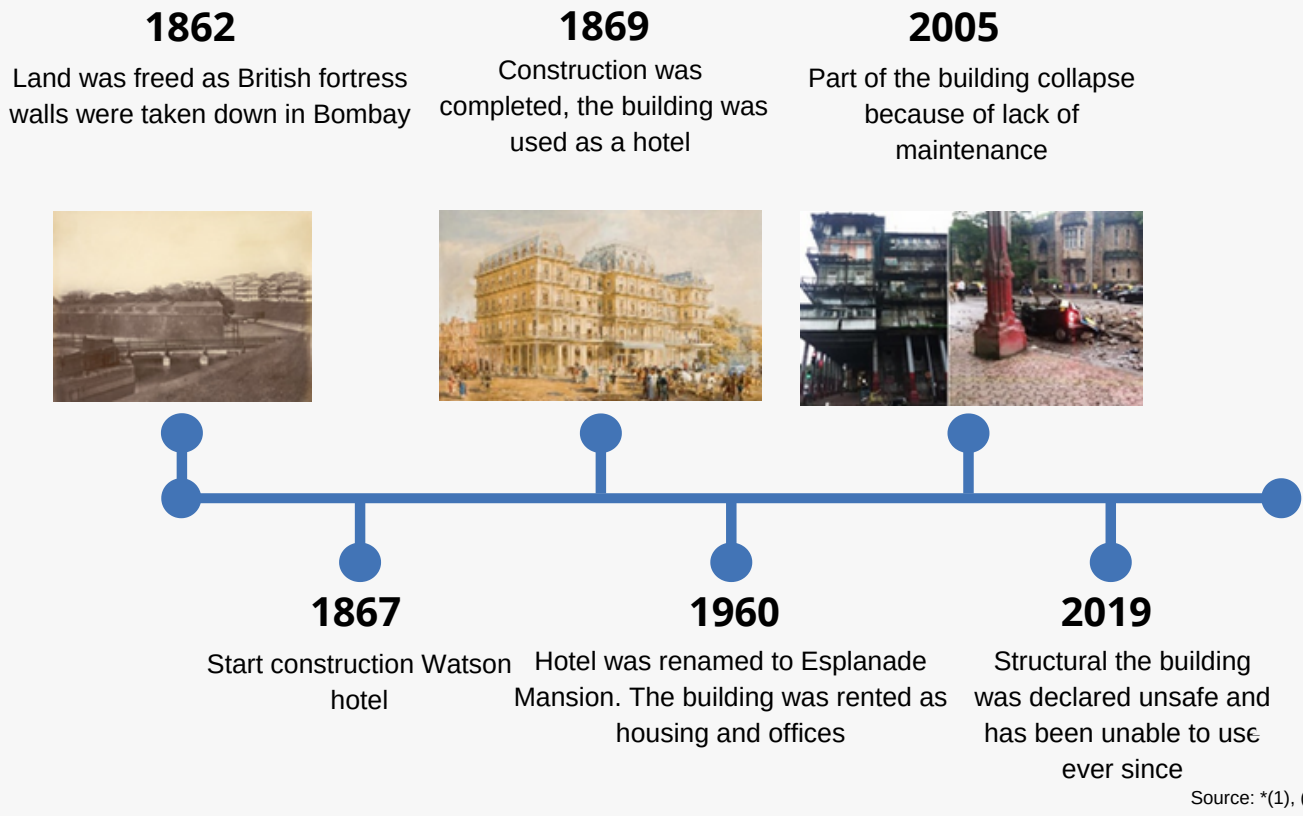


Week 1 - Orientation phase

BOUINT01P

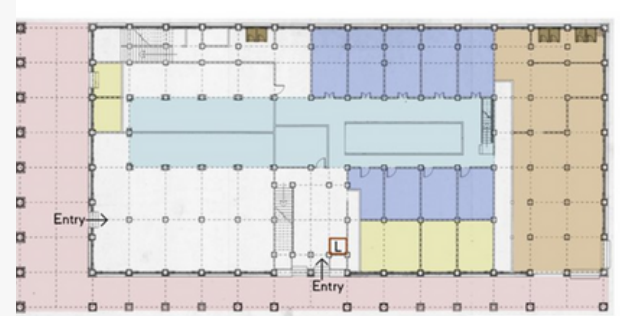
1 History



2 Building analysis



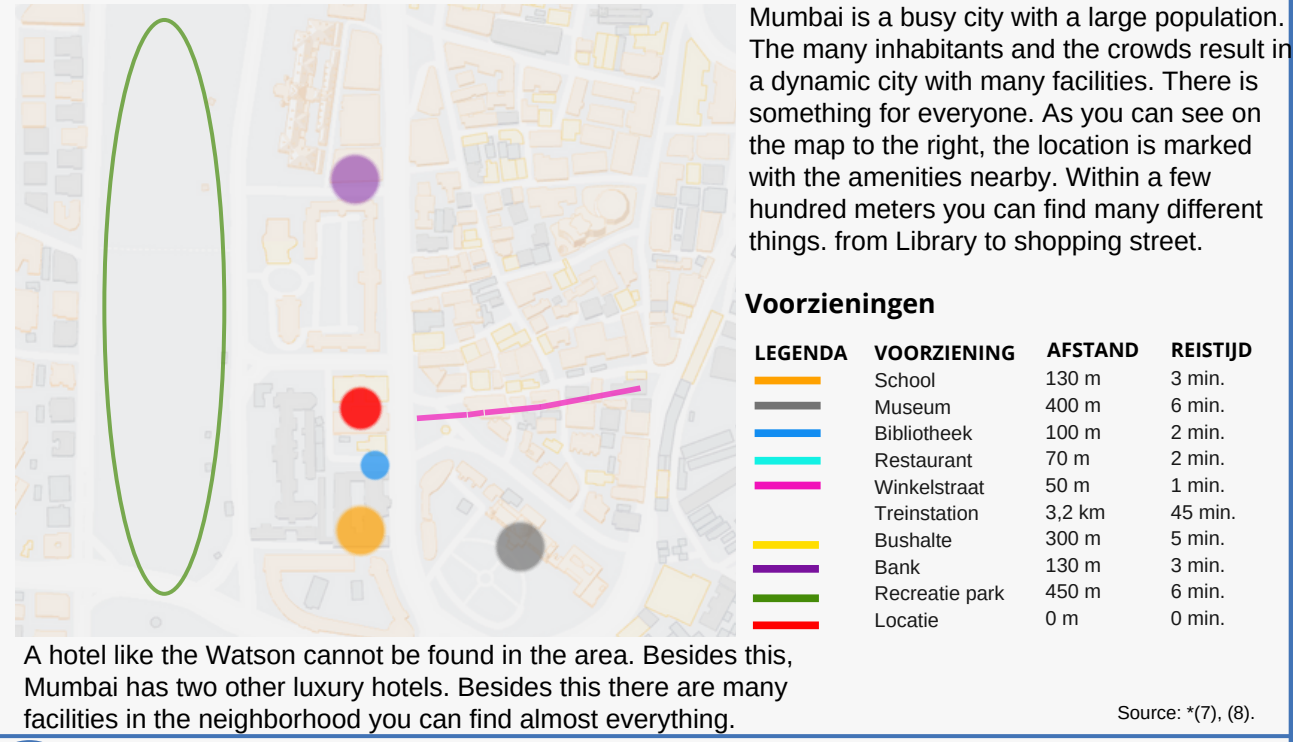
the Watson hotel has a structure that consist of cast iron (steel) and wooden floors. The structure of the Watson hotel consists of columns (cast iron), beams (wood) and girders (cast iron). The foundation consists of brick on rubble wall foundations



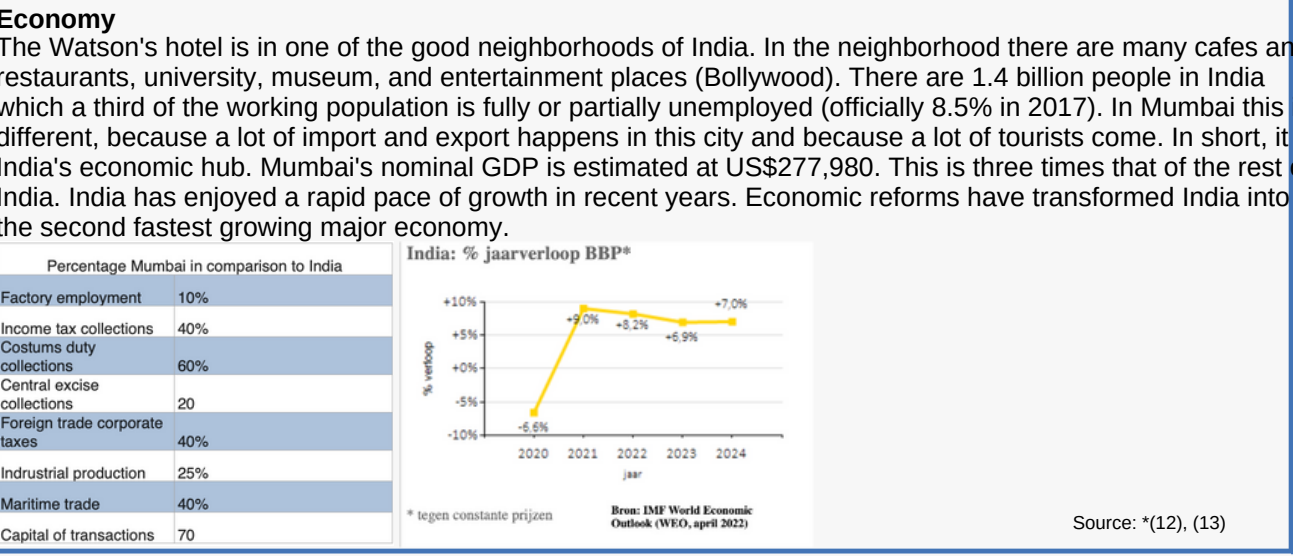
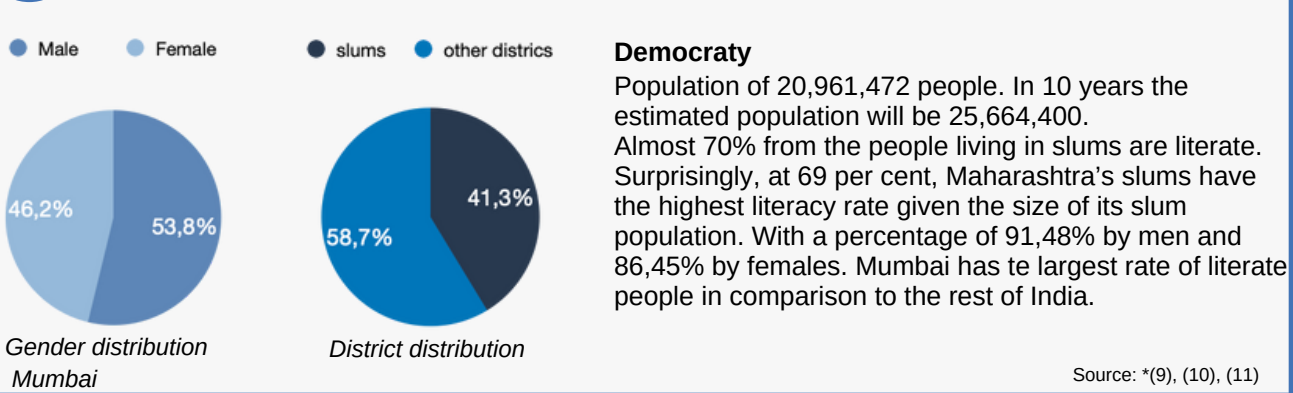
The building 28000 x 56000. Often there is a cast iron pole every 4 meters. On the first floor there were different activities such as: stores (84 M2), a courtyard (80 M2) office space (24 M2), and a restaurant (224 M2), the rest of the first floor is traffic space (corridor). On the other floors (1,2,3 and 4) there were mainly office buildings. There is also a terrace on the 2nd floor (64 M2). There are also toilets available on each floor. In the middle of the building there is a void this gives a lot of architectural expression.

Source: *(4), (5).

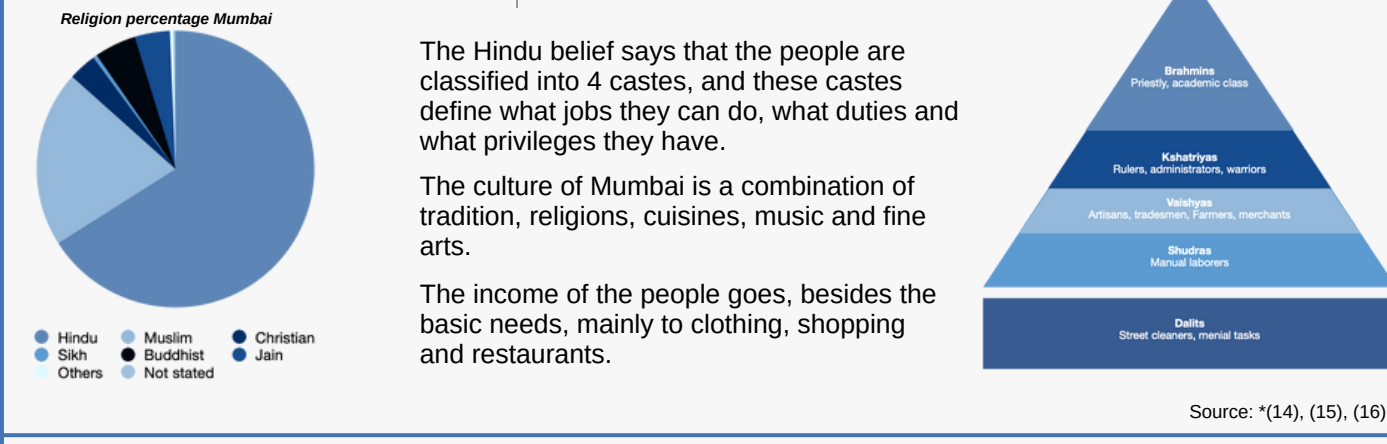
3 Environment analysis



3 Destep analysis



Social cultural

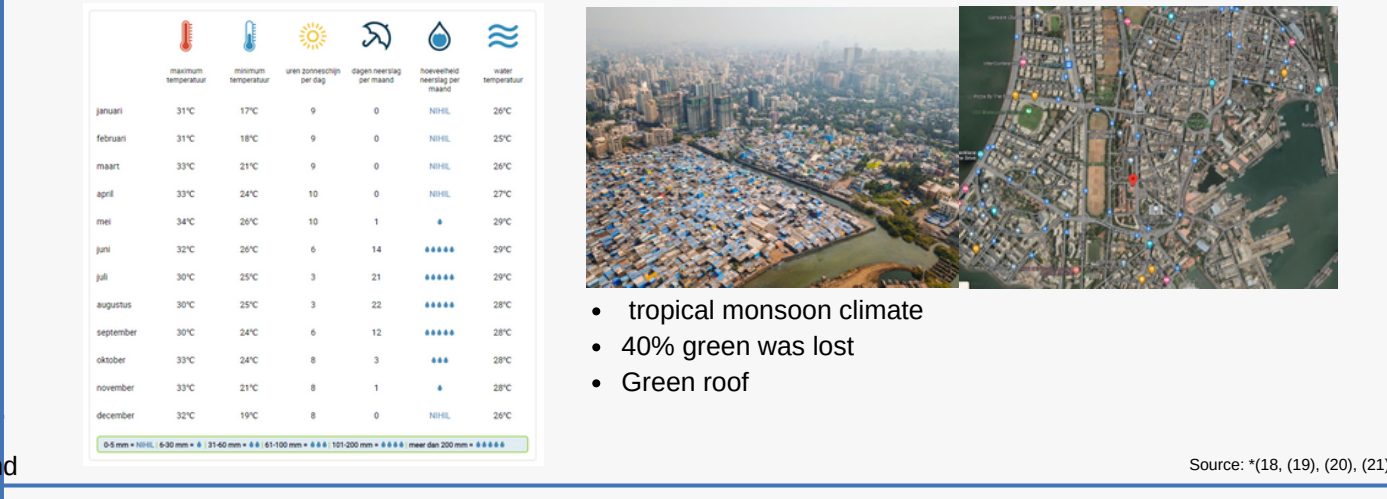


Technical

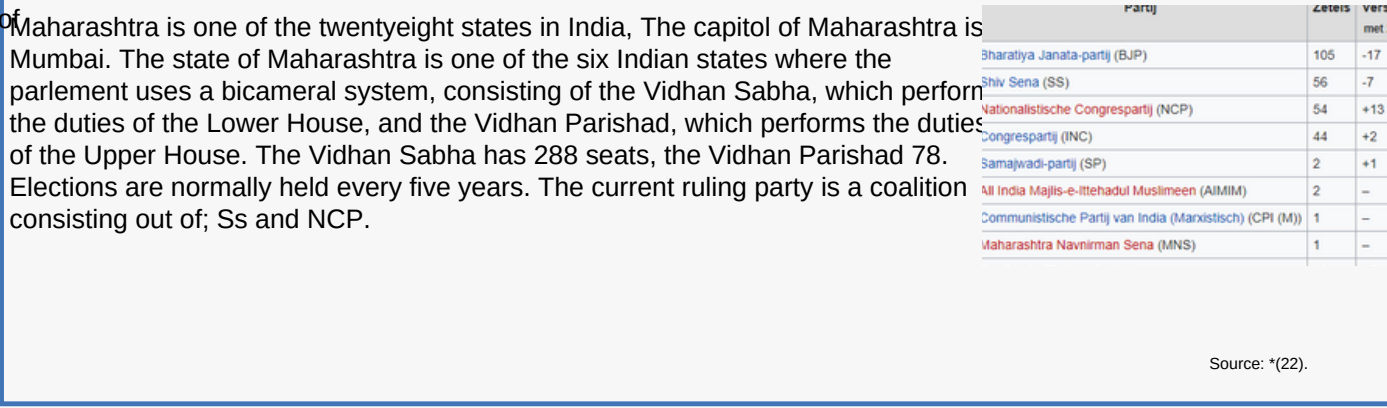
Mumbai, compared to the rest of India, is a reasonably developed city in which various facilities are arranged as we know them in Europe. The infrastructure is also well organized by means of buses, subways and monorails. In terms of sustainability, Mumbai is also developing more and more. They encourage electric driving by installing charging stations and deploying electric buses. By the end of 2028, the government wants all buses to be electric.

Source: *(17).

Ecological



Political



*(1) British fort at the port of Bombay (photo from 1863 & drawing from 1600s) - the urban imagination. (z.d.). Hum54. Geraadpleegd op 20 juni 2022, van https://hum54-15.omeka.fas.harvard.edu/items/show/1815
 *(2) V. (2018, 18 juli). After Watson's hotel balcony collapse, Bombay HC tells authorities to buckle up. India Today. Geraadpleegd op 17 juni 2022, van https://www.indiatoday.in/india/story/watson-hotel-esplanade-mansion-balcony-collapse-taxi-bombay-hc-1289731-2018-07-19
 *(3) Interieur - detail van gietijzeren kolom op de eerste verdieping. (z.d.). [Foto]. Wikimedia. https://commons.wikimedia.org/wiki/File:Interieur_detail_van_gietijzeren_kolom_op_de_eerste_verdieping_-_Rotterdam_-_20373903_-_RCE.jpg
 *(4) Brick wall, red. (z.d.). [Afbeelding]. Rebel walls. https://rebelwalls.com/nl/fotobehang/themas/oppervlakken/stenen-en-tegels/brick-wall-red
 *(5) International Masonry Institute. (2021, 24 februari). 01.020.0216 wall system brick wall w/ rubble foundation. 3D Warehouse. Geraadpleegd op 17 juni 2022, van https://3dwarehouse.sketchup.com/model/974b31db-21df-40a3-adb9-3f4fb6fa976b/010200216-Wall-system-Brick-wall-w-rubble-foundation

*(7) Google. (z.d.). Google maps. Geraadpleegd op 14 juni 2022, van https://google.nl/maps
 *(8) Snazzy maps - free styles for google maps. (z.d.). Snazzy Maps. Geraadpleegd op 17 juni 2022, van https://snazzy.com
 *(9) Mumbai, India metro area population 1950-2022. (z.d.). MacroTrends. Geraadpleegd op 14 juni 2022, van https://www.macrotrends.net/cities/21206/mumbai/population
 *(10) Mumbai population 2022 (demographics, maps, graphs). (z.d.). Worldpopulationreview. Geraadpleegd op 13 juni 2022, van https://worldpopulationreview.com/world-cities/mumbai-population
 *(11) Maharashtra literacy rate 2022. (z.d.). Indiacensus. Geraadpleegd op 18 juni 2022, van https://www.indiacensus.net/states/maharashtra/literacy
 *(12) India in cijfers | Flanders trade. (z.d.). Flanders investment trade. Geraadpleegd op 20 juni 2022, van https://www.flandersinvestmentandtrade.com/export/landen/india/cijfers
 *(13) EasyXpat.com. (z.d.). Economie van Mumbai, overzicht van India - EasyXpat.com. dotXpat. Geraadpleegd op 17 juni 2022, van https://www.easyxpat.com/nl/guides/india/mumbai/overzicht/economie.htm
 *(14) Mumbai (greater Mumbai) city population census 2011-2022 | Maharashtra. (z.d.). Census. Geraadpleegd op 20 juni 2022, van https://www.census2011.in/census/city/365-mumbai.html
 *(15) Culture & heritage | Mumbai city | India. (z.d.). Mumbaicity. Geraadpleegd op 14 juni 2022, van https://mumbaiacity.gov.in/tourism/culture-heritage/

*(16) Spending behaviour in India. (z.d.). Dealsunny. Geraadpleegd op 14 juni 2022, van https://www.dealsunny.com/spending-behaviour-in-india/#?_k=piq5
 *(17) How Mumbai is becoming environmentally friendly. (2021, 11 oktober). Mumbai Live. Geraadpleegd op 17 juni 2022, van https://www.mumbaiive.com/environment/how-mumbai-is-becoming-environmentally-friendly-69020
 *(18) CNBCTV18.com. (2022, 13 juni). Mumbai is sinking by 2 mm every year, reveals study; here is why. Geraadpleegd op 17 juni 2022, van https://www.cnbc18.com/environment/mumbai-city-is-sinking-2-mm-every-year-on-average-chinas-tianjin-is-52-cm-says-research-13799932.htm
 *(19) Ecological literacy regarding Mumbai. (z.d.). Base d. Geraadpleegd op 20 juni 2022, van https://base-d-p-h.info/en/fiches/dphfiche-dph-8713.html
 (20) Overstromingen in Mumbai: Als steden ecologie opofferen voor ontwikkeling. (z.d.). MO. Geraadpleegd op 17 juni 2022, van https://www.mo.be/opinie/overstromingen-mumbai-als-steden-ecologie-opofferen-voor-ontwikkeling
 *(21) Google. (z.d.). Google maps. Geraadpleegd op 17 juni 2022, van https://google.nl/maps
 *(22) Wikipedia-bijdragers. (2022, 19 april). Maharashtra. Wikipedia. Geraadpleegd op 17 juni 2022, van https://nl.m.wikipedia.org/wiki/Maharashtra

Week 2 - Design phase

BOUINT01P

1 Function

As you can see on the left side there is a table in which we have tested different functions. Based on the criteria we chose a function that best fits in the environment and in the building. Some important points were that it is constructively possible and whether the function comes from the analysis. The new function had to meet these criteria in any case.

Proposal of variants					
	Building Layout	Possibility construction	Generates revenue	Relation with the environment	Outcome from analysis
Ground level	Theatre	major construction modifications	High	Yes	No
Levels	Apartments	Yes	Middle	Yes	Yes
Ground level	Cinema	major construction modifications	High	No	No
Levels	Theatre Academy	Partial adjustments to construction	Low	Yes	No
Ground level	Stores, Restaurants	Yes	High	Yes	Yes
Levels	Apartments	Yes	High	Yes	Yes
Ground level	Gym	Yes	Middle	No	No
Levels	Restaurants	Yes	High	Yes	Yes
Ground level	Event location	Yes	High	Yes	Yes
Levels	Hotel	Yes	High	Yes	Yes
Ground level	School	Partial adjustments to construction	Low	No	No
Levels	Student housing	Yes	Middle	No	No
Ground level	Stores, Restaurants	Yes	High	Yes	Yes
Levels	Student housing	Yes	Middle	No	No

Sustainability Watson hotel (Mumbai)

The function of a green roof is that the roof absorbs rainwater. A green roof converts solar energy into water vapor.

As a result, the green roof has a cooling effect. It also slows down the water into the sewer system. This keeps the groundwater level stable and will help reduce the flooding in Mumbai. A green facade has the same function as a green roof.

For the climate prevailing in Mumbai, the choice was made to apply a Sedum plants. This is because sedum plants is extremely suitable to be applied in extreme weather conditions. Sedum plants can withstand dry periods and retain water longer.



Function green facade and roof

- A green roof and facade lowers the temperature of the city by about 3% °C. The plants allow about 50% of the sunlight to be absorbed and 30% to be reflected. This can provide cooling in the building.
- Green roof and facade provides noise reduction.
- Extends the life of the roof and facade because it provides protection.
- A Green roof and facade works to purify the air and improve the air quality.
- Structure must be modified. Applying a green roof and facade weighs heavy.
- The application of greenery contributes to biodiversity.

Source: *(1), (2), (3)

1 Reference

Quartier Bleu

Quartier Bleu is an apartment complex with shops and restaurants in

the plinth. Quartier Bleu is located in Hasselt in Belgium. As I have already indicated, there are a few restaurants in the plinth where you can eat and also a few small shops. The area is a bit like the Côte d'Azur. As you can see in the pictures on the right, it looks very luxurious and exclusive. However, many changes have to be made to make something like this in the Watson's hotel because there is a large void there that also needs to be filled. However, the area around the Watson's hotel is a good location for an occasion like this, because many rich people live there and they also have to have a luxurious house. We chose the restaurants and shops because there are many similar establishments in the area and there is therefore a demand for them.

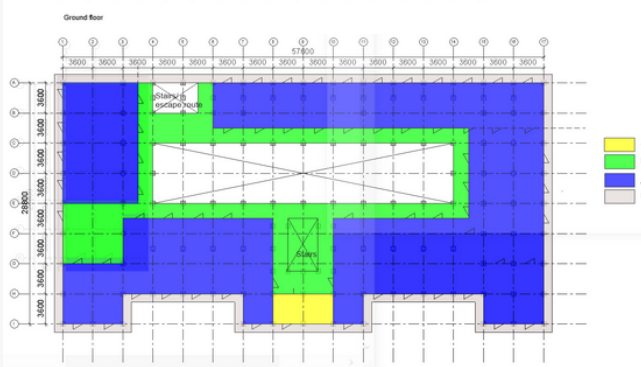
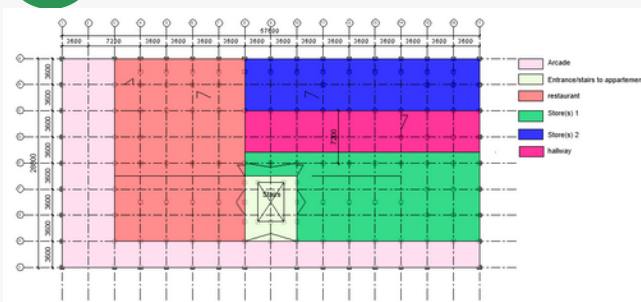


The Arcade Provence, USA

Built in 1828, The Arcade Provence was America's first indoor shopping mall but since 2014 the top 2 floors of the total 3-story mall have been used as residential space where 48 micro apartments have been created. In the plinth there are still stores and restaurants as in the past. I chose this as a reference because it would be an amazing fill-in for the space in the Watson's hotel, only on a slightly larger scale. The micro apartments are meant for people with busy lives which is also very appropriate for the population of Mumbai. This could become an ideal place for students and businessmen to have a home in the city center within walking distance of the university, for example. For the Watson's hotel, you could consider making normal apartments in addition to these micro apartments to increase the target community.

Source: *(4), (5)

1 Proposition



Reasons for transforming the building into an apartment complex with a restaurant and shops

- Close to schools and shops, so in the middle of the city and therefore a busy place where many people want to live
- Because there are already many shops, so there is a demand for it
- The building is already being used as appartements by people
- by updating the existing construction and lay out we can better the situation
- mixed target demographic

Emin

2 Reference



Stifle theatre

Stifle theatre is a theatre and event location in St. Louise USA. The pictures on the left are from the Lobby area. The lobby is a wedding venue. This area can be rented for a wedding or other events. As you can see the area looks very luxurious and chique. A perfect place for high end events. With a couple of changes in the current construction and floorplan it would be possible to realize a area like this. In the current floorplan the atrium seems like a good place. Mumbai has the highest number of millionaires and billionaires among all the cities in India. Those wealthy people look for the most beautiful location for events or weddings. The building is in a central location with many facilities around it. The perfect place to make such a thing happen.

Source: *(6), (7), (8), (9), (10)

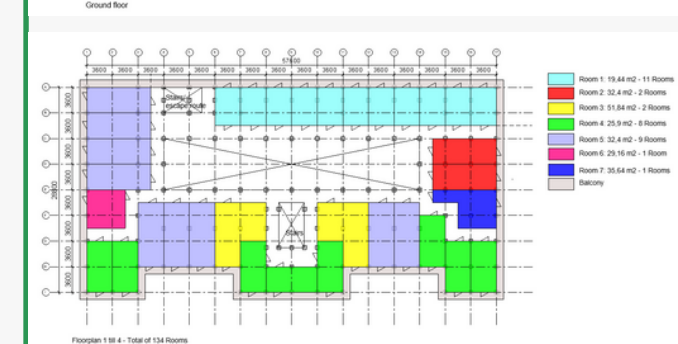
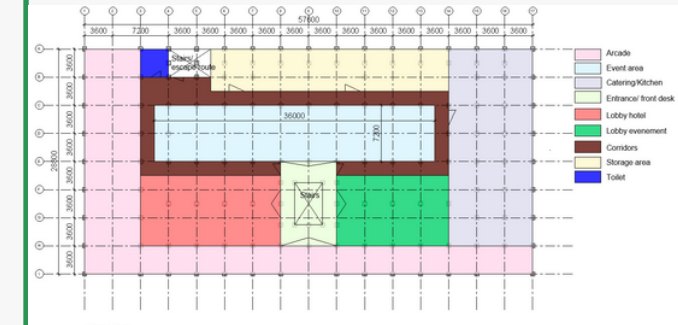
The Jakarta Hotel Amsterdam

The Jakarta Hotel in Amsterdam is a unique and sustainable building. This reference is mainly about the design of the rooms and the hotel. The top images shows that the hotel has an atrium with the hotel room doors attached. This gives an open appearance and can be well applied in the Watson building. The other images shows a hotel room in the Jakarta hotel. Here it is easy to see that a sustainable and luxurious style can be created with an open view of the balcony.



Source: *(11)

2 Proposition



Reasons for transforming the building into an event Venue and Hotel

- Generates a lot of income to maintain and preserve the building.
- There are not many event spaces like this in the area.
- Little competition in the area.
- Lots of potential with lots of millionaires and billionaires around.
- Something innovative in the area.
- additional employment opportunities for people in the area.
- an eye-catcher in the neighborhood
- located in a central location that is easily accessible.
- Bring the original purpose of the building back

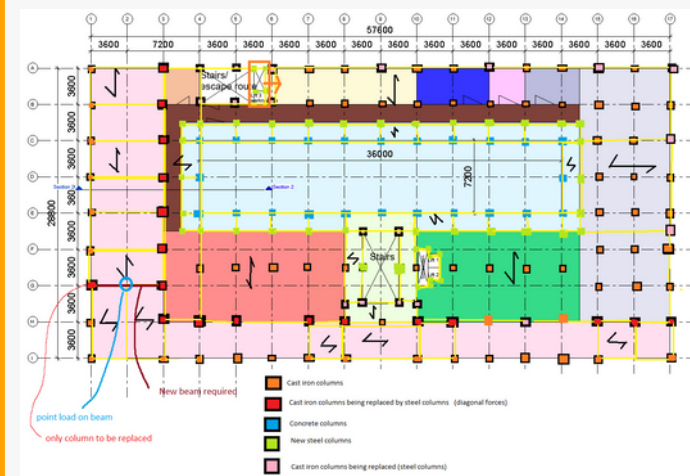
Berlhen

*(1) Sedumdak 123 lichtgewicht systeem. (2022, 5 januari). Sedumworld. Geraadpleegd op 20 juni 2022, van <https://www.sedumworld.com/product/sedumdak-1-2-3-systeem/>
 *(2) Sedumdak. (z.d.). [Foto]. Sedumworld. <https://www.sedumworld.com/product/sedumdak-1-2-3-systeem/>
 *(3) Voordelen van een groendak - sempergreen. (z.d.). Sempergreen. Geraadpleegd op 22 juni 2022, van <https://www.sempergreen.nl/nl/oplossingen/groene-daken/voordelen-groendak>
 *(4) Televiziót, J. (2021, 3 juni). America's Oldest Mall Is Saved By Transforming It Into 48 Cozy Low-Cost Micro-Apartments. Bored Panda. Geraadpleegd op 23 juni 2022, van https://www.boredpanda.com/americas-oldest-shopping-mall-micro-lofts-arcade-providence-northeast-collaborative-architects/?utm_source=google&utm_medium=organic&utm_campaign=organic
 *(5) America's oldest shopping mall has been turned into beautiful micro-apartments — take a look inside. (2016, 10 oktober). Business Insider Nederland. Geraadpleegd op 23 juni 2022, van <https://www.businessinsider.nl/americas-first-shopping-mall-is-now-micro-apartments-2016-10/>
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 *(8) The most beautiful wedding venues in the U.S. (z.d.). [Foto]. Cn traveler. <https://www.cntraveler.com/galleries/2016-03-08/the-most-beautiful-wedding-venues-in-the-us>
 *(9) Southern soirée at the peabody opera. (z.d.). [Foto]. Southern soirée at the peabody opera. <https://mnc-photography.com/wedding/southern-soiree-at-the-peabody-opera-house/>
 *(10) Romantic-mod, black tie wedding at the peabody opera house. (z.d.). [Foto]. Romantic-mod, black tie wedding at the peabody opera house. <https://www.eventsluxe.com/black-tie-wedding/>
 *(11) Hotel Jakarta Amsterdam. (2022b, april 11). Hotel Jakarta Amsterdam • by WestCord. Geraadpleegd op 22 juni 2022, van <https://hoteljakarta.com/>
 *(12) Quartier Bleu. (z.d.). Quartier bleu. Geraadpleegd op 23 juni 2022, van <http://www.quartierbleu.be/>

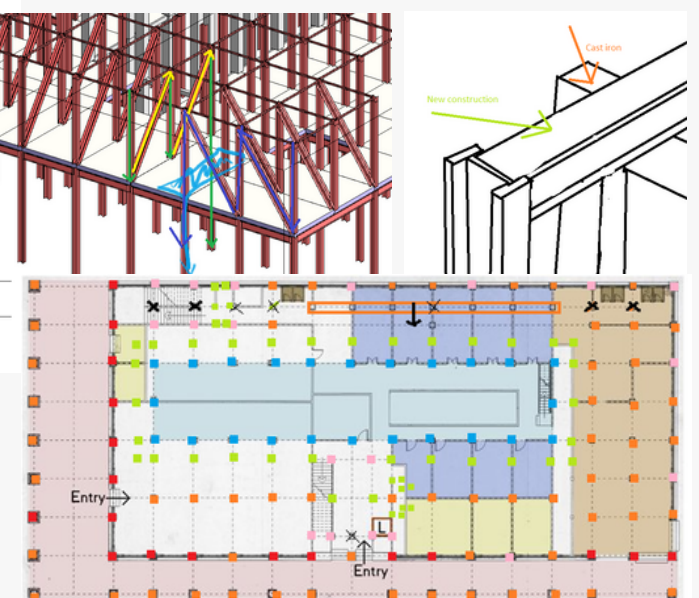
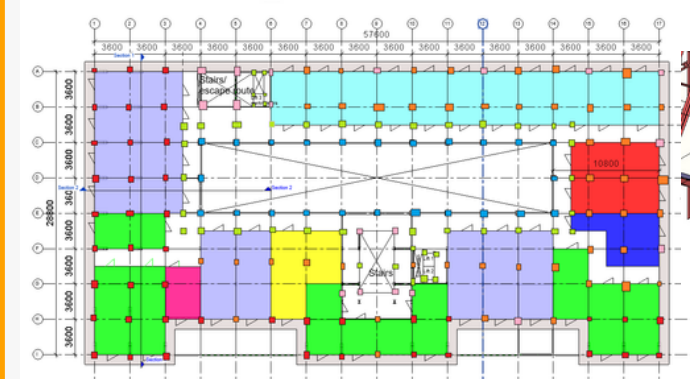
Week 3 - Development phase

BOUINT01P

1 Construction



New construction and the replacement construction (green, red and pink) will be made out of steel. The quality of steel that will be used is the S355. This allows the construction to be designed as slim and strong as possible. The blue columns have been replaced with concrete columns to meet the current function in the new building and because around the recess many forces come down. This makes the cast iron unstable. The red columns are the columns where the diagonals carry the weight of the roof and bring the forces to the columns in the façade. The new construction carries the weight of the green roof. The columns in the facade are hidden by walls. By using diagonals the monumental value is not affected (the views).

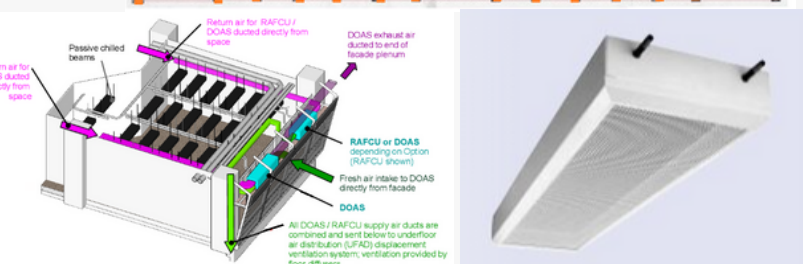


The new structure is connected to each other with moment fixed connections. This construction is not placed directly on the frame but a few centimeters next to the frame so the new construction can be connected above the current construction and the beams of the new construction can be incorporated in the floor so they are not in sight.

Ventilation



Decentralized ventilation ensures that the temperature per room is controllable. The reason for applying this ventilation system in the Watson hotel is to avoid excessive insulation in the hot climate in Mumbai, ventilating according to system D needs a heavy air handling unit on the roof and large shafts. Therefore, this is an excellent choice. Decentralized ventilation is great to apply in transformation and improve the indoor climate. Decentralized ventilation can be attached to the window, ceiling or facade.

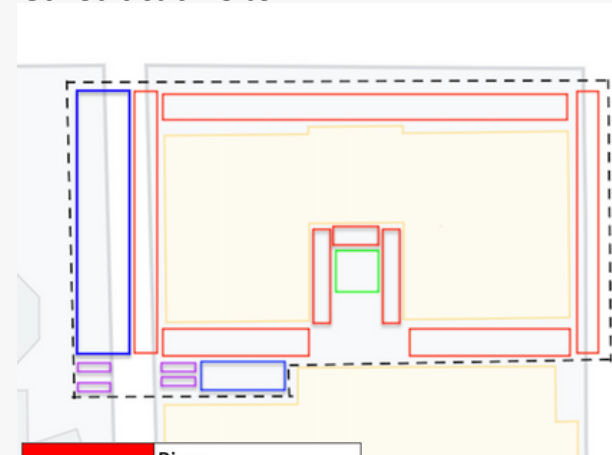


Decentralized ventilation is a local ventilation system. Ventilating in this way avoids the need for air ducts. Air from outside enters through the (duct) facade and exits through another duct. The ground floor is also decentrally ventilated in combination with passive cooling vectors. In large rooms this has less effect therefore passive cooling vectors are used which are attached to the ceiling. These cooling vectors can dissipate high internal heat loads and save energy. The atrium will have roof windows, so the warm air is possible to escape without any required systems.

Source: *(1), (2), (3), (4)

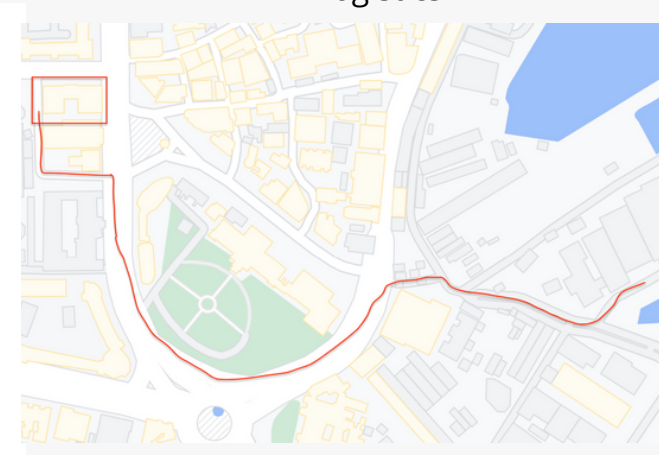
2 Implementation

Construction site



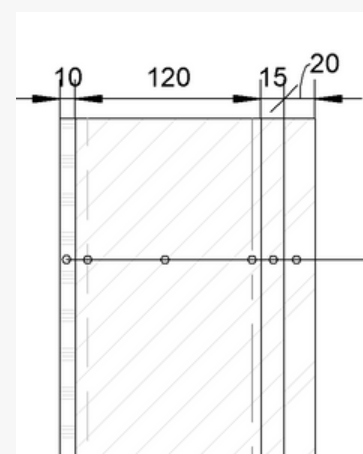
Red	Riser
Green	Crane
Purple	Waste bins
Blue	Material storage
Black	Construction fences

Logistics



Construction method

For the construction of the renovated hotel we use assembly building with steel columns and beams and the atrium is reinforced by a concrete structure consisting of columns and beams. We start the renovation by demolishing the interior walls so that we are left with only a cast iron skeleton. The cast iron structure that remains is not everywhere sufficient to carry the new floors. For this reason, our structural engineer has devised a steel structure with wind bracing that can provide the required strength. The columns and girders are delivered prefabricated and put into place by crane. The same applies to the concrete structure. This is also delivered prefabricated and assembled on site. In order to preserve the authentic look of the building, the cast iron columns that are still in good condition will be retained. The building is built per floor. We first place the steel structure by means of a crane which is placed in the atrium. The facade finishing will be made of thin HSB walls containing ventilation. These are also placed per floor.



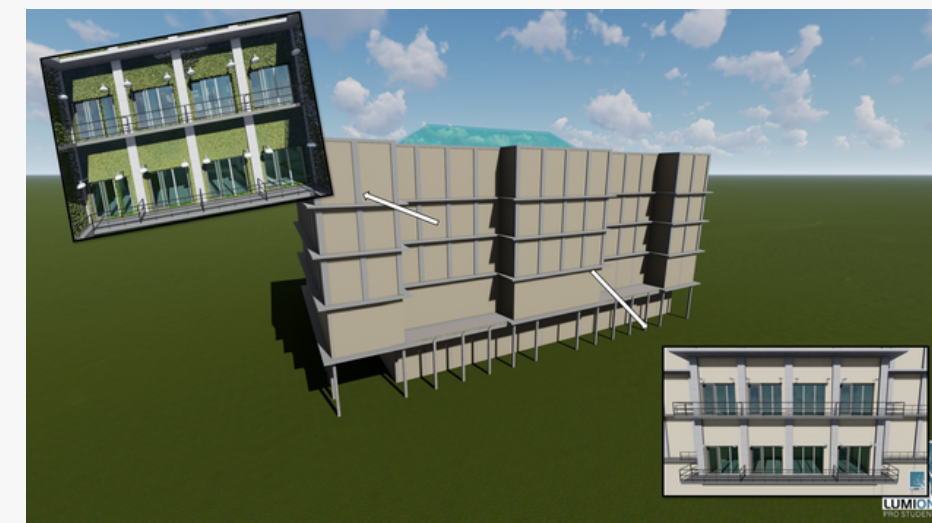
- Gypsum fiber board 10mm
- Vapor retardant foil
- Wooden framework (uprights 120mm)
- Waterproof plywood board 15mm
- Stonestrips 20 mm

Facade

The inner walls are also HSB, however, these are placed last. The axis to axis distance of the wooden uprights in the HSB walls is 500 mm. The distance between the columns is 3.6m so you can exactly place 5 uprights of 120mm between the cast iron columns of the outer wall. The floors consist of wooden beams with plywood boards on top, a softboard layer for sound insulation and a hardboard screed. For the roof we use a green roof to promote the sustainability of the building. As vegetation we decided to use sedum, because this is one of the lightest green roofs which minimizes the pressure on the steel structure.

3 Design

The floor plans show a number of changes and additions compared to week 2. Firstly, the technical areas and shaft areas. These have been placed at certain spots in the building, so that the installations can be placed vertically there. For horizontal installations, a lowered ceiling will be installed; this is easily done due to the current storey heights of approximately 5 metres. Furthermore, the terrace on the 2nd to 4th floors will be retained.



Visualisation

On the visualisation you can see renders of the event venue located in the atrium and a hotelroom. The event space is accessible for event such as weddings and conferences but is also rentable for other uses. A hotel room has also been rendered. this represents what it should look like.



*(1) Buiting, E. (2017, 21 december). ClimaRad krijgt zijaansluiting. Installatie.nl. Geraadpleegd op 1 juli 2022, van <https://www.installatie.nl/nieuws/climarad-krijgt-zijaansluiting/>
 *(2) DOOR REDACTIE LIVIOS, Tom Mondelaers. (z.d.). Decentrale ventilatie: Het overwegen waard? Livios. Geraadpleegd op 1 juli 2022, van <https://www.livios.be/nieuwsinformatie/technieken/ventilatie/ventilatiesystemen/29720/decentrale-ventilatie-het-overwegen-waard/?autid=6fed1712-0341-43d1-b720-7b050bc9311&referer=https://www.google.nl/&2F&refer=https://www.google.nl/&2F>
 *(3) Redactie Installatie. (2016, 1 november). Ventilatie met opbouwkanalen. Installatie.nl. Geraadpleegd op 1 juli 2022, van <https://www.installatie.nl/artikelen/ventilatie-met-opbouwkanalen/>
 *(4) Weringsprincipe. (z.d.). ClimaRad. Geraadpleegd op 1 juli 2022, van <https://www.climarad.nl/actueel/artikel/weringsprincipe/>