

**nec4** | **Improvement**  
*through collaboration*

# **Integrating BIM into NEC Contracts webinar**

*Ian Heaphy and Richard Patterson*

# Today's speakers

Ian Heaphy

*NEC4 Contract Board and  
Director at IN Construction  
Consulting*

Richard Patterson

*Mott MacDonald NEC  
Advisory Services*



**Send us your questions**

**or**

# What we will cover

- What is Information Modelling?
- NEC approach to Information Modelling in NEC3 and use of version 1 of the CIC Protocol
- NEC4 X10 Information Modelling
- NEC4 X10 and version 2 of the CIC Protocol
- Tips on the use of the X12 with the CIC Protocol
- Tips on the use of X10 without the CIC Protocol
- What next?

# What is Information Modelling

- Information Modelling / Building Information Modelling is a electronic model containing data in relation to the component parts of an asset and the asset as whole
- Information Modelling allows all members of a construction team to collaborate and share information in a common data environment this reduces cost, improves productivity, identifies conflicts and clashes and provides the Client with a complete and detailed as built model that can be used for operation and maintenance of the asset in use

# What is Information Modelling

- Due to the nature of the information provided in an Information Model and the requirement for multiple parties to collaborate in providing information this impacts on contractual relationship in terms of liability and ownership of information, which needs to be addressed in the contracts
- A set of rules need to be created to determine which party does what and when and how they work together this is normally in the form of protocol

# BIM = 'Information Modelling' – Levels and Dimensions

Level 3

Level 2

Level 1

Level 0

Seriously integrated  
'single' model

'Dimensions'

No real  
standard

- UK Government says we are supposed to be here now.
- 'Federated' models
- Winfield Rock suggests no one has properly defined it!

3D 4D 5D 6D 7D ....

X,Y,Z

sequence

cost

carbon

operation

# PAS Publicly Available Specification - 'temporary' ....to BS British Standard.....to ISO International Standard

- BS 1192-2007+A2:2016
- PAS 1192-2:2013
- PAS 1192-3:2014
- BS 1192-4:2014
- PAS 1192-5:2015
- PAS 1192-6:2018



Moving towards ISO 19650:

- Stage 1 – concepts and principles
- Stage 2 – delivery phase requirements for information

# NEC3 approach to Information Modelling

- Did not form part of NEC3 when first published in 2005
- Technological advances and greater use of BIM in subsequent years
- Various protocols and guides produced
- CIC BIM Protocol issued in 2013

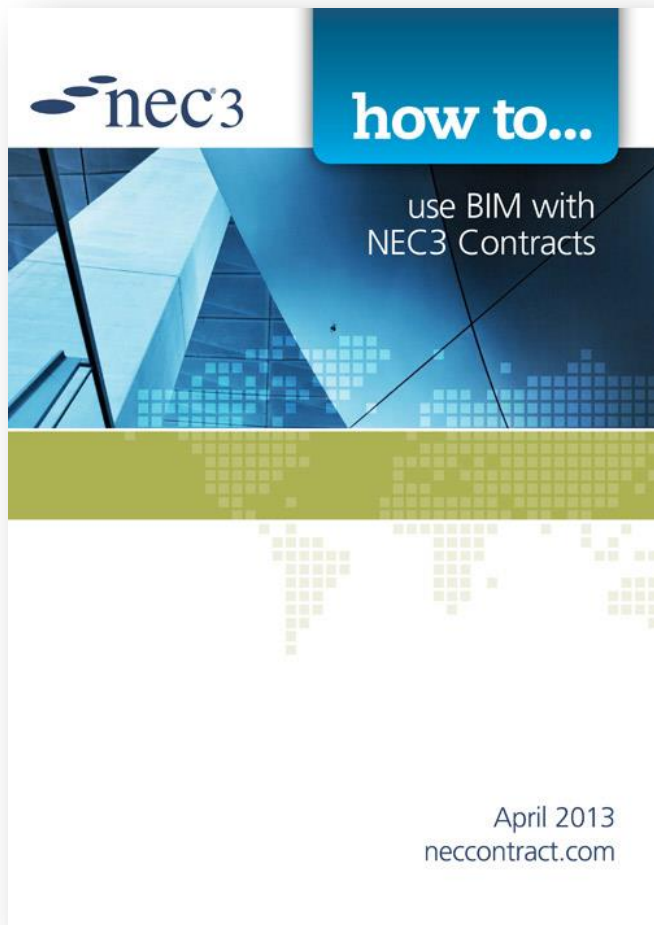


# CIC BIM Protocol Rev1 : Key principles

- The Protocol
  - incorporated into contracts of all those inputting to BIM
  - same version, not amended
  - details all BIMs to be produced by all parties
- Appendix 1 – Model Production and Delivery Table – who, “drops”, what and when
- Appendix 2 – Information Requirements – the information management standards



# How to use BIM with NEC3 contracts



This guide sets out some practical steps on using BIM with NEC3 Contracts, dealing with the contractual and technical matters that arise.

# NEC3 approach to Information Modelling

- General guidance on using BIM with NEC contracts
  - Technical content to form part of Works Information
  - Parties right and responsibilities - Z Clauses
- Recommended use of X12 Partnering (in NEC3)
- Specific guidance and additional clauses for incorporating the CIC BIM Protocol

# Incorporating the CIC BIM Protocol in an ECC contract

## ECC additional clause

### CIC BIM Protocol

1	In this clause, the Protocol is the CIC Building Information Modelling Protocol, first edition 2013. Terms used in this clause are those defined in the Protocol.
2	Clauses 1, 2, 5, 6. 7 of the Protocol are <i>additional conditions of contract</i> . Clauses 3 and 4 and Appendices 1 and 2 of the Protocol are Works Information.
3	<p>The following are compensation events.</p> <ul style="list-style-type: none"><li>• The <i>Contractor</i> encounters an event which is outside his <u>reasonable control</u> and which prevents him from carrying out the work specified in clause 4.1.2 of the Protocol.</li><li>• The <i>Employer</i> revokes a licence granted under clause 6.6 of the Protocol.</li></ul>

# NEC4

- NEC4 released in June 2017
- Additional secondary Option X10 Information Modelling
- Information Modelling = Building Information Modelling
- Name chosen to be broader than BIM and with international application
- X10 included in all main contracts
- X10 different approach in DBO and ALC contracts

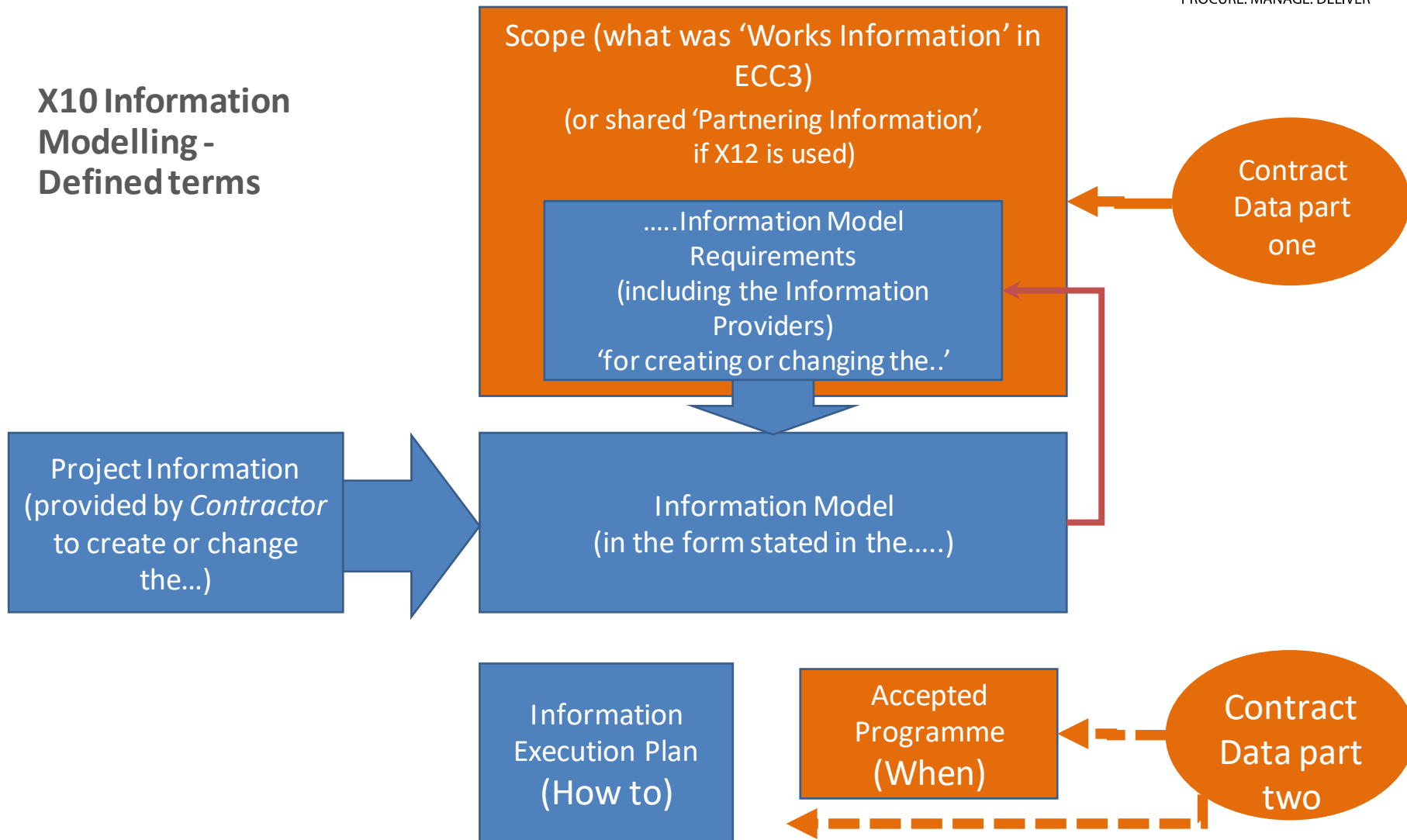
## X10 Information modelling – ECC, PSC, TSC, ECS, SC

- Designed to be used with or without a BIM / Information Model protocol
- Covers contractual matters related to the creation or updating of an Information Model
  - Ownership of Project Information and the Information Model - Client
  - Liability for faults and errors
    - In the Project Information – Contractor
    - In the Information Model – Client
- Information Execution Plan – how Project Information is issued by the Contractor

## X10 Information modelling – DBO, ALC

- Contractor / Alliance creates the Information Model not the Client and hands this and the Project Information over to the Client at the end of the contract
- Liability for faults or errors in the Project Information and Information Model sit with the Contractor / members of the Alliance on a fitness for purpose basis
- Risk can be capped with X18 limitation of liability
- ALC risk is shared by the members of the Alliance

## X10 Information Modelling - Defined terms





# Information Model Requirements

- How the 'Contractor collaborates with other Information Providers (X10.2)
- Form in which Project Information to be submitted (X10.4(4))
- Any requirements for the Information Execution Plan (X10.4(2))
- Any limits on Client ownership of :
  - Information Model and
  - Contractor's rights over Project Information (X10.6)

# Information Execution Plan

- A 'plan' for '**how**' – leave the '**when**' to the programme
- Like the NEC programme it can be pointed to from Contract Data Part 2, or required within X weeks of Contract Date
- Unlike programme
  - NO standard rules on its content
  - NO requirement for **routine** update
- X10.4(2) requirements for Information Execution Plan to be stated in Information Model Requirements

# Information Execution Plan

- Contractor revises when instructed by PM or when it wants to
  - PM accepts or gives reasons for not accepting within 2 wks
  - Like ECC4 programme, if no response, Contractor can prompt. No response for further week means 'treated as accepted'
- *Non acceptance stops nothing!*
- Altered if affected by a compensation event

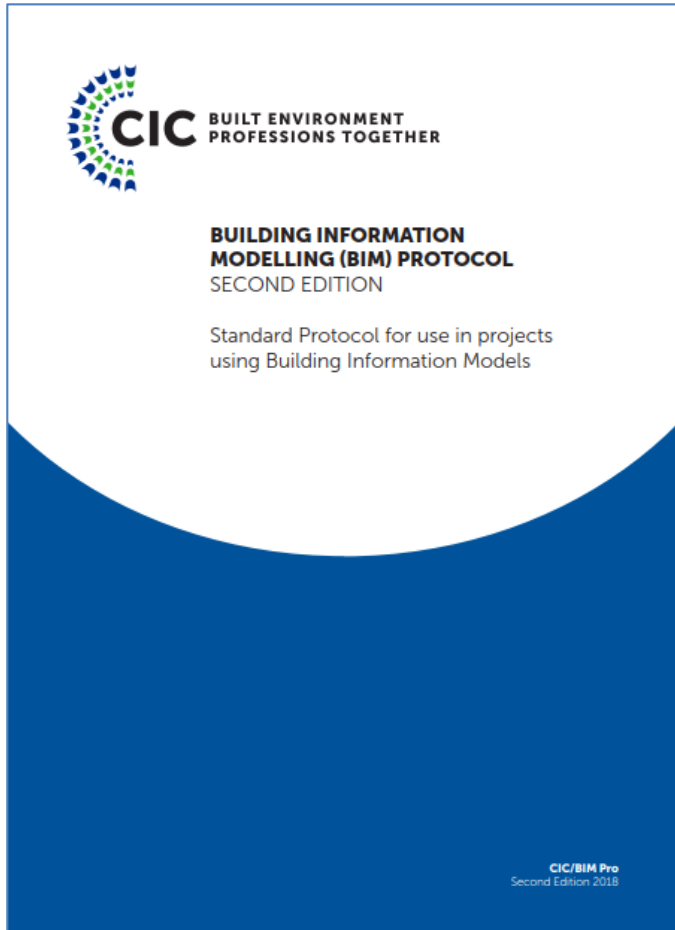
## Liability (10.7)

- Client's liabilities (more than a compensation event):
  - A fault or error in the Information Model...other than a Defect in the Project Information.
  - A fault in information provided by Information Providers other than the Contractor.
- The Contractor is not liable for a fault or error in the Project Information unless it failed ..... skill and care normally used .... **.....see X15 and X18**

## Other stuff

- No contract-independent 'Information Manager' as per CIC – could introduce in X12?
- And no explicit equivalent of the CIC Protocol Rev 1's MPDT or Rev 2's 'Responsibility Matrix' for
  - Who provides:
    - what (Project Information) and
    - when?
- Dates shown in programmes submitted for acceptance

# CIC Protocol Rev 2 – April 2018



<http://cic.org.uk/admin/resources/bim-protocol-2nd-edition-2.pdf>

# CIC BIM Protocol Rev 2

- The Protocol (Clauses 1-10)
  - incorporated into contracts of all those inputting to BIM
  - same version, not amended
  - details all BIMs to be produced by all parties
- Appendix 1 – Responsibility Matrix
- Appendix 2 – Information Particulars
- Appendix 3 – Security Requirements

# Obligations of Project Team Member

- 4.1.2 ... use the Common Data Environment (CDE) process to share.. the Specified Information
  - a) at the Level of Definition as Responsibility Matrix
  - b) during the Project stage as Responsibility Matrix
  - c) at such times stated in
    - the Responsibility Matrix
    - the Information Particulars; and/or
    - any other part of the Agreement



## Appendix 1 – Responsibility Matrix

- Key document - Oddly no standard format given in the CIC Protocol
- Logically something like:

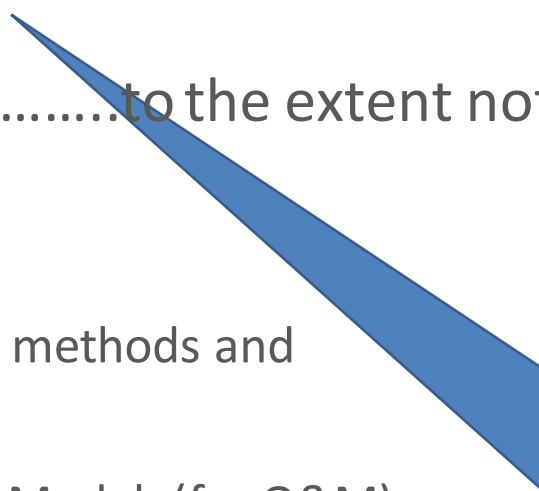
Ref	Project stage	Project Team Member	Element of Specified Information	Level of Definition	Date
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## Time – linking Protocol to Agreement

- 4.1.2 ‘subject to any events or circumstances which entitle the Project Team Member to an extension of time ...under the Agreement’
  - The Client may want a clear remedy for supplier being late
  - In the extreme, each element and date in Appendix 1 might be ‘pointed to’ from a ‘condition’ and ‘key date’ in the Contract Data
  - And may want to change 25.3 ‘remedy’ to a predetermined ‘damage’, possibly ‘nil’

## Appendix 2 – Information Particulars

- 1. Employer's Information Requirements
- 2. BIM Execution Plan
- 3. Project Procedures.....to the extent not covered in the above....
  - 3.1 Co-ordination
  - 3.2 Inconsistency
  - 3.3 Project standards, methods and
  - 3.4 Level of Definition
  - 3.5 Asset Information Model (for O&M)
  - 3.6 Software
  - 3.7 Amendments
  - 3.8 Specified Information



Odd as the BIM Execution Plan comes from supplier. May be appropriate to include constraints and requirements on the BIM Execution Plan, as suggested in Protocol Guide notes

## Appendix 3 – Security Requirements

- If required.....
- 1. Sensitive Information
- 2. Project Specific Security Requirements
  - 2.1 The Built Asset Security Information Requirements
  - 2.2 The Employer's Baseline Security Requirements
- 3. Employer's Policies and Procedures
- With prompts and links to the PASs

# Change

- 3.3 'The Employer shall....
- 3.1.3 arrange for
  - (a) the Information Particulars and the Responsibility Matrix to be reviewed and updated (if necessary) at each Project stage'
- As these are in the NEC Scope (and time may be Key Date)...
- ...any change will be a change in Scope or Key Date (ECC 14.3).....
- .....and so, normally, be a compensation event under 60.1(1).

## CDE = Common Data Environment

- 3.3 ‘The Employer shall....unless in Scope of Project Team member....’
- 3.1.3 arrange for
  - ‘(c) the Project Team Member to be able to make use of the CDE Process to the extent necessary to enable the Project Team Member to comply with the Agreement’
- CDE – most think best provided by Employer through a third party specialist

# Employer's Information Manager

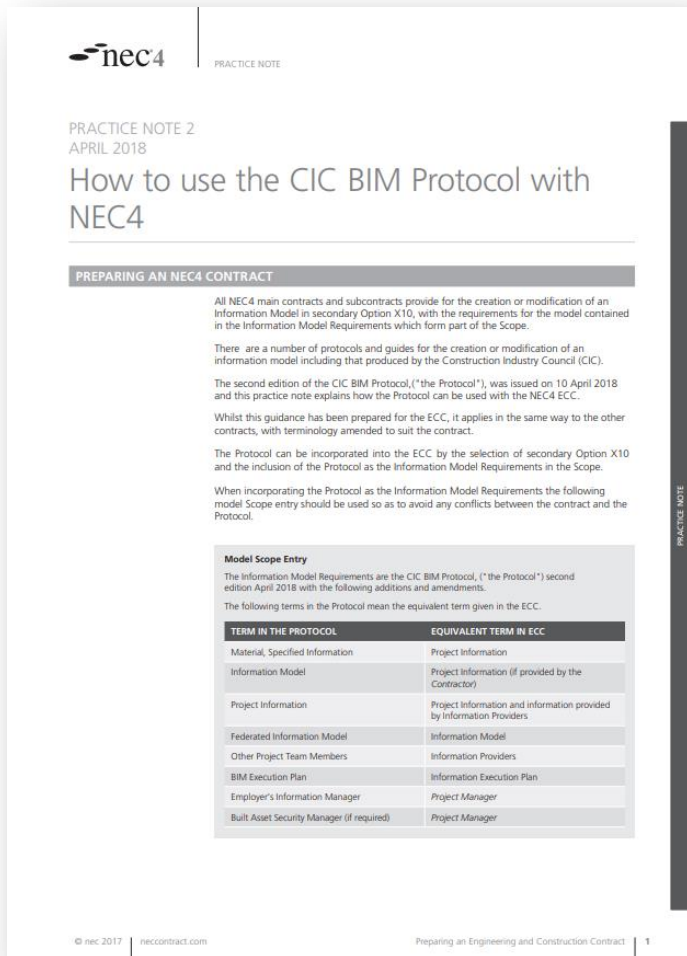
- 'Employer's Information Manager means the person .....appointed, initially by the Employer .... to perform a role in connection with the Project which includes, amongst other things, the establishment and management of the processes, protocols and procedures set out in the Information Particulars'

# Employer's Information Manager

- Logically the same person in each contract
- Logically a delegate of each PM/SM
- ditto Built Asset Security Manager
- 2.2 obligation to meet to resolve ambiguities....



# NEC has, in parallel published....



**PREPARING AN NEC4 CONTRACT**

All NEC4 main contracts and subcontracts provide for the creation or modification of an Information Model in secondary Option X10, with the requirements for the model contained in the Information Model Requirements which form part of the Scope.

There are a number of protocols and guides for the creation or modification of an information model including that produced by the Construction Industry Council (CIC).

The second edition of the CIC BIM Protocol, ("the Protocol"), was issued on 10 April 2018 and this practice note explains how the Protocol can be used with the NEC4 ECC.

Whilst this guidance has been prepared for the ECC, it applies in the same way to the other contracts, with terminology amended to suit the contract.

The Protocol can be incorporated into the ECC by the selection of secondary Option X10 and the inclusion of the Protocol as the Information Model Requirements in the Scope.

When incorporating the Protocol as the Information Model Requirements the following model Scope entry should be used so as to avoid any conflicts between the contract and the Protocol.

**Model Scope Entry**

The Information Model Requirements are the CIC BIM Protocol, ("the Protocol") second edition April 2018 with the following additions and amendments.

The following terms in the Protocol mean the equivalent term given in the ECC.

TERM IN THE PROTOCOL	EQUIVALENT TERM IN ECC
Material, Specified Information	Project Information
Information Model	Project Information (if provided by the Contractor)
Project Information	Project Information and information provided by Information Providers
Federated Information Model	Information Model
Other Project Team Members	Information Providers
BIM Execution Plan	Information Execution Plan
Employer's Information Manager	Project Manager
Built Asset Security Manager (if required)	Project Manager

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# NEC Practice Note – Model Scope entry

The Information Model Requirements are the CIC BIM Protocol, ("the Protocol") second edition April 2018 with the following additions and amendments.

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Federated Information Model	Information Model
Other Project Team Members	Information Providers
BIM Execution Plan	Information Execution Plan
Employer's Information Manager	Project Manager
Built Asset Security Manager (if required)	Project Manager

The Information Model Requirements are the CIC Protocol (with its appendices)

Will need to be PSC and 'Service Manager' in a PSC contract

# NEC Practice Note – Model Scope entry... more

Any notice or instruction to be given by the Employer is given by the *Project Manager*.

Clause 1.4 is deleted as is reference to clause 1.4 in clause 9.1. ←

Appendix 1 and 2 (and 3 if required) of the Protocol are the following documents.

The Protocol Appendix 1

*[Complete the relevant information]*

The Protocol Appendix 2 ←

*[Complete the relevant information]*

The Protocol Appendix 3

*[State "Not required" or complete the relevant information]*

This is the  
"hierarchy" clause in  
the BIM Protocol

This is 'Information  
Particulars'  
..which includes the  
Protocol's:  
>'Employer's Information  
Requirements' and  
>**'BIM Execution Plan'**.

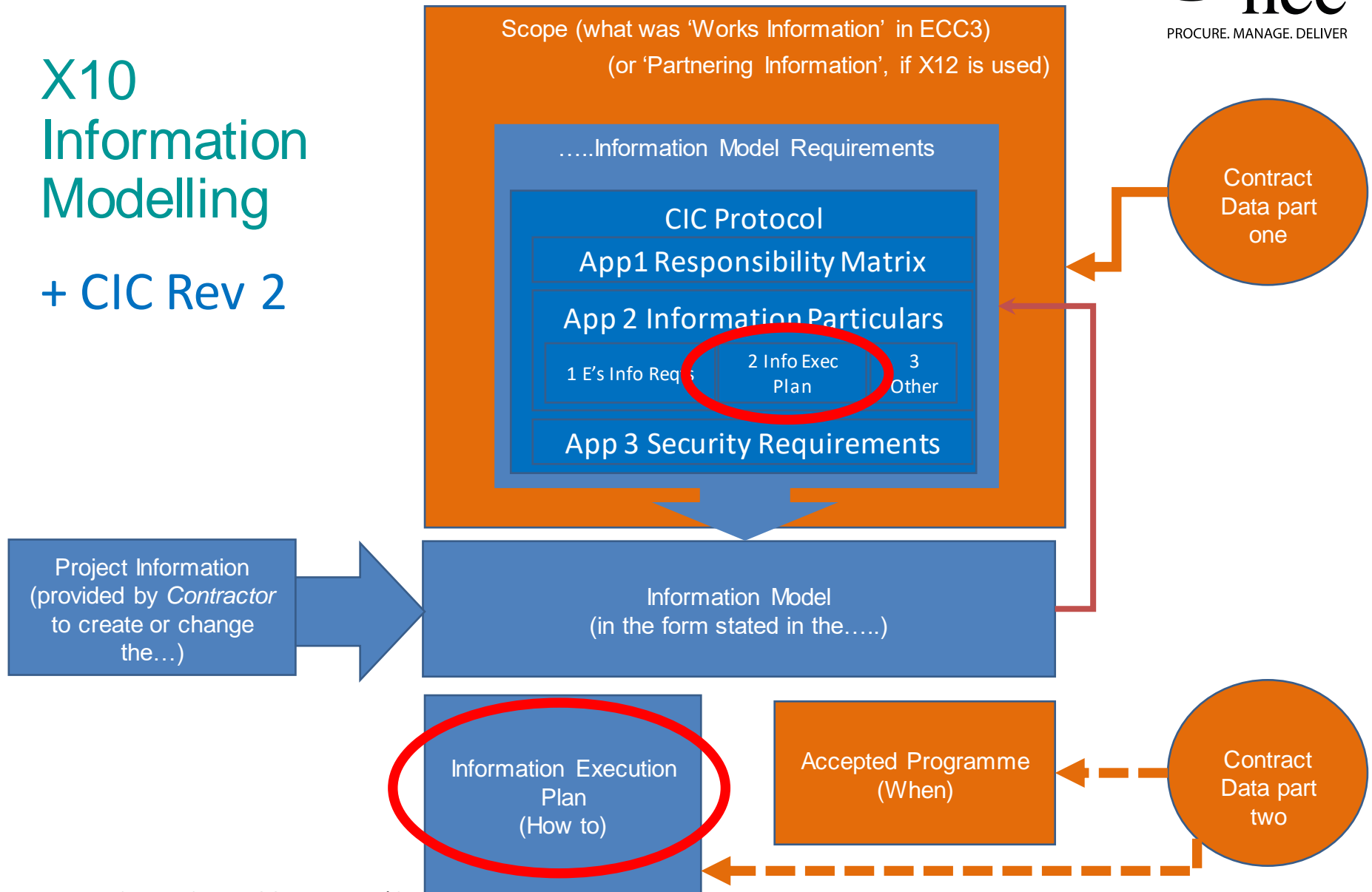
This is NEC's '**Information  
Execution Plan**'..  
...which, in NEC, is  
>separate from the  
Information Requirements  
provided by the contractor  
and may be pointed to from  
Contract Data part two or  
submitted after award  
(X10.4)

## Stitching together....

Need to ensure the App 2 'Information Particulars' addresses all the things that X10 says the Information Requirements must cover:

- How the 'Contractor collaborates with other Information Providers (X10.2)
- Form in which Project Information to be submitted (X10.4(4))
- Any requirements for the Information Execution Plan (X10.4(2))
- Any limits on Client ownership of :
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  - Contractor's rights over Project Information (X10.6)

# X10 Information Modelling + CIC Rev 2



# Information Execution Plan

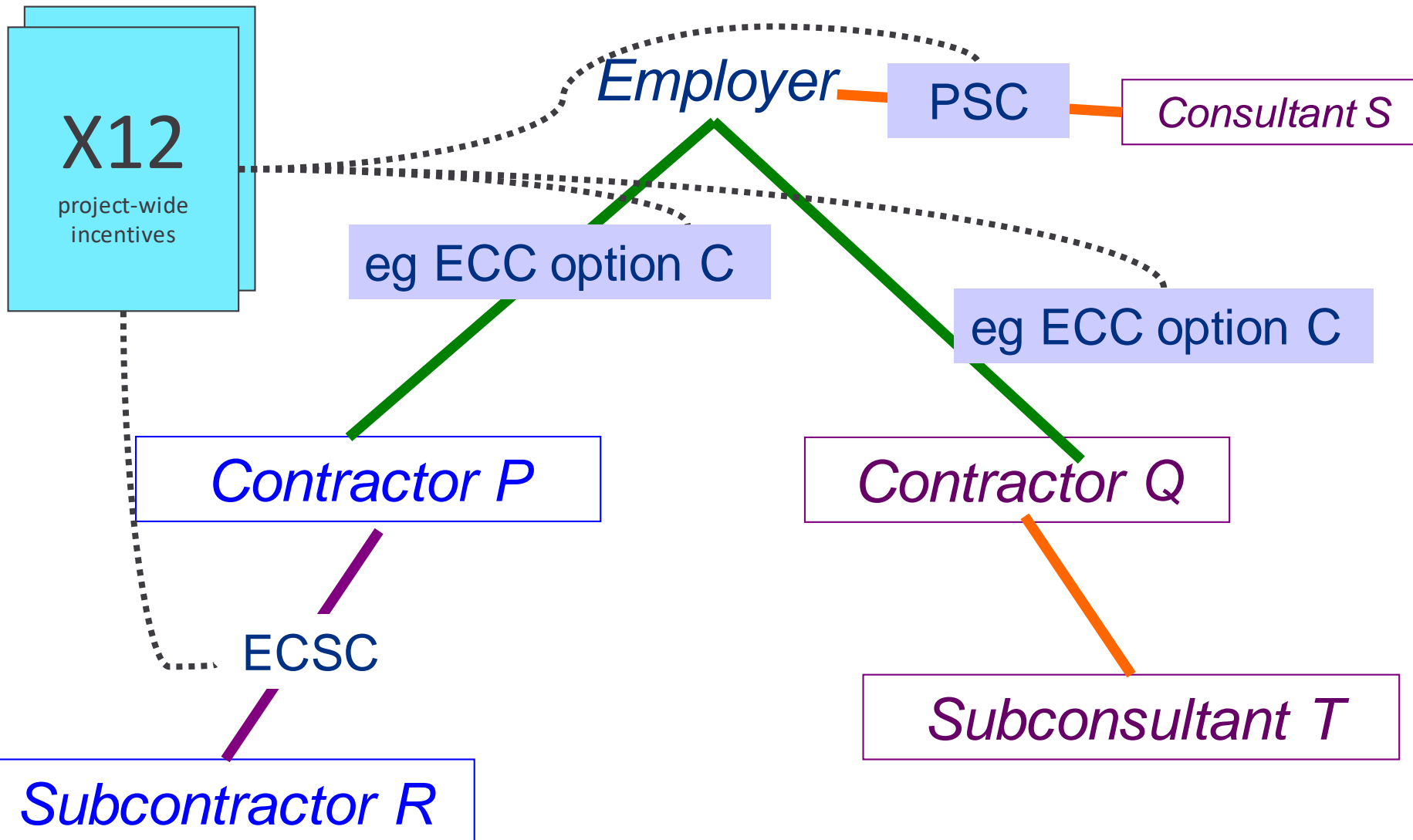
This:

- is from the supply side
- cannot be unilaterally changed by the *PM*
- so better not part of the Scope
- Ensure that the contents of Appendix 2 to Protocol are constraints and requirements on the Execution and **not** the plan itself.
- Then the plan is treated in X10 as a separate document

# X12 multiparty collaboration

- Used to incentivise multiple Partners to work together to achieve the objectives of the Promotor
  - Partners are all the suppliers that have X12 in their contracts
  - Promotor normally the Client
- A Core Group is created to take decision on behalf of the Partners and led by the Promotor
- The Partners collaborate as stated in the Partnering Information and in a spirit of mutual trust and cooperation
- The Schedule of Partners sets out the objectives of the Partners and includes joint targets for performance
- Partners are paid the amount stated in the schedule if they achieve or better the target
- There is no reduction in the amount due to the Partners if they fail to achieve a target set

# X12 – joined up thinking; joined up procurement





# X10 with no Protocol?

NEC Practice note:

‘The Protocol includes a number of other provisions and mechanisms which users may wish to build into their Information Model Requirements’.

- eg
- Meetings to coordinate and resolve ambiguities
- Security
- Software corruption
- Licenses to use material
- Provisions after termination

## Moving forward...

- ‘The only way you can go forward on serious BIM levels is some sort of alliancing’
- (interviewee for Winfield Rock Report)
- NEC published ‘NEC4 Alliance Contract’ for consultation June 2017
- Due to be published June 2018

# Close

- It's all moving as we learn
- You have a basic understanding of Information Modelling and NEC
- NEC will continue to support
- This is your future: Come back and tell us how you have made it work!



# NEC Users' Group Annual Seminar 2018

20 June | County Hall, London

**Dr. David  
Hancock**  
*Infrastructure  
Projects  
Authority*

**Ian Arbuckle**  
*Defence  
Infrastructure  
Organisation  
(DIO)*

**David  
Ferrousat**  
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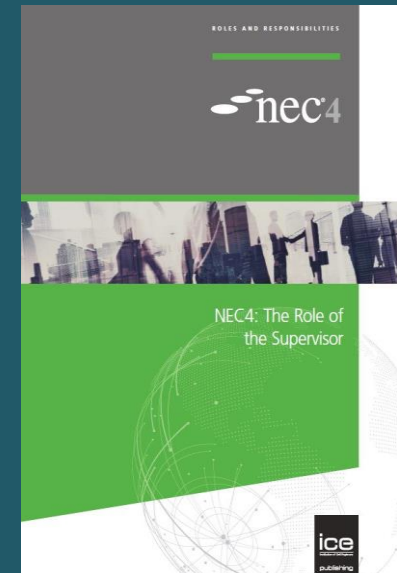
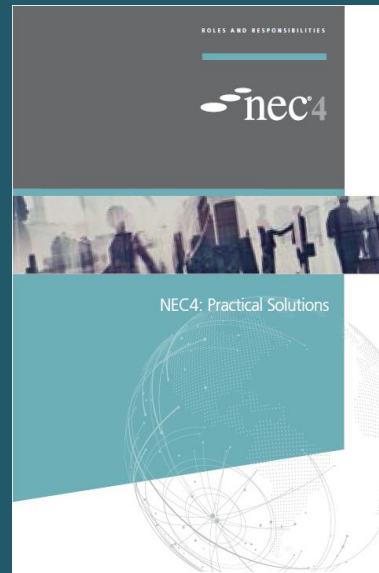
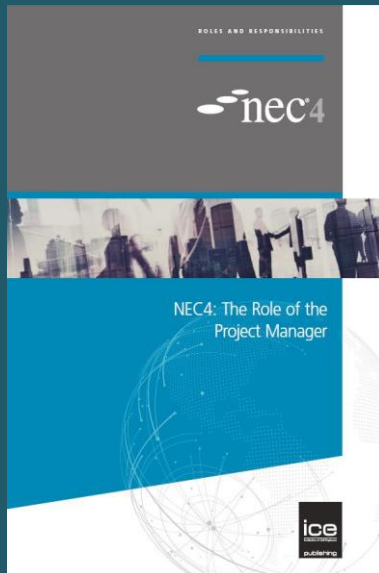




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