OpenPlant

Interoperability with COMOS

Bentley
Advancing Infrastructure

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Interoperability with COMOS - Optioneering

COMOS FEED – Bentley PlantWise

- Place parametric piperacks
- Import Equipment and Pipeline tags
- Define or import Equipment sizes and locations
- (Auto) Nozzle
- Autorouting pipelines
- Review reports

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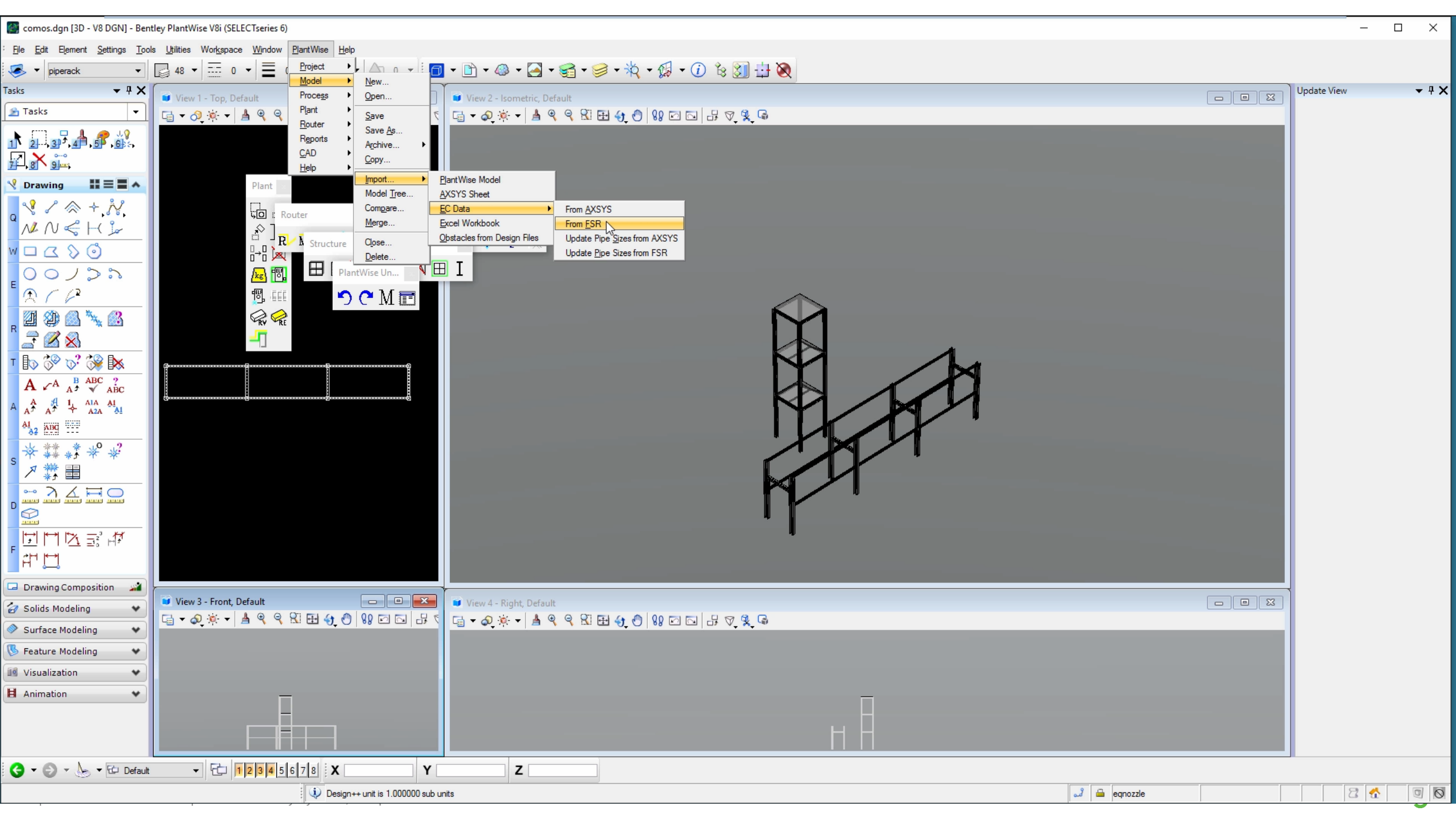
Bentley


comos.dgn [3D - V8 DGN] - Bentley PlantWise V8i (SELECTseries 6)
File Edit Element Settings Tools Utilities Workspace Window PlantWise Help
Project
Model
Process
Plant
Router
Reports
CAD
Help
New...
Open...
Save
Save As...
Archive...
Copy...
Import...
Model Tree...
Compare...
Merge...
Close...
Delete...
PlantWise Model
AXSYS Sheet
EC Data
Excel Workbook
Obstacles from Design Files
From AXSYS
From FSR
Update Pipe Sizes from AXSYS
Update Pipe Sizes from FSR
Tasks
Drawing
Drawing Composition
Solids Modeling
Surface Modeling
Feature Modeling
Visualization
Animation
View 1 - Top, Default
View 2 - Isometric, Default
View 3 - Front, Default
View 4 - Right, Default
Update View
Design++ unit is 1.000000 sub units

comos.dgn [3D - V8 DGN] - Bentley PlantWise V8i (SELECTseries 6)

File Edit Element Settings Tools Utilities Workspace Window PlantWise Help

piperack

Tasks

Pipeline List

File Edit Display

Equipment | Nozzles | Pipelines | Cables | Boundaries | Named Inlines

Line ID	Diameter	Specification	Bending Radius	Origin	Terminus	Un
1	100	NONE	1.5D	HEX001/N-1	VES001/N-1	
2	100	NONE	1.5D	VES001/N-2	PUM001/N-2	
3	100	NONE	1.5D	PUM001/N-3	DEST1/N-4	
5	350	NONE	1.5D	DEST1/N-5	HEX001/N-5	
6	100	NONE	1.5D	DEST1/N-6	HEX002/N-6	
7	100	NONE	1.5D	HEX002/N-7	DEST1/N-7	
8	50	NONE	1.5D	FL-1/N-8	DEST1/N-8	
9	100	NONE	1.5D	VES001/N-9	9-Terminus	
10	100	NONE	1.5D	HEX002/N-10	10-Terminus	
11	200	NONE	1.5D	GL-R/N-11	FL-1/N-11	

Row: 1 of 12

OK Cancel Apply

View 1 - Top, Default

View 2 - Isometric, Default

View 3 - Front, Default

View 4 - Right, Default

Update View

Drawing Composition

Solids Modeling

Surface Modeling

Feature Modeling

Visualization

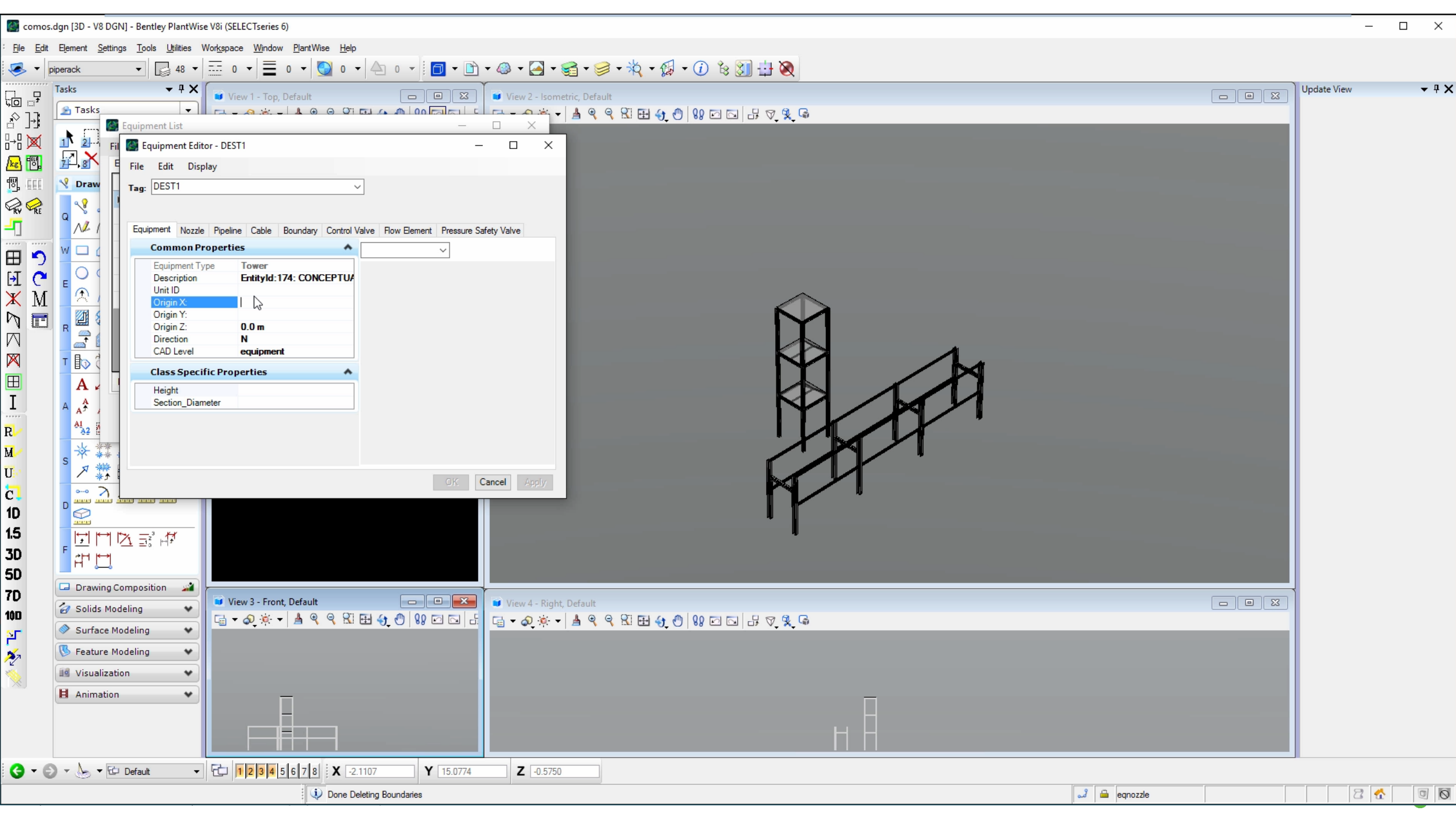
Animation

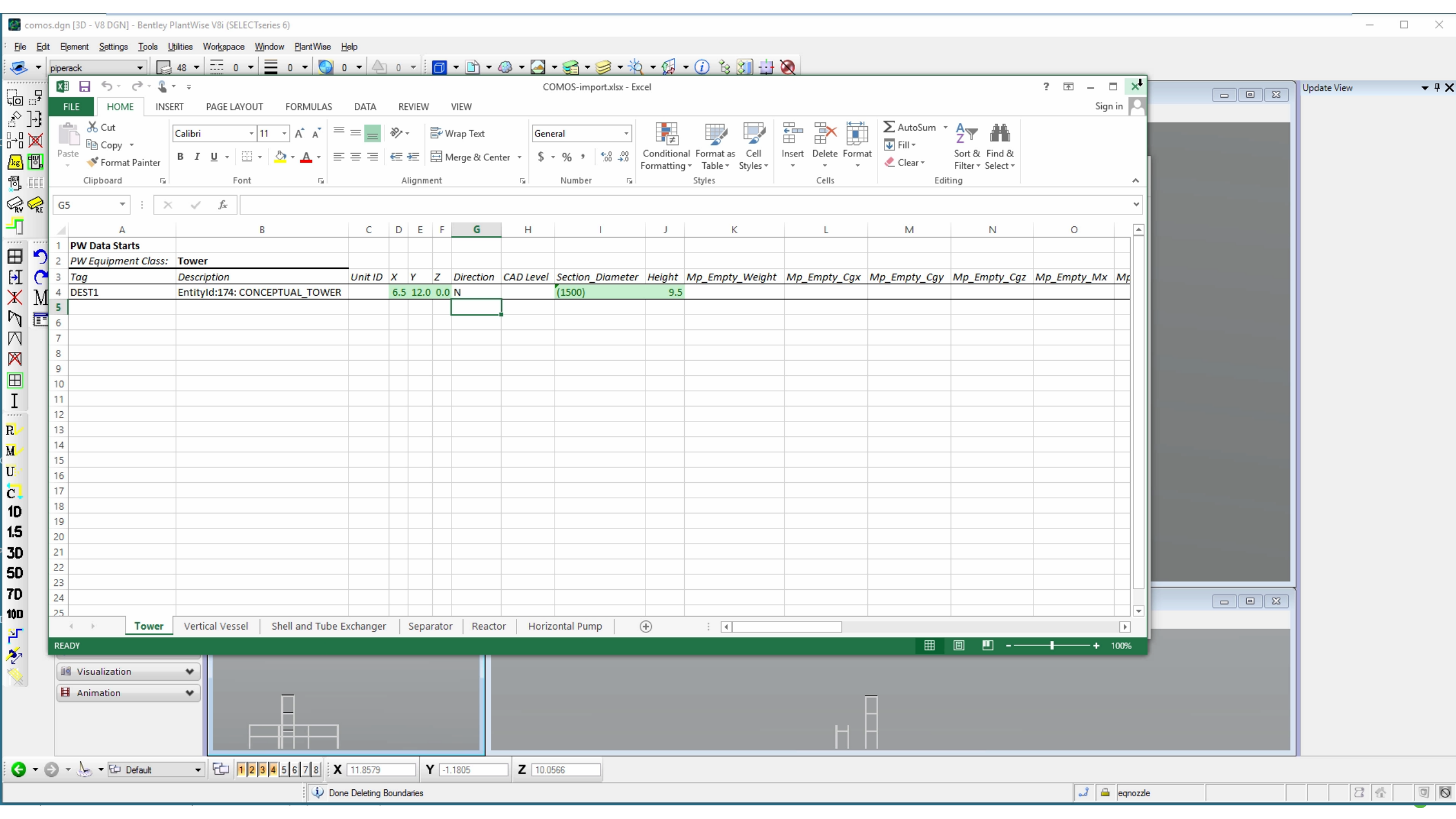
Default

X -2.1107 Y 15.0774 Z -0.5750

Done Deleting Boundaries

eqnozzle


comos.dgn [3D - V8 DGN] - Bentley PlantWise V8i (SELECTseries 6)
File Edit Element Settings Tools Utilities Workspace Window PlantWise Help
piperack
Tasks
View 1 - Top, Default
View 2 - Isometric, Default
Update View
Equipment List
Equipment Editor - DEST1
File Edit Display
Tag: DEST1
Equipment Nozzle Pipeline Cable Boundary Control Valve Flow Element Pressure Safety Valve
Common Properties
Equipment Type Tower
Description EntityId:174: CONCEPTUA
Unit ID
Origin X:
Origin Y:
Origin Z: 0.0 m
Direction N
CAD Level equipment
Class Specific Properties
Height
Section_Diameter
OK Cancel Apply
View 3 - Front, Default
View 4 - Right, Default
Drawing Composition
Solids Modeling
Surface Modeling
Feature Modeling
Visualization
Animation
Default
X -2.1107
Y 15.0774
Z -0.5750
Done Deleting Boundaries
eqnozzle


comos.dgn [3D - V8 DGN] - Bentley PlantWise V8i (SELECTseries 6)
File Edit Element Settings Tools Utilities Workspace Window PlantWise Help
COMOS-import.xlsx - Excel
FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW
Sign in
Cut Copy Format Painter Paste
Calibri 11
Wrap Text Merge & Center
General
Conditional Formatting Format as Table Cell Styles
Insert Delete Format
AutoSum Fill Clear
Sort & Filter Find & Select
Clipboard Font Alignment Number Styles Cells Editing
G5
PW Data Starts
PW Equipment Class: Tower
Tag Description Unit ID X Y Z Direction CAD Level Section_Diameter Height Mp_Empty_Weight Mp_Empty_Cgx Mp_Empty_Cgy Mp_Empty_Cgz Mp_Empty_Mx
DEST1 EntityId:174: CONCEPTUAL_TOWER 6.5 12.0 0.0 N (1500) 9.5
Tower Vertical Vessel Shell and Tube Exchanger Separator Reactor Horizontal Pump
READY
100%
Update View
Visualization
Animation
Default
X 11.8579
Y -1.1805
Z 10.0566
Done Deleting Boundaries
eqnozzle

comos.dgn [3D - V8 DGN] - Bentley PlantWise V8i (SELECTseries 6)

File Edit Element Settings Tools Utilities Workspace Window PlantWise Help

equipment

Tasks

Drawing

Drawing Composition

Solids Modeling

Surface Modeling

Feature Modeling

Visualization

Animation

View 1 - Top, Default

View 2 - Isometric, Default

View 3 - Front, Default

View 4 - Right, Default

Update View

Default

X 12.4244 Y 13.9543 Z 10.0566

Finished Excel Import

eqnozzle

comos.dgn [3D - V8 DGN] - Bentley PlantWise V8i (SELECTseries 6)

File Edit Element Settings Tools Utilities Workspace Window PlantWise Help

Tasks

Drawing

Drawing Composition

Solids Modeling

Surface Modeling

Feature Modeling

Visualization

Animation

View 1 - Top, Default

View 2 - Isometric, Default

View 3 - Front, Default

View 4 - Right, Default

Update View

Default

X 7.3605 Y 11.3921 Z 5.2110

Finished Routing!

eqnozzle

comos.dgn [3D - V8 DGN] - Bentley PlantWise V8i (SELECTseries 6)

Report List

File

Report	Combined	Xml	Filter	Comment
dpar-connectivity-export				
dpar-CWP-WBS-report				
dpar-element-report				
dpar-equipment-export				
dpar-inline-export				
dpar-mto-export				
dpar-mto-report				
dpar-nozzle-export				
dpar-pipeline-export				
dpar-reducer-report				
dpar-sample-cost-report				
dpar-sample-flange-quantities				
dpar-steel-report				
drv-cv				
drv-eq				
drv-fe				
drv-line				
drv-nozzle				
drv-psv				
drv-reducer				
drv-structure-member				
drv-tee				
drv-udi				
flange-count				
mass_property_export				
mass_property_export				
MTO-By-Volume-And-Category				
dpar-mto-report				
Off-PW-mto-report				
On-PW-mto-report				
Pipeway-pipelines				
sample-flange-report				
sample-model-cost	X			
sample-steel-cost				
pw-structure-pml-updated				A file to export pipeway steel elements to Integraph PML format
unrouted_pipes				

Show | Edit | Close

Report Writer Output: Sample-Model-Cost

```
ALL STRUCTURAL MEMBERS

designatio     weight      total cost
========== ========== ===============
W100X19          1717 $       1717.16
W130X28          1564 $       1564.05
W150X30          4994 $       4994.30
W200X100         4828 $       4827.52
           ========== ===============
                13103 $      13103.03


Pipeline Cost = $    1151114.97
Elbow Cost = $  446608.50
Steel Cost = $   13103.03
Total Model Cost = $    1610826.50
```

Output to File | Close

Update View

Default | X 7.3605 | Y 11.3921 | Z 5.2110

Finished Routing!

eqnozzle

Interoperability with COMOS – Detail 3D

COMOS PID to OpenPlant Modeler

- Publish i-model in for PID in COMOS
- Attach PID i-model to 3D model
- Place Equipment re-using process data
- Create Pipelines re-using process data
- Route Pipelines
- Produce deliverables (ortho and iso drawings, BOM)
- Send 3D – 2D differences back to COMOS

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Items

Consistency Checker - =0.D0A.T1....

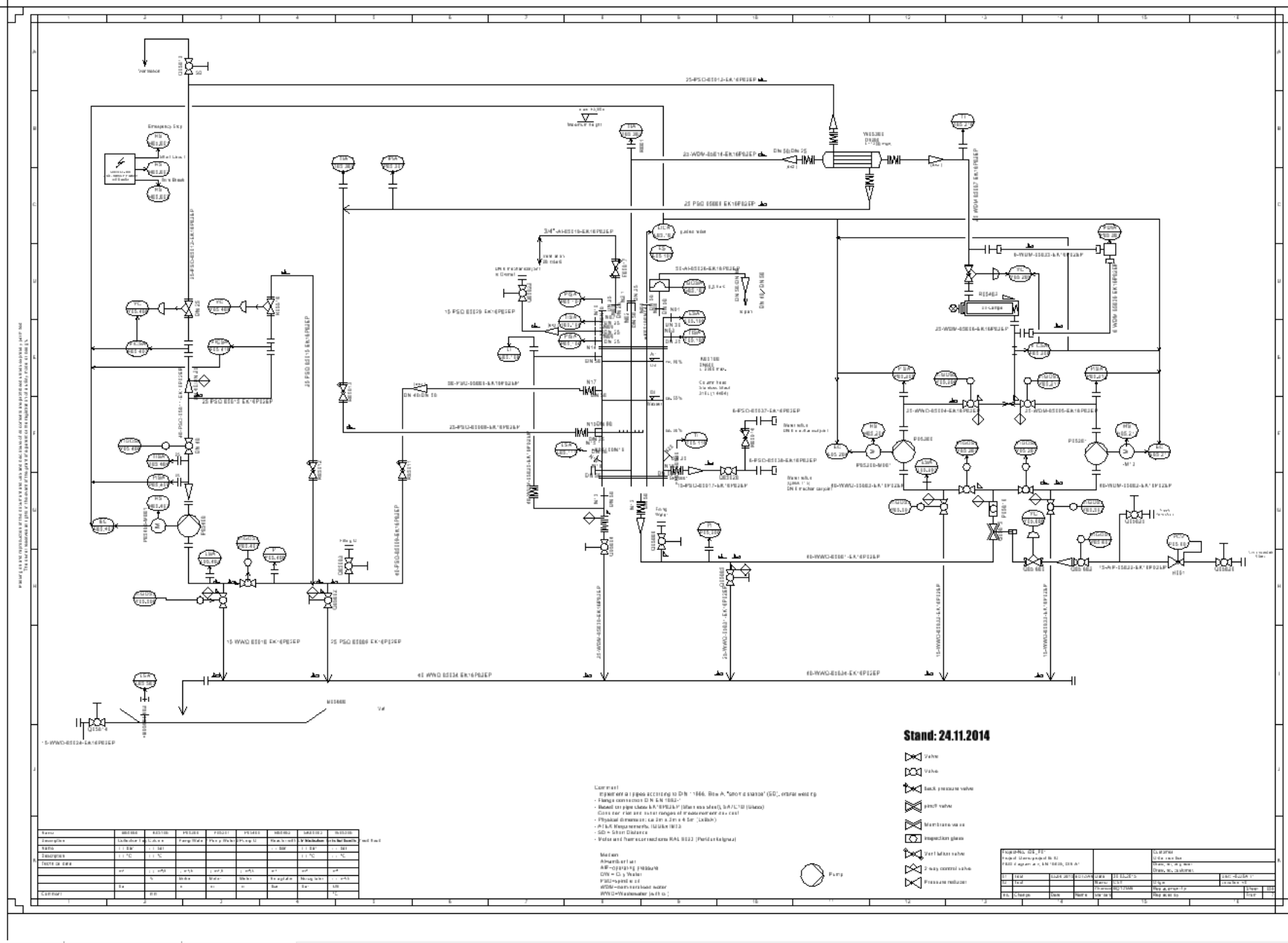
- Area
- Equipment
- Instrument
- Pipeline
- Plant
- Service
- Subunit
- System
- Unit

Active

Cannot display content

Tasks | Items

View 1 - Top, Default



Iso View | 1 2 3 4 5 6 7 8 | X -12.03 | Y -0.29 | Z 0.00

Items

Consistency Checker - =0.D0A.T1....

- Area
- Equipment
  - =0.D0A.T1K05100
  - =0.D0A.T1P05200
  - =0.D0A.T1P05201
  - =0.D0A.T1P05400
  - =0.D0A.T1R05402
  - =0.D0A.T1W05300
- Instrument
- Pipeline
  - 05001
  - Q001
  - Q002
  - Q003
  - Q004
  - Q005
  - Q006
  - Q007
  - Q008
  - Q009
  - Q010
  - Q011
  - Q013
  - Q014
  - Q016
  - Q018
  - Q021
  - Q023
  - Q024

Active

Tag Information

Number	=0.D0A.T1K05100

General Info

Description	Column
Manufacturer	QVF DeDietrich Proces

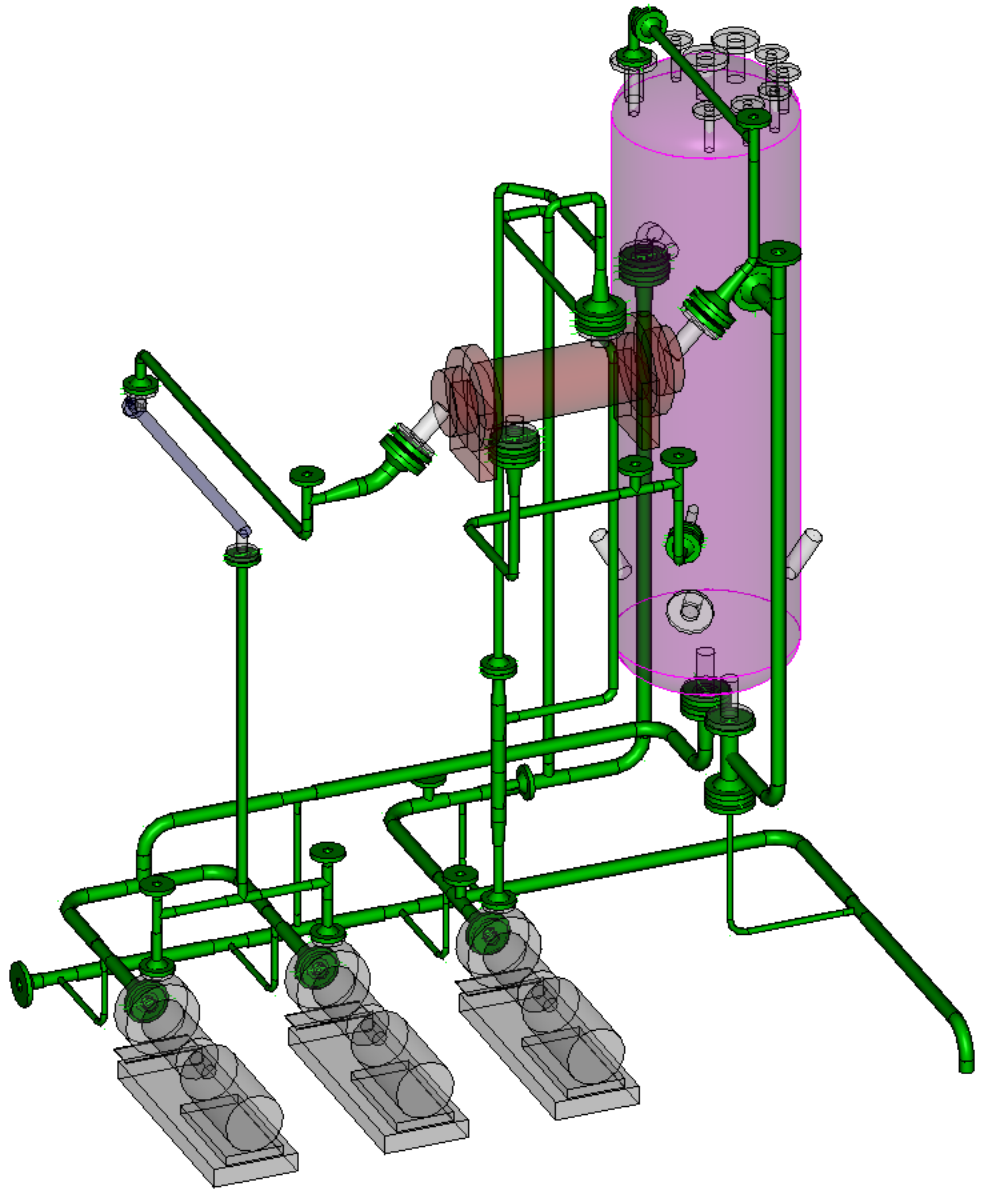
Miscellaneous

Guid	A3KRI4UTPA
COMOS GUID	A3KRI4UTPA
COMOS PathFullNa	08U0§>08UD0A§>08U
COMOS System UI	A3KRI4UTPA
Comment	

Save Undo

Tasks Items

View 1, Default



Iso View 1 2 3 4 5 6 7 8 X 859.79 Y 99578.49 Z 2369.56

Items

Consistency Checker - =0.D0A.T1....

- Instrument
- Pipeline
  - 05001
  - Q001
  - Q002
  - Q003
  - Q004
  - Q005
  - Q006
  - Q007
  - Q008
  - Q009
  - Q010
  - Q011
  - Q013
  - Q014
  - Q016
  - Q0
  - Q021
  - Q023
  - Q024
  - Q025
  - Q028
  - Q029
  - Q030
  - Q031
  - Q032
  - Q033
  - Q034

Create Pipeline

Active

Tag Information

Number	Q016
Specification	CS150

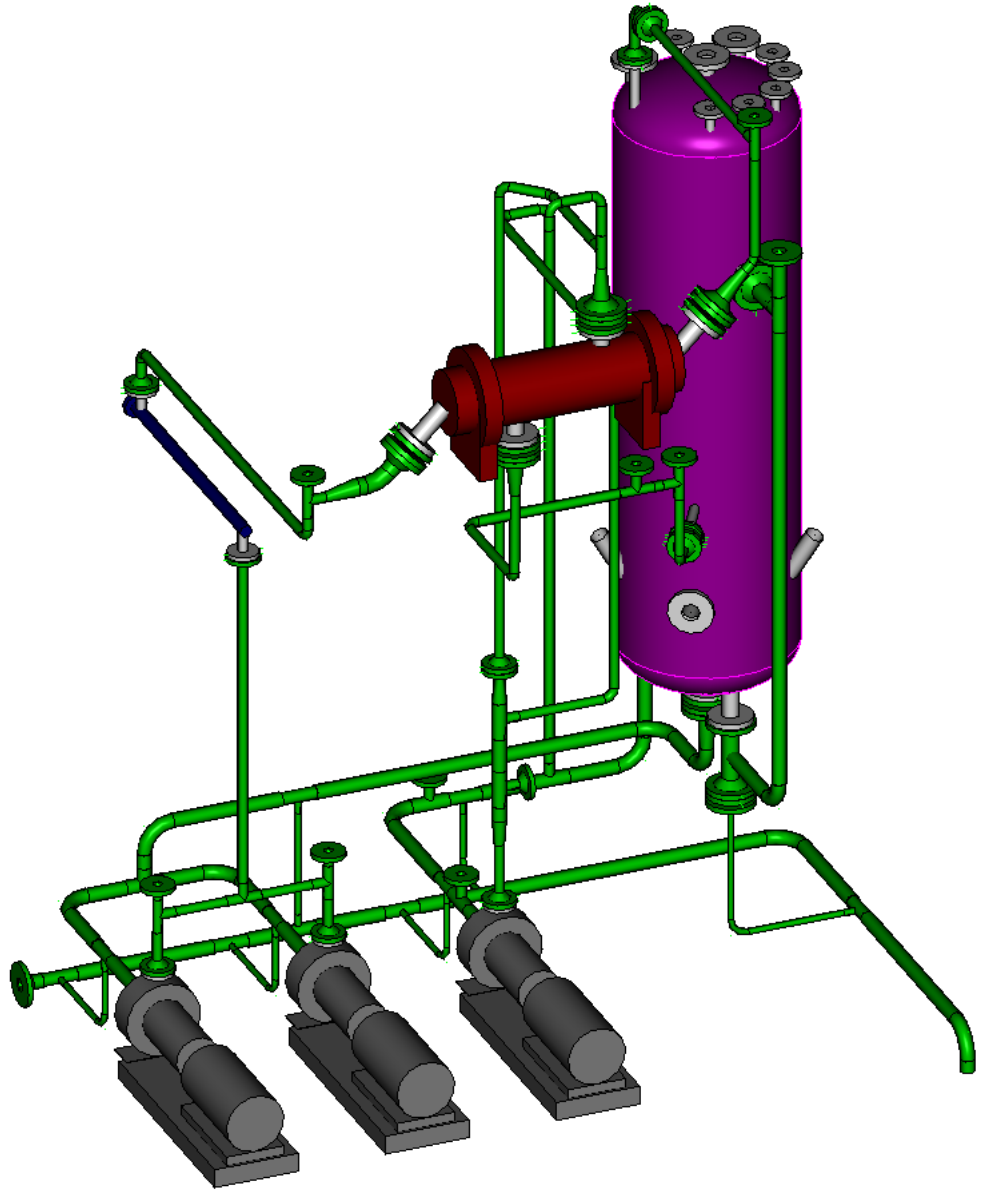
Miscellaneous

Guid	A3KSKRE97S
COMOS GUID	A3KSKRE97S
COMOS PathFullNa	08U0§>08UD0A§>08U
COMOS System UI	A3KSKRE97S
Design Size	
Tag Number	Q016
Service	None

Save Undo

Tasks Items

View 1, Default



Iso View 1 2 3 4 5 6 7 8 X 2285.71 Y 101975.49 Z 3106.88

Interoperability with COMOS

COMOS Electrical – Bentley Raceway and Cable

- Import cable types
- Import cable list and Equipment list
- Associate Equipment IDs with BRCM Equipment
- Place Raceways
- Automatic cables routing
- Cables Management
- Cable schedules and section cuts
- Real cable lenghts sent back to COMOS

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Bentley

EQUIPMENT_SIEMENS.dgn [3D - V8 DGN] - Bentley Raceway and Cable Management V8i (SELECTseries 2)

File Edit Element Settings Tools Utilities Workspace Window Help

BCL-Type.xlsx - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW ADD-INS ACROBAT Team

Slavica Bozic

Paste Cut Copy Format Painter — Clipboard

Calibri 11 — Font

Wrap Text Merge & Center — Alignment

Number

Conditional Formatting Format as Table — Styles

Insert Delete Format — Cells

AutoSum Fill Clear Sort & Filter Find & Select — Editing

GET THE NEW OFFICE It's one of the perks of having Office 365. See what's new Update Office

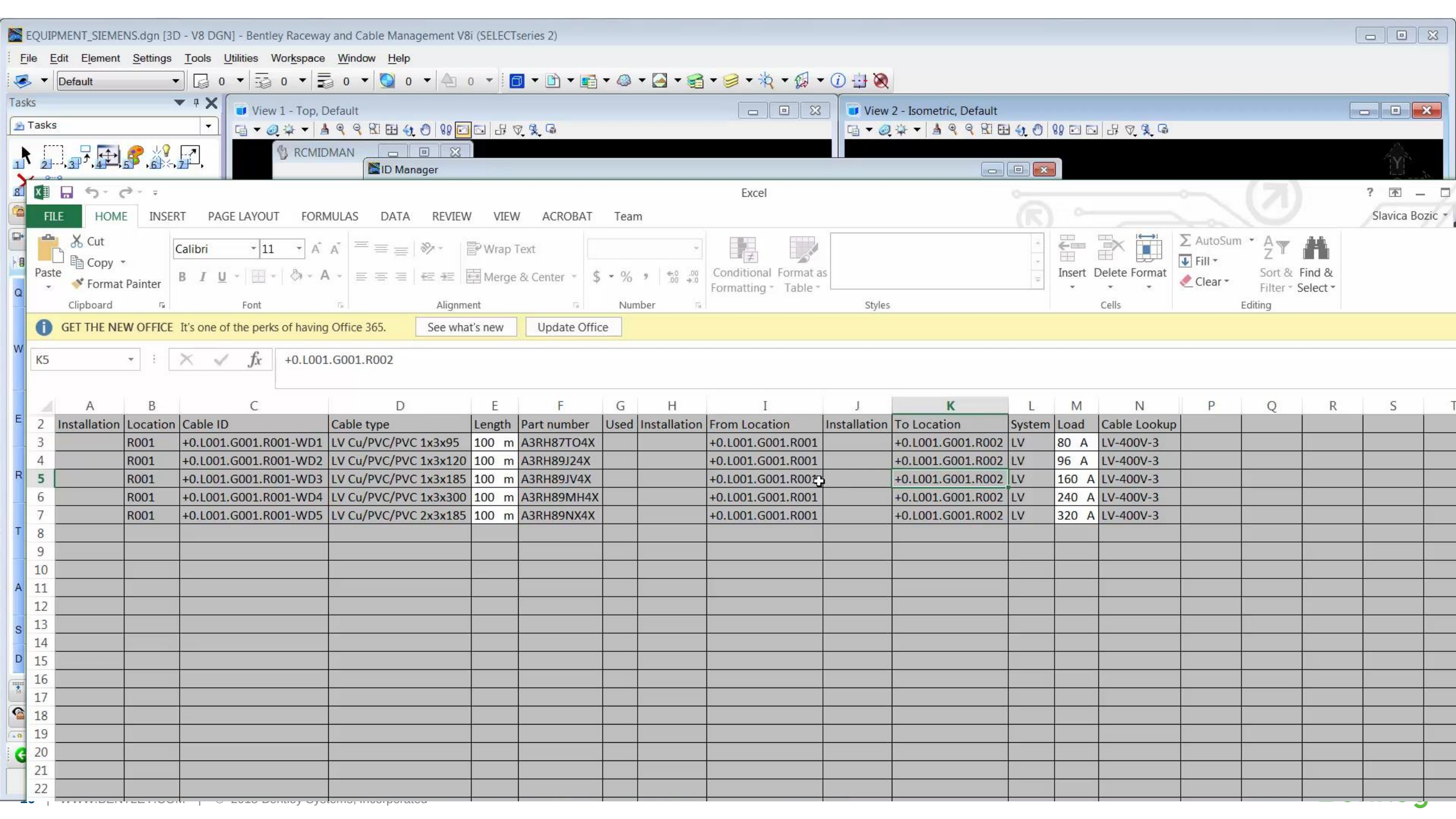
B2 Cable type

	A	B	C	D	E	F	G	H	I	J	L	M	N	O	P	Q	R	S	T
2	Cable ID	Cable type	Max. cable length	Unit	Outer Diameter	Unit	Weight	Unit	Cross-Section (mm)	CS (AWG/kcmil)									
3	+0.L001.G001.R001-WD1	LV Cu/PVC/PVC 1x3x95	404.685	m	237.5	mm	0.63555	Kg/m	95	3/0									
4	+0.L001.G001.R001-WD2	LV Cu/PVC/PVC 1x3x120	424.522	m	300	mm	0.8028	Kg/m	120	4/0									
5	+0.L001.G001.R001-WD3	LV Cu/PVC/PVC 1x3x185	386.618	m	462.5	mm	1.23765	Kg/m	185	350									
6	+0.L001.G001.R001-WD4	LV Cu/PVC/PVC 1x3x300	405.443	m	750	mm	2.007	Kg/m	300	500									
7	+0.L001.G001.R001-WD5	LV Cu/PVC/PVC 2x3x185	193.309	m	462.5	mm	1.23765	Kg/m	185	350									
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			

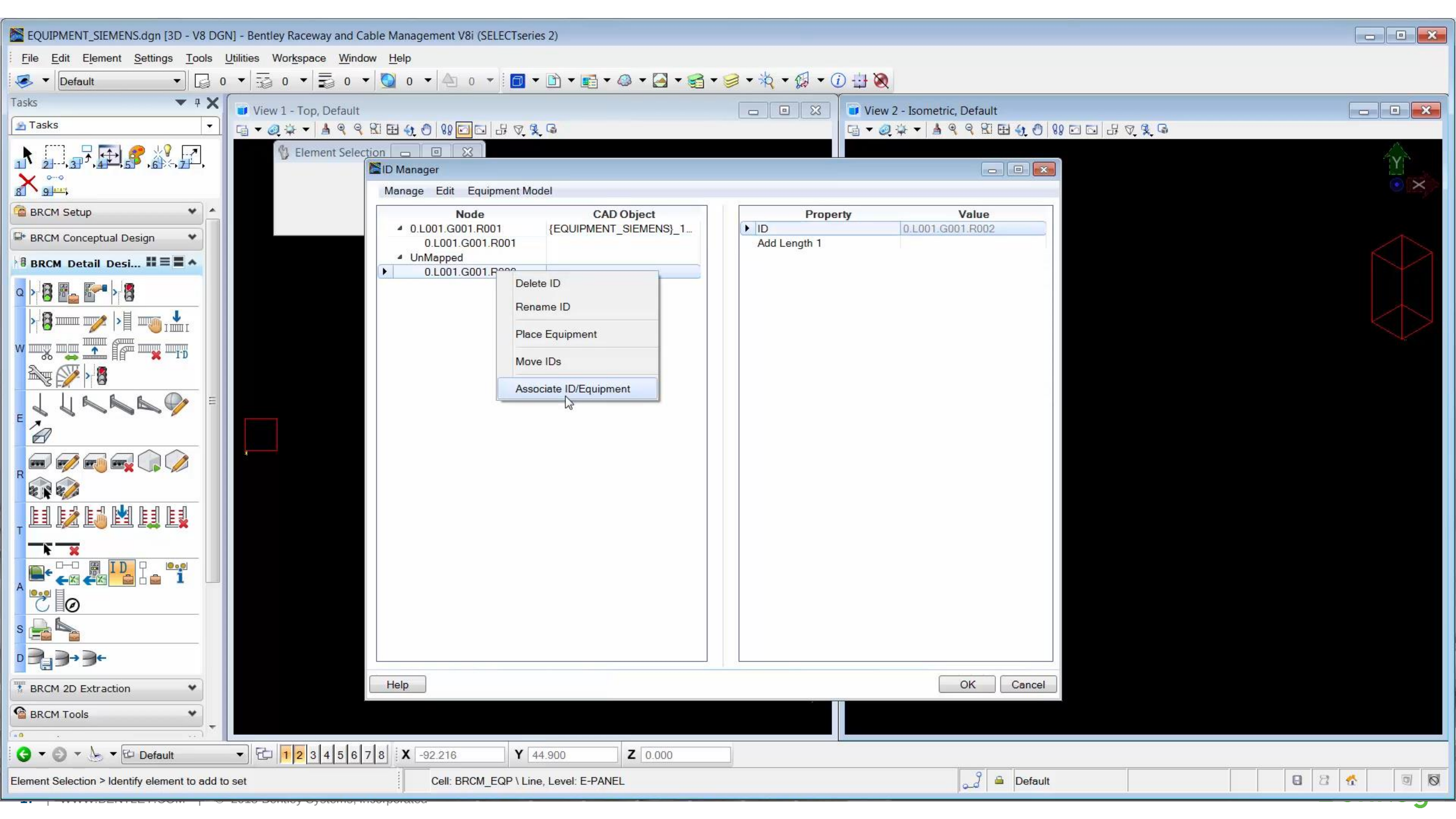
Query_CSI Query

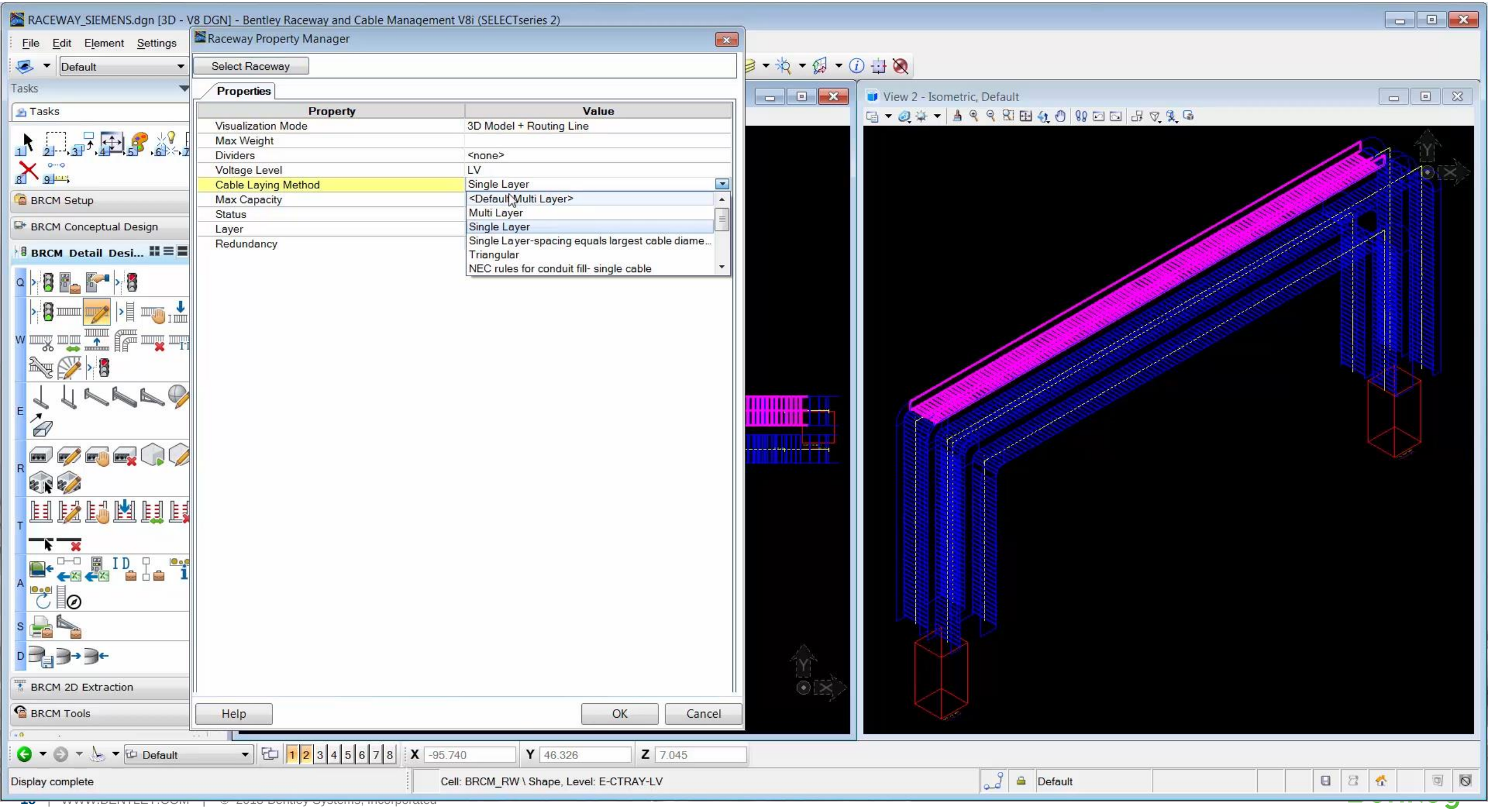
READY 100%

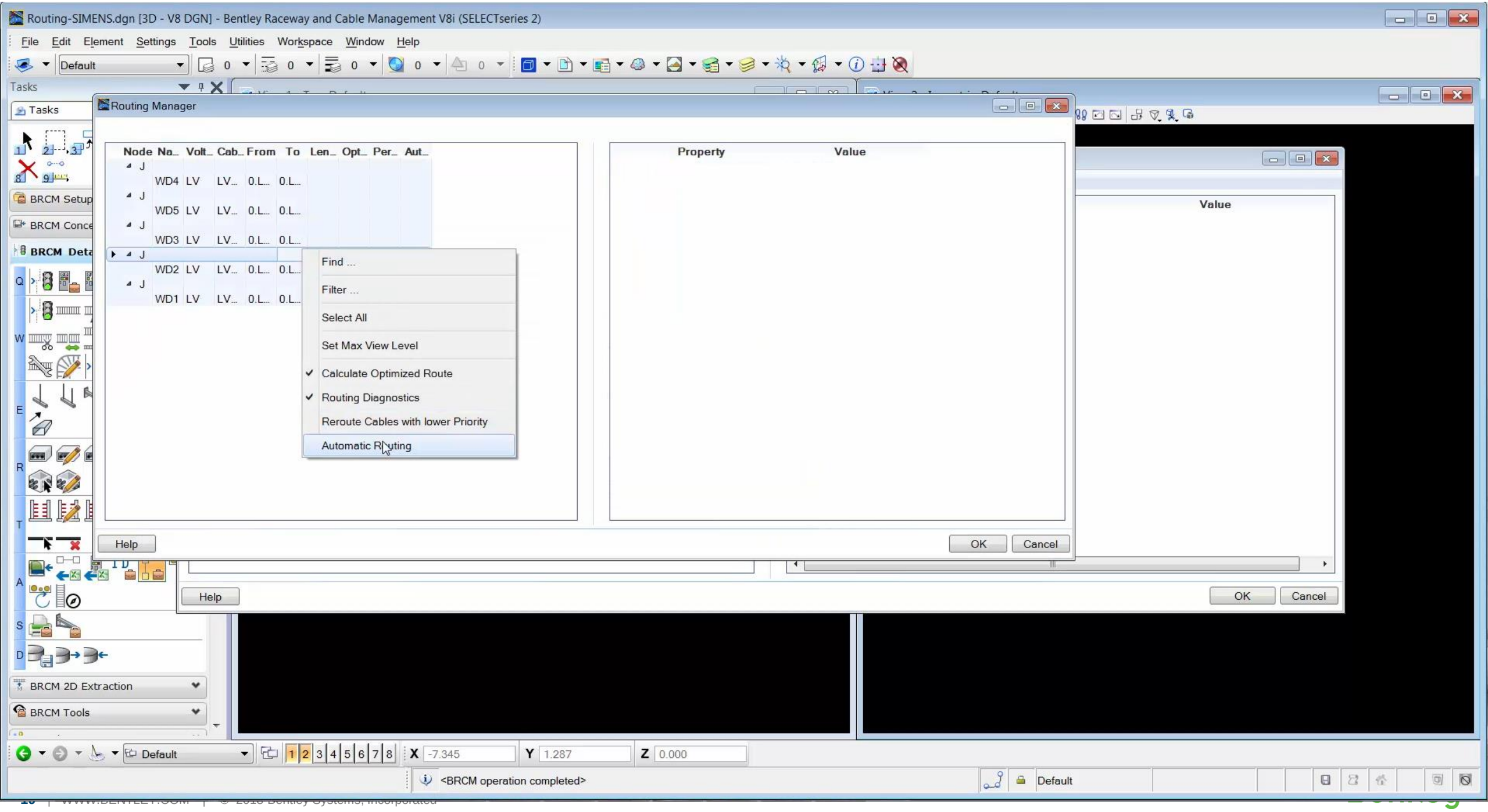
Cell: BRCM_EQP \ Line, Level: E-PANEL Default

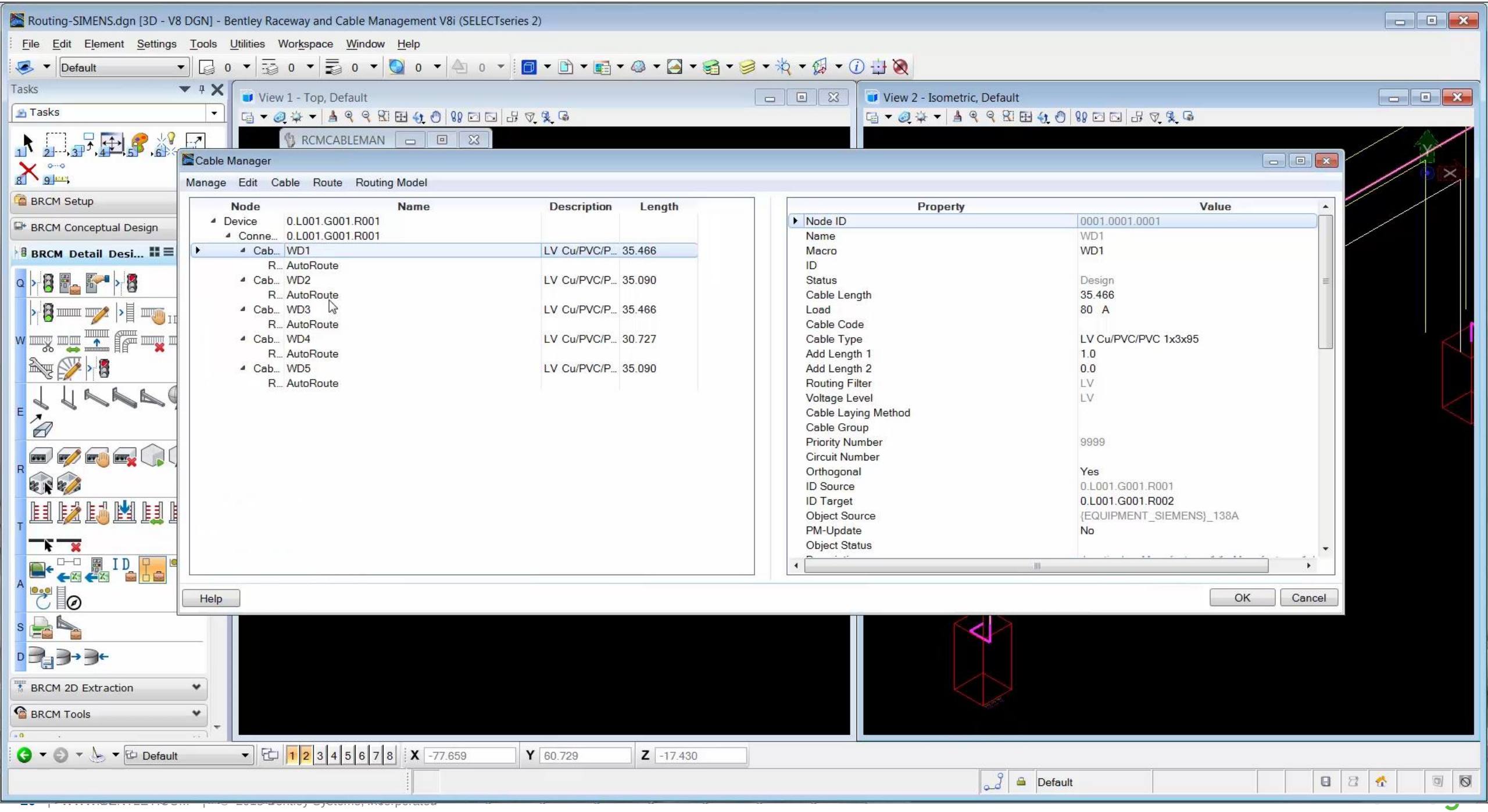


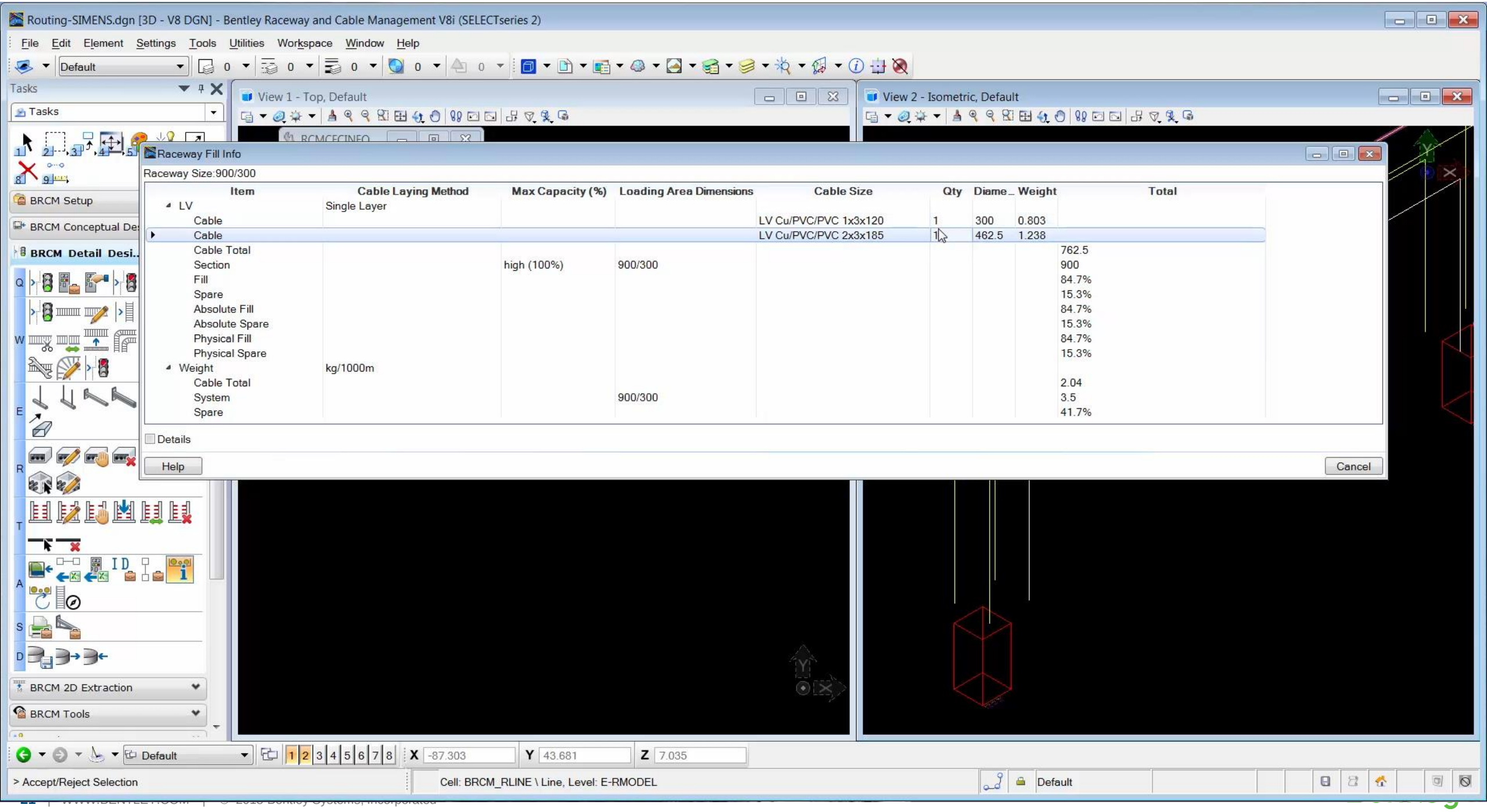
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S
2	Installation	Location	Cable ID	Cable type	Length	Part number	Used	Installation	From Location	Installation	To Location	System	Load	Cable Lookup				
3		R001	+0.L001.G001.R001-WD1	LV Cu/PVC/PVC 1x3x95	100 m	A3RH87TO4X			+0.L001.G001.R001		+0.L001.G001.R002	LV	80 A	LV-400V-3				
4		R001	+0.L001.G001.R001-WD2	LV Cu/PVC/PVC 1x3x120	100 m	A3RH89J24X			+0.L001.G001.R001		+0.L001.G001.R002	LV	96 A	LV-400V-3				
5		R001	+0.L001.G001.R001-WD3	LV Cu/PVC/PVC 1x3x185	100 m	A3RH89JV4X			+0.L001.G001.R001		+0.L001.G001.R002	LV	160 A	LV-400V-3				
6		R001	+0.L001.G001.R001-WD4	LV Cu/PVC/PVC 1x3x300	100 m	A3RH89MH4X			+0.L001.G001.R001		+0.L001.G001.R002	LV	240 A	LV-400V-3				
7		R001	+0.L001.G001.R001-WD5	LV Cu/PVC/PVC 2x3x185	100 m	A3RH89NX4X			+0.L001.G001.R001		+0.L001.G001.R002	LV	320 A	LV-400V-3				


EQUIPMENT_SIEMENS.dgn [3D - V8 DGN] - Bentley Raceway and Cable Management V8i (SELECTseries 2)
File Edit Element Settings Tools Utilities Workspace Window Help
Tasks
BRCM Setup
BRCM Conceptual Design
BRCM Detail Desi...
BRCM 2D Extraction
BRCM Tools
View 1 - Top, Default
View 2 - Isometric, Default
Element Selection
ID Manager
Manage Edit Equipment Model
Node
CAD Object
0.L001.G001.R001
{EQUIPMENT_SIEMENS}_1...
0.L001.G001.R001
UnMapped
Delete ID
Rename ID
Place Equipment
Move IDs
Associate ID/Equipment
Property
Value
ID
0.L001.G001.R002
Add Length 1
Help
OK
Cancel
Default
X -92.216
Y 44.900
Z 0.000
Element Selection > Identify element to add to set
Cell: BRCM_EQP \ Line, Level: E-PANEL
Default


RACEWAY_SIEMENS.dgn [3D - V8 DGN] - Bentley Raceway and Cable Management V8i (SELECTseries 2)
File Edit Element Settings
Default
Tasks
Raceway Property Manager
Select Raceway
Properties
Property
Value
Visualization Mode
3D Model + Routing Line
Max Weight
Dividers
<none>
Voltage Level
LV
Cable Laying Method
Single Layer
Max Capacity
Status
Layer
Redundancy
<Default Multi Layer>
Multi Layer
Single Layer
Single Layer-spacing equals largest cable diame...
Triangular
NEC rules for conduit fill- single cable
Help
OK
Cancel
BRCM Setup
BRCM Conceptual Design
BRCM Detail Desi...
BRCM 2D Extraction
BRCM Tools
View 2 - Isometric, Default
X -95.740
Y 46.326
Z 7.045
Display complete
Cell: BRCM_RW \ Shape, Level: E-CTRAY-LV
Default


Routing-SIMENS.dgn [3D - V8 DGN] - Bentley Raceway and Cable Management V8i (SELECTseries 2)
File Edit Element Settings Tools Utilities Workspace Window Help
Tasks
Routing Manager
Node Na... Volt... Cab... From To Len... Opt... Per... Aut...
WD4 LV LV... 0.L... 0.L...
WD5 LV LV... 0.L... 0.L...
WD3 LV LV... 0.L... 0.L...
WD2 LV LV... 0.L... 0.L...
WD1 LV LV... 0.L... 0.L...
Find ...
Filter ...
Select All
Set Max View Level
Calculate Optimized Route
Routing Diagnostics
Reroute Cables with lower Priority
Automatic Routing
Property
Value
Help
OK
Cancel
BRCM Setup
BRCM Conce
BRCM Deta
BRCM 2D Extraction
BRCM Tools
X -7.345
Y 1.287
Z 0.000
<BRCM operation completed>
Default


Routing-SIMENS.dgn [3D - V8 DGN] - Bentley Raceway and Cable Management V8i (SELECTseries 2)
File Edit Element Settings Tools Utilities Workspace Window Help
Tasks
BRCM Setup
BRCM Conceptual Design
BRCM Detail Desi...
BRCM 2D Extraction
BRCM Tools
View 1 - Top, Default
View 2 - Isometric, Default
RCMCABLEMAN
Cable Manager
Manage Edit Cable Route Routing Model
Node Name Description Length
Device 0.L001.G001.R001
Conne... 0.L001.G001.R001
Cab... WD1 LV Cu/PVC/P... 35.466
R... AutoRoute
Cab... WD2 LV Cu/PVC/P... 35.090
R... AutoRoute
Cab... WD3 LV Cu/PVC/P... 35.466
R... AutoRoute
Cab... WD4 LV Cu/PVC/P... 30.727
R... AutoRoute
Cab... WD5 LV Cu/PVC/P... 35.090
R... AutoRoute
Property Value
Node ID 0001.0001.0001
Name WD1
Macro WD1
ID
Status Design
Cable Length 35.466
Load 80 A
Cable Code
Cable Type LV Cu/PVC/PVC 1x3x95
Add Length 1 1.0
Add Length 2 0.0
Routing Filter LV
Voltage Level LV
Cable Laying Method
Cable Group
Priority Number 9999
Circuit Number
Orthogonal Yes
ID Source 0.L001.G001.R001
ID Target 0.L001.G001.R002
Object Source {EQUIPMENT_SIEMENS}_138A
PM-Update No
Object Status
Help
OK
Cancel
X -77.659
Y 60.729
Z -17.430
Default


Routing-SIMENS.dgn [3D - V8 DGN] - Bentley Raceway and Cable Management V8i (SELECTseries 2)
File Edit Element Settings Tools Utilities Workspace Window Help
Tasks
BRCM Setup
BRCM Conceptual Des
BRCM Detail Desi..
BRCM 2D Extraction
BRCM Tools
View 1 - Top, Default
View 2 - Isometric, Default
Raceway Fill Info
Raceway Size:900/300
Item | Cable Laying Method | Max Capacity (%) | Loading Area Dimensions | Cable Size | Qty | Diame.. | Weight | Total
LV | Single Layer
Cable | LV Cu/PVC/PVC 1x3x120 | 1 | 300 | 0.803
Cable | LV Cu/PVC/PVC 2x3x185 | 1 | 462.5 | 1.238
Cable Total | 762.5
Section | high (100%) | 900/300 | 900
Fill | 84.7%
Spare | 15.3%
Absolute Fill | 84.7%
Absolute Spare | 15.3%
Physical Fill | 84.7%
Physical Spare | 15.3%
Weight | kg/1000m
Cable Total | 2.04
System | 900/300 | 3.5
Spare | 41.7%
Details
Help
Cancel
X -87.303
Y 43.681
Z 7.035
> Accept/Reject Selection
Cell: BRCM_RLINE \ Line, Level: E-RMODEL
Default

Section Cut.dgn [3D - V8 DGN] - Bentley Raceway and Cable Management V8i (SELECTseries 2)

File Edit Element Settings Tools Utilities Workspace Window Help

Default

Tasks

BRCM Setup

BRCM Conceptual Design

BRCM Detail Design

BRCM 2D Extraction

- Q 2D Extraction
- W Place Section Plane
- E Section Plane Properties
- R Create Section
- T Update Sections
- A Remove 2D Extraction
- S Raceway Labels

BRCM Tools

Drawing

Drawing Composition

Solids Modeling

Surface Modeling

Mesh Modeling

Feature Modeling

Visualization

Animation

View 1 - Top, Default

Element Selection

Section 1

Section 2

Section 2

RW ID	RW Category	RW fill %	RW Type	Size	Elev
ROO1-3	LV	85%	CL	W:900mm; H:300mm	7.0m
ROO1-21	LV	83%	CL	W:900mm; H:600mm	5.6m
ROO1-10	LV	78%	CL	W:900mm; H:300mm	7.0m
ROO1-15	LV	0%	CL	W:900mm; H:600mm	5.6m

Section 2

#	RW ID	RW Category	Cbl #	Cbl Type	Cbl Size	Cbl Wgt	Qty
1	ROO1-3	LV	WD2	LV Cu/PVC/PVC 1x3x120	300	0.8028	1
			WD5	LV Cu/PVC/PVC 2x3x185	462.5	1.23765	1
2	ROO1-21	LV	WD4	LV Cu/PVC/PVC 1x3x300	750	2.007	1
3	ROO1-10	LV	WD3	LV Cu/PVC/PVC 1x3x185	462.5	1.23765	1
			WD1	LV Cu/PVC/PVC 1x3x95	237.5	0.63555	1
4	ROO1-15	LV	--	--	--	--	--

Default 1 2 3 4 5 6 7 8 X -87.3 Y 44.3 Z 5.3

Element Selection > Identify element to add to set

Locks=AS,GG,SN,NS

Default

Cable Route List (Detailed Design)

20 October, 2016 14:03

			From			*To*				*Raceway*	
Item	**Cable No**	**Cable Type**	**ID**	**Description**	**Location**	**ID**	**Description**	**Location**	**Length**	**RW Segment ID**	**RW Segment Length**
1	WD1	LV Cu/PVC/PVC 1x3x95	0.L001.G001.R001	Junctionbox Manufacturer 1 1x Manufacturer 1 Junc		0.L001.G001.R002	Junctionbox Manufacturer 1 1x Manufacturer 1 Junc		35.500000		
										Air Gap	1.7
										ROO1	6.4
										ROO1- 9	0.5
										ROO1- 10	17.0
										ROO1- 11	1.3
										ROO1- 12	6.0
										Air Gap	1.6
2	WD2	LV Cu/PVC/PVC 1x3x120	0.L001.G001.R001	Junctionbox Manufacturer 1 1x Manufacturer 1 Junc		0.L001.G001.R002	Junctionbox Manufacturer 1 1x Manufacturer 1 Junc		35.100000		
										Air Gap	1.5
										ROO1- 1	6.4
										ROO1- 2	0.5
										ROO1- 3	17.0
										ROO1- 4	1.3
										ROO1- 5	6.0
										Air Gap	1.4
3	WD3	LV Cu/PVC/PVC 1x3x185	0.L001.G001.R001	Junctionbox Manufacturer 1 1x Manufacturer 1 Junc		0.L001.G001.R002	Junctionbox Manufacturer 1 1x Manufacturer 1 Junc		35.500000		
										Air Gap	1.7