

# Application forms: Common information requirements for automated compliance checking

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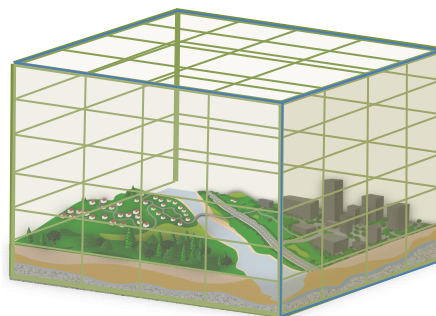
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Bringing together the needs of asset regulators and asset developers



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## Executive Summary

This report is the result of a review initiated by the buildingSMART Regulatory Room during the buildingSMART Standards Summit in London in Autumn 2018. It explores the information requirements that are common in many compliance application forms and so will be required in models as a pre-requisite to formal automated compliance checking

Fifteen different chapters offered to provide example application forms from their national regulatory processes. These have been analysed to establish the commonalities between them. A review process then distinguished between information requirements related to the applicant and application topic, and information that could best be embodied in BIM as part of the submission.

The buildingSMART IFC schema is already able to represent the necessary entities (objects). This report is therefore a specification for the development of property sets and an MVD – a specification for the usage of IFC that is itself checkable automatically against a submission. Alternatively, individual buildingSMART chapters may take this report as the basis for developing a national MVD by adding local classification and naming rules.

In either case, there will be additional information requirements that are needed to satisfy the actual topic of the application, such as fire approval, planning and zoning codes, building regulations, or permits to occupy. These will be specific to individual national practice and are the concern of the individual buildingSMART chapters.

## Contributors

Thanks are recorded to many participants as this report is the result of the vision of attendees of the buildingSMART Standards Summit Regulatory Room in London in 2017, and the subsequent inputs from:

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## 1. Introduction

This report is the result of a review initiated by the buildingSMART Regulatory Room during the buildingSMART Standards Summit in London in Autumn 2018. It explores the information requirements that are common in many compliance application forms and so will be required in models as a pre-requisite to formal automated compliance checking.

The project was defined as requiring three stages:

- a. Research: collate application forms from various locales, either as PDF, web or XML formats. Where necessary the forms will be translated into English using online language tools.
- b. Classify the contents into three groupings covering applicant details, approval type and BIM information, so as to allow focus on the latter. The applicant details and information relating to the application type were taken out of scope as these were unlikely to be transmitted using BIM.
- c. Identify the appropriate IFC entities, property sets and properties needed to convey the relevant information that would be covered by either an International MVD or national MVDs.

A scope for the delivery of the results was outlined:

### Table of contents (draft)

#### Forwards / Summary

#### 1. Purposes for collating application forms

- 1.1 Comparison of information requirements
- 1.2 Standardisation of common information requirements

#### 2. Common information requirements

- 2.1 Application Purpose and Details of the receiving body
- 2.2 Applicant details
- 2.3 Actual and Intended situation models

#### 3. Situation models

- 3.1 Common requirements
- 3.2 Specific information requirements

#### 4. Recommendations

- 4.1 Common forms
- 4.2 Common property sets and object usage

#### 5. Conclusions

## Table of contents (draft)

### 2. Research

Fifteen different chapters offered to provide example application forms from their national regulatory processes. In the event five followed through, and their attention is gratefully acknowledged.

Chapter/Country	Responded
AT	
BE	
CA	
CN	
DE	
ES	Yes
FI	Yes
FR	
IT	Yes
JP	
KR	
NL	
NO	Yes
SE	
UK	Yes

Where necessary the forms were processed through an online document translation service <https://www.onlinedoctranslator.com> that preserved the layout and presentation whilst substituting the English equivalents. In general, the results were understandable given some familiarity with the topic but were not always presentable.

### 3. Analysis

The forms have been analysed to establish the commonalities between them. A review process then distinguished between information requirements related to the applicant and application topic, and information that could be embodied in BIM as part of the submission.

### 3a. Application Purpose, applicant details and situation reports

The information requested on the forms included information that was important but not directly related to BIM.

The application purpose was usually the first topic. These questions covered the type of application, whether it was a new application or a renewal and details of any past applications. There were also information identifying various related parties with their role, name, address, telephone and email.

The applicant details included the same information (their role, name, address, telephone and email) for the applicant and for any nominated agent, keyholder and contractor. Some forms required reference to evidence of competency, ownership and declaration of interests. If the application required a fee payment, the sum and means of payment was included.

## Forms

Application Purpose	Applicant details	Situation reports
<ul style="list-style-type: none"> <li>• <b>Scope</b> <ul style="list-style-type: none"> <li>• Type</li> <li>• New or renewal</li> <li>• Past permits</li> </ul> </li> <li>• <b>Regulator</b></li> <li>• <b>Other parties</b> <ul style="list-style-type: none"> <li>• Name</li> <li>• Role</li> <li>• Address</li> <li>• Telephone</li> <li>• Email</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Applicant(s)</b></li> <li>• <b>Agent(s)</b></li> <li>• <b>Interest in land</b></li> <li>• <b>Builder / electrical contractor</b></li> <li>• <b>Notified neighbours</b></li> <li>• <b>Site Keyholder</b> <ul style="list-style-type: none"> <li>• Name</li> <li>• Role/Profession</li> <li>• Address</li> <li>• Telephone</li> <li>• Email</li> </ul> </li> <li>• <b>Payment as required</b></li> <li>• <b>Certifications as required</b> <ul style="list-style-type: none"> <li>• Competency</li> <li>• Ownership</li> <li>• Declaration of interest</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Plan, sections, elevations</b></li> <li>• <b>Environmental assessments</b> <ul style="list-style-type: none"> <li>• Impact assessment</li> <li>• Species, habitat and geology conservation</li> <li>• Landscape</li> <li>• Microclimate</li> <li>• Contaminated land</li> <li>• Energy</li> <li>• Flood</li> <li>• Water services</li> <li>• Electrical safety</li> </ul> </li> <li>• <b>Social assessment</b> <ul style="list-style-type: none"> <li>• Economic and employment</li> <li>• Community impact</li> <li>• Disability assessment</li> <li>• Heritage</li> <li>• Noise</li> <li>• Consultation</li> </ul> </li> </ul>

Most forms also required reference to supporting documents. There were also expectations for a number of environmental and social assessments. The table below summarises their scope. This dependence on written reports represents an open-ended requirement that increases dependency on professional services and challenges the relevance and economics of automated compliance checking.

The requirement for supporting documents included site-plans, plans, elevations and sections, which could be replaced or complemented by a BIM model. This is considered in the next section.

### 3b. Situation models

The situation models are properly the scope of BIM submissions – the provision of well structured information in a neutral computer-accessible form, that can therefore be checked for compliance systematically.

Since applications relate to change in the built environment, the information requirements covered both the existing situation and the intended situation. These requirements covered three aspects:

- a. The site as existing and as intended
- b. The facility as existing and as intended
- c. The project and the process of transition from the current state to the intended state.

In each section, these three aspects were required to be properly identified by name and description along with other references (administrative district, geospatial location, land parcel code). Each was required to be properly classified according to one or more classification tables or controlled vocabularies.

## Situation Models

Site (existing/intended)	Project (change process)	Facility/Building (existing/intended)
<ul style="list-style-type: none"> <li>• <b>Name and other identifiers</b></li> <li>• <b>Description</b></li> <li>• <b>Classification</b> <ul style="list-style-type: none"> <li>• Address</li> <li>• Geolocation</li> <li>• Administrative region(s)</li> <li>• Planning zone(s)</li> <li>• Ecological zone(s)</li> </ul> </li> <li>• <b>Zones (areas)</b> <ul style="list-style-type: none"> <li>• Name</li> <li>• Description</li> <li>• Classification</li> <li>• Parking</li> <li>• Soft Landscaped</li> <li>• Hard</li> <li>• Facility/Building</li> <li>• Activities                             <ul style="list-style-type: none"> <li>• Jobs</li> <li>• Occupants</li> <li>• Usage hours</li> <li>• Waste generation</li> </ul> </li> <li>• * above/below ground</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Name and other identifiers</b></li> <li>• <b>Description</b></li> <li>• <b>Classification</b> <ul style="list-style-type: none"> <li>• Renovation</li> <li>• Restoration</li> <li>• Conservation</li> <li>• Consolidation</li> <li>• New</li> <li>• Temporary/permanent</li> </ul> </li> <li>• <b>Timing</b> <ul style="list-style-type: none"> <li>• Start date</li> <li>• finish dates</li> <li>• Expected duration</li> <li>• Usage hours</li> </ul> </li> <li>• <b>Construction Logistics</b> <ul style="list-style-type: none"> <li>• Access</li> <li>• Cranes and temporary works</li> <li>• Work outside curtilage</li> <li>• Waste generated</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Name and other identifiers</b></li> <li>• <b>Description</b></li> <li>• <b>Classification</b> <ul style="list-style-type: none"> <li>• Use</li> <li>• Historic protection</li> <li>• Fire</li> </ul> </li> <li>• <b>Systems</b> <ul style="list-style-type: none"> <li>• Name</li> <li>• Description</li> <li>• Classification</li> <li>• Dominant materials</li> <li>• Energy consumption</li> </ul> </li> </ul>

The site was usually required to be broken down into specific zones by usage and some key metrics reported, such as area, occupancy, usage hours and waste generation. Both the existing and intended analysis was required.

Similarly, the facility as existing and as intended was required to be broken down, typically by functional system. Key information for each system was dominant materials and energy consumption.

Finally, information about the project and the necessary change process was requested. Required information covered timings and construction logistics.

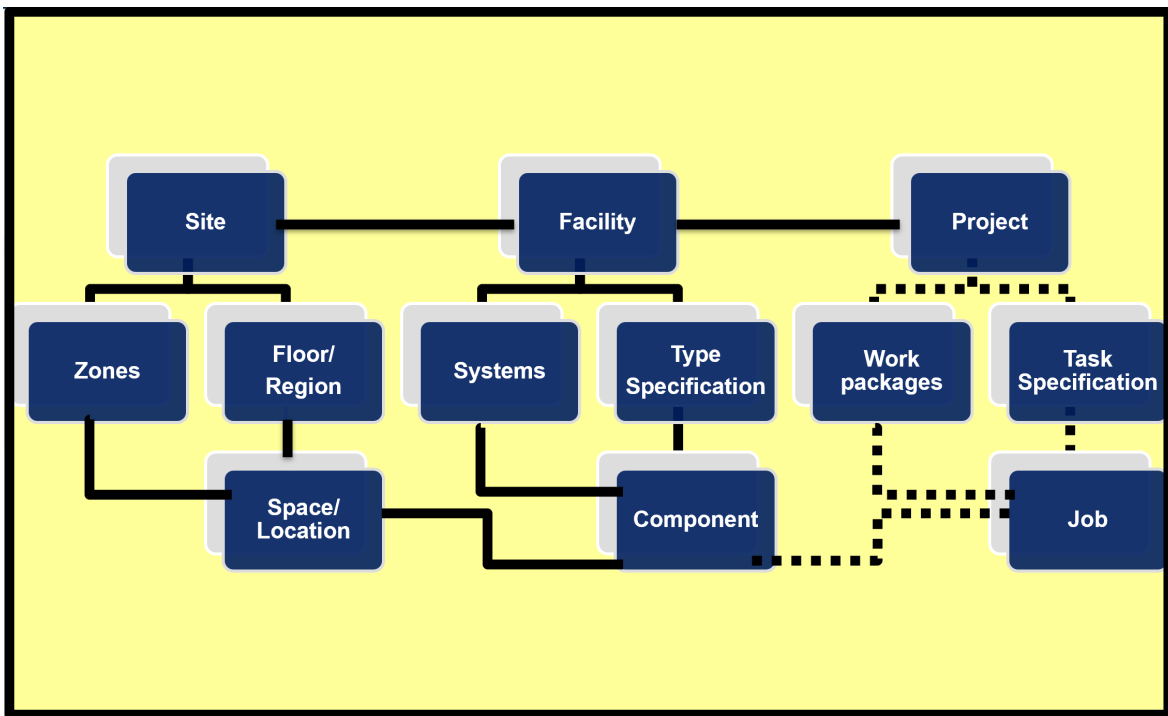
## 4. Implications for IFC

The IFC schema already has entities to represent the site (IfcSite), facility (IfcBuilding) and project (IfcProject), each having name, description and the potential for multiple classification references. Sites can have geolocation and other land references associated.

There is a 'Status' property for identifying existing, removed and new entities, so the two situation models can be presented separately in two models or together in a combined model.

IFC can also represent the zones (IfcZone) and systems (IfcSystem) required for analysing the decomposition of the site and the facility. A project can have a work-package (IfcWorkPlan) associated, so IFC can represent the overall project timing as a task (IfcTask) with defined duration and /or start and finish dates. Alternatively, these could be captured in a specific property set along with the answers to any additional construction logistics questions.

Given this framework, it is therefore only necessary for buildingSMART chapters to support the individual jurisdictions by identifying the classification tables in use and defining the appropriate property sets relating to the key measurements of the zones and systems.





## 5 Conclusions

This technical report has left open the question as to whether sponsorship should be sought for a buildingSMART International “Submission” MVD. This would introduce a top level of consistency. However, given that each individual jurisdiction will have its own specifics, it may be better to await National efforts such as are underway in Norway or Finland, with a view to other countries then modifying each.

Comments on this paper and discussions of the potential for further work are welcomed.

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