BUILDING INFORMATION MODELING REQUIREMENTS

For the purpose of establishing protocols, expected levels of development, responsibilities, and authorized uses of Building Information Models (BIM) on the Project and arising out of the contract between Hoffman and Owner for the construction of the Project (the "Prime Contract") and the contract between Owner and the Architect (or contract between Hoffman and Architect, as applicable) for the design of the Project (the “Design Contract”) Subcontractor/Supplier agrees as follows:

Section 1: General Principles

a. This Attachment identifies the Parties' rights and responsibilities related to the use of BIM on the Project. It is not intended to create privity among any Parties outside this Agreement that would not otherwise exist at law or by the terms of the Design Contract, the Prime Contract, or any Affiliated Contract.
b. This Attachment does not alter or waive any duty, condition, or remedy in the Prime Contract, the Design Contract, or any Affiliated Contract.
c. Each Party to the Design Contract and the Prime Contract will append or incorporate, and will cause each member of the Design Team (as defined in Section 2.h) or each CMS (as defined in Section 2.d) with which it is in privity to append or incorporate, this identical Attachment in all contracts for which any other members of the Design Team or any CMS are to perform obligations to be modeled in connection with the Project (the "Affiliated Contracts"). All Affiliated Contracts will contain flow-down provisions requiring that the provisions of this Attachment be passed downstream to subconsultants and subcontractors, as applicable.
d. Nothing in this Agreement relieves any design professional from its obligation, or diminishes the design professional's role, as the party responsible for and in charge of the design of the Project.
e. Participation of Hoffman or its CMSs and suppliers in contributing to a Model (as defined in Section 2.o) does not constitute the performance of design services except to the extent that Hoffman or its CMSs have duties under the Prime Contract for design-build elements of the Project.

Section 2: Definitions

a. **BIM Execution Plan** means a plan containing detailed, project-specific information associated with BIM use on the Project. The Plan will include file naming dictionaries of Building Levels, Sectoring guides (if any), discipline codes, Model Author codes, Project Coordinates, etc. The plan will also provide guidance regarding requirements of the BIM coordination process such as meeting timings and the like.
b. **BIM Track** is a software application used for communicating locations or issues in a model and collaboratively resolving them. https://bimtrack.co/
c. **Clash** means the situation that occurs when two or more elements are positioned to occupy the same physical space or be placed in unacceptable proximity, including without limitation pipes, ducts, conduits, supports, egress aisles, and maintenance clearances.
d. **Clash Report** means a summary of the Clashes found when comparing one or more systems against one or more other systems.
e. **Construction Model Subcontractor (CMS)** includes all Subcontractors, Trade Partners, Suppliers or Vendors who have a responsibility to produce Project Data (as defined in Section 2.bb) for the Project.
f. **Construction Model** means a CMS’s accurate and complete representation of field construction conditions associated with their scope (whether planned or actual), including all components necessary for complete fabrication and installation.
g. **Contract Documents** has the meaning given under the Prime Contract and also encompasses the definition of "Subcontract Documents" set forth under any CMS's subcontract.
h. **Design Model (DM)** means the Model file (or files) Provided by the Design Team.
i. **Design Model Author (DMA)** includes all Design Team parties (as defined in 2.k) who have a responsibility to product Project Data (as defined in section 2.bb) for the Project.
j. **Design Team** means the Architects of record and/or the Engineers of record retained by Owner or Hoffman and includes the Architect and any other design consultants or subconsultants.
k. **Drawings** means those two-dimensional plans, sections, elevations, or other details that are Contract Documents under the Prime Contract, including specifications.
l. **Existing Conditions Model (EM)** means a model file containing elements of a project built previously. These are often provided by Owners for use as backgrounds. They should be used only in conjunction with field validation.
m. **Federated Model (FM)** means a compilation of the pertinent Design Model files and all distinct Construction Model files that incorporate detailed attributes submitted by the DMAs and the CMSs to describe the Project, whether as-planned or as-built.
n. **Field Clash** means the situation that occurs when two or more physical elements of the Project occupy the same physical space or are placed in unacceptable proximity, including without limitation pipes, ducts, conduits, supports, egress aisles, and maintenance clearances.
o. **File Names** means specified text strings defined for the Project and assigned to the Design and Construction Model files.
p. **Issued for Construction (IFC)** means a status achieved by the DMA team when a package and/or DM files are formally issued for project use. This will typically follow with revision management from that point forward.
q. **Issued for Fabrication (IFF)** means a status achieved following successful routing coordination of an entire given system, or level and/or sector of a given system, that is Clash-free (or deemed to be otherwise acceptable by Model Coordinator) to document the agreed-upon zone routing coordination for that system or sector.
r. **Level of Development (LOD)** means a description that identifies the specific content requirements and associated authorized uses for each Model Element at progressively detailed levels of completeness.
s. **Model** means a three-dimensional (3D) representation in electronic format of building elements representing computer-generated objects with true-to-scale spatial relationships and dimensions. A Model may be considered a single file or a compilation of numerous files. A Model may also include additional information or data. Models by their nature are saved as files, in various file formats, including DWG, RVT, NWD, and NWC.
t. **Model Archive** is the collection of source files and published Federated Models produced over the course of the Project.

u. **Model Author** means any Party contributing content to a Model.
v. **Model Coordinator** means the Party responsible for incorporating Design Models and Construction Models into the Federated Model and supervising the model coordination effort.
w. **Model Element** means a portion of the BIM representing a component, system, or assembly within a building or building site.
x. **Partial IFF** means a Construction Model file containing a portion of content that has achieved IFF status while other elements within that file have not.
y. **Parties** means multiple of Hoffman, Owner, Design Team, and CMS, taken together, and a **Party** means any one of them.
z. **Project Coordinates** means the system used to establish the X, Y, Z coordinates and compass rotation used in all Models and in the Project as the common Project coordinate system.
aa. **Project Data** means the geometry, performance parameters, material properties, layering codes, or other information that a CMS or member of the Design Team (a) creates or prepares, and/or (b) incorporates, distributes, transmits, communicates, or otherwise shares with other Parties for use in or in connection with any Model.
bb. **Provide** means to exchange, transmit, share, deliver, transfer, deliver, upload, download, or otherwise convey.
cc. **Record Model** means a model file or collection of files that meet all requirements for content, including CAD/BIM standard compliance, level of development and field-to-model accuracy.

Section 3: Model Use

a. **Reliance.** Design Models are produced solely for convenience purposes and are supplemental to the Contract Documents, whether they are used to generate the Contract Documents or not. By contributing content to or producing a Design Model, the Design Team does not create a right to rely on the Design Model or imply that the Design Model has been reviewed, approved, certified, or accepted. Design Models are not Contract Documents or Subcontract Documents, and they may differ from the Contract Documents or Subcontract Documents. All Parties must perform in accordance with the Contract Documents and the applicable Subcontract Documents.
b. **Order of Precedence.** Whenever an apparent conflict arises and is properly verified between the Contract Documents and the Design Model or the Federated Model, the Contract Document will govern with respect to the conflict. Whenever a conflict arises between the Federated Model and any other Model, the Federated Model will govern with respect to the conflict. In the case of any inconsistency, conflict or ambiguity among the Contract Documents, the documents shall govern in the following order:
    1. Any addenda or clarifications to the specifications issued to the project by the Owner or by the Architect/Engineer at Owner's direction.
    2. The piping and instrumentation diagram ("P&ID").
    3. Drawings at a more detailed scale (i.e. details, enlarged plans, etc.) govern over those with a less detailed scale (i.e. overall plan sheets, full building section views, etc.).
c. **Risks of Use.**
    1. Models and Model Elements.
        i. Each Party acknowledges and understands that Models and their respective Model Elements (a) might not include all known or contemplated addenda or revisions at the time Provided; (b) are not Contract Documents under the terms of the Prime Contract, the Design Contract, or any Affiliated Contract; (c) may be inaccurate as a result of electronic storage, transmission, technology compatibility, or related issues; (d) might have been revised by others without the Model Author's knowledge or consent; (e) might have incorrect or incomplete titles, file designations, or coding; and (f) when plotted, could result in variances or corrupt Models, Model Elements, or other data. Each Party accepts the risks identified in this Section and waives and releases the Model Coordinator and Model Author from any liability, risk, or legal expense for that risk.
        ii. Each CMS, for itself and for any other person or entity using a Model or Model Element that the CMS received, will release and, to the fullest extent permitted by law, defend and indemnify the Design Team, Model Coordinator, and Model Author and their respective consultants, partners, shareholders, officers, agents, and employees and hold them harmless for, from, and against all claims, demands, losses, liabilities, expenses, damages, and penalties of any kind, including without limitation expert and attorney fees, arising out of or relating to any use of the Model or Model Element by the CMS that is inconsistent with this Agreement, unauthorized modifications of the Model or Model Element by the CMS, or the Model Subcontractor's breach of this Agreement.
    2. File-Sharing.
        i. Release. Each Party (and any other person or entity using Models from or through the Party) agrees to release and, to the fullest extent permitted by law, defend and indemnify Model Coordinator (and anyone providing Models on behalf of Model Coordinator), its consultants, and its partners, shareholders, officers, agents, joint venturers, and employees and hold them harmless for, from, and against all claims, demands, losses, liabilities, expenses, damages, and penalties of any kind, including without limitation expert and attorney fees, arising out of or relating to the provision or use of the file-sharing service identified in Section 4.e.
        ii. Security. Model Coordinator has policies and systems in place to ensure that the file-sharing service described in Section e is reasonably secure. Owner, Design Team, and CMSs acknowledge, however, that use of the file-sharing site involves some degree of risk that third parties may "hack into" or otherwise access confidential information, and Owner, the Design Team, and CMSs using the service assume that risk. To protect the security of the file-sharing site, Design Team and CMSs will use computers or other electronic devices, networks, or Internet addresses that are owned, are controlled, or may be accessed by others. Any device that the Design Team and CMSs use to access the file-sharing service must be password-protected and not accessible for use by any third party.
d. **Confidentiality.** All Models are deemed to be confidential information. If any Models are subject to a nondisclosure agreement, protective order, or similar contractual or legal obligation, each Party agrees to be bound by the terms of that obligation with respect to all uses of the Models. At a minimum, each Party agrees to maintain confidential information in strict confidence and not to disclose it to any third parties without the prior written consent of the creator.

e. **Model Use Limitations.** The Design Team and any CMS's use of the Models is limited solely to the Project. Each CMS will return any Models in their possession, custody, or control to the Model Author after termination of the Project, termination of the Model Author's Design Contract or Affiliated Contract, or after receiving final payment for the Design Team's or CMS's scope of work for the Project.

f. **Responsibility for Model Ownership, Accuracy, and Errors.**
   1. Model Ownership Indemnification. Notwithstanding Section 3.c, the Design Team and each CMS will defend and indemnify any Party and its respective consultants, partners, shareholders, officers, agents, and employees and hold them harmless for, from, and against all claims, demands, losses, liabilities, expenses, damages, and penalties of any kind, including without limitation expert and attorney fees, arising out of or relating to any breach or alleged breach of the representations made by the Design Team or CMS in Section 3. h of this Agreement.
   2. Responsibility for Accuracy. Each CMS warrants that its Project Data and Construction Model will be accurate and free of Clashes, errors, inconsistencies, discrepancies, and omissions. Each CMS is responsible for correcting any errors, inconsistencies, discrepancies, or omissions identified in its Project Data or Construction Model at its own cost and will defend and indemnify any Party and its respective consultants, partners, shareholders, officers, agents, and employees and hold them harmless for, from, and against all claims, demands, losses, liabilities, expenses, damages, and penalties of any kind, including without limitation expert and attorney fees, arising out of or relating to any error, inconsistency, discrepancy, or omission.

g. **Design Model Liability Waiver.** If the Design Model carries a liability waiver holding the Design Team harmless for the content of the Design Model files, each CMS will sign a liability waiver agreement as part of their Subcontract.

h. **Model Intellectual Property Rights.**
   1. Ownership and Licensing. By contributing Project Data or any other content to a Model, each Model Author warrants that it is the owner or exclusive licensee of all rights in and to that Project Data and content and that the Model Author is authorized to transmit and grant a license to Hoffman to use the Model Author's Project Data and content in connection with the Project. The Model Author does not possess, and will not claim, any ownership in the Model beyond the content and the Project Data that it contributed. In contributing content and Project Data to a Model, and notwithstanding the Project Data's or content's incorporation into a Model, the Model Author grants Hoffman and its agents a perpetual, worldwide, fully paid-up and royalty-free, nonexclusive, and sublicensable right and license to freely exploit and exercise all rights in and to the Project Data and content, by itself or as incorporated into a Model, in any manner in connection with the Project. Unless otherwise agreed in a separate license, any subsequent Model Author's right to use, modify, or further transmit the Model is specifically limited to the design and construction of the Project. Nothing contained in this Agreement conveys any other right to use the Model for another purpose.
   2. Joint Authorship. Model Authors are not co-authors or co-owners in another Model Author's Project Data or content, and collaboration on a Model will not result in the creation of joint work.
   3. Owner's Right to Use Models. In addition to any other licenses that may be granted to Owner under the Prime Contract or the Design Contract, each Model Author grants Owner a perpetual, worldwide, fully paid-up and royalty-free, nonexclusive, and sublicensable right and license to freely exploit and exercise all rights in and to the Model Author's Project Data and content, by itself or as incorporated into a Model, in any manner in connection with the Project. Owner's entitlement, if any, to use Models (including Design Models, Construction Models, and the Federated Model) developed for the Project for purposes other than the Project is governed by the Prime Contract and the Design Contract.

i. **Coordination and Conflicts.** When a member of the Design Team or a CMS finds an error, inconsistency, discrepancy, omission, or Clash in a Model, regardless of the phase of the Project or LOD, that Party will promptly notify Model Coordinator and the Model Author. Upon notification, the Model Author and the discovering Party will act promptly with the help of Model Coordinator to mitigate the error or conflict.

j. **IFF Acceptance, Partial IFF and Conditional IFF.**
   1. IFF Acceptance. IFF acceptance occurs when Model Coordinator produces Construction Model files that are represented in a published Navisworks NWD file at the time of completion of coordination of each work zone and all affected participants sign an IFF approval document.
   2. Partial IFF. Partial IFF workflows are sometimes necessary because of schedule pressures, but it is the responsibility of each CMS to minimize the need for Partial IFF through thoughtful file-sectoring strategies and proactive submission of properly coordinated files.
   3. Conditional IFF Acceptance. At times, the Model Coordinator may approve an IFF request conditionally, such as in the case where there remain minor unresolved clashes needing to be resolved by the submitting CMS. These conditions remain the responsibility of the CMS to resolve. This is similar to an “Approved as Noted” shop drawing submittal.
   4. Resolving Field Clashes. The current Federated Model containing approved IFF files will be used as the basis for resolving any Field Clashes.

k. **Model Standards.**
   1. Models will be developed in accordance with the standards defined in the Contract Documents, if any. If no standards are provided, Model Standards will align with the requirements defined in Section 5, at minimum. If there is a difference between the Contract Documents and the Standards defined in this document, the more stringent of the two shall govern.

l. **File Names.** Each CMS must adhere to proper file-naming conventions. File Names may not contain revision numbers or revision dates. Files must retain the same File Names throughout the Project. The Model Coordinator will manage File Names and is responsible for publishing and keeping current a dictionary containing the values for each aspect of the file-naming structure. A decoder file name dictionary will be published within the BIM Execution Plan and/or in a Hoffman Welcome Package. Unless otherwise established, Construction Model File names must use the following format:

CCC-BBB-LLL-UUU-DD-SSS-AAA-MM.ext, where:

CCC	Client Name
BBB	Building Name
LLL	Building Level
DDD	Discipline Code
SSS	Building Sector
AAA	Model author
MM	Model type (CM, DM, EM, FM)
ext	File Extension (dwg, nwc, rvt etc.)

When the project does not require detailed breakdown, use "0" wildcard placeholders in the file name. Consult project-specific BIM Execution Plan or welcome package for file naming dictionaries.

m. **File Format**(s). CMSs will deliver Model files in the following formats and using the correct software version in use:

3D CAD File	AutoCAD *.dwg, and
Navisworks Cache File	Navisworks *.nwc
Revit	Revit *.rvt/nwc (Only needs to be provided if the subcontractor is using Revit as the primary detailing model)

n. **File-Sectoring.** When sectors are in use, CMS will segment all geometry in separate Model files by building level and sector. Model Coordinator will define the sectoring approach for each building, if any, in the BIM Execution Plan. CMSs may be required to combine any sectored files into one level for each discipline and/or scope for Record Models if Owner requirements dictate.

Section 4: Model Coordinator Requirements and Duties

a. **Model Coordinator**. The Party acting as Model Coordinator is Hoffman unless this is addressed in Project-specific language elsewhere in the Subcontract.
b. Publishing and maintaining a Project-specific BIM Execution Plan. The BIM Execution Plan is intended to clarify and supplement the requirements outlined in this document and not to supersede them. If a CMS feels that the BIM Execution Plan adds scope or responsibilities which are in conflict with or in addition to the requirements identified in this document, the CMS shall notify Hoffman's Project Manager in writing.
c. Publishing and maintaining the Federated Model and organizing the routing coordination process. The goal is to maximize collaboration between the Design Team, CMSs, and Owner.
d. Providing a collaborative electronic platform (such as Microsoft Teams or GoToMeeting) for coordination meetings that enables sharing of Models and Drawings and facilitates the process of identifying and resolving conflicts before construction.
e. Providing a file-sharing site for all Project Data (such as BIM 360). The site must be password-protected by assigning a unique login/password to each individual Party (and not one per company or one per Project) with controlled and monitored access rights. The site must have backup and restore capabilities.
f. Providing authorized users with access instructions and system requirements for the file-sharing site described in Section 4.e of this Agreement; responding to requests by authorized users for assistance in maintaining access; and creating, deleting, modifying, and maintaining user accounts and access rights to all Models.
g. Defining procedures for distributing, accessing, and updating information to all relevant Parties throughout the development of the Federated Model.
h. Compiling, maintaining, and publishing current contact information for each member of the Design Team and each CMS.
i. Developing and managing file-naming conventions, publishing file-naming dictionaries, and ensuring compliance with naming conventions.
j. Managing object-naming conventions to be used (e.g., building levels, building zones and match lines, sheet index, layers, shared building components) that are consistent with the flow-of-work plan and schedule.
k. Managing conventions for units and critical dimensions, such as finish floor elevations. These should align with the Design Model when applicable.
l. Managing conventions for units and critical dimensions, such as finish floor elevations. These should align with the Design Model when applicable.
m. Managing color conventions to uniquely represent each Party's materials and equipment.
n. Identifying and adjudicating all conflicts before commencement of construction. Model Coordinator will identify the CMS responsible for resolving a reported conflict. Any conflicts not corrected on the Clash Report before the completed IFF file is issued must be reported as part of the IFF signoff process. Model Coordinator will maintain a log of the IFF (or Partial or Conditional IFF) status of each file and also submit the Navisworks NWD file to each CMS for recording the condition of the Federated Model at the time of any IFF. While every effort will be made to produce a complete clash report, any erroneous or missing clashes remain the responsibility of the CMS to resolve.
o. Completing Clash detections within the Federated Model using an iterative process that captures updated Project Data before each coordination meeting.
p. Coordinating with each CMS to drive resolution of all conflicts before or during each coordination meeting.
q. Creating and maintaining the Clash Report and providing the Clash Report to all CMSs before or immediately after each coordination meeting to capture all significant conflicts.
r. Hosting and leading regular coordination meetings at least once a week during the coordination period. If a CMS fails to attend any coordination meeting, Model Coordinator will take the necessary steps to alert the CMS's Project management that the attendance requirements are not being met.
s. Incorporating the Design Model into the Federated Model as applicable. The Model Coordinator, however, will not be responsible for errors, inconsistencies, discrepancies, or omissions in the Federated Model that arise from any errors, inconsistencies, discrepancies, or omissions in a Design Model.
t. Determining routing solutions based on the best choice for the Project when the affected CMSs cannot resolve the issue(s) between themselves. Whenever possible, it is anticipated that the Design Team, Model Coordinator, and the CMSs will determine the best solution for a given routing coordination task collaboratively. If the team cannot reach a consensus, Model Coordinator will identify the responsible Party to determine the best solution for the routing coordination task. Model Coordinator will make the final decision in the event that a consensus approach cannot be achieved.
u. Producing a "Model Archive" at the end of each Project phase and preserving the Model Archive as a record that may not be altered for any reason. The Model Archive is to consist of two sets of files. The first set is to be a collection of individual Models as received from the Design Team and the CMSs. The second set of files is to consist of historical versions of the Federated Model. The Federated Model must be saved in the following file format and meet the following requirements:
    Navisworks Document (NWD) positioned on the Project Coordinate system.

Section 5: CMS Requirements and Duties

a. **Owner Processes and procedures:** CMS shall coordinate and incorporate all applicable processes and procedures which relate to these BIM Requirements, such as obtaining routing approval in designated zones, consuming points of connection (POC) and/or floor penetrations, etc. CMS acknowledges that there may be many such zones noted in the Contract Documents, including but not limited to clearance zones, access zones, "no-fly" zones, zones reserved for future needs, etc. CMS shall not route through these zones without prior approval.

b. **Computer Hardware Requirements**. All CMSs must obtain at their own cost the computer hardware necessary to successfully participate in using BIM on the Project.

c. **Computer Software Requirements.** CMSs will ensure that Models and submittals are compatible with Navisworks and AutoCAD formats, and delivered in both DWG and NWC file formats. All Model files must be submitted in the software version (e.g., Navisworks and AutoCAD) as defined by Model Coordinator. CMSs understand that the software version may require annual upgrades as well as periodic service upgrades over the course of the Project. The approach to annual upgrades is at the discretion of the Model Coordinator. CMSs using software containing proprietary object-enabling libraries must provide a means by which Model Coordinator can assimilate this information into the Federated Model and must keep these enabler utilities current if upgrades occur during the Project duration. BIM Track licenses will be provided to each subcontractor but may be limited to 5 seats per company.

d. **Training Requirements.** All CMSs must obtain at their own cost the trained personnel necessary to successfully participate in using BIM on the Project.

e. **Third Party Resources.** CMSs using third party resources shall require these resources to work under the terms and conditions of this Agreement.

f. **Lead Contact.** Each CMS will designate a single point of contact to lead, coordinate, and execute the CMS's responsibilities. This individual must also have the decision-making authority required to resolve any conflicts in coordination with Model Coordinator.

g. **Schedule.** All CMSs will comply with Model Coordinator's most current schedule for modeling activities and submittal of Construction Models and Model Elements. At minimum, coordination activities must be completed in advance of subcontract, schedule, and/or Contract Document requirements for submittals such as shop Drawings. Unless specified otherwise, CMSs must deliver initial Construction Model files to Model Coordinator within ten days of subcontract issuance and deliver regular Model updates weekly in advance of each Model coordination meeting thereafter.

h. **File Preparation.** CMS must prepare and submit their specific Model files for incorporation into the Federated Model in an electronic format that is compatible with AutoCAD and Navisworks and meet the schedule as determined by Model Coordinator for the submission deadlines. At minimum, files must be submitted to Model Coordinator by no later than 3 p.m. on the day before the scheduled coordination meeting to allow sufficient time to compile the current Federated Model for use during the meeting. Late files will not be incorporated into the Federated Model before the coordination meeting.

i. **Clash Resolution.** Each CMS that the Model Coordinator designates as responsible for resolving a reported Clash under the process set forth in this Agreement must resolve the Clash either as a prerequisite of IFF approval or as a condition of IFF approval. The designated CMS will be responsible for any Field Clash that results in rework, additional costs, or schedule interruptions in accordance with the terms of the responsible CMS's subcontract if this does not occur. All subcontractors are responsible for running clash detection on their own scopes compared with other subcontractor scopes and resolving clashes proactively. Only unresolvable issues are intended to be discussed during BIM Coordination meetings.

j. **Issued for Fabrication (IFF).** All CMSs that prepare and submit specific Construction Model files for incorporation into the Federated Model will provide and sign an IFF approval document relating to the portion of the Federated Model associated with the particular IFF request. This model content shall be represented in a published Navisworks NWD file at the time of completion of coordination of each level or level/sector, to document the agreed-upon coordination routing. Once additionally approved and signed by Hoffman personnel, the process will be considered to be completed and the scope documented will be considered Issued for Fabrication (IFF). For scopes where the Contract Documents require shop drawings to be submitted, IFF shall be considered a prerequisite to shop drawing submittal. For scopes where the Contract Documents do not require shop drawings, achieving IFF releases the affected objects for fabrication and installation. The granting of IFF, Partial IFF or Conditional IFF shall not be construed as a complete approval of the system routing, completeness of scope, or alignment to the Contract Documents. CMS remains responsible to fabricate and install building elements which meet all building codes, align with the Contract Documents, meet the functional and performance requirements of that system, etc.
    1. A CMS that elects to fabricate or install any portion of its work before achieving IFF status, or if the model was incomplete at the time of IFF approval, does so at its sole risk. Any rework required to achieve IFF will be at the sole expense of the CMS that fabricated or installed its work before achieving IFF status, regardless of which CMS's scope generates the additional cost.
    2. A CMS is at fault for any Field Clashes, rework, or schedule impacts as a result of components not fabricated or installed per the Federated Model that has achieved IFF status. CMS will bear the costs of correction in accordance with the terms of its subcontract.
    3. Achieving IFF status does not mean that the coordination process has terminated at that point. CMSs remain responsible to coordinate their work using their Construction Model files throughout the construction duration to address any changed conditions which may occur.

k. **Model Level of Development (LOD) – General Requirements.**
    1. Each CMS's Construction Model is expected to provide the LOD needed to extract precise routing geometry and material or object properties. In general, and unless specified otherwise, Construction Model content shall be modeled to the industry standard LOD 400 (fabrication quality). The LOD set forth for each Model Element under this Section is the minimum level of development required. Greater development detail should be incorporated in the Model whenever possible. If any CMS wishes to deviate from the requirements set forth in this section, the CMS must first seek approval from Model Coordinator and any deviations must be documented by the CMS and approved by Model Coordinator.
    2. CMSs will segment all geometry in separate files by building level or level/sector where sectors are in use. Model Coordinator will define the sectoring approach for each building, if any, and document these sectors in the BIM Execution Plan.
    3. In general, any element taking up physical space in the Project, or virtual space in the form of clearance zones or other reserved volumes, shall be modeled.
    4. CMSs will ensure that all equipment shows all connection points, maintenance/service locations, including any "pull" spaces, maintenance access clearances, and code-required access and clearances. CMSs will model all equipment to its overall height, width, and depth. The CMS

that is responsible for installing a piece of equipment is responsible to create and coordinate the Model content for that equipment, regardless of how the equipment is procured. Materials or equipment that Owner or Hoffman provides, but that a CMS installs, is the CMS's responsibility to model and coordinate. If Model files are Provided to the CMS (for example, from an equipment vendor), the CMSs installing related equipment is solely responsible for the completeness and accuracy of the Model file content.

5. For cast-in-place concrete housekeeping pads, the CMS installing the equipment, rather than the Concrete CMS, will model the housekeeping pad. Housekeeping pad geometry is up to the equipment installer to generate and communicate with the Concrete CMS, administered by Hoffman.
6. CMSs will represent access, clearance, and maintenance zones at 65 percent transparency/shading so as not to obscure the main fixtures.
7. CMSs will model all mechanical, plumbing, sprinkler heads and head clearance zones, electrical, and low voltage system structural supports, struts, hangers, clips, brackets and all seismic supports.
8. CMSs will model all access panels, including access and maintenance zones above and below. When an access panel serves multiple systems, Model Coordinator will decide which CMS is responsible for including and coordinating the access panel in its Model if the respective contracts are silent on this.
9. CMSs will model trays or drip pans for the protection of electrical equipment, if permitted by code. It is the responsibility of the CMS requiring the tray or drip pan (and not the electrical equipment CMS) to include that device in its Model.
10. CMSs will ensure that valve handle swings and other adjustable devices have a swing clearance zone included in their Models to ensure that the entire swing range has proper clearance, including hand clearance.
11. If hatch zone representation is allowed, CMSs will endeavor to make the hatch zone as small as possible to properly identify the spatial requirements of that object.
12. CMSs will field verify all equipment dimensions including elevations and connections based on equipment submittals prior to setting and/or connecting to equipment.

l. **Scope-Specific Level of Development Requirements.**

1. Architectural Model requirements:
   i. CMS will model all exterior walls, doors, windows, steps, parapets and roofs. Studs and individual layers of drywall or sheathing need not be modeled, with the exception of “king studs” and headers which cannot be routed through. This includes, but is not limited to, ceilings, soffits and seismic appurtenances.
   ii. CMS will model all interior walls, including CMU structural and non-structural, framed rated and nonrated walls separating rooms, to finished wall surface. Studs and individual layers of drywall need not be modeled, with the exception of “king studs” and headers which cannot be routed through. This includes, but is not limited to, ceilings, soffits and seismic appurtenances.
   iii. CMS will model all interior slabs/floors, openings, trenches, risers, sloped floors, ceilings, soffits, stairs, ladders, grating, and guard railings.
   iv. CMS will model all interior doors if any walls that they are associated with are included in the Models.
   v. CMS will model access zones on both sides of the openings of all doors (interior and exterior) and other framed openings, with length and width equal to the opening width and height equal to the opening height, to ensure that obstructions to opening clearance can be detected. CMSs will model doors, window eaves, and frames. Openings involving egress, such as doorways, roof hatches, operable windows, etc. shall include clearance zones to preclude other systems from infringing on these clearances.
   vi. CMS will model all fire extinguisher cabinets and individual fire extinguishers if not enclosed in cabinets. CMS shall model all ladders which are fixed to the building, including a clearance zone to preserve egress pathways.
2. Structural Concrete Model requirements:
   i. CMS will model all cast-in-place concrete (e.g., columns, slabs/floors, trenches, curbs not supporting equipment, walls), including without limitation all penetrations and openings identified in the Contract Documents.
   ii. Curbs and housekeeping pads which support equipment shall be modeled by the CMS responsible for setting the equipment.
   iii. CMS will model all precast concrete to its correct geometry, including without limitation blockouts and embedded items for connections.
   iv. CMS will model all masonry walls and blockouts.
3. Structural and Miscellaneous Steel Model requirements:
   i. CMS will model all structural steel, including without limitation supports, trusses, beams, joists, clips, gussets, mounting plates construction aides and connections.
   ii. CMS will model all miscellaneous metals including without limitation stairs, guardrails, grating, mounting plates, coiling and overhead door supports, and catwalks.
4. Civil and Site Utilities Model requirements:
   i. CMS will model all specific sanitary sewers structures at all specific locations, sizes and materials.
   ii. CMS will model all storm drainage utilities of surface and subsurface water including piping, culverts, water drains, drainage pumps, sub-drainage, storm drainage ponds and reservoirs.
   iii. CMS will model all site energy distribution including hydronic heating, steam energy, hydronic cooling distribution, trenching and backfilling. Include liquid and gas site utilities supplementary components as appropriate.
   iv. CMS will model all Site Fuel Distribution including gas, fuel-oil, diesel fuel, trenching and backfilling. Include liquid and gas site utilities Supplementary components as appropriate.
   v. CMS will model all its electric distribution systems electrical wiring systems to distribute electrical power to the site. Includes duct banks, pull boxes, vaults and transformers from the utility’s point of connection, to the building’s main electric room. Model actual size, shape, spacing, and location of raceways, boxes, enclosures, duct banks in the power distribution system. Model actual size, shape, spacing, and location for supports and seismic control; actual size, shape, and location/connections of equipment and support

structure/pads. Actual access/code clearance requirements shall be modeled. Supplementary components added to the model required for fabrication and field installation.

5. HVAC Sheet Metal Model requirements:
   i. CMS will model all ducts, related accessories (including without limitation standard dampers, fire dampers, VAV boxes, diffusers, turning vanes), and HVAC equipment.
   ii. CMS will model all mains, submains, and lateral ducts, regardless of size.
   iii. CMS will model all ducts to the outside face dimension, regardless of size.
   iv. CMS will incorporate duct slope in the Models.
   v. CMS will incorporate insulation affecting the outside surface of ducts in their Models.
   vi. CMS will include flexible elements in their Models, but these elements may be represented as hatch zones.
   vii. CMS will model access and maintenance zones for all elements requiring access. including without limitation equipment, fixtures, standard dampers, fire dampers, VAV boxes, diffusers, turning vanes, and fan coil units.
6. HVAC Mechanical Piping and Equipment Model requirements:
   i. CMS will model all piping, related accessories (including without limitation valves, valve chains, air vents, drain valves, flow meters), and HVAC piping equipment.
   ii. CMS will model all mains, submains, laterals, and points of connection, regardless of size.
   iii. CMS will model all pipes to their outside diameter, regardless of size. CMSs must include flexible elements in their Models, but these elements may be represented as hatch zones.
   iv. CMS will incorporate insulation affecting the outside surface of pipe in their Models.
   v. CMS will incorporate pipe slope in their Models.
   vi. CMS will model access and maintenance zones for all elements requiring access, including without limitation equipment, fixtures, and valves.
7. Plumbing Model requirements:
   i. CMS will model all plumbing piping and related accessories (including without limitation valves, air vents, drain valves, flow meters, fixtures, equipment). CMSs will model all pipes to their outside diameter, regardless of size.
   ii. CMS will model all mains, submains, laterals, and points of connection, regardless of size.
   iii. CMS will include flexible elements in their Models, but these elements may be represented as hatch zones.
   iv. CMS will incorporate insulation affecting the outside surface of pipe in their Models.
   v. CMS will incorporate pipe slope in their Models.
   vi. CMS will model access and maintenance zones for all elements requiring access, including without limitation equipment, fixtures, cleanouts, and valves.
   vii. For double containment piping and tubing, CMS will model only the outer containment.
   viii. CMS will model underground and under/in-slab pipe routing (including without limitation city water, fire water, sanitary sewer, storm drains) to the extent that a system is within a CMS's scope.
   ix. CMS will model safety showers and eye washes.
   x. CMS will model chemical and gas distribution boxes and modules shall identify all point of connection openings.
8. Fire Protection (Sprinkler, Fire Alarm) Model requirements:
   i. CMS will model all fire protection piping regardless of size.
   ii. CMS will model all sprinkler heads, flexible elements, sensors and control panels.
   iii. CMS will model access, clearance and maintenance zones for all elements requiring access, including without limitation equipment, fixtures, cleanouts, valves, and sprinkler head zones identifying spray coverage.
   iv. If Fire Alarm is in CMS's scope, model these components per Section 10, Low Voltage Electrical.
   v. CMS will incorporate pipe slope in their models.
9. Electrical Model requirements:
   i. CMS will include all conduit, MC cable, wireway, junction/pull boxes, controllers, grounding and cable trays regardless of size in their Models.
   ii. CMS will include flexible elements in their Models, but they may be represented as hatch zones.
   iii. CMS will model all switch gear, transformer, panel, junction box, equipment, cable tray, and pull box locations with their code clearances.
   iv. CMS will include light fixture locations (including without limitation in/below and above catwalks and other service areas) and space requirements in their Models and coordinate them with the reflected ceiling plan.
   v. CMS will model access and maintenance zones for all elements requiring access, including without limitation equipment, fixtures, junction/pull boxes, and controllers. CMSs will model access and maintenance zones or clearances to maintain light fixtures, including without limitation maintenance clearances for removing/replacing fixtures, lamps, or fixture ballast.
   vi. CMS will model all column-mounted receptacles, grounding conduits, and ground bars, including without limitation access and maintenance zones above and below.
   vii. CMS will model underground and under/in-slab duct banks and conduit routing.
   viii. CMS will model all its electric distribution systems electrical wiring systems to distribute electrical power to the site. Includes duct banks, pull boxes, vaults and transformers from the utility point of connection to the building's main electric room. Model actual size, shape, spacing, and location of raceways, boxes, enclosures, duct banks in the power distribution system. Model actual size, shape, spacing, and location for supports and seismic control; actual size, shape, and location/connections of equipment and support structure/pads. Actual access/code clearance requirements shall be modeled. Supplementary components added to the model required for fabrication and field installation.

10. Low-Voltage Electrical, I&C, Life Safety Systems, Telecom, Security, etc. Model requirements:
    i. CMS will include all conduit, wireway, junction/pull boxes, controllers, grounding and cable trays regardless of size in their Models.
    ii. CMS may represent flexible conduit and tubing as hatch zones in their Models.
    iii. CMS will model all I&C cabinets (e.g., PLC, IO Panels, Gateways), equipment, and components.
    iv. CMS will model all LSS cabinets, safety showers, eyewash stations, horns, strobes, equipment, and components.
    v. CMS will model all Telecom consolidation point boxes, column-mounted data-com boxes, equipment cabinets, equipment, and components.
    vi. CMS will model all Security hardware for doors and access-control configurations.
    vii. CMS will model all security cameras (type and location) and installation components (e.g., covers, mounting).
    viii. CMS will model all access and maintenance zones for all elements requiring access, including without limitation equipment, fixtures, junction/pull boxes, and controllers.
    ix. CMS will model underground and under/in slab duct banks and conduit routing.
11. Elevator Equipment
    i. CMS will model all elevator equipment (including without limitation, equipment, panels, electrical tray, supports etc).

m. **Project Coordinates.** Model Coordinator is responsible for establishing Project Coordinates and compass rotation. CMSs will align their Models to the Project Coordinates. A CMS's failure to align its Model to the Project Coordinates will result in the rejection of the Model, which will not be incorporated into the Federated Model for coordination.

n. **Use of 3D CAD.** CMSs using CAD must meet the following requirements:
1. Compliant with Owner's CAD/BIM standards, of provided.
2. 3D CAD geometry will utilize 3D solids and avoid surface- and mesh-only geometries when possible.
3. 3D CAD entities will be modeled to sufficient detail for Clash detection analysis. Missing objects, clearances, or other content not included in a CMS's Construction Model that results in a Field Clash will be remedied solely at the expense of the CMS responsible for failing to include the necessary detail.
4. 3D CAD entities will be named and/or identified with enough detail to identify what the Model objects represent.

o. **Coordination Meetings.** Each CMS will attend every coordination meeting described in Section 4.r. Attendance by all CMSs is mandatory in order to maintain BIM deliverables and meet the Project schedule. Each CMS will make a good-faith effort to coordinate with Model Coordinator before or during each Coordination Meeting to resolve conflicts.

p. **Model Accuracy**
1. Model accuracy shall reflect field conditions by no more than 2" unless further-defined in the Contract Documents.
2. Field installation shall follow approved IFF routing although this shall not supersede construction installation tolerances which are defined elsewhere in the Contract Documents. If the field installation differs from the approved IFF by more than 1" beyond specified construction tolerances, CMS may, if acceptable to the Model Coordinator, choose to revise the model to reflect the differing field conditions and re-submit Model for an additional IFF review and approval. The Model Coordinator shall determine if the revised Model is approved for re-IFF or if the conditions in the field require re-work. Regardless of the deviation distance, field installation which does not align with the approved IFF location and which causes a clash with another installation or defined space reservation shall be resolved at the sole expense of the Participant who has deviated from their approved IFF file location(s).

q. **3D REVIT and CAD Attribute Requirements.**
1. At a minimum the parameters listed below are required. This does not alleviate the need to include all default/standard Revit and AutoCAD attribute values (e.g. pipe size, elevation, length, size, type, width, diameter etc.).
2. Exceptions or deviations from the listed Property Value and/or Attribute Name are to be reviewed and approved by Hoffman or Owner prior to acceptance. Contract amendment is required for any approved exceptions to be valid.
3.

	Category	Property	Example	Notes
RVT	Element	HCC_IFF_ID	;<IFF-CCC-BBB-AAA-CC>;	**IFF**=IFF **CCC**=CLIENT **BBB**=BUILDING **AAA**=AUTHOR CODE **CC**=COUNTER
	Category	Property	Example	Notes
DWG	differs depending on detailing add-ons	HCC_IFF_ID	;<IFF-CCC-BBB-AAA-CC>;	**IFF**=IFF **CCC**=CLIENT **BBB**=BUILDING **AAA**=AUTHOR CODE **CC**=COUNTER