Bentley Building Datasets
The 'I' in BIM

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Product Director - Bentley Building

Bentley® Sustaining Infrastructure

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Topics

- Dataset Overview
  - Purpose of BIM
  - Outputs from BIM
  - Inputs into BIM
- Dataset Customization
  - Project Datasets
  - Company Datasets
  - Special-purpose Dataset Extensions

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Dataset Overview

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Purpose of BIM (1 of 2)

- modelling of buildings and information
- design
  conceptual design, design development, design, as builds, …
- creation/generation of drawings
  floor plans, sections, elevations, details, …
- generation of quantity takeoff reports and schedules
- design visualization and creation of images and animations

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Purpose of BIM(2 of 2)

- coordination with other disciplines
- interoperability with analysis applications
  energy, structural, costs, ...
- clash detection/interference management
- schedule simulation
- fabrication
- ...

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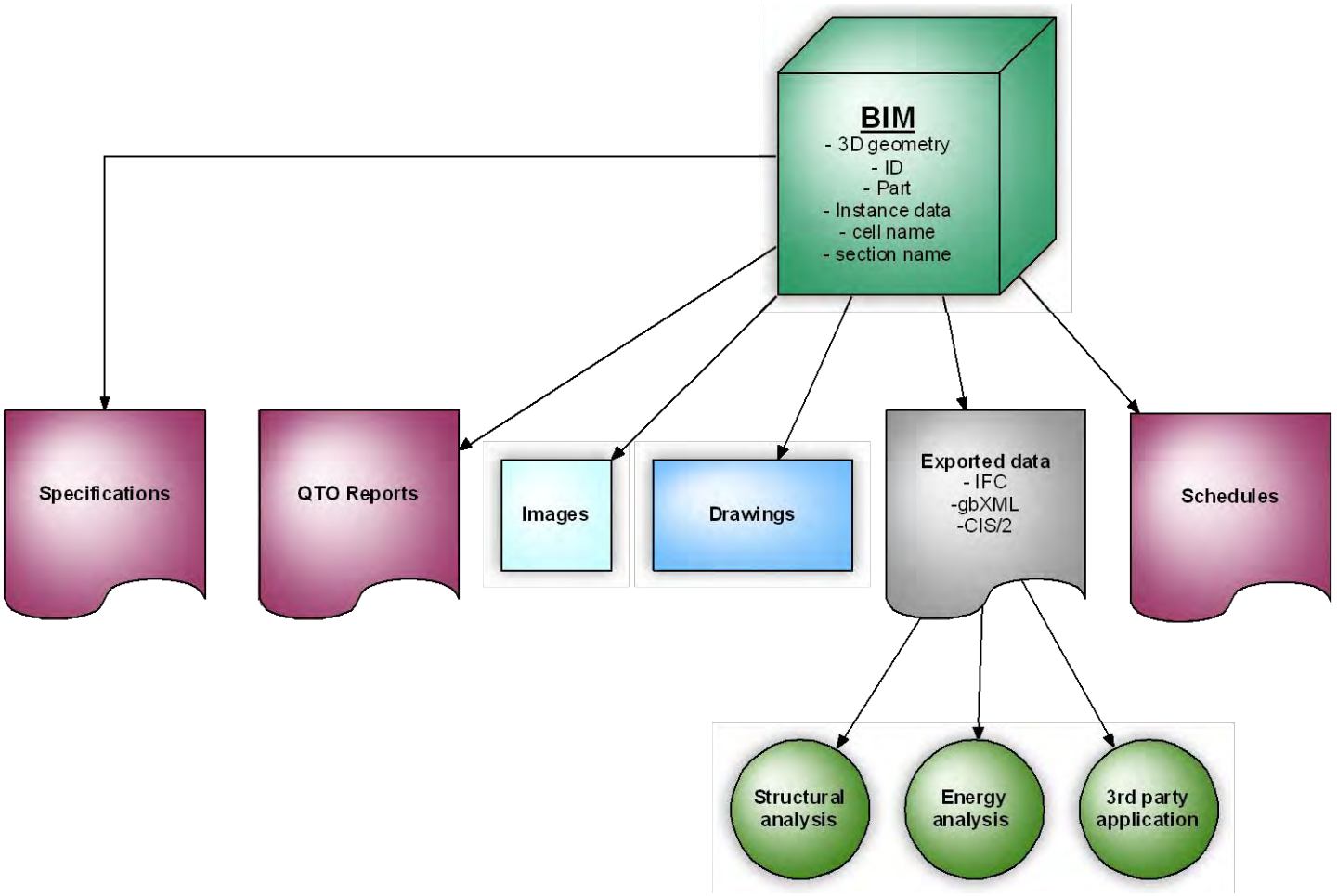
Outputs from BIM/Deliverables



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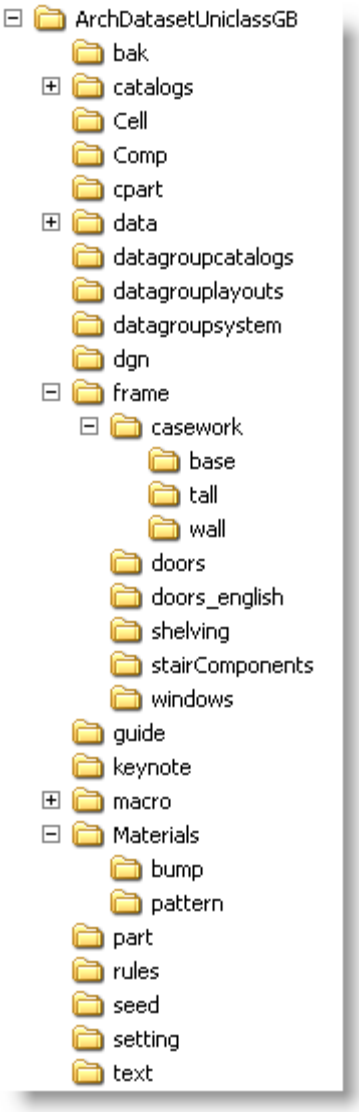
Inputs into BIM

- content
  parts, compound parts, components, parametric and non-parametric cell, DataGroup catalogs, section tables, annotation and other symbols, palettes, materials, …
- DataGroup definitions (schema)
  property names, data formats, lists values (enumerations), display names, …
- settings and seed files,
  schedule templates, macros, …



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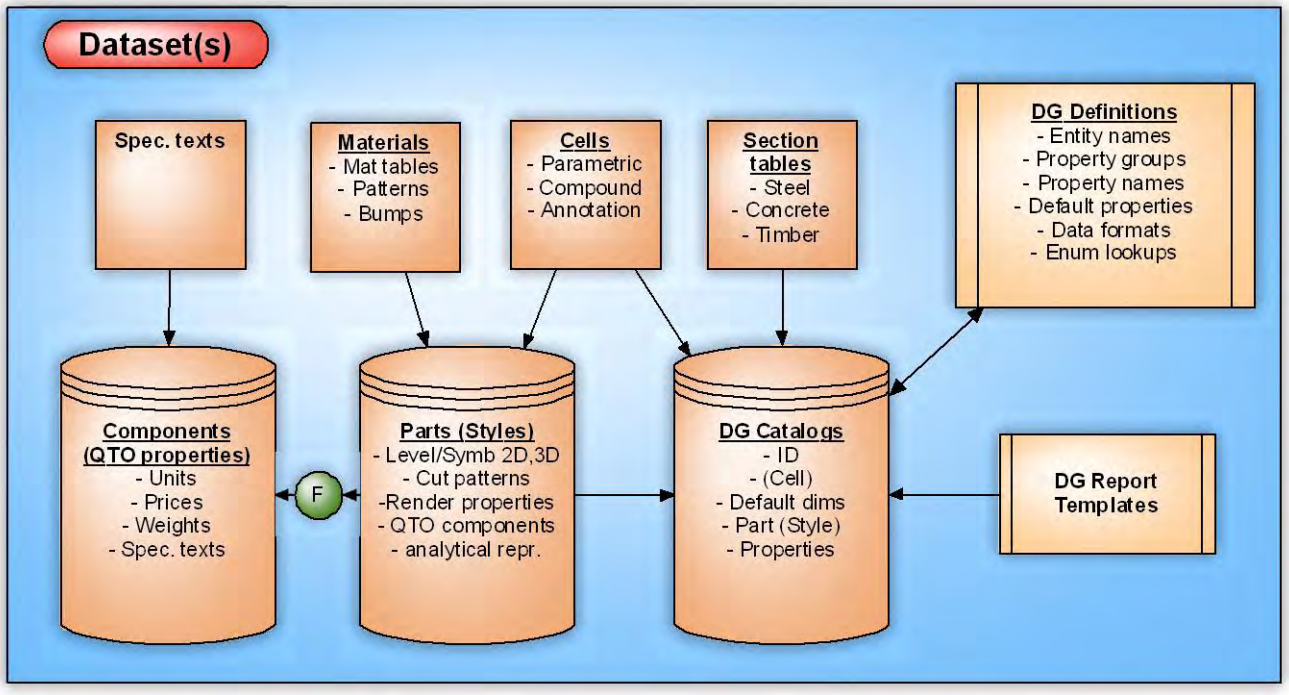
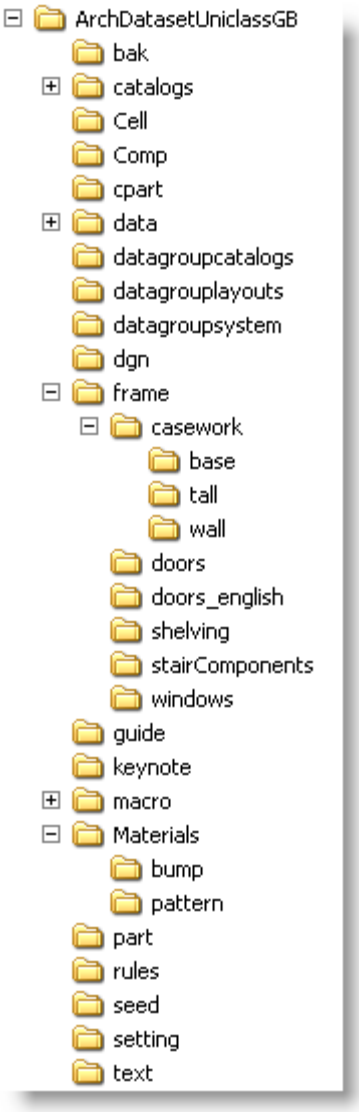
Inputs into BIM





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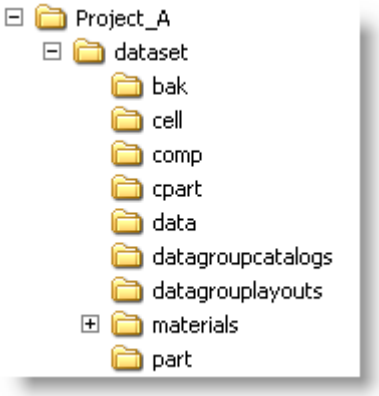
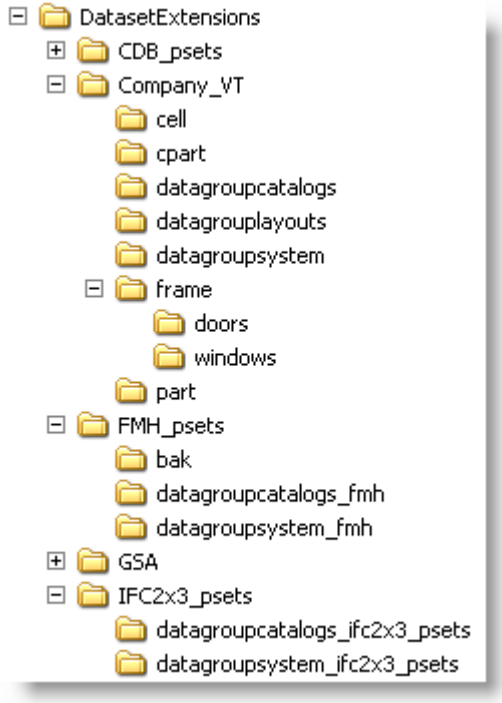
Inputs into BIM

- optional dataset extensions
  - project datasets
  - company datasets
  - special-purpose datasets





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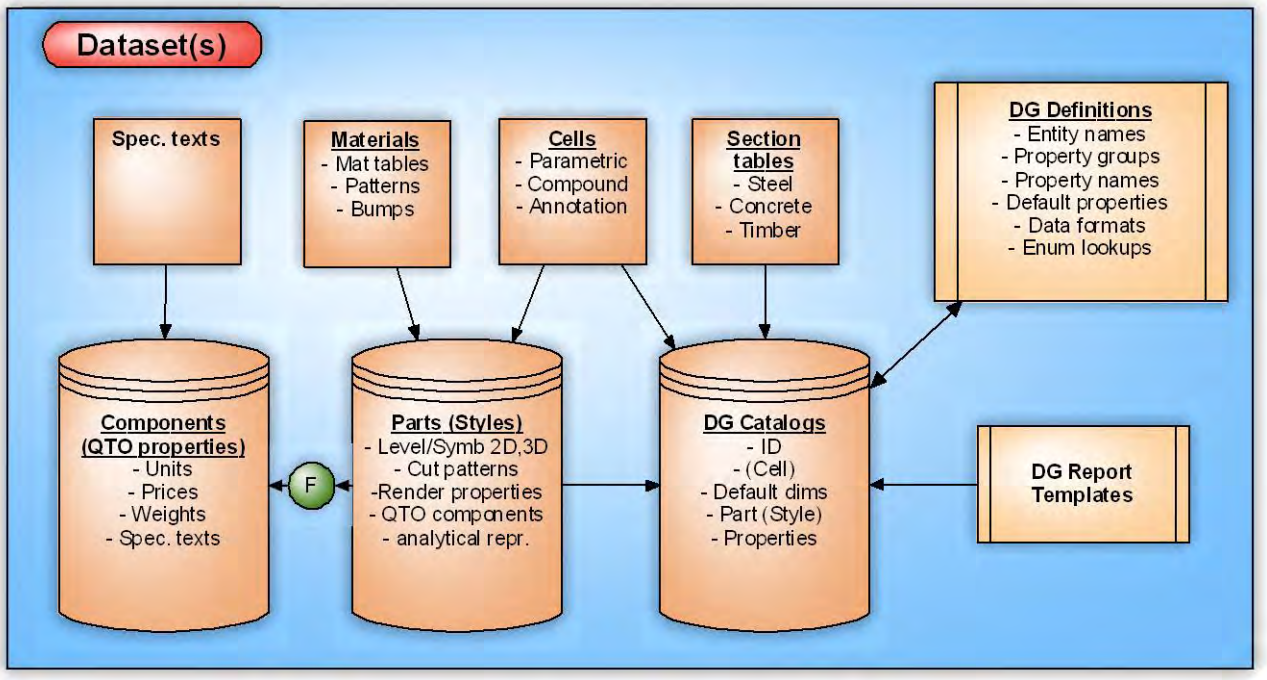
Inputs into BIM



country classification and level standards

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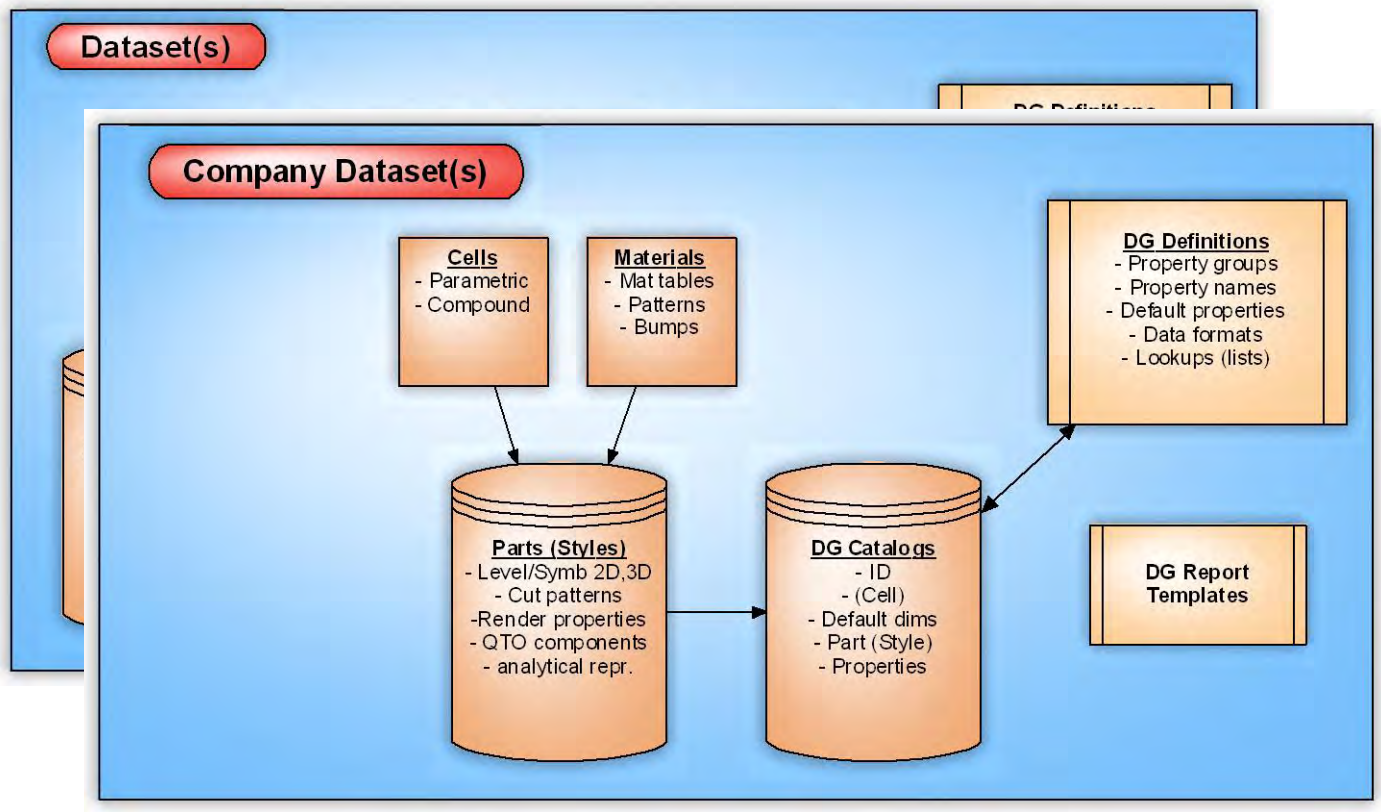
Inputs into BIM



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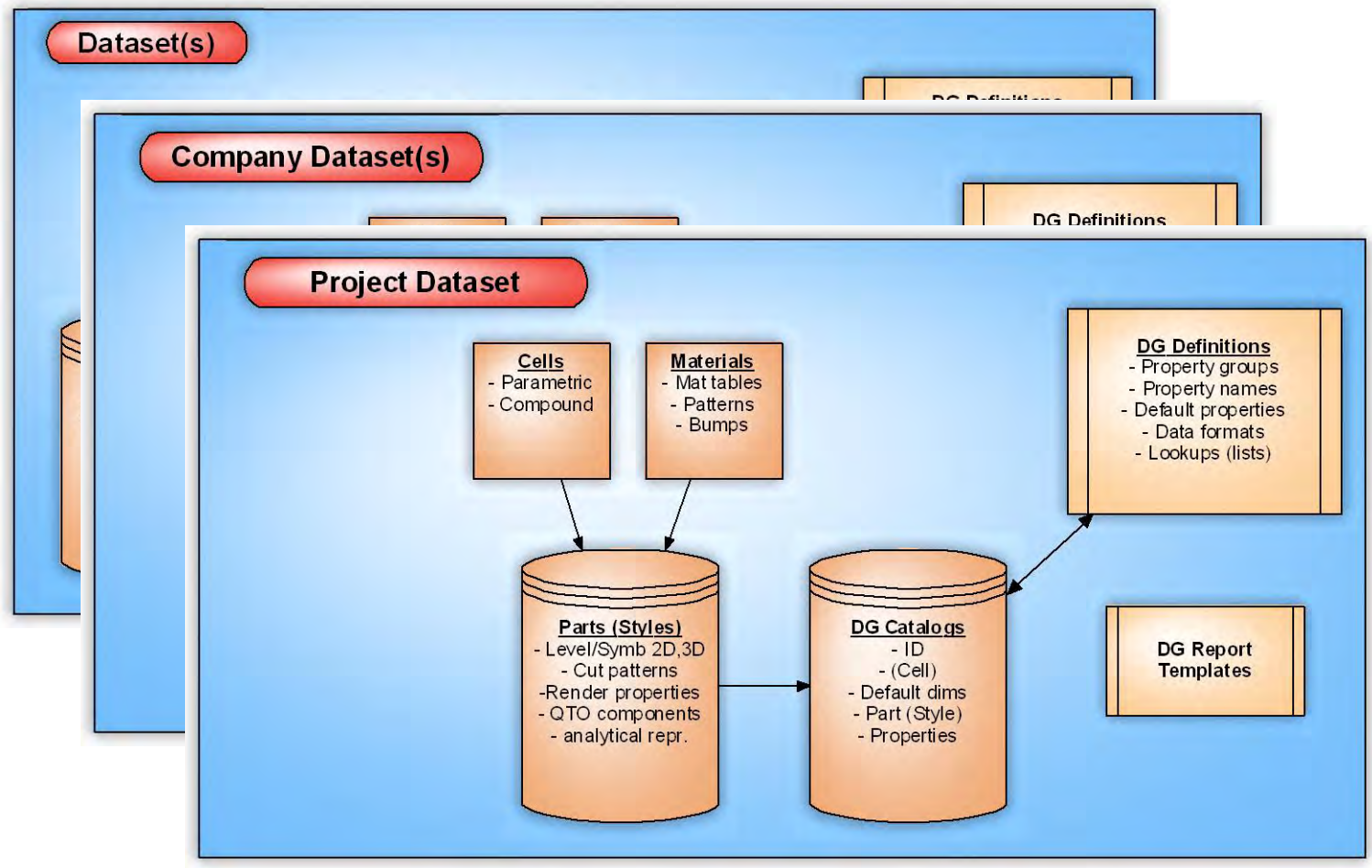
Inputs into BIM



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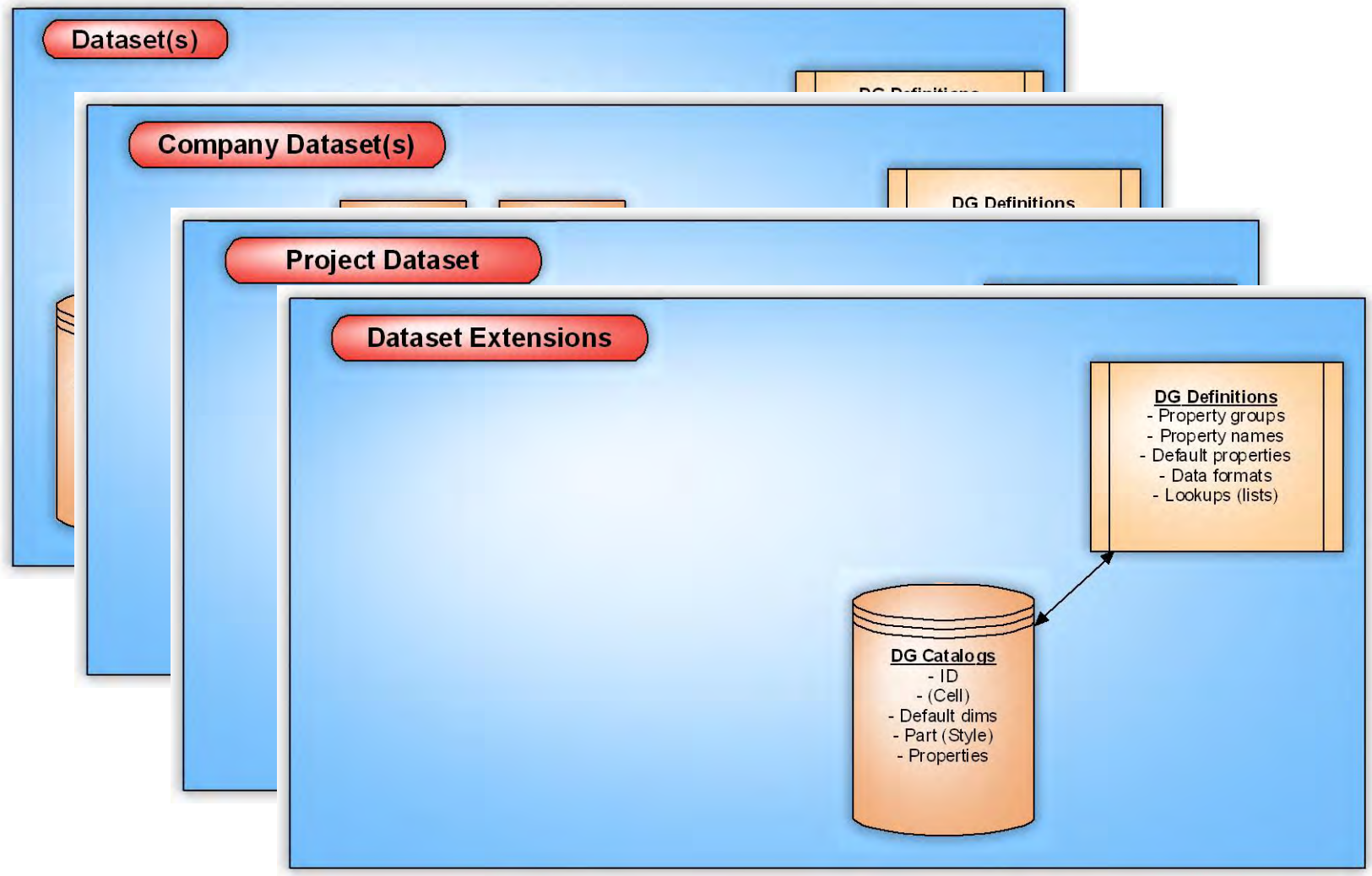
Inputs into BIM



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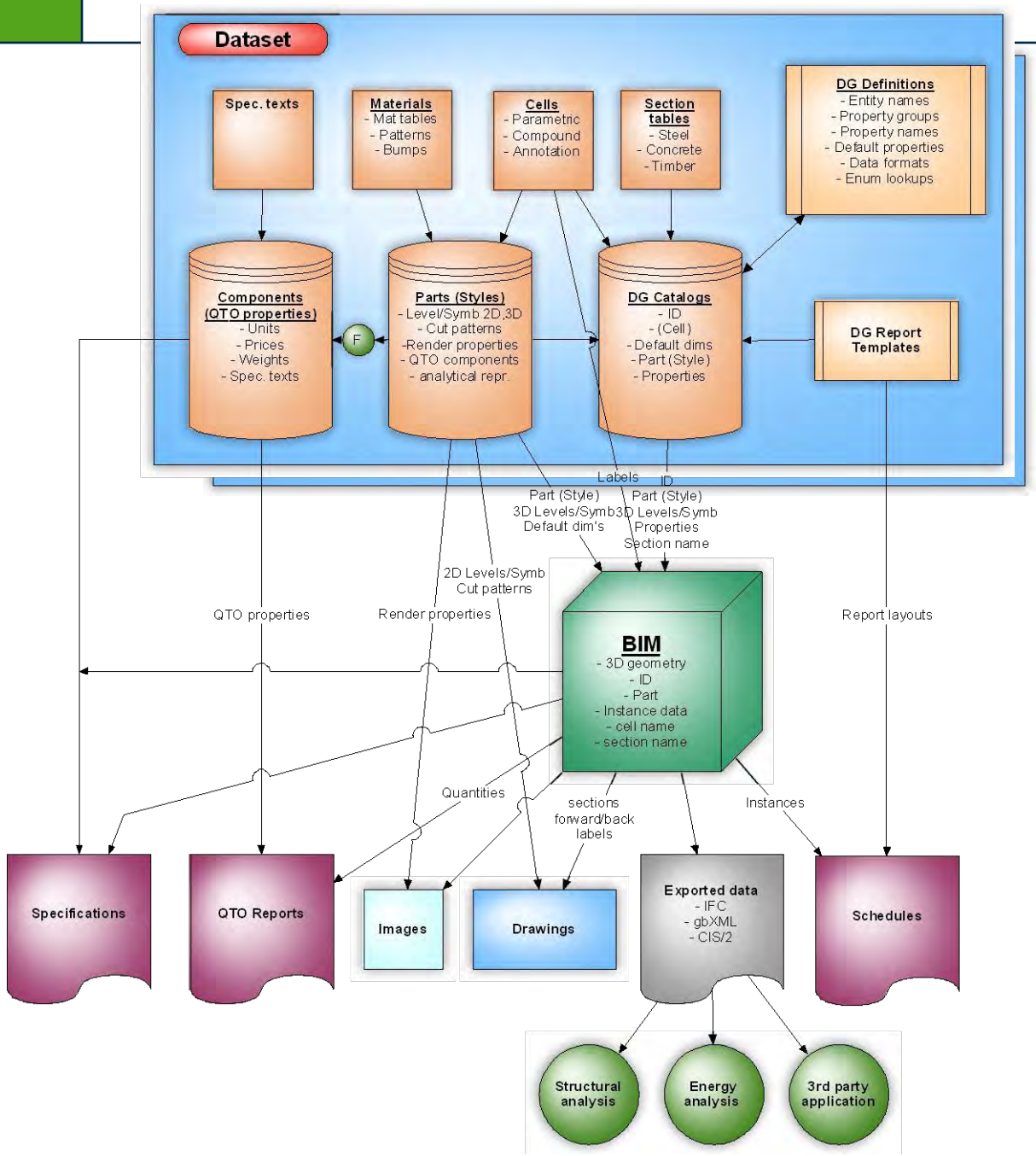

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Do not edit delivered dataset files!

Dataset Customization

- Project
- Company
- Special-purpose

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Project Datasets

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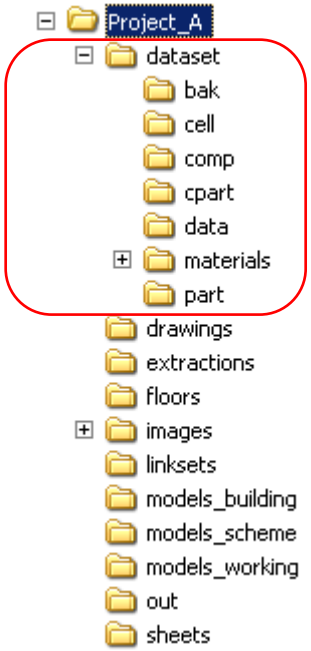
Project Datasets

- installed in ProjectTemplate

Configuration Variables in PCF-file

```
#---------------------------------------------------------------------
# Append search path for project-level dataset portions
#---------------------------------------------------------------------
PROJ_DATASET                    = $(_USTN_PROJECTDATA)dataset/

TFDIR_PART                      < $(PROJ_DATASET)part/
TFDIR_CELL                      < $(PROJ_DATASET)cell/
TFDIR_COMP                      < $(PROJ_DATASET)comp/
TFDIR_CPART                     < $(PROJ_DATASET)cpart/
MS_CELLLIST                     < $(PROJ_DATASET)cell/*.*
MS_MATERIAL                     < $(PROJ_DATASET)materials/
MS_BACKUP                       < $(PROJ_DATASET)bak/
MS_PATTERN                      < $(PROJ_DATASET)materials/pattern/
MS_BUMP                         < $(PROJ_DATASET)materials/bump/
DG_CATALOGS_PATH                > $(PROJ_DATASET)datagroupcatalogs/
DG_SCHEDULE_LAYOUT_PATH         < $(PROJ_DATASET)datagrouplayouts/
```



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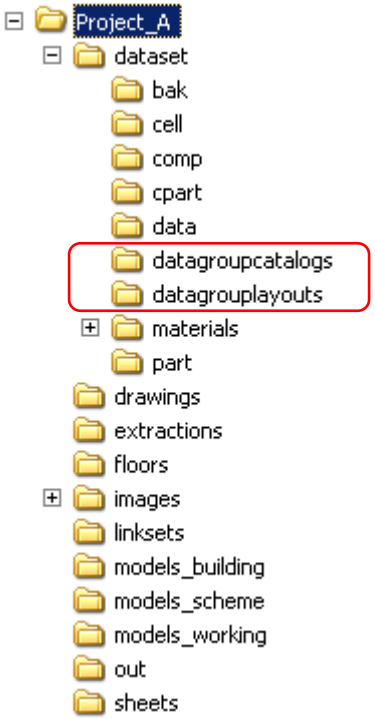
Project Datasets

- installed in ProjectTemplate
- additional folders

Configuration Variables in PCF-file

```
#--------------------------------------------------------------------
# Append search path for project-level dataset portions
#--------------------------------------------------------------------
PROJ_DATASET                    = $(_USTN_PROJECTDATA)dataset/

TFDIR_PART                      < $(PROJ_DATASET)part/
TFDIR_CELL                      < $(PROJ_DATASET)cell/
TFDIR_COMP                      < $(PROJ_DATASET)comp/
TFDIR_CPART                     < $(PROJ_DATASET)cpart/
MS_CELLLIST                     < $(PROJ_DATASET)cell/*.*
MS_MATERIAL                     < $(PROJ_DATASET)materials/
MS_BACKUP                       < $(PROJ_DATASET)bak/
MS_PATTERN                      < $(PROJ_DATASET)materials/pattern/
MS_BUMP                         < $(PROJ_DATASET)materials/bump/
DG_CATALOGS_PATH                > $(PROJ_DATASET)datagroupcatalogs/
DG_SCHEDULE_LAYOUT_PATH         < $(PROJ_DATASET)datagrouplayouts/
```



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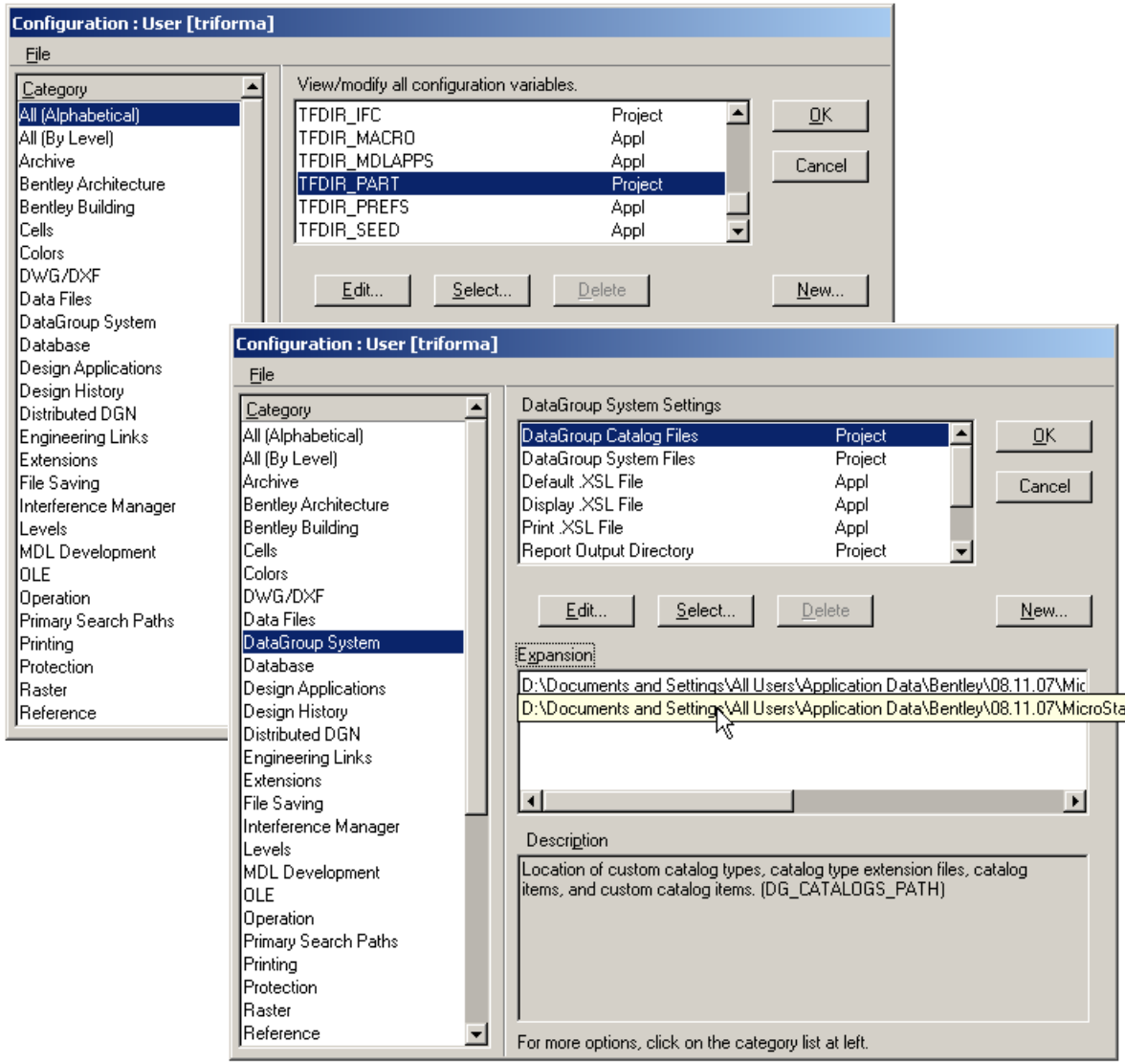
Configuration Variables



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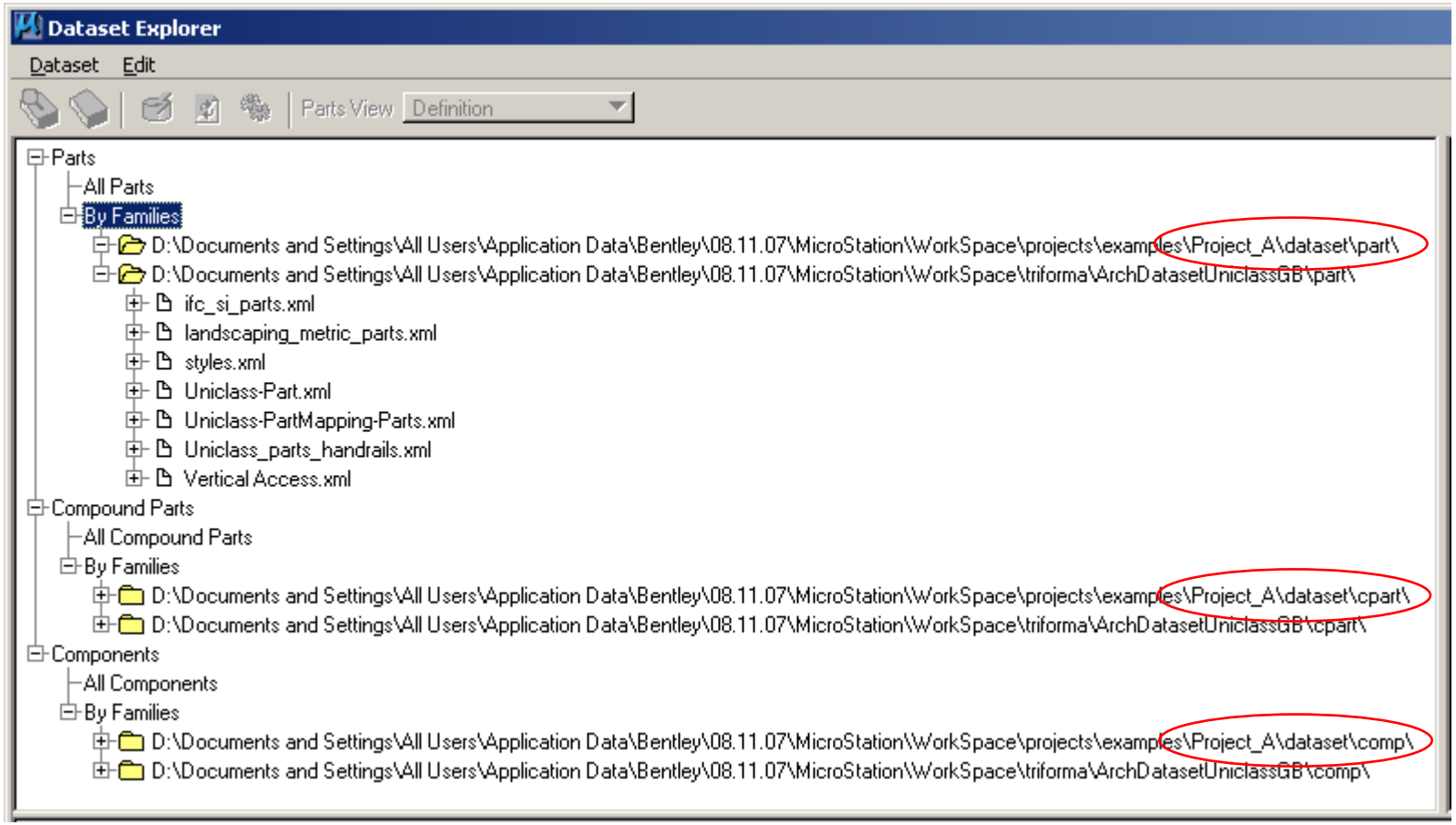
Project: Families & Parts



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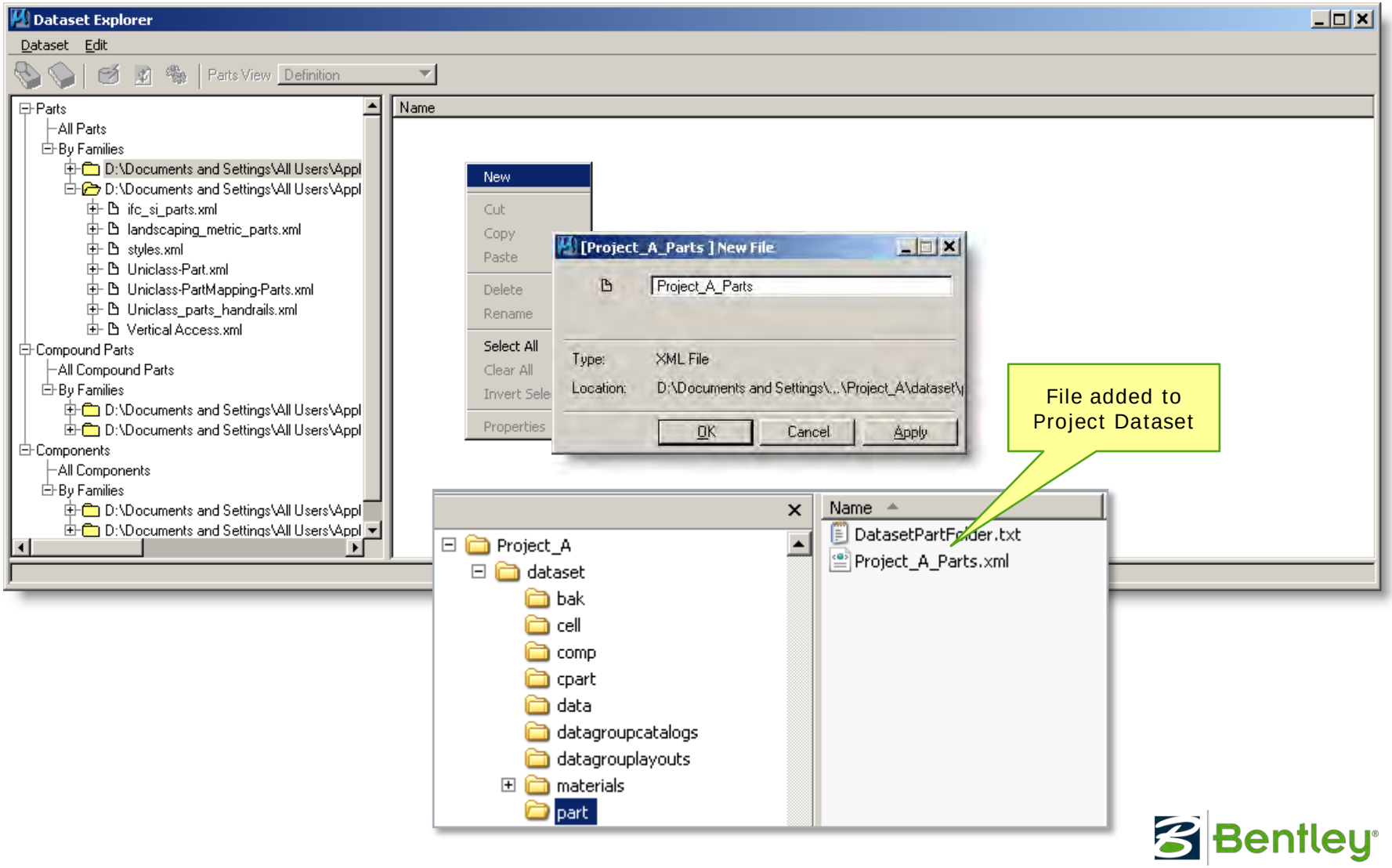
Add Part File



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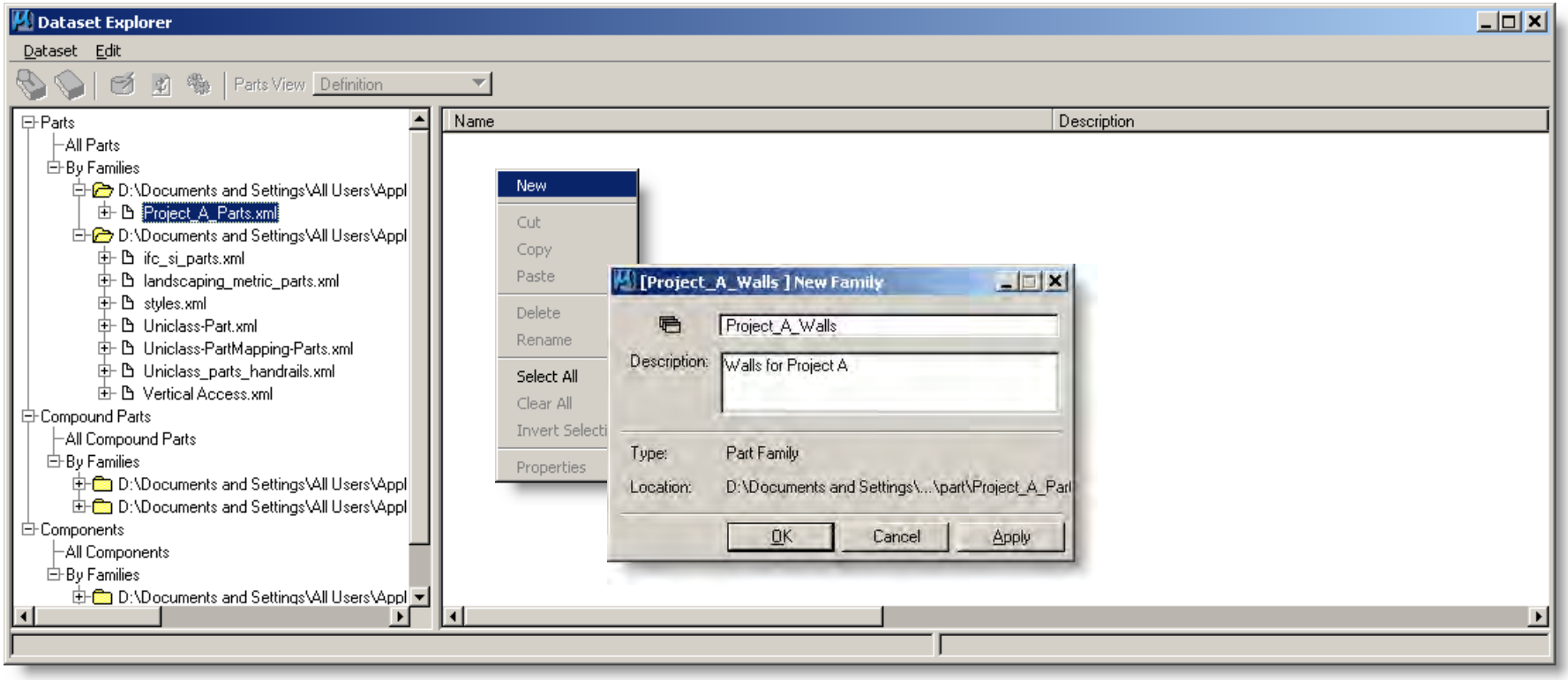
Add Part Family



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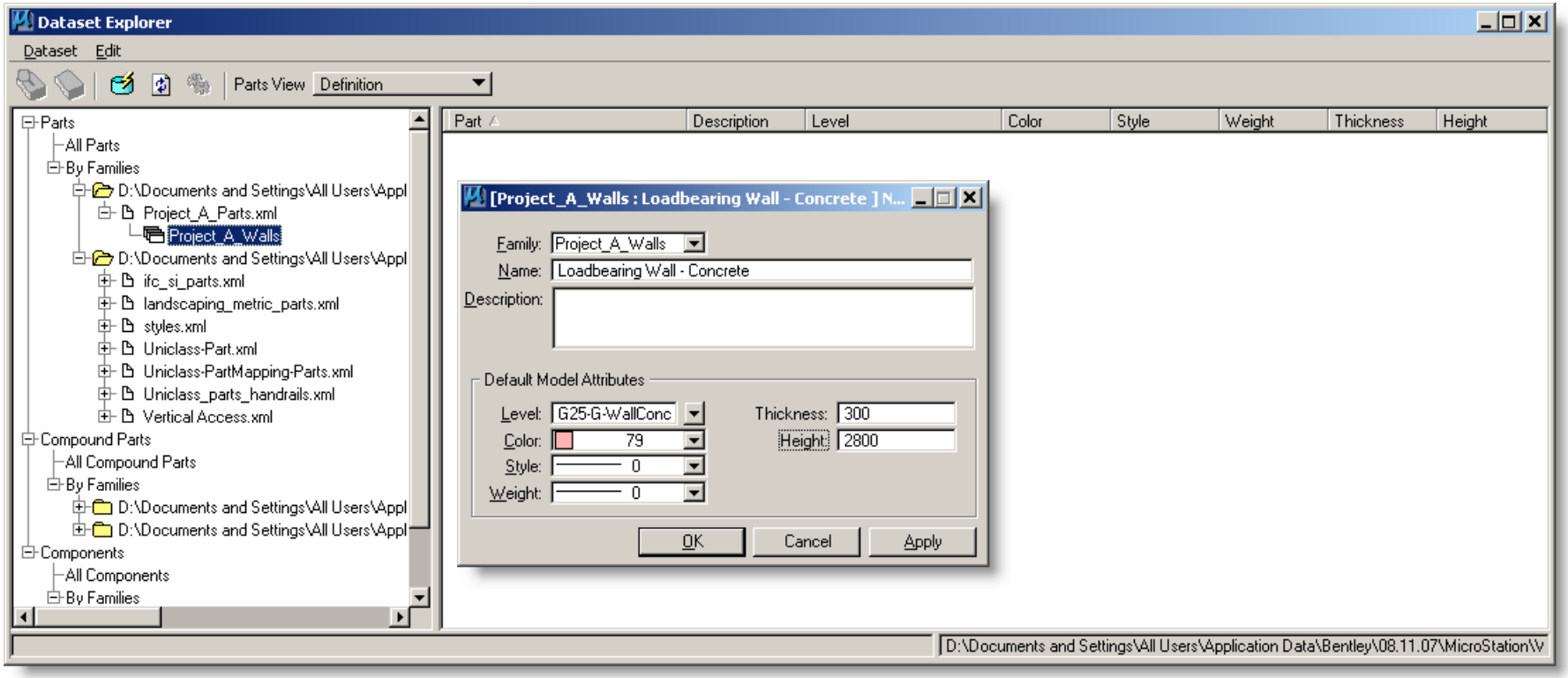
Add Part



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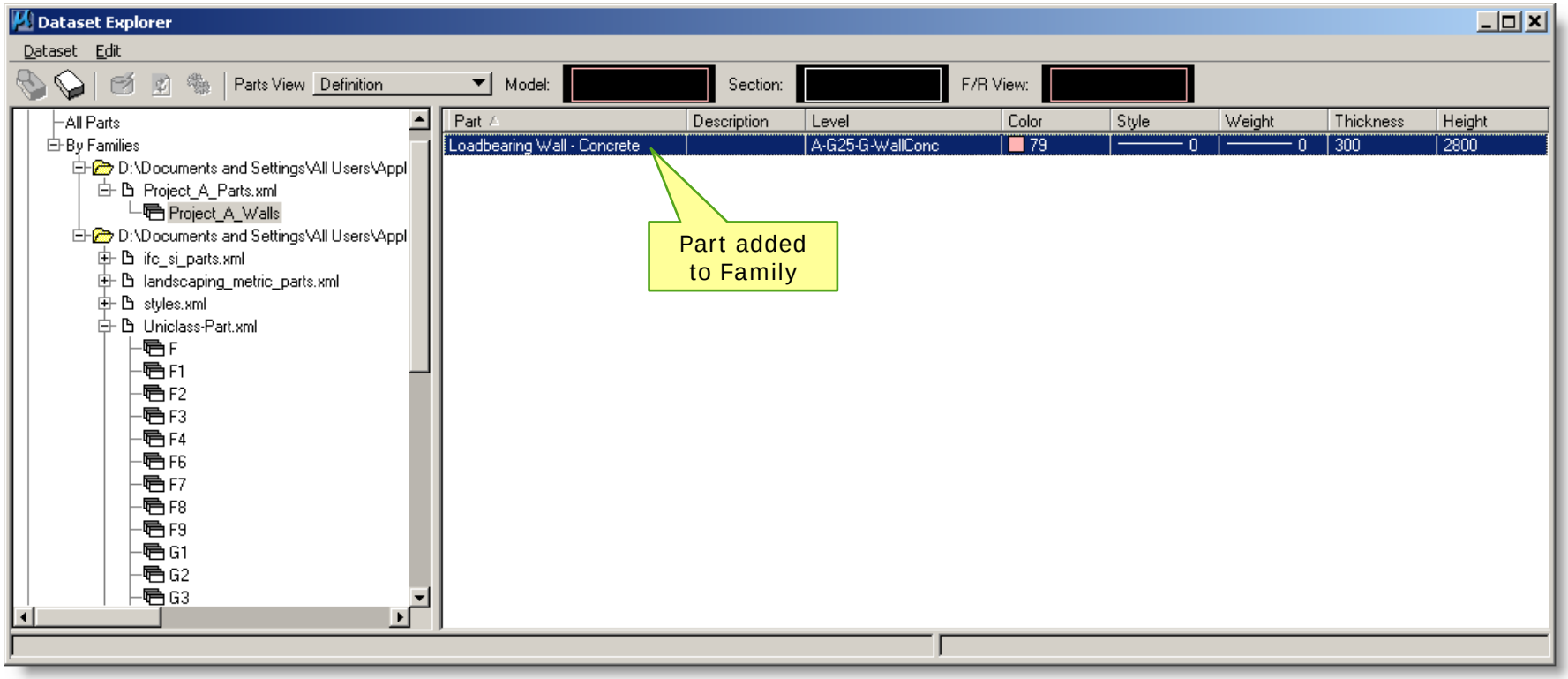
Add Part



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Add Part

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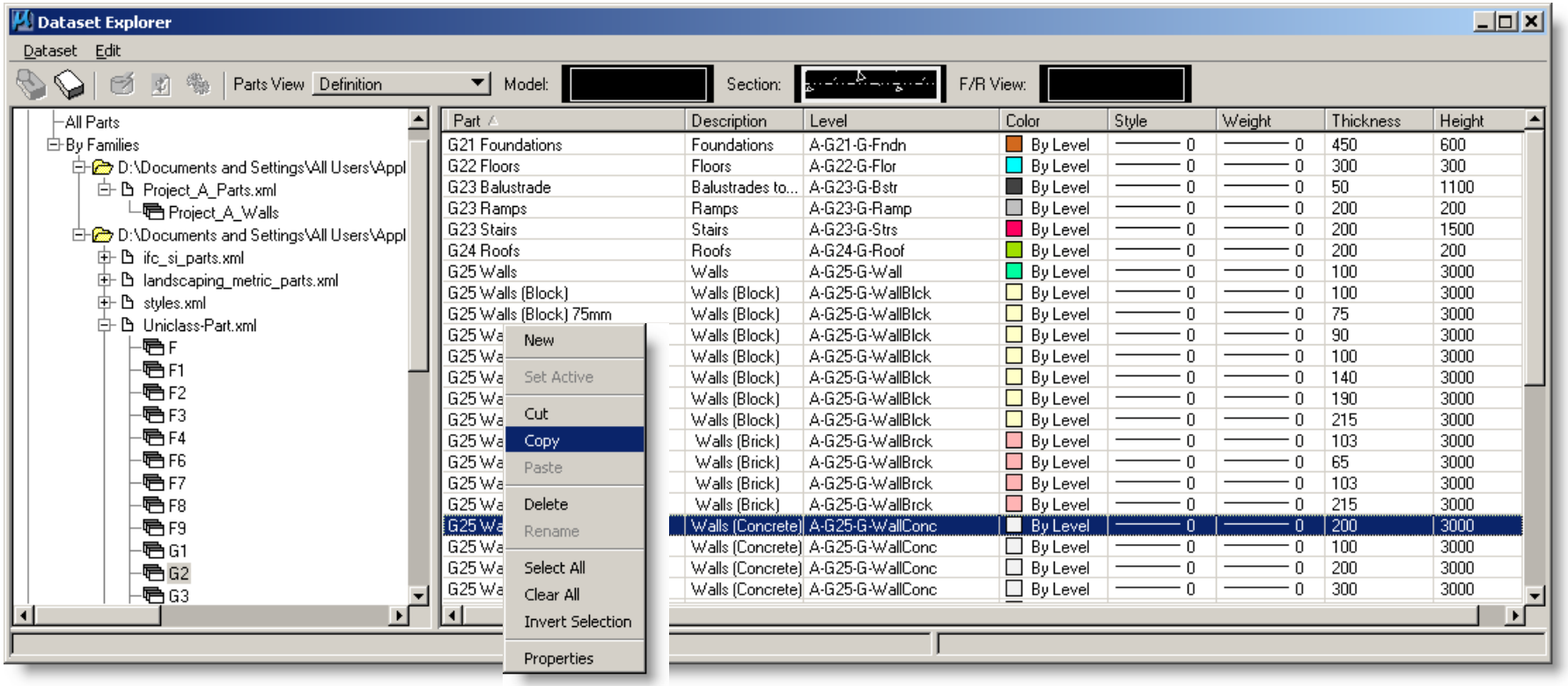
Copy Part



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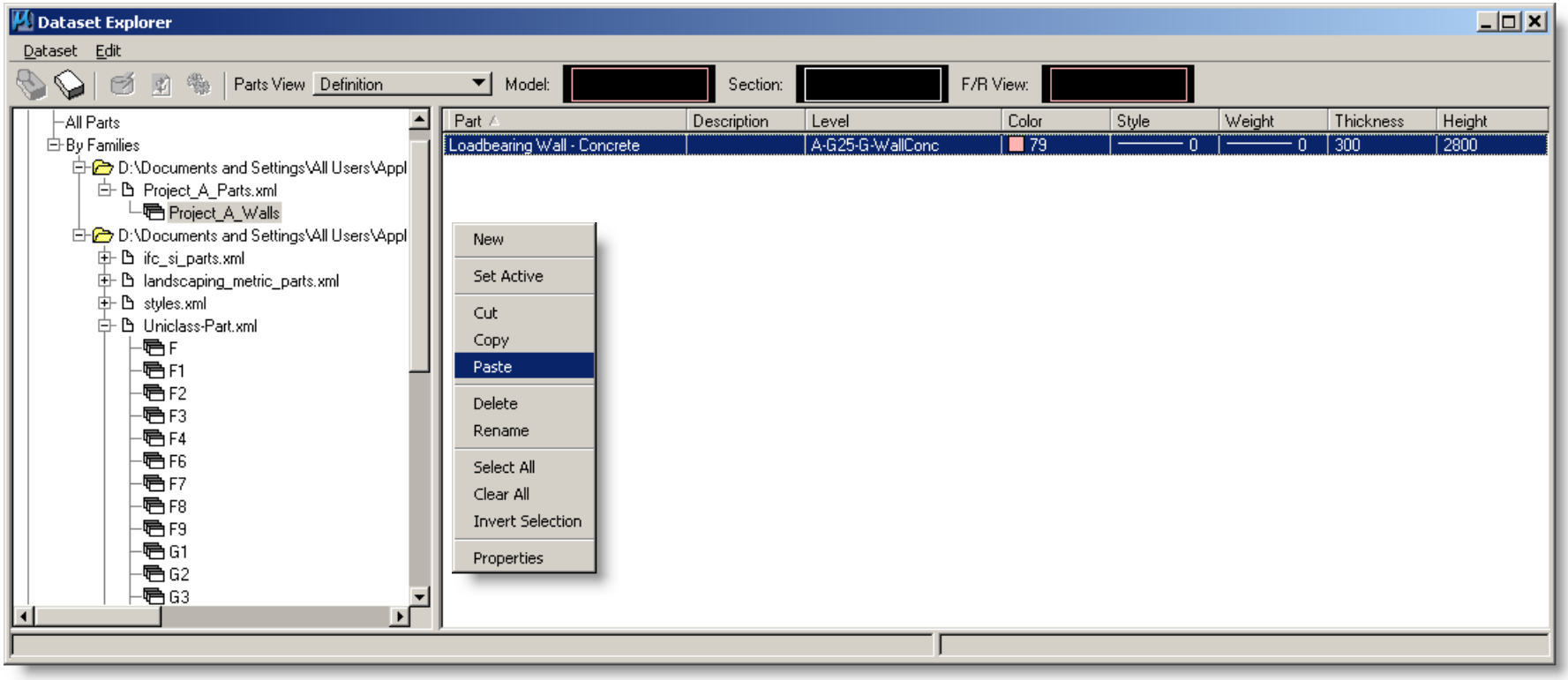
Paste Part



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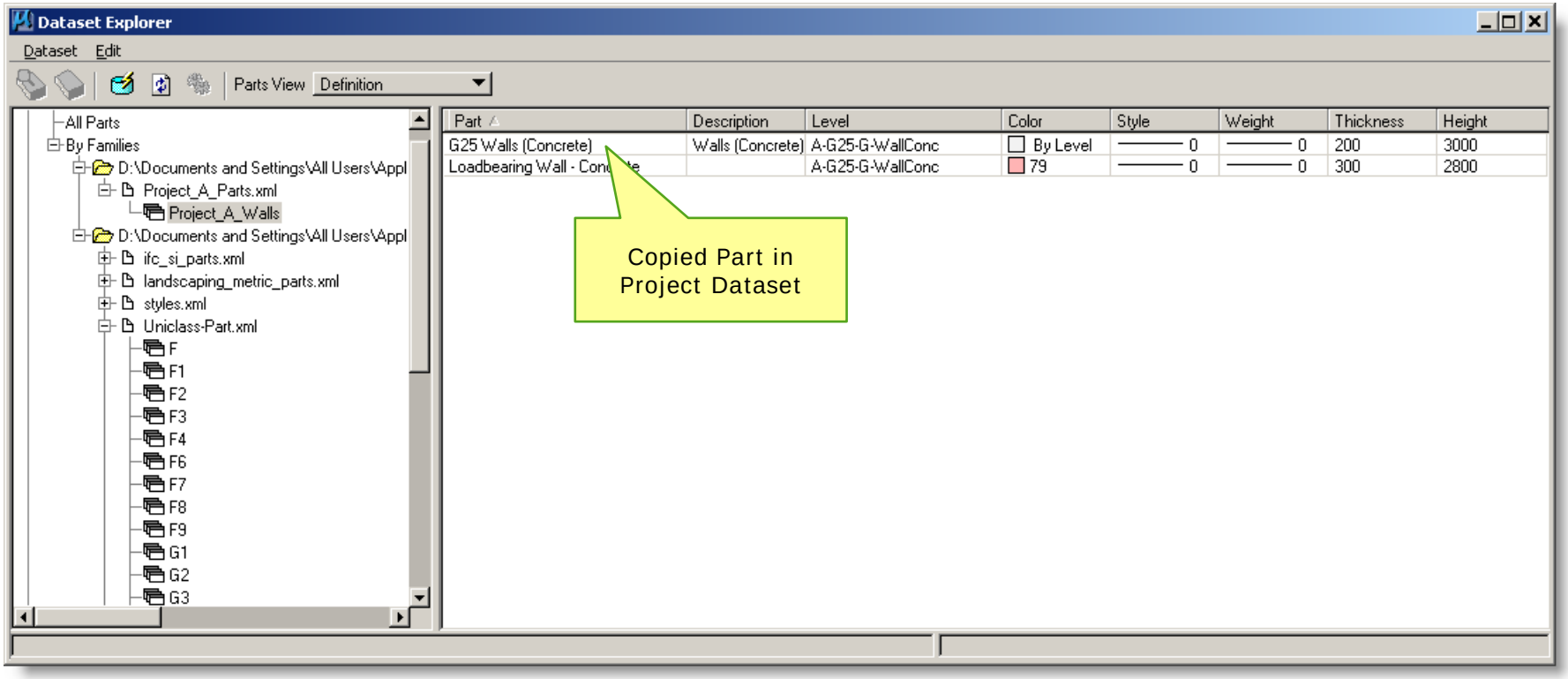
Paste Part



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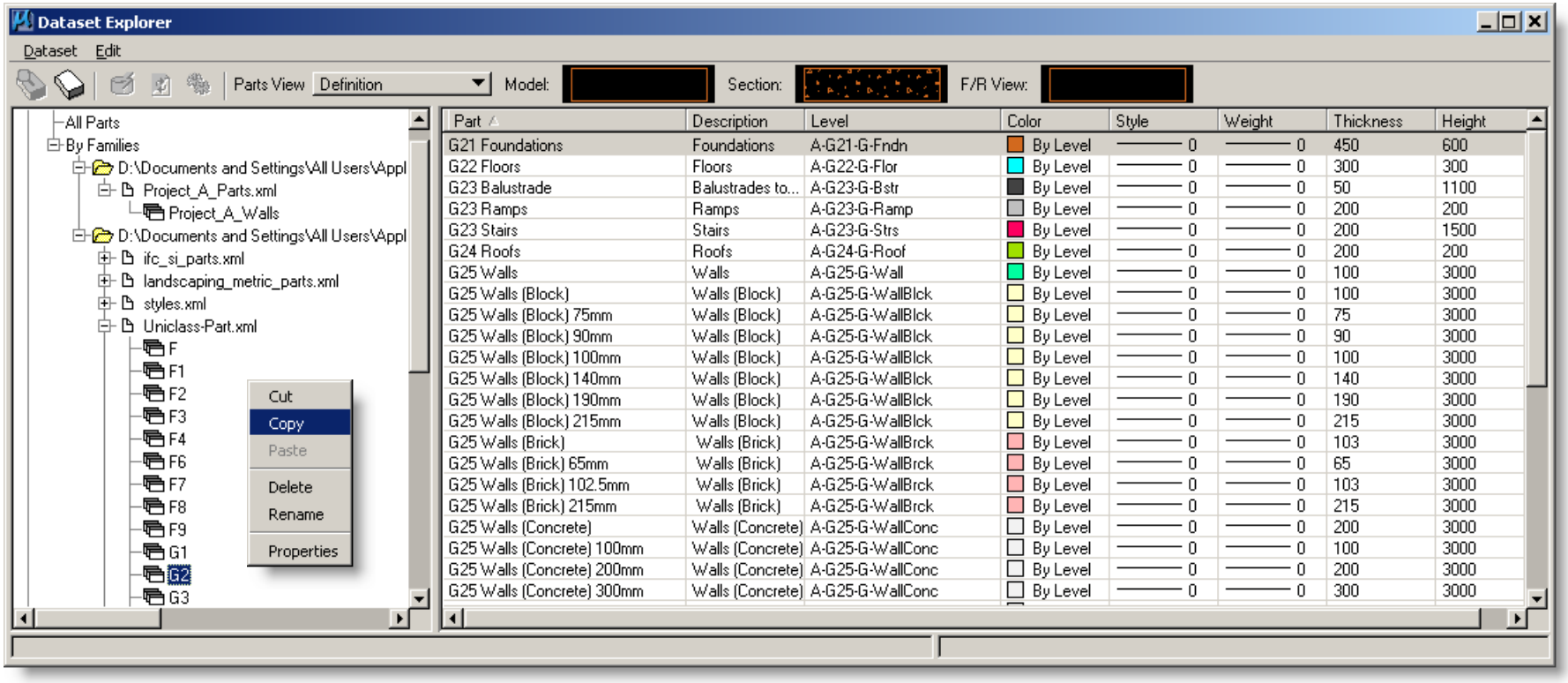

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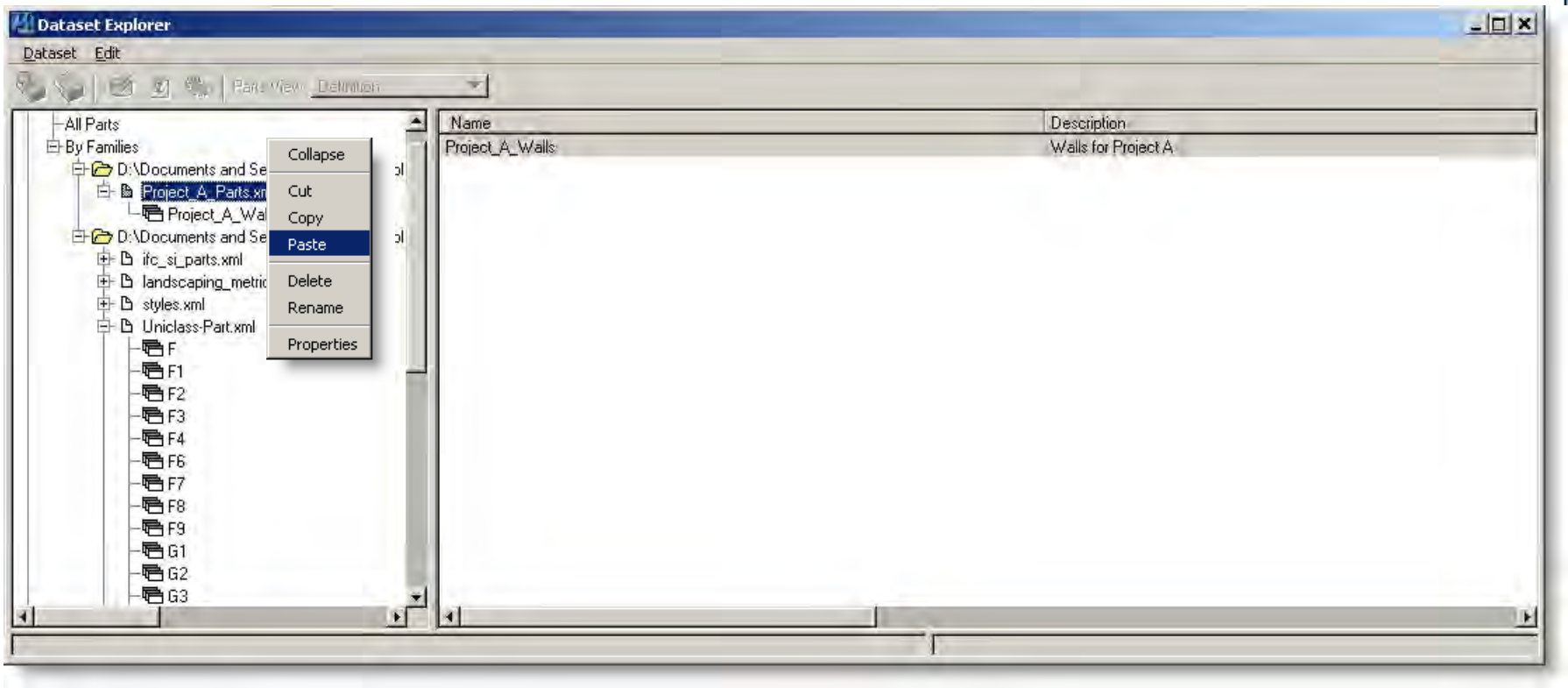

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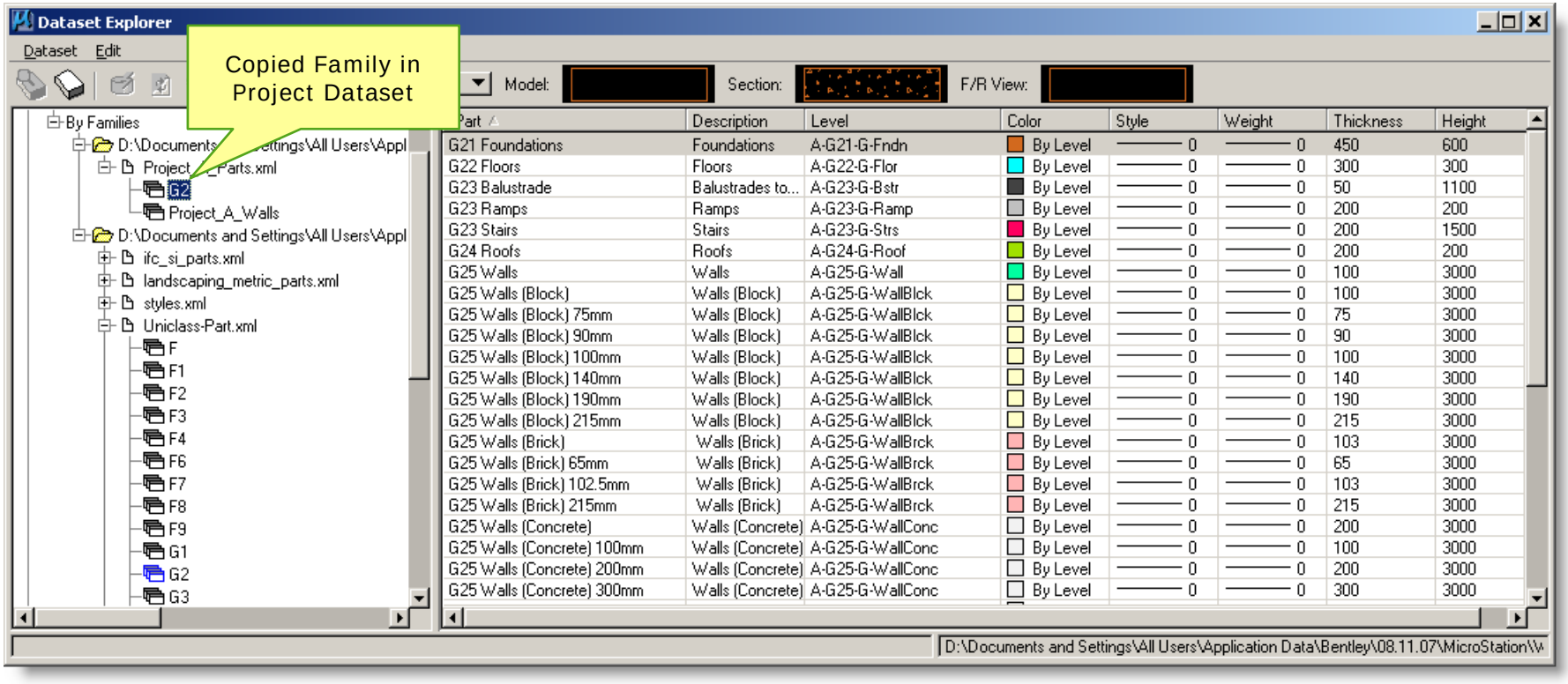
Paste Family



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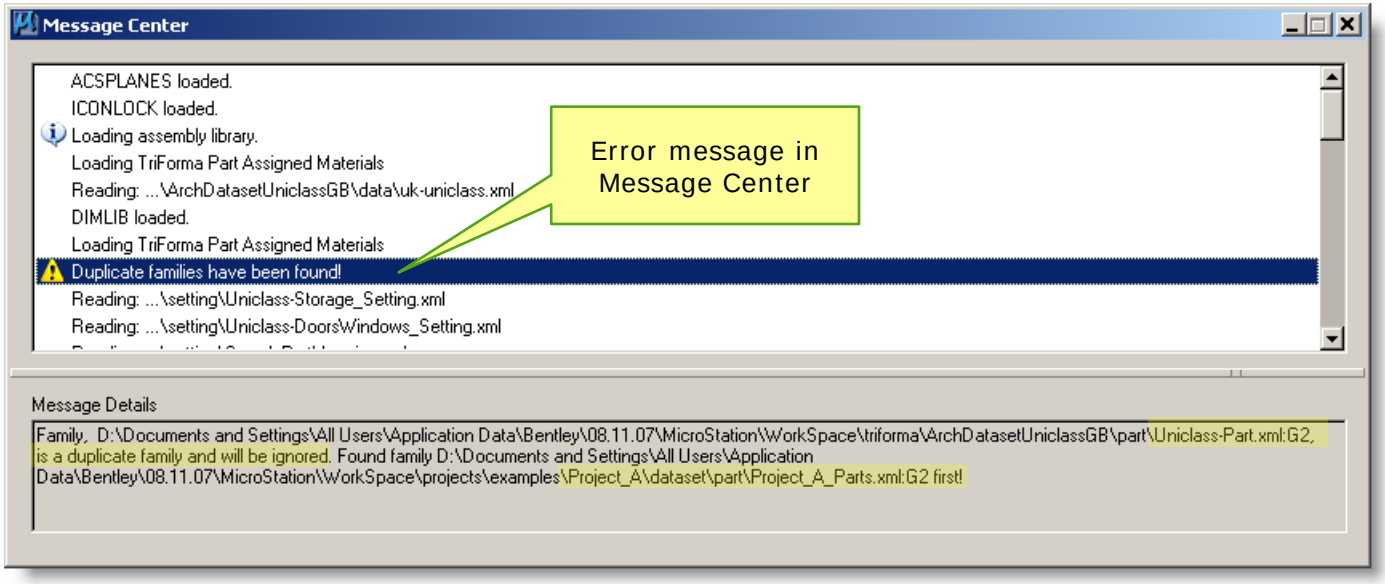

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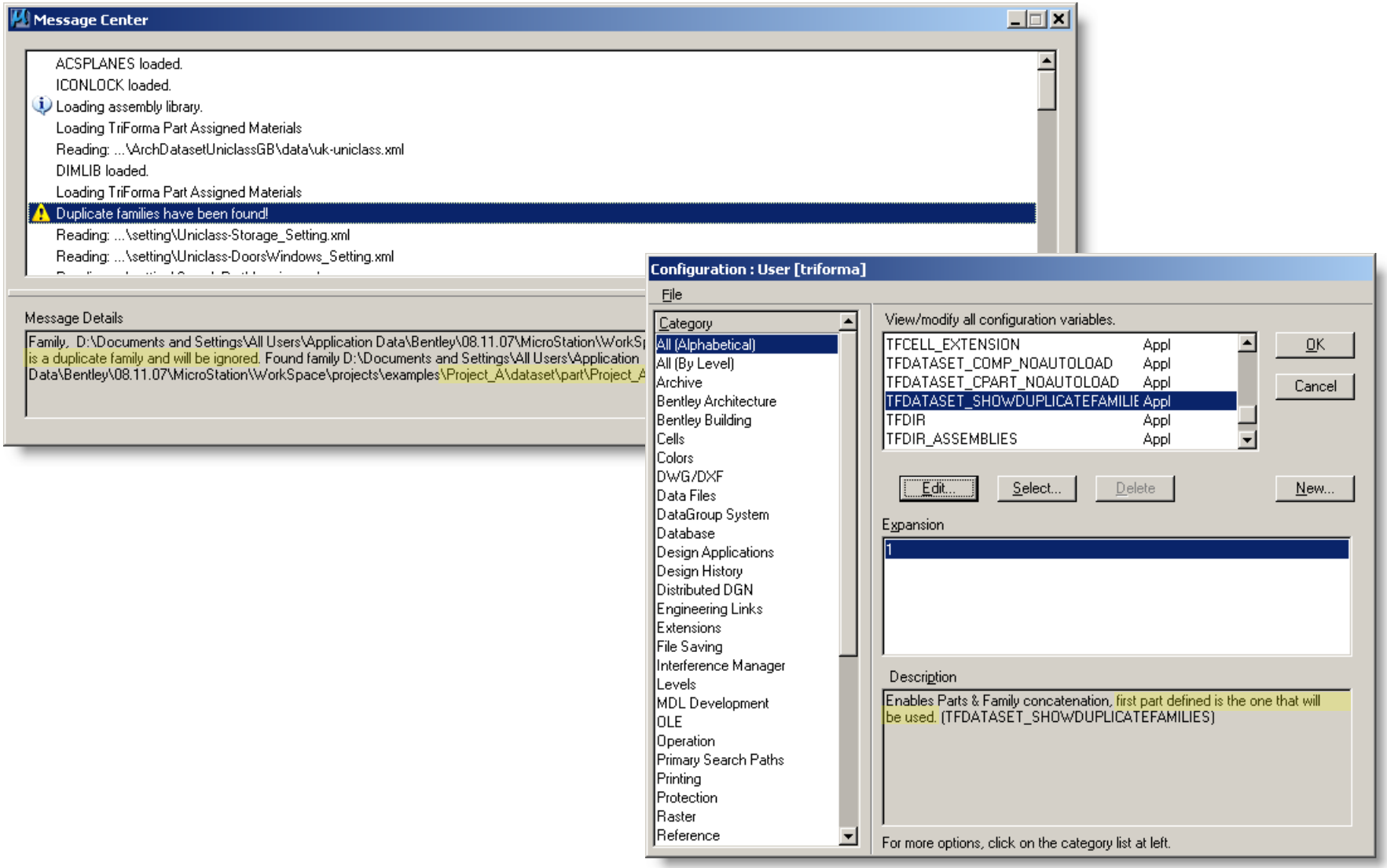

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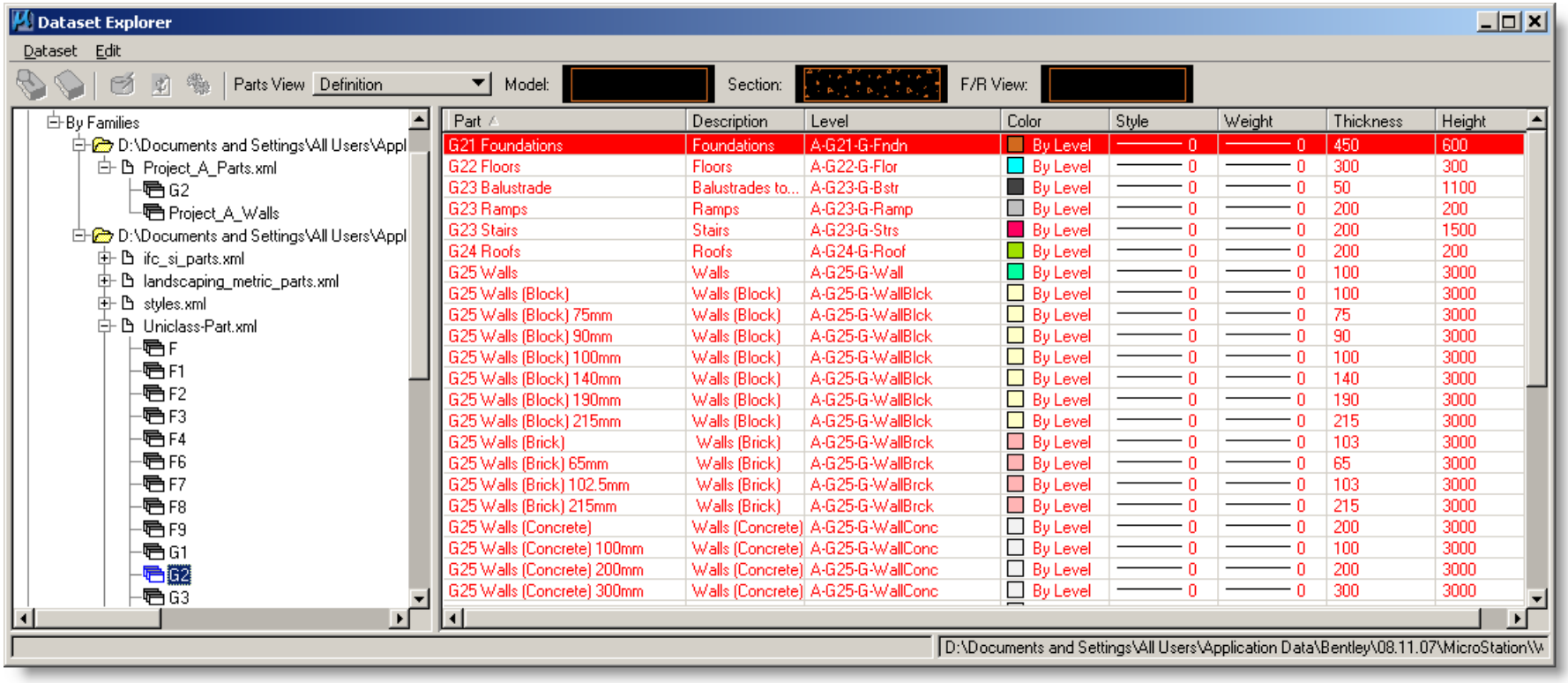

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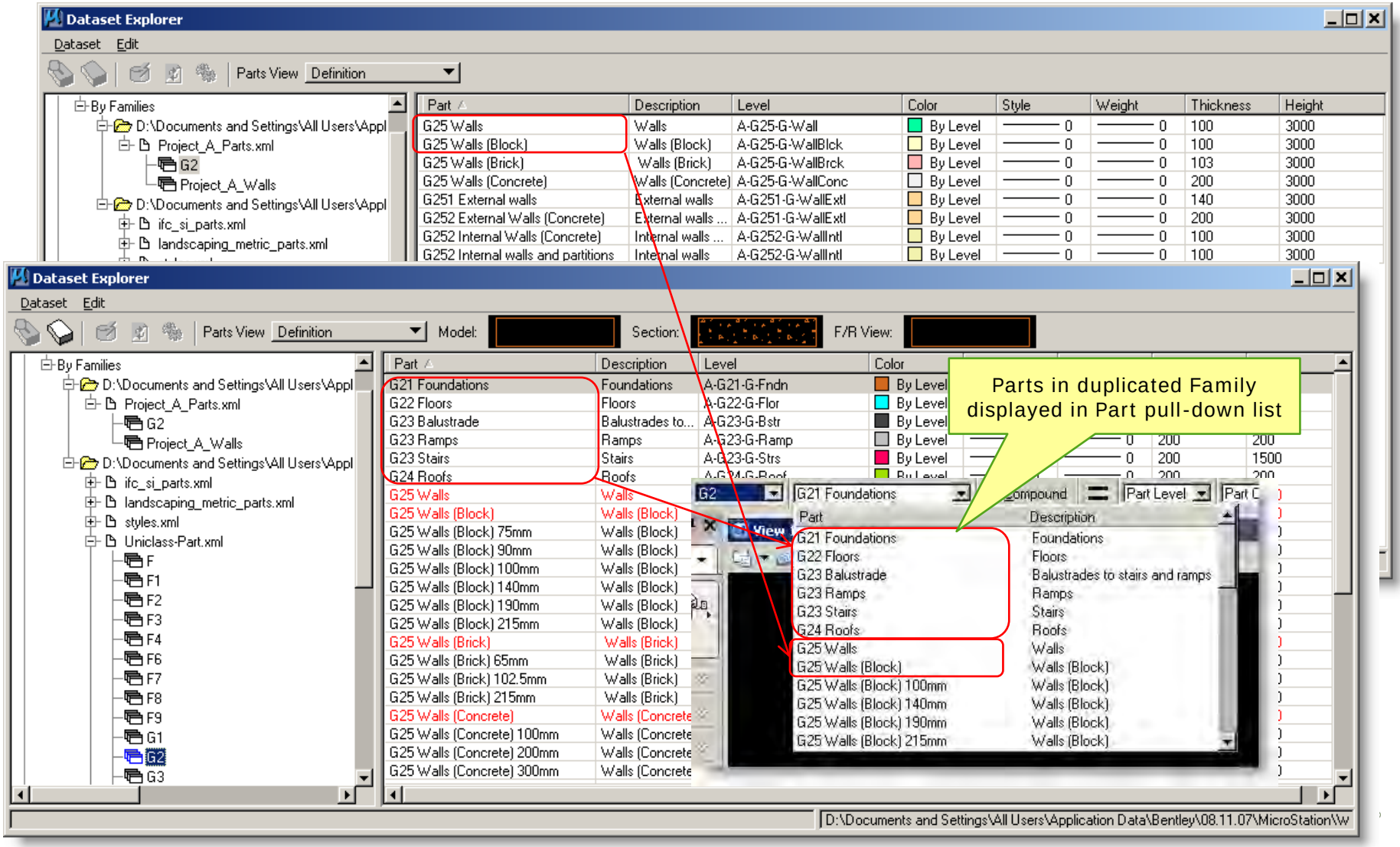

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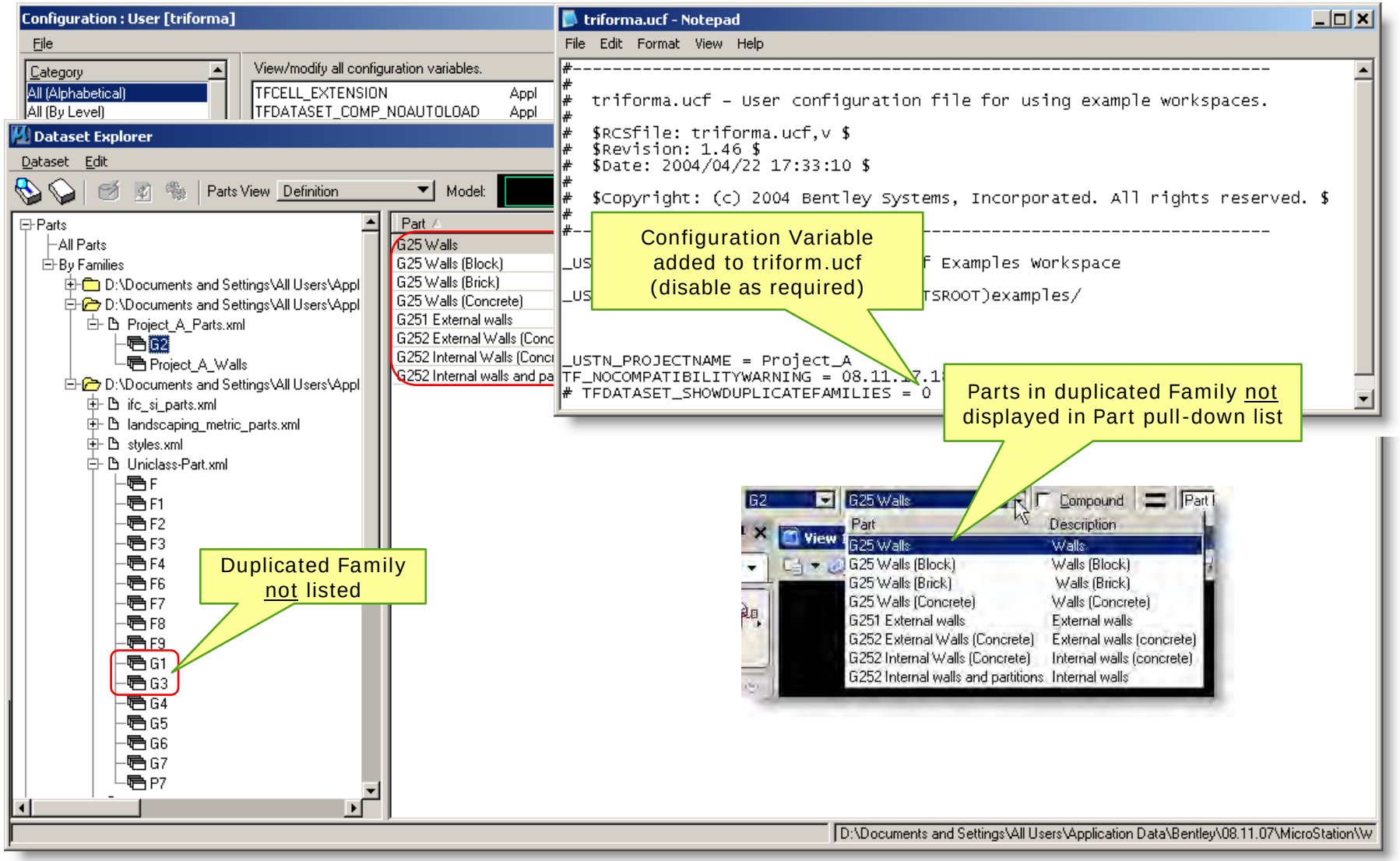

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Add Catalog Items

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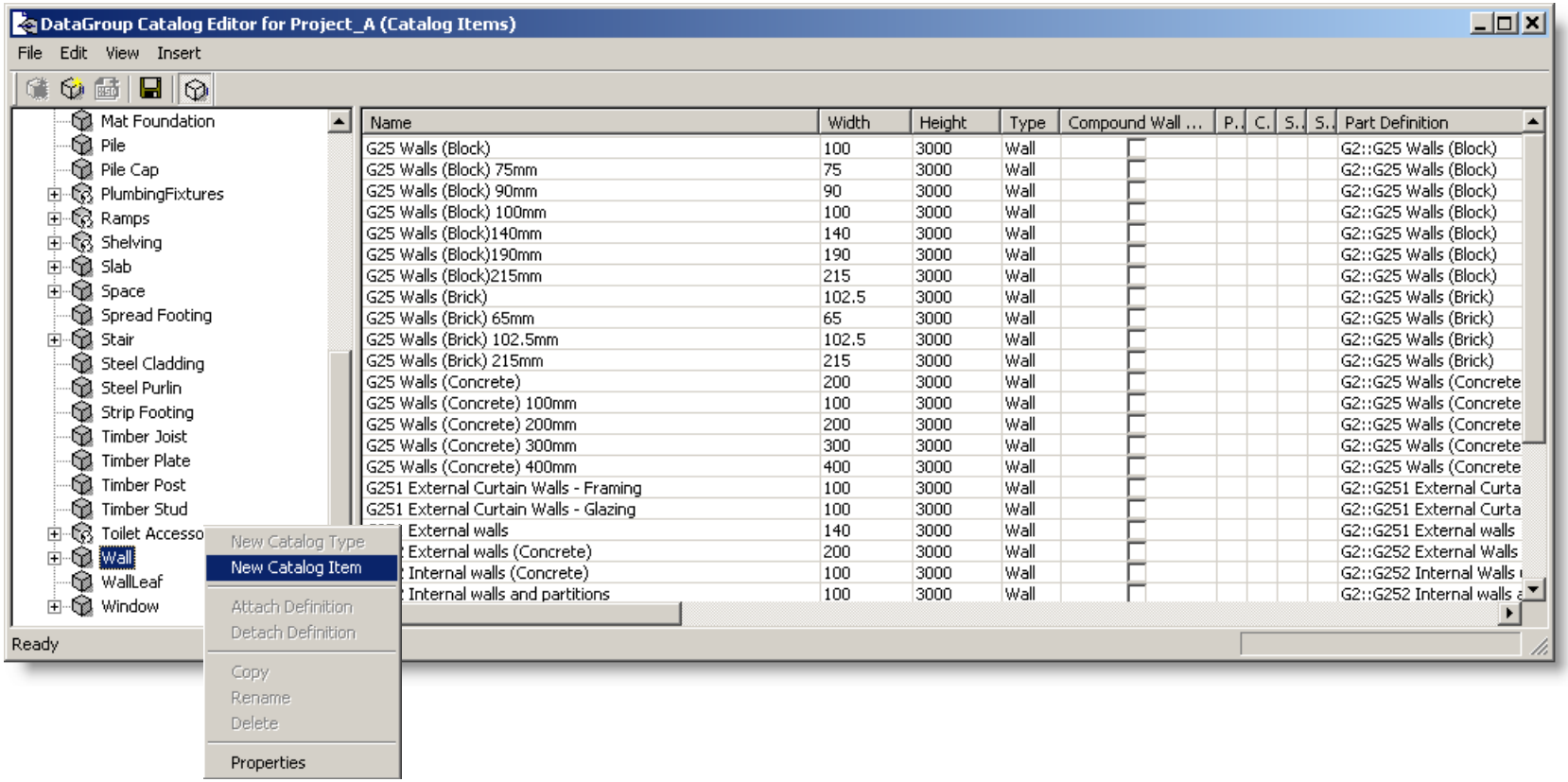
Add Catalog Item



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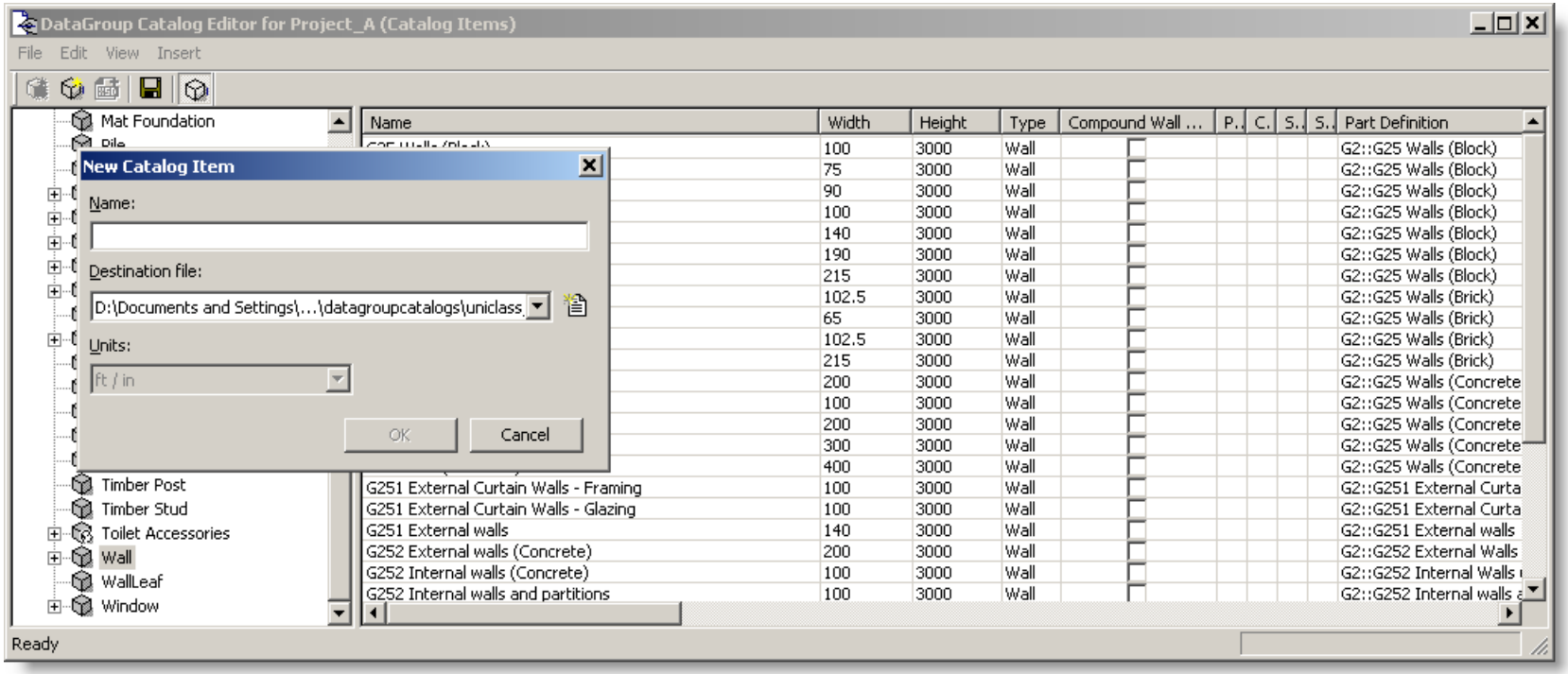
Add Catalog Item



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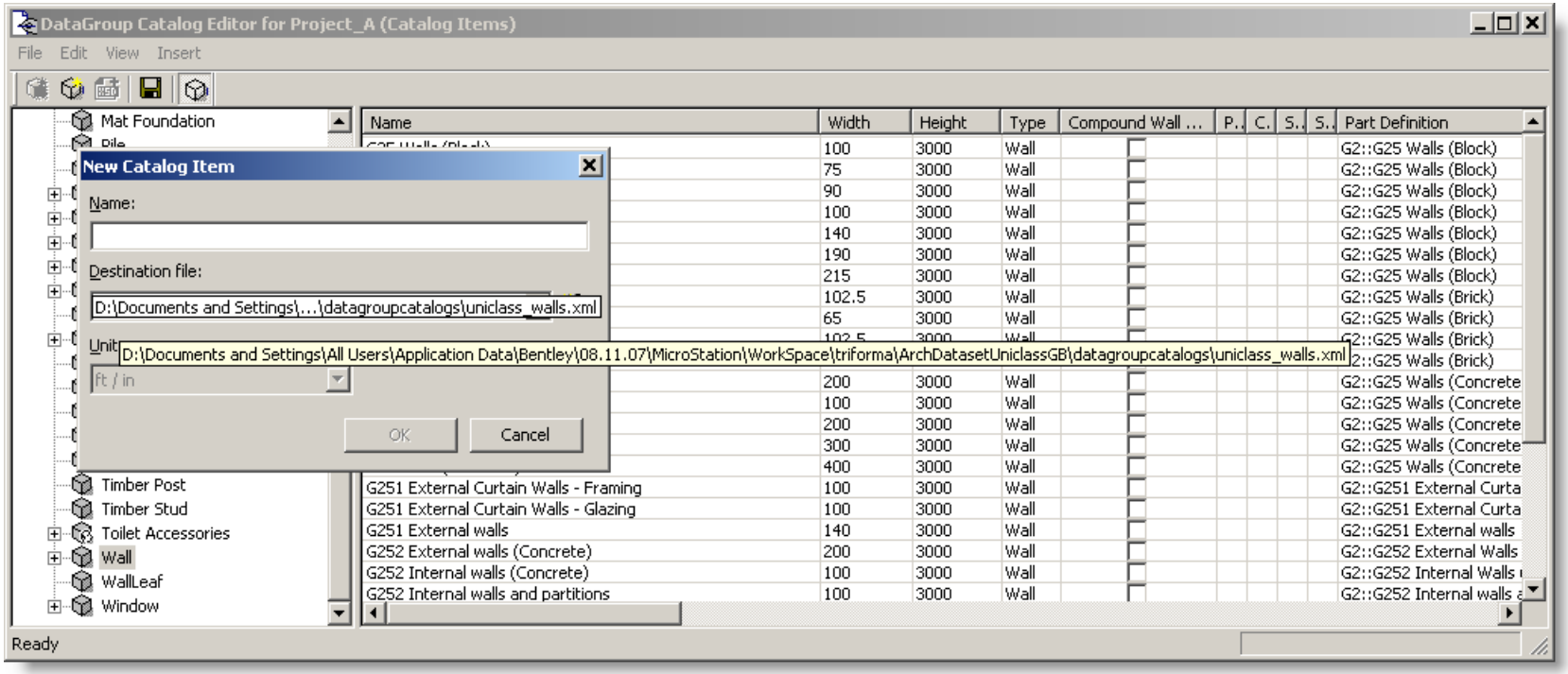
Add Catalog Item



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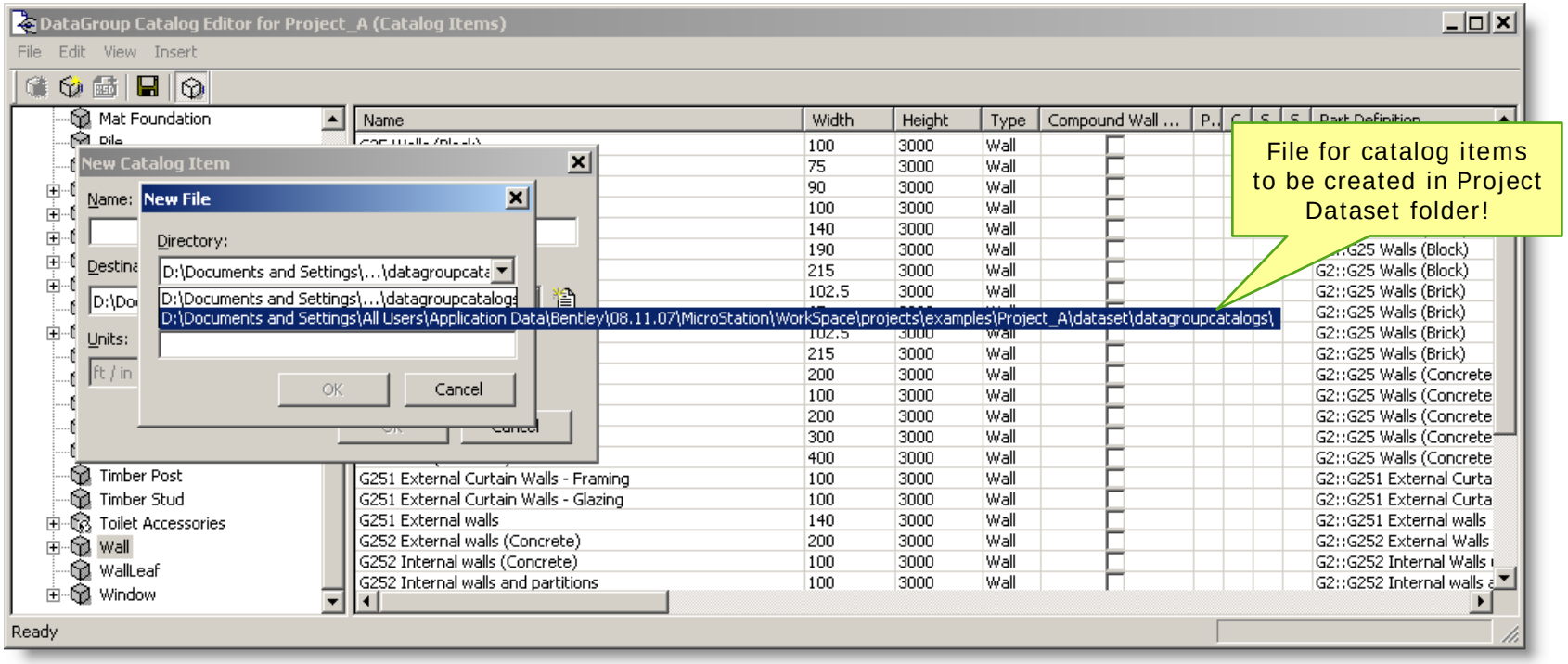
Add Catalog Item



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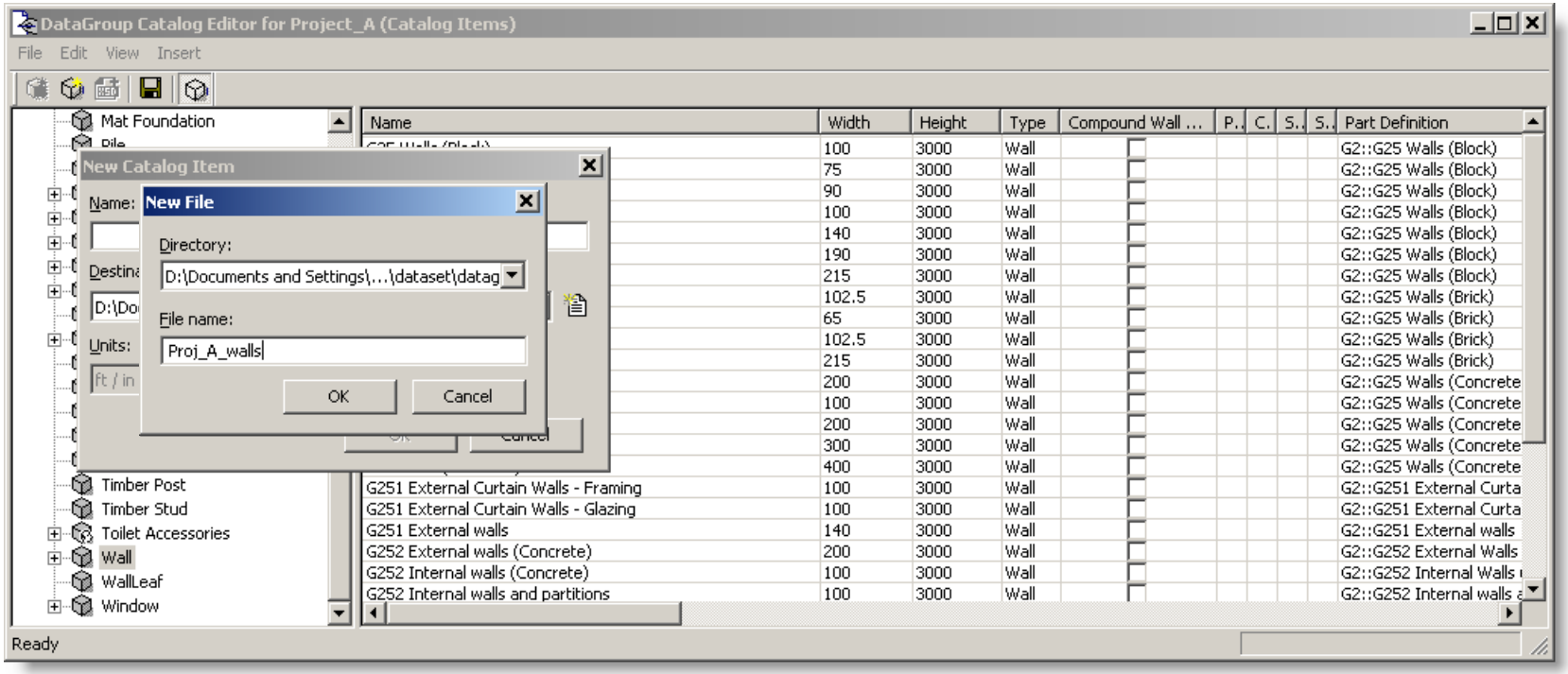
Add Catalog Item



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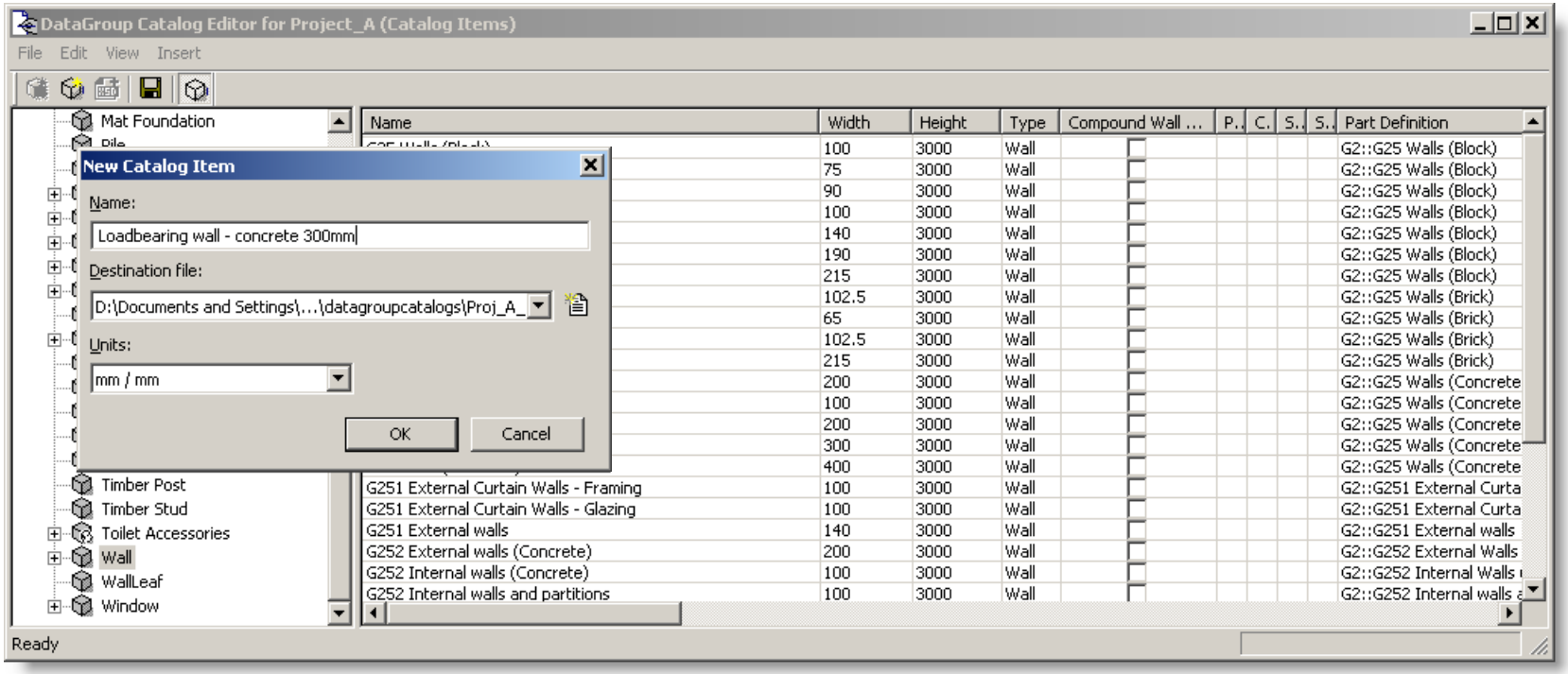
Add Catalog Item



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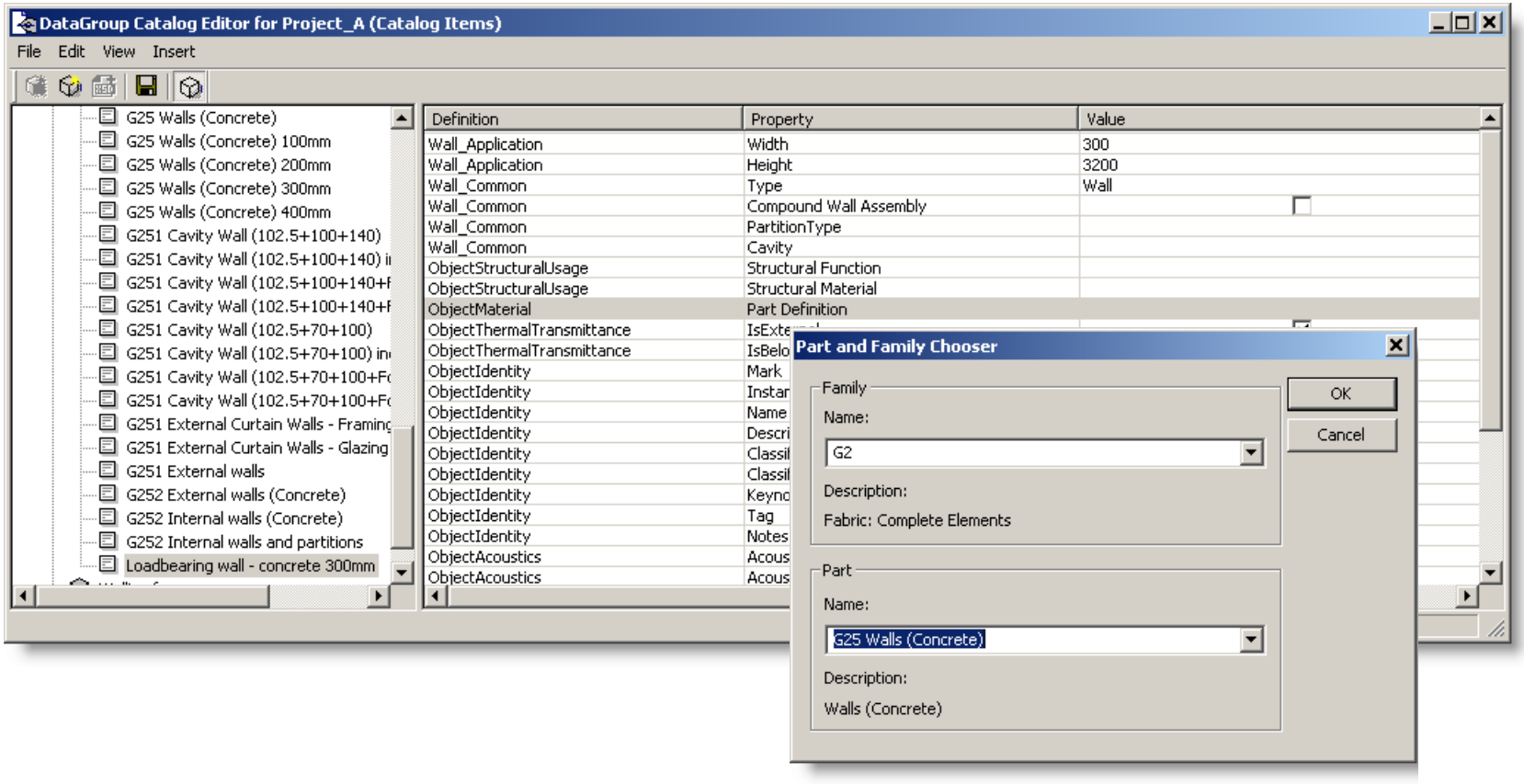
Add Catalog Item



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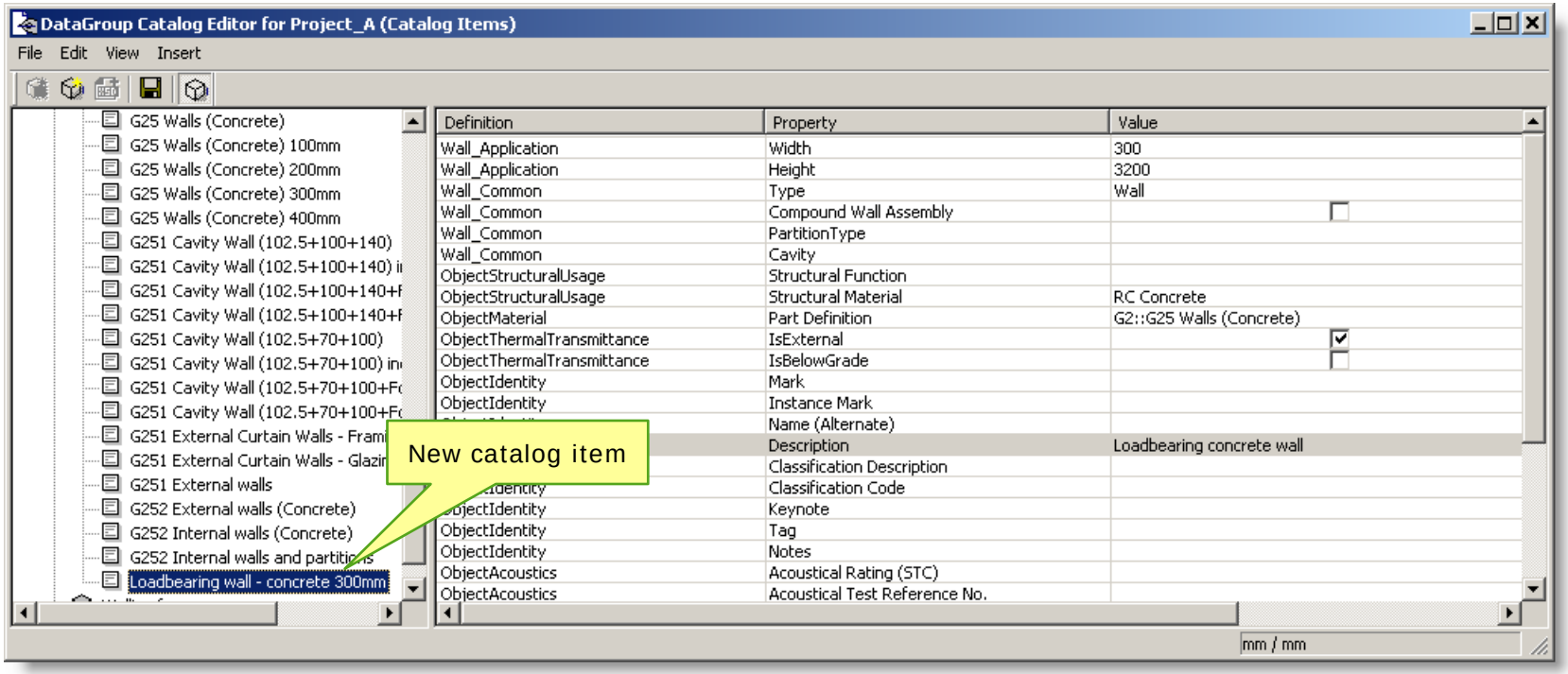
Add Catalog Item



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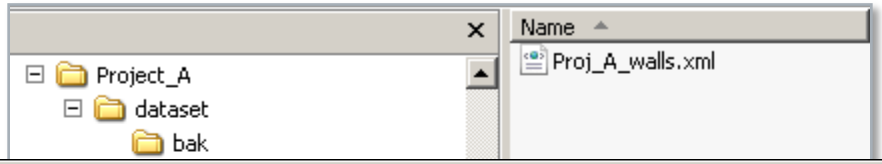
Add Catalog Item



Proj_A_walls.xml - Notepad

File Edit Format View Help

```
<?xml version="1.0" encoding="Windows-1252"?>
<DataGroupSystem>
        <Version major="1" minor="0"/>
        <Units master="mm" sub="mm"/>
        <CatalogItems>
                <CatalogItem type="Wall" name="Loadbearing wall - concrete 300mm">
                        <Defaults>
                                <Property definition="Wall_Application" name="Wall_Application/@Width" value="300"/>
                                <Property definition="Wall_Application" name="Wall_Application/@Height" value="3200"/>
                                <Property definition="ObjectThermalTransmittance" name="ObjectThermalTransmittance/@IsExternal" value="true"/>
                                <Property definition="ObjectMaterial" name="ObjectMaterial/@PartDefinition" value="G2::G25 Walls (Concrete)"/>
                                <Property definition="ObjectIdentity" name="ObjectIdentity/@Description" value="Loadbearing concrete wall"/>
                                <Property definition="ObjectStructuralUsage" name="ObjectStructuralUsage/@StructuralMaterial" value="RC Concrete"/>
                        </Defaults>
                </CatalogItem>
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</DataGroupSystem>
```
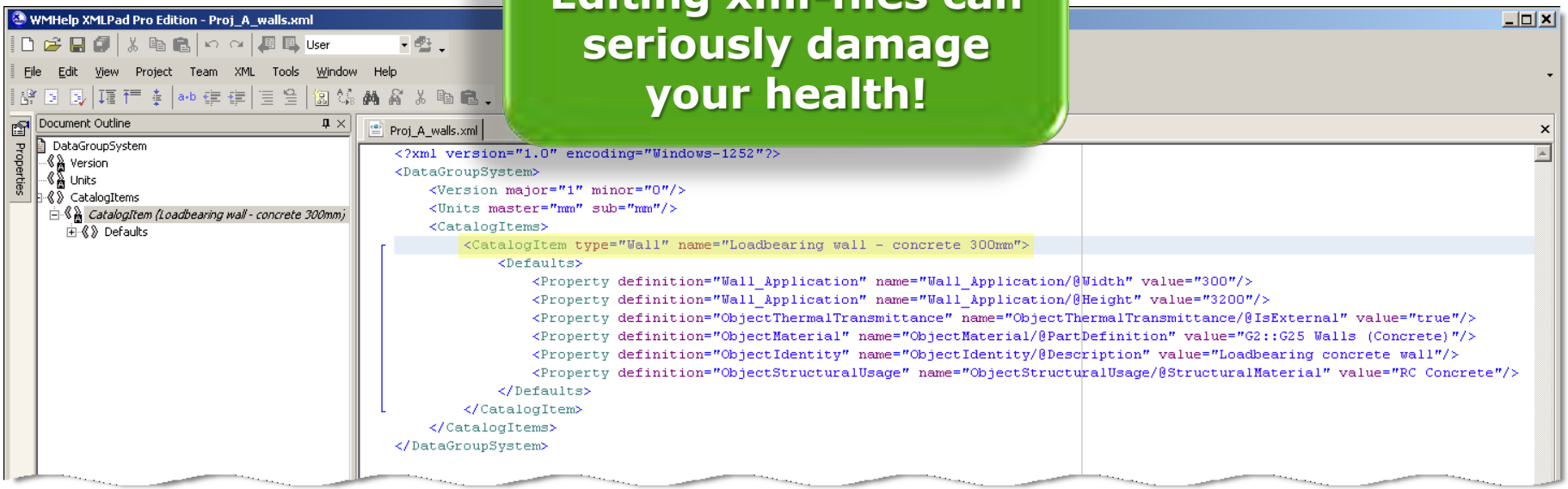

Warning:
Editing xml-files can seriously damage your health!



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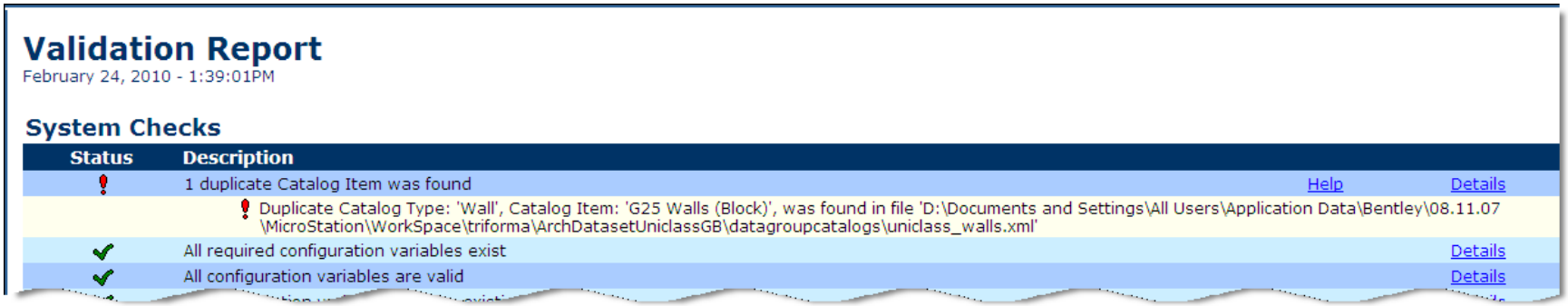
Add Catalog Item

- can’t create duplicate DataGroup items

A catalog item with the name you entered already exists. Please enter a unique name.

- if created ‘manually’, then error message



Validation Report

February 24, 2010 - 1:39:01PM

System Checks

Status	Description		
!	1 duplicate Catalog Item was found	Help	Details
!	Duplicate Catalog Type: 'Wall', Catalog Item: 'G25 Walls (Block)', was found in file 'D:\Documents and Settings\All Users\Application Data\Bentley\08.11.07 \MicroStation\WorkSpace\triforma\ArchDatasetUniclassGB\datagroupcatalogs\uniclass_walls.xml'		
✓	All required configuration variables exist		Details
✓	All configuration variables are valid		Details

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Hiding Catalog Items

- enclose the entire item with <!-- and -- >

uniclass_walls.xml*

```
<?xml version="1.0" encoding="Windows-1252"?>
<DataGroupSystem>
    <Version major="1" minor="0"/>
    <Units master="mm" sub="mm"/>
    <CatalogItems>
        <!-- <CatalogItem type="Wall" name="G25 Walls (Block)">
            <Defaults>
                <Property definition="ObjectMaterial" name="ObjectMaterial/@PartDefinition" value="G2::G25 Walls (Block)"/>
                <Property definition="ObjectThermalTransmittance" name="ObjectThermalTransmittance/@IsExternal" value="false"/>
                <Property definition="Wall_Application" name="Wall_Application/@Width" value="100"/>
                <Property definition="Wall_Application" name="Wall_Application/@Height" value="3000"/>
                <Property definition="Wall_Common" name="Wall_Common/@IsCompound" value="false"/>
            </Defaults>
        </CatalogItem> -->
        <CatalogItem type="Wall" name="G25 Walls (Block) 75mm">
            <Defaults>
                <Property definition="Obj                                    value="G2::G25 Walls (Block)"/>
                <Property definition="Obj                                    ttance/@IsExternal" value="false"/>
```

Warning:
Editing xml-files can seriously damage your health!

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Company Datasets

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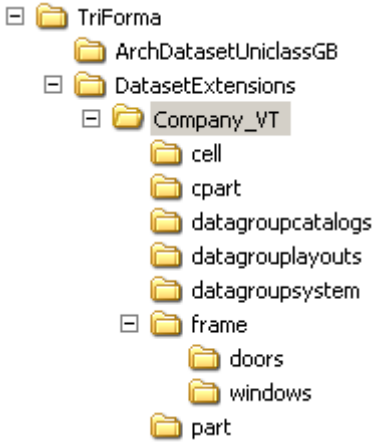
Company Datasets

- add folder 'DatasetExtensions'
- add folder and subfolders
- create configuration variable to folder in PCF-file
- append search paths to subfolders



Configuration Variables in PCF-file

```
#------------------------------------------------------------------
# Append search paths for company-level dataset portions
#------------------------------------------------------------------
COMP_DATASET                = $(TF_DATASETS)DatasetExtensions/Company_VT/

TFDIR_PART                  < $(COMP_DATASET)part/
TFDIR_CELL                  < $(COMP_DATASET)cell/
TFDIR_COMP                  < $(COMP_DATASET)comp/
TFDIR_CPART                 < $(COMP_DATASET)cpart/
TFDIR_FRAME                 < $(COMP_DATASET)frame/
ATFDIR_Window               < $(COMP_DATASET)frame/windows/
ATFDIR_Door                 < $(COMP_DATASET)frame/doors/
MS_MATERIAL                 < $(COMP_DATASET)materials/
MS_PATTERN                  < $(COMP_DATASET)materials/pattern/
MS_BUMP                     < $(COMP_DATASET)materials/bump/
DG_CATALOGS_PATH            > $(COMP_DATASET)datagroupcatalogs/
DG_SCHEDULE_LAYOUT_PATH     < $(COMP_DATASET)datagrouplayouts/
DG_PATH                     < $(COMP_DATASET)datagroupsystem/
```

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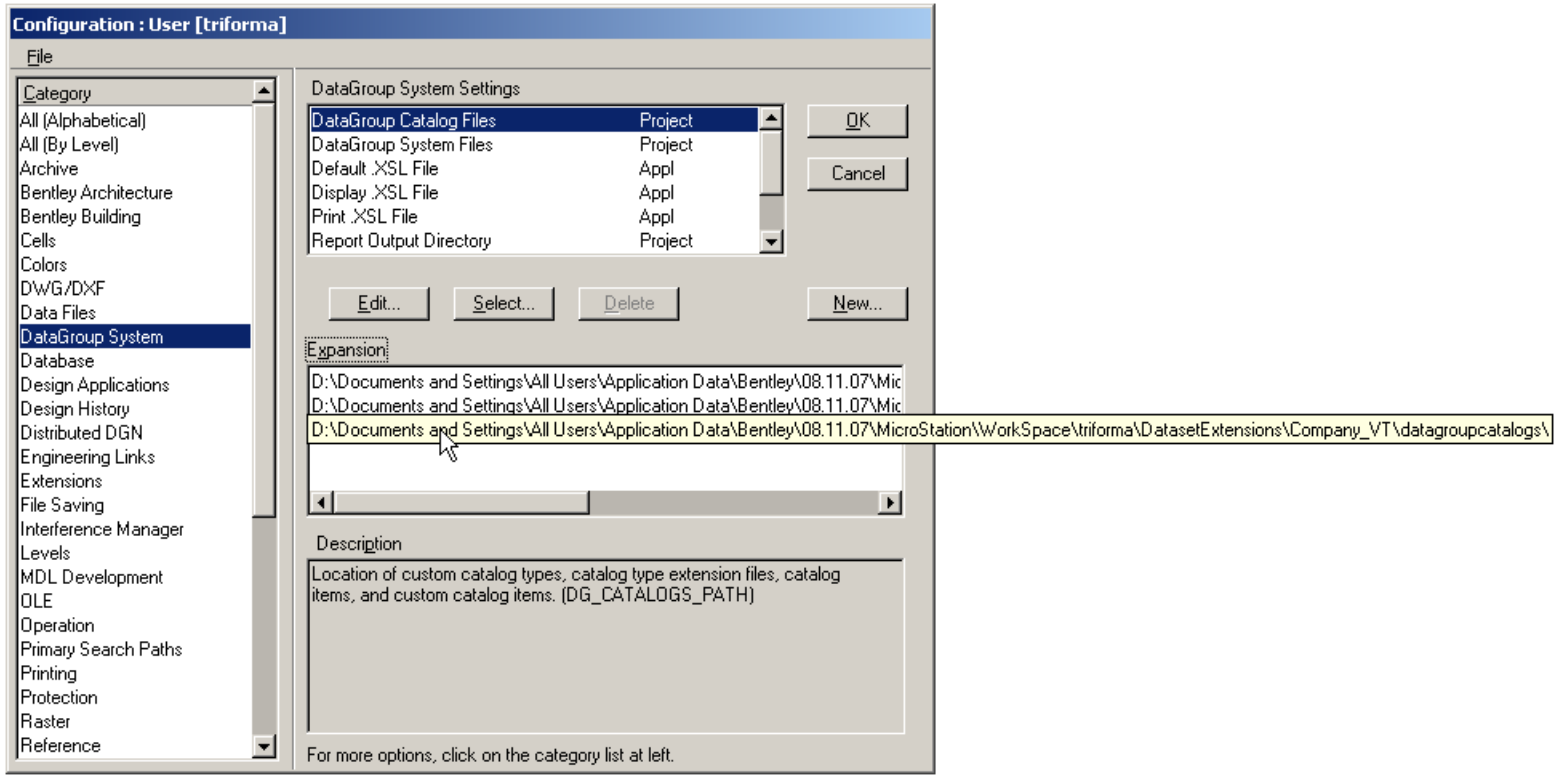
Configuration Variables



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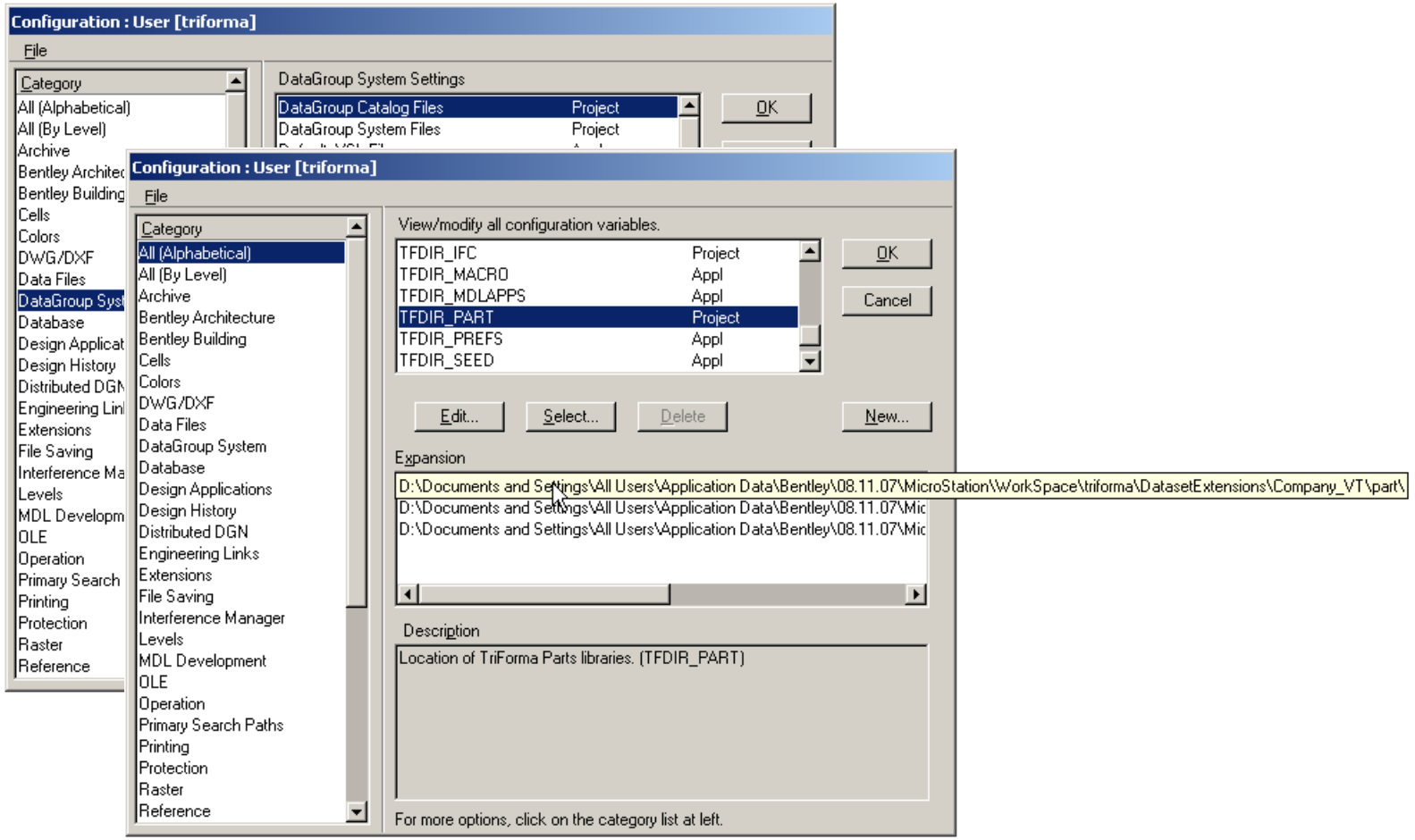
Configuration Variables



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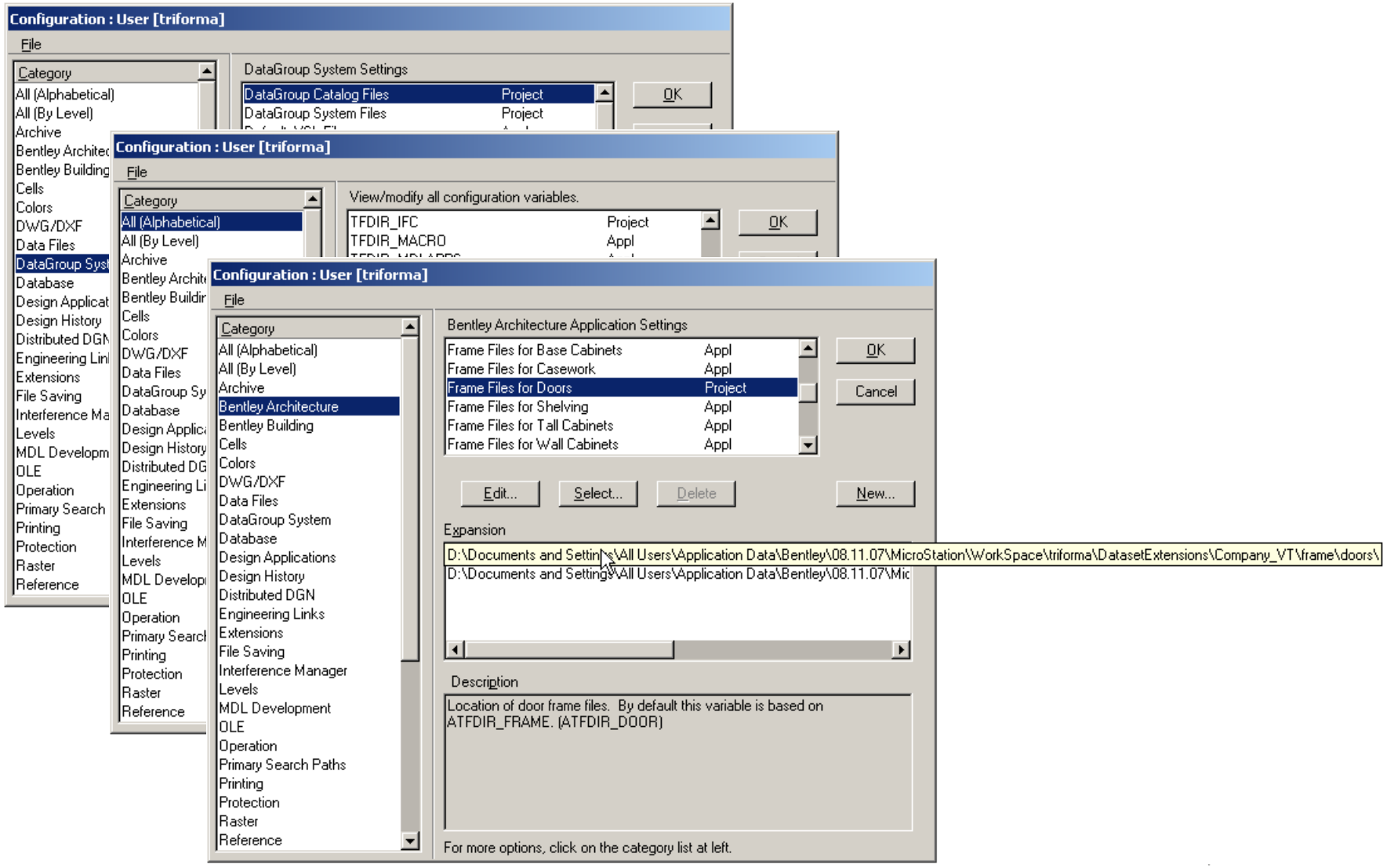
Configuration Variables



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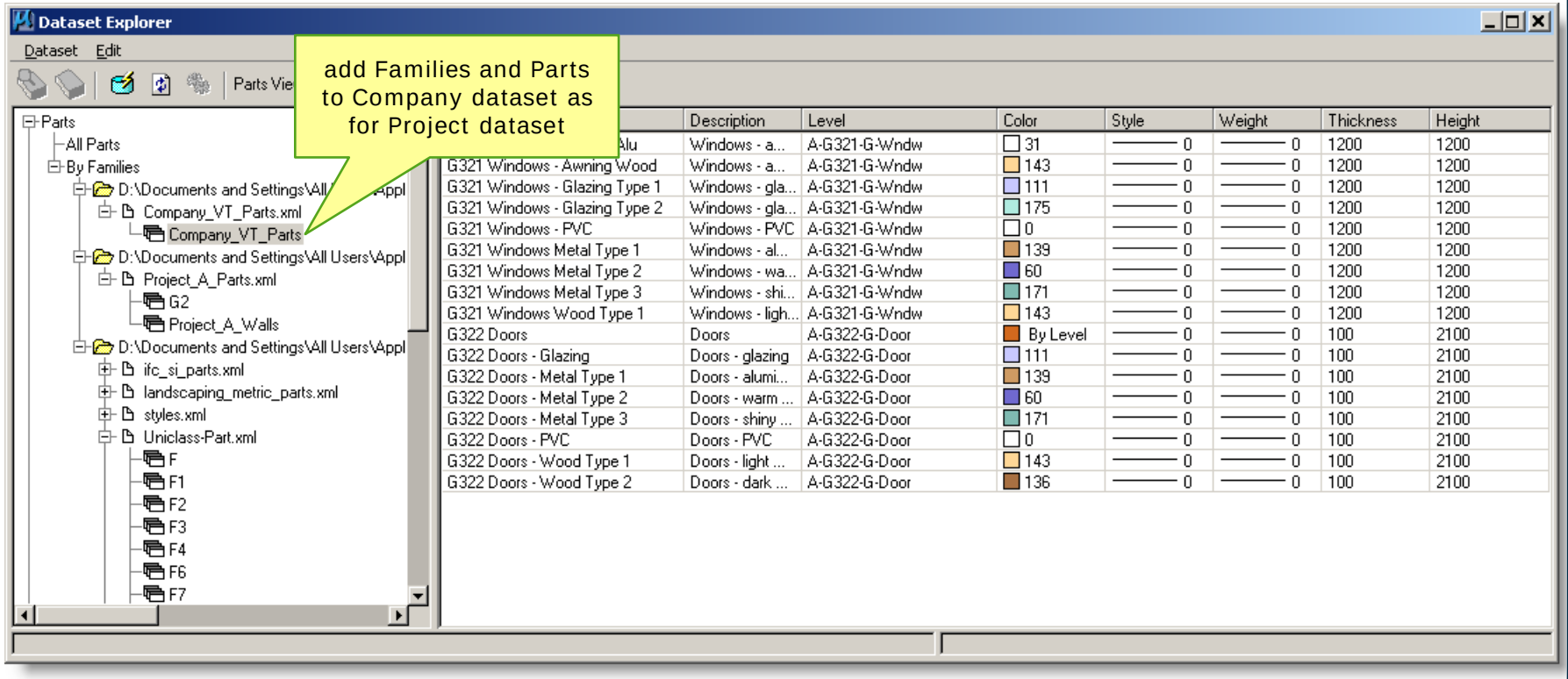
Company Family & Parts



	Description	Level	Color	Style	Weight	Thickness	Height
Alu	Windows - a...	A-G321-G-Wndw	31	0	0	1200	1200
G321 Windows - Awning Wood	Windows - a...	A-G321-G-Wndw	143	0	0	1200	1200
G321 Windows - Glazing Type 1	Windows - gla...	A-G321-G-Wndw	111	0	0	1200	1200
G321 Windows - Glazing Type 2	Windows - gla...	A-G321-G-Wndw	175	0	0	1200	1200
G321 Windows - PVC	Windows - PVC	A-G321-G-Wndw	0	0	0	1200	1200
G321 Windows Metal Type 1	Windows - al...	A-G321-G-Wndw	139	0	0	1200	1200
G321 Windows Metal Type 2	Windows - wa...	A-G321-G-Wndw	60	0	0	1200	1200
G321 Windows Metal Type 3	Windows - shi...	A-G321-G-Wndw	171	0	0	1200	1200
G321 Windows Wood Type 1	Windows - ligh...	A-G321-G-Wndw	143	0	0	1200	1200
G322 Doors	Doors	A-G322-G-Door	By Level	0	0	100	2100
G322 Doors - Glazing	Doors - glazing	A-G322-G-Door	111	0	0	100	2100
G322 Doors - Metal Type 1	Doors - alumi...	A-G322-G-Door	139	0	0	100	2100
G322 Doors - Metal Type 2	Doors - warm ...	A-G322-G-Door	60	0	0	100	2100
G322 Doors - Metal Type 3	Doors - shiny ...	A-G322-G-Door	171	0	0	100	2100
G322 Doors - PVC	Doors - PVC	A-G322-G-Door	0	0	0	100	2100
G322 Doors - Wood Type 1	Doors - light ...	A-G322-G-Door	143	0	0	100	2100
G322 Doors - Wood Type 2	Doors - dark ...	A-G322-G-Door	136	0	0	100	2100

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Special-purpose dataset extensions

IFC2x3 psets, IFC MVDs, etc.

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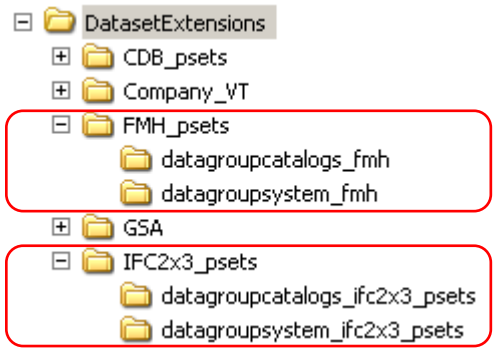
Dataset Extensions

- add folders and subfolders (if necessary
- create configuration variable to folders in PCF-file
- append search paths to subfolders



Configuration Variables in PCF-file

```
#-------------------------------------------------------------------
# Append search paths to support the IFC 'FM Handover (COBie2)' Model View Definition
# (folders and files created by unzipping DatasetExtenstions_FMHandover.zip
# in ...\Workspace\Triforma with create folder option on)
#-------------------------------------------------------------------
FMH_DATASET             = $(TF_DATASETS)DatasetExtensions/FMH_psets/
DG_CATALOGS_PATH        > $(FMH_DATASET)datagroupcatalogs_fmh/
DG_PATH                 < $(FMH_DATASET)datagroupsystem_fmh/

IFC_Psets               = $(TF_DATASETS)DatasetExtensions/IFC2x3_psets/
DG_CATALOGS_PATH        > $(IFC_Psets)datagroupcatalogs_fmh
DG_PATH                 < $(IFC_Psets)datagroupsystem_ifc2x3_psets/
```

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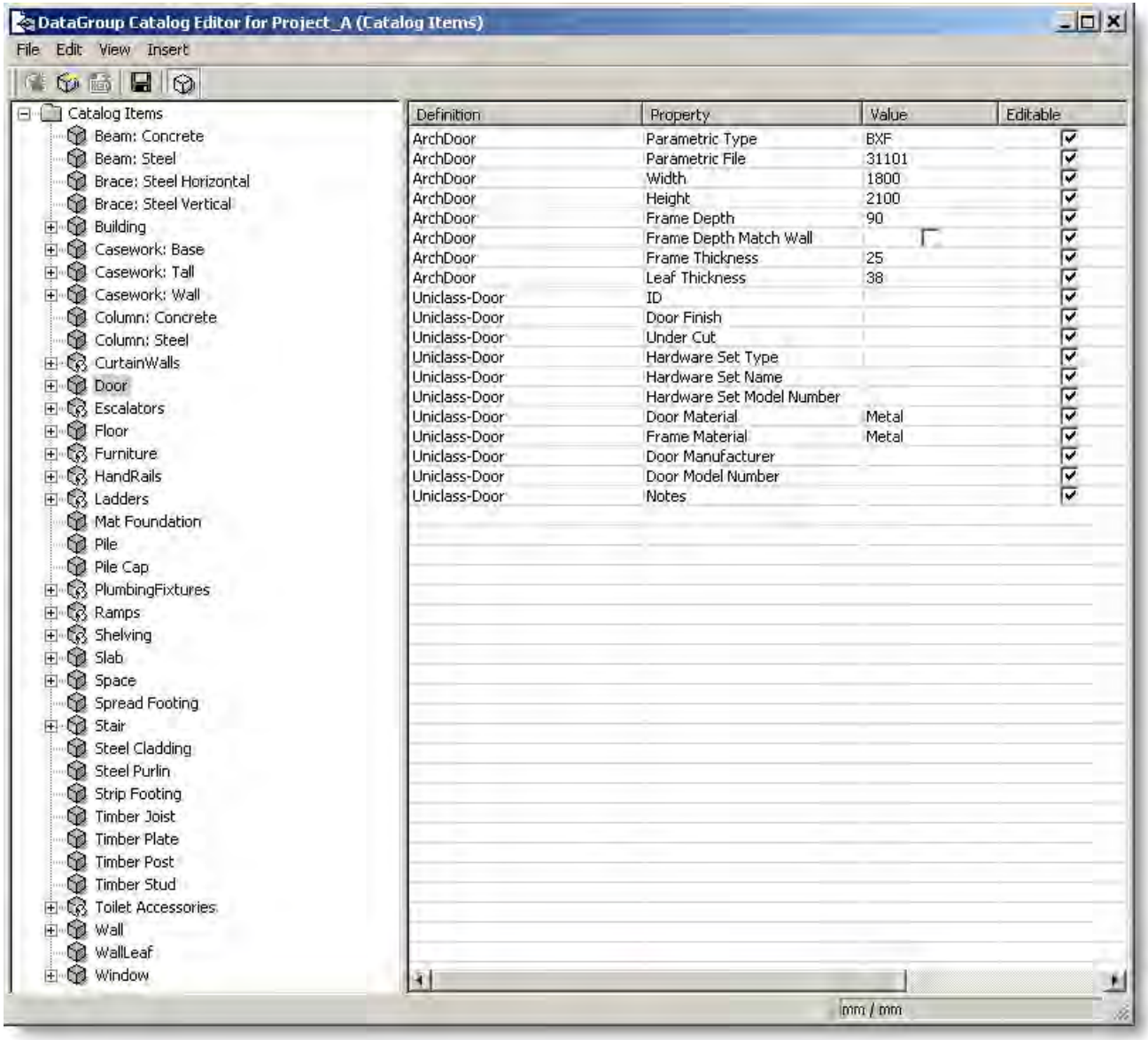

Before

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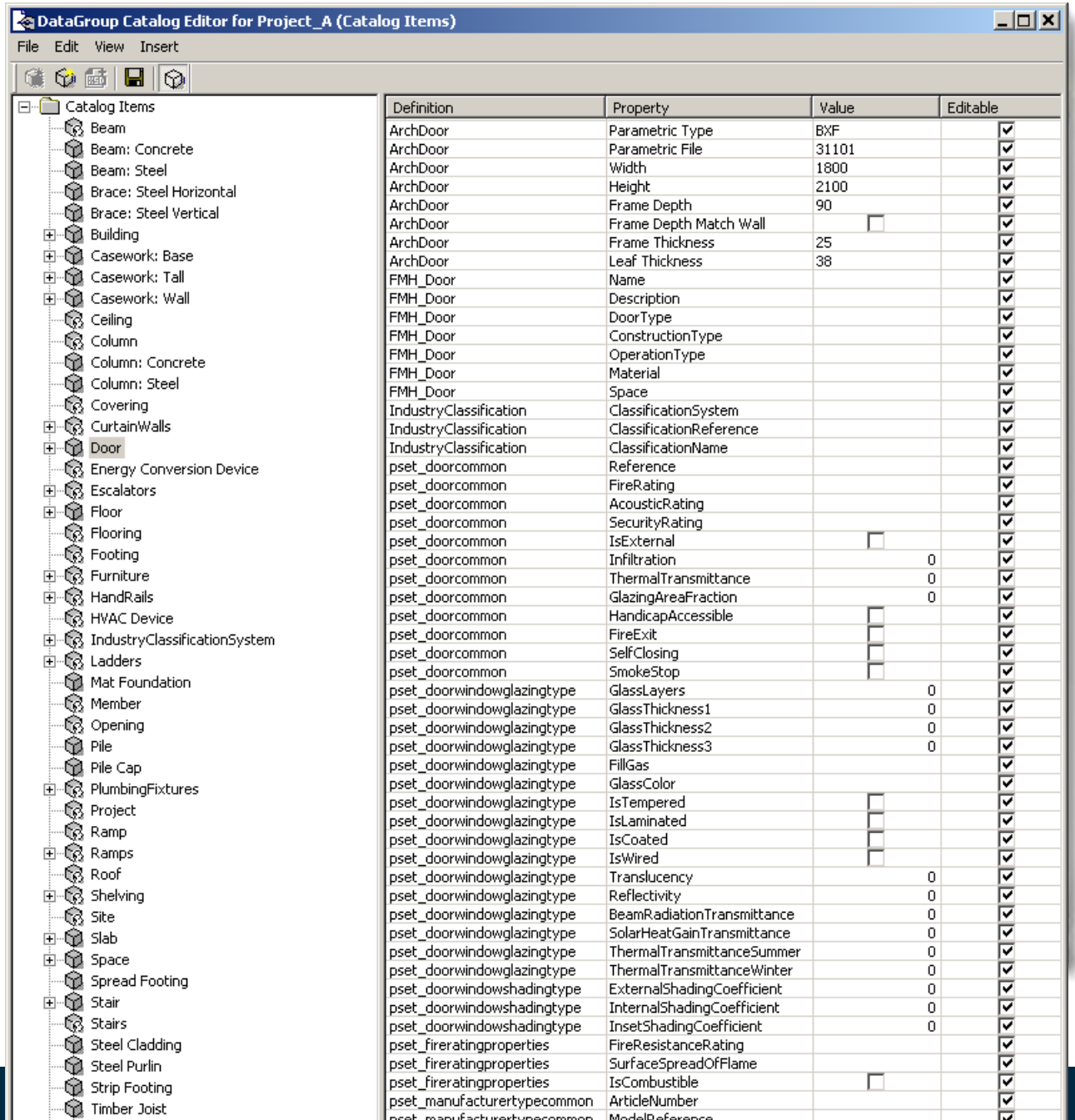

After

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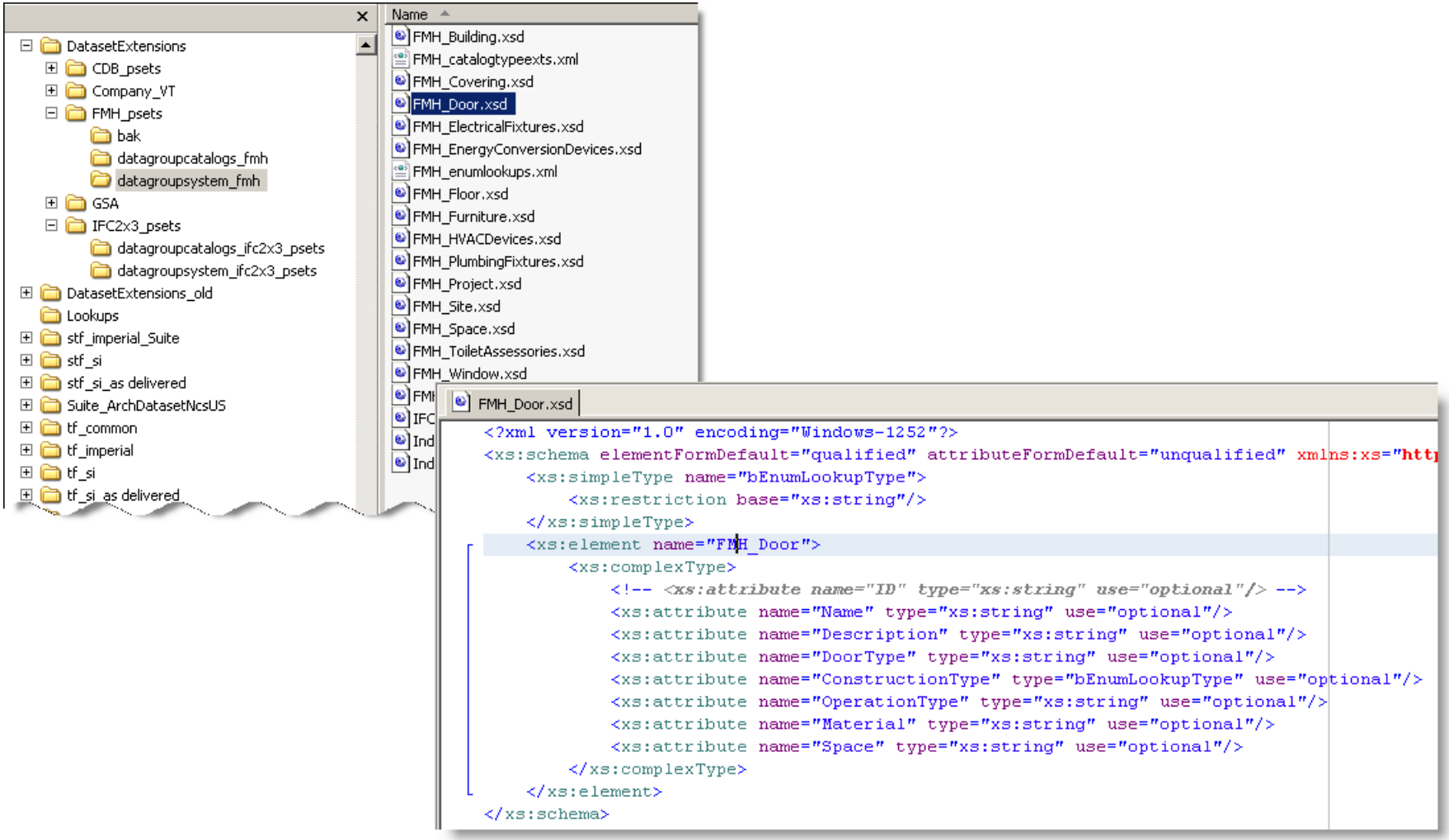
Special-purpose DataGroup Definitions



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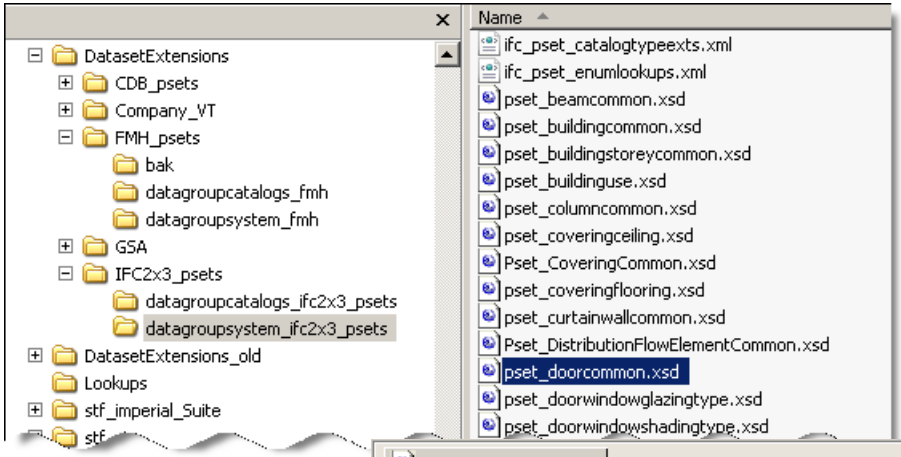
Special-purpose DataGroup Definitions



pset_doorcommon.xsd

```
<?xml version="1.0" encoding="Windows-1252"?>
<xs:schema elementFormDefault="qualified" attributeFormDefault="unqualified" xmlns:xs="http://www.w3.org
    <xs:element name="pset_doorcommon">
        <xs:complexType>
            <xs:attribute name="Reference" type="xs:string" use="optional" default=""/>
            <xs:attribute name="FireRating" type="xs:string" use="optional" default=""/>
            <xs:attribute name="AcousticRating" type="xs:string" use="optional" default=""/>
            <xs:attribute name="SecurityRating" type="xs:string" use="optional" default=""/>
            <xs:attribute name="IsExternal" type="xs:boolean" use="optional" default="false"/>
            <xs:attribute name="Infiltration" type="xs:decimal" use="optional" default="0"/>
            <xs:attribute name="ThermalTransmittance" type="xs:decimal" use="optional" default="0"/>
            <xs:attribute name="GlazingAreaFraction" type="xs:decimal" use="optional" default="0"/>
            <xs:attribute name="HandicapAccessible" type="xs:boolean" use="optional" default="false"/>
            <xs:attribute name="FireExit" type="xs:boolean" use="optional" default="false"/>
            <xs:attribute name="SelfClosing" type="xs:boolean" use="optional" default="false"/>
            <xs:attribute name="SmokeStop" type="xs:boolean" use="optional" default="false"/>
        </xs:complexType>
    </xs:element>
</xs:schema>
```

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Dataset Key Features

- pre-defined geometry, symbology & properties
  - default geometry (width, height, thickness, …)
  - level and symbology in models
  - level, symbology, material hatching/patterning in drawings
  - rendering properties
  - properties for quantity takeoff and cost calculation
  - specification texts
  - user attributes for schedules
  - schedule templates
- libraries of parametric and non-parametric cells

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Dataset Key Benefits

- enforce country, company, project standards
  - naming, level, symbology, hatching, rendering, quantification, …
- consistency of models, drawings, schedules, renderings
- geometry and attribute edits to single/multiple building elements
- query model by attributes/create selection sets
- facilitate downstream tasks
  interference detection, schedule simulation, analyses, …
- interoperability with other applications via IFC export

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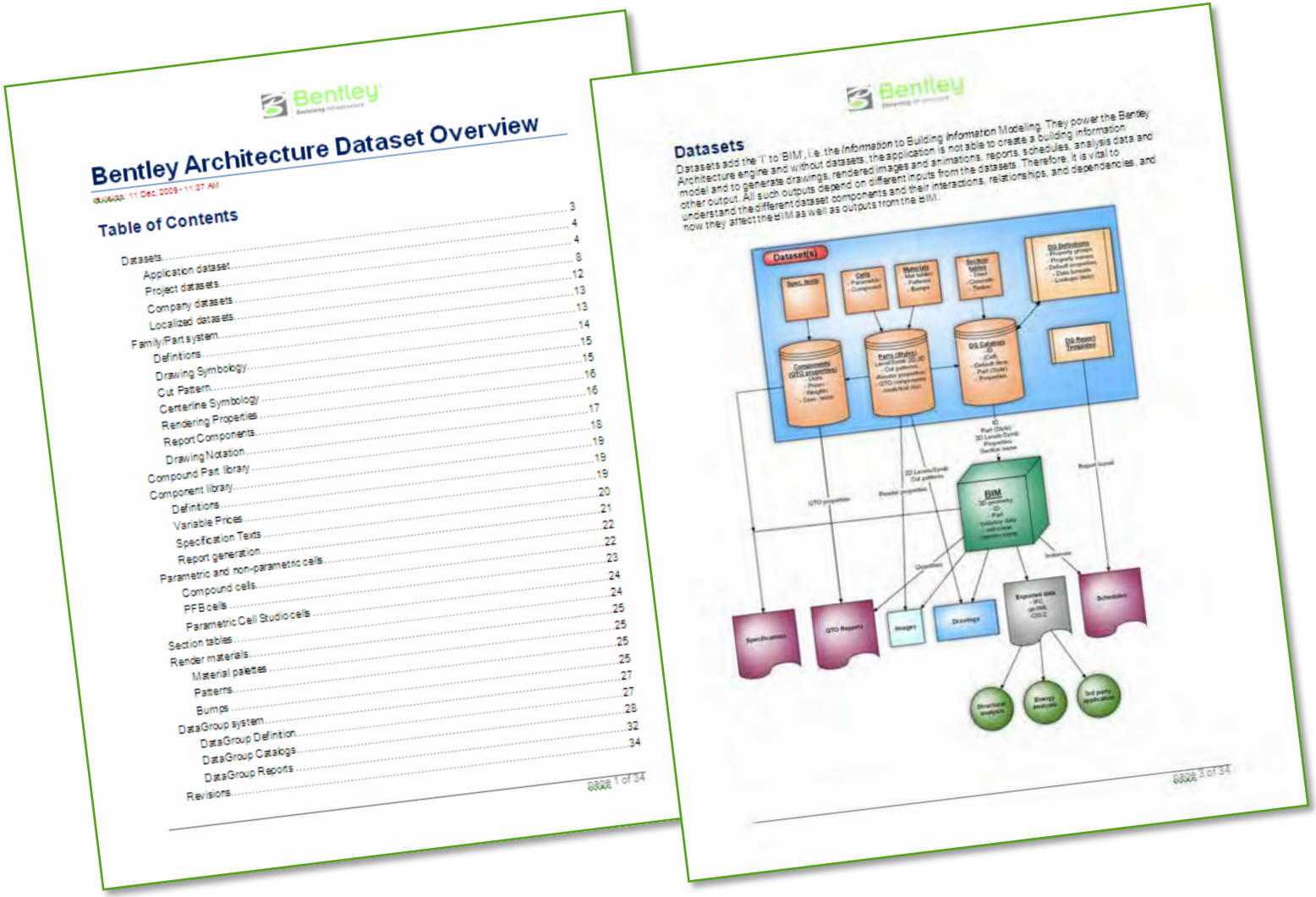
Dataset Overview



Bentley Architecture Dataset Overview

11 Dec 2009 - 11:37 AM

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Datasets

Datasets add the 'I' to BIM, i.e. the (Information to Building Information Modeling. They power the Bentley Architecture engine and without datasets, the application is not able to create a building information model and to generate drawings, rendered images and animations, reports, schedules, analysis data and other output. All such outputs depend on different inputs from the datasets. Therefore, it is vital to understand the different dataset components and their interactions, relationships, and dependencies, and how they affect the BIM as well as outputs from the BIM.

http://communities.bentley.com/files/folders/bentley_bim_soulutions-files/entry64189.aspx

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Bentley Building Datasets
The 'I' in BIM

Thank you!

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