

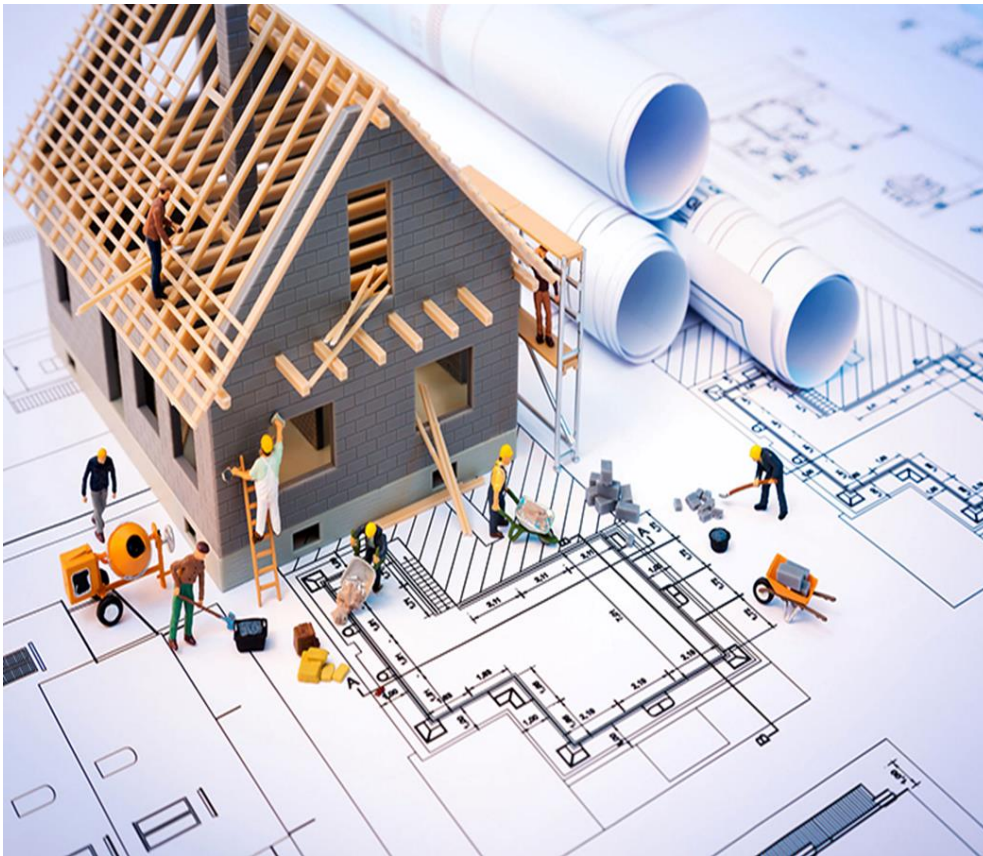


**Level 3 Advanced Technical
Extended Diploma in Constructing
the Built Environment
(Construction) (1080) (6720-37)**

**6720-053 Level 3 Constructing the
Built Environment - Synoptic
assignment
Recording forms**

Version 1.0 – January 2018

Report year 2 pre- construction report



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Abstract

The following report is for the planning authority and the client. This is a pre-construction report, the report will mention the materials that will be used to construct and how they will be sustainable, the existing build, the demolition process and renewable energy.

Executive summary

The development site area covers approximately 1.5 hectares and the new hotel building plan area is to be 60 x 34.4m. The aim of this project is to report on a proposed construction development. To build a three storey budget hotel, new boiler house for the heating and hot water services, car park to hold 40 cars and external landscapes that include tree protection and new tree planting and building low rise boundary walls using reclaimed brickwork from the building demolition. This project is trying to achieve and aim in improving the u value. Rebuilding will also improve the aesthetics and boost the local area.

Findings

New build hotel

- i. The new rebuild of the hotel will be mostly made from reclaimed brickwork and materials from the demolition, this will save costs. An example of this is an archway at the main entrance of the hotel will be built. Bricks are durable and long lasting and have a long life span. Reclaimed brickwork from the demolition and added back onto the new build hotel will also add aesthetic enrichment, this will also uplift the local environment with the new build hotel. The new build will also meet all current building regulations, will be modern, also achieve energy performance of building directive 91/2002. The reclaimed brickwork will be used for the archway of the main entrance. The reclaimed brickwork that will not be used will be sold to companies if needed. On the other hand using reclaimed brickwork could be damaged already, giving it a shorter lifespan and resulting in cracking.
- ii. Slate will also be reused for the roof of the hotel, slates could also be crushed for gravel and paved outside, and this will also give the build its own aesthetics yet keep its features of the build. Slate has a long life span for up to 100 years on an average roof. This will also save costs. Reusing slates could be a disadvantage because some may be cracked and will eventually deteriorate overtime and will reduce the roofs lifespan by more than half.
- iii. Timber will also be reclaimed or reused from a sustainable forest (FSC), every time a tree is purchased from the FSC there more trees are planted. It will mainly be used for the flooring joists of the hotel as requested by the client. The cladding externally will also be constructed with timber.
- iv. Reclaimed metals e.g. iron cast, copper and lead, Will be difficult to be reused and constructed with on site, so the best option would be to sell the metals, this will provide money which can either be used on other materials or can be saved.

Commented [JW1]: Over generalised

Boiler house

The newly constructed boiler house will consist of two boilers, a woodchip biomass and gas boiler. It will provide heating and water throughout the hotel.

- i. Concrete will be used for the blockwork and for the external walls, we are using this because of the durability and strength of the concrete and blockwork, on the other hand the disadvantages of this is if it doesn't have reinforced steel bars put in the concrete it is prone to cracking and can cause damage to the topsoil.
- ii. Timber will be used for the fencing, it has many advantages it will boost aesthetics, a nice finish, it has great strength and it is cost effective and easily available, it will be sustainable too as it is a natural material and no harmful toxins will come off when constructed. The timber fence will blend into the environment and its surroundings as well as boosting the aesthetics, this was requested by the client to be based around the environment.

Commented [JW2]: Understanding?

Suds pond and Rain water harvesting

A SUDS (sustainable urban drainage system) pond will be used for surface water collection. This will be done by collecting any surface water on the land and then diverted away from the site, also more water will come from the rainwater harvesting system. To avoid any risks or hazards a fence will be constructed around the pond, so people on site will not trip or fall into the pond. Rain water harvesting systems will be collected and stored in the tank, surplus water from the tank will then be used as additional water for the SUDS pond. The water will be reused and recycled for the toilets in the hotel. This will save costs on water bills and help out the community and environment for not having a high demand on public water usage and less wastewater into the drains and sewers. This will make the system sustainable and environmentally friendly fitting into the client's needs.

Wood chip biomass boiler

The client wants a biomass boiler for sustainability. A woodchip biomass will provide the heat throughout the hotel by burning wood e.g. wood chip and logs. The woodchip boiler is fuelled by recycled wood and it is much cheaper than oil. It also has a lot of advantages for the environment.

'You may already know that biomass is considered an environmentally friendly source of energy. That is because unlike coal, which needs much longer than a lifetime to re-generate, biomass is considered a renewable source of energy because it can be obtained relatively quickly by replacing or growing new plants or trees'

'Replacing a coal or electric heating system with a biomass boiler can help you reduce your carbon dioxide output by up to 9.5 tons, annually'

<https://www.greenmatch.co.uk/blog/2015/10/advantages-and-disadvantages-of-biomass-boilers>

Gas boiler

The client also wants to use a gas boiler for hot water throughout the building. A gas boiler is very reliable and most common type of boiler, the water will not require a hot water tank, so they will always be hot water from the gas boiler. A gas boiler has many advantages it is very long lasting and won't corrode and it is cheaper to maintain and use.

Commented [JW3]: Why is no tank required, heck of a combi if it can produce the requirements of this project

Part B demolition

The current building will be demolished and to be constructed on again, as the condition of the current building is in no condition to be used again, it could be refurbished but will not meet the community guidelines or current building regulations. This 50 year old building will deteriorate soon, weakening the structure and the materials used throughout the building, if it was to be refurbished overtime you would find to see the foundation may not be stable, find dampness, the u value being low and not insulating well or in worse case scenarios finding asbestos, creating more problems and not being cost effective. The recommended thing to do is to demolish this 50 year old building and to be built on again.

Machinery to be used for the demolition

- i. A Crane
- ii. Bulldozer
- iii. Excavator
- iv. Work platform (elevated)

Process of the demolition work

- i. All services throughout the site will have to be disconnected and checked thoroughly to ensure they are.
- ii. An asbestos survey will be carried out
- iii. If asbestos is found it will then be removed by professionals
- iv. Fencing and signs will be put out around site where the demolition will take place, closing off access on site.
- v. To remove fittings and fixtures a salvage crew will be sent out. Trying to reclaim as much material as possible.
- vi. The frame and roof covering will be demolished
- vii. The framing structure will be removed by the crane
- viii. The structural engineer will then advise which walls and floors to demolish
- ix. The reclaimed materials will then be put onto pallets and moved to storage.
- x. Ground slab will be removed
- xi. Foundation will be demolished
- xii. The site will then be graded and filled to create a platform ready for surfacing.

Commented [JW4]: What?

Commented [JW5]:

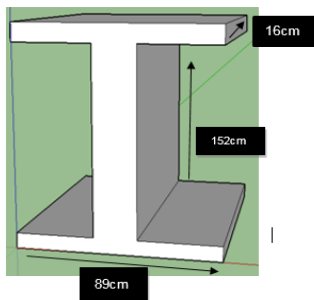
Commented [JW6]: What are you looking for?

Commented [JW7]: cost

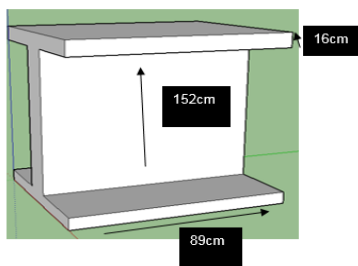
Commented [JW8]: why

Steel I beams

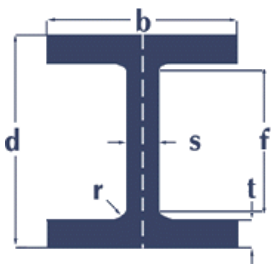
Task 2



152 X 89 X 16



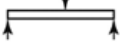








Universal Beam



The steel beam should be supported on two other supports, it must be able to take the load of the foundations, the beam should have an opening of a minimum of 150mm bearing on each side of the opening and on the existing wall beneath the bearings are likely to be strengthened to prevent crushing them. Also the steel beam has to be installed accurately and cater for the design for the specific use. Poor workmanship and wrong installation will cause structural damage.

Measurements from diagram					
d	177.8	Depth d mm	b	101.6	Width b mm
s	4.7	Web s mm	t	7.9	Flange t mm
r	7.6	Root Radius r mm	f	146.8	Depth Between Fillets f mm
	19	kg/m		53	Approx. Metres per Tonne
	24.3	Area of Section cm ²		0.738	Surface Area per Metre m ²
	38.8	Surface Area per Tonne m ²		0.004	Surface Area Two End Faces m ²

This table above shows the sizes of the beam and calculations that will be done by the structural engineer.

Load	Slope for shear force	Slope for bending Moment
<p>P</p> 	<p>Constant</p> 	<p>Linear</p> 
<p>Uniformly distributed load</p> 	<p>Linear</p> 	<p>Parabolic</p> 
<p>Uniformly varying load</p> 	<p>Parabolic</p> 	<p>Cubic</p> 

This diagram shows the impact of bending moment and shear force of a slope.

Commented [JW9]: Using cut and paste from the internet reduces the opportunity to demonstrate any understanding of the purpose or how to calculate them and do the drawings

Figure-1 Slopes for various types of loads

https://www.google.com/search?safe=active&rls=com.microsoft%3Aen-GB%3AIE-Address&biw=1280&bih=907&tbn=isch&sa=1&ei=uNXpWoTRLsTsULeoovql&q=steel+i+beams+bending+moment+diagram&og=steel+i+beams+bending+moment+diagram&q=steel+i+beams+bending+moment+diagram&gs_l=psy-ab.3...4946.6986.0.7498.15.15.0.0.0.118.1339.10j5.15.0....0...1c.1.64.psy-ab..3.0.0....0.hP7xSp3CNlo#imgsrc=oVHtxkVR_UH1hM:&spf=1525274049323

Task 3

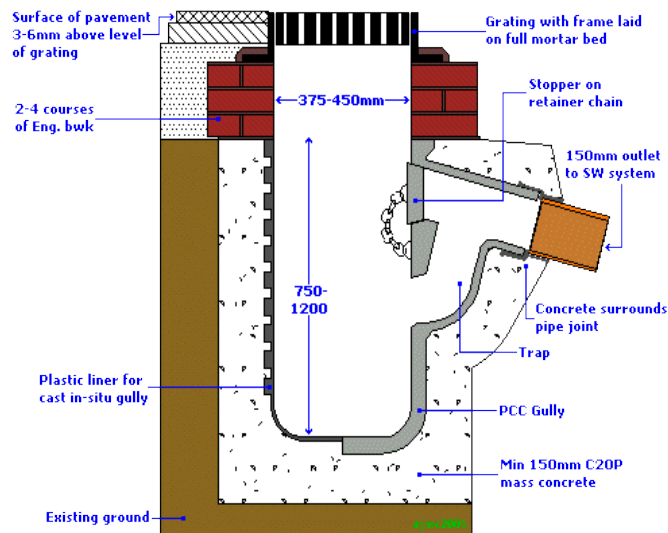
The aim for this drainage system for the car park following to the SUDS (sustainable urban drainage system) pond, is to ensure the water scheme being used is of sustainable standard. A gradient pipe will also be fitted.

A rain water gully will be used throughout the car park to collect the rain water and then any excess will be transferred to the SUDS pond. Four gully pots will be fitted in the car park, they will have a 16m distance between each of them, and this will allow a two-point access to clean the pipework in case of blockages. The stopper chain will have to be removed in order to clean the pipes using a jet rod. A manhole is the access point of the Gully to the SUDS pond, the manhole will allow underground pipes to be accessed in case of blockages.

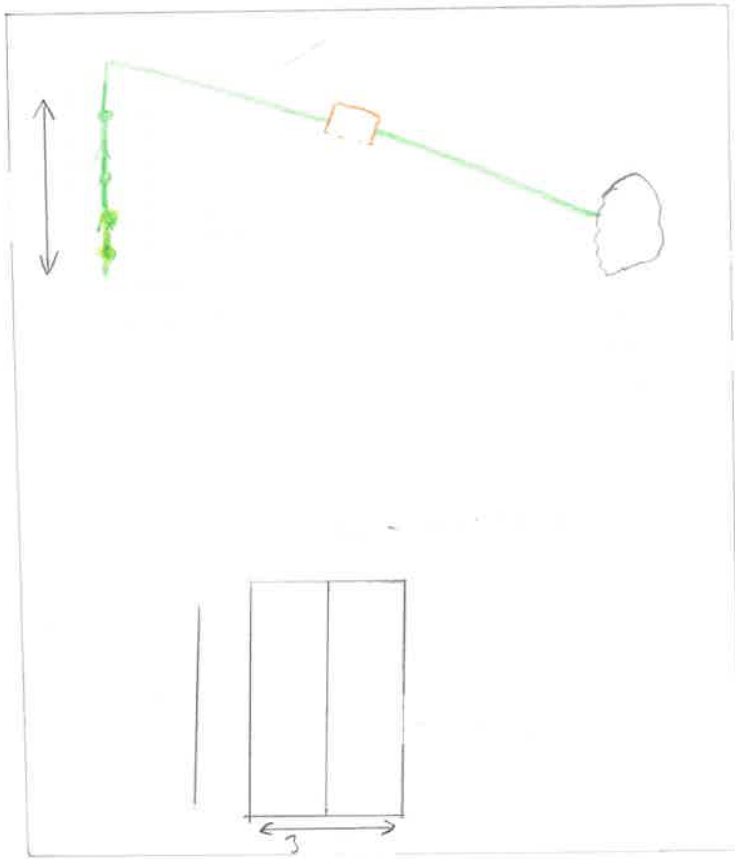
A VCP (Vitrified Clay Pipe) pipe will be used because they are sustainable and can be easily recycled, whereas metal pipes can't be recycled and can corrode quicker. VCP pipes are strong and durable and environmental friendly and do not give off toxic chemicals when aged, also they have a long lifespan and are cheap. Asbestos can grow on metal pipes overtime.

The pipework will be 100mm with a gradient of 0.125mm over 1000mm. The overall distance being 120m equals to a fall of 1.75m from the head of start to the SUDS pond. This fits the specified standards of sustainability by preventing flooding by taking away the water from entering the main surface, water sewer.

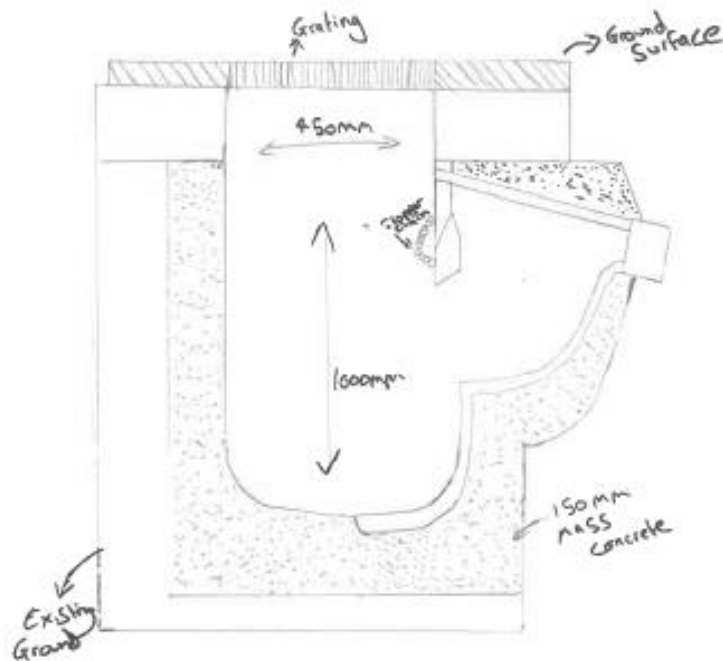
The diagram below shows how the SUDS and rain water gully will work and how it will be constructed.



<http://www.pavingexpert.com/drain10.html>



— orange —
— green —



Task 4

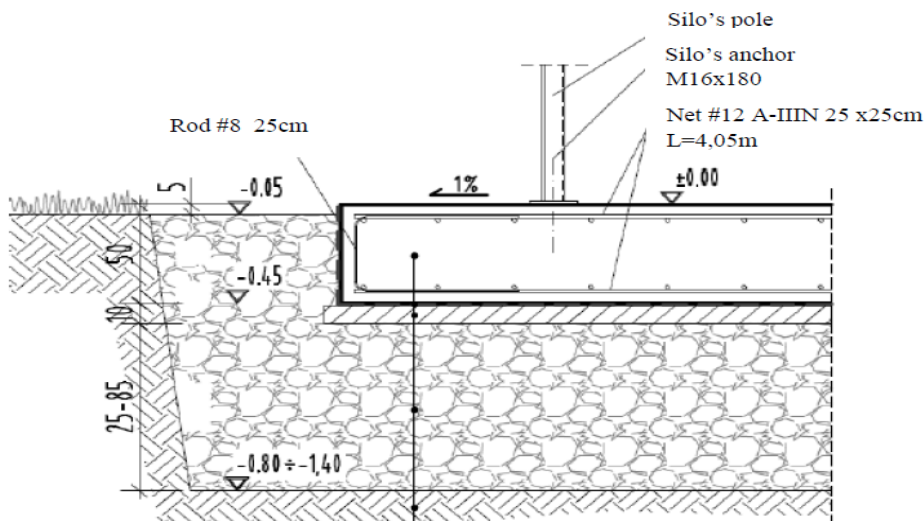
Before the concrete cube test is done a health and safety risk assessment and method statement must be carried out. Furthermore, all workers that will be on site that will be carrying out the tests must be trained and skilled to do the test, they also need to wear correct PPE, for their own protection this is part of COSHH regulations.

Whilst doing the concrete cube tests for the flooring of the hotel, this will show the characteristics of the concrete to see the compressive strength and to see if it can carry a load.

Concrete foundations C20, they should be a minimum of 600mm below external ground level and where the ground can support a safe bearing pressure of 100kn/m^2 following British standard 8110 and BS 5328.

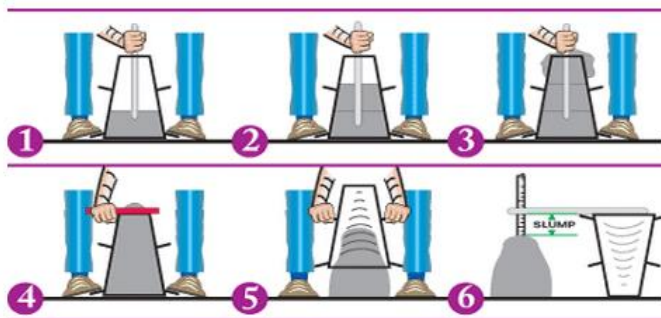
BS 1881-108:1983 – The British standard for making cubes from fresh concrete and testing concrete.

BS EN 12350-1:2000 – This is for concrete sampling.



- *Foundation plate of thickness 50 cm, concrete C20/25 W8.
- *Layer of heat-weldable roofing membrane of thickness at least 4 mm.
- *Bedding concrete C12/15, thickness of 10 cm.
- *Crushed aggregate, fraction 0-32 mm, volume should be adjusted to the surface conditions.
- *Subsoil

<https://theconstructor.org/concrete/concrete-slump-test/1558/>



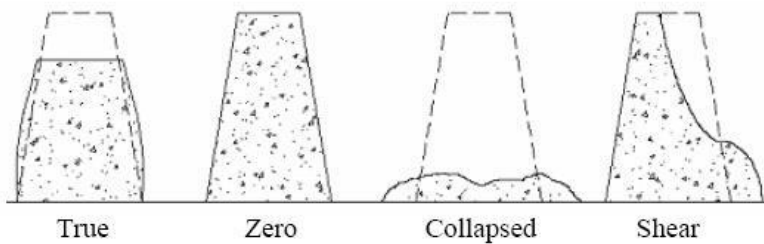
Before carrying out any type of concrete tests, there may be factors that can affect the tests. An example of this is the weather. If it is raining, the mixture may not be at its full potential and will have more water in the mixture, resulting in it not holding well. Very warm conditions can cause it to dry too quickly, not letting it set properly.

The slump test is to be carried out before the concrete cube test is done. This is done to ensure the concrete is suitable for use. The slump test has to meet British standards in this case (BS EN 12350 – 1:2000). Failure to meet British standards means the load cannot be used. Furthermore, a damp slump cone will have to be placed on a flat and hard surface. The cone will then be filled with concrete in three stages. Once the three stages are

Commented [JW10]: Reliance on cut and paste used in recall but lacks a demonstration of understanding

Commented [JW11]: Reliance on cut and paste used in recall but lacks a demonstration of understanding

filled, tamp the mix with the tamping rod 25 times. Once the tamping is done, the concrete will be struck to the top of the cone, to make sure the mould is lifted upwards, then the concrete will slump. Then the cone will be placed besides the concrete to take the measurements in height of the concrete.



A

concrete cube test will be carried out, for the hotel straight after the slump test. This will measure the strength of the concrete and if it is suitable to be used throughout the building e.g. structural purposes such as foundations, floors, beams and columns. The moulds of the cube must meet British standards (BS EN 1881-108:1983). Three samples are taken from the concrete cube test, the three samples will be for the contractor, the client and evidence for the court if needed. A 150mm mould is used, the concrete sample is scooped into the mould in equal layers of three, and each layer will be 50mm and compact. The layers will be compacted using a compacting rod, 35 tamps per layer is required. Tampering must be done so no air is trapped, making the concrete compact. The concrete is then levelled off using a trowel to give a smooth surface. Each layer will then be removed off any bubbles on the surface by simple vibration, this will be repeated for each layer. The cubes will then be covered with a damp cloth and plastic wrap or a sheet and then stored in a dry area at room temperature (19-25 degrees). Over the period of 16-72 hours the cubes will be removed. The cubes will then be transferred from the mould to a curing tank. The cubes will be tested at 7 days and then at 28 days. On the seventh day a cube will be tested and then two cubes will be tested on the 28th day. Once the cubes are removed from the curing tank, it is then dried and removed from grit. A calibrated compression machine will test the cubes, they test it by progressing a constant force on the cubes till they fail, to see if it meets the client's criteria of compressive strength for the hotel.

Project plan of performance targets and measurement techniques

Introduction

The following presentation will be for the client explaining which measurement techniques will be to produce effective performance targets for the construction of the hotel.

I will be using Microsoft project plan to track progress and go through these key things:

- Time Scales
- Costs
- Managing budgets

Time scales

							Sat 09/06/18						
							11 Jun '18						
							S	M	T	W	T	F	S
Task Name	Duration	Start	Finish	Predecessors	Resource Names	Fixed Cost							
Site set up	3 days	Thu 26/04/18	Mon 30/04/18		2 labourers & 125 n	£2,300.00							
Delivery of plant & materials	1 day	Tue 01/05/18	Tue 01/05/18	1	Driver	£0.00							
Excavate for foundations	2 days	Wed 02/05/18	Thu 03/05/18	2	JCB & driver & banksman	£1,000.00							
Excavate for drainage	1 day	Fri 04/05/18	Fri 04/05/18	3	JCB & driver & bank	£500.00							
Formwork & steelwork for foundations	5 days	Fri 04/05/18	Thu 10/05/18	3		£4,000.00							
Pour concrete for foundations	2 days	Fri 11/05/18	Mon 14/05/18	5		£3,000.00							
Blockwork to eaves level	15 days	Tue 15/05/18	Mon 04/06/18	6		£15,000.00							
Timber for floor (first and second)	3 days	Tue 05/06/18	Thu 07/06/18	7		£3,000.00							
Brickwork to eaves level	15 days	Tue 05/06/18	Mon 25/06/18	7		£25,000.00							
Roof trusses	3 days	Tue 26/06/18	Thu 28/06/18	9		£8,000.00							
Roof covering	5 days	Fri 29/06/18	Thu 05/07/18	10		£9,500.00							

It is important the project has a time scale, so tasks are done time efficiently and with quality.

Predecessors show, you can only start the task, when one is already completed.

This will be done over a 12 week period as confirmed with the client, the client has been given a completion date and can then start advertising the hotel. If it is not done by the completion date the client and contractor may come to some agreement or the client can sue and charge the contractor for each day it is delayed has to pay. If completed before the agreed on date between the client and contractor, both of them benefit from this e.g. early advertising and the contractor could get paid for each day till the completion date

Cost and managing budgets

It is important to keep a track of costs, so no money is lost and everything is in budget. The client has a fixed price of the costs. This table shows the fixed costs. The client knows how much is paid on a weekly basis and the contractor knows how much to pay staff on a weekly basis.

Budget Report as of Thu 26/04/18 Project hotel								
ID	Task Name	Fixed Cost	Fixed Cost Accrual	Total Cost	Baseline	Variance	Actual	Remaining
9	Brickwork to eaves level	£25,000.00	Prorated	£25,000.00	£0.00	£25,000.00	£0.00	£25,000.00
7	Blockwork to eaves level	£15,000.00	Prorated	£15,000.00	£0.00	£15,000.00	£0.00	£15,000.00
11	Roof covering	£9,500.00	Prorated	£9,500.00	£0.00	£9,500.00	£0.00	£9,500.00
10	Roof trusses	£8,000.00	Prorated	£8,000.00	£0.00	£8,000.00	£0.00	£8,000.00
5	Formwork & steelwork for found.	£4,000.00	Prorated	£4,000.00	£0.00	£4,000.00	£0.00	£4,000.00
6	Pour concrete for foundations	£3,000.00	Prorated	£3,000.00	£0.00	£3,000.00	£0.00	£3,000.00
8	Timber for floor (first and second	£3,000.00	Prorated	£3,000.00	£0.00	£3,000.00	£0.00	£3,000.00
1	Site set up	£2,300.00	Prorated	£2,300.00	£0.00	£2,300.00	£0.00	£2,300.00
3	Excavate for foundations	£1,000.00	Prorated	£1,000.00	£0.00	£1,000.00	£0.00	£1,000.00
4	Excavate for drainage	£500.00	Prorated	£500.00	£0.00	£500.00	£0.00	£500.00
2	Delivery of plant & materials	£0.00	Prorated	£0.00	£0.00	£0.00	£0.00	£0.00
		£71,300.00		£71,300.00	£0.00	£71,300.00	£0.00	£71,300.00

Cost and managing targets

Cash Flows of Thu 26/04/18 Project hotel									Cash Flow as of Thu 26/04/18 Project hotel					
	11/04/18	18/04/18	25/04/18	02/05/18	09/05/18	16/05/18	23/05/18	30/05/18	14/06/18	21/06/18	28/06/18	05/07/18	12/07/18	Total
Site set up	£1,333.33	£766.67												£2,100.00
Delivery of plant & materials														
Excavate for foundations			£1,000.00											£1,000.00
Formwork & steelwork for foundations			£800.00	£3,200.00										£4,000.00
Pour concrete for foundations				£1,500.00	£1,500.00									£3,000.00
Blockwork to eaves level					£4,000.00	£3,000.00	£3,000.00	£1,000.00						£15,000.00
Brickwork to eaves level								£6,666.67	£8,333.33					£25,000.00
Roof trusses									£8,000.00					£8,000.00
Roof covering									£1,900.00	£7,600.00				£9,500.00
Total	£1,333.33	£1,066.67	£4,700.00	£5,500.00	£5,000.00	£5,000.00	£5,000.00	£10,666.67	£8,333.33					£71,300.00

Questions?

- Benefits of this plan and technique

Candidate Record Form

Technical qualifications

Level 3 Advanced Technical Extended Diploma in Constructing the Built Environment (Construction) (1080) (6720-37)

Level 3 Constructing the Built Environment - Synoptic assignment (6720-053)

Candidate name	Candidate number	Candidate
Mohammed	0000	
Centre name	Centre number	Centre name
College	0000	

Marker Notes – Please always refer to the relevant marking grid for guidance on allocating marks and make notes that describe the quality of the evidence and justification of marks. Expand boxes as required.

AO1 – Recall - Breadth, depth, accuracy	
20%	1 2 3 4 5 6 7 8 9 10 11 12
AO1 Mark Centre 5 PM 5	<p>The candidate has demonstrated a number of materials methods and techniques. He has shown understanding of the concepts and included descriptions together with diagrams to support his write-up</p> <p>Julian's Comments General recall is accurate and shows reasonable breadth though there are gaps in the intended coverage for the learning outcomes, those covered sometimes also lack confidence.</p>
AO2 – Understanding - Security of concepts, causal links	
35%	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
AO2 Mark Centre 11 PM 9	<p>The candidate has shown an understanding of the knowledge across the qualification. He has demonstrated his understanding of the materials the reasons for choosing certain materials. He has explained the methods of constructing with consideration for environmental impact and Health and Safety concerns</p> <p>Julian's Comments Some areas of the work show some general comprehensions of the subjects and in places like making concrete test cubes there is evidence of understanding though generally the use of extensive cut and paste demonstrates greater recall and neglects real explanations and the opportunities to show consistent and confident responses. In some places there are comments where it could be argued that comments show misunderstandings and again this detracts from the general quality of the demonstration of understanding.</p>
AO3 - Practical skill - Dexterity, fluidity, confidence, ease of application	
10%	1 2 3 4 5 6
AO3 Mark Centre 43 PM 3	<p>The candidate has made the effort to produce drawings and presentation slides, he attempts all tasks and try's hard to produce good results</p> <p>Julian's Comments There is some application of skills demonstrated in some of the tasks though these are inconsistent and in places there is a general lack of care. Whilst the presentation is logical again it has a reliance of clippings that appear to be pasted from the internet.</p>

Commented [JW12]: If he has then this should be included in LO2

AO4 – Bringing it together - use of knowledge to apply skills in new context												
20%	1	2	3	4	5	6	7	8	9	10	11	12
AO4 Mark Centre 5 PM 5	<p>The candidate has completed all tasks and explored ideas to present his work</p> <p>Julian's Comments The work does demonstrate links between theory and practice though in many areas this lack real subsidence and there are some inconsistencies and comments that are not fully supported by the theory for example suggestions that using a gas boiler will not require storage may satisfy domestic requirements but is this the case on a commercial project, there are numerous sweeping comments that have no follow up detail to provide justification such as those around asbestos.</p>											
AO5 - Attending to detail / perfecting - Repeated checking, perfecting, noticing, engaged												
15%	1	2	3	4	5	6	7	8	9			
AO5 Mark Centre 5 PM 4	<p>The candidate has demonstrated his willingness to achieve good work, he is neat and presents his document well in a report format</p> <p>Julian's Comments Attention to detail is intermittent for example the throw away comments mentioned above and some work although completed could have been done so with more care and with more attention to detail such as the sketching and an over reliance again of cut and paste reduces the candidate's opportunities to demonstrate their attention to detail.</p>											

Tutor signature	Date	Total
Martin Dawson	16/05/2018	29
PM		26



Declaration of authenticity

Technical qualifications

Assessment ID	Qualification number
6720-053	6720
Candidate name	Candidate number
Mohammed	0000
Centre name	Centre number
College	0000

Candidate:

I confirm that all work submitted is my own, and that I have acknowledged all sources I have used.

Candidate signature	Date

Tutor:

I confirm that all work was conducted under conditions designed to assure the authenticity of the candidate's work, and am satisfied that, to the best of my knowledge, the work produced is solely that of the candidate.

Tutor signature	Date
Tutor	17/05/2018

Additional Support

Has the candidate received any additional support in the production of this work?

No ☐ Yes ☐ (Please tick appropriate)

If yes, give details below (and on a separate sheet if necessary).

--

Note: Where the candidate and/or tutor is unable to, or does not confirm authenticity through signing this declaration form, the work will not be accepted at moderation and a mark of zero will be given. If any question of authenticity arises, the tutor may be contacted for justification of authentication.