NHS National Services Scotland

Scottish Health Planning Note 00-07: Resilience planning for the healthcare estate

Health Facilities Scotland
Engineering and Environment

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Preface

About Scottish Health Planning Notes

Scottish Health Planning Notes give 'best practice' guidance on the design and planning of new healthcare buildings and on the adaptation/extension of existing facilities.

They provide information to support the briefing and design processes for individual projects in the NHS building programme.

Other resources in Health Facilities Scotland

Scottish Health Technical Memoranda

Scottish Health Technical Memoranda give comprehensive advice and guidance on the design, installation and operation of specialised building and engineering technology used in the delivery of healthcare (for example medical gas pipeline systems, and ventilation systems).

They are applicable to new and existing sites, and are for use at various stages during the inception, design, construction, refurbishment and maintenance of a building.

All Scottish Health Planning Notes should be read in conjunction with the relevant parts of the Scottish Health Technical Memorandum series.

Scottish Health Technical Memorandum Building Component series

All Scottish Health Planning Notes refer to Scottish Health Technical Memorandum Building Component documents for specifications and design guidance on building components for healthcare buildings. All Scottish Health Planning Notes should therefore be read in conjunction with the relevant parts of the Scottish Health Technical Memorandum Building Component series.

Activity DataBase (ADB)

The Activity DataBase (ADB) data and software assists project teams with the briefing and design of the healthcare environment. Data is based on guidance given in the Scottish Health Planning Notes, Scottish Health Technical Memoranda and Scottish Health Technical Memorandum Building Component series.

Room data sheets provide an activity-based approach to building design and include data on personnel, planning relationships, environmental considerations, design character, space requirements and graphical layouts.

Schedules of equipment/components are included for each room, which may be grouped into ergonomically arranged assemblies.

Schedules of equipment can also be obtained at department and project level.

Fully loaded drawings may be produced from the database.

Reference data is supplied with ADB that may be adapted and modified to suit the users' project-specific needs.

For further information please refer to the Health Facilities Scotland website: http://www.hfs.scot.nhs.uk/

How to obtain publications

To find out about HFS publications that are currently published, look at the Health Facilities Scotland website: http://www.hfs.scot.nhs.uk/online-services/publications/

Executive summary

Scottish Health Planning Note 00-07 provides guidance on developing NHS facilities that are resilient to a range of threats and hazards. Resilience is the ability of the building and its services to withstand the impact of an incident or emergency.

The Scottish Health Planning Note 00-07 provides:

- a strategic approach to resilience planning;
- technical guidance on measures to enhance resilience.

The Scottish Health Planning Note 00-07 is relevant to the whole NHS estate, including private sector premises providing NHS healthcare or other services to the NHS. It is applicable to both new schemes and existing facilities.

The guidance is based on the Integrated Emergency Management model, which is the UK's national approach to emergency planning. The model aims to help identify threats and hazards, assess the associated risks, develop measures to mitigate those risks, and to prepare plans for responding to an emergency should it occur.

Resilience issues should be considered early in the procurement process. The measures required to achieve resilience should be incorporated into the project brief. Design proposals should then be reviewed to assess whether the level of resilience proposed meets the requirements set out in the project brief. Appendix 2 gives examples of questions that may be posed when assessing designs.

The Scottish Health Planning Note 00-07 gives technical guidance on a wide range of measures to enhance resilience, including architectural features and the design of engineering services such as electricity, water and ventilation.

1. Introduction

Purpose and scope

1.1 Resilience, in terms of the built environment, is the ability of a building or engineering installation to withstand the impact of threats (man-made with malicious intent) and hazards (man-made or natural, without direct malicious intent).

1.2 Scottish Health Planning Note 00-07 provides guidance on assessing, developing and implementing resilience in the NHS. It aims to help NHS bodies to determine an appropriate resilience level for a site, building or installation against a range of threats and hazards, with particular reference to threats originating from terrorist operations and their impacts and consequences. It provides:

- a strategic approach to resilience planning (Sections 2 and 3);
- technical guidance on measures to enhance resilience in NHS facilities (Sections 4 and 5).

Key points in each section are summarised in boxes throughout the document.

1.3 The guidance in this document is consistent with the UK Government standard threat and risk assessment and emergency planning doctrine. This ensures an approach that is consistent with other public bodies, while allowing NHS bodies to preserve the unique requirements of the Health Service.

1.4 Scottish Health Planning Note 00-07 is issued as 'best practice' guidance for all NHSScotland organisations, and those who advise and support them. It is relevant to the NHSScotland estate, as well as private sector premises and buildings servicing NHSScotland requirements, such as the extended family of clinical service delivery organisations and their associated supply chains. The guidance should be considered in the planning and briefing of new schemes and in the operation and development of the existing estate.

Cost impact

1.5 Implementing the guidance in this Scottish Health Planning Note is not expected to add any significant cost to the majority of schemes. However, this will depend on the mitigation of any risks identified. For further guidance on costs, refer to paragraphs 3.16–3.17.

The need for guidance

1.6 The Civil Contingencies Act 2004 (CCA 2004) Sec 2(1)(c) requires NHS Boards as Category 1 Responders to "*maintain plans for the purpose of ensuring, so far as is reasonably practicable, that if an emergency occurs, the body is able to*

continue to perform its functions." All NHS organisations should be aware of their obligations in relation to emergency planning:

> *"The aim of emergency planning within NHSScotland is to ensure that essential health care needs are met effectively when normal services become overloaded, restricted or non-operational for whatever reason."* (The National Health Service in Scotland Manual of Guidance: Responding to Emergencies, paragraph 1.4.) – This document is currently under review.

1.7 For further details on the legal duties of NHS organisations, refer to Appendix 1 of this guidance.

1.8 Scottish Health Planning Note 00-07 supplements the 'The National Health Service in Scotland Manual of Guidance: Responding to Emergencies' with particular advice on the planning, design, construction, commissioning and operation of NHS facilities to assist in ensuring NHS compliance with relevant legislation and UK Government policy.

Related guidance

1.9 Scottish Health Planning Note 00-07 deals specifically with the functions of individual healthcare facilities, with particular reference to the estates and facilities management communities under circumstances of degraded or threatened operations.

1.10 Further guidance related to Scottish Health Planning Note 00-07 is contained in:

- Scottish Health Technical Memorandum 00 – 'Policies and principles' – which deals specifically with the principles of engineering services in NHS facilities, including emergency preparedness and contingency planning. Other Scottish Health Technical Memoranda in the series provide specific and detailed engineering guidance;
- 'The National Health Service in Scotland Manual of Guidance: Responding to Emergencies' – which deals specifically with the strategic external and healthcare functions of NHS facilities generally and their coordination with other responders, service to patients and delivery of medical services under circumstances of degraded or threatened operations;
- 'Counter Fraud and Security Management Service Manual' ('CFSMS Manual') – which deals specifically with the security and safety of NHS staff, patients, assets and facilities under all circumstances (restricted access to Departmental Security Officers (DSOs) within the Department of Health).

1.11 Additional guidance may be obtained from the following limited-access documents (held by DSOs within the Department of Health):

- 'Counter-Terrorist Protective Security Manual';
- 'Manual of Protective Security'.

1.12 Informed advice on any aspect of security, resilience or emergency planning may be obtained from:

- strategic co-ordinating groups (SCGs);
- police local counter-terrorism security advisors;
- police architectural liaison officers;
- council emergency planning officers (CEPOs);
- Health Emergency Planning Team, Scottish Government Health Directorates;
- Scottish Ambulance Service National Risk & Resilience Department;
- Centre for Protection of National Infrastructure (CPNI[1]).

1.13 Advice from any of these sources should be sought through the NHS organisation's Emergency Planning Lead (EPL) to ensure a consistent and co-ordinated approach to planning.

Intended audience

1.14 Scottish Health Planning Note 00-07 is relevant to any premises in which NHS services are delivered, and will involve:

- emergency planning teams;
- estates and facilities managers;
- engineers, architects and designers or others with a responsibility for technical input and support;
- clinicians;
- private-sector equivalents to the above providing services to or on behalf of the NHS;
- NHS general management and those executives with security and/or emergency planning portfolios;
- commissioners of new buildings and refurbishments, and strategic health authorities;
- NHSScotland Boards

Note: CPNI was formed from the merger of the National Infrastructure Security Co-ordination Centre (NISCC) and a part of MI5 (the UK's Security Service) the National Security Advice Centre (NSAC); www.cpni.gov.uk

2. The strategic approach to resilience in the NHS estate

Introduction

2.1 This section explains how to estimate the level of resilience required in a facility and how to develop an appropriate emergency plan. It provides a straightforward approach to emergency planning, using a standard UK model known as the Integrated Emergency Management model. The model can be applied to small and large premises. It brings together the diverse legislation, regulations, standards and guidance that apply in this area. The guidance in this section does not, however, replace any law, regulations or extant Scottish Health Planning Notes or Scottish Health Technical Memoranda.

Definitions

2.2 For the purposes of this guidance the following definitions apply:

NHS facility – all buildings, infrastructure, equipment, plant, embedded systems and related items that support the delivery of healthcare and services of all types, irrespective of their ownership or operation by third parties[2].

Note: Although private healthcare providers and other suppliers do not have specific obligations under the Civil Contingencies Act 2004 (CCA 2004), contracts that NHS organisations place with them for facilities' use, support or services may create subordinate consequential requirements.

Resilience and resilience management – all activities undertaken to give NHS facilities the capacity to anticipate, prevent, prepare for, respond to and recover from disruptive challenges that would otherwise prevent the organisation from meeting its primary duties. The terms subsume 'business continuity management'; 'emergency planning and/or management'; 'risk management'; and their derivatives. Where appropriate, the singular term "resilience" is used throughout.

Emergency – the CCA 2004 defines an emergency as "*an event or situation which threatens serious damage to human welfare in a place in the UK, the environment of a place in the UK, or war or terrorism which threatens serious damage to the security of the UK".* It subsumes the term "major incident" used within the NHS.

Integrated Emergency Management model

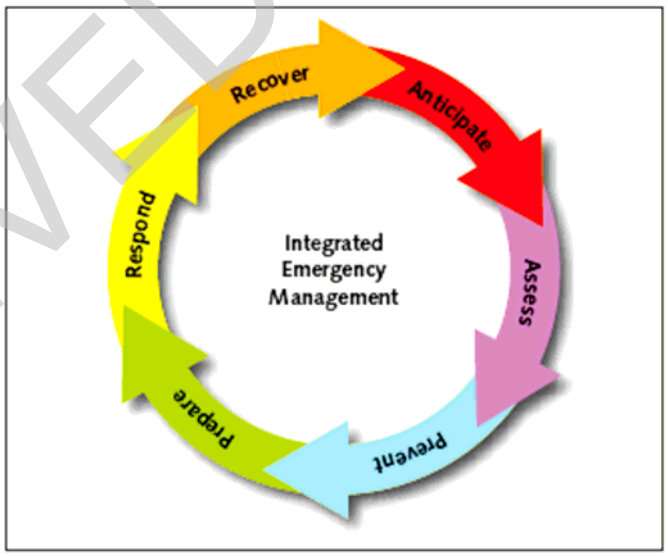
2.3 The Integrated Emergency Management (IEM) model is a UK national model. It is described in 'Preparing Scotland: Scottish Guidance on Preparing for Emergencies' published by the Scottish Government Civil Contingencies

Division (see note below). Although there are other approaches to emergency management, the IEM model is adopted here because it:

- implements the common and consistent UK national model for the anticipation, assessment, mitigation and management of physical risks to the health environment;
- defines a common set of words and processes, thereby minimising the risk of misunderstandings;
- facilitates the integration of site and event-specific risk assessments and plans into the wider risk and emergency arrangements of other involved agencies;
- provides common ground for effective discourse between the organisations directly involved, the emergency services, and the many external agencies that may become engaged (with varying degrees of intensity) at different stages of any event or emergency.

Note: Refer to http://www.scotland.gov.uk/Publications/2006/02/27140215/0

2.4 The IEM model is a series of processes. It is essential to view the elements as mutually supporting processes and not as sequential steps, as the first four of the six are continuous connected activities.



1. Anticipate
2. Assess
3. Prevent
4. Prepare
5. Respond
6. Recover

IEM processes 1 and 2: Anticipation and assessment

2.5 The nature of the processes of anticipation and assessment make it simpler to consider them jointly. They include scanning the environment within and beyond

the facility in order to identify the threats and hazards, and then examining them in order to establish the likelihood, impact and warning indicators. Anticipation and assessment should start even before the facility is designed and built – that is, at the conceptual stage – but should also be introduced into an existing facility when resilience issues and emergency plans are being reviewed. The process should be repeated continuously until the facility is eventually decommissioned.

Box 1: Anticipation and assessment – the principles

The anticipation and assessment of business continuity and emergency risks will be an integral part of the wider risk management process and should be conducted within the following guiding principles:

Accountability

In an NHS organisation the responsibility for the resilience of facilities rests with the Chief Executive, who may delegate specific tasks to a director responsible for estates and facilities at Board level.

Clarity

Delegations, roles and reporting lines should be clear, formally recorded and embodied in job descriptions. Any changes occasioned by reorganisation or movement of personnel should be implemented at the same time and not after the event.

Coordination

Managers should co-ordinate all risk-related activities closely, otherwise the probability of incoherent and ultimately defective activity increases. There should be the closest possible liaison between estates and facilities managers, clinicians, health and safety managers and the EPLs, in order to ensure that they are working within a common and regularly reviewed risk assessment, consistent assumptions and an integrated planning process. That requirement should extend across NHS Board boundaries if appropriate.

Box 1: Anticipation and assessment – the principles continued

Coherence

If risk management is to be effective, actions should be balanced and coherent across the whole organisation, and matched to the corporate risk assessment. It is important for managers to understand that their actions may displace risk from their domain to another part of the organisation, which in turn could present the recipient with an unexpected consequence and the organisation with a serious problem. Changes that may appear minor can have disproportionate unforeseen impacts extending beyond the function or facility. Managers should therefore evaluate the impact of any decision that may change the risk environment and context before implementation; explore the consequences and possibility of displacement with stakeholders; and record the changes in revised documentation and instructions and incorporate in any training/exercises.

Continuity

All activities and compliance surveillance should be continuous, should work to clearly defined and documented processes, and should include regular independent audit.

Culture

The effective management of resilience requires leadership at every level to promote a culture of robustness and disciplined behaviour. Without cultural pressure on behaviour, systems will fail.

The wider risk context

2.6 NHS facilities also form part of a wider risk context and are exposed to threats and hazards that may originate at the local, regional or national level. As a result they will usually feature in the deliberations of a Strategic Co-ordinating Group (SCG), which provides the first layer of Scotland's integrated resilience structure. NHS Boards are represented on the SCG, by their Chief Executive or other Executive Director, supported by an EPL. NHS Board and SCG boundaries are not necessarily contiguous, and so it is possible that NHS Boards may be providing and receiving information to and from more than one SCG. Special Health Boards e.g. Scottish Ambulance Service will be represented on each SCG, but may have to co-ordinate it's response through their strategic co-ordinating centre (SCC) during an incident requiring national response and co-ordination. For a detailed description of the role, composition, responsibilities and operation of SCGs refer to Preparing Scotland: Scottish Guidance on Preparing for Emergencies, Section 2, Chapter 2.9. http://www.scotland.gov.uk/Publications/2006/02/27140215/11

2.7 The SCG provides NHS Boards with:

- an effective means for discussion of risk with other Category 1 responders and partner organisations through the medium of the Community Risk Register that the SCG maintains (see Appendix 1 for description of category 1 responders). This is the primary route towards achieving the external aspects of co-ordination and coherence described above; and
- information about wider threats and hazards from the national risk assessment process. This process brings together the inputs of local risk assessments such as Flooding Liaison and Advisory Groups, local authority emergency planners and the work of national agencies such as the intelligence and security services, the Met Office and the management of critical national infrastructures. It includes terrorist threats and large-scale hazards originating beyond the SCG's area, and brings perspectives otherwise unavailable to local NHS executives. Most importantly it provides an authoritative view of the likelihood and impact of the full range of threats and hazards that may arise in a NHS Board's area of responsibility, and thereby the priorities for planning and remedial actions. The national risk assessment works within a continuous cycle, and it is updated whenever significant changes are identified. For security reasons, sensitive terrorist-related information is disseminated on a 'need-to-know' basis, but NHS EPLs may be able to obtain more detail through the police representative on the SCG as required.

2.8 Leadership and mutual responsibilities should be defined, agreed and documented. Each NHS organisation should engage fully with the key external agencies to ensure that all emergency plans are coherent and cohesive.

Threats

2.9 The threat level can change rapidly. Managers should secure regular threat assessments and advice from the SCG and/or the local risk assessment group through the EPL. They should then ensure that they disseminate the information to all those within the facility who need to know, adjusted to suit their needs. Where necessary and appropriate, they should seek technical advice on the protective mitigation measures that are described in more detail in Section 4 of this guidance.

Hazards

2.10 The basic hazards that may impact on a facility are not unique; indeed, most are commonplace – such as fire, flood and failure. Not all hazards originate from an event on the site. The overloading of facilities as a result of an incident occurring elsewhere is a hazard that in turn creates risks. Extended supply chains and high levels of out-sourcing combine to introduce new risks that can emerge or change rapidly. The key point is that a complex organisation is vulnerable to both external and internal risks, and especially to compounding effects between them. Risk is not a static phenomenon: once a stimulus changes the risk environment or equilibrium, all other risks change dynamically.

The more complex the environment, the more rapid the change. Other hazards are described below.

Service failure

2.11 The continuity of technical services in facilities delivering NHS services is both a safety-critical issue and a key management responsibility. In accordance with Scottish Health Technical Memorandum 00 all healthcare facilities should have arrangements for technical service continuity. The additional dimensions that this guidance introduces and which require consideration and planning include:

- the possibility of overload created by events or circumstances that occur elsewhere. This overload may bear directly on NHS facilities or upon wider supporting infrastructures. For example, major incidents involving casualties will usually cause overloading of the mobile telephone networks and loss or suspension of service. Accordingly, emergency plans should never rely solely upon mobile telephones for primary or secondary communications;
- the secondary impact of such events. For example, the fuel protests of 2000 had a direct impact on some NHS supply chains. For many Boards however, the more profound impacts arose from the inability of ancillary staff to fuel their cars to drive to work. This experience reinforced the significance of correctly identifying critical business processes before an emergency arises. The importance of a person is not the same as the criticality of their function;
- the extreme levels of staff absence that may occur, for example, during an influenza pandemic, are likely to exceed the basic rate of infection owing to the demands on individuals to care for children and dependants. In those circumstances, understanding the profile of the workforce is an essential part of the risk assessment process. Additionally, in the event of incidents such as bomb blast or contamination, some staff may be unwilling to expose themselves to risk and may be reluctant to come to work;
- collateral effects such as blast or down-wind contamination that may damage or deny the use of facilities. Where the threat is significant, estates and facilities managers should seek expert technical advice to guide their responses and support the business case, which they should obtain in consultation with the EPL;
- the consequences of mass casualties and/or fatalities from an incident elsewhere impacting on the operation of the facility, and
- extended duration and recovery period, subject to guidance on planning assumptions as described above.

Supply chain failure

2.12 The operation of healthcare facilities relies upon many complex supply chains delivering goods and services. Some extend internationally. Most involve wider sub-contract dependencies. Managers will therefore need to gain a clear understanding of the supply chain risks that may impact on their operations,

which in turn requires understanding of the supplier's own risk assessments, which may be subject to commercial confidentiality. The development of mutual confidence and information sharing between customer and supplier presents considerable challenges that require direct managerial engagement to resolve. The risk information obtained from the SCG will help managers to determine the possible cost impacts of some risks. Where suppliers deal with multiple NHS organisations, the principles of co-ordination and coherence (see Box 1) will apply.

Down-wind contamination

Crowd effects

2.13 In an emergency, NHS facilities may become crowded with self-presenting casualties ('walking wounded') or others seeking refuge. Advice on 'lock down' and other preventative actions is provided in Section 4 of this guidance. Facilities managers need to be aware of the severe hazards that can arise from the behaviour of a mass of people, especially when they are contained in a complex and unfamiliar environment and subject to stress. Collective fear of contamination with chemical, biological, radiological and nuclear (CBRN) substances presents an especially demanding example. The probability of occurrence is sensitive to a wide range of factors, and can therefore change rapidly. This scenario presents a safety management challenge that requires systematic and continuous review. All actions should be informed by SCG/national risk information and agreed with the security and EPLs.

Impact and vulnerability analysis

2.14 The final stage of the assessment process links each threat or hazard with its probability (in many cases drawn from the SCG information) and its impact on the facility in order to derive the overall risk. The impact is a combination of the vulnerability of the facility's operations and the consequences of the event for people's immediate health and safety and business-critical functions. Identifying business-critical functions and their vulnerability (including single points of failure) is a painstaking activity based on process analysis common to engineering disciplines. In resilience the additional requirement is for effective consultation and communication between all stakeholders in the organisation. Although time-consuming, this activity does resolve the differences between perceived importance and criticality.

Community Risk Register

2.15 The output of the anticipation and assessment processes is the recording of all the risks in the Community Risk Register. The register should note the likely warning time associated with each risk, and the indicators that suggest an increasing likelihood or imminence of occurrence.

2.16 The Community Risk Register is a dynamic document, which should be continuously reviewed and updated. The register should record all risk-related activities and should cross-refer to generic and specific emergency plans, and to expenditure requirements and programmes. This linkage between physical risk and expenditure enables the integration of all types of risk at Board level – financial, physical, and compliance – and provides an audit trail to underpin investment proposals and decisions. The Community Risk Register is an indispensable management tool that is fundamental to resilience and good management alike.

Box 2: **Anticipation and assessment – Key points**

Use the organisation's existing risk management process to identify potential threats and hazards.

Seek regular advice from the SCG or National Boards/organisations on external threats and hazards.

Co-ordinate with the organisation's emergency planning team.

Carry out an impact and vulnerability assessment.

Record all the risks in the Community Risk Register.

IEM process 3: Prevention

2.17 Prevention covers the full range of actions – technical, practical, procedural and organisational – that managers can apply in order to limit either the likelihood of a hazard occurring or its impact should it occur. These actions are applicable

throughout the life-cycle of a facility, from inception to demolition. The term prevention does not imply that risks can be eliminated absolutely: they cannot, owing to the phenomenon of displacement, which is discussed further below.

Risk displacement

2.18 The continuous interaction between action and environment creates a dynamic situation in which mitigating or reducing a risk may cause its displacement in time, place or nature, or combinations of all three. Such displacement phenomena can be unpredictable, and may not become obvious until long after the initial action was taken.

2.19 Managers should subject all preventative plans and actions to rigorous and continuous analysis in order to identify where displacement may be occurring and its potential consequences. Any analysis should look beyond the boundaries of the facility to identify where risks may arise as a result of displacement caused by other organisations' risk management activities, a consideration that underlines the importance of external coordination and communication through the organisation's emergency planning procedures.

One airport's response to accommodating unplanned crowds

Physical risks

2.20 The primary preventative strategies for physical risks involve a combination of regulatory approaches and engineering responses. Major facilities are subject to a comprehensive array of preventative legislation, regulations, standards and guidance, including Scottish Health Planning Notes and Health Technical Memoranda, which seek to mitigate physical risks. Additional guidance on preventative design and engineering approaches is provided in Section 4 of this document. No one individual is likely to be expert in all areas, and so the project team during design and construction, and the operational management team

thereafter, should draw on professional advice across the spectrum of subjects in order to ensure compliance.

Box 3: Prevention – Key points

Risks can never be wholly eliminated.

Taking action to reduce a risk will have an impact on the overall risk environment.

Regularly review preventative plans to identify where risk displacement may be occurring.

Draw on a wide range of specialist professional advice when developing preventative measures.

IEM process 4: Preparation

2.21 In large, complex facilities, preparation will pose serious management challenges, owing to the coordination demands of multiple functions on the site, the size and nature of the total workforce, and the difficulty of maintaining effective communication with a large stakeholder community. If those challenges are to be resolved, a systematic approach and clearly defined processes are essential.

2.22 Preparation can be broken into five sub-processes conducted in a continuous cycle of:

- planning for emergencies;
- developing response capabilities;
- designing and embedding instructions, procedures and exercises;
- training;
- validation and testing.

Planning for emergencies

2.23 Detailed guidance on emergency planning and business continuity management is contained in 'The National Health Service in Scotland Manual of Guidance: Responding to Emergencies' and in 'Preparing Scotland: Scottish Guidance on Preparing for Emergencies'. Preparing Scotland (Section 1, Chapter 4) provides the national structures for managing response and the outline structures for co-ordination in preparing for response in Scotland.

The issues requiring specific management attention include:

- giving clear strategic direction to emergency planners in terms of purpose, scope and policy constraints;

- the critical role of the Community Risk Register in driving the emergency planning process at the facility, departmental and healthcare organisation levels;
- the need for a clear understanding that the production of an emergency plan is not an end in itself, but rather a key element of a continuous process;
- integrating emergency services, neighbours and the operators of the facility into the emergency planning process in order to produce a coherent plan which has total stakeholder commitment and the benefit of wide-ranging expert advice. This rests on the effective functioning of the organisations' emergency planning group;
- in situations with complex, multi-occupancy arrangements there should be vertical coherence between the top-level plan and all other occupants' arrangements; and lateral coherence and consistency between all occupants. In a very large facility this can present a significant challenge;
- any emergency in a healthcare facility is likely to affect large numbers of people. Patients are central to the NHS's concerns, but emergency planners should also consider and cater for the consequences of an emergency for everyone else on the site – public and staff;
- as far as is possible, maintaining robustness and simplicity in all things in order to cope with the unexpected, and
- ensuring that plans are validated by procedural and practical exercises. The term "tested" applies to the entire system (including planning) working within the context of a plan.

Developing response capabilities

2.24 Capability is defined as "*the capacity to do something in defined conditions*". In this case the objective is the safe and successful management of an emergency that impacts on the facility.

Capability comprises four components:

- assets and equipment;
- people;
- concepts, and
- control.

2.25 These combine in differing proportions to create capability. For example, equipment alone does not provide capability – it requires trained people, concepts for its use and a management control system.

2.26 The emergency planning process will inevitably expose capability gaps that require corrective action, or modification of the plan, or a combination of both, to make the plan viable.

2.27 This corrective activity should be managed as a programme of projects linked to the emergency planning process in order to ensure coordination and coherence.

Assets and equipment

2.28 The mapping and agreement of responsibilities for assets and equipment between estates and facilities managers and other functions within the organisation or facility are essential to effective outcomes. The term 'assets and equipment' covers the physical necessities of healthcare delivery: facilities, equipment, logistics and services, and their engineering support. It also covers those physical items that may only be required in an emergency, such as chemical and biological protective equipment (CBPE and Decontamination Equipment) and contingency communications systems.

People

2.29 For many estates and facilities personnel, their emergency role will be the maintenance of normal service, albeit under more demanding conditions, and managers have a duty to prepare them adequately for those circumstances. Where people have specific emergency roles, their selection and training is critical to their performance, especially if they have leadership and supervisory responsibilities. In addition, the uncertainties of leave, sickness and other activities, and the likelihood of extended emergency operation, create the need for the selection and training of multiple deputies, and for developing individuals' ability to deputise upwards. Plans that rely on highly-qualified individuals will fail. Beyond the issue of non-compliance with the Civil Contingencies Act 2004 (CCA 2004), the cost of not giving emergency training can be extreme in terms of lives lost and damage to the organisation's reputation. In contrast, well-motivated and trained staff will be more resilient to the unexpected and more likely to perform well in a challenging situation.

Concepts

2.30 The Board should communicate its strategy to the whole organisation. It should issue strategic resilience planning guidance including a statement of desired outcomes, policy and resource constraints, and organisation structure. The EPL then works with directors and senior managers to produce the emergency plan and top-level standard operating procedures.

Control

2.31 The organisation and its facilities require robust control arrangements, including clearly-defined roles, and provision for control centres, operational business continuity and physical redundancy. Through the organisation's emergency planning team, managers should discuss and agree their control arrangements with the emergency services in order to ensure clear understanding and interoperability in those circumstances where they need to intervene in NHS facilities. Mobilisation and call-out procedures form an essential part of any emergency plan.

Box 4: Action for estates and facilities managers

Estates and facilities managers should:

- derive their own planning guidance down to the level of specific activities, including the identity of business-critical functions;
- determine the concept of emergency operations for the facilities under their charge, and promulgate it to their subordinate managers;
- direct and lead the functional emergency planning process;
- draw up the requisite emergency organisation and operating procedures, and ensure their conversion into guidance, aide-memoires, task sheets and similar staff instructions.

Major exercises and rehearsals are essential to validate emergency plans

Instructions, procedures and exercises

2.32 The purpose of instructions, procedures and exercises (IPE) is to enable every employee to discharge their safety and resilience duties efficiently, reliably and predictably.

IPE should be:

- Simple - to ensure that instructions are quickly understood and easy to follow. This is especially important where there are high rates of staff turnover. Signs and displayed instructions should be correctly sited, oriented, sized and cater for the full range of comprehension skills (the following Health Facilities Scotland guidance document provides detailed

information on signage: 'Wayfinding, Effective Wayfinding and Signing Systems guidance for healthcare facilities');

- Clear - to reduce the scope for misunderstanding or differing interpretations under stress. In some areas, multi-lingual expression may be necessary. The needs of those with sight or hearing impairments should be taken into account;
- Direct - to ensure that employees and the public have no doubt as to what is expected of them;
- Consistent - to create coherent responses across the entire facility.

2.33 The efficacy and feasibility of the actions required by IPE should be established before they are issued to staff. This will require pre-audit, followed by simulation, checking and rehearsal under realistic conditions.

2.34 The embedding of IPE in staff requires systematic approaches at every level, from induction training and refresher periods to major procedural rehearsals.

Training

2.35 As well as the training of individuals, effective response requires the team training of those who will work together to manage any emergency, and the collective training of the organisation. This may be conducted by means of exercises. Guidance on the design and management of exercises is given in the 'Emergency Planning' section on the UK Resilience website. www.cabinetoffice.gov.uk/ukresilience/preparedness/emergencyplanning.aspx

2.36 In planning collective training it is essential to note that external assistance is indispensable: an incident control team cannot train itself, nor can an entire organisation, because the removal of key staff to run the training distorts the system and leads to undesirable outcomes.

2.37 The emergency services should be included, whenever possible, in collective training and major exercises, especially where evacuation of patients from hazardous areas require the support of Fire and Rescue Services and the Scottish Ambulance Special Operations Response Teams.

Validation of emergency plans

2.38 All emergency plans should be validated as part of the emergency planning process. This will involve testing teams or the whole organisation to establish the level of performance. Detailed guidance on validation and testing is contained in the training section of the UK Resilience website www.cabinetoffice.gov.uk/ukresilience/preparedness/training.aspx

2.39 Again, neither a team nor an organisation can validate the effectiveness of their own emergency plans, because in many cases those doing the testing form part of the system being validated. External support is therefore essential, and it can often be helpful for neighbouring facilities performing similar functions to agree mutual exercising and testing arrangements. Internally the basic principle is

"two down": an organisation can test parts of itself that are two levels below the testers in the hierarchy.

2.40 Events to validate the effectiveness of the Emergency plans should be focused on clearly defined objectives and should not take place until the level of training is satisfactory. If such events are carried out too early it can damage staff morale and motivation. It can also confuse outcomes because planning, system or training deficiencies cannot be differentiated reliably.

2.41 Once completed, validation events and exercises should be reviewed and the lessons that are identified should be incorporated into amended plans and fed back to involved staff.

Box 5: Preparation – Key points

Good preparation will help to minimise the consequences of an incident.

Preparation is a continuous process. Organisations should develop clear and consistent instructions, procedures and exercises.

Training is required for individuals, teams and the organisation as a whole. All emergency plans should be validated.

IEM process 5: Response

2.42 Managers should be ready to respond to the exceptionally broad range of circumstances that may impact their facilities either directly or indirectly. Although the Community Risk Register gives a view of the range of most feasible events and an indication of their likelihood, it is not a predictor. Events with a 1:10,000 probability of occurrence are as likely to happen today as on any other day. Events with a high probability may not occur for a wide variety of reasons, including preventative action. Faced with this uncertainty, managers should be flexible and robustly prepared for the unexpected.

Box 6: Principles for effective response

- **Preparedness** – Be ready and unsurprised by an emergency, and rely on robust, adaptable plans and competent people;
- **Direction** – Be clear about what you have to achieve and remain focused on the desired outcome; manage the consequences, not the incident; set priorities; and give clear, simple direction to subordinates;
- **Subsidiarity** – Delegate authority and action, which will increase both performance and flexibility;
- **Co-operation** – Mutual trust and understanding are the foundations of effective response when multiple agencies are engaged;
- **Anticipation** – Always look ahead and anticipate what may happen next, or what may occur as a result of your and others' actions. Without anticipation you will not regain control under the pressure of events, and will remain reactive and vulnerable to the unexpected.
- **Information** – information is critical to emergency response and recovery and the collation, assessment, verification and dissemination of information must be underpinned by appropriate information management systems. These systems need to support single and multi-agency decision making and the external provision of information that will allow members of the public to make informed decisions to ensure their safety. Additional information can be found in 'Warning and information Scotland - Communicating with the Public'. This guidance provides information to assist category 1 responders and SCG better understand issues surrounding public communication.
- **Integration** – effective co-ordination should be exercised between and within organisations and levels (i.e. local, regional and national) in order to produce a coherent, integrated effort;
- **Continuity** – emergency response and recovery should be grounded in the existing functions of organisations and familiar ways of working, albeit on a larger scale, to a faster tempo and in more testing circumstances.

Emergency services' response

2.43 The emergency services will form the primary response to any significant incident endangering life and property. An explanation of the management and co-ordination of multi-agency operations is laid out in 'Preparing Scotland: Scottish Guidance on Preparing for Emergencies, Section 1, Chapter 2: Integrated Emergency Management'. Which organisation co-ordinates the response to an incident will be determined by the nature of the incident, except

in the case of terrorist attack when the police will always assume responsibility for co-ordination.

Senior staff responsibilities

2.44 The senior management team bear responsibility for the life, health and safety of all persons within the facility. Beyond that they also have to:

- initiate their emergency control facilities and structures;
- mitigate the effects of the emergency on patients, public and staff in accordance with previously agreed plans;
- direct the immediate response until the emergency services take control;
- manage any evacuation required;
- brief the emergency services' commanders on the situation, and stand ready to provide any additional information requested (for example plans and diagrams);
- initiate relevant business continuity arrangements;
- be prepared to send an empowered senior manager, who is able to make decisions and deploy resources on behalf of the NHS without referring to higher authority to the off-site Strategic Command Centre to represent the NHS Board and to communicate with the Board Control Centre. In any event they should initiate the NHS Board's media emergency plan, and
- establish the scale of the business recovery task and direct associated planning.

Staff responsibilities

2.45 In an emergency, staff employed within a facility should:

- make all reasonable endeavours to safeguard the life, health and safety of patients, visitors, contractors, and other staff and colleagues. This includes, for example, assisting their evacuation to a place of safety. The test of 'reasonable expectation' in such cases rests on the assumption that employees have a right to a level of risk not lower than that facing the people they are evacuating. While it would be unreasonable for an employer to expect a member of staff to go back into a situation presenting immediate threat to life to get someone out, it is entirely reasonable that they should require an employee to remain with those whom they were responsible for evacuating, sharing a common level of risk. Managers should note, however, that the strength of 'reasonable expectation' is directly related to the quality of IPE and training that they provide for their staff;
- take prompt action to prevent a situation from becoming a more general danger to life, for example by the possible use of fire extinguishers. Again, the criterion of 'reasonable expectation' applies, and the quality and frequency of training is critical in this area;

- conform to the site safety arrangements and plans;
- assist the emergency services in the conduct of their duties, noting that under certain circumstances it is an offence to fail to assist a police officer if directly requested to do so, or to fail to evacuate a building or area when so instructed in response to terrorist action, and
- meet the terms and conditions of their contract of employment in those cases where the job description includes specific reference to emergency duties.

Estates and facilities management and technical staff responsibilities

2.46 As a result of preparing for lower-order incidents that impact healthcare facilities and of observing good engineering practices, technical staff will already have a series of defined procedures and actions to guide their responses to emergencies. Managers should strive to build up from the familiar as far as is possible before creating new practices and procedures that are only initiated in an emergency. However, the possible scale, duration and relative unexpectedness or unfamiliarity of an emergency will inevitably require both additional procedures and the ability to manage the unexpected. In planning and leading the technical response, directors and managers need to consider:

- the impact of a large-scale emergency on the availability of staff, especially technical specialists who are in short supply, and authorised persons. This requires careful analysis of their personal circumstances in relation to hazards covering an extensive area that might, for example, prevent them from reaching work or require them to stay at home to care for dependants. This analysis not only informs planning, but also assists managers in leading their teams in an emergency;
- that in some types of emergency the response phase may be protracted, and generate additional pressures on working time, the nature of tasks and the psychological environment. The superimposition of a major incident onto the adverse conditions created by an extended wide-area emergency (for example an influenza pandemic) would exacerbate those pressures. These are circumstances in which managers should provide leadership, motivation and care for their staff, whilst giving due consideration to what they may reasonably expect, the terms and conditions of employment, and job descriptions of key staff;
- the emergency provisions contained in contracts for technical support and out-sourced services;
- any changes in the NHS financial management regime arising from the emergency;
- the requirements for documentation and records of actions taken, and
- their own endurance and relief, because managers persistently over-estimate their capacity for absorbing pressure and under-estimate their fallibility when tired. Relief and deputy systems should be initiated from the outset, and not when the first team is exhausted.

Box 7: Response – Key points

Be flexible and prepared for the unexpected.

The emergency services will form part of the response to significant incidents. The senior management team is responsible for the safety of everyone in the facility.

Staff should help safeguard the lives of patients, visitors and other staff and colleagues. Estates managers should consider the availability of technical specialists and authorised persons.

Initiate relief and deputy systems from the outset.

IEM process 6: Recovery

2.47 Following wide-area emergencies, local government will co-ordinate the multi-agency post-emergency recovery effort within the wider community. In some cases regional or national government and agencies will support the recovery, and may assume responsibility for co-ordinating that area of the response. The public sector's role is to create an appropriate and positive policy and programme management environment within which communities can help themselves as far as possible and engage fully in the process of recovery; and the contractors and engineers who deliver the physical aspects of recovery can discharge their roles swiftly and economically. General guidance on recovery planning and management is in 'Preparing Scotland: Scottish Guidance on Preparing for Emergencies'. The speed and long-term effectiveness of organisational recovery rests critically on the quality of leadership applied and the unity of purpose it creates.

2.48 The role of healthcare organisations will vary with the type of emergency. In some cases they will face the dual challenge of assisting community recovery whilst simultaneously seeking to restore its internal capabilities and services. In those circumstances estates and facilities managers will play a key role in the programme management of the various subordinate recovery projects – technical and otherwise – that together will deliver the required outcome. In those cases where the emergency has impacted their facilities directly, managers need to consider:

- the consequences of extended working during the recovery phase on staff and themselves. It may be necessary to extend relief systems for some time after the response phase;
- the potential psychological impacts of the emergency on staff, their families and the communities in which they live. In extreme cases this may lead to sickness, reduced productivity and increased risks of technical error. Managing this normalisation is a significant aspect of the recovery plan;
- the potentially disruptive effects of site clearance, decontamination and reconstruction;

- any opportunities that the damage or loss of facilities may present for making improvements rather than straightforward replacement;
- the lessons that need to be identified, promulgated and actioned.

Box 8: Recovery – Key points

Speedy and effective recovery depends on high-quality leadership.

The recovery phase may be protracted.

Relief systems will be required for staff working extended hours.

Any psychological impact on staff and their families will need to be considered and carefully managed.

3. Procuring resilient facilities

Introduction

3.1 This section explains how threats and hazards can be dealt with in the procurement process to ensure that resilience is achieved.

Box 9: Action points

Understand the principles

⬇

Analyse the threats and hazards

⬇

List the risks to be mitigated

⬇

Identify the resilience requirements

⬇

Incorporate the resilience requirements into the project brief

⬇

Review the design proposal to ensure that the requirements have been met

⬇

Control delivery

Infrastructure resilience principles

3.2 Resilience is the ability of the building and engineering infrastructure to continue operating in extraordinary circumstances. Resilient facilities are those that have the following features:

- robustness – the system or facility should be able to absorb the effects of an event and continue to operate at the required level;
- redundancy – where robustness cannot be absolutely guaranteed, it is essential to provide more than one of a key facility or sub-system;
- reconfigurability – the unanticipated risk is often the most devastating. To be truly resilient, a system or facility should be adaptable to cope with the effects of an unexpected event.

3.3 Whatever the baseline resilience requirements identified at the planning stage, designs should always be sufficiently flexible to cope with unexpected changes in the threat and risk context.

Baseline threat and hazard assessment

3.4 In assessing the resilience requirements, the first step is to analyse the threats and hazards faced by the facility. This will produce a list of the risks that can be mitigated by the infrastructure design. 'Preparing Scotland: Scottish Guidance on Preparing for Emergencies', Sections 2 and 3, Chapter 3 Risk Assessment provides detailed guidance on the identification and assessment of risk.

3.5 For large projects (particularly new builds), the threat part of the assessment may be produced at regional or national level, and may include input from government sources. At a local level, advice could be sought from the local police counter-terrorist security advisors.

3.6 New threats and hazards can arise quickly – this is particularly true when considered in terms of the design life of the facility. The vulnerability assessment should therefore be made a baseline document within the project and subject to the normal change control process when reviewed and updated.

Resilience requirements

3.7 The resilience requirements are developed from the risks identified in the vulnerability assessment. At this early stage in the project, it will only be possible to state the outputs required rather than describing solutions. This is to the advantage of the project, as it gives designers greater freedom and allows the application of SMART principles to the definitions, see note below.

Note: Specific, Measurable, Achievable, Realistic/Relevant and Timely.

Box 10: Hypothetical examples of resilience requirements

These are examples of resilience requirements developed from a risk assessment:

- "*The completed facility incorporates the means to control the approach of vehicles so that a potential vehicle bomb cannot approach within 25m of an occupied area*."
- "*Provision for at least two entrances to the facility that will have sufficient space to assemble and operate a casualty decontamination facility capable of processing ten casualties per hour – four to be on stretchers*."
- "*Provision for an electricity supply system that is capable, in the absence of mains electricity, of sustaining the essential load of the facility for a period of not less than 200 hours*."

3.8 Resilience levels should be directly cross-referenced with Low, Moderate, Substantial, Severe and Critical threat levels as appropriate.

3.9 Where the project is examining leased options as well as purchased, the wider question of plant and facility ownership should be considered. In responding to an incident the facility may be required to operate outside of its design conditions, which will have consequences for equipment life, future maintenance costs and residual capital value. Declaration of an emergency in a non-owned facility may have financial penalties and is a risk that the provider should be expected to include. How this risk is priced, invoked and measured should be included as part of the negotiations if value for money is to be obtained from resilience requirements.

The project brief

3.10 The project brief should communicate the requirement for resilience to the design team. This is the start of the continuous process of anticipation and assessment that should be undertaken as part of the facility's lifecycle.

3.11 For private-sector service providers, some resilience requirements will impose a capital cost on the project. Examples of this include:

- emergency holdings of fuel and water, and duplicate supplies of electricity;
- stocks of maintenance materials;
- contingency stocks against supply chain failure (for example laundry, sterile supplies).

3.12 Where such capital items are required of the service provider, it may prove cheaper for ownership to be transferred to the NHS organisation but with maintenance undertaken by the provider. In this way, the provider's financial model can be improved and the resulting unitary payment reduced.

3.13 A fundamental tension exists between the commercial interests of the service provider and the operational and resilience interests of the NHS organisation. It remains the responsibility of the NHS organisation to manage the service relationship in a manner that ensures that the operational and resilience requirements are fulfilled properly. This should not be taken to imply any lack of commitment to operability or resilience, or any malicious intent on the part of the provider; rather, it should be viewed as a simple statement of commercial interest.

New build versus refurbishment projects

3.14 The decision to refurbish or replace a facility will normally be made in accordance with the needs of the healthcare service and in line with the NHS organisation's estate strategy. To ensure that resilience is considered as a factor, the following questions could be added:

- how resilient is our estate? (that is, what risks exist in our assessment of the built environment's response to design threat assumptions?);

- how resilient should it be? (that is, what risks are unacceptably high?);
- how can we improve our resilience? (that is, what building or engineering measures can we apply to mitigate risks?).

3.15 Senior managers should ensure that a means of measuring the changes in resilience is developed so that the effectiveness of the strategy can be monitored.

Cost impact

3.16 The design to mitigate terrorist threats in any facility will depend on the assessed risk for that scheme at the time. Applying the guidance in this Scottish Health Planning Note to a particular scheme for a particular locality will require skilful risk-managed judgement, due to the variability and likelihood of threats and hazards in different parts of the country. A risk assessment will be required for each business case, and this will need to address the resilience brief, geographical location and any other mitigating local factors. Any additional costed risk elements will need to be identified and justified in the business case and budget.

3.17 At the time of publication, the risk to the NHS is assessed as severe, hence in the majority of cases this guidance is not expected to add any significant costs to schemes. It is judged that the cost of applying this guidance will, in most cases, be included within cost allowances already published by the Building Cost Information Service.

The design proposal

3.18 Design proposals should be reviewed to assess whether the level of resilience meets the requirements set out in the project brief. In a simple facility purchase this can be a straightforward review of the physical design, but where some form of leasing arrangement is proposed, the review should also include an operational assessment. In terms of the IEM model introduced in Section 2 of this document, the project proposal is the point at which threats and hazards can be prevented or prepared for.

Design resilience review

3.19 Designs should be reviewed against the requirements set out in the project brief and using the specific guidance in Section 4 of this document. The likely effect of incidents on the various elements of the proposed facility should be considered and the risk assessment process detailed in ‘Preparing Scotland: Scottish Guidance on Preparing for Emergencies’, Sections 2 and 3, Chapter 3 Risk Assessment followed.

Operational assessment

3.20 Operational assessment should look at the supporting resources that are proposed by the provider to operate and maintain the proposed infrastructure. Since workforce and running costs will be a significant proportion of the whole-life cost of the facility, and resilience measures are not expected to be used

regularly, the temptation will be to take risk on their adequate provision. As the NHS is the ultimate bearer of any risk to service provision, the delivery mechanisms proposed for resilience should be scrutinised very closely.

3.21 An example of the direction that a resilience review could take is given in Appendix 2 of this document.

Controlling delivery of resilience

3.22 The delivery of resilience should be controlled and monitored. This phase in the project life-cycle is demonstrating the ability of the organisation to *respond* and *recover* as set out in the IEM model.

3.23 Measuring resilience need not be complicated. In fact, the system should be as simple and unequivocal as possible. In common with other requirements stated in the project brief, the resilience requirements should be tested and measured in the delivered project against the original output specification.

3.25 In a facility where service provision has been outsourced, responsibilities need to have been made clear. A useful mechanism to control and monitor the delivery of resilience requirements is to incentivise the contract with the use of key performance indicators (KPIs). This will ensure that the contractor pays attention to critical parts of the service. This mechanism is of particular value to resilience requirements, since they are not products that are delivered but capabilities that are expected to be available.

Box 11: Measuring resilience – an example

The requirement

"Provision is to be made for an electricity supply system that is capable, in the absence of mains electricity, of sustaining the essential load of the facility for a period of not less than 200 hours."

Assessing whether the proposal satisfies the requirement

The measure is not just in the physical presence of a suitably-sized generator (or alternative), but also in the presence of:

- sufficient fuel for 200 hours running;
- the necessary breakdown/maintenance cover;
- trained personnel to operate it;
- proof that the system works in its design condition (that is, under continuous full load, not just that it starts).

Clarifying responsibilities

If the NHS organisation owns the generator and the contractor is responsible for maintaining and operating it, where does responsibility lie if it fails to start? Ultimately, no matter how the contract is written, the risk of loss of power lies with the NHS organisation, and therefore ownership of the risk has not been transferred. Where the entire supply mechanism (generator, maintenance, operation) is outsourced, responsibilities are easier to define and less likely to produce gaps from which failures tend to arise.

Using key performance indicators

- Negative KPIs (penalty or reduced payments): number of days when the standby generator was unavailable due to maintenance failure or number of days when trained personnel were unavailable.
- Positive KPIs (bonus payments): a successful periodic test run of the generator under load or successful completion of a periodic test exercise.

4. Resilience design considerations

Introduction

4.1 The key objective of the design team, from a resilience perspective, is to prevent the infrastructure from creating or reinforcing an emergency. This can be achieved by applying the three resilience principles described in Section 3 of robustness, redundancy and reconfigurability to the design of each element and system within the new or refurbished facility.

4.2 The guidance given in this chapter places a greater emphasis on threats than hazards, not because of their anticipated likelihood but because a large body of design guidance on hazard avoidance is already available and widely understood.

4.3 The Cabinet Office has produced two sources of guidance for physical security and protection of government buildings: 'The Manual of Protective Security' and 'Counter-Terrorist Protective Security Manual'. Both documents have limited circulation and access is controlled by Departmental Security Officers within the Department of Health. Project teams are strongly encouraged to make themselves familiar with their contents. (It should be noted that at the time of issuing this document, The Manual of Protective Security and The Counter Terrorist Protective Security Manual are being revised. Revised versions of the documents will be available from the Cabinet Office Website www.cabinetoffice.gov.uk . Project teams should also bear in mind the advice in 'Secured by Design', which defines a series of baseline measures for security-conscious design.

Planning permission

4.4 Specific provisions for security that are deemed of a confidential nature should be discussed with the local planning authority prior to submission. Local planning authorities will usually look sympathetically upon requests to limit the detail in publicly available information, provided that a clear case is made for this restriction.

4.5 Local planning authorities and police architectural liaison officers and SCG will be able to advise on specific cases.

Access to documentation

4.6 During an incident the emergency services may request to see site plans, engineering services diagrams and other relevant documents. Responsible managers should ensure that these are readily available. This will need consideration during the procurement process, as it may be difficult and time-consuming to identify and gather all the necessary documents after a building has been brought into use. For further guidance on access to documentation refer to NHSScotland FIRECODE, NHS in Scotland 'A Model Management

Structure for Fire Safety' and HDL (2005) 53 Fire Safety Policy for NHSScotland.

Architecture

4.7 The form and structure of the facility contribute to resilience largely by providing its robustness. The building (or buildings) provide a protective layer around the occupants while the grounds in which they sit can constitute a buffer zone in which the opportunity exists to detect an approaching threat and initiate controlling action to limit its effect.

Site selection

4.8 Resilient design starts with the selection of the site: while hospitals and medical facilities are not often targets for attack themselves, other neighbouring facilities may be. Siting a prospective new build near to a potential terrorist target (government or commercial) may increase the risk of becoming involved in an incident. Consider also that city centres themselves, because of their symbolic nature or the potentially large number of people, have also been attacked. When considering less extreme events, choosing low-lying ground near a river or a site downwind from a major chemical works may be a risk too far – even if the capital cost of the land is attractive.

Grounds and site layout

4.9 Having selected a site, the nature of the grounds and the layout of the facility should be considered. While fenced sites are not popular, they do offer the ability to control foot and vehicle traffic and enable accurate surveillance by channelling visitors into areas covered by CCTV (Closed Circuit Television) and making a suspicious intent more conspicuous earlier. This can improve the general security of the facility (see note below) as well as improving resilience by reducing the likelihood of a threat materialising. Natural boundaries could be considered as these can provide effective barriers whilst mitigating the impact of such barriers on the visual amenity of the site.

Note: When considering general security and crime prevention, see also the Police initiative 'Secured by Design' (www.securedbydesign.com) for additional guidance.

Control of vehicular access

4.10 One of the most dangerous threats that could be identified is the vehicle bomb, e.g. Glasgow Airport car firebomb. Because of the large amount of explosive that can be carried in a car, bus, van or truck, such a device is a potentially devastating threat to the entire facility. The best defence against such devices is distance so, where such a threat is considered credible, precautions should be designed to maintain a stand-off distance by controlling vehicular approaches. Points to consider include:

Car parking

Vehicles should not be allowed to park closer than 25m from a building. This should be balanced with the requirements for disabled access but, generally, large parking areas should not be close to buildings. Where this cannot be achieved in existing facilities, careful management of the car park will be required to reduce any risk. Siting car parks in basements beneath tall buildings, where the effects of a confined explosion would be much greater, will require significant additional structural engineering effort (hence expense) to ensure that the building would safely withstand the detonation of a car bomb (to say nothing of the risk of flooding inherent in an underground car park).

Roads

Limit the maximum possible approach speeds of vehicles by implementing traffic calming measures such as bends, humps and chicanes and consider the use of barriers as a final line of defence. This conflicts with having easy access for emergency vehicles, but a suitable compromise should be reached in discussion with local emergency services that balances the risk with usability.

Loading bays

These present a particular vulnerability to the structure as trucks require close proximity to the building to deliver supplies. The risk can be minimised by siting them away from high-occupancy areas such as wards, canteens, etc. Access to the loading bays should be controlled and, where the threat is deemed high enough, barriers covered by a CCTV and intercom arrangement should be considered to deny entry until the validity of the delivery is assured.

Loading bays should be located away from areas of particular sensitivity, for example laboratories or facilities housing pathogens, toxins, inflammable or explosive gases or liquids.

While design should follow current perception of threat, risk and resultant necessary resilience, unexpected changes in threat and risk may lead to a requirement to impose additional measures for control of vehicular access to facilities covered in this Scottish Health Planning Note.

The design team should consider provision of space for possible introduction of further restrictions on vehicular access, denial of access of certain areas altogether and the introduction of enhanced parking restrictions, for example.

Space for additional facilities

Space may be allocated on the proposed site for additional emergency facilities to deal with specific eventualities. Facilities such as Chemical, Biological, Radiological or Nuclear (CBRN) decontamination units, temporary water and/or fuel tanks and logistic stockpiles may be included in the project brief and need space allocated to them. If the public parking area is earmarked for this, an alternative plan will be needed to allow visitors access to the site, and perhaps

a shuttle bus-service could be considered. Where local partner spaces (public parks, local business estates, school sports pitches etc) are earmarked for these purposes, these plans should be agreed with the partners and regularly reviewed to ensure their continued viability. The SCG provides the means to facilitate this.

Temporary decontamination facilities may be needed and will require space

Control of pedestrians

4.11 Within the grounds, hard landscaping features such as footpaths and planted areas can be used to mark areas and make suspicious intent easier to spot. Smooth building lines and well-designed and well-maintained grounds will minimise hiding places and improve general security.

Pedestrian entrances

4.12 Designers should consider:

- limiting the number of entrances into a building or facility to the smallest number commensurate with anticipated (and desired) flow of patients, staff and visitors;
- including space at the entrance to incorporate a personnel search facility if required;
- allowing space for a decontamination area to be set up to receive and process contaminated casualties. External or adjacent land – car parks, playing fields, open areas, etc. – should be considered as potential decontamination locations using tents for cover. The draught lobby space could also be used for this, or perhaps commercial areas could be earmarked;

- separating staff and visitor entrances and incorporating positive access control on staff doors using keys or electronic pass systems;
- making the entrance robust against potential civil disturbances by selecting suitable street furniture and landscaping materials to ensure that the number of potential missiles is minimised. Where a large expanse of glazing is being considered, the type and strength of glass to be used should be appropriate to a possible threat, and
- ensuring that access can be further restricted as necessary without additional impact on operational efficiency.

Zoning and room layout

4.13 The guidance given in the Scottish Technical Handbooks, Section 2 Fire, Annex 2.B Additional Guidance for Hospitals on compartmentation of hospitals applies equally to risks imposed by threats such as bombing. However, additional consideration should be given to evacuation strategies. The fire safety strategy is to progressively evacuate a hospital horizontally to a place of refuge in an adjacent fire compartment. In a situation where a bomb has gone off, or may go off, an immediate full evacuation of the entire hospital should be considered. Project teams should consider the impact of increased flows of people on evacuation routes.

4.14 Where an evacuation strategy is considered impractical, an alternative is to ensure that protected spaces are provided by incorporating robust design features at the refuge boundaries. These structural requirements need to be appropriate to the threat envisaged and, where sufficient additional control measures are in place to limit the potential size of an explosive device inside the facility, need not be too onerous.

High-rise sites

4.15 In high-rise or small-footprint sites, an incident at street level may require upward evacuation to a protected space at the top of the building.

High-density sites

4.16 In city-centre or other high-density sites, where pressure for space will always be high, designers should consider potentially radical options for re-using space to ensure that the impact of an event is reduced to an acceptable level. Since on such sites vertical travel will be almost inevitable, it may be considered appropriate to locate the clinical areas on the upper floors of a multi-storey building to allow the option of re-using non-essential facilities such as offices and administration areas if a need for any of the additional facilities mentioned above is identified.

Redundancy

4.17 Depending upon the threat level (Low, Moderate, Substantial, Severe and Critical), organisations should consider whether any of the architectural features

listed above which are vital to the viability of the entire facility should exist in duplicate or have an alternative. This particularly includes non-building facilities such as access roads and entrances from the public highway.

Building structures

4.18 'The Counter-Terrorist Protective Security Manual' (under revision) contains excellent research-based advice on the structural design of buildings to resist blast effects caused by explosions. It is strongly recommended that this manual be consulted where a bomb threat to the facility is deemed credible. However, this document has limited circulation and access is controlled by Departmental Security Officers within the Department of Health. Generally, this manual recommends that buildings should:

- use a framed construction in either structural steel or reinforced concrete that has the 'degree of robustness' required by the relevant British Standards, regardless of the number of storeys (that is, all buildings less than five storeys high should be designed as a five-storey building for robustness only);
- provide 'protected spaces' (previously known as bomb shelter areas (BSAs)). This may be achieved by careful planning of the internal building (not necessarily reinforced concrete), or by the provision of robust basement construction. In a healthcare environment these areas may need to be extended to wards if patients cannot be evacuated;
- have ground and first-floor slabs constructed of in-situ reinforced concrete, with slabs designed as suspended so that they can withstand the removal of one or more structural columns beneath them;
- have floor slabs tied down to their structural supports to allow for the load reversal that occurs in an upward blast;
- have a roof slab that is of similar construction to that of a typical floor, and
- have a cladding system that will not become an additional shrapnel hazard if separated from its supports and that can be repaired without removing undamaged panels.

Electricity

4.19 Electricity is the most vital of all infrastructure services, as without it most of the other services will not function. The entire electricity distribution system should therefore be designed to be as resilient as possible. This can be achieved by applying the principles of robustness, redundancy and reconfigurability to the system as the design progresses in accordance with Scottish Health Technical Memorandum 2007: 'Electrical services: supply and distribution'.

Robustness

4.20 The distribution system, including all of the non-electrical components such as substation buildings, emergency fuel supplies, cable ducts and other containment, should be robust enough to survive design threats and hazards.

Where facilities are not duplicated, or where potential for a single point of failure exists (for example where the standby generator is in the same building as the intake substation), robustness is doubly vital as the last line of defence. Consideration should be given to designing such facilities as 'protected spaces' (see note below). Action should also be taken to eliminate the single point of failure, as a matter of good practice and to ensure maximum robustness.

Note: As defined in 'Counter-Terrorist Protective Security Manual'.

Redundancy

4.21 The electricity distribution system within the facility is best protected by having multiple sources of supply at all levels. Normal electrical system design, including the requirements and recommendations made in Scottish Health Technical Memorandum 2007: 'Electrical Services: supply and distribution', recommends the degree of redundancy in an electrical system which may need to be enhanced once credible threats are included in the risk management process.

Mains supplies

4.22 As the supply of electricity is critical, consideration should be given to having two or more sources of supply from the regional provider. A supply at high voltage (HV) may have a higher whole-life cost, but will be more resilient against load-shedding in times of high demand – especially if qualified for the provider's priority use list.

Standby generation

4.23 Generators may be required as an additional level of redundancy for essential loads. Scottish Health Technical Memorandum 2007: 'Electrical Services: supply and distribution' gives guidance on the number of generators that may be appropriate; the threats and hazards identified in the design brief will indicate whether it is appropriate to site standby generation in the same physical location as the power supply it replaces.

Combined Heat and Power (CHP)

4.24 Where a CHP system is being considered, there is scope to consider this as a form of standby generation provided that its other operating capabilities will be met (see note overleaf). If the CHP system is provided on a leased arrangement, the maintenance and emergency repair response times should be considered and stated as contractual requirements, as should regular testing and availability criteria.

Note: CHP systems aim to recover waste heat from the generation process and are often specified and controlled on the basis of their heat potential. If a CHP unit is to be used as a standby generator, the designer should ensure that adequate arrangements are made to use or remove the heat that is also produced when generating. The unit should also be designed to start and run in power failure conditions and should be tested in this mode.

Uninterruptible Power Supplies (UPS)

4.25 Critical loads may require a UPS to be installed. Currently, battery technology and space requirements generally limit these devices to providing power for a short initial period or to bring the system to an orderly halt rather than to continue operating indefinitely. An exception to this is where a UPS is used to cover the break in supply while a standby generator starts.

Control

4.26 Building management or other control systems need to give an indication as to the state of the electricity supply. When the mains supply fails, there are actions that need to be triggered such as the ordering of fuel and the preparation of maintenance responses, as well as automated responses such as the shutting down of a computer server on activation of a UPS.

Reconfigurability

4.27 The ability to reconfigure a faulty or failed electricity supply system, or to reconfigure it should demand increase, can be designed into a system at the outset:

- ring circuits rather than radial feeders provide two possible sources of supply and therefore provide a degree of resilience against damage and failure. Critical ring mains in HV networks can be made “closed” rather than “open” for maximum security of supply, albeit at greater expense, provided that adequate protection arrangements are installed;
- inter-connectors between node points on the network can be positioned to increase options for supply and to allow for bypass of damaged areas or failed components;
- spare capacity in switchrooms and substations is essential to allow on-site engineering staff options to re-establish supplies after a failure. Provided access to the bus bar is available, a portable generator can be coupled to the system to replace a failed mains supply, or a new cable can be run out to a temporary facility. When refurbishment projects are being designed in existing facilities it is good engineering practice to ensure spare capacity remains and, if necessary, install new switchgear, and
- sensing and control: developments in building management and automatic control systems are making it increasingly possible to design in the ability to

automatically sense failures and reconfigure the network accordingly. Business-critical facilities should consider using this technology.

Water

4.28 The availability of clean water is critical to most healthcare facilities to establish and maintain cleanliness as well as for consumption. In applying the guidance in Scottish Health Technical Memorandum 2040: 'The control of legionellae in healthcare premises – A code of practice', designers should consider not only how a constant supply can be guaranteed, but also how its portability can be similarly assured. NHS organisations should take a view and advise the designer on whether the risk of using non-potable supplies for cleaning is acceptable. At the time of producing this document NHSScotland's legionellae guidance is being updated. The revised guidance is titled, Scottish Health Technical Memorandum 04-01: 'The control of Legionella, hygiene, 'safe' hot water, cold water and drinking water systems - Parts A & B'.

4.29 Availability of water from the local supplier is taken for granted within the UK, and pressures on supplies in some parts of the country are increasing, with infrastructure struggling to keep up with rising demand. The risk of having a single source of supply, particularly in light of potential issues such as flooding and water availability arising from climate change impacts, should be considered by the project team and the possibility of acquiring a second source – for example from a private borehole – should be investigated. Such a secondary source need not be permanent, and may be easier to licence if it were specifically for emergencies. Cogniscence should be taken of the Water Environment and Water Services (Scotland) Act 2003 and local planning conditions in the decision making process.

Scottish Water hold an Emergency Plan for all In Patient Accommodation. This lists all actions procedures and obligations to be carried out by Scottish Water and the timescales to which these will be carried out in the event of an emergency. All Boards should have a copy of this plan so they know what to expect from Scottish Water.

4.30 Secondary or alternative sources need not necessarily produce potable water; there are on-site water treatment options (see below) which can go some way towards mitigating the loss of mains potable water if non-potable water is available on-site from alternative sources.

Water treatment

4.31 Where a need for on-site water treatment is identified, there are currently two practicable technologies available:

- reverse osmosis: this can produce very high-quality water from highly contaminated sources (even saline), but is expensive, requires large amounts of power, and the product is only guaranteed clean on production. It is unlikely to be appropriate for anything other than where a threat of severe contamination, such as CBRN, exists;

- filtration and sterilization: filtration will only reduce the suspended solid content of a source and will not on its own produce potable water. Sterilization can be carried out chemically (typically using chlorine-releasing compounds) or using UV light sources. Chemical dosing, if properly controlled, can maintain a residual disinfectant level in the treated water, so is the preferred solution. UV units are only suitable for treatment of water that is to be consumed or used immediately.

4.32 For further guidance on water treatment see SHTM 2040: 'The Control of Legionellae in Healthcare premises – a code of practice'.

Bulk stocks

4.33 The quantity of water that is held in storage on-site should be decided. The key factor affecting the decision will be the anticipated length of time that the mains water supply may fail and the time that would be required to establish an alternative (for example bowser delivery) supply route. This should also be balanced against the costs associated with maintaining the stock in a potable condition. Because time will be of the essence in the event of a failure of the mains supply, a monitoring system covering water flow and quality should be fitted to raise an alarm and allow plans to be enacted as soon as possible.

Fuel

4.34 Fuels should be carefully selected to ensure continuity of supply as well as to satisfy economic and environmental concerns. Primary and secondary fuel arrangements (for example natural gas and diesel dual-fuel options for boilers) can reduce reliance on sole suppliers and improve resilience. Bulk stocks of fuel should be held to span gaps in supply in appropriate bunded storage facilities, but these bulk stocks may also present an attractive target to potential thieves or attackers and should be physically protected. Redundancy can be achieved by ensuring that a number of smaller tanks are held in more than one location, but beware of creating a vulnerability by aggregating the fuel, generator and mains transformer into the same space.

4.35 Piped supplies of gas should be discussed with the regional gas transporter to ensure that they are noted as 'priority user' and will be maintained/ restored as priorities in event of network difficulties.

Consideration should also be given to position of meter houses which can be sited in vulnerable, easily accessible areas.

Critical cooling

4.36 A number of areas within healthcare facilities have a critical requirement for cooling. These include drug and blood banks, mortuaries, and food and prepared meal stores. Related facilities might include business-critical computer servers and data centres. In addition to ensuring that the cooling systems have adequate arrangements to power them, adequate redundancy within the system should be provided. This could be achieved by installing a common type of plant

across a site to enable cannibalisation of equipment if required. Monitoring systems to provide warning of cooling or power failures should be provided, and arrangements or plans made such as:

- data centres being able to hand over to a third party's backup facility;
- high-priority items such as drugs and blood stocks being moved to other temperature-controlled stores, and
- letting enabling contracts for the provision of temporary facilities such as refrigerated ISO (International Organisation for Standardisation) containers.

Medical gases

4.37 Healthcare facilities may have a large enough requirement for medical gases to make the provision of a Vacuum Insulated Evaporator (VIE) and a piped distribution system rather than individual bottles an economically attractive option. In such circumstances the following factors should also be considered alongside the guidance given in Scottish Health Technical Memorandum 2022: 'Medical gas pipeline systems':

- a single VIE for each nature of gas presents a vulnerability to interruption of supply. Provision of two smaller (and physically separated) tanks may not be as economic but will improve resilience;
- regardless of the storage method selected, cylinder storage facilities should be available as a last resort, since the supply of these can be guaranteed from a number of sources;
- the location of storage tanks should be very carefully considered as they represent a significant hazard in their own right, regardless of any additional threats. The tanks should have good physical protection from unauthorised access and be sited away from high-occupancy areas. Where space considerations prevent a reasonable separation, a protective wall or bund should be considered;
- the engineering infrastructure to generate medical air and vacuum should be as resilient as the supply of other gases. Compressors and vacuum pumps require a source of electrical power to operate, and standby vacuum devices that operate on the venturi principle need a working supply of medical air.

4.38 Additionally, the piped medical gas distribution systems should include features to prevent gases such as oxygen contributing to a fire or explosion in the event that they become damaged, for example numerous and easily accessible isolation valves should be provided.

Ventilation systems

4.39 Ventilation systems are installed throughout healthcare premises to fulfil a number of purposes, some of which have resilience implications. Factors such

as smoke clearance for fire protection are already well understood and documented.

4.40 Threats and hazards that may be considered credible in healthcare facility schemes might include the spread of:

- airborne infections in pandemic outbreaks such as avian flu;
- chemical or biological contaminants brought in on casualties, and
- a contaminant deliberately released in a healthcare facility. Such a contaminant need not be in itself dangerous – but the impact of a cloud of coloured vapour in a crowded reception may be significant.

4.41 Scheme designers should be briefed that as well as the guidance in Scottish Health Technical Memorandum 03-01: 'Ventilation for healthcare premises', they should consider ventilation schemes across the entire facility and make an assessment of the flow of air based on developed pressure differentials. This is already commonplace in smaller areas of hospitals such as operating suites, but holistic consideration of the ventilation profile will enable better assessment of likely contamination routes and – if properly designed and commissioned – will provide an additional obstacle to the spread of contamination.

4.42 Good practice dictates the positioning of air intakes out of easy reach and the provision of facilities for immediate shut-down and isolation of discrete zones within the healthcare facility from a central location.

4.43 The various chapters of Scottish Health Technical Memorandum 2025 stress the importance of ensuring that systems are correctly designed, installed, commissioned and maintained. Resilience requirements do not detract from these, but do reinforce the need for stringent maintenance including regular testing, inspection and cleaning to ensure that systems are operating as designed and will deliver the required function in the event of an incident.

4.44 Due to the higher running costs associated with generating the pressure differentials, it may be felt appropriate that systems have a 'normal' (low-pressure) mode and an 'isolation' (high-pressure) mode. If such a method is chosen, the control of how the modes are changed should be carefully designed – both in engineering and management terms – to ensure that it is activated at the appropriate times and remains active until no longer required. Both engineering and clinical staff need to be aware of the modes and the consequences of operation.

4.45 Risk assessment may indicate the requirement for filtration of supply air either full-time or temporarily in times of heightened threat. Consideration should be given to the development of safe-changing routines in the event that contamination has occurred.

4.46 The three resilience principles should be applied to designs to ensure that the ventilation plan is robust enough to withstand threats and hazards; redundant to allow continued operation in the event of component failure; and reconfigurable

in the event of damage – though in such a case, this may be limited to the provision of dampers to ensure that damaged areas are isolated and that pressure gradients can be maintained. Consideration should be given to whether ventilation systems should be kept on or turned off.

Waste disposal

4.47 The ability to remove waste from a facility will often be more critical than any logistic input. Site restrictions and hygiene requirements will preclude the storage of waste for any significant length of time. Healthcare facilities typically require a means to dispose of three separate types of waste namely:

- infectious clinical waste;
- sewage;
- non clinical waste.

Infectious/clinical waste

4.48 Disposal of clinical waste in NHSScotland is outsourced. Consequently there is an issue of supply chain resilience, the consequences of this failure may be such that contingency arrangements will be required, for example the provision of a temporary refrigerated store.

Sewage

4.49 Sewage will normally be disposed of through the municipal network; however, there are instances where this network may break down. Many municipal networks were constructed in the Victorian era and are approaching the end of their lives – blockages and other failures are becoming more common. Consideration of the age and condition of the local sewage disposal network would be prudent in the selection of a site for a new facility. Additionally, sewerage systems typically operate under gravity and at relatively low gradients, which makes them vulnerable to backflow if the surrounding areas inundate. Facilities built in flood-prone areas should assess the risk of sewage inundation as well as flooding. Advice on the regional likelihood of flooding, both current and future, can be obtained from Scottish Water, Scottish Environment Protection Agency (SEPA), the local authority and Scottish Climate Change Impacts Partnership (SCCIP).

4.50 Loss of the facility to dispose of sewage is a critical infrastructure vulnerability, and due attention should be paid to close liaison with local providers at the design stage to ensure that the relevant facilities are fully understood in terms of their resilience and reliability. NHS organisations may consider provision of alternative disposal facilities, perhaps at a far lower flow rate, to allow continued operation of at least part of the facility under condition of failed sewerage arrangements.

Non clinical waste

4.51 Refuse refers to non-clinical waste refers to recycled, skip waste etc, its removal is traditionally outsourced to a municipal or other contractors, thus requiring an assessment of supply chain resilience which may indicate that an area for refuse storage needs to be set aside or an alternative standby arrangement made.

4.52 For further guidance on waste disposal refer to Scottish Hospital Technical Note 3 Version 4: 'Management and Disposal of Clinical Waste'.

Telecommunications

4.53 Telecommunications systems should be considered from two perspectives: first, the systems themselves may be business-critical (for example in an IT data centre) or they may provide a vital function in managing an emergency (for example public address, telephone and paging systems). Where the system is business-critical, the resilience principles should be applied to it and any supporting subsystems:

- emergency switching of telephones: fall-back telephones should be sited to guarantee the availability of internal communications to all planned refuges and control centres. The public mobile telephone networks should not be relied on in any emergency communications plan, since extreme external events may overload them or force them to be shut down. Unless specific provision has been made for availability of a reduced mobile telephone service for specific individuals and handsets, this service should not be solely relied upon in emergency planning;
- public address (PA) and alarm systems: PA and alarm systems provide the primary means to communicate with service users. In addition to providing systems throughout a facility, if people could be expected to gather around the facility (for example an A&E department), consider extending the system (or making provision for extension) into the car park or other waiting areas. PA systems should be on the essential services power supply and should also allow input into the system from multiple locations;
- paging and wireless data systems: similarly, these systems may need to be receivable in spaces adjacent to sites that are earmarked for emergency use and;
- in an emergency, the media will be extremely keen to gather information. The security of data links, including audio, should be considered. Some form of encryption may be prudent to enable positive control of information release and protect personal or sensitive information.

Protective security

4.54 Protective security design covers many areas, most of which are described as robustness measures elsewhere in this chapter. Additionally, the threat and hazard assessment may indicate that the areas described below are examined.

Lock down

4.55 The need to seal off a facility from the outside or to isolate it internally may arise as a result of an intrusion, civil disturbance, terrorist attack or outbreak of an infectious disease. Selection of appropriate doors, barriers and locks as well as the use of electronic locks and identity/authority verification systems such as card readers, pin codes and biometrics can then be used to enforce a policy.

4.56 Lock down may be imposed from either an internal or an external authority, and may have as its role either the prevention of entry or the prevention of exit. The precise form the lock down takes will depend upon a number of variables, including:

- duration;
- reason;
- direction of movement to be controlled;
- local circumstances;
- availability of personnel to administer;
- suitability of facility to be locked down, and
- lock down zoning.

4.57 Design teams should consider the necessary architectural elements which make the implementation of lock down easier to perform – in essence, those elements which define discrete zones within a facility and which limit access to those zones, with particular reference to external interfaces and interfaces to areas of high sensitivity or threat potential.

Detection systems

4.58 There are a number of electronic options to assist security staff in detecting intruders and managing incidents. The two most commonly in use today are intruder detection systems (burglar alarms), which provide an excellent method of backing up an access control system by guarding entrances that are not normally in use (fire escape doors, windows, etc) and Closed Circuit Television (CCTV), which allows more efficient deployment of security manpower and allows verification of alarm incidents remotely. CCTV may prove particularly useful in isolation units as it will allow staff to maintain protection around an area without needing to enter it. In a new-build project, access control, intruder detection and CCTV could be integrated into a security management system, akin to a building management system, which may prove to be easier to operate and control.

Screening

4.59 Where there is a particularly high threat to a facility, permanent installation of screening equipment to examine incoming goods and mail may be indicated. Even where it is not, it may be prudent to allow space and services for its installation in the future.

Mail rooms

4.60 Mail rooms should be sited to minimise the distance that unchecked mail has to travel through a building. Rooms should have at least one outside wall to allow a blast to vent, and should be robust enough not to pose a threat to the remainder of the structure. More detailed guidance can be found in the 'Counter-Terrorist Protective Security Manual'. However, this document has limited circulation and access is controlled by Departmental Security Officers within the Department of Health.

Personnel screening

4.61 The precise screening measures required will depend upon the local threat and risk assessment, and may include the provision of security staff at entry and exit points on a part or full-time basis.

4.62 Airport-style walk-through metal detectors and bag searches may be required in high-threat areas at times of heightened alert. Where required, these should take place outside of a protected space. Consideration should be given to the space required not only to carry out the searches but also for queues of waiting people. If the threat is one of explosives, physical protection of the rest of the facility from the screening area should be included. Thought should also be given to how persons screened but found unsuitable for access should be directed away from the site in a secure manner.

4.63 Imposition of an airport-style regime will severely impact the flow of people in and out of the facility. Each line will require at least three persons to administer it – one screening, one searching and one keeping oversight of all activity. Each line will process in the range of 110–200 people per hour, dependent on how well screening personnel have been trained, the amount of baggage to be searched and the number of individuals requiring a body search.

5. Operational engineering response

5.1 Scottish Health Technical Memorandum 00-00: 'Best Guidance for Healthcare Engineering – Policies & Principles' contains outline guidance on emergency and contingency planning and should be consulted by the project team including at design stage to ensure that operational issues are taken into account. When considering the refurbishment of a facility, a review of the existing emergency plans and reports on previous training exercises will hopefully indicate shortcomings in the facility that can be addressed in the new design brief.

5.2 Emergency or contingency plans are separate to major incident plans, the latter being concerned with the medical implications of an external incident. Estates contingency plans should be prepared alongside each major incident plan so that the additional stresses placed on the engineering systems by an influx of casualties can be managed and controlled. Such stresses will require closer monitoring of the engineering services to hopefully pre-empt breakdowns and ensure a quick response.

5.3 When developing emergency plans, the authority to declare an emergency should be considered and appropriately delegated. Similarly, when negotiating contracts with suppliers with emergency responsibilities, consideration should be given to:

- the method of payment for emergencies and training exercises, and
- demonstrating that the emergency capability exists and is to the level and standard required.

5.4 Key to successful control of an emergency is effective cross-communication between involved parties. In the healthcare environment, this means the passage of information between all stakeholders, including estates and clinical staff. Managers and incident controllers should ensure that regular briefings are held throughout the duration of an emergency so that clinical staff are aware of the level of service that is being provided and what difficulties are being faced by estates and facilities staff and vice versa. Not only will this allow effective control, but it will also ensure that staff are fully involved and actively contributing.

Appendices

Appendix 1: Legal duties of NHS bodies under the Civil Contingencies Act 2004

Appendix 2: Design proposal review – example questions

Appendix 3: Acronyms

Appendix 1: Legal duties of NHS bodies under the Civil Contingencies Act 2004

The duties and powers of various bodies and persons in an emergency situation are set out in the Civil Contingencies Act 2004.

There are two categories of NHS body created by the Act in Schedule 1: Category 1 responders and Category 2 responders. Category 1 responders have greater duties under the Act than Category 2 responders. The duties of Category 1 responders are set out in Section 2 of the Act. (Geographical Boards and the Scottish Ambulance Service are designated as Category 1 responders.)

In the Act, “emergency” has two precise definitions, one definition in Part 1 in the context of local arrangements for civil protection, and the other in Part 2 in the context of emergency powers.

Part 1 defines emergency, in the context of local arrangements for civil protection, as:

a an event or situation which threatens serious damage to human welfare in a place in the United Kingdom;

b an event or situation which threatens serious damage to the environment of a place in the United Kingdom; or

c war, or terrorism, which threatens serious damage to the security of the United Kingdom.

An event or situation may occur or be inside or outside the United Kingdom. An event or situation threatens damage to human welfare only if it involves, causes or may cause:

a loss of human life;

b human illness or injury;

c homelessness;

d damage to property;

e disruption of a supply of money, food, water, energy or fuel;

f disruption of a system of communication;

g disruption of facilities for transport; or

h disruption of services relating to health.

Part 2 of the Act sets out the duties of Category 1 responders to assess, plan and advise in relation to emergencies. Category 1 responders must:

a from time to time assess the risk of an emergency occurring;

b from time to time assess the risk of an emergency making it necessary or expedient for the body to perform any of its functions;

c maintain plans for the purpose of ensuring, so far as is reasonably practicable, that if an emergency occurs, the body is able to continue to perform its functions;

d maintain plans for the purpose of ensuring that if an emergency occurs or is likely to occur, the body is able to perform its functions so far as necessary or desirable for the purpose of:

   i. preventing the emergency;

   ii. reducing, controlling or mitigating its effects, or;

   iii. taking other action in connection with it.

e consider whether an assessment carried out under paragraph (a) or (b) makes it necessary or expedient for the body to add to or modify plans maintained under paragraph (c) or (d);

f arrange for the publication of all or part of the assessments made and plans maintained under paragraphs (a) to (d) in so far as publication is necessary or desirable for the purpose of:

   i. preventing an emergency;

   ii. reducing, controlling or mitigating the effects of an emergency, or;

   iii. enabling other action to be taken in connection with an emergency.

g maintain arrangements to warn the public, and to provide information and advice to the public, if an emergency is likely to occur or has occurred.

Among other things, the Act makes provision for the following. A Minister may by order require a Category 1 responder to perform its functions for the purpose of preventing an emergency, reducing, controlling or mitigating the effects of an emergency, or enabling other action to be taken in connection with an emergency. A Minister may in an urgent situation give written directions requiring a Category 1 responder to perform these functions. These directions shall cease to have effect after 21 days. The Act contains provisions allowing a Minister to make regulations about disclosure of information by Category 1 or 2 responders to other responders. There are provisions for enforcement allowing proceedings to be brought in the High Court in respect of a failure by a Category 1 or 2 responder to comply with certain of their duties under the Act. A Scottish Minister or a Category 1 or 2 responder can bring these proceedings. There are also provisions for cross-border collaboration between Category 1 and 2 responders in England and Wales and Category 1 and 2 responders in Scotland.

Part 2 of the Act sets out the emergency powers available to central government.

The Civil Contingencies Act 2004 (Contingency Planning) (Scotland) Regulations 2005, Scottish Statutory Instrument 2005 No. 494, set out in further

detail what are the extent of the duties of Category 1 responders in relation to the duty in Section 2 of the Act to assess, plan for and advise on emergencies, and the manner in which those duties are to be performed.

In addition, the Government has produced statutory guidance entitled 'Emergency preparedness, guidance on Part 1 of the Civil Contingencies Act 2004, its associated Regulations and non-statutory arrangements' (Chapter 10 Scotland). Both Category 1 and 2 responders must have regard to this guidance.

Appendix 2: Design proposal review – example questions

This annex gives examples of the questions that should be asked by the reviewers of an infrastructure proposal. The scenarios are based on the 2006 resilience planning assumptions in the 'The National Health Service in Scotland Manual of Guidance: Responding to Emergencies'. (It should be noted that at the time of issuing this document, planning assumptions are moving towards being based on the National Risk Register, it is anticipated that a Scottish Version of the register will be produced). The list of questions given here should not be taken as exhaustive; it is intended as a guide to show how to gauge the level of resilience in a proposal.

Scenario 1 – Mains water supply fails for three days

a What arrangements exist in the design for supplying water?

b How will a failure in the supply be detected?

c Are emergency stocks held in tanks?

   iv. How much stock?

   v. How was this figure arrived at?

   vi. Is this based on normal rates of consumption, or rationed?

   vii. How will the water in these tanks be kept potable so that it is ready for use immediately?

   viii. What arrangements exist for turning over the stock?

d Is there space in the grounds for collapsible temporary tanks?

   i. How long will it take to provide this capability (that is, how much notice is required)?
   ii. Does the volume of tank stock allow sufficient time to construct these temporary tanks?
   iii. Will they require pumping arrangements to feed into the existing distribution system?

e Could a borehole and private supply be provided (that is, one procured outwith that supplied by the local water vendor)?

   i. Will this be for emergency use only (might be easier to get abstraction licence)?

f What engineering controls will be in place if water rationing is part of the response plan?

g Will non-essential supplies be shut off? Manually or automatically (by the Building Management System)?

h What impact will the loss of water or imposition of rationing have on other services? Steam boiler/generator plant, Central Decontamination Unit, operating theatre air-conditioning plant, and other medical users Catering, cleaning and other support users.

i What will be the effect of reduced flow on the sewerage system? Can simple trap water seals evaporate and allow gases/airborne bacteria to backflow? Will there be reduced effectiveness in clearing pipework, build up of sludge, or blockages?

j What is the possibility of using non-potable water from borehole or other source to flush systems?

Scenario 2 – Mains electricity fails for 24 hours

a Is the normal supply at HV or LV? (LV-only supplies cannot be placed on the 'priority user' list by regional distribution companies.)

b What external services require mains electricity for delivery?

c Will the local water provider be able to deliver water (pump failure?)

d Outsourced suppliers, for example sterile supplies: is there sufficient space allocated within the facility to hold stocks for the anticipated duration of the failure? Will the provider be prepared to invest sufficient capital to hold these stocks?

e What arrangements exist for emergency supply of electricity?

Standby generator

f Is the engine rated for continuous running? (Cheaper generators are often rated for 8 hours in 24 or less.)

g How much fuel is held?

h Is there adequate cooling for the generator to operate for extended periods in midsummer?

i What if the generator is down for servicing on the day?

j Has provision been made in the design for connection of another mobile generator during maintenance?

k Who will provide this additional generator and where will it be sourced from?

l Who owns the standby generator: the provider or a subcontractor?

If it is a subcontractor, how quickly are emergency repairs carried out?

Consider the implications of a wide-scale incident on this subcontractor's ability to deliver.

Combined Heat and Power plant used as a standby generator

m What arrangements exist for dumping excess heat in case of low demand? (If this needs water, consider a cascade failure.)

n Does the design use the hospital heating system? (Consider the effect of possibly having to turn on the heating in midsummer to allow the generator to operate.)

o What is the impact of internal failure, for example if a substation or distribution board fails?

i. Can supply be re-routed from somewhere else?

ii. Is it possible to attach a portable generator?

iii. Who will provide the generator, service it, etc.?

p What impact will the loss of the non-essential supply have on facility operations?

q How long will it take to recover and clear any backlog of non-essential work?

Scenario 3 – Loss of telephone communications for up to five days

a Which systems use the telephone network?

Internet connection

b Can supplier orders and deliveries still be tracked?

c Are stock levels of critical supplies sufficient to last for the loss of service, or will manual monitoring of stock levels be required?

d Where will the manpower for manual monitoring come from?

Building management system

e Are satellite sites controlled and monitored from a remote location?

f Could loss of the telephone network make remote operation impossible?

i. Will systems have to be manually operated (manpower provision, cost)?

ii. Will systems operate in less economical modes (increased running costs)?

Plant monitoring systems

g Leased generators and CHP plant often have a telephone connection to the manufacturer to report faults and maintenance requirements.

i. How will a fault be reported if found?

ii. Will the estates department even be aware?

CCTV and security systems

h Remote monitoring of CCTV at an off-site security centre may be a cheaper option for a provider.

i. Will this system continue to operate if the telephone network fails?

ii. What vulnerabilities would be exposed by this failure?

Appendix 3: Acronyms

ADB Activity DataBase
BMS Building Management System
BSA Bomb Shelter Areas
CBRN Chemical/Biological/Radiological/Nuclear
CCA 2004 Civil Contingencies Act 2004
CEPO Council Emergency Planning Officers
CFSMS Manual Counter Fraud and Security Management Service Manual
CHP Combined Heat and Power
CDU Central Decontamination Unit
CCTV Closed Circuit Television
DSO Departmental Security Officer
EPL Emergency Planning Lead
HDL Health Department Letter
HV High Voltage
IEM Integrated Emergency Management
IPE Instructions, Procedures and Exercises
ISO International Organisation for Standardisation
KPIs Key performance indicators
NSAC National Security Advice Centre (part of MI5)
NSF National Service Framework
PA Public Address
SCCIP Scottish Climate Change Impacts Partnership
SCG Strategic Co-ordinating Group
SEPA Scottish Environment Protection Agency
SMART Specific, Measurable, Achievable, Realistic/Relevant and Timely
UPS Uninterruptible Power Supplies
UV Ultraviolet
VIE Vacuum Insulated Evaporator

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