

# INFORMATION, RISK, AND BUILT ASSET MANAGEMENT

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## 1 Introduction

The management of information and risk relating to the built environment is increasing in importance. This is driven by several factors, including safety, sustainability, and governance. The challenge is present across all asset classes within the built environment, albeit with the variety of factors carrying different weight in some contexts.

The processes supporting these demands need to ensure that the information is always available to the relevant stakeholders – those with accountability, managers, regulators, supply chain, investors and others. This requires a representation of the built asset and its context as it is, at any point in time. Those responsible need to use an effective information management process to ensure that the information is accurate and maintained.

This specification provides practical guidance for those specifying the digital format of built asset data from concept, through the delivery/construction and occupation phases, to the end of occupation, and also gives context for other stakeholders in the process.

It is important to distinguish this specification, which provides an ontology (a set of concepts and categories in the domain showing properties and relationships), from two important but separate types of specification:

- *Representations* describe a way in which specific instances of the concepts and properties in this specification can be expressed in a machine-readable digital format. Representations are important and helpful as they provide the basis for computer systems to be interoperable and are usually defined by data standards. The appendices herein contain some examples of representations that can be used.
- *Presentations* describe the way in which specific instances of the concepts and properties in this specification can be expressed in a human-readable format, which would usually also be digital but may include printed materials. Presentations are important and helpful as they provide the basis for stakeholders in the data to access and work with it. Presentation formats are specified by the consumers of the information and are designed to make it easier for the stakeholder to find and process the information that is relevant to their role, interests, and responsibilities.

This ontology covers what information might be stored and shared (including exchanged and via a common data environment), and is in several sections:

- Section 2 provides an overview which includes the rationale for holding built asset data and how the information that it by implication must contain can be organized.
- Section 3 then provides a detailed review of the information that may be needed. This offers a generic schema applicable to all built assets, even if the information may be distributed across several information systems.
- Section 4 sets out the relationship between documents (often relied upon traditionally as pervasive record) and information.
- Sections 5 and 6 discuss the level of granularity that may be desired and how this can vary through the lifecycle of the built asset.
- Section 7 provides some worked examples.

The appendices A1, A2 and A3 indicate how the built asset information can be represented using two existing industry data standards and a third more informal approach that uses ordinary documents and tables to allow the rapid documentation of existing built assets.

The representations provided in the appendices are not intended to be exclusive, and readers are welcome and encouraged to prepare additional appendices setting out the corresponding mapping of the generic schema to other formats.

Chris Lees of OSCRE and Nick Nisbet of buildingSMART UKI have developed this technical report to support the integration of risk, information and asset management based on existing standards. Feedback and comments are welcome through the contact details in the report.

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<sup>1</sup> OSCRE International, Inc. is a global not-for-profit real estate data standards publisher, education and thought leadership organization based in Florida, USA – [www.oscre.org](http://www.oscre.org)

<sup>2</sup> HACT is the Housing Associations Charitable Trust, a research and innovation agency supporting the UK social housing sector, who partnered with OSCRE to deliver the UK Housing Data Standards - <https://www.hact.org.uk/DataStandard>

<sup>3</sup> The Housing Asset Data Group is a collaboration between HACT, BIM4Housing Associations, BIM4Housing, OSCRE, Building Research Establishment (BRE) and independent subject matter experts whose aim is to publish and curate a Housing Asset Data Dictionary following ISO23386:2020 and PAS14191:2020 principles.

## 2 Overview

A key determinant of the scope of built asset information is the need to ensure that the risks regarding the safety of the users is managed effectively.

This approach focusses on the asset information needed to support the risk management process. The examples start with the risk register. The risk register may be focussed on specific regulatory requirements or it may be drawn more widely to cover risks arising from other corporate and social responsibilities. The individual risks within scope are associated to, and mitigated by, spatial, physical and process entities. Structured information about these entities is supported by digital and physical documentation and by the accountability of named parties. The asset information is supported by documentary evidence. A benefit of the approach outlined here is that the same asset information can be presented in many different ways, depending on the intended audience. The information requirements are independent of any presentation of the asset or its risks. Many different representations and presentations can be derived to suit reporting requirements.

Factual summaries can be drawn from the asset information, identifying the site, building and phase along with the contact details of the persons responsible for the building such as the building manager, asset manager and facilities manager.

The risk register can be used to substantiate a claim. In principle a claim could be made about a range of important aspects of a building, including its safety, environmental performance, or financial performance. Here is an example of a safety claim:

Building 'B' at site 'S' under phase 'occupancy' is safe in that:

1. The building's safety risks are being actively managed;
2. The building's safety critical systems, zones and packages are compliant to current obligations;
3. The buildings safety information is being maintained.

'The supporting risk register, argument and evidence is accessible ....'

Generated by the responsible person with contact details ...

It is critical that such reports are based on an up-to-date risk register that includes the relevant risks linked to the corresponding safety issues.

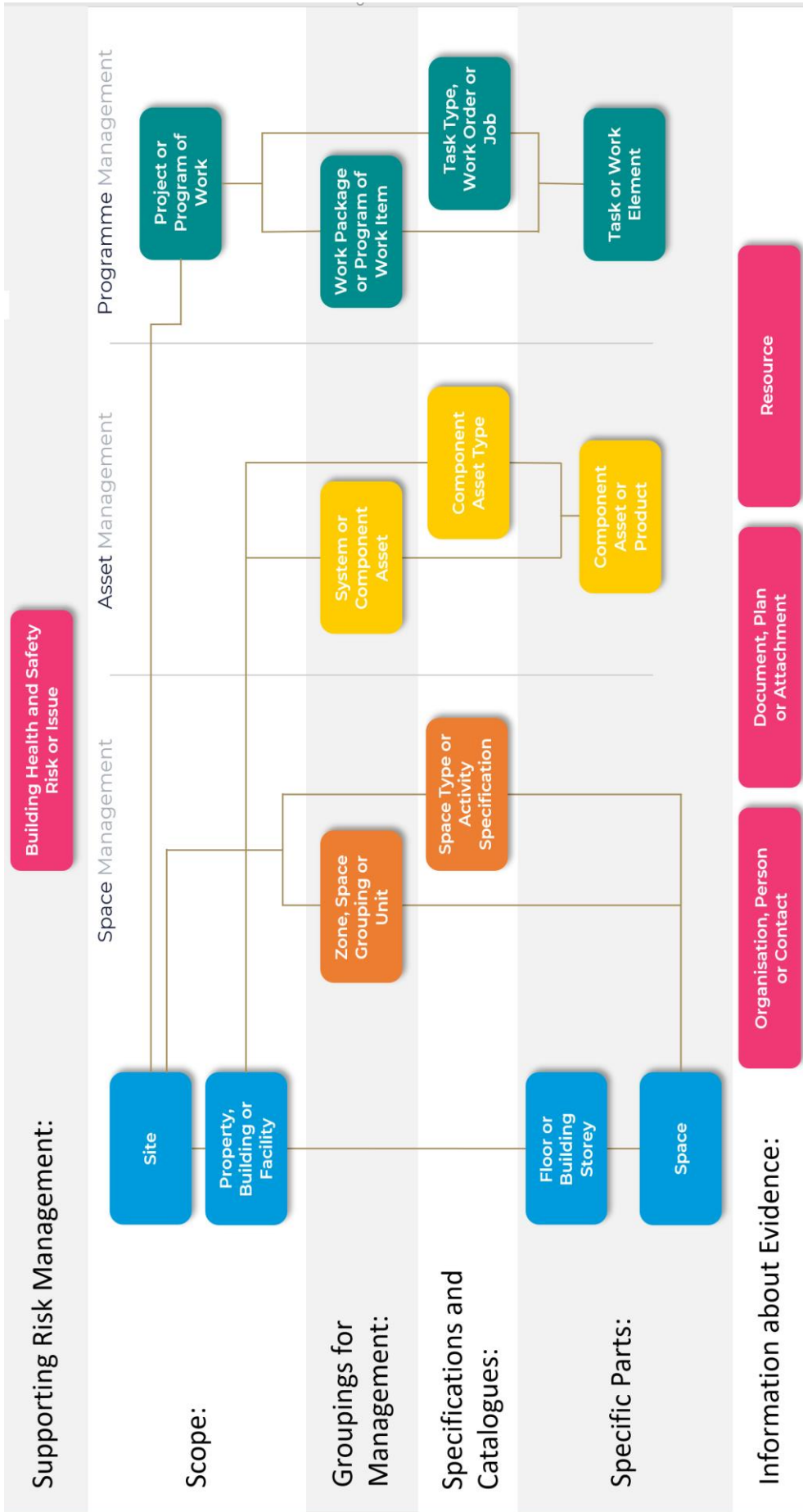
The report and risk register are supported by the asset information relating to the identified risks, either as associations or treatments. The scope of the information that is required ranges across the spatial and physical aspects of the building and, once the building is completed, includes the management aspects.

The asset information is made up of detailed spatial, physical and process information. The spatial information includes the activities and occupancies and information for wayfinding and

management. The physical information includes the assets critical for its safety and its use. The process information includes the processes and management in place.

The asset information is supported by evidence. This evidence is typically documents and contact details. The documentation, including drawings and information models, is held electronically along with information on where and how any physical originals can be accessed. Contact details are identified to support the documentary evidence and to confirm the roles of the responsible parties.

To validate the reports, the risk register, asset information and evidence are intensely cross-referenced, so that audit threads and investigations can be pursued.







### 3 Components of Asset and Risk Information

The asset information is kept in any application but the standard representations need to be accessible to regulators, responsible parties and other duty holders and stakeholders. The asset information is transferable on any change or ownership or responsibility.

The asset as a whole must be described using a common breakdown structure and classification. This formal structure may well be different to any internal project, asset, cost or work breakdown structure in use by the owner/operator. The representation of this structure is possible using existing standards as described in the three appendices.

The following describes the topics that may be required as relevant to the management of risk. Each topic is covered by documenting individual entries and their interrelationships. Each entry has a unique name, a description, a classification, and links to supporting evidence. Cross-references relating entries in the same or other topics are accessible by consistent naming, hyperlinks or database links.

Information relevant to risk management is included but other and more detailed information may also be held to support other purposes.

## 3.1 Managing risk

### 3.1.1 Risk Register

Synonyms: Risk, Hazard, Issue. At different points in the asset life cycle, parts of the risk register may appear in “Pre-Construction (H&S) Information”, or the “Health and Safety File”.

Risk management is supported by the Risk Register. The Risk Register covers, as a minimum, the risk grouping of immediate concern. Any failure may be a specific offence under existing and forthcoming legislation. An example of priority risk groups could be:

- A failure to manage risk
- A failure to maintain the safety entities
- A failure to maintain the building safety claim, argument and evidence

The Risk Register links each risk to its associated entries and treatment entries in the asset information. Only these and the entities defining the scope need be documented further, along with the supporting evidence. The management of the extent of the asset information needed is discussed further in sections 5-6.

The risk register contains risk entries, with each entry describing an identified risk. The risk register is based on PAS1192-6 (currently being upgraded to become ISO19650-6). Each entry has the fields required by PAS1192-6 Appendix A. Documentation, such as detailed risk assessments, may be associated to each entry. The table includes all risks classified as being related to the prioritised risk groups. The risk groups, are broken down into specific risk entries. Risk entries are classified using the Uniclass PM table entries (forthcoming revision), for example any failure to achieve and maintain:

- |                                    |                                    |
|------------------------------------|------------------------------------|
| • Effective management of risk     | PM_90_10 : Issue (Risk management) |
| • Compliance to safety legislation | PM_90_60 : Operational (in-use)    |
| • The asset information            | PM_90_80 : Information management  |

The priority is driven by considering likelihood and consequence. The risk assessment is based on the PAS1192 part 6 table 9 may use a heightened emphasis on high consequence events. Risks are linked to specific spatial, physical and process entities associated to the risk. The mitigating treatments are also linked to specific method statements or other entities.

Risks are only re-graded when the state of the entries reflects the execution of the mitigation treatments. In particular, this means that mitigation treatments described in library resources (3.4) such as space-types (3.4.1), products (3.4.2), and method-statements (3.4.3), do not cause a re-grading of a risk until they are instantiated in spaces, components and events.

## 3.2 Scope

The asset information identifies the specific site, building and life cycle stage so as to be unambiguous and meaningful to regulators, management, residents and other services.

The asset information details the site, building and phase. The site and/or building have geospatial, postcode and UPRN references. The phase determines the expected entities relating to the active management of the risks, including tasks/events, method statements and packages/duties.

### 3.2.1 Site

Synonyms: Location, Address, Neighbourhood, Campus, Estate

The site is recorded as a single entity with its address, postcode, GPS and optionally what3words code along with geospatial and the UPRN. Classification is to Uniclass 2015 Co Complexes table. The associated documentation references a locational map.

### 3.2.2 Building

Synonyms: Facility, Property

The building or complex is recorded with its entrance location and access arrangements. Classification is to Uniclass 2015 En table. A single entry is expected with geospatial and address information, including the postcode, UPRN and optionally a what3words code.

### 3.2.3 Project / Program of Work

Synonyms: Programme, Phase, Stage

The project or program is recorded, classified to the CIC (RIBA) lifecycle. These stages occur between the mandatory gateways. A single entry is expected, confirming the life cycle stage, and therefore the applicable risk, regulatory and information requirements. The name and/or classification of stages may be planning, construction or use.

### 3.3 Groupings for Management

The site, building and project entries are broken down further. The breakdowns are to a generic standard pattern which may differ from other project, work or cost breakdown structures in use by stakeholders.

The asset information identifies the zones, systems and packages referenced in the risk register. Zones can be used to group types of space by their accessibility to the public, escorted/shared, maintainers and individual occupancies. Systems represent the functional aspects of the physical building, including structure, compartmentation and mechanical installations. Packages (for corporate responsibilities) and duties (for individual responsibilities) include the method statements for actual execution as tasks in the future or events in the past.

NOTE: Only those entities that are referenced by the risk register need be included in the asset information, but others may be included.

#### 3.3.1 Zones / Space Groupings / Units

Synonyms: Occupancy, Compartment, Accessibility, Premise

Zones identify the occupancies, compartments and accessibility.

Zones represent groups of areas and regions of the site or within the building with a common dominant characteristic, such as accessibility, tenancy and compartments. Individual spaces may not need to be recorded. Classification is to Uniclass 2015 SL table. Zones record all the safety relevant areas outside and inside the building. This may include the individual occupancies or all the occupancies as one entry, along with the common parts and approaches around the building. Maintenance and plant rooms may also be taken as a zone.

#### 3.3.2 Systems / Component Asset

Synonyms: Fabric (bounding and structure including compartmentation), MEP (distribution)

Systems are functional breakdown of the building. Systems represent groups of elements and equipment on the site or within the building with a common primary function or purpose (whether or not the individual assemblies or components are recorded). Any functional system such as fabric and compartmentation, mechanical, electrical, plumbing or control systems that are relevant to the safety case are included. Systems should be classified to Uniclass 2015 EF (not Ss) table.

NOTE: Some classification tables, applications and disciplines use the term 'system' where 'assembly' may be more appropriate, see 3.4.2.

#### 3.3.3 Packages / Program of Work Item

Synonyms: Duty, Work Plan/Package, Appointment

Packages group tasks within a programme relevant to the safety case falling under the responsibility of an organisation or individual, whether or not the individual tasks are recorded. Classification is to Uniclass 2015 PM table.

## 3.4 Specifications and Catalogues

Catalogue entries consolidate specifying information about occurrence entries (see 3.5 below). Catalogue entries may be common and shared with other projects and programmes and held externally. Catalogues include activity profiles for types of spaces, product data applicable to sets of components, and method statements applicable to sets of tasks/events.

### 3.4.1 Space Type / Activity Type

Synonyms: Room Type, Usage

Space/Activity Types identify common specifications and purposes of spaces, whether or not the individual spaces are recorded. Classification is to Uniclass 2015 SL table. Such activities may be referenced by risks.

### 3.4.2 Product / Component Type / Material Types

Synonyms: (Component) Type, Product, Material (Type), Catalog Entry

Products and materials are generic resources. Component/Material Types identify common specifications of components relevant to the safety case, whether or not the individual components are recorded. Classification is to Uniclass 2015 Pr table. Assemblies can be classified using Uniclass 2015 SS table.

### 3.4.3 Task Type / Work Order / Job

Synonyms: Method (Statement), Strategy, Plan, Approach, Arrangements

These entries describe how tasks are to be achieved. Job/Task Types identify common specifications and purposes of tasks, whether or not the individual tasks are yet recorded. Classification is to Uniclass 2015 PM table.

NOTE: 'Strategy' documents may be management level descriptions (see 3.3) or method statements.

### 3.5 Specific Parts

Specific items such as storeys, assemblies, and missions (higher-level tasks), are recorded and may be further disaggregated. The level of disaggregation depends on the relevance to the management of risk. The most basic entities include the spaces, components, and tasks/events.

#### 3.5.1 Storeys and Spaces

Synonyms: Space (inside), Location (outside), Room, Floor, Storey, Level, Region

Storeys and Spaces are the recognisable indoor and outdoor named locations. Floors/Storeys and other named levels are recorded. Suites or individual spaces may also be recorded. Classification for uncatalogued entries is to Uniclass 2015 SL. Storeys should be documented but only spaces associated to specific risks need be documented. Storeys may include specific outside areas such as the roof and surroundings, and spaces may be indoors or outdoors including on the roof. Minor and secondary spaces may not need to be individually described.

Spaces should not be used to document personal information relating to occupancies.

#### 3.5.2 Asset / Product / Component

Synonyms: Product Occurrence, Instance, Assembly, Part

Assemblies and individual components, constructions or parts may be recorded. Classification of uncatalogued product entries is to Uniclass 2015 Pr table. Assemblies may configure several Components, each possibly serving different functional systems, and can be classified using Uniclass 2015 SS table.

#### 3.5.3 Task / Event / Diary Entry / Work Element

Synonyms: Mission

Diary covers past events and future tasks relevant to the management and operational processes. Diary events are recorded with their expected and actual completion dates. Unplanned events that are also unanticipated may not have a method statement. Classification is informal using planned/completed. Diary must record changes to any entries that affect the risk register.

The documentation of future tasks is an exception to the rule that the built asset information must document the state of the building 'as-is'. Future events may indicate when active management is planned.

## 3.6 Information about Evidence

Documentation and contacts provide evidence to support the argument including the built asset information.

Documentation may require verification from contacts.

### 3.6.1 Documents

Synonyms: Drawing, Information Model, Specification, Table, Certificate, Photograph, Attachment, Dockets

Entities in the asset model are illustrated or supported by reference documentation. Documents are held electronically in an accessible (non-proprietary) format along with the location and accessibility of any physical counterparts. This will ensure that evidence can be reviewed remotely and reduce the need to access physical material. Documents are classified to Uniclass 2015 PM\_20/30/40.

### 3.6.2 Contact

Synonyms: Actor, Agent, Role, Participant, Holder, Person (GDPR permitting), Organization, Contractor, Accountable Person

Contacts include any organization or person specifically referenced in the asset information, including the responsible parties and the contractors responsible for specific Packages/Duties. Contacts have their relevant professional and competency qualifications documented which may need to be evidenced. Contacts are classified to Uniclass 2015 Ro roles table. Some contacts, such as residents, are protected by GDPR and so access to the information may need to be restricted.

### 3.6.3 Resource: Qualifications and Attributes

Synonyms: Tools

The entries detailed above may need to be further described. Examples include certifications and qualifications held by Contacts or additional attributes assigned to specific asset information entries.



## 4 Example of Documents and Information

Current practice relies heavily on the preparation and receipt of documents, and this is reflected on many of the existing standards and recommendations. This approach causes many issues across the built environment. In response to the many failings of this approach, the Government (through the Building Safety Bill) is giving priority to the provision of digital information for buildings in scope of the new more stringent regime. This is to improve transparency, accuracy, checking and accountability. These requirements will not cover all buildings and the Government has yet to set out details of what exactly they will be mandating with regards to digital information management.

The approach outlined in this document can apply to any built asset. It is clear that management of information and risk relating to the built environment is increasingly important. Industry may choose to implement the approach outlined here in order to ensure they are managing their information effectively.

Instead of Documents being the sole vehicle for the exchange of information, the management of the risk and asset information requires that the manageable entities (as described in section 3) should be represented as named objects with their relationships and attributes. The role of Documents within Information management is then clarified into two distinct purposes. Firstly, Documents may be generated on demand as presentations from the asset and risk information. Secondly, Documents may be held electronically and as physical records to act as evidence, supporting and validating the information as necessary. This section shows examples of how this transition can be implemented:

### 4.1 Example 1: Representing Management Systems

A 'Management System' (such as BS9997) is kept and maintained around the risk and asset information thereby ensuring that the management system procedures, policies etc which the responsible parties have in place to manage the property, data, personnel, general 'compliance' etc form part of their reporting to gain the approvals and to assure that all is being managed in an appropriate manner.

- As part of the risk and asset information, those Procedures, policies etc are noted as mitigation/treatment of specific risks in the (3.1.1) risk register.
- As part of the asset information, those Procedures, policies etc are recorded as (3.4.3) Method Statements with a document reference.
- As part of the asset information, those Procedures, policies etc are noted against the (3.5.3) Events that record their implementation or execution by a Contact.
- As part of the evidence, that someone will appear as a (3.6.2) Contact with their relevant competency or qualification.
- As part of the evidence, those Procedures, policies etc are detailed in (3.6.1) Documents along with a hyperlink location and a Contact able to give access.

### 4.2 Example 2: Handling general requirements

For example, various documents (see figure 2) were mentioned in a discussion of the requirements for risk and asset management. Some (left-hand panel) focussed on the requirements around the 'delivery' gateways and others (the right-hand panel) focussed on requirements around the 'in-use' phase. The documents derived from the asset information are shown in black, for example reports

that reflect the state of the asset information as it develops. The documents that are supporting evidence and are immutable are shown in green. Drawings may either be reports derived from the information or may be evidence.

In figure 3, the information content – using the entities covered in section 3 – is shown, independent of the documents they are traditionally found in.

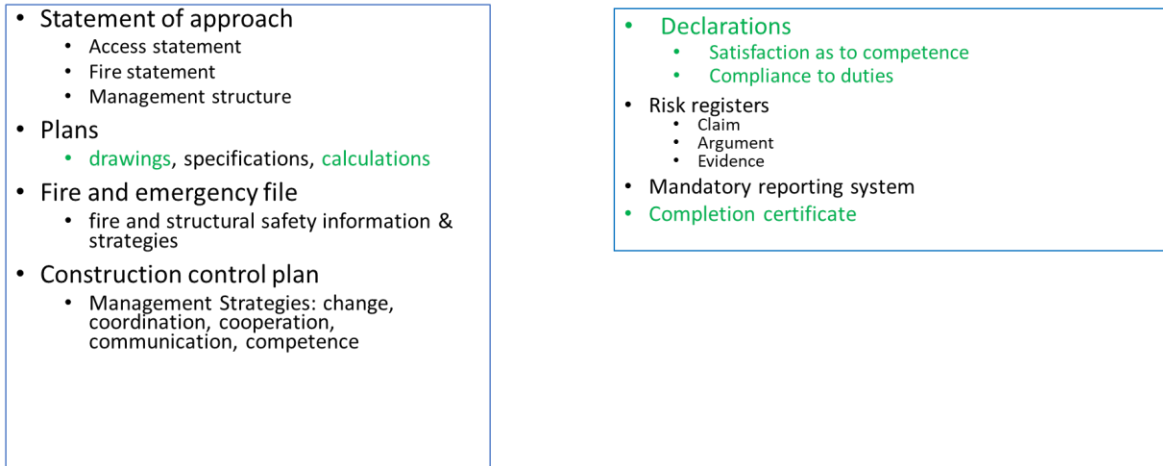


Figure 2: Examples of expected report Documents (black) and evidence Documents (green)

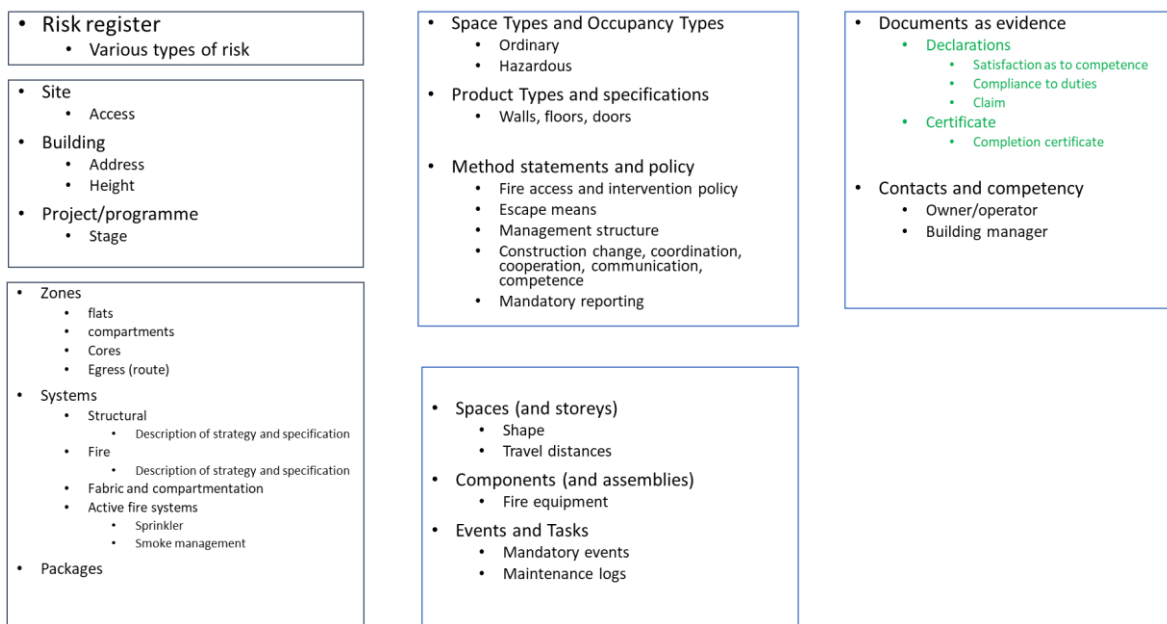


Figure 3: The same examples as Information

## 5 Benefits of Granular Data

As has been described in previous sections, managing risks requires linking each risk to the related spatial elements, assets, and activities that impact or are impacted by the risk.

When creating and maintaining an asset information store, there is a choice to be made about the level of detail provided for the risks themselves and their related spatial elements, assets and activities.

At one extreme, very high-level information could be used – describing a generalized risk and associating this with the entire site or building and all maintenance activities. For example, the risk posed by the “spread of fire” might be associated with an entire building, or the risk that assets “do not reach expected operating life” might be associated with all assets collectively in a site.

At the other extreme, very granular information could be used to describe the same scenario – breaking the “fire spread” or “not reaching expected operating life” risks into more specific risks (perhaps based on where the fire originates or the individual asset types) and associating these risks with the relevant specific assets (individual fire compartment systems and their component fire doors, closers, walls, floors, etc., or for operating life the automatic opening vents, lift drive unit, kitchens, floor surfaces etc.), and specific maintenance and inspection schedules for each.

Neither of these approaches is right or wrong, but a balance must be found that is appropriate in context.

The table below sets out some scenarios that illustrate some of the benefits and drawbacks of the two extreme approaches to help organizations implementing the Golden Thread determine what is the right balance for them.

Activity or event	Implications for high-level representations	Implications for very granular representations
<b>Development handover</b>	<p>Small number of things to describe, but each description could be lengthy.</p> <p>The detail may not be available to easily monitor asset service and inspection schedules, or to provide information about assets to support planned or reactive maintenance activities.</p>	<p>Large volume of data requiring a more sophisticated asset management system.</p> <p>More data to maintain, but details available to support service and inspection jobs and planned and reactive maintenance.</p>
<b>Replacing an automatic closer on a fire door</b>	<p>Because at the high-level the spatial and asset definition is simply the entire building, a change to this component would necessitate considering all risks and each element within the risk.</p>	<p>The detailed representation would mean that it was easy to identify which systems the closer was part of (the passive fire protection system, the fire door assembly, the specific compartment/s etc.) and which specific risks might be affected by this change. This reduces the scope of the impact assessment making it faster and less resource intensive.</p> <p>However, the replacement will then require information about the new</p>

		component, the installation, and the service and inspection schedule to be updated in the detailed asset information store.
<b>Replacing a lobby floor tile</b>	Again, because of the high-level nature of the representation, it isn't possible to tell that this change has no impact on the risks, and therefore an impact assessment must be conducted – for example to check if this floor is part of a fire compartment.	The detailed representation allows the repair to go ahead with knowledge that this has minimal “spread of fire” impact because it is known that this floor surface is not part of a fire compartment, but may indicate a risk that the floor surface is failing and may not reach its expected life (perhaps triggering a review of how the floor has been maintained, or any potential warranty claim).

The use of industry data standards for representation (as opposed to individually defined organizational data standards) increases the likelihood that the information required can be automatically shared between stakeholders (including the supply chain) and stored – in other words, that the technology systems and information management platforms can interoperate.

This is because industry data standards provide a consistent structure to the data and shared, clear definitions of what each data field should and should not contain. This makes it easier for a machine to find the right data or store it in the right place, without the need for a person to interpret data or transcribe it from one format to another. Appropriately competent people can then more easily rely on this information when it is presented to them to support their decision making.

## 6 Cascade and Promotion of Data

The specific data in the risk and asset information changes over time. During the early part of a building's life, lots of relevant data is created, especially during the construction process leading up to handover. Even during this stage, the data is also being updated and detail added as specified products are swapped out and details of installation and certification become available.

As the building moves into its operational phase, the data for the building will continue to evolve. Assets will be inspected and serviced, fail, and be replaced. These events will give rise to new and updated information – replacing the closer on a fire door, for example, would require the new model numbers and serial numbers to be recorded, details of who installed it and when, tests that were conducted to ensure it performed as expected etc.

The information created during these events creates a cascade that expands the risk and asset information. This information was (presumably) already held in some form, but until the event takes place, may not have been included in the digital asset information.

Using the fire door automatic closer as an example, before it was replaced it could be held at a higher level, as – likely – all closers on that particular type of fire door in the building were the same. Providing the context of their use was comparable, one might be able to describe the use of the fire door as a mitigation for the risk of spread of fire in more general terms. However, once one door has had its closer replaced, unless the exact same make, model and batch of closer is still available, there is now one door with a different closer, and this may well now bring more detail about the closers into the scope of the risk and asset information. Consider a product recall: this would require the information about the two different closer types now in use to be maintained and easily searchable to establish not only if the recalled product was in use in the building, but where in the building it was being used.

This process of promotion of information into shareable risk and asset information also informs the granularity of information that should be stored. Clearly, if granular data is not available – for example, the serial number of the closer – then certain activities will require more effort to establish the scope of any treatments. In the case of the closer, the absence of a serial number in the information management platform may lead to the need to survey all the closers in the portfolio to establish which – if any – were subject to a recall.

## 7 Worked Example

[to follow as online resources]

# APPENDICES

The following annexes detail three ways that the risk and asset information can be represented using standard schemas and formats. This allows regulators and any new owner of the asset to review and acquire the information efficiently and accurately over the long term.

- Annex A1: “IFC” is included to allow continuity from best practice in the design, construction and operational processes and to ensure that geometric information remains accessible.
- Annex A2: The “OSCRE” standard is included to allow asset owners already committed to this standard (or to the HACT UK Housing Data Standards which it contains) to convey the entities and attributes.
- Annex A3: “Open” document standards including “HTML” is included to allow designers, constructors and owners not yet engaged with formal information management to prepare and share their asset information as rapidly and easily as possible.



## A1.Representation using IFC4

IFC is the international consensus and ISO standard used in the design, construction and operation of built assets. It has the ability to organise the entire suite of spatial, physical and process entities with their geometry and attributes. The following sections identify the entities in the buildingSMART ISO16739 IFC schema and property sets that can be used to represent the data identified in section 3 above. This section assumes familiarity with the standard. IFC concepts and principles are detailed here [\[link\]](#).

- IFC4 is preferred and must be used post-handover. IFC4 ADD2 TC1 (ISO 16739-1:2018) is the latest published release, but use can also be made of IFC4.3 which is available as a release candidate.
- Information pre-handover and occupancy gateway may be held in IFC2x3 within the Coordination/Reference View.

These standards can be read and downloaded in a number of formats free of charge at <https://technical.buildingsmart.org> (registration is not required).

Entity names below correspond to the entity names in the schema. The following five items of information are associated to each entity:

Name	Updated	Category	Description	Documentation
------	---------	----------	-------------	---------------

IfcRoot [\[link\]](#)

**Name** should be a unique readable identifier used throughout the asset information including the claim, argument and evidence. It should match any name used in any supporting documents.

**Updated** is represented using the OwnerHistory entity or using a specific property set. Dates should be in ISO format (yyyy-mm-ddThh:mm:ss). The time component is optional. Dates are either date of last review (risks) or otherwise date of last modification of the actual entity and its electronic record.

**Category** is a Uniclass 2015 classification or a CIC (**RIBA**) project stage

**Description** should be a noun clause or phrase to aid the identification and understanding of the entry. Any synonyms in use for the name of the entry should be noted in the Description.

IfcOwnerHistory [\[link\]](#)

IfcClassiifcationReference [\[link\]](#)

IfcDocumentReference [\[link\]](#)

Property set content based on the specific information requirements)

### Other notes

- l. Scale values are typically “very high, high, moderate, low, very low”. Numeric scales should not be used for gradings or evaluations.
- m. Logical values are typically true, unknown or false.
- n. Units should be SI metric and should not appear in the data fields.
- o. Angles should be in degrees (clockwise).
- p. Time intervals should be expressed in years.

## A1.1 Managing risk

The Claim is not represented directly in the IFC but all the relevant information comprising the Argument can be found within an IFC model, see A1.1.1 and A1.5.2 below.

### A1.1.1 Risk Register

Risks are represented using a property set with formal or informal links to the associated entities and the mitigating treatment entities.

HS\_Risk\_UK (see PAS1192 Part 6 currently be upgraded to become ISO19650-6)

or Pset\_Risk (IFC4.3)

## A1.2 Scope

This information is represented directly by three entities and supporting property sets.

### A1.2.1 Site

IfcSite [\[link\]](#)

SiteAddress

Pset\_SiteCommon

Property set content based on the specific information requirements)

### A1.2.2 Building

IfcBuilding [\[link\]](#)

BuildingAddress

Pset\_BuildingCommon

GT\_BuildingCommon\_UK (content based on the Key Data and other requirements)

### A1.2.3 Project / Program of Work

IfcProject [\[link\]](#)

Phase may hold the category in the form "CIC n : aaaaaa"

Property set content based on the specific information requirements)

## A1.3 Groupings for Management

This information is represented directly by three entities (and subtypes) and supporting property sets.

### A1.3.1 Zones / Space Groupings / Units

IfcZone [\[link\]](#)

Pset\_ZoneCommon

Pset\_MaintenanceStrategy (IFC4.3)

Property set content based on the specific information requirements)

### A1.3.2 Systems / Component Asset

IfcSystem [\[link\]](#)

IfcCircuit

IfcDistributionSystem [\[link\]](#)

IfcBuildingSystem

Pset\_MaintenanceStrategy (IFC4.3)

Property set content based on the specific information requirements)

### A1.3.3 Packages / Program of Work Item

IfcWorkPlan [\[link\]](#)

Pset\_WorkControlCommon

Property set content based on the specific information requirements)

## A1.4 Specifications and Catalogues

This information is represented directly by three entities and their subtypes and supporting property sets.

### A1.4.1 Space Type / Activity Type

IfcSpaceType [\[link\]](#)

Pset\_SpaceOccupancyRequirements

[Pset\\_SpaceFireSafetyRequirements](#)

Property set content based on the specific information requirements)

### A1.4.2 Product / Component Type / Material Types

IfcElementType and subtypes [\[link\]](#)

Pset\_ManufacturerTypeInfo

Pset\_(various)TypeCommon

Pset\_(various)Type(predefinedtype)

Property set content based on the specific information requirements)

#### A1.4.3 Task Type / Work Order / Job

IfcTaskType [\[link\]](#)

Property set content based on the specific information requirements)

### A1.5 Specific Parts

This information is represented directly by three entities and their subtypes and supporting property sets.

#### A1.5.1 Storeys and Spaces

IfcBuildingStorey [\[link\]](#)

IfcSpace [\[link\]](#)

IfcExternalSpace

Pset\_SpaceCommon

Property set content based on the specific information requirements)

#### A1.5.2 Asset / Component

IfcElement and subtypes [\[link\]](#)

Pset\_ManufacturerOccurrence

Property set content based on the specific information requirements)

#### A1.5.3 Task / Event / Diary Entry / Work Element

IfcTask [\[link\]](#)

Property set content based on the specific information requirements)

### A1.6 Information about Evidence

This information is represented directly by two entities and supporting property sets.

#### A1.6.1 Documents

IfcDocumentReference [\[link\]](#)

#### A1.6.2 Contact

IfcActor [\[link\]](#)

Pset\_ActorCommon

### A1.6.3 Resource: Qualifications and Attributes

Qualifications may be associated to IfcActor and further Attributes may be associated to the other entities above.

## A2. Representation using OSCRE

*Including the HACT UK Housing Data Standard powered by OSCRE.*

OSCRE is the international consensus standard used in the operation of built assets. It has the ability to organise the entire suite of spatial, physical and process entities with their geometry and attributes. The following sections identify the entities in the OSCRE Industry Data Model and HACT UK Housing Data Standards powered by OSCRE that can be used to represent the data identified in earlier sections. This section assumes familiarity with this standard.

These standards can be accessed free of charge at <https://www.oscre.org/Industry-Data-Model/Introducing-the-Data-Model> (a free, self-service guest registration is required).

Entity names below correspond to the entity names in the Industry Data Model.

Square brackets are used to identify the earliest version of the published standards to support the entity, where “WIP” means “work-in-progress” (standards that are under development but are already published on the OSCRE website for information).

This is intended for existing OSCRE users to understand whether an upgrade to a more recent version of standards is likely to be required for each entity.

The versions referenced and their publication dates are shown below:

OSCRE version	Date published
3.0	21st June 2018
3.1	29th November 2018
3.2	15th November 2019
3.3	2nd November 2020
3.4	23rd September 2021
WIP	Work in progress is published frequently as projects progress and change requests are processed (often every couple of weeks)

Links are provided to the online documentation for each entity in the latest ‘work in progress’ information. If the link is followed, it is easy to switch to a published version of the standard using the version selector in the top right of the main window – for example, to see the entity as it was in version 3.2 of the standards, click on “Main/3.2”.

### A2.1 Managing risk

#### A2.1.1 Risk Register

Building Health And Safety Risk [WIP]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/BuildingHealthAndSafetyRisk&product=OSCRE>

### A2.2 Scope

### A2.2.1 Site

Site [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/Site&product=OSCRE>

### A2.2.2 Building

Property [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/Property&product=OSCRE>

### A2.2.3 Project / Program of Work

Program Of Work [3.2]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/ProgramOfWork&product=OSCRE>

## A2.3 Groupings for Management

### A2.3.1 Zones / Space Groupings / Units

Unit [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/Unit&product=OSCRE>

Space Grouping [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/SpaceGrouping&product=OSCRE>

### A2.3.2 Systems / Component Asset

Component Asset [3.2]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/ComponentAsset&product=OSCRE>

Component Asset Basket [3.2]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/ComponentAssetBasket&product=OSCRE>

### A2.3.3 Packages / Program of Work Item

Program of Work Item [3.2]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/ProgramOfWorkItem&product=OSCRE>

## A2.4 Specifications and Catalogues

### A2.4.1 Space Type / Activity Type

Space Class Code [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/SpaceClassCode&product=OSCRE>

Uniclass Space Location Code [3.3]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/UniclassSpaceLocationCode&product=OSCRE>

Uniclass Element Function Code [3.3]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/UniclassElementFunctionCode&product=OSCRE>

#### A2.4.2 Product / Component Type / Material Types

Component Asset Type [3.2]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/ComponentAssetType&product=OSCRE>

#### A2.4.3 Task Type / Work Order / Job

Work Order [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/WorkOrder&product=OSCRE>

Work Type [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/WorkType&product=OSCRE>

Work Class Code [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/WorkClassCode&product=OSCRE>

Program Of Work Item Driver Type Code [3.2]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/ProgramOfWorkItemDriverTypeCode&product=OSCRE>

Cost Subject Code [3.3]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/CostSubjectCode&product=OSCRE>

M3NHF Schedule Of Rates Code [3.1]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/M3NHFScheduleOfRatesCode&product=OSCRE>

### A2.5 Specific Parts

#### A2.5.1 Storeys and Spaces

Floor [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/Floor&product=OSCRE>



Space [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/Space&product=OSCRE>

A2.5.2 Asset / Component

Component Asset [3.2]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/ComponentAsset&product=OSCRE>

A2.5.3 Task / Event / Diary Entry / Work Element

Work Order [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/WorkOrder&product=OSCRE>

Work Element [3.1]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/WorkElement&product=OSCRE>

A2.6 Information about Evidence

A2.6.1 Documents

Attachment [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/Attachment&product=OSCRE>

Document Reference [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/DocumentReference&product=OSCRE>

A2.6.2 Contact

Person [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/Person&product=OSCRE>

Organization [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/Organization&product=OSCRE>

A2.6.3 Resource: Qualifications and Attributes

Qualification [3.0]

<https://www.oscre.org/idm?version=idm-main-wip&content=entity/Qualification&product=OSCRE>

### A3.Representation using open document formats

This is an interim presentation suitable for existing high-risk buildings so as to help correlate the required content as quickly as possible. Organizations should transition to formal asset management applications as required so as to support the IFC or OSCRE representations.

Documentation should be delivered in an open office (odt) or HTML format. Landscape format may be appropriate to make room for the wider tables.

All tables in the document start with the same five columns: headed as shown (*without the italic notes*):

<b>Name</b>	<b>Updated</b>	<b>Category</b>	<b>Description</b>	<b>Documentation</b>
<i>The actual column heading is specific to each table.  (unique readable identifier used throughout the Claim, Argument and Evidence. )</i>	<i>(ISO date of the last change to the entry or the actual entity)</i>	<i>(Uniclass 2015 or CIC stage classification)</i>	<i>(phrase or narrative identifying and describing the entry)</i>	<i>(reference to <a href="#">Documents</a>)</i>

The following guidance applies to all the tables within the document:

- a. The table may be preceded by introductory remarks, but these should not include nor contradict any information representable in the tables.
- b. Tables should have only one header row. No blank rows should be included.
- c. Every entry has a Name, which should be short and unique within the document, and should match any name used in any supporting documents and evidence.
- d. Any synonyms in use for the name of the entry should be documented in the Description.
- e. Dates should be in ISO format (yyyy-mm-ddThh:mm:ss). The time component is optional. Dates are either date of last review (risks) or otherwise date of last modification. Modification refers to both the actual entity and its electronic record.
- f. Classifications should be presented in the form “code : description” and to Uniclass 2015 and CIC stages where possible.
- g. Description should be a noun clause or phrase to aid the identification and understanding of the entry.
- h. Documentation should reference a named entry in the 5.1 Documents table.
- i. Contact should reference a named organisation or person in the 5.2 Contacts table.
- j. Any referenced named entry must have a single hyperlinked corresponding entry.
- k. UPRN, Postcodes and W3W are freely available.
- l. Scale values are typically “very high, high, moderate, low, very low”.
- m. Logical values are typically “true”, “unknown” or “false”.
- n. Units should be SI metric but should not appear in the data fields.
- o. Angles should be in degrees (clockwise).

- p. Any blank entry in an optional field may be presented as ‘n/a’ covering not applicable or not available or no answer.
- q. Time intervals should be expressed in years.
- r. Any table may have additional columns to the right of the mandated columns. The content of any additional columns should not contradict the information in the mandatory columns.
- s. There can be multiple tables within a section, if different additional columns are used in each.
- t. Cells should not be merged nor sub-divided.
- u. The table may be followed by notes, but these should not include nor contradict any information representable in the tables.

### A3.1 Managing risk

#### A3.1.1 Risk Register

Column 1 is headed “Risk”. Columns 6 onwards are headed as shown:

Spatial Association	Physical Association	Process Association	Spatial Treatment	Physical Treatment	Process Treatment	Likelihood	Consequence	Priority
<i>(reference to Spatial)</i>	<i>(reference to Physical)</i>	<i>(reference to Process)</i>	<i>(reference to Spatial)</i>	<i>(reference to Physical)</i>	<i>(reference to Process)</i>	<i>(very low, low, moderate, high, very high)</i>	<i>(very low, low, moderate, high, very high)</i>	<i>(very low, low, moderate, high, very high)</i>

#### A3.2 Scope

##### A3.2.1 Site

Column 1 is headed “Site”. Columns 6 onwards are headed as shown:

Postcode	UPRN	W3W	Latitude	Longitude	Elevation
<i>(aann naa)</i>	<i>(twelve digits)</i>	<i>(a-a-a)</i>	<i>(decimal degrees)</i>	<i>(decimal degrees)</i>	<i>(m)</i>

##### A3.2.2 Building

Column 1 is headed “Building”. Columns 6 onwards are headed as shown:

Postcode	UPRN	W3W	Latitude	Longitude	Elevation	Gross Area	Occupants	Access Hint
<i>(aann naa)</i>	<i>(twelve digits)</i>	<i>(a-a-a)</i>	<i>(decimal degrees)</i>	<i>(decimal degrees)</i>	<i>(m)</i>	<i>(m2)</i>	<i>(number)</i>	<i>(aids to gaining access)</i>

### A3.2.3 Project / Program of Work

Column 1 is headed “Project”. Columns 6 onwards are headed as shown:

<b>Holder</b> <i>(reference to Contacts)</i>	<b>Commencement Date</b> <i>(ISO date this commenced)</i>
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## A3.3 Groupings for Management

### A3.3.1 Zones / Space Groupings / Units

Column 1 is headed “Zone”. Columns 6 onwards are headed as shown:

<b>Holder</b> <i>(reference to Contacts)</i>	<b>Vulnerability</b> <i>(very low, low, moderate, high, very high)</i>	<b>Criticality</b> <i>(very low, low, moderate, high, very high)</i>	<b>Priority</b> <i>(very low, low, moderate, high, very high)</i>	<b>Gross Area</b> <i>(m<sup>2</sup>)</i>	<b>Occupants</b> <i>(number)</i>
---	---	---	--	---	-------------------------------------

### A3.3.2 Systems / Component Asset

Column 1 is headed “System”. Columns 6 onwards are headed as shown:

<b>Vulnerability</b> <i>(very low, low, moderate, high, very high)</i>	<b>Criticality</b> <i>(very low, low, moderate, high, very high)</i>	<b>Priority</b> <i>(very low, low, moderate, high, very high)</i>
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### A3.3.3 Packages / Program of Work Item

Column 1 is headed “Package”. Columns 6 onwards are headed as shown:

<b>Holder</b> <i>(reference to Contacts)</i>	<b>Vulnerability</b> <i>(very low, low, moderate, high, very high)</i>	<b>Criticality</b> <i>(very low, low, moderate, high, very high)</i>	<b>Priority</b> <i>(very low, low, moderate, high, very high)</i>
---	---	---	--

## A3.4 Specifications and Catalogues

### A3.4.1 Space Type / Activity Type

Column 1 is headed “Space Type”. (no further fields specified)

### A3.4.2 Product / Component Type / Material Types

Column 1 is headed “Product Type”. Columns 6 onwards are headed as shown:

<b>Manufacturer</b> <i>(reference to Contacts)</i>	<b>Series</b> <i>(product number, model number, series identifier)</i>
---	---

### A3.4.3 Task Type / Work Order / Job

Column 1 is headed “Task Type”. Columns 6 onwards are headed as shown:

<b>Interval</b> <i>(years)</i>	<b>Is Planned</b> <i>(true, unknown, false)</i>
-----------------------------------	--

## A3.5 Specific Parts

### A3.5.1 Storeys and Spaces

Column 1 is headed “Space”. Columns 6 onwards are headed as shown:

<b>Part Of</b> <i>(reference to another entry in this table)</i>	<b>Elevation</b> <i>(m)</i>	<b>Clear Height</b> <i>(m)</i>	<b>Gross Area</b> <i>(m2)</i>	<b>Occupants</b> <i>(number)</i>	<b>Tag</b> <i>(identifier)</i>	<b>Zone</b> <i>(reference to Zones)</i>	<b>Activity</b> <i>(reference to Activities)</i>
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### A3.5.2 Asset / Component

Column 1 is headed “Component”. Columns 6 onwards are headed as shown:

<b>Part Of</b> <i>(reference to another entry in this table)</i>	<b>System</b> <i>(reference to Systems)</i>	<b>Spatial</b> <i>(reference to Spatial)</i>	<b>Product</b> <i>(reference to Products)</i>	<b>Serial Number</b> <i>(identifier)</i>	<b>Tag</b> <i>(identifier)</i>
---	--	---	--	---	-----------------------------------

### A3.5.3 Task / Event / Diary Entry / Work Element

Column 1 is headed “Event”. Columns 6 onwards are headed as shown:

<b>Part Of</b> <i>(reference to another entry in this table)</i>	<b>Package</b> <i>(reference to Duties)</i>	<b>Method</b> <i>(reference to Methods)</i>	<b>Completion Date</b> <i>(ISO date this completed)</i>	<b>Spatial Affected</b> <i>(reference to Spatial)</i>	<b>Physical Affected</b> <i>(reference to Physical)</i>	<b>Process Affected</b> <i>(reference to Process)</i>
---	--	--	--	--	--	--

## A3.6 Information about Evidence

### A3.6.1 Documents (incl. plans and attachments)

Column 1 is headed “Document”. Columns 6 onwards are headed as shown:

<b>URI</b>	<b>Holder</b>	<b>Is Private</b>
<i>(identifier)</i>	<i>(reference to Contacts)</i>	<i>(true, unknown, false)</i>

### A3.6.2 Contact

Column 1 is headed “Contact”. Columns 6 onwards are headed as shown:

<b>Email</b>	<b>Telephone</b>	<b>UPRN</b>	<b>W3W</b>	<b>Qualification</b>	<b>Is Private</b>
<i>(identifier)</i>	<i>(identifier)</i>	<i>(twelve digits)</i>	<i>(a-a-a)</i>	<i>(identifier)</i>	<i>(true, unknown, false)</i>

### A3.6.3 Resource: Qualifications and Attributes

Further recommendations concerning Qualifications and Attributes will be added once these are clarified.