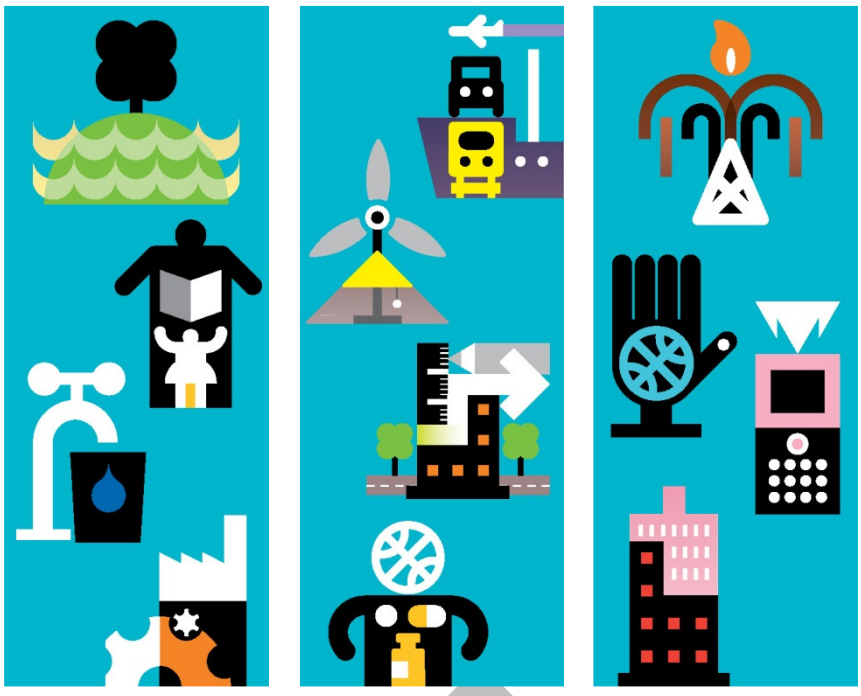

BIM Protocol

A guide to 5D publishing.

August 2013

Franklin+Andrews

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description	Standard
01	19-07-2013	Michael Saggers Tanju Ismet	Ian Levers Duncan Boughton	Malcolm Wright	BIM Protocol	

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Executive Summary

Mott MacDonald aims to be an industry leader and innovator in the field of BIM, specifically in the ability to interpret a 3D model as a deliverable in terms of extracting material quantities. For this reason, the following BIM protocol has been developed as a guide to help the designer name, group and more importantly understand how to develop a 3D model from the beginning stages of the RIBA New Plan of work to be completely interpretable to the modern day Quantity Surveyor.

When using Revit Architecture/Structure/MEP as the chosen Building Information Modelling (BIM) authoring tool, the processes laid out in this guide should be followed to ensure maximum transferability of information.

Background

Conventionally, the Quantity Surveyor would create a set of take-off items from 2D design drawings; these would usually consist of floor plates, sections and elevations. This can be a timely process dependent on the nature and complexity of the project, the 3D environment allows for a quicker (in most cases), more accurate take-off, and it also gives the Quantity Surveyor the correct environment to interpret the building correctly, understanding how the various elements inter-relate. It must be noted, the process of taking-off from 3D models is still in development, it's not an all-encompassing method of measurement, as it's interdependent on the quality of information produced within the model.

Component Naming

1.1 Revit Viewport

As the model is exported from Revit into Vico, it's vital that the right elements are published in the first instance. To achieve this, it's recommended that a viewport is created within Revit which filters only the elements of the project that require take-off. Conventionally the designer will have multiple views, highlighting different elements of the building with items hidden or filtered for clarity. We recommend that a viewport is created specifically for the Quantity Surveyor, named the 'Quantity Surveyors View' or something similar.

There can be numerous issues if the viewport is not created, the following elements for example may be exported with the model:

- Topography
- Trees & Shrubbery
- Icons/models for aesthetic purposes like surrounding buildings, people, vehicles etc.

The above items cause the following issues:

- Slow the model down considerably
- Result in the model taking a lot longer to export
- Creates unnecessary items in the take-off list

To summarise, the 'Quantity Surveyors View' must filter all the items that require take-off, and nothing more.

1.2 Element Naming

To ensure maximum readability when the BIM model is exported from Revit, an accurate and descriptive name is essential. It is the primary tool by which the design team can communicate intent to the Quantity Surveyor through the BIM model.

For any components that are standardised from Revit, in which you can only add types rather than create new families, i.e. columns, roof, floors, walls etc. use the following naming convention when creating new 'Types':

<Specification-Code*>_<Category>_<Object-Description>_<size-or-dimension>

Please ensure each field is separated by an underscore ("_"). Each field is expanded upon below:

Specification Code

- This is a field that can hold any reference code which will refer to the project's specification sheets; it should also appear in the components keynote field.
- There should be no spaces in the field, any gaps should be dashes ("-").
- If the specification code is currently not known, simply leave a generic entry to be filled in later e.g. ("AAA"), alternatively if the component will not have a specification code, omit this field.

Category

- This field is important as it identifies the component as the correct building element.
- For example, "Wall" or "Column" would be acceptable entries.

Object Description

- This field defines the characteristics of the component, in terms of the build-up and type.
- Each subcomponent should be separated with a dash ("-").
- For example, simple entries like "block" or more complex entries like "Brick-Insulation-Cavity-Block" would be acceptable.

Size or Dimension (in mm)

- In this field enter the dimensions of each component, separated by a dash (“-“) and following the same sequence as the “Object Description” in the previous section.
- The dimensions can be written in different units, for example 50 L/S or 2 kN, as long as they are to widely understood standards.
- For example, simply entries like “100mm” for block, or “65-90-100mm” for a cavity wall construction.

Worked Examples

A typical wall may be:

WALL-110_Wall_Brick-Insulation-Cavity-Block_65-90-25-100mm

A typical column may be:

COL-110_Column_PrecastConcrete_600mm

This list of examples is broad, and is not exhaustive; a logical approach should be taken.

Component Grouping

To ensure we can measure elements correctly, they must be grouped or filtered to the same naming convention described in the previous section. In the Quantity Surveying field, the standards by which our Cost Plans are defined are key; the 'New Rules of Measurement' by the Royal Institute of Chartered Surveyors is the guiding document in this regard. The majority of items will fall under substructure and superstructure; however some worked examples are explained below.

1.3 Substructure

The structural floors may vary in nature throughout the building, usually in thickness, as long as the specification remains the same (in terms of strength and construction), all the "200mm" concrete floors should be grouped, and all the "300mm" concrete floors should be grouped, as again this will be the way they are captured within the Cost Plan. However there is an exception, we defined the 'ground floors' and 'upper floors' as separate elements, this is where the correct grouping system comes in to play.

1.4 Superstructure

The External Façade can often be a complex element in the measurement process; it can consist of multiple specifications, all of which have their own build up. For example, on stadia there can be several different types of External Façade which require measurement, so it's vital that the correct naming standards are defined to ensure that the correct quantities for each material are captured. For this reason, each different material must be named correctly (refer to section 1), but it must also be grouped correctly. For example, there may be blockwork on the External Façade dotted all around the building, which has the same build-up, this must all be named exactly the same, as it will be taken-off as one element because it will be listed and priced within the Cost Plan as one element. The same goes for Rainscreen Cladding; it

must all be grouped into one naming convention, unless the specification for the Rainscreen Cladding is actually different.

If you refer to the New Rules of Measurement, it dictates that the internal and external walls must be measured and priced separately, for this reason; they must be named/grouped separately to ensure we can achieve this. In some instances block walls of the same specification may be used as internal dividing walls, as well as external retaining walls, this is where the naming conventions are crucial as we need an accurate measure for each.

1.5 Internal Finishes

The finishes usually comprise part of the specifications rather than actually being modelled. Room data sheets (which are present from Revit) can be exported directly as a schedule, this is sufficient enough for the Quantity Surveying team to extract quantities and apportion cost to the various types of finishes.

1.6 Fittings, Furnishings and Equipment

The FF&E is usually allowance based; this element of the work usually embodies a large amount of space and processing power, which is why it is usually scheduled out from the outset.

1.7 Services

The process for extracting the service's elements is still in its early stages, a correct method for this element of the work is still not been developed.