

Module: Integrated Group Project

Module Code: ACBA6003



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The need for the project to go ahead:

The project development site (E9) is located adjacent to the Prince of Wales Dock in the SA1 development area of Swansea. Within the project's surrounding area, there are numerous businesses, a large number of residential buildings, a university campus, and several smaller retail units (consisting of a few cafés bars, and restaurants). It is essential to note that there is only one shop within the vicinity of the project area, the Tesco Express located on the opposite side of the Prince of Wales Dock to our site. Both our allocated development site and the Tesco Express have been marked on the map below in figure 1. With the allocated development site being highlighted in red and the location of the Tesco Express being highlighted in blue.

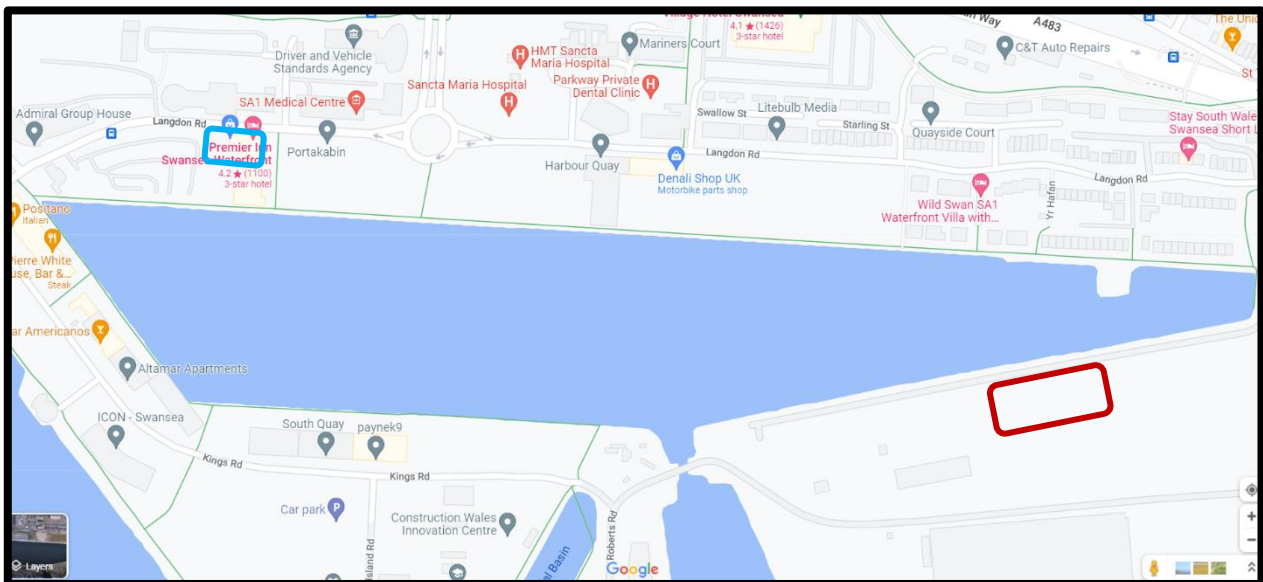


Figure 1: A screenshot of a map obtained from google maps, to clearly show the locations of both our allocated development site, as well as the Tesco Express within the area (Google, 2022).

The need for this project to go ahead is of great importance, as previously mentioned above, there is a minimal amount of retail units within the area, so consumer choice within the area is low, if not non-existent. Therefore, this is a major driving reason why residents and people who work within the local area, commute away from the local area to different locations to purchase their produce and goods. If there were more retail units within the local SA1 development area, then it is likely that fewer people would leave the area to do their shopping if they had a choice of where to shop locally. Not only that, it is more likely that with more of a choice of where to shop, there is a high possibility that it will drive people who do not work or live near the area to change their shopping destinations and habits by choosing to use these new retail units. Therefore, driving an injection of positive financial into the area. With there being a possibility of a larger footfall of people within the area, there is a higher chance that people who are already within the area are likely to make

use of the other retail units within the local area, whether that be the pubs, cafes or restaurants, etc. Therefore, helping other pre-existing local businesses also increases their revenue and adds more money and financial benefits to the local community.

One of the main reasons why this project simply has to go ahead is the clear gap in the market for student accommodation within the immediate surrounding area. There are numerous student accommodations within the Swansea area, including the Fabian-Way campus, the Singleton campus, and the student village in Hendrefoilan in Sketty. However, the problem that has arisen itself is that the University of Wales Trinity Saint David campus located in the SA1 area, near our site does not have an allocated student hall within proximity of the campus. Therefore, the students who are living in Swansea (away from home) and attend this university, who wish to live in student halls simply have no choice other than to live in one of the available student accommodation blocks in Swansea. These are located at a significant distance away from the university. Therefore, for them to get to the university itself, the majority of students have no choice but to travel on public transport, which inevitably adds extra unnecessary expenses. This could all be avoided with the construction of this student hall block, which eliminates the distance that the students have to travel as they would virtually be based on site. The majority of students at the university wish to study within the library facilities located on the university campus, outside of their allocated lecture times or days. Therefore, the issue with travel to and from the university campus and the additional expense, not only occurs within lecture time and term time but also during times when the student just wishes to spend their free time there.

The ground floor retail units of the proposed building on the allocated SA1 site will also bring with it additional jobs to the local area. The type of businesses that will be housed within the retail units on the ground floor is not of any relevance, due to any type of business within these units providing new additional job opportunities. This will also assist in improving the economy within the local area surrounding the new development.

Within Swansea, there are two universities, Swansea University as well as the University of Wales Trinity Saint David. There are 21,465 students enrolled at Swansea University, with 17,845 of these students coming from the UK, 1,070 coming from EU countries, and 2,550 coming from non-EU countries (Swansea Council, 2021). The University of Wales Trinity Saint David, however, is not only based within Swansea, it is based over three main campuses including both Carmarthen and Lampeter. The Swansea campus, however, is by far the largest of the campuses, therefore it is an assumption that the large majority of the students enrolled in this university are based within Swansea. The amount of students that are enrolled at the University of Wales Trinity Saint David is 14,800. With 14,000 coming from the UK, 340 coming from EU countries, and 460 coming from non-EU countries (Swansea Council, 2021). Taking these figures into consideration and the overall shortage of student accommodation being seen across the vast majority of the UK, the need for this student accommodation building along with any other student accommodation building to be built within the UK is of high importance. For the university students to study and

achieve their chosen degrees to be able to progress with their careers within their lives, they inevitably need somewhere to live whilst carrying out their studies (Hubbard, 2009).

The Location:

The proposed multi-story student accommodation and retail space project that we are planning to construct is located in Port Tennant, a suburban district of Swansea located on the East side of Swansea harbour. The approximate proposed site coordinates taken from google maps are 51.618474, -3.919030. The proposed site is specifically located on the boundary of the Prince of Wales Dock. At this current time, there is no current specific use of the site. Plot E9 (our plot) and a significant number of the surrounding plots around our site are sitting dormant. All of the sites have tremendous potential for development to be undertaken on them, with them being large open spaces in an idyllic location. Development potential is optimal, with numerous businesses, retail and residential units located near the vacant sites. Figure 2 below, shows what the site (E9) looks like from across the opposite side of the Prince of Wales Dock before any development works have started. It is clearly visible that the site and surrounding sites are completely overgrown with vegetation and will need a lot of preparation works to be undertaken before any construction work can proceed on site.



Figure 2: A photograph of the proposed site location, from across the opposite side of the Prince of Wales Dock (Bolton 1902382, 2022).

On the zoomed out wider view of the map below in figure 3 (Digimaps, 2022) it is visible to see, that the location of our plot (E9) and the land near this, is the largest cluster of unused, underutilised, vacant land within the whole view of the map. Directly to the South of our plot on the map, there is an industrial building, which has links to the origins and heritage of our site and the surrounding areas. There is a narrow road that runs along the front of our plot, which we have the potential of tying into, to develop our access road in and out of our site. This enables access for deliveries, customers, and residents. We are planning a one way in-one way out vehicle route, around the perimeter of our building which will allow delivery drivers to park up in a designated lay-by and unload their deliveries whilst still allowing enough room for a vehicle to pass on the outside of the delivery vehicle to continue its route around the perimeter of the building.

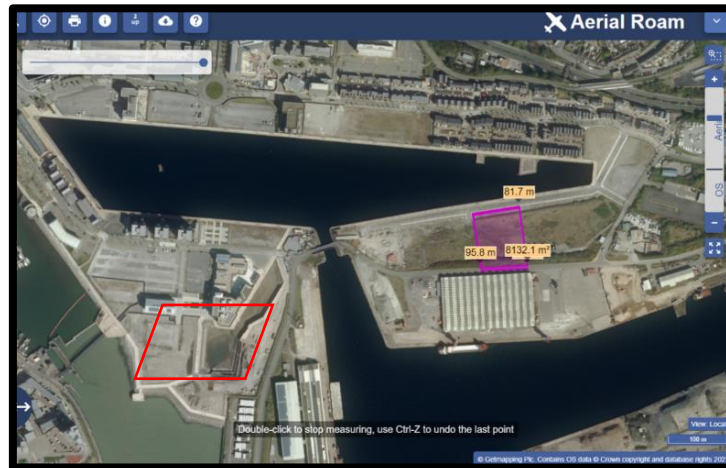


Figure 3: An aerial map obtained from Digimap, showing a zoomed-out aerial view of our site and the surrounding areas (Digimap, 2022).

The section of the SA1 area depicted within the map above surrounding our proposed project site, the Prince of Wales Dock, and The University of Wales Trinity Saint David Campus is located 1.8 miles away from Swansea City Centre itself. Within Plot E9, the main entrance of our proposed development plan faces toward the Prince of Wales Docks. Our site (E9) is located to the North of the nearest university campus, The University Of Wales Trinity Saint David SA1 Campus. The location of the proposed project is in and around the area of Swansea that was destroyed by the Luftwaffe during the 'Three Nights Blitz' on the 19th, 20th, and 21 February 1941 during World War Two. The centre of Swansea and the surrounding areas were turned from a bustling town, into a pile of rubble within three days. Below are three images in the form of physical maps, which outline and highlight the difference in the location of our proposed site and the surrounding areas from the first image showing Swansea Town Centre in 1919 through to the last image being from 1949. The difference between the image shown in figure 4, compared to figure 6, is due to the intense bombing of the area by the Luftwaffe during the Second World War, with the Luftwaffe's bombing targets being portrayed in the map in figure 5.



Figure 4: A physical map showing Swansea Town Centre before the Blitz in 1919 (3rd edition, 6th OS Sheet 24)(West Glamorgan Archives, 2021).



Figure 5: Showing a physical German Target map of Swansea Town Centre in 1941, highlighting the main target areas of the Luftwaffe (West Glamorgan Archives, 2021).



Figure 6: A physical map obtained from the Swansea Council website (4th edition, 6th OS Sheet 24) portraying Swansea Town Centre in 1949 after it had been bombed during the Blitz in the Second World War (West Glamorgan Archives, 2021).

- The Blitz on the Prince of Wales Dock, was in close proximity to both the 'J' Sheds and our proposed site location in the SA1 area.
- Due to the location of the site, being within the area that was bombed by the Luftwaffe during the Second World War, there is a possibility that there will still be unexploded bombs located in and around our E9 plot. As a result of this unexploded ordnance surveys (UXO) will have to be carried out on-site to determine whether there are any unexploded bombs remaining. The way that these surveys are carried out is by initially inserting a probe into the ground under hydraulic pressure, this can then detect any deep-buried unexploded bombs within a certain diameter, depending on the ground conditions. The better the ground conditions are, the lower the number of probes have to be inserted into the ground at different locations within the site. If there are any remaining, we must ensure that they are dealt with and removed correctly to ensure everyone on site is kept safe.



Figures 7 and 8: Show the same map, but show the different data regarding soil depths available for different parts of our allocated site (Digimaps, 2022).

The allocated site for our proposed project is visible in both figures 7 and 8 above and has been marked using a red dot on both the images obtained from (UKSO, 2021). The difference between the two soil layer depth graphs above however is the data that can be extracted from each image, with the positioning of the red marker determining this. Both of the red markers on each image are within the perimeter of our allocated site. Figure 7 (on the left-hand side above) has the marker positioned towards the Prince Of Wales Dockside of our allocated site, and is within the green highlighted area of the map, and therefore has data available on this location to notify that the soil and subsoil within this area can be “easily dug to a depth of more than 1 metre. Whereas however, figure 8 (on the right-hand side above) has the marker located more towards the centre of our allocated site, just outside of the green highlighted area marked on the map. Due to the marker being located outside of the green highlighter area, the data that can be obtained regarding the soil of this

section of our site perimeters is minimal, with “no data applicable”. Therefore, the amount of information that we can gather overall regarding the soil on our allocated site is fairly minimal, this is due to the majority of the allocated site being located outside of the green highlighted area on the map.

Location of the nearest emergency department in case of an emergency during construction works on site:

Below in figure 9, is a screenshot of a route planner, describing the directions from our allocated site to the nearest Accident and Emergency Department which is located within Morriston Hospital. This is to be displayed within the site cabins and welfare facilities on-site, to make sure that all workers on site know where to go in case of an accident. The workers on-site will also have this shown to them within their site induction before they begin any work on-site.

From: Prince of Wales Dock, Swansea SA1 8AG, UK		Distance: 6.1 miles	
To: Morriston Hospital, Heol Maes Eglwys, Morriston, Swansea, UK		Time: 14 mins	
Distance	Directions	Total	
Start:	Prince of Wales Dock, Swansea SA1 8AG, UK		
0.0	Head west on Langdon Rd toward King's Rd	0.0	Show map
0.1	Turn right onto Kings Rd	0.1	Show map
0.2	Kings Rd turns left and becomes Quay Parade/A4067	0.2	Show map
0.1	Turn right onto New Cut Rd/A483	0.3	Show map
0.1	Slight right onto Tawe Bridge/A483 Continue to follow A483	0.4	Show map
0.1	Turn left onto E Bank Way/A4217 Continue to follow A4217	0.5	Show map
1.0	At the roundabout, take the 2nd exit and stay on A4217	1.5	Show map
0.2	At the roundabout, take the 2nd exit and stay on A4217	1.7	Show map
0.2	At the roundabout, take the 2nd exit onto A4067	1.9	Show map
0.4	At the roundabout, take the 4th exit onto Ffordd Cwm Tawe/A4067 Continue to follow A4067	2.2	Show map
1.1	At the roundabout, take the 3rd exit onto Neath Rd/A4067	3.3	Show map
1.4	At Ynysforgan Interchange, take the 1st exit onto B4603	4.7	Show map
0.1	At the roundabout, take the 2nd exit onto Llanillienwedd Rd	4.7	Show map
0.6	At the roundabout, take the 3rd exit onto Heol Maes Eglwys	5.3	Show map
0.2	At the roundabout, take the 1st exit and stay on Heol Maes Eglwys	5.5	Show map
0.3	Turn right onto Clos George Morgan	5.9	Show map
0.1	At the roundabout, take the 1st exit	5.9	Show map
0.1	Turn right Destination will be on the left	6.0	Show map
0.1	Arrive: Morriston Hospital, Heol Maes Eglwys, Morriston, Swansea, UK	6.1	
Section time: 14 mins 29 s, Total time: 14 mins 29 s			

Figure 9: A screenshot of the route from the plot 'E9' to the nearest Accident and Emergency Department in Morriston Hospital, Swansea. (AA, 2022)

What is currently located within the surrounding areas of the location of our proposed site:

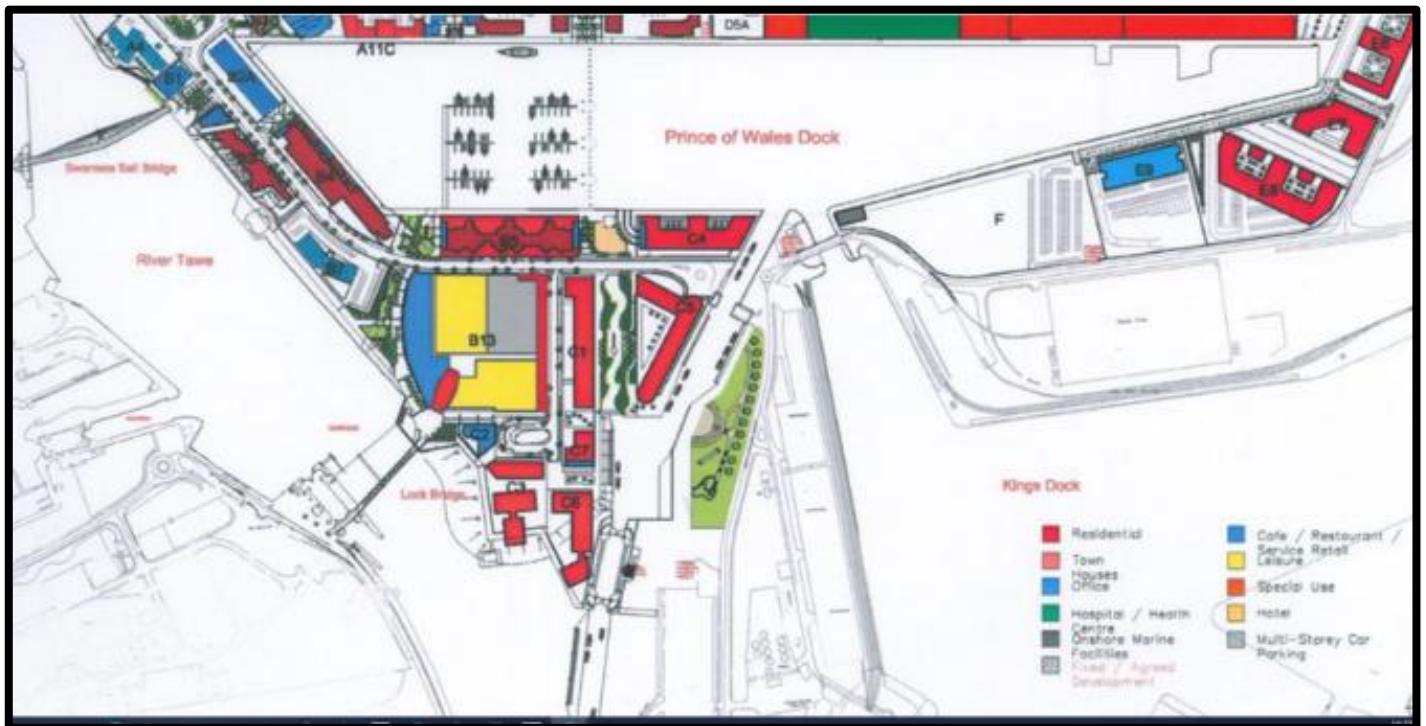


Figure 10: Shows a map of our site and the surrounding areas, with an attached key detailing different areas of the map. (Swansea City Council, 2020)

Within the surrounding areas of our allocated construction site, there are numerous other buildings which can be seen in figure 10 above, for example; offices, townhouses, hospital/ health centre, multi-story car park, and onshore marine facilities. These are highlighted in different colours, which correspond with the colour-coded key on the bottom right-hand corner of the image.

Feasibility Study:

Section I- Introduction:

I.I-Background explaining reasons why the scheme is being considered:

The three-storey student residence hall within the SA1 development, comprising of two-storeys of student accommodation and the ground floor being a multi-functional retail space has many reasons as to why this project is being considered. The development is based in the brownfield development area located in the Northern part of Swansea Docks, otherwise known as SA1 Swansea Waterfront. Within the surrounding areas of our proposed site lies numerous different buildings with different types and needs of occupancy. One of the most prominent clusters of buildings within the close vicinity of our project is the University itself. This campus is comprised of two large buildings, the IQ building, and the Forum. With this university being within this area and not having a site-specific student accommodation building in place, then the need for our project to be undertaken is of high importance. Within the University of Wales Trinity Saint David, there are 12,700 students enrolled across Swansea, Lampeter, and Carmarthen, with Swansea being the largest of these campuses with the highest number of students enrolled. With this in mind, without there being a student accommodation based in or around our university campus, students have to rent accommodation off-campus. This therefore could result in them having extra costs such as travel expenses, so if the opportunity for an onsite accommodation is offered to students then they are more than likely going to take the opportunity to do so. The retail units located on the ground floor of our development, regardless of what they are decided upon to be, will be of high importance within the surrounding SA1 area. Within the surrounding area, the only shop is a Tesco Express, therefore the level of consumer choice is significantly low and if the residents do not wish to shop in Tesco, then they are going to take their business out and away from the local area. If one of the retail units however was to house a shop, then that instantly puts competition up against Tesco and has the opportunity of drawing back business from residents who are leaving the area to shop, as well as winning customers of the major supermarket chain, maybe to a more local independent business possibly (depending on what goes there). It also has the opportunity to draw in new customers who do not live in and around the surrounding area and therefore creates new trade and money for the area. With the new development being within the SA1 area, an area within Swansea that people like to come to visit to go for a walk/jog/cycle, etc. then the opportunity for passing trade is huge. There is also the business that comes along with the other businesses that are within the area, like admiral workers going for their lunchtime snack, or to get their evening meal on the way home from work.

I.II-Scope of feasibility study:

Item Number:	Item Description, Position and Reason for the Project:
	Accommodation and Retail.
	Student Halls of Residence and additional Retail Units.
1)	To carry out a Design and Build a new three-storey Student Residence Hall, with the top two floors consisting of student accommodation and the ground floor being a cluster of multi-functional retail spaces. The location of the proposed site is on the boundary of the Prince of Wales Dock, located within the SA1 area of Swansea, which is in close proximity to the University of Wales Trinity Saint David SA1 campus. To cope with the growing number of home and overseas students wishing to attend the University, additional Halls of Residence are required.

I.III- Input from (and notification of the proposal to) other appropriate parties NB. A feasibility study requires a Principal Designer to be appointed:

GWYRDD CYMRU CONSTRUCTION LTD 146 High Street, Swansea, SA1 2PN gwydd@cymrucconstruction.co.uk	
2. DUTY HOLDERS & KEY PERSONNEL	
CLIENT	University of Wales Trinity Saint David, Swansea Waterfront, IQ Campus, Swansea, SA1 8EW.
PRINCIPAL DESIGNER	Gwydd Cymru Construction Ltd. 146 High Street, Swansea, SA1 2PN.
PRINCIPAL CONTRACTOR	Gwydd Cymru Construction Ltd. 146 High Street, Swansea, SA1 2PN.
PROJECT MANAGER	Gwyn Davies E: Gwyn.Davies@gcconstruction.co.uk M: 07837 763022
SITE MANAGER & TEMPORARY WORKS CO-ORDINATOR	Aled Owen E: Aled.Owen@gcconstruction.co.uk M: 07884 673922
SITE SUPERVISOR & TEMPORARY WORKS SUPERVISOR	Rhys Jones E: Rhys.Jones@gcconstruction.co.uk M: 07767 636343
H&S MANAGER	Hannah Rees E: Hannah.Rees@gcconstruction.co.uk M: 07855 346721
SITE SAFETY OFFICER	Alex Williams E: Alex.Williams@gcconstruction.co.uk M: 07775 433222
COMMUNITY LIAISON OFFICER	Barry Davies E: Barry.Davies@gcconstruction.co.uk M: 07012 143621
PROJECT ENVIRONMENTAL MANAGER	Llinos Rees E: Llinos.Rees@gcconstruction.co.uk M: 07442 369283

Figure 11: A screenshot obtained from Gwyn's list of duty holders and key personnel (Davies 1605993, 2022).

The image above portrays the list of duty holders and key personnel allocated to this site. This includes; the client, the principal designer as well as the principal contractor. Due to the project being one of a Design and Build, the principal designer, as well as the principal contractor, are both Gwyrdd Cymru Construction. This means that all of the responsibilities on both the design side as well as the construction side fall to Gwyrdd Cymru Construction. A benefit to using us as design and build contractors is the amount of time that can be saved overall on the project, to ensure that we meet the August 2023 deadline for the completion of the project. The additional benefit of using a design and build contractor is that the collaboration of services within the same company means that the overall flow of the project is likely to run smoother, due to there not being another contractor trying to impose their own ideas onto the development, this way the work is carried out harmoniously.

Section II- Background Information:

II.I-Customer supplied information (List for Principal Designer):

- The project is to be one of a 'design and build contract.
- Three-storey student accommodation building.
- Top two floors consisting of student accommodation.
- Ground-floor consisting of multi-functional retail spaces.
- Preference for the student accommodation rooms to be en-suite.
- Encouragement to maximise the rental potential of these units. (by having alternative occupancies during non-term time)
- Single and family units to be incorporated within the design of the upper floors within the student accommodation areas.
- Access available for all persons, including those with disabilities (Inclusion of a lift for people with disabilities to access the upper floors.
- Areas of the plot of land not utilized within the build should be fully landscaped for the community to use these spaces.
- Parking spaces should be available for both the retail and residential units with the specific amount allocated being within the requirements of the local council for the area.

II.II- Use of building, past, and present:

- The building in question is a new multi-use, residential and retail construction and not a renovation project, therefore there are no previous or present uses of the building.
- The proposed use of the building is for it to be a three-story student accommodation building, with the top two floors consisting of student residences and the ground floor being multi-functional retail spaces.

II.III- Current/ Proposed Occupancy:

- The building's past and current occupancy is non-applicable, due to the fact that the building is a proposed new build.
- The proposed occupancy of the building is potentially a combination of building occupancy types, dependent on which type of retail units are decided upon to be used within the 'retail shells' on the ground floor. The combination of building occupancy types includes; type A-2, type M and type R-1, (Building Code Trainer, 2020) Type A-2 is a space that is used for assembly that is intended for food and/ or drink consumption, which would be the case if one or both of the retail units were to be used to house a café, bar, or restaurant. Type M categorises a use that involves the display and/or sale of merchandise, stocking of goods, and is accessible to the public. This building occupancy type would be applicable if either of the ground floor units were to be used to occupy a shop, market, or salesroom. Type R-1 is the category that surrounds sleeping units that are primarily transient in nature, this coincides with the student accommodation floors of this building and the fact that standard student accommodation leases only last around 9-10 months at a time, (Building Code Trainer, 2020).

Section III- Outline Brief:

III.I- Client's Requirements:

- The clients' requirements for this project are primarily based on the concept of a three-story building, comprised of three floors, with the two upper floors being student accommodation and/or family apartments, and the ground floor consisting of two unknown multifunctional retail units.
- It is a requirement of the client that the window of time for the project to be completed is within twenty-two months, with the completion date being August 2023.
- It is also a requirement that the accommodation rooms within the top two floors are 'preferred to be en-suite rooms'.
- The client has also declared that one of the main aims of this project as a whole is to 'maximise rental income'. Therefore, the design that has been agreed upon maximises the space that is available, and therefore, the top two floors comprise of 180 apartments.
- There is also the possibility of allowing overseas students the possibility of renting out these apartments all year round (not just during term time) which also enables us to maximise the rental income of these units. There must be proper access to all areas of the building (including for those with disabilities) and therefore we have incorporated lifts into the design to allow them to gain access to all floors of the Project.
- We have also incorporated community areas into the 'unused areas' of the plot, to engage this project with the local community, allowing them to benefit from exercise

equipment being provided on-site, and community garden space to walk around and relax in.

- There is also a requirement to provide parking spaces for the apartments on the upper floors, as well as parking spaces for the retail units (for both staff and customers). We have provided ample parking spaces for these as the requirement for the number of spaces for the apartments and maintenance is 25 spaces and we have designed for there to be a significantly larger amount of 42 Spaces to cover this. We have provided staff car park spaces alongside the perimeter of the building to maximise the use of the available space. There is also a requirement for space to allow delivery lorries and refuse lorries to pull off the main road to allow other vehicles to pass by, whilst the lorries are loading or unloading.

III.II- Operational/ Functional needs:

This construction project much like all construction projects that are undertaken requires a specific set of skills in order for the projects to be managed effectively. There are numerous elements that the site manager (Aled Owen) must ensure are correct, these include elements such as; the health and safety of both the workers on-site as well as the general public, general fire safety, protection against noise, accessibility, and use safety, energy-saving and environmental impact factors (Health and Safety Executive, 2022).

Elements that are applicable on our site in particular:

- **Health and safety-** the below are covered by the Health and Safety at Work, etc. Act 1974, covers all aspects of Health and Safety on construction sites (Health and Safety Executive, 2020).
 - All personnel on-site must wear adequate Personal Protective Equipment (PPE), which meets the Personal Protective Regulations (Health and Safety Executive, 2022).
 - The Manual handling operations regulations (insert reference here).
 - The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR), to report not just all injuries and accidents but also any near misses.
 - Ensure that employees are competent in using tools necessary to carry out work, also ensure that the employees take regular breaks away from power tools that could help prevent causing injuries such as hand-arm vibration syndrome. (Health and Safety Executive, 2022).
- **Protection against noise-**
 - It is a significant difficulty to completely eradicate the noise that is created as a result of construction activities, so therefore it is a priority to control the noise using different methods such as; isolation, engineering controls, and substitution
 - With work on construction sites changing frequently, it is the responsibility of the site or project manager to review the control measures that are in place, to ensure that they are adequately reducing the noise being created as best as can be achieved in the circumstances that present themselves.

- Fire Safety-
 - Emergency Routes and Fire exits should be highlighted clearly and under no circumstances should these be blocked at any time (Health and Safety Executive, 2022).
 - Adequate temporary fire doors, the use of horizontal and vertical fire compartmentation may be required during construction phases.
 - Fire detection and alarm systems (Health and Safety Executive, 2022).
 - Hot work permits- these are required for any operation involving flames or producing heat and/or sparks and must be prepared by a competent person. These hot works can include; torch cutting, grinding, welding and soldering.
- Environmental impact factors, including both initial installation and life-cycle environmental factors-
 - Monitor and maintain that all waste materials are dealt with and disposed of correctly to avoid it spreading.
 - Keep materials such as cement and sand secure and located on-site where there is no risk of them being washed into drains or waterways.
- Energy saving and efficiency-
 - More than 75% of heavy construction equipment on site are powered by diesel, due to the performance levels and reliability. Newer machines offer higher efficiency levels and gains over equipment that is older than 15 years. Therefore, we have ensured that all of the machinery is as recently manufactured as possible and ensure that the machinery is well maintained. The use of newer, better-maintained machinery and vehicles to maximise efficiency levels and save energy.
- Accessibility and use safety-
 - The construction site will adapt whole perimeter security measures in the form of security fencing or perimeter hoarding to control access to the site, this is not only for security reasons to prevent theft and vandalism but also for safety purposes primarily for members of the public passing on the outside of the construction site.
- Materials storage and waste management-
 - The storing of materials on site must be safe to prevent any hazards whilst also ensuring that any waste is collected, removed, and disposed of safely.

Section IV- Site Location:

IV.I- Location Description:

As seen within chapter one of this document (the location).

IV.II- Site Investigation

The site and ground investigations for this project were carried out by Timothy Rees (1807470) and therefore can be seen within the report he has compiled for the site.. Attached below within this section (4.2- Site Investigation) and section 4.3 (Ground Levels Investigation), are key relevant findings that I believe need to be included within this feasibility study for the proposed development.

IV.III- Ground Levels survey

It was identified by Tim that during his desktop study that the proposed development site in questions ground level is relatedly even and does not show any significant differences in height varying away from the ground level.

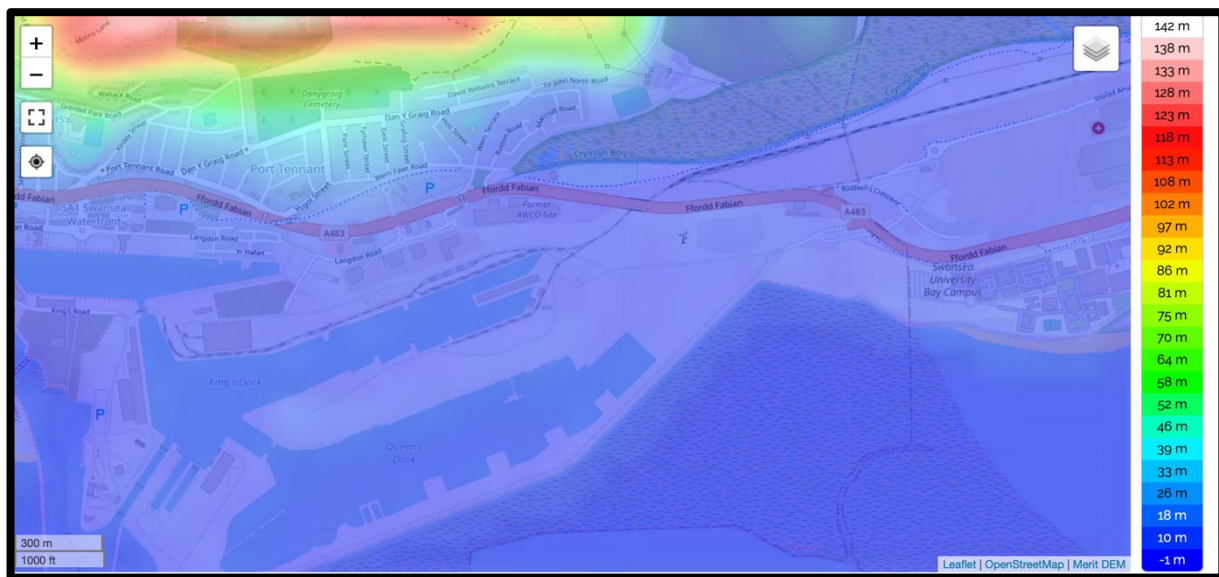


Figure 12: This image was obtained from the Ground Investigation Section that was composed within a colleague's piece of work (Rees 1807470, 2022).

It has been recommended by Tim, that although a desk study has been carried out to determine the ground levels, a further site-based topographical survey should be carried out by a team using stations, reflective prism, and GPS units to accurately measure the topography of the land.

IV.IV-Access- Pedestrian, vehicular- Highways' restrictions

Initially, there is an access restriction issue to the site, as during our initial site visits we were unable to gain access to the site. The closest we were able to get to the site to view, was from across the opposite side of the Prince of Wales Dock. A photograph that was taken on this day is visible in figure 14 within the visual survey section below, showing what we were able to view of the site. There is a roadway, passing in front of our site between our site and the Prince of Wales Dock. This road would be sufficient for all vehicle types to access our site, including larger vehicles such as refuse collection and product delivery vehicles when the project is up and running. The only issue that could possibly hinder the access to this

road from our site is ensuring that permission is received from the Highways to make sure that our entrance to the site, and exit off the road, meet the Highways' restrictions.

IV.V- Visual Survey/ photographs for incorporation into a study:

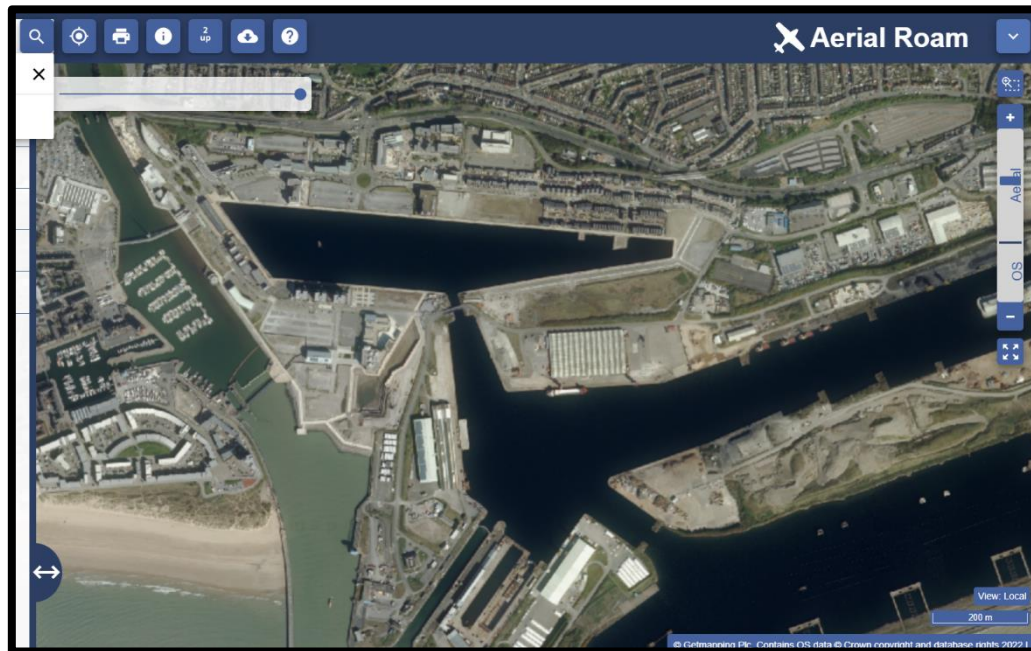


Figure 13: This image was obtained from Digimaps, and is an aerial snapshot of the 'E9' site and the surrounding areas (Digimaps, 2022).

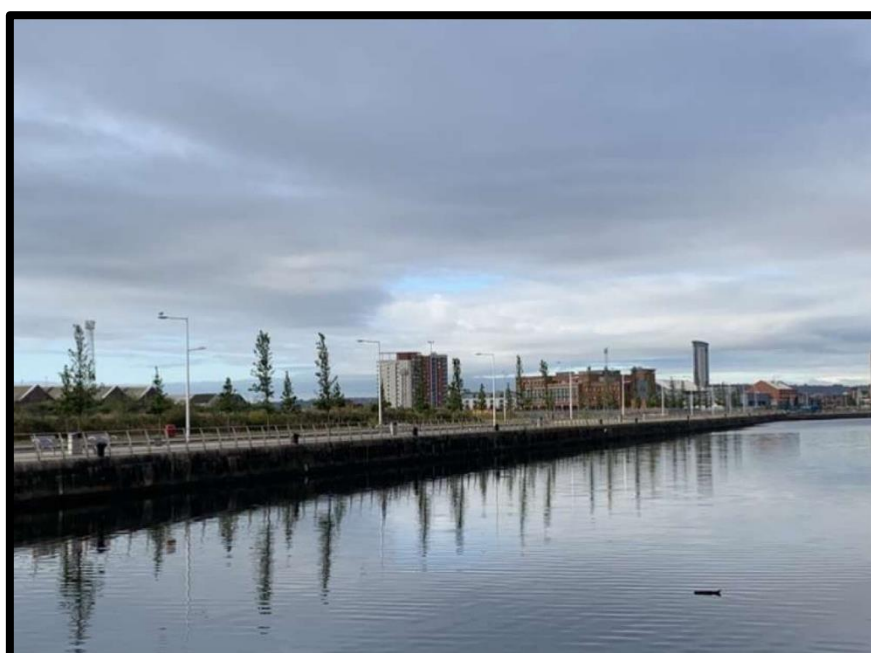


Figure 14: A photograph of the surrounding areas of the 'E9' plot, was taken on the first visit that we had to the site (Bolton 1902382, 2022).



Figure 15: A photograph of previously developed residential units, located on the opposite side of the Prince of Wales Dock to the site 'E9' (Bolton 1902382, 2022).

IV.VI- Surrounding development, highways, footpaths, parking, noise

There are a number of developments that are currently ongoing or have been completed within the surrounding area of our development. These include residential units as well as businesses. Overall the existing highways surrounding the development site are adequate to cope with the current needs and requirements of the local area. Overall, the footpaths in the surrounding area are of high quality and the quantity is high. This is due to the location of the area surrounding our site being a largely popular route for pedestrians and cyclists to use. The parking within the local area currently is quite questionable, due to there not being many car parks within the local area, and the majority of roadside parking being labeled as residents only car parking or as areas which are not suitable for parking. The car parks that are within the area are very commonly used by both customers to the local bars, cafes, and restaurants, as well as providing facilities for local workers to leave their vehicles. Therefore, the capacity of these car parks is regularly at its maximum. The noise levels currently within the area are fairly load due to the mass number of construction projects that are currently being undertaken. Apart from this, the overall noise levels within the area are fairly quiet, and this is also the case during the evenings when the construction works come to a stop for the day.

Section V- Development Constraints:

V.I- Planning- Local Plan/ Development Plan, Adjacent buildings of architectural interest:

Due to the size and nature of the proposed design and build project, it is a requirement that adequate planning permission is granted before any construction works can begin on site. This planning permission is granted through Swansea City Council, which will review all of the necessary documents that are submitted to them via the client and/or the main contractor with the proposition of the new use of the land attached within being one of the attached documents. Below are a few examples of the sections required from the Council that must be filled in by the client or main contractor before any decisions can be made and planning permission can be granted or denied. The below example is based on the demolition of an existing structure, and in its place building a three-story student accommodation building. This planning application was based upon a plot of land located in Swansea City Centre, only a few miles from our project and has very similar elements to the building that we are proposing to build. Below are a small number of screengrabs obtained from the document to portray some of the example information required to fill in the forms.

4. Description of the Proposal
Please provide a description of the approved development as shown on the decision letter

Demolition of existing structure and construction of a 3 storey building to provide 72 bedroom student accommodation units (studios & cluster flats), access from Miers Street, landscaping and car & cycle parking

Reference number
2017/1429/FUL

Date of decision (date must be pre-application submission) 26/11/2018

Please state the condition number(s) to which this application relates

Condition number(s)
5

Has the development already started? ☐ Yes ☒ No

Figure 16: A screengrab of the description proposal of a similar project located near our site, (City and County of Swansea, 2018).

1. Site Details	
Number	
Suffix	
Property name	Former Cape Horner Public House
Address line 1	Miers Street
Address line 2	St Thomas
Town/city	Swansea
Postcode	SA1 8BY
Description of site location must be completed if postcode is not known:	
Easting (x)	266362
Northing (y)	193388
Description	

Figure 17: A screengrab of the site details of a similar project that was granted planning permission near our site, (City and County of Swansea, 2018).

V.II- Highways implications of development e.g. Required improvements to site access and adjacent highway, additional on-site and coach/delivery parking:

- Before any preparation, site clearance or construction work can proceed on the allocated site, the access to the site must be improved. During our initial visit to the allocated site, plot (E9), we were unable to gain access to the site. The closest we could get to the site was across the opposite side of the Prince of Wales Dock, an image that was taken during this 'site-visit' is portrayed in figure 14. The adjacent highway to the site is sufficient for us to link the entrance and/or exits into, and it is wide enough to cater to the larger vehicles that we require on-site to carry out the construction works, as well as the refuge and delivery vehicles to site once the final project is up and running. On the site, we have designed for there to be adequate delivery parking spaces, in the form of laybys around the perimeter of our building. We have opted within the design for there to be a one-way vehicle access route around the perimeter of the building within the site boundaries, with the delivery vehicle laybys allowing the delivery vehicles to be parked off the road, to allow access around the perimeter for other vehicles to still flow whilst they unload/load their deliveries.

V.III- Uses of surrounding development:

- There is nothing located on the sites that are located around our development site, they are primarily just overgrown wasteland. This is clearly portrayed in the image displayed below in figure 18.



Figure 18: Showing our allocated plot and the surrounding areas, which are all overgrown wasteland (Bolton 1902382, 2022).

- However, located across the opposite side of Prince of Wales Dock are numerous blocks of residential apartments. This is clearly displayed below in figure 19.



Figure 19: Showing the surrounding developments across the opposite side of the Prince of Wales Dock to our allocated site (Bolton 1902382,2022).

Within the surrounding areas of our allocated construction site, there are numerous other buildings which can be seen in figure 20 below, for example; offices, townhouses, a hospital/ health center, a multi-story car park, and onshore marine facilities.

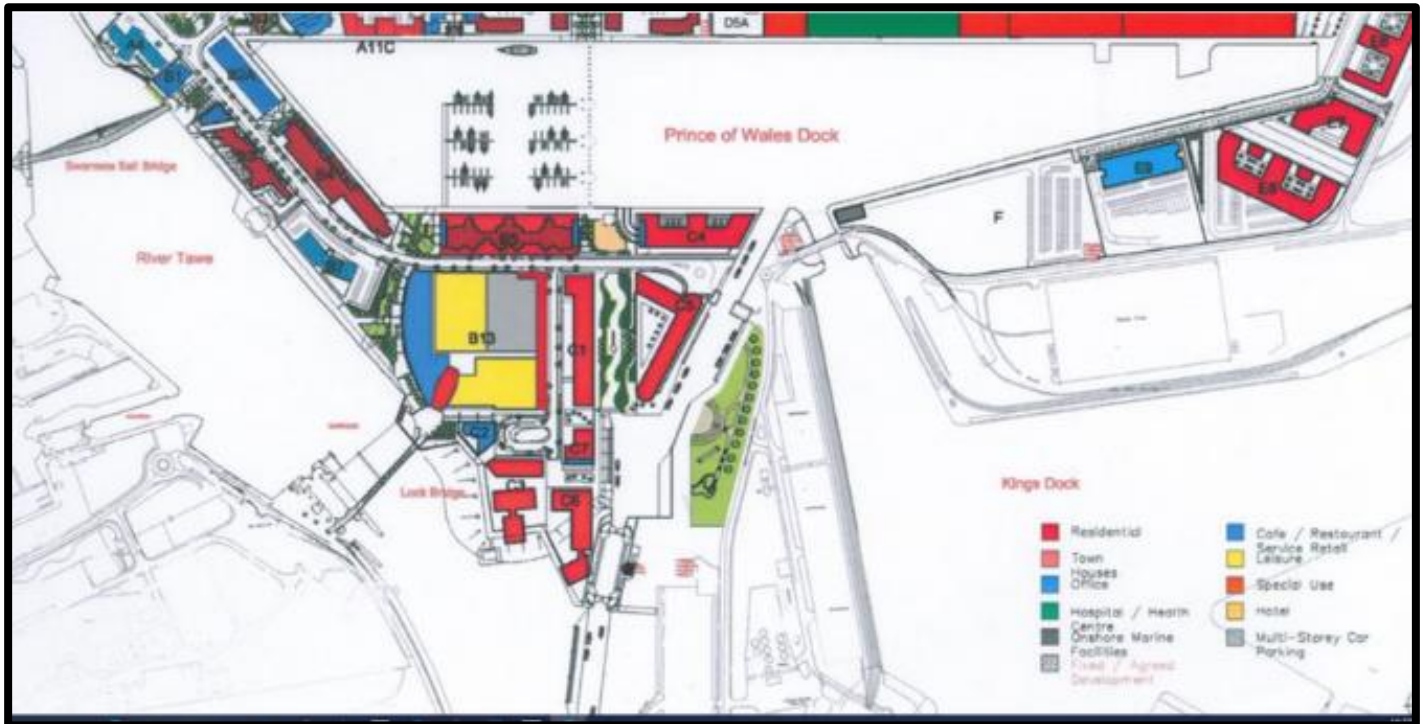


Figure 20: Shows a map of our site and the surrounding areas, with an attached key, to assist in highlighting key areas and buildings located on the map, (Swansea City Council, 2020).

V.IV- Contractors' site compound and access thereto:



Figure 21: Shows a site layout plan, composed by Stuart, (Jones 1910146, 2022).

Figure 21 above composed by Stuart Jones, portrays the site compound and all of the relevant details within and the access to the site compound from the site entrances. The site office, canteen, drying room, and toilets are all located on the West of the allocated site, close to the perimeter fencing of the site. The access to these facilities is also highlighted in the image above, with the access gates highlighted in navy lines, the vehicle route highlighted by yellow arrows, and the pedestrian walkways highlighted with purple arrows, (Jones 1910146, 2022).

Technical and Non-Technical Specifications:

There are numerous technical and non-technical specifications that are specifically applicable to this proposed construction project in particular.

Technical Specifications:

Technical specifications are written requirements and instructions which are used within construction projects and drawings to aid the completion of construction projects to comply with the regulations and guidelines.

Construction specifications are details, that are seen within a construction contract that are in place to outline all of the important aspects that are necessary to carry out the project in full to the best possible standards achievable (Indeed Editorial Team, 2021). A way in which the specifications can be improved is by not leaving it until the last minute to outline them. Therefore, by including specifications early on within a construction project's lifecycle, the requirements are set out clearly from the beginning and the overall risk of the project is reduced entirely (Ellis, 2022).

Technical Specifications applicable to this project in particular:

- **1) The reinforced concrete building frame-** Reinforced concrete should be designed by a structural engineer and must comply with the technical requirements of R5.BS 8103-1. The steel specification listed on the structural drawings should display the steel's size, grade, and type. All of the drawings and bending schedules must be prepared in correspondence with BS 8666 and must include all of the mandatory dimensions for the site work to be completed. All reinforcement should act by the standards that are categorized within the table below:

BS EN 1992-1	'Design of concrete structures'
BS 4449	'Steel for the reinforcement of concrete'. Specification
BS 4482	'Steel wire for the reinforcement of concrete products'. Specification
BS 4483	'Steel fabric for the reinforcement of concrete'. Specification
BS 6744	'Stainless steel bars. Reinforcement of concrete'. Requirements and test methods
BS 8103-1	'Structural design of low-rise buildings'. Code of practice for stability, site investigation, foundations, precast concrete floors and ground floor slabs for housing

Table 1: A table showing the reinforcement standards categorised, (NHBC, 2022).

Concrete Cover- There should be sufficient cover to the reinforcement, especially where it is in a position where it is in contact with the floor, or if it is exposed. If the structural engineer can't design the concrete, then the minimum cover for the reinforcement in (mm) must be per the table that is shown below:

Position of the concrete	Minimum cover (mm)
In contact with the ground	75
External conditions	50
Cast against a DPM on sand blinding	40
Against adequate blinding concrete	40
Protected or internal conditions	25

Table 2: A table showing the minimum cover for the reinforcement for concrete that has not been designed by an engineer (NHBC, 2022)

The concrete cover to the reinforcement has to adhere to the requirements to resist fire and therefore has to be of BS EN 1992-1-2 standard or equivalent, This standard of fire resistance will usually provide up to one hour of fire resistance for the reinforced concrete structure, (NHBC,2022).

- 2) Material Suppliers-** Any product that is manufactured not only must comply with the relevant regulations but also must meet all of the safety requirements before it can be sold from the supplier to the consumer (in this case the contractor). Adequate information must be provided by the supplier for the consumers to use the products safely and also it needs to be ensured that the product can be traced back to the business where it was purchased from. Therefore, if there was a fault within a certain product, such as was the case within the Grenfell disaster, (Symonds, 2021) then a product can be traced back to a certain batch of products. The business where the faulty product has been traced back has the obligation by law to recall all of the products that have been sold from the same batch, to prevent the same fault from reoccurring (Office for product safety and standards, 2019).
- 3) Construction sequence and restrictions-** A construction sequence implies that the process begins with the paperwork, including the drawings, material, and labour cost take-offs, planning approvals, and contingencies. The next stage is marking out the layout of the construction within the approved plan boundaries. This is followed by the excavation of the ground for the foundations of the construction, with the foundation work proceeding after this. This is the point where the rest of the

construction works to complete the building can proceed, trying to follow the programme of works that have been designed to achieve all of the works by the completion date as closely as possible. A section of our programme of works has been presented below in figure 22.

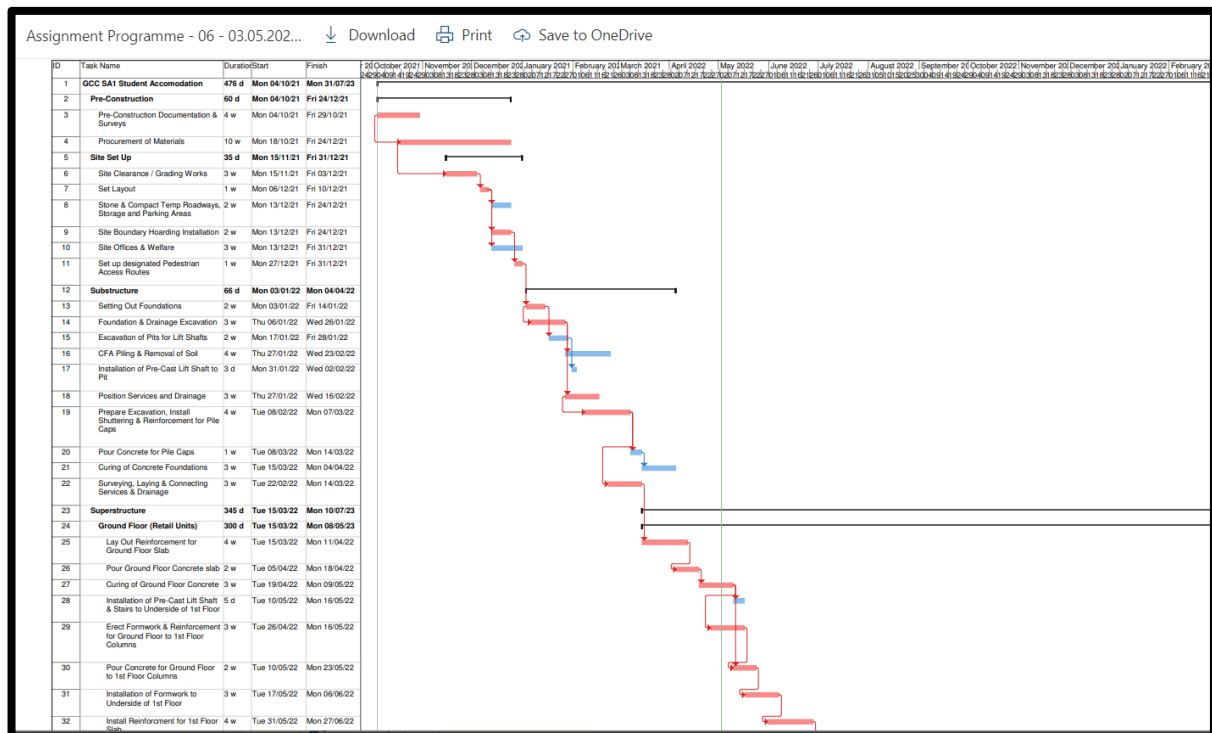


Figure 22: The screengrab attached above is a small snapshot of the programme of works prepared for this site (Davies, 2

Non-Technical specifications:

Within this project, once the contract has been awarded to the contractor, no work linked to the contract will commence until the contractor has obtained all of the insurances that are presented within the Non-Technical Specifications, and these insurances have been approved by the client or client's representative. Not only this, but the main contractor of the project will also ensure that any sub-contractor who is due to work on the project, will not do so until all relevant insurances involving the sub-contractors have also been obtained and approved by the client or the client's representative (Law Insider, 2019).

Non-Technical specifications applicable to this project in particular:

- **1) Main contractor proposal list of sub-contractors for the client's approval:**
When putting the project out to tender, each contractor who puts in a bid to carry out the work required of the project, the main contractors must in turn provide a list of sub-contractors who they propose will assist them in carrying out the works. This is for the client to ensure that all of the sub-contractors that will be working on their

construction site will be competent to carry out the required work and that they are technically and financially suited to assist in carrying out the project.

- **2) Construction site facilities and welfare:**

The main contractor must provide and maintain sanitary facilities and adequate welfare units to meet regulation 22 of the Construction (Design and Management) Regulation 2007 which states that the below must be provided on-site as a minimum requirement; sanitary and washing facilities, rest facilities, changing facilities and an adequate supply of drinking water.

Material choices, costings, and comparisons:

Please find the relevant excel document separate from this document, which shows the material choices, costings, and comparisons. It was not possible to add the excel table to this document due to the level of detail included, the visibility of the information was not very clear. So, it was decided to keep the document separate and attach this note to inform you of the additional document.

Summary Project Costings:

Attached below is a screengrab of the summary project costings that are also available within the summary project costings excel document which will be submitted alongside this document, with the individual material costings being obtained from Spons, (AECOM, 2020).

Summary Project Costings:								
Item Number:	Item Description:	Unit of Measurement:	Material Cost	Total Material Cost:	Total Material Amount:	Contractors Overheads and Profits @ 12% of total cost:	Prelims @ 5% of total cost:	Total Costs (Inclusive of prelims and O+P):
1	Common Brick	m ²	£120.00	£484,680.00	4089	£58,161.60	£24,234.00	£567,075.60
2	Gypsum Wall Board	m ²	£6.72	£167,811.84	24972	£20,137.42	£8,390.59	£196,339.85
3	Fibreglass Batt Insulation	m ²	£6.55	£26,746.30	4022	£3,209.56	£1,337.32	£31,293.17
4	Plaster	m ²	£12.28	£200,851.68	16556	£24,102.20	£10,042.58	£234,996.47
5	Insulation/Frame Support	m ²	£5.76	£23,103.36	4011	£2,772.40	£1,155.17	£27,030.93
6	Board Formed Concrete	m ²	£27	£108,378	4014	£13,005.56	£5,418.90	£126,802.26
7	Nitrile Rubber	m ²	£22.40	£90,473.60	4039	£10,856.83	£4,523.68	£105,854.11
8	Concrete Cast In-Situ	m ³	£107.16	£147,880.80	1,380	£17,745.70	£7,394.04	£173,020.54
9	Light Gauge Steel Framing	m ²	£74.94	£944,484.16	5264	£47,338.10	£19,724.21	£461,546.47
10	Rigid Foam Insulation Board	m ²	£12.50	£73,375.00	5870	£8,805.00	£3,668.75	£85,848.75
11	Polythene Film Membrane	m ²	£4.37	£12,825.95	2935	£1,539.11	£641.30	£15,006.36
12	Damp Proofing	m ²	£5.13	£15,056.55	2935	£1,806.79	£752.83	£17,616.16
13	Concrete Slab Topping	m ²	£165	£1,924,725	11665	£230,967.00	£96,236.25	£2,251,928.25
14	EPDM Roof Membrane	m ²	£45.63	£133,924.05	2935	£16,070.89	£6,096.20	£156,091.14
15	Crushed Stone/Gravel	m ³	£51.07	£29,078.00	587	£3,507.37	£1,498.00	£35,074.37
16	Triple-glazed sealed units	m ²	£297.60	£242,041.60	816	£29,140.99	£12,142.08	£284,124.67
17	Aluminium Doors	nr	£1,678.99	£184,688.90	110	£22,162.67	£9,234.45	£216,086.01
18	Aluminium Curtain Walling	m ²	£1,225	£632,100	516	£75,852.00	£31,605.00	£739,557.00
19	Engineering Brick	m ²	£132.50	£76,320.00	576	£9,158.40	£3,816.00	£89,294.40
20	Birch Wood	m ²	£14.77	£34,904.42	2446	£4,188.53	£1,745.22	£40,838.17
21	Textile/Fabric	m ²	£8.53	£20,116.53	2331	£2,413.98	£1,005.83	£23,536.34
22	Porcelain	m ²	£5.43	£3,887.88	716	£466.55	£194.39	£4,548.82
23	Air Infiltration Barrier	m ²	£4.57	£15,515.15	3395	£1,861.82	£775.76	£18,152.73
24	Internal moulded panel door, half hour fire resisting (FD30)	nr	£114.25	£88,086.75	771	£10,570.41	£4,404.34	£103,061.50
25	Door Frame/ Mullion	nr	£30.58	£6,849.92	224	£821.99	£342.50	£8,014.41
26	Door Architrave	nr	£26.80	£6,003.20	224	£720.38	£300.16	£7,023.74
27	Metal-Steel (furniture)	m ²	£37.61	£15,232.05	405	£1,827.85	£761.60	£17,821.50
28	Air	m ³	£0	£0	4028	£0.00	£0.00	£0.00
29	Cabinets	nr	£137.91	£88,538.22	642	£10,624.59	£4,426.91	£103,589.72
30	Laminate- Ivory	m ²	£12.84	£14,149.68	1102	£1,597.96	£707.48	£16,555.13
31	Laminate- Marble	m ²	£31.49	£27,049.91	859	£3,245.99	£1,352.50	£31,648.39
32	Cast In-Place Concrete	m ³	£83.78	£131,283.26	1567	£15,753.99	£6,564.16	£153,601.41
33	Televisions	nr	£779	£9,206	14	£84.72	£60.30	£9,751.02
34	Window Frame	m ²	£218	£17,004	78	£2,040.48	£850.20	£19,895
35	Concept Doors	nr	£0.095	£80,340	12	£9,540.80	£4,017.00	£93,997.80
36	Concrete Masonry Unit	nr	£7.53	£220,507.00	28,900	£26,460.84	£11,025.35	£257,993.19
Total Project Costings:								£6,710,215.05
Total project cost, incorporating the Tender Price Index (TPI) which is: (126.7-124)÷124(x100%)								£6,865,693.94
Total project cost incorporating the Location Factor for Wales (which is 0.85):								£5,711,332.80
Total project cost, incorporating both the TPI and Location Factor for Wales:								£5,835,830.85

Figure 23: Showing the summary project costings composed by myself, which is also available in a separate excel document to this report (Bolton 1902382, 2022).

Interim Valuations:

Attached below is a screengrab of the interim valuations costings that are also available within the summary project costings excel document on the second tab at the bottom, which will be submitted alongside this document.

Interim Valuation 1:						
Item Number:	Item Description:	Unit of Measurement:	Material Cost	Total Material Amount:	% of the element completed;	Cost of works to date:
1	Common Brick	m ²	£120.00	4039	100%	£567,075.60
2	Gypsum Wall Board	m ²	£6.72	24972	50%	£98,169.93
3	Fibreglass Batt Insulation	m ²	£6.65	4022	50%	£15,646.59
4	Plaster	m ²	£12.28	16356	30%	£70,498.94
5	Insulation/Frame Support	m ²	£5.76	4011	40%	£10,812.37
6	Board Formed Concrete	m ²	£27	4014	40%	£50,720.90
7	Nitrile Rubber	m ²	£22.40	4039	40%	£42,341.64
8	Concrete Cast In-Situ	m ³	£107.16	1,380	70%	£121,114.58
9	Light Gauge Steel Framing	m ²	£74.94	5264	100%	£461,546.47
10	Rigid Foam Insulation Board	m ²	£12.50	5870	80%	£58,579
11	Polythene Film Membrane	m ²	£4.37	2935	60%	£9,003.82
12	Damp Proofing	m ²	£5.13	2935	80%	£14,092.93
13	Concrete Slab Topping	m ²	£165	11665	100%	£7,251,928.25
14	EPDM Roof Membrane	m ²	£45.63	2935	80%	£125,352.91
15	Crushed Stone/Gravel	m ³	£51.07	587	100%	£35,074.37
16	Triple-glazed sealed units	m ²	£297.60	816	50%	£142,062.34
17	Aluminium Doors	nr	£1,678.99	110	40%	£66,434.40
18	Aluminium Curtain Walling	m ²	£1,225	516	80%	£591,645.60
19	Engineering Brick	m ²	£132.50	576	100%	£89,294.40
20	Birch Wood	m ²	£14.27	2446	20%	£8,167.63
21	Textile/Fabric	m ²	£8.63	2331	20%	£4,707.27
22	Porcelain	m ²	£5.43	716	20%	£909.76
23	Air Infiltration Barrier	m ²	£4.57	3395	60%	£10,891.64
24	Internal moulded panel door; half hour fire resisting (F030)	nr	£114.25	771	40%	£41,224.60
25	Door Frame/ Mullion	nr	£30.58	224	40%	£3,205.76
26	Door Architrave	nr	£26.80	224	40%	£2,809.50
27	Metal-Steel (Furniture)	m ²	£37.61	405	20%	£3,564.30
28	Air	m ²	£0	4028	0%	£0
29	Cabinets	nr	£137.91	642	20%	£20,171.94
30	Laminate- Ivory	m ²	£12.84	1102	20%	£3,511.03
31	Laminate- Marble	m ²	£31.49	859	20%	£6,329.68
32	Cast In-Place Concrete	m ²	£83.78	1567	90%	£138,241.27
33	Televisions	nr	£229	14	0%	£0
34	Window Frame	m ²	£218	78	80%	£15,916
35	Concept Doors	nr	£6,695	17	100%	£98,997.80
36	Concrete Masonry Unit	nr	£7.63	28,900	80%	£106,394.55
						Interim Valuation 1 Total:
						£5,411,337.57

Figure 24: Showing interim valuation costings composed by myself based upon the summary project costings, which is also available in a separate excel document to this report (Bolton 1902382, 2022).

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9. Appendix:

9.1: The multi-category material take-off quantities, which were then accumulated to determine overall quantities, to multiply by the rate obtained from Spons Architect and Builders 2020, to determine the overall costs.

Upto Row 4503 @ 17:00 on 03/04

64				26		2562		28		100		= 100	
404				281		1		278		304		531	
Cabinets				Birch Wood		T.V		Fabric / Textile		Air Infiltration Barrier		Plaster	
5	5	8	1					5	7	4	4	8	10
9	5	4	8					1	5	6	6	12	7
5	9	1	4					7	1	5	5	11	1
5	5	8	1					5	7	4	4	7	8
9	5	4	8					1	5	4	4	8	12
5	9	1	4					7	1	6	6	12	10
5	5	8	1					5	7	5	5	11	7
9	5	4	8					1	5	4	4	7	1
5	9	1	4					7	7	4	4	8	8
5	5	8	1					5	5	6	6	12	12
9	5	4	8					1	1	5	5	11	10
5	9	1	4					7	1	4	4	7	7
5	5	8	1					5	7	4	4	8	1
9	5	4	8					1	5	6	6	12	8
5	9	1	4					7	1	5	5	11	12
5	5	8	1					5	7	4	4	7	10
9	5	4	8					1	5	4	4	8	7
5	9	1	4					7	1	6	6	12	1
5	5	8	1					5	7	5	5	11	8
9	5	4	8					1	5	4	4	7	12
5	9	1	4					7	7	4	4	8	10
5	5	8	1					5	5	6	6	12	7
9	5	4	8					1	1	5	5	10	1
5	9	1	4					7	1	4	4	7	8
5	5	8	1					5	7	4	4	1	12
9	5	4	8					1	5	6	6	8	10
5	9	1	4					7	1	5	5	12	7
5	5	8	1					5	7	4	4	10	1
9	5	4	8					1	5	4	4	7	8
5	9	1	4					7	1	6	6	1	12
5	5	8	1					5	7	5	5	8	10
9	5	4	8					1	5	4	4	12	7

Upto Row 4503 @ 17:00 on 03/04																							
209				128				128				64				576				192			
Internal				Door				Door				Metal - Steel				Mahogany Wood				Laminate - Ivory			
Door Panel				Frame				Architrave															
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
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4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
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4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
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3	3	2	2	2	2	2	2	1	1	9	9	2	2										
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4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
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4	3	2	2	2	2	2	2	1	1	9	9	4	4										
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4	3	2	2	2	2	2	2	1	1	9	9	4	4										
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4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
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4	3	2	2	2	2	2	2	1	1	9	9	4	4										
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4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
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3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3	2	2	2	2	2	2	1	1	9	9	2	2										
4	3	2	2	2	2	2	2	1	1	9	9	4	4										
3	3																						

Upto Row 4503 @ 17:00 on 03/04

As 172 Birch	of Row 267 Plaster	6986... 40 Textile / Fabric	23 Air Infiltration Barrier
4	1	1	8
1	8	8	12
8	4	12	10
4	1	10	7
1		7	5
8		1	1
4		1	7
1		8	7
8		12	
4		10	
1		7	
8		1	
4		8	
8		12	
12		10	
10		7	
7		1	
1		8	
8		12	
4		10	
1		7	
8		1	
4		8	
1		12	
8		10	
4		7	
1		1	
8		8	
4		12	
1		10	
8		7	
4		1	

[illegible]

[illegible]

Metal -		Wood -		Cabinets		Laminate -		Plaster		Birch Wood		74 DOOR schraue	
Steel		Mahogany					Ivory						
1	1	9	9	9	9	2	2	1	13	8	4	1	2
1	1	9	9	9	9	4	4	8	8	4	1	2	2
1	1	9	9	5	5	4	4	11	12	1	8	4	2
1	1	9	9	5	5	2	2	7	10	8	4	2	2
1	1	9	9	9	9	4	4	7	1	1	2	2	2
1	1	9	9	5	5	2	4	8	12	4	1	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	9	9	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	10	4	1	2	2
1	1	9	9	5	5	2	4	12	8	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	10	1	4	2	2
1	1	9	9	5	5	2	4	7	1	4	1	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10	1	4	2	2
1	1	9	9	5	9	2	4	10	7	8	4	2	2
1	1	9	9	5	5	2	4	1	8	1	4	2	2
1	1	9	9	5	9	2	4	12	8	1	4	2	2
1	1	9	9	5	5	2	4	10	7	8	4	2	2
1	1	9	9	5	9	2	4	1	8	1	4	2	2
1	1	9	9	5	5	2	4	12	10				

196 475 Cabinets Laminated work

Soda-lime glass window	Window frame	Physica Air infiltration barrier	Plaster
2/2	3/3	6/7	11/14
2/2	3/3	5/6	11/13
2/2	3/3	6/7	11/14
2/2	3/3	5/6	11/13
2/2	3/3	6/7	11/14
2/2	3/3	5/6	11/13
2/2	3/3	6/7	11/14
2/2	3/3	5/6	11/13
2/2	3/3	4/6	10/12
2/2	3/3	5/4	10/7
2/2	3/3	4/6	12/8
2/5	3	5/4	12/10
3/1		4/6	7/1
1/1		5/4	8/12
1/3		4/6	10/7
3/5		5/4	1/8
3/1		4/6	12/10
3/1		5/4	7/1
1/1		4/6	8/12
1/3		5/4	10/7
3/5		4/6	1/8
3/1		5/4	12/10
1/1		4/6	7/1
1/3		5/4	8/12
3/5			10/7
3/1			1/8
1/1			12/10
1/3			7/1
3/5			122/122
3/1			122/106
1/1			106





**GWYRDD
CYMRU
CONSTRUCTION**

[illegible]

[illegible]

Air In		584		122		70		70		304		195	
on Plaster		Internal		Door Frame		Door		Architrave		Air Infiltration		Cabinets	
		Door Panel								Barrier			
13	7	4	3	2	2	2	2	4	4	4	4	5	9
8	8	3	3	2	2	2	2	4	4	6	6	5	5
4	11	4	3	2	2	2	2	5	5	5	5	9	5
7	11	3		2		2		4	4	4	4	5	5
13	7	4		2		2		4	4	6	6	5	5
8	8	3		2		2		6	6	5	5	9	5
11	12	4		2		2		5	5	4	4	5	5
7	11	3		2		2		4	4	4	4	5	5
13	7	4		2		2		4	4	6	6	9	5
8	8	3		2		2		6	6	5	5	5	5
12	12	4		2		2		5	5	4	4	5	5
11	11	3		2		2		4	4	4	4	9	5
7	7	4		2		2		4	4	6	6	5	5
8	8	4		2		2		6	6	5	5	5	5
12	12	3		2		2		5	5	4	4	9	5
11	10	3		2		2		4	4	4	4	5	5
7	7	4		2		2		4	4	6	6	5	5
8	1	4		2		2		6	6	5	5	9	5
12	8	3		2		2		5	5	4	4	5	5
11	12	4		2		2		4	4	6	6	5	5
7	10	3		2		2		4	4	5	5	5	5
8	7	4		2		2		6	6	4	4	9	5
12	1	3		2		2		5	5	4	4	5	5
11	8	3		2		2		4	4	6	6	5	5
7	12	4		2		2		4	4	5	5	5	5
8	10	4		2		2		6	6	4	4	9	5
12	7	3		2		2		5	5	4	4	5	5
11	1	4		2		2		4	4	6	6	5	5
7	8	3		2		2		4	4	5	5	5	5
8	12	3		2		2		6	6	4	4	5	5
12	10	4		2		2		5	5	4	4	9	5
11	7	4		2		2		4	4	6	6	5	5

[illegible]

148 Textile/ fabric	37 Metal/ Steel	Wood 196 Mahogany	475 Cabinets	72 Laminate work
7 / 3	1 / 1	9 / 9	9 / 5	2 / 4
7 / 1	1 / 1	9 / 9	5 / 9	2 / 4
1 / 3	1 / 1	2 / 9	5 / 5	2 / 4
7 / 1	1 / 1	9 / 9	9 / 5	2 / 4
3 / 7	1 / 1	9 / 9	5 / 9	2 / 4
1 / 3	1 / 2	2 / 9	5 / 5	2 / 4
5 / 7	1 / 1	9 / 2	6 / 9	2 / 4
1 / 5	2 / 1	9 / 9	6 / 9	2 / 4
7 / 1	1 / 2	2 / 9	6 / 6	2 / 4
5 / 7	1 / 1	9 / 2	9 / 6	2 / 4
1 / 5	2 / 1	9 / 9	9 / 6	2 / 4
7 / 1	1 / 2	2 / 9	9 / 6	
5 / 7	1 / 1	9 / 2	6 / 9	
1 / 5	2 / 1	9 / 9	6 / 9	
7 / 1	1 / 2		6 / 6	
5 / 7	1 / 1		9 / 6	
1 / 5			9 / 6	
7 / 1			9 / 6	
			6 / 9	
			6 / 9	
			6 / 9	
			6 / 6	
			9 / 6	
			9 / 6	
			9 / 6	
			6 / 9	
			6 / 9	
			6 / 9	
			6 / 6	
			9 / 6	
			9 / 6	
			9 / 6	

[illegible]

[illegible]

Common brick		Material Takeoff -		Integrated Group project		Insulation/Support Im	
Air Cavity		Gypsum wall board		Fibreglass batt insulation		Plaster.	
		board				Frame	
752	750	746	82	750		746	748
752	751	746	82	750		746	748
90	89	88	82	89		88	89
555	554	551	83	553		550	552
90	90	90	83	90		90	90
555	555	555	83	555		555	555
242	241	151	83	240		76	239
97	95	151	83	94		76	92
725	724	151	83	723		76	722
91	89	151	83	88		238	86
90	90	238	83	90		2935	90
		184	83			89	
		184	83			720	
		423	83			84	
		423	83			90	
		90	83			100	
		720	83			76	
		84	83			36	
		82	83			29	
		82	71			51	
		82	71			28	
		82	71			46	
		82	71			3	
		82	71			55	
		82	71				
		82	151				
		82	111				
		82	111				
		82	90				
		82	367				
		82	375				



222 ↑ Birch		298 ↑ Textile / fabric		96 ↑ Porcelain		305 ↑ Air Infiltration Barrier		1579 ↑ Plaster		231 ↑ Internal door Panel		lm
Wood												
4	2	7	5	3	3	4	5	8	58	3	4	
1	2	7	1	1	1	6	4	12	29	4	4	
8	2	7	7	3	3	15	6	10	51	3	4	
4	1	1	5	1	1	4	5	7	28	3	3	
1	7	3	1	3	3	4	4	1	76	4	3	
8	1	13	7	1	1	6	4	8	76	4	3	
4	1	13	5	3	3	5	6	12	100	3	3	
1	1	7	1	1	1	4	5	10	86	3	3	
8	1	5	5	3	3	4	4	7	45	4	3	
7	4	7	5	1	1	6	4	1	3	3	3	
1	1	5	5	3		4	6	8	55	4	3	
1	8	7	5	1		6	5	11	29	4	4	
1	4	5	5	3		4	4	7	51	4	4	
1	1	7	5	1		6	4	13	28	4	4	
7	8	5	1	1		5	6	8	48	4	4	
1	4	6	1	6		4	5	12	3	4	3	
1	7	6	1	3		4	4	10	55	4	4	
1	1	6	6	1		6	4	7	29	4	3	
1	8	1	6	3		5	6	1	51	4	4	
4	4	1	6	1		4	5	8	28	4	3	
1	1	1	7	3		4	4	12	76	4	4	
8	8	1	7	1		6	5	11	76	4	3	
4	4	1	7	3		5	5	7	28	4	4	
1	1	1	1	1		4	4	8	28	4	3	
8	8	1	1	3		4	5	12	28	4	4	
4	7	5	6	1		6	5	10	8	4	4	
1	1	7	6	1		5	5	7	12	3	4	
8	1	5	6	6		4	4	1	10	3	4	
4	1	1	6	1		5	5	100	7	3	4	
1	1	7	6	6		5	5	45	1	3	4	
7	1	5	6	1		4	5	3	11	3	4	
1	1	1	1	6		4	5			3	4	