Flexibility and adaptability reduce the risk vacancy and contributes to the long-term economic success of a building.

Evaluation Method:

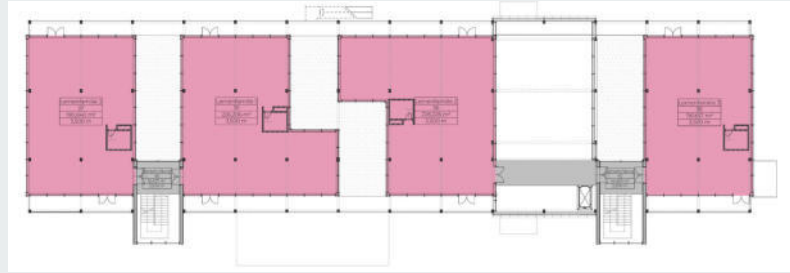
The way the evaluation was throughout was by taking the **existing floor plans, sections and elevations** and then analysing the flexibility and adaptability of the building. With this documentation it is then possible to find out if there can be any improvements made on the building to see if any points can be added to the certification process. A maximum of **110 Points** can be awarded to the **flexibility and adaptability** of the building.



Through the documentation of the existing floor plans, sections and elevations I was able to analyse the space efficiency of the building to see how flexible the building is to be adapted for other purposes. I was also able to evaluate the ceiling height and shell dimensions of the building and see if the building's room height was to standard to be awarded 15 points. Also the analysis of the vertical access of the building and its relationship between the gross floor area and the number of building access cores on per story basis. And finally to see the structure of the building to see if any changes could be made and see if the columns and load-bearing walls could be improved to be awarded extra points.

Space Efficiency

The space efficiency factor is measured by the proportion of the usable floor area divided by the gross floor area.



Usable Floor Area (UA) = (2,887,883m²) **2,887.883m²**
Gross Floor Area (GFA) = (3,560,296m²) **3,560.296m²**

1	Space efficiency	
1.1	Space efficiency	
	Space efficiency factor: Proportion of usable floor area (UA) / gross floor area (GFA) [T&D_04]	
	Office	
	≤ 0.48 – ≥ 0.75	1–10
	Education	
	≤ 0.48 – ≥ 0.75	1–30

0.811 (Space Efficiency Factor)
Only 23 Points could be awarded

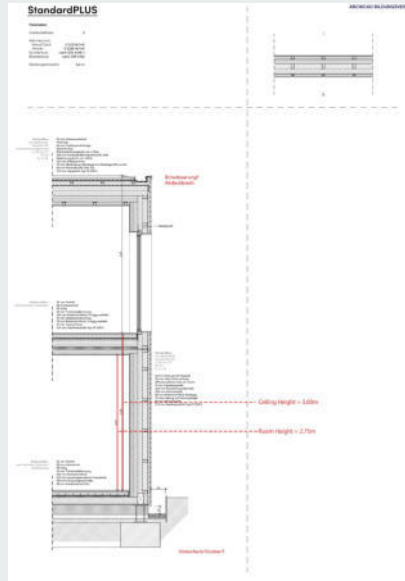
Ceiling Height (Shell Dimension)

The minimum room height is defined by its relation with the floor area of the room. The success of room heights for the adaptability of buildings according to DGNB is defined below



Floor area	Room height
Up to 50m²	At least 2.50m
50m² or more	At least 2.75m
100m² or more	At least 3.00m
2000m² or more	At least 3.25m

Adaptability of Buildings: Success: better room heights (DGNB)	Office buildings: ≥ 3.00m	Apartment buildings: ≥ 2.50m	Educational buildings: ≥ 3.00m	Hotel buildings: ≥ 2.50m (hotel) ≥ 3.25m (free access areas)
---	------------------------------	---------------------------------	-----------------------------------	--



The room heights and ceiling heights are defined as below.

Ceiling Height = 3.00m

Room Height = 2.75m

According the DGNB it can be awarded **15 Points** as the heights fit inside the regulation

Vertical Access

The Relationship between the gross floor area (GFA) and the number of building access cores in the building on a per-storey basis. For educational buildings **it must fit inside 400m² - 1,200m²**

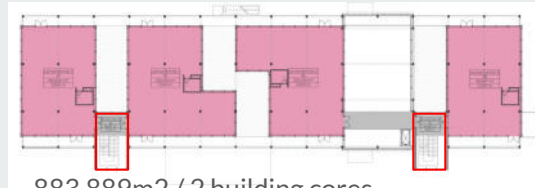
4 Vertical access	
4.1 Relationship between the gross floor area and the number of building access cores, on a per-storey basis [GFAs-storey / n building access cores]	
Office Hotel Assembly buildings ≤ 1200 m ² to ≤ 400 m ²	1-10
Education ≤ 1200 m ² to ≤ 400 m ²	1-15
NO. INDICATOR	POINTS



1,320,902m² / 2 building cores
(660,451m²)
660.451m²



812,304m² / 2 building cores
(406,152m²)
406.152m²



883,889m² / 2 building cores
(416,944m²)
416.944m²

The relationship between the floors and the building access cores fit inside the DGNB regulation standard and so therefore **15 Points can be awarded**

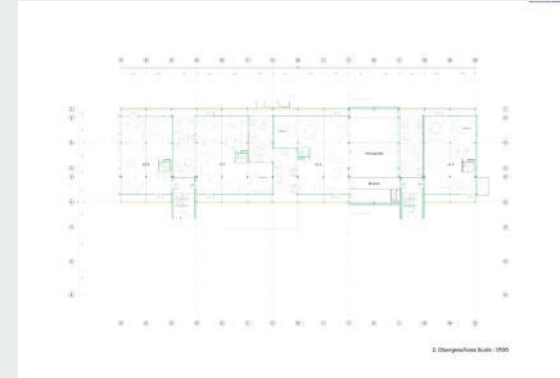
Structure

The flexibility aspects of the structure can allow for changes to be made for different purposes of the building, and with different purposes means different loads on the structure. DGNB allows upto for a **40 points** to be awarded in educational buildings

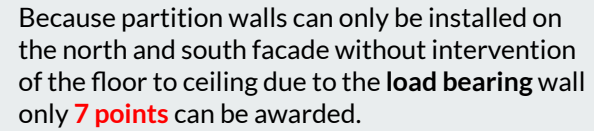


Load Bearing Wall -

Non-Load Bearing Wall -



A majority of the walls inside the building a non-load bearing except 1 that runs east to west. Therefore 10 points can be awarded

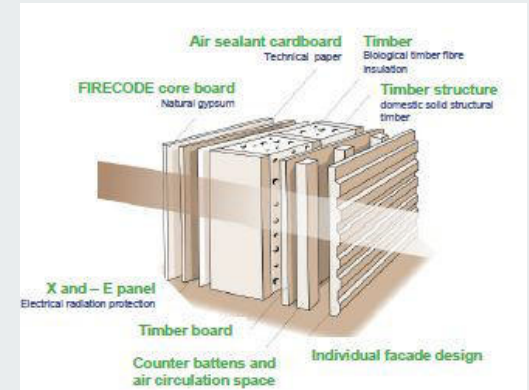


Because partition walls can only be installed on the north and south facade without intervention of the floor to ceiling due to the **load bearing wall** only **7 points** can be awarded.

Re-usage of partition walls

The partition walls inside the building are of materials that can be re-used. When it comes to the end of life of the building or the building needs to be re-adapted for a different purpose the material of the partition walls allow you to do that, beside the load bearing wall which is made of concrete. The **timber structure, biological fibre timber insulation, cardboard air sealant and FIRECODE natural gypsum core board** allow the walls to be re-purposed. However when the materials of the partition walls age sealants and chemicals must be added which can affect the recyclability of the material.

As the building is new and does not need additives and coatings yet the building is awarded **10 points**



Structural Engineering



The structural engineering of the building and where the columns are positioned allow for sufficient contingencies for the building to be adapted for other purposes. The span of the beams based on the position of the columns (with a maximum span of 5,400m) allow for heavier loads if need be. Therefore **10 points can be awarded**



Circular Economy Bonus

The building has over 50% of its space being usable and adaptable. With the load-bearing wall running from east to west and where the structural columns are located as well as the service cores it is over 50%. Therefore the building can gain an **extra 10 points** for its circular economy. The building is well accommodated for buiser uses and purposes at acquire heavier loads on the buildings structure.

Total Points

Space Efficiency = **23 Points**

Ceiling Height (Shell Dimension) = **15 Points**

Vertical Access = **15 Points**

Structure (Non-Load Bearing Walls) = **7 Points**

Structure (Partition Walls) = **10 Points**

Structure (Re-usage) = **10 Points**

Structural Engineering = **10 Points**

Circular Economy Bonus = **10 Points**

Total Points = 100 Points



ECO 2.2 Commercial viability

Objectives:

The objective is to create buildings with maximum user acceptance and long-term market potential

Benefits:

To see if unused buildings constitute a misallocation of financial resources. A building that stands empty (in the medium or long term) is not sustainable. In order to achieve good commercial viability, a property must maintain or even increase its value, making it sustainable easier to position it on the market.

Evaluation Method:

The commercial viability is essentially evaluated on the basis of the market and site aspects. The aim here is to establish the extent to which the building and its uses are geared towards market and site requirements. The objective is not to undertake an absolute analysis of the site, but rather to evaluate the property quality and site aspects in relation to one another. The commercial viability can be described by addressing the topic of "Site and Image", "Entrance Situation, routing and signposting", "Parking space situation", "Market Risk" and "Occupancy rate". **100 points can be awarded** for this topic and an **extra 10 bonus points**.

Entrance Situation, routing and signposting



Readily identifiable and easy to find entrance of the building. 10 Points

Routing and signposting



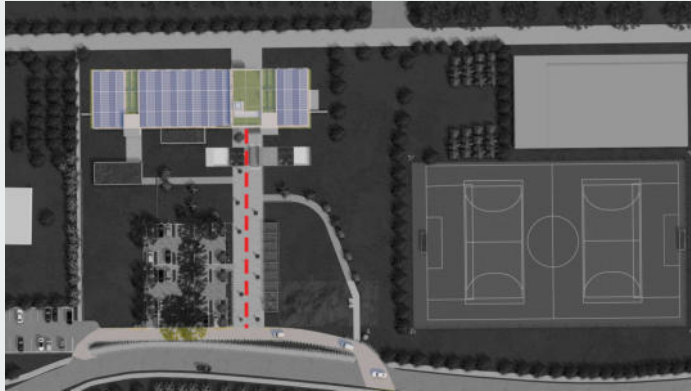
No routing and signposting at the entrance of the building so is confusing on where enter from the road or footpath. **0 Points**

Designated Parking Spaces



There is a clear designed parking space in the immediate vicinity of the main building or entrance or the delivery entrance. **10 Points**

Distance From Building to access points

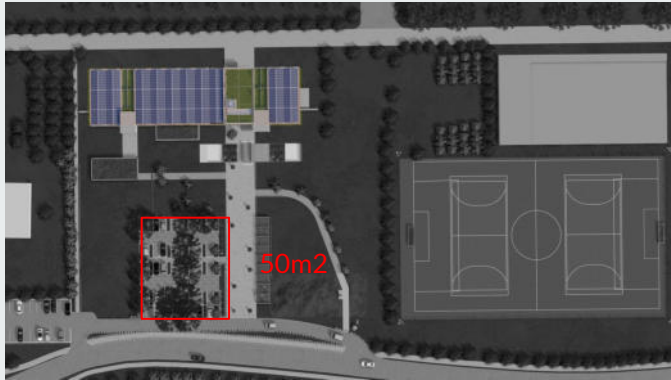


50m or less from the main building to the Kiss and Ride Location point. **7.5 Points**



Parking Spaces are less or no more than 200m from the main entrance of the building. **15 Points**

Car Parking Space for Occupants



50m² of car parking for office administration. 1 car park per person. **10 Points**



100% of the bike parking bays are in line with according to the parking space standard are in up to standard with the european cycling federation. **10 Points**

SOCIOCULTURAL AND FUNCTIONAL QUALITY



SOC 1.1 Thermal comfort

Objective

Our objective is to guarantee thermal comfort that is appropriate for the intended use of the building throughout the year regardless of season, and to ensure user comfort.

Benefits

Measures that give building users the greatest possible control over indoor climate conditions improve their individual well-being. Improved well-being results in better satisfaction with the facilities and therefore also increases the productivity of building users.





SOC 1.1 Thermal comfort



Thermal comfort in the heating and cooling period is evaluated via several individual indicators. The specifications of DIN EN 15251, DIN EN ISO 7730, DIN EN ISO 13786, DIN EN ISO 10211, together with the DIN EN ISO 13370, (or) DIN EN ISO 13789, DIN EN 12831 and the workplace regulation (from German Employers' Liability Insurance Association) form the basis of the evaluation.

SOC 1.1 Thermal comfort

Permitted upper temperature limits during the cooling period (in accordance with DIN EN 15251 and DIN EN ISO 7730)

LEVEL OF ACTIVITY	CATEGORY IN ACCORDANCE WITH DIN EN 15251	PMV INDEX/OPERATIVE TEMPERATURE FOR BUILDINGS WITH MECHANICAL COOLING CLOTHING ≈ 0.5 CLO		PMV INDEX/OPERATIVE TEMPERATURE FOR BUILDINGS WITH NO COOLING: ADAPTIVE COMFORT MODEL CLOTHING ≈ 0.5 CLO	
		LOWER LIMIT FOR COOLING PERIOD	UPPER LIMIT FOR COOLING PERIOD	LOWER LIMIT FOR COOLING PERIOD	UPPER LIMIT FOR COOLING PERIOD
Education, teaching and culture	Sitting ~ 1.2 met	Category I	+0.2 / +25.5 °C		$\theta_{li} = 0.33\theta_{rm} + 18.8\text{ °C} + 2\text{ K}$
		Category II	+0.5 / +26.0 °C		$\theta_{li} = 0.33\theta_{rm} + 18.8\text{ °C} + 3\text{ K}$
		Category III	-0.7 / +22.0 °C +0.7 / +27.0 °C	$\theta_{li} = 0.33\theta_{rm} + 18.8\text{ °C} - 4\text{ K}$	$\theta_{li} = 0.33\theta_{rm} + 18.8\text{ °C} + 4\text{ K}$
Kindergarten	Standing, walking ~ 1.4 met	Category I	+0.2 / +24.5 °C		$\theta_{li} = 0.33\theta_{rm} + 18.8\text{ °C} + 2\text{ K}$
		Category II	+0.5 / +25.5 °C		$\theta_{li} = 0.33\theta_{rm} + 18.8\text{ °C} + 3\text{ K}$
		Category III	-0.7 / +21.0 °C +0.7 / +26.0 °C	$\theta_{li} = 0.33\theta_{rm} + 18.8\text{ °C} - 5\text{ K}$	$\theta_{li} = 0.33\theta_{rm} + 18.8\text{ °C} + 4\text{ K}$

3 GOOD HEALTH AND WELL-BEING



SOC 1.1 Thermal comfort



Permitted lower temperature limits during the heating period (in accordance with DIN EN 15251 and DIN EN ISO 7730)

	LEVEL OF ACTIVITY	CATEGORY IN ACCORDANCE WITH DIN EN 15251	PMV INDEX/OPERATIVE TEMPERATURE FOR HEATING PERIOD LOWER LIMIT CLOTHING = 1.0 CLO	PMV INDEX/OPERATIVE TEM- PERATURE FOR HEATING PERI- OD UPPER LIMIT CLOTHING = 1.0 CLO
Education, teaching and culture	Sitting ~ 1.2 met	Category I	-0.2 / +21.0 °C	
		Category II	-0.5 / +20.0 °C	
		Category III	-0.7 / +19.0 °C	+0.7 / +25.0 °C
Kindergarten	Standing, walking ~ 1.4 met	Category I	-0.2 / +19.0 °C	
		Category II	-0.5 / +17.5 °C	
		Category III	-0.7 / +16.5 °C	+0.7 / +23.5 °C

SOC 1.1 Thermal comfort

Predicted Mean Vote (PMV):

Definition: PMV is a numerical index that represents the mean value of a group's thermal sensation votes.

Factors Considered: PMV takes into account various factors that contribute to thermal comfort, including air temperature, mean radiant temperature, air velocity, humidity, and clothing insulation.

Scale: The PMV is expressed on a scale from -3 to +3, where:

-3: Cold

0: Neutral

+3: Hot

Calculation: The PMV is calculated based on a mathematical formula that considers the differences between the environmental conditions and the conditions that people find comfortable.





SOC 1.1 Thermal comfort

The following indicators are assessed as part of the evaluation:

- (1) Operative temperature/indoor air temperature/heating period (quantitative)
- (2) Drafts/heating period (qualitative)
- (3) Radiant temperature asymmetry and floor temperature/heating period (qualitative)
- (4) Relative humidity/heating period (quantitative)
- (5) Operative temperature/indoor air temperature/cooling period (quantitative)
- (6) Drafts/cooling period (qualitative)
- (7) Radiant temperature asymmetry and floor temperature/cooling period (qualitative)
- (8) Relative humidity/cooling period (quantitative)
- (9) Agenda 2030 bonus: Thermal comfort climate adaptation



SOC 1.2 – Indoor air quality



Objective

Our aim is to ensure that indoor air is of sufficient quality not to adversely affect users' health and well-being.

Benefits

Nowadays humans spend up to 90 percent of their time in closed rooms. The indoor air quality therefore plays a significant role concerning performance and health. Ensuring high air quality in rooms by using low-emission products and providing an adequate air exchange rate increases users' well-being, productivity and satisfaction.

SOC 1.2 – Indoor air quality

NO.	INDICATOR	POINTS
1	Indoor air quality – Volatile organic compounds (VOCs)	
1.1	Measurement of volatile organic compounds	
	Office Education Hotel Assembly buildings	
	■ Evaluation of the indoor air concentration of volatile organic compounds according to the ISO 16000-6, -3 standards	
	TVOC [$\mu\text{g}/\text{m}^3$] Formaldehyde [$\mu\text{g}/\text{m}^3$]	Max. 50
	> 3000 > 100	0
	≤ 3000 ≤ 100	10
	≤ 1000 ≤ 60	25
	≤ 500 ≤ 30	50
	Alternatively:	
	■ Evaluation of incomparable VOC measurements according to the ISO 16000-6, -3 standards (measured more than four weeks after completion)	
	TVOC [$\mu\text{g}/\text{m}^3$] Formaldehyde [$\mu\text{g}/\text{m}^3$]	Max. 25
	> 3000 > 100	0
	≤ 3000 ≤ 100	5
	≤ 300 ≤ 30	25

SOC 1.2 – Indoor air quality

2 Indoor air quality – Ventilation rate

2.1 Air exchange rate

Office Education Hotel Assembly buildings

Mechanical ventilation systems according to EN 15251 or DIN EN 16798-1 Max. 50

EN 15251 Description

■ IV	Values outside categories I to III; should only be used for a limited period of the year	0
■ III	Acceptable, moderate expectations; can be used for existing buildings.	25
■ I and II	Normal expectations; recommended for new and renovated buildings	50

Alternatively:

Natural ventilation through opening windows Max. 25

Category	Description	
■	no verification	0
■ Workplace regulation A 3.6	The requirements of workplace regulation A (continually 3.6) are met. Ventilation or boost ventilation. See Appendix A	25

Alternatively:

Zonal flow simulation Max. 50

EN 15251 CO₂ concentration higher than the exterior air concentration [ppm]

■ IV	> 800	0
■ III	> 500 and ≤ 800	25
■ I and II	≤ 500	50



SOC 1.2 – Indoor air quality

The evaluation of the total ventilation rate for non-residential buildings must be carried out in accordance with the calculation specifications of EN 15251 (or DIN EN 16798-1), Annex B, Section "B.1.2 Method based on person and building component". The person component takes into account natural perspiration of users as well as CO₂ pollution due to breathing. The total ventilation rate q_{tot} (= air flow per person + air flow for the building component) defines the satisfaction rate of users in accordance with EN 15251.

$q_{tot} = n * q_P + A * q_B$ (n: Number of persons, A: Floor area)

Where:


q_{tot} is the total ventilation rate of the room, in l/s;

n is the design specification for the number of persons in the room, –;

q_P is the ventilation rate for the occupancy or use per person, l/s, per;

A is the floor area of the room, m²;

q_B is the ventilation rate based on the building emissions, l/s, m².



SOC 1.3 Acoustic comfort



Objective

The objective is to achieve room acoustic conditions that correspond to the intended use and to ensure appropriate user comfort.

Benefits

Good acoustic conditions are an important requirement for ensuring productivity and comfort of users.

SOC 1.3 Acoustic comfort

Selected variant

Variant 1

Schemes

Education

Variant 1: Weighted evaluation on the basis of the actual ratios of usable area (NUF) (R) in accordance with DIN 277-1

Achieved points variant 1

110.0

CLP

	Area shares by room types [%]	Max. achievable points (per indicator)	Achieved points
1. Room acoustics concepts		20.00	20.0
2. Office ≤ 40 m²	45%	49.50	37.1
3. Office > 40 m²	30%	33.00	24.8
4. Meeting rooms	15%	16.50	26.4
5. Cafeterias	10%	11.00	11.0
6. AGENDA 2030 BONUS		10.00	10.0
SUM (Max. points criteria)	100%	110.00	110.00

SOC 1.3 Acoustic comfort


Variant 2: Simplified method without assignment of area ratios

Achieved points variant 2

110.0

CLP

	Max. achievable points (per indicator)	erreichte Punkte
1. Room acoustics concepts	20.00	20
2. Office $\leq 40 \text{ m}^2$	10.00	7.5
3. Office $> 40 \text{ m}^2$	20.00	15
4. Meeting rooms	30.00	40
5. Cafeterias	40.00	30
6. AGENDA 2030 BONUS	10.00	10
SUM (Max. points criteria)	110.00	110.00



SOC 1.3 Acoustic comfort



Indicator 1: Acoustic concept formulated during the planning process


Indicator 2: Individual offices and multi-person offices up to an area of 40 m²

Indicator 3: Multi-person offices with an area of more than 40 m²

Indicator 4: Rooms in accordance with DIN 18041:2016-03 (room group A1–A5) with special requirements regarding speech intelligibility

Indicator 5: Rooms with recommendations in accordance with DIN 18041:2016-03 (building uses B3–B5) with special requirements regarding noise reduction

Indicator 6: AGENDA 2030 BONUS – Stress reduction, health and well-being



SOC 1.3 Acoustic comfort



1.Noise Levels:

Assess ambient noise levels within different spaces of the building.

2.Reverberation Times:

Evaluate the reverberation times in areas where it is essential to control sound reflections.

3.Sound Insulation:

Measure sound insulation between different spaces to prevent the transmission of noise.

4.Speech Intelligibility:

Assess speech intelligibility in spaces where clear communication is crucial.

SOC 1.4 Visual comfort

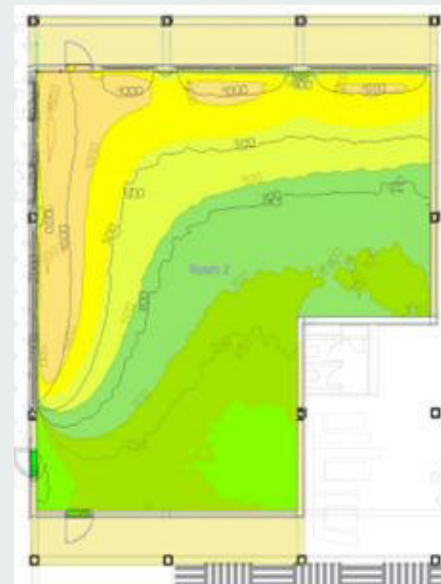
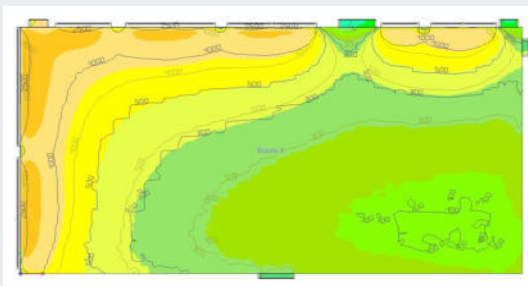
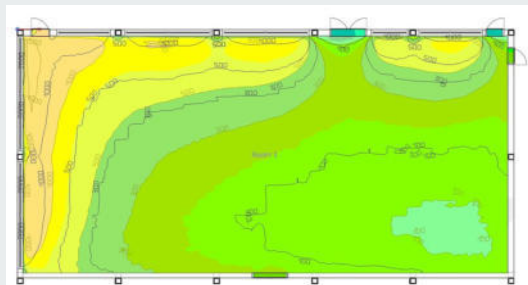
Introduction

Criteria Group	03-SOCIOCULTURAL AND FUNCTIONAL QUALITY	
Objective	-supply of daylight and artificial light -potential energy savings in lighting -general well-being and efficient work -mental and physical health of humans	
Benefits	strongly affects user productivity and satisfaction	
Indicators	6 of 7 applicable for Educational Spaces	
Sustainability	Sustainable Development Goal 7	 7 AFFORDABLE AND CLEAN ENERGY
Share of Total	2.7%	
Weighting	3	

Indicator 1 & 2: The availability of daylight in the entire and at permanent workstations

Definition	Availability of daylight in the entire building
Method	-DIALux software -Revit software -pCon .planner software
Required Documents	Floor Plans

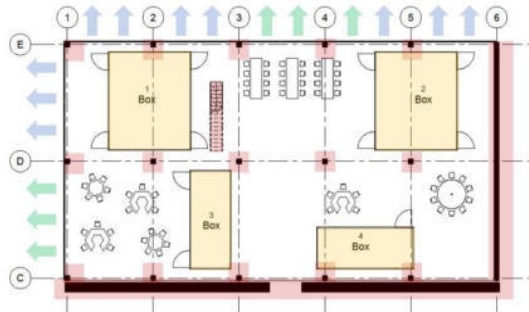
50% (UA) has (DF)	Points- 1	annual relative useful exposure	Points- 2
$\geq 1.0\%$	10	$\geq 45\%$	8
$\geq 1.5\%$	14	$\geq 60\%$	12
$\geq 2.0\%$	18 (Max)	$\geq 75\%$	16



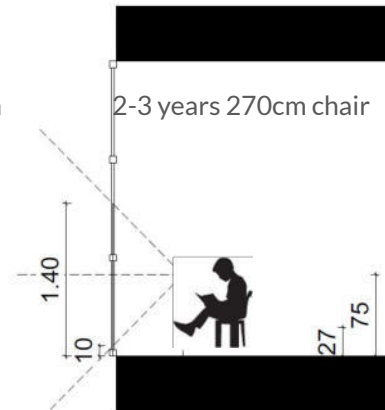
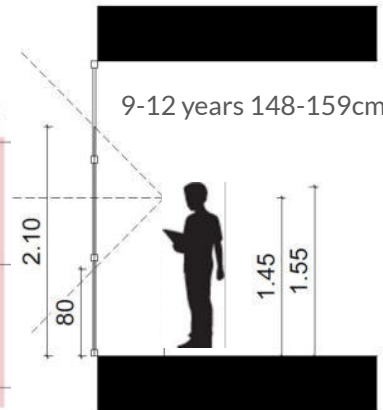
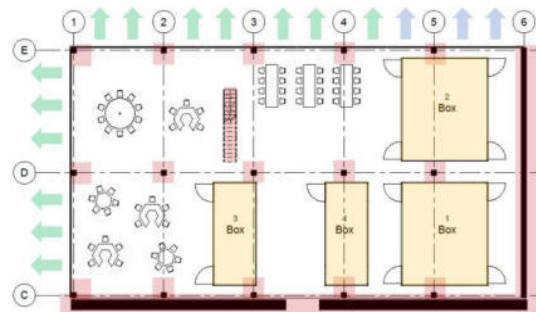
Indicator 3: Visual contact with the outside

Definition	Availability of line of sight to the outside	Visual Contact	Points
Method	qualitatively via floor plans and sections	possible	8
Required Documents -Floor Plans -Sections -DIN 5034		in direct field of vision	12
		even when protection down	16

Experimentarium - Planned Situation



Experimentarium - Proposed Situation



Indicator 4: Absence of glare in daylight

Definition	Absence of glare due to solar radiation/glare protection system	Solar radiation/glare protection class	Points
Method	classified with regard to DIN 14501	available	8
Required Documents DIN 14501, Section 6.3.		= class 1	12
		≥ class 2	16



0 Products in this class do not offer any glare protection.

1 There is only limited glare protection. This class is therefore only suitable for a few applications, e.g. B. on north-facing facades when no glare from an opposite facade is possible. This class is not suitable for computer workstations, especially on east, south and west facades.

2 Anti-glare protection is almost always guaranteed. For most screen work, this class is a sensible choice. This class is only not sufficient for a few applications, for example if the screen is aligned frontally to the window. The darkening is minimal, so that artificial light usually does not have to be used during the day. Suitable for east, south and west facades.

3 Anti-glare protection is guaranteed in most cases. Only in extreme cases, for example when the screen is facing the window and the smallest details have to be recognized, is it not sufficient. The room is darkened so that artificial light has to be used. Suitable for east, south and west facades.

4 Glare is 100 percent prevented. The room is very dark, so artificial light has to be used. Suitable for east, south and west facades.



E.0 The incidence of light is only minimally reduced. There are no light exclusion systems. The darkening can be increased by choosing the curtain material (see matrix).








D.1 The curtain in conjunction with a light exclusion system reduces the incidence of light to a very small extent. The darkening can be increased by choosing the curtain material (see matrix).

C.2 The curtain in conjunction with a light exclusion system noticeably reduces the incidence of light. This class is suitable for bedrooms. The darkening can be increased by choosing the curtain material (see matrix).

b.3 The curtain in conjunction with a light exclusion system reduces the incidence of light almost completely. This class is ideal for normal bedrooms. This class is also recommended for normal photography work. The darkening can be increased by choosing the curtain material (see matrix).

A.4 In conjunction with a light exclusion system, the incidence of light is prevented. Even on a bright summer day, the room is completely dark. This class is recommended for professional applications such as sensitive laboratory work, optical and photochemical work and the handling of extremely light-sensitive materials.

northeast, north and northwest : without
 South: Wire Mesh, Glare shields, ...

			Keine Wahrnehmung von Licht bei der folgenden externen Lichteinfallstärke (L)	Klassifizierung von Behangmaterial					
				0	1	2	3	4	
Rahmen	A	Mit Lichtausschlusssystem	75 000 lx						Sonderbau
	B	Mit Lichtausschlusssystem	30 000 lx						
	C	Mit Lichtausschlusssystem	1 000 lx						
	D	Mit Lichtausschlusssystem	Keine Prüfung						
	E	Ohne Lichtausschlusssystem	Keine Prüfung						

Indicator 5: The artificial light condition

Definition	Requirements for artificial lighting	5.1- 5.2	Points
Method	-DIALux -Norka catalog of Dialux	comply with DIN EN 12464-1	16
Required Documents	-Floor Plans -Artificial light information	Number of features implemented ≥ 3	10

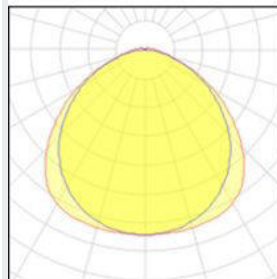
Product data sheet

ERFURT LED M1500 - 10560LM, PMMA TRANSOPAL® (IMPACT STRENGTHENED), 840/4000K, WIDE BEAM
4466804424-E-MC3

NORKA

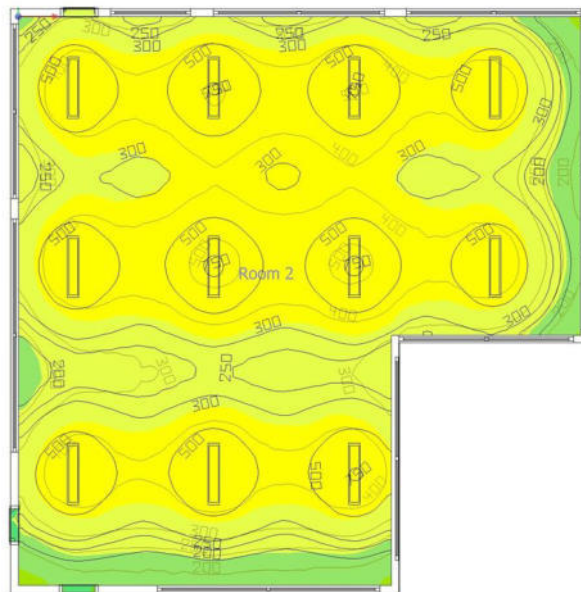
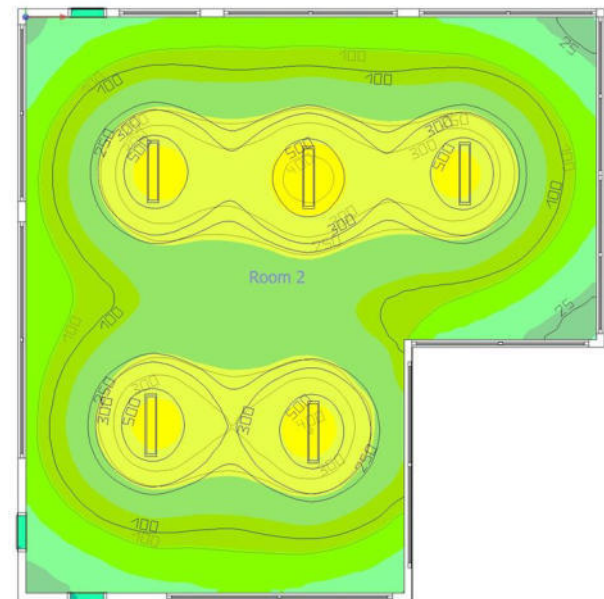
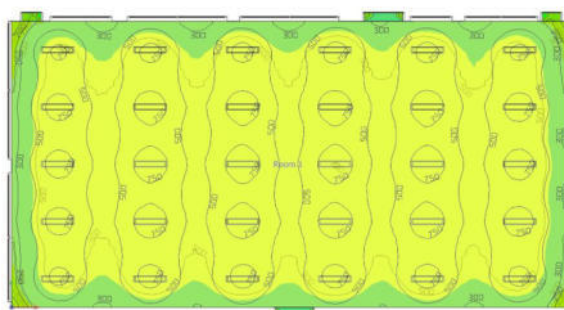
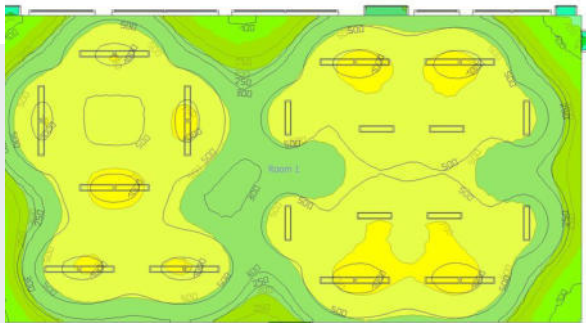


Light output 1



2 x LED

Nominal lamp power	30 W	LOR	98%
Lamp flux	5280 lm	ULOR	2%
Luminous efficacy	176 lm/W	Total flux	10300 lm
CCT	4000 K	Total power	60 W
CRI	84		



Electric

System power: 60 W

Protection

IP: 65

IK: 04

Designation labels: CE

Other operating numbers

Ambient temperature range: -13...104°F

Mounting mode

Ceiling mounted, Pendant, Ceiling recessed,

Shape and measurements

Length: 61.06 in

Width: 9.53 in

Height: 5.51 in

Adjustability

Tilttable

Indicator 6: Daylight colour rendering



Definition	Colour rendering index Ra	Ra	Points
Method	Using Colour rendering index Ra	≥ 80	4
Required Documents	-Ra values -Glass Codes -velfac.de	≥ 90	8 (Max)

Glasscode	M2	Units	Values
360055WG	16.82	9.00	Ad1 360055WG RW(C;Ctr)=38 (ÿ1;ÿ5) Ra transmittance=97 Ra outdoor reflectance=97
36B001WG	39.25	32.00	Ad2 36B001WG RW(C;Ctr)=33 (-2;-6) Ra transmittance=96 Ra outdoor reflectance=95



SOC 1.5 User control

The criteria of sociocultural and functional quality help to assess buildings with regard to health, comfort and user satisfaction as well as the essential aspects of functionality.

Objectives :

Our objective is to achieve a high level of user satisfaction in the interior of a building. This is why occupants should be provided with the best possible options to control the indoor climate. Aside from the actual conditions in the building, users' satisfaction also depends on the ability to adjust ventilation, shading and glare protection, temperature and lighting to their individual preferences, beyond the standard settings.

Benefits :

Measures which allow occupants to exert the greatest possible influence on the indoor climate increase comfort in a building, which in turn, improve comfort and contribute to greater satisfaction and productivity.

APPENDIX B – DOCUMENTATION



Indicator 1: Ventilation

- Excerpt from the ventilation concept for the building, outlining the essential features of the design and detailing fundamental assumptions regarding the building and the energy consumption for air conditioning in accordance with DIN V 18599 or local requirements.
- Documentation of the spatial allocation of the windows to workstations

Indicator 2: Shading / glare protection

- Information on shading system, e.g. in the form of data sheets from the manufacturer
- Description of the shading system, listing products and manufacturers and providing information on the type and extent of control possibilities
- Information on glare protection, e.g. in the form of data sheets from the manufacturer
- Description of the glare protection system, listing products and manufacturers and providing information on the type and extent of control possibilities

Indicator 3: Temperatures during the heating period

- Information on the heating system, e.g. in the form of data sheets from the manufacturer
- Detailed heating concept with information on the components installed, the control system and the relevant parameters, e.g. system temperatures
- Documentation detailing how a heating system is controlled and the extent of the area that the user has control over (i.e. control by zone or by room)
- Documentary evidence of the control options available to the user, e.g. in the form of photo documentation

Indicator 4: Temperatures outside of the heating period (cooling)

- Information on shading system, e.g. in the form of data sheets from the manufacturer
- Description of the shading system, listing products and manufacturers and providing information on the type and extent of control possibilities
- Information on glare protection, e.g. in the form of data sheets from the manufacturer
- Description of the glare protection system, listing products and manufacturers and providing information on the type and extent of control possibilities

APPENDIX B – DOCUMENTATION



Indicator 5: Artificial light control

- List of products used and manufacturers engaged for illuminating the office workstations and workspaces, e.g. in the form of data sheets from the manufacturers
- If different fittings are used for different workstations or workspaces, all fitting types must be documented and included in the evaluation.

Proposal to improve User Control



For Children

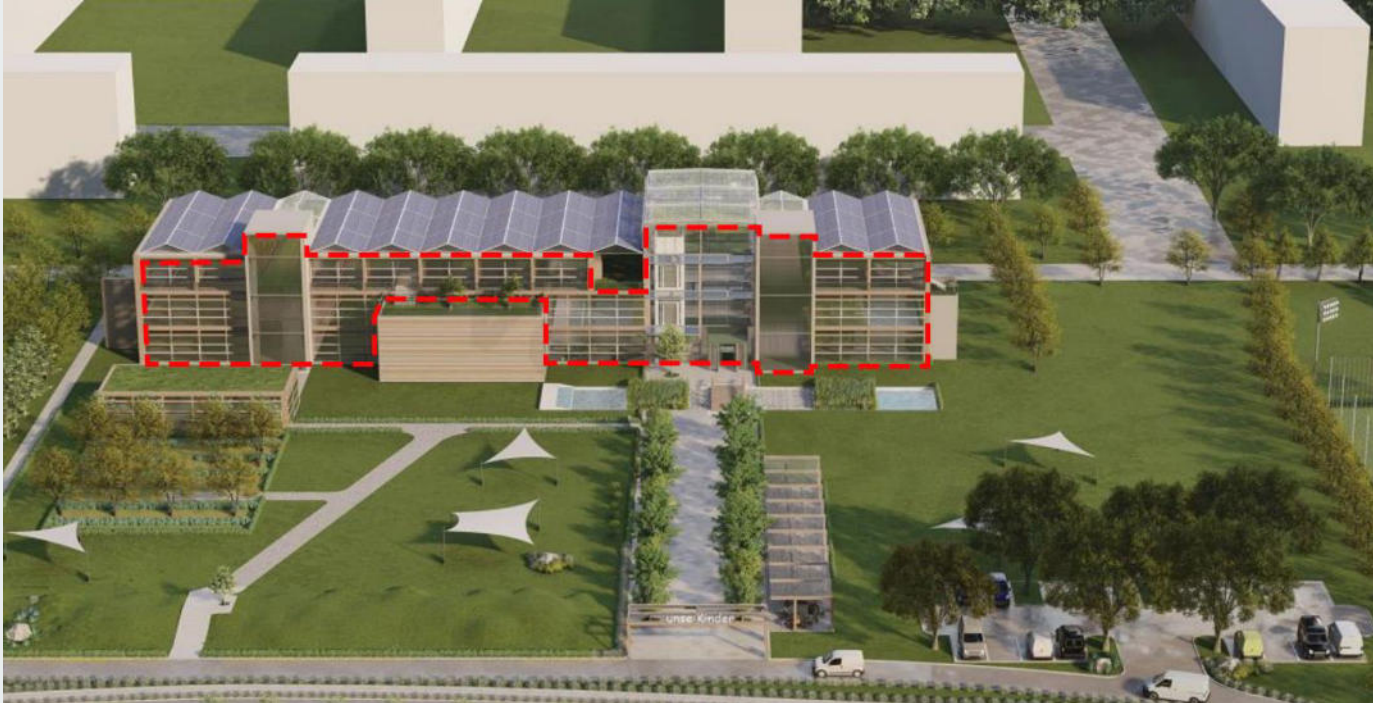
- **Ventilation:**
 - Install child-friendly window latches at lower levels, allowing children to open and close windows easily.
 - Integrate colorful and engaging ventilation panels that children can adjust, promoting awareness of fresh air circulation.
- **Heating:**
 - Use radiant floor heating to avoid exposed hot surfaces. Children can comfortably play on the floor without the risk of burns. (Provided in the current situation)
 - Incorporate playful temperature control interfaces like animal-themed thermostats, making it easy for kids to understand and adjust.
- **Shade Glazing:**
 - Install adjustable blinds or curtains with child-safe mechanisms so that children can control the amount of sunlight entering the room.
 - Use sunshade sails in outdoor play areas, allowing kids to move and adjust them according to their preferences.
- **Cooling Systems:**

Utilize natural ventilation strategies like operable skylights or windows at child height.

For Adults

- **Provide clear instructions:**
 - Ensure that user manuals for control systems are easy to understand and prominently displayed.
 - Conduct workshops for parents and teachers on how to use and teach children to use the building's systems responsibly.
- **Accessible Controls:**
 - Place controls for heating, ventilation, and cooling at an accessible height for adults while considering the safety of children.
 - Consider smart building systems that can be controlled via mobile apps, allowing adults to monitor and adjust settings remotely

1.1 Ventilation Control (Max. 20 points)



Ventilation control

- **Office (25 pt)**
 - Air exchange for a particular room can be controlled in that room (15 pt)
 - Air exchange can be controlled individually by the users or user group (1 to 3 people) (25 pt)
- **Education (20 pt)**
Indoor air quality of a particular room can be controlled as required.

Professional Indoor Climate And Building Monitoring For Educational Facilities

RYSTA Protect is a CO2 traffic light and air quality monitor, helping schools and businesses ventilate optimally to improve air quality and reduce virus transmission risk.

RYSTA Protect reliably records the following measured values:

- CO2-Level
- Temperature
- Humidity
- Brightness
- Noise
- Air pressure

The RYSTA Insights also provide you with the following insights into your building:

- Room usage
- Energy consumption savings
- Mould prevention

Source : <https://www.rysta.de/>



Benefit of Professional Indoor Climate Monitoring

- **Monitor and improve the air quality** in your school to ensure a safe and healthy environment for students, faculty and staff.
- **Discrete indication by CO2 traffic light.** With the discreet visual indication of the integrated CO2 traffic light, you are immediately informed when the CO2 concentration is too high. Without disturbing the lesson.
- **ESG & energy saving measures.** Create the basis for reporting temperature reductions and CO2 savings for various regulations. Because climate change affects us all.
- **Joint health protection.** Through the CO2 traffic light **children will learn from an early age to pay attention to air quality and to ventilate regularly.**
- **24/7 Data collection.** of the six indoor climate parameters: **CO2, air temperature, humidity, volume, brightness, air pressure.**
- **Maximum energy saving.** Changed behaviors combined with sound indoor climate data have a positive impact on energy balance and spending.
- **Reduce risk of infection & sick days.** Good air quality has been proven to help reduce the transmission of pathogens and improve health. As a result, you sustainably reduce absences due to illness.



Smart Indoor Climate System



A room can be kept warm or cool with the help of automated blinds and other smart systems that integrate with smart climate control. Smart home control systems can close blinds to block the sun and cool a room, which reduces the workload placed on air conditioning systems.

<https://www.180technologies.ae/smart-climate-control-system/>

The advantages of having a smart climate control system

- **Achieve seamless control and keep rooms comfortable at all times.** However, smart thermostats and an indoor climate control system guarantee that your living spaces are kept at the ideal temperature. Additionally, you can control the system using a tablet or smartphone.
- **Every room with perfect temperature.** Each room is always the ideal temperature thanks to a smart vent system that works in tandem with your climate control system.
- **Smart thermostats offer remote control and energy savings.** You can increase the energy efficiency of your home with the help of smart thermostats and climate control. However, you can access smart thermostats remotely by using your smartphones. To adjust the temperature in your house, check your phone. Additionally, you can save energy by pressing just one button.



Thermo-Hygrometer for Children

The Topcom Thermometer uses smileys to indicate the situation in the baby's room. With a cheerful smiley, both the temperature and humidity are optimal. This means that the temperature is between 18c and 26c and the humidity is between 40% and 60%. If the temperature and/or humidity fall below these values, the smiley changes into a doubtful face.

Smart Control Of Windows, Doors And Ventilators.



The universal remote control with numerous additional functions for all SIEGENIA smart systems.

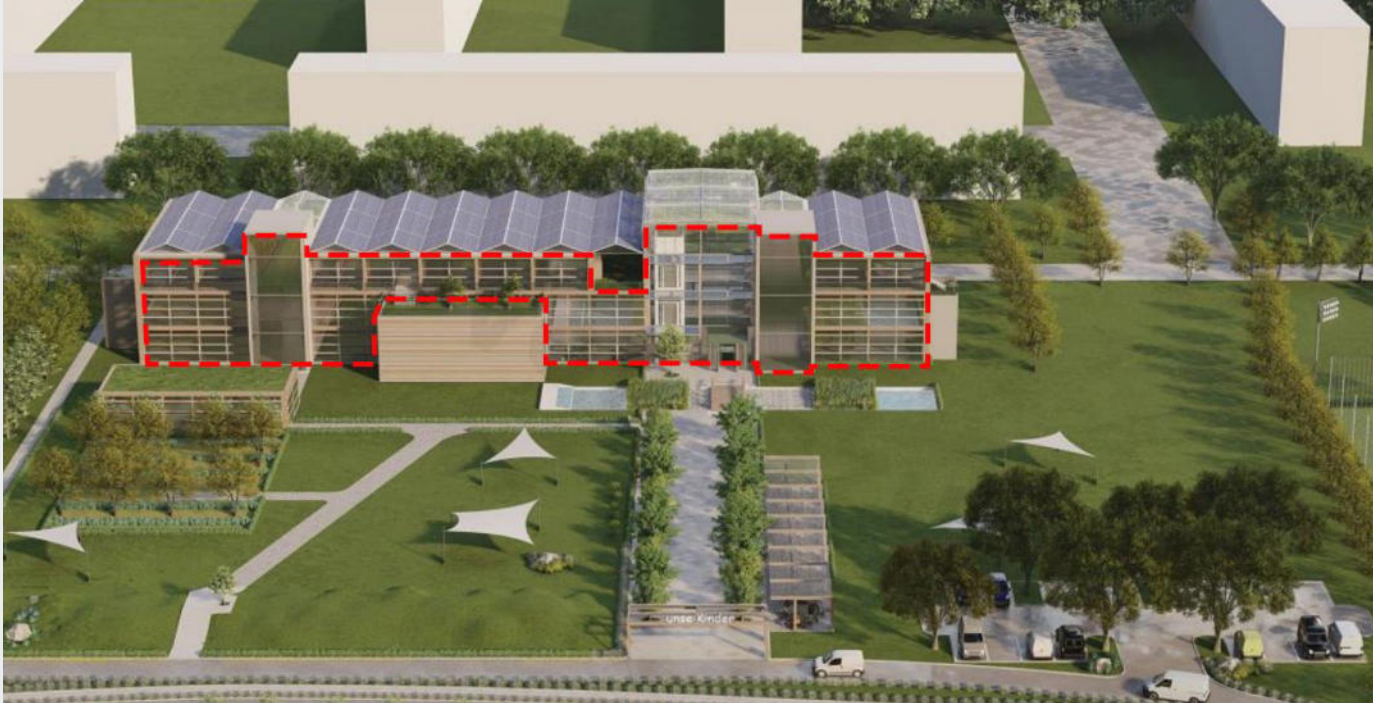
The SIEGENIA Comfort app allows you to operate all SIEGENIA “smart” products remarkably conveniently and intuitively via smartphone or tablet. A wireless or infrared remote control is no longer needed. On the contrary, the app elevates the ease of use to an entirely new level with numerous additional functions: from smart automatic and timer functions to individual adjustment options and extending to the easy coupling of drives, ventilators and sensors for a perfectly automated indoor environment. And thanks to feedback on the device and command status, you can keep everything under control.

- Convenient operation of all SIEGENIA “smart” devices over WLAN via smartphone or tablet with wide ranging additional functions.
- Simple coupling for a healthy, automated indoor environment: link “smart” sensors, ventilators and window drives together.
- Free app solution from ios 8.0 and Android 5.0.
- No need for an additional remote control.
- Optimal control due to feedback of the device and command status.
- Secure SSL encryption.
- Development of attractive target groups and targeted customer loyalty.



Source : <https://www.siegenia.com/en/products/smart-systems/smart-solutions/siegenia-comfort-app>

2.1 Shading and glare protection control (Max. 25 points)



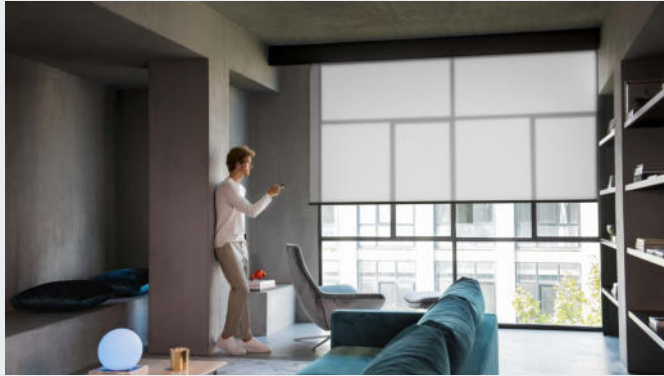
Office Max. 30

- Shading or glare protection can be controlled in the room (10)
- Shading or glare protection can be controlled by the users or user group (1 to 3 people) (20)
- Shading and glare protection can be controlled by the users or user group (1 to 3 people) (30)

Education Max. 25

- Shading for a particular room can be controlled in that room (15)
- Shading or glare protection can be controlled by the users or user group (1 to 3 people) (20)
- **Shading and glare protection can be controlled by the users or user group (1 to 3 people) (25)**

Smart Motion Blinds



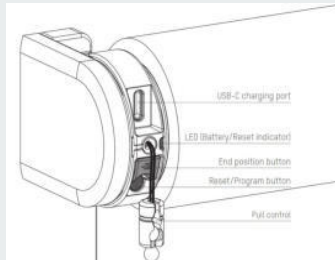
Eve MotionBlinds & sonevo

Our blinds powered by Eve MotionBlinds motors with Apple HomeKit technology. Maximum connectivity. Maximum flexibility. The future of roller blinds begins here, as sonevo meets Eve MotionBlinds.

One roller blind - all possibilities: Smartly hidden inside are the interfaces for the control options of tomorrow. In addition to the Apple HomeKit, you can also control the latest roller blind generations via Thread, Bluetooth, voice and remote control, and later also via Matter. Everything is discreetly installed in the roller blind shaft with the motor and battery.

The best connection for your smart home: With sonevo roller blinds powered by Eve MotionBlinds, setting up new devices is as smooth as the subsequent control. Smart and stylish thanks to our real-time configurator and a huge selection of colors and fabrics. You create your unique roller blind and make the decision: which type, which color, which material, how much transparency, which properties.

eve. | MOTIONBLINDS



Source : <https://www.sonevo.de/eve-motion-blinds>

Barrier Load Louvres (Temperature during heating period)



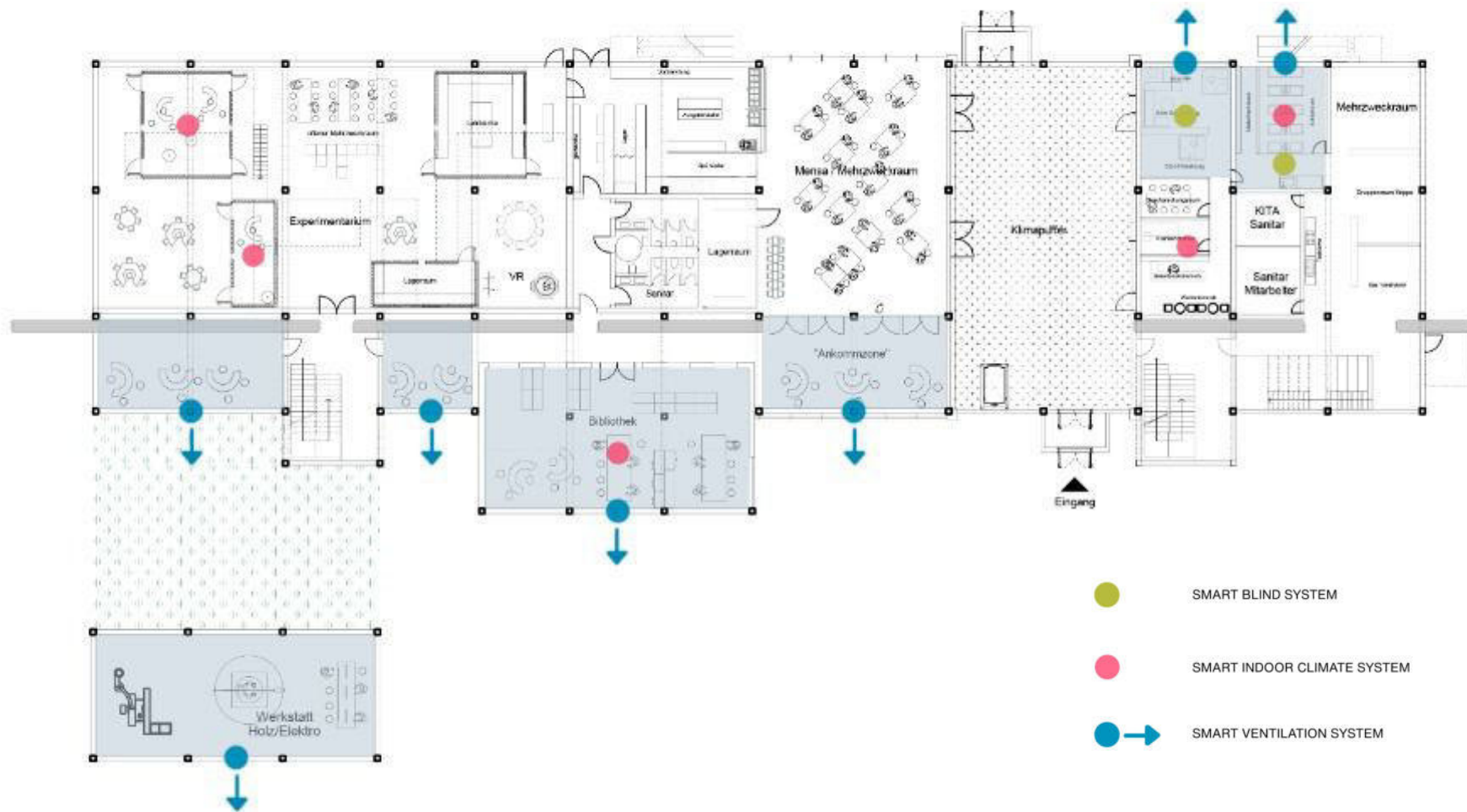
Barrier Load Louvres add an aspect of **protection**, intensive **ventilation** and **solar shading** to student rooms or classrooms at significant heights. This type of louvres is prominently used in student accommodation, but can be adapted to suit any project.

Barrier Load Louvres have several advantages such as **fall protection for open windows at great heights** and **intensive ventilation** of the rooms inside the building. At the same time, the blades provide solar shading while **blocking out the sun's rays and heat** without loss of daylight.

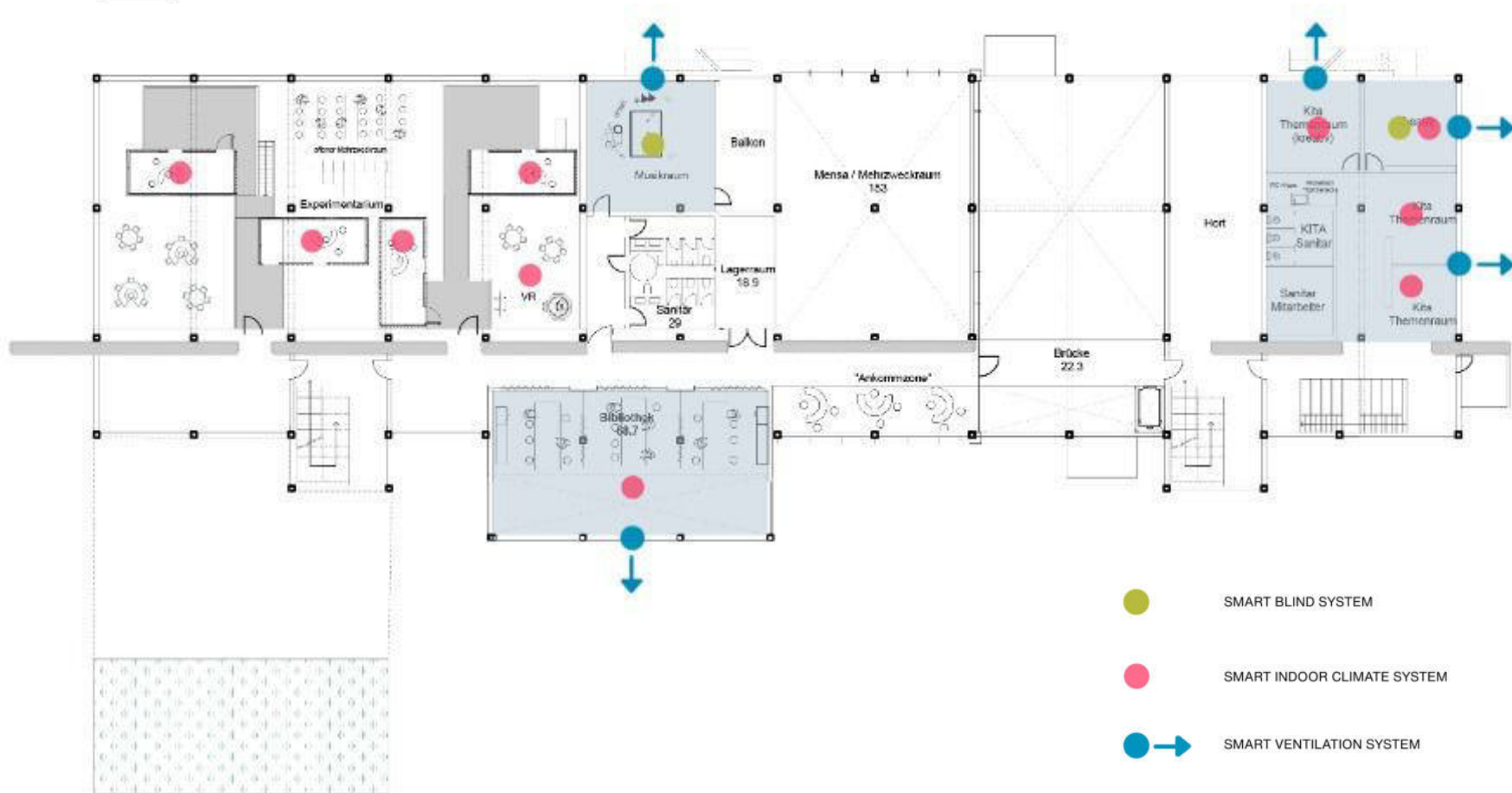
In addition to these functions, DUCO Barrier Load Louvres also provide an **architectural aspect to the facade**. This type of louvres is prominently used in student accommodation, but can be adapted to suit any project.

External shading systems naturally block the heating of classrooms, **reducing the cooling load by up to 30%**.

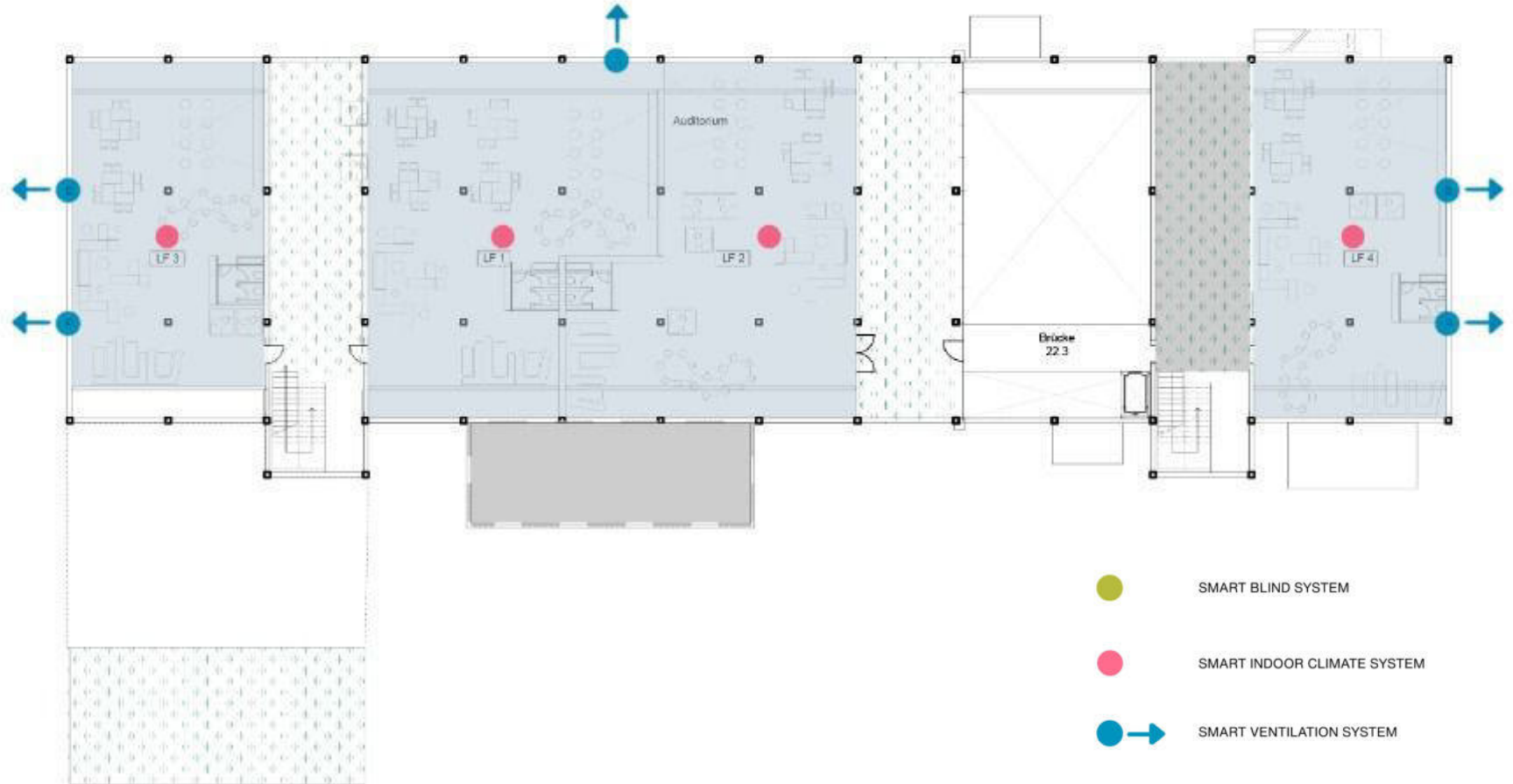
Ground Floor



First Floor



Second Floor



3.1 Room temperature control during the heating period (Max. 15 points)



Occupants should benefit from opportunities to influence the temperature in rooms or in zones within the room. Simply opening the windows does not qualify, because it does not provide occupants with the opportunity to actively influence the temperature. Hence this indicator specifically looks for (active) temperature control.

Office Max. 15

- Temperature can be adjusted in the room (8)
- Temperature can be adjusted individually by the users or user group (1 to 3 people) (15)

Education Max. 15

- Temperature can be adjusted in the room (15)

4.1 Temperature control outside of the heating period (Cooling) (Max. 15 points)



Active cooling is required for the purposes of the evaluation. Alternatively, if the choice of passive systems achieves a cooling effect that allows for individual adjustments to the indoor climate for groups of people or rooms, this can also be credited

Office Max. 15

- Temperature can be adjusted in the room (8)
- Temperature can be adjusted individually by the users or user group (1 to 3 people) (15)

Education Max. 15

- Temperature can be adjusted in the room (15)

Purge ventilation



Purge ventilation **naturally cools the school building** or student housing by using **high flow rates** (= intensive ventilation).

With summer night ventilation via **DucoGrille NightVent vents**, nighttime ventilation is **safe and intensive**. **The coolness of the night is stored in the thermal mass of the school building through purge ventilation.**

DucoGrille NightVent

The DucoGrille NightVent is a glass-replacing ventilation hatch (for glass thicknesses from 24 to 48 mm) protected from outside by an aesthetic window ventilator, with the option of an intrusion-resistant version. This system boasts a sleek design.

A new feature of the DucoGrille NightVent is the ventilation hatch control, which can now be done with manual or fully automatic operation. In addition, the DucoGrille NightVent can be connected to a building management system (BMS).

In addition, the outside grille is also available in a **vandalism-proof or burglarproof** version.



5.1 Artificial light control (Max. 25 points)



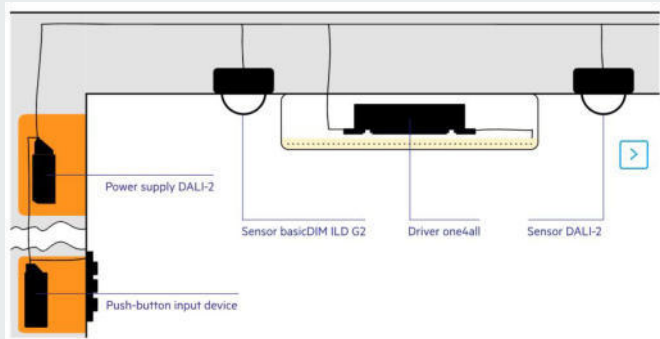
Office Max. 15

- Artificial light can be adjusted in the room (5)
- Artificial light can be controlled individually by the users or user group (2 to 3 people) (10)
- Artificial light can be controlled individually by a user 1(5)

Education Max. 25

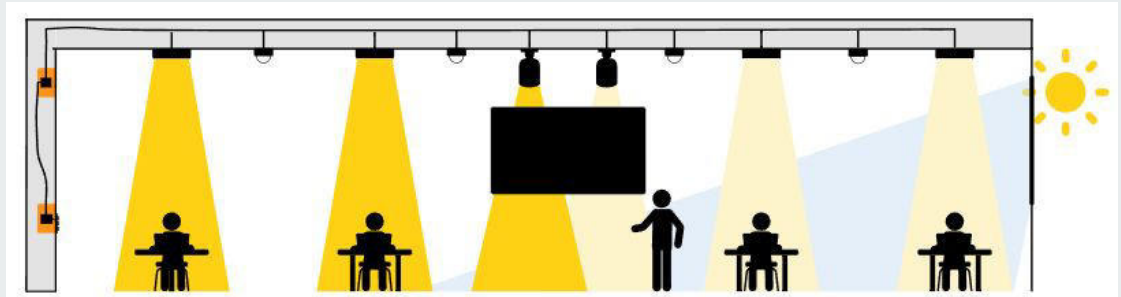
- Daylight and artificial light of a particular room can be controlled (15)
- **Artificial light can be controlled individually by the users or user group (2 to 3 people) (25)**

Smart Lighting System



Smart light on demand for schools

By using sensors, lighting can be dimmed to the right level, depending on motion and daylight. The lighting system can also be divided into two groups of luminaires, which are controlled differently thanks to an adjustable offset. As a result, the window row, which gets more daylight, is illuminated with less light than the wall row. With the help of simple momentary-action switches on the wall or the use of a remote control, the lighting in the room can be individually switched on/off and dimmed.



Sensor-controlled lighting in the classroom depending on movement and daylight. The lighting automatically adapts to the level of daylight.

basicDIM ILD G2 uses sensor technology to switch the lighting on/off when presence or absence is detected and to dim/brighten it with the help of daylight linking. CompanionSUITE can be used to configure the DALI-2 application controller with combined sensor as required.

Smart Lighting System



Manual control of individual luminaires or light lines

- Adjustable offsetting (adjustment of the colour temperature and brightness) between two light lines or the direct/indirect lighting
- Switching on/off
- Dimming/brightening

basicDIM ILD G2 can be used to configure an offset between two groups of luminaires. This results in additional energy savings, because the luminaires beside the windows are used less often than the luminaires in the corridor. Another option is to create an offset between direct and indirect light.

Automated light on demand

- Dependent on movement and daylight
- Detection range can be expanded with additional MSensors
- Shutters can be used to prevent presence detection in a particular direction

Evaluation



• Ventilation Control Indoor air quality of a particular room can be controlled as required	20
• Shading and glare protection control Shading and/or glare protection can be controlled individually for a particular room or by the users/user groups.	25
• Room temperature control during the heating period Room temperatures (during heating period) can be controlled individually for a particular room or by the users/user groups.	15
• Temperatures outside of the heating period (cooling) Temperature can be adjusted in the room.	15
• Artificial light control Artificial light can be controlled individually for a particular room or by the users/user groups.	25
<hr/>	
TOTAL	100



SOC 1.6 Quality of indoor and outdoor spaces

Objectives: to provide building users with high-quality indoor and outdoor spaces that accommodate as wide a variety of recreational and functional uses as possible and increase the sustainability of the property and the comfort of all users for a long time to come.

Benefits: Buildings with high-quality spaces boost the health and happiness of their users and residents, and promote social interaction. This significantly improves the building's utility value



Evaluation Method

Spaces designed to facilitate communication, additional provisions for users, family-friendly, child-friendly and senior- friendly design, interior access and circulation areas, design of the outdoor space, outdoor areas and fixtures and equipment.

The amount of possible points adds up to more than 100 points; however, there is a maximum of 100 points that can be awarded in this criterion

APPENDIX B – DOCUMENTATION



Indoors:

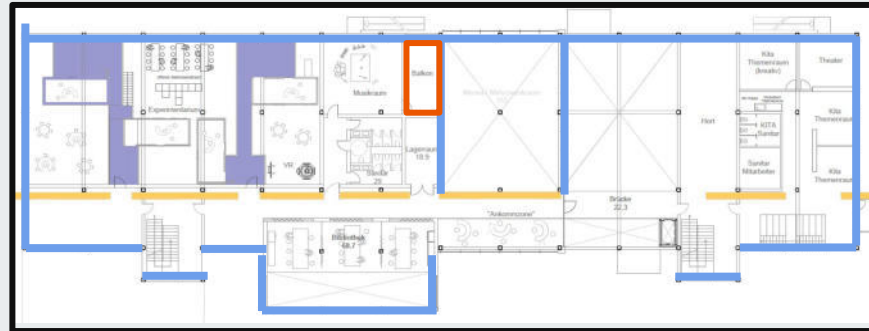
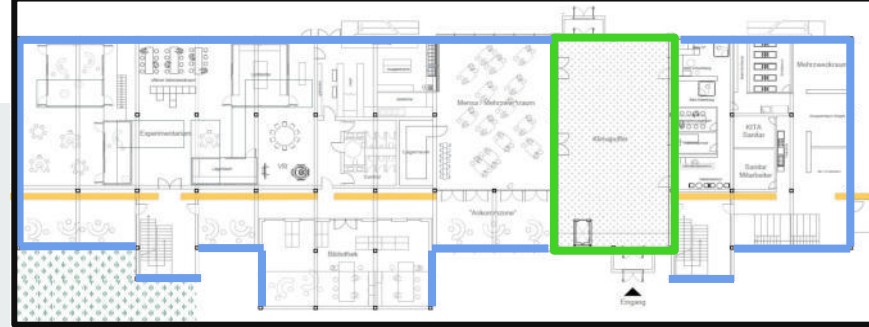
- Excerpts from the floor plans and sections, including spatial and functional allocation, and furnishings if appropriate
- Photo documentation
- Interior design concept for forward-thinking office design (flexibility and economic viability form part of the concept)
- Every aspect of the areas being assessed must be documented using photographs/views/sections/floor plans and a statement regarding their positive effect in accordance with the requirements of the indicator

Outdoors:

- Open space plan (possibly with detailed plans)
- Outdoor space design concept (with conceptual description or sketches)
- Plan view of the roof surfaces with information regarding the proportion used for technical installations, rooftop greenery, material and colour choice for the roofing and the usable areas
- Roof surface design concept
- Views of the building that show its design
- Site plan
- Three-dimensional visualisation (renderings, model photographs, drawings)
- Photographs/views/sections/floor plans

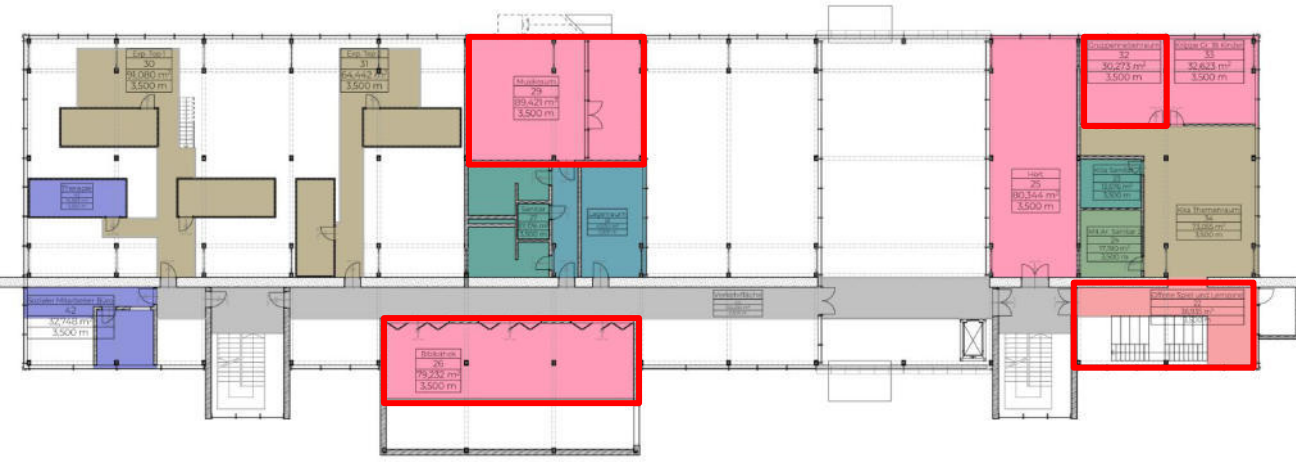
1.1 Communication zones of primary use (Max. 15 points)

- Various communication zones, e.g. open meeting areas or meeting zones, conditioned atria and inner courtyards, alcoves as meeting points **(+10)**
- Interior design that facilitates and promotes communication, e.g. by means of glass door and wall elements: transparency allowing a direct view of multiple rooms (e.g. learning areas, recreation rooms) **(+5)**



2.1 Additional provisions/services (Max. 15 points)

- Additional provisions, multipurpose rooms or common rooms, e.g. cafeteria, gym, library, spa, sauna (+10)



- Bibliothek
- Gruppenraum
- Offene Spiel und Lernzone
- Auditorium
- Musikraum

2.2 Navigation/information (+5 points)

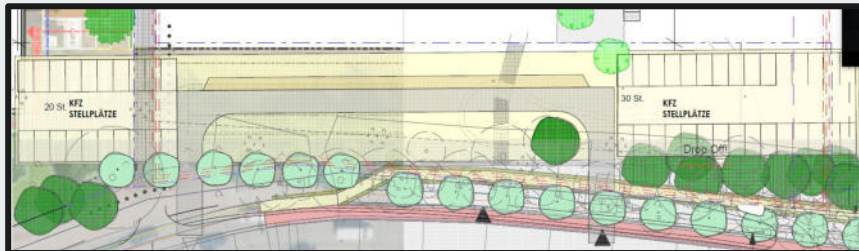
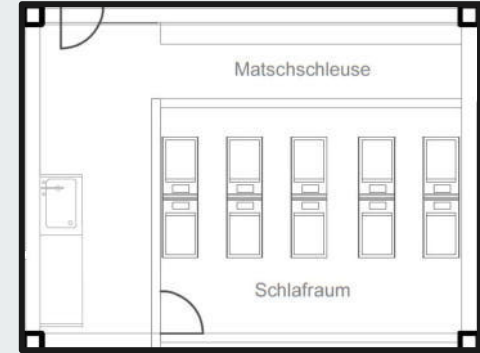
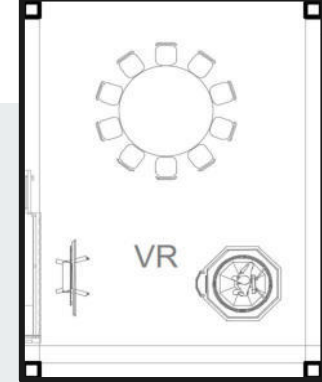
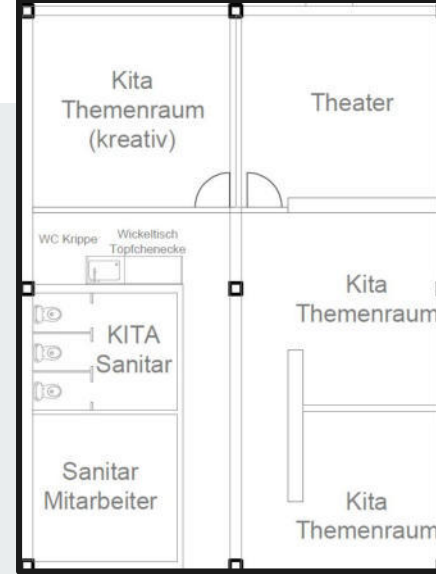
- Navigation system (e.g. signage, information boards/columns)
- Presence of an information desk that is integrated into the overall interior design concept



Ref. images

3.1 Provisions for families in the building (Max. 20 points)

- Childcare facilities (+5)
- Rooms with baby changing facilities and separate breastfeeding rooms/areas (tailored to the individual scheme) (+5)
- Children's play areas (without childcare) (+5)

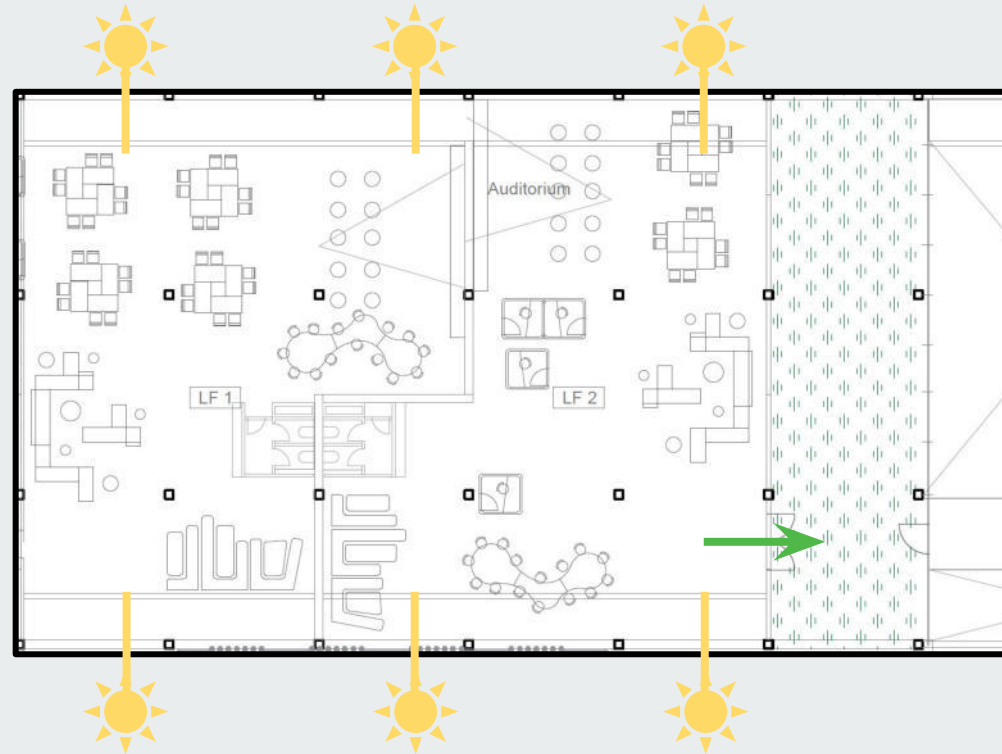


- Parking areas include a number of designated parking spaces for families, with dimensions to accommodate the additional needs of families (width ≥ 2.7 m) (+5)

4.1 Quality of interior access and circulation areas (Max. 10 points)

Number of features provided 3 = 5, $\geq 5=10$

- Areas that open out, galleries, alcoves, stairways that are sufficiently wide and offer sufficient open space vertically to allow communication between people on different storeys, entrance stairways, seating (e.g. suitable projecting elements, steps, benches and similar).
- Daylight shines into the access and circulation areas.
- Doorways opening into exterior spaces, e.g. balconies, roof terraces, atria



5.1 Design concept for the outdoor facilities (Max. 20 points)

- The design concept integrates the clever use of materials, lighting, navigation, **greening** and the necessary technical installations (+10)
- Connecting building areas with the goal of creating **social spaces** and building a sense of community (+5)
- Playgrounds with high-quality equipment (+5)
- Green spaces and parks that are easily accessible (+5)
- Technical infrastructure that is part of the user experience, e.g. visible, aesthetically pleasing **water circulation systems** (+5)
- Auxiliary facilities are integrated into the design (waste disposal sites, bicycle storage facilities, underground garage ventilation, etc.) (+5)
- Social control of outdoor areas is afforded by means of linkages between the building and the outdoor space. (+5)

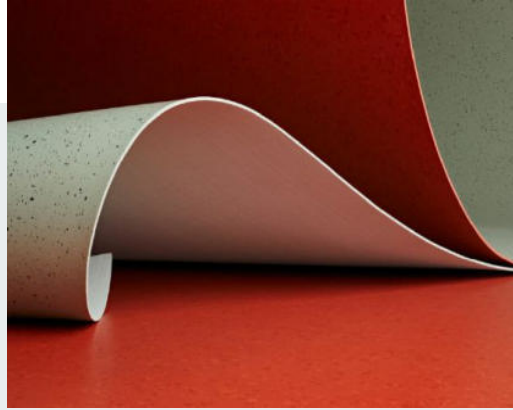


Design concept for the indoor facilities (proposal)

Flooring design for children:

LINOLEUM

life cycle assessment for DLW Flooring in accordance with DIN EN ISO 14040-43



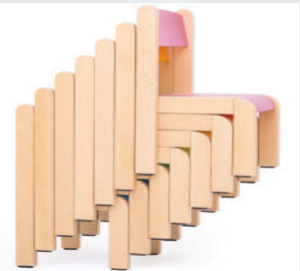
This floor covering is robust, durable and easy to care for, as well as being non-slip and therefore well suited to the demands of a kindergarten



Design concept for the indoor facilities (proposal)

Furniture design for children:

SCHILDIS KITAMOEBEL



Qualified range

All of our furniture has been specifically selected and designed for use in daycare facilities.



Certification

In addition, the majority of our daycare furniture has been checked by external certification bodies, such as GS or Ansi/Bifma.



sustainability

Our wood products are sourced exclusively from sustainable forestry and coated with environmentally friendly varnishes.

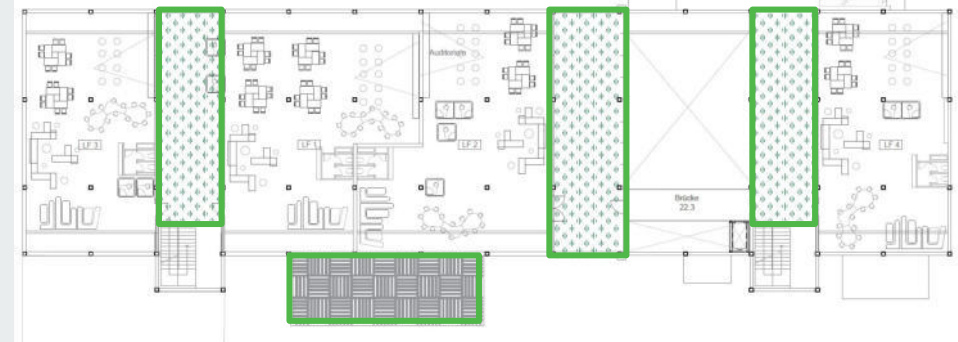


DIN standards

Our kindergarten furniture is largely manufactured according to DIN standards. Seat heights and table heights are created according to DIN EN 1729, for example.

6.1 Roof surfaces (Max. 25 points)

1. 10% of the roof surface areas (but at least 5 m² of usable area) are outdoor spaces available to the building users. (+5)
2. Balconies, loggias or conservatories with at least 3 m² of usable area per unit (+5)
3. Façade greening over > 10% but at least 20 m² in total. (+5)
4. Communal outdoor seating areas or terraces, atrium (not conditioned) or inner courtyard with spaces where users from all over the building can spend time (+10)
5. At least 80% of all classrooms and other rooms in a building have doors that provide access to the outdoors, allowing the adjacent outdoor areas/roof surfaces to be used. (+10)



7.1 Fixtures and equipment in the usable outdoor areas (Max. 10 points)

Number of features provided 3 = 5, $\geq 5=10$

- Fixed seating and/or loungers
 - Movable seating and/or loungers
- Weatherproof outdoor furniture for lunch breaks, including tables and chairs
 - Power supply for outdoor workstations and workspaces
 - Fixed fitness, playgrounds and exercise equipment
- Open green spaces that people can spend recreation time in
- Water features
- Shelter that protects against weather
- Wind protection measures
- Protection from the summer sun in the form of trees or fixed, rigid or movable shading systems
 - Other fixtures or equipment that increases comfort for the user groups in outdoor areas

7.1 Design concept for outdoor facilities

Playground design for children:



Ecological vision:

- Timber sourced from sustainable forestry, guaranteed 100% FSC® certified (COC)
- Environmental protection: deeply anchored in the corporate philosophy
- Award-winning environmental management and environmentally friendly products
- Ecologically compatible manufacturing processes
- Consequent fair thinking and acting

Final Evaluation



• 1.1 Communication zones of primary use	15
• INNOVATION AREA As in 1.1	
■ Forward-thinking space concepts	
• 2.1 Additional provisions/services	10
■ 2.2 Navigation/information	5
• 3.1 Provisions for families in the building	20
• 4.1 Quality of interior access and circulation areas	10
• 5.1 Design concept for the outdoor facilities	20
• 6.1 Roof surfaces / Outdoor spaces	25
• 7.1 Fixtures and equipment in the usable outdoor areas	10

TOTAL

115



SOC 1.7 – Safety and security

Objectives :

Our objective is to devise a design concept that prevents dangerous situations in buildings and their immediate vicinity as much as possible.

Benefits :

A high sense of security makes a vital contribution to people's comfort. By contrast, uncertainty and anxiety restrict freedom of movement. Measures which increase the sense of security also generally help with reducing the possibility of being assaulted.

APPENDIX B – DOCUMENTATION



Indicator 1.1: Level of visibility

- Excerpt from the detailed design plans showing the visual relationship between rooms and general areas such as main thoroughfares, paths and roads, the entrance areas and inner courtyards and clear visibility of the underground car park.
- Written explanations of the plans
- Photo documentation

Indicator 1.2: Level of lighting

- Plan of the paths
- Lighting concept for the paths
- Documentary evidence demonstrating the light intensity (illuminance) or light densities (luminance), e.g. from data sheets for the lighting used or by measuring, simulating or calculating these values
- Documentation showing the location of the car parks, e.g. on the site plan or the underground car park plan
- Documentation showing the location of the bicycle parking areas, e.g. in the site plan or the underground car park plan

Indicator 1.3: Technical safety equipment

- List and documentary evidence of the technical safety installations present, e.g. through the functional specification created or contracts made
- Location of the technical safety installations, e.g. on plans
- Photo documentation of the safety installations that have been provided, specifying their location

Indicator 1.4: Preventive safety measures

- As in indicator 1.3

Proposal to improve Safety & Security



For Children

- **Secure Design:**
 - Install childproof locks and safety features on doors and windows.
- **Emergency Drills:**
 - Conduct age-appropriate emergency drills to familiarize children with evacuation procedures.
 - Implement clear signage and visual aids to guide children to safe areas.

For Adults

- **CCTV and Monitoring:**
 - Implement security cameras in common areas with restricted access.
 - Ensure that adults have access to emergency communication systems and can quickly alert authorities if needed.
- **Staff Training:**
 - Provide regular training for teachers and staff on emergency response procedures.
 - Establish a clear communication protocol for parents in case of emergencies.

1.1 Level of visibility (Max. 40 points)



Level of visibility Max. 40

General areas (entrance areas, main thoroughfares, inner courtyard paths) and underground garages, ground-level car parks and multi-storey or rooftop car parks (where available) offer clear visibility.

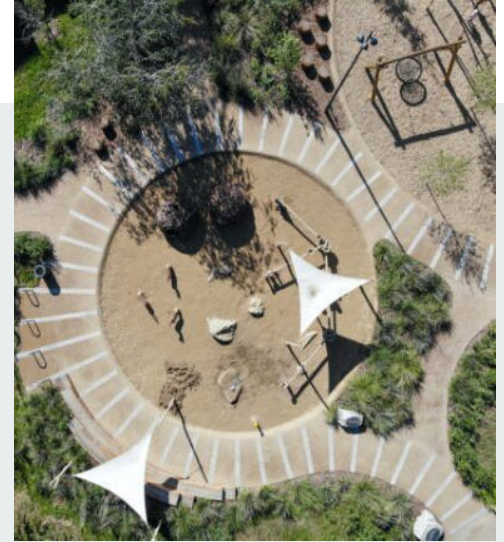
Visible Entrances, Pathways, Parking, Landscaping



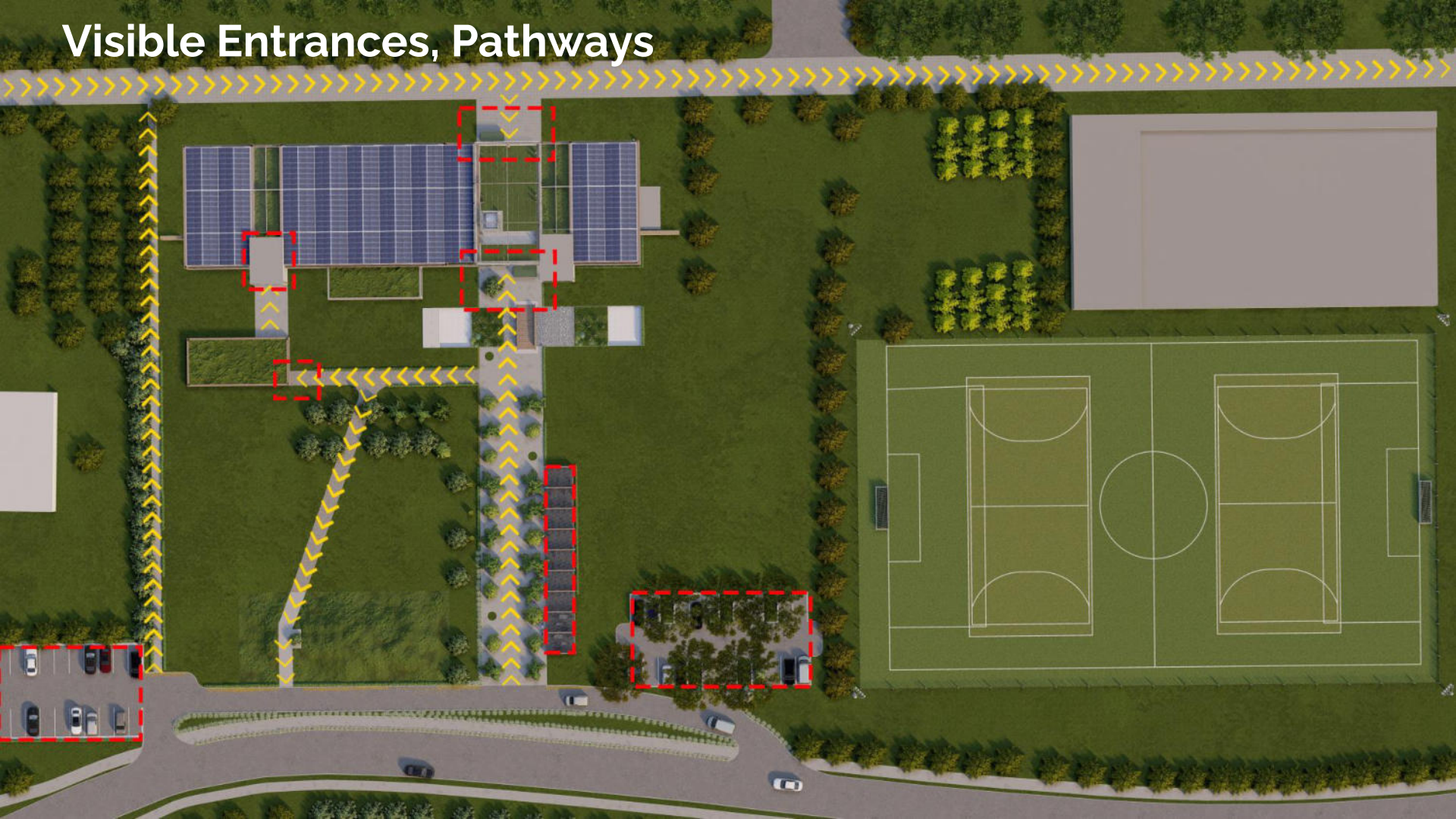
Ref. images

Bushes and trees should be in appropriate size to ensure they do not create blind spots or obstruct views.

Opt for low-maintenance vegetation that allows for **clear visibility**



Visible Entrances, Pathways



1.2 Level of lighting (Max. 30 points)



Level of lighting Max. 30

Main thoroughfares, paths to car parks and bicycle parking areas are well lit.



CAR PARKING

BICYCLE PARKING
CAR PARKING

CAR PARKING

Outdoor Lighting for Pathway



LED LIGHTING FOR PATHS

Illuminating paths has the primary aim of safely and securely accompanying people during hours of darkness. High quality of light enabling rapid orientation and safe use of paths by people therefore becomes the primary selection criterion.

LED LIGHTING FOR PARKING

The robust Lumena Star 40 provides energy-efficient light precisely according to the needs of the outdoor application thanks to MLTIQ technology. The all-rounder can be equipped with light management functionality, enabling maximum energy savings due to intelligent control. Thanks to its flexible lens system, Lumena Star 40 provides safety and security in outdoor workplaces and outdoor areas – even with wide luminaire spacing.

Source : <https://www.trilux.com/en/applications/education/ancillary-areas/>

Outdoor Lighting for Car Park



Jovie LED can be perfectly adapted to individual project-related requirements, e.g. as a Smart Lighting Ready variant with Zhaga interfaces for a light management system. Also ideal for later retrofitting.

Source : <https://www.trilux.com/en/applications/education/ancillary-areas/>

TWO-SIDED ARRANGEMENT, OPPOSITE



Outdoor Lighting for Bicycle Parking



The bicycle parking area is slightly illuminated so that the night itself is not disturbed, but the bicycles are clearly visible. Moreover, such a bike stand looks chic and additionally enhances the surroundings.

Since the LED bike rack is already equipped with electric cables, it can be used in the area of charging stations for e-bikes or even as a charging station itself. The LED bike rack provides the electrical power and can also be set up as a WIFI station. In remote outdoor areas without electrical power supply, the light system can also be connected via photovoltaic elements due to the low energy requirement.

Source : <https://lux-glender.com/en/blog-en/the-led-bike-rack>

The SAFE system is ideally designed for lighting all public areas such as schools, public stairways, sports stadiums, foot and cycle bridges, etc.

The LUX GLENDER SAFE system allows the installation of an LED handrail with symmetrical wide-beam light emission or asymmetrical light distribution. The reflector in the luminaire directs the light in one direction while the other side is less illuminated. This special shape of the reflector ensures excellent and uniform illumination of the walkway without creating any glare in the water or in the road traffic below.

Cables for the power supply line can be laid between the light and the handrail profile.

1.3 Technical safety equipment (Max. 30/20 points)



Number of technical safety installations (emergency telephones, CCTV, PA systems (in offices), voice alarm systems or comparable installations)

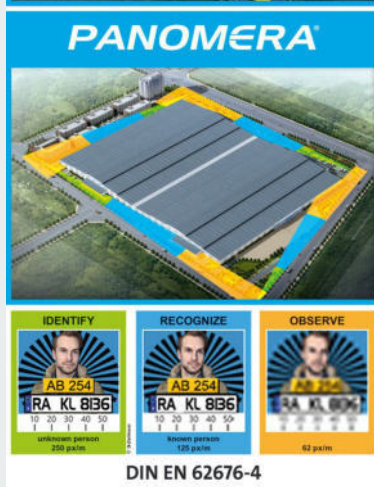
Security Surveillance Camera



For school administrators and security teams, enhanced situational awareness is vital to helping ensure the safety and security of education facilities. Security cameras for schools, or CCTV cameras for schools, can help administrators and security teams achieve this. Therefore, it's not a surprise that between 2009-10 to 2019 – 20, the percentage of public schools reporting the use of CCTV cameras in schools grew from 61% to 91%, according to the National Center for Education Statistics. With this technology, schools and college campuses can:

- **Detect unfolding incidents and emergencies** – Installing school security cameras at strategic locations will provide maximum awareness. Key areas include IP security cameras in school classrooms, libraries, entrances, hallways, stairwells, parking lots and faculty rooms. This gives school security camera system operators better visibility over areas where incidents and emergencies are most likely, enabling improved focus and faster response. From detecting escalating tensions within a group of students to spotting a potential fire hazard, security cameras in schools, including security cameras in classrooms, can provide users with a view of what's happening without being there physically.
- **Deter bad behavior and illegal activities** – The simple presence of security cameras in school classrooms, hallways, cafeterias, and outdoor grounds has proven to deter bad student behavior and criminal activities, whether that be bullying, theft or vandalism.
- **Capture evidentiary footage** – In the event of an incident, school CCTV cameras can capture school security camera footage that can be used for evidentiary purposes by the administrators, school security team or local law enforcement. School security camera system footage of incidents and emergencies can also be used to better train individuals and teams to ensure there's no repeat of the incident and improve future response efforts.

Proposal Security Camera



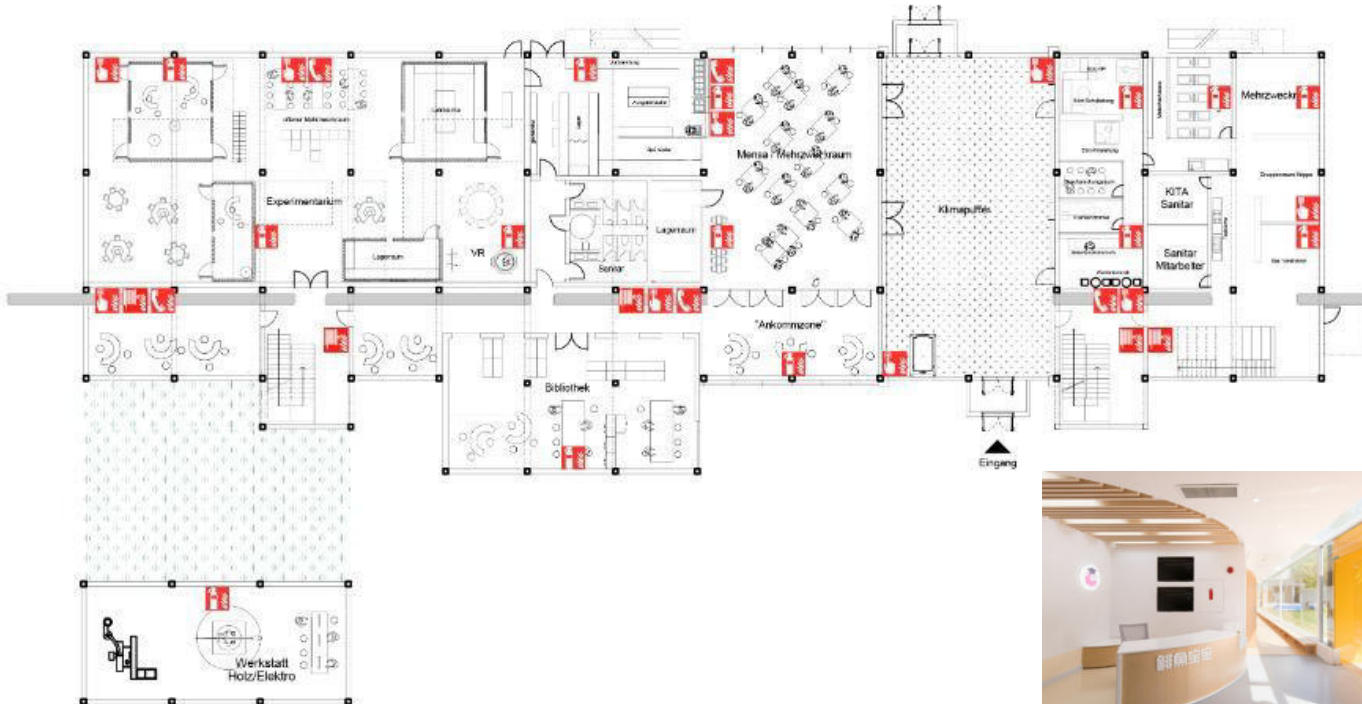
Benefits

- Fewer cameras and minimal infrastructure costs thanks to patented Panomera® multifocal sensor system
- Protection against burglary & theft through “Virtual Guard” function
- Reduction of false alarms to almost zero thanks to AI-based object classification
- Savings in patrols and optical verification
- Continuous video surveillance and person tracking over the entire area with defined minimum resolution.

<https://www.dallmeier.com/products/panomera-cameras>

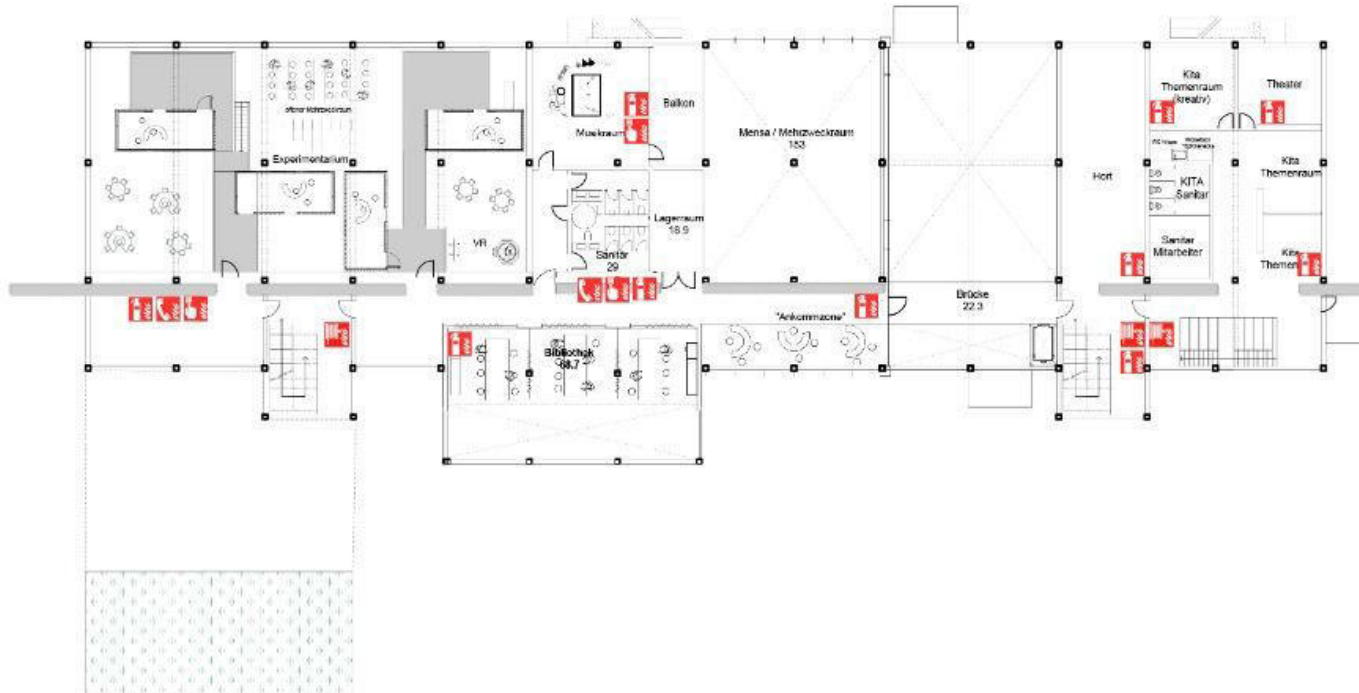
Proposal of Technical Safety Installations

0. EG



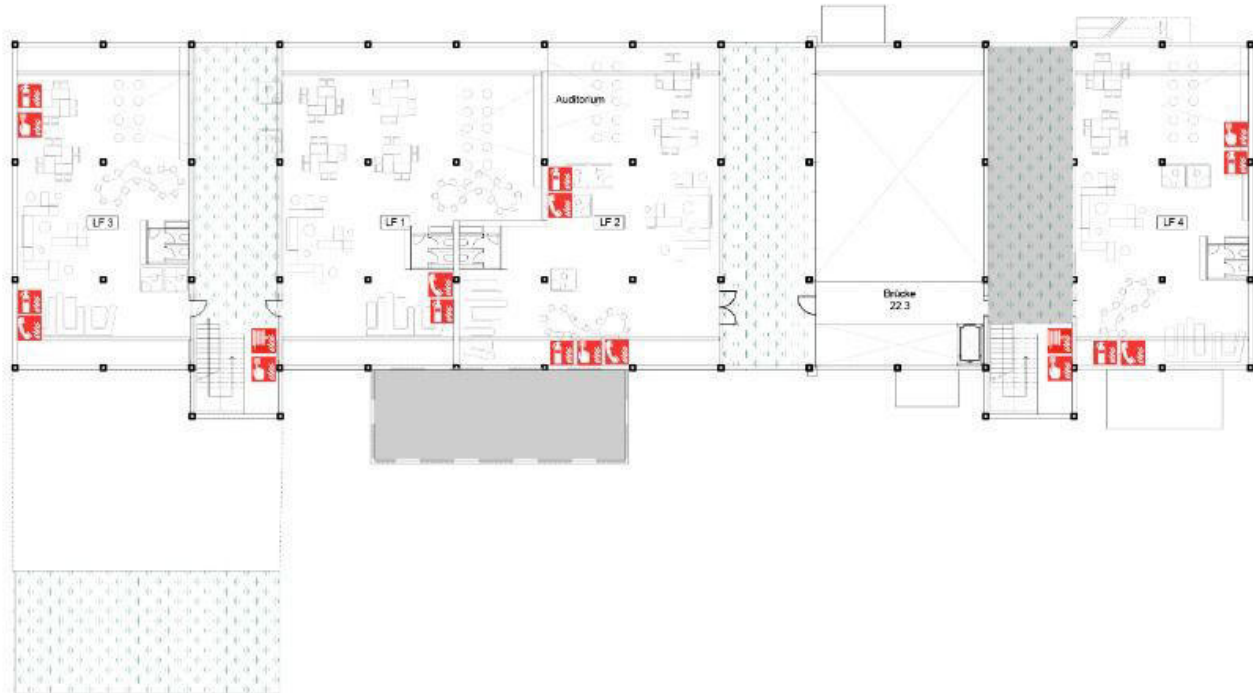
Proposal of Technical Safety Installations

1. OG



Proposal of Technical Safety Installations

2. OG



Kindergarten Fences

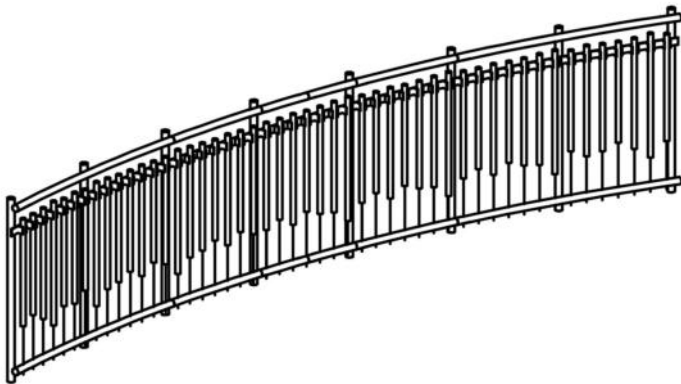


The melodic fence consists of handrail, frame and sound tubes. Running a hammer or a stick over the metal rods of the melodic fence creates the tune of a song. In non-public areas the suspension can be done with cables instead of a screw. The length of the fence can be varied depending on the melody or the required space.

Recommended for

- Kindergarten children
- School children
- Young people
- Adults
- Older people
- Public play areas without supervision, such as playgrounds, parks or similar
- Barrier-free - Independent play

Source :
<https://www.richter-spielgeraete.de/en/playground-equipment/products/senses/acoustics/1058000-melodic-fence-melody-haenschen-klein/>



Acoustic effect	soft
Vandalism	not vulnerable
Supervision	not necessary
Explanation Board	included
Installation	indoors and outdoors
Safety check (DIN EN 1176)	not necessary
Installation in concrete	possible

Secure Design (Install childproof locks and safety features)

- Protects from injuries caused by tipping furniture



- Protects children from dangerous window falls

1.4 Preventive safety measures (Max. 10 points)



Does not apply to Education

Evaluation



•	Level of visibility General areas (entrance areas, main thoroughfares, inner courtyard paths) offer clear visibility.	40
•	Level of lighting Main thoroughfares, paths to car parks and bicycle parking areas are well lit	30
•	Technical safety equipment Number of technical safety installations (emergency telephones, CCTV, PA systems (in offices), voice alarm systems or comparable installations)	30
•	Preventive safety measures Does not apply to Education	-

TOTAL

100



SOC 2.1 Design for all

Objective: “...entire environment we build around ourselves accessible to everyone and without restrictions on its use, whatever their personal situation.”

Benefits:

If barrier free building principles are integrated while building work planning, the cost and the complications of adapting the building later for it would be eradicated.

Building becomes attractive to all user groups, especially people with impaired motor skills, sensory impairments and cognitive impairments.

Quality Level 1 – DGNB Minimum Requirement (10P)

The requirements of the national building regulations with regard to barrier-free design have been fulfilled.

Internal and external infrastructure: Access routes to entrances, entrances and areas in which to manoeuvre in front of the entrance door(s) (and lift, if installed) and the associated circulation and secondary areas and general areas of the building that are important for the use are barrier-free.

Barrier free infrastructure for all units of the building.

Dedicated circulation areas for disabled passenger car parking spaces.

Operating information (e.g. for entrance doors, lift) provided in line with the "multiple-sense principle" ("at-least-two-senses principle« e.g. visual, audible, tactile).

At least one barrier-free toilet cubicle can be accessed from a public area.

	Quality Level 2 (25P)	Quality Level 3 (50P)	Quality Level 4 (75P)	Quality Level 5 (100P)
Quality Level 1 obtained	+	+	+	+
A detailed overall barrier-free design concept	+	+	+	+
All areas for teaching, the related circulation and secondary areas are barrier free Mandatory barrier-free toilet cubicles in these areas	+	+	+	+
Quality level 2 has been achieved.		+	+	+
Min. ...% of the outdoor areas people areas people can traverse or spend time in in the outdoor facilities (where present) are barrier-free.		25	50	75
Min ...% of the workspaces, the related circulation and secondary areas are barrier-free The requisite barrier-free toilet cubicles in these areas		25	50	100

Evaluation Method

The building was checked according to the SOC2.1 Design for All criteria quality levels to see what is applied and missing.

To evaluate the barrier free qualities of the building “Guideline: Accessibility in Building Design (January 2015)” was utilized.

The analysis was done by :

Creating diagrams over the drawings such as plans, sections taken from the 3D model and images of the building.

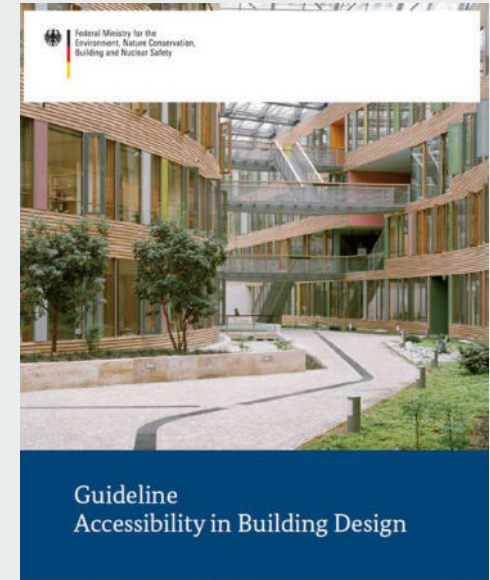
Dimensioning corridors, doors and manoeuver spaces.

Calculating usable barrier free areas.

Experience:

The task was mainly quite looking at the criterias of the guideline and checking if it is applying.

As the project is still being developed the interiors and the guidance systems could not be fully analyzed as there was not enough data. (Tactile information, visual, audible information, difference in interior surfaces etc.)



https://www.leitfadenbarrierefreiesbauen.de/fileadmin/downloads/archiv/barrierefreies_bauen_leitfaden_en_bf_version2.pdf

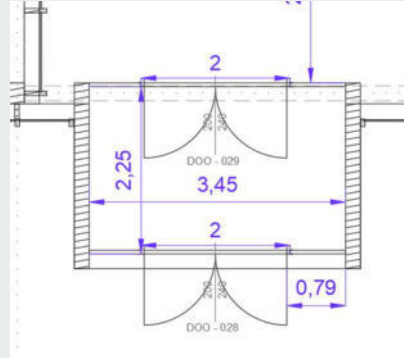
Quality Level 1 - DGNB Minimum Requirement

External and interior infrastructure to be Barrier-free.



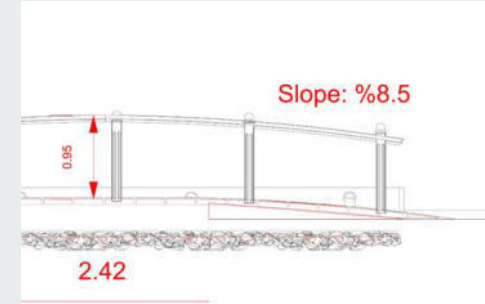
Applied

No threshold at the entrance and approaching the building



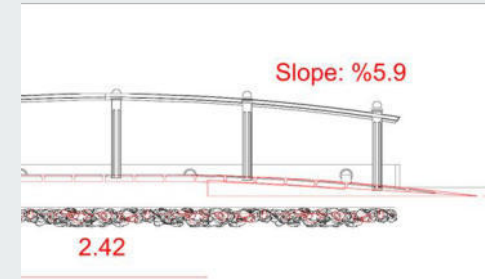
Applied

Enough space to manoeuvre around the entrance



Missing

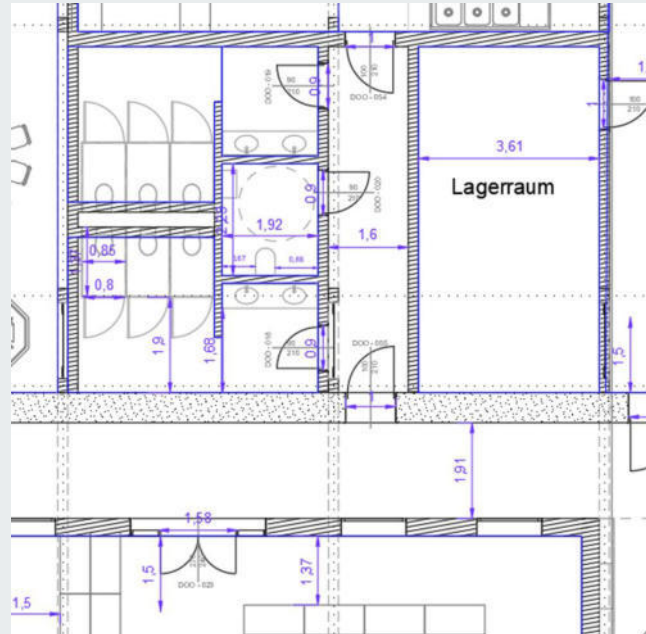
The slope cannot be more than %6.



Solution

Making the ramp longer

Barrier free infrastructure for all units of the building.



Min. 90 cm passage

Min 1.5 m corridors and
1.8x1.8 space after 15m
(when needed)

For corridors up to 6m,
min 1.2m width

Quality Level 1 - DGNB Minimum Requirement

Min. one barrier-free toilet cubicle can be accessed from a public area.

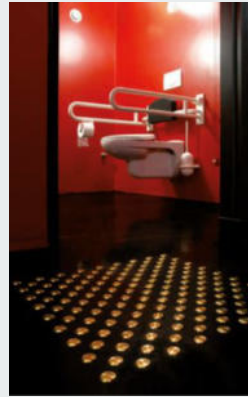
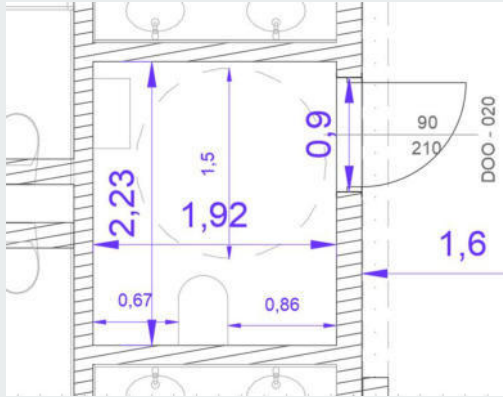


Image 1

Applied:

The door is opening outwards.

The 150x150 movement area is applied.

Has a washstand.

Missing:

The width approaching the toilet from the sides should not be less than 90 cm.

Fittings such as handrails and backrest.

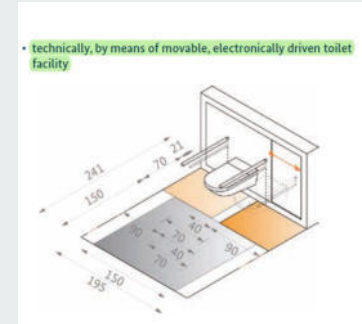
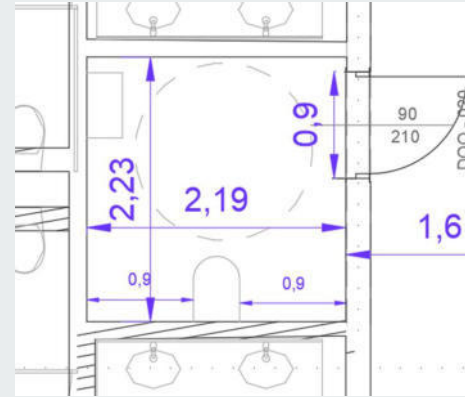


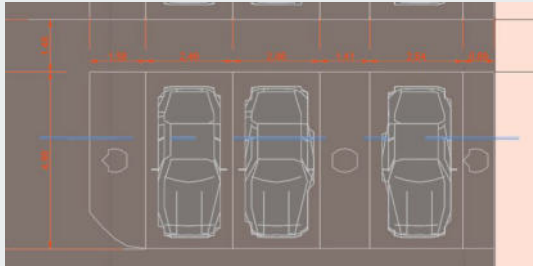
Image 2

Solution:

The toilet electronically driven movable toilet.
Or making the room bigger.

Quality Level 1 - DGNB Minimum Requirement

Dedicated circulation areas for disabled passenger car parking spaces.

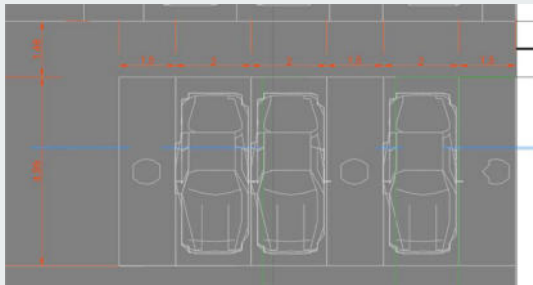


Applied:

Parking space with 2 m width and 5 m length. Free space of 1.5x1.5 m for getting in and out of.

Missing:

Some of the walkways are under 1.5 m.

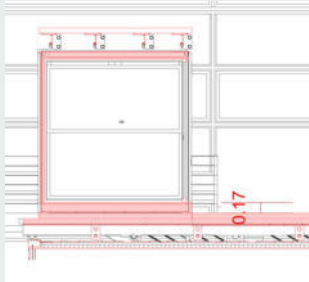


Solution:

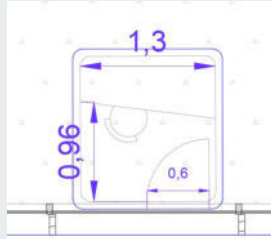
The car parking space width is bigger than 2 meters so the walkway can get bigger.

Quality Level 2

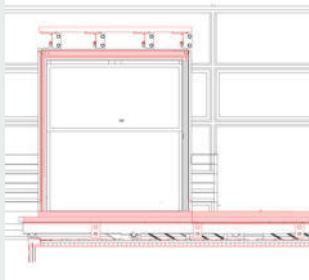
All rooms/areas dedicated to teaching, including the associated circulation and secondary areas/rooms are to be Barrier-Free.



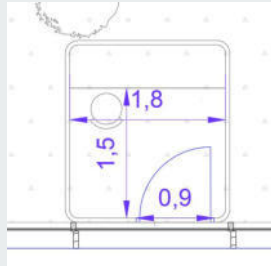
Missing:
Manoeuvring inside the room.



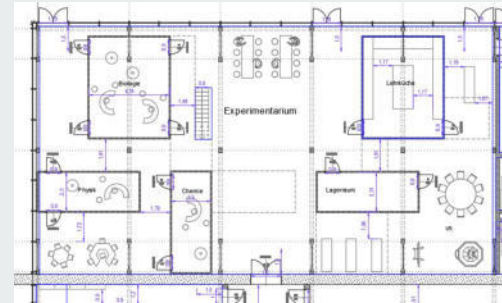
Missing:
There is a 17 cm threshold.



Solution:
Making the room floor even with the slab.



Solution:
Changing room dimensions.



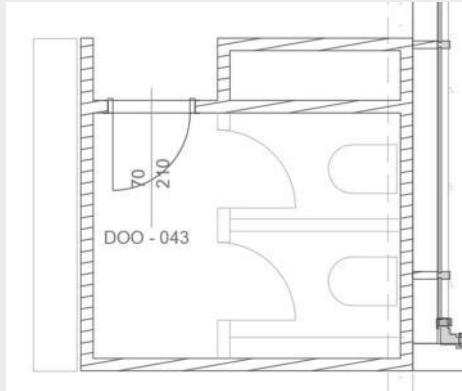
Missing:
In this classroom to arrive at the upper floor with a wheelchair, one needs to get out of the classroom and take the lift.



Solution:
Making the stair bigger and adding a wheelchair lift.

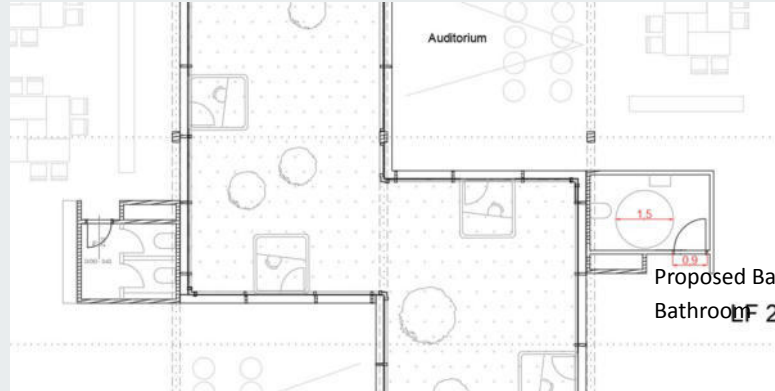
Quality Level 2

The requisite barrier-free toilet cubicles in these areas (on each of the relevant storeys) are to be barrier-free.



Missing:

Barrier Free Bathroom on second floor.



Solution:

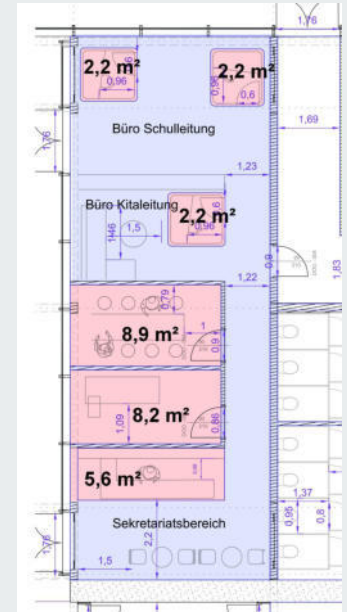
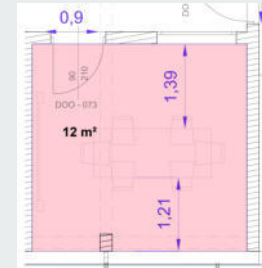
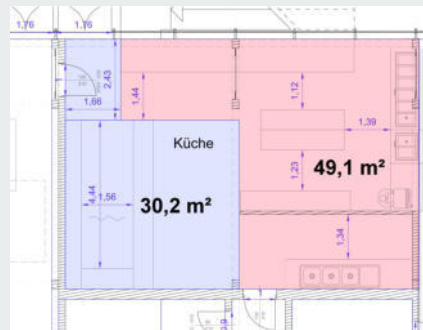
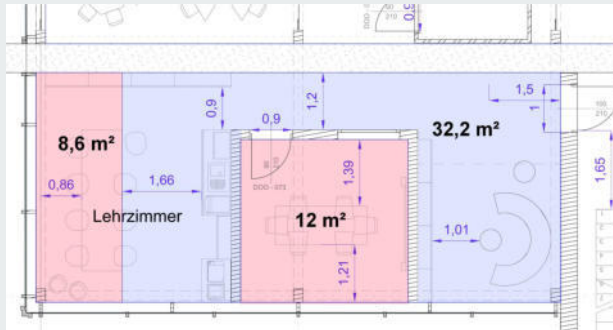
There are already 4 bathrooms. One can become barrier free.

Quality Level 3

At least 25% of the areas designated as workspaces, including the areas that are relevant for operational reasons and the associated circulation and secondary areas are to be barrier-free.

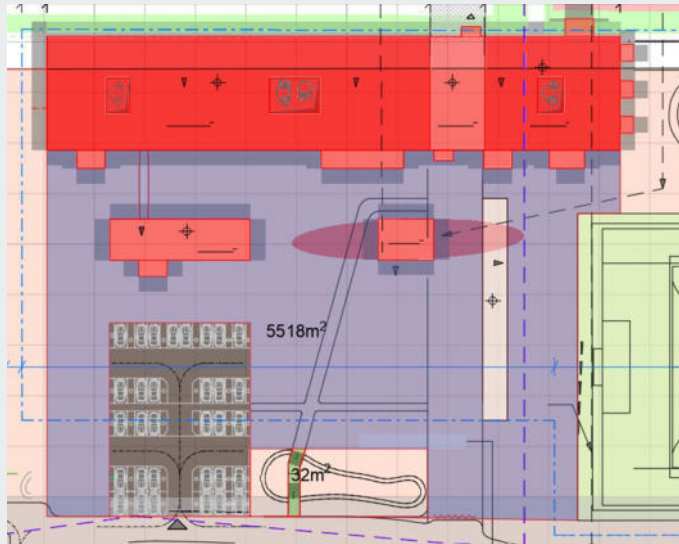
Workplace Usable Area	Barrier Free Workplace Usable Area	Percentage of Barrier Free Usable Area
382,4	271,4	70,97%
*Kitchen, Cafeteria, Administration Offices and Team Office are the workplaces		

Non - Barrier Free
 Barrier Free



Quality Level 3

At least 25% of the areas that people can traverse or spend time in outdoors (where present) to be barrier free.



Applied:

Whole area: 5550m²

Non-Barrier Free: 32m²

Barrier Free: 5518m²

%99.42 Barrier Free

Quality Level 3

At least 25% of the areas that people can traverse or spend time in outdoors (where present) to be barrier free.



Applied:

Guidance elements for circulation.



Missing:

Consistent illumination.

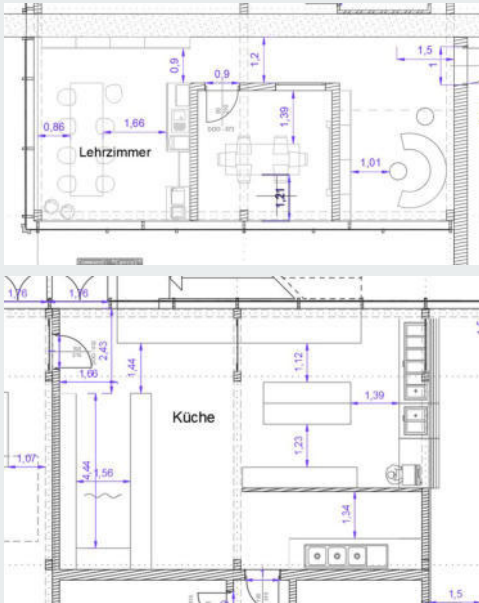


Solution:

Lighting fixtures following the paths.

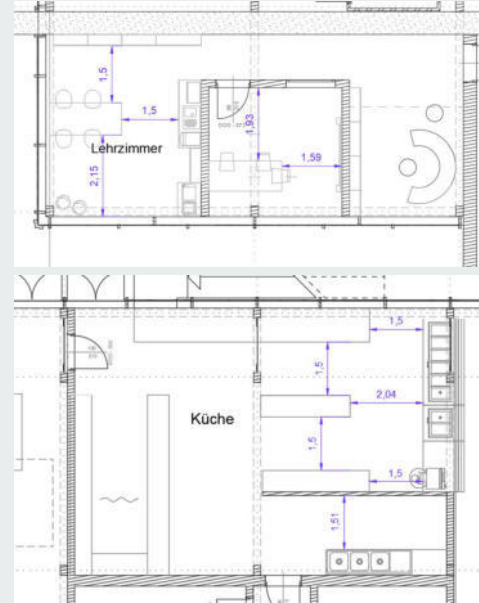
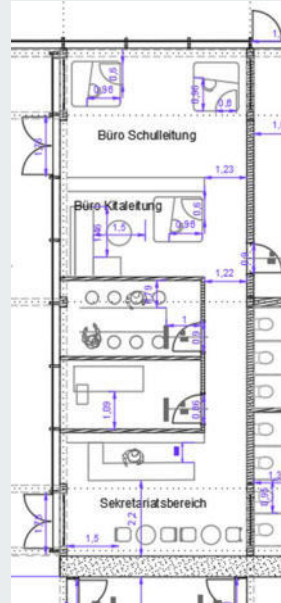
Quality Level 5

All workspaces, the related circulation and secondary areas are barrier-free.



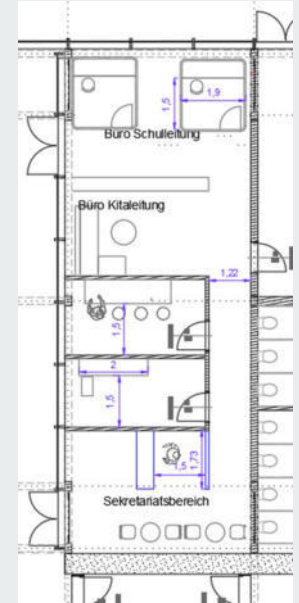
Missing:

Enough manoeuvre spaces.



Solution:

Changing furniture layout.



Final Evaluation



If the recommendations:

Regarding barrier free toilets, the slope of the ramp, walkways for car parking and the further analysis made in the attached documents are applied the building gets **10 points**.

Regarding evening out the threshold in the classroom, adjusting the room dimension, adding a wheelchair lift and placing a barrier-free bathroom on second floor the building will get **75 points**.

Regarding workplace furniture layout are applied, the building gets **100 points**.

TECHNICAL QUALITY



TEC 1.1 – Fire safety





Objective

Fire events do not only **endanger life and safety of humans and animals** but also **damage the building fabric, emit pollutants** and thus **cause harm to the environment**.

Benefits

reduce the potential loss of lives and injuries during a fire, as well as the **destruction caused by fire**, and hence the associated **repair and liability costs** in the aftermath.

It is essential to prevent the occurrence of a fire and the spread of **fire and smoke**, which will affect not just the building itself, but also its surroundings.

Equipping a building with sufficient fire safety measures will also bring **reassurance** to building users during normal operation by allaying safety concerns.

APPENDIX A – DETAILED DESCRIPTION

Indicator 1. Fire safety certificate

This indicator represents the minimum requirement for fire safety. It relates to basic fire safety features and their compliance with local building regulations. Requests for approvals of deviations from local building regulations are examined on a case-by-case basis.

Indicator 2. Additional fire safety features of the design and structure

Additional points may be allocated for each feature of the design or structure which enhances fire safety and contributes to the building exceeding minimum building regulation requirements. **additional fire safety measures** such as **smaller fire and smoke compartments, shorter escape route length or larger escape route width** can be considered to attain additional points.

Indicator 3. Additional fire safety features of the technical building

Additional points may be allocated for each technical feature of the building system which **enhances fire safety and contributes to the building exceeding the minimum building regulation requirements.**

APPENDIX B – DETAILED DESCRIPTION

Required documentation

Indicator 1. Fire safety certificate

- Summary of legal requirements and any additional conditions attached to planning permission.
- Precisely formulated fire safety concept.
- Detailed fire safety plan and compensation measures.

Indicator 2. Additional fire safety features of the design and structure

- Evidence of additional fire safety features of design and structure, including e.g. extracts from fire safety plan, drawings and specifications for additional features, or photographic evidence.

Indicator 3. Additional fire safety features of the technical building

- Evidence of additional technical fire safety features, including e.g. extracts from fire safety plan, drawings and specifications for additional features, or photographic evidence.

Evaluation

challenges

Did have the access to the building fire protection concept
local building fire protection regulations



Necessary stairs must:
§35 LBauO

- Direct access to the outdoors
- Ventilated and capable of effective smoke extraction for firefighting support
- Each floor must have an operable window or opening at the highest point.

Usage units

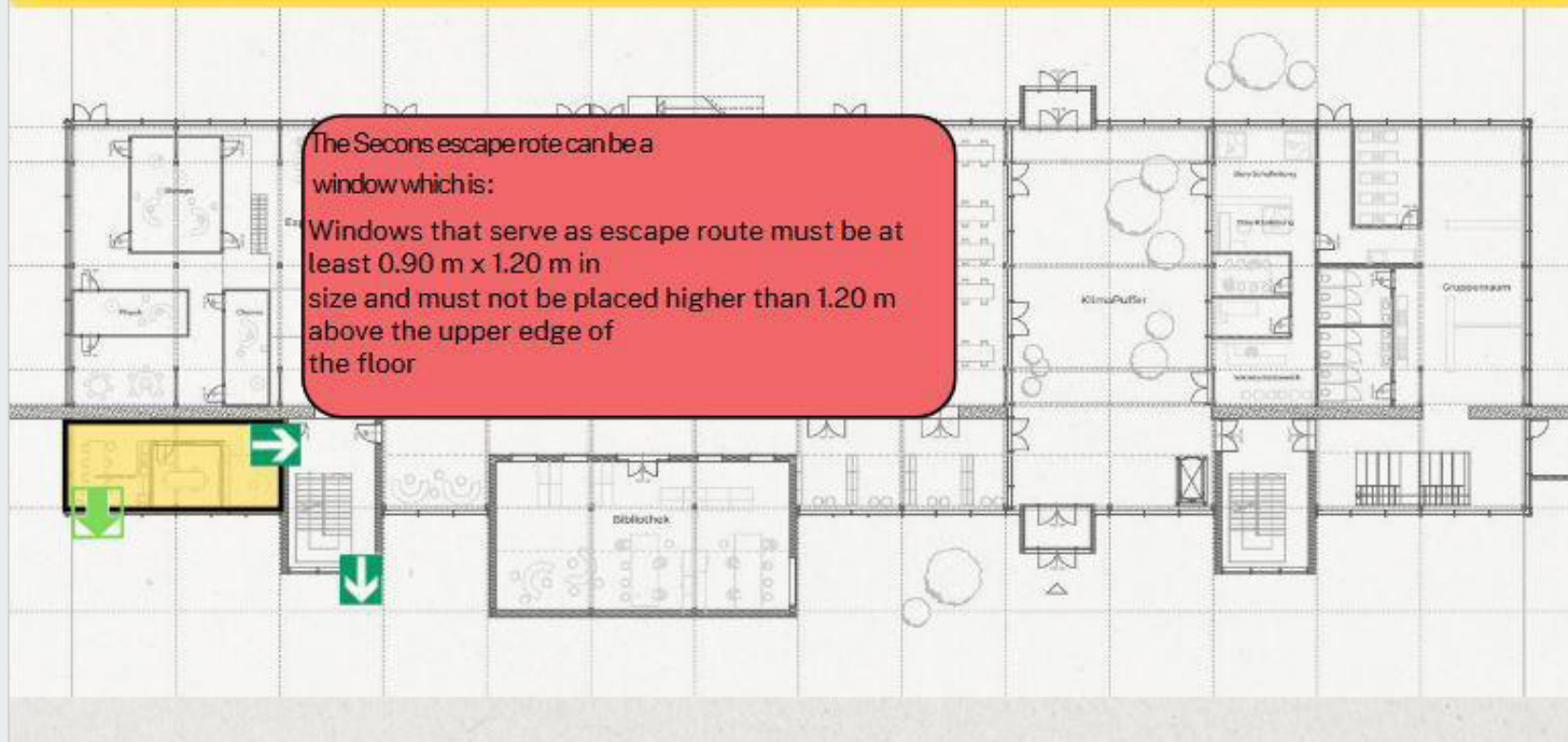
- Usage units are defined as self-contained, Areas assigned to a specific purpose

Escape route length

- From any point in a dwelling or basement, there must be at least one exit to a necessary stairwell or outdoors within a maximum distance of 35 meters.



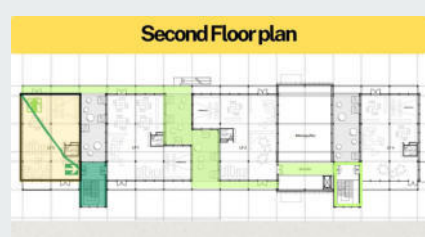
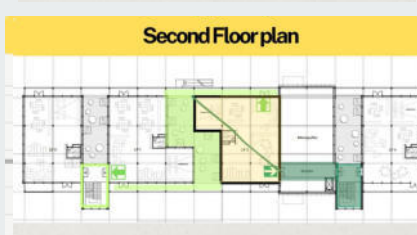
Ground Floor plan



Ground Floor plan



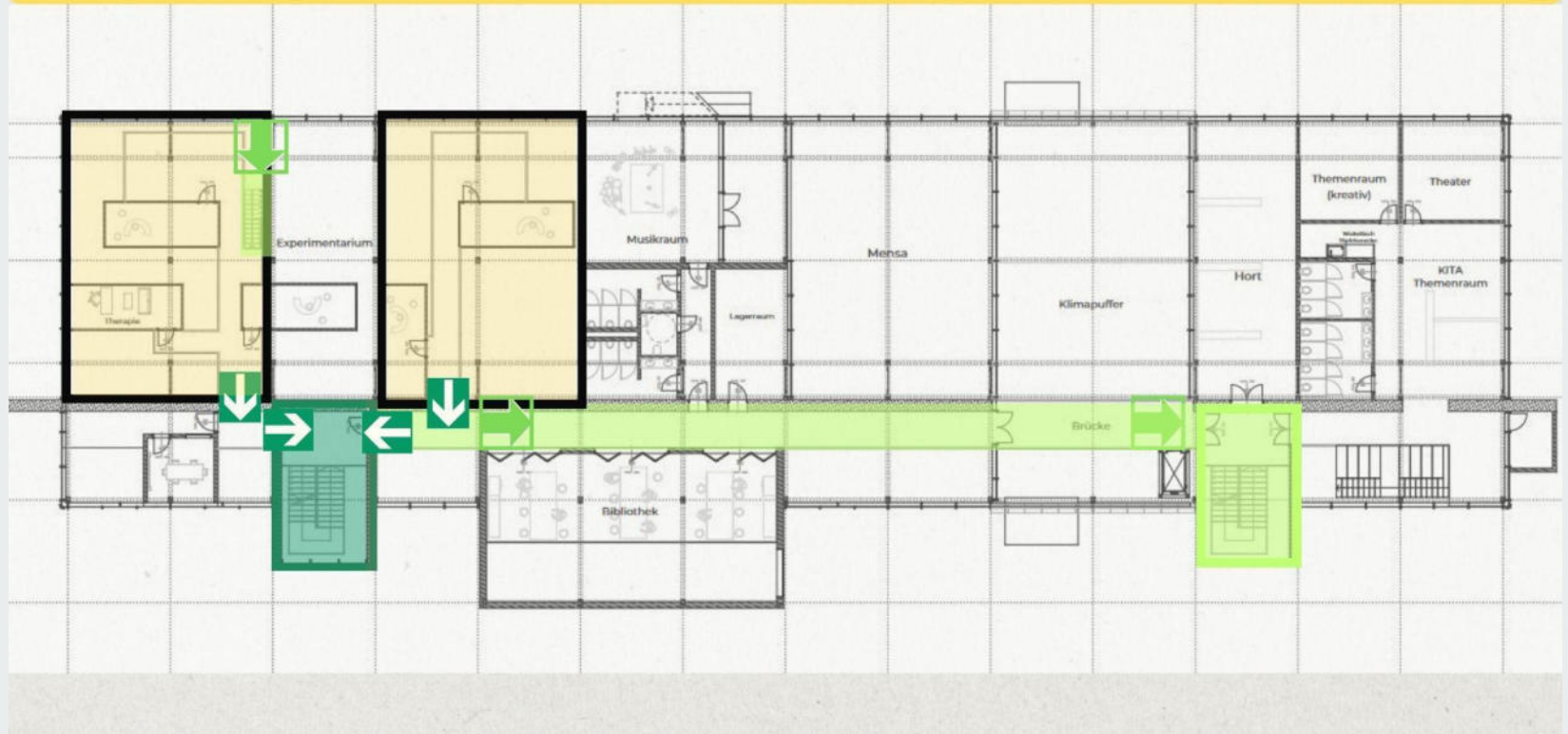
Evaluation



First Floor plan



First Floor plan



Evaluation

Gebäudeklasse GKL 3

- considering the high and the area

More than 4,000 area
the highest level is 7 meter

GKL	1	2	3	4	5
1	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).
2	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).
3	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).
4	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).
5	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).

building a building of GKL 3
in timber construction is
allowed based on LBauO



in Anzahl Gesamtzahl 3 und mehr	1	2	3	4	5
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Brandwände



Sonderbauten (§2 LBauO)

- Buildings with more than 1,600 m² floor area of the largest floor, excluding residential buildings and garages.
- Buildings with rooms that are individually intended for use by more than 100 people.



Example LBauO §31

Ceilings must act as load-bearing and space-enclosing components between floors in the event of a fire able to stand for a sufficiently long time and resistant to the spread of fire. You need to

- fire-retardant in buildings of building classes 2 and 3

Fire resistance classes

Fire retardant 30 min



Indicators

Considering the existing situation of the plan and applying the suggested fire protection the building can achieve the rate of 50 of the first indicator.



who should do the fire
protection for each
building classification?



GKL	1	2	3	4	5
1	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).
2	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).
3	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).
4	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).
5	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).	Ein- oder Zweigeschossige Gebäude mit einer Höhe bis zu 10 m (einschließlich der Dachstuhlhöhe) und einer Fläche bis zu 4.000 m ² (einschließlich der Dachstuhlfläche).

Brandwände

1) Fire walls, whether concluding buildings (building-end walls) or dividing them into fire sections (internal fire walls), must be sufficiently long to prevent the spread of fire to other buildings or fire sections.



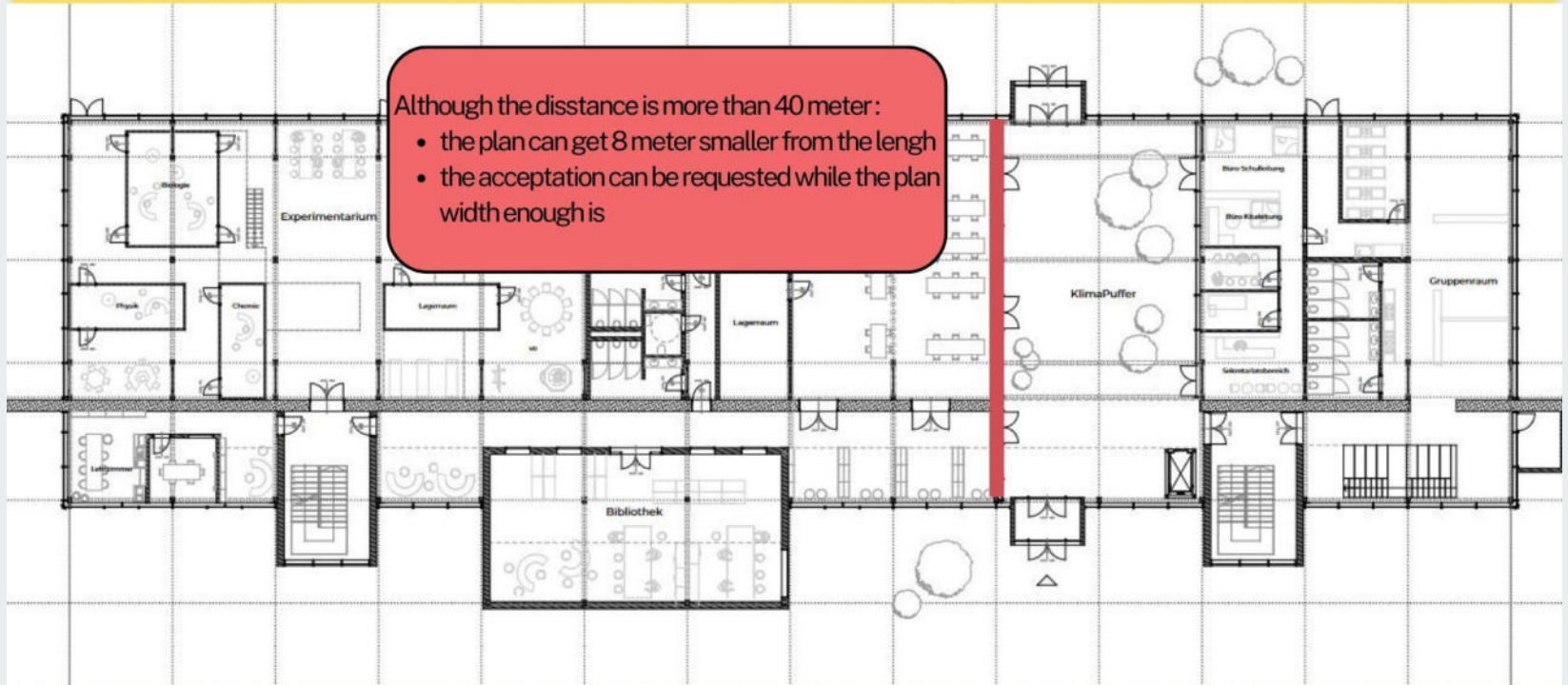
3) For buildings in classes 1 to 3, end-walls must meet fire resistance standards, both inside-out and outside-in, including fire-retardant components.



Brandwände

Although the distance is more than 40 meter :

- the plan can get 8 meter smaller from the length
- the acceptance can be requested while the plan width enough is



NO.	INDICATOR	POINTS
1	Fire safety certificate <div> Consumer market Shopping centre Department stores Logistics Production Office Education Residential Hotel Assembly buildings </div> <p>Fire safety features have been designed in accordance with the local building regulations, or deviations from local building regulations have been approved by the relevant authorities and meet the required safety level.</p>	<div>max. 50</div>



NOTE: Buildings that are without basic fire safety features and do not comply with local building regulations cannot be certified.

2 Additional fire safety features of the design and structure

Consumer market Shopping centre Department stores Logistics Production Office max. 60
Education Residential Hotel Assembly buildings

- | | |
|--|----|
| ■ Creating smaller fire and smoke compartments | 10 |
| ■ Providing direct external access to fire alarm centre and equipment room / fire brigade control panel, or fire brigade information system. | 5 |
| ■ Installing self-closing panic locks/bolts on the building entrance doors or emergency exit doors | 10 |
| ■ Providing a glass panel on all doors on escape routes | 5 |

3 Additional fire safety features of the technical building system

Consumer market	Shopping centre	Department stores	Logistics	Production	max.
Office	Education	Residential	Hotel	Assembly buildings	100
<hr/>					
■ Installing a dynamic escape and rescue guidance system					12.5
<hr/>					
■ Increasing illumination of safety lighting (at least 10 Lux)					7.5
<hr/>					
■ Fitting smoke extraction systems with air vents / air supply apertures that open automatically.					7.5
<hr/>					
■ Installing an additional (i.e. not required) automatic fire extinguishing system (e.g. sprinkler system)					12.5



TEC 1.2 Sound insulation

Sound Isolation



Objective

Ensuring sound insulation that is appropriate for the room usage type prevents excessive disturbances.

Benefits

Reducing disruptive noises has a significant impact on the well-being and satisfaction of users in a building. Good sound insulation enables users to concentrate better, helps ensure their privacy, provides them with better peace and quiet, and positively impacts their living comfort and health.

Contribution to overriding sustainability goals

CONTRIBUTION TO SUSTAINABLE DEVELOPMENT GOALS (SDGS) OF UNITED NATIONS (UN)

CONTRIBUTION TO GERMAN SUSTAINABILITY STRATEGY

Sound Isolation

Outlook There are currently no plans to make any of the requirements stricter.

Share of total score

				SHARE	WEIGHTING FACTOR
Office	Education	Residential	Hotel	1.9%	3
Consumer market	Shopping centre			0.0%	0
Department stores	Logistics				
Production					
Assembly buildings				1.3%	2

Sound Isolation



EVALUATION

The evaluation is based on the least favourable indoor situation. The sound insulation requirements in each case must always be met by all components in order to ensure that the corresponding quality level is reached. In this criterion, a total of 115 points can be achieved (100 points for Residential and Assembly buildings Type II) but only a maximum of 100 points can actually be awarded. Assembly buildings are divided into different building types with regard to the assessment. These are under the chapter "IV. Usage-specific description" described.

No requirement/evaluation for Consumer market Department stores Shopping centre Logistics Production

1 Airborne sound insulation between rooms

Within the room's own area – partition walls R'_w and corridor doors

1.1

 R_w

Office

Max. 20

Assembly buildings Type I

Max. 30

Rooms with normal requirements

Office

+Max. 10

Assem.Type I

+Max. 15

Partition walls R'_w Doors R_w ■ ≥ 37 dB ≥ 27 dB

Office

5

Assem.Type I

7,5

■ ≥ 42 dB ≥ 32 dB

Office

7,5

Assem.Type I

10

■ ≥ 45 dB ≥ 37 dB

Office

10

Assem.Type I

15

Rooms with increased requirements

+Max. 10

Assem.Type I

+Max. 15

Partition walls R'_w Doors R_w ■ ≥ 42 dB ≥ 32 dB

Office

5

Assem.Type I

7,5

■ ≥ 45 dB ≥ 37 dB

Office

7,5

Assem.Type I

10

■ ≥ 50 dB ≥ 42 dB

Office

10

1.2 Partition walls R'w and doors Rw

Office

Insulation against noise from other areas – Partition walls R'w	Max. 10
■ Minimum requirements in accordance with DIN 4109-1* (53 dB)	5
■ As above, but with over-fulfilment by 2 dB (≥ 55 dB)	7.5
■ As above, but with over-fulfilment by 2 dB (≥ 57 dB)	10

Hotel

Partition walls R'w (of hotel rooms)	Max. 40
	+Max. 20
■ Minimum requirements in accordance with DIN 4109-1* (47 dB)	5
■ As above, but with over-fulfilment by 3 dB (≥ 50 dB)	10
■ As above, but with over-fulfilment by 3 dB (≥ 53 dB)	15
■ As above, but with over-fulfilment by 3 dB (≥ 56 dB)	20
Doors Rw (from hotel rooms to corridors)	+Max. 20
■ Minimum requirements in accordance with DIN 4109-1* (32 dB)	7.5
■ As above, but with over-fulfilment by 5 dB (≥ 37 dB)	15
■ As above, but with over-fulfilment by 5 dB (≥ 42 dB) or alternatively a design of a closed corridor/hallway	20

Note: * Requirements and calculation methods to be applied in accordance with the valid building regulations. DIN 4109-1: 2016-07 or 2018-01, calculation method DIN EN 12354-1 or equiv.

Education

Insulation against noise from classrooms	Max. 35
Insulation against noise from other areas – Partition walls R'w	
■ Minimum requirements in accordance with DIN 4109-1 (47 dB)	20
■ As above, but with over-fulfilment by 3 dB (≥ 50 dB)	35



NAVIGATION

BERECHNUNGSPROTOKOLL

INNERWALLCLAY(INNERWALLCLAY).DWB

BERECHNUNGSOPTIONEN

- Projekt
- Bauteile
- Wärmebrücken
- Feuchteschutz
- Faltmodelle
- Gebäudebilanz 18599
- Ökobilanz
- Energieberatung
- DIN V 4108-6
- DIN V 4701-10
- Übersichten
- Lüftungskonzept
- Heizlastberechnung
- Simulation zur Bedarfsdeckung
- thermische Simulation 13791
- Gebäudesimulation VDI 6007
- Schallschutz
 - Schallschutz
 - 3.0 Wandbauteil "INNER WALL"
 - 3.1 Bau-Schalldämm-Maße na
 - 3.9 Anforderungen an die Luft
 - 3.10 Nachweis
- Raumakustik
- Brandschutz
- Brandschutzkonzepte
- Einstellungen

3.1.5 Flankierende Bauteile in Leichtbauweise (Ref-No 3.1.5)

flankierende Bauteile

 l_f
m $D_{n,f,w}$
dB $R_{f,w}$
dB

06 xxx

l_f = gemeinsame Kantenlänge zwischen flankierendem und trennendem Bauteil
 l_{lab} = Bezugskantenlänge = 2,8 m für Längswände, 4,5 m für Decken
 S_s = Fläche des trennenden Bauteils [m²]
 $D_{n,f,w}$ = bewertete Norm-Schallpegeldifferenz des flankierenden Bauteils (tabelliert)
 $R_{f,w}$ = Bewertetes Flankendämm-Maß Ff nach T2, $GL23 = D_{n,f,w} + 10 \cdot \log(l_{lab}/l_f) + 10 \cdot \log(S_s/10)$
Die Schallnebenwege Fd und Df werden nicht beachtet (Leichtbauweisen)

3.1.6 bewertetes Bau-Schalldämm-Maß (Ref-No 3.1.6)

$$R'_w = -10 \cdot \log(10^{-RDd,w/10} + \sum_{1,n} 10^{-R_{f,w}/10} + \sum_{1,n} 10^{-RDf,w/10} + \sum_{1,n} 10^{-R_{f,d,w}/10}) = 22.2 \text{ dB (T2 Gl.1)}$$

relevante Übertragungswege: $RDd=100\%$

3.1.7 Rechenwert Bau-Schalldämm-Maß (DIN 4109:2018) (Ref-No 3.1.7)

$$\text{vorh } R'_{w,R} = R'_w - 2.0 \text{ dB} = 24.2 \text{ dB (T2 Gl.45)} \text{ als Vergleichswert}$$

Standard-Schallpegeldifferenz zwischen Sende- und Empfangsraum
 $D_{nT,w} = -22.200000000 + 10 \cdot \log(0.32 \cdot 41.60/10.40) = -21.1 \text{ dB (T2, Gl.B.1)}$

35 point

Schallschutz

▼ Grafik: 1 Bauteilquer

- ☐ 0 ohne
- ☒ 1 Bauteilquersch
- ☐ 2 Raumskizze (E)
- ☐ 3 Messkurven (IS
- ☐ 4 Nachhallzeit (E
- ☐ 5 erläuternde Gr

- > nach DIN 4109:2018
- > nach DIN 4109:1989
- > nach E DIN 4109:20
- > nach DIN EN 12354
- > besondere Berechn
- > Außenlärmpegel ern
- > § Nachweis
- > ▶ Aktionen
- > ▶ Einstellungen



HINWEISE

Berechnungsblatt
(3) Schallschutz

PROBLEM:

Zeichen "D" in
der
Berechnungsform
el: $<DNFW6+10^*$
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 $00E+0000+10^*$
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 $04E-0002 > \dots **$
3.1.5
Flankierende
Bauteile in
Leichtbauweise

Sicherheitsbeiwert
für
Außenwände mit
Türen
flächenanteilig
aus Wand und
Tür [dB] ...



1.3 Separating ceilings R'_w

Office Assembly buildings Type I

Separating ceilings in their own areas and other areas R'_w **Max. 10**

- Requirements in accordance with DIN 4109* (≥ 54 dB) 5
- As above, but with over-fulfilment by 2 dB (≥ 56 dB) 7.5
- As above, but with over-fulfilment by 2 dB (≥ 58 dB) 10

Education Hotel*

Max. 20

Separating ceilings between common rooms R'_w **7.5**

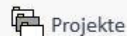
- Requirements in accordance with DIN 4109* (≥ 54 dB Hotel), (≥ 55 dB Education) 15
- As above, but with over-fulfilment by 2 dB (≥ 56 dB) 20
- As above, but with over-fulfilment by 2 dB (≥ 58 dB)

1.4 Standard flanking transmission level difference $R_{l,w,R}$ or $D_{n,f,w,R}$

Office Assembly buildings Type I

$R_{l,w,R}$ or $D_{n,f,w,R}$ applies for all flanking components (floor, ceiling, façade) for each partition wall grid **Max. 15**

- ≥ 42 dB 5
- ≥ 47 dB 10
- ≥ 50 dB 15



Projekte



Bauteile



NAVIGATION

BERECHNUNGSPROTOKOLL

Deckenachoben-allstandard-eckenaufbau(Deckenachoben-allstandard-eckenaufbau).DWB

BERECHNUNGSOPTIONEN

- Projekt
- Bauteile
- Wärmebrücken
- Feuchteschutz
- Faltmodelle
- Gebäudebilanz 18599
- Ökobilanz
- Energieberatung
- DIN V 4108-6
- DIN V 4701-10
- Übersichten
- Lüftungskonzept
- Heizlastberechnung
- Simulation zur Bedarfsdeckung
- thermische Simulation 13791
- Gebäudesimulation VDI 6007
- Schallschutz
 - Schallschutz
 - 3.0 Deckenbauteil "Decke nach
 - 3.1 Bau-Schalldämm-Maße na
 - 3.9 Anforderungen an die Luft:
 - 3.10 Nachweis
- Raumakustik
- Brandschutz
- Brandschutzkonzepte
- Einstellungen

3.1.5 Flankierende Bauteile in Leichtbauweise (Ref-No 3.1.5)

flankierende Bauteile

lf

m

Dn, f, w

dB

Rff, w

dB

06 xxx

lf = gemeinsame Kantenlänge zwischen flankierendem und trennendem Bauteil

l_{lab} = Bezugs-kantenlänge = 2,8 m für Längswände, 4,5 m für DeckenS_s = Fläche des trennenden Bauteils [m²]D_{n, f, w} = bewertete Norm-Schallpegeldifferenz des flankierenden Bauteils (tabelliert)Rff, w = Bewertetes Flankendämm-Maß Ff nach T2, Gl.23 = D_{n, f, w} + 10*LOG(l_{lab}/lf) + 10*LOG(S_s/10)

Die Schallnebenwege Fd und Df werden nicht beachtet (Leichtbauweisen)

3.1.6 bewertetes Bau-Schalldämm-Maß (Ref-No 3.1.6)

$$R'_w = -10 \cdot \log(10^{-RDd, w/10} + \sum_{1, n} 10^{-Rf, w/10} + \sum_{1, n} 10^{-RDf, w/10} + \sum_{1, n} 10^{-Rfd, w/10}) = 20.2 \text{ dB (T2 Gl.1)}$$

relevante Übertragungswege: RDd=100%

3.1.7 Rechenwert Bau-Schalldämm-Maß (DIN 4109:2018) (Ref-No 3.1.7)

vorh $R'_{w, R} = R'_w - 2.0 \text{ dB} = 2.2 \text{ dB (T2 Gl.45)}$ als Vergleichswert

Standard-Schallpegeldifferenz zwischen Send- und Empfangsraum

$$D_{nT, w} = -20.200000000 + 10 \cdot \log(0.32 \cdot 41.60/16.00) = -21.0 \text{ dB (T2, Gl.B.1)}$$

7.5 point

Schallschutz

Grafik: 0 ohne

nach DIN 4109:2018

- ☐ 1 flächenbezogen
- ☒ 2 vorh Rw des G
- ☒ 3 flankierende B
- ☒ 4 flankierende B
- ☐ 5 Trittschallpege
- ☐ 6 nur vorhRw be

nach DIN 4109:1989

nach E DIN 4109:20

nach DIN EN 12354 //

besondere Berechnu

Außenlärmpegel ern

Nachweis

Aktionen

Einstellungen



HINWEISE

eckenaufbau
(Deckenachoben-
allstandard-
eckenaufbau).D
WB" wurde
geladen

//
Berechnungsblatt
(3) Schallschutz

PROBLEM:

Zeichen "D" in
der
Berechnungsform
el: <DNFW6+10*
0.000000000000
00E+0000+10*
2.041199826559
25E-0001> ... **
3.1.5
Flankierende
Bauteile in
Leichtbauweise



Type here to search



3°C Bewölkt



ENG

6:39 PM

1/21/2024

2 Footfall sound insulation

2.1 Footfall sound insulation of dividing ceilings and stairs

Office Education Assembly buildings Type I

5 point

2.1.1 In its own area (use of the same building)

Requirement $L'_{n,w}$ – Horizontal Requirement $L'_{n,w}$ – Vertical

■ ≤ 60 dB ≤ 53 dB

Max. 15

5

Note: * Requirements and calculation methods to be applied in accordance with the valid standard DIN 4109-1: 2016-07 or 2018-01, calculation method DIN EN 12354-2 or equiv.

Office Education Assembly buildings Type I

2.1.2

Insulation against noise from other areas (insulation against noise from other usages and from leasing of space)

Max. 15

- Minimum requirements in accordance with DIN 4109-1:* (≤ 53 dB) 5
- Increased sound insulation in accordance with Supplement 2 to DIN 4109 (≤ 46 dB) 10
- Increased sound insulation in accordance with Supplement 2 to DIN 4109, over-fulfilment by 3 dB (≤ 43 dB) 15

5 point

Hotel

Insulation against noise from other areas (insulation against noise from other usages and from leasing of space) **Max. 20**

- Minimum requirements in accordance with DIN 4109-1:* (≤ 53 dB) 7.5
- Increased sound insulation in accordance with Supplement 2 to DIN 4109 (≤ 46 dB) 15
- Increased sound insulation in accordance with Supplement 2 to DIN 4109, over-fulfilment by 3 dB (≤ 43 dB) 20

3 Airborne sound insulation

3.1 Airborne sound insulation against external noise

Office Education Hotel Assembly buildings Type I

5 point

Max. 15

- | | | |
|---|--|----|
| ■ | DIN 4109-1:* fulfilled, see Appendix 1 | 5 |
| ■ | DIN 4019-1:* over-fulfilment by 3 dB, see Appendix 1 | 10 |
| ■ | DIN 4019-1:* fulfilled, with Ctr. 100 – 5000, see Appendix 1 | 15 |

Note: * Requirements and calculation methods to be applied in accordance with the valid standard DIN 4109-1: 2016-07 or 2018-01, calculation method DIN EN 12354-3 or equiv.

4 Airborne sound insulation against noise from building services installations (water installations, other building services)

4.1 Airborne sound insulation against building services installations

Office Education Assembly buildings Type I

Max. 15

- | | | |
|---|--|----|
| ■ | DIN 4109-1:* fulfilled, see Appendix 1 | 5 |
| ■ | DIN 4109-1:* over-fulfilment by 3 dB | 10 |
| ■ | DIN 4109-1:* over-fulfilment by 5 dB | 15 |

Hotel

Max. 20

- | | | |
|---|--|-----|
| ■ | DIN 4109-1:* fulfilled, see Appendix 1 | 7.5 |
| ■ | DIN 4109-1:* over-fulfilment by 3 dB | 15 |
| ■ | DIN 4109-1:* over-fulfilment by 5 dB | 20 |

Note: * Requirements and calculation methods to be applied in accordance with the valid standard DIN 4109-1: 2016-07 or 2018-01, calculation method DIN EN 12354-5 or equiv.

5 Sound insulation in residential buildings

5.1 Sound insulation requirements

Residential

Max. 100

Creation of a concept plan for reducing disruptive noises, at least in the service phase	50
--	----

4 of the project at the latest.

The service phases described under the chapter "terms and definitions" (T&D_01) of the document "Evaluation and structure of the DGNB system".

The sound insulation concept has been implemented.

100

6 Sound insulation for special building types

6.1 Sound insulation concept plan

Max. 100

Assembly buildings Type II

Creation of a concept plan for reducing disruptive noises where the following aspects have to be considered:

- Indoor noise level, consideration through the structural sound insulation and the sound radiation of technical installations (if necessary, with allocation) +20
- Airborne sound insulation of wall and ceiling constructions +20
- Impact (footfall) sound insulation of ceiling structures, stairs +20
- Airborne sound insulation against outside noise +20
- building services systems +20

APPENDIX A – DETAILED DESCRIPTION

II. Additional explanation

As long as sound insulation is over and above the minimum requirements of DIN 4109, it is evaluated positively. Sound insulation measures should however still remain within a reasonable extent. Hence this criterion assesses whether requirements for sound insulation towards third party living and work spaces are met.

Retrospective improvements to sound insulation on existing structures are not possible or only possible to a limited extent. Therefore, decisions in the project development and planning phase are essential for the eventual fulfilment of sound insulation requirements.

III. Method

Assessment of the sound insulation quality of the building components is based on the sound insulation documentation referring to the requirements of DIN 4109 and Supplement 2 of DIN 4109 whereby following aspects have to be considered:

- Airborne sound insulation against noise from residential and work rooms, within their own areas and in other areas (walls, doors, ceilings)
- Footfall sound insulation against noise from residential and work rooms, within their own areas and in other areas (separating ceilings, staircases, landings)
- Airborne sound insulation against external noise (such as traffic noise)
- Airborne sound insulation against noise from building services installations (water installations, other building services)

Compliance with the requirements must be verified by providing mathematical documentation of the sound insulation and assessing the level of sound insulation provided by the planned components. All components must meet the relevant requirements. Sound insulation must be measurable during the construction. The calculation and documentation processes are based on the calculation methods from commonly recognised regulations.

Indicator 1.2: Partition walls R'_w and doors R_w

Education

Insulation against noise from classrooms

For partition walls and doors in classrooms, the requirements in accordance with DIN 4109 for "schools and comparable educational establishments" apply for office and meeting rooms as per the requirements in accordance with Supplement 2 to DIN 4109, Table 3. Over-fulfilment of the requirements between normal classrooms by 3 dB and for increased requirements for office partition walls with normal activities is evaluated positively.

Please note: For classrooms with very high requirements (music and lecture halls), over-fulfilment of the objective by 3 dB is generally not feasible. In this case, it can generally be recognised as an over-fulfilment of 3 dB for partition walls between (normal) classrooms.

1.3 Separating ceilings R_w

Education

Hotel

Separating ceilings and ceilings R'_w (between hotel rooms)

The minimum requirements in accordance with DIN 4109 apply for separating ceilings and ceilings of hotel rooms and classrooms. Over-fulfilment of the minimum requirements is evaluated positively.

1.4 Standard sound level difference $R_{L,w,R}$ or $D_{n,f,w,R}$
The standard sound level difference or the linear sound reduction measurement are important parameters for assessing flexible office room design. If the $R_{L,w,R}$ or $D_{n,f,w,R}$ meets the increased requirements for all flanking components (floor, ceiling, façade) for each partition wall grid, this is evaluated positively.



Projekte



Bauteile



NAVIGATION

BERECHNUNGSPROTOKOLL

Außenwand(Wandaufbau-allstandard).DWB

BERECHNUNGSOPTIONEN

- Projekt
- Bauteile
 - Wärmebrücken
 - Feuchteschutz
 - Faltmodelle
 - Gebäudebilanz 18599
 - Ökobilanz
 - Energieberatung
 - DIN V 4108-6
 - DIN V 4701-10
 - Übersichten
 - Lüftungskonzept
 - Heizlastberechnung
 - Simulation zur Bedarfsdeckung
 - thermische Simulation 13791
 - Gebäudesimulation VDI 6007
 - Schallschutz
 - Schallschutz
 - 3.0 Wandbauteil "Außenwand"
 - 3.1 Bau-Schalldämm-Maße na
 - 3.9 Anforderungen an die Luft:
 - 3.10 Nachweis
 - Raumakustik
 - Brandschutz
 - Brandschutzkonzepte
 - Einstellungen

Übertragungsweg

lf

m

R_{i,w}

dB

R_{j,w}

dB

ΔR_{ij,w}

dB

K_{ij}

dB

R_{ij,w}

dB

Weg Ff

Ff = Übertragungsweg flankierendes Bauteil im Senderraum ⇒ flankierendes Bauteil im Empfangsraum

lf = gemeinsame Kantenlängen und K_{ij} = Stoßstellendämm-Maße zum ÜbertragungswegR_{i,w} / R_{j,w} = Schalldämm-Maße der flankierenden Bauteile im Sende- und EmpfangsraumΔR_{ij,w} = bewertete Verbesserung der Schalldämm-Maße durch raumseitige Vorsatzschalen nach T2 Abs.4.2.2.1K_{ij} = Stoßstellendämm-Maße nach T32, Gl.24 ff, Mindestwert nach T2 Gl.17R_{ij,w} = R_{i,w} / 2 + R_{j,w} / 2 + ΔR_{ij,w} + K_{ij} + 10 * LOG(S_s / (l₀ * lf)) = bewertete Flankenschalldämm-Maße (T2 Gl.10)

3.1.5 Flankierende Bauteile in Leichtbauweise

(Ref-No 3.1.5)

nicht relevant (Schutz gegen Außenlärm)

3.1.6 bewertetes Bau-Schalldämm-Maß

(Ref-No 3.1.6)

$$R'_{w} = -10 \cdot \text{LOG} \left(\frac{\Sigma 10^{-R_{e,i,w}/10} + \Sigma_{1,n} 10^{-R_{Ff,w}/10} + \Sigma_{1,n} 10^{-R_{Df,w}/10} + \Sigma_{1,n} 10^{-R_{Fd,w}/10}}{\Sigma_{1,n} 10^{-R_{Ff,w}/10} + \Sigma_{1,n} 10^{-R_{Df,w}/10} + \Sigma_{1,n} 10^{-R_{Fd,w}/10}} \right) = 38,0 \text{ dB (T2 Gl.34)}$$

relevante Übertragungswege: Re=100%

3.1.7 Rechenwert Bau-Schalldämm-Maß (DIN 4109:2018)

(Ref-No 3.1.7)

vorh R'_{w,R} = R'_{w} - 2,0 dB = 36,0 dB (T2 Gl.45) als Vergleichswert

Schallschutz

Gratik: 0 ohne

nach DIN 4109:2018

☐ 1 flächenbezogen☒ 2 vorh Rw des G☒ 3 flankierende B☒ 4 flankierende B☒ 5 Trittschallpe☐ 6 nur vorhRw be

nach DIN 4109:1989

nach E DIN 4109:20

nach DIN EN 12354

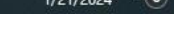
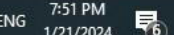
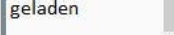
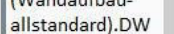
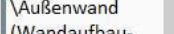
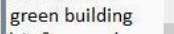
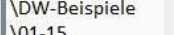
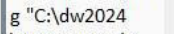
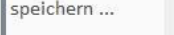
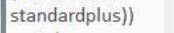
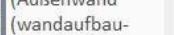
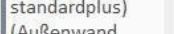
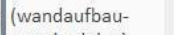
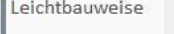
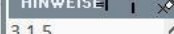
besondere Berechn

Außenlärmpegel ern

Nachweis

Aktionen

Einstellungen



Type here to search



4°C Bewölkt



7:51 PM

1/21/2024



Indicator 2: Footfall sound insulation

Indicator 2.1: Footfall sound insulation of dividing ceilings and stairs

Rooms in their own areas and in other areas are taken into account differently in this scheme.

Office Education Hotel

In its own area (use of the same building)

For the evaluation of the footfall sound insulation of dividing ceilings and stairs in the same area, different requirements apply regarding the evaluated $L'_{n,w}$ – horizontal and $L'_{n,w}$ – vertical standard footfall sound levels.

Indicator 3: Airborne sound insulation

Indicator 3.1: Airborne sound insulation against external noise

Office Education Hotel

The requirements in accordance with DIN 4109 apply for the evaluation of airborne sound insulation against external noise.

Airborne sound insulation against external noise that is 3 dB better than the requirements of DIN 4109 or documentation of better airborne sound insulation taking into account the spectrum adaptation value for traffic noise (C_{tr} in accordance with DIN 717) in the frequency range of 100 to 5000 Hz is evaluated positively. The spectrum adaptation value only applies to transparent components (windows).

If there is significant noise pollution from external noise (above significant threshold of > 66 dB(A)), ventilation that is not reliant on windows is necessary for the proper evaluation of the sub-target value and target value.

This generally means that a mechanical ventilation system is required.

APPENDIX 1

Requirements in accordance to the DIN 4109

Airborne sound insulation against outside external noise

„Relevant external noise level“ in dB	Room types		
	Bedded rooms in hospitals and sanatoriums	Sitting rooms in apartment, overnight stays rooms in accommodation establishments, <u>teaching rooms and similar</u>	Office spaces and similar
	<u>R'_w total of outdoor components in dB</u>		
<u>to 55</u>	35	30	—
56 to 60	35	30	30
61 to 65	40	35	30
66 to 70	45	40	35
71 to 75	50	45	40
76 to 80	b	50	45
> 80	b	b	50

Maximum permissible A-evaluated sound pressure level in protection required external rooms, generated by technical buildings equipment and structurally with the building related usage	Column	1	2	3	4
Row	Noise sources	Maximum permissible A-evaluated sound pressure level dB			
		Living spaces and bedrooms		Teaching- und workrooms	
1	Sanitary equipment/water installations (Water supply and wastewater system collectively)	$L_{AF,max,n} \leq 30^{a,b,c}$		$L_{AF,max,n} \leq 35^{a,b,c}$	

Requirements for Maximum permissible A-evaluated sound pressure level in protection required rooms, in the same apartment, generated by air conditioning systems in the same living area

Column	1	2	3
Row	Noise sources	Maximum permissible A-evaluated sound pressure level dB	
		Living spaces and bedrooms	Kitchen
1	Permanently installed sound sources of air conditioning systems in the same living- and workspace	$LAF,max,n \leq 30^{a,b,c,d}$	$LAF,max,n \leq 33^{a,b,c,d}$



TEC 1.3 Quality of the building envelope

Ensure high thermal comfort with the lowest possible energy demand

Evaluation:

Heat transfer

Heat transfer coefficients

Evaluation of the indicator is not possible (see

Appendix A Detailed description)

Office Education Shopping centre Department stores

Logistics Production Hotel Assembly buildings

Consumer market

Opaque exterior components *

Transparent exterior components *

Curtain wall

Glass roofs, strip lights, skylights

Opaque exterior components *

Transparent exterior components *

Curtain wall

Glass roofs, strip lights, skylights

Opaque exterior components *

Transparent exterior components *

Curtain wall

Glass roofs, strip lights, skylights

For: Consumer market

U values: 0

W/(m²·K)

Max. 40

Max. 45

≤ min. country
specific
mandatory
requirement

-15% of the 30

min.

mandatory

U-Value

-30% of the 40

min.

mandatory

U-Value -

45

Indicator 1: Heat transfer

In order to prevent damage in the long term, the building envelope must always be designed to ensure that only noncritical amounts of condensation water occur in the envelope surface components.

Table 1: Optional **U - Values** (minimum requirement) for the various climatic zones

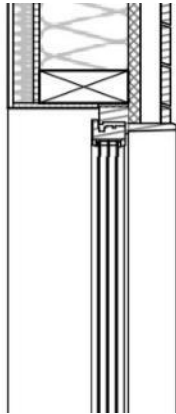
	Climate Zones:						
	Arctic	Cold	Cool, temperate	Warm, temperate	Warm	Hot	Very hot
Heat transfer							
Non-residential							
W/(m ² ·K)							
Opaque exterior components	0.25	0.30	0.35	0.50	0.75	0.75	0.50
Transparent exterior components	0.90	1.30	1.70	2.00	2.30	2.30	2.00
Curtain wall	0.90	1.30	1.70	2.00	2.30	2.30	2.00
Glass roofs, skylights etc.	1.50	2.00	2.80	3.00	3.30	3.30	3.00
Transmission heat loss H_T							
Residential							
W/(m ² ·K)							
Freestanding A _N < 350 m ² of the façade area	0.35	0.40	0.45	0.60	0.90	0.90	0.60
Freestanding A _N > 350 m ² of the façade area	0.45	0.50	0.55	0.80	1.20	1.20	0.80
Semi-detached	0.40	0.45	0.50	0.70	1.10	1.10	0.70
Other	0.50	0.60	0.70	1.05	1.50	1.50	1.05
Heat transfer							
(indoor air temperature between 12 °C and 19 °C)							
Logistic/Production							
W/(m ² ·K)							
Opaque exterior components	0.40	0.50	0.55	0.80	1.20	1.20	0.80
Transparent exterior components	1.65	2.35	3.00	3.50	4.00	4.00	3.50
Curtain wall	1.70	2.40	3.30	3.70	4.10	4.10	3.70
Glass roofs, skylights etc.	1.90	2.50	3.40	3.90	4.25	4.25	3.90

Transparent exterior components :

Min requirement= 1.30

Surface Area=1724 m²

U value= 0,80 w/km



Wall structure
from pdf
similar to dataholz.eu awrhh07a-
03 U 0.16 W/m K²
REI 60 from the
inside REI 30
from the outside
R_w 51 db

AllStandard

Parameter:

Gebäudeklasse 3

Wärmeschutz

Wand/Dach U 0,15 W/mK

Fenster U 0,80 W/mK

Schallschutz nach DIN 4109-1

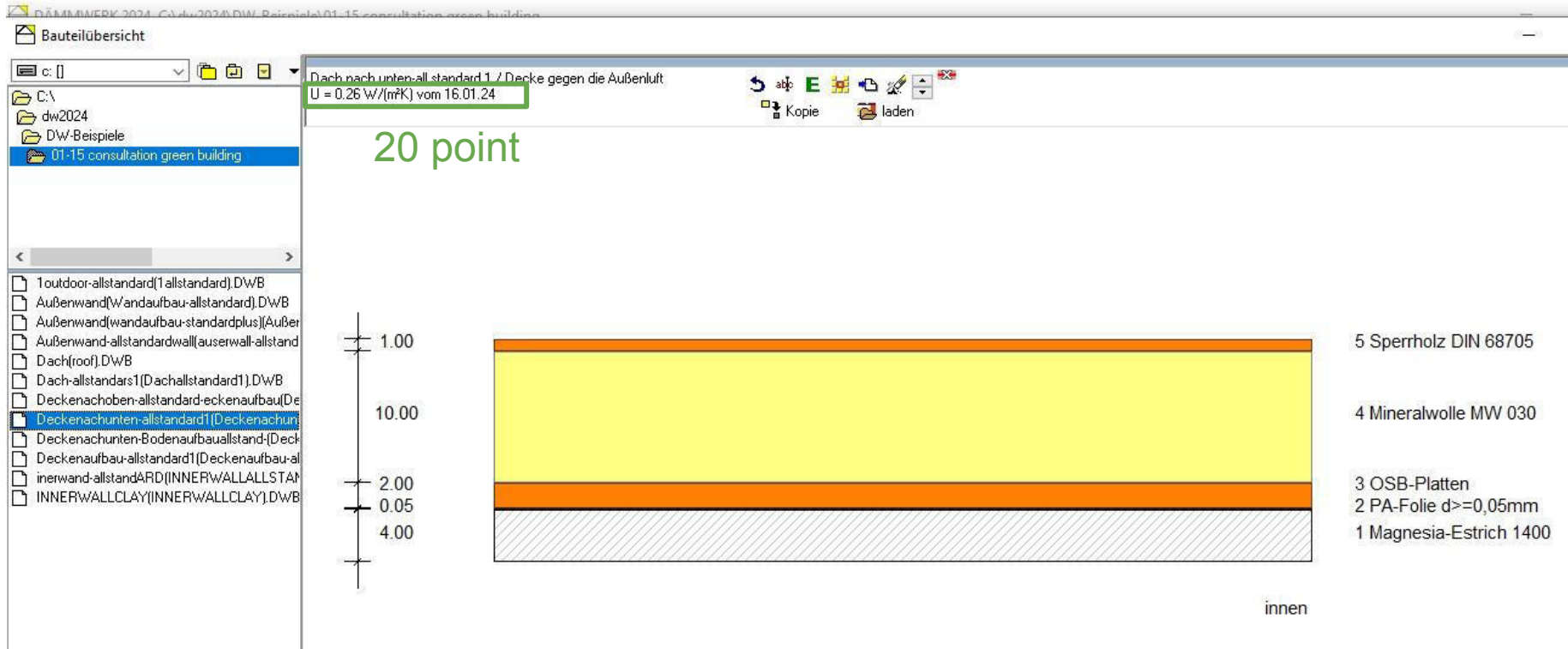
Brandschutz nach DIN 4102

Deckenspannweite 5,4 m

45 point

Roof U value: Min requirement: 0.30

Surface Area=1388 m²
U value=0.13 w/mk



Wall U value: Min requirement: 0.30

Surface Area=550 m²
0,08 w/mk

DÄMMWERK 2024 C:\dw2024\DW-Beispiele\01-15 consultation green building

Projekte Bauteile

Zeitlizenz: noch 125 Tage Nutzungsdauer

NAVIGATION

- Projekt
- Bauteile
 - Bauteilquerschnitt
 - Bauteil: Außenwand (Wandaufbau)
 - Wärmeübergangswiderstand (R_{si})
 - Querschnitt
 - Wärmedurchgangskoeffizient (U)
 - Anforderungen nach ...
 - Thermisch-dynamische Charakteristika
- Wärmebrücken
- Feuchteschutz
- Faltmodelle
- Gebäudebilanz 18599
- Ökobilanz
- Energieberatung
- DIN V 4108-6
- DIN V 4701-10
- Übersichten

BERECHNUNGSPROTOKOLL Außenwand(Wandaufbau-allstandard).DWB

	R _{si}					
01 FERMACELL Gipsfaserplatte 12,5 m	1.25	1150	14.4	0.320	0.04	
02 Mineralwolle MW 050	5.00	20	1.0	0.050	1.00	
03 PAVATEX PAVATHERM-PROFIL 40-80 m	5.00	160	8.0	0.045	1.11	
04 Hassolan Dampfsperre	0.20	1100	2.2	0.170	0.01	
05 OSB-Platten	1.50	650	9.8	0.130	0.12	
06 Sparren 220 mm	2.20	600	13.2	0.130	0.17	
07 Holzfaserdämmstoff WF 035	2.20	160	3.5	0.035	0.63	
08 Nadelholz	3.00	600	18.0	0.130	0.23	
09 PVC-Folie 1 mm	0.10	1500	1.5	-	-	
10 Grundlattung	5.00	-	-	-	-	
R _{se}					0.04	
d =	25.45	G =	71.5	R _T =	3.48	

Wärmedurchgangskoeffizient (Ref-No 1.8)

Wärmedurchgangskoeffizient U = 0.29 W/(m²K) (ohne Korrekturen)

20 point

BERECHNUNGSOPTIONEN

- Bauteile
- Grafik: 1 Bauteilquerschnitt
- Berechnungsoptionen
- Fenster
- sommerlicher Wärmeschutz
- Mindestwärmeschutz
- Leitwerte, Wärmebrücken
- Energieberatung
- Anlagen (Texte)
- Aktionen
- Einstellungen

HINWEISE

Berechnungsblatt (3) Schallschutz

Bauteilberechnung g "C:\dw2024\DW-Beispiele\01-15 consultation green building\Außenwand (Wandaufbau-allstandard).DWB" wurde geladen

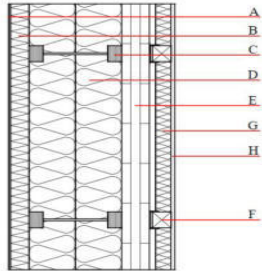
Suggested detail for a better U value:

Suggested Option 1:

<https://www.dataholz.eu/bauteile/bauteil-aussenwand/detail/kz/awmopi03a.htm>

Suggested Option 2:

<https://www.dataholz.eu/bauteile/bauteil-aussenwand/detail/kz/awmopi04a.htm>



Bemerkung

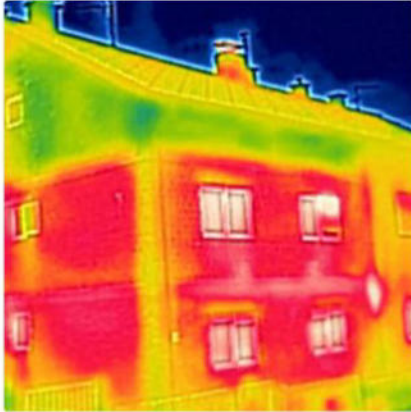
ACHTUNG: REI90 (von innen) in Deutschland nur mit
2x12,5mm GKF/GF

Bauteilvariationen

	Schichtdicke	Baustoff	Σ	Brand	Wärme	Diffusion	Schall	Öko	Masse
	Dicke [mm]			REI	U [W/(m²K)]		R _w (C,C _p) [dB]	ΔOI3	m [kg/m²]
awmopi03a-00	D 300,0	Zellulosefaser [040; 50]	553,5	90 von innen 90 von aussen	0,09	geeignet	63 (-2,-7)	45,04	108,2
	E 94,0	Brettspertholz (verklebt)							
	G 50,0	Zellulosefaser [040; 50]							
awmopi03a-01	D 300,0	Holzfaserdämmung [039; 45]	553,5	90 von innen 90 von aussen	0,09	geeignet	63 (-2,-7)	47,98	106,4
	E 94,0	Brettspertholz (verklebt)							
	G 50,0	Holzfaserdämmung [039; 45]							
awmopi03a-02	D 300,0	Mineralwolle [034; 18; <1000°C]	553,5	90 von innen 90 von aussen	0,08	geeignet	63 (-2,-7)	57,82	97,1
	E 94,0	Brettspertholz (verklebt)							
	G 50,0	Mineralwolle [034; 18; <1000°C]							

45 point

Passive house windows:



Regular windows



Passive house windows

Reduced energy costs

Well-insulated passive windows ensure that warmth is kept in during winter whereas undesirable heat is prevented from entering during summer. Considerable **savings** on energy bills can therefore be expected due to reduced usage of regular heating and cooling systems.

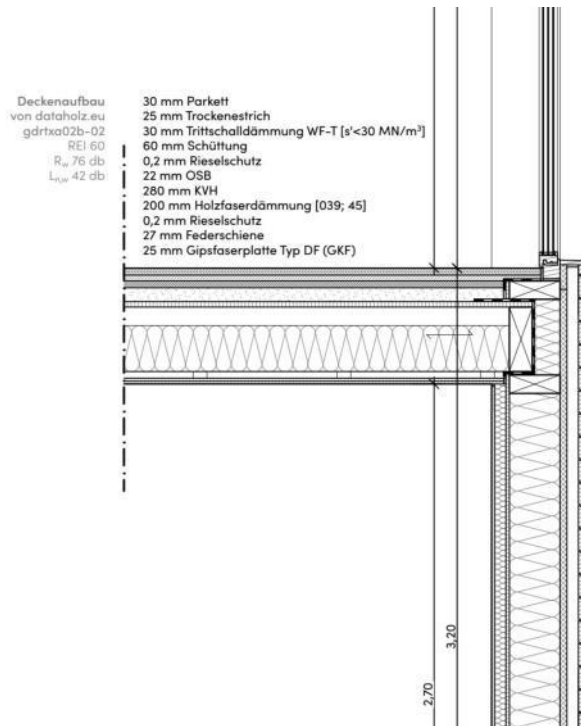
Additional chambers

A multi-layered profile ensures that passive house certified windows are well insulated and allows buildings to effectively self-regulate interior temperatures. Our best passive house windows, such as the [Energeto 8000](#) model, feature a **6-chamber system** with carbon fibre inserts to prevent heat transfer via conduction, or the creation of a so-called thermal bridge.



Indicator 2: Thermal Heat Bridge

The thermal heat bridges must always be designed to ensure that the structural minimum heat insulation (moisture protection) is complied with throughout the entire area to provide long-lasting protection against damage.

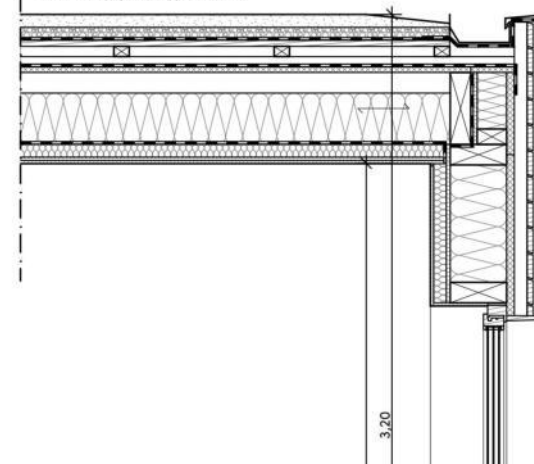


Wandaufbau
aus pdf
ähnlich dataholz.eu awrhhi07a-03
U 0,16 W/m²K
REI 60 von innen
REI 30 von außen
R_w 51 db

24 mm Holz Fassadenbekleidung
50 mm Holz Lattung
diffusionsoffene Folie
30 mm Holzfaserdämmplatte
220 mm KVH (80/220; e=625)
220 mm Holzfaserdämmung
15 mm OSB
Dampfsperre
50 mm CW-Profil
50 mm Mineralwolle
12,5 Gipsfaserplatte

Dachaufbau
von dataholz.eu
fdrhbi01a-06
nsiver Begrünung
U 0,17 W/m²K
REI 30
R_w 50 db

50 mm Extensivsubstrat
Filtervlies
40 mm Festkörperdrainage
Speichervlies
Abdichtungsbahn
24 mm Holz Fichte Vollschalung
80 mm Holz Fichte Konterlattung (Hinterlüftung)
Unterdeckbahn sd < 0,3m
22 mm Holzfaserdämmplatte [045; 250] - Unterdeckplatte
280 mm KVH
200 mm Zellulosefaser [040; E]
Dampfbremse sd < 2m
50 mm Holz Fichte Querlattung (50/80; a=400)
50 mm Zellulosefaser [040; E]
25 mm Gipsplatte Typ DF (GKF)



Wandaufbau
aus pdf
ähnlich dataholz.eu awrhhi07a-03
U 0,16 W/m²K
REI 60 von innen
REI 30 von außen
R_w 51 db

2.1 Thermal heat bridge correction factors

Evaluation of the indicator is not possible

Office Education Residential Hotel

Assembly buildings

Thermal heat bridge correction factor ΔU_{WB} in
W/(m²·K)

W/(m²·K)

10–15

≤ 0.05

10

≤ 0.02

15

Standard

Parameter:

Gebäudeklasse 3

Wärmeschutz

Wand/Dach $U\ 0,15\ \text{W/mK}$

Fenster $U\ 0,80\ \text{W/mK}$

Schallschutz nach DIN 4109-1

Brandschutz nach DIN 4102

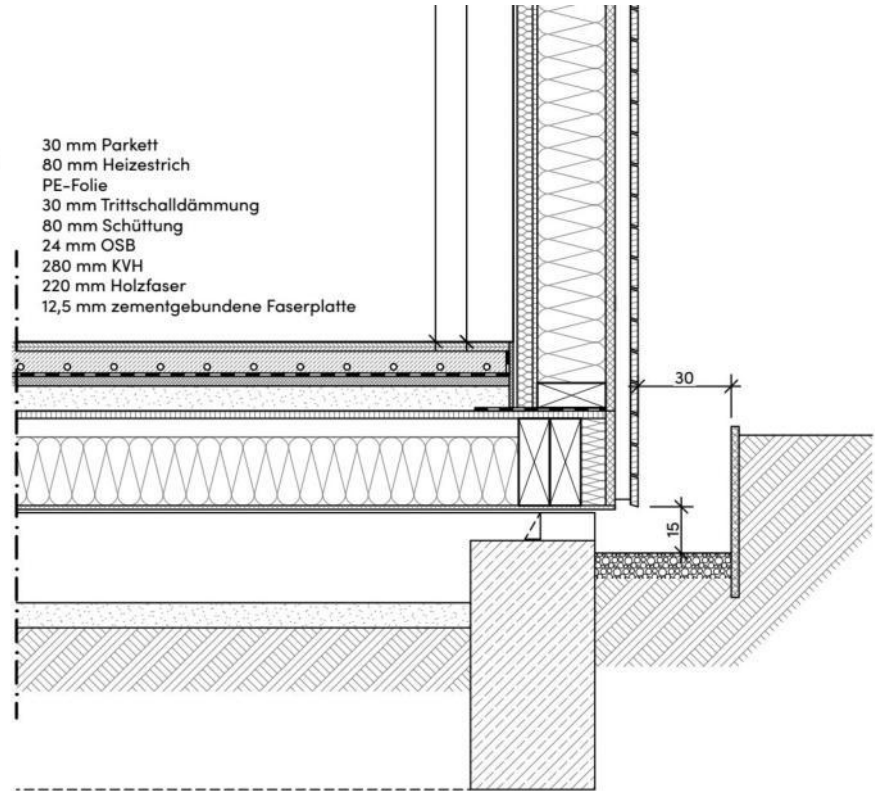
Deckenspannweite 5,4 m

Delta $U < 0.02$

15 point

Bodenaufbau
aus pdf

30 mm Parkett
80 mm Heizestrich
PE-Folie
30 mm Trittschalldämmung
80 mm Schüttung
24 mm OSB
280 mm KVH
220 mm Holzfaser
12,5 mm zementgebundene Faserplatte



According to the book “**din 4108 beiblatt 2 2019 06**” **wärmebrückendetails** all the details have the minimum requirements ,therefore the kindergarten gets the points of this indicator.

Indicator 3: Air Tightness

For buildings with an interior volume $> 1500 \text{ m}^3$, the following also applies:

Assessment of the air exchange from external surfaces q_{50} in accordance with DIN EN 13829

Blower door test:

A **blower door** is a machine used to perform a **building air leakage test**.

It can also be used to measure airflow between building zones, to **test ductwork airtightness** and to help physically locate air leakage sites in the building envelope.

Function:

A blower door test assesses a building's airtightness by **temporarily sealing a fan in a doorway**. Interior doors are opened, and all windows and exterior doors are closed. Mechanical devices like exhaust fans are turned off. The fan creates a pressure difference between inside and outside, revealing air leaks. The test involves measuring pressure differentials with tubing, considering factors like wind. Both depressurization and pressurization tests are ideal. The procedure varies, but typically, a fan is adjusted to achieve target pressure differentials, revealing the building's air leakage. The test helps evaluate a building's energy efficiency by assessing its tightness.



Air leakage prevention methods:

1. Windows and Doors:

- Install weatherstripping around window and door frames to create a tight seal.
- Use high-quality caulking to seal gaps between window or door frames and the building structure.
- Consider using draft stoppers or sweeps at the bottom of doors to minimize air movement.

2. Facade (Gap Between Bricks):

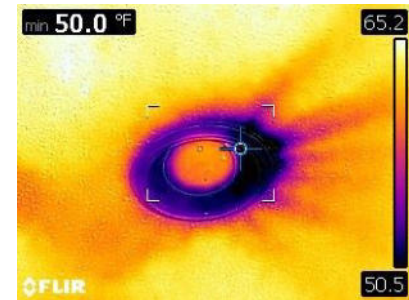
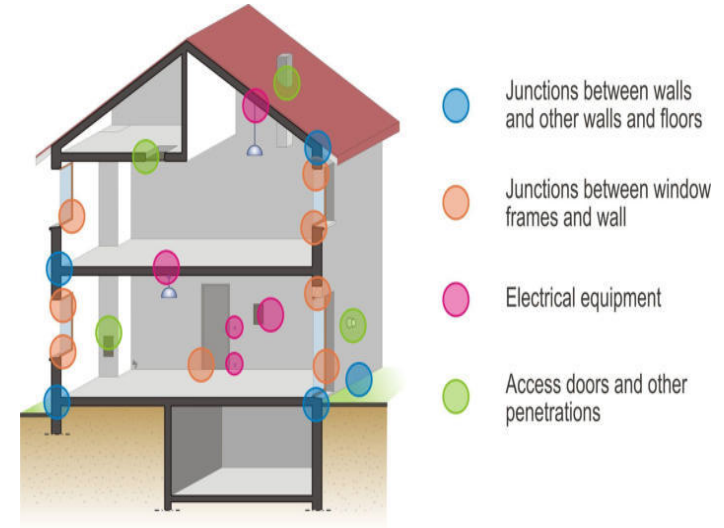
- Apply a flexible, weather-resistant sealant to fill gaps between bricks, ensuring a continuous barrier.
- Consider using sealant-backed compressible foam strips designed for masonry applications to fill larger gaps.

3. Wood Panel Connections:

- Apply a high-quality caulking or sealant at the joints and connections of wood panels.
- Ensure proper installation and use of flashing to prevent water infiltration, which can contribute to air leaks.

4. Attic and Roof:

- Seal gaps and cracks in the attic floor, ceiling, and roof with expanding foam or other appropriate sealants.
- Install weatherstripping around attic access points, such as hatches or doors.



3.2 Joint permeability of windows and doors

Office Education Residential Hotel

Assembly buildings

Joint permeability Q in accordance with DIN EN
12207

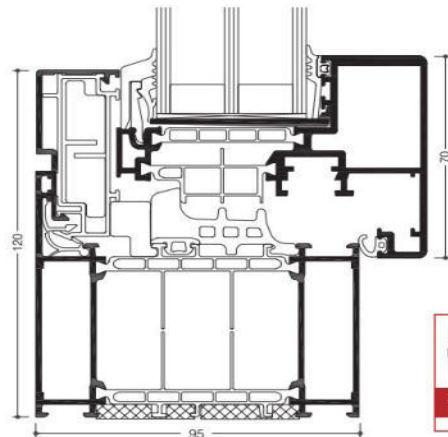
Max. 15

- Class 2 5
- Class 3 10
- Class 4 —————→ **Best performance = 15 Points** 15

Not applicable for Consumer market Shopping centre
Department stores Logistics Production

All the windows and door in the Unserkinder have the class 4 requirements.

Window data sheet sample:



System tests / CE-marked product passport according to DIN EN 14351-1:2006+A1:2010

Air permeability:	Class 4
Waterproofing against driving rain :	E900
Resistance to wind load:	Class C5/B5
Soundproofing:	$R_w (C; C_w) = 47 (-1; -4)$ dB
Operating forces:	Class 1
Load capacity of safety precautions:	Fulfilled
Mechanical strength:	Class 4
Continuous operation:	Class 3 (20 000 cycles)
Corrosion resistance of fittings:	Class 5
Burglar resistance:	RC1N, RC2N, RC2, RC3
Quality management:	Certified to DIN EN ISO 9001:2008

Technical capabilities:

Profile technology:

- Highly thermally insulated multi-chamber system with ETC Intelligence® thermal break 'zone', passive house certified to efficiency class phB.
- Patented corner and butt joint technology for high rigidity of components
- Infill thicknesses up to 55 mm

Thermal insulation:

- U_i values 0.68 to 0.91 W/(m²K) for fixed glazed units with external sight lines from 65 to 180 mm
- U_i values 0.75 to 0.88 W/(m²K) for sash-frame combinations with external sight lines from 105 to 260 mm
- Passive house efficiency class phB, U_w and $U_i = 0.80$ W/(m²K) with sight lines of only 125 mm and 95 mm sash-frame installation depth

Sealing concept:

- Large volume central seal in three variants:
 - Circumference installation without corner butts
 - With formed corners, no adhesive processing of butts
 - Corner vulcanised frames

Hardware:

- Concealed single handed operated fittings, optionally with:
 - overlaid hinges, coated or anodized in all colours
 - concealed hinges with integrated end position damping, opening angle max. 105°
- Sash weights:
 - concealed hinges: up to 160 kg
 - Visible hinges: up to 160 kg
- Sash sizes (w x h): up to 1300 mm x 2250 mm,
- Optionally with opening limiter

System combinations:

- Fully integratable into WICTEC façades using integration sash frames.

Indicator 4: Summer Heat Protection

a dynamic thermal simulation calculation can be carried out to assess the number of exceeding temperature hours for the purposes of evaluating the thermal conditions.

Unserkinder evaluation:

Since the simulation of building is not available, we use the simplified method

Window area= 1724 m²

Opaque area= 1388 m² (roof)+ 550 m² (walls)= 2,274 m²

Result: the area of windows is bigger than 30% of the whole surfaces , we face overheating in summer.

Points given= 5 points

Reduce summer heat:

1. Vertical Shading on East and West Windows:

Plant deciduous trees or install vertical shading devices like trellises with vines on the east and west sides to block the low-angle morning and afternoon sun during the summer. The leaves provide shade, and in the winter, they allow sunlight to penetrate.

2. Horizontal Shading on South Windows:

Utilize horizontal shading devices, such as overhangs, awnings, or horizontal louvers, to block the high-angle summer sun from entering south-facing windows. This helps reduce direct sunlight penetration during peak heat periods.

3. Deciduous Trees on the South Side:

Plant deciduous trees on the south side of the building to provide shade in the summer when the leaves are full, and allow sunlight to penetrate in the winter when the leaves fall.





4. Roof Overhangs:

5. Natural Ventilation:

6. High-Albedo Roof:

7. Thermal Mass:

8. Cool Roof Design:

9. Night Cooling:

10. External Reflective Surfaces:

11. Dynamic Glass:

TEC 1.4 Use and integration of building technology



TEC1.4

Use and integration of building technology

To create a building concept plan that uses and incorporates renewable energy sources and Passive systems in the best possible way.

The flexibility of the building to changing conditions of use and technical developments.

Reducing the use of technical systems in the building.

Use of renewable energy sources.

Economical, long life, durable.

EVALUATION

INDICATOR 1 Passive systems

INDICATOR 2 Adaptability of the distribution system to suit operating temperatures to enable the use of renewable energy

INDICATOR 3 Accessibility of the building technology

INDICATOR 4 Integrated systems

INDICATOR 1 Passive systems

SCORING Maximum 20 points

Arrangement and compactness of the building structure, proportion of window area

Use of daylight (light redirection)

Use of solar output (passive)

Solar radiation protection

Storage mass and insulation standard

Natural ventilation

Passive heating

Passive cooling

For every aspect specified in indicator 1 +2.5 each

Arrangement and compactness of the building structure, proportion of window area



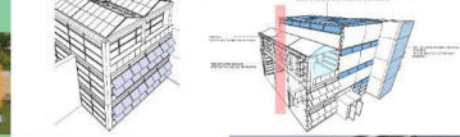
Use of daylight (light redirection)



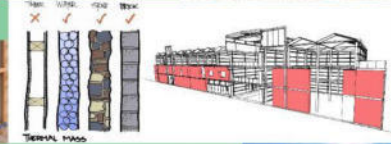
Use of solar output (passive)



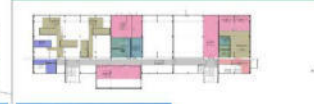
Solar radiation protection



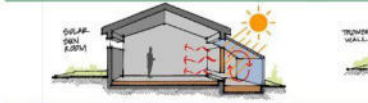
Storage mass and insulation standard



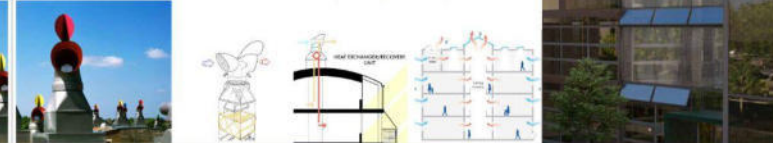
Natural ventilation



Passive heating



Passive cooling



INDICATOR 2 Adaptability of the distribution system to suit operating temperatures to enable the use of renewable energy

Heat distribution and transfer system

Cooling distribution and transfer system

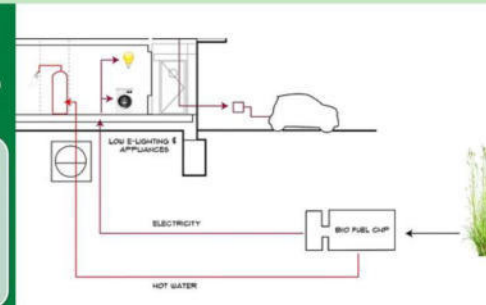
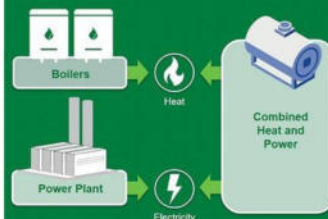


CHP provides efficient, clean, reliable,
affordable energy – today and for the future

Traditional System
(about 50% Efficiency)



CHP System
(about 75% Efficiency)



Use and integration of building technology

- All the technical facilities/generators are exposed because of the educational reasons to show the children how they work and what they are...



<https://www.softdb.com/blog/insights-for-facility-and-office-managers/>



Steel structure house interior_ © <https://www.caandesign.com/exposed-structural-steel-house-designed-float-site-offering-spectacular-rainforest-views/>.

Point evaluation

3 Accessibility of the building technology

3.1 Technical facilities/generation

10

All components of the technical facilities are easily accessible for retrofitting and subsequent replacement. The technical facilities include an adequate number of sufficiently large installation openings, doors and corridors. Components can be transported and replaced without needing to make structural changes.

3.2 Shafts/routes/distribution

Max. 10

- Vertical shafts/routes for all construction tasks are adequately accessible. 5
- Vertical shafts/routes for all construction tasks are adequately accessible and conversion work can be carried out without significant disruption to the building operation. 10

Total point 25



Indicator 4: Integrated systems

Condition and expandability of system integration

Integration of existing systems into a building automation system is evaluated positively. Open and standardized protocols should be used in existing networks to ensure cross-system, interdisciplinary communication.

Building automation

Building automation is the use of automation and control systems to monitor and control building wide systems, such as, lighting, alarms, and security access and cameras. Converging these systems into a single IT-managed network infrastructure creates a smart building. Smart buildings often use Power over Ethernet to power and connect devices and sensors.

Building automation use sensors and controls to monitor and adjust a building's three types of utilities: electricity, heating and air-conditioning, and water and sewer.

Common examples are:

- Thermostats to control room temperature
- Occupancy sensors to control lighting
- Humidity sensors
- Fire and smoke detectors

Building Automation Systems

Building automation is the automatic centralized control of a building's heating, ventilation and air conditioning, lighting and other systems through a building management system or building automation system (BAS). The objectives of building automation are improved occupant comfort, efficient operation of building systems, and reduction in energy consumption and operating costs, and improve life cycle of utilities.

Almost all multi-story green buildings are designed to accommodate a BAS for the energy, air and water conservation characteristics. Electrical device demand response is a typical function of a BAS, as is the more sophisticated ventilation and humidity monitoring required of "tight" insulated buildings. Most green buildings also use as many low-power DC devices as possible, typically integrated with power over Ethernet wiring, so by definition always accessible to a BAS through the Ethernet connectivity.

- **Access control, presence detection for lighting, solar protection and glare protection** are some of the possible functions that needs to be automated.



TEC1.5

Ease of cleaning building components

The issue of how a building structure can be cleaned has a significant effect on the costs and environmental impact of a building during its use. Surfaces that can be easily cleaned require less cleaning agents and result in lower cleaning costs.

Accessibility of the exterior glass surfaces

Evaluation of how **easily** the exterior glass surfaces can be cleaned.

Exterior glass surfaces that can be cleaned **without the use of aids** are more highly evaluated due to the **lower** expected cleaning costs.

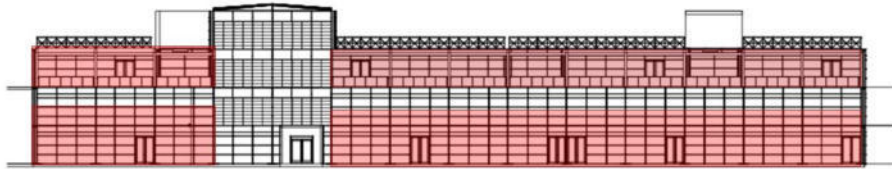
This is generally the case for window casements that can be **opened inwards**, or where the distance from the top of the standing surface to the top of the glass surface is approximately **4 m**.

1680 M2 total areas of glass surfaces

1038 M2 areas of glass surfaces under 4 m height

61% of glass surfaces can be cleaned without aid

39% of glass surfaces can be cleaned using aid

[illegible]

Cleaning concept.

Cleaning glass facades

For facade glass cleaning, add a natural detergent or an appropriate commercial cleaning product to water and mix together.

Dip a squeegee or specially designed cloth into the cleaning mixture and shake off any excess.

Apply the solution to the facade in gentle, even strokes.

For particularly oily or dirty spots, apply isopropyl alcohol or acetone with a soft, clean cloth.

To remove another residue, lightly polish the area with a suspension of cerium oxide.

Rinse the area thoroughly and repeat the above steps until the entire facade is clean.

Cleaning wooden facades

Remove any moss or algae that may be present on the facade.

Add some dish soap to warm water and mix together.

Use a soft-bristled brush to apply the cleaning solution.

Gently scrub the wood to remove any dirt, paying attention to particularly soiled areas.

Rinse the area with clean water and repeat the above steps until the entire facade is clean.

<https://www.realcleaning.co.uk/blog/what-is-facade-cleaning/>

Floor covering

List and evaluation of the floor coverings installed with regard to their tolerance to contamination

HARD-SURFACE FLOORING MATERIALS	Chemical Resistant	Water Resistant	Seamless	Integral Cove Base
Tiles (Vinyl, Ceramic, Porcelain)	X*	X*		
Solid & Engineered Hardwood				
Vinyl Plank	X			
Vinyl Sheet	X		X*	
Rubber Sheet	X	X	X*	
Linoleum	X	X*	X*	
Terrazzo	X	X	X*	X*
Concrete			X	X
Resinous	X	X	X	X

* CONDITIONS APPLY

Floor covering material

Based on the section that we have from the project the floor covering is **parquet**

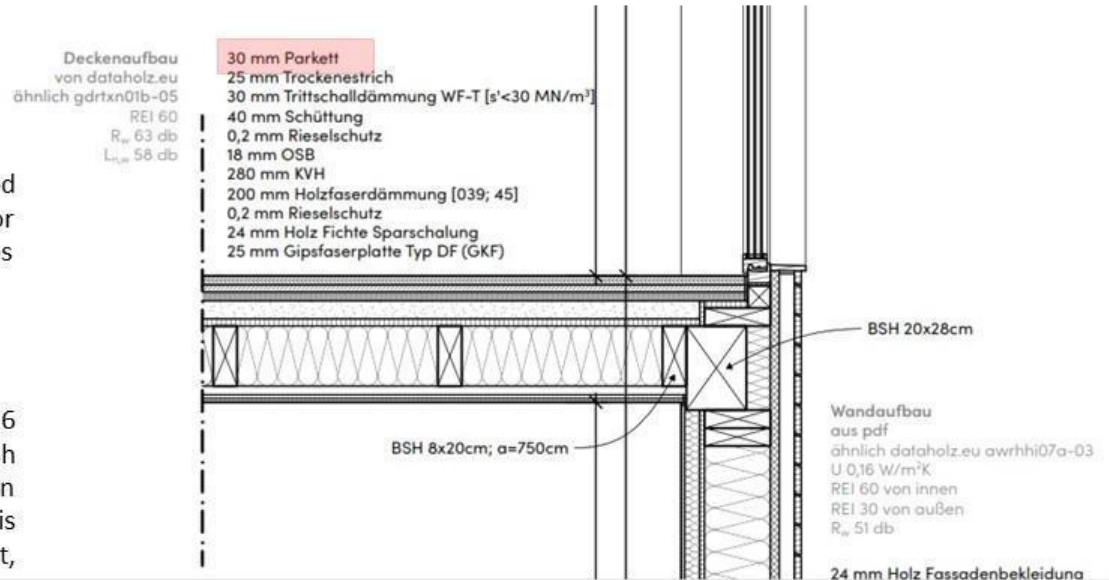
Parquet flooring is made of narrow strips of hardwood joined to create a pattern directly on the floor or installed as prefinished parquet-style tiles. The tiles come in a few common sizes:

9 inches by 9 inches

12 inches by 12 inches

19 inches by 19 inches

The total thickness of tiles typically ranges from 5/16 inch to 3/4 inch. Parquet tiles usually include a mesh backing of paper, cloth, or plastic stitched with a thin metal or plastic skeleton. The hardwood top layer is most commonly oak but may also be maple, walnut, and other popular hardwood species.



Advantages of wood flooring

Aesthetic appeal : Parquet flooring is sophisticated and bold, making it a popular choice for formal settings such as living rooms, dining rooms, and foyers as well as in midcentury modern home style.

Low-maintenance: clean your flooring as you would any other hardwood flooring by simply sweeping and dry mopping your parquet at least once a week. It's also easy to Prevent scratches by using rugs and mats beneath chairs.

Durable: Hardwood parquet is structurally sound and can hold up beautifully for decades.

Easy to install: Parquet strips and parquet tiles are thin, easy to cut, and can be simply arranged and often glued down to a perfectly flat subfloor rather than nailed.

Wood species options: You can choose from a wide variety of hardwood options to create a parquet floor design.



Dirt trap at building entrances

Evaluation of whether a sufficiently long dirt trap is in place at the main entrances.

- What Dirt Trap is?

An outdoor dirt trap mat is the first place to remove dirt and moisture from footwear and keep the building clean.

However, not every doormat is suitable for outdoor use. Many normal mats would probably not survive the tough demands placed on a dirt trap mat for outdoor use.

<https://www.cobaurope.com/news/requirements-for-an-outdoor-dirt-trap-mat-31560>

It must be ensured that adequate dirt traps are in place in front of and/or behind all main entrances. This concerns both the main and the secondary uses of the building. Staff access, delivery access and secondary access routes do not need to meet these specification.

- What properties should an outdoor dirt trap mat have?

Long-lived-Weatherproof-Robust-UV-resistant-Good moisture absorption / drainage-Suitable for hot summers and cold winter temperatures-Non-slip-Easy to clean-Easy to install.

An effective dirt trap mat for outdoor use must withstand wind and weather all year round to protect the entrance of a building from dirt. Therefore, the material from which the dirt trap mats are made must be able to be exposed to a wide temperature range and be UV resistant. Dirt trap mats made of rubber or PVC are suitable to meet these requirements.

<https://www.cobaurope.com/news/requirements-for-an-outdoor-dirt-trap-mat-31560>



<https://www.coba-europe.com/flooring/product/plan-e>



Representation of the dirt traps using floor plans with dimension specifications.



Point evaluation

Dirt trap at building entrances

Dirt trap at building entrances I

Office Education Consumer market Shopping centre Department stores Hotel

Logistics Assembly buildings Production Residential

■ There are dirt traps at every main entrance. 5

Dirt trap at building entrances II

Office Education Consumer market Shopping centre Department stores Hotel 5-10

Logistics Production Assembly buildings

■ All dirt traps comply with the three-step principle (approx. 2.4 m). 5

■ All dirt traps comply with the five-step principle (approx. 4 m). 10

Residential 5-10

■ All dirt traps comply with the two-step principle (approx. 1.6 m). 5

■ All dirt traps comply with the five-step principle (approx. 4 m). 10

Unobstructed floor plan

This indicator evaluates whether the room layout and fittings have been implemented with the fewest possible obstructions.

Individual components are evaluated in terms of their ease of cleaning.

Radiators: There is no Radiator in the project, **floor heating** is the main heating system in the project.

Railing supports for staircases:

We have both railings hanged to the wall also attached to stairs

WCs and sinks are hanged to the wall

Separating walls are designed without support points on the floor or as separating walls with a wall/floor connection wherever possible.

Lighting is integrated into the ceiling and does not need to be cleaned. But in the project we also have hanged Lighting.



https://www.betterbathrooms.com/p/verona-rimless-wall-hung-toilet-and-sc-seat-matt-white-bunbeba_2585977183

5 Unobstructed floor plan

5.1 Obstacle prevention

Office	Education	Consumer market	Shopping centre	Department stores	Hotel	Max. 20
Logistics	Production	Assembly buildings				
						2.5
						5
						+5
						+2.5
						+2.5
						+5
						+2.5
						+2.5

Total point 12.5

Designing implementations Concept to ensure ease of cleaning

Easy maintenance is an important part of designing for longevity; when spaces are hard to maintain, regular changes are inevitable and result in more resource consumption and waste creation.

The application of flexible elements in the interior makes the interior easier to maintain. With modular carpets for instance, you can replace just the worn-out pieces instead of the whole carpet, which effectively keeps waste out of landfills.

Maintenance of spaces with lots of easy-to-clean materials and surfaces requires fewer cleaning products, which are often harmful for the environment. Therefore, investing in elements that are sturdy, durable and easy to clean or replace means that less renovations will be needed; and, consequently, less waste will be generated. Saving money that would go toward cleaning and maintenance cost is an additional benefit.

Depending on the material used on any surface or object used in project, the amount of effort and cost of maintenance and cleaning would be different. There is an example in the next slide which explains the different maintenance of Door Handles with different materials.

TEC 1.6 Ease of recovery and recycling



TEC1.6

Ease of recovery and recycling

Introduction

The importance of natural resources is increasing in this world. Providing ease of recycling helps us use these resources economically and efficiently.

The purpose of this section is to ensure that the current value is reused with minimum loss.

How can the amount of primary resources required for the construction and maintenance of buildings be reduced to almost zero?

How can the level of material efficiency be increased?

Is it possible to recycle used materials without loss?

A structure designed in accordance with the "Ease of Recovery and Recycling" criterion will reduce natural energy consumption and thus our resources will continue to be available for use by future generations.

Indicator 1: Selection of easy to recycle construction materials

Indicator 2: Easy to recover building structure

Indicator 3: Ease of recovery, conversion and recycling in the planning process



TEC 1.7 Immissions control



introduction

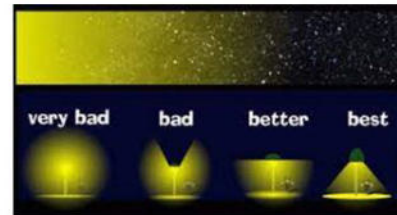
Our objective is to **minimize disruption to the immediate surroundings** of the building due to sound and light emissions. In addition, we wish to **prevent negative impacts on people and nature** due to noise and light from buildings

Measures to prevent/reduce sound emissions and adverse light conditions have a positive impact on the health and well-being of users and the surrounding environment. This increases the productivity of building users and reduces absenteeism. Preventing light pollution supports the stability of ecosystems and can reduce the subsequent social costs incurred as a result of damage.

Thanks to ever-emerging new research and solutions, available technical options are becoming increasingly sophisticated and tailored more closely to the needs of people and nature. In the industrial sector, a large extent of impacts and emissions can already be partially contained or prevented (e.g. urban factories). DGNB monitors these developments and will update the indicators of this criterion as required.

Share of total score

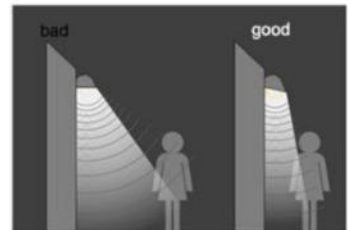
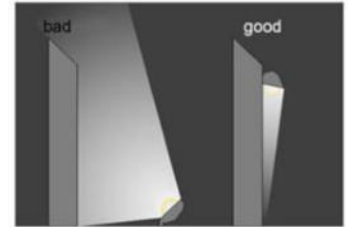
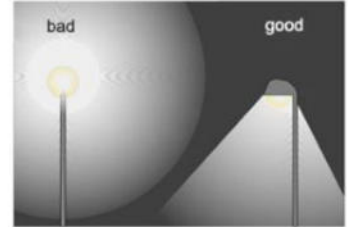
				SHARE	WEIGHTING FACTOR
Office	Education	Residential	Hotel	0.6%	1
Consumer market		Shopping centre		1.4%	2
Department stores					
Logistics	Production				
Assembly buildings				0.7%	1



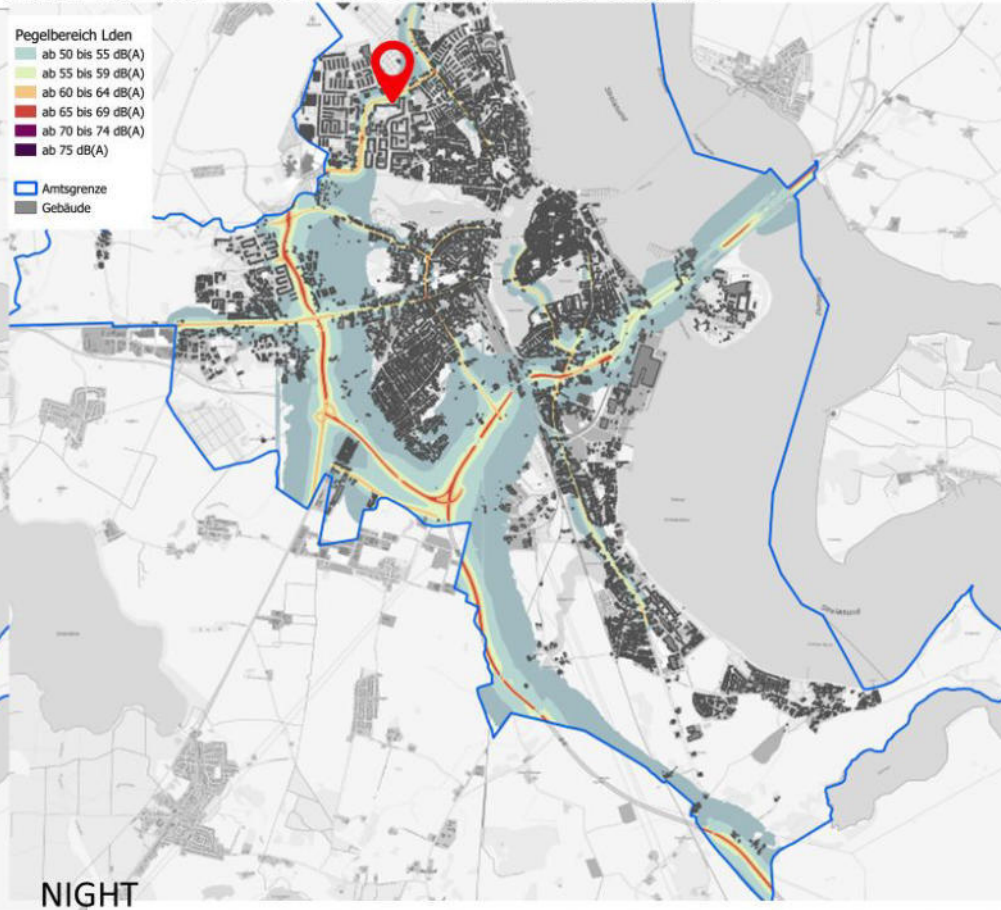
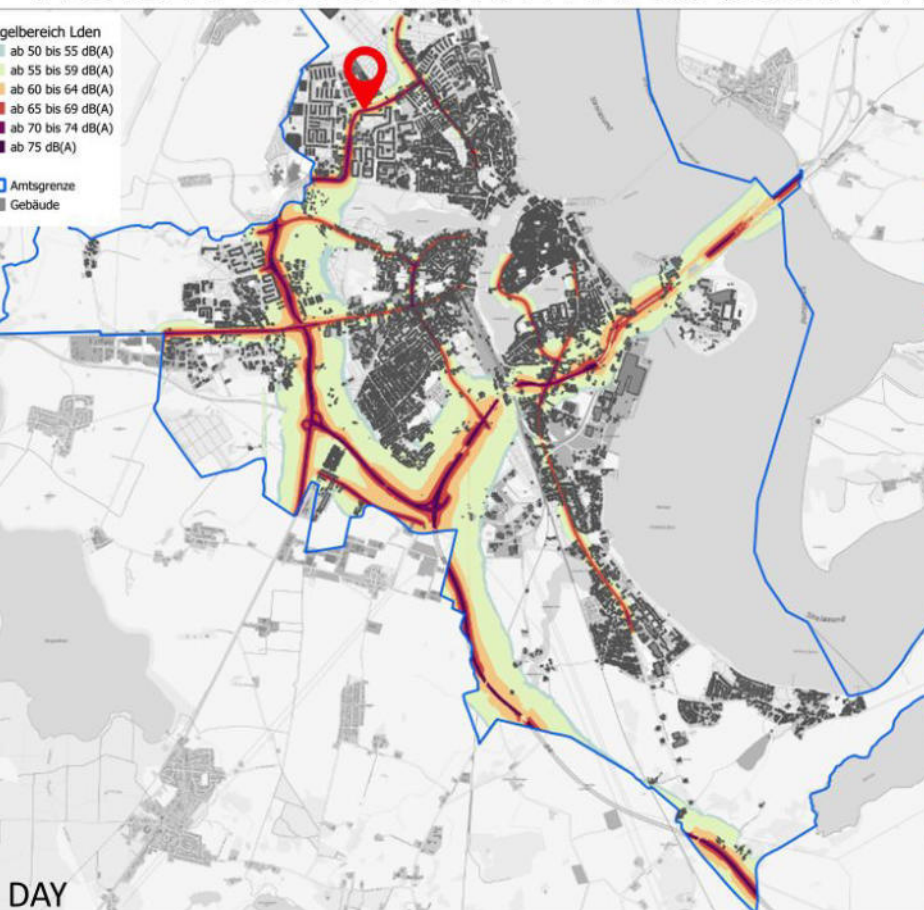
EVALUATION WITH RESPECT TO STARSLUND

Criteria for Evaluation	Max 30	Criteria satisfied?	points
<ul style="list-style-type: none">• There is an implemented lighting concept that explicitly examines the issue of light pollution and its prevention, and focuses on minimizing light trespass into neighboring areas, for instance, due to outdoor advertising, outdoor lighting, façade lighting, and indoor lighting which has an external impact (excluding required safety lighting).	+15	yes	+15
<ul style="list-style-type: none">• At least 80% of all illuminants or lights with external impact are designed to prevent upward and lateral light scattering.	+5	yes	+5
<ul style="list-style-type: none">• At least 80% of all illuminants or lights with an external impact are switched off or dimmed automatically or are equipped with motion sensors.	0	No	0
<ul style="list-style-type: none">• For all illuminants, care has been taken to reduce distracting glare effects.	0	No	0
<ul style="list-style-type: none">• A simulation has been carried out and the resulting potential for optimization has been implemented	+10	yes	+10

- Light pollution reduction measures Light is defined as the intolerable illumination of a living or working area inside a building and increased illumination of outdoor areas by external light sources. Residential buildings near a department store, for instance, are particularly affected by this.
- Light pollution at the site is **evaluated in qualitative terms**.
- Outdoor lighting systems and indoor lighting systems with an external impact are evaluated. The objective is to **prevent light from scattering upwards or laterally as far as possible**.
- The illuminance should also be adjusted to the actual light conditions. Consequently, **lights that feature low upwards and lateral light scattering and can automatically adjust their light intensity to suit the surrounding conditions are classified as good**.
- In addition, **motion sensors, for instance, should be positioned in such a way that unnecessary activation is prevented**.
- **A lighting concept** should explicitly examine the issue of light pollution and its prevention. The objective is to **ensure the lowest possible illumination due to outdoor advertising, outdoor lighting, façade lighting, and indoor lighting with an external impact** (excluding required safety lighting).



NOISE POLLUTION EVALUATION WITH RESPECT TO STARS LUND





DAY



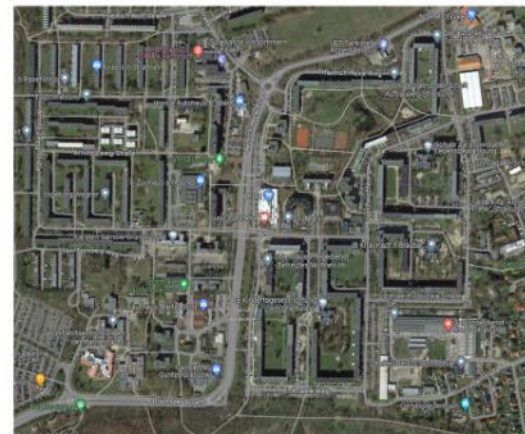
NIGHT

NOISE POLLUTION

	Criteria satisfied?	Max 70
• Compliance with the immissions guide values in accordance with Technical Instructions on Protection against Noise (TI noise) throughout the day and the night.	No	0
• Immissions values that fall below the Immissions Guide values in accordance with TI noise by at least 6 dB throughout the day and the night.	No	0
• Immissions values that fall below the Immissions Guide values in accordance with TI noise by at least 10 dB throughout the day and the night.	No	0

Table 1: Immissions guide values from Technical Instructions on Protection against Noise

Expulsion	Daytime reference values (6:00 to 22:00)	Nighttime reference values (22:00 to 6:00)
Industrial area	70 dB(A)	70 dB(A)
Industrial estate	65 dB(A)	50 dB(A)
Urban area	63 dB(A)	45 dB(A)
Business, village and mixed area	60 dB(A)	45 dB(A)
General residential area	55 dB(A)	40 dB(A)
Residential area	50 dB(A)	35 dB(A)
Spa area, hospital and nursing home	45 dB(A)	35 dB(A)



SUGGESTIONS- FOR REDUCING SOUND POLLUTION

- Noise Barriers: Sustainable facades can incorporate external noise barriers, such as **vegetation walls** or **acoustic panels**, to further reduce noise infiltration. These barriers absorb sound energy and act as buffers between the building and external sources of noise



Echo Wall - Fabric Acoustic
Panel 50 x 50 cm



ACER - perforated wood
acoustic panel



WAVO - perforated wood
acoustic panel



Beelive Felt - PET Acoustic
Panel





TEC 3.1 – Mobility infrastructure



INTRODUCTION AND OBJECTIVE

Share of total score

				SHARE	WEIGHTING FACTOR
Office	Education	Residential	Hotel	1.9%	3
Consumer market		Shopping centre		2.1%	3
Department stores					
Logistics	Production			2.0%	3
Assembly buildings					

- Our objective is to **save natural resources, reduce traffic-related emissions into the air, water and soil**, increase user comfort via sustainable mobility infrastructure, and increase the opportunities for the use of efficient and **affordable mobility**.
- Sustainable and **smart traffic infrastructure** enables users to select the mode of transport that **best suits their individual needs**.
- If the conditions necessary for using a wide variety of forms of mobility are established for the building, it is to be expected that the level of pollution and other negative impacts from motorized private transport will be reduced.
- In addition, doing so **increases user satisfaction** with the site and the building, expands the extent of affordable mobility, and encourages health-promoting cycling and walking.

EVALUATION WITH RESPECT TO STARSLUND

- **Bicycle infrastructure- Parking facilities**

Parking facilities, clearly assigned to the building, are located in or around the building and are easily accessible

Anti-theft measures for bicycles and anti-vandalism measures for the parking facilities/spaces have been adopted

Maintenance facilities are available

Weather protection is available for the parking facilities/spaces (at least 80%)

Lighting is available for the parking facilities/spaces (at least 80%)

Criteria satisfied?	Max points 20
yes	+5
yes	+5
yes	+5
yes	+5
No	0



- Rental systems (public or private)

2.1 CIRCULAR ECONOMY BONUS –

MOBILITY SHARING

Parking spaces for mobility sharing (car, scooter, bike sharing, etc.) are **available near the entrance** (max. 350 m)/easily accessible at the building, or the building is within the area of an operation of a free-floating sharing provider.

- Infrastructure for Alternate driving system

3.1 Motorized private transport

3.1.1 Development of a Mobility Management Strategy

Mobility management strategy - charging infrastructure (variant A) -A mobility management strategy is available, which ensures the availability of an adequate number of charging stations. It should take into account the project-specific needs of the relevant criteria (considering future users, building typology, public transport connections, etc.). It also supports the goals of the national strategic framework for infrastructure creation for alternative fuels and, if available, is based on measures derived at the municipal level for buildings and districts.

The mobility management strategy includes future developments and enables amendments for the future

Mobility management strategy - no parking spaces (variant B)- Motorized private transport was deliberately avoided. Instead, an active contribution (e.g. loan systems, financing of a bus stop, improvement of the timing of local public transport) was made to develop and implement a mobility management strategy that enables building users to use non-motorized types of transport, public transport and/or loan systems to forego motorized private transport without compromising the comfort and quality. The infrastructure for electric two-wheelers should also be part of the mobility management strategy.

3.1.2 Implementation of the mobility management strategy

The mobility management strategy (variant A or variant B) was fully implemented.

Criteria
satisfied? points

yes +10

Criteria
satisfied? Max 30
+10

yes +5

No +0

No +0

Yes +20

Criteria satisfied?	points
---------------------	--------

AGENDA 2030 BONUS – CLIMATE PROTECTION GOALS

- No parking spaces

The mobility management strategy, variant B was fully implemented
alternatively (without a mobility management strategy):

Parking spaces with charging and/or refueling stations (plug type 2 with at least 22kW) for 1% (but at least 2 charging stations) - 50% of the car parking spaces, required by the local building code or realized (if there are no building code requirements), charging and/or fueling stations are available.

No	0
	10-30
yes	+30



AGENDA 2030 BONUS – CLIMATE PROTECTION GOALS

Parking spaces with charging and/or refueling stations (plug type 2 with at least 22kW)
for >75% (but at least 2 charging stations) of the **car parking spaces**, required by the local building code or realized (if there are no building code requirements), **charging and/or fueling stations are available.**

Criteria
satisfied? points

yes +10

3.2 Electric bikes/two-wheeler transport

5-30

for 1% (but at least 2 charging stations) - **50% of the bike/two-wheeler transport parking spaces**, required by the local building code or realized (if there are no building code requirements), **charging and/or fueling stations are available.**

yes +15

3.3 Electromobility: Integration of charging stations

Max.20

Integration of the charging stations into the building energy management system

yes +10

Integration of the charging stations into the networked charging management system, for 10 or more charging spaces

yes +10

Integration of the charging stations into the billing system of the car park operator

No 0

Integration of the charging stations into a billing system with roaming capability

No 0

Criteria satisfied?	points
---------------------	--------

AGENDA 2030 BONUS – CLIMATE PROTECTION GOALS

3.4.1 Vehicle to grid: Preparations are in place for **bidirectional charging** and discharging of electric vehicles.

yes	+10
-----	-----

Max 10

- 4 User comfort 4.1 -User comfort inside the building

Shower facilities are available

yes	+5
-----	----

Changing and drying rooms are available

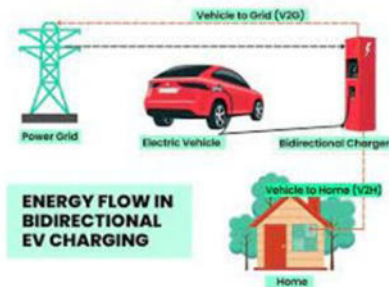
No	0
----	---

Storage facilities are available

yes	+5
-----	----

Parking spaces/facilities for mobility aids such as walking frames, prams, Segways, etc. are available

yes	+10
-----	-----



SUGGESTIONS- MOBILITY INFRASTRUCTURE



1. Providing adequate lights in the parking areas
2. Means of public transport such as a bus halt near the building to promote Public transportation
3. Including amendments for mobility infrastructure concerning future expansions
4. Integration of charging systems for billing and roaming capability.

TEC3.1	Mobility infrastructure	0		120
	1 Bicycle infrastructure			
	1.1 Parking facilities		20	20
	2 Rental systems (public or private)			
	2.1 CIRCULAR ECONOMY BONUS – MOBILITY SHARING Parking spaces for mobility sharing (car, scooter, bike sharing, etc.) are available in the immediate vicinity of the entrance (max. 350 m) easily accessible at the building, or the building is within the area of an operation of a free-floating sharing provider.		10	10
	3 Electromobility			
	3.1 Electromobility – motorised private transport (MPT)		30	30
	3.2 Electric bikes		30	30
	3.3 Integration of charging stations		20	20
	3.4 AGENDA 2030 BONUS – CLIMATE PROTECTION GOALS Vehicle to Grid: Preparations are in place for bidirectional charging and discharging of electric vehicles		10	10
	4 User comfort			
	4.1 User comfort inside the building		10	10
	6 INNOVATION AREA Explanation: If there are measures implemented which encourages building users to extensively at			100

PROCESS QUALITY (PRO)

PRO 1.1

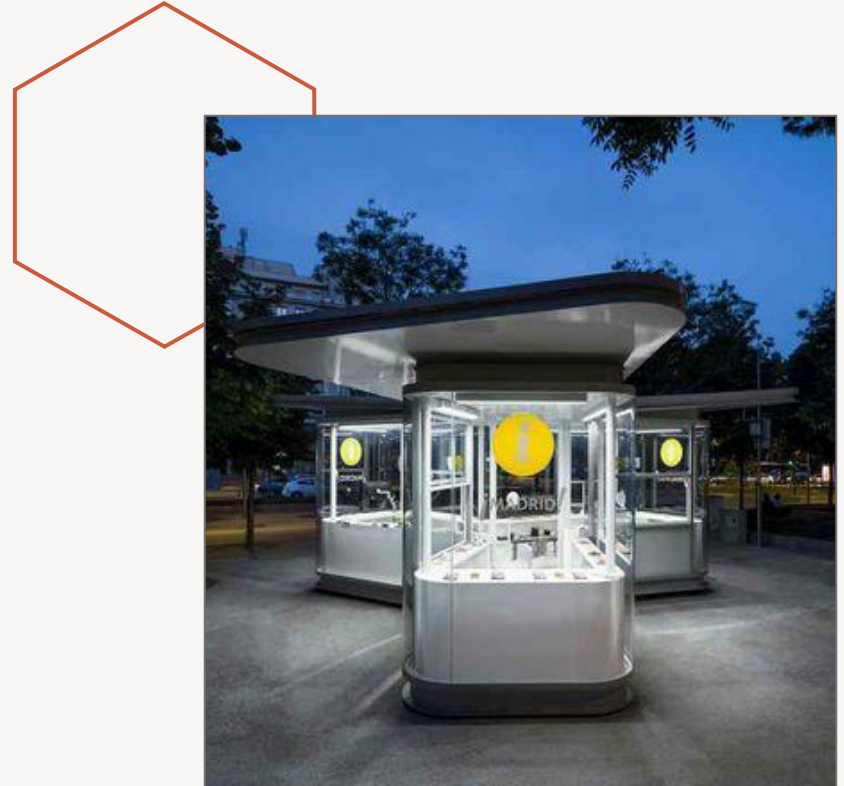
Comprehensive Project Brief

Objective:

The goal is to maximize building quality by optimizing the planning process and defining general criteria early in the "Phase 0" pre-planning phase.

Benefits:

- Emphasizes clear definition of building owners' requirements in construction
- Highlights importance of planning objectives and specifications in the process
- Aims to consistently fulfill building owners' needs for better project quality
- Advocates for increased public participation in decision-making
- Benefits include enhanced decision acceptability, balanced solutions, improved decision-making, conflict resolution, and stronger community connection.



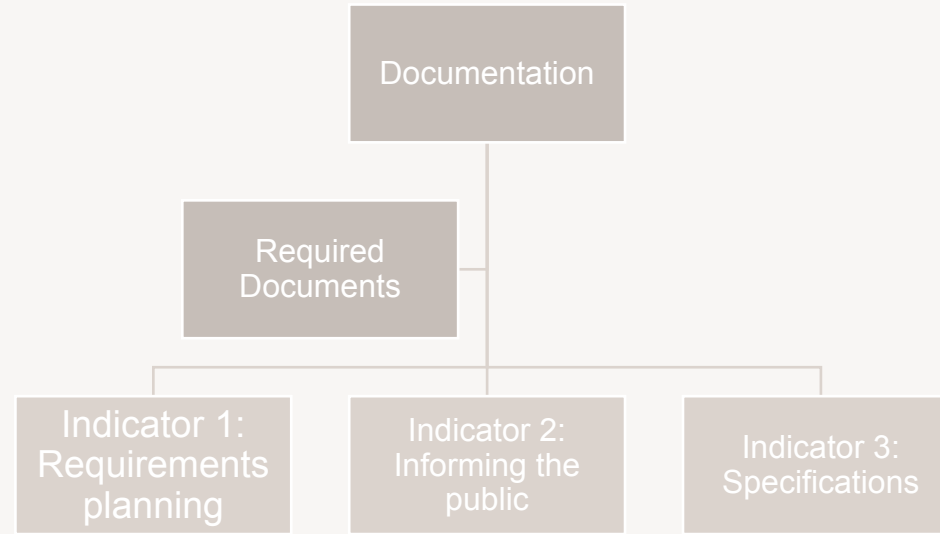
Evaluation:

01	Requirements planning	<u>Scope of requirements planning (max. 40)</u> <ul style="list-style-type: none">• A requirements description 10• A small-scale requirements planning 20• A large-scale requirements planning to establish the builder's requirements 40
02	Informing the public	<u>Measures for working with the public (max. 20)</u> <ul style="list-style-type: none">• Various measures have been implemented to inform the general public. +10• People in the immediate neighborhood have been informed about the construction work. +10
03	Specifications	<u>Sustainability requirements in the specification (max. 40)</u> <ul style="list-style-type: none">• Specifications have been drawn up, with detailed requirements regarding the building's sustainability. 25• Responsibilities have been defined and information has been provided. 40

DIMENSIONS OF SUSTAINABILITY
FIGURE A1



Documentation:



-The requirements planning or other documents which show the scope and when the requirements planning is implemented (e. g. extracts from records).

-A brief description of the methods employed (market analysis, environmental impact assessment, schedules of accommodation, expert site reports, cost estimates, capital budgeting, etc.).



-Documentation of the measures implemented to inform the public.

-Photo documentation of the construction site sign.



-Specifications setting out the concrete objectives for the sustainability aspects and responsibilities.

Documentation:

Requirements Planning:

Appendix 1a: Requirements description Typical/possible content;

- Main objectives of the project
- Size
- Quality
- Financial framework
- Time frame
- Current planning status of the project
- Future changes

Appendix 1b: Small requirements planning;

1. Requirements description
2. Financial and time framework
3. Priorities
4. Plot and surroundings
5. The building as a whole
6. Access for all
7. Individual rooms

Appendix 1c: Extensive requirements planning;

1. Requirements description
2. Financial and time framework
3. Priorities
4. Participation
5. Effects on users and on the public
6. Effects on the environment
7. Plot and surroundings
8. The building as a whole
9. Access for all
10. Individual rooms

Confirmation for PRO1.1: Requirements planning

We hereby confirm that, as part of the planning process for the project entitled

[project name] _____

with agreement number _____

requirements planning has been undertaken in line with the scope and quality of one of the evaluation levels below.

PLEASE CROSS WHERE APPRO- PRIATE	DESCRIPTION	POINTS
<input type="checkbox"/>	A requirements description based on Appendix 1a of this criterion or a comparable scope was carried out by the end of service phase 2 "Concept design" [T&D_01] at the latest.	10
<input type="checkbox"/>	A small-scale requirements planning based on Appendix 1b of this criterion or a comparable scope was carried out by the end of service phase 2 "Concept design" [T&D_01] at the latest.	20
<input type="checkbox"/>	A large-scale requirements planning to establish the builder's requirements based on Appendix 1c of this criterion or a comparable scope was carried out by the end of service phase 2 "Concept design" [T&D_01] at the latest.	40

A brief description of the methods employed as part of the project preparation (market analysis, environmental compatibility study, schedules of accommodation, expert site reports, cost estimates, capital budgeting, etc.) must be included with the documentation submitted for the purposes of the conformity assessment.

Date _____ Signature _____ Building owner _____ Stamp _____

The auditor hereafter confirms that they have checked that the information contained in the relevant documents is a true and fair representation of the reality.

Date _____ Auditor's signature _____ Stamp _____

PRO1.4 Sustainability aspects in tender phase

Objective:

Our objective is to integrate sustainability aspects early on, right from the tender phase, in order to ensure that all decisions take an integrated holistic approach.

Benefits:

Integrating sustainability aspects into the tender phase improves the quality of the building and ensures that decisions regarding product quality are no longer based exclusively on economic considerations.



Contribution to overriding sustainability goals



CONTRIBUTION TO SUSTAINABLE DEVELOPMENT GOALS (SDGS) OF UNITED NATIONS (UN)

CONTRIBUTION TO THE GERMAN SUSTAINABILITY STRATEGY

12.2	Sustainable management and use of natural resources	12.1.a	Sustainable consumption
12.5	Substantially reduce waste generation	12.2	Sustainable production

1
Low



01

Extent of integration of sustainability aspects in tender phase

In this criterion, 100 points can be achieved, or maximum of 110 points including bonus points.

- **Health Enhancements:**

1.Safety Standards:

2.Health Features:

- **Environment Enhancements:**

1. Environmental Standards:

2. Sustainability Practices:

- **Technical Enhancements:**

1. Technical Specifications

2. Innovation

3. Integration

- **Cross-Cutting Considerations**

1. Life Cycle Assessment

2. Compliance and Certification



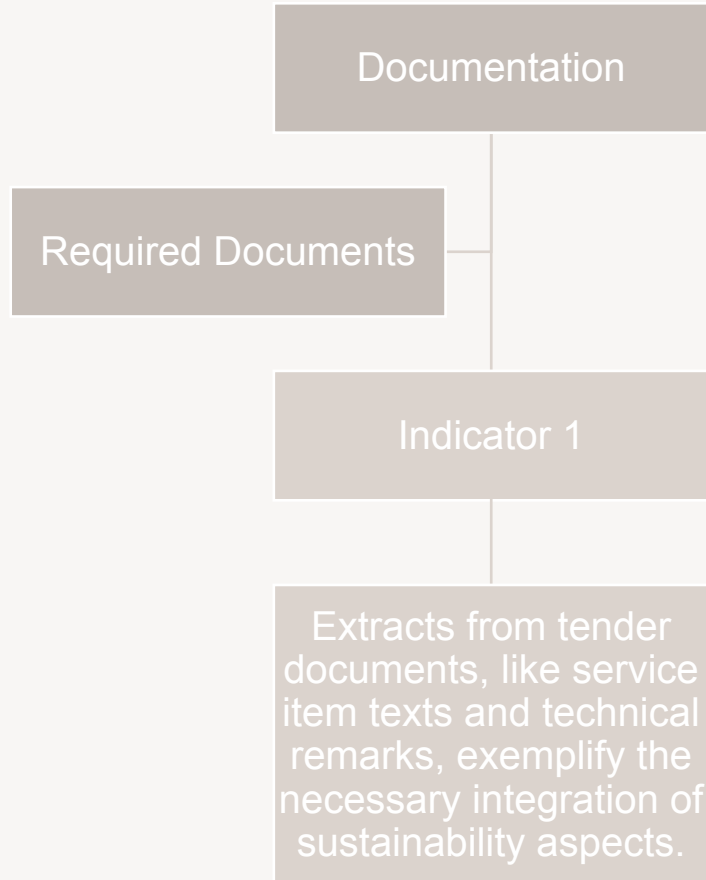
- Health, environment, and technical enhancements have been included in tender specifications **10**
- Health and environmental impact requirements for construction products have been included. **50**
- Functional invitations to tender must include specific recommendation/exclusion criteria for choosing construction products **75**
- Besides health and environmental requirements, technical aspects like durability, ease of cleaning, maintenance, or recovery are specified for each trade in the invitation to tender. **100**

CIRCULAR ECONOMY BONUS – RECYCLING MATERIALS

- A bonus can be given in the tender phase for explicitly recommending or requesting the use of reused or recycled materials, specifically for mineral construction products. **+10**



Documentation:



What is tender document?

A tender document is a set of details provided by an organization to invite bids from potential suppliers or contractors. It includes information about the project, specifications, terms, and conditions, serving as an invitation for suppliers to submit formal proposals to fulfil the project requirements.



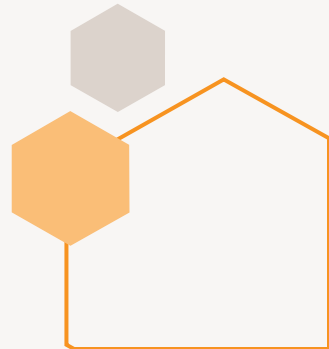
PRO 1.5 Documentation For Sustainable Management

Objective:

Efficiently operate the completed building, ensuring it meets planned performance. Provide clear and organized information to the owner, tenant, and facility manager to minimize deviations from the original plans.

Benefits:

Having all the relevant information available is key to ensuring that the building can be operated efficiently. This allows the operation of the building to be planned, and any particular issue to be dealt with, at an early stage.



01

Maintenance, inspection, operating, and care instructions

What's a maintenance inspection?

As a key component of a maintenance program, inspections include tasks that check the condition of equipment and determine what tools, materials, and labor are required to service them. A maintenance inspection is the process of evaluation the condition of equipment or machines. The purpose of a maintenance inspection is to determine what tools, materials, and labor are needed to keep them in good working condition.

Production and provision of maintenance, inspection, operating and care instructions (max. 30)

- Provision of maintenance, inspection, operating and care instructions to the appointed **+15**
- Production of maintenance and inspection schedules for building components **+15**



Evaluation:

Roof cleaning, facade, heating system, fire protection etc. regular checks should be made every year. For example the heating system;

- Filter Inspection and Replacement
- Thermostat Inspection and Replacement
- Boiler and Furnace Inspection, Repair, and Replacement
- Fuel Line Inspection and Repair
- Ventilation Inspection and Repair
- Duct Inspection and Repair/Replacement
- Central Heating System Maintenance
- Annual HVAC Maintenance



02

Up-to-date plans



Updating of plans, documentation and calculations to reflect the building as it was actually built, and provision of these to the building owner (max. 30)

- The plans reflect the building as it was actually built and are provided to the building owner **+15**
- The relevant documentation and calculations, such as the energy performance calculations, sound insulation documentation, interior acoustics documentation, fire safety concept, thermal simulation, daylight simulation, etc. **+15**
(Detailed, updated planning documents and calculations assist in confirming the target aimed for in planning. They are also important basis for modernization, revitalization or renovation work in later life cycle phases; therefore they must be kept up to date.)



03

Facility management manual

Production and provision of a facility management manual **20**

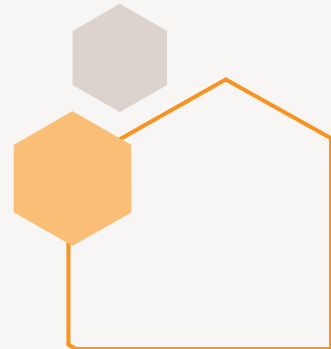
- A manual has been produced and provided to the facility manager

04

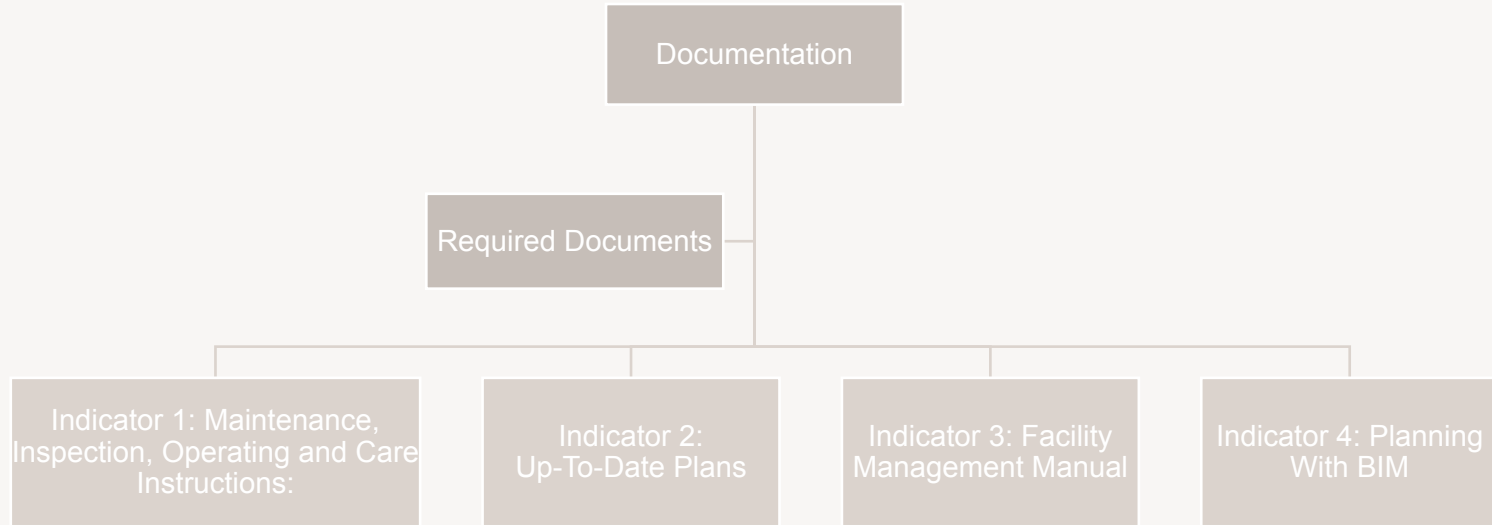
Planning with BIM

Execution of planning with BIM and provision of the BIM model **(5-20)**

- Planning has been executed with BIM and a copy of an up-to-date partial model **5**
- Planning has been executed with BIM and a copy of the up-to-date complete model has been provided to the facility management firm and to the owner. **20**



Documentation:



- Use, maintenance and care instructions that have been produced.
- Maintenance agreements that have been concluded.
- Maintenance and inspection schedule that has been drawn up, including the maintenance and inspection cycles, and the qualifications that must be held by the people/companies appointed to undertake the work.
- Documentation that contains plans and calculations which reflect the building as it was actually built, e.g. in the form of confirmation by the specialist designers and plans.
- Manual produced for the facility manager.
- Confirmation by the client/building owner that the facility manager and owner have an up-to-date copy of the BIM model.

Documentation:

Confirmation for PRO1.5: Preparation of maintenance, inspection, operating and care instructions



Hereby confirm:

_____, that in addition to the existing project's documentation

(Owner's name)

Project name: _____

Contract number: _____

maintenance, inspection, operating and care instructions to be provided within 6 months after the completion, in terms of scope and quality to comply with the requirements of the following assessment level. The corresponding services were contracted with the qualified planners.

REQUIREMENTS						POINTS (TO INSERT)	REQUIREMENTS FULFILLED
Use, maintenance and care instructions are created to the usual extent, i.e. the use, maintenance and care instructions are documented and available for the executive service providers. Alternatively, it can be proven that maintenance contracts are agreed with companies / service providers who have the appropriate expertise.						25	<input type="checkbox"/>
Detailed maintenance, inspection, operating and care instructions are created and implemented in the maintenance and operation plan, and they are specified individually for different target groups (facility management, caretaker, user, cleaning company, etc.),						40	<input type="checkbox"/>

Date

Owner's signature

Stamp

The Auditor confirms that he/she has verified the plausibility of relevant documents.

Date

Auditor's signature

Stamp

PRO 1.6 Procedure for urban and design planning

Objective:

The objective is to create sustainable buildings that integrate Baukultur, extending beyond architecture to include urban planning, infrastructure, and public art, rooted in regional cultural identity. The goal is to enhance the overall design quality of the built environment for long-term enjoyment.

Benefits:

Planning competitions provide a clear, structured, and transparent process for building owners to select the best contractor and design. The competitive nature improves design quality, offering diverse solutions and contributing to an enhanced built environment.

Contribution to overriding sustainability goals



CONTRIBUTION TO SUSTAINABLE DEVELOPMENT
GOALS (SDGS) OF UNITED NATIONS (UN)

CONTRIBUTION TO THE GERMAN
SUSTAINABILITY STRATEGY

11.3 Inclusive and sustainable urbanisation

1
Low

Outlook:

DGNB prioritizes a criterion, integral to its certification system, with no imminent plans to significantly tighten its requirements in the coming years.

Evaluation:

Points achieved in this design:

45

Scope and quality of the planning competition:

- Planning competition is held 15
- Planning competition is held, with a special focus on sustainable buildings 20

Type of competition held:

- Cooperative process 15

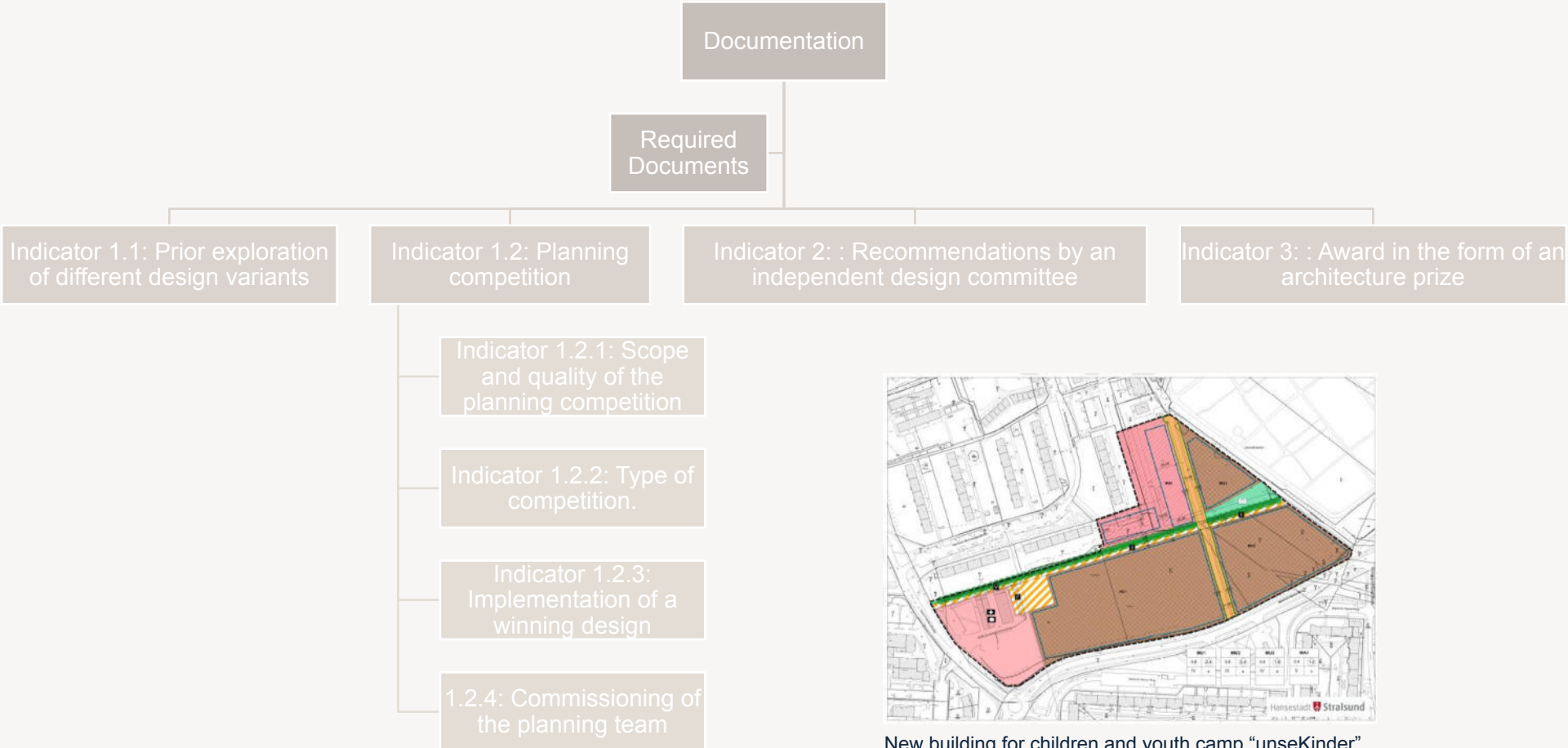
Award in the form of an architecture prize:

100

Award will be decided in future.

NO.	INDICATOR	POINTS
1	Exploration of different design variants or planning competition	
1.1	Prior exploration of different design variants Different design variants have been explored (no planning competition).	10
	Alternatively:	
1.2	Planning competition	Max. 85
1.2.1	Scope and quality of the planning competition	+Max. 20
	■ Planning competition is held	15
	■ Planning competition is held, with a special focus on sustainable buildings	20
1.2.2	Type of competition held	+Max. 35
	■ Cooperative process	15
	■ Open competition (single-stage or two-stage) or restricted competition with preliminary application procedure (single-stage or two-stage; with preliminary application procedure)	35
1.2.3	Implementation of a winning design	
	Prize winner commissioned and winning design implemented	+Max. 20
	■ Until at least service phase 3 "Developed design" [T&D_01]	10
	■ Until at least service phase 5 "Technical Design" [T&D_01]	15
	■ Until at least service phase 8 "Construction" [T&D_01]	20
1.2.4	Commissioning of the planning team	
	Prize winner's specialist design team commissioned	+Max. 10
	■ Until at least service phase 3 "Developed design" [T&D_01]	5
	■ Until at least service phase 5 "Technical Design" [T&D_01]	7.5
	■ Until at least service phase 8 "Construction" [T&D_01]	10
	Please note: Indicators 1.2.2–1.2.4 can only be credited if a planning competition in accordance with indicator 1.2 has been held.	
2	Recommendations by an independent design committee	Max. 15
2.1	Project is presented before a design committee of the municipalities and chambers of architects.	+5
2.2	Design recommendations of the design committee are implemented.	+10
	Alternatively:	
3	Award in the form of an architecture prize	
3.1	Recognition/award	Max. 100
3.1.1	Recognition in terms of good design and <i>Baukultur</i> *	40
3.1.2	Award for the completed project (e.g. architecture prize, "DGNB Diamond" Award)	100

Documentation:

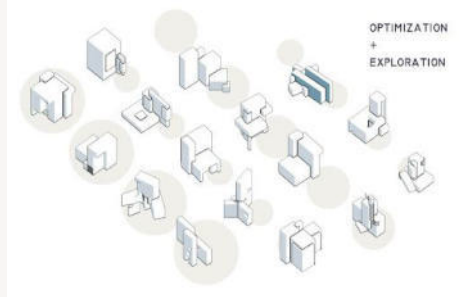


New building for children and youth camp “unseKinder”
Stralsund

Documentation:

Indicator 1.1:

- Different design variants for the whole building are explored by the appointed planning firm
- At least two different variants for each of three of the following areas should be explored and presented:
 - i. Building infrastructure (situation of entrance)
 - ii. Views (issues relating to the façade)
 - iii. Cubic content
 - iv. Materials
 - v. Urban design variants
 - vi. Floor plan variants



Indicator 1.2.1: Scope and quality of the planning competition

Planning competition held:

- Excerpt from the public offer of a reward of the planning competition that was held, specifying the competition guidelines, the competition criteria, the schedule of accommodation and a list of the members of the panel of judges.
- Additional documentation such as meeting minutes can also be submitted for the purpose of clarification.



Indicator 1.2.2: Type of competition.

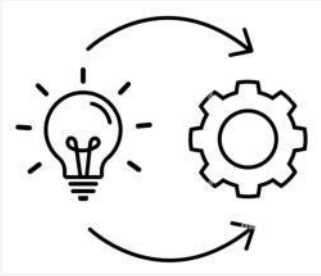
- Information about the type of competition held in the form of excerpts from the public offer of a reward, the preliminary inspection report or the report by the panel of judges.



Documentation:

Indicator 1.2.3: Implementation of a winning design

- Document the implementation of the winning design, including commissioned prize winner agreements, service phase lists, and a comparison with actual building photos.
- Also, publish the design in specialist magazines for visibility.



Indicator 1.2.4: Commissioning of the planning team

- Documentation of the commissioning of the prize winner's specialist design team by submitting excerpts of the signed agreements



Indicator 2: Recommendations by an independent design committee

- Minutes of the design committee meeting, including information on the composition of the independent committee
- Comparison of the planning status before and after the design committee meeting, with information about recommendations that are implemented



Indicator 3: Award in the form of an architecture prize

- Document architecture prize details, judge panel, and award reasoning.
- Include additional published award information.
- List expert judges and their qualifications.
- Consider recommendations from the DGNB Commission for the "DGNB Diamond" Award or architectural recognition.







PRO 2.1 Construction site/construction process



POINTS

Low-Noise Construction Site

	Low-noise concept	<u>5 out of 5</u>	Noise-generating activities were scheduled Sound barriers were used for noisy machinery
	Training for the contractors	<u>10 out of 10</u>	The Contractor was educated and trained
	Reviewing the implemented work	<u>10 out of 10</u>	The plan was monitored and documented
	Innovation area	<u>10 bonus points</u>	Provide the workers with personal protective equipment: noise-cancelling headphones.



Acoustics Innovation





Silence your construction site!
Retractable noise barrier helps!



Mai Po, HK

POINTS

Low-Dust Construction Site

	Low-Dust concept	<u>5 out of 5</u>	wet processes were used: wet saws that use water to reduce dust
	Training for the contractors	<u>10 out of 10</u>	The Contractor was educated and trained
	Reviewing the implemented work	<u>10 out of 10</u>	The plan was monitored and documented
	Innovation area	<u>1 bonus point</u>	Provide the worker with personal protective equipment: respirators and dust masks



POINTS

Soil and Groundwater protection on the site



Soil and Groundwater protection concept

5 out of 5

Hazardous substances were avoided
Valuable topsoil layer was remediated



Training ffor the contractors

10 out of 10

The Contractor was educated and trained



Reviewing the implemented work

10 out of 10

The plan was monitored and documented



POINTS

Low-waste construction site



**Low-waste protection
concept**

5 out of 5

Waste was separated into categories



**Training ffor the
contractors**

10 out of 10

The Contractor was educated and trained



**Reviewing the
implemented work**

10 out of 10

The plan was monitored and documented



Innovation area

1 bonus point

On site recycling facilities were set up to handle recyclable and organic materials.

A breakdown of the common categories of waste separation in construction:

1. Construction and Demolition (C&D) Waste
2. Recyclable Waste
3. Hazardous Waste
4. Organic Waste
5. Electronic Waste (e-waste)
6. Construction Wood Waste
7. Demolished Concrete Waste
8. Metal Waste
9. Asphalt and Tarp Waste
10. Paint and Solvent Waste



PRO 2.2 Quality assurance of the construction



Contribution to overriding sustainability goals

No direct contribution to the Sustainable Development Goals (SDGs) of the United Nations (UN) and to the German Sustainability Strategy.

Objectives

To ensure that sustainability requirements are effectively implemented during the construction phase through informative quality assurance processes, and providing documentation of their fulfillment.

Benefits

Building quality verification through investigations ensures sustainable use for a long time and provides the owner with informative documentation.

POINTS

Quality control measurements



Implementation of quality control measurements

Max. 60

Differential pressure has been measured (using blower door test) before the implementation of the fitting work.

+20



Thermal imaging measurement has been carried out for the building.

+10



Reverberation period has been measured for relevant, representative building components.

+10



Sound reduction index (airborne sound insulation) pertaining to the attenuation of external noise ingress (e.g. by means of the façade) has been determined.

+10

Sound reduction index (airborne sound insulation) pertaining to the attenuation of noise in the interior (e.g. by means of meeting-room walls) has been determined.

+10

Measurements have been taken to determine the footfall noise level from ceilings.

+10

Other measurements that are relevant to the building (e.g. emissions control measurement, smoke extraction tests, moisture measurement prior to laying floor coverings in order to prevent moisture damage, etc.) have been taken – and the associated zero-defect declaration has been submitted

+10

BLOWER DOOR TEST

by



THE FAN DRAWS AIR FROM THE INSIDE TO THE OUTSIDE

THE AIR IS FORCED BACK IN THROUGH CRACKS OR LEAKS

THE BLOWER DOOR FAN DEPRESSURIZES THE HOME



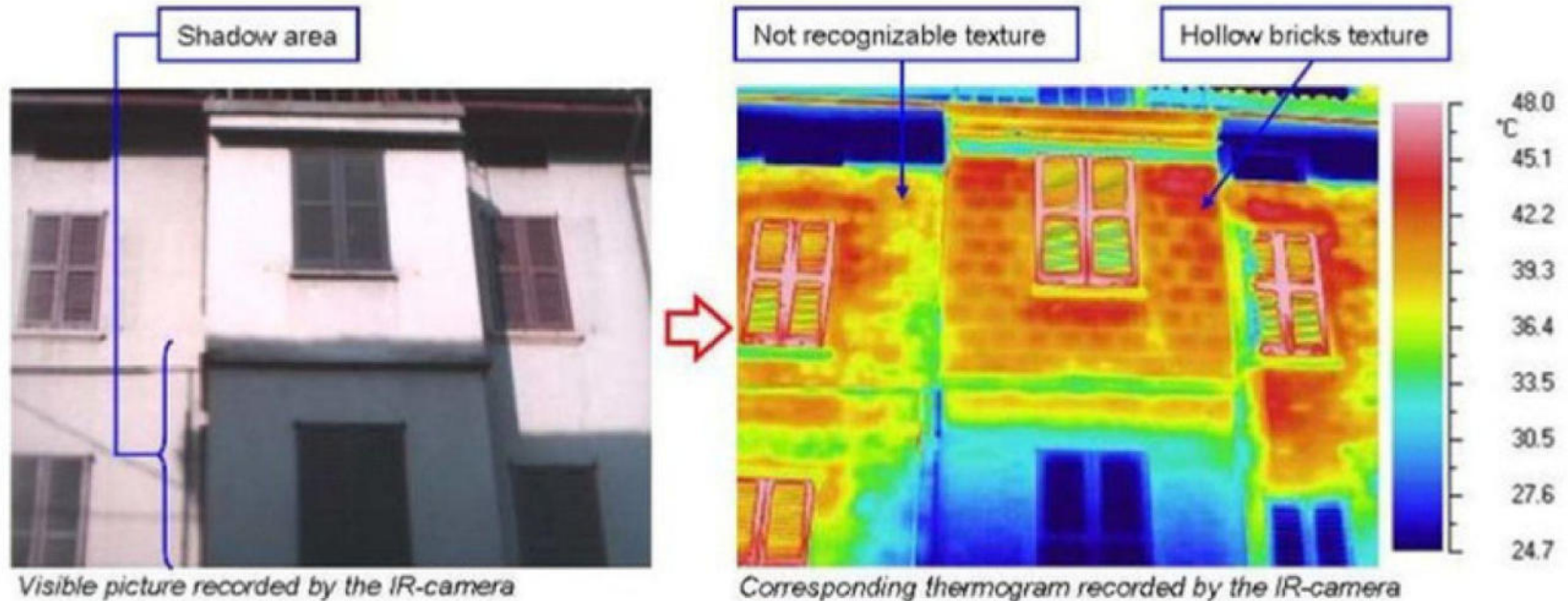
A blower door is a machine used to perform a building air leakage test. It can also be used to measure airflow between building zones, to test ductwork airtightness and to help physically locate air leakage sites in the building envelope.

<https://www.barriersciences.com/blog/blower-door-test-faq>



Thermal imaging, also known as infrared thermography, is a non-destructive testing (NDT) method that uses infrared radiation to create an image of a surface's temperature distribution. This information can be used to identify areas of heat loss or gain, as well as potential fire hazards.

It can be measured using a thermal imaging camera or a thermal scanner.



Reverberation time is a measure of how long sound waves bounce around a room before they dissipate.

The reverberation time of a room is determined by a number of factors, including the size, shape, and materials of the room. Hard, reflective surfaces, such as wood and tile, will cause sound to bounce around more, leading to a longer reverberation time. Soft, absorbent surfaces, such as curtains and carpet, will absorb sound waves, leading to a shorter reverberation time.

In classrooms, a short reverberation time can help students to hear the teacher clearly and to distinguish between different sounds.

XL2 Acoustic Analyzer for
Reverberation Time
Measurement measures
the reverberation time
automatically



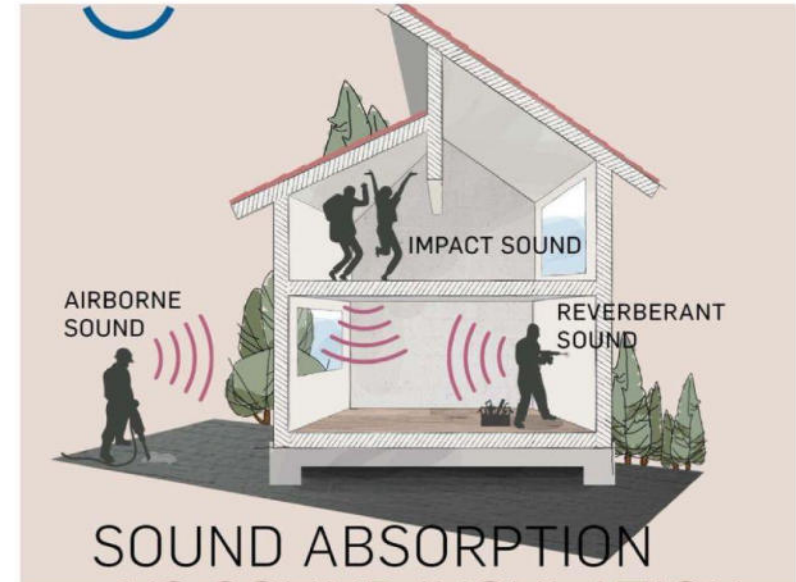
Sound reduction index (SRI) is a measure of how well a material or structure can block sound from passing through it.

Factors that can affect the SRI of a façade:

- The type of materials used in the façade: Different materials have different soundproofing properties. For example, dense materials like concrete and brick tend to have higher SRI ratings than lightweight materials like wood and glass.
- The thickness of the materials
- The number of layers of materials
- The type of joints between the materials

Several factors contribute to the SRI of meeting room walls:

- Material
- Thickness
- Design
- Surface Treatment



POINTS

Mould prevention

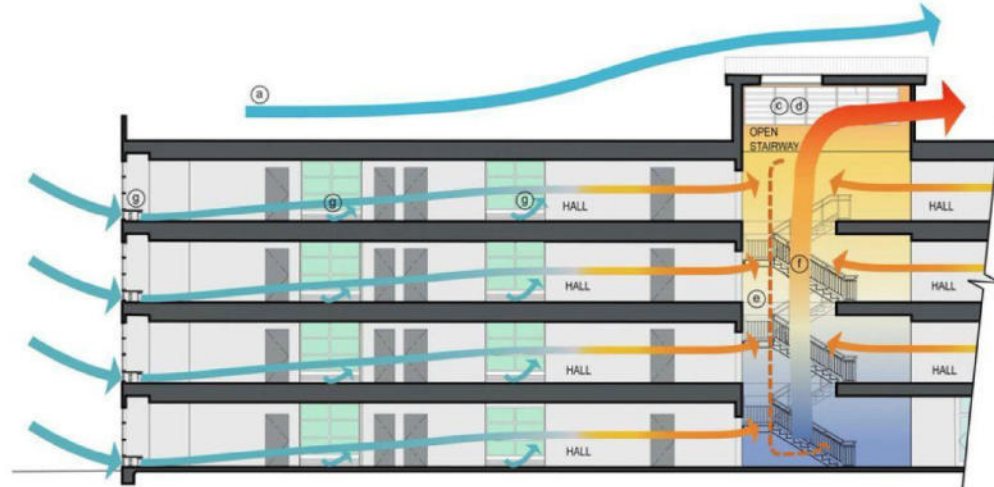


Mould prevention

A ventilation programme tailored for the building has been drawn up and implemented in order to ensure that the building components are sufficiently dry

10 of 10

Ventilation concept was suggested to keep the air inside fresh



PRO 2.3 Systematic commissioning

Contribution to overriding sustainability goals



Objectives

Our objective is to promptly hand over the completed building and ensure its systematic operation where all features/attributes work as initially designed.

Benefits

Systematic commissioning ensures that the planned features/attributes of the building are implemented. This minimises risks and is a relevant component for the efficient use of energy sources.

POINTS

Monitoring concept



Creation of a monitoring concept

Suitable monitoring concept is created for recording energy and water consumption

15 of 15

Water monitoring
product example



https://nicevoteet.live/product_details/92123895.html

POINTS

Commissioning concept



Creation of a commissioning concept for scheduling

Commissioning concept including scheduling is created

10 of 10

A commissioning concept for scheduling in DGNB involves developing a detailed plan for the commissioning process to ensure that all building systems are properly tested, inspected, and adjusted to meet the required performance criteria. This is crucial for achieving the high sustainability standards set forth by DGNB certification.

POINTS

Function test and training



Performance and documentation of a function test and training for the operator

Function test is performed, its results are documented and training is provided for the operator

15 of 15

A function test in DGNB involves a rigorous evaluation of the building's technical systems to ensure they are operating as intended and meet the performance requirements outlined in the building design and DGNB standards. This test typically covers the following aspects:

1. Mechanical Systems
2. Electrical Systems
3. Control Systems
4. Building Envelope
5. Water Management Systems
6. Waste Management Systems

POINTS

Final report on commissioning



Creation of a detailed final report

A detailed final report for commissioning is created.

20 of 20

POINTS

Integral operating concept and systematic commissioning



Creation and handover of an integral operating concept

Creation and handover of an integral operating concept is done as part of a process for continuous monitoring and regulating, and training is provided for the operators. The operator has been appropriately briefed regarding the integral operating concept.

20 of 20

POINTS

Commissioning management



Readjustment of the system following initial operating phase

Service descriptions for the general services, developed design, technical design, construction, completion, documentation, building use and operating phase readjustment during building operation. Commissioning of a specialist planner or a(n) (independent) third party for continued regulation is done, and for the first time, approximately 10-14 months following completion.

10 of 10

PRO 2.4 User communication

Contribution to overriding sustainability goals

CONTRIBUTION TO SUSTAINABLE DEVELOPMENT
GOALS (SDGS) OF UNITED NATIONS (UN)

- ☒ Education for sustainable development and global citizenship



- ☐ Promote universal understanding of sustainable lifestyles

Objectives

Inform the building's users with regard to the building's sustainability; Motivate them to contribute to the building's sustainability; Motivate them to act in a way that contributes to their own well-being.

Benefits

The desired effects are achieved when the users help to make the building more sustainable through their behaviour and actions. Effective communication increases customer retention and customer satisfaction.

This criteria will no longer be needed

POINTS

Sustainability guide



Provision of a sustainability guide for the user

Sustainability guide with recommended courses of action regarding ecological, economic and social issues, provided for the users.

35 of 35

POINTS

Sustainability information system



Implementation of an information system on the sustainability aspects of the building

30 of max 30

- A concept has been developed, including implementation planning .
- An information system on the sustainability of the building has been installed.

15 of 15

15 of 30

POINTS

Technical user manual



Provision of a technical user manual

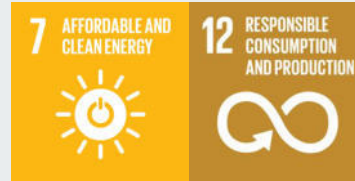
Set of user instructions for the building's technical services, with information and specifications that supports the operation of the building, with instructions and simple graphics that explain technical aspects of the building technology and specific.

35 of 35

PRO 2.5 FM-compliant planning

CONTRIBUTION TO SUSTAINABLE DEVELOPMENT
GOALS (SDGS) OF UNITED NATIONS (UN)

- ☒ Resource conservation
- ☐
- ☒ Doubling the improvement in energy efficiency
- ☐



CONTRIBUTION TO THE GERMAN
SUSTAINABILITY STRATEGY

- ☒ Use of natural resources
- ☐

Objectives

Adequately take into account the requirements of facility management (FM) for later building operation, as early as in the planning phase. This enables optimal operation of the building by users and service providers.

Benefits

A review of the areas with regard to the requirements resulting from the building operation and operating costs; Projection enables later operating costs and effort to be significantly reduced by means of simple measures; Analysis and optimisation of user-related and use-related energy consumption supports the energy efficiency of the entire building and thereby results in lower operating costs.

POINTS

Facility Management Check



Performance of an FM check

Performance of an FM check for the project with regard to accessibility, operational routing and space utilisation issues

30 of 30

POINTS

Operating cost projection



Detailed operating cost projection

Creation of a detailed operating cost projection for infrastructure services (cleaning), technical services, energy costs and municipal charges.

40 of 40

POINTS

User-related and use-related energy consumption



Optimisation of user/use-related energy consumption

- Optimisation of the user-related and use-related energy consumption
- Creation and implementation of a metering concept relating to the
- facilities that have an impact on energy consumption

30 of 30

15 of 15

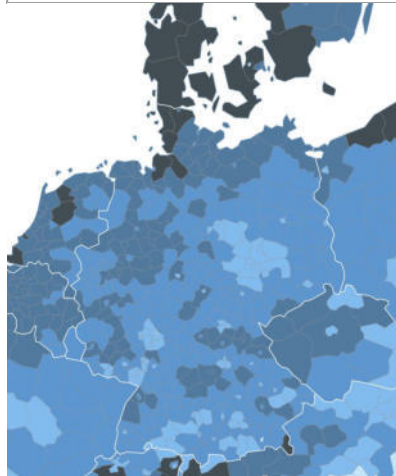
15 of 15

SITE QUALITY (SITE)



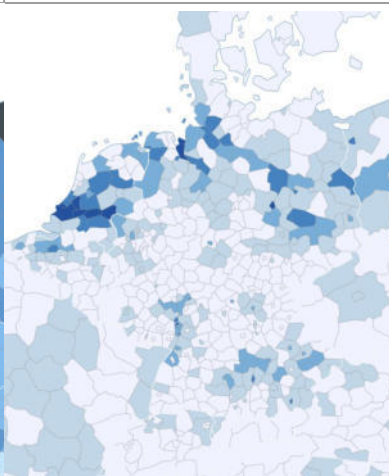
SITE 1.1 Local environment

Storm	Floods	Heavy rain	Hail
Hurricane > 33 m/s Major devastation	Medium (flood hazard every 50 to 100 years)	≥ 36 mm rain in 1 hour or ≥ 50 mm rain in 6 hours (extreme weather warning); recurs every 10 years	Moderate zone
5	3.5	5	14



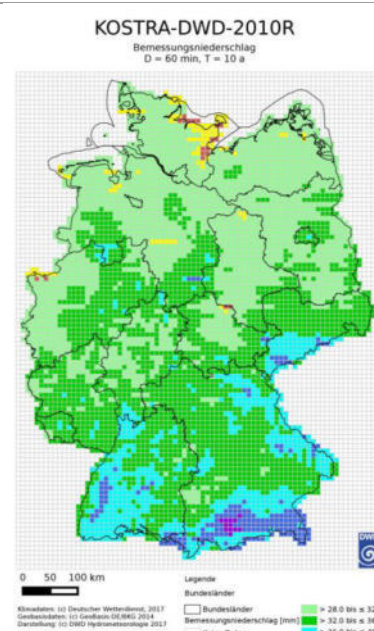
Maximum wind speed for three-second gusts for winter storms, 1981–2010

m/s



Flooded area of river floods with a 100-year return period

%



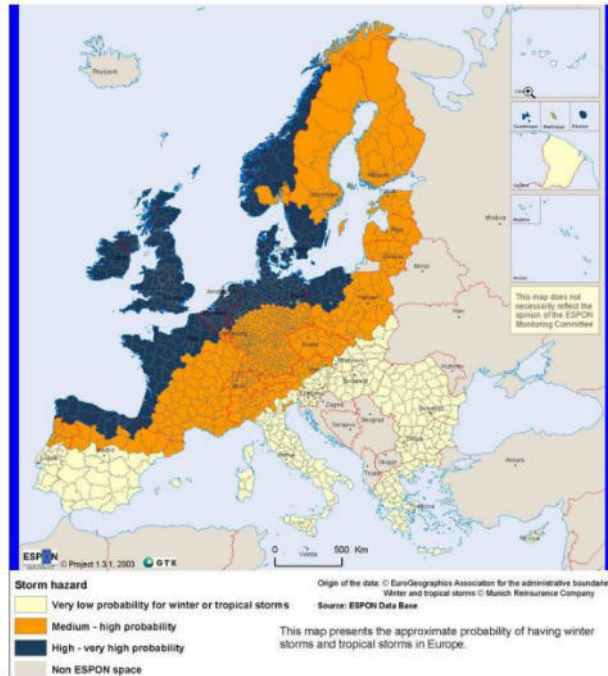
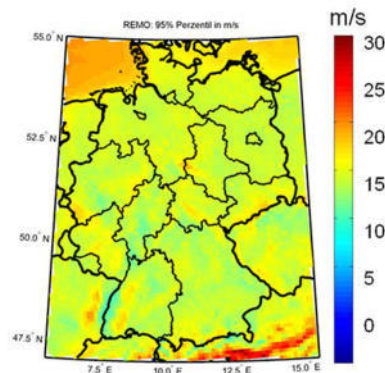
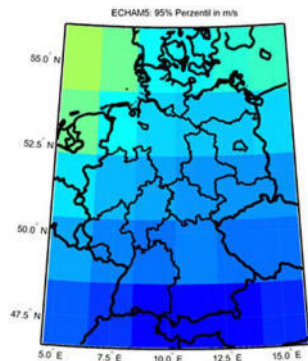
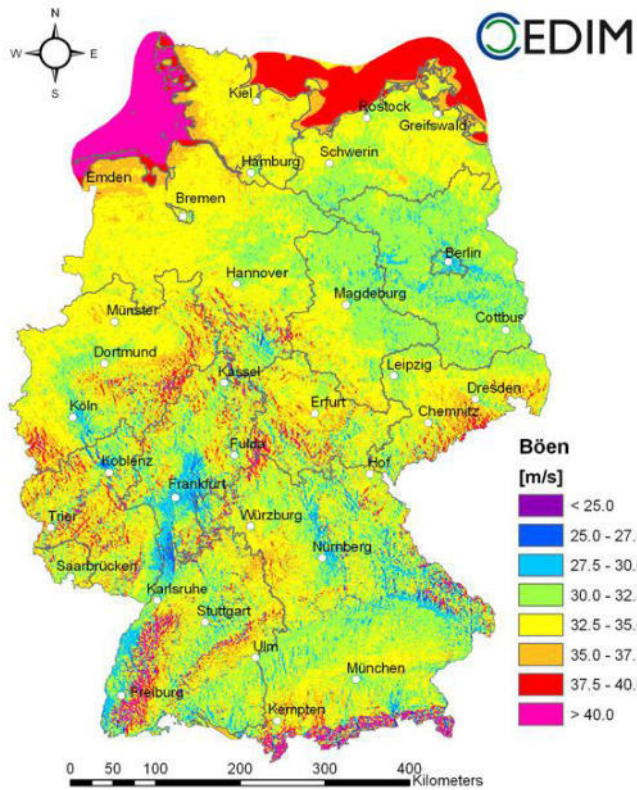


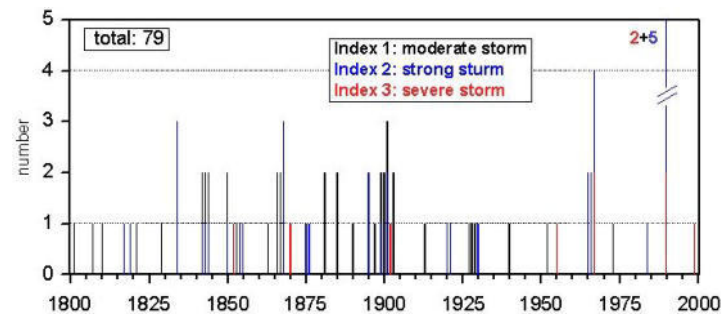
Figure 5 Storm hazard map, ESPON

AVERAGE WIND SPEED	DEFINITION	DESCRIPTION OF THE MAXIMUM IMPACT
21–24 m/s	Storm	Minor damage to houses (roof tiles come loose)
25–28 m/s	Severe storm	Wind snaps trees, major damage to buildings
29–32 m/s	Violent storm	Wind uproots trees, propagates storm damage
> 33 m/s	Hurricane	Major devastation

A storm is defined as wind with speeds of at least 20.8 m/s (74.9 kph) or 9 on the Beaufort Scale. Direct storm damage primarily affects roof coverings and other objects that can be carried by the wind; in heavily forested areas, damage also occurs due to uprooted or snapped trees. Indirect damage is also significant, for example as a result of sand deposited on agricultural land in a sandstorm or as a result of hailstones.



Storm hazard in Germany - ESKP

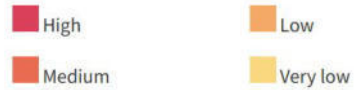





River flood

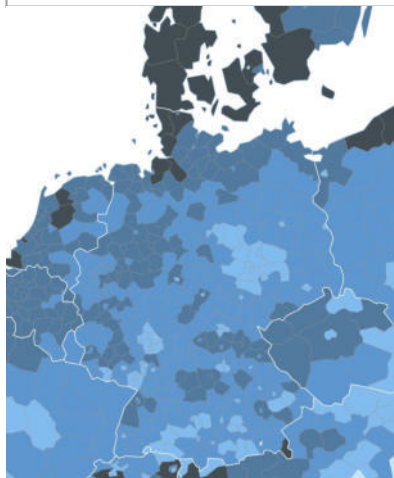
Urban flood

Coastal flood

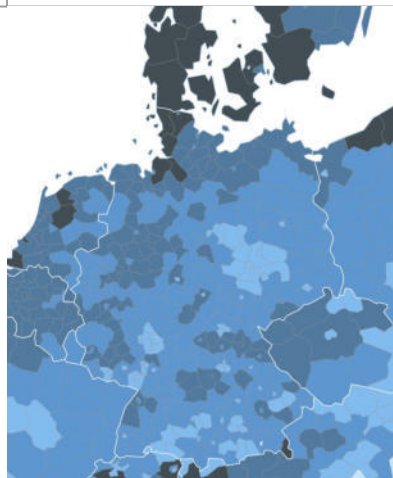


Flooding is generally a natural occurrence. It is classified as a disaster (flood disaster) when human lives are affected. The more intensively the land is used, the larger the amount of area exposed to the risk of flooding.

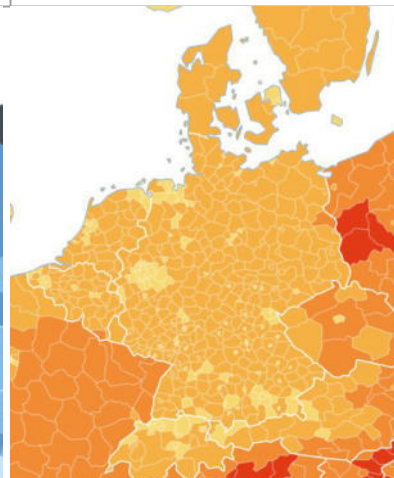
Storm surge/tsunami	Extreme climates	Forest fires	Air quality
<p>Moderate risk</p> <p>38-44</p> 	<p>Moderate risk</p>	<p>Last forest fire was more than 50 years ago or no forest fires in the immediate vicinity of the district</p>	<p>PM10 not exceeded</p> <p>NO2 not exceeded</p>
8	8	20	10 10



Maximum wind speed for three-second gusts for winter storms, 1981–2010

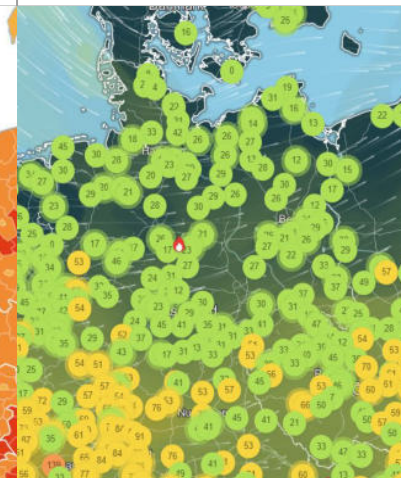
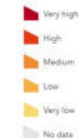


Maximum wind speed for three-second gusts for winter storms, 1981–2010



Risk of wildfire on environment

Baseline climate (1981–2010) with absolute exposure





Wildfire



Outdoor noise

Building oriented/positioned so as to minimise the noise level in common areas both indoors and outdoors (noise protection development).

River flood	High
Coastal flood	High
Wildfire	High
Urban flood	Low
Water scarcity	Low
Extreme heat	Low
Earthquake	Very low
Landslide	Very low
Tsunami	Mid-Danger
Volcano	Mid-Danger
Cyclone	Mid-Danger

HAZARD LEVEL

compensation measures

Extreme climates Structural measures to alleviate the effects of extreme climates can be proposed.

Forest fires The district is situated on a site that is normally not directly affected by forest fires.

Noise level Building oriented/positioned so as to minimise the noise level in common areas both indoors and outdoors (noise protection development).

Air quality Active measures to improve the air quality on the facade or in the building's outdoor area will be reflected positively in the evaluation. Points will be awarded when clear evidence can be provided, e.g. in the form of measurements, that these measures directly result in the improvement of air quality. Measures to improve the air quality include for example façade greening and/or the use of proven air-purifying materials.

Storm 90% of all the surrounding buildings have no more than four storeys (because the wind load on a facade increases exponentially in relation to its height).

Flood Safe distance of the ground floor (> 15 cm) above the water level of a 50-years flood event-+3 +1.5

By proposing the risk analysis and also safety measures for building in all criteria we can get more points.and more importantly make our building safer in environmental situation.

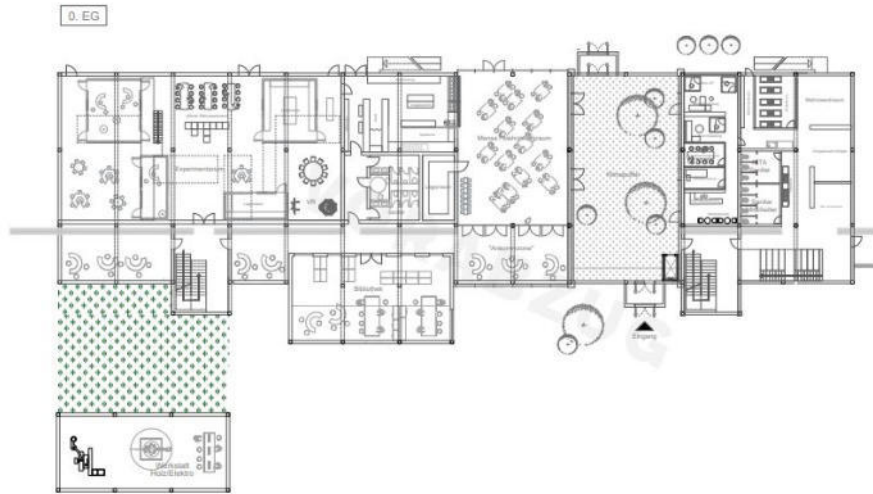


SITE 1.2 Influence on the district

The image of a site has a significant influence on how the building and its vicinity are received by its users and visitors, and on the building's ability to play a productive role in the district. In terms of a building's economic and social quality in particular, it is therefore vital that it not only satisfies functional requirements, but that it also conveys a positive image •

Site analysis



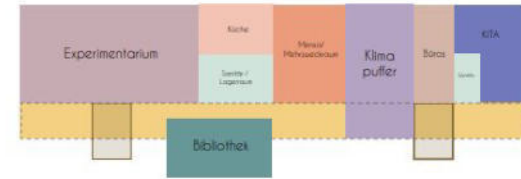


Information on the building's function, use and accessibility

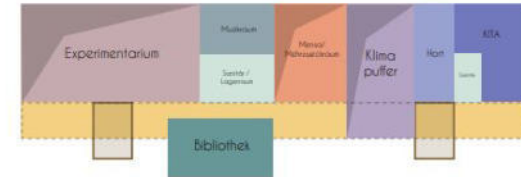
site is a landmark and has a desirable location

Site has positive local impact and/or exposed location in the district as a whole: positive image of the building/site due to its location in the district is the basis for high-quality architecture and use.

0. EG



1. OG



2. OG

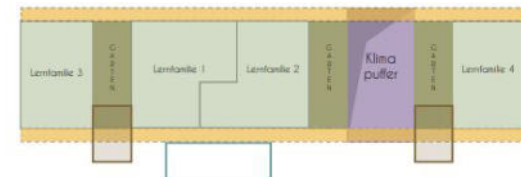




Image and site value appreciation

Influence of the building on the site or the district

Max. 15

- | | |
|--|----|
| <ul style="list-style-type: none"> ■ Building has a neutral image; impact neither positive nor negative: Acceptable image for the district. The building and its use fit into the existing structure. | 5 |
| <ul style="list-style-type: none"> ■ Building has a positive local impact: positive image for the district. The building and its use enhance the district with a unique impact and character; the building has a regional pull. | 10 |
| <ul style="list-style-type: none"> ■ Building has a positive impact regionally and nationally: very positive image for the district. The building and its use make the district a desirable area. National pull due to use or building. | 15 |

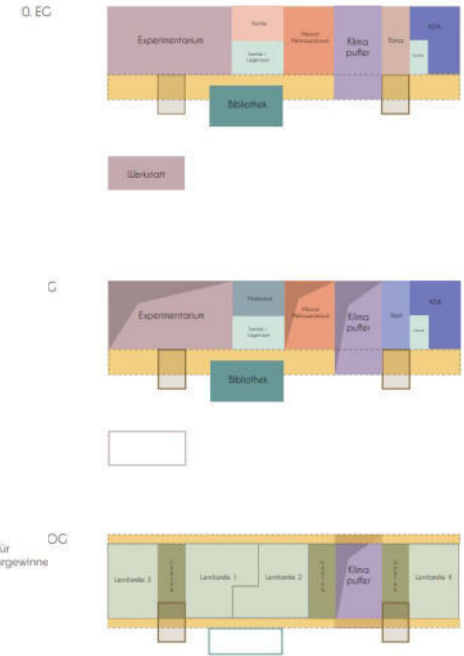
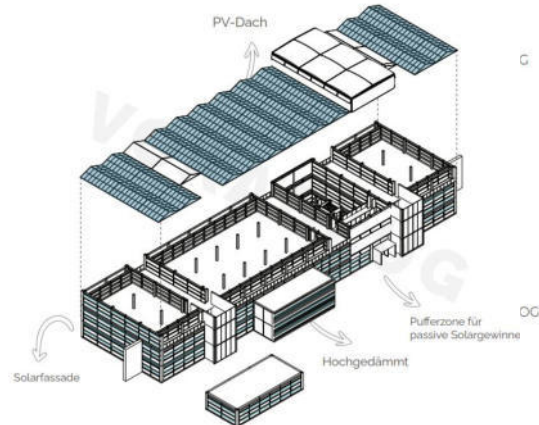


3-Potential synergy

Building with neutral, integrated use and impact on the surrounding area

Building/use with at least two synergistic effects at technical or economical, usage or social level that form a cluster configuration that is highly attractive to customers and users, who are therefore closely connected to associated companies or even competitors.

Building/use with at least three synergistic effects at technical or economical, usage or social level that form a cluster configuration that is highly attractive to customers and users, who are therefore closely connected to associated companies or even competitors.



4 Boost/attraction

4.1 Boost due to use

15

There is a new use/a new building for the district, which adds a unique feature to the region/attracts people from around the country and/or attracts new uses/employers/leisure attractions (e.g. outlet centres, experiences, etc.)

4.2 Boost due to spatial and design aspects

15

Building/use as a unique building project that makes the district a desirable area and "stimulates" the district (e.g. 50Hertz building in Berlin) or building/use after which a district is named (e.g. Alnatura Campus, Ricola Kräuterzentrum, Torre Agbar, Kulturbrauerei Berlin, ZKM Karlsruhe, etc.).

Re 4. INNOVATION AREA

Explanation: If this building gives an exceptional boost to the district/site that goes beyond the scope of the aspects defined above, this can also be credited. This can include, for example, architectural or civil engineering innovations.



As in 4.

Due to the attraction, as there is not much to do at that area by building the kindergarten definitely will bring so many attraction to the area. Even the local were saying that the crime rate is high due to the lack of attraction for youngsters.

This building gives Unique features to the region, it is attractive for local people

Also i think by opening the door for local can give a chance to them to have a place for having fun and gathering together.

SITE 1.3 Transport access



Our objective is to promote sustainable mobility in various forms for the building users and to ensure that sustainable traffic infrastructure is created.

Benefits

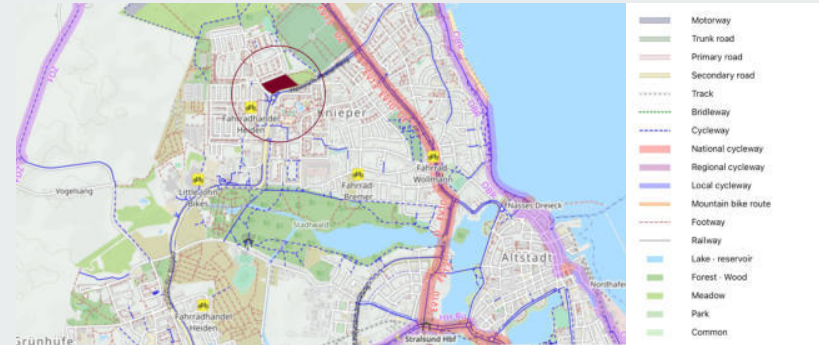
Sustainable, intelligent traffic infrastructure allows users to choose the most appropriate means of transport for their individual needs. If a wide variety of mobility provisions are offered, it can be assumed that the use of motorised private transportation, and hence the associated amount of pollution and other negative effects will be reduced.

1-Motorised private transportation



1.1 Surrounding area

Topic	Distance	Score
Access to a highway	12 min (car)	+5
Access to a main road	Quick access	+5



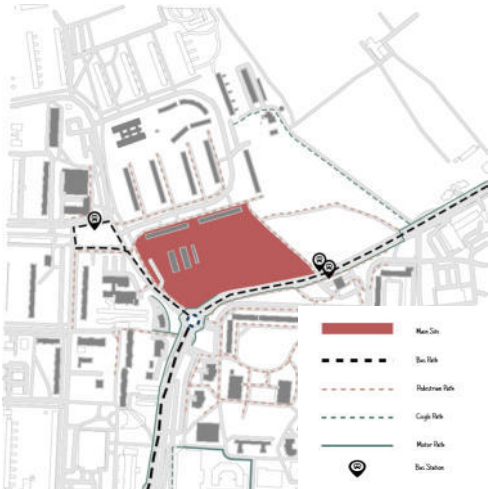
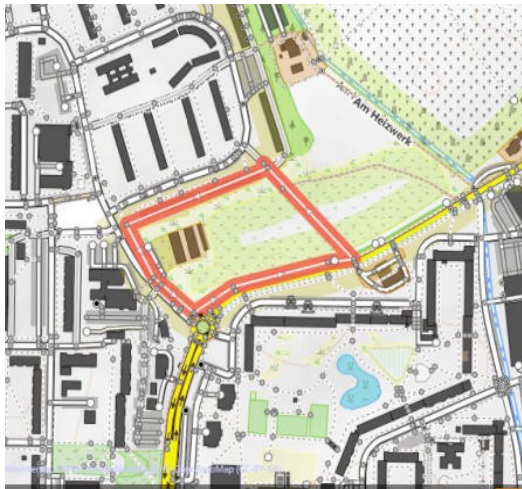
1.2 Building-related

Topic	Score
The parking spaces allocated to the building	+5



2-Public transport

Topic		Score
Stops(Bus)	Quick access	+5
Access to the nearest railway station	>20 minutes	0
Public transport frequency	Every 10 minutes max	+2.5



Building-related

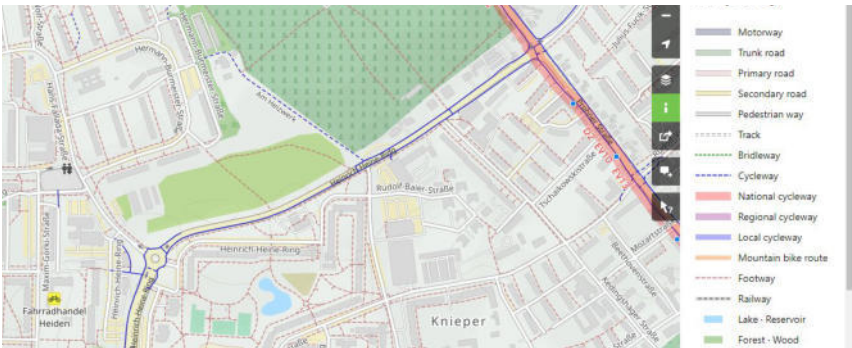


Topic		Score
Access to passenger information (permanent notice or digital display)	At the bus stations	+5
A map of the surrounding area is displayed, showing the location of bus stops and how far away they are in minutes; alternatively, signposting is provided	At the bus stations	+5



[https://www.ostsee-zeitung.de/resizer/p-xNlbYpoZmPERqoselbbv55aaE=/1200x675/filters:quality\(70\):watermark\(assets.rndtech.de/oz/watermark-plus.svg,50,50,0\)/cloudfront-eu-central-1.images.arcpublishing.com/madsack/G2HFETI3MCVWDZMB7XNQH241CY.jpg](https://www.ostsee-zeitung.de/resizer/p-xNlbYpoZmPERqoselbbv55aaE=/1200x675/filters:quality(70):watermark(assets.rndtech.de/oz/watermark-plus.svg,50,50,0)/cloudfront-eu-central-1.images.arcpublishing.com/madsack/G2HFETI3MCVWDZMB7XNQH241CY.jpg)

3-Cyclists



Topics	Score
Not mixed with vehicular traffic/shared space or bicycle lane	5
National access (> 10 km) and continuity	5
Access road within the boundaries of the property leading directly to the building/parking facilities	5



4-Pedestrian traffic

Pedestrian path network (radius of 350 m from the main entrance)	All walking possibilities covered	5
Crossing possibilities	Direct crossing is possible without any restriction	5
Signage	Extensive signage	3

5-Barrier-free design of stops

Barrier-free access to nearby public transport stops	Covers all access points	10
Barrier-free design of the path to the building and the area surrounding it	No visual obstructions, tactile guiding elements, dips, area is not crossed by cyclists	10

SITE 1.4 Access to amenities



Our objective is to optimally cater to the day-to-day needs of the building users through the provision of easily accessible social and commercial infrastructure in the vicinity, thereby achieving social acceptance for the building. We also seek to ensure that the building is integrated into its urban context by opening up a wide range of uses to the public.

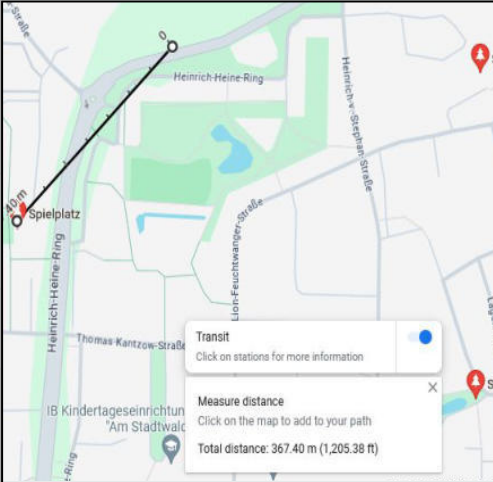
Benefits

The building users' satisfaction with the site can be increased by ensuring that there are facilities nearby that cater to their day-to-day requirements. Districts become more lively when their pavements and cycle paths are used. This also has the effect of reducing the use of motorised transportation and the associated noise pollution and harmful emissions. Furthermore, the value retention of buildings within lively districts is greater.

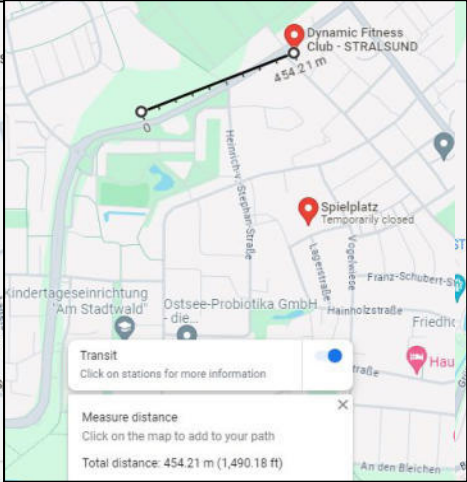
Social infrastructure

Within the district/surrounding area

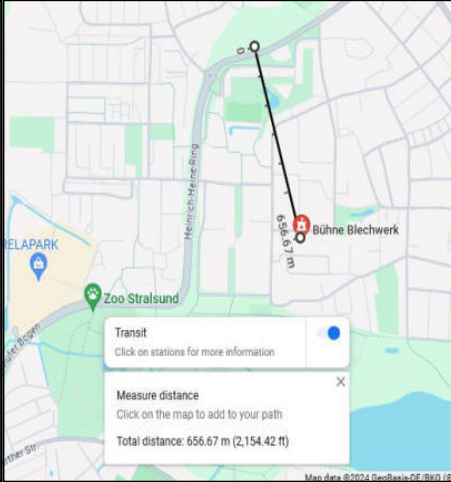
Topics	MAX. AIR-LINE DISTANCE [M]	Score
Education 1	350	+10
Leisure	700	+5
Playgrounds	350	+10
Sports facilities	700	+5



Playground



Fitness club



Leisure(Theater)

Commercial infrastructure

Within the district/surrounding area



Considering the conversations we have had with the locals and surveys, we found that due to the high rate of residential buildings in this area, there is no environment for people to gather and communicate. Therefore, it is better to consider specific interior and exterior spaces in this design so that we can increase people's communication as well as entertainment.

But in general, I think it will not be very safe to consider common spaces for the children who will come to this kindergarten. But according to the reviews, it may be considered a public library in this design.

Topics	MAX. AIR-LINE DISTANCE	Score
Full-range supplier (supply of everyday goods)	700	+15
Small retail outlets (bakery, butcher, drug store, etc.)	700	+5
Restaurant, café, bakery, etc.	700	+5
Bank, post office, hairdresser, fitness studio, wellness facilities, etc.	700	+5
Medical services 1 General practitioner	700	+10
Medical services 2 Specialists, pharmacy, etc.	700	+5