MULTI-PURPOSE HALL

LOVBYVEJ 54, 8700 HORSENS

GREEN LINE ARCHITECTS

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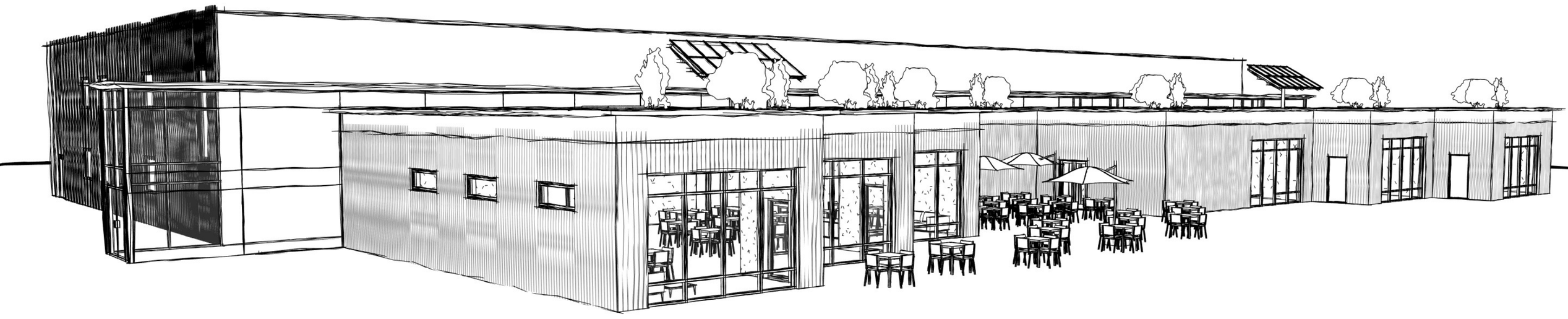
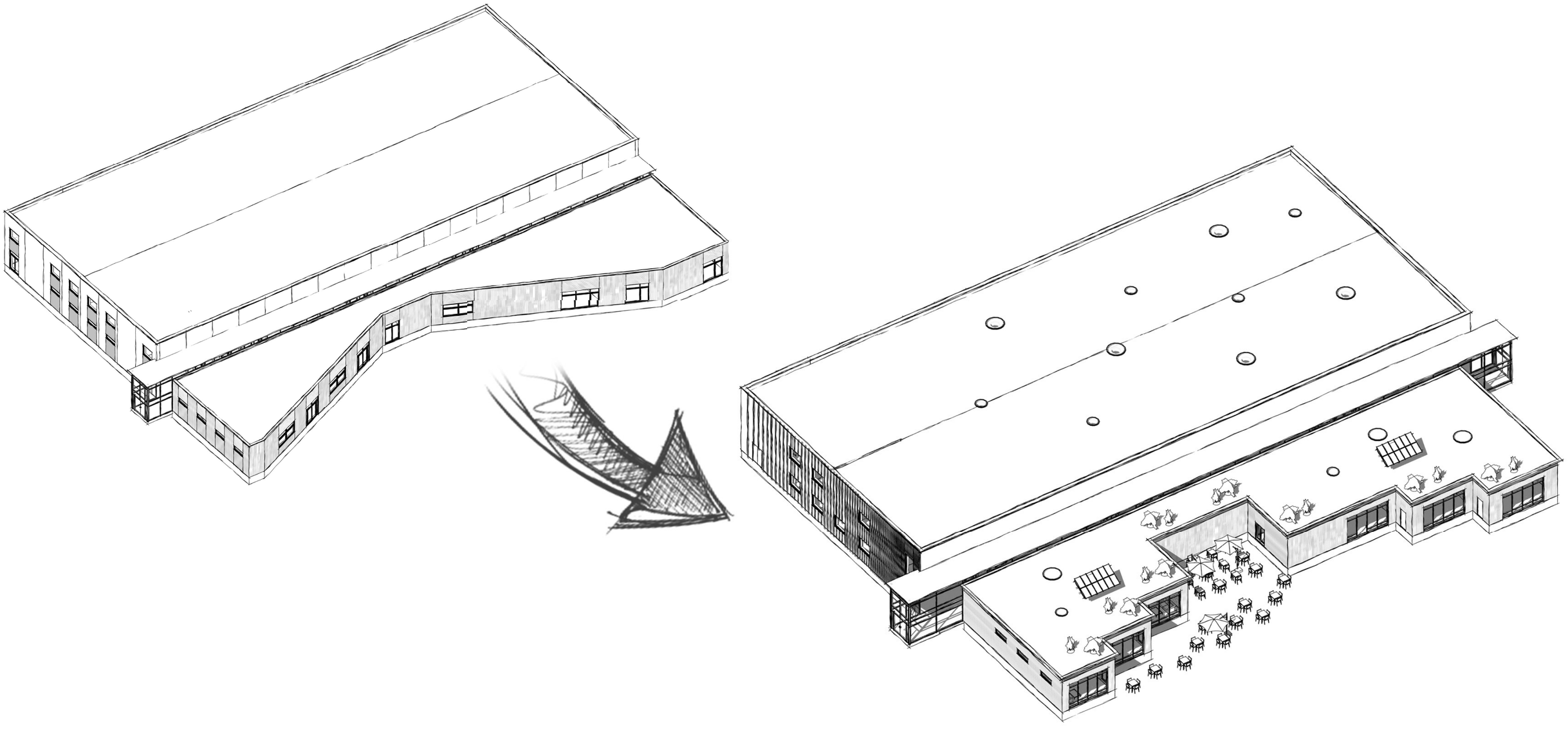


PROPOSED CHANGES: SHAPE



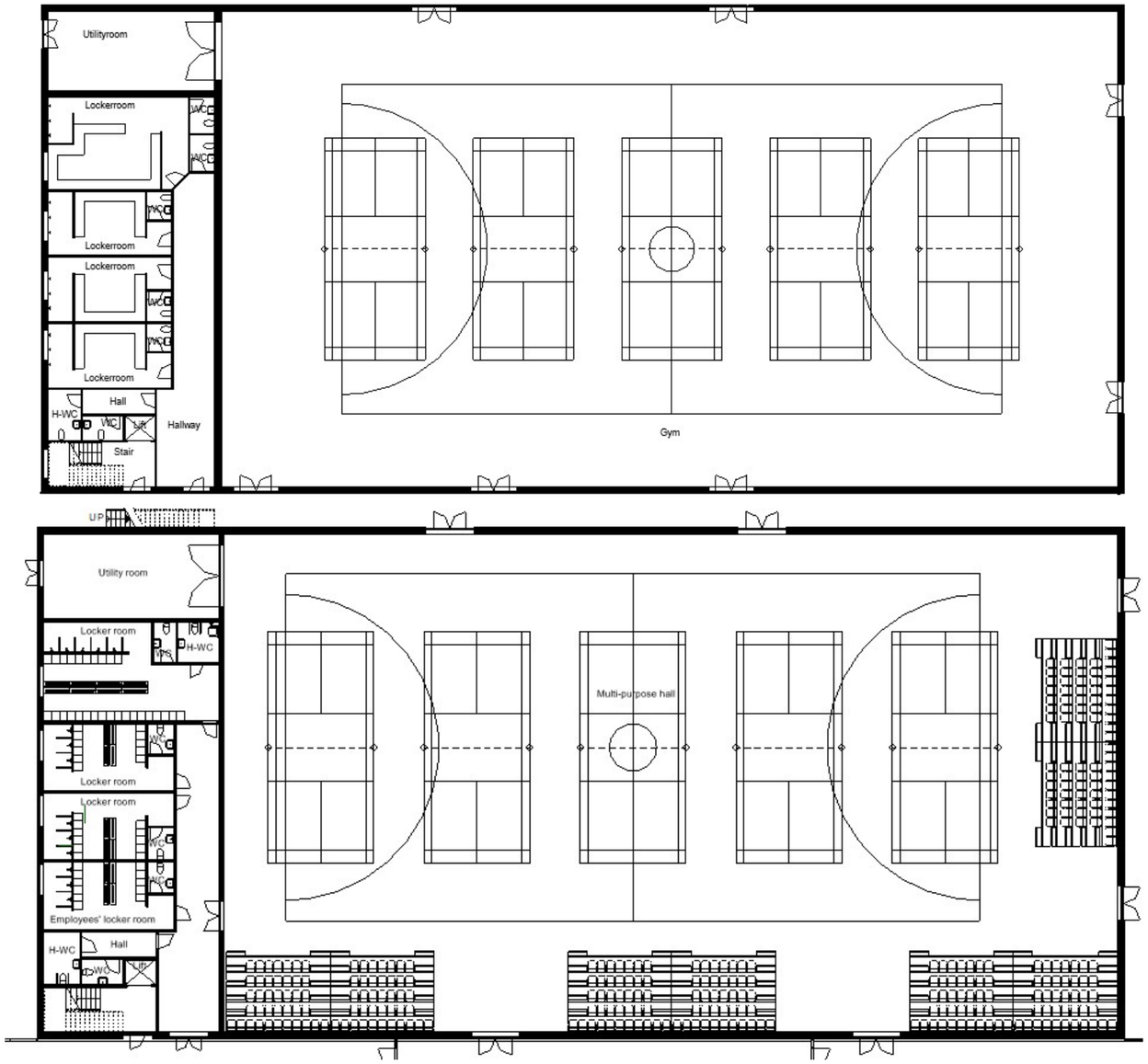
PROPOSED CHANGES: CONCRETE HALL

ROOM CHANGES

- added windows and tunnel skylights for additional natural light
- added wooden cladding on concrete for a more natural and modern layout
- doors direction have been changed in order to lead to the escape routes
- changed position of showers and lockers for easier access and to meet the regulations as well as space requirements
- added toilet for handicapped with shower in the locker room for a team as well as for disabled people
- added seats for visitors of sports hall
- hallway on the first floor has been changed to meet the regulations about fire escape route from the first floor directly to the external staircase
- fire exit stairs have been added as additional escape route from first floor directly to the outside
- changed shape of the office on the first floor for a better layout of the room
- added windows on the first floor which are facing the sport hall to brighten up a corridor and add a view for employees and visitors on that floor

MAXIMUM DESIGNED OCCUPANCY

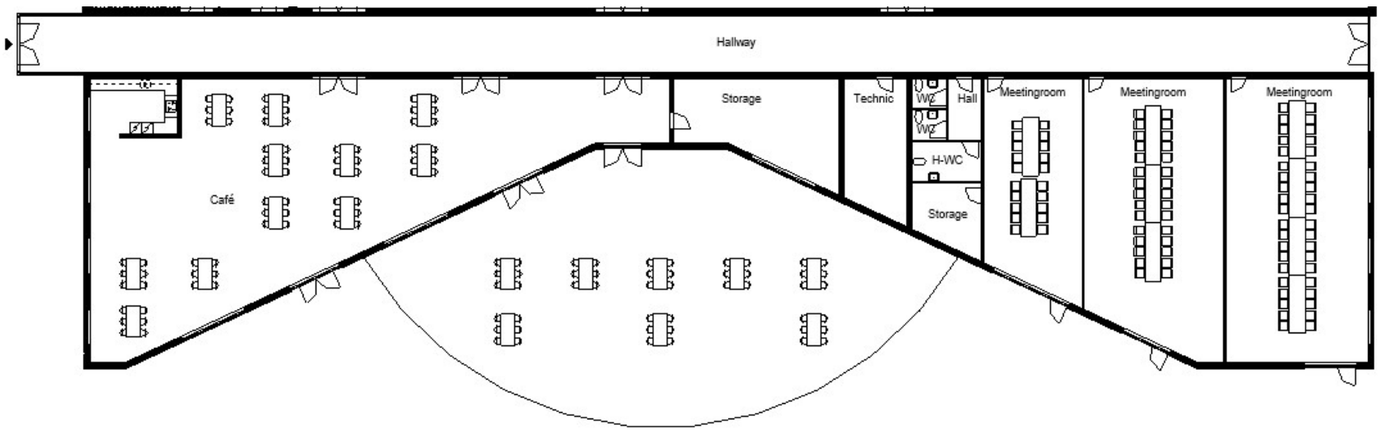
- seats (sports hall) – 312
- lockers for employees – 22
- lockers for men and ladies – 44
- lockers for team – 56
- separated toilets – 8
- toilets for handicapped – 3



PROPOSED CHANGES: WOODEN PART

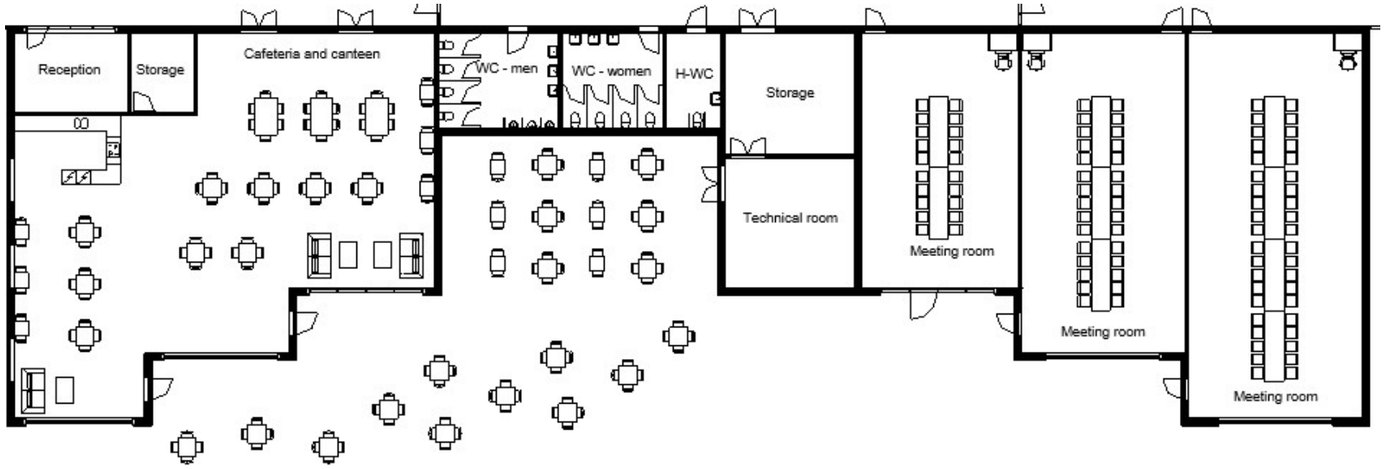
ROOM CHANGES

- layout and design changed with the respect to the previous project
- solar panels and green roof added to make the building more ecologically friendly and to support biodiversity
- windows and curtain walls added for additional natural light and design
- added reception for people where they can buy tickets for matches or get any needed information
- number of toilets accessible from main corridor was increased for café guests, people having a meeting as well as visitors
- added storage next to the café for better access from the kitchen
- corridor has been divided with glass door to meet the regulations about the fire
- doors direction have been changed in order to lead towards escape routes
- trees and green areas will be planted around the building to put the visitors closer to nature
- established playground for children at the back, in the safe distance from parking lot



MAXIMUM DESIGNED OCCUPANCY

- café – 72
- open café – 80
- toilets – 8
- urinals – 3
- toilets for handicapped – 1
- meeting room 1 – 20 + 1
- meeting room 2 – 30 + 1
- meeting room 3 – 40 + 1



LOCATION AND ACCESS

AREA DESCRIPTION

The multi-purpose hall is planning to be built on Lovbyvej 54, 8700 Horsens. It is placed next to the Silkeborgvej and 3 km from Horsens city center. Area is really attractive for people as a perfect place to spend time there, because future multi-purpose hall will be surrounded by Bygholm Lake and Golf Club.

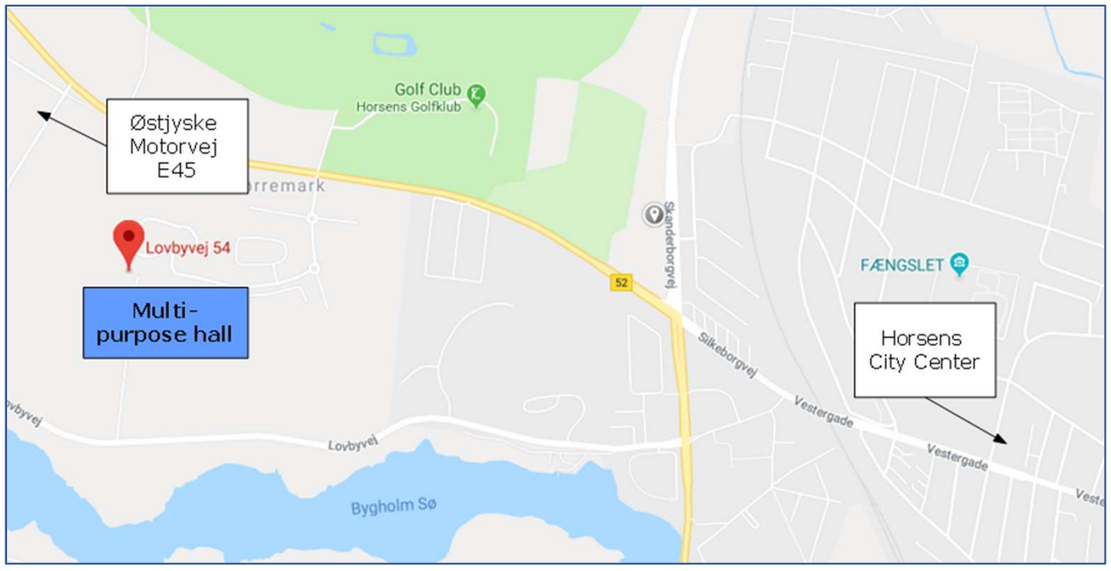
Although, the location is outside of the city center, the area is well communicated and it is really easy to get there. There are few options to get there by car which are shown on the picture on the right. Visitors can also get there by buses no. 110, 114, 116, which are stopping just next to the future multi-purpose hall. Pedestrians and cyclists have also an easy access to the location through the lovely road which is placed just on the shore of a lake. It will take 15 min by bike and 50 min by walk to get there from the city center.

Hall ↔ Train station = 4,1 km

Hall ↔ VIA University College = 6,8 km

Hall ↔ Bilka = 5,0 km

Hall ↔ Hospital = 6,3 km



SITE PLAN AND PARKING ANALYSIS

GENERAL INFORMATION:

ADDRESS: Lovbyvej 54, Horsens 8700

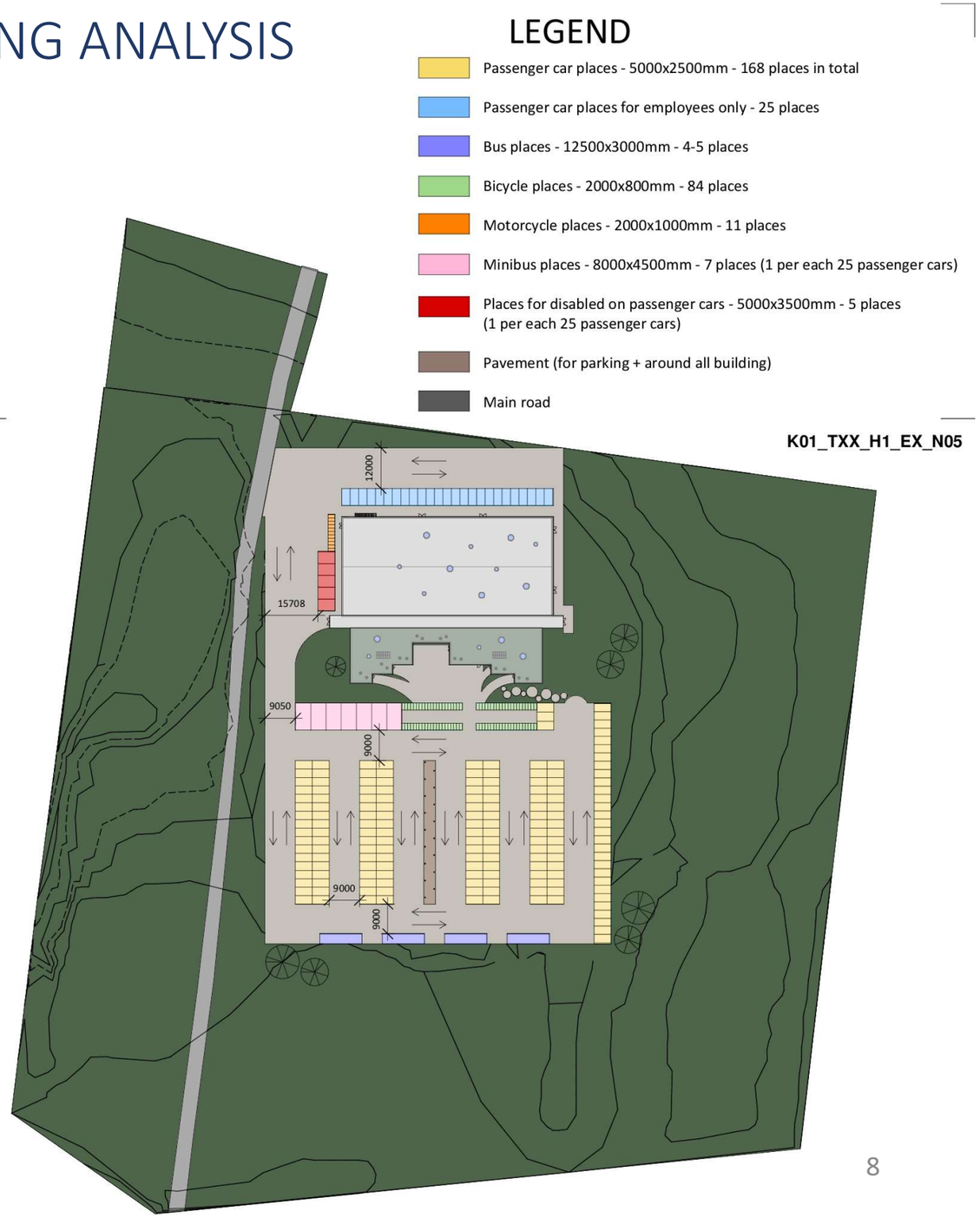
PLOT AREA: 52 617 m^2

FLOOR AREA: Multi-purpose hall – 1850,77 m^2
Wooden construction – 660 m^2
Glass hall – 214 m^2

PLOT RATIO: 5,18%

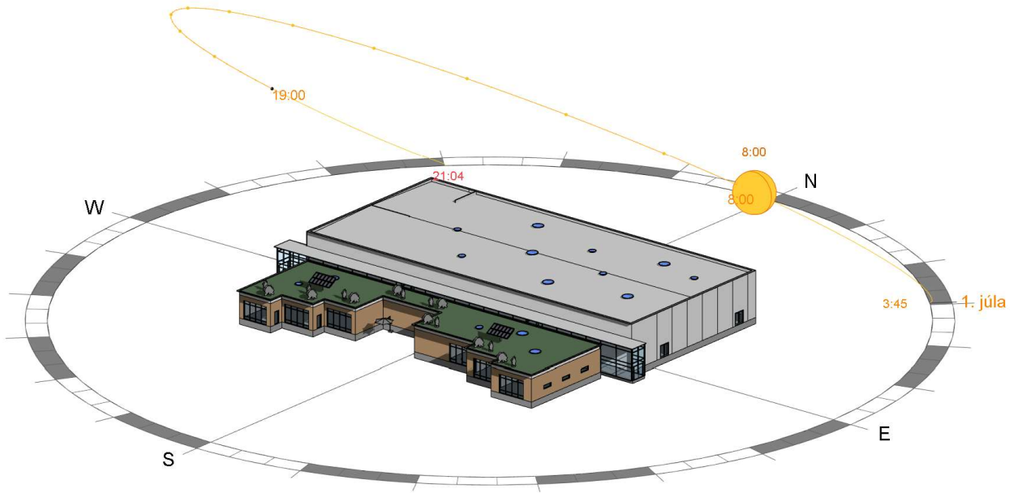
PARKING ANALYSIS:

Behind the building, more than 62 m wide parking place is reserved for employees or distribution cars. Places for disabled people were placed based on the rule 1 per each 25 cars. There are located near the entrance in order to establish easy access for the disabled. 84 places for bikes and 11 for motorcycles were reserved in front of the building as well. In the main part of the parking lot, there are four 42,5 m long and one 71 m long parking places. They provide place for 168 cars. In the middle of the main street lights are provided. Based on the fact that sport hall serves for team matches as well, there are 4 places reserved for buses at the back of the parking lot as well as 7 places for minibuses.

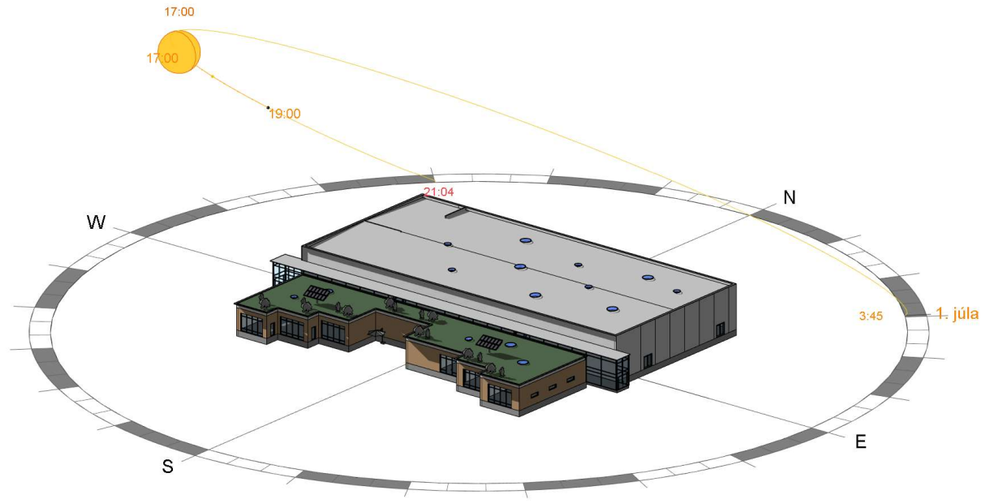


SUN PATH

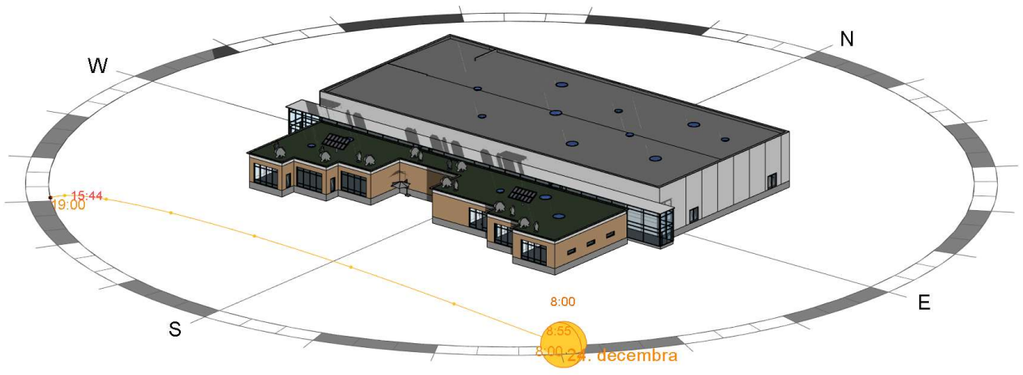
SUMMER MORNING



SUMMER EVENING



WINTER MORNING

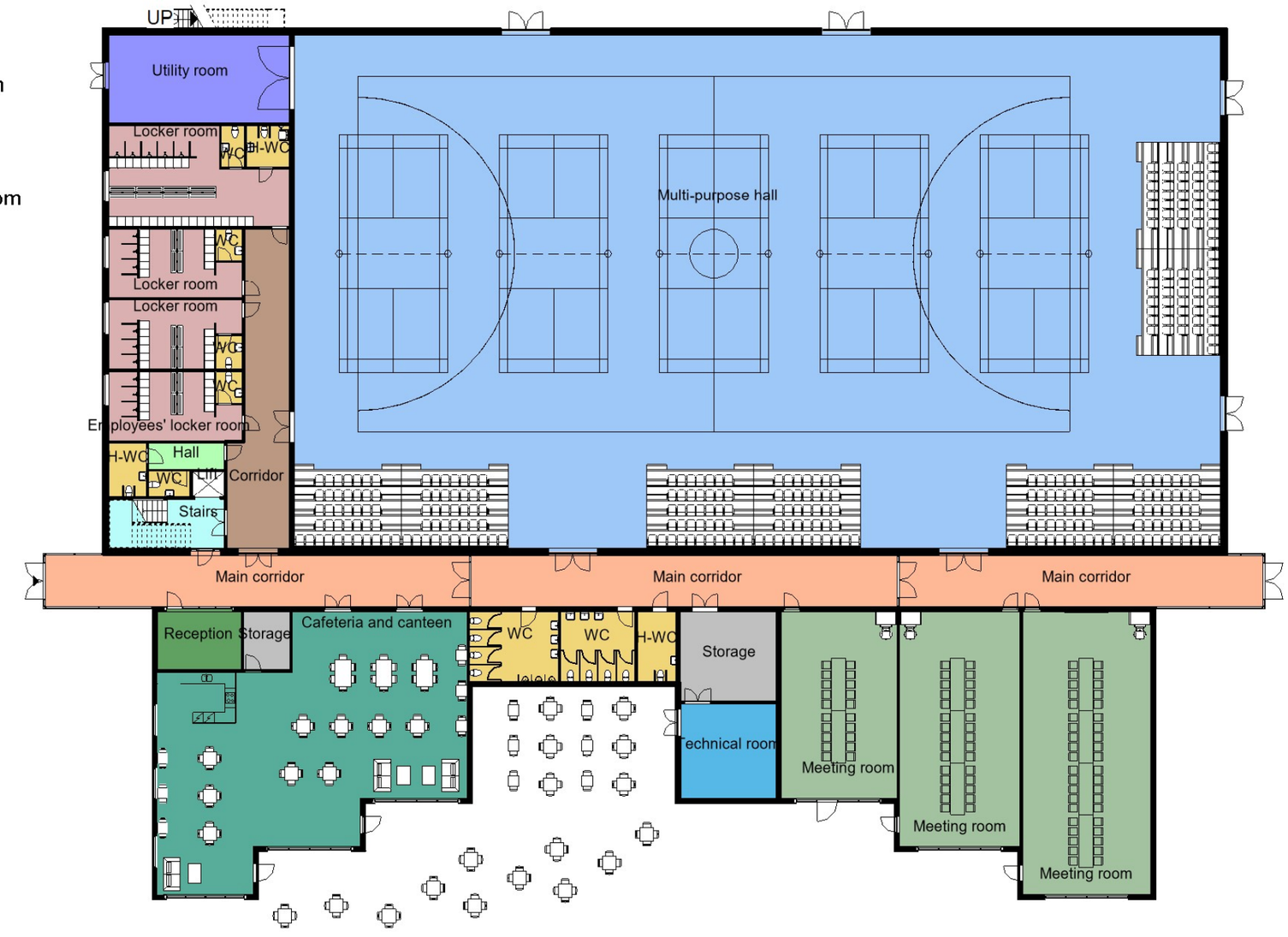


WINTER EVENING

GROUNDFLOOR PLAN

Room Legend

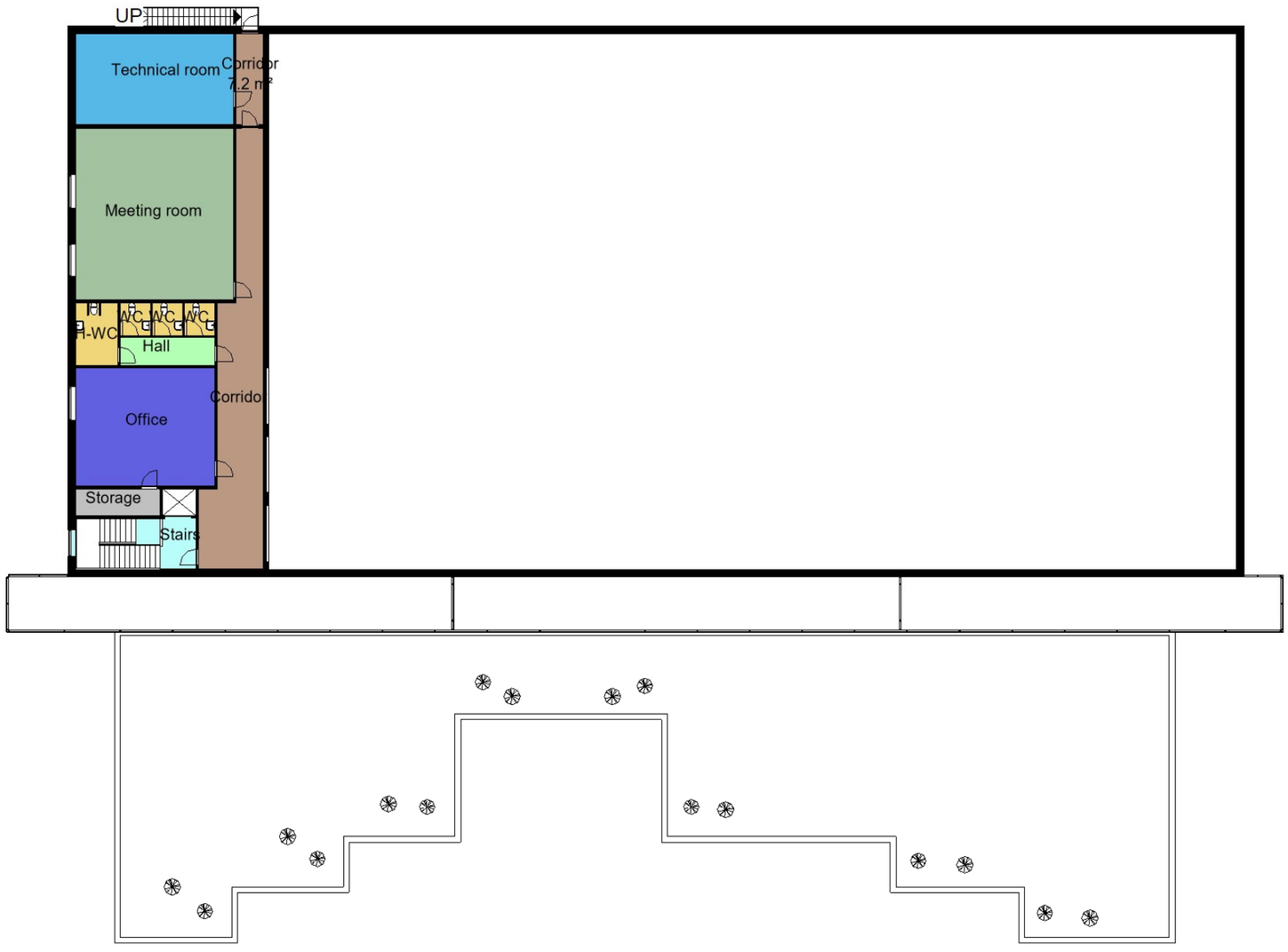
- Cafeteria and canteen
- Corridor
- Employees' locker room
- H-WC
- Hall
- Locker room
- Main corridor
- Meeting room
- Multi-purpose hall
- Reception
- Stairs
- Storage
- Technical room
- Utility room
- WC



FIRST FLOOR PLAN

Room Legend

- Corridor
- H-WC
- Hall
- Meeting room
- Office
- Stairs
- Storage
- Technical room
- WC

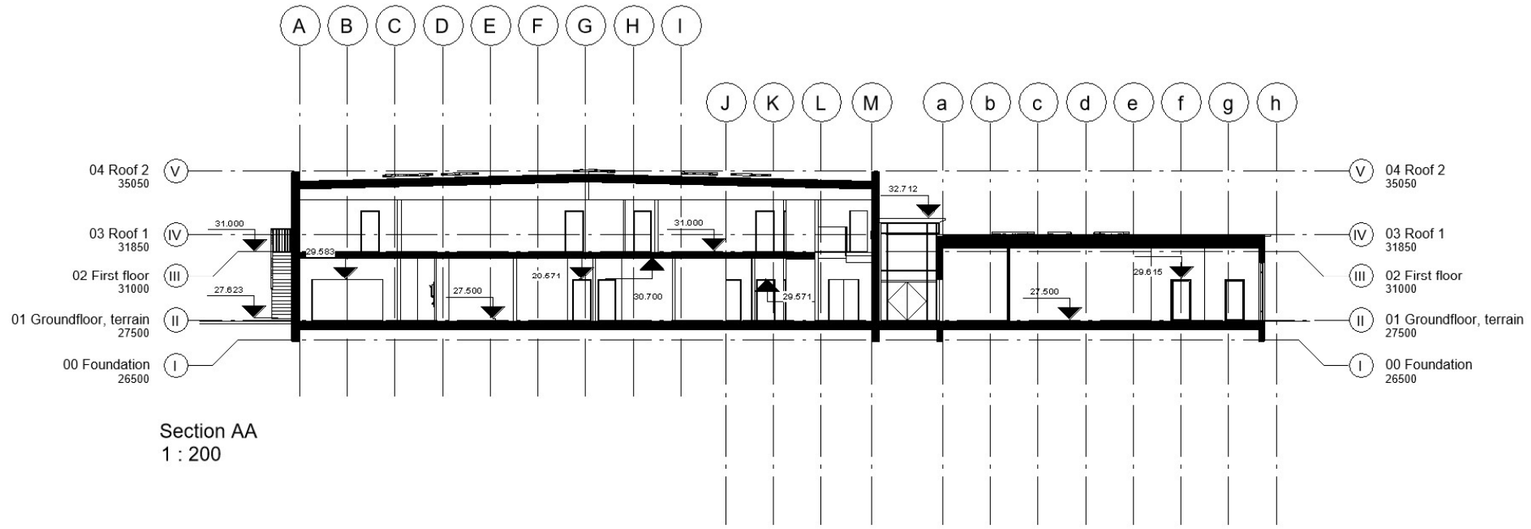


ROOM SCHEDULE

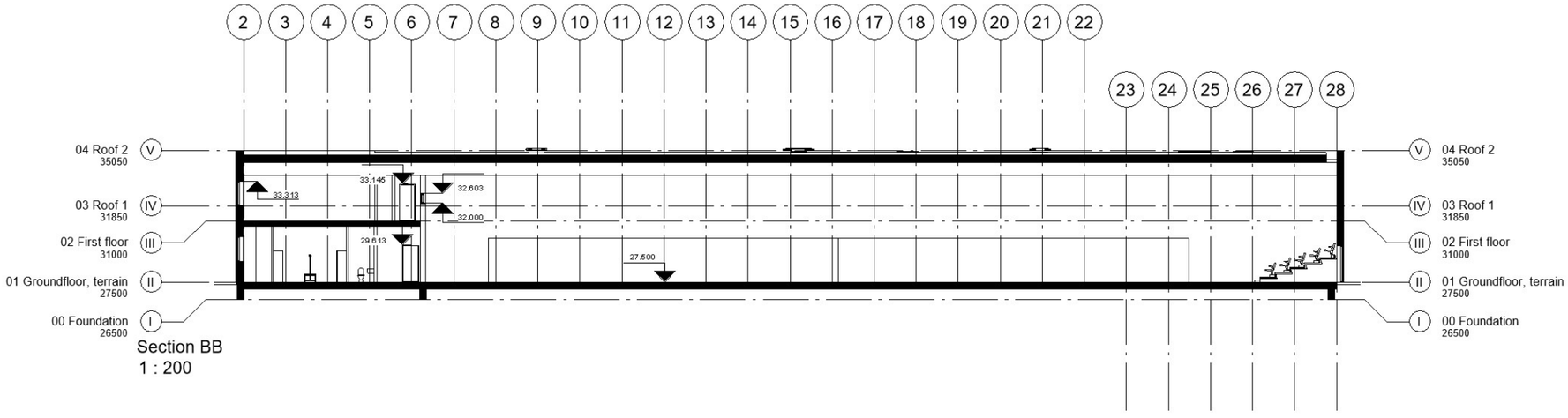
Room Schedule		
Name	**Area**	**Level**
Lift	2.58 m²	01 Groundfloor, terrain
WC	2.6 m²	01 Groundfloor, terrain
WC	2.6 m²	01 Groundfloor, terrain
WC	2.74 m²	01 Groundfloor, terrain
WC	3.01 m²	01 Groundfloor, terrain
WC	3.44 m²	01 Groundfloor, terrain
H-WC	5.56 m²	01 Groundfloor, terrain
Hall	6.22 m²	01 Groundfloor, terrain
H-WC	6.36 m²	01 Groundfloor, terrain
H-WC	8.34 m²	01 Groundfloor, terrain
Storage	8.4 m²	01 Groundfloor, terrain
Reception	15.21 m²	01 Groundfloor, terrain
WC	16.25 m²	01 Groundfloor, terrain
Stairs	17.6 m²	01 Groundfloor, terrain
WC	19.48 m²	01 Groundfloor, terrain
Locker room	25.2 m²	01 Groundfloor, terrain
Locker room	25.35 m²	01 Groundfloor, terrain
Employees' locker room	25.48 m²	01 Groundfloor, terrain

Room Schedule		
Name	**Area**	**Level**
Storage	26.88 m²	01 Groundfloor, terrain
Technical room	28.69 m²	01 Groundfloor, terrain
Locker room	47.24 m²	01 Groundfloor, terrain
Utility room	49.53 m²	01 Groundfloor, terrain
Corridor	50.38 m²	01 Groundfloor, terrain
Main corridor	60.51 m²	01 Groundfloor, terrain
Meeting room	68.45 m²	01 Groundfloor, terrain
Main corridor	70.62 m²	01 Groundfloor, terrain
Main corridor	70.77 m²	01 Groundfloor, terrain
Meeting room	89.23 m²	01 Groundfloor, terrain
Meeting room	114.55 m²	01 Groundfloor, terrain
Cafeteria and canteen	202.59 m²	01 Groundfloor, terrain
Multi-purpose hall	1498.66 m²	01 Groundfloor, terrain
WC	2.83 m²	02 First floor
WC	2.87 m²	02 First floor
WC	2.87 m²	02 First floor
Storage	6.57 m²	02 First floor
Corridor	7.22 m²	02 First floor
Hall	7.63 m²	02 First floor
H-WC	7.71 m²	02 First floor
Stairs	17.39 m²	02 First floor
Technical room	41.67 m²	02 First floor
Office	47.34 m²	02 First floor
Corridor	53.57 m²	02 First floor
Meeting room	78.76 m²	02 First floor

CROSS SECTIONS



Section AA
1 : 200



Section BB
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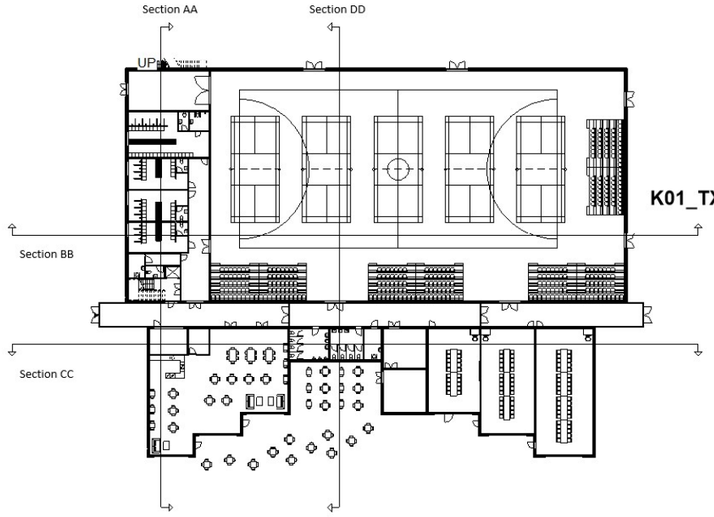
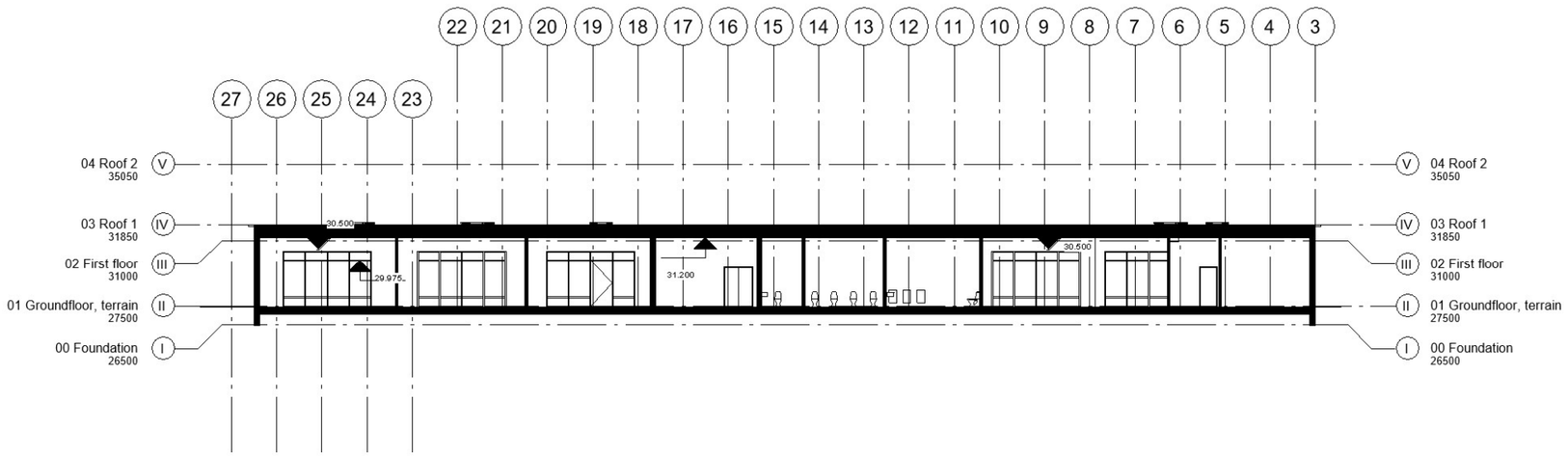


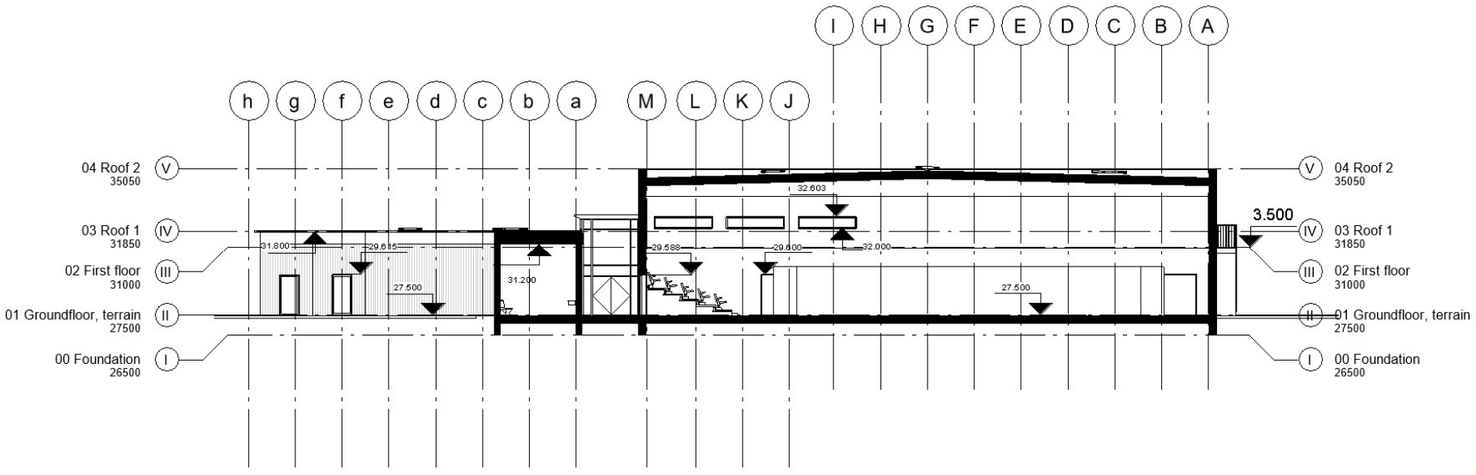
K01_TXX_H1_EX_N2

01.1 Ground floor plan
1 : 500

CROSS SECTIONS

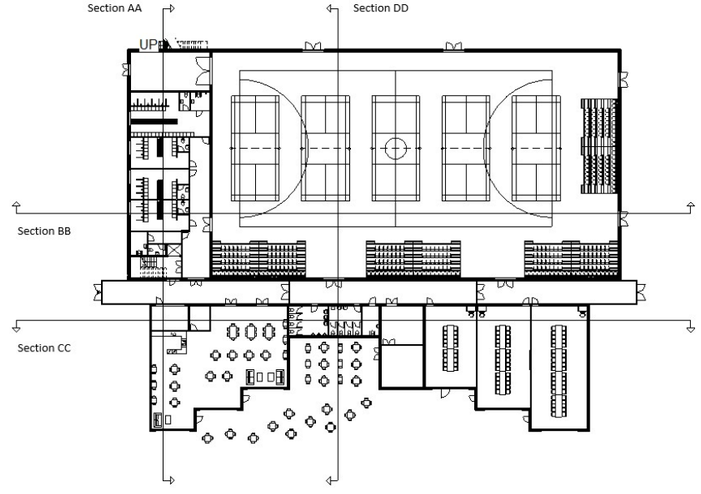


Section CC
1 : 200



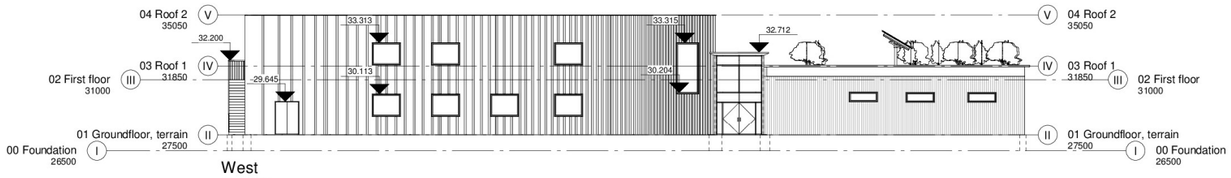
Section DD
1 : 200

K01_TXX_H1_EX_

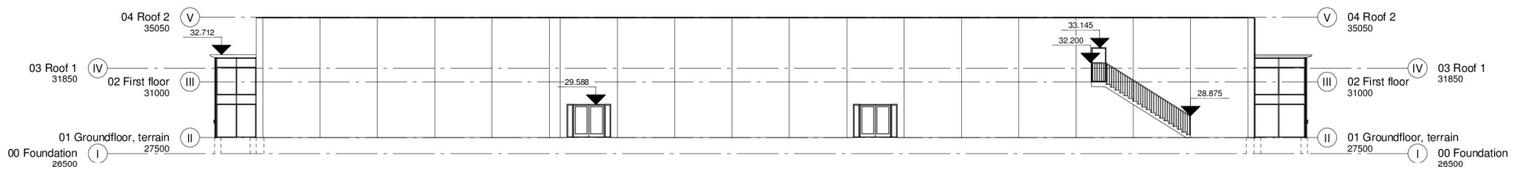


01.1.2 Ground Floor Plan
1 : 500

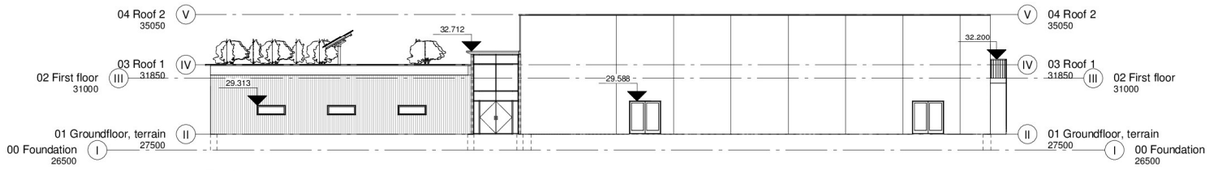
ELEVATIONS



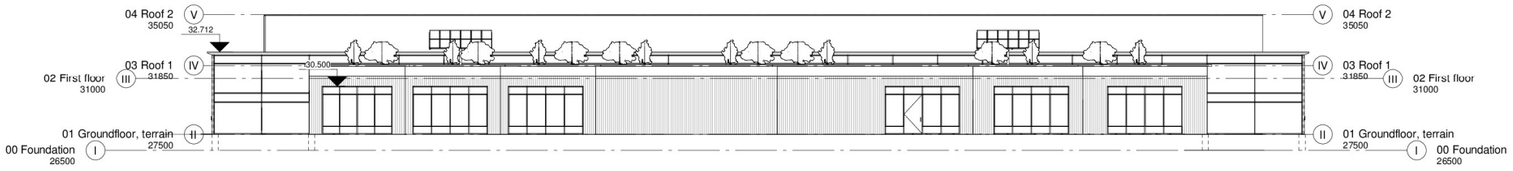
West
1 : 200



North
1 : 200



East
1 : 200



South
1 : 200

K01_TXX_H2_EX_N06

UNIVERSITY COLLEGE
SCHOOL OF TECHNOLOGY AND BUSINESSHORSENS

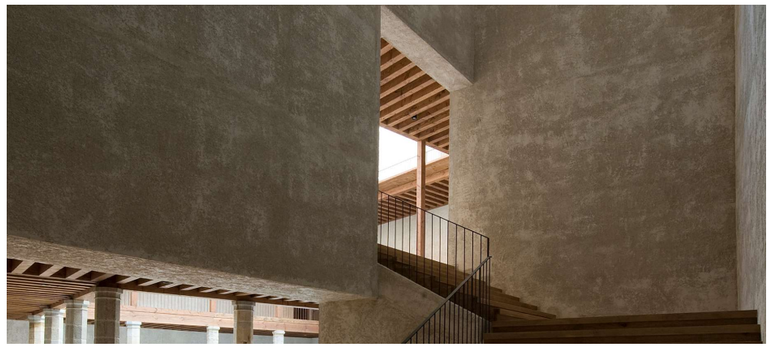
PROJECT:Multi-purpose hall at Bygholm Lake, Horsens	DATE: 09/06/18	**K01_TXX_H2_EX_N06**
SUBJECT:Elevations	SCALE: 1 : 200	
DRAWN BY: Carina Pronscaia (Group 5)	CLASS: AH31-A18	

MATERIALS AND SUSTAINABILITY – CONCRETE HALL

EXTERNAL WALL

Sandwich elements

- effective and long-lasting
- prefabricated, fast and easy to mount
- many attractive finishes available in Spæncom
- great insulation characteristics



INTERNAL WALLS

Concrete walls

- fire safe reinforced concrete
- soundproof characteristics
- prefabricated solution with fast and easy mounting
- easy to apply finishes (e.g. mortar based leveling and finish)

SPORT HALL FLOOR

Beech hardwood boards with neoprene shock absorbing strips

- shock absorbing ability
- good ball bounce
- ability to withstand rolling loads and point load

FLOOR IN CORRIDORS

Polished concrete as sustainable design flooring

- utilizes a material that has already been placed

FLOOR IN OFFICES

Ultramatt lacquered dark ash floorboards

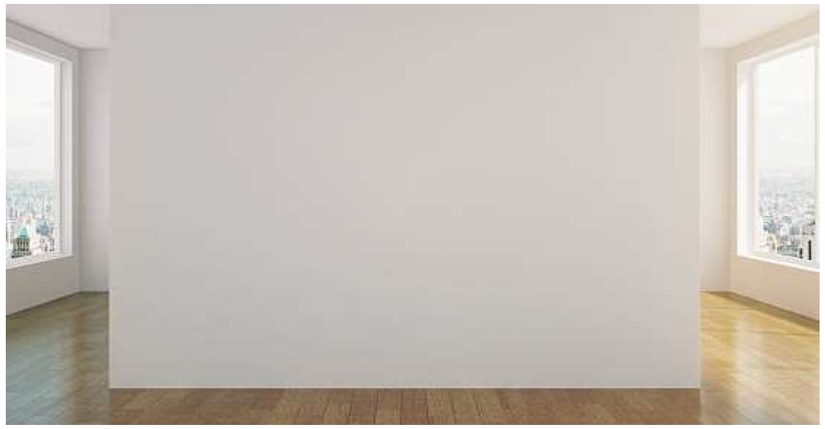
- Junckers' residual wood from the production is supplying Danish national electricity network

MATERIALS AND SUSTAINABILITY - WOODEN PART

INTERNAL WALLS

Gypsum walls on steel studs

- entirely prefabricated and customizable
- sound and fire resistant
- no profound finish application needed (joint masking, paint)
- durable and space saving



ROOF

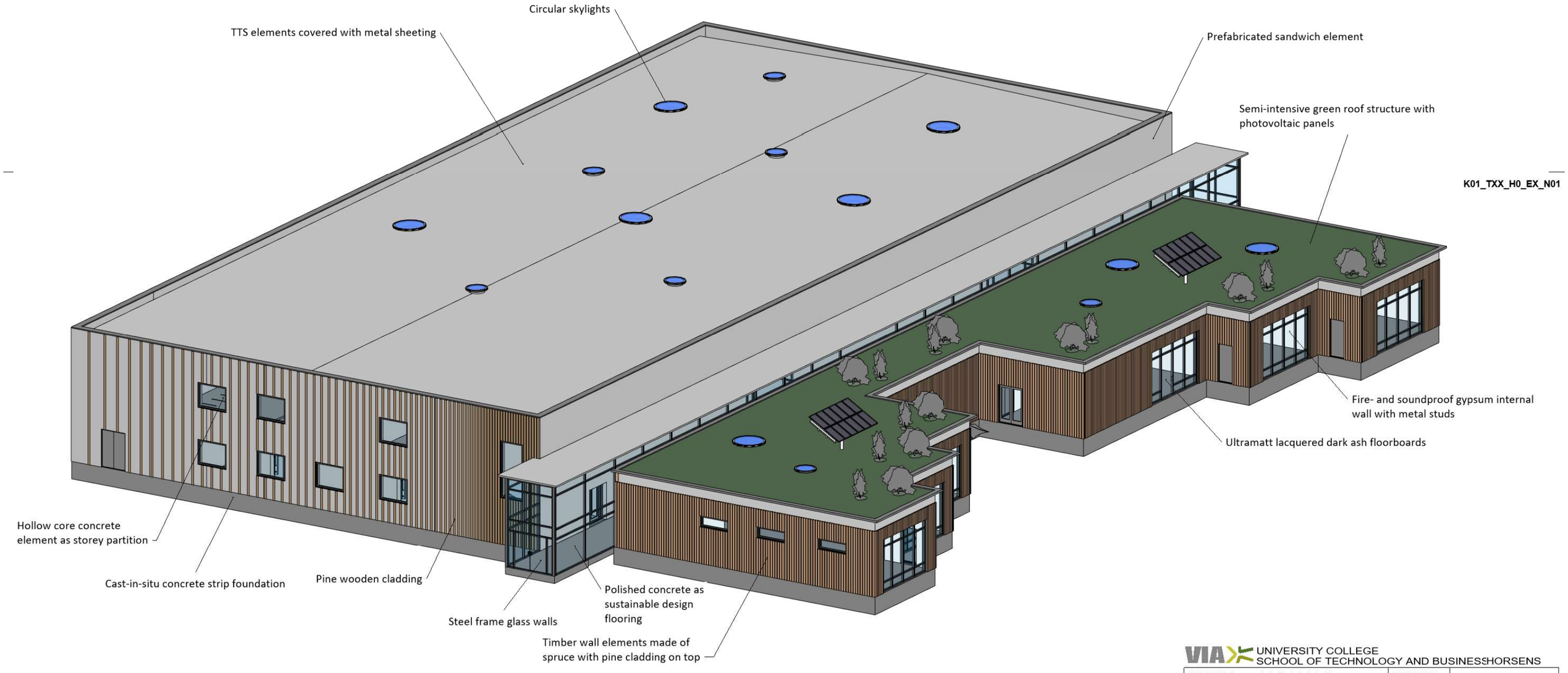
Green roof supporting biodiversity with Sun-Root™ System solar panels

- reduce urban heat island effect
- absorb 50% of the annual rainfall
- use recycled materials as growing medium

WOODEN FAÇADE CLADDING ON WOODEN WALL

- cladding made of environmentally certified Nordic pine from Sweden and Norway
- wall made of Nordic spruce from certified forestry

BUILDING SYSTEM



K01_TXX_H0_EX_N01

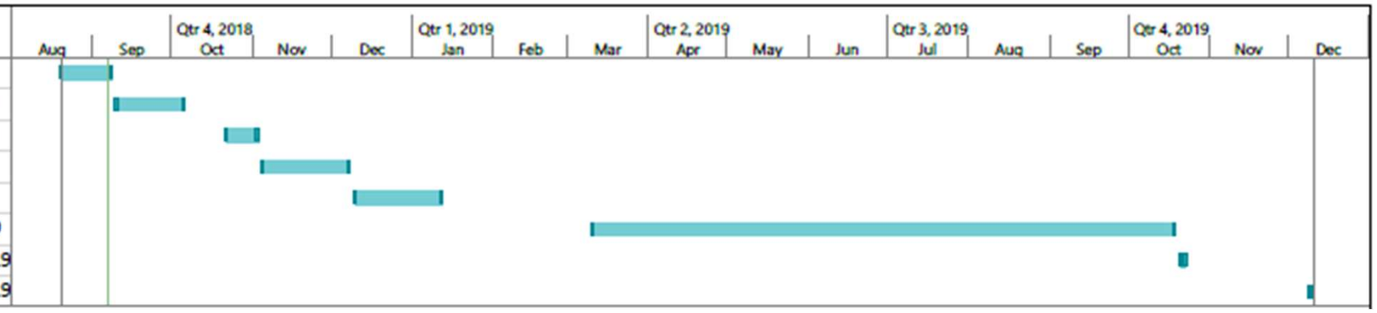
VIA UNIVERSITY COLLEGE
SCHOOL OF TECHNOLOGY AND BUSINESS HORSENS

PROJECT: Multi-purpose hall at Bygholm Lake, Horsens	DATE: 09/05/18	K01_TXX_H0_EX_N01
SUBJECT: Building system	SCALE:	
DRAWN BY: Michaela Machová (Group 5)	CLASS: AH31A18	

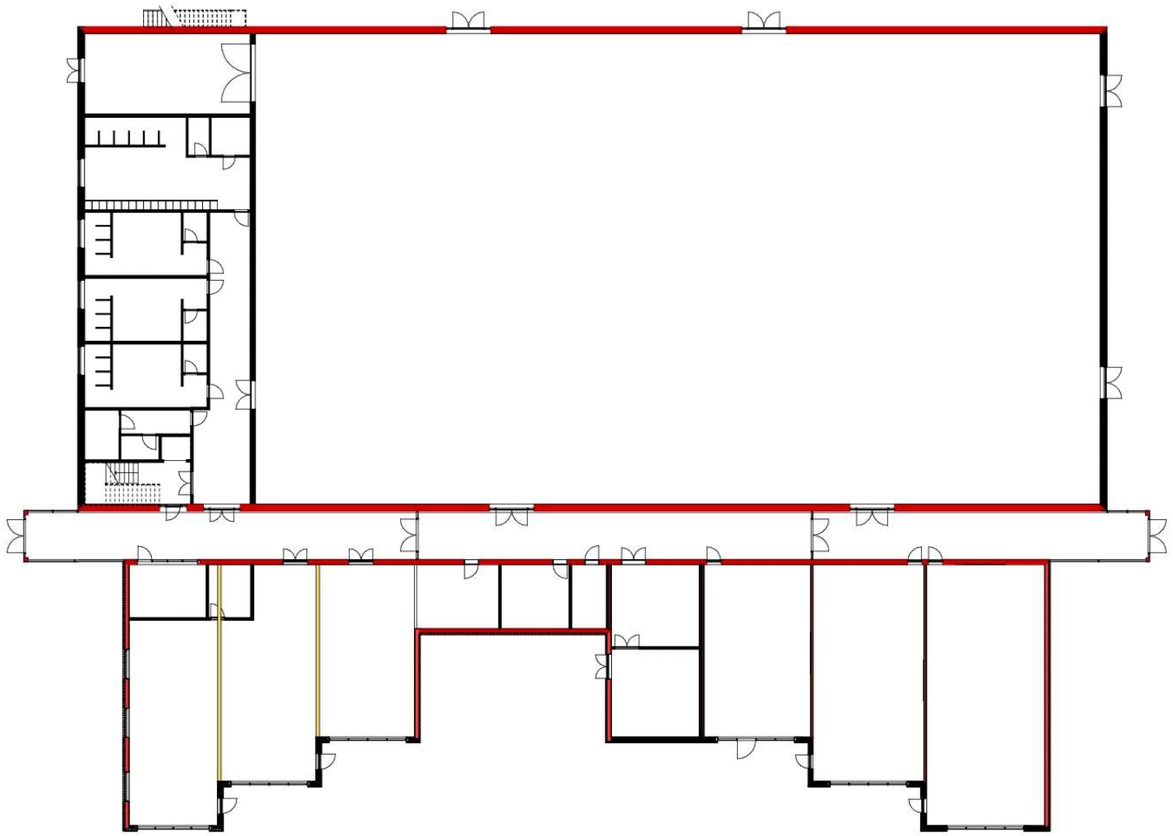
INITIAL PROJECT COST ESTIMATION + TIME SCHEDULE

Plot and outdoor areas		10.000.000 DKK
Buildings		30.000.000 DKK
Fees and expenses		8.000.000 DKK
Architect's fee		2.130.000 DKK
Outline Proposal and Scheme	1.000.000 DKK	
Technical Design	1.000.000 DKK	
Project management	50.000 DKK	
Inspection	25.000 DKK	
Site menagement	55.000 DKK	
Engineer's fee	3.300.000 DKK	
Other expenses	2.570.000 DKK	
Total cost Excl VAT		48.000.000 DKK

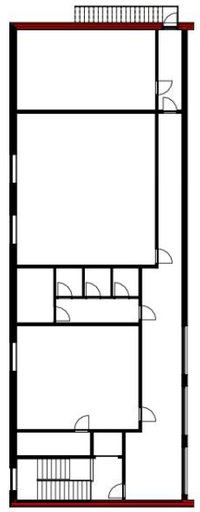
ID	Task Mode	Task Name	Duration	Start	Finish
1		Outline Proposal	15 days	Mon 8/20/18	Fri 9/7/18
2		Scheme Design	20 days	Mon 9/10/18	Fri 10/5/18
3		Detail 1/Tender	10 days	Mon 10/22/18	Fri 11/2/18
4		Company/Production	25 days	Mon 11/5/18	Fri 12/7/18
5		Execution	25 days	Mon 12/10/18	Fri 1/11/19
6		Construction	160 days	Mon 3/11/19	Fri 10/18/19
7		Handover	2 days	Mon 10/21/19	Tue 10/22/19
8		Inaguration	2 days	Mon 12/9/19	Tue 12/10/19



STATIC ANALYSIS – VERTICAL LOAD



08.3.1 Static analysis, vertical load, groundfloor
1 : 300



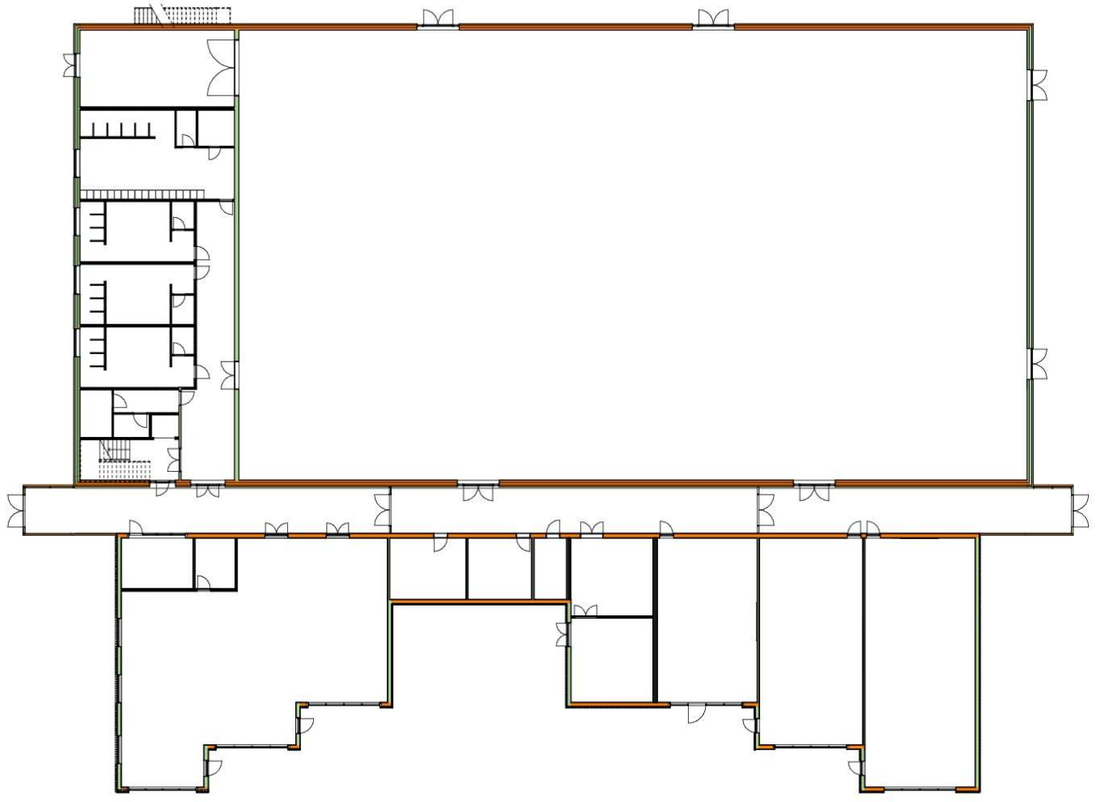
08.3.2 Static analysis, vertical load, first floor
1 : 300

LEGEND

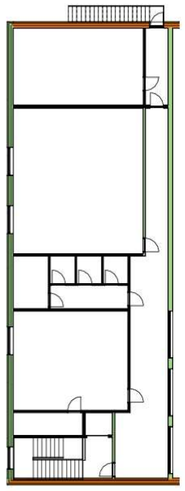
FUNCTIONS

- Column
- Slab
- Shear

STATIC ANALYSIS – HORIZONTAL LOAD ON THE FACADE



08.1.1 Static analysis, facade, groundfloor
1 : 300



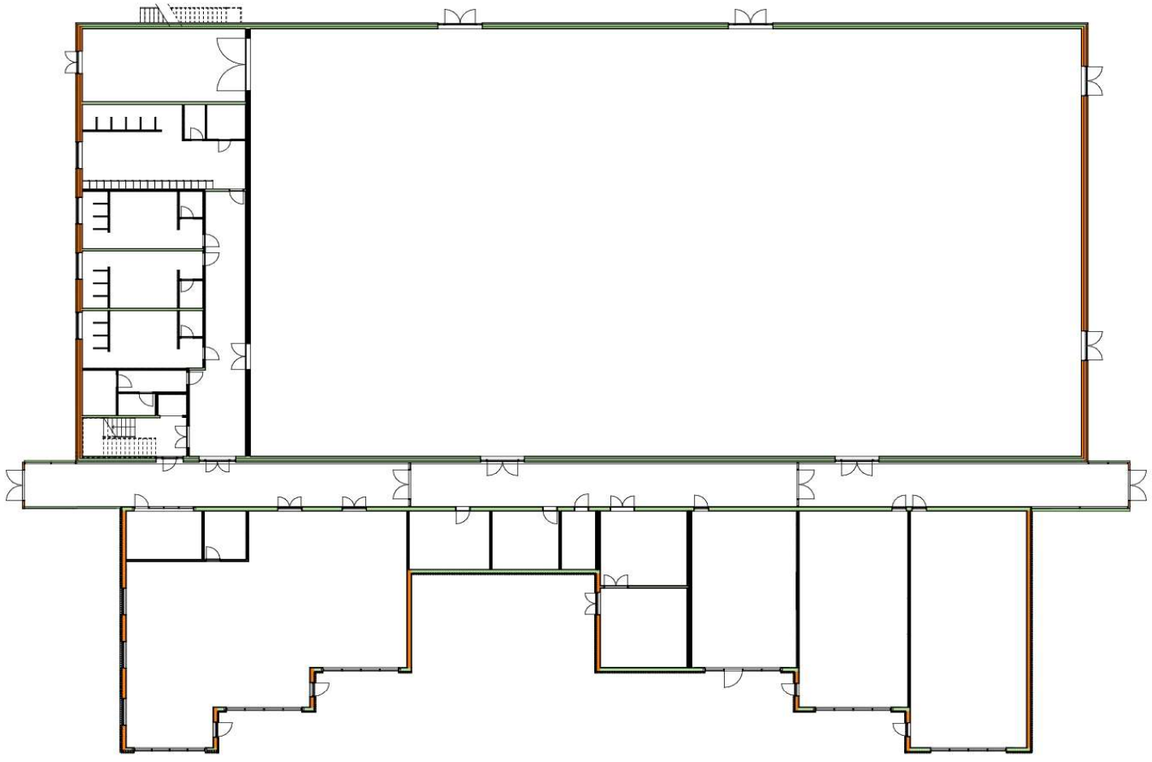
08.1.2 Static analysis, facade, first floor
1 : 300

LEGEND

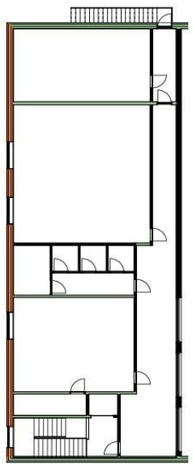
FUNCTIONS

- Column
- Slab
- Shear

STATIC ANALYSIS – HORIZONTAL LOAD ON THE GABLE



08.2.1 Static analysis, gable, groundfloor
1 : 300



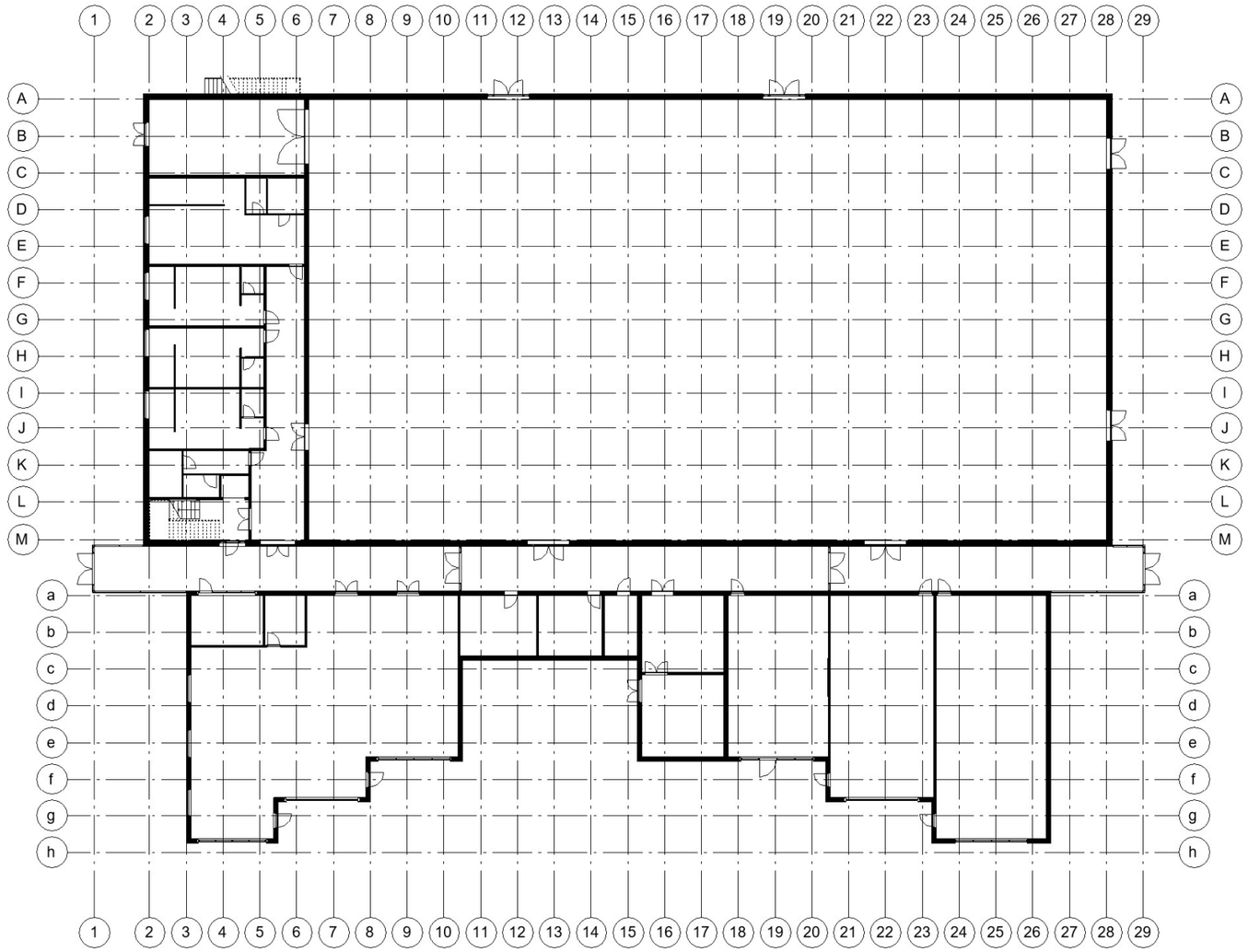
08.2.2 Static analysis, gable, first floor
1 : 300

LEGEND

FUNCTIONS

- Column
- Slab
- Shear

MODULAR PLAN



05 Modular plan, groundfloor
1 : 200

INITIAL VENTILATION ANALYSIS – CONCRETE HALL

TYPE OF ACTIVITY SPACE	AREA m^2	VOLUME m^3	VENTILATION RATE	CALCULATION	REFERENCE
Utility Room	49.53	99.06	10 l/s/m^2	49.53m^2 x 10 l/s/m^2 = 495.3 l/s = 1783.08 m^3/h	BR2015
Changing Room 1	36.8	73.66	8-12 l/s/m^2	36.8 m^2x 8 l/s/m^2 = 294.4 l/s = 1059.84 m^3/h 36.8 m^2 x 12 l/s/m^2 = 441.6 l/s = 1589.76 m^3/h	STÅBI
Bathroom 1	10.41	20.81	5-10 h	20.81 m^3 x 5 = 104.05 m^3h 20.81 m^3 x 10 = 208.10 m^3h	AIR CHANGES
Toilet 1a	3	6.02	5-15 h	6.02 m^3 x 5 = 30.1 m^3h 6.02 m^3 x 15 = 90.3 m^3h	AIR CHANGES
Toilet 1b	5.56	11.11	5-15 h	11.11 m^3 x 5= 55.55 m^3h 11.11 m^3 x 15 = 166.65 m^3h	AIR CHANGES
Changing Room 2	19.27	38.54	8-12 l/s/m^2	19.27 m^2 x 8l/s/m^2 = 154.16 l/s = 554.98 m^3/h 19.27 m^2 x 12 l/s/m^2 = 231.24 l/s = 832.46 m^3/h	STÅBI
Bathroom 2	6.08	12.16	5-10 h	12.16 m^3 x 5 = 60.8 m^3h 12.16 m^3 x 10 =121.6 m^3h	AIR CHANGES
Toilet 2	3	5.19	5-15 h	5.19 m^3 x 5 = 25.95 m^3h 5.19 m^3 x 15 = 77.85 m^3h	c
Changing Room 3	19.12	38.25	8-12 l/s/m^2	19.12 m^2 x 8 l/s/m^2 = 152.96 l/s = 550.66 m^3/h 19.12 m^2 x 12 l/s/m^2 = 229.44 l/s= 825.98 m^3/h	STÅBI
Bathroom 3	6.08	12.16	5-10 h	12.16 m^3 x 5 = 60.8 m^3h 12.16 m^3 x 10 = 121.6 m^3h	AIR CHANGES
Toilet 3	2.74	5.49	5-15 h	5.49 m^3 x 5 = 27.45 m^3h 5.49 m^3 x 15 = 82.35 m^3h	AIR CHANGES
Changing Room 4	19.37	38.74	8-12 l/s/m^2	19.37 m^2 x 8 l/s/m^2 = 154.96 l/s = 557.86 m^3/h 19.37 m^2 x 12 l/s/m^2 = 232.44 l/s = 836.78 m^3/h	STÅBI
Bathroom 4	6.11	12.23	5-10 h	12.23 m^3 x 5 = 61.15 m^3h 12.23 m^3 x 10 = 122.3 m^3h	AIR CHANGES
Toilet 4	3	5.19	5-15 h	5.19 m^3 x 5 = 25.95 m^3h 5.19 m^3 x 15 = 77.85 m^3h	AIR CHANGES

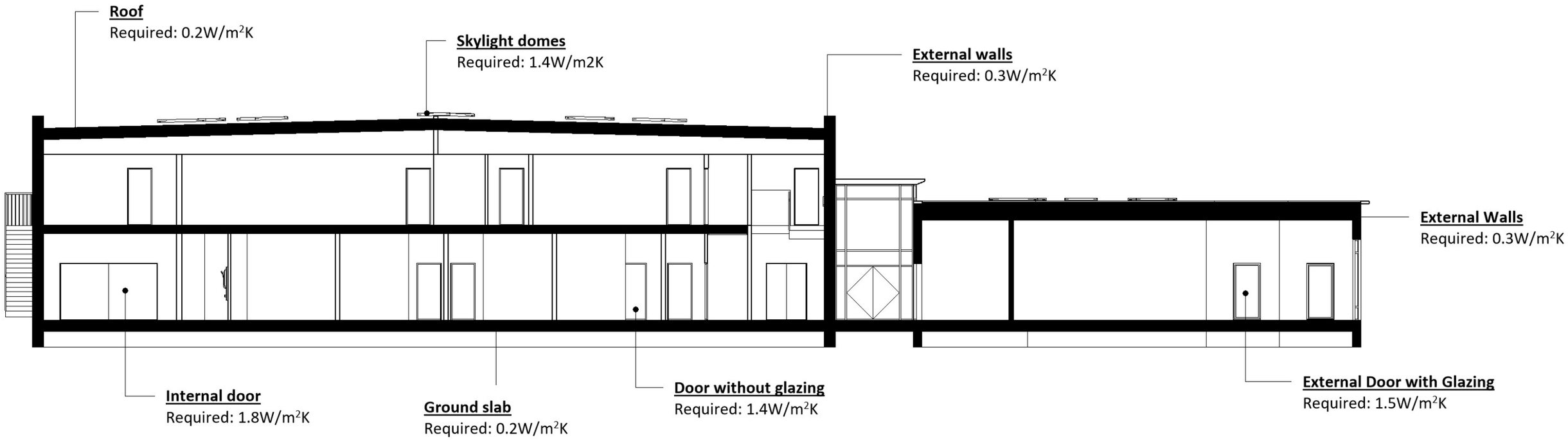
- minimum ventilation in concrete hall is 21527,69 m^3/h
- maximum ventilation in concrete hall is 29326,76 m^3/h

INITIAL VENTILATION ANALYSIS – WOODEN PART

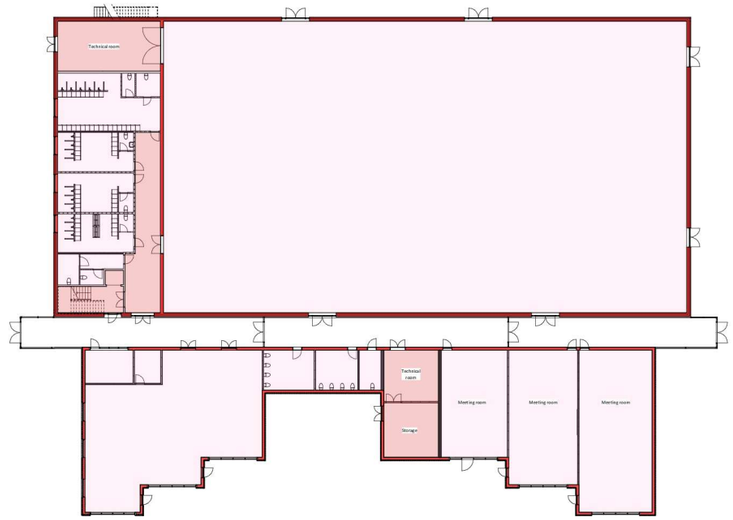
TYPE OF ACTIVITY SPACE	AREA m^2	VOLUME m^3	VENTILATION RATE	CALCULATION	REFERENCE
Cafeteria	202.6	404.97	4 l/s/m^2	202.6 m^2 x 4 l/s/m^2 = 810.4 l/s = 2917.44 m^3/h	STÅBI
Reception	15.21	30.40	3 l/s/m^2	15.21 m^2 x 3 l/s/m^2 = 45.63 l/s = 164.27 m^3/h	STÅBI
Storage	8.40	16.79	1-2 h	16.79 m^3 x 1 = 16.79m^3h 16.79 m^3 x 2 = 33.58 m^3h	AIR CHANGES
Toilet 6a	19.48	38.94	5-15 h	38.94 m^3 x 5 = 194.7 m^3h 38.94 m^3 x 15 = 584.1 m^3h	AIR CHANGES
Toilet 6b	16.25	32.48	5-15 h	32.48 m^3 x 5 = 162.4 m^3h 32.48 m^3 x 15 = 487.2 m^3h	AIR CHANGES
Toilet 6c	8.92	17.84	5-15 h	17.84 m^3 x 5 = 89.2 m^3h 17.84 m^3 x 15 = 267.6 m^3h	AIR CHANGES
Storage 2	26.84	53.65	1-2 h	53.65 m^3 x 1 = 53.65 m^3h 53.65 m^3 x 2 = 107.3 m^3h	AIR CHANGES
Technical Room	26.69	57.35	3-4 l/s/m^2	26.69 m^2 x 3 l/s/m^2 = 80.07 l/s = 288.25 m^3/h 26.69 m^2 x 4 l/s/m^2 = 106.76 l/s = 384.33 m^3/h	STÅBI
Meeting Room 1	68.45	253.18	2.4 l/s/m^2	68.45 m^2 x 2.4 l/s/m^2 = 164.28 l/s = 591.41 m^3/h	DS447
Meeting Room 2	89.23	178.38	2.4 l/s/m^2	89.23 m^2 x 2.4l/s/m^2 = 214.15 l/s = 770.95 m^3/h	DS447
Meeting Room 3	114.55	229	2.4 l/s/m^2	114.55 m^2 x 2.4 l/s/m^2 = 278.36 l/s = 1002.08 m^3/h	DS447

- minimum ventilation in wooden part is 6251,14 m^3/h
- maximum ventilation in wooden part is 7310,26 m^3/h

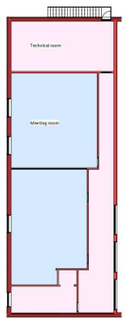
U-VALUES WE AIM FOR



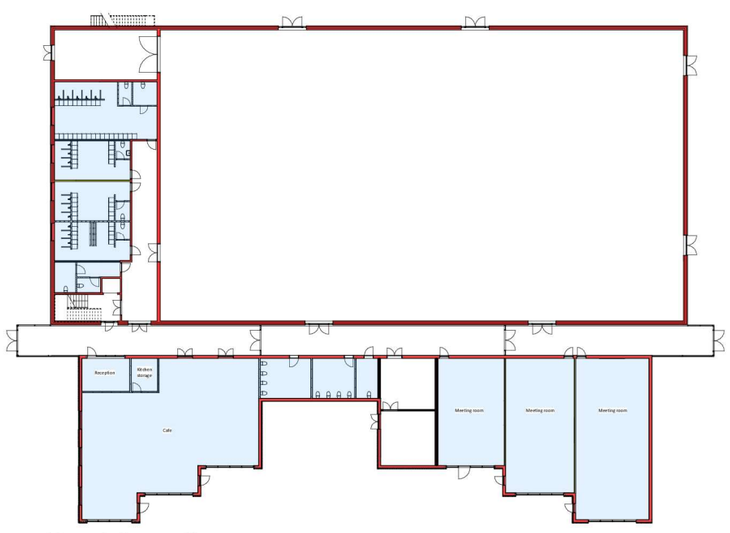
FIRE ANALYSIS



07.1.1 Fire analysis, groundfloor
1 : 300



07.2.1 Fire analysis, first floor
1 : 300



07.1.2 Fire analysis, groundfloor
1 : 300

Sports hall is USAGE CATEGORY 3, therefore automatic sprinklers, warning system and fire extinguishers must be installed.
Administration building is USAGE CATEGORY 1, therefore sprinklers, smoke alarms and signage must be installed.

LEGEND

K01_TXX_H1_EX_N03

Rooms:

Fire sections (sports hall, administrative wooden building), must be divided with [R]EI60 A2-s1,d0 fire safe partitions

Fire section in fire section (corridors, staircase, technical rooms), must be divided with [R]EI60 A2-s1,d0 fire safe partitions

Fire compartments (meeting rooms, office, cafe), must be divided with [R]EI60 fire resistant partition

Walls:

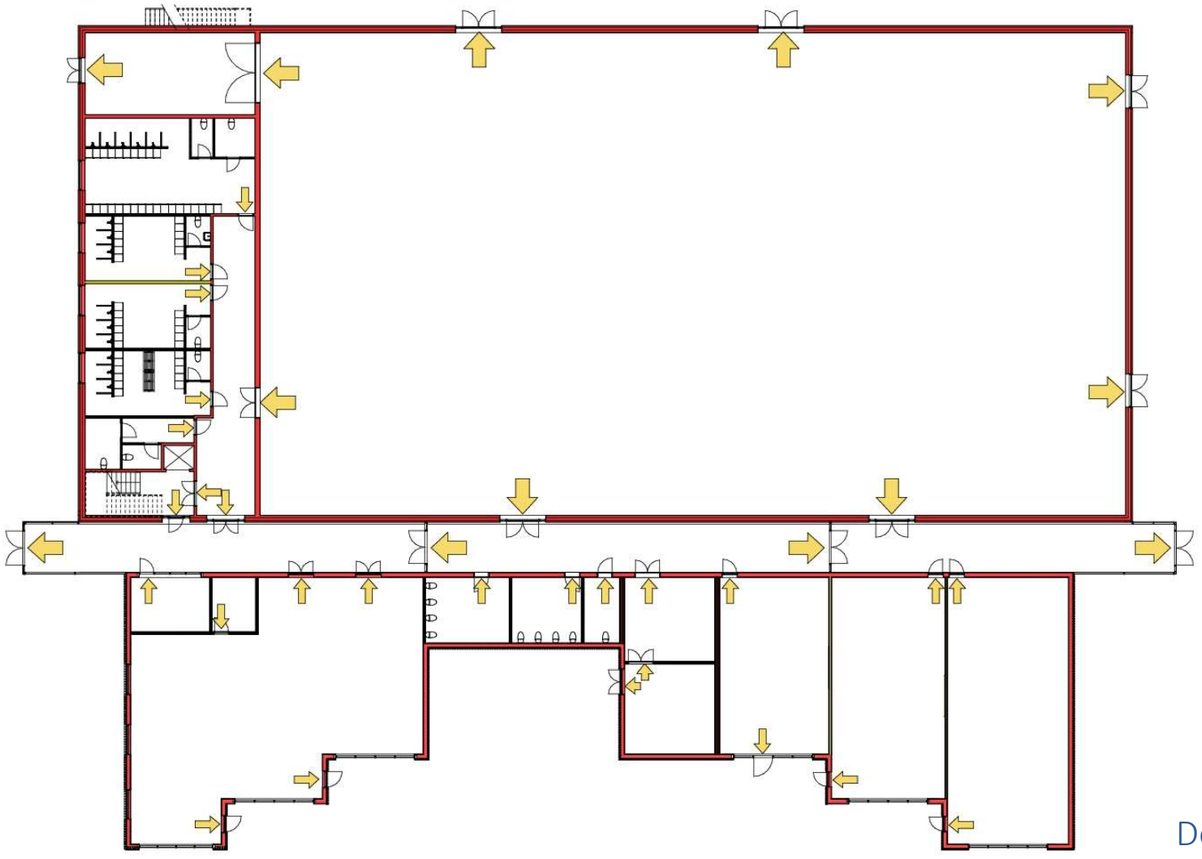
- EI60 A2-s1,d0
120mm reinforced concrete wall up to 3m (Spaencom)/
- EI120 A2-s1,d0
150mm reinforced concrete wall (Spaencom)/
- REI120
285mm steel double stud gypsum wall (Knauf)

- EI60 A2-s1,d0
120mm reinforced concrete wall up to 3m (Spaencom)/
- REI60
145mm steel stud gypsum wall (Knauf)

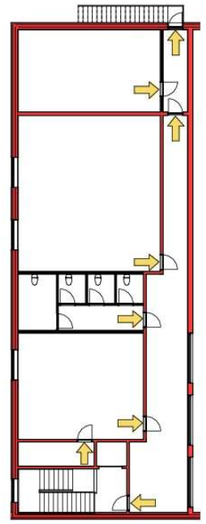
VIA UNIVERSITY COLLEGE
SCHOOL OF TECHNOLOGY AND BUSINESSHORSENS

PROJECT:Multi-purpose hall at Bygholm Lake, Horsens	DATE: 09/04/18	K01_TXX_H1_EX_N03
SUBJECT:Fire analysis	SCALE: As indicated	
DRAWN BY: Carina Pronscaia	CLASS: AH31-A18	

ESCAPE ROUTES



07.1.3 Fire analysis, groundfloor - escape routes
1 : 300



07.2.2 Fire analysis, first floor - escape routes
1 : 300

Doors must be EI30 A2-s1,d0 class, open in the direction of escape.
All populous rooms should have at least 2 independent escape routes.
Exit doors are placed not further than 25 m from each other.
Escape routes must be easily defined, evacuation is done without professional help.
Windows are placed not higher than 1,2 m for additional emergency exit.