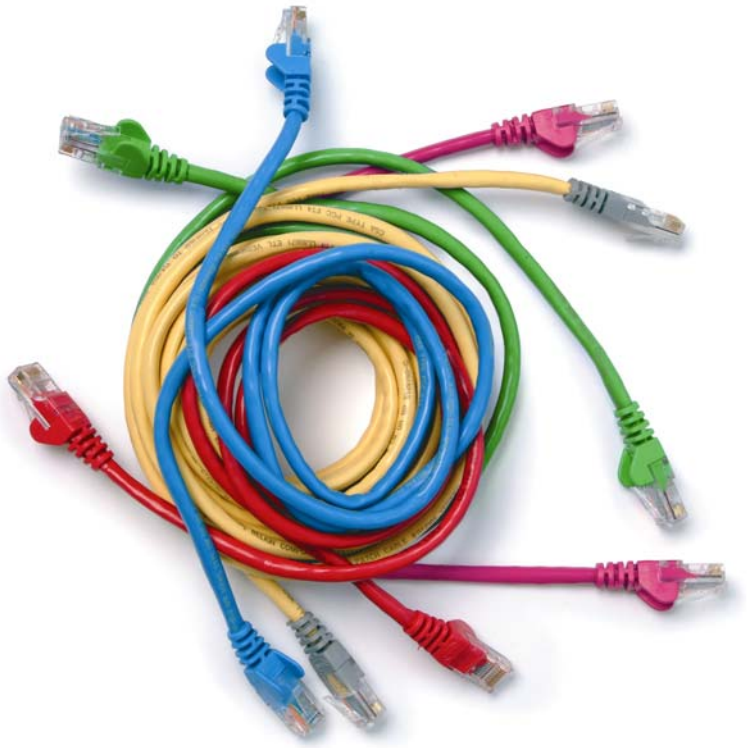
Level 3 Design and plan for an internal network cabling infrastructure (7540-357)

Systems and Principles
Assignment guide for candidates

www.cityandguilds.com
January 2009
Version 1.0



About City & Guilds

City & Guilds is the UK's leading provider of vocational qualifications, offering over 500 awards across a wide range of industries, and progressing from entry level to the highest levels of professional achievement. With over 8500 centres in 100 countries, City & Guilds is recognised by employers worldwide for providing qualifications that offer proof of the skills they need to get the job done.

City & Guilds Group

The City & Guilds Group includes ILM (the Institute of Leadership & Management) providing management qualifications, learning materials and membership services and NPTC (National Proficiency Tests Council) which offers land-based qualifications. City & Guilds also manages the Engineering Council Examinations on behalf of the Engineering Council.

Equal opportunities

City & Guilds fully supports the principle of equal opportunities and we are committed to satisfying this principle in all our activities and published material. A copy of our equal opportunities policy statement *Access to assessment and qualifications* is available on the City & Guilds website.

Copyright

The content of this document is, unless otherwise indicated, © City & Guilds Limited and may not be copied, reproduced or distributed without prior written consent.

However, approved City & Guilds centres and learners studying for City & Guilds qualifications may photocopy this document free of charge and/or include a locked PDF version of it on centre intranets on the following conditions:

- centre staff may copy the material only for the purpose of teaching learners working towards a City & Guilds qualification, or for internal administration purposes
- learners may copy the material only for their own use when working towards a City & Guilds qualification
- the *Standard Copying Conditions* on the City & Guilds website.

Please note: National Occupational Standards are not © City & Guilds Limited. Please check the conditions upon which they may be copied with the relevant Sector Skills Council.

Publications

City & Guilds publications are available on the City & Guilds website or from our Publications Sales department at the address below or by telephoning +44 (0)20 7294 2850 or faxing +44 (0)20 7294 3387.

Every effort has been made to ensure that the information contained in this publication is true and correct at the time of going to press. However, City & Guilds' products and services are subject to continuous development and improvement and the right is reserved to change products and services from time to time. City & Guilds cannot accept liability for loss or damage arising from the use of information in this publication.

City & Guilds
1 Giltspur Street
London EC1A 9DD
T +44 (0)20 7294 2800
F +44 (0)20 7294 2400
www.cityandguilds.com
enquiry@cityandguilds.com

Contents

Introduction - Information for Candidates	2
Level 3 Design and plan for an internal network cabling infrastructure (7540-357)	2
Candidate Instructions	2

Level 3 Design and plan for an internal network cabling infrastructure (7540-357)

Candidate Instructions

Assignment 7540-357

You are advised to read all instructions carefully before starting work. Check with your Assessor/Tutor, if necessary, to ensure that you have fully understood the process.

You must, at all times, observe all relevant health and safety requirements.

Time allowed 12 hours

Introduction

This assignment is broken down into 6 parts:

1. A brief scenario is provided for candidates in the form of a company specification for a project to be prepared.
2. Task A requires candidates to prepare for and carry out a paper site survey
3. Task B requires candidates to identify a range of options and select the optimum solution using suitable criteria
4. Task C requires candidates to document the chosen option sufficiently for a decision to be made on whether it should proceed.
5. Task D requires the candidate to identify the works packages that make up the project, prepare detailed plans and calculate the overall costs of completing the project.
6. Task E is prepare a PERT diagram for the project and identify those work packages that are critical in meeting the overall timescale of the project and explains what measures would need to be put in place to ensure the project is completed on time.

Scenario

You are working for a drinks manufacturer who has four bottling plants around the country. The newest of the four is co-located with the company's main office. The other three plants are old and require to be replaced if the company is to remain competitive and reduce its running costs. The management have produced plans to build a brand new bottling plant on spare land at the main site that will replace each of the three older plants over the next 4.5 years. It is intended to replace them in turn at 18 month intervals. This new plant is to be fully automated and will be controlled by the main computer that is situated in the main office block.

About 3 years ago the main office block and the existing buildings were re-cabled to CAT 5 standard when the main computer system was introduced. This works very successful and the management have been very pleased with its performance.

Your assignment is to develop a plan for an internal network cabling infrastructure for the new plant that will take into account the requirements of the replacement of the three other bottling plants over the next 4.5 years.

Task A

1. Identify the sites and obtain plans and records for the sites that require to be surveyed. (*e.g. main building telecoms room, site plan, plan of new bottling plant*)
2. Identify possible hazards that may be encountered and explain what actions can be taken to limit or eliminate their effect. (*e.g. buried services: water, gas or electricity: spillage of stored chemicals*)
3. Explain why it is important to identify possible hazards at this stage of the planning process.
4. Carry out a paper survey of the sites of interest and record all the relevant results.

Task B

1. From the information given calculate a forecast for the number of telecommunications access point required in the new building. Details of all assumptions and amendments should be recorded.
2. Evaluate all the available information and identify a range of design options that will meet the requirements of the forecast. (*e.g. provision of new duct, type of cable, new equipment, re-use of existing equipment, requirements for power standby and ventilation*)
3. Using suitable criteria rank each of your design options in order of preference and select the optimum design. The justification for the selection or rejection of each design option should be fully recorded. (*e.g. costs, practicality, availability, possible future requirements*).

Note : -

All designs are usually a combination of different components and the optimum design is the one that makes the most effective use of the different components. These components may include duct, equipment, cable, power and ventilation.

Task C

Document the selected design in a format suitable for a decision to be made as to whether the project should proceed along the lines of the design. The documentation should be clear and concise and explain the design. It should specify the type and quantities of the major components, highlight the advantages of the design, identify possible timescales and contain broad costs.

Task D

1. Produce detailed plans for the selected design. The plans should be in sufficient detail to identify the type and location of the plant or equipment that is required to be installed. (*e.g. site plans, equipment room layout, rack layouts*)
2. Break down the selected design into identifiable packages of work. (*e.g. purchase and install new equipment racks, lay duct, install cables*)
3. Cost the individual packages of work and produce an overall cost for the selected design. This should include cost of stores and materials, relocation costs if appropriate, installation costs, man-hour costs and contract costs where applicable. If the final costs include an allowance for unexpected work not identified during the planning stage the reason and the amount should be justified.

Task E

1. Using the packages of work identified in Task D construct the PERT diagram to show the relationship between the various packages.
2. Using the PERT diagram identify the critical path and calculate the minimum time to complete the project. Identify the packages of work that are critical to meeting that timescale for the overall completion of the project.
3. Describe the measure that could be put in place to ensure the project is completed on time.

Note

- At the conclusion of each session for this assignment, hand all paperwork to the test supervisor.
- Ensure that your name is on all documentation.

ASSIGNMENT INFORMATION

FORECASTS

The new bottling plant will open with the filling machine, bottling machine1, and packing machine 1 operational. Bottle machine 2 will be added in time for the second closure and machine 3 and packing machine 2 in time for the final closure.

The control room requirements are Office 1, work surface 1, testing facility 1 and bottling machine control operational for the first closure. Bottling machine 2 control and office 2 will be required for the second closure and the remainder of the control room for the third and final closure.

The entire requirement will be required 12 months in advance of each section of the new plant becoming operational.

COSTS FOR LAYING DUCT & BUILDING JOINTING BOXES

CONTRACT CHARGES

Single way in grass = £ 20.00 per metre at a rate of 100 metres a day
Single way in asphalt = £ 55.00 per metre at a rate of 70 meters a day
Joint box in grass = £ 250 per box at a rate of 2 boxes a day
Joint box in asphalt = £ 800 per box at a rate of 1 box a day

EXTERNAL CABLING COSTS

CONTRACT CHARGES

Optical Fibre cable (4 Fibre) £ 20.00 per metre installed and terminated.
Multi core copper cable 60 pair £ 25.00 per metre installed and terminated.

INTERNAL CABLING COSTS

CAT 5 stores and material costs for the control room£ 35.00 per access point.
CAT 5 stores and material costs for the bottling plant ground floor £ 65.00 per access point.
CAT 5 cabling, terminating and testing access points in the control room 2.5 hours per access point.
CAT 5 cabling, terminating and testing access points in the bottling plant ground floor 5 hours per access point.

EQUIPMENT

Transmission Equipment

Optical fibre systems cost £ 1500.00 per system contract charges

Power

The existing standby power system is capable of supplying the original equipment power load for a minimum of 3 hours. If the new bottling plant goes ahead the company intend to arrange for a back up power supply to be provided by their supplier that will be able to be switched with 30 seconds of the original failure.

Ventilation

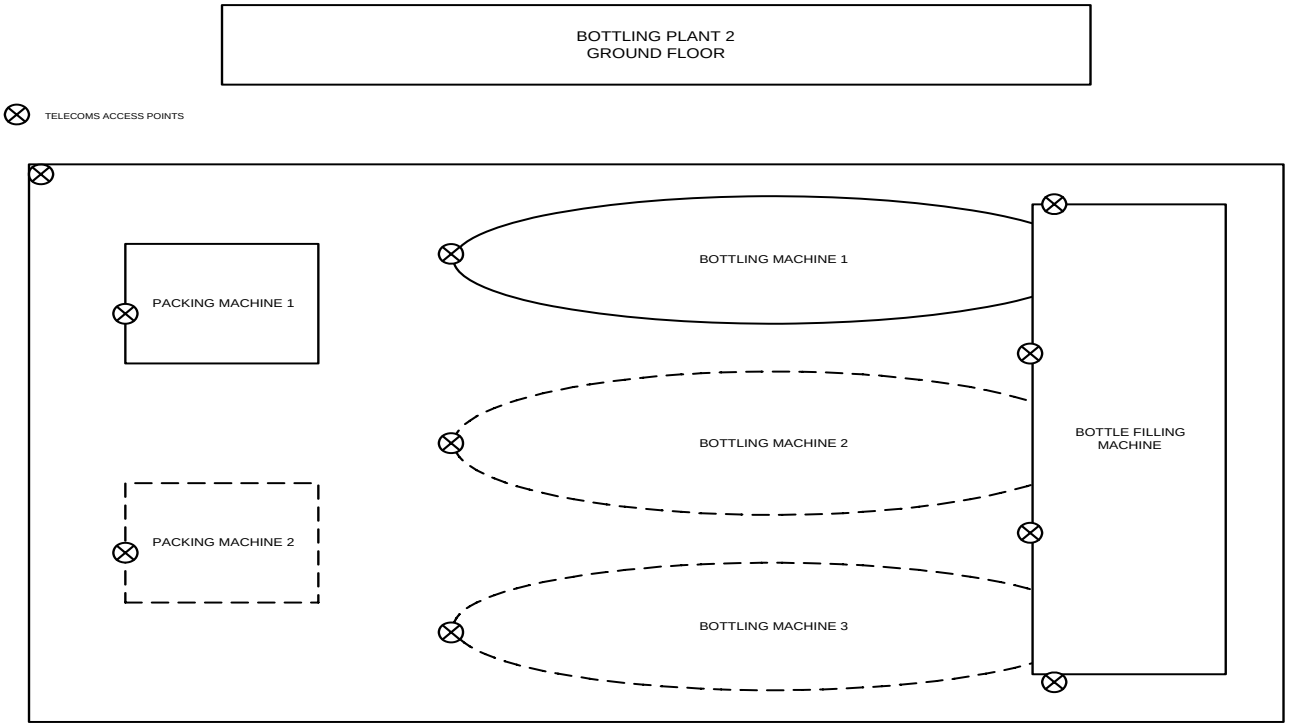
Assume the room size is sufficient not to require any additional ventilation.

Note:

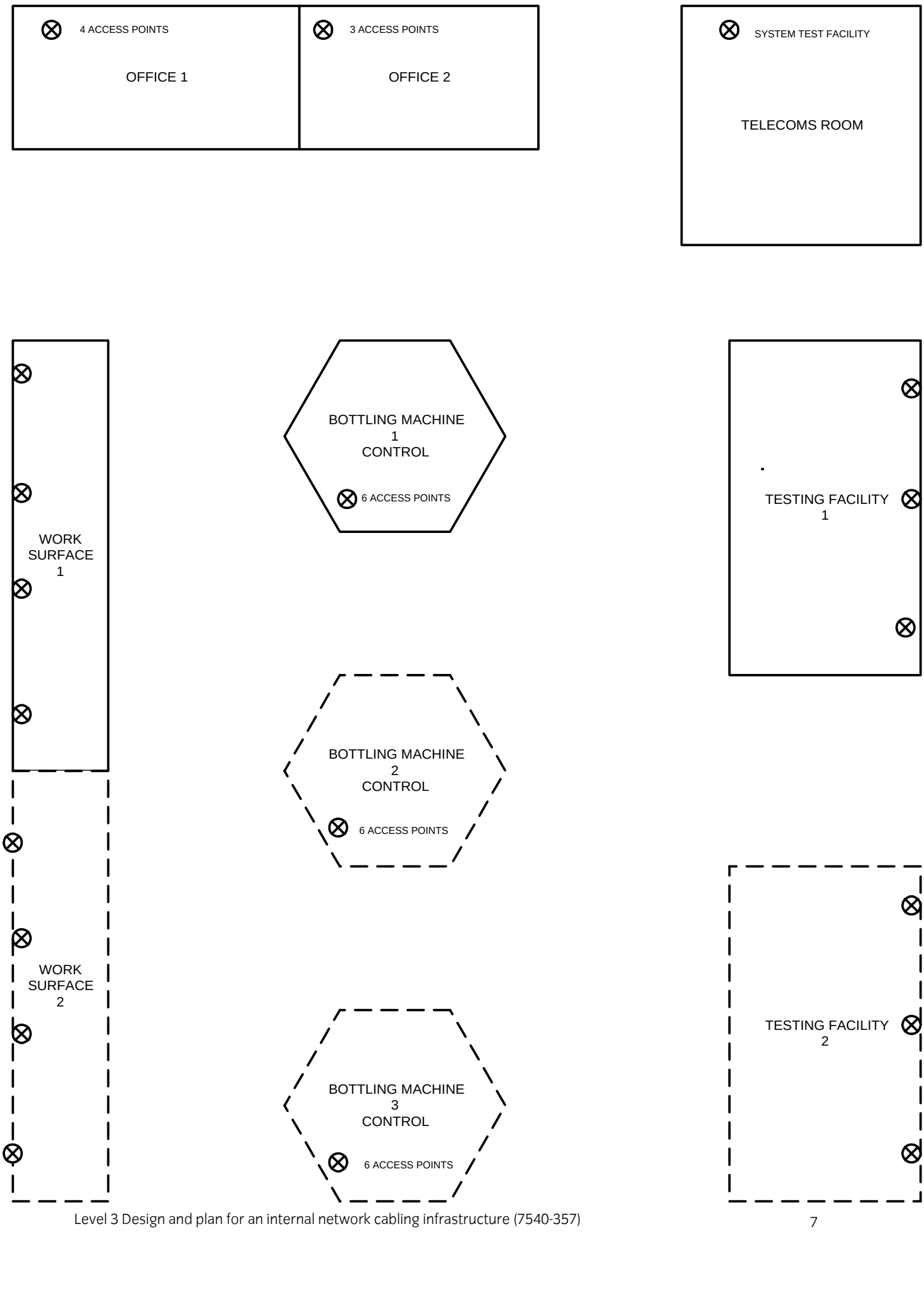
- Assume all other items are capable of catering with the demand without further extension.
- All other equipment or racks are costed at the price quoted in any supplier's catalogue.

Manhour rate

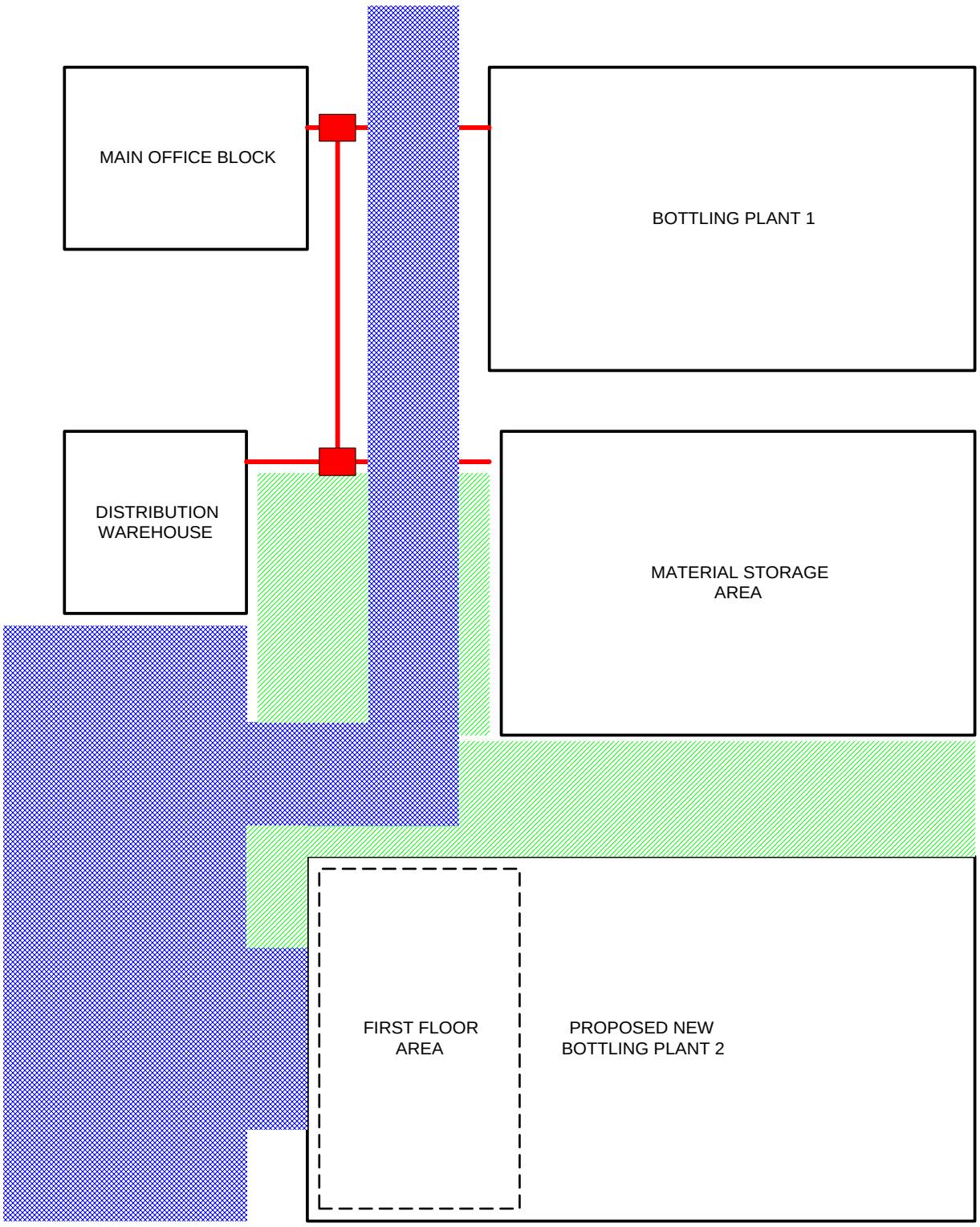
Assume £15.00 per hour.



BOTTLING PLANT 2
FIRST FLOOR



SITE PLAN



ASPHALT ROAD WAY

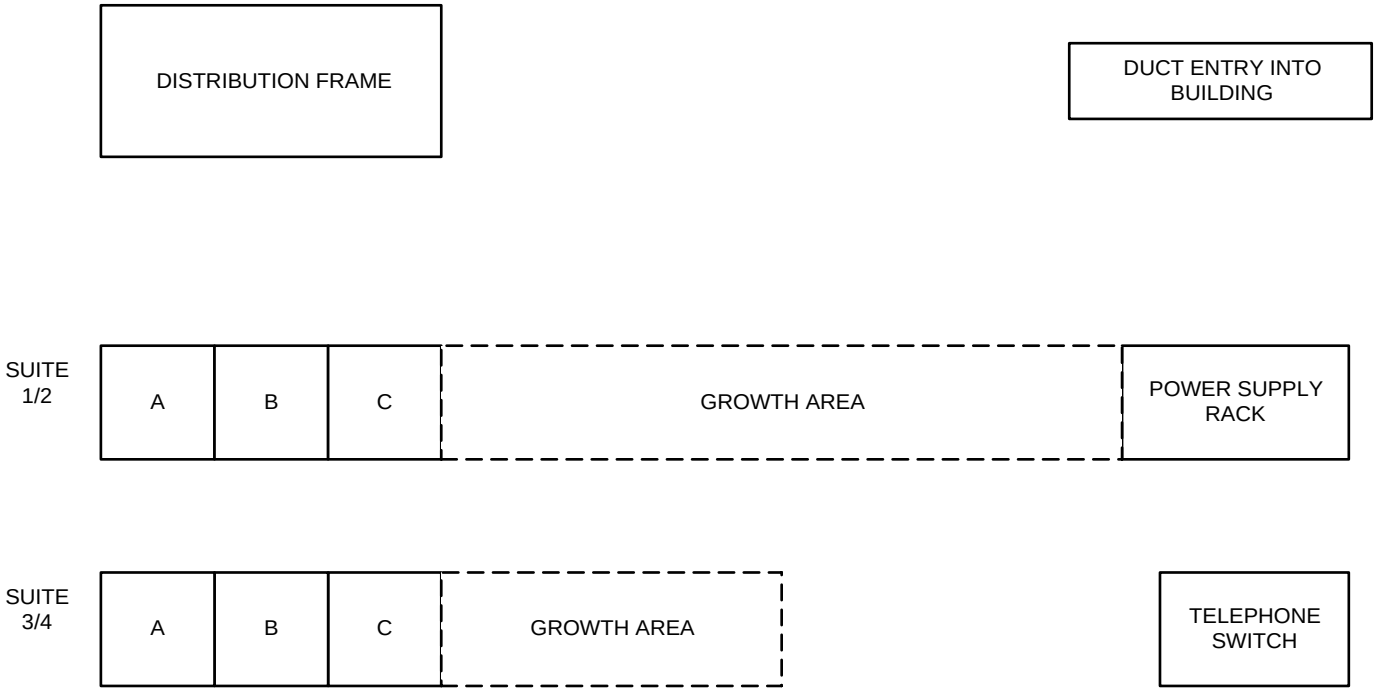
JOINTING BOX

GRASS

DUCT ROUTE

SCALE
1CM = 10 METRES

MAIN BUILDING TELECOMS ROOM



SUITE 1/2 A PRIVATE WIRES TO OTHER BOTTLING PLANTS
B MODEM RACK FOR DIAL UP ACCESS TO COMPUTER SYSTEM
C CAT 5 TERMINAL EQUIPMENT

SUITE 3/4 A OPTICAL FIBRE TERMINATING RACK
B OPTICAL FIBRE SYSTEMS
C UNEQUIPPED RACK

Published by City & Guilds
1 Giltspur Street
London
EC1A 9DD
T +44 (0)20 7294 2800
F +44 (0)20 7294 2400
www.cityandguilds.com

City & Guilds is a company registered in England and Wales (company number 16513878)