

Pirtle & BIM

42
BIM PROJECTS

The Pirtle logo is a green hexagon with the word "PIRTLE" in white capital letters inside.

Pirtle & BIM

2008 Pirtle delivers first As-Build Model to FAU and UF

2011 Pirtle hires a full-time BIM Coordinator as in-house expert

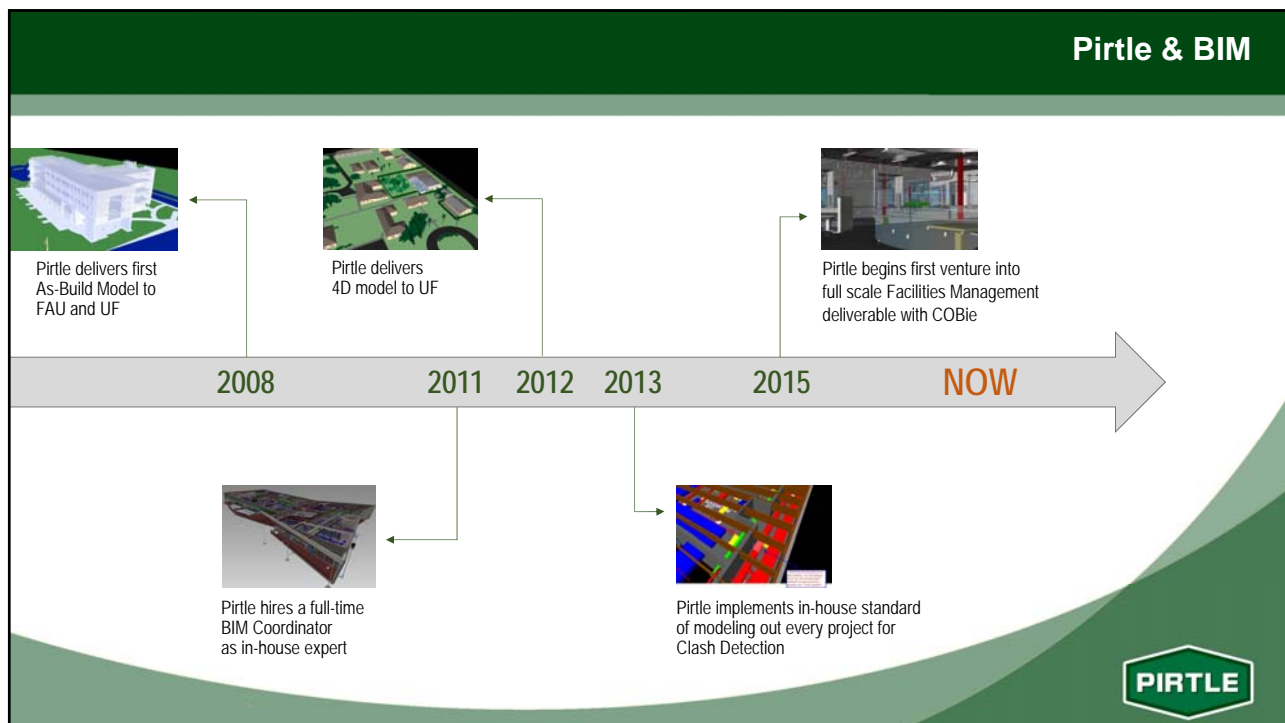
2011 Pirtle delivers 4D model to UF

2013 Pirtle implements in-house standard of modeling out every project for Clash Detection

2015 Pirtle begins first venture into full scale Facilities Management deliverable with COBie

NOW

The Pirtle logo is a green hexagon with the word "PIRTLE" in white capital letters inside.



Agenda



- BIM Overview
- Case Studies
- Open Discussion
- Virtual Project Walk-through



Introduction to BIM & BIM Categories



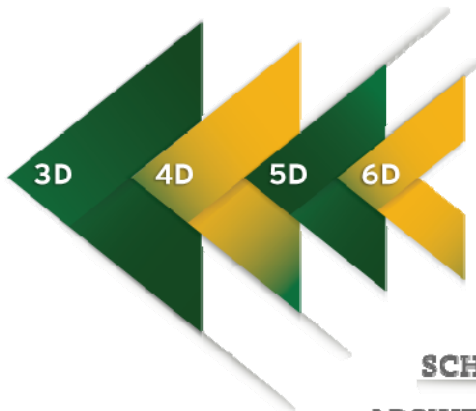
Common Attributes



- Visualization tool
- Coordination tool
(especially mechanical, electrical, plumbing and fire sprinkler systems below and above ground)
- Efficient
(faster completion of the project schedule)
- Minimizes unforeseen conditions
(less change orders = lower final price)
- Better quality installations



ESTIMATING
FACILITIES MANAGEMENT



BIM

SCHEDULING
ARCHITECTURAL/STRUCTURAL/MEP



Categories of BIM and Value for an Owner

3D | Visualization

Value:

- Better understanding of final product
- Reduced probability of unforeseen conditions (eliminates cost)

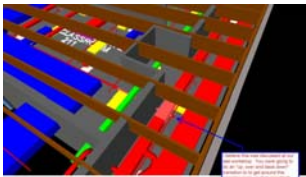
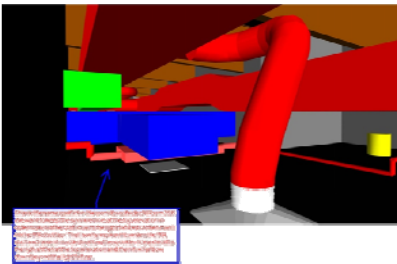


Categories of BIM and Value for an Owner

3D | Clash Detection

Value:

- Reduces unforeseen conditions and cost
- Better quality installation
- Improved schedule results



Case Study – Young at Art Museum



BIM Finding a Design Mistake (3D)

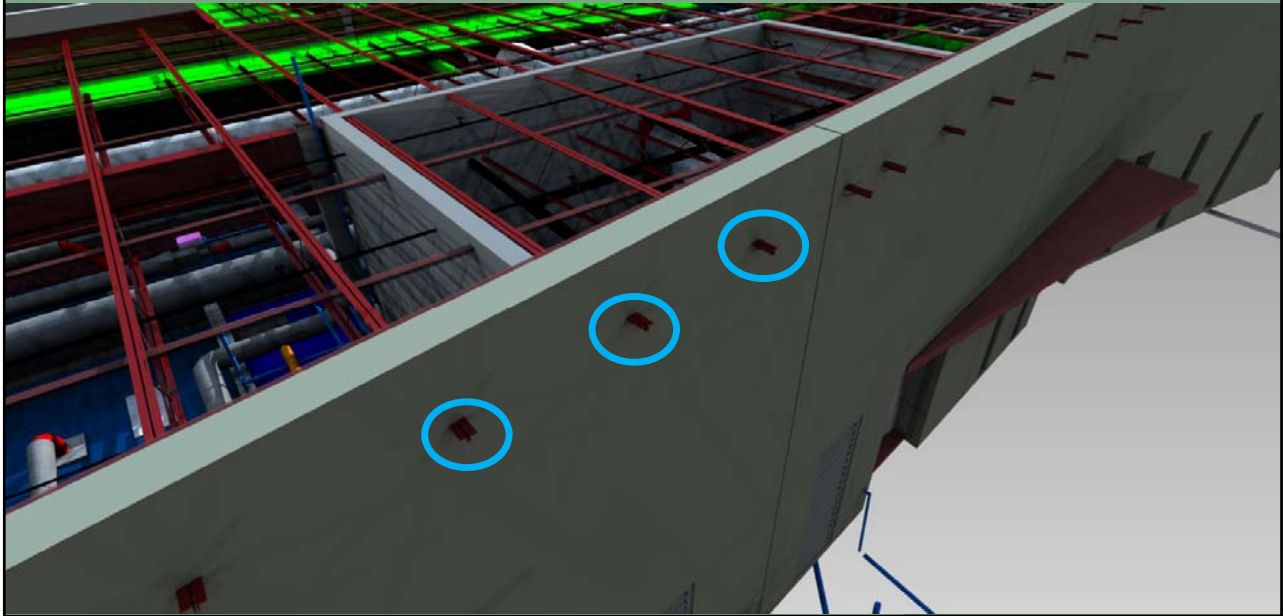


The steel joists shown here, protruding through the wall, were **designed correctly per the 2D roof framing plan**.

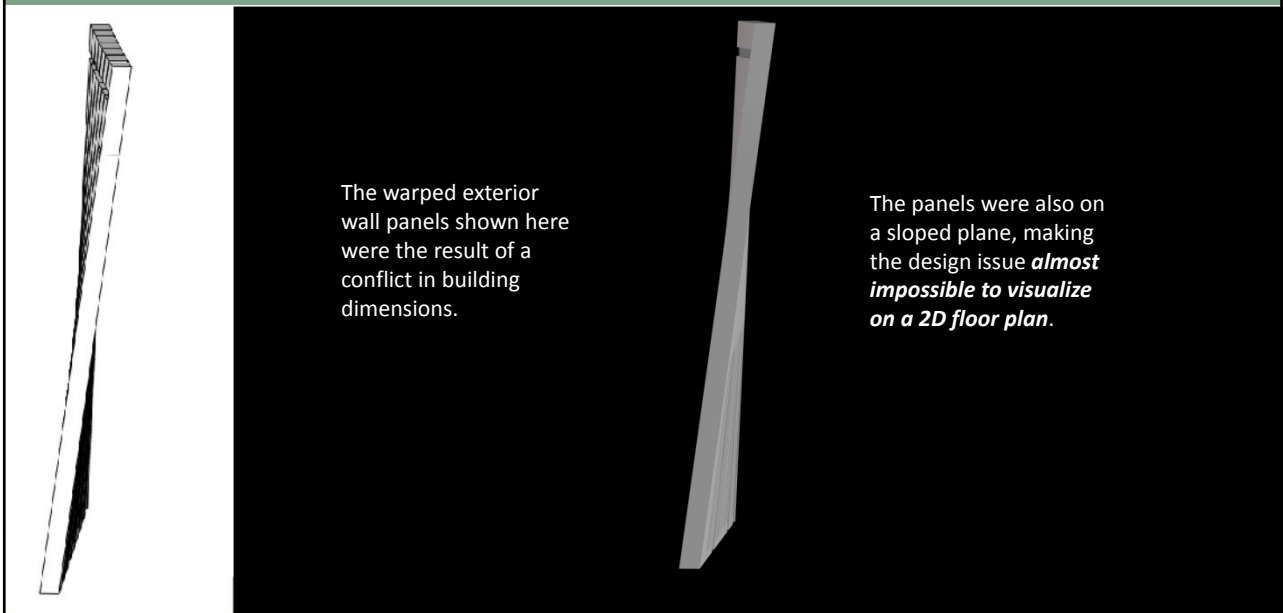
The wall panels start at the correct plane at the corners of the building and gradually become more warped as they intersect at the center of the building.



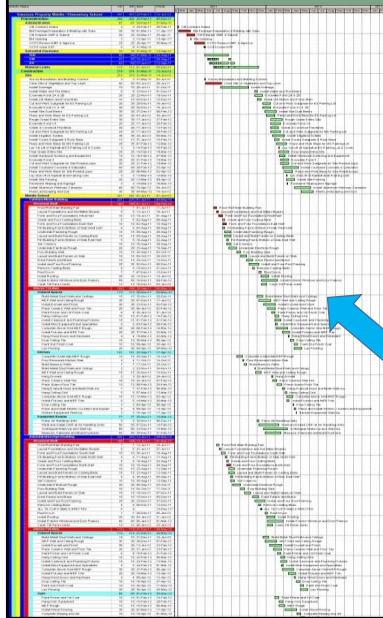
BIM Finding a Design Mistake (3D)



BIM Finding a Design Mistake (3D)



Categories of BIM and Value for an Owner



4D | Scheduling

Value:

- Improved visualization of construction sequencing



Categories of BIM and Value for an Owner



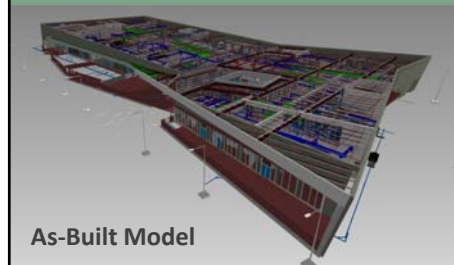
5D | Cost Loaded

Value:

- Improved analysis of detailed project cost
- Ability to easily substitute components/ materials with impact on cost



Categories of BIM and Value for an Owner



As-Built Model



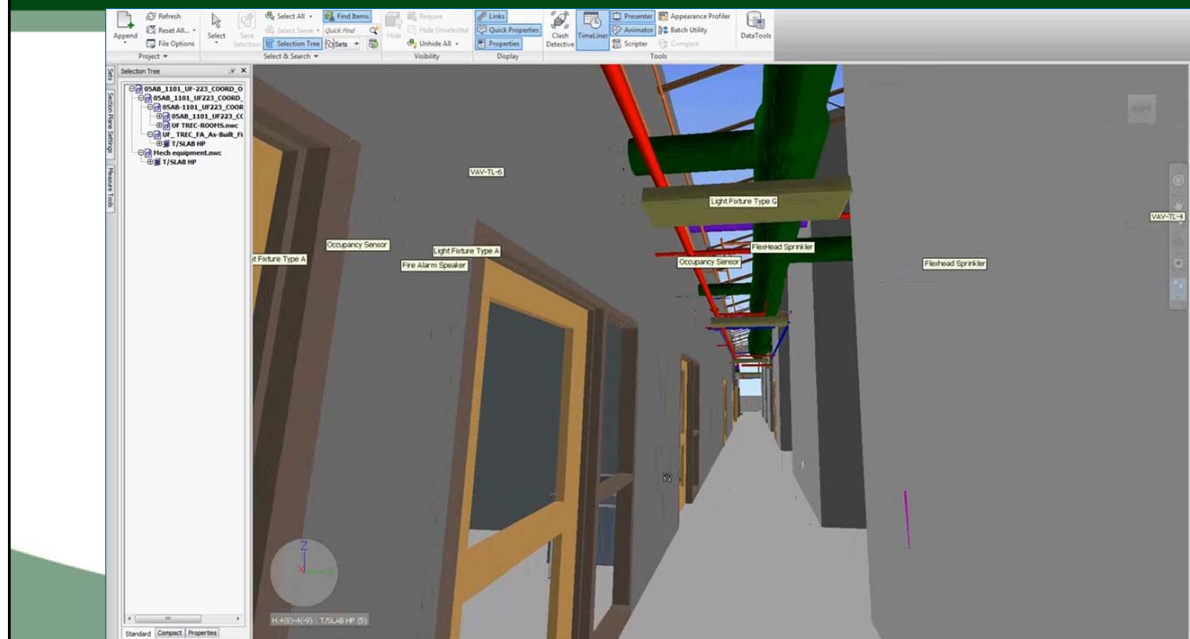
6D | Facility Management

Value:

- Complete detail of as-built conditions especially above ceilings/behind walls
- Increased efficiency with building maintenance



More About BIM 6D – Facility Management



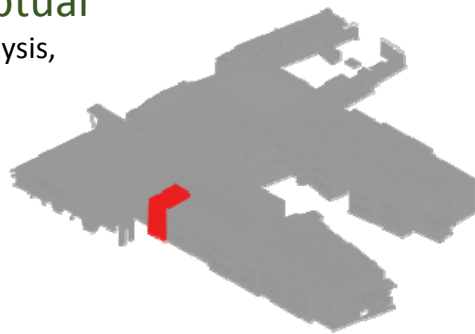
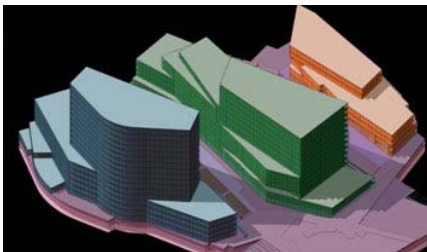
Levels of Development (LOD)



Level of Development (LOD)

LOD 100 | Schematic and Conceptual

- Schematic, overall massing, building type analysis, orientation and schematic planning

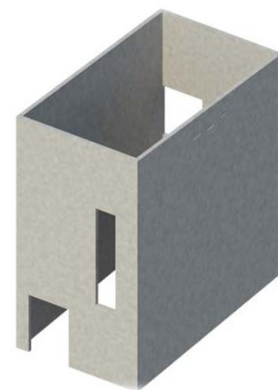
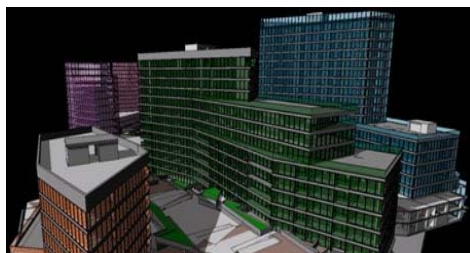




Level of Development (LOD)

LOD 200 | Design Development

- General Modeling with approximate quantities, size, shape, location, and orientation
- Can be used for general performance analysis and early calculations



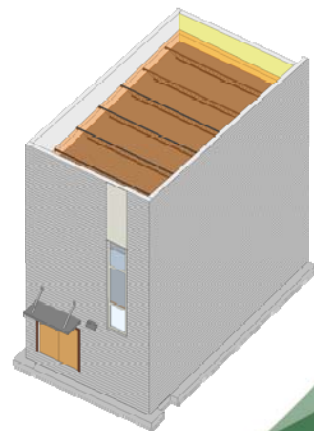
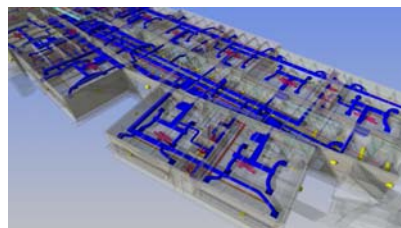
PIRTLE



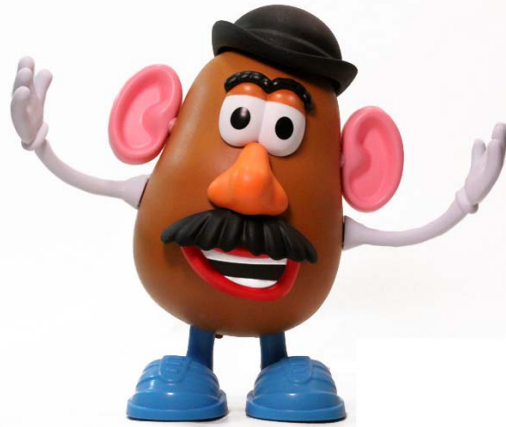
Level of Development (LOD)

LOD 300 | Construction Documents

- Detailed and suitable for generating traditional Construction Documents provided by Architects and Engineers
- Model elements accurately integrated with their actual size and location



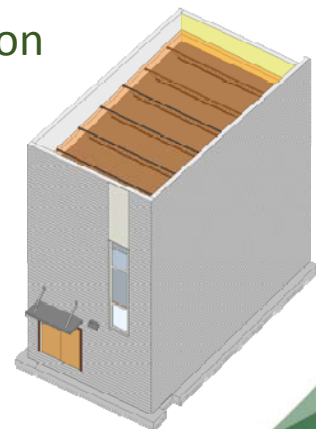
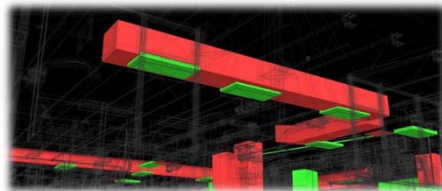
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Level of Development (LOD)

LOD 350 | Clash Detection and Coordination

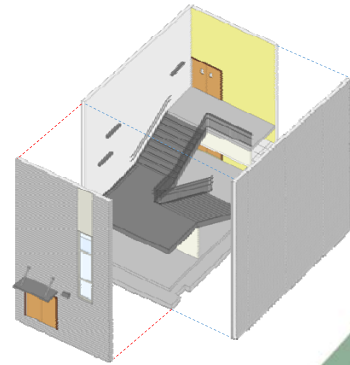
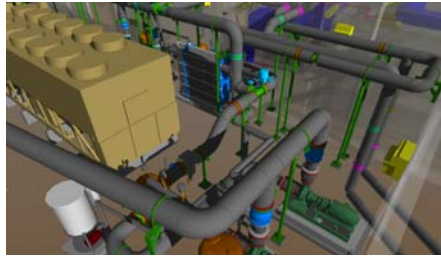
- Detailed and suitable for generating traditional Construction Documents provided by Architects and Engineers
- Model elements accurately integrated with their actual size and location



Level of Development (LOD)

LOD 400 | Construction Assembly

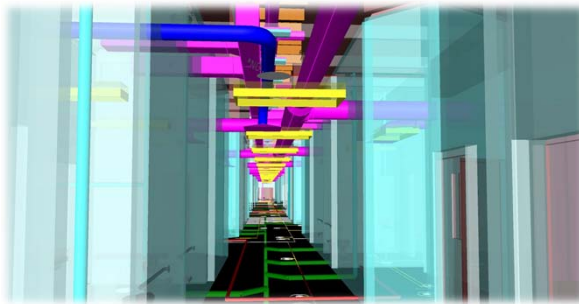
- Model elements with complete fabrication, assembly, and detailing information
- Suitable for fabrication and assembly
- Can be used for direct production and construction scheduling



Level of Development (LOD)

LOD 500 | Facility Management

- Highly detailed and representative of as-built conditions.
- Incorporates all technical information within the model and is suitable for maintenance and operations of the facility.



Level of Development (LOD)

LOD defines the content and detail:



LOD 200

LOD 300

LOD 350



LOD 400

Shop Drawing Level



LOD 500

As-Built & COBie

- LOD 100 – Schematic and Conceptual
- LOD 200 – Design Development
- LOD 300 – Construction Documents
- LOD 350 – Clash Detection & Coordination
- LOD 400 – Construction Assembly
- LOD 500 – Facility Management



BIM Execution Plan

SECTION F: MODEL QUALITY CONTROL

1. Visual Check
 - Ensure that design intent has been followed properly and there are no unintended model components
2. Interference Check
 - Detect problems in the model where different model components are clashing
3. Model Accuracy

Models should include all appropriate dimensions as needed for design intent, analysis, and construction. With the exception specified items on a case by case basis, all disciplines should be modeled with accuracy and completeness.
4. Level of Detail

Clearance zones for access, door swings, service space requirements, gauge reading, filter replacement and other operational clearance that are either required by code or necessary for good practices must be modeled as part of individual requirement and fixtures and checked for conflicts with other elements. One option for modeling these clearance zones would be to model them as transparent solids with the model if working with Revit, or as solid blocks of different color than the fixture/equipment if modeling with a CAD base application. Clearances above the ceiling that are required to be accessible from the ceiling must be modeled down to the ceiling elevation or lower.

All models shall be provided at a Level of Detail (LOD) of 400 / Shop Drawing

SECTION G: COLLABORATION PROCESS

As set by the schedule, each discipline shall provide a BIM model that is ready for coordination.

1. Model Submittal Dates & Workshop Schedule

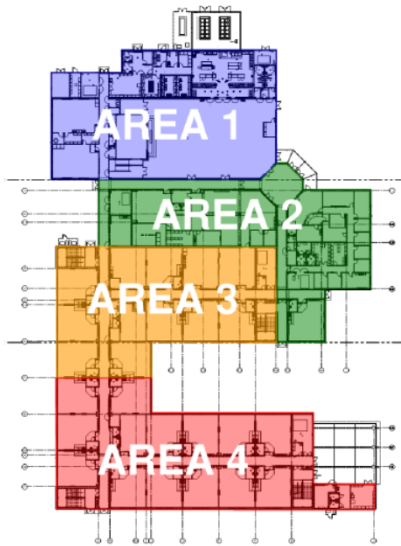
Meeting dates may be changed depending on the status of the coordination model. Additional meetings may be held if necessary.

Meeting Type	Participant	Frequency	Location
Kick-off	All Project Team	Once	Jobsite Trailer
BIM Coordination Meetings	BIM Managers	As required by schedule	Go-to Meeting

Area	Due Date	Tentative Review / Coordination Meeting
Kick-off	9/12/2017	9/12/2017
Area 1&2	9/19/2017	9/21/2017
Updated Model Area 1&2	9/26/2017	9/28/2017
Area 1&2 Revision	10/3/2017	10/5/2017
Updated Model Area 1&2 Revision	10/10/2017	
Area 3&4	10/10/2017	10/12/2017
Updated Model Area 3&4	10/17/2017	10/19/2017
Area 3&4 Revision	10/24/2017	10/26/2017
Updated Model Area 3&4 Revision	10/31/2017	
Area 5&6	10/31/2017	11/2/2017
Updated Model Area 5&6	11/7/2017	11/9/2017
Area 5&6 Revision	11/14/2017	11/16/2017
Updated Model Area 5&6 Revision	11/21/2017	

BIM Execution Plan

Trades will work together in predefined areas set by the phases at intervals outlined in the construction schedule.



Electronic Communication Procedure

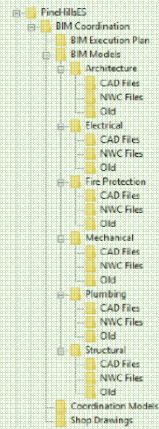
a. FTP File Structure

Files should be uploaded to the respective folder on Pirtle's FTP site.

f. The address for the Pirtle FTP site:
<http://ftp.samesoftware.com/Projects/PineHills/ES/DIRM%20Coordination/>

The username and password are as follows:

- Username: PineHills (case sensitive)
- Password: Ptnethesc (case sensitive)

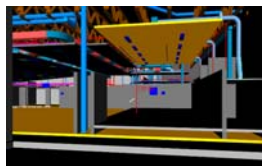


The Real Cost of BIM



Architect/Engineer/Contractor/Subcontractor Scope

- **Architects/Engineers** design project in BIM software (i.e. Revit)
- **Subcontractors** model their components
- **Contractors** coordinate all models, eliminate clashes and prepare model for construction, as-builts, facilities management, COBie data



Subcontractors Involved in BIM

Note: Unless specified various BIM software maybe used.

- Concrete and/or Precast
- Structural Steel
- Fire Sprinkler Subcontractor
- Plumbing Subcontractor
- Mechanical Subcontractor
- Electrical Subcontractor



Subcontractors Involved in BIM

Note: Unless specified various BIM software maybe used.

Additional cost for most subs:

- Concrete and/or Precast
- Plumbing
- Electrical




No cost premium for most subs:

- Structural Steel
- Fire Sprinkler
- Mechanical

Cost of BIM

CONSTRUCTION MANAGER MODELS

	1	2	3
	5% of GC's	90% of GC's	
	Hire Outside BIM Consultant	In-house BIM Department	Project Team Experts in BIM
COST	\$\$\$	\$\$	\$ 0
FLEXIBILITY	√	√√	√√√
RESPONSIVENESS	√	√√	√√√



In Summary

- BIM Implementation is Not Complicated
- Establish Realistic Goals Up-front
- Align Procurement Process with Goals
- Create and Adhere to an Execution Plan

