Appendix G

Hea02 Indoor Air Quality Plan

1. Purpose of this Guidance Note

It has been shown that poor indoor air quality is linked to health deterioration and poor performance of building occupants [1 and 2]. For this reason BREEAM-NOR rewards projects that produce an Indoor Air Quality plan (IAQP) which seeks to minimise sources of pollution and optimise indoor air quality.

This Guidance Note is provided to support the development and assessment of an IAQP with respect to Criterion 1 of issue Hea02 of the BREEAM-NOR 2016 It should not be interpreted as BREEAM-NOR criteria. It is intended to provide assessors and project teams with further, flexible information and guidance regarding the rigour, content and tasks of an IAQP.

2. Level of requirements

The contents of an IAQP depend on a number of factors, including the requirements of building users, the client and other stakeholders, outdoor air quality, the complexity of the building and advice from air quality professionals. For buildings situated in areas of good air quality with no special indoor air quality requirements, an IAQP may be relatively straightforward, whereas for other buildings a more complex plan addressing a number of specific issues may be required. The scope of air pollutants and issues which may need to be covered in an IAQP are given in Sections 2.1 and 2.2.

2.1. Air pollutants

Air pollutants that are commonly found within buildings that an IAQP would be required to address (where applicable) include:

– Particulates including vehicle emissions, pollen, dust;

– Volatile organic compounds (VOCs);

– Formaldehyde;

– Gaseous oxides such as CO, CO2, NOx, SO2 and O3

– Airborne bacteria and micro-organisms and their spores,

– Airborne inorganic substances such as metal fumes ,ammonia, chlorine, radon

– Unpleasant odours.

2.2. Indoor Air Quality Plan

Criterion 1 of BREEAM-NOR 2015 issue Hea02 requires an IAQP to be produced which considers the following;

a. Removal of contaminant sources

b. Dilution and control of contaminant sources

c. Procedures for pre-occupancy flush out

d. 3rd party testing and analysis.

e. Maintaining Indoor Air Quality In-Use

The following sub-sections provide further guidance on the issues which may be relevant to each of these areas within the IAQP.

This is not intended to form an exhaustive list for a design team to consider. As such, additional aspects can be considered for inclusion where deemed to be relevant to an IAQP.

a) Removal of contaminant sources

Aim: Identification and minimisation or elimination of sources of air pollution at early stages of the design process in order to subsequently reduce the amount of air pollution that needs to be removed and diluted by ventilation strategies.

Issues that could be considered as part of the IAQ plan include:

i. The implication of building location and development configuration

ii. Reducing outdoor air pollutants ingress through consideration of building form, layout and permeability of the building envelope

iii. Locating the air intakes and openable windows away from sources of external pollution, such as car parks and delivery/vehicle waiting areas.

iv. Selection of construction materials and finishes with low air quality impact

v. Protection of HVAC equipment and ductwork from dust and other pollutants during installation and when in the vicinity of other construction/ installation works

vi. Checking and cleaning ventilation systems and ductwork prior to or during commissioning, so that pollutants are not released in to the building.

vii. Practical procedures and checks to ensure that the above outcomes are achieved and documented.

b) Dilution and control of contaminant sources

Aim: Minimising the ingress of external pollutants and removing/minimising the sources of internal pollutants to reduce and regulate levels of indoor air pollutants in buildings. Moreover, this sub-section should provide consideration of the building ventilation strategy and its mitigating impact upon indoor air quality levels.

This aspect of an IAQ plan may consider:

i. Design targets for the concentrations of relevant/different internal pollutants

ii. Strategies for dealing with internal pollutant concentration breaches.

iii. Sources of external air pollution, where these are likely to impact indoor air quality, to inform building ventilation strategies.

iv. The impact of construction materials and finishes specified to help inform dilution and control strategies.

v. The impact of recirculation and ventilation rates on indoor air quality

vi. Complex building types with specific air quality requirements, e.g. healthcare operating theatres, laboratories, manufacturing facilities.

vii. Indoor air quality monitoring provisions/systems and links to ventilation control

viii. The influence/effect of occupants on ventilation control

c) Procedures for pre-occupancy flush out

Aim: Ensuring that pre-occupancy flush out processes remove residual sources of pollution which may have accumulated in the building during construction and higher concentrations of pollutants which are released by new products such as sealants, pressed wood and textiles. This makes sure that any subsequent testing is carried out in conditions which are representative of indoor air quality when occupied.

This aspect of an IAQ plan may involve:

i. Defining appropriate flushing procedures and timings for the project, to purge the building of internal pollutants

ii. Completing and cleaning the building prior to measuring indoor air quality

iii. Measures to protect against subsequent pollution ingress if construction has not been completed in other areas

d) 3rd party testing and analysis

Aim: To ensure that third party testing and analysis uses a recognised method of testing for different air pollutants, in addition to providing impartial and objective measurement results which record levels of air pollutions in the newly constructed building.

This aspect of an IAQP may include:

i. Determining procedures for performing IAQ testing (post construction but pre-occupancy) on the pollutants of concern. [3]

ii. Ensuring that the maximum concentration requirements for total volatile organic compound (TVOC) and Formaldehyde have not been exceeded, and all measurements are recorded appropriately. [4]

iii. Consideration given to the remedial measures to be undertaken should the prescribed levels not be met, the circumstances in which re-testing is required and its timing and methodology in relation to discounting occupancy-related pollutants. [5]

e) Maintaining Indoor Air Quality In-Use

Aim: To ensure that indoor air quality levels are maintained within compliant levels throughout the buildings operational life-cycle to uphold occupant health and wellbeing.

This aspect of an IAQP may consider: [6]

i. Dissemination of relevant information to the building occupier, via a building user guide, regarding operating and managing the building to maintain suitable IAQ. This may include:

ii. Recommendations for establishing policies and procedures for minimising the use of VOC/Formaldehyde emitting materials or substances within the building throughout operation

iii. Recommendations for establishing policies and procedures for carrying out regular cleaning of the building interior to prevent collection of dust and other pollutants

iv. Recommendations for establishing policies and procedures for carrying out maintenance of ventilation plant. This can include replacing filters at regular intervals in addition to clean of heating/cooling coil surfaces, ductwork and humidifiers.

Further reading

1. BRE (2004) Improving air Quality in urban environments – Guidance for the construction industry (ref BR474)

2. WHO (2010) Guidelines for indoor air quality – selected pollutants.

3. BRE Trust (2011) Ventilation for Healthy buildings – reducing the impact of urban air quality (ref FB 30)

4. BRE (2002) Digest 464 Part 1 - VOC emissions from building products: sources, testing and emissions data

5. BRE (2002) Digest 464 Part 2 - VOC emissions from building products: control, evaluation and labelling schemes

6. CIBSE (2011) Knowledge Series KS17 - Indoor Air Quality and Ventilation

7. Part F: Ventilation; Building Regulations for England and Wales

8. The levels of key air pollutants across the UK published by DEFRA

9. CIBSE TM40 (2006) Health Issues in Building Services. Chaper 4 – Air Quality and Ventilation

Footnotes:

1 WHO Fact sheet 313: Air quality and health.

2 Department of Health/COMEAP (2004) Guidance on the Effects on Health of Indoor Air Pollutants

3 Further information regarding the scope of IAQ testing is provided under ‘other information’ within issue Hea 02 of the BREEAM-NOR 2015 technical manual. Criterion 10 outlines the standards which IAQ testing should be carried out in accordance with.

4 Hea 02 Criteria 8 & 10 with related tables and references outlines the minimum requirements for air pollutant concentrations.

5 Hea 02 Criterion 8-10 requires project teams to confirm measures to be undertaken to reduce TVOC and formaldehyde levels within prescribed limits.

6 BREEAM In Use seeks to further assess and reward measures of good practice in indoor air quality throughout the buildings operational life cycle