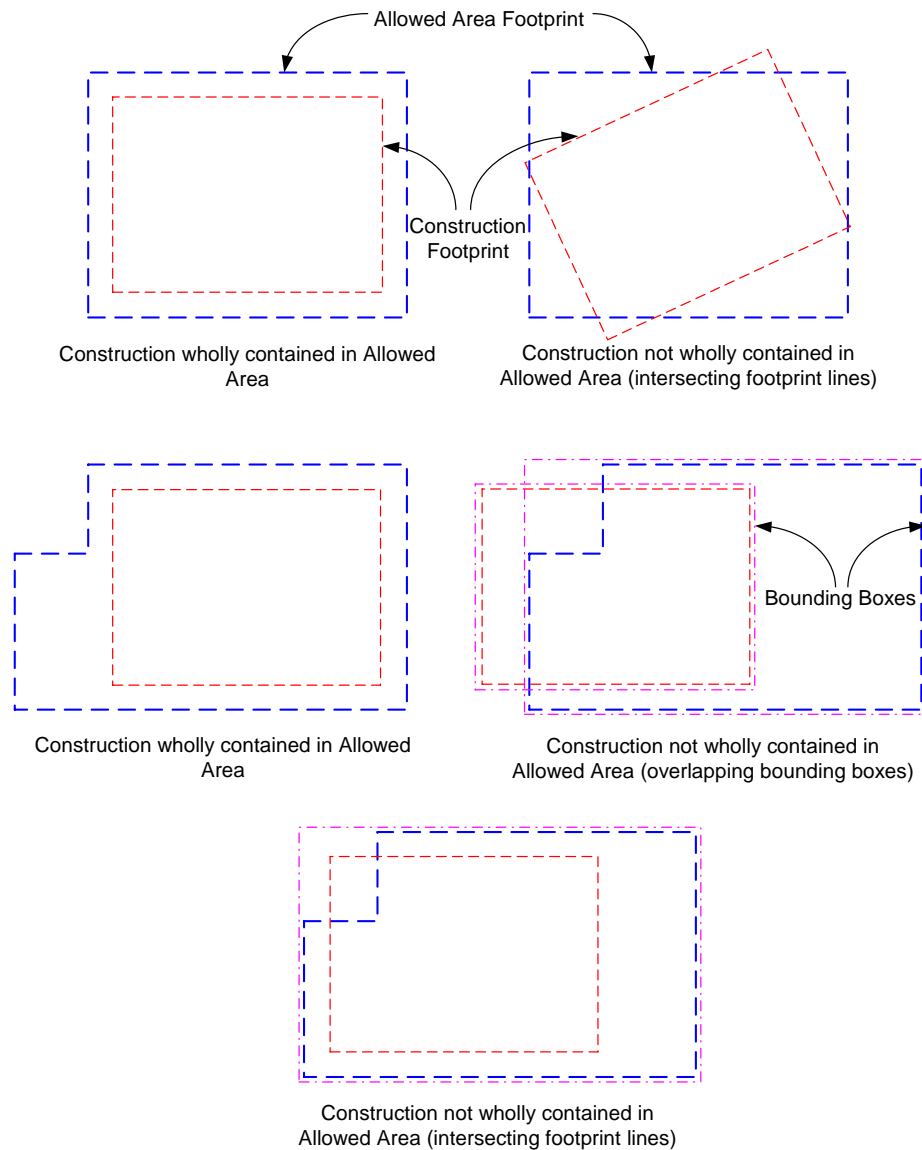


Flow of Events for Use Case - Locate Construction

Change Log	
17/10/2004	Renamed from UC-LocateConstruction
01/11/2004	Finalized for pre-integrated model

Overview

Provides a test to ensure that a construction or proposed construction is actually located within the allowed area for construction for the containing physical property.



For the purposes of this use case, it is assumed that the area of the construction that must be contained within the physical property is the footprint of the projected area onto the ground of the complete building although there may be circumstances when it is the footprint of the building at the point where it meets the ground.

Process

Preconditions

Physical property is defined.

Allowed area(s) for the property are defined and related to the property

The construction is defined with a shape representation defined as a footprint.

A relationship between the construction/building and the allowed area is defined.

Actors

Applicant

Main Flow

Flow	Entity
1. Determine the building or construction that is to be tested.	IfcBuilding
2. Get the footprint shape representation of the building or construction (occurrence of IfcBuilding) and retrieve the coordinates that define its shape.	IfcShapeRepresentation
3. Traverse the relationship between the construction and allowed area (IfcRelContainedInSpatialStructure) to determine the allowed area within which the construction is to be contained.	IfcRelContainedInSpatialStructure
4. Get the footprint shape representation of the allowed area (occurrence of IfcSpace) and retrieve the coordinates that define its shape.	IfcSpace
5. Carry out a geometric test to ensure that there is no overlap of the construction footprint with the allowed area footprint.	
6. This can be achieved in various ways including possibly: <ul style="list-style-type: none">• test the X, Y coordinates of the bounding box representations of the allowed area and the construction within the local coordinate system of the allowed area to ensure that:<ul style="list-style-type: none">• $X_{min}(\text{allowed area}) \leq X_{min}(\text{construction})$• $Y_{min}(\text{allowed area}) \leq Y_{min}(\text{construction})$• $X_{max}(\text{allowed area}) \geq X_{max}(\text{construction})$• $Y_{max}(\text{allowed area}) \geq Y_{max}(\text{construction})$• test that there are no intersections of the lines defining each footprint	

Post Conditions

Returns a value of TRUE to indicate that the construction is contained within the allowed area OR

Returns a value of FALSE to indicate that the construction is not contained within the allowed area

IFC Usage and Extension Requirements

Existing Entity/Class Usage

<i>Entity Class Name</i>	<i>Usage</i>
IfcBuilding	Defines the construction that is to be tested to ensure that it is within the bounds of the allowed area.
IfcRelContainedInSpatialStructure	Describes the relationship between a construction and the allowed area
IfcShapeRepresentation	Provides the footprint for the construction and the allowed area
IfcSpace	Used to specify the allowed area

Issue List

<i>Question</i>	<i>Answer</i>
Is the assumption that it is the building footprint that must be contained within the allowed area rather than the projected area onto the ground of the complete building/construction (including roof and other overhangs) true or not?	The general rule probably is "the projection of building corners in the facade" should be considered "allowed area". There are however a number of exceptions to the rule. Guidance can be obtained from Norwegian Standard NS3940 and "REN - Veiledning til teknisk forskrift til plan- og bygningsloven", Ch IV, §4.3 - http://www.be.no/beweb/regler/veil/REN2003/04maale.html (sorry, Norwegian only). The preliminary conclusion must be that this is a tricky point that will have to be examined thoroughly with experts on this topic.