Technology and Environment 1

Assessment 2- Reflective essay

HydroHaws

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This essay will reflect on the process and development of our proposed home of the future, the HydroHaws.

Initial group discussion

The group agreed that the main aims whilst designing the future house was to implement systems, functions and materials that deal with issues such as sustainability, adaptability, wellbeing and increasing population.

We decided to carry out individual research and designs. The aim of this exercise was to enhance our knowledge and utalise each individual's ideas into a final design. Due to different circumstances there was a lack of ideas presented by my colleagues therefore we advanced using my design.

Personal research, development and final design

The Well-being of Future Generations Act (Wales) 2015 (FGAW) was the key inspiration behind my design process. The Act has gained international recognition for its forward thinking principles to protect the environment and future generations ("What Wales is doing today the world will do tomorrow" United Nations, 2015). My design was broken down into four elements; environmental, economical, social and wellbeing.

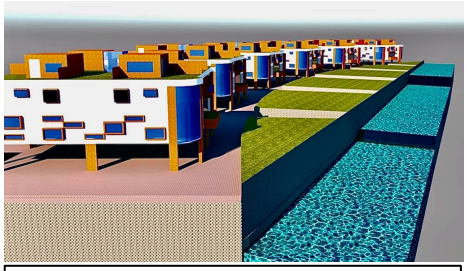
Recent flooding across the UK from storm Ciara and Dennis resulted professionals such as the chief scientist at Greenpeace UK to protest against the idea of building on land that is considered high risk of flooding (Lloyd, 2020). Contrary to this, government advisors and professionals such as Sir James Bevan emphasises the need to utalise such land to tackle the rising demand for houses, by applying innovative changes in the design and construction of buildings (Halliday and Carroll, 2020). The utalisation of such poor land provides the opportunity to utalise good quality land for more advantageous uses such as growing crops. Thus, I decided to design a house suitable for floodplain land.

I was inspired by the design of the Miami Produce Center, which has been built on legs. This construction method would allow floodwater to flow under the main occupied sections of the building, providing protection and security to occupants and homes. I anticipate that this design would reduce claims and insurance premiums. The UK Government aims for 50% of cars to be electric by 2030 (House Of Commons Library, 2020). The HydroHaws ground floor parking area is designed as a practical space for charging facilities.

(Miami Produce Center Gets First Approval From Board, n.d. Image)

The UK government's 2050 zero carbon target was a key influence in the design for this proposal. Initially, I decided to use ground source as the primary source of heating. However, to develop the principle of designing a house that would withstand flooding, I designed a watercourse system to run alongside the houses

to alleviate flooding during heavy rainfall. Upon carrying out research on renewable energy sources I was inspired by an off grid building by Ábaton which utalises surrounding streams for electricity (Frearson, 2013). I decided to utalise the manmade watercourse in my design by implementing a hydroelectric system as the HydroHaws' primary source of energy. The implementation of FGAW's principles of long-term thinking and prevention of future problems, led me to included solar panels the top level of the houses. With predictions that future weather conditions will become increasingly extreme; the solar panels will be used as a backup system in drought conditions (Sambrook, n.d.). On reflection, I am happy with this design, as it would allow the HydroHaws to be independent from the national grid. In future, I would attribute time to execute thorough research to ensure that such ideas are realistic in terms of cost and technicalities.



Sketchup model showing the watercourse running alongside the site (Author, 2020, image).

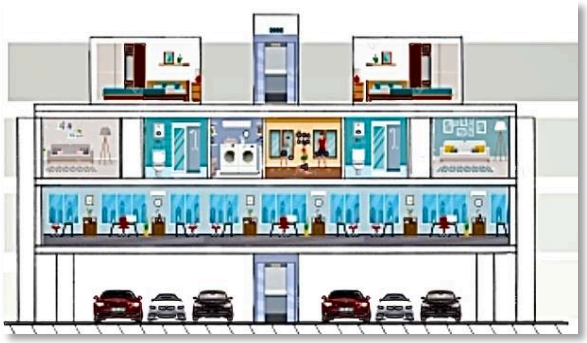
Active House standards would be seen as a standard feature of the HydroHaws. The HydroHaws takes advantage of solar gain with larger windows on the south and smaller windows on the north elevations. Deep window reveals will provide shading to assist with internal cooling in summer, providing a more confortable environment. External insulated shutters are fitted on the windows to reduce thermal bridging and heat loss in cold conditions. Some Passive House elements are included within the scheme, such as insulation. My research helped me understand the distinction between Passive and Active House.

The rooftop garden space provides residence with private and communal spaces to grow plants and fresh food, benefitting well-being, environmental and economical factors. The inclusion of a small gym on the second floor further supports the (FGAW) promotion for better health and wellbeing.

To achieve the social and communal aims of the FGAW, I was inspired by the Masdar City project, which is designed to provide a vibrant mixed-use community that accommodates for people/families of all ages and abilities (Masdar City: Constructing the world's most sustainable community, n.d.). I developed my initial design from a single house into a multiple complex design to create a larger community. The first floor was developed to provide a multi functional space such as office spaces promoting agile working and communal markets. The second floor accommodates various flats that include interior movable walls, provides the option to reconfigure the flat's layout according to the needs of the occupants.

Image showing how the movable walls provide the four different floor plan configurations (Author, 2020, image)

Initially, the floor plan included four identical flats. The group decided to develop this idea to include a further two smaller granny flats. On reflection, this development adds great value to the design as it provides families with a practical way to care for elderly/ill family members, promoting the choice of independent living and combating isolation. A central lift and adequate sized rooms support disabled access.



Section drawing demonstrating the functions of each floor within the HydroHaws design (Amy Frohwein, 2020)

Second floor, floor plan showing the 6 flats, communal areas and gym (Author and Amy Frohwein, 2020)

Materials

The HydroHaws is constructed of a timber frame structure set on short pile foundations, suitable for floodplain land. Sustainable concrete such as Timbercrete would be used for its longevity and water resilient properties. The structure is cladded in timber panels to improve aesthetics and U-values. Due to lack of time, I was unable to carry out in-depth research into new sustainable materials. In future projects I will dedicate time to develop my project further by including sustainable materials and technologies such as the electrically heated raised floor tile system that was introduced to us at the Specific Centre.

Group Presentation

The group agreed to enter the George Clarke "Home of 2030" Competition. We collectively participated in designing a name, logo and a four-page presentation document using Photoshop. On reflection, entering the competition was a valuable experience. It gave me the opportunity to push the boundaries of my

creativity and to develop my Photoshop and Sketchup skills. I gained experience in presenting a schemes key points whilst using professional vocabulary during the class presentation.

The four page presentation that the group submitted to the competition (Author, Amy Forhwein, Iestyn Bentley, Reuben Dutch, 2020)

Image demonstrating the Photoshop skills I developed during the project- applying a sky background onto a sketchup model (Author, 2020)

Conclusion (Group)

During future projects, I will ensure that we hold weekly meetings to discuss and develop ideas, ensuring that everyone participates throughout. However, I am please that we all co-worked at the end of the project to produce the presentation sheets for the competition.

Conclusion (individual)

I am happy with the proposed scheme as it achieves many of the key principles set out in the (FGAW). This project has emphasised to me the responsibility that architects have to create future proof designs and the extent of thought and detail that is required to achieve a diverse and successful scheme.

Word Count: 1,099 (Excluding titles and references)

Other group members: Amy Forhwein, Reuben Dutch, Iestyn Bentley

References:

- Frearson, A., 2013. *Off Grid Home In Extremadura Stable Conversion By Ábaton*. [online] Dezeen. Available at: <https://www.dezeen.com/2013/04/26/off-grid-home-in-extremadura-stable-conversion-by-abaton/> [Accessed 5 March 2020].

- Halliday, J. and Carroll, L., 2020. *Building New Homes On Land Prone To Flooding 'Making Damage Worse'*. [online] the Guardian. Available at: <https://www.theguardian.com/politics/2020/feb/25/avoid-building-homes-on-flood-plains-says-environment-agency-head> [Accessed 5 March 2020].

- House Of Commons Library, 2020. *Electric Vehicles And Infrastructure (Number CBP07480)*. House Of Commons Library, p.9.

- Lloyd, M., 2020. *'Stop Building New Homes On Flood Plains'*. [online] BBC News. Available at: <https://www.bbc.co.uk/news/uk-wales-51712267> [Accessed 10 March 2020].

- Oxford Martin School. 2015. *"What Wales Is Doing Today The World Will Do Tomorrow" United Nations*. [online] Available at: <https://www.oxfordmartin.ox.ac.uk/news/2015-wales/> [Accessed 5 March 2020].

- Ramboll Group. n.d. *Masdar City: Constructing The World'S Most Sustainable Community*. [online] Available at: <https://ramboll.com/projects/rme/masdar-city> [Accessed 5 March 2020].

- The Well-being of Future Generations (Wales) Act (2015).

- 2020. *The Next Miami*. [image] Available at: <https://www.thenextmiami.com/miami-produce-center-gets-first-approval-from-miami-board/?fbclid=IwAR1xkT-SCmVm4CxhOmMs8NFK_l17NE7A7NxNUMgETeofVQ8N9XaFOR-bpyo> [Accessed 7 March 2020].

Bibliography

Coutts, R. and Sharman-Hayles, M., 2019. *Better Design Can Help Us Build Safely In Flood Zones*. [online] Architects Journal. Available at: <https://www.architectsjournal.co.uk/opinion/better-design-can-help-us-build-safely-in-flood-zones/10045285.article?fbclid=IwAR0BAdGn4-dSqwTAwsgp2I6RDouqMXAoK-U22We3uWJ-CugQ2CZcD8PjXYU> [Accessed 7 March 2020].

Futuregenerations.wales. 2015. *Well-Being Of Future Generations (Wales) Act 2015*. [online] Available at: <https://futuregenerations.wales/wp-content/uploads/2017/02/150623-guide-to-the-fg-act-en.pdf> [Accessed 7 March 2020].

Seniorliving.com. n.d. *The Future Of Senior Living Communities | Seniorliving.Com*. [online] Available at: <https://www.seniorliving.com/article/future-senior-living-communities> [Accessed 7 March 2020].

Specific. n.d. *Solar Research & Active Buildings At Swansea University » Specific*. [online] Available at: <https://www.specific.eu.com> [Accessed 7 March 2020].

Stanton, A., 2019. *'Not Enough' Electric Car Charging Points*. [online] BBC News. Available at: <https://www.bbc.co.uk/news/uk-47696839> [Accessed 7 March 2020].