

## **HEALTHCARE IN THE BUILT ENVIRONMENT**

### ***Innovative virtual regulatory review, through collaborative team environment***

- ❖ How to establish and validate the full range of an owner's project goals.
- ❖ Collaboration as a requirement for increased team accountability
- ❖ New options on regulatory oversight, improving end user satisfaction.

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### **Will also cover**

- What are Building Information Modeling and Integrated Project Delivery (BIM-IPD) and why are they important?
- What is driving the growing use of collaborative delivery with BIM.
- How do owner's look at project delivery?
- Maximizing collaboration.
- BIM-IPD impact on the local authority having jurisdiction's (AHJ) work.

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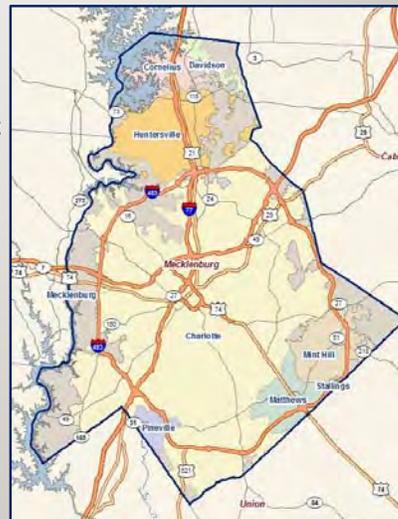
## High level background

- The BIM-IPD combination offers opportunity for greater project delivery efficiency
- Collaboration is the glue that makes this possible.
- In contrast design-bid-build encourages players to work in silos.
- Design-bid-build also creates a mindset that is difficult to shed, even on collaborative projects.

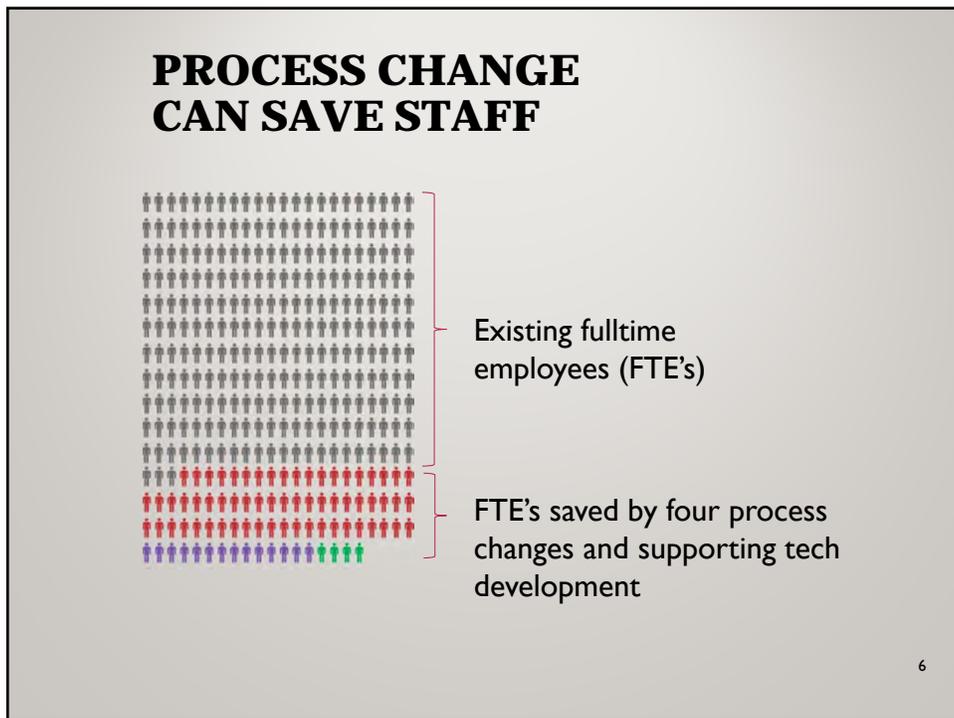
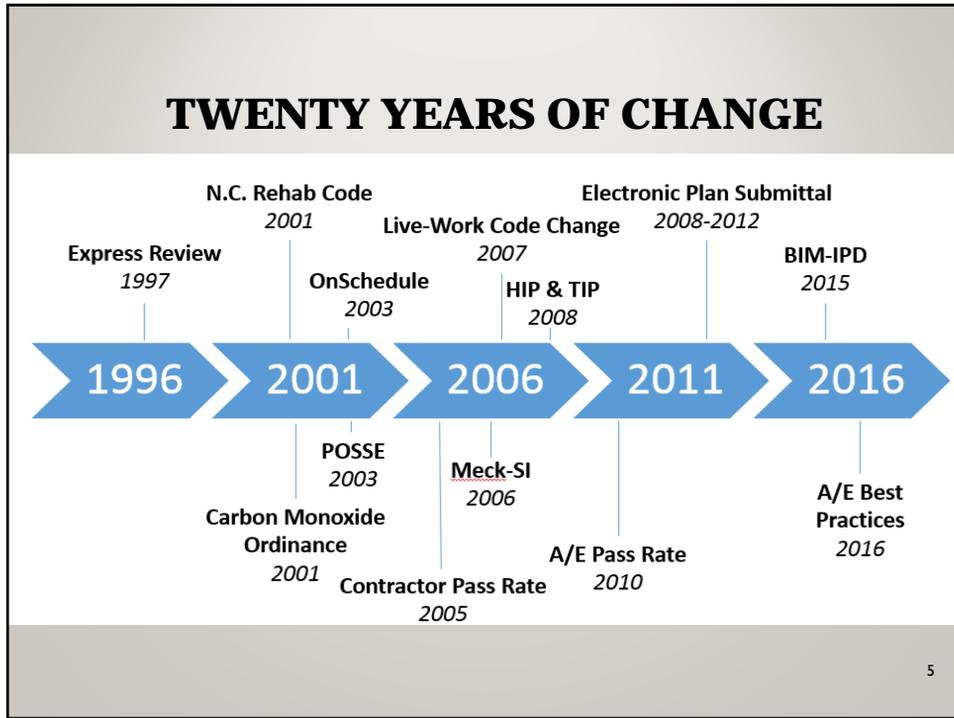
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## MECKLENBURG COUNTY CODE ENFORCEMENT

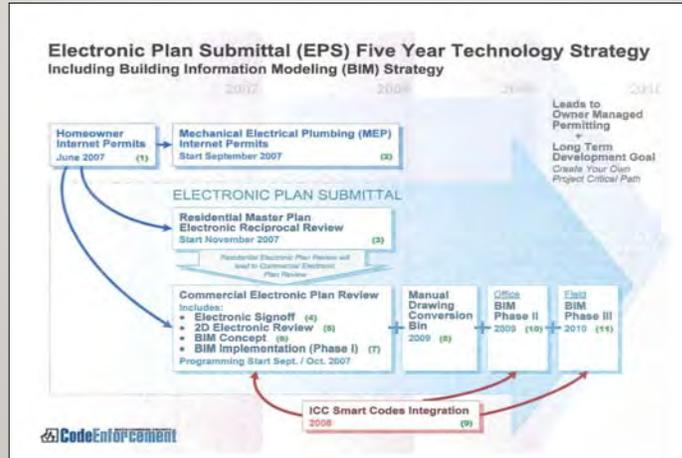
- One of the largest Code Enforcement authorities east of Mississippi River
- Jurisdiction includes the City of Charlotte and six surrounding towns
- Fully fee-funded
- 245 full-time staff includes 126 inspectors covering 545 sq. mi.
- In FY16
  - 90,198 permits issued
  - 265,520 inspections performed
  - 20,479 plan review cycles



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## TECH SUPPORT: PLANNING FOR ELECTRONIC SUBMITTAL AND REVIEW (EPS-EPR) AND BIM-IPD



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## DESIGN-BID-BUILD (DBB)



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## FORTY YEAR DECLINE IN CONSTRUCTION PRODUCTIVITY

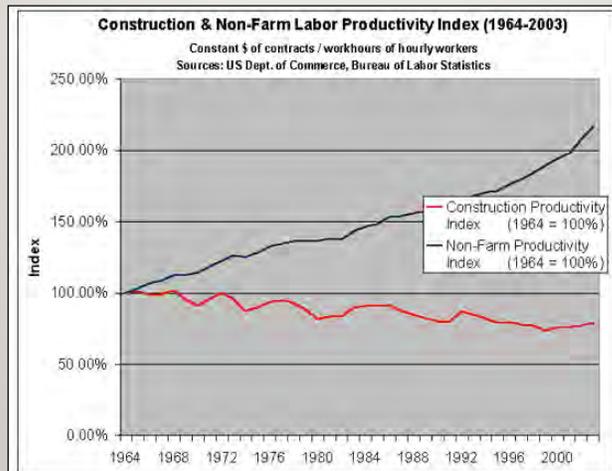


Figure 1. Labor productivity index for US Construction Industry and all non-farm industries from 1964 through 2003.

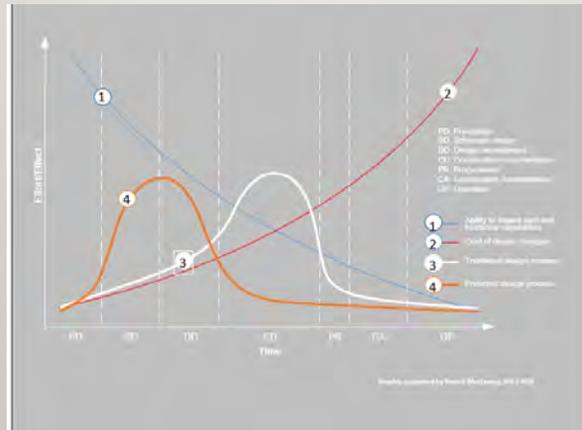
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## INDUSTRY TRENDS IN USE OF BIM

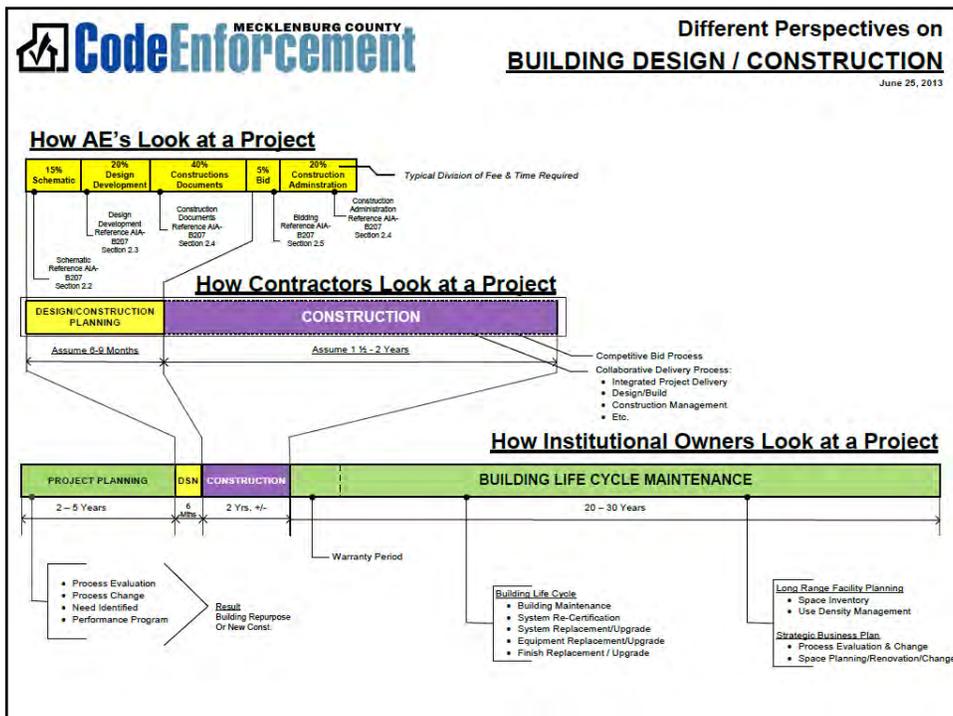


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# BIM IMPACT ON PROJECT PLANNING



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## BIM-IPD IS...

Definitions from NC Administrative Code Section 106.2.3.1

- **BIM:**

Model based technology linked with a data base of project information, using three dimensional, real time dynamic modeling software, to plan all building construction. The model encompasses building geometry, spatial relationships, geographic information, and quantities and properties of building components.

- **IPD:**

A project delivery method that integrates key participants (owner, Architect, Engineer, contractor, code official, et al), systems, business structures and practices into a process that collaboratively plans and constructs facilities. The collaborative process begins in early design and continues through all phases of design, fabrication and construction.

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## HOW BIM-IPD WORKS

- Different contract format, participants and relationships
- Totally paperless process, typically using Revit along with a total project environment file, such as Navisworks
- Early participation by both design and construction team
- Ongoing communication rather than linear
- Ideally, designed, constructed and inspected virtually before physical assembly and inspection in the field

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## BIM-IPD BENEFITS

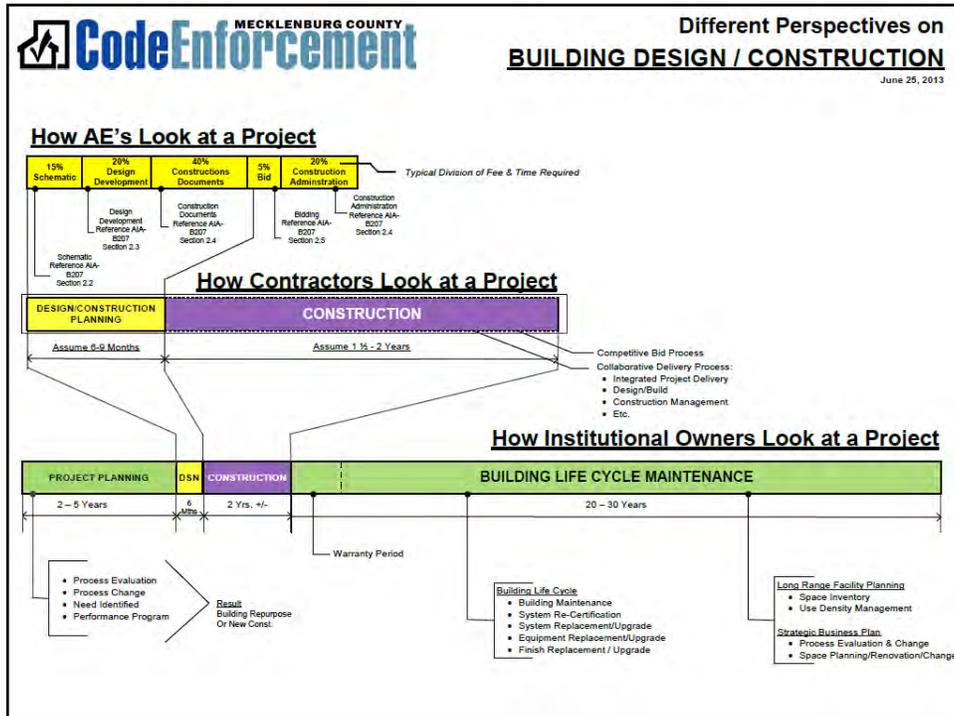
- Promotes a “big room” setting, either physical or virtual
- Joint work in model on clashes, design options, costs, schedule, et al.
- More effective resolution of unavoidable changes
- Promotes ongoing communication and teamwork

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## FULL RANGE OF AN OWNER'S PROJECT GOALS

- Certainly: function, design and material quality/durability
- Givens on project delivery: budget management and schedule
- What about the big picture:
  - ❖ Master planning
  - ❖ Facility management focus
  - ❖ Building use density
- Determine if owner's keen interest is through delivery, or for decades!

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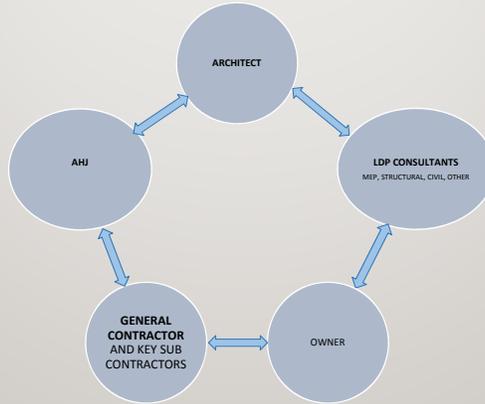


## CHALLENGES IN USING BIM-IPD

- Participant regression to DBB regimen
- Different contract approach;
  - AIA forms A195, C191, C195
- Permitting process assuming DBB delivery
- AE licensing Board rules based on DBB delivery

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## KEY CONTRIBUTORS/PLAYERS



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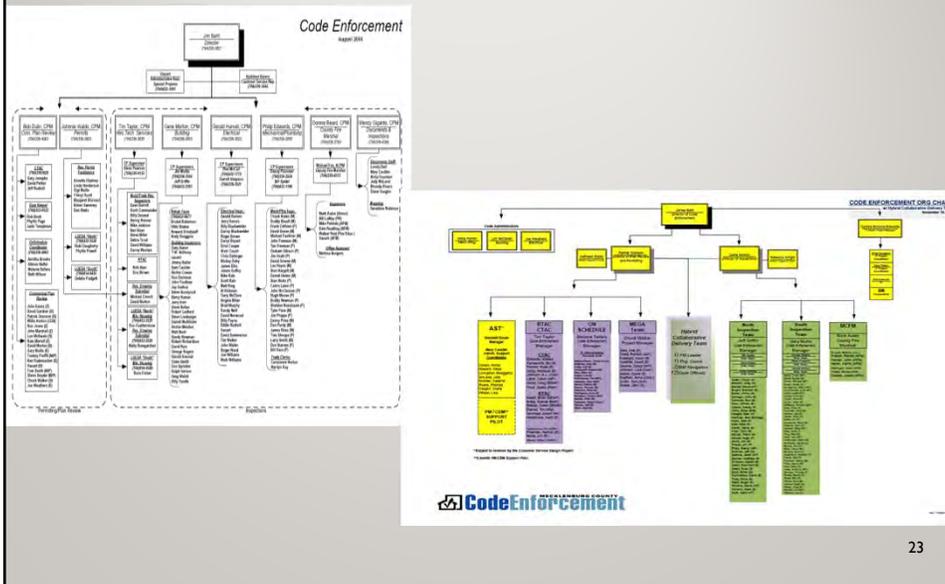
## Collaboration Options



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# MIGRATING FROM SILOS TO TEAMS, INCLUDING BIM-IPD



## MECK COUNTY PILOT WITH CAROLINA HEALTHCARE SYSTEMS (CHS): DAVIDSON BEHAVIORAL HEALTH AND MORROCROFT ED





## Life in the “bullpen”



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## VA Healthcare Center



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## Davidson College Martin Science Building addition/renovation



## Crescent Stonewall Station

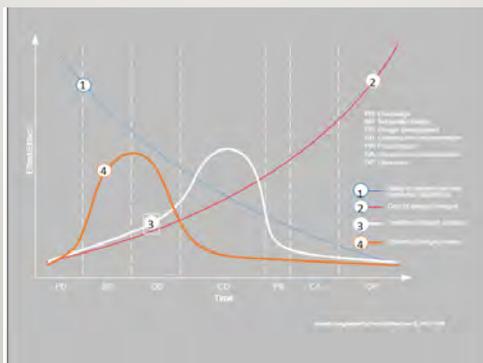


# ROADBLOCK ONE: PERMITTING PROCESS CHANGES MOVING AWAY FROM ASSUMPTION ALL PROJECTS ARE DBB



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# MOVING FROM PHASES TO “1000 SLICES”



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## **NC Admin Code section 106.2.3.1**

### **Changes made supporting BIM-IPD projects**

- BIM-IPD defined: a project delivery method using 3-D software to virtually construct all building components, by a collaborative team process from design start to construction completion.
- Voluntary for owner, but limited to BIM-IPD projects.
- Master or “umbrella” permit issued based on **code compliance concept**.
- Code Officials work collaboratively with owner’s team to review details in the model (virtual inspections); concurrence required.
- Field inspection required.
- Ends with validation document showing **the building** complies with the code.

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## **ROADBLOCK TWO:**

### **ARCHITECT/ENGINEER (AE) BOARD RULES & PILOT LEADING TO BOARD APPROVED BIM-IPD RULES**

- Jointly proposed by CHS and Mecklenburg County Code Enforcement
- Approved by NC Board of Architecture and NC PE Board in March-April 2013
- Reports by CMC and Meck County submitted semi-annually
  - Five reports total (last two reports April, 2015 & October, 2015)

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## NC AE BOARD APPROVED CRITERIA FOR AE SEAL USE IN BIM-IPD

- Boards issued two independent criteria sets
  - The NC Board of Architecture issued a *Position Statement* on 9/14/15 (approved by NC B Arch on 9/11/15)
  - The NC Board of Examiners for Engineers and Land Surveyors issued *Project Guidelines* on 10/22/15
  - Language is very similar
  - Copies available at [www.meckpermit.com](http://www.meckpermit.com)
- Five part criteria on seal use in BIM-IPD
  - 1) Use of Professional Seal on BIM-IPD documents confirming project development
  - 2) Use of Digital Signature on other benchmark documents
  - 3) Collaboration allowed
  - 4) Professional review of others' documents treated as equivalent to shop drawing review
  - 5) Changes during construction; AE allowed to rely on the information of others in the model
- Differences between NC B Arch “position statement” and NCBELS “guidelines”
  - NC B Arch always refers to “Architect”; NC PE Board always refers to “licensee”
  - NC B Arch found BIM-IPD consistent with Board Rules and Laws in NC; statement offers “guidance”
  - NC PE Board placed the Project Guidelines in effect until 10/31/2016, will review before that date

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## WHAT DOES THE AE BOARD CRITERIA MEAN?

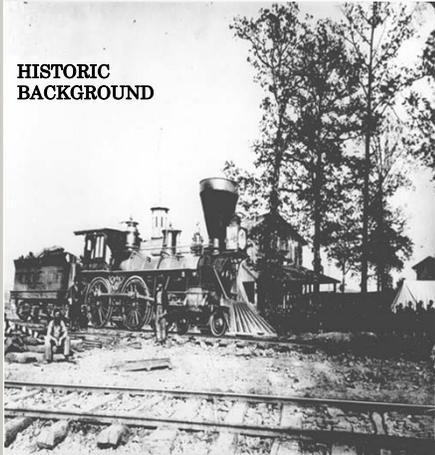
- AE's use seal and signature on documents confirming project development
- AE's use electronic signatures on other “benchmark” documents
- AE's may collaborate with other team members in the model
- AE's may review other team members' work in the model, without accepting responsibility for it
- AE's may rely on other team members' work in the model, in preparing changes in construction

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# Continuing challenges

## fencing with the vestiges of DBB

HISTORIC  
BACKGROUND



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## Meet collaboration challenges head-on



- Owners can't assume all AE's & GC's know how to collaborate
- Design-Bid-Build tendencies run very deep
- You are asking them to work with their "historic adversaries"

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## Questions?

### **Web link to NC Admin Code Section 106.2.3.1**

<https://www.mecknc.gov/LUESA/CodeEnforcement/permitting/Documents/BIM-IPD%20final%20language%20in%20NC%20Admin%20Code%20-%206.27.pdf>

### **Web link to NC Architecture Board position statement on BIM-IPD**

❖ [https://www.mecknc.gov/LUESA/CodeEnforcement/permitting/Documents/FINAL\\_2015-0911\\_NCBA\\_BIMIPD\\_Statement.pdf](https://www.mecknc.gov/LUESA/CodeEnforcement/permitting/Documents/FINAL_2015-0911_NCBA_BIMIPD_Statement.pdf)

### **Web link to NC Eng Board Project Guidelines on BIM-IPD**

❖ <https://www.mecknc.gov/LUESA/CodeEnforcement/permitting/Documents/NCBELS%20-%20Signing%20and%20sealing%20BIM-IPD%20Projects%20Guidelines%20-%2010.21.2015.pdf>

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