MASSACHUSETTS STATE PROJECT: ITD0901 DC1
SPRINGFIELD DATA CENTER, SPRINGFIELD, MA

SECTION 013129

BIM COORDINATION

1. **GENERAL**

1. SUMMARY
   A. Models will be prepared by the following contractors for the BIM Coordination process.
      1. Structural Steel Non Trade Contractor
      2. Fire Protection Trade Contractor
      3. Plumbing Trade Contractor
      4. HVAC Trade Contractor
      5. Electrical Trade Contractor including communications and security

All relevant models will be incorporated into one review file for use during coordination meetings. The coordination team will utilize NavisWorks 2010 clash detection software to expedite the drawing review process and resolution. Trade and Non Trade Contractor Models must be submitted in a model format that is compatible with NavisWorks 2010.

2. DEFINITIONS
   A. 3D Geometric Coordination Model: electronic 3D geometric representation combining all trades involved in the coordination process.
   B. 3D Trade and Non Trade Contractor Model: electronic 3D geometric representation of the trade specific building elements to be installed for a specific contractor's scope of work.
   C. Shop Drawing: submittal drawing to be used for approval by the CM and reviewed by the design team. Shop drawings will be generated from the 3D Trade and Non Trade Contractor Model where appropriate. These drawings shall be a 2D representation of the installation intent. These drawings shall be submitted per the contract documents prior to completion of the coordination process.
   D. VDC Modeling Manager: CM appointed personnel responsible for working with the model and for guiding the 3D coordination process.
   E. Trade and Non Trade Contractor Model Manager: Trade and Non Trade Contractor personnel responsible for working with the model and for interpreting the information provided within the model.
   F. Clash Detection Software: NavisWorks Manage 2010 (minimum or other version agreed to by the team).
   G. Coordination Team: CM, Designers, Trade and Non Trade Contractors
3. SUBMITTALS

   A. Coordination Model: the coordination model will be reconciled by each contractor to find the best collective solution to the coordination of all items.

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1. Each Trade and Non Trade Contractor will supply a 3D Trade and Non Trade Contractor Model for their own scope of work separated by areas as directed by CM.
2. Each Trade and Non Trade Contractor will be responsible for working in harmony with the other Trade and Non Trade Contractors to resolve coordination issues.
3. Trade and Non Trade Contractor models will be color coded to provide delineation between systems.
4. 2D coordination drawings will still be required as directed by CM and required for shop drawing approvals.

PART 2 – PRODUCTS

1. MODELS
   A. 3D Trade and Non Trade Contractor Model – computer generated 3D drawings used for coordination, conflict resolution, fabrication, and as-built documentation.

1. Each Trade and Non Trade Contractor will be responsible for producing a model/models to represent the work of the contractor in accordance with the work breakdown structure to be provided by the CM.
5. If the Trade and Non Trade Contractor does not have the in-house capability to produce the required model/models, the contractor may utilize the service of an outside entity to provide this service.
6. All elements must be drawn to scale and shall be a true representation of what is to be installed in the field in all three dimensions.
7. File origin or project insertion point (x,y,z) shall be agreed upon by the project team. Any conflicts that arise due to non-adherence with the insertion point shall be the responsibility of the non-compliant Trade and Non Trade Contractor.
8. File layering convention shall follow the DCAM layering standards if applicable.
9. The file naming convention shall be broken down as follows: trade_level_date
   a. Example “MS_FLR1_070109.dwg” where “MS” designates the mechanical subcontractor, “FLR1” is the building level, and “070109” indicates the date the file is posted.
10. Model coordination files will be saved to the project intranet site for access by all trades, CM and the owner’s representative. The folder structure will contain a “Current Model” file folder and an “Old Model” file folder. It will be the Trade and Non Trade Contractor’s responsibility to maintain the appropriate models in the correct file at all times.
11. When an update to a model has been posted the Trade and Non Trade Contractor shall issue a notification via email to each of the other coordination team members notifying them that new information is available. Email, however, shall not be the primary method of delivering model or drawing updates.
12. Working units, unless otherwise specified, shall be in inches.
13. All trades must use a separate color as agreed upon.
14. Each Trade and Non Trade Contractor will maintain their own model files as sole author. Trade and Non Trade Contractors are responsible for providing the team with Navis

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Works compatible files for their scope of work which will be used for coordination. In some cases separate files will be requested for specific systems within a trade in order to provide the Owner with greater functionality in the record model.

15. In the event the design changes are issued by bulletin which will result in changes in the model/models, it is the responsibility of the Trade and Non Trade Contractor to make any and all changes required for coordination and compliance with the design. The Trade and Non Trade Contractor may include the cost of modeling and coordination if warranted into their request for change authorization.

PART 3 – EXECUTION

1. Model Coordination Process

A. Coordination Meetings

1. Each Trade and Non Trade Contractor is required to take part in regular coordination review meetings.

The time and place for these meetings will be established by CM.

1. The purpose of the coordination meeting is to identify and resolve probable interferences between building systems.
2. Trade and Non Trade Contractor shall supply a Trade or Non Trade Contractor Modeling Manager or person authorized to act and make decisions on behalf of their organization.
3. If conflicts are identified and a resolution is agreed upon it is the Trade and Non Trade Contractor's responsibility to have the necessary changes made in their model and republish said model to the project intranet site in time for the next meeting unless another timeframe is agreed upon.

B. Record Information

1. Upon completion of coordination activities for a floor area as deemed appropriate by CM, a 2D drawing or series of drawings representing the floor or area will be printed and signed by all members participating in the coordination. This will become the record coordination document.
2. Trade and Non Trade Contractors shall maintain their models during construction to match the 'as-built' condition of their installed work.
3. CM will deliver to the Owner, at the completion of the project, a record construction model in NavisWorks that incorporates all of the trade models, fabrication models and updated design models. The native files from each trade shall also be provided. In addition the CM will deliver to the Owner, an updated Revit model as per their CM at Risk Contract.

C. Change Conditions

1. In that design changes are issued by bulletin, CCD or other method the Trade and Non Trade Contractor will make the changes required in their model/models to support the coordination process without delay.

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3.2 3D Modeling

A. Order of Modeling

1. Unless otherwise noted in the bid packages and subcontractor agreement, the sheet metal contractor should publish a base model with the major trunk lines which will serve as the basis for the other trades to begin their individual models. The design team shall provide their model to be used as the geometric background for coordination.

B. Stratification

1. Each trade will be assigned specific work zone elevations (top and bottom) to run racks and mains. The assigned trades will take precedence in these areas, when traveling outside of these areas the following order of importance rules apply. (additional rules may be instituted at the first coordination meeting).
   a. Immovable objects (equipment pads, hoods, shafts)
   b. Graded piping routed throughout floors (waste, storm drainage, high purity)
   c. Item coordinated with structure (duct penetrations shown on structural)
   d. Items located in their designated area (piping zone, pipe rack, cable tray)
   e. Items that require access (VAV's, shut off valves, fire/smoke dampers, etc.)

C. System Models and Level of Detail

1. The level of detail defined in each section below (Modeling Standards) is the minimum level of detail required in the model. Greater detail than the minimum should be incorporated in the model whenever inclusion of such detail will improve spatial or sequencing coordination of the work.
2. To the extent that location can be determined from the construction documents, the model will reflect that location. The intent of this model is to show the ductwork and piping, etc. in as true representation of the actual condition at construction completion.
3. Pre-purchased equipment shall be the responsibility of the contractor assigned to receive, install and coordinate the equipment. This subcontractor shall be fully responsible for layout, 3D drawings and coordination of the pre-purchased equipment.
4. Each Trade and Non Trade Contractor is responsible for modeling protected access zones. Access zones should be drawn at 60% shading as not to obscure the main fixture or element being protected, or shall have another similar identifying characteristic.
5. Individual model elements (such as VAV boxes, pumps etc.) described in further detail below shall each contain the specific and individual name assigned to it as per the design documents, following the approved naming conventions established by the Owner.

D. Modeling Standards

1. HVAC Sheet Metal Standards
   a. All ducts, related accessories (including but not limited to standard dampers, fire dampers, VAV boxes, diffusers, turning vanes, etc.) and HVAC equipment will be modeled.
   b. Ducts will be modeled to the outside face dimension of duct or duct insulation. Hangers must be modeled where necessary to coordinate with the work of

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other trades.

c. Access zones shall be modeled for all elements requiring access including but not limited to equipment, fixtures, standard dampers, fire dampers, VAV boxes, diffusers, turning vanes, etc.
d. All equipment shall be modeled to its overall height, width and depth.
e. All access panels shall be modeled, including access zones above and below.
f. In the event that seismic bracing for suspended elements is required by code, such bracing shall be included in the model.

2. HVAC Piping Standards
   a. All piping, related accessories (valves, air vents, drain valves, flow meters, etc.) and HVAC equipment will be modeled.
   b. Pipes will be modeled to the outside diameter of the pipe or pipe insulation. Hangers must be modeled where necessary to coordinate with the work of other trades.
   c. Equipment will be modeled to its overall height, width and depth.
   d. Access zones shall be modeled for all elements requiring access including but not limited to equipment, fixtures and valves.
   e. All access panels shall be modeled, including access zones above and below.
   f. In the event that seismic bracing for suspended elements is required by code, such bracing shall be included in the model.
3. Plumbing and Specialty Piping Standards
   a. All plumbing, specialty piping, related accessories (valves, air vents, drain valves, flow meters etc.) and equipment will be modeled (piping 1 ½" diameter or larger). Process piping 2" diameter or larger shall be modeled.
   b. Pipes will be modeled to the outside diameter of the pipe or the pipe insulation. Pipe slope will be incorporated in the model. Hangers must be modeled where necessary to coordinate with the work of other trades.
   c. Equipment will be modeled to its overall height, width and depth.
   d. Access zones shall be modeled for all elements requiring access including but not limited to equipment, fixtures, valves and cleanouts.
   e. All access panels shall be modeled, including access zones above and below.
   f. In the event that seismic bracing for suspended elements is required by code, such bracing shall be included in the model.
4. Electrical Standards
   a. All conduit/MC cabling (1 ½" diameter and larger), power feeds to equipment, switch gear, panels, junction box and pull station locations will be modeled. Where groups of smaller conduit totaling 1 ½" diameter or larger are located, a graphic representation of the overall dimension of the grouped conduit may be substituted.
   b. Light fixtures with above-ceiling space requirements are to be included in the model and coordinated with reflected ceiling plan. All access zones or clearances to maintain light fixtures will also be modeled.
   c. Equipment and cable tray with access zones to be included in the model. Equipment will be modeled to its overall height, width and depth.
   d. Equipment and junction box access zones per specification and code (whichever is greater) shall be modeled.
   e. All access panels shall be modeled, including access zones above and below.
   f. In the event that seismic bracing for suspended elements is required by code,

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such bracing shall be included in the model.

5. Fire Protection (Sprinkler, Fire Alarm)
    a. All components of the fire protection system will be modeled.
    b. Access zones shall be modeled for all elements requiring access including but not limited to equipment, fixtures, valves and controllers.
    c. Locate all piping, valves, fire pump, and sprinkler heads.
    d. All access panels shall be modeled, including access zones above and below.
    e. In the event that seismic bracing for suspended elements is required by code, such bracing shall be included in the model.
6. Structural Steel
    a. All structural steel shall be modeled, including but not limited to columns, beams, braces, gusset plates, connections, reinforcing plates and angles, pour stops, metal grating, seismic or secondary supports and beam penetrations.
    b. The model elements shall contain non-graphic information that associates each element with its erection sequence as appropriate, and identifies the size of the structural element.

END OF SECTION

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