

Level of Development (LOD) Specification 2021 Supplement



Collaborating Organizations



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December 2022

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Cover Image by Tocci Building Corporation



ACKNOWLEDGEMENTS

Many thanks to all the individuals and organizations who reviewed and contributed to the *BIMForum LOD Spec*, and to the following industry association representatives and co-chairs of the major discipline subgroups who made this document possible:

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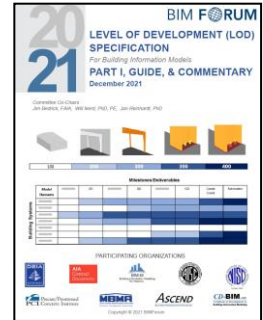
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Introduction

As 2023 marks the 10th anniversary of the *BIMForum Level of Development Specification* the BIMForum Working Group Advisory Board decided that it was time for a major review and update, so the LOD Working Group will not be adding any new content for 2022 and the [2021 version of the LOD Spec](#) will remain the current version until the 2023 version is published.

The purpose of the update is not to make any changes in model element requirements, but rather to resolve any conflicts and to improve consistency and readability in the logic and format of text and graphics.

The purpose of this *Supplement* to the 2021 version is to introduce the updated LOD definitions developed in 2022. In general the new definitions are the previous (2013) AIA definitions with the BIMForum Interpretations incorporated, so **the interpretations of building systems and components at various LODs included in the 2013 through 2021 versions of the LOD Spec are applicable to the new definitions without change.**



Evolution of the Level of Development (LOD) Definitions

AIA Effort

In 2008, the AIA published the first set of Level of Development definitions for *AIA Document E202™-2008 Building Information Modeling Protocol*. Due to the rapidly evolving nature of the use of BIM, the AIA updated the LOD definitions for its *G202-2013 Project BIM Protocol Form* and again, in collaboration with other industry organizations, for its *E201-2022 BIM Exhibit for Sharing Models with Project Participants*¹,

BIMForum Effort

In 2011 BIMForum initiated the development of the *LOD Specification* and formed a working group comprising contributors from both the design and construction sides of the major disciplines. To help further the standardization and consistent use of the LOD schema, and to increase its usefulness as a foundation for collaboration, the AIA licensed BIMForum to utilize its latest LOD definitions in this Specification. The BIMForum working group interpreted the AIA's basic LOD definitions for each building system, and then compiled examples to illustrate the interpretations. Because BIM is being put to an ever-increasing number of uses, the group decided that it was beyond the initial scope to address all of them. Instead, the definitions were developed to address model element geometry, with three of the most common uses in mind – quantity take-off, 3D coordination, and 3D control and planning. The group felt that in taking this approach the interpretations would be complete enough to support other uses.

In working with the AIA definitions the working group identified the need for an LOD that would define model elements sufficiently developed to enable detailed coordination between disciplines – e.g. clash avoidance/detection, layout, etc. The requirements for this level are higher than those for 300, but not as high as those for 400, thus it was designated LOD 350. The 2022 AIA Digital Practice documents include LOD 350.

The working group also decided that since the AIA's definition of LOD 500 related only to field verification and thus had no impact on modeling of elements the Specification would not develop interpretations for LOD 500.

In developing the system- and component-specific interpretations of the LODs the working group found it useful to define some fundamental interpretations, adding some color and shade to the AIA's definitions in order to guide the development of the specific interpretations.

The LOD definitions included in the LOD Specification versions 2013 through 2021 are the definitions from the AIA 2013 suite of Digital Practice documents plus the BIMForum's definition of LOD 350 and minus the definition of LOD 500, along with the BIMForum's fundamental interpretations.

¹ AIA Contract Document *E201-2022* is part of a series of digital practice documents published by AIA Contract Documents in July 2022. For general information and executable versions of the documents see <http://www.aia.org/contractdocs>.

2022 LOD Definition Update

In December of 2021 a collaborative effort was convened to incorporate lessons learned from almost a decade of practical application of the LOD framework into an updated set of LOD definitions. The following organizations were represented:

- AIA Contract Documents (ACD)
- American Association of State Highway Officials (AASHTO)
- American Institute of Architects (AIA)
- Canada's Integrated Project Delivery Alliance (IPDA)
- National BIM Standard (NBIMS)
- National Institute of Building Sciences (NIBS)

Basically, the group ratified the BIMForum interpretations and folded them into the new definitions, also simplifying and clarifying the language. As a result of this outcome the existing narrative and graphic interpretations of specific systems and components included in the 2013-2021 versions of the *LOD Spec* remain valid.

Some notable tweaks:

1. The sentence "Non-graphic information may also be attached to the Model Element" has been removed from all definitions. Since non-graphic information in any quantity and degree of accuracy can be attached to a model element of any LOD, the issue is addressed with a single over-arching statement in *AIA E201-2022*. This approach will be followed in future versions of the *LOD Spec*.
2. While the BIMForum 2013 interpretations assigned space-reservation volumes to LOD 200, the 2022 LOD 200 definition requires the element to show recognizable geometry. Thus space-reservation volumes are assigned to LOD 100.
3. The group developed a more succinct definition of LOD 500, making it clear that this LOD applies to existing or "as-constructed" elements rather than the "as-designed" elements addressed by LODs 100-400. The definition also requires that the accuracy of an LOD 500 element must be specified by some means other than LOD 100-400. The BIMForum will be collaborating with other industry organizations to develop a schema to specify this accuracy.

The text below shows the original 2013 AIA definitions, the 2013 BIMForum interpretations of those definitions, and the collaboratively-developed 2022 definitions.

LOD 100

AIA 2013 Definition. The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e. cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements.

BIMForum Interpretation: LOD 100 elements are not geometric representations. Examples are information attached to other model elements or symbols showing the existence of a component but not its shape, size, or precise location. Any information derived from LOD 100 elements must be considered approximate.

AIA/BIMForum 2022 Definition. **The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. Information related to the Model Element (e.g., cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements.**

LOD 200

AIA 2013 Definition. The Model Element is graphically represented within the Model as a generic system, object, or assembly with approximate quantities, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.

BIMForum interpretation: At this LOD elements are generic placeholders. They may be recognizable as the components they represent, or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.

AIA/BIMForum 2022 Definition. **The Model Element is generically and graphically represented within the Model with approximate quantity, size, shape, location, and orientation.**

LOD 300

AIA 2013 Definition. The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.

BIMForum 2013 interpretation: The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs. The project origin is defined and the element is located accurately with respect to the project origin.

AIA/BIMForum 2022 Definition. The Model Element, as designed, is graphically represented within the Model such that its quantity, size, shape, location, and orientation can be measured.

LOD 350

BIMForum 2013 Definition. The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and interfaces with other building systems. Non-graphic information may also be attached to the Model Element.

BIMForum2013 interpretation. Parts necessary for coordination of the element with nearby or attached elements are modeled. These parts will include such items as supports and connections. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.

AIA/BIMForum 2022 Definition. The Model Element, as designed, is graphically represented within the Model such that its quantity, size, shape, location, orientation, and interfaces with adjacent or dependent Model Elements can be measured.

LOD 400

AIA 2013 Definition. The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. Non-graphic information may also be attached to the Model Element.

BIMForum2013 interpretation. An LOD 400 element is modeled at sufficient detail and accuracy for fabrication of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.

AIA/BIMForum 2022 Definition. The Model Element is graphically represented within the Model with detail sufficient for fabrication, assembly, and installation.

LOD 500

AIA 2013 Definition. The Model Element is a field verified representation in terms of size, shape, location, quantity, and orientation. Non-graphic information may also be attached to the Model Elements.

BIMForum2013 interpretation. Since LOD 500 relates to field verification and is not an indication of progression to a higher level of model element geometry or non-graphic information, this Specification does not define or illustrate it.

AIA/BIMForum 2022 Definition. The Model Element is a graphic representation of an existing or as-constructed condition developed through a combination of observation, field verification, or interpolation. The level of accuracy shall be noted or attached to the Model Element.