Model development management on Highways England SMART motorways projects with CH2M

Paul Napier, Pete Burchill, Jonathan Dempsey

CH2M

Agenda

- Client Requirements
  - Governing Documents
  - Resulting scope of information
- Solution Architecture
- Key features
- Live Demo
- Resulting Output
- Questions

Client Requirements

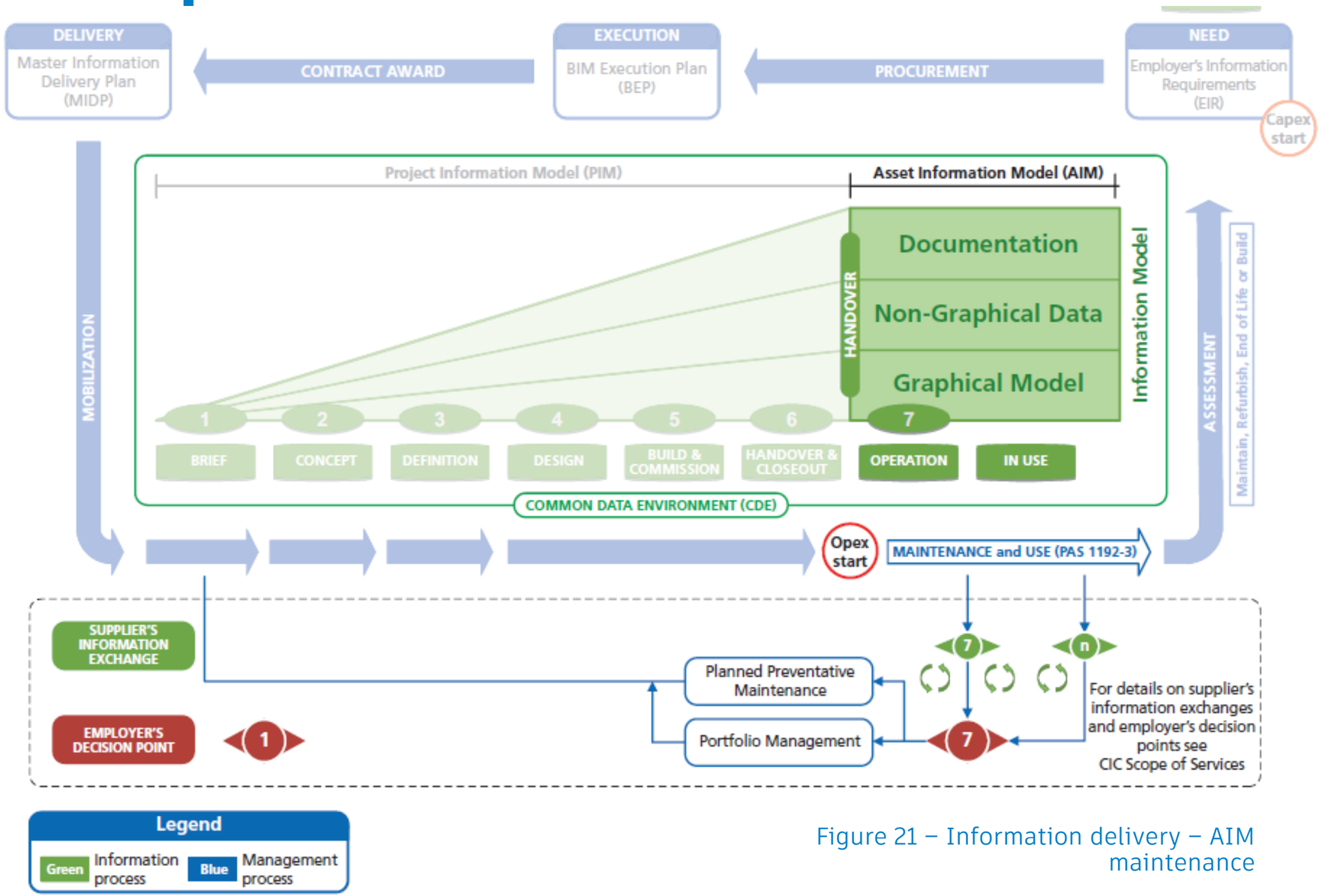
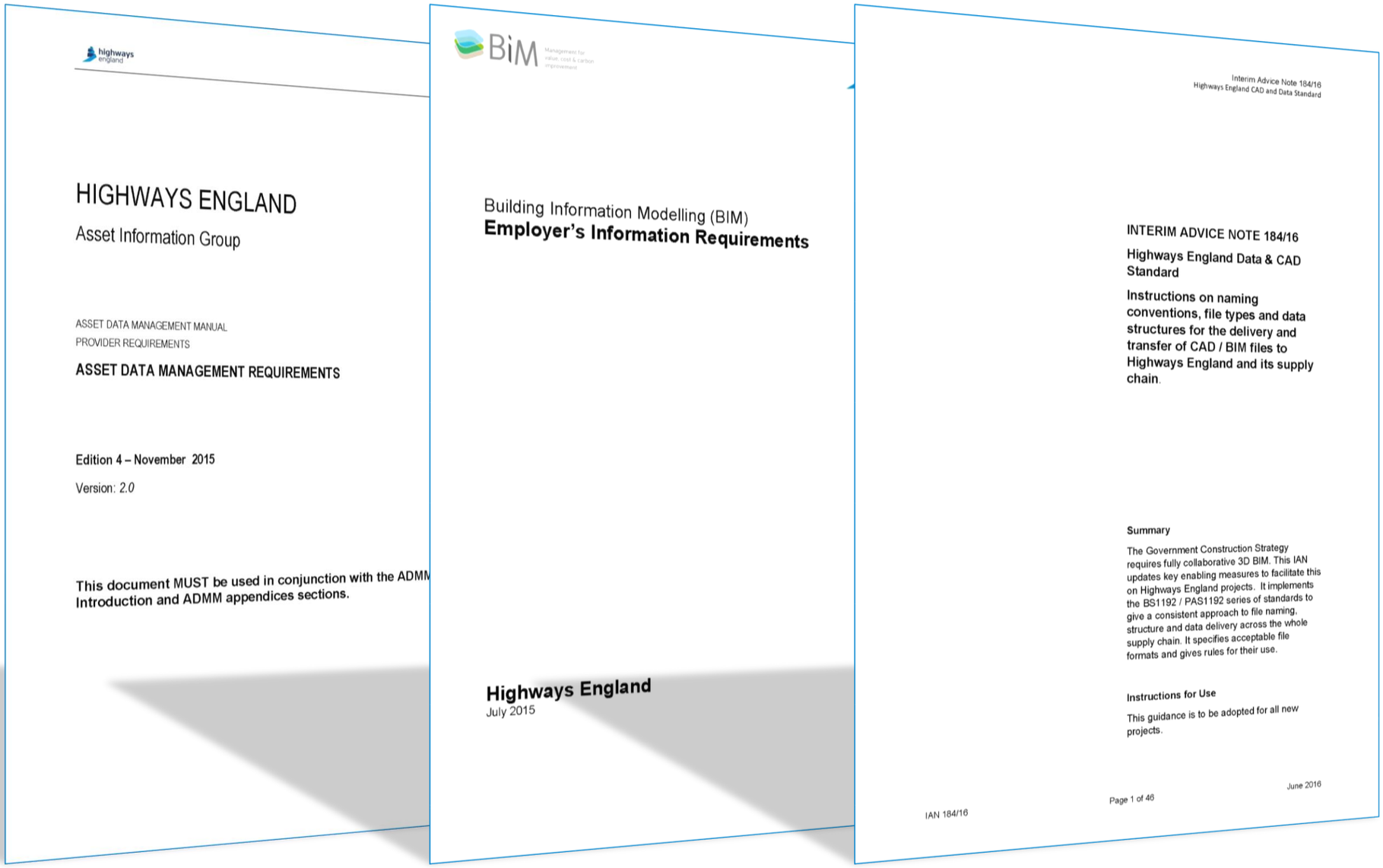


Figure 21 – Information delivery – AIM maintenance

PAS 1192-2:2013

Client Requirements

Client Requirements



highways england

HIGHWAYS ENGLAND

Asset Information Group

ASSET DATA MANAGEMENT MANUAL
PROVIDER REQUIREMENTS

ASSET DATA MANAGEMENT REQUIREMENTS

Edition 4 – November 2015

Version: 2.0

This document MUST be used in conjunction with the ADMM Introduction and ADMM appendices sections.

BIM Management for value, cost & carbon improvement

Building Information Modelling (BIM)
Employer's Information Requirements

Highways England
July 2015

Interim Advice Note 184/16
Highways England CAD and Data Standard

INTERIM ADVICE NOTE 184/16

Highways England Data & CAD Standard

Instructions on naming conventions, file types and data structures for the delivery and transfer of CAD / BIM files to Highways England and its supply chain.

Summary

The Government Construction Strategy requires fully collaborative 3D BIM. This IAN updates key enabling measures to facilitate this on Highways England projects. It implements the BS1192 / PAS1192 series of standards to give a consistent approach to file naming, structure and data delivery across the whole supply chain. It specifies acceptable file formats and gives rules for their use.

Instructions for Use

This guidance is to be adopted for all new projects.

June 2016

IAN 184/16

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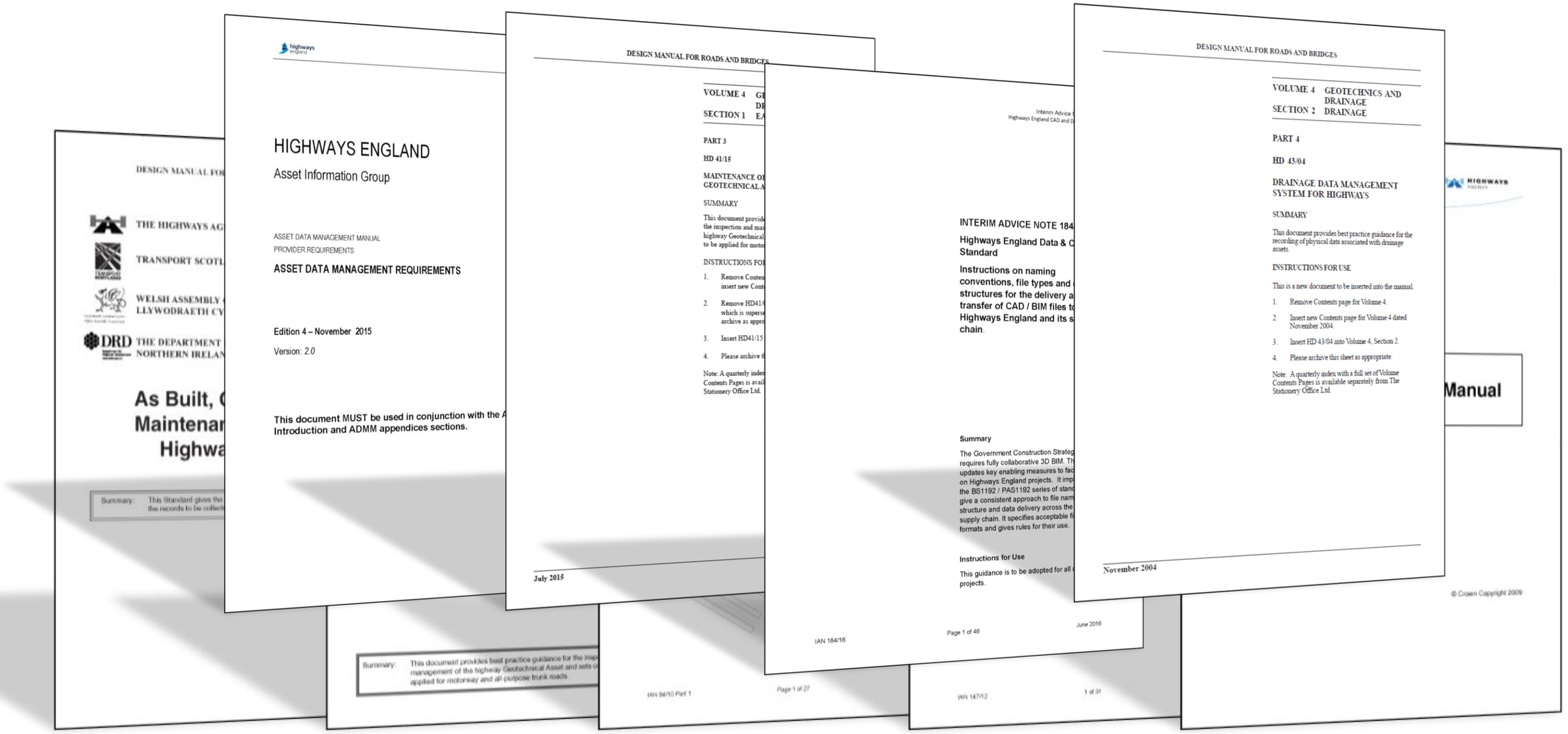
Client Requirements



Highways England Handover Requirements

Attributes

Name	Type	Values	Requirement	Phase	Required By	D	C	M	Data Source	Comments
Status										
Object ID	VARCHAR			Design / Const / Ma	All	M	M			
Status	ENUM			Design / Const / Ma	All	M	M			See IAN 184 for Asset Status
3D Model Confidence	ENUM			Design / Const / Ma	All	M	M			Relevant to 3D model of existing
3D Model Revision	VARCHAR			Design / Const / Ma	All	M	M			Model version the design data came f
3D Model File	VARCHAR			Design / Const / Ma	All	M	M			Model file the design data came from
Location										
XSP	VARCHAR		ADMM	Design / Const / Ma	Maintainer	O	O	M		
Section Label	VARCHAR		ADMM	Main	Maintainer	O	O	M		
Start Chainage	NUMBER		ADMM	Design / Const / Ma	All	M	M	M		
End Chainage	NUMBER	NOT APPLICABL	ADMM	Design / Const / Ma	All	N/A	N/A	N/A		
Start Date of Asset	DATE		ADMM	Const / Main	All	O	O	M		
Road Link	VARCHAR			Design / Const / Ma	All	M	M			The road link the chainage relates to
Start Easting (X) Local	NUMBER			Design / Const / Ma	All	O	O		AutoCAD	
Start Northing (Y) Local	NUMBER			Design / Const / Ma	All	O	O		AutoCAD	
Start Elevation (Z) Local	NUMBER			Design / Const / Ma	All	O	O		AutoCAD	
End Easting (X) Local	NUMBER	NOT APPLICABLE		Design / Const / Ma	All	N/A	N/A	N/A	AutoCAD	
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Start Easting (X) National	NUMBER			Design / Const / Ma	All	O	O			Calculate from Local Grid
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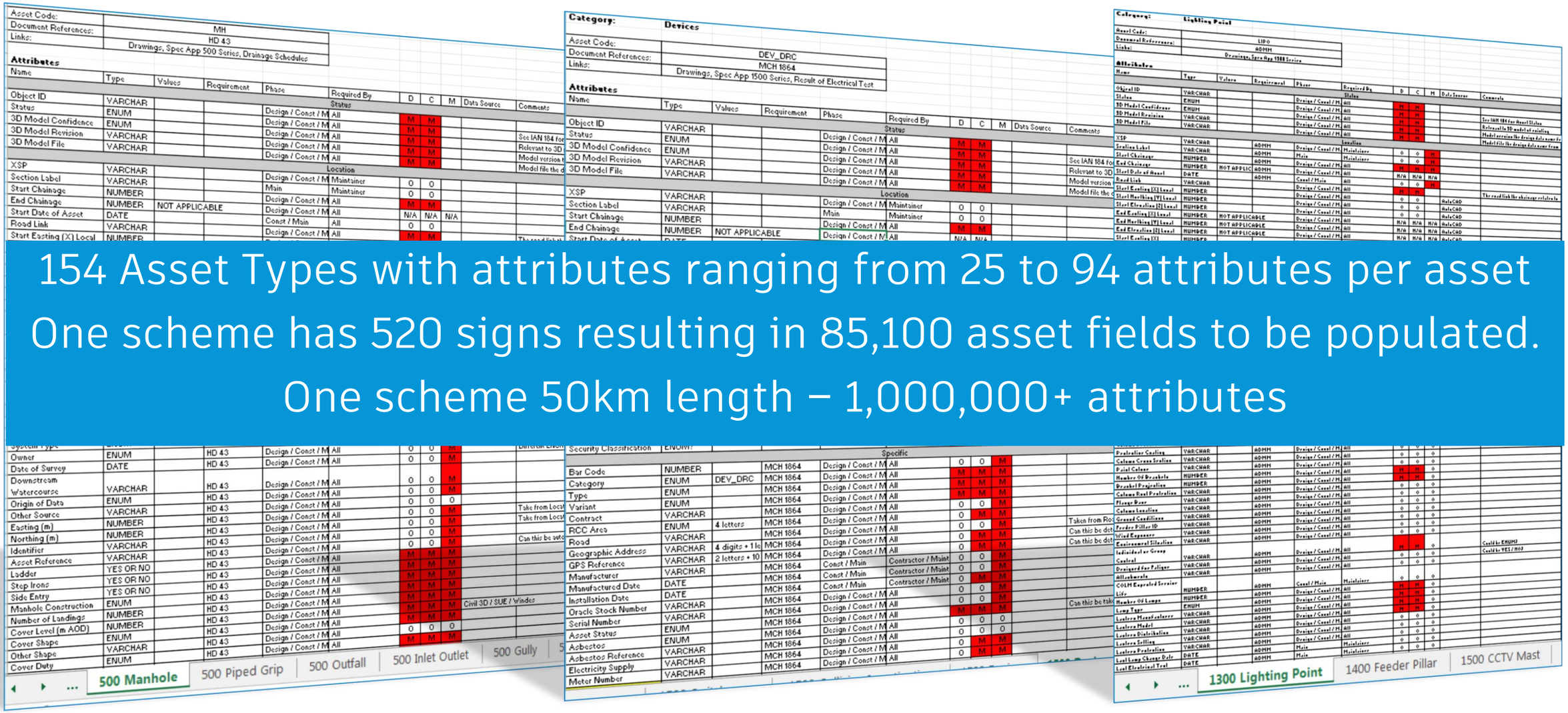
Security										
Security Classification	ENUM?					M	M			

23 Attributes are common to all asset types. Most are location based

Highways England Handover Requirements



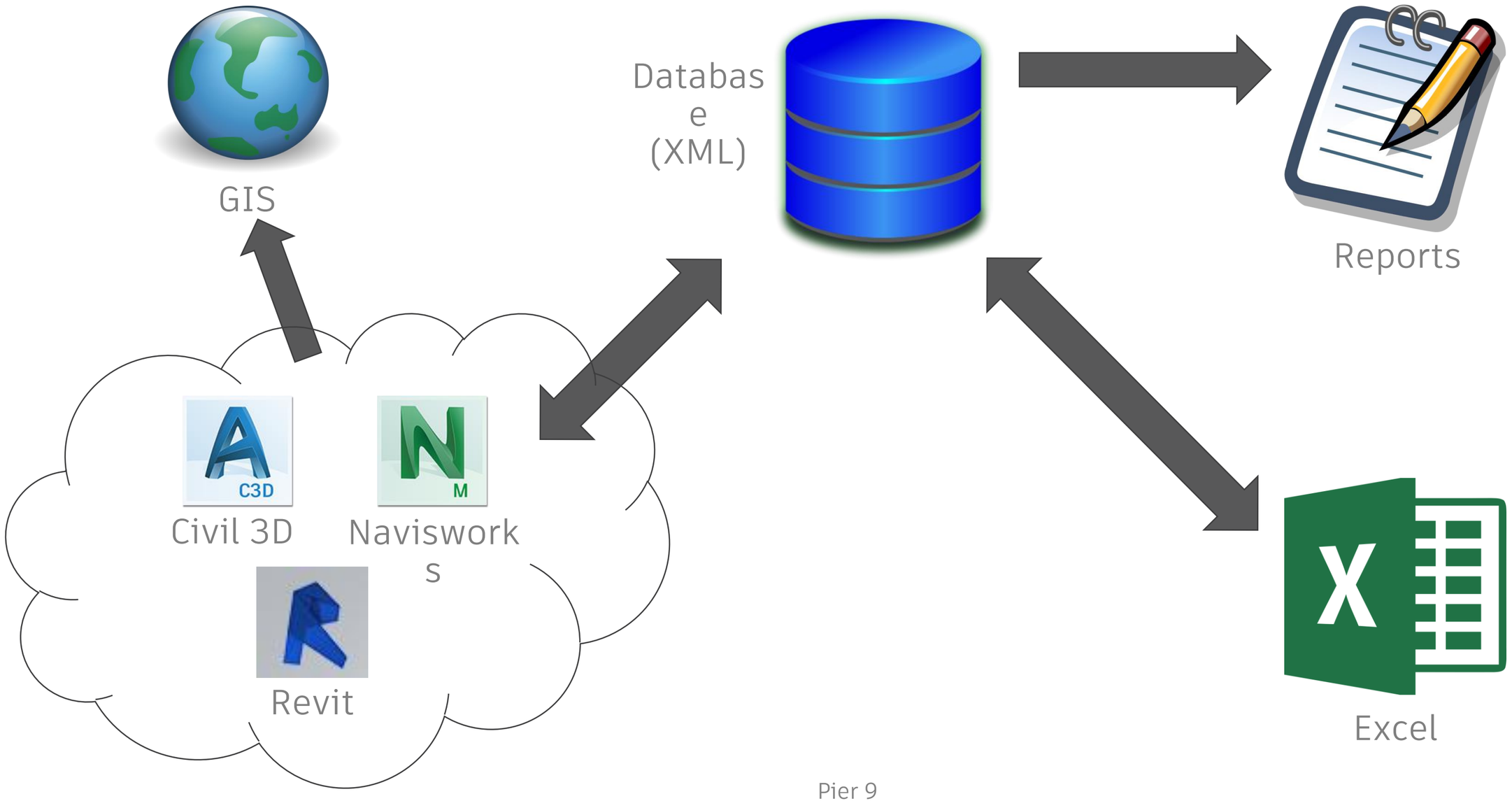
154 Asset Types with attributes ranging from 25 to 94 attributes per asset

One scheme has 520 signs resulting in 85,100 asset fields to be populated.

One scheme 50km length – 1,000,000+ attributes

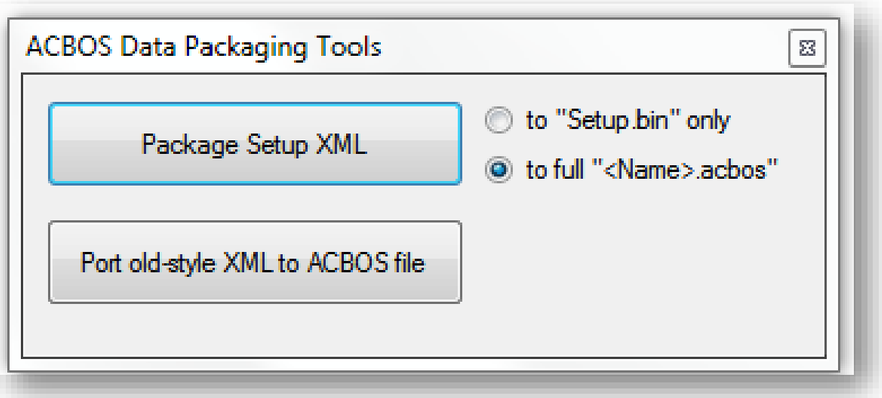
Solution Architecture

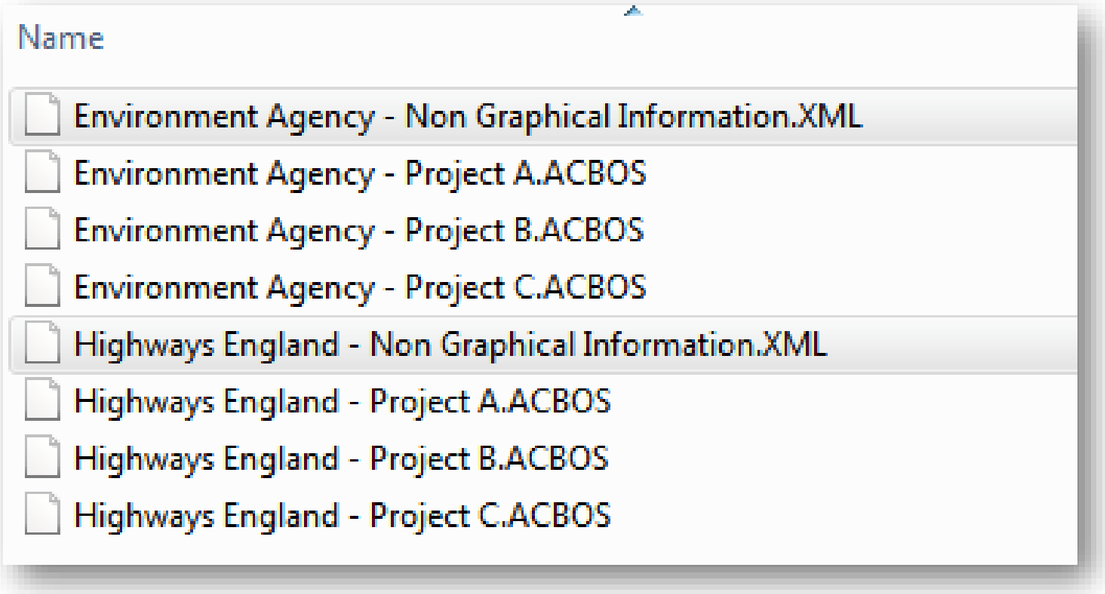
Solution Architecture



Model Development Manager Capabilities

Project Setup

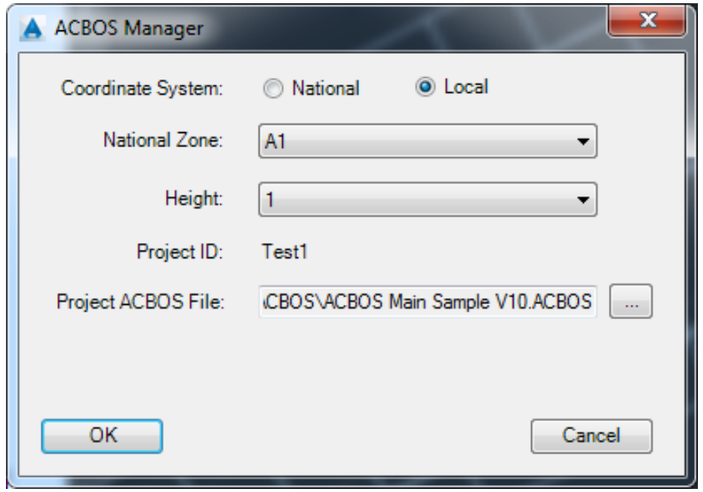




- Create XML schema template per client
- Easily create specific project database file from the template
- Assign project information such as Project ID and Name
- All generated asset ID numbers will contain the Project ID code

Model Development Manager
Civil 3D Ribbon

Manager



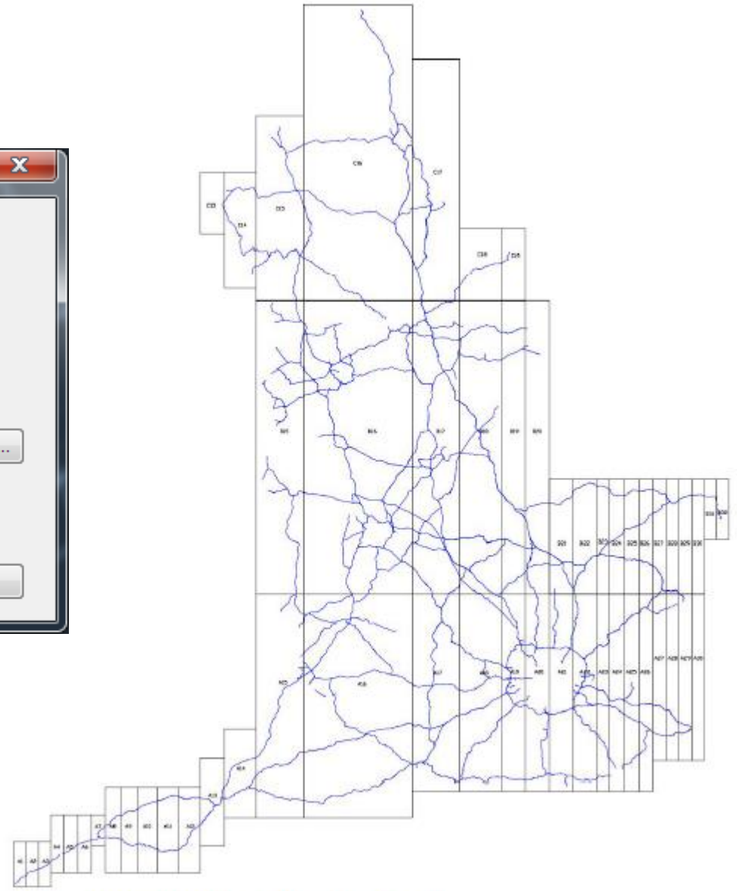
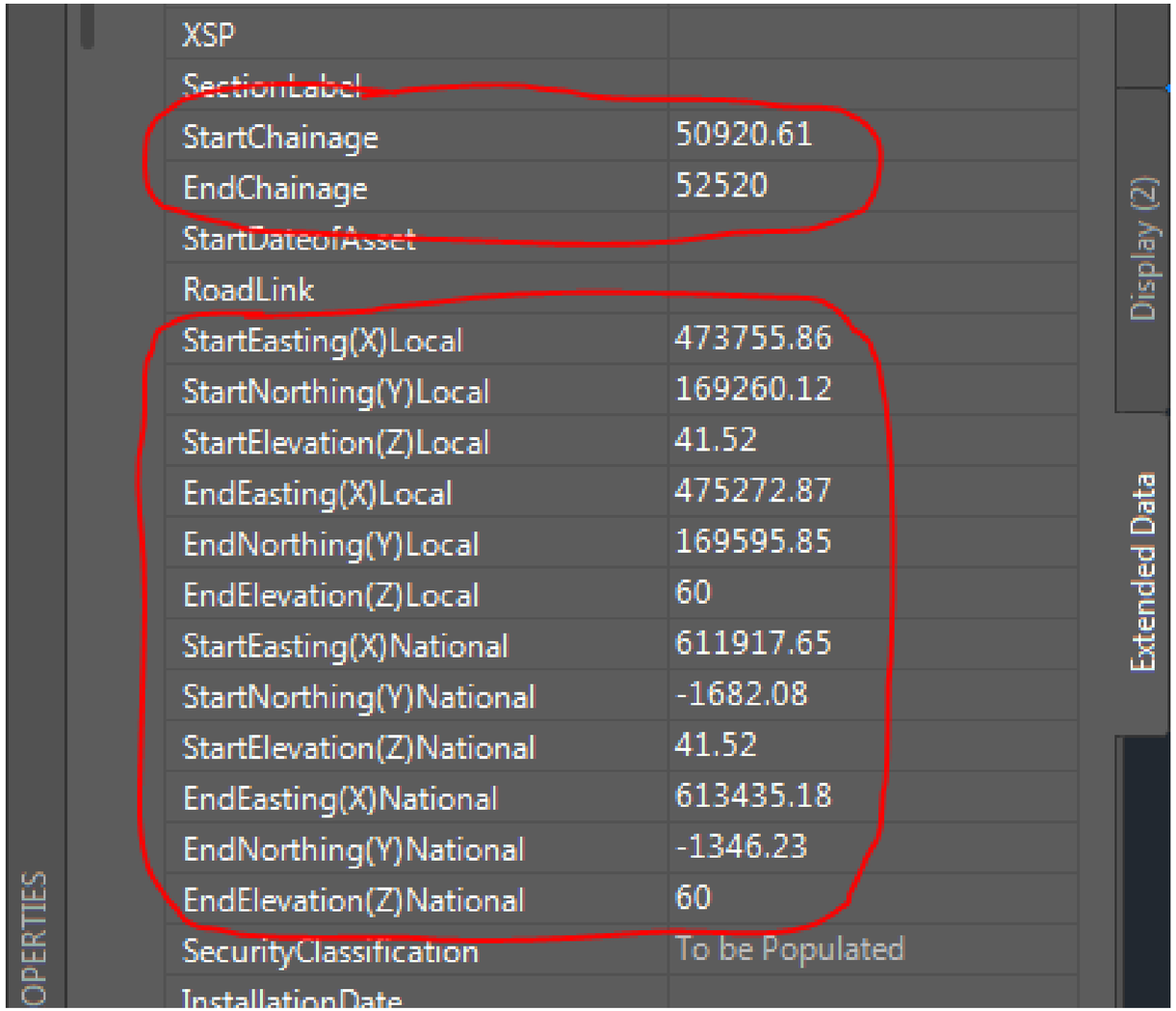


Figure 3: Highways Agency Local Grid Layout for England

- Set the database file to use with the model
- Specify if your model is in National or Local co-ordinate system.
- Specify details for Local Grid setup (Currently accepts IAN 99 zone bands)

Calculate Properties

- MDM can automatically calculate for each object:
  - Start / end chainage in relation to its assigned alignment
  - Bounding box X,Y,Z co-ordinates in both National and Local grids.
- Easily change which alignment objects are assigned to with “Assign Alignment” tool



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Security										
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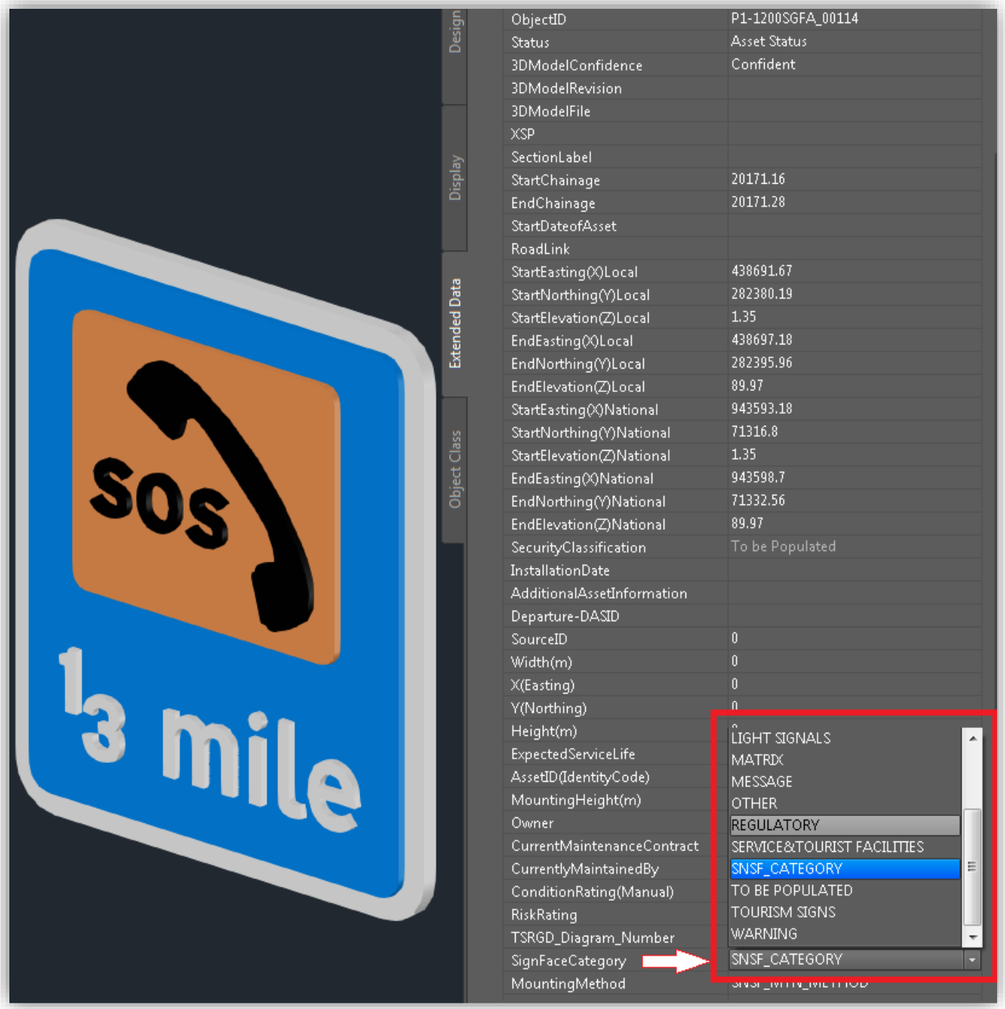
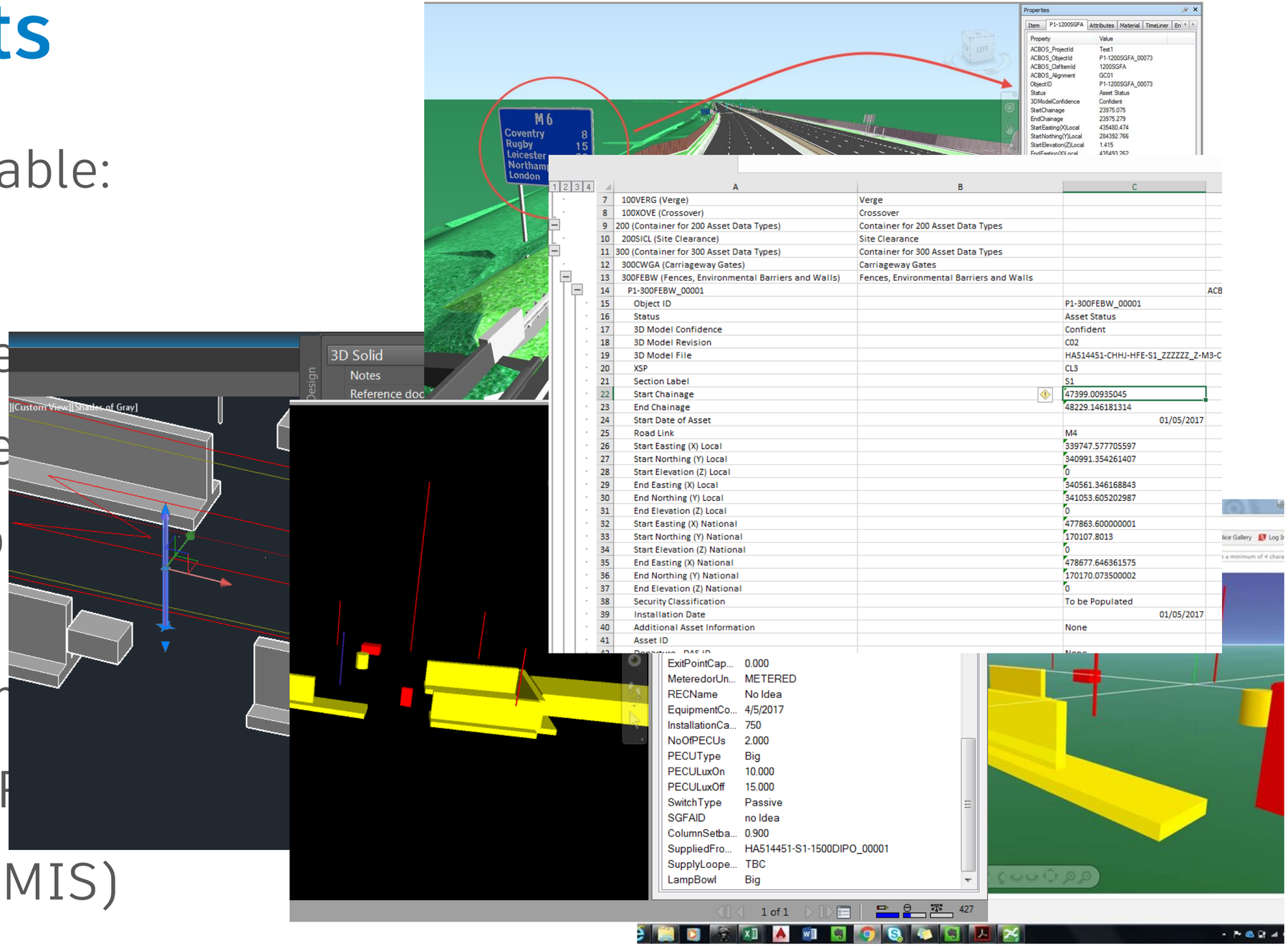
Live Demo

Graphical and Non-Graphical Information



MDM Outputs

- The data is available:
  - In the tools
  - In the federate
  - For use in sche
  - As Industry Fo
    – in HE CDE
  - As GIS in a nur
    - Tab (CONFIF
    - SHP (HE-IAMIS)

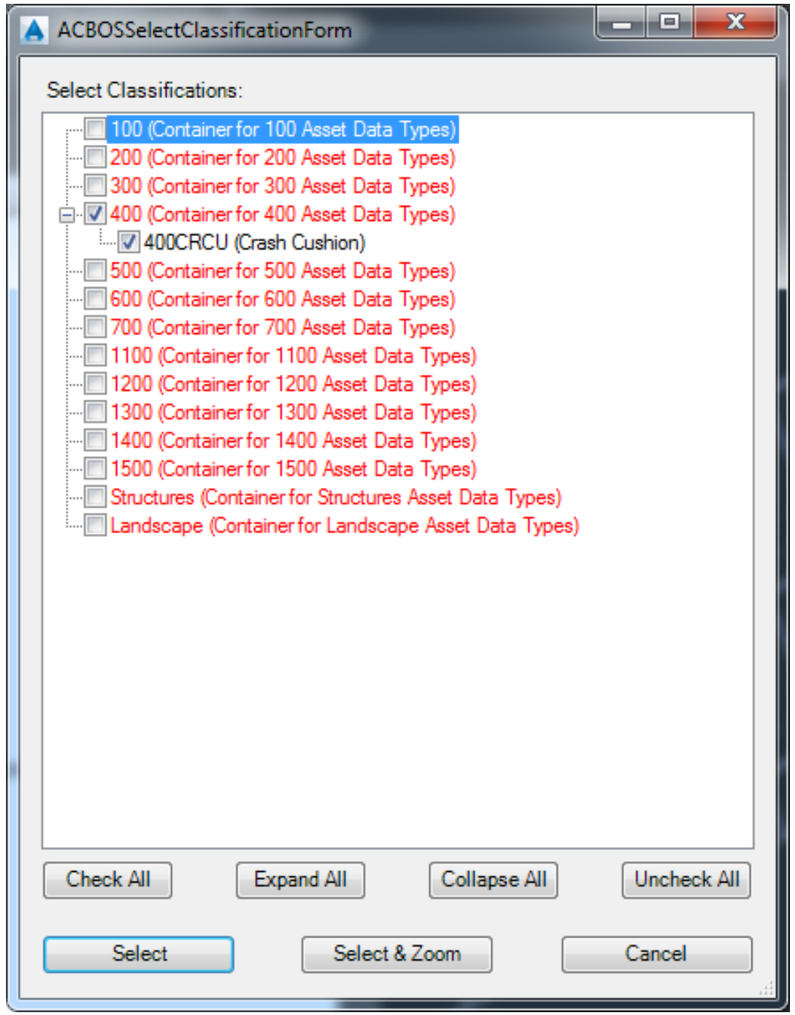


Development Team

- Pete Burchill
- Paul Napier
- Jon Dempsey
- Rich McCabe
- Miroslav Schonauer (Autodesk)
- Emyr Isaac (Autodesk)
- Lynn Palko (Autodesk)

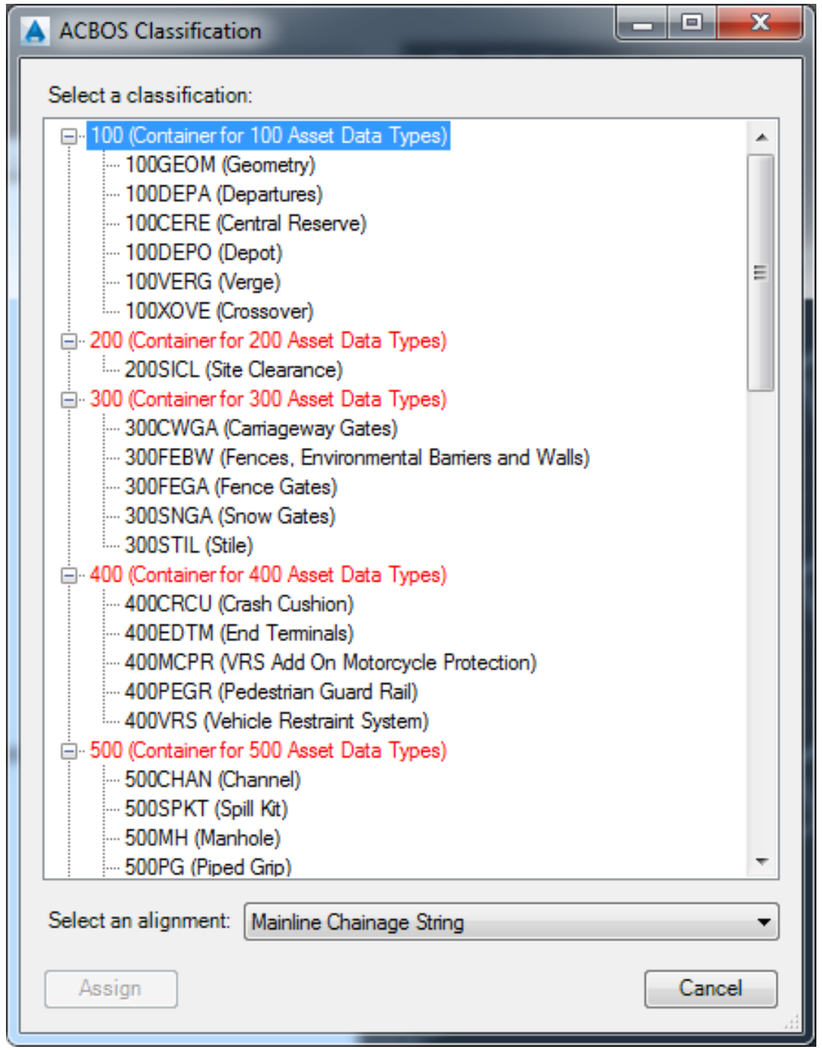
Questions & Answers

Select



- Select objects within model which have been “tagged” as an asset
- Able to refine selection by asset type, and by individual assets.
- Automatically zoom to selected asset(s)

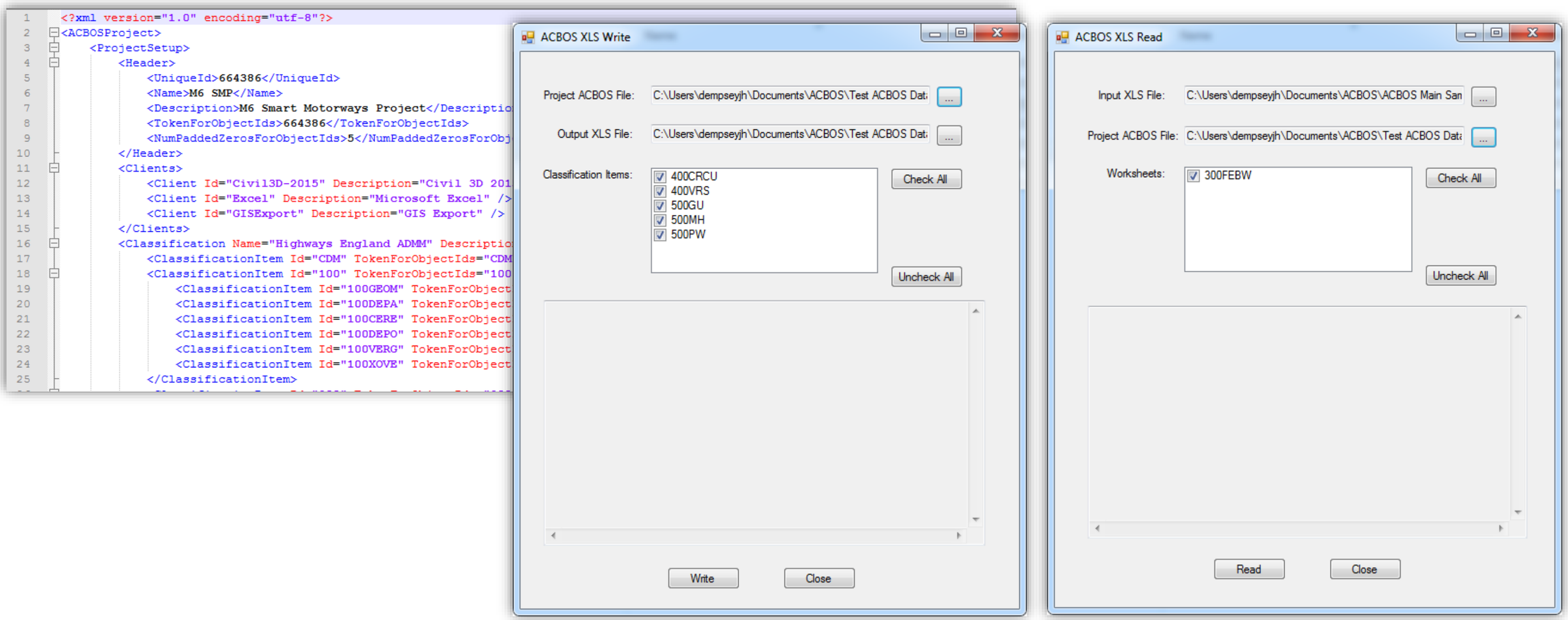
Identity Create / Acquire / Remove / Destroy



- Assign an object as a specified asset.
- Assign with new asset record (Identity Create)
- Assign with existing asset record (Identity Acquire)
- Remove object assignment with asset record, but leave asset record in database to be re-assigned later (Identity Remove)
- Remove object assignment with asset record, and delete asset record from database (Identity Destroy)

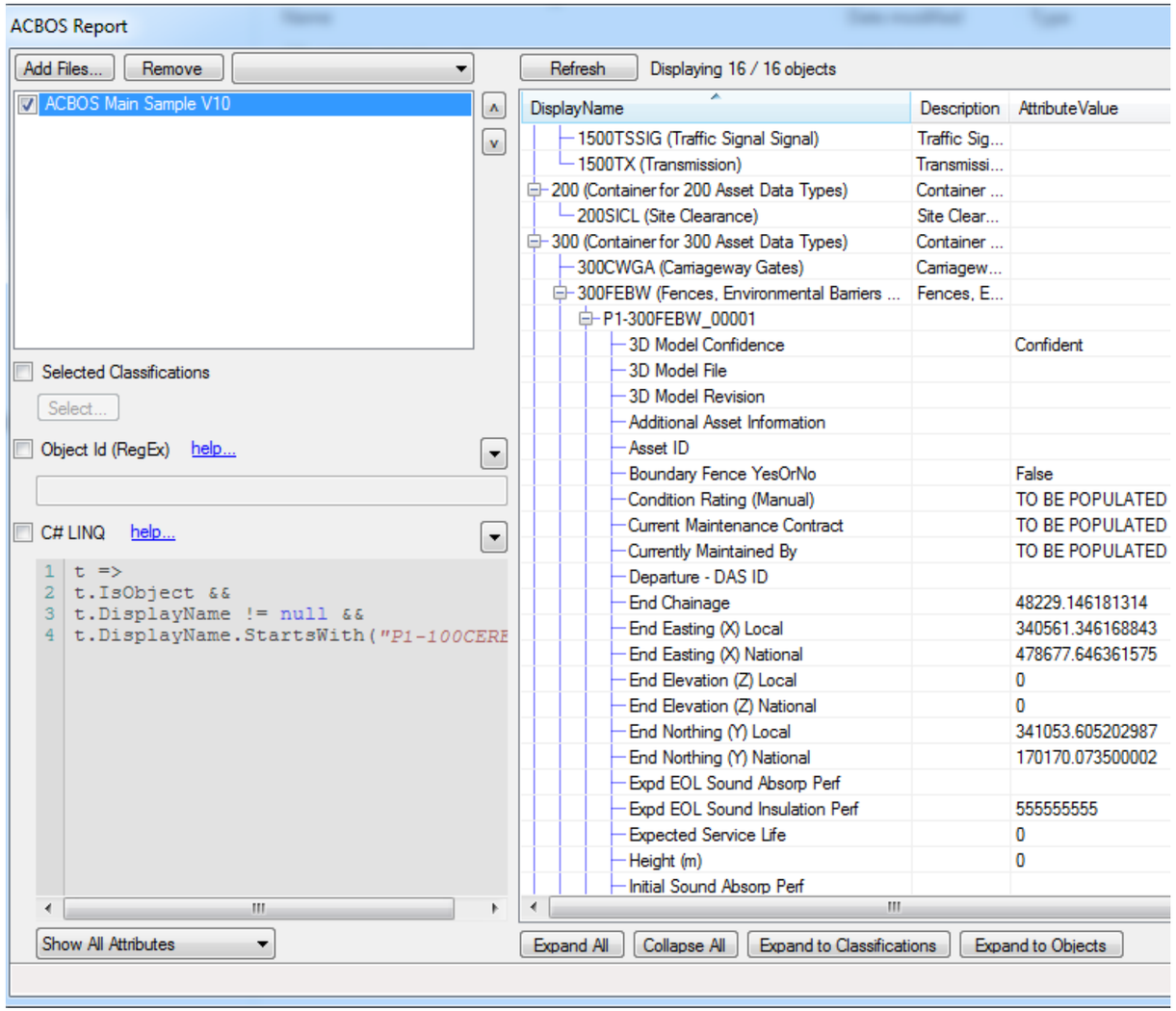
XML ←→ XLS

- Write to/from the database via Excel spreadsheets



Asset Reports

- Query the database with Regular Expressions or C# LINQ queries on any asset type and attribute
- Export results to Excel or XML formats



Export to GIS

- MDM can automatically export a model to GIS formats
  - Export to DWG creates a GIS compatible drawing. Then able to export to any GIS file format Civil 3D is capable of
  - Export via FDO exports directly to .shp for all assets in a model file.
- GIS config file specifies if an asset should be converted to a point, line, or polygon