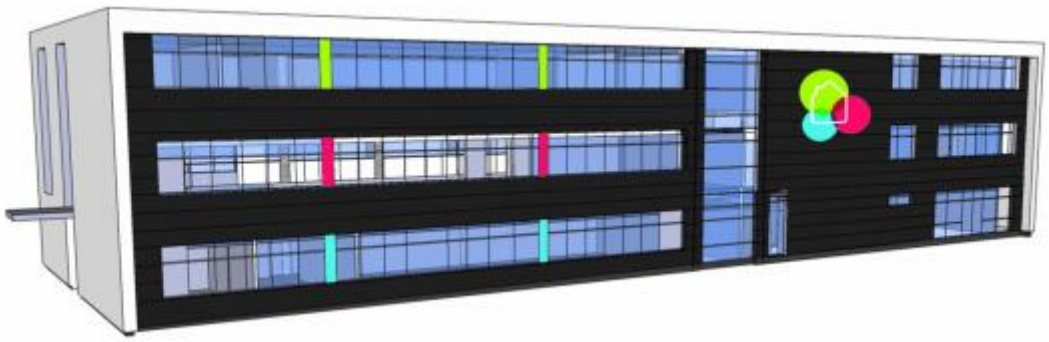
- **Student: Sian Walkey**
- **Module: Project Planning for Construction**
- **Module code: ACBA5001**
- **Lecturer: Dr Deborah Hughes**
- **Programme: Built Environment Programmes – Level 5.BSc (Hons) Construction Management**
- **Submission deadline: 27.04.20**

Tai Tarian Office Construction Project



Source: Planning documents supplied by D.Hughes

A report focussing on:

Proposed Construction of the Tai Tarian Office Building.

Baglan Bay Energy Park

Prepared for:

Dr.D.Hughes

Created by:

S.Walkey

Date completed:

3rd April 2020

Table of Contents

		Page Number
1.0	**Executive Summary**	**4**
2.0	**Terms of reference**	**4**
3.0	**Procedure**	**4**
4.0	**Findings**	**5-19**
5.0	**Conclusion**	**20**
6.0	**References & Bibliography**	**21**

1.0 Executive Summary

Tai Tarian (Local Housing Group in Neath) has received planning consent for a new office building in Baglan Bay Energy Park. This report aims to examine the project details in terms of time, cost and resources of the work activities.

2.0 Terms of Reference

2.1 The principal focus are:

2.1.1 To discuss the findings from the Work Breakdown Schedule, Gantt chart and Method Statements

2.1.2 To consider work permits and background checks required prior to project commencement

3.0 Procedure

This section identifies the research sources used.

3.1 Information for this report was gained from previous knowledge of project planning and a variety of external channels; all referenced in the reference and bibliography sections (6.0 & 7.0)

3.2 Background information provided through lectures UWTSD. (D.Hughes)

4.0 Findings

4.1 Consideration should be given to a Design and Build contract, the estimated value is £3 million. Utilising local resources for labour and materials wherever possible.

4.2 The project is to incorporate renewable technologies including ground source heat pump, solar thermal and photo voltaic arrays, natural ventilation system and a water system boosted by grey water and rain water harvesting systems.

4.3 A 22,000ft project. The construction will be steel frame on PAD foundations (locally sourced steel).

4.4 Drawings are to be prepared by Local Architects who will complete the working drawings and architectural plans.

4.5 The project timescale is approximately 15 months from start to finish. Local labour will be sourced.

4.6 Costing's based on the following activities are estimated at **£1,699,224.39. (Full details in Gantt chart provided separately)**

- Substructure
- Frames, Uppers floors and stairs
- Roof
- External wall, windows and doors
- Internal walls and Partitions and doors
- Wall finishes
- Floor finishes
- Ceiling finishes
- Furniture and fittings
- Sanitary appliances
- Disposal Installations
- Water installations

- Space heating, AC and ventilation
- Electrical and Gas installations
- Incoming services
- Protective Installations
- Communication Installations
- Specialists Installations
- Builders work in connection
- Preliminaries and Contingency

This is not accounting for Planning, Local Authority Building regulations, Permits, Design Team, Construction site Teams and Car Park construction – The estimated costs for these items are **£1,300,000.00,** which brings the total project cost to £3 Million.

Details from Spons 2016 relating to relevant costs:

48 *Labour Rate Calculations*

The table which follows illustrates how the all-in hourly rates have been calculated based upon CIJC Working Rule Agreement. Productive time has been based on a total of 1727 hours (44.3 weeks) worked per year.

			Craft Operatives		General Operatives	
			£	£	£	£
Wages at standard basic rate						
Productive time	44.3	weeks	441.87	19,574.84	332.21	14,716.72
Lost time allowance, say	0.9	weeks	441.87	397.68	332.21	298.99
Overtime	0	weeks	0	0	0	0
				19,972.52		15,015.71
Extra payments under National Working Rules	45	weeks				
CITB Levy (0.50% of payroll)	0.50	year		112.68		84.71
Holiday pay & Public holiday pay	5.80	weeks	441.87	2,562.85	322.57	1,926.79
Employer's contribution to:						
EasyBuild Stakeholder Pension	52	weeks	7.50	390.00	7.50	390.00
National Insurance (average weekly payment)	52	weeks	38.99	2,005.97	24.07	1,230.30
				25,044.02		18,647.51
Severance pay and sundry costs, say	Plus		1.5%	375.66	1.5%	279.71
				25,419.68		18,927.23
Employer's Liability and Third Party Insurance	Plus		2.0%	508.39	2.0%	378.54
Total cost per annum				**£25,928.08**		**£19,305.77**
Total cost per hour				**£15.01**		**£11.18**

Similar calculations for other CIJC labour classifications result in the following cost per hour:

Based on basic rates of pay that came in to effect 29 June 2015:	**Rate per hour (£)**
Craft Operative	15.01
Skill Rate 1	14.28
Skill Rate 2	13.72
Skill Rate 3	12.80
Skill Rate 4	12.07
General Operative	11.18
Rates for responsibilities:	
Foreman	15.91
Ganger	12.07

Labour Rate Calculations 49

Gang Build-up	Rate £/hour	Unit rate £/hour	Productive Hours	Labour rates with bonus payment £/hour Normal	+10%	+20%	+30%
Groundwork Gang							
1 Ganger	12.07	12.07					
6 Labourers	11.18	67.05					
		79.13	/ 6.5 =	12.17	13.44	14.70	15.97
Concreting gang							
1 Foreman	15.91	15.91					
4 Skilled labourers	12.07	48.30					
		64.20	/ 4.5 =	14.28	15.74	17.22	18.69
Steel Fixing Gang							
1 Foreman	15.91	15.91					
4 Steel fixers	15.01	60.03					
		75.94	/ 4.5 =	16.88	18.61	20.35	22.08
Formwork Gang							
1 Foreman	15.91	15.91					
10 Carpenters	15.01	150.10					
1 Labourer	11.18	11.18					
		177.17	/ 10.5 =	16.87	18.61	20.35	22.09
Bricklaying/Light Blockwork Gang							
1 Foreman	15.91	15.91					
6 Bricklayers	15.01	90.05					
1 Labourer	11.18	11.18					
		117.13	/ 6.50 =	18.02	19.88	21.73	23.59
Dense Blockwork Gang							
1 Foreman	15.91	15.91					
6 Bricklayers	15.01	90.05					
1 Labourer	11.18	11.18					
		117.13	/ 6.50 =	18.02	19.88	21.73	23.59
Carpentry/Joinery Gang							
1 Foreman	15.91	15.91					
5 Carpenters	15.01	75.04					
1 Labourer	11.18	11.18					
		102.13	/ 5.5 =	18.57	20.48	22.39	24.31
Painter, Slater, etc.							
1 Craft operative	15.01	15.01	/ 1 =	15.01	16.55	18.10	19.64
1 and 1 Gang							
1 Craft operative	15.01	15.01					
1 Skilled labourer	12.07	12.07					
		27.08	/ 1 =	27.08	29.88	32.67	35.47
2 and 1 Gang							
2 Craft operatives	15.01	30.02					
1 Skilled labourer	12.07	12.07					
		42.09	/ 2 =	21.05	23.22	25.39	27.56
Small Labouring Gang (making good)							
1 Foreman	15.91	15.91					
4 Skilled labourers	12.07	48.30					
		64.20	/ 4.5 =	14.27	15.74	17.22	18.69
Drain Laying Gang/Clayware							
2 Skilled labourers	12.07	24.15	/ 2 =	12.07	13.33	14.58	15.83

		Technical Plumber		Trained Plumber	
		Rate £	Total £	Rate £	Total £
Wages at standard basic rate					
productive time	1,687.5 hrs	15.61	26,341.88	12.06	20,351.25
Plumber's welding supplement (gas and arc)	1,687.5 hrs	0.50	843.75		0.00
			27,185.63		20,351.25
Employer's contribution to:					
Holiday credit/welfare					
Holiday pay for 30 days	30 days	117.08	3,512.25	90.45	2,713.50
Additional Holiday Pay (maximum)	60 credits	2.25	135.00	2.25	135.00
			30,832.88		23,199.75
Pension, say	7.5%		2,312.47		1,739.98
National Insurance	52 weeks	61.84	3,215.75	40.88	2,125.89
			36,361.09		27.065.62
Severance pay and sundry costs, say	1.5%		545.42		405.98
Liability and Third Party Insurance	2.0%		735.64		549.58
Total cost per annum			**37,644.63**		**28,021.04**
Total cost per hour			**22.31**		**16.61**
Average all-in rate per hour				**19.46**	

Notes:

1. First 37.5 hours paid at normal rate
2. 1.5 overtime rate after 37.5 hrs up to 8 pm, after which overtime rate is at double time
3. National Insurance is payable on top-up funding as this is payable by the employer
4. Absence due to sickness has been assumed to be for periods not exceeding 3 days for which no payment is due. The entitlement is payable from and including the fourth day of illness onwards
5. This table is an example showing a typical breakdown

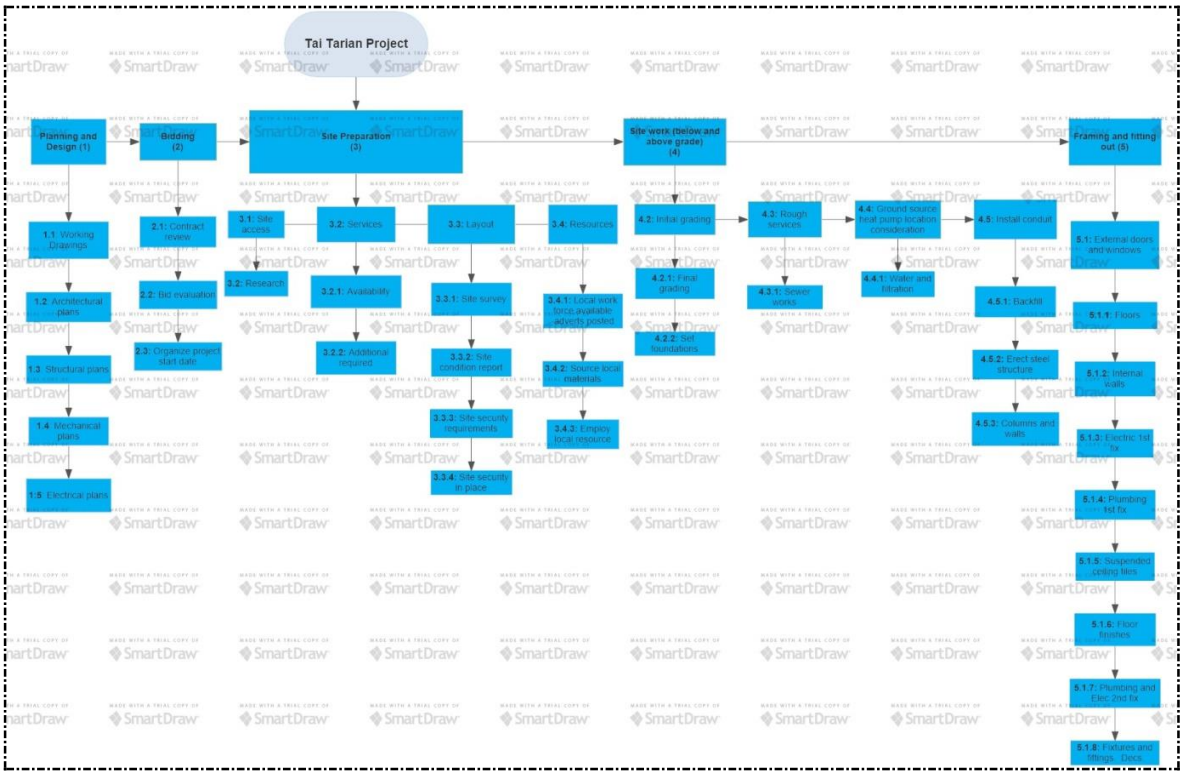
Source: ***Spons 2016 Architects' and Builders' Costs***

4.7 Work Breakdown Structure

The work breakdown structure is a tool used to break down the tasks of a project to show small bite sized sections. This will enable the Project Managers to coordinate works and deligate tasks to the project teams as appropriate.

The WBS is exclusive to this project and covers everything required from start to completion.

The Tai Tarian Development specification is as follows:



Source: ***Workflow format used with SmartDraw.com Content: S.Walkey***

Please note - This document will be available in a separate format for ease of reading.

4.8 Method Statements

3 Method statements have been produced as an example for this report. They are based on the following:

- PAD Foundations
- Site Preparation
- Steel frame erection

Method Statement

Project title:	Tai Tarian Office build
Reference:	TT052020
Date:	31.03.20

Description of Works

Scope:	Pad Foundation concrete casting
Method of work:	Following excavations. Prepare site. Install rebar and concrete fill
Duration:	2 weeks
Sequence:	**Reinforcement**: • Cut and bend rebar on-site as per specification. • Support bars with concrete blocks. • Allow for inspection prior to casting. **Casting:** • Clear areas of all debris • Readymade concrete brought to site – hourly supply as per specification • Vibration plant in place at time of casting • Site personal to check composition of concrete to confirm correct mix (delivery schedule) Temperature to be checked as per specification. • Record all data on site – ensure local supply can reach site in the timescales required • Concrete should undergo vibration at various intervals – follow spec – to ensure sufficient fill • Apply water proofer according to spec. • Inspection by Site Engineer on completion
Location:	Baglan Bay site

Resources required

Personnel:	Site labour, Engineer and Site Manager
Supervision:	Site Manager
Plant/Equipment	Crane, concrete mixer, vibrators, total station, trowel, level, shovel, wheelbarrow
Materials:	Rebars, conc block, concrete brought to site ready made

Assessment of Risks

Access to site:	
Area of work:	
Staff at risk:	
Staff competence (sufficient training completed?)	CSCS card for general labour, Site Engineer and Manager suitably qualified.

Control Measures in place

Permits:	n/a
Security:	On site
Other:	n/a

Method Statement

Project title:	Tai Tarian Office Build
Reference:	TT052020
Date:	03.04.2020

Description of Works

Scope:	General site preparation
Method of work:	General set up
Duration:	1 week
Sequence:	**General site prep** • Erection of Heras fencing, pedestrian barriers, vehicle stops, signage around site • Areas of work to be identified and any materials placed by the forklift close to the work area. Panels and barriers to be assembled by 2 operatives. Linking of oanels with heavy duty cable ties. • Clearance of site to allow safe access to and from work areas. • Excess materials to be removed. Consider manual handling. • Waste materials – All waste should be placed on pallets ready for removal by the forklift or use designated skips for specific material type. Site to be left clean and tidy at all times to eliminate build up and risk of falls • Allocation of storage areas – consideration for forklift truck activity. Forklift has many tasks on site, including offloading materials from deliveries, carrying materials to a specific area. • General maintenance of forklift will be required – topping up fluids, changing bulbs, refuelling. Full COSHH information to be available for these materials to minimize risk. • Operators should hold a current CSCS card and be fully knowledgeable of site instructions, site management. • PPE will be made available and specific to the tasks. • Plant only to be operated by trained staff
Location:	Baglan Bay site

Resources required

Personnel:	Direct labour and agency
Supervision:	Site Manager

Plant/Equipment	Forklift, use of small tools and plant – individual risk assessments available
Materials:	Forklift, shovel, wheelbarrow, heras fencing, barriers

Assessment of Risks

Access to site:	Works in preparation for appropriate site access
Area of work:	Whole site
Staff at risk:	Labour, agency staff, Site Manager
Staff competence (sufficient training completed?)	CSCS registered

Control Measures in place

Permits:	Organised during planning
Security:	Onsite security
Other:	n/a

Method Statement

Project title:	Tai Tarian Office Build
Reference:	TT052020
Date:	31.03.20

Description of Works

Scope:	Steel frame erection
Method of work:	Transportation to site ready for erection
Duration:	1 week
Sequence:	**Transportation to site:** • Organise storage facility • Coordinate with Site Manager as per erection date/site accessibility • Installation of steel columns • Erection of steel frame **Access to site:** • Ensure site has a sufficient road build for truck access, transportation of frame and crane loader for installation • Clear location plan for communication between site workers and deliveries **On delivery:** • Appropriate storage available – clean and dry • Unloading methods to be agreed with Site Manager • Use of appropriate belts for lifting and placing – attention to detail here to avoid damage to frame prior to and during installation • All materials to be inspected by Site Manager and any damaged components replaced **Erection** • local resource for equipment hire • Site Manager to report on site conditions to ensure it's ready for major works • Employ specialist contractors for the build – local if possible • Weather conditions must be suitable for erection purposes **Transportation to site** • Beams should be appropriately arranged on appropriate transport • Unloading to be completed by crane • Access road must be made accessible for the width/length – allow for turning space • Deliver the sections close to the point of erection to limit movement/damage of materials • Ensure I-Beams and rafters are

	positioned appropriately for ease of build • Consider storage to avoid contamination – dry area, above ground, packaged appropriately and ventilated • Clash detection to have been undertaken prior to manufacture • Positioning of anchor points to be confirmed by Site Manager as per specification • Equipment to be inspected prior to lifting. Staff numbers to be accounted for and recorded. • Temporary anchor points to be set up whilst erection underway to avoid swinging materials • Crane to stay in position until anchor points are secured
Location:	Baglan Bay

Resources required

Personnel:	Crane driver, labour, Site Manager, Site Engineer
Supervision:	Site Manager
Plant/Equipment	Crane
Materials:	Steel frame, anchor bolts

Assessment of Risks

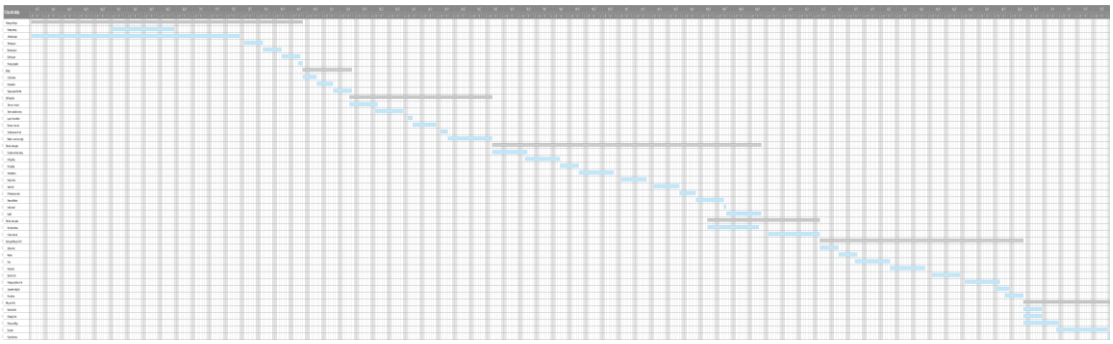
Access to site:	Temporary road made accessible
Area of work:	Baglan Bay
Staff at risk:	Whole site
Staff competence (sufficient training completed?)	Previously confirmed.

Control Measures in place

Permits:	n/a
Security:	Site security
Other:	n/a

4.9 Gantt chart

The Gantt chart has been produced to show the works required, timescales and critical path.



Source: ***Gantt chart format used with SmartSheet.com Content: S.Walkey***

Please note, these documents will be provided separately for clarity. You will also be provided with an excel sheet showing the individual elements required for the project, this will enable adjustments to be made as appropriate prior to tender. Format as follows:

Tai Tarian Office Building	**Duration**	**Start**	**Finish**	**Per M2**	**Project size (m2)**	**Total estimated costs**
Planning and Design	84d	29/07/2019	21/11/2019			
Working drawings	21d	01/09/2019	27/09/2019			
Architectural plans	65d	29/07/2019	25/10/2019			
Structural plans	6d	28/10/2019	04/11/2019			
Mechanical plans	6d	05/11/2019	12/11/2019			
Electrical plans	6d	13/11/2019	20/11/2019			
Planning completed	2d	20/11/2019	21/11/2019			
Bidding	15d	22/11/2019	12/12/2019			
Contract review	4d	22/11/2019	27/11/2019			
Bid evaluation	5d	28/11/2019	04/12/2019			
Organise project start date	6d	05/12/2019	12/12/2019			
Site Preparation	43d	12/12/2019	10/02/2020			
Site access - research	8d	12/12/2019	23/12/2019			
Services available and req.	10d	23/12/2019	03/01/2020			
Layout - site conditions	2d	06/01/2020	07/01/2020			
Resources - local subs	8d	08/01/2020	17/01/2020			
Security measures for site	3d	20/01/2020	22/01/2020			
Materials - source local supply	13d	23/01/2020	10/02/2020			
Site work - below grade	83d	11/02/2020	04/06/2020			
Excavation and land clearing	11d	11/02/2020	25/02/2020			
Initial grading	11d	25/02/2020	10/03/2020			
Final grading	6d	11/03/2020	18/03/2020			
Set foundations	11d	19/03/2020	02/04/2020			

Rough services	9d	06/04/2020	16/04/2020			
Sewer works	9d	20/04/2020	30/04/2020			
GS Heat pump location	5d	01/05/2020	07/05/2020			
Water and filtration	8d	08/05/2020	19/05/2020			
Install conduit	1d	20/05/2020	20/05/2020			
Backfill	11d	21/05/2020	04/06/2020			
Site work - above grade	34d	13/05/2020	29/06/2020			
Erect steel structure	16d	13/05/2020	03/06/2020			
Columns and walls	16d	08/06/2020	29/06/2020			
Framing and fitting out - Part 1	63d	30/06/2020	24/09/2020			
External doors	6d	30/06/2020	07/07/2020			
Windows	6d	08/07/2020	15/07/2020			
Floors	11d	15/07/2020	29/07/2020			
Internal walls	11d	30/07/2020	13/08/2020			
Electrical 1st fix	10d	17/08/2020	28/08/2020			
Plumbing installation 1st fix	11d	31/08/2020	14/09/2020			
Suspended ceiling tiles	6d	13/09/2020	18/09/2020			
Floor finishes	6d	17/09/2020	24/09/2020			
Fitting out - Part 2	26d	25/09/2020	31/10/2020			
Electrical 2nd fix	6d	25/09/2020	02/10/2020			
Plumbing 2nd fix	6d	25/09/2020	02/10/2020			
Fixtures and fittings	11d	25/09/2020	09/10/2020			
Decoration	16d	09/10/2020	30/10/2020			
Project finish date	1d	31/10/2020	31/10/2020			
Plant						
180 degree backhoe loader						
360 degree excavator						
Loading shovel						
Overhead Gantry Crane						
Lorry Loader						
Forward Tipping dumper						
Ride on roller						
Breaker						
Cherry picker						
Bulldozer						
Wheel barrow						
Personel						
Directors						
Project board						
Employee management						
Project Manger						
Consultant						
Lead designer						
Design Team						

Architect						
Services engineer						
Structural engineer						
Specialist designer						
CDM Co-ordinator						
Contractor						
Sub-Contractors						
Suppliers						
Basic materials						
Steel frame system						
I-beams and columns						
Rebar						
Steel joists, framing						
Purlic and cladding rolls						
Concrete						
Building insulation						
Building envelope						
Weatherproof systems						
Ground source heat pump						
Rainwater harvesting system						
Internals:						
Carpentry						
Doors, hardware						
Electrical services						
Plumbing services						
Surface finishing						
Fire alarm system						
Finishes						
HVAC (Heating, ventilation and AC)						
Costings						
These costings are based on the average build of a Buisness Park construction from the Spons 2016 edition (costs per m2)						
Substructure				71.88	2043	146850.84
Frames, Uppers floors and stairs				130.39	2043	266386.77
Roof				105.9	2043	216353.7
External wall, windows and doors				139.45	2043	284896.35
Internal walls and Partitions and doors				53.94	2043	110199.42
Wall finishes				11.2	2043	22881.6
Floor finishes				13.05	2043	26661.15
Ceiling finishes				8.69	2043	17753.67
Furniture and fittings				6.29	2043	12850.47

Sanitaryappliances				4.21	2043	8601.03
Disposal Installations				5.42	2043	11073.06
Water installations				0.55	2043	1123.65
Space heating, AC and ventilation				65.91	2043	134654.13
Electrical and Gas installations				46.79	2043	95591.97
Incoming services				1.66	2043	3391.38
Protective Installations				1.41	2043	2880.63
Communication Installations				6.21	2043	12687.03
Specialists Installations				15.63	2043	31932.09
Builders work in connection				1.66	2043	3391.38
Preliminaries and Contingency				141.49	2043	289064.07
						1699224.39
Costs to be considered:						
Car park construction						
Design Team						
Construction site team						
Local Authority fees						
Work permits						

5.0 Conclusion

5.1 The project is a 3 storey, steel framed building, PAD foundations. It will have an integrated ground source heat pump, natural ventilation systems and a rainwater harvesting system.
It is a viable in terms of cost and performance. Estimated timescale for completion is 15 months from start to finish.

Method Statements will be made available along with full sets of RAMS for all activities on site that pose an element of risk.
The Gantt chart and work breakdown structure show the full flow of works required.
I recommend this project to be a Design and Build JCT contract.

- **References**

- **ANON (2016)** Method Statement for structural steel- http://promoxbuzz.blogspot.com/2016/01/method-statement-for-structural-steel.html: date accessed 20.03.20

- **ANON (2020)** Steel construction info-
- https://www.steelconstruction.info/Health_and_safety#Method_statement_development . Date accessed 20.03.20

- **JEHU Group** Publication project/NPT-offices
- https://jehu.co.uk/project/npt-offices/ Date accessed: 15.03.20

- **INSIDER MEDIA NEWS**
- https://www.insidermedia.com/news/wales/73729-3m-construction-contract-jehu Date accessed: 15.03

- https://esub.com/the-complete-construction-project-planning-checklist/
- Accessed 06.04.20

7.0 Bibliography

- **Chudley, R and Greeno.R (4th Edition)** Advanced Construction Technology

- **HSE (2020)** H&S guide. Accessed online March 30th 2020

- **SPONS** Architects' and Builders' Price Book 2016