



June 2018

**Level 3 National in
Information Technology**

**Unit 14
IT Service Delivery**

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August 2018

Publications Code 20161K_1806_ER

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Grade Boundaries

What is a grade boundary?

A grade boundary is where we set the level of achievement required to obtain a certain grade for the externally assessed unit. We set grade boundaries for each grade, at Distinction, Merit and Pass.

Setting grade boundaries

When we set grade boundaries, we look at the performance of every learner who took the external assessment. When we can see the full picture of performance, our experts are then able to decide where best to place the grade boundaries – this means that they decide what the lowest possible mark is for a particular grade.

When our experts set the grade boundaries, they make sure that learners receive grades which reflect their ability. Awarding grade boundaries is conducted to ensure learners achieve the grade they deserve to achieve, irrespective of variation in the external assessment.

Variations in external assessments

Each external assessment we set asks different questions and may assess different parts of the unit content outlined in the specification. It would be unfair to learners if we set the same grade boundaries for each assessment, because then it would not take accessibility into account.

Grade boundaries for this, and all other papers, are on the website via this link:

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Unit 14 IT Service Delivery

Grade	Unclassified	Level 3		
		P	M	D
Boundary Mark	0	19	30	41

Introduction

1806 is the first external assessment window for Level 3 BTEC Information Technology Unit 14: IT Service Delivery. This is an optional unit for learners studying the extended diploma.

The unit is a paper-based examination and is broken down into a two-part task. Part A contained material for the completion of the preparatory work for Part B and was to be taken over a maximum of 3 hours across a period of 2 weeks. No marks were awarded for Part A. Part B contained materials for the completion of the set task under supervised conditions, allowing a maximum two A4 sides hard copy research notes from Part A to be taken into the assessment.

Part B is broken down into five activities that cover different areas of the specification where learners are expected to apply knowledge and understanding of the IT service delivery requirements for the Civil Engineering sector provided in the scenario.

The following section considers each activity on the paper, giving examples of responses and a brief commentary why the responses gained the marks. This section should be considered with the live external assessment and the corresponding mark scheme.

Introduction to the Overall Performance of the Unit

The overall performance of learners was good though we have nothing to compare to previous cohorts for this window.

The performance for each Activity varied with a low number of blank responses, and some responses focusing on head office personnel rather than the construction sites, which resulted in lower marks. Activity 5 (implications) performed the least best with learners explaining what they have produced rather than giving implications to the organisation of introducing the IT system. Very few learners discussed legislation and specialist equipment required for the construction sites, e.g. GPS Survey kit and EDM.

Individual Questions

The following section considers each activity on the paper and provides examples of learner responses. A brief commentary is included giving reasons why the responses gained the marks they did. This section should be considered with the live external assessment and the corresponding mark scheme.

Activity 1

(Outline IT service strategy)

An attempt has been made to provide a description of IT service/process requirements for the organisation but there are many inaccuracies and omissions, and there is no attempt to prioritise IT service/process requirements. General discussion given, but the learner has had no discussion on individual personnel needs for the head office and the construction sites. The learner work would fit into Band Mark 1 (1 – 3) in the mark scheme.

Organisational Needs	
IT Service Requirements	Explanation of priority (high, medium, or low)
Web based storage	Buckton construction will need to have consistent connection with everyone they communicate with as the different sites will need to check with other members about what they will be doing. The site manager needs to be able to access files and share documents with other members on the construction site as well as have a safe and secure network.
Security network system	This will be a must have in the construction site as this is high priority because having security footage if anything goes wrong will allow safety of others to be first. If any intruder enters the site, the CCTV will catch them, and anything suspiciously caught on camera can be sent off to the police to be dealt with.
Digital communication/portable devices	All the staff members and construction site members will need to be able to access files and data as well as communicate with each other. Using work phones will enable them to use their mobile data or internet from the construction site to send messages between each other and work more efficiently instead of wasting time physically walking over to them. Having access to files on the phone will be much easier than carrying a laptop everywhere, this is a medium priority as not much money needs to be spent on high-tech phones from the budget.
Backed up data using cloud storage	Using a cloud storage to back up data will be essential as this can prevent loss of work that will be needed to complete a project on a construction site. As well as backing it up on the cloud, it can be accessed from anywhere and shared with whoever you give access to it. This will be a high priority as keeping files safe and backed up is vital.
Highly secured networks	This is a high priority as everyone's data who is partaking on this project is supposed to be in safe hands and away from anyone outside the construction site that don't affiliate with Buckton Construction. To create a secure network some software's will need to be installed to prevent hackers and malware to enter the IT network of the construction sites. Using Antivirus software's and installing them onto any laptop/computer on site will be beneficial. Updating any devices will also be a good way to have a secure network too.
Digital monitoring screens	To be able to see the both sites, you will need to have a monitoring screen where the site manager can record and watch. If the security network system isn't available to view than there will be a risk of something being either damaged, stolen or someone can get hurt with no evidence. As this is a high priority, it is essential that the monitoring screens are installed and ready for the site managers at the head office.
Customer/Client Needs	
IT Service Requirements	Explanation of priority (high, medium, or low)
Health and Safety videos	This is a very high priority to Buckton as everyone's health is at risk during the process of the project. There are different factors to considering when carrying out health and safety for Buckton. This can range from practical work to in office work. It is also vital that the laws for using work online is followed accordingly. Having videos to explain these issues can be given to the clients and employees.
Communication with clients and using communication devices	The communication between the clients and customers need to be a medium to high priority. This will create a good relationship between everyone which will then extend the partnership between each other. Having communication devices on site will enable everyone communicate and will allow productivity. This is better than going back and forth on site to go speak to someone. Also, the communication between the clients and employees will be easier.

Learner has provided relevant information from the scenario and given a basic outline of the organisation.

An attempt has been made to provide a description of IT service/process requirements for the organisation that meet most of their needs, and there is an attempt to prioritise IT service/process requirements that is supported by a rationale. The learner has shown an awareness of the scenario for both head office and the two construction sites.

There is a discussion that includes basic hardware, software and communication requirements for head office personnel and individual software requirements for construction site personnel. The learner work would fit into **Band Mark 2 (4 – 6)** in the mark scheme.

Organisational Needs	
IT Service Requirements	Explanation of priority (high, medium or low)
Buckton Construction is a civil engineering company with one main head office and multiple remote sites. They require an enormous range of different IT services to maintain basic operations.	
Once the company has a project tender it can accept it shall hand out contracts to its staff, so they can begin work. Head office controls the sites and how they operate. It allocates materials and runs the legal site of operations.	
Site and Office Communication	High – This is a major priority as it ensures that everyone can communicate with the rest of the office and sites. Without this service, there would be no way to establish the progress of a site or be able to have a direct conversation with site managers. Office users would also not be able to make phone calls, this would seriously undermine the operations of the business and impact on their ability to order supplies, speak with clients and internally speak with other staff members
PCs	High – PCs are required to allow office staff to do their job. They are required to access stored information and input more data. They are also used to design and review building diagrams and blueprints. Without the use of PCs, there would be few alternatives to allow mainstream office tasks to continue.
Printers	Medium – Printers are required when hard copies of documents need to be printed. In a modern world, this is less important now as most documents are emailed and viewed digitally. However, in a construction company these documents may need to be printed and sent to the sites on occasion when there is a need to review blueprints and legal documents on site.
Project management software	High – Project management software is extremely important. It provides a clean way to keep documents and information for the site together and in a logical fashion. Without this software, it is harder to make sure targets are met and that the project is moving smoothly. Main features like document sharing, communication and tasks can be monitored. An example application can be BIM360. It connects people to the field, reviews design and allows for posting and drawing attachments.
Site manager	High – The site manager needs access to a variety of IT services to perform their job. Firstly, they need to be able to type documents and sent emails. This is all done within an Office suite like Office365. It lets documents be stored in the cloud and shared with other people easily. It also connects outlook and email. Secondly, he needs a laptop and tablet to communicate when they are out in the field as they may not have access to a desktop PC. This is essential to maintain a flow of data and documentation. It also allows the site manager to review design documents and CAD designs while mobile.
Site Engineer	High – <i>This is the same as above</i>
Quantity Surveyor	Medium – The quantity surveyor is not essential to the key operations after the initial building assessment but they are still required throughout construction. They need separate accountancy software to calculate costs and budgets to maintain financial stability for the project. They also require an inventory software solution as this need to keep track of what stock and materials are on site or have been ordered so that they can control and order more if needed. The basic office and email requirements also stand so that they can communicate and order supplies as needed.
Cat6 Network Cabling	Medium – For PCs to have network capability and therefore run most office tasks, they must be connected to a network. Using cat6 cable ensures a high speed of data transfer and removes the threat of an unauthorised breach via a wireless network. However, it takes time to install such a vast amount of cabling through an office and a wireless solution may be preferable in the short time, provided the correct security is in place.

Health and safety	High – The health and safety of any business should be their top priority over anything else. To operate safely using PCs there must be some PPE installed. Arm rests and head restraints should be available to users to reduce the risk of repetitive injuries. Also, foot rests should be available for users. Monitors should be at a correct height and not be flashing or flickering as this could cause injury to eyes resulting in a visual impairment.
Digital Security	High – The main security aspect of the business should be installed straight away as it protects client information and business data. This can be done via firewalls and user access levels to restrict who can gain access to various parts of the network. People should all be wearing ID to show who they are to remove any risk of unauthorised personnel from being in rooms they shouldn't.
Customer/Client Needs	
IT Service Requirements	Explanation of priority (high, medium or low)
Communication	Medium – The client needs to be kept informed about the stages of their project or building. This can be done via email or phone calls. However, these services must be available. It is a medium priority as building project go on for long periods of time and therefore the client is not going to be in contact all the time, there may be periods of several days where there is no direct communication therefore this is not a main priority of operations.
CAD	Medium – The client needs CAD software to create and edit designs and templates for the construction company to keep working. They need a constant stream of data on how to build the project. It is not an immediate priority as the client is likely to have this already however by providing this application to the customer the construction firm can ensure compatibility with their software and no data should be unreadable. As this could result in delays and therefore extra money being spent.
Confidentiality	High – Confidentiality is very important as clients do not want to have information leaked or spread to people or competitors about their project. This is also a legal requirement when dealing with clients as to share client data without consent is in breach of Data Protection laws the new GDPR.
Website	High- So the client can see the company's services
Online Platform	Low – This is not essential however it would enable the client to see in an online portfolio the current stage of the project and be able to leave comments or messages for staff.

Activity 2

(Produce an IT service strategy)

An attempt has been made to produce an IT service catalogue using the templates provided, however there is limited information to show individual IT services for each function of the organisation. IT services identified are generic and service names and descriptions have been omitted, showing a limited understanding of the organisation's requirements. The learner work would fit into **Band Mark 1 (1 - 3)** in the mark scheme.

Function: Manufacturing of products and delivering services	
Service name	Service description
Blink XT Cameras	<p>As the business was very specific about what kind of cameras they wanted and the features they had to do this is the best option available. These cameras are battery operated and the batteries have a two-year lifespan before they need to be replaced. This has many advantages to it as the business does not need to spend additional money wiring the cameras up to the mains and the cameras will continue to operate in the event of the construction site losing electricity. As they are going to be used on a construction site and there is a pretty high chance that it will be out doors so because of this the cameras have been designed to be weatherproof. In terms of the security they can offer there possess a wide range of features that help improve the security of the place they are being used in. Firstly the cameras poses infrared night vision and LED illumination so they can easily see what is happening at night as well as having built in motion detectors that will alert the users phone if anything is detected. And the reason why it alerts there phone is because the user can access the cameras feed from the phone and gain access to live HD video and sound recorded by the camera.</p> <p>However with all this comes cost and the cost is quite high with the cameras as an individual camera can cost the user up to £150, though they can be bought in bundles that discount the price. And another down side is that only ten cameras can be on one camera network so if a site requires more than ten cameras multiple networks may have to be created or the business may have to comprise some of the sites security by reducing the number of available cameras. It would roughly cost the user just over £1000 to set a site up with ten of these cameras. Additionally cameras have a very strict set of legislation that must be followed such as everyone should be made aware of the existence of the</p>
	<p>cameras and that they could potentially be recording you. The best way to do this is to simply place signs around the site warning people of this, though this may cost the business a little bit extra money. And any video that is record and stored falls under the Data Protection Act 1988, soon to be the GDPR, General Data Protection Regulations. This states that the company must keep the recorded video safely stored and protection from any means of a cyber-attack or theft. This video should only be stored for how long the business needs it, the recommended is fourteen days then after that the video is deleted. Anyone also has the right to view the recorded video simply by asking and the business should deliver that request in about three days.</p>
Microsoft Office Package	<p>The Microsoft Office Package offers the business a wide variety of software that may or may not be useful depending on what the person job is. This package offers word processing software, MS Word, which everyone in the business needs as well as spreadsheet software, MS Excel, which the managers would find useful for manage the budget and resources of a project. MS Access is also included and it is extremely useful for creating the database that I recommended the business does, The package also contains a lot more bits of software.</p> <p>The costing of this varies depending on the packages and durations that the business may choose. Individual pieces of software can have the licences acquired for a set amount of time, a month, a couple of months, a year and sometimes may allow a lifetime licence. However if the business decides to purchase multiple lifetime licences for the software they may use then that cost can be massive and it may actually be more beneficial to simply get the entire package and rent it on a yearly basis as the cost may be lower and the business would have access to more software.</p>

**Function:
Marketing and sales**

Service name	Service description
Website	Having a website can do wonders for the business as it can be used to promote the business, gain more clients and provide useful information about the business. However the business would have to build a website then decide on how it will be stored and run. For building a website the business would more than likely outsource it to professionals who build websites as for the business to do it internally would require them to either hire people who are skilled at building websites or train up employees on how to do it. Realistically the business would outsource this as the quality of the website would usually be higher, it would be built faster and the business wouldn't have to divert staff away from a project to do it. For when it comes to storing and running the website the business can again outsource it or do it internally. I highly recommended that it is outsources simply because of the fact that the business doesn't have the necessary infrastructure or knowledge on how to do it as a server is required which will cost the business a lot of money and people are required to manage the server and the website. By at least outsourcing it means that the business can save a lot of money and time that can be better used elsewhere. There are some downsides to this though as if the business responsible for running the website encounters some difficulties with their hardware then your website may be inaccessible which could hurt the business in finding new clients and if the business wishes to make any changes to the way the website is run then those changes could take weeks to come into effect and by that time the purpose of the changes may have been lost.

**Function:
Customer/client relations**

Service name	Service description
Google Drive	Google Drive would allow the business to easily transfer files to each other as well as potential clients and additionally have multiple people working on the files simultaneously. The service also offers a basic form of cloud storage meaning that files can be stored on Google's cloud servers which is extremely useful for backing up the business files. The account is also free to use however if the business does what to use it for its cloud storage capabilities then additional storage space would more than likely have to be purchased. Additionally if the business is unable to access the internet then they would be unable to access those files until an internet connection is restored and if those files are of something important it could be disastrous for the business.
Skype for Business	Having Skype for Business would allow the business to video call people around the world from almost any location and it can be done to and from a wide variety of devices such as laptops, desktop computers, tablets, mobile phones etc. Skype for Business also allows multiple people to be in the same video call at once so for example the project manager could be at their desk in the business's head office, the site manager could be walking around on the construction sites and the client could be at their home sitting down at a table. These three people would be able to communicate in real time and gain an almost instant reaction and response at things that may be shown. While normal Skype can do this and is free to use, Skype for Business being a paid service means that the business would be provided with a better connection on calls and a variety of more features and benefits. Though this too requires an active internet connection to use so if someone is unable to get a connection then they can't join the business call.

Learner has produced an IT service catalogue that covers both head office and construction site personnel. Relevant information from the scenario has been included and the learner has identified services that are appropriate for the business functions and have included accurate service names and descriptions, showing a good understanding of the organisation's requirements. Descriptions included are clear and concise enabling a non-IT specialist to understand. The learner work would fit into **Band Mark 3 (7 - 8)** in the mark scheme.

Function: Manufacturing of products and delivering services	
Service name	Service description
<p>Hardware requirements</p> <p>Managing Director: PC with 2 monitors, webcam with microphone, speakers, keyboard, mouse, capable of running 3D modelling software, Word processing and Spreadsheets software. Tablet with HDMI, capable of running Google Docs.</p> <p>Personal Assistant: Laptop with integrated webcam, microphone and speakers. Powerful enough to run Word processing and Spreadsheets software.</p> <p>IT Systems Manager: PC with 2 monitors, webcam with microphone, speakers, keyboard, mouse, Word processing and Spreadsheets software.</p>	<p>-The managing director is required to have a high-end PC as they will be managing and reviewing other staff members' work. They need dual monitors to work more efficiently so they can display more documents at the same time. They will also need a tablet with an HDMI port to use at meetings for presentations.</p> <p>-The personal assistant will most likely be assisting at meeting and supporting the Managing Director. This means they will most likely attend meetings and working at different rooms, so she needs portable hardware to meet these requirements.</p> <p>-The IT Systems Manager requires to have a powerful enough PC manage the different IT Systems the company uses.</p>
<p>IT Technicians (2): PC with monitor, mouse, keyboard and speakers. Powerful enough to run Microsoft Office smoothly. PC needs to be powerful enough to being able to test software required for other staff members.</p> <p>Human Resources Manager: requires a PC capable of handling word processing and spreadsheets software.</p> <p>Finance Manager: PC with monitor, ethernet, mouse, keyboard, powerful enough to run word processing and spreadsheet software, capable of running mathematical software, charts, graphs and Big data.</p> <p>Finance Assistant: required a laptop capable of running several mathematical equations as well as managing big data.</p> <p>Office Manager: PC with monitor, ethernet, mouse, keyboard, powerful enough to run word processing and spreadsheet software</p> <p>Receptionist: PC with monitor, ethernet, mouse, keyboard, powerful enough to run word processing and spreadsheet software. Telephone to receive customer calls.</p>	<p>-The IT Technicians (2) will be needing a PC not as powerful as the managing director's but powerful enough to run software used by other staff members for testing purposes and to provide support when needed.</p> <p>-The Human Resources Manager will be needing a PC that can handle the Microsoft Office package as well as managing software.</p> <p>-The Finance Manager will be needing a PC that is capable of managing a lot of data, as they will be looking at many documents involving numbers.</p> <p>-The Finance Assistant will be supporting the Finance Manager, so they required a laptop capable of managing the big data used for financial purposes.</p> <p>-The Office Manager will require a PC powerful enough to run Microsoft Office.</p> <p>-The Receptionist will be the first point of contact between clients and the organization. They need to have a powerful enough computer to run Word and Excel which is what they will be mostly using.</p>

<p>Construction Sites (2)</p> <p>Site manager: Laptop capable of running 3D Modelling software</p> <p>Estimator: Laptop cable of running Microsoft Office and Calculations software</p> <p>Project Manager: Laptop cable of running Microsoft Office and Calculations software, JIRA, AutoCAD</p> <p>Site Engineer: Laptop cable of running Microsoft Office and Calculations software Tablet for portability and pictures</p> <p>Quantity Surveyor: Laptop cable of running Microsoft Office and Calculations software</p>	<p>-The Site Manager will be at a location supervising staff and making sure everyone is fulfilling their role. They need a laptop and a tablet for portability as they will normally be working in different locations.</p> <p>-The Estimator needs to be able to run calculations software to give an estimate of the cost of the project.</p> <p>-The Project Manager makes sure the project is delivered within the time limit, as well as within budget and scope. They need a laptop for portability as they will normally be working in different locations.</p> <p>-The Site Engineer is in charge of organizing and supervising materials and roles as well as the site is safe to work in. They need a laptop for portability as they will normally be working in different locations.</p> <p>-The Quantity Surveyor is responsible for calculating the amount of materials needed and their cost. They need a laptop for portability as they will normally be working in different locations.</p>
<p>Software Requirements</p> <p>Managing Director:</p> <p>Personal Assistant:</p> <p>IT Systems Manager:</p>	<p>Windows 10, Microsoft Office 2016, AutoCAD, Skype for business, Google Chrome</p> <p>Windows 10, Microsoft Office 2016, Skype for business, Google Chrome</p> <p>Windows 10, Linux Distro, Microsoft Office 2016, Skype for business, Google Chrome</p>
<p>IT Technicians (2):</p> <p>Human Resources Manager:</p> <p>Finance Manager:</p> <p>Finance Assistant:</p> <p>Office Manager:</p> <p>Receptionist:</p>	<p>Windows 10, Linux Distro, Microsoft Office 2016, Skype for business, Google Chrome</p> <p>Windows 10, Microsoft Office 2016, Skype for business, Google Chrome</p> <p>Windows 10, Microsoft Office 2016, Skype for business, STAAD (Calculations software), Google Chrome</p> <p>Windows 10, Microsoft Office 2016, Skype for business, STAAD (Calculations software), Google Chrome</p> <p>Windows 10, Microsoft Office 2016, Skype for business, Google Chrome</p> <p>Windows 10, Microsoft Office 2016, Skype for business, Google Chrome</p>
<p>Construction Sites (2)</p> <p>Site manager:</p> <p>Estimator:</p> <p>Project Manager:</p> <p>Site Engineer:</p> <p>Quantity Surveyor:</p>	<p>SM: Windows 10, Microsoft Office 2016, Skype for business, Google Chrome, AutoCAD</p> <p>E: Windows 10, Microsoft Office 2016, Skype for business, Google Chrome, AutoCAD, STAAD(Calculations software)</p> <p>PM: Windows 10, Microsoft Office 2016, Skype for business, Google Chrome, AutoCAD, STAAD(Calculations software), JIRA, MS Project</p> <p>SE: Windows 10, Microsoft Office 2016, Skype for business, Google Chrome, AutoCAD, STAAD(Calculations software)</p> <p>QS: Windows 10, Microsoft Office 2016, Skype for business, Google Chrome, AutoCAD, STAAD(Calculations software)</p>
<p>Security</p>	<p>Account-based: The operating systems will require a login and password</p>

Account-based OS	meaning that only members of staff can access them.
Auto lock	Auto lock: Devices such as PC's and Laptops will auto lock after a time of inactivity to avoid unauthorized access when the device is left unattended.
Anti-virus software (Avast, Avira):	Anti-virus software (Avast, Avira): Anti virus software will be installed on devices such as laptops and PC's to block incoming threats that might intent to breach the device's security.
VPN + Firewall:	VPN + Firewall: A VPN that includes a firewall will be installed to add a layer of security to the systems. This will block unwanted incoming traffic.
Access Levels	Access Levels : Access levels stop other staff members from accessing unauthorized data.
Software Licensing	All software requires to have a valid commercial license that guarantees their functionality and availability.
Future Improvements:	

Function: Marketing and sales	
Service name	Service description
Website	A website is required to advertise the organisation's services.

Function: Customer relations	
Service name	Service description
Legislations	
Data protection act	-The Data protection act says client information is not misused and not stored for longer than required.
Computer Misuse	-The Computer misuse act ensures computers are not used unlawfully.

Activity 3

(Design an IT service delivery solution)

Learners are required to design an IT service delivery solution that meets the needs of the organisation, and this learner has provided limited mapping of the solution that demonstrates limited technical understanding of the solution.

Although an attempt has been made to include information and data requirements, the information is limited and covers basic requirements. The learner has included and construction site organisation chart and details of hardware and software, however there is little understanding of how the hardware and software can be used to implement the system. Diagrams have been included showing the infrastructure for head office and a constructions site, but the learner has not demonstrated understanding of how they will link and communicate with each other.

Data flow diagrams and a full infrastructure diagram could be used to illustrate requirements. The learner work would fit into **Band Mark 1 (1 - 5)** in the mark scheme.

Information Requirements

- Database of independent contractors with their relative skills and expertise.
- Legislation
 - Computer Misuse to be considered when handling the onsite and head office networks.
 - Data protection act to be considered when handling client information and information and the project at hand.

Data Requirements

- Budget
- Timelines and deadlines
- Client Contact information and detail
- Location of sites with details
- Site risk assessment

Hardware and Software Service Options

Laptops

The laptops will have high end CPU as they will need to be able to run multiple programmes at the same time, high end batteries as they will need to last at least a full working day without running out of charge. It will be able to run CAD software in high definition smoothly also.

Phones

Physically sturdy, touch screen phones. So, if they are dropped won't break and are easy to send quick emails on.

Microsoft Office

Word, Excel, Outlook.

Computer Aided Design (CAD) Software

This software will be oriented around building and structure design as that is what civil engineers produce.

Digital Cameras

HD cameras so accurate surveying, estimating and assessing can be done with aid of detailed pictures.

Wireless Security Cameras

These will be bulky, easy to see cameras to deter criminals and allows the managing director to keep a close eye of his projects in progress.

Server Boxes

The server box will be capable of storing vast amounts of documents and spreadsheets, as well as CAD designs. It will also be able to process live videos feed 24 hours a day. The server box will be wired via ether cable to several routers so it will have multiple ether ports

Routers

The routers will have a large range as nodes (cameras, laptops, mobiles) all of over the site will need to have a consistent connection to them.

Project Management Software

The software is hierarchy based, with vast scheduling and privilege configuration capabilities.

Head Office Computers

All computers in the office have Microsoft office installed, high quality cyber security software installed on the and will auto lock after 10 seconds of inactivity.

IT Department

Standard grade hardware, Ticketing system able to run.

HR Department

Standard Grade Hardware.

Finance Department

Standard Grade Hardware, able to process complex spreadsheets and mathematics.

Office and Reception

Standard Grade Hardware.

Upper management

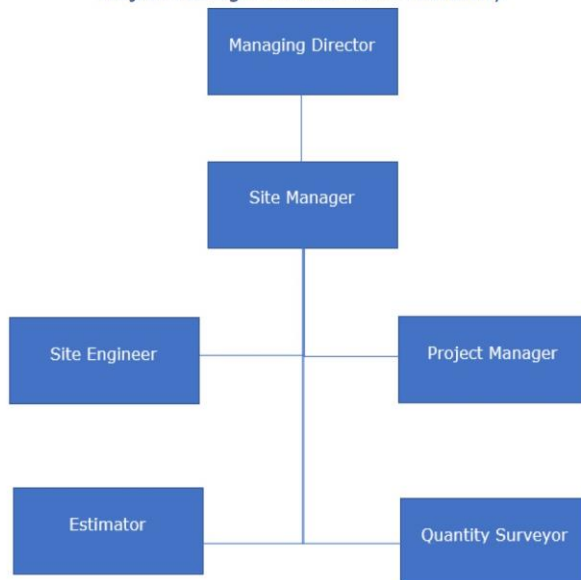
High processing and multitasking capabilities, graphics card that will support a building and structures based CAD. Project management software.

Personal Assistant

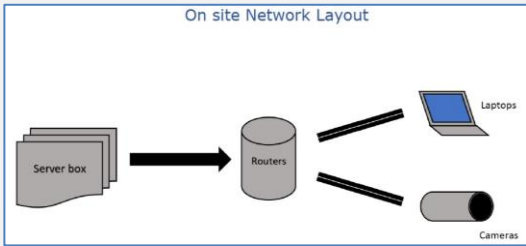
Standard Grade Hardware, scheduling software.

Managing Infrastructure and Users

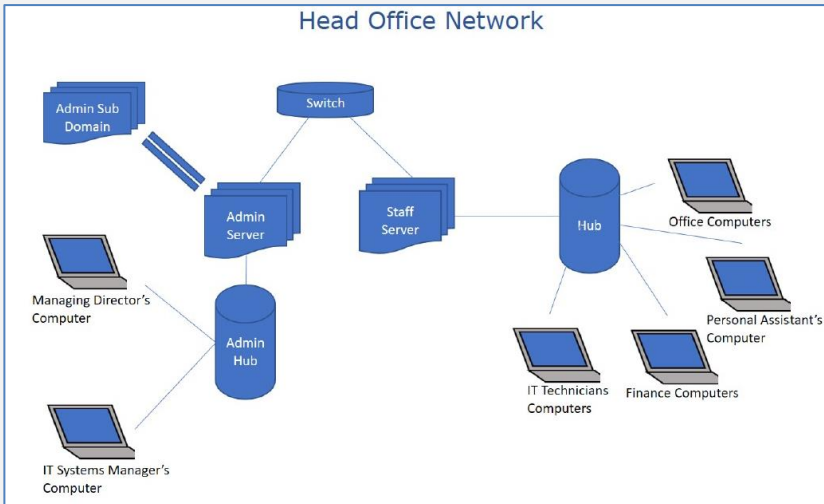
Project Management Software Hierarchy



This hierarchy works because each of the four roles below the site manager have very different responsibilities but still require the same level of access as each other for different purposes.



The onsite network as show in the above diagram will consist of a server box capable of storing vast amounts of documents and spreadsheets, as well as CAD designs. It will also be able to process live videos feed 24 hours a day. The server box will be wired via ether cable to several routers around the site, these routers will have a large range as they will be what the security cameras around the site will connect to. Member of the site team may also wish to access information on the laptops distributed at any given time so it is essential that connection to the server box is always available.



The head office network is split into two segments, Staff and Administration.

Staff

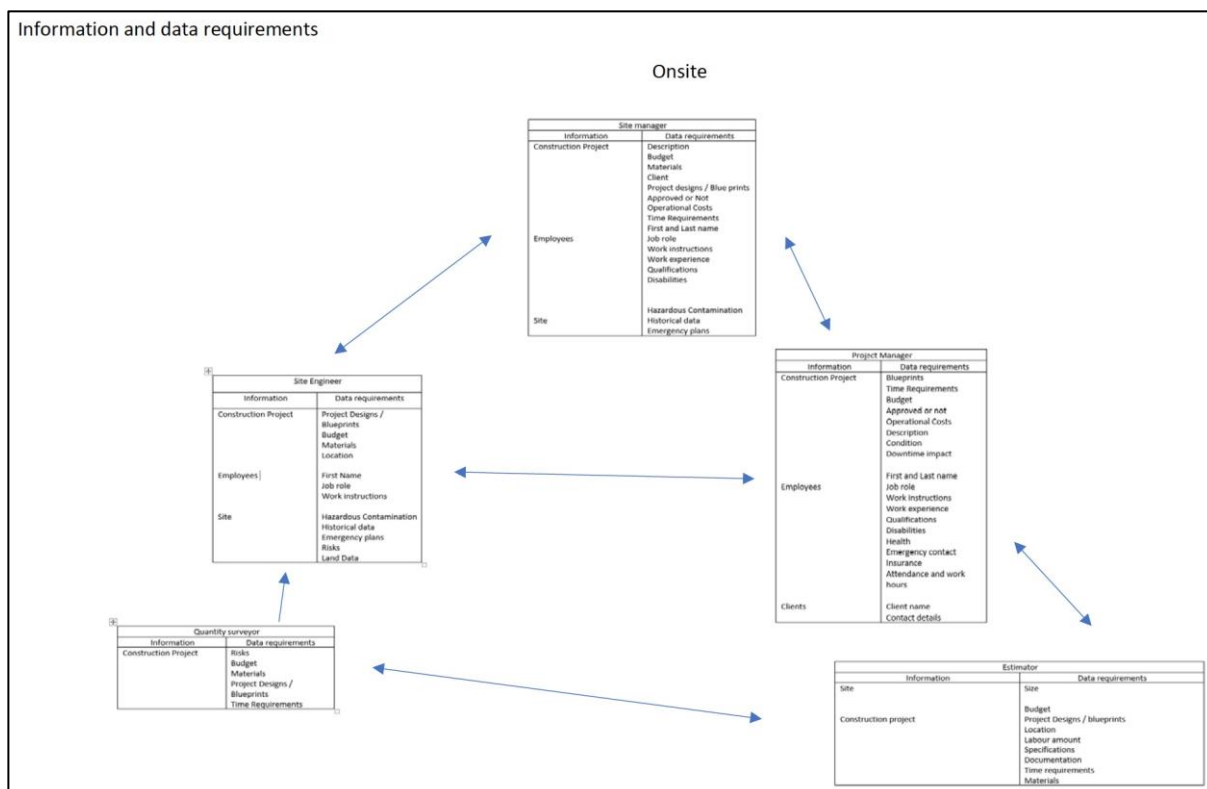
The staff part of the network spans from a single server which is wired to a Hub so network traffic and permissions can be controlled. On the staff network are the office computers, It technicians, finance department computers, Human resources and the managing director's personal assistant. The permission for each network member will varied as you don't want the receptionist's computer to have the same access as the finance managers computer.

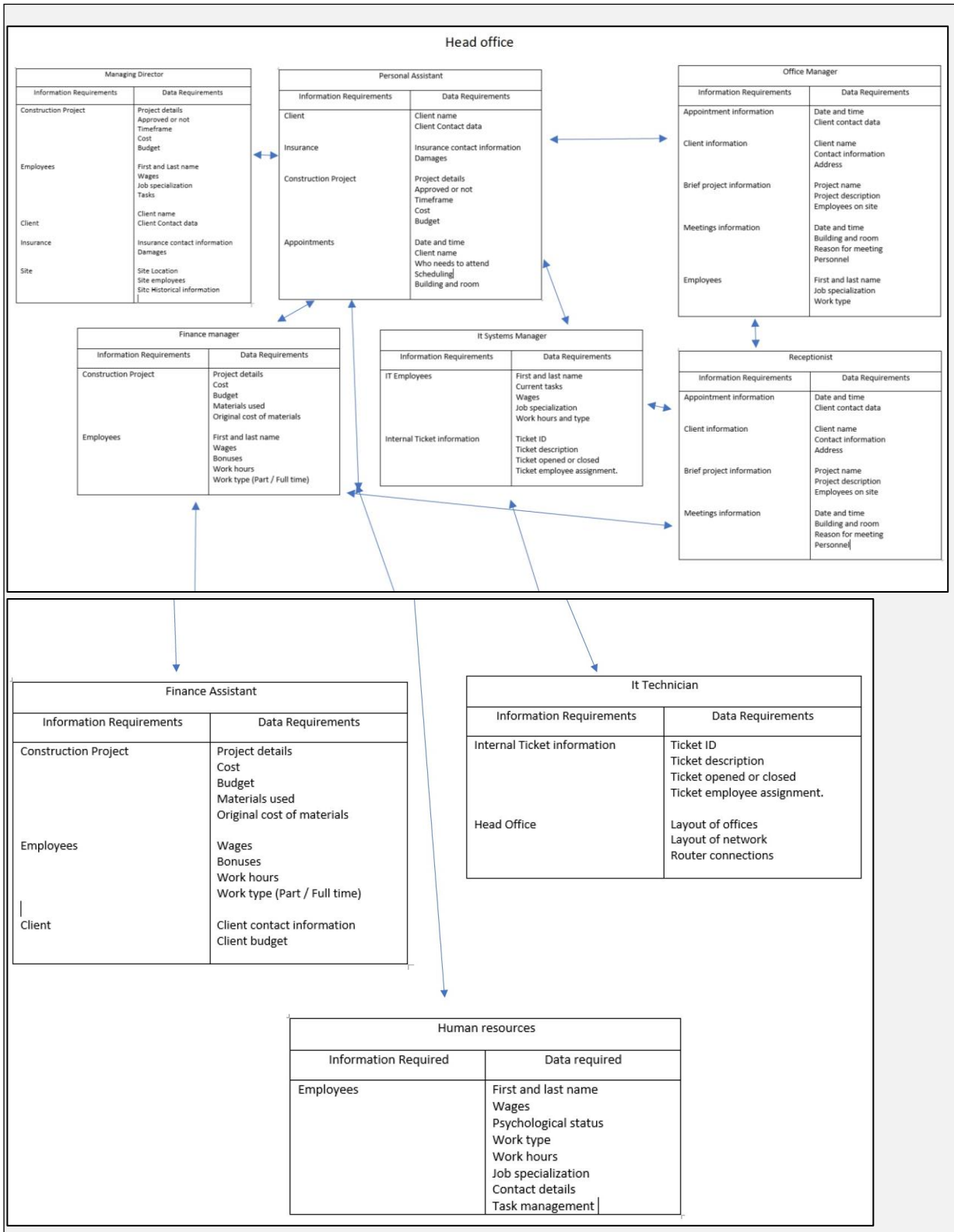
Administration

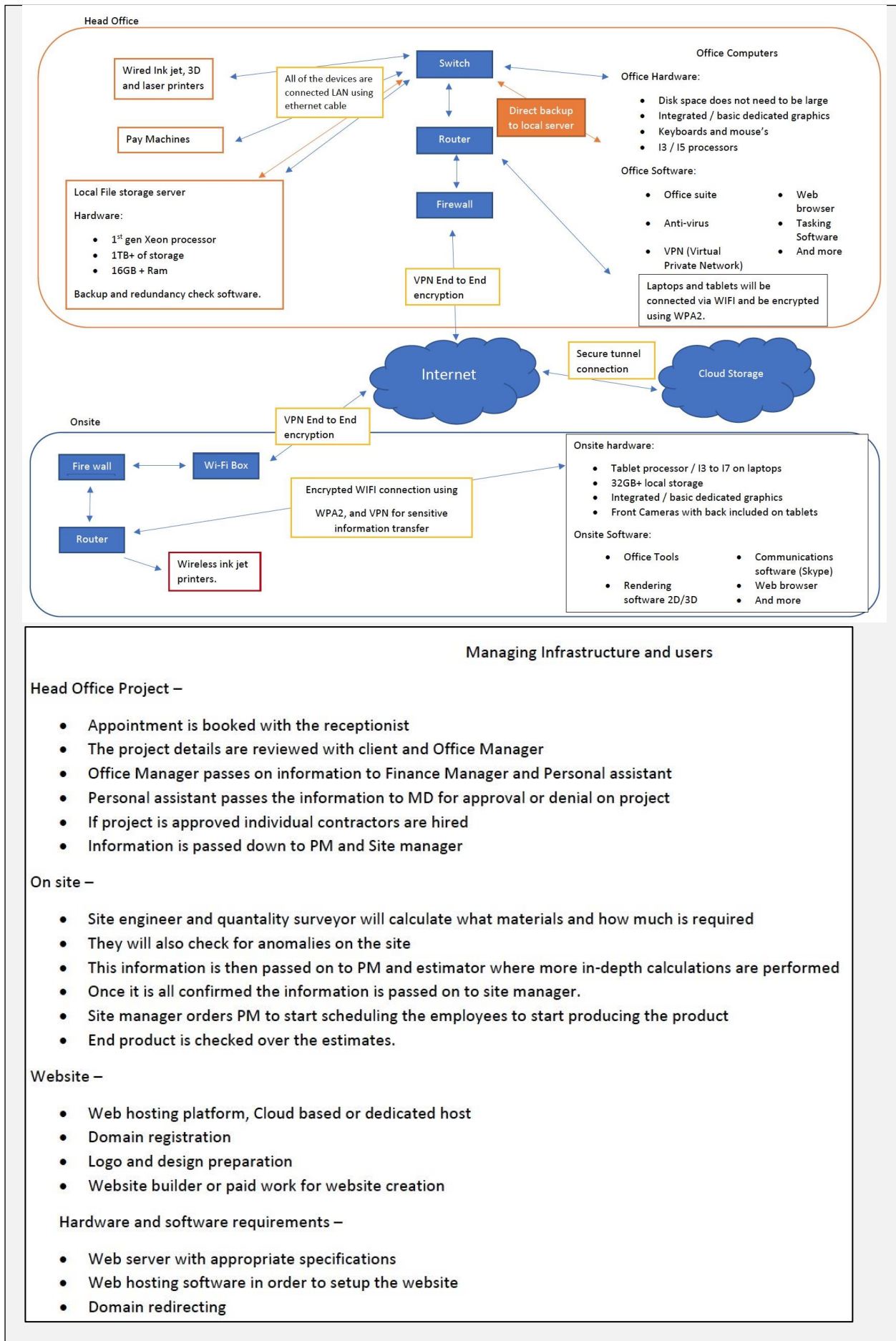
The admin side of the network consists of a server connected to a admin sub domain, used for receiving live video feed from the various sites the company is working on, a hub to control the access levels of the two devices on the admin hub. The computers on the admin hub are the managing director's computer and the IT systems manager's computer. The managing director being the top dog needs full access whereas the IT systems manager only needs enough control to maintain and administrate the network.

Learners are required to design an IT service delivery solution that meets the needs of the organisation, and this learner has provided most of the IT service delivery mapping of the solution that demonstrates mostly technical understanding of the solution.

The learner has included effective information and data requirements for the organisation as well as how hardware and software can be used to implement the solution and support users. A mostly accurate infrastructure solution diagram that shows how head office and construction sites link and communicate effectively. The learner work would fit into **Band Mark 1 (11 – 15)** in the mark scheme.







Managing Infrastructure and users

Head Office Project –

- Appointment is booked with the receptionist
- The project details are reviewed with client and Office Manager
- Office Manager passes on information to Finance Manager and Personal assistant
- Personal assistant passes the information to MD for approval or denial on project
- If project is approved individual contractors are hired
- Information is passed down to PM and Site manager

On site –

- Site engineer and quantity surveyor will calculate what materials and how much is required
- They will also check for anomalies on the site
- This information is then passed on to PM and estimator where more in-depth calculations are performed
- Once it is all confirmed the information is passed on to site manager.
- Site manager orders PM to start scheduling the employees to start producing the product
- End product is checked over the estimates.

Website –

- Web hosting platform, Cloud based or dedicated host
- Domain registration
- Logo and design preparation
- Website builder or paid work for website creation

Hardware and software requirements –

- Web server with appropriate specifications
- Web hosting software in order to setup the website
- Domain redirecting

Network Infrastructure –

- Cable layout
- Router layout (Maximum and minimum distances for WIFI connection)
- Connected devices and positions
 - Servers
 - Mobile Phones
 - Tablets
 - Laptops
 - Printers
 - Routers
 - Pay machines
 - And more
- Operating systems and versions
- Benchmarking, making sure each device is getting fair amount of bandwidth

Users –

- Users can interact with company website
- They can access their own information as well as company information on the website
- They can also modify their own information if that does not match the records
- Users can request help as well as view status on their projects

Users to Customers –

- Users will firstly enter the website and find as much information as possible
- The user will look at reviews and compare
- Then the user will get in contact with the business either using email, phone or contact form
- At that point receptionist will book an appointment.
- Once the appointment goes well and the client has provided his feedback the office will start to hire individual contractors and start managing the sites.

IT Technicians –

- It technician manager will receive an internal ticket.
- The ticket will be assigned to a capable or free employee
- At that point, the appointed technician will work on solving the issue
- Once the issue is solved the ticket is closed and the process repeats.

Activity 4

(Management report evaluating the solution)

Learners are required to evaluate the appropriateness of their IT service delivery solution for the requirements of the organisation, by reviewing requirements and making recommendations to discuss if the system recommended is effective and appropriate for the needs of the organisation. The learners should compare the recommended system to the initial organisation requirements, will it enable all staff to undertake their job roles more effectively, and are there any limitations. The evaluation report should recommend solutions to any limitations.

Rather than evaluating the solution, the learner has discussed the requirements and job roles, but has not discussed the appropriateness of the solution. The learner has identified alternative solutions and future developments; however, these are generic and all areas are not fully supported. The report itself shows an awareness of the scenario, with little justification. The learner work would fit into **Band Mark 1 (1 – 3)** in the mark scheme.

The solution designed for Buckton Construction is meant to be efficient and effective.

First, the hardware used by the main office.

All staff members will be using PCs except for the Personal Assistant and the Finance Assistant. These PCs will use ethernet to connect to the internet through the server. Ethernet is more stable than Wi Fi and allows a direct connection to the server, for faster speed.

The PCs will be equipped with suitable basic office software: Microsoft Office for word processing, spreadsheets and presentations. They will also include a webcam with integrated microphone and speakers.

The assistants will be using laptops because their roles in the organization most likely involve moving to different work stations or potentially assisting other members of staff, therefore why they need portability.

The staff members working at the Main Office will be using Skype for business to communicate. This software is especially helpful because it allows group chatting and video calling which is highly effective for meetings.

The technicians' role is executed more effectively because all staff devices share the same OS (Windows 10) and the same Office suite (Microsoft Office 2016). This means that they can troubleshoot issues more easily and solve them quicker than if everyone was using different software.

This decision was also made due to compatibility. Files shared across staff members can be easily read or modified if everyone uses the same file format.

A single, powerful server will be providing network access, website, storage and printing services for the organization. This will be accomplished by virtualizing more servers to make the previously mentioned services available. Servers are usually underused, so by using virtualisation instead of having more physical server, expenses are reduced, as well as physical maintenance.

Construction Sites

Staff working at the construction sites will need portable hardware because the location changes with every job, which is why all staff members will be using laptops.

The Site Engineer will be using a tablet as well. A tablet allows more portability and has an integrated camera which is useful to take photographic proof of the progress at the site to report back at the staff at the main office.

Devices used at the construction site will be configured to use VPN as well.

Security

The network at the Main Office will be configured to use a VPN so all traffic is encrypted and secure. The VPN will include a firewall to limit the traffic that gets through, to avoid unwanted potential security breaches. Anti-virus software will be installed in every device to protect against threats.

Devices will need credentials to be accessed and they will auto lock after an inactivity period, all to avoid unauthorized access. Furthermore, data will have different access levels so only staff that needs that data can access it.

Staff roles in solution

The first point of contact between a potential client and the organization will be the **receptionist**. They will have information about the organization, pricing and vacancies.

The **Managing Director** will be dealing with clients, making important decisions and communicating with the construction sites to check progress.

The **Personal Assistant** will be assisting the Managing Director with meetings, clients and reminders.

The **Human Resources Manager** is who will be dealing with vacancies, hiring staff and interviewing potential candidates for the vacancies. They will information about staff roles to determine which roles needs an additional member of staff.

The **IT Systems Manager** will decide what systems need changing, updating or upgrading. They will need to keep the IT systems up to date.

The **IT Technicians** will support staff members regarding issues with hardware, software or information. They will change, update or upgrade hardware and systems as told by their IT Systems Manager.

The **Finance Manager** will be analysing big data to determine what happens and what will happen with the organization's money. This role involves heavy mathematics which is why the **Finance Assistant** will be supporting the manager in his role.

The **Office Manager** will be overseeing that everyone in the office fulfils their role.

Regarding the construction sites:

The **Site Manager** will be supervising staff and making sure the work is being done.

needs to be waterproof and with long lens, to successfully identify subjects at larger distances. Along with this a night vision feature would increase the camera's efficiency at night.

For indoors an IP camera can be used. These cameras usually have an app that can be installed on multiple devices to monitor the cameras. This is especially helpful because staff members can check the footage even when not at the office.

Portable devices:

Systems can be improved by adding portability. As required, some staff members can carry a tablet or mobile phone to take photographic proof of the project at hand. This data can be later stored in a cloud service such as Google Drive so it can be accessed by other staff members. These devices can be connected to the server at the Main Office by using a VPN.

Learner has provided a partial justification of the appropriateness of the solution and has outlined appropriate alternatives for some aspects. Rationales have been provided for points discussed and the report demonstrates some logical chains of reasoning, however there are quite a lot of omissions. The learner work would fit into **Band Mark 2 (4 – 6)** in the mark scheme.

<p>The methods that I will integrate into Buckton Construction to support data and different networking protocols is integrated networking.</p> <p>The aspects that I included in my integrated network is:</p> <ul style="list-style-type: none"> • CCTV Live Feed • Portable Device • IT Support Office • Cloud Service <p>Portable Device</p> <p>The reason that I have integrated portable devices into my network is because it allows members of staff to communicate at a faster and more efficient rate. The portable device will also have features that will help the members of staff such as the Site Manager, Site Engineer, Project Manager and the Estimators on the two sites such as, navigation features like Google Maps which will help with construction. The portable devices will also be integrated with a construction software used to help the members of staff working on the sites with their jobs. The portable devices will have restricted web sites used to limit the amount of staff that will use the devices for their personal needs. The portable devices will be connected to the cloud service so that members of staff can store data anywhere. The portable devices will be provided by a third-party company because it will cost less rather than using the businesses material.</p> <p>An alternative to integrating portable devices into the network is by using devices that aren't portable such as desktops. Desktops would be an appropriate alternative because communication features would be more advanced, and the construction software would be faster to use it. The disadvantage is that it is only located at one specific point and can not be carried to different areas like portable devices.</p> <p>CCTV Live Feed</p> <p>The reason that I have integrated CCTV Live Feed into my network is to provide added security around the vicinity. This will provide proof of criminal activities</p>	<p>taking place around the business. The CCTV Live Feed will be connected to the Cloud Service through a VPN to send data securely. The IT Support Office will monitor the CCTV Live Feed and will have full access to the Cloud Service to see footage of what's going on around the building. The CCTV cameras will be placed around parameters to see all angles.</p> <p>An alternative for CCTV Live Feed is the hiring of security guards. An advantage of having security guards instead of CCTV Live Feed is that it is less expensive because it doesn't require the need of Cloud Service data storage and they don't need to be monitored by a system that would cost additional money. A disadvantage of security guards is that they get tired meaning they would need to be replaced by another security guard. This would increase the chance of criminal activities because there will not be someone monitoring the surroundings at all time. Another disadvantage is that security guards aren't able look at all angles at a time and even if they did, they would stop monitoring one area to watch area. Another disadvantage is that security guards aren't reliable since they aren't being monitored by someone else.</p> <p>IT Support Office</p> <p>The reason for adding an IT Support Office which will contain IT professional into my integrated network is to provide the aspects around the business such as the CCTV Live Feed, the Server, the Cloud Service, the two sites (Site A and Site B) and the hardware and Software such as the Portable Devices additional support. The IT Support Office will monitor the CCTV Live Feed 24/7 to provide footage of activities in the building, maintain, monitor and upgrade the Server to provide members of staff with features to complete task, monitor the Cloud Service by seeing what data is being stored by members of staff and provide a VPN connection to make data transmission more secure rather it be: sending an email or storing data.</p> <p>An alternative to an internal IT Support Office would be an external IT Support Office that will do the task of an internal IT Support Office but provided by a third-party company. An advantage of an external IT Support System is it is cheaper because it is an IT Support System that is provided by a different company meaning the company won't need to spend as much on purchasing IT Support equipment. A disadvantage of an external IT Support System is the level of privacy that will be provided.</p>
<p>Cloud Service</p> <p>The reason for integrating a Cloud Service into my integrated network is because it provides privately accessed and stored data anywhere in the world if there is an internet connection and a VPN is installed. This will be monitored by the IT Support Office, so they know what data is being accessed, reviewed, edited, deleted and stored.</p> <p>An alternative to Cloud Service is a WAN network (Wide Area Network) which is a server that connects to multiple desktops through an ethernet cable. An advantage is that ethernet cable makes transmission of data more secure because it is directly connected to a station. A disadvantage is that it cannot be accessed from anywhere and can only be accessed from one specific area.</p> <p>Overall</p> <p>In my opinion, my first option solutions/Integrations are the most efficient and safe way when running a day-to-day business.</p>	

Activity 5

(IT service delivery implications report)

Learners are required to analyse the implications of managing IT service delivery for the requirements of the organisation, by considering how the implications will affect the organisation.

The report demonstrates limited reasoning that shows minimal awareness of the implications for the organisation; the learner has discussed the changes rather than any implications. The learner work would fit into **Band Mark 2 (4 - 6)** in the mark scheme.

Implementing your solution and delivering the organisation's services and products

There will be 4 main changes to the new solution for the network. Firstly, the communication between staff is now implemented through the use of modern technology. They will each be allocated mobile devices, each device is dependent on the personal's role in the organisation. Each member of staff on the construction site will receive these. To prevent data from being taken out of the organisation and or copied they have to return the device each day before they are able to log out. The mobile devices are provided by a 3rd party company and the network manager is in charge to ensure the devices are set up for each user along with having to make sure the 3rd party doesn't have access to any data. The mobile devices serve multiple purposes some of which is related to other changes made to the organisation's infrastructure. The other purposes are as followed but not limited to being able to now access the central storage straight from their mobile devices. This means they are able to update records and access files that may be needed in real time. They are now also able to work together with collaborative working so when they use the devices to write reports, they are able to work on the reports together and thus save time and money.

The next major change was introducing CCTV system for the site managers. This was brought in as surveillance system that is now installed in all sites. These are controlled and viewed by the site manager. The manager is only able to view the footage for their own site. The CCTV is accessible to them 24/7. The storage of each footage is stored in an off site server located in the head office. They would have to use a VPN to access the server securely. Each manager will only have access to their own sites footage. This is due to it being inappropriate to the other construction sites footage.

The storage system for the organisation will now be cloud based. The reasoning for having this is due to the fact that there will always be two construction sites and the sites will change every time a new project is started. Having a normal in-house server will not fulfil this need as the workers on the construction site will be unable to access these files. Also it would mean that they would have to use desktops to connect to the network and each site would have to have its own network. This would cause multiple issues as desktops would be long and difficult to set up at the construction sites. There's also a risk of it being destroyed. For this reason it would more appropriate to have a cloud based storage as its centralised so everyone can access it. It also reduces data

redundancy.

The other manager change was having two server systems instead. Confidential files are now stored on a spare server that is located in a secure room in the head office. The server is connected to the network but is hidden to the rest of the network. This is to ensure that if anyone does manage to get into the cloud network without any authorisation they are unable to see the most important and confidential files. This also applies to staff that work for the organisation. It removes the chance of an employee attempting sabotage and or theft of data as they will not be able to access this server. This server will be kept secret to keep any staff members attempting to access the server.

Back-ups for each server will also be created offsite. There will be routinely backups done every day after office hours to ensure that if for some reason data is lost from the main servers. This is to ensure that no data is lost for projects as in the case it is lost, then projects will have major setbacks. This would have a huge financial impact on the organisation as all documentation would have to be started from scratch. Thus halting the progression of the construction. Clients can be lost along with their reputation.

Managing and supporting users

Each client will receive a username and password for a VPN. This will allow them to access the projects files for their project. It will let them see the reports created by each staff from the construction site. The site manager will have to ensure that the files are updated routinely for the client to see the updates on the project. They are also able to communicate directly within a chat directly with the project manager to get constant updates and to ensure that everything is going according to plan.

Managing and supporting the organisation's employees

Each user initially will be given a mobile device which will have a unique password to them. The phone is fitted with GPS to ensure they don't accidentally take it off site and if they do they alerted instantly and have to return the device. Each user will also have an organisation email which they use to access the cloud service. They are only able to access the cloud through the devices which are authorised. These would include the computers and devices in the head office along with the portable device given to each staff member on the construction site. Each user in the head office will have desktops and will be able to use their work email to log into the system. The work email can only be opened on authorised devices such as the mobile device they are given and their desktops if they work in the head office. This disables the feature of staff working at home but will increase security and will ensure that they are unable to take any documents from the organisations network.

Each user when starting off in the organisation, will have a tutorial videos that they are able to use to know how to use the system after the initial introduction. This saves money on having each staff being trained. It will also allow the staff to go back over the videos if they are later confused on how to use the system for a particular task.

Managing the organisation's IT assets

Each asset should be logged into a database. This can be done through various software or using a database set up. Having a database would be more appropriate but will require an expert in databases. This can be done by the network manager or a specialist hired to create the database. The IT technicians can then be trained to maintain this along with support from the network manager. All the devices should be noted down along with what employee received them. There should be serial codes written down to ensure that each employee's device can be identified. This could be unique codes created or just using the MAC address on the system. The devices have to be returned each day. To do this they have to use NFC (near field communication) and leave it designate spots. This will then automatically pick up what users have left their devices and what haven't. Alerts will be sent out if the device is taken. If there are lack of equipment this can cause issues and slow down the production rate of the building. To insure enough resources are given, all resources should be in a database along with what site it's currently being used in and if its job is finished and is required at the other site, transportation should be accommodated to move the equipment. Any computer hardware should also be delegated based on the staff's priority in the project. For instance

Ability to respond to changes in the aims of the organisation, and the products and services it provides

The organisation should be able to freely be able to change their aims. This could include if a client wishes for a building or service that the organisation has never done before. An example is a statue being put in place, whereby they have never done this before. Within the budget new allocation should be made to ensure that new architects are hired that have experience in this area along with the correct staff. Old staff can also be trained into learning new techniques that can provide assistance if they ever have to change the services that they offer along with any products. This training can come from specialists. Although it is expensive to hire these specialists its more guaranteed the staff will learn more as they are specialised in that area of expertise and thus allow for the staff to have a more in depth knowledge along-side this expert. This could include having more staff having an understanding of databases or how to run a server and this will be cost effective in the long run as more staff are available for more daunting tasks. This means in future less experts will have to be hired as staff on site will have the necessary training and can also train new staff if required. The training may require legal certificates for the staff to be implementing these new roles and therefore, correct examinations should be taken to receive these qualifications to ensure that the organisation stays within the parameters of the law.

The implications report demonstrates appropriate consideration of the implications of the solution, giving an understanding of the organisation's capacity to respond to change. The report demonstrates logical chains of reasoning that shows an awareness of the implications for the organisation. The learner work would fit into **Band Mark 3 (9 – 12)** in the mark scheme.

Implementing your solution and delivering the organisation's services and products

The implementation of my solution may cause unfamiliarity depending upon the devices and IT services that are currently implemented by Buckton Construction and this may in turn result in the requirement of staff training for new hardware and software.

The introduction of cloud services may introduce new security issues which will have to be addressed in company policies such as ensuring that staff members are keeping their login credentials safe, are using strong passwords and changing them frequently. Whilst ensuring that loss of personal devices containing access to company storage is reported in order to mitigate the issue.

The service will be high costing, as a result of high end portable devices and licences, therefore depending upon Buckton Constructions budget for IT service upgrades, some services may not become possible and an alternative solution may have to be made.

With the introduction of cloud storage, the company must comply with legal legislations which ensure that data is held correctly such as the data protection act 1998 and the new GDPR legislations which are going to be enforced in the future.

Depending upon site locations, the network option provided may not be the best fit. In some areas, signals for 4G connectivity are limited and an alternative solution may be better since signals may be stronger such as satellite internet.

Downtime may also become an issue, with 4G LTE broadband, availability may not be as reliable and power outages may occur, this will result in the failure of the IT service as it is highly reliant upon broadband connectivity to gain contact to head office and cloud services.

Managing and supporting users

Users may find it difficult to adapt to the new service with the introduction of new devices and services, therefore training will be available for all members of staff to teach them how to use the new devices and software that has been implemented into the organization.

Monitoring of services should be in place and permissions should be set on user accounts to prevent exploitation of user access. For example, a construction worker will not require access to confidential information stored on One Drive but may need access to plans – therefore he shouldn't have permission to access these folders.

There should be restrictions put in place on the local network to ensure that the workers are not using the portable devices to access none work related services such as social media, this can be blocked in web filtering to manage users access. Devices should be properly made available as users should have access to devices when they require them, there is no need to provide all members of staff with portable devices but rather provide them on demand, this reduces costs and manages availability of the devices.

Office 365 package provides users with familiarity of software, proving for better usability of services. Since this software suite is proprietary, there is a huge community behind the software which provides online resources for learning materials and templates so that staff members can take their own initiative when it comes to meeting a roadblock. The software should become familiar to the user due to its consistent layout.

Managing and supporting the organisation's employees

To support the organizations employees, lawful practices must be followed, including;

- General Data Protection Regulations (GDPR) 2018 must be implemented to ensure that any staff personal details are correctly stored and managed.
- Computer Misuse Act (CMA) must be enforced on all company computers to prevent permission exploitation and general misuse of company devices.
- Depending upon the implementation of these services, the Data Protection Act (DPA) 1998 will still be enforced, therefore it's important that the company complies.
- Copyright Protection legislations may become an issue if staff members are copying software such as CAD over to personal devices with the aim to work from home – this must be addressed in company policy to prevent the manipulation of software provided on company devices with company licences.

To manage the organizations employees;

- Staff user accounts should be made and distributed with correct privileges, this includes both office 365 logins and head office logins. For example, not all employees should have access to confidential folders held in management storage accounts.

- The storage of confidential data to One Drive must be addressed in company policy, with the requirement of data encryption to keep data secured on servers that isn't held on company servers.
- Employee's personal details will be held in a company database to ensure that jobs are recorded and staff details are properly managed, this data must be lawfully and securely held under the GDPR. AWS provides built in security to its services.

Managing the organisation's IT assets

The management of IT assets will involve the provision and maintenance of implemented services, including:

- Updates that must continuously be scheduled and implemented so that devices are fully secured and compatibility is fully up to date, this is important for devices that are running windows (surface series laptops) as frequent updates are made to improve security and patch vulnerabilities.
- Security must be maintained on all devices and software services, to prevent misuse and potential attacks. This may involve frequently planned changes of passwords, or as mentioned above, consistent updates of device operating systems.
- Backups should be consistently made by the organization for local services such as video and audio storage servers, however backups are already handled by Microsoft with One Drive.

However, during the management of IT assets implications may occur, which include:

- Owning high costing devices and handling them in a construction site may be prone to human error. Any damage to portable devices will require repair or replacement which will have high costs involved. Buckton Construction may not have the budget ready to immediately replace high costing devices. It is important that all portable devices are fitted with reinforced cases to reduce risks.
- Network downtime will result in services which become unreachable, for example, cloud services rely heavily on an internet connection to function so during down time, staff will not be able to store or access files. This is also the same for communication services such as Skype and Slack as they require an internet connection to function correctly.

Ability to respond to changes in the aims of the organisation, and the products and services it provides

If Buckton Construction decides to change its aims and the products and services it provides, my IT solution can always be altered, this is because I have used a range of different services. Cloud services don't have much impact when it comes to the cancellation of the service, however local infrastructure may

have a large impact in terms of discontinuation of the service.

My choice to implement a cloud service for both database and storage will allow for adaptability and flexibility. These services are scalable and the service can be cancelled at any time with minimal impact, to replace the system is a matter of replacing the old with the new. In other words clearing storage and replacing it with a new folder structure or database.

However, when it comes to changing the other services such as the website or portable devices, negative implications may occur. For example, to change the website the company will have to contact the website developer in order to make changes and to change the devices used – the company may have to dispose of high costing systems even though I trust that these systems can be highly adaptable to changes as they are multi-functioning.

Therefore, I would say that my service is widely adaptable to changing company requirements as the services are mostly capable of being multi-purpose and therefore there should not be a high impact from change to company aims, products or services.

Summary

Based on performance on this paper learners should:

- Ensure they cover all aspects of the scenario, such as head office personnel and construction site personnel, to enable them achieve marks in the higher mark band ranges.
- Apply knowledge and understanding to a variety of sectors. The paper will always contain the same five activities with just a different sector.
- Learners should be encouraged to practice writing evaluative reports for other areas of study.
- Learners should develop a better understanding of 'implications' to ensure they do produce an evaluation instead.

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