Contents

How to use this Guidance

Introduction

What is CIRAM? 3

Why is CIRAM Important? 3

When is CIRAM Required? 4

How to Undertake CIRAM 5

Stage A – Pre-Workshop Preparation and Production of the Delegates Pack 8

Stage B – Risk Assessment Workshop 19

Stage C – Post-Workshop Review 31

Stage D - Implementation 32
How to use this Guidance

This guidance forms Section 7 of the MOD Sustainability and Environmental Appraisal Tool Handbook (‘the Handbook’). It provides guidance on undertaking a Climate Impacts Risk Assessment.

Section 7.1: What is CIRAM?

Section 7.2: Why is CIRAM important?

Section 7.3: When is CIRAM required?

Section 7.4: How to undertake CIRAM

Who is the guidance aimed at?

This guidance provides advice on how and when to complete a Climate Risk Impact Assessment.

Box 7.1 – CIRAM Guidance & Policy

<table>
<thead>
<tr>
<th>CIRAM Guidance and Implementation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIO Sustainable Development Support: <a href="mailto:DIOSDEUS-SusDevSpt@mod.uk">DIOSDEUS-SusDevSpt@mod.uk</a></td>
</tr>
</tbody>
</table>

CIRAM Policy

JSP 850 – Infrastructure and Estate Policy – Awaiting Publication. Please refer to JSP 418

FMC Capability Infrastructure: FMC-Cap-InfraPolSustEste@mod.uk

MOD is always seeking to learn from good practice to improve the ways that guidance is provided. Please email any suggestions or feedback to DIOEUS-SusDevSpt@mod.uk
What is Climate Impact Risk Assessment Methodology?

7.1.1 CIRAM is a risk assessment tool, based on MOD’s own risk management methodology (JSP 892 MOD Risk Management Policy), designed to improve the resilience of MOD establishments to climate related hazards and ensure the continuity of defence outputs. It has been developed to meet MOD’s business and statutory commitments.

7.1.2 CIRAM identifies the risks posed by current and projected impacts of climate or extreme weather events on the outputs of MOD establishments and identifies actions required to maintain and optimise operational capability. It identifies:

- Existing vulnerabilities to weather related hazards;
- Whether existing vulnerabilities are likely to change over time;
- Any additional vulnerability likely to arise in the future;
- The likely direct and indirect impacts on defence output;
- Actions and measures to build resilience into the defence function of the establishment;
- Any opportunities created by changes in climate.

Why is CIRAM important?

7.2.1 CIRAM helps enhance MOD Business Resilience proportionate to the risks posed by weather and climate related hazards. It can enhance the performance of the MOD estate, by identifying improved efficiencies, better targeting of resources, adopting flexible solutions and managing social impacts.

7.2.2 CIRAM helps MOD establish an understanding of the estate’s ability to anticipate, absorb, accommodate and recover from the effects of climate driven challenges, and implement resilience and adaptation actions where necessary.

7.2.3 Climate resilience is a UK Government and Defence priority. The UK National Security Strategy (NSS) 2010 A Strong Britain in an Age of Uncertainty highlights natural hazards such as floods as one of the national security priorities (Tier 1 risks), together with terrorism, cyber-attack and international military crises. The NSS emphasises the need to predict, prevent and build resilience to these risks and remain adaptable for the future. Weather events can compromise the delivery of defence outputs on MOD establishments. Existing vulnerabilities are likely to become more challenging with changes in climate.

7.2.4 CIRAM also supports the UK Climate Change Act 2008, UK Government Greening Government Commitments, UK National Adaptation Programme, Cabinet Office Critical Infrastructure Resilience Programme and MOD resilience policy.

7.2.5 Climate resilience threats, impacts and opportunities shall be fully appraised and taken into account in all strategies, policies, decision-making processes and associated programmes, projects, activities and behaviours.
7.2.6 Climate change is likely to exacerbate existing risks as well as create additional risks and opportunities for MOD establishments. There will be implications for the way the estate is managed and developed; core works, core services and refurbishments will need to reflect future climatic conditions; business continuity processes may need to be revised; new ways of working introduced and there may be issues for establishment security.

When is CIRAM required?

7.3.1 As indicated in JSP850 Estate Infrastructure & Policy, MOD shall continue to assess and manage climate resilience risks to meet current and future infrastructure capability requirements. The application of the CIRAM tool shall be prioritised and triggered by:

- Estate initiatives such as: plans, programs or projects with wider implications for the MOD estate;
- The development or update of long-term development plans of an establishment e.g. Establishment Development Plan;
- Strategic initiatives e.g. Footprint Strategy, equipment basing studies etc.
- Strategic Environmental Assessments and Sustainability Appraisals.

7.3.1 CIRAM may be required if MOD activities:

- Provide or support critical national infrastructure;
- Have elements affected by the weather;
- Involve significant investment;
- Involve decisions with significant irreversible impacts;
- Have significant interdependencies with other government activities or the wider economy; or
- Address contingency planning or business continuity needs.
How to undertake a climate impacts risk assessment

7.4.1 This chapter provides practical guidance on how to prepare and undertake a CIRAM assessment and its implementation as well as identifying roles and responsibilities. The CIRAM assessment has 4 key stages (Fig. 7.1) focused on a risk assessment workshop and the production of a Climate Resilience Risk Register (CRRR) which are:

- **Stage A** – Pre-workshop Preparation and Production of the Delegates Pack
- **Stage B** – Risk Workshop
- **Stage C** – Post Workshop Review
- **Stage D** – Implementation

Figure 7.1 Key stages and outputs of the CIRAM assessment
Resources

7.4.2 Stage A (pre-workshop preparation) is the most resource intense as it involves the collation and interpretation of climate and site data (approximately 2-4 days full time equivalent depending on existing knowledge of the site).

7.4.3 Climate information is collated on a 25km² scale and therefore may also be applicable to neighbouring establishments. For example climate data for Thorney Island may be applicable to the Portsmouth/Gosport area.

7.4.4 The risk workshop will last for half a day and should be attended by relevant internal and external staff, including military and contractors, who are responsible for the management of the establishment (see para. 7.6.4).

7.4.5 It is advisable to allow up to four weeks for the post-workshop review and consultation of the Climate Resilience Risk Register (CRRR) before its formal adoption by the establishment. This provides an opportunity for the HoE and/or nominated representative and workshop participants to review and further understand the risks and actions identified in the workshop, and also to consult with any stakeholders identified as risk owners.

7.4.6 The annual review of the Climate Resilience Risk Register can be combined with existing processes e.g. review of establishment IEMP, SHEP committee meetings etc. See Stage D and Practitioner Guidance 01/12 Building a Climate Resilient Estate.

Table 7.1 Indicative resource requirements for undertaking a CIRAM assessment

<table>
<thead>
<tr>
<th>CIRAM stage</th>
<th>TLB Staff Resource</th>
<th>DIO Staff Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-workshop preparation</td>
<td>• Support DIO SDS in provision of information and critical objectives for site.</td>
<td>• Collate and interpret climate data (up to 3-4 days).</td>
</tr>
<tr>
<td></td>
<td>• Organise workshop and attendees in conjunction with SDS.</td>
<td>• Support Establishment in organisation of workshop.</td>
</tr>
<tr>
<td>Risk workshop (1/2 day)</td>
<td>• Facilities for workshop.</td>
<td>• Workshop facilitated by DE SDS (1/2 - 1 day).</td>
</tr>
<tr>
<td></td>
<td>• Attendance by relevant TLB and establishment staff including military (1/2 day).</td>
<td>• Attendance by relevant DIO and contractor staff e.g. SIM, LMS etc.</td>
</tr>
<tr>
<td>Post workshop review</td>
<td>• HoE nominated representative to agree sign off of Climate Resilience Risk Register.</td>
<td>• DIO SDS to provide support in agreement of risk register where required.</td>
</tr>
</tbody>
</table>

Who can help?

7.4.7 The Sustainable Development Support (SDS) team (see Box 7.1) within DIO EUS has been allocated resources to undertake Stage A of CIRAM for defence priority / strategic sites as part of the second roll-out phase of CIRAM. SDS will also provide support in facilitating the workshops for these establishments. SDS resources will be limited for supporting CIRAM assessments for the remaining operational and less sensitive establishments.
7.4.8 For all other establishments, the guidance contained within this Section will enable non-specialists to undertake a CIRAM assessment. SDS can provide advice and training on the CIRAM process and application.

7.4.9 The Climate Resilience Focal Point within SDS can also provide SME advice on stages C and D.
STAGE A – PRE-WORKSHOP PREPARATION AND PRODUCTION OF DELEGATES’ PACK

Introduction

7.5.1 Stage A involves a desk study to collate the climate and site information, to update the delegate’s pack and accompanying workshop presentation. The aim of the delegates’ pack is to provide participants and facilitators at the workshop (Stage B) with the relevant information to allow them to effectively contribute and identify risks. The desk study requires compiling the following information:

- Identifying the establishment’s objectives and operational functions in delivering its defence output (this will govern the scope of the assessment);
- Details of the infrastructure, assets and utilities on the establishment; and
- Historic and projected climatic information for the establishment.

Figure 7.2: Stage A Tasks

A1: Identifying who to involve
A2: Identify Site Objectives and Critical Operational Functions
A3: Collation of Site information and identification of potential issues
A4: Collection of climatic information related to the site
A5: Production of Delegates’ Pack
A6: Update Workshop Presentation

Introductory letter (Includes Risk Scoring Guidance Climate Change Question Set)

A1: Identifying who to involve in the Desk Study

7.5.2 When undertaking a CIRAM desk study a number of functional areas can provide guidance, support and key information required, including

- Sustainable Development Support (SDS) and MOD Climate Resilience Focal point (see Box 7.1)
- Site Infrastructure Manager (SIM), Estate Manager, or equivalent can provide information regarding the management of the establishment e.g. IEMP, IRMP etc. together with any
other additional information e.g. age of built assets, recurrent issues e.g. exceeding drainage capacity etc. The SIM or equivalent should be provided an early opportunity to review the accuracy of the delegates’ pack.

- Site Business Continuity (BC) Focal Point can assist in identifying the establishment’s objectives and critical operational functions and provide the Business Continuity Plan.

- Site Safety, Health, Environment and Fire Officer or equivalent can assist in identifying the establishment’s wider sustainable development, environmental and health and safety obligations e.g. discharge consents.

- Staff with good site knowledge and long experience of the establishment should also be consulted, as they are likely to have a detailed knowledge of the impacts of previous weather-related events.

**A2: Identification of Objectives and Critical Operational Functions for the establishment**

7.5.3 It is essential to identify the establishment’s key objectives and critical operational functions that are fundamental to delivering operational capability on the establishment and if compromised would have a negative impact on operational output. This includes any dependant or sister sites.

7.5.4 Wider sustainable development and environmental issues should also be considered where there is a legal obligation or a significant reputational impact.

7.5.5 The site Business Continuity Plan can help identify the critical assets and operations on site. If no Business Continuity plan is in place then the establishment should be consulted to agree the success criteria for the establishment.

7.5.6 An opportunity is provided during the workshop to review the objectives and success criteria.
Box 7.2 Task A2 example – Identification of Objectives and Critical Operational Functions at Thorney Island

The critical operational functions identified for the establishment are:

- Operating Station infrastructure;
- Delivery of training;
- Essential services/utilities (water supply, power);
- Security of personnel;
- Provision of Support Services (food supply, messes);
- Provision of Service Family Accommodation (SFA).

The wider SD/Environmental legislative and policy obligations that could impact on the establishment's reputation are:

- Minimal impact to the environmentally and ecologically sensitive Chichester Harbour and surrounding Site of Special Scientific Interest (SSSI) areas;
- Contamination avoidance;
- Compliance with all legislative requirements;
- Provide buildings with comfortable interior environment/temperatures;
- Minimise disruption and nuisance to the local community and promote the base as a good neighbour;
- Maximise opportunities for partnership working and community engagement activities;
- Maximise opportunities for the use of local suppliers;
- Compliance with all legislative requirements.

Resource performance

- Value for money;
- Low maintenance costs;
- Avoidance of damage costs from flooding event.

A3: Compiling establishment specific information and identification of potential issues

7.5.7 Information about the establishment (and surrounding area) should be collated to identify the key assets and dependencies (e.g. transport routes) in delivering the establishment's operational output. This includes other sister, satellite or remote sites which are dependent of or support the establishment’s operational output e.g. radar stations, firing ranges, water access points, Service Family Accommodation (SFA) etc.

7.5.8 Table 7.2 provides advice on the relevant sources of information to compile Appendix 7A. A worked example of establishment information is at Appendix 7A.

Table 7.2 Information required to compile and sources

<table>
<thead>
<tr>
<th>FACTOR</th>
<th>POTENTIAL SOURCES OF INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Operational Functions</td>
<td>Business Continuity Plan (BCP)</td>
</tr>
<tr>
<td></td>
<td>Establishment Webpage</td>
</tr>
<tr>
<td>Key establishment objectives</td>
<td></td>
</tr>
</tbody>
</table>
### Establishment Location

<table>
<thead>
<tr>
<th>Identify current and future operational issues of the site</th>
<th>Business Continuity Plan (BCP)</th>
<th>Establishment Webpage</th>
<th>Establishment plans e.g. EDP, IEMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractors, lodger units &amp; sister sites</td>
<td>Business Continuity Plan (BCP)</td>
<td>Establishment Webpage</td>
<td>Establishment plans e.g. EDP, IEMP</td>
</tr>
</tbody>
</table>

#### Topography (e.g. meters above sea level)
- Geographic Online Data for Estates (GEODE mapping) 
  [http://geode.cis.r.mil.uk/GEODE/](http://geode.cis.r.mil.uk/GEODE/)
- Land Quality Assessment (LQA) for the site (GEODE, LQA Phases layer)

#### Transport routes (type and any documented existing issues)
- GEODE mapping (for location of routes) e.g. if only 1 main access route exist
- Establishment Webpage
- Local Authority (LA) information e.g. the Local Climate Impacts Profile, may include information on transport routes vulnerabilities

#### Landscape (proximity to urban development, estuaries, forested areas, heathland areas etc.)
- GEODE mapping
- Establishment Webpage
- Landscape component of the Integrated Rural Management Plan (IRMP) available from SIM or DIO Environmental Planning Team

### Site Layout & description

<table>
<thead>
<tr>
<th>Site Layout</th>
<th>GEODE mapping</th>
<th>Establishment Webpage</th>
<th>Infrastructure plans e.g. IRMP</th>
<th>LQA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &amp; condition of assets</td>
<td>Infrastructure plans e.g. IRMP, IEMP, EDP</td>
<td>Establishment Webpage</td>
<td>LQA</td>
<td></td>
</tr>
<tr>
<td>Existence of training areas</td>
<td>GEODE mapping</td>
<td>Infrastructure plans e.g. IRMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demographics</td>
<td>Establishment Webpage</td>
<td>Infrastructure plans e.g. IRMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilities (water, electricity etc.)</td>
<td>Establishment Webpage</td>
<td>Infrastructure plans e.g. IRMP, IEMP, EDP</td>
<td>LQA</td>
<td></td>
</tr>
</tbody>
</table>

### Environmental Setting & issues

<table>
<thead>
<tr>
<th>Geological conditions (e.g. type of soil) and hazards</th>
<th>GEODE (see Natural Designations options, and select layers for Superficial Geology and Bedrock Geology)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Land Quality Assessment for the site</td>
</tr>
<tr>
<td></td>
<td>British Geological Survey (BGS) <a href="http://mapapps.bgs.ac.uk/geoologyofbritain/home.html">http://mapapps.bgs.ac.uk/geoologyofbritain/home.html</a> and <a href="http://www.bgs.ac.uk/products/geosure/home.html">http://www.bgs.ac.uk/products/geosure/home.html</a></td>
</tr>
<tr>
<td><strong>Ecology</strong></td>
<td>• GEODE (see Natural Designations layers)</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td><strong>Forestry</strong></td>
<td>• GEODE (see Natural Designations layers)</td>
</tr>
<tr>
<td><strong>Archaeology and Historic Environment</strong></td>
<td>• GEODE (see Cultural Designations layers)</td>
</tr>
<tr>
<td><strong>Access &amp; recreation</strong></td>
<td>• GEODE (see Access and Recreation layers)</td>
</tr>
<tr>
<td><strong>Other e.g. discharge consents, contaminated land issues etc.</strong></td>
<td>• LQA</td>
</tr>
</tbody>
</table>

**Summary of potential Climate Change risks**

| **Any site existing reports or documented issues e.g. overwhelming of drainage systems during periods of intense rainfall** | • IRMP  | • Site records on maintenance events related to weather information may be available from SIM and SHEF officer  |
|                                                                                                                |        | • SHEP committee minutes  | • Industry Partner's data on maintenance issues |
| **Local authority issues**                                                                                      | • IRMP  | • LA information on climate change adaptation e.g. strategic plans for development / population change and Local Climate Impacts Profile |
| **Flood risk**                                                                                                | • GEODE mapping (Estate Management, Flood layers)  | • Coastal component of the IRMP |
|                                                                                                                | • Environment Agency (EA) indicative fluvial, coastal, tidal and surface water flood maps |
|                                                                                                                | • EA Catchment Flood Management Plans (which provide an strategic view on how the risk may evolve) |
|                                                                                                                | • Scottish Protection Agency (SEPA) flood maps and strategic assessments and plans |
|                                                                                                                | • LA Strategic Flood Risk Assessment |
| **Drought risk**                                                                                               | • LA information e.g. LCLIP  | • Water company climate change risk assessment / adaptation plan |

**Historic weather data**

| **Obtain any summary historic weather data relevant to the site** | • Site weather station  | • Closest Met Office station averages http://www.metoffice.gov.uk/climate/uk/averages/19611990/ |
A4: Compiling climatic information from UKCP09 related to the site

7.5.9 Information on observed and projected climate change needs to be collated in order to understand the current and future impact of climate related hazards on the establishment.

7.5.10 This information is freely available from the UK Climate Projections 09 (UKCP09) which provides data on observed changes and future projections under different emissions scenarios on how the UK climate is likely to change up to the end of the century (see Box 7.3). A worked example of an establishment’s projected climate change is at Appendix 7A.

Box 7.3 UK Climate Projections (UKCP09)

What are the UK Climate Projections (UKCP09)?

In June 2009, the UK Climate Impact programme (UKCIP), leading source of climate change information for the UK, released the latest and most detailed probabilistic projections on climate in the UK for the coming decades – the UK Climate Projections 2009 (UKCP09).

The projections consist of numerous freely available datasets at the UKCP09 User Interface. There are a number of prepared reports, including regional maps and graphs but the data can also be interrogated at establishment level. To find out more see http://ukclimateprojections.defra.gov.uk/.

For advice to compile UKCP09 data contact DIO SDS team.

7.5.11 Observed climate change data is provided regionally and can be found at Figures 7.3, 7.4 & 7.5.

Figure 7.3 Change in daily mean temperature (°C) from 1961 to 2006 by season and area

<table>
<thead>
<tr>
<th>Area</th>
<th>Spring</th>
<th>Summer</th>
<th>Autumn</th>
<th>Winter</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>South West England</td>
<td>1.40</td>
<td>1.41</td>
<td>1.15</td>
<td>1.72</td>
<td>1.37</td>
</tr>
<tr>
<td>South East England</td>
<td>1.56</td>
<td>1.77</td>
<td>1.32</td>
<td>2.00</td>
<td>1.62</td>
</tr>
<tr>
<td>London</td>
<td>1.60</td>
<td>1.90</td>
<td>1.31</td>
<td>2.02</td>
<td>1.67</td>
</tr>
<tr>
<td>Wales</td>
<td>1.44</td>
<td>1.36</td>
<td>1.00</td>
<td>1.70</td>
<td>1.33</td>
</tr>
<tr>
<td>East of England</td>
<td>1.52</td>
<td>1.86</td>
<td>1.27</td>
<td>2.02</td>
<td>1.63</td>
</tr>
<tr>
<td>West Midlands</td>
<td>1.57</td>
<td>1.70</td>
<td>1.21</td>
<td>1.95</td>
<td>1.56</td>
</tr>
<tr>
<td>East Midlands</td>
<td>1.57</td>
<td>1.87</td>
<td>1.27</td>
<td>2.01</td>
<td>1.64</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>1.13</td>
<td>1.32</td>
<td>0.97</td>
<td>1.43</td>
<td>1.18</td>
</tr>
<tr>
<td>Yorkshire and Humberside</td>
<td>1.45</td>
<td>1.66</td>
<td>1.15</td>
<td>1.90</td>
<td>1.50</td>
</tr>
<tr>
<td>North West England</td>
<td>1.44</td>
<td>1.45</td>
<td>1.07</td>
<td>1.81</td>
<td>1.40</td>
</tr>
<tr>
<td>North East England</td>
<td>1.43</td>
<td>1.57</td>
<td>1.13</td>
<td>1.86</td>
<td>1.46</td>
</tr>
<tr>
<td>West Scotland</td>
<td>1.15</td>
<td>1.25</td>
<td>0.98</td>
<td>1.44</td>
<td>1.16</td>
</tr>
<tr>
<td>East Scotland</td>
<td>1.17</td>
<td>1.34</td>
<td>1.00</td>
<td>1.49</td>
<td>1.20</td>
</tr>
<tr>
<td>North Scotland</td>
<td>0.95</td>
<td>1.24</td>
<td>0.96</td>
<td>1.22</td>
<td>1.05</td>
</tr>
</tbody>
</table>
### Figure 7.4 Percentage change in total precipitation amount from 1961-2006 by season

<table>
<thead>
<tr>
<th>Area</th>
<th>Spring</th>
<th>Summer</th>
<th>Autumn</th>
<th>Winter</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>South West England</td>
<td>4.0</td>
<td>-8.8</td>
<td>28.6</td>
<td>15.9</td>
<td>9.7</td>
</tr>
<tr>
<td>South East England</td>
<td>-6.5</td>
<td>-13.1</td>
<td>20.6</td>
<td>23.3</td>
<td>5.4</td>
</tr>
<tr>
<td>London</td>
<td>-7.0</td>
<td>-16.7</td>
<td>19.4</td>
<td>22.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Wales</td>
<td>8.4</td>
<td>-5.6</td>
<td>22.3</td>
<td>27.0</td>
<td>13.6</td>
</tr>
<tr>
<td>East of England</td>
<td>-1.7</td>
<td>4.9</td>
<td>21.6</td>
<td>17.7</td>
<td>9.3</td>
</tr>
<tr>
<td>West Midlands</td>
<td>-1.4</td>
<td>-5.2</td>
<td>29.8</td>
<td>10.9</td>
<td>7.6</td>
</tr>
<tr>
<td>East Midlands</td>
<td>-4.6</td>
<td>2.6</td>
<td>28.7</td>
<td>11.0</td>
<td>8.1</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>9.5</td>
<td>2.5</td>
<td>-0.7</td>
<td>12.5</td>
<td>5.2</td>
</tr>
<tr>
<td>Yorkshire and Humberside</td>
<td>-0.3</td>
<td>-1.1</td>
<td>10.2</td>
<td>24.3</td>
<td>7.1</td>
</tr>
<tr>
<td>North West England</td>
<td>6.3</td>
<td>-13.2</td>
<td>5.6</td>
<td>43.0</td>
<td>8.8</td>
</tr>
<tr>
<td>North East England</td>
<td>4.6</td>
<td>-6.9</td>
<td>12.4</td>
<td>29.6</td>
<td>8.7</td>
</tr>
<tr>
<td>West Scotland</td>
<td>23.2</td>
<td>4.3</td>
<td>11.0</td>
<td>58.6</td>
<td>23.2</td>
</tr>
<tr>
<td>East Scotland</td>
<td>14.3</td>
<td>-3.6</td>
<td>28.0</td>
<td>35.9</td>
<td>18.7</td>
</tr>
<tr>
<td>North Scotland</td>
<td>22.6</td>
<td>-5.0</td>
<td>11.1</td>
<td>65.8</td>
<td>23.0</td>
</tr>
</tbody>
</table>

### Figure 7.5 Change in relative humidity (%) from 1961 to 2006 by season and area

<table>
<thead>
<tr>
<th>Area</th>
<th>Spring</th>
<th>Summer</th>
<th>Autumn</th>
<th>Winter</th>
<th>Annual</th>
</tr>
</thead>
<tbody>
<tr>
<td>South West England</td>
<td>-2.3</td>
<td>-2.7</td>
<td>-3.0</td>
<td>-2.4</td>
<td>-2.7</td>
</tr>
<tr>
<td>South East England</td>
<td>-3.4</td>
<td>-4.7</td>
<td>-3.7</td>
<td>-3.3</td>
<td>-3.8</td>
</tr>
<tr>
<td>London</td>
<td>-3.9</td>
<td>-5.2</td>
<td>-3.9</td>
<td>-3.9</td>
<td>-4.3</td>
</tr>
<tr>
<td>Wales</td>
<td>-2.1</td>
<td>-1.9</td>
<td>-2.7</td>
<td>-2.6</td>
<td>-2.4</td>
</tr>
<tr>
<td>East of England</td>
<td>-3.2</td>
<td>-4.5</td>
<td>-3.1</td>
<td>-3.4</td>
<td>-3.6</td>
</tr>
<tr>
<td>West Midlands</td>
<td>-2.6</td>
<td>-3.3</td>
<td>-3.1</td>
<td>-3.1</td>
<td>-3.1</td>
</tr>
<tr>
<td>East Midlands</td>
<td>-3.1</td>
<td>-4.2</td>
<td>-2.8</td>
<td>-3.1</td>
<td>-3.3</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>-0.7</td>
<td>-0.6</td>
<td>-1.4</td>
<td>-0.2</td>
<td>-0.8</td>
</tr>
<tr>
<td>Yorkshire and Humberside</td>
<td>-2.9</td>
<td>-3.4</td>
<td>-2.3</td>
<td>-2.9</td>
<td>-2.9</td>
</tr>
<tr>
<td>North West England</td>
<td>-2.3</td>
<td>-1.9</td>
<td>-2.3</td>
<td>-2.3</td>
<td>-2.2</td>
</tr>
<tr>
<td>North East England</td>
<td>-2.8</td>
<td>-2.8</td>
<td>-2.3</td>
<td>-2.6</td>
<td>-2.7</td>
</tr>
<tr>
<td>West Scotland</td>
<td>-2.2</td>
<td>-1.6</td>
<td>-2.7</td>
<td>-1.9</td>
<td>-2.1</td>
</tr>
<tr>
<td>East Scotland</td>
<td>-2.4</td>
<td>-1.9</td>
<td>-2.6</td>
<td>-2.5</td>
<td>-2.4</td>
</tr>
<tr>
<td>North Scotland</td>
<td>-3.2</td>
<td>-2.5</td>
<td>-4.0</td>
<td>-2.8</td>
<td>-3.2</td>
</tr>
</tbody>
</table>
7.5.12 In order to ensure consistency, projected climate change data should be compiled as follows:

a. **2050 timescale.** This is the projected changes averaged for the period 2040–2069 relative to the 1961–1990 baseline and the 1980-1999 baseline for sea level rise and storm surge. It should be noted that not all UKCP09 outputs are provided for all timescales e.g. data for the number of hot days (annually) is only available for the 2080s period. If a business benefit is identified then different timescales may be considered.

b. **Emissions scenarios.** It is recommended that the 10th and 90th percentiles for both high scenario and the 50th percentile for the medium emissions scenario are compared (see Box 7.4). This is because as for other risk assessments e.g. those undertaken for business cases it is important to consider and develop sensible contingency options for the future. The 10th and the 90th probability will give the range of the change likely to occur, so decisions can be made whether there is a need to adapt a particular asset to the low, medium or high projections depending on the type of asset and capability to undertake the risk. It may be justifiable to only use the high emissions scenario due to the criticality of the establishment. However, this should be agreed with the establishment during Stage A as part of the identification of the objectives and critical operational functions. This also applies to the use of the High ++ sea level rise scenarios.

**Box 7.4 Climate related risks examples**

The key climate impacts identified by the UK Climate Impacts Programme (UKCIP) are likely to be:
- An increase in the risk of all types of flooding (coastal, fluvial, surface water, groundwater) and erosion;
- Greater pressure on drainage systems;
- Increased likelihood of storm damage;
- Increased risk of water shortages and low stream flows;
- Increased risk of subsidence and landslides;
- Buildings becoming uncomfortably hot;
- A range of health issues; and
- Loss of many important habitats for wildlife and ecosystem services

The UK Climate Change Risk Assessment 2012 and the Cabinet Office National Risk Register identify as key risks likely to have an impact in the UK in the short term, coastal erosion and flooding, inland flooding, heatwaves and wildfires. Risks that could have an impact in the longer term include drought and subsidence. However there is uncertainty with regard to the rate of change and the level of associated risk would be establishment specific.
Box 7.5 Interpreting the Climate Projections

The UKCP09 projections are probabilistic. Climate variables are presented for a range of probability levels. The 10th, 50th & 90th Percentiles relate to the 10%, 50% and 90% probability change ranges, which mean the following:

i. 10% = it is very likely that the change will be greater than
ii. 50% = central estimate, i.e. it is as likely as not
iii. 90% = it is very unlikely that the change will be greater than.

The graphs below illustrate the 10th and 90th percentiles and show the ways of presenting probability (Probability Density Function and Cumulative Distribution Function) for two emissions scenarios. The graphs illustrate that it is:

- LIKELY that temperature change will be greater than +1.4°C under the medium emissions scenario (blue line) and
- LIKELY that change will be greater than +1.7°C under the high emissions scenario (red line),
- VERY UNLIKELY that it will be greater than +6.0°C under the medium emissions scenario (blue line) and
- VERY UNLIKELY that it will be greater than +7.0°C under the high emissions scenario (red line).

Graph 1 Probability Density Function
7.5.13 The following projected climatic change variables should be considered within all CIRAM assessments:

- Mean summer temperature;
- Number of hot days (annually);
- Number of dry spells longer than 10 days (annually);
- Maximum daily summer temperatures;
- Mean winter temperature;
- Average temperature of the coolest day in winter;
- Mean summer precipitation;
- Mean winter precipitation; and
- Precipitation on the wettest day in winter.

7.5.14 Depending on the location of your site, other climatic variables may need to be considered within the CIRAM assessment. These include:

- Projected change in snow cover e.g. high altitude, latitude sites;
- Projected change in cloud cover;
- Projected change in relative sea level rise e.g. coastal sites;
- Projected change in sea temperature e.g. coastal sites; and
• Projected change in storm surge height e.g. coastal sites.

**A5: Compiling the Delegates' Pack**

7.5.15 The Delegates' Pack is designed to provide the workshop participants with an awareness of climate change issues, the CIRAM process, establishment-related issues and key projected climate change issues prior to attending the workshop. Participants are expected to review the information beforehand to enable them to effectively contribute.

7.5.16 The Delegates' Pack includes:

a. **Introductory letter.** This provides an overview of CIRAM process, the importance of undertaking the assessment and instructions for workshop participants. Template can be found at Appendix 7C. The Introduction includes links to:
  - **Risk Scoring Guidelines.** Also found at Appendix 7E.
  - **Climate Question Set.** This is a list of questions that may arise during the workshop itself. It is designed to help the participants understand and formulate their views on the key climate-related risks to the establishment and any adaptation actions required. The Climate Question Set is at Appendix 7G.

b. **Agenda for Workshop.** A template is at Appendix 7B.

c. **Summary of Establishment & Climate Information.** This is a summary of the information collated during the desk study relevant to the site. It should identify the site objectives, critical operational functions and a summary of key observer and projected climatic issues relevant to the establishment. A worked example is at Appendix 7A.

7.5.17 The delegates' pack should be sent out in sufficient time to allow participants to complete their pre-workshop preparation. Participants should read through the material and consider the potential climate risks in advance of the workshop. Participants may have other relevant data or information and should be encouraged to highlight it at the workshop.

**A6: Updating the Workshop Presentation**

7.5.18 The PowerPoint template and speakers notes can be found at Appendix H. It will be necessary to populate the presentation with information relevant to the establishment i.e. climatic information from UKCP09 etc. The workshop provides an opportunity to expand on and discuss the detail of the climate change projections. Speaker notes and a presenter’s aide memoir are also provided at Annexes 7H & 7J.
STAGE B – RISK ASSESSMENT WORKSHOP

Introduction

7.6.1 Stage B concerns the organising and delivering of the risk assessment workshop. The output of the workshop is a completed Climate Resilience Risk Register (CRRR).

7.6.2 The key aims of the Risk Workshop are:

a. To identify current and future risks to the operational capability of the site as a result of climate related hazards; and

b. To identify adaptation actions that would allow the site to become resilient to the effects of climatic events and therefore maintain operational capability, as well as identifying processes and risk action owners for delivery of these actions.

B1: Organising the Risk Workshop

7.6.3 Participants. It is important to invite participants with long experience of working on the site who have knowledge of historical management issues and can provide an insight into the impacts of past extreme weather events on the establishment.

7.6.4 It is also important to invite participants who are responsible for the management of the relevant functional areas on the establishment and may be aware of any potential risks. The following functions should be represented:

- Representative familiar with site and military operations on site;
- Business continuity planning;
- Property/facility management;
- Land Management Services;
- Site Health & Safety and Fire management;
- Housing manager;
- Site Environmental management;
- Area Utility Manager;
- Contract management team (e.g. NGEC and Aquatrine);
- Sustainable development advisory team;
- Emergency planning; and
- A site user.
7.6.5 Different sites will have different contract arrangements in place and responsibilities may come under different organisational roles. All relevant functional roles should be consulted and represented at the workshop.

7.6.6 **Timings.** Half a day should be allocated for the workshop. The template agenda (Appendix 7B) gives an indication of timings.

7.6.7 **Roles and Responsibilities.** There are a number of roles and responsibilities for those engaged in the workshop. These are as follows:

   a. **Facilitator.** The role of the facilitator is to:
      - Provide the introduction to the workshop;
      - Deliver presentations on introduction to CIRAM Process and each climate variable;
      - Facilitate working sessions for each climatic variable.

      Speaker notes are provided with the PowerPoint presentation (Appendix 7H) and a FAQ for climate sceptics and a Facilitators’ Aide Memoire are provided (Appendices 7I and 7J).

   b. **Risk Recorder.** A member of the establishment staff should be available to record the risks in the Climate Resilience Risk Register as they arise during the discussions and to annotate actions and process owners.

**Delivering the Workshop**

7.6.8 The power point presentation template provided at Annex 7H includes speaker notes. A presenter’s aide memoir is also provided at Annex 7J

**B2: Welcome and Structure**

7.6.9 The structure for the workshop follows Appendix 7B & 7H as follows:

   a. **Welcome and Introduction.** Welcome participants and provide policy background to climate change adaptation and the relevance to defence, the CIRAM process and outcomes from the workshop.

   b. **Introduction to the CIRAM Process.** A brief presentation on climate change science, observed trends, and risk scoring. Outline the approach to the working session.
c. **Presentation on Climatic Variables.** A presentation on each climatic variable, (temperature, precipitation, storminess and sea level rise\(^1\)) including observed and projected information relevant to the site and interactions.

d. **Facilitated Working Session.** Facilitated session to identify the risks, adaptation actions, processes and risk action owners and recording of these on the risk register.

e. **Summary.** Provides an opportunity review the proceedings of the day and agree next steps.

**B3: Delivering the Introductions to the Establishment and the Workshop Process**

7.6.10 **Introduction to the Workshop process (B3b).** This outlines the structure of the workshop and the completion of the risk register. The following should be covered:

a. **Background to climate change science and projections**, illustrating how climate change could change over time at the location of the establishment. This section provides information on the climate change projections, emissions scenarios and timescales used.

b. **Identifying the key objectives and critical operational functions for the establishment.** This provides an opportunity to review the key objectives and critical operational functions contained in the delegates’ pack. This will set the scope of later discussions.

c. **Introduction to the facilitated working session.** Which will include:

   - Identifying direct and indirect impacts and identifying critical thresholds;
   - Scoring the risks;
   - Identifying adaptation actions;
   - Assigning a process and owner; and
   - Recording on the risk register.

**B4: Facilitating the Working Session and Completing the Risk Register**

7.6.11 Following the format at Appendix 7L consider:

- Review existing and future climatic conditions (B4a);
- Identify the risks to the operational performance of the site (B4b);
- Score each risks (B4b) and
- Identify management actions, processes and owners against each risk identified (B4c).

7.6.12 An aide memoire is available for facilitators to guide discussions (Appendix 7J). It should be noted that the aide memoire is not exhaustive.

---

\(^1\) Where applicable to the site
7.6.13 The facilitated session provides an opportunity to workshop participants to contribute their own experience.

**B4a Review of existing and future climatic conditions**

7.6.14 The following climatic variables should be considered when assessing risks:

- Temperature.
- Precipitation
- Storms frequency and intensity.
- Sea level rise. This variable is relevant to coastal establishments or establishments reliant on the sea for operations or where transport and supply routes could be affected by coastal flooding and

7.6.15 It is also important to consider interaction between variables and risks for instance:

- Identify whether any climate projections have cumulative or beneficial impacts;
- Identify any interactions between the proposed adaptation actions. There may be ‘quick wins’, cumulative or compounding effects;
- Identify any knock-on/chain effects on other areas if adaptation actions were implemented and
- Identify any wider, strategic or institutional risks e.g. budgetary constraints.

**B4b: Risk identification and scoring**

7.6.16 The following information should be recorded on the Climate Resilience Risk Register (A template risk register and a worked example are at Appendices L and M):

a. Climate related risks. Identifying the direct and indirect impacts of current and future climate on the operational functionality of the site, together with any benefits and opportunities that may arise; and cumulative impacts

b. Prioritising and scoring current and future climatic risks

c. Identify any existing management actions currently in place which address the risks;

d. Identify future actions required to ensure resilience and deliver adaptation; and

e. Identify the risk owners and processes of the actions.

**Guidance to Risk Identification**

7.6.17 The identification of risks involves the identification of direct and indirect impacts, and an assessment of the "critical thresholds" if known, of those risks to operational capability. This process involves:
a. The identification of existing climate risks, by considering how weather events and changes in climate have historically impacted the establishment. This will enable an assessment of how climate may impact on the establishment in future.

b. It is important to assess whether past weather events have caused critical thresholds or sensitivities to be breached and therefore impacting on the operational output of the establishment. A critical threshold is the boundary between 'tolerable' and 'intolerable' levels of risk e.g. the amount of precipitation required to cause a flood that disrupts operations (Box 7.6).

c. Climate risks or thresholds may already be reflected within existing risk management processes. However, climate change is likely to alter the current thresholds and this will be a gradual process over time.

d. Quantitative values for critical thresholds should, where possible be recorded on the risk register e.g. IT performance sub-optimal at ambient temperatures above 32ºC. If this information is not available, then further exploration and monitoring may be required to identify the thresholds.

e. Once current climate risks have been identified they should be considered in the context of the climate projections to determine whether they are likely to be exacerbated and whether the critical thresholds are more likely to be exceeded in future.
Box 7.6 Indentifying Critical Thresholds

An example of a critical threshold is the height of a flood defence. When water levels reach a certain threshold height, the establishment floods.

The height of the water when it floods is the “critical threshold” as illustrated on the graph below. If climate change is considered e.g. sea level rise or the height of the river (jagged blue line on the graph), there is a gradual upward trend.

The critical threshold will therefore be reached with greater frequency in the future e.g. due to increased sea rise or winter river flows.

To cope with this change, there is a requirement to **adapt**. In this example, the adaptation measure would be to increase the height of the flood defence. This is represented on the graph by the step in the horizontal and the blue shaded area. By adapting, the ‘coping range’ has been increased.
Guidance to Risk Scoring

7.6.18 Once a risk has been identified, its significance should be assessed by using scoring methodology contained within the MOD risk assessment model (JSP 892). Both current and future risks should be scored. When scoring the risks the following factors should be considered:

a. Existing climatic/weather vulnerabilities;

b. Projected climatic change;

c. Existing management action, processes on site; and

d. Any future management actions, processes etc. planned.

7.6.19 The assessment of the significance involves scoring the likelihood of a risk occurring and the magnitude that the impact will have on operations. This is scored using a 3x3 matrix to give a High, Medium or Low value to the risk (Fig. 7.6). The JSP 892 definitions for Likelihood and Impact are at Box 7.7.

Box 7.7 MOD JSP 892 Definition of Risk Likelihood and Impact

<table>
<thead>
<tr>
<th>LIKELIHOOD</th>
<th>IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High</strong>: Probable. 60% probability that the risk will occur. More likely to happen than not. Risk could occur within next calendar year</td>
<td></td>
</tr>
<tr>
<td><strong>Medium</strong>: Possible. 30-60% probability that the risk will occur. About as likely to happen as not. Risk could occur within next two-four years</td>
<td></td>
</tr>
<tr>
<td><strong>Low</strong>: Remote. &lt;30% probability that the risk will occur. More likely not to happen than to happen. Risk could occur within next four-ten years</td>
<td></td>
</tr>
<tr>
<td><strong>High</strong>: Major. Major impact on the achievement of Defence objective(s). Important reduction in performance. Major damage to reputation with extensive negative press coverage. Major management effort required.</td>
<td></td>
</tr>
<tr>
<td><strong>Medium</strong>: Significant. Significant impact on the achievement of Defence objective(s). Moderate reduction in performance. Significant damage to reputation with significant negative press coverage. Significant management effort required.</td>
<td></td>
</tr>
<tr>
<td><strong>Low</strong>: Minor. Minor impact on the overall achievement of Defence objective(s). Some effect on performance. Minor damage to reputation with limited external press coverage. Moderate management effort required.</td>
<td></td>
</tr>
</tbody>
</table>

7.6.20 The likelihood of current weather events will need to be established. Risks should be given a high rating if they are already a concern. It is important to consider whether critical thresholds are already being compromised.

7.6.21 It is important to note some changes in climatic variables e.g. temperature have a greater level of certainty than others e.g. storms (Box 7.8). It is important to reflect these differing certainty levels within the risk scoring.
Figure 7.6 MOD JSP 892 risk scoring

![Risk Scoring Matrix]

7.6.22 Some risks may have considerable uncertainty regarding their likelihood of occurring e.g. whether a protected species migrating into/from an establishment could impact on training especially if MOD activities exacerbate the issue (e.g. use of pyrotechnics during dry conditions). Workshop participants should use their judgment to estimate likelihood, by considering all the different vulnerabilities. Stakeholder attitudes should be considered as these may also impact on operational outputs e.g. conservation bodies may re-designate protected areas in response to a changing climate.

B4c: Identifying the resilience and adaptation actions, processes and owners

7.6.23 Having evaluated and scored the key risks, adaptation actions need to be identified and the process and risk action owner need to be assigned.

7.6.24 It should be noted that infrastructure was constructed on the basis of historic climate information and may not necessarily be adapted to changing climatic conditions and increases in frequency of extreme climatic events.

7.6.25 Risk controls and processes currently in place (e.g. management plans or existing maintenance regimes) should be assessed for fitness of purpose in a changing climate. If not, actions need to be identified to manage this risk. Any existing management actions in place that reduces the risk should be noted in the risk register. An example of how a risk is linked to existing MOD management processes is at Fig. 7.7.
Box 7.8 Certainty of Climate Change Projections

Different climate change variables have differing levels of certainty.

Temperatures and sea levels are projected to continue to rise during the 21st century with high certainty i.e. there is an 80% chance or greater that the climate change projections are correct.

Future changes in precipitation (rain, snow, sleet, hail) are projected with ‘medium certainty’ i.e. 50% to 80% chance of projections being correct. Say something about average changes vs. extreme precipitation.

And changes in wind storms and storm surges are only projected with low certainty i.e. 20% to 50% chance of being correct.

Climate variables should be treated differently and establishments should plan and design for those variables projected with high certainty (rising temperatures and sea levels).

For those variables where there is lower certainty, such as increasing storm intensity, we should test the sensitivity and robustness of our assets and activities against the projected change.

Increasing CO2 concentrations
Increasing land & sea temperatures
Increasing risk of heat waves
Rising sea levels
Changing precipitation intensity and patterns (increasing drought/flood risks)
Increasing storm intensities
Increasing storm surge heights

Higher certainty

Lower certainty
7.6.26 Different risks will require different management strategies. The impacts of climate change may not be fully understood at this stage. In these cases the adaptation action could include monitoring of the effects of climate on performance of the asset. The information gained can better inform the decision making at a later date as part of the future review of the risk register. There may be opportunities to enhance the resilience of infrastructure to climate as part of routine refurbishment or facility upgrades. These two approaches are referred to by UKCIP as Building Adaptive Capacity and Delivering Adaptation Actions. Box 7.9 illustrates different risk management strategies (4Ts) as identified in JSP 892 and provides examples of adaptation action.
### Box 7.9 Risk Adaptation Strategies

<table>
<thead>
<tr>
<th>Risk Strategy</th>
<th>Definition on JSP 892</th>
<th>Adaptation examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terminate</td>
<td>Some risks will only be treatable to acceptable levels by terminating the activity.</td>
<td>Accepting the loss of coastal site due to high risk of coastal erosion and flooding. Achieved through strategic estate planning.</td>
</tr>
<tr>
<td>Transfer</td>
<td>Transfer the responsibility / burden of risk to another organisation that is more capable of managing the risk.</td>
<td>Ensuring estate contracts (Regional or Stand Alone PC, PPPs, PFIs) incorporate climate change adaptation. Partnership working with Local Authorities, transport and utility providers e.g. Abbey Wood joint venture with the LA to resolve flood issues improving vehicular access to the site. e.g. Portsmouth historic assets lease.</td>
</tr>
<tr>
<td>Treat</td>
<td>Continue with the activity whilst constraining the risk to an acceptable level. This option can be further broken down into four different types of controls:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Preventive control:</strong> limiting the possibility of undesirable outcome being realised</td>
<td>Increasing the resilience of new and existing infrastructure through adapting new builds and refurbishments. Improving maintenance regimes (proactive rather than reactive) e.g. monitor and clear drainage systems more frequently in order to minimise the risk of flooding. Limiting certain activities during extreme circumstances e.g. use of water resources to wash vehicles during a drought; limiting public access to training areas during hot and dry weather.</td>
</tr>
<tr>
<td></td>
<td><strong>Corrective control:</strong> correcting undesirable outcomes which have been realised</td>
<td>Business Continuity Plans etc. that reflect climate risks will enhance the establishment’s ability to recover from disruption from extreme weather events e.g. disruption of the energy supply.</td>
</tr>
<tr>
<td></td>
<td><strong>Detective control:</strong> identifying occasions of undesirable outcomes having been realised</td>
<td>Annual review of CIRAM risk registers. Monitoring of risks to determine their significance and critical thresholds, e.g. monitoring the high temperatures and low precipitation levels that will cause discharge consents to be breached. Auditing of projects for compliance with SA and DREAM on climate change adaptation.</td>
</tr>
<tr>
<td></td>
<td><strong>Directive control:</strong> ensuring that a particular outcome is achieved</td>
<td>Include adaptation measures within renewed contracts. Include adaptation measures within H&amp;S risk assessments e.g. ensure long trousers are worn on training areas during warm weather to minimise the risk of tick-borne diseases, use hats and use of sun-cream protection to minimise the risk of heatstroke.</td>
</tr>
<tr>
<td>Tolerate</td>
<td>The risk might be tolerable without any control action required, the ability to address the risk may be limited or the cost of taking action is disproportionate to the cost of the risk</td>
<td>Weather related impacts that are a nuisance rather than disrupting operational outputs; Unaffordable actions; i.e. accepts the level of risk to output due to limited funding</td>
</tr>
</tbody>
</table>
STAGE C – POST WORKSHOP REVIEW

7.7.1 Following the workshop it is necessary to review the completed Climate Resilience Risk Register. This provides an opportunity to:

a. Review, explore further and clarify the risks (and their scores) identified in the workshop;
b. Identify any new risks;
c. Review and clarify any adaptation action identified;
d. Clarify process and risk action owners; and
e. Obtain any further information that may inform the risks or adaptation.

7.7.2 The key stakeholders should be engaged in the review. Any subsequent stakeholders identified within the risk workshop should also be engaged.
STAGE D – IMPLEMENTATION
Incorporate into action plans, monitoring and assurance

7.8.1 Once the Climate Resilience Risk Register has been formally adopted by the establishment, the risks and actions identified should be embedded within the establishment’s own management processes (e.g. management plans etc. and structures e.g. SHEP committee; IEMP review. See JSP850 and PG 01/12 Building a Climate Resilient Estate.

7.8.2 It is the responsibility of the HoE (see JSP850) to ensure the site risk action owners are aware of their assigned risks and these are addressed in their own processes and procedures. These processes may include:

- Business Continuity;
- Security;
- Forward Maintenance Registers;
- Health and Safety;
- Environmental Management Systems (EMS);
- Establishment Command; and
- Training providers.

7.8.3 The Climate Resilience Risk Register should inform short, medium and long-term resilience actions and allocation of funding balanced against affordability and risk appetite by the TLB. The impacts and risks identified by the assessment will be direct effects on the ability to operate and deliver defence capability and should be weighted on that basis.

7.8.4 Funding for further research, adaptation measures etc. lies with the relevant budget owner. Funding issues should be flagged up to the TLB Climate Resilience Focal Point at the earliest opportunity.

7.8.5 The HoE should ensure any life-cycle replacement is climate proofed based on the risk level (some may be linked to a statutory requirement). This should be reflected within any Statement of Need for the Industry Partner to deliver.

7.8.6 Not all adaptation measures will require injected funding to build in resilience instead will require increased liaison, cooperation with service providers or adopting new procedures and new ways of working.

7.8.7 The owner for some risks and adaptation measures will not lie with the establishment but will require a response from another department within MOD. These areas include:

- Strategic Estate Planning;
- Equipment as specification and location of equipment may need to change;
- Partnering arrangements may need to be improved in order to facilitate adaptation;
- Health and Safety Policy. Department's central H&S policy may need to be reviewed;
- Personnel Policy. Departmental personnel policy and working practices may need to be reviewed;
- Infrastructure Design and Construction. Core works specifications may need to be future climate proofed; and
- TLB Command Plans. Operational activities of site may need be revised in a changing climate e.g. increased civil assistance.

7.8.8 It is important that these issues are flagged up to the TLB Climate Resilience Focal Point who will then inform the Climate Change Resilience Focal Point within DIO EUS SDS. These issues will then be raised and taken forward to be addressed by the relevant owners.

7.8.9 Guidance on adaptation measures and how to efficiently embed adaptation into existing processes will be made available from DIO EUS SDS Climate Resilience Focal Point. This will be made available on the DIO EUS portal/website.

Monitoring and Review

7.8.10 Each risk action owner at the establishment is responsible for monitoring the delivery of their actions. The HoE will be required to report annually to the TLB CRFP on progress in adaptation action delivery. A reporting requirement may also be required from the individual process chains e.g. Business Continuity to assure climate change adaptation has been considered.

7.8.11 Provisions should be made by the TLBs to ensure that the HoE reviews and revises the risk register on an annual basis, in the same way as EMS or Business Continuity. Reviews can be undertaken alongside existing monitoring mechanisms e.g. CESO monitoring activities. Revision and monitoring of the risks and the delivery of actions allows for flexibility and the provision of new information etc. to inform and understand the risks, risk thresholds and their scores. Adaptation measures may also need to be reviewed accordingly. This also allows for continuity given changes in personnel and contractual arrangements at site level. A full establishment CIRAM assessment should be repeated on a five year basis, however as this will be built on existing assessment should involve less resources.
Box 7.10 Examples of Risk Adaptation Processes

<table>
<thead>
<tr>
<th>MOD ESTATE PROCESS</th>
<th>Risk Action Owner’s Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business Continuity Plan</strong></td>
<td>The BC owner should ensure the relevant BC risks identified e.g. Heatwave disrupting IT/comms are reflected in the establishment BC Plan and cascaded down into team plans etc.</td>
</tr>
<tr>
<td><strong>Health &amp; Safety</strong></td>
<td>H&amp;S owners should ensure any SHEF risks identified are reflected within their standard risk assessments and provide assurance that Health, Safety and Environmental legislation, Codes of Practice and MOD/TLB Policies will be complied with.</td>
</tr>
<tr>
<td><strong>Site Security Risk Management</strong></td>
<td>The owner needs to ensure that any security related risks are reflected within the establishment security risk management plan.</td>
</tr>
<tr>
<td><strong>Strategic Development Plan (SDP)</strong></td>
<td>The strategic development of a cluster of establishments should consider any climate risks when planning for operational needs, rationalisation and cooperation between sites. The SDP should examine how climate risks will on the maintenance, through life costs of the establishments. The financial plan, supporting the SDP should forecast any adaptation costs required maintain resilience in the short, medium and long term.</td>
</tr>
<tr>
<td><strong>Establishment Development Plan (EDP)</strong></td>
<td>The EDP should also reflect any relevant climate risks. These risks register should inform the identification of the establishment’s current threats and constraints, and any issues relating to the future use of land and infrastructure.</td>
</tr>
<tr>
<td><strong>Estate Management and IEMP</strong></td>
<td>The estate manager should ensure any relevant CIRAM outcomes are embedded within the IEMP. CIRAM should inform the prioritisation of condition improvement actions.</td>
</tr>
<tr>
<td><strong>Core Works and Minor New Works</strong></td>
<td>Core works, minor new works and core service projects should take into account climate projections and if a CIRAM assessment has been undertaken, then the outcomes should inform the location, design, construction etc. of the asset.</td>
</tr>
<tr>
<td><strong>Strategic Estate Planning DEDP</strong></td>
<td>CIRAM assessments can inform strategic planning of the MOD estate, identifying opportunities to rationalisation and re-development opportunities. Consideration should be given in high risk areas e.g. flooding or coastal erosion. Opportunities may arise to manage risks in partnership with local and regional bodies.</td>
</tr>
<tr>
<td><strong>EMS</strong></td>
<td>EMS should embed any relevant CIRAM and ensure any actions are implemented and monitored accordingly e.g. issues concerning discharges.</td>
</tr>
</tbody>
</table>