

BIM MODELĒŠANA AVK UN UK PROJEKTĒŠANĀ

IZSTRĀDĀJA JURĢIS ZEMĪTIS
2023.GADS

SATURS:

- ▶ Aktualitātes un iespējas inženiersistēmu modelēšanai BIM
- ▶ Materiālu specifikāciju izveide un noformēšana atbilstoši prasībām
- ▶ Inženierkomunikāciju sistēmu modelēšana un dimensionēšana
- ▶ Elementu izvēle, pievienošana un jaunu elementu izveide
- ▶ Projekta noformēšana, izvietošana uz lapām, apzīmējumu izvietošana
- ▶ IFC modeļu eksportēšana, apskate un informācijas pievienošana

KURSA MĒRĶIS:

Kursa mērķis ir sniegt padziļinātu priekšstatu par AVK un UK sistēmu modelēšanu BIM vidē.

Attīstīt zināšanas par iespējām ko sniedz BIM platforma inženierkomunikāciju projektēšanā, darbību automatizāciju, savstarpējo inženiersistēmu koordināciju, nepieciešamās informācijas pievienošanu, izmaiņu ieviešanu.

Praktiski apgūt inženiersistēmu projekta izstrādi BIM platformā, ietverot sasaisti starp dažādām sadaļām, izmaiņu veikšanu, risinājumu atspoguļošanu, projekta noformēšanu un specifikāciju automātisku izvedi atbilstoši izvirzītajām prasībām.

JURĢIS ZEMĪTIS

PRAKSE

Praktiskā projektēšanas prakse aptuveni 13 gadu garumā SIA «MEP Solutions» (ofisi, dzīvojamās ēkas, viesnīcas, sporta centri, baznīcas, expo centrs un lielveikals)

ZINĀTNE

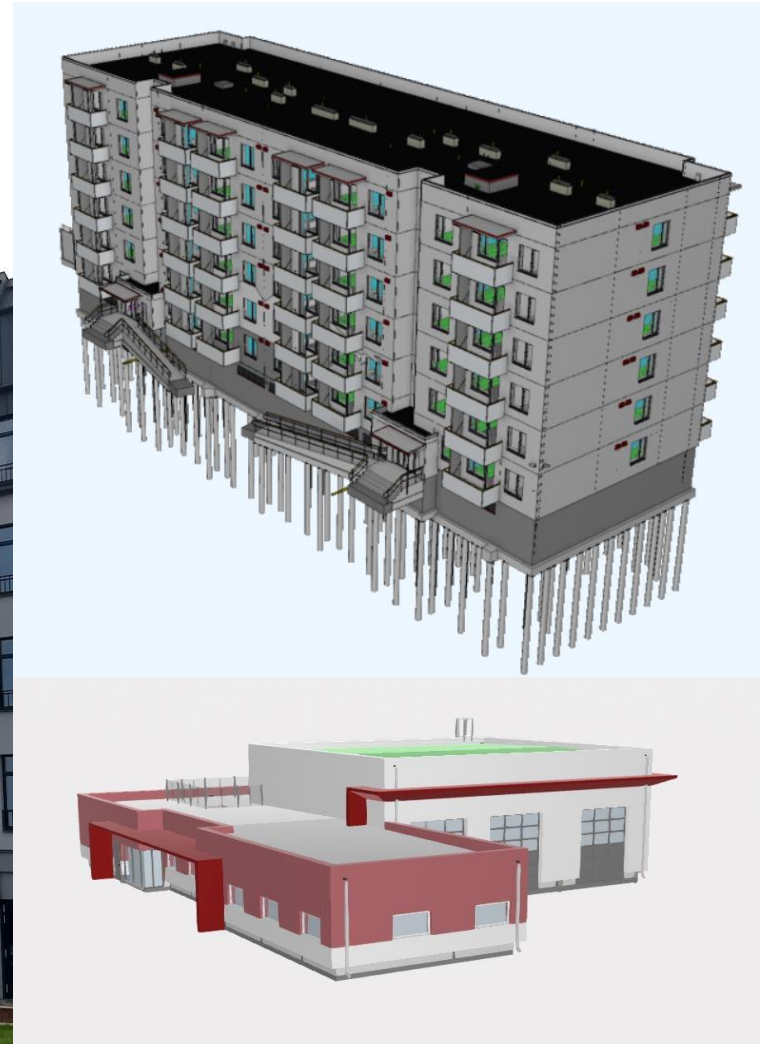
2015. gadā iegūts inženierzinātņu doktora grāds RTU Siltuma, gāzes un ūdens tehnoloģiju institūtā



IZGLĪTĪBA / PIEREDZE

- 2020. gada Februāris – Asociētais prof. RTU
- 2013. gada Decembris - Projektu vadītājs, valdes loceklis SIA „MEP solutions”

REALIZĒTIE BIM PROJEKTI



BIM OBJEKTS 2020

1. vieta



Dzīvojamā kvartāla *Merks* *Viesturdārzs 2.kārtas ēka* Rūpniecības ielā 27, Rīgā

Pasūtītājs: SIA Merks

Projekta autori: SIA Merks – Juris Jirgens, SIA Noblese – Andis Ābele, Agrita Kalnozola, SIA RUUME arhitekti – Oskars Elksnis, Oskars Vāvere, SIA K Forma – Kaspars Kurtiņš, SIA VPM Latvia – Vilnis Puļķis, Laimonis Drozdovs, SIA DOP Birojs – Irīna Irēna Čerņiņa, Sandris Liepiņš, SIA MEP Solutions – Mārcis Sīpols, Jurgis Zemītis, Sandis Jasevičs, SIA A.Ābeles inženieru birojs – Armands Ābele, SIA Ekstracom – Viesturs Krastiņš, SIA FTP Service – Sergejs Paņkovs, Marina Pavlovska
Galvenais būvuzņēmējs: SIA Merks

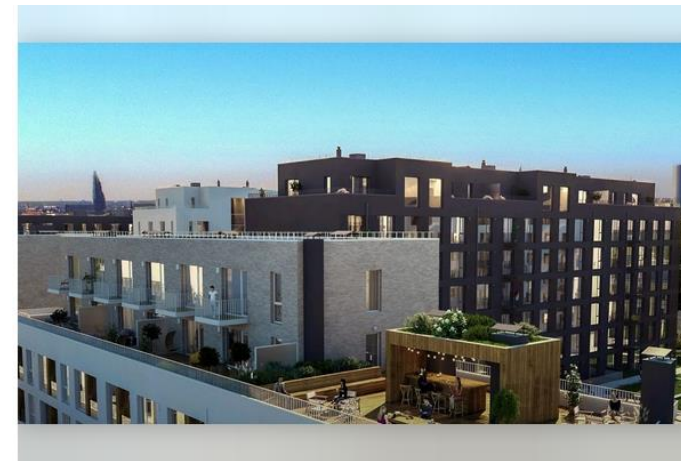
GADA LABĀKĀ BŪVE LATVIJĀ 2021 FINĀLISTI



#1/37 Nominācija - BIM objekts. Daudzstāvu dzīvojamās ēkas Lucavsalā, 1. kārtā Lucavsalas ielā 5, Rīgā.



#2/37 Nominācija - BIM objekts. Daudzstāvu dzīvojamo ēku apbūve Kaivas ielā 48, Rīgā.



#3/37 Nominācija - BIM objekts. Dzīvojamā kvartāla Merks Viesturdārzs 3. kārtas ēka Rūpniecības ielā 33, Rīgā.

LIVE **33**

1. VIETA
NOMINĀCIJA
BIM OBJEKTS

DAUDZSTĀVU DZĪVOJAMĀS ĒKAS
KAIVAS IELĀ RĪGĀ

Pasūtītājs **SIA YIT Latvija**
Projekta autors **SIA CORE Projekts**
Galvenais būvuzņēmējs **SIA YIT Latvija**
Projektētāji-konstruktori **SIA K Forma, Kaspars Kurtišs;**
SIA MEP, Jurgis Zemītis;
SIA MKM Engineering, Igors Semjonovs

GADA LABĀKĀ
BŪVE LATVIJĀ

AKMENS
TIRKĪZS



IEVADS

BIM PAMATPRINCIPI UN AKTUALITĀTES

Apmācību modulis

“BIM modelēšana AVK un UK projektēšanā ar priekšzināšanām”

KAS IR BIM?

Digitāls būves ģeometriskais modelis, kas satur informāciju par būves fizikālajām un tehniskajām īpašībām, un funkcijām. (*Building Information Modeling (BIM) is a digital representation of physical and functional characteristics of a facility. A BIM is a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle; defined as existing from earliest conception to demolition.*)

Izstrādes programmas – ArchiCad; Revit, Tekla, DDS-CAD, ...

Pārbaudes programmas – Solibri, Naviswork, Bimsight, Trimble connect, ...

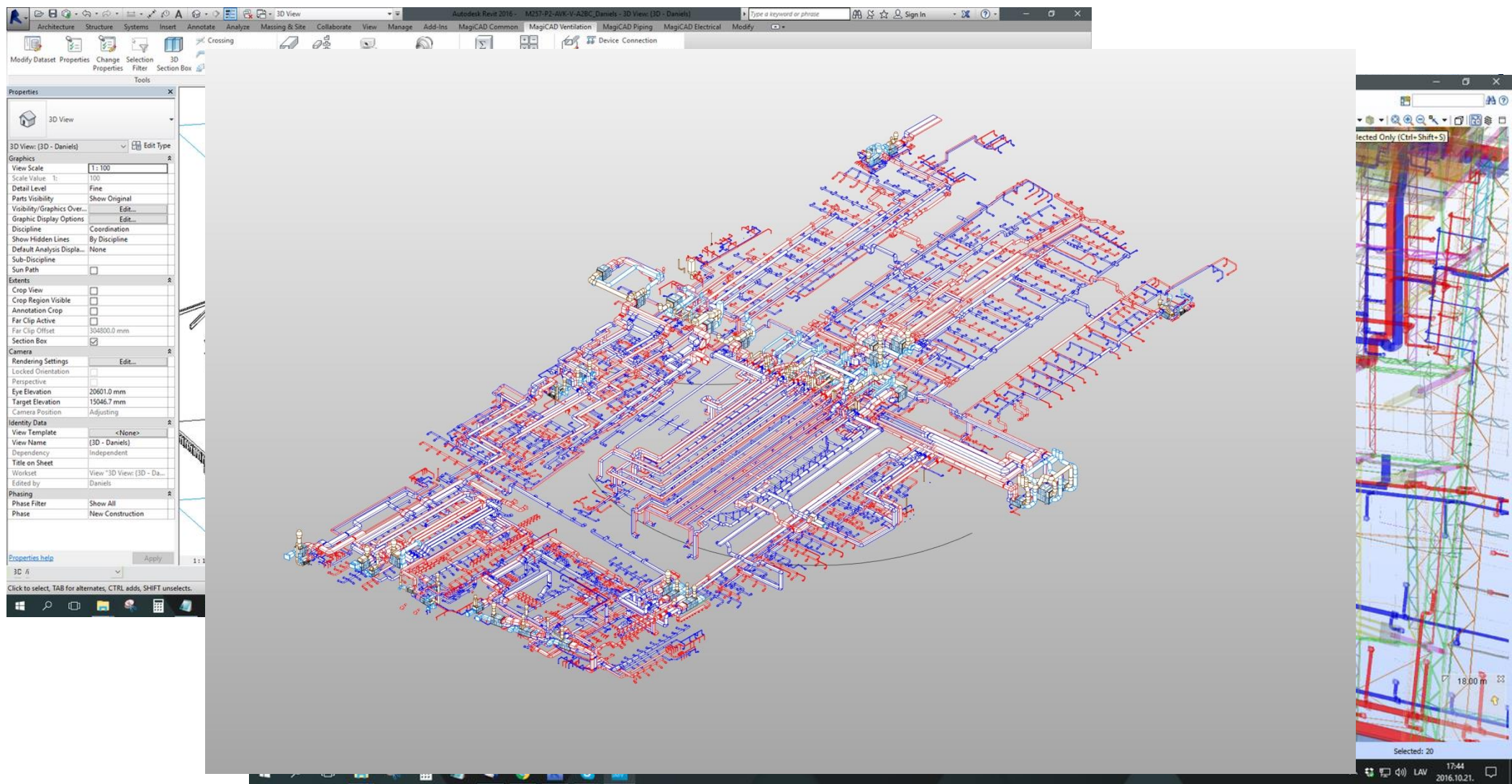
PROGRAMMAS MEP BIM IZSTRĀDEI

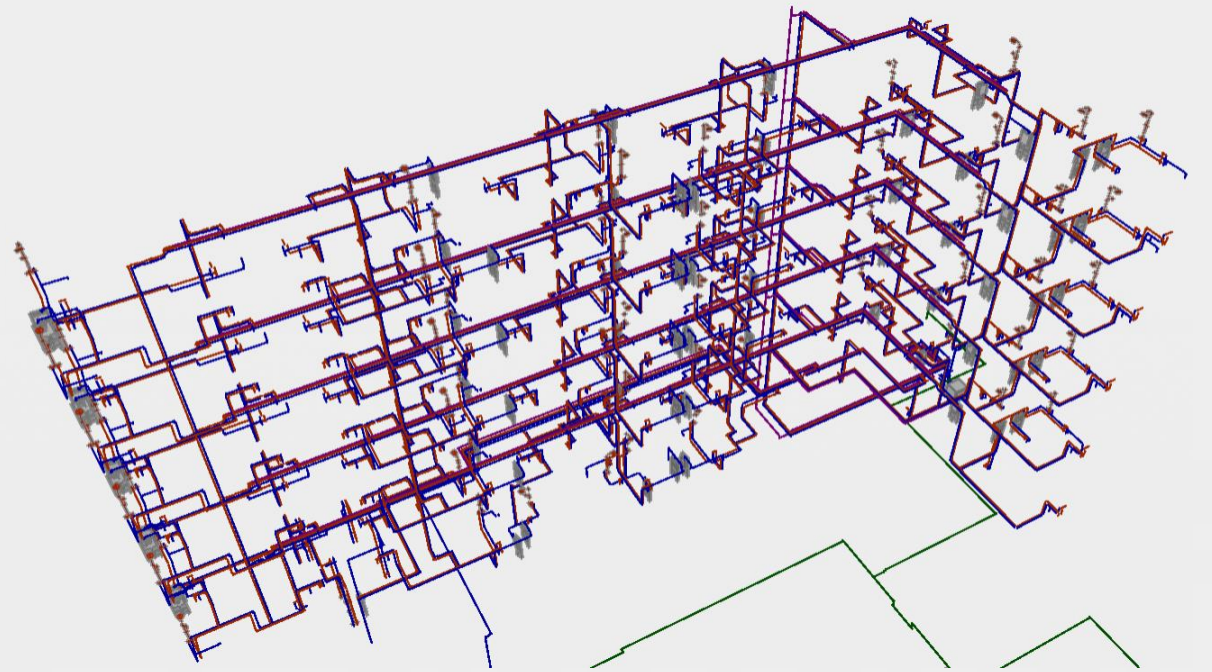
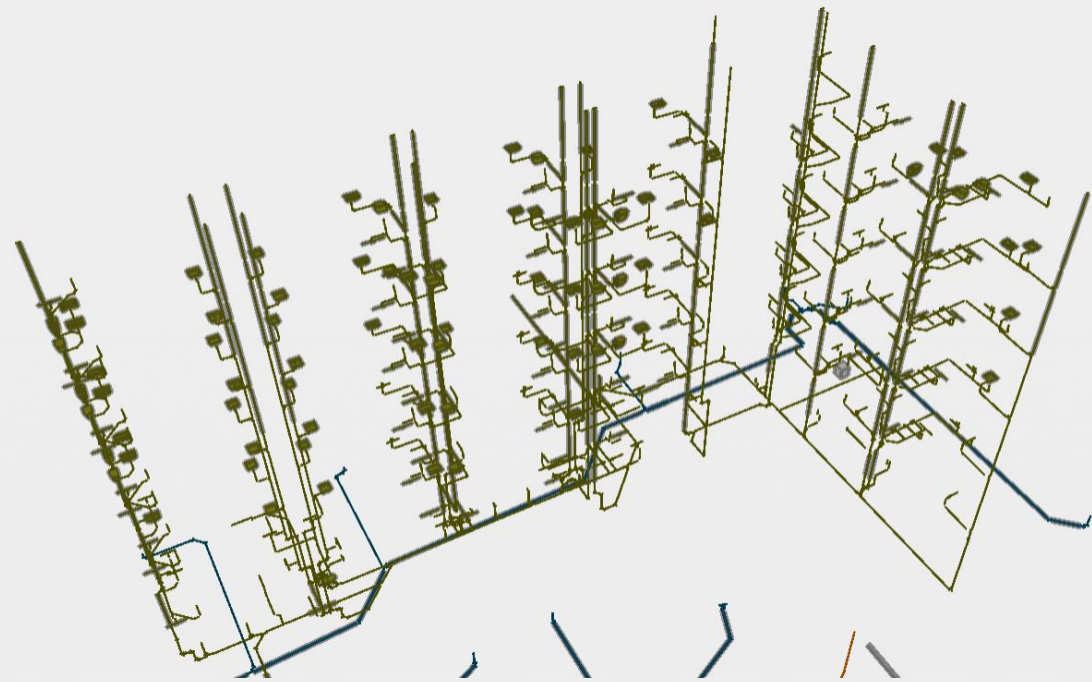
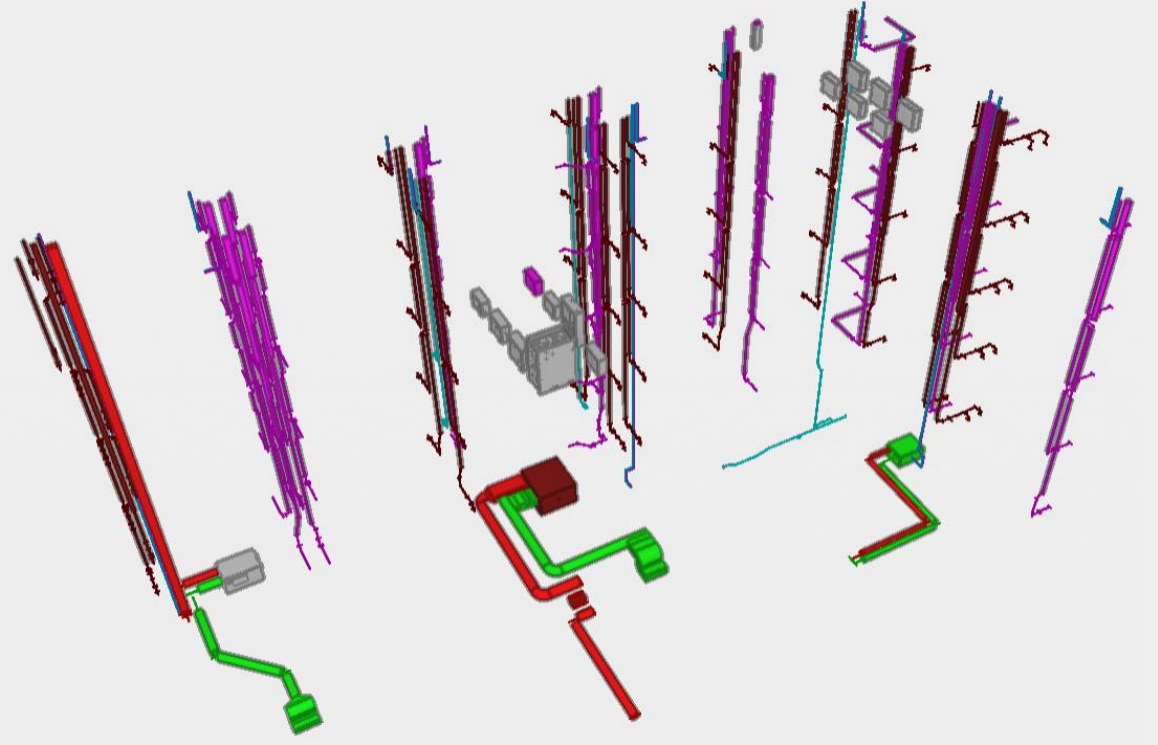
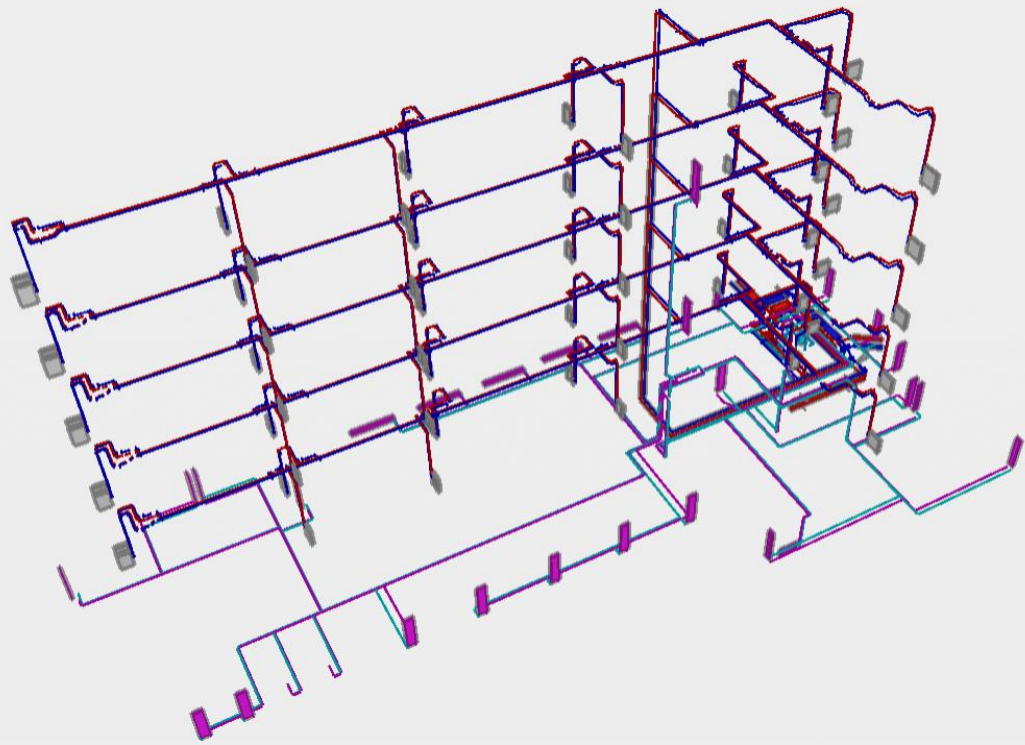
Autorprogrammas:

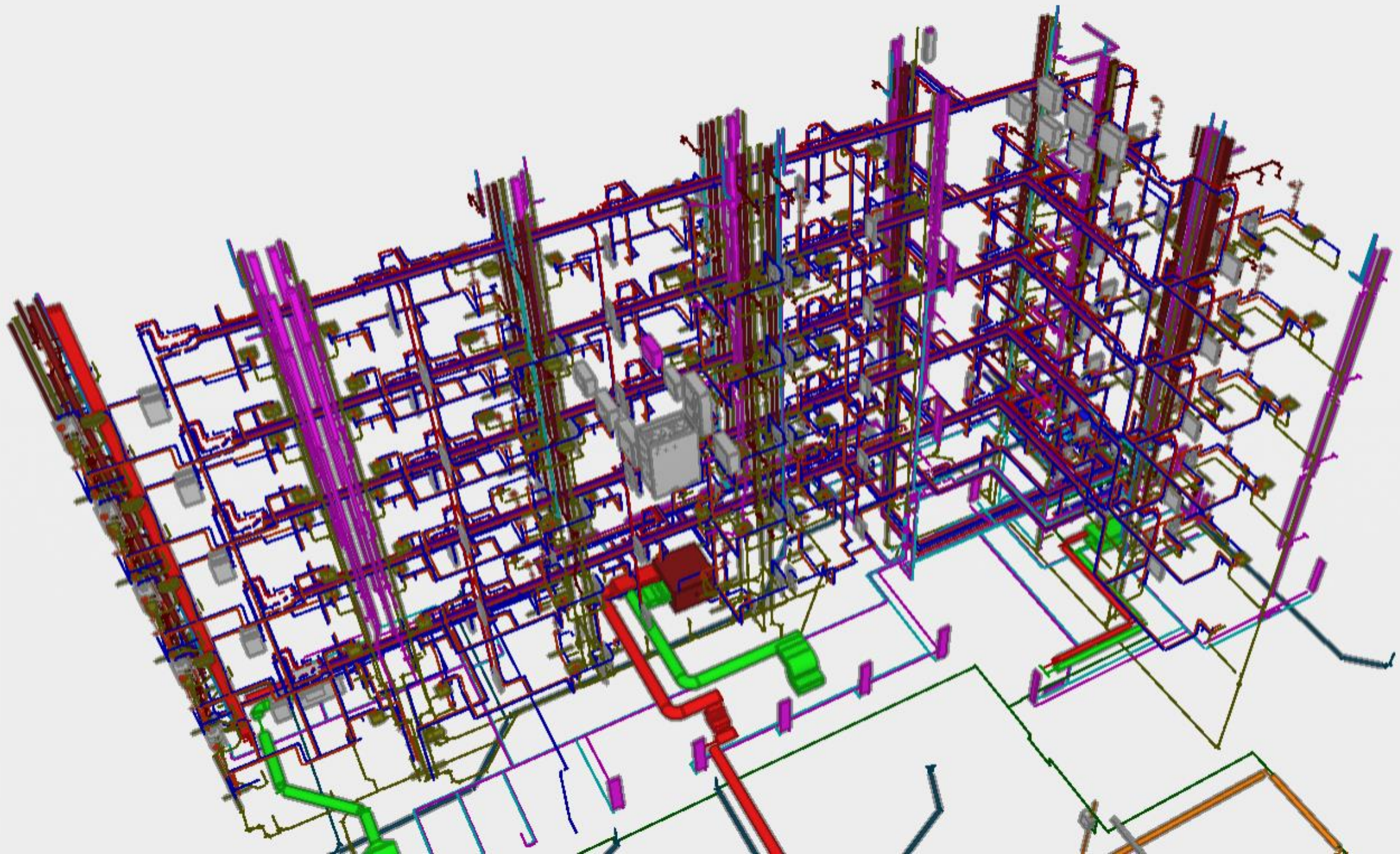
- ▶ Revit
- ▶ DDS-CAD
- ▶ Autocad+Magiacad
- ▶ OpenBuildings Designer / Bentley (<https://virtuosity.bentley.com/product/openbuildings-designer/>)
- ▶ Edificius (<https://www.accasoftware.com/en/mep-software>)
- ▶ VenturisIT (<https://www.directindustry.com/prod/venturisit-gmbh/product-79087-827661.html>)

Plugini Revitam:

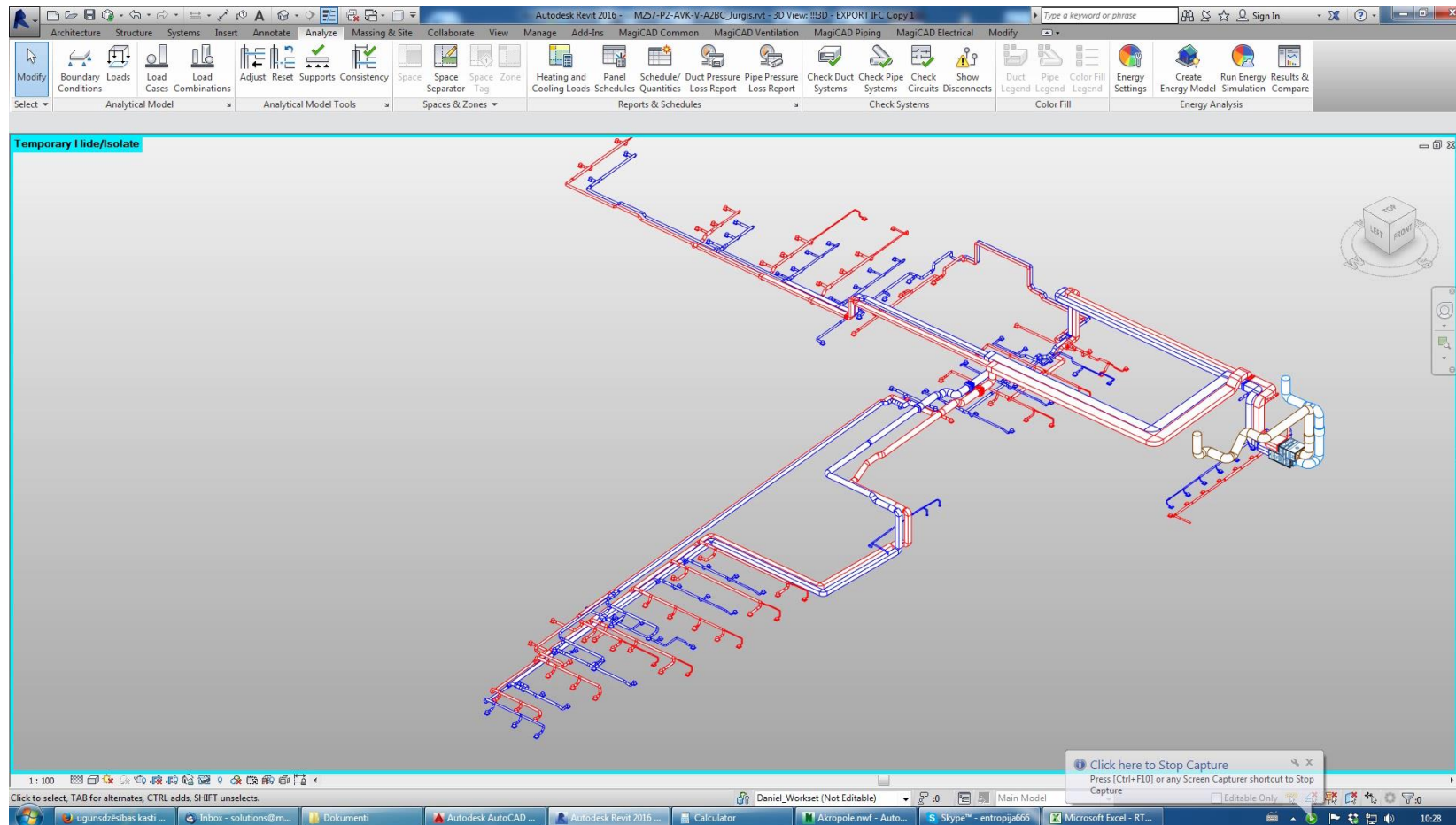
- ▶ Magiacad (<https://www.magicad.com/en/>)
- ▶ Uponsor BIM (https://bim.uponor.com/BLDE/GB/en_GB/plugin-revit)
- ▶ Daikin BIM (<https://bim.daikin.eu/>)
- ▶ liNear (<https://www.linear.eu/en/home/>)







KĀ IZSKATĀS REZULTĀTS



PRIEKŠROCĪBAS BIM

Elementi ar reāliem parametriem (dimensijas, pieslēgumi, tehniskie dati, ...)

Uzdevumi citām sadaļām (EL, BK ...)

Darbība vienotā centralizētā modelī

Visas izmaiņas ir jādara tikai vienu reizi

Vienots exportējamā faila paplašinājums - *.ifc

Iespēja salāgot visas sistēmas un izveidot modeli *as-built* līmenī, iebūvēta kolīziju kontrole

Viens modelis, kur var veikt visus aprēķinus

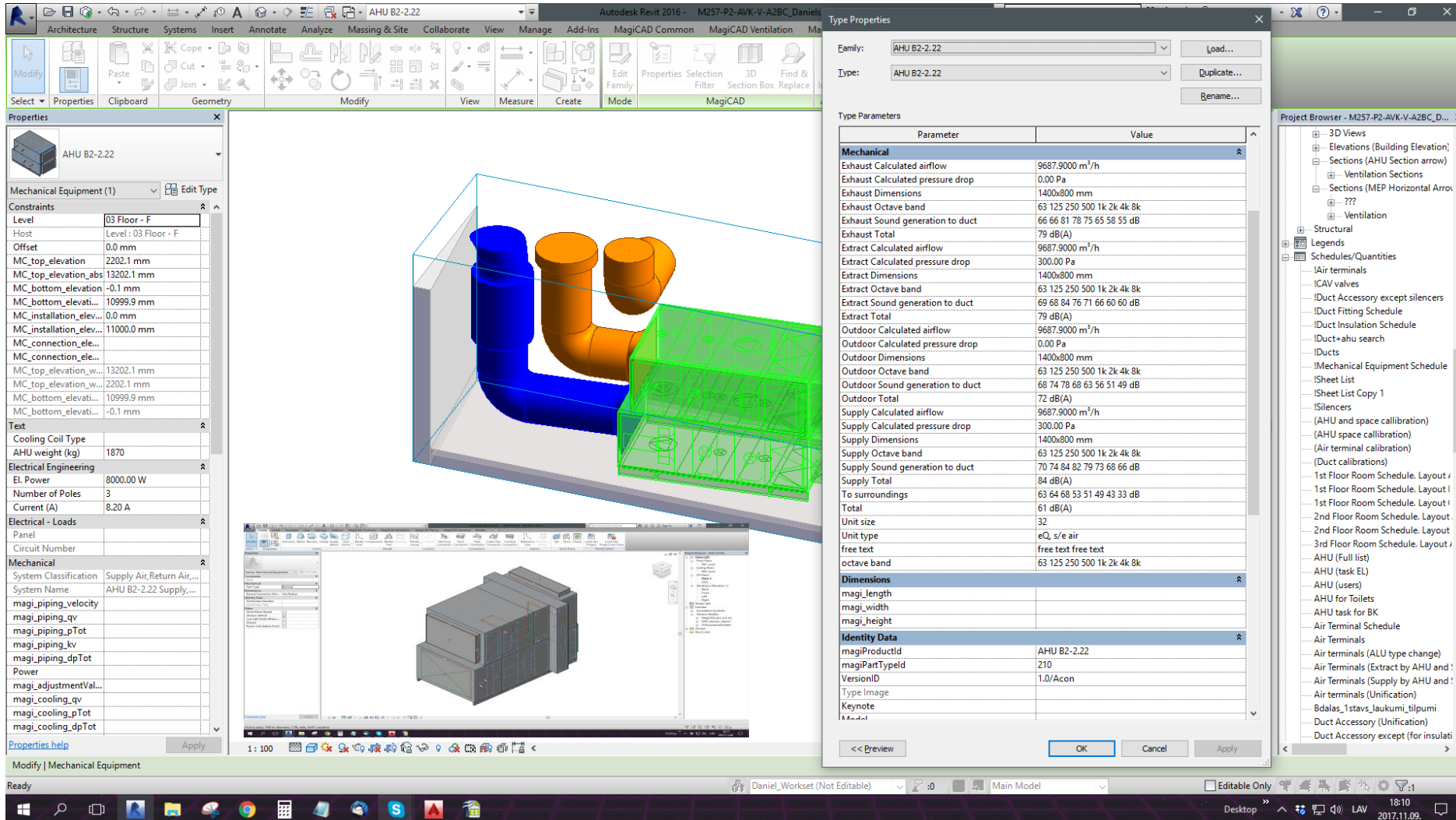
Iespējas automatizēt projektu (piem., piesaistīt radiatoru sienai, vai gaismekli griestiem)

Iespēja iegūt precīzu specifikāciju

Ļoti plašas modifikācijas iespējas, iespēja pašam pievienot savus parametrus

Vizuāli iespaidīgi priekš pasūtītāja

ELEMENTI AR REĀLIEM PARAMETRIEM (DIMENSIJAS, PIESLĒGUMI, TEHNISKIE DATI, ...)



The screenshot displays the Autodesk Revit 2016 interface with a 3D model of an AHU B2-2.22. The main window shows the model, the Properties palette on the left, and the Type Properties dialog on the right. The Properties palette lists constraints, text, electrical engineering, and mechanical data. The Type Properties dialog shows a table of parameters and their values, categorized into Mechanical, Dimensions, and Identity Data.

Properties

Mechanical Equipment (1)

Constraints

Level	03 Floor - F
Host	Level: 03 Floor - F
Offset	0.0 mm
MC_top_elevation	2202.1 mm
MC_top_elevation_abs	13202.1 mm
MC_bottom_elevation	-0.1 mm
MC_bottom_elevati...	10999.9 mm
MC_installation_elev...	0.0 mm
MC_installation_elev...	11000.0 mm
MC_connection_ele...	
MC_connection_ele...	
MC_top_elevation_w...	13202.1 mm
MC_top_elevation_w...	2202.1 mm
MC_bottom_elevati...	10999.9 mm
MC_bottom_elevati...	-0.1 mm

Text

Cooling Coil Type	
AHU weight (kg)	1870

Electrical Engineering

El. Power	8000.00 W
Number of Poles	3
Current (A)	8.20 A

Electrical - Loads

Panel	
Circuit Number	

Mechanical

System Classification	Supply Air_Return Air...
System Name	AHU B2-2.22 Supply...
magi_piping_velocity	
magi_piping_qv	
magi_piping_pTot	
magi_piping_kv	
magi_piping_dpTot	
Power	
magi_adjustmentVal...	
magi_cooling_qv	
magi_cooling_pTot	
magi_cooling_dpTot	

Type Properties

Family: AHU B2-2.22
Type: AHU B2-2.22

Parameter	Value
Mechanical	
Exhaust Calculated airflow	9687.9000 m ³ /h
Exhaust Calculated pressure drop	0.00 Pa
Exhaust Dimensions	1400x800 mm
Exhaust Octave band	63 125 250 500 1k 2k 4k 8k
Exhaust Sound generation to duct	66 66 81 78 75 65 58 55 dB
Exhaust Total	79 dB(A)
Extract Calculated airflow	9687.9000 m ³ /h
Extract Calculated pressure drop	300.00 Pa
Extract Dimensions	1400x800 mm
Extract Octave band	63 125 250 500 1k 2k 4k 8k
Extract Sound generation to duct	69 68 84 76 71 66 60 60 dB
Extract Total	79 dB(A)
Outdoor Calculated airflow	9687.9000 m ³ /h
Outdoor Calculated pressure drop	0.00 Pa
Outdoor Dimensions	1400x800 mm
Outdoor Octave band	63 125 250 500 1k 2k 4k 8k
Outdoor Sound generation to duct	68 74 78 68 63 56 51 49 dB
Outdoor Total	72 dB(A)
Supply Calculated airflow	9687.9000 m ³ /h
Supply Calculated pressure drop	300.00 Pa
Supply Dimensions	1400x800 mm
Supply Octave band	63 125 250 500 1k 2k 4k 8k
Supply Sound generation to duct	70 74 84 82 79 73 68 66 dB
Supply Total	84 dB(A)
To surroundings	63 64 68 53 51 49 43 33 dB
Total	61 dB(A)
Unit size	32
Unit type	eQ, s/e air
free text	free text free text
octave band	63 125 250 500 1k 2k 4k 8k
Dimensions	
magi_length	
magi_width	
magi_height	
Identity Data	
magiProductId	AHU B2-2.22
magiPartTypeId	210
VersionID	1.0/Acon
Type Image	
Keynote	

UZDEVUMI CITĀM SADAĻĀM

Autodesk Revit 2016 - M257-P2-AVK-V-A2BC_Daniels.rvt - Schedule: AHU (Full list)

Properties Parameters Columns Rows Titles & Headers Appearance Element

Properties Parameters Columns Rows Titles & Headers Appearance Element

Schedule: AHU (Full list) Edit Type

Identity Data View Template <None> View Name AHU (Full list) Dependency Independent Workset View "Schedule: AHU (...)" Edited by Phasing Phase Filter Show All Phase New Construction Other Fields Edit... Filter Edit... Sorting/Grouping Edit... Formatting Edit... Appearance Edit...

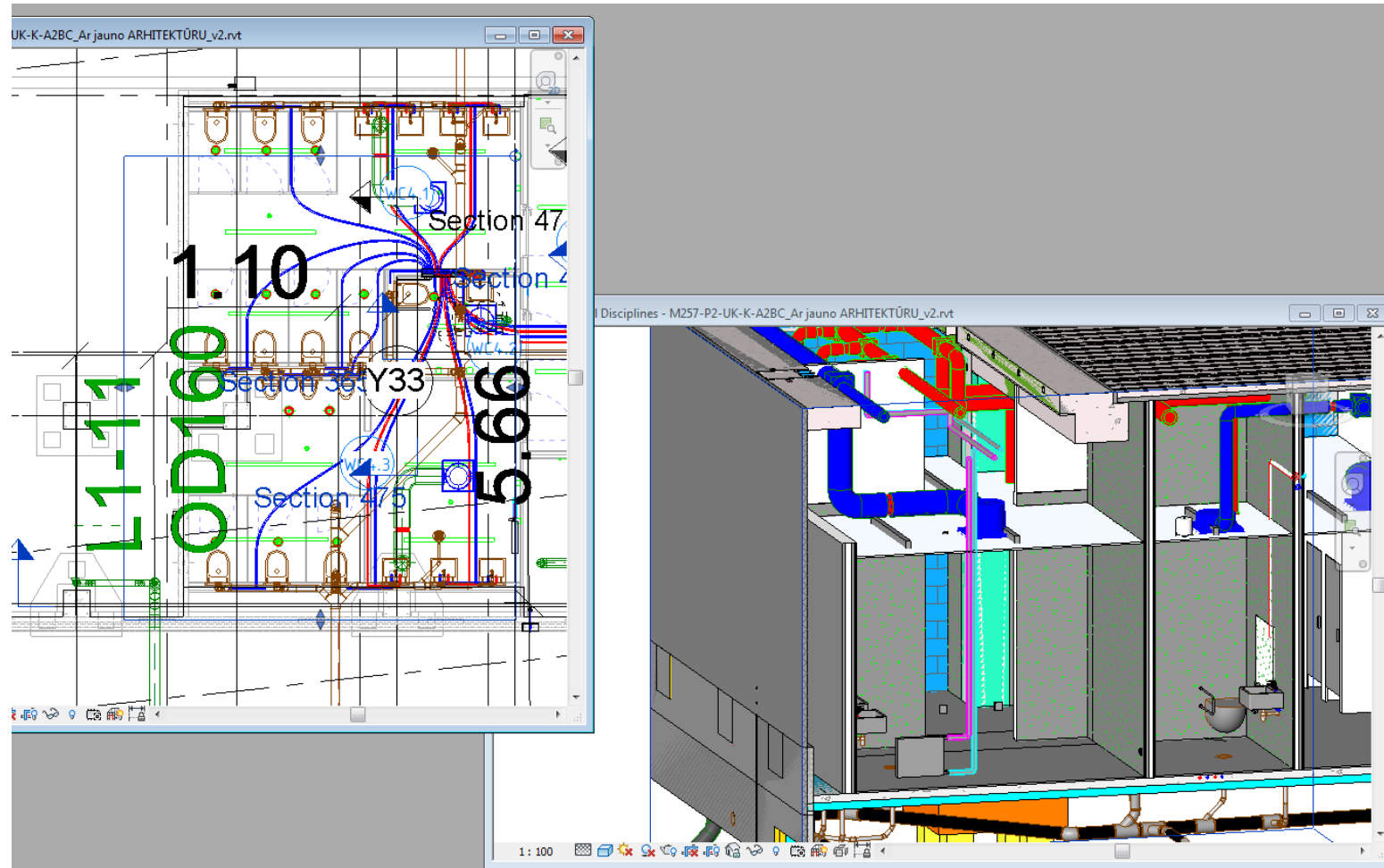
A	B	C	D	E	F	G	H	I	J	K	L	M
Level	System Name	Air supply	Air extract	Cooling Coil Type	Cooling loads	Cooling pressure dr	Type Comments	Heating load	Heating pressure drop	El Power	Mass	Cooling Capacity
02 Floor - AB	AHU A.2 Supply,A	26,000.0 m³/h	26,000.0 m³/h	VRF	152.0 kW	15.3 kPa	Air handling unit	87.6 kW	1.4 kPa	22.0 kW		
03 Floor - Cinema	AHU A.3 Supply,A	10,534.0 m³/h	10,534.0 m³/h	VRF	66.6 kW	3.9 kPa	Air handling unit	16.4 kW	13.1 kPa	11.0 kW		
03 Floor - A +20.2m	AHU A.4 Supply,A	33,594.0 m³/h	33,594.0 m³/h	VRF	188.0 kW	16.1 kPa	Air handling unit	52.1 kW	0.6 kPa	30.0 kW		
03 Floor - A +20.2m	AHU A.5 Supply,A	20,915.0 m³/h	20,915.0 m³/h	VRF	111.0 kW	7.3 kPa	Air handling unit	32.9 kW	0.2 kPa	26.0 kW		
03 Floor - A +20.2m	AHU A.6 Supply,A	11,427.0 m³/h	11,427.0 m³/h	VRF	73.0 kW	4.6 kPa	Air handling unit	17.7 kW	0.2 kPa	9.5 kW		
03 Floor - A +20.2m	AHU A.7.1 Supply,	20,000.0 m³/h	20,000.0 m³/h	VRF	141.0 kW	10.0 kPa	Air handling unit	29.8 kW	0.2 kPa	18.5 kW		
04 Floor-A	AHU A.7.2 Supply,	20,000.0 m³/h	20,000.0 m³/h	VRF	141.0 kW	10.0 kPa	Air handling unit	29.8 kW	0.2 kPa	18.5 kW		
03 Floor - F	AHU B1-2.65 Suppl	5,000.0 m³/h	5,000.0 m³/h	Water	33.6 kW	37.4 kPa	Air handling unit	17.1 kW	10.4 kPa	3.7 kW		
03 Floor - F	AHU B1-2.19 Suppl	6,230.0 m³/h	6,230.0 m³/h	Water	49.6 kW	60.1 kPa	Air handling unit	0.0 kW	0.0 kPa	5.2 kW		
03 Floor - F	AHU B1-2.20 Suppl	3,800.0 m³/h	3,800.0 m³/h				Air handling unit			3.0 kW		
03 Floor - F	AHU B1-2.29 Suppl	5,810.0 m³/h	5,810.0 m³/h	Water	46.1 kW	53.5 kPa	Air handling unit	13.2 kW	16.6 kPa	4.4 kW		
03 Floor - F	AHU B1-2.30 Suppl	7,460.0 m³/h	7,460.0 m³/h	Water	59.9 kW	63.8 kPa	Air handling unit	17.5 kW	20.5 kPa	7.0 kW		
03 Floor - F	AHU B2-2.12 Suppl	2,090.0 m³/h	2,090.0 m³/h	Water	17.2 kW	47.2 kPa	Air handling unit	2.8 kW		15.8 kPa		
03 Floor - F	AHU B2-2.14 Suppl	1,675.0 m³/h	1,675.0 m³/h				Air handling unit			2.2 kW		
03 Floor - F	AHU B2-2.15 Suppl	3,180.0 m³/h	3,180.0 m³/h	Water	25.5 kW	11.1 kPa	Air handling unit	9.3 kW	15.6 kPa	2.6 kW		
03 Floor - F	AHU B2-2.17 Suppl	930.0 m³/h	930.0 m³/h				Air handling unit			1.5 kW		
03 Floor - F	AHU B2-2.18 Suppl	1,020.0 m³/h	1,020.0 m³/h	Water	8.4 kW	11.5 kPa	Air handling unit	1.3 kW	9.1 kPa	1.5 kW		
03 Floor - F	AHU B2-2.19 Suppl	4,790.0 m³/h	4,790.0 m³/h				Air handling unit			4.4 kW		
03 Floor - F	AHU B2-2.20 Suppl	5,610.0 m³/h	5,610.0 m³/h	Water	35.0 kW	36.0 kPa	Air handling unit	0.0 kW	0.0 kPa	4.4 kW		
03 Floor - F	AHU B2-2.21 Suppl	5,900.0 m³/h	5,900.0 m³/h	Water	46.7 kW	45.6 kPa	Air handling unit	16.0 kW	11.4 kPa	4.4 kW		
03 Floor - F	AHU B2-2.22 Suppl	9,650.0 m³/h	9,650.0 m³/h				Air handling unit			8.0 kW		
03 Floor - F	AHU B2-2.23 Suppl	7,340.0 m³/h	7,340.0 m³/h				Air handling unit			7.0 kW		
03 Floor - F	AHU B2.24. Supply	3,732.0 m³/h	3,732.0 m³/h	VRF	14.6 kW	1.3 kPa	Air handling unit	12.5 kW	1.0 kPa	6.0 kW		
03 Floor - F	AHU B.5 Supply,A	33,464.0 m³/h	33,464.0 m³/h	VRF	219.5 kW	16.6 kPa	Air handling unit	130.0 kW	4.9 kPa	33.5 kW		
02 Floor - AB	AHU B.6 Supply,A	26,644.0 m³/h	26,644.0 m³/h	VRF	151.0 kW	12.1 kPa	Air handling unit	41.3 kW	0.4 kPa	30.0 kW		
02 Floor - AB	AHU B.7 Supply,A	15,091.0 m³/h	15,091.0 m³/h	VRF	85.6 kW	4.9 kPa	Air handling unit	25.0 kW	1.7 kPa	11.0 kW		
02 Floor - AB	AHU B.8 Supply,A	14,130.0 m³/h	14,130.0 m³/h	VRF	53.8 kW	5.1 kPa	Air handling unit	46.7 kW	5.6 kPa	13.0 kW		
03 Floor - F	AHU B.20 Supply,	25,000.0 m³/h	25,000.0 m³/h	Water	128.0 kW	24.8 kPa	Air handling unit	42.2 kW	4.6 kPa	26.0 kW		
03 Floor - F	AHU B.22 Supply,	25,000.0 m³/h	25,000.0 m³/h				Air handling unit					
02 Floor - AB	AHU B.24 Supply,	46,300.0 m³/h	46,300.0 m³/h	VRF	302.0 kW	32.3 kPa	Air handling unit	153.0 kW	3.0 kPa	37.0 kW		
02 Floor - AB	AHU B.25 Supply,	22,183.0 m³/h	22,183.0 m³/h	VRF	100.0 kW	10.3 kPa	Air handling unit	37.9 kW	0.4 kPa	26.0 kW		
02 Floor - AB	AHU B.26 Supply,	18,493.0 m³/h	18,493.0 m³/h	VRF	99.9 kW	6.0 kPa	Air handling unit	29.2 kW	0.3 kPa	22.0 kW		
02 Floor - AB	AHU B.27 Supply,	11,040.0 m³/h	0.0 m³/h				Air handling unit			20.0 kW		
03 Floor - F	AHU BH.1 Supply,	43,600.0 m³/h	43,600.0 m³/h	VRF	287.0 kW	42.2 kPa	Air handling unit	137.0 kW	3.0 kPa	44.0 kW		
03 Floor - F	AHU BH.2 Supply,	24,900.0 m³/h	24,900.0 m³/h	VRF	154.0 kW	15.8 kPa	Air handling unit	83.8 kW	1.3 kPa	18.5 kW		
02 Floor - C	AHU C.3 Supply,A	12,840.0 m³/h	12,840.0 m³/h	VRF	45.5 kW	3.7 kPa	Air handling unit	40.3 kW	4.3 kPa	15.0 kW		
03 Floor - F	AHU C.4 Supply,A	41,662.0 m³/h	41,662.0 m³/h	VRF	220.4 kW	20.6 kPa	Air handling unit	102.0 kW	1.5 kPa	44.0 kW		
02 Floor - C	AHU C.5 Supply,A	35,700.0 m³/h	35,700.0 m³/h	VRF	210.0 kW	49.7 kPa	Air handling unit	110.0 kW	11.6 kPa	30.0 kW		
02 Floor - C	AHU C.6 Supply,A	33,810.0 m³/h	33,810.0 m³/h	VRF	199.0 kW	18.8 kPa	Air handling unit	101.0 kW	10.0 kPa	30.0 kW		
02 Floor - C	AHU C.7 Outdoor,	11,680.0 m³/h	11,680.0 m³/h	VRF	44.9 kW	3.7 kPa	Air handling unit	36.9 kW	0.5 kPa	11.0 kW		
02 Floor - C	AHU CD.1 Supply,	14,300.0 m³/h	14,300.0 m³/h	VRF	92.8 kW	7.2 kPa	Air handling unit	44.8 kW	0.2 kPa	13.0 kW		
02 Floor - C	AHU CH.1 Supply,	44,000.0 m³/h	44,000.0 m³/h				Air handling unit					
04 Floor-A	AHU K.1 Supply,A	15,350.0 m³/h	15,350.0 m³/h	Water	45.8 kW	18.6 kPa	Air handling unit	88.1 kW	17.4 kPa	13.0 kW		
04 Floor-A	AHU K.2 Supply,A	10,900.0 m³/h	10,900.0 m³/h	Water	33.1 kW	37.7 kPa	Air handling unit	66.2 kW	34.4 kPa	9.5 kW		
03 Floor - A +20.2m	AHU K.4 Supply,A	8,350.0 m³/h	8,350.0 m³/h	Water	25.0 kW	9.9 kPa	Air handling unit	47.6 kW	9.2 kPa	7.0 kW		
03 Floor - A +20.2m	AHU K.663 Supply,	10,950.0 m³/h	10,950.0 m³/h	Water	38.0 kW	7.8 kPa	Air handling unit	43.3 kW	0.0 kPa	6.0 kW		

Properties help Apply

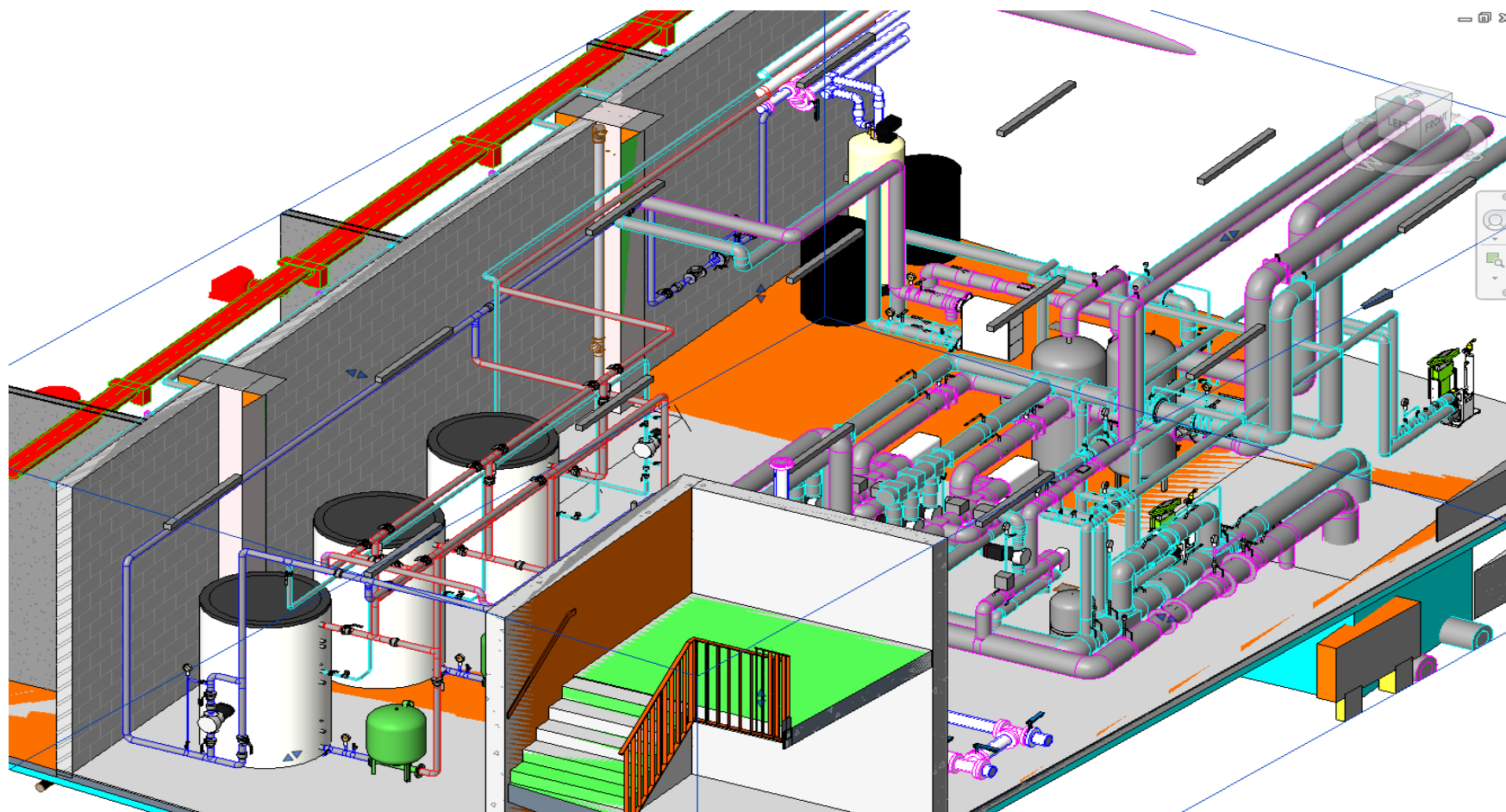
Modify Schedule/Quantities

Ready Daniel_Worset (Not Editable) Main Model

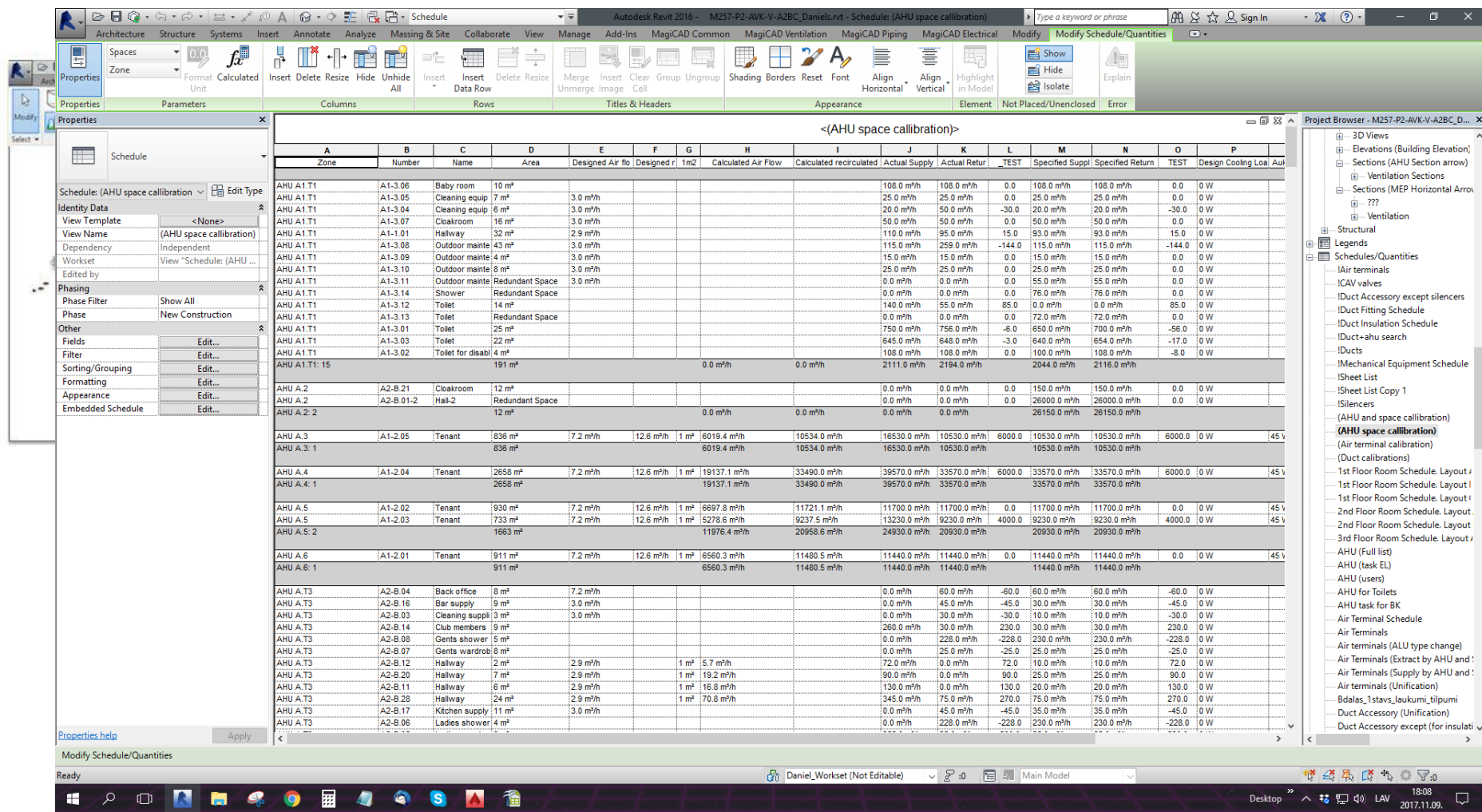
DARBĪBA VIENOTĀ CENTRALIZĒTĀ MODELĪ



IESPĒJA SALĀGOT VISAS SISTĒMAS UN IZVEIDOT MODELI *AS-BUILT* LĪMENĪ, IEBŪVĒTA KOLĪZIJU KONTROLE



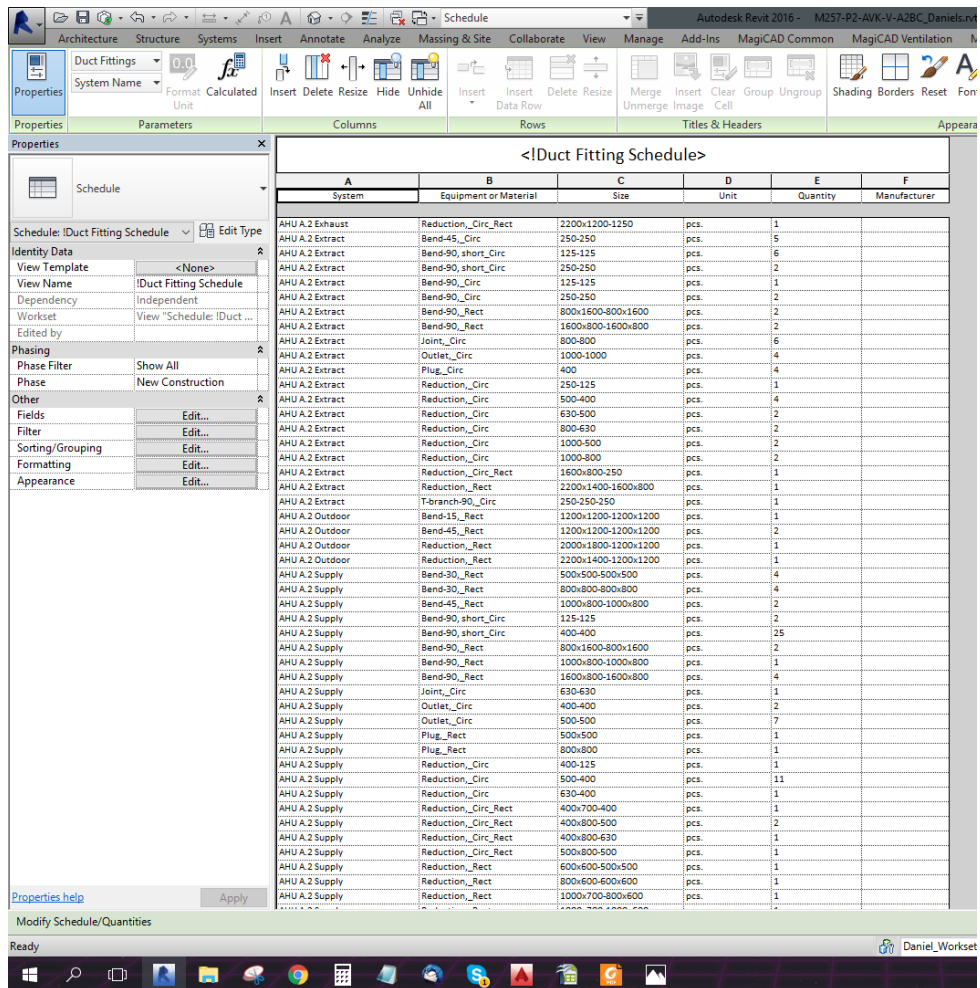
VIENS MODELIS, KUR VAR VEIKT VISUS APRĒĶINUS



<(AHU space calibration)>

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Zone	Number	Name	Area	Designed Air Flow	Designed r	1m2	Calculated Air Flow	Calculated recirculated	Actual Supply	Actual Return	_TEST	Specified Suppl	Specified Return	TEST	Design Cooling Loa	Air
AHU A1.T1	A1-3.06	Baby room	10 m²						108.0 m³/h	108.0 m³/h	0.0	108.0 m³/h	108.0 m³/h	0.0	0 W	
AHU A1.T1	A1-3.05	Cleaning equip	7 m²	3.0 m³/h					25.0 m³/h	25.0 m³/h	0.0	25.0 m³/h	25.0 m³/h	0.0	0 W	
AHU A1.T1	A1-3.04	Cleaning equip	6 m²	3.0 m³/h					20.0 m³/h	50.0 m³/h	-30.0	20.0 m³/h	20.0 m³/h	-30.0	0 W	
AHU A1.T1	A1-3.07	Cloakroom	16 m²	3.0 m³/h					50.0 m³/h	50.0 m³/h	0.0	50.0 m³/h	50.0 m³/h	0.0	0 W	
AHU A1.T1	A1-1.01	Halfway	32 m²	2.9 m³/h					110.0 m³/h	95.0 m³/h	15.0	93.0 m³/h	93.0 m³/h	15.0	0 W	
AHU A1.T1	A1-3.08	Outdoor mante	43 m²	3.0 m³/h					115.0 m³/h	259.0 m³/h	-144.0	115.0 m³/h	115.0 m³/h	-144.0	0 W	
AHU A1.T1	A1-3.09	Outdoor mante	4 m²	3.0 m³/h					15.0 m³/h	15.0 m³/h	0.0	15.0 m³/h	15.0 m³/h	0.0	0 W	
AHU A1.T1	A1-3.10	Outdoor mante	8 m²	3.0 m³/h					25.0 m³/h	25.0 m³/h	0.0	25.0 m³/h	25.0 m³/h	0.0	0 W	
AHU A1.T1	A1-3.11	Outdoor mante	Redundant Space	3.0 m³/h					0.0 m³/h	0.0 m³/h	0.0	55.0 m³/h	55.0 m³/h	0.0	0 W	
AHU A1.T1	A1-3.14	Shower	Redundant Space						0.0 m³/h	0.0 m³/h	0.0	76.0 m³/h	76.0 m³/h	0.0	0 W	
AHU A1.T1	A1-3.12	Toilet	14 m²						140.0 m³/h	55.0 m³/h	85.0	0.0 m³/h	0.0 m³/h	85.0	0 W	
AHU A1.T1	A1-3.13	Toilet	Redundant Space						0.0 m³/h	0.0 m³/h	0.0	72.0 m³/h	72.0 m³/h	0.0	0 W	
AHU A1.T1	A1-3.01	Toilet	25 m²						750.0 m³/h	756.0 m³/h	-6.0	650.0 m³/h	700.0 m³/h	-56.0	0 W	
AHU A1.T1	A1-3.03	Toilet	22 m²						645.0 m³/h	648.0 m³/h	-3.0	640.0 m³/h	654.0 m³/h	-17.0	0 W	
AHU A1.T1	A1-3.02	Toilet for disabili	4 m²						108.0 m³/h	108.0 m³/h	0.0	100.0 m³/h	108.0 m³/h	-8.0	0 W	
AHU A1.T1: 15			191 m²				0.0 m³/h	0.0 m³/h	2111.0 m³/h	2194.0 m³/h		2044.0 m³/h	2116.0 m³/h			
AHU A.2	A2-B.21	Cloakroom	12 m²						0.0 m³/h	0.0 m³/h	0.0	150.0 m³/h	150.0 m³/h	0.0	0 W	
AHU A.2	A2-B.01-2	Halk-2	Redundant Space						0.0 m³/h	0.0 m³/h	0.0	26000.0 m³/h	26000.0 m³/h	0.0	0 W	
AHU A.2: 2							0.0 m³/h	0.0 m³/h	0.0 m³/h	0.0 m³/h		26150.0 m³/h	26150.0 m³/h			
AHU A.3	A1-2.05	Tenant	836 m²	7.2 m³/h	12.6 m³/h	1 m²	6019.4 m³/h	10534.0 m³/h	16530.0 m³/h	10530.0 m³/h	6000.0	10530.0 m³/h	10530.0 m³/h	6000.0	0 W	45 V
AHU A.3: 1			836 m²				6019.4 m³/h	10534.0 m³/h	16530.0 m³/h	10530.0 m³/h		10530.0 m³/h	10530.0 m³/h			
AHU A.4	A1-2.04	Tenant	2658 m²	7.2 m³/h	12.6 m³/h	1 m²	19137.1 m³/h	33490.0 m³/h	39570.0 m³/h	33570.0 m³/h	6000.0	33570.0 m³/h	33570.0 m³/h	6000.0	0 W	45 V
AHU A.4: 1			2658 m²				19137.1 m³/h	33490.0 m³/h	39570.0 m³/h	33570.0 m³/h		33570.0 m³/h	33570.0 m³/h			
AHU A.5	A1-2.02	Tenant	930 m²	7.2 m³/h	12.6 m³/h	1 m²	6697.8 m³/h	11721.1 m³/h	11700.0 m³/h	11700.0 m³/h	0.0	11700.0 m³/h	11700.0 m³/h	0.0	0 W	45 V
AHU A.5	A1-2.03	Tenant	733 m²	7.2 m³/h	12.6 m³/h	1 m²	5278.6 m³/h	9237.5 m³/h	13230.0 m³/h	9237.5 m³/h	4000.0	9230.0 m³/h	9230.0 m³/h	4000.0	0 W	45 V
AHU A.5: 2			1663 m²				11976.4 m³/h	20958.6 m³/h	24930.0 m³/h	20930.0 m³/h		20930.0 m³/h	20930.0 m³/h			
AHU A.6	A1-2.01	Tenant	911 m²	7.2 m³/h	12.6 m³/h	1 m²	6560.3 m³/h	11480.5 m³/h	11440.0 m³/h	11440.0 m³/h	0.0	11440.0 m³/h	11440.0 m³/h	0.0	0 W	45 V
AHU A.6: 1			911 m²				6560.3 m³/h	11480.5 m³/h	11440.0 m³/h	11440.0 m³/h		11440.0 m³/h	11440.0 m³/h			
AHU A.T3	A2-B.04	Back office	8 m²	7.2 m³/h					0.0 m³/h	60.0 m³/h	-60.0	60.0 m³/h	60.0 m³/h	-60.0	0 W	
AHU A.T3	A2-B.16	Bar supply	9 m²	3.0 m³/h					0.0 m³/h	45.0 m³/h	-45.0	30.0 m³/h	30.0 m³/h	-45.0	0 W	
AHU A.T3	A2-B.03	Cleaning suppli	3 m²	3.0 m³/h					0.0 m³/h	30.0 m³/h	-30.0	10.0 m³/h	10.0 m³/h	-30.0	0 W	
AHU A.T3	A2-B.14	Club members	9 m²						260.0 m³/h	30.0 m³/h	230.0	30.0 m³/h	30.0 m³/h	230.0	0 W	
AHU A.T3	A2-B.08	Gents shower	5 m²						0.0 m³/h	228.0 m³/h	-228.0	230.0 m³/h	230.0 m³/h	-228.0	0 W	
AHU A.T3	A2-B.07	Gents wardrob	8 m²						0.0 m³/h	25.0 m³/h	-25.0	25.0 m³/h	25.0 m³/h	-25.0	0 W	
AHU A.T3	A2-B.12	Halfway	2 m²	2.9 m³/h		1 m²	5.7 m³/h		72.0 m³/h	0.0 m³/h	72.0	10.0 m³/h	10.0 m³/h	72.0	0 W	
AHU A.T3	A2-B.20	Halfway	7 m²	2.9 m³/h		1 m²	19.2 m³/h		90.0 m³/h	0.0 m³/h	90.0	25.0 m³/h	25.0 m³/h	90.0	0 W	
AHU A.T3	A2-B.11	Halfway	6 m²	2.9 m³/h		1 m²	16.8 m³/h		130.0 m³/h	0.0 m³/h	130.0	20.0 m³/h	20.0 m³/h	130.0	0 W	
AHU A.T3	A2-B.28	Halfway	24 m²	2.9 m³/h		1 m²	70.8 m³/h		345.0 m³/h	0.0 m³/h	270.0	75.0 m³/h	75.0 m³/h	270.0	0 W	
AHU A.T3	A2-B.17	Kitchen supply	11 m²	3.0 m³/h					0.0 m³/h	45.0 m³/h	-45.0	35.0 m³/h	35.0 m³/h	-45.0	0 W	
AHU A.T3	A2-B.06	Ladies shower	4 m²						0.0 m³/h	228.0 m³/h	-228.0	230.0 m³/h	230.0 m³/h	-228.0	0 W	

IESPĒJA IEGŪT PRECĪZU SPECIFIKĀCIJU



Autodesk Revit 2016 - M257-P2-AVK-V-A2BC_Daniels.rvt

Schedule: <IDuct Fitting Schedule>

A	B	C	D	E	F
System	Equipment or Material	Size	Unit	Quantity	Manufacturer
AHU A.2 Exhaust	Reduction_Circ_Rect	2200x1200-1250	pcs.	1	
AHU A.2 Extract	Bend-45_Circ	250-250	pcs.	5	
AHU A.2 Extract	Bend-90_short_Circ	125-125	pcs.	6	
AHU A.2 Extract	Bend-90_Circ	250-250	pcs.	2	
AHU A.2 Extract	Bend-90_Circ	125-125	pcs.	1	
AHU A.2 Extract	Bend-90_Rect	800x1600-800x1600	pcs.	2	
AHU A.2 Extract	Bend-90_Rect	1600x800-1600x800	pcs.	2	
AHU A.2 Extract	Joint_Circ	800-800	pcs.	6	
AHU A.2 Extract	Outlet_Circ	1000-1000	pcs.	4	
AHU A.2 Extract	Plug_Circ	400	pcs.	4	
AHU A.2 Extract	Reduction_Circ	250-125	pcs.	1	
AHU A.2 Extract	Reduction_Circ	500-400	pcs.	4	
AHU A.2 Extract	Reduction_Circ	630-500	pcs.	2	
AHU A.2 Extract	Reduction_Circ	800-630	pcs.	2	
AHU A.2 Extract	Reduction_Circ	1000-500	pcs.	2	
AHU A.2 Extract	Reduction_Circ	1000-800	pcs.	2	
AHU A.2 Extract	Reduction_Circ_Rect	1600x800-250	pcs.	1	
AHU A.2 Extract	Reduction_Rect	2200x1400-1600x800	pcs.	1	
AHU A.2 Extract	T-branch-90_Circ	250-250-250	pcs.	1	
AHU A.2 Outdoor	Bend-15_Rect	1200x1200-1200x1200	pcs.	1	
AHU A.2 Outdoor	Bend-45_Rect	1200x1200-1200x1200	pcs.	2	
AHU A.2 Outdoor	Reduction_Rect	2000x1800-1200x1200	pcs.	1	
AHU A.2 Outdoor	Reduction_Rect	2200x1400-1200x1200	pcs.	1	
AHU A.2 Supply	Bend-30_Rect	500x500-500x500	pcs.	4	
AHU A.2 Supply	Bend-30_Rect	800x800-800x800	pcs.	4	
AHU A.2 Supply	Bend-45_Rect	1000x800-1000x800	pcs.	2	
AHU A.2 Supply	Bend-90_short_Circ	125-125	pcs.	2	
AHU A.2 Supply	Bend-90_short_Circ	400-400	pcs.	25	
AHU A.2 Supply	Bend-90_Rect	800x1600-800x1600	pcs.	2	
AHU A.2 Supply	Bend-90_Rect	1000x800-1000x800	pcs.	1	
AHU A.2 Supply	Bend-90_Rect	1600x800-1600x800	pcs.	4	
AHU A.2 Supply	Joint_Circ	630-630	pcs.	1	
AHU A.2 Supply	Outlet_Circ	400-400	pcs.	2	
AHU A.2 Supply	Outlet_Circ	500-500	pcs.	7	
AHU A.2 Supply	Plug_Rect	500x500	pcs.	1	
AHU A.2 Supply	Plug_Rect	800x800	pcs.	1	
AHU A.2 Supply	Reduction_Circ	400-125	pcs.	1	
AHU A.2 Supply	Reduction_Circ	500-400	pcs.	11	
AHU A.2 Supply	Reduction_Circ	630-400	pcs.	1	
AHU A.2 Supply	Reduction_Circ_Rect	400x700-400	pcs.	1	
AHU A.2 Supply	Reduction_Circ_Rect	400x800-500	pcs.	2	
AHU A.2 Supply	Reduction_Circ_Rect	400x800-630	pcs.	1	
AHU A.2 Supply	Reduction_Circ_Rect	500x800-500	pcs.	1	
AHU A.2 Supply	Reduction_Rect	600x600-500x500	pcs.	1	
AHU A.2 Supply	Reduction_Rect	800x600-600x600	pcs.	1	
AHU A.2 Supply	Reduction_Rect	1000x700-800x600	pcs.	1	

<IPipe Accessory Schedule>

A	B	C	D	E	F
Sistēmas tips	Type	Izmēri, marka	Daudz.	Mērvienība	Piezīmes
T11	Lodveida nosīģvārsts DN15	15 mme-15 mme	2	gab.	Danfoss
T11	Lodveida nosīģvārsts DN20	20 mme-20 mme	1	gab.	Danfoss
T11	Lodveida nosīģvārsts DN25	25 mme-25 mme	1	gab.	Danfoss
T11	Lodveida nosīģvārsts DN32	32 mme-32 mme	2	gab.	Danfoss
T11T21	Uponor Ecoflex gala uzmeva. Quattro 28-32-40/200	64 mme-51 mme-51 mme	2	gab.	Uponor
T21	Lodveida nosīģvārsts DN15	15 mme-15 mme	1	gab.	Danfoss
T21	Lodveida nosīģvārsts DN32	32 mme-32 mme	2	gab.	Danfoss
T21	STAD-15/14	15 mme-15 mme	1	gab.	IMI Hydronic Eng
T21	STAD-20	20 mme-20 mme	1	gab.	IMI Hydronic Eng
T21	STAD-25	25 mme-25 mme	1	gab.	IMI Hydronic Eng
Undefined	STAD-15/14	15 mme-15 mme	1	gab.	IMI Hydronic Eng
Undefined	STAD-20	20 mme-20 mme	1	gab.	IMI Hydronic Eng
Undefined	STAD-25	25 mme-25 mme	1	gab.	IMI Hydronic Eng
Undefined	STAD-32	32 mme-32 mme	1	gab.	IMI Hydronic Eng

Schedule Properties

Fields Filter Sorting/Grouping Formatting Appearance

Select available fields from: Pipe Accessories

Available fields:

- Assembly Code
- Assembly Description
- Assembly Name
- Comments
- Connection Size
- Connection Type
- Cost
- Description
- EWGworks URL
- Family
- Family and Type
- IFCUID
- Image
- Innovation Thickness

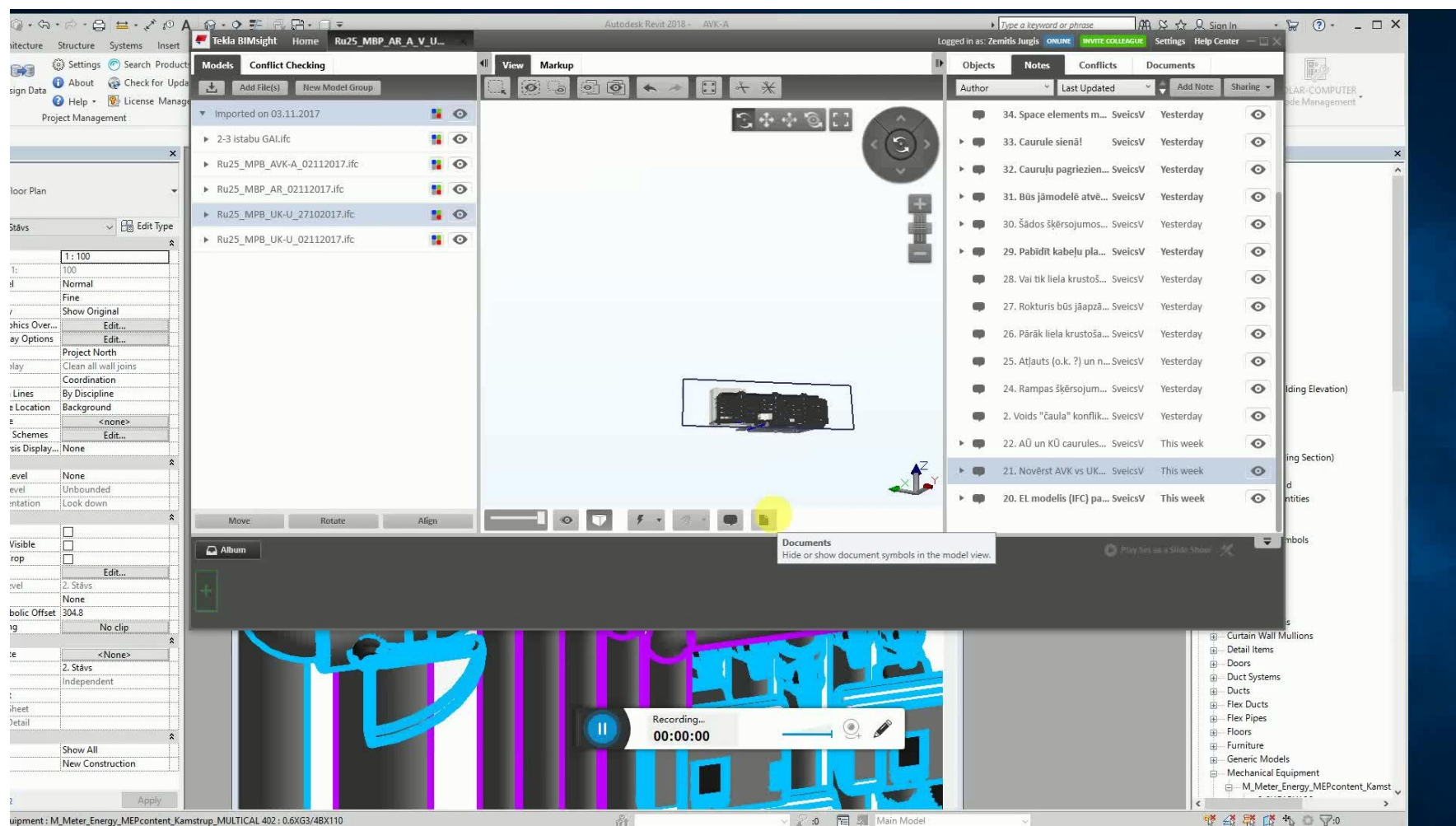
Scheduled fields (in order):

- System Type
- Type
- Size
- Count
- Unit
- Manufacturer

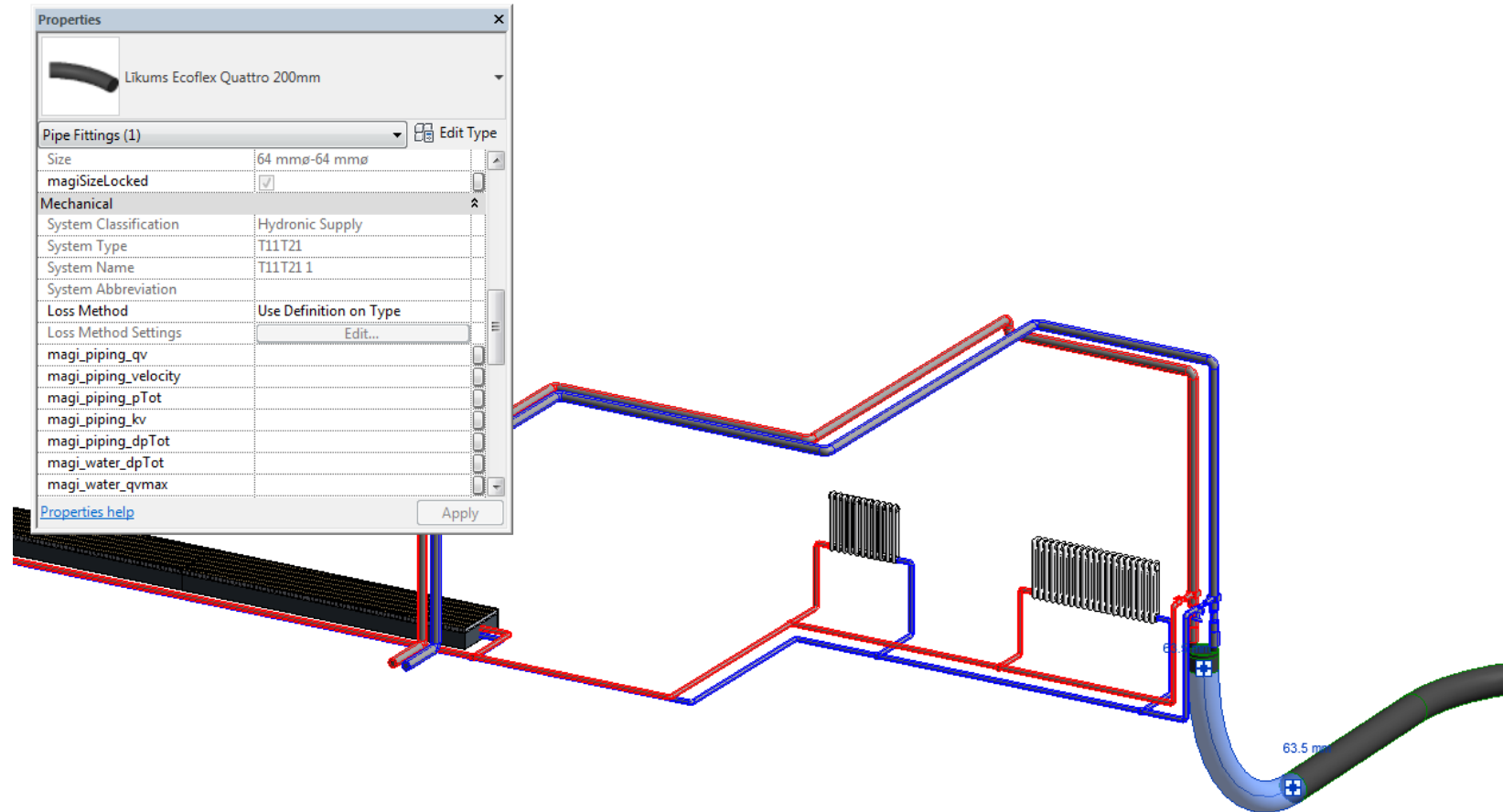
Include elements in links

OK Cancel Help

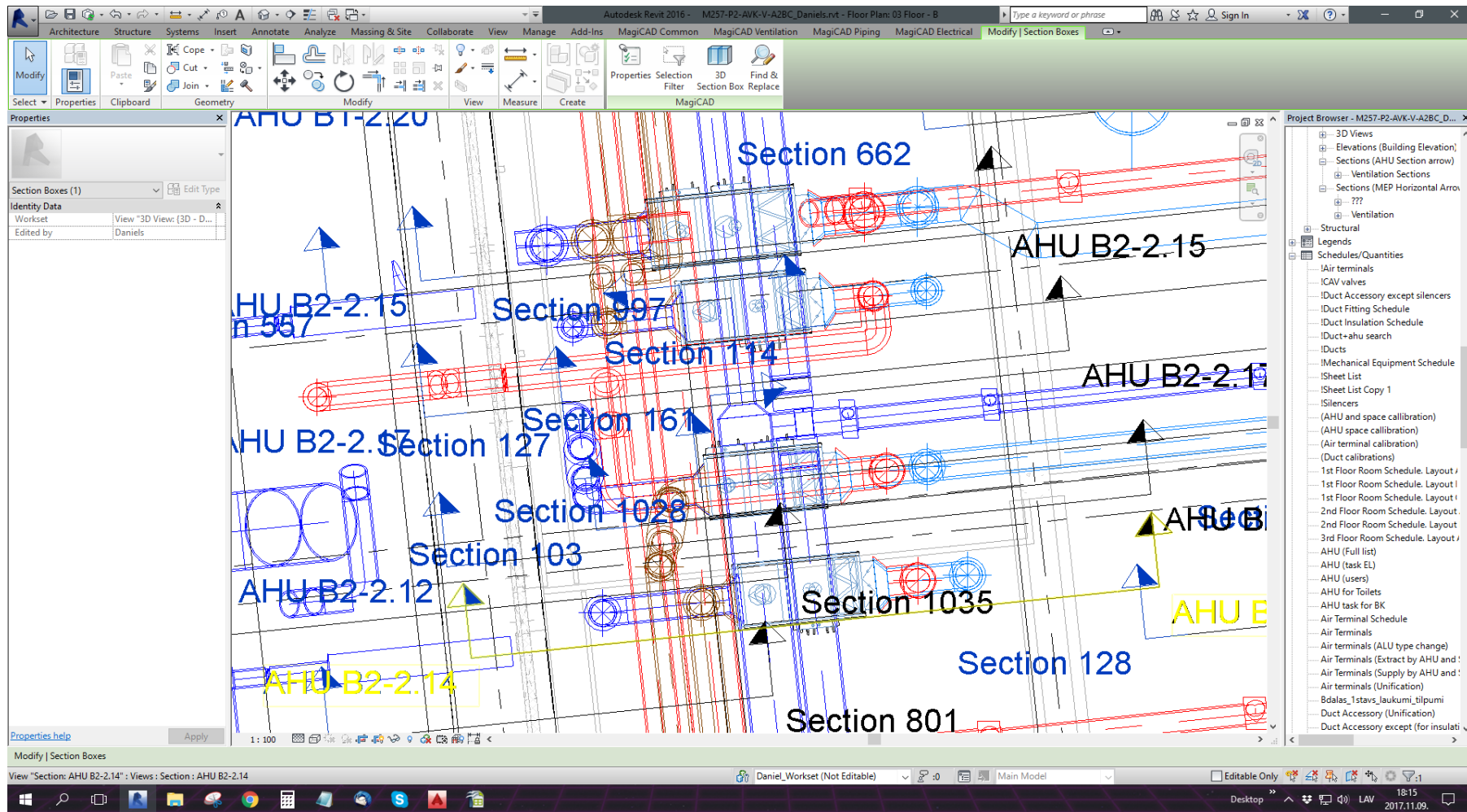
KOORDINĒŠANA BIEŽI PIELIETO ATSEVIŠKAS PROGRAMMAS



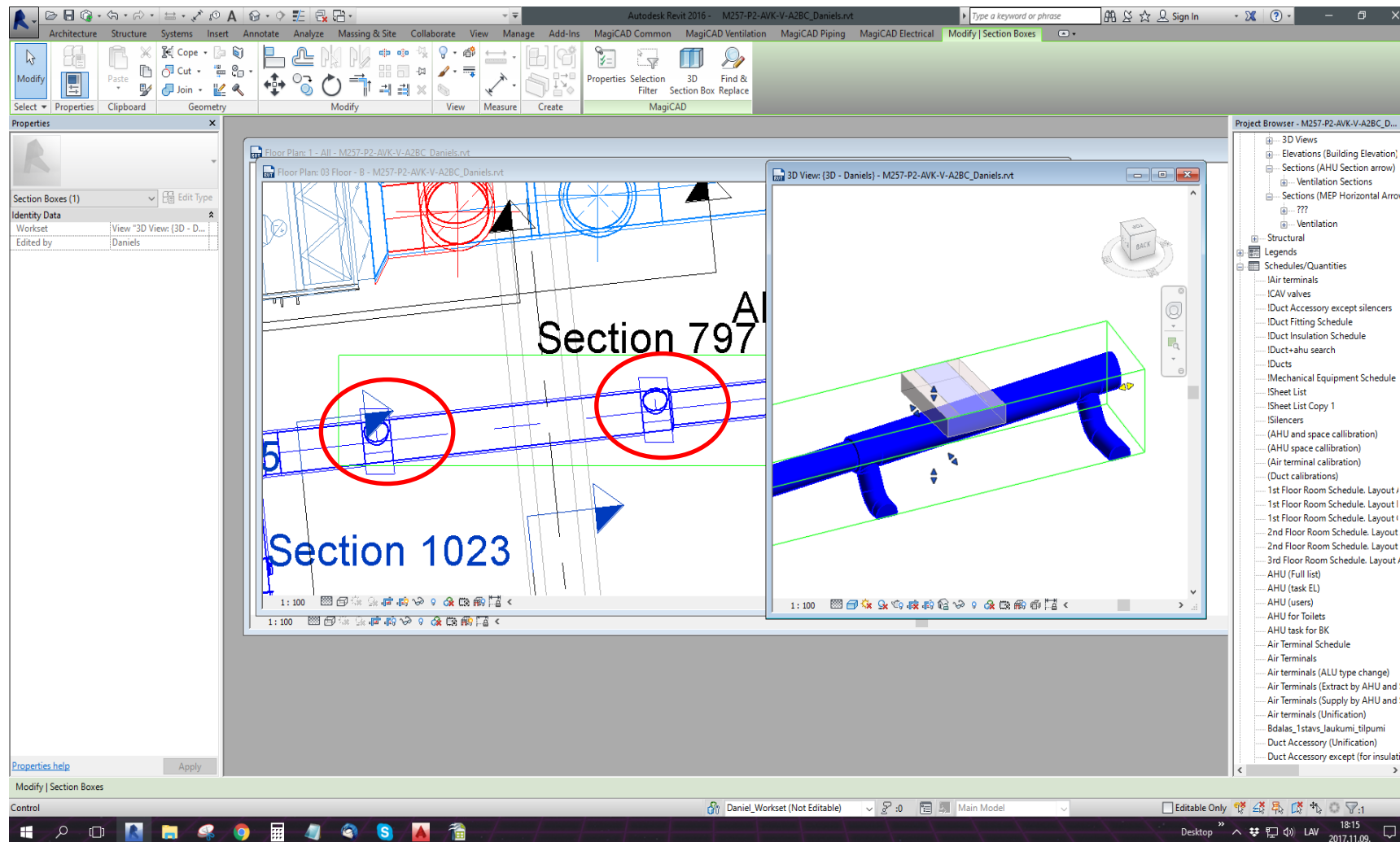
NE VISI APRĒĶINI IR IESPĒJAMI



IZMAINU VEIKŠANA UN JAUNU ELEMENTU IELIKŠANA JAU PĪLNĀ MODELĪ



NAV ĪESPĒJAMS VIENKĀRŠI PASKICĒT VARIANTUS, VIZUĀLĀS NEPRECIZITĀTES



PROBLĒMAS PROJEKTĒŠANAI BIMĀ

Apvienoto modeļu izmērs, atvēršanas laiks, prasības pēc jaudīgas datortehnikas un stabila centrāla servera

Jāpārvalda jauna programmatūra ne tikai projektēšanai, bet arī koordinēšanai un savietošanai

Vairāku cilvēku darbība pie viena modeļa ir jāveic ļoti precīzi un darbības zonas nedrīkst pārklāties

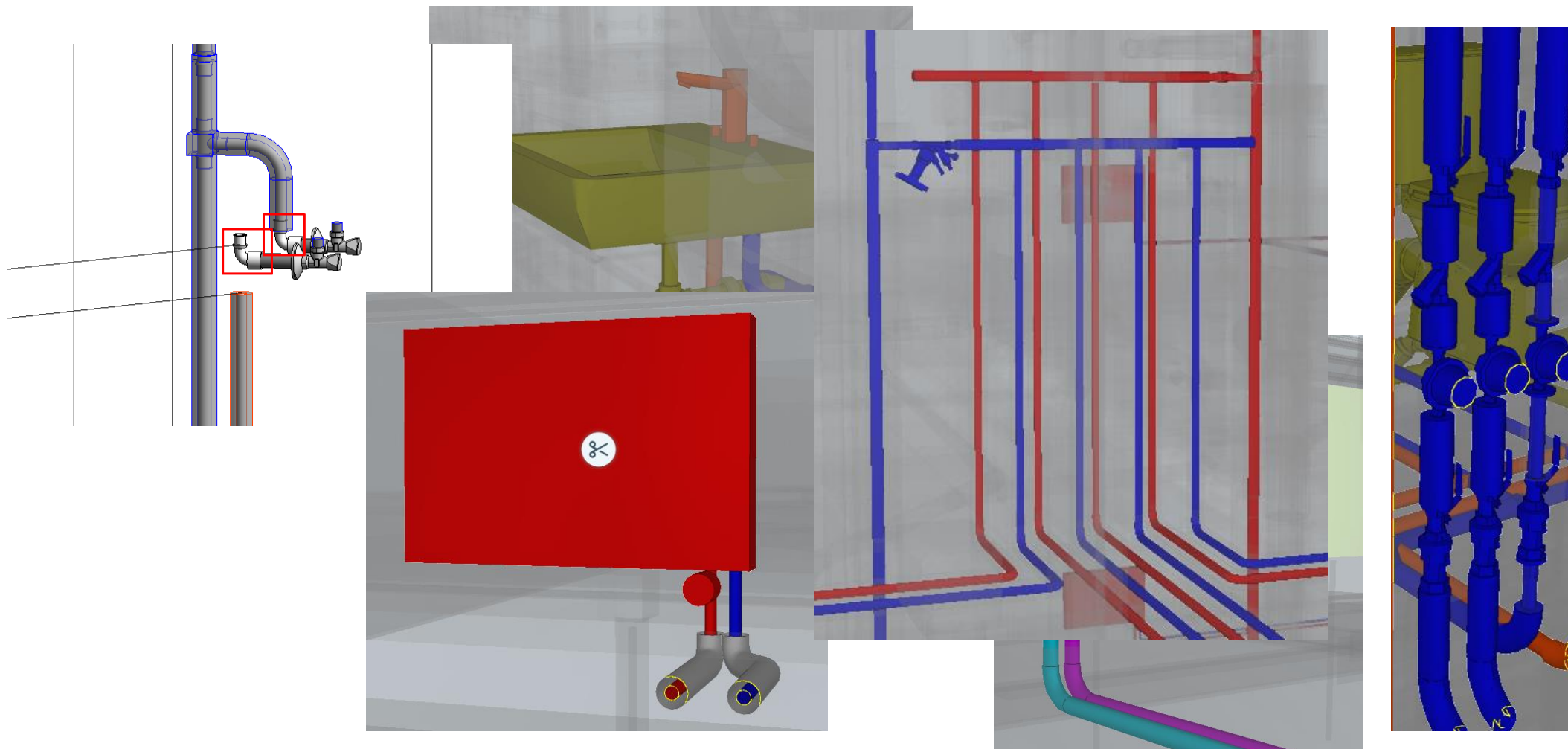
Elementu sadalījums pa sfērām, lai nepārklājas

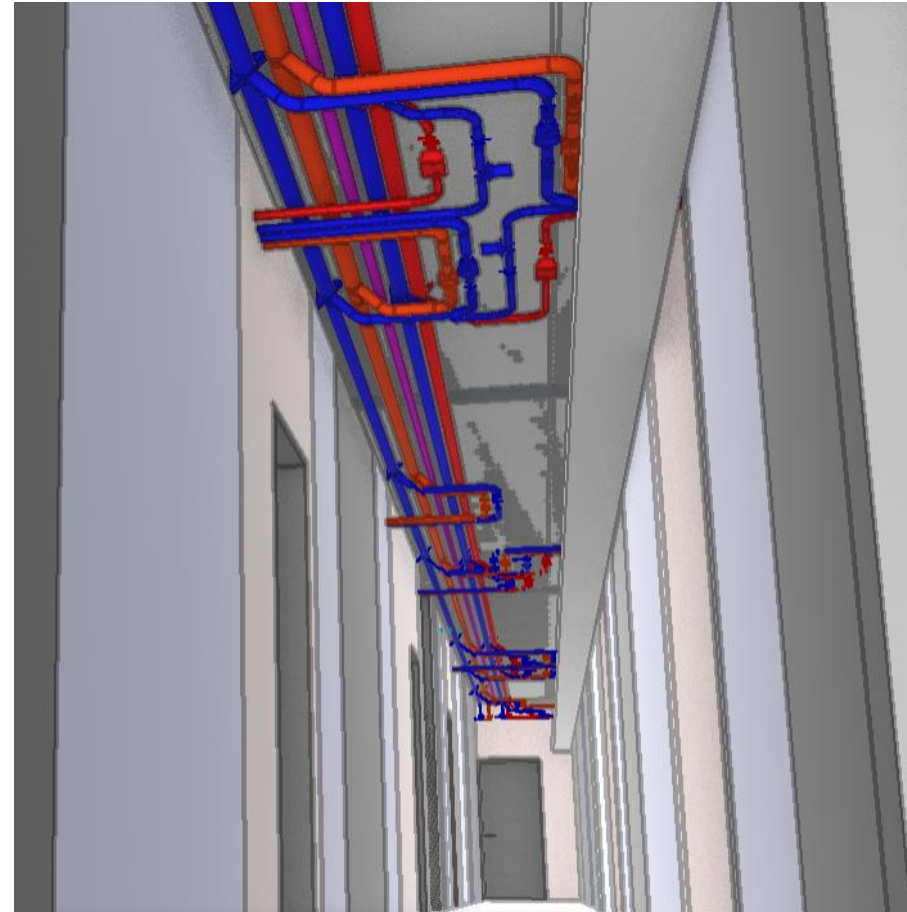
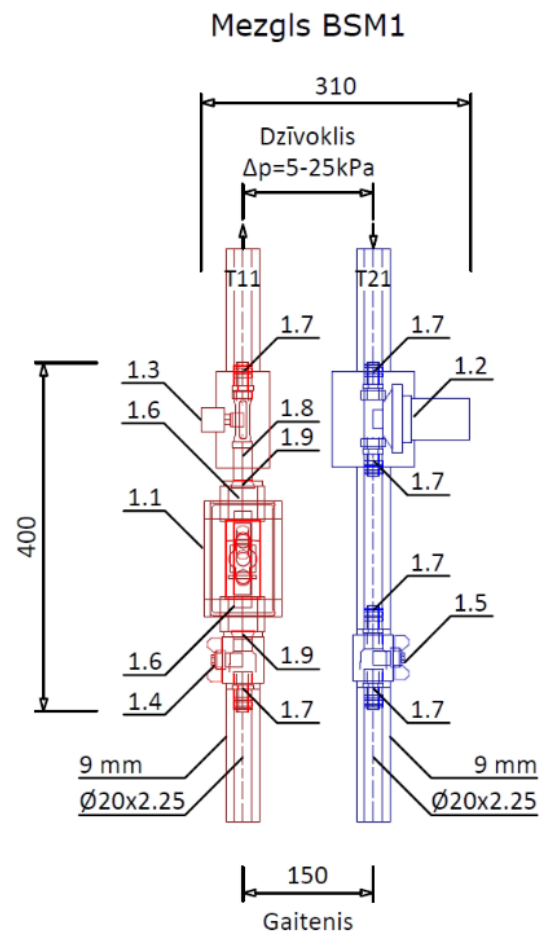
Motivācija patērēt milzu laika daudzumu, lai novērstu visus krustojumus un izzīmētu perfektu sistēmu

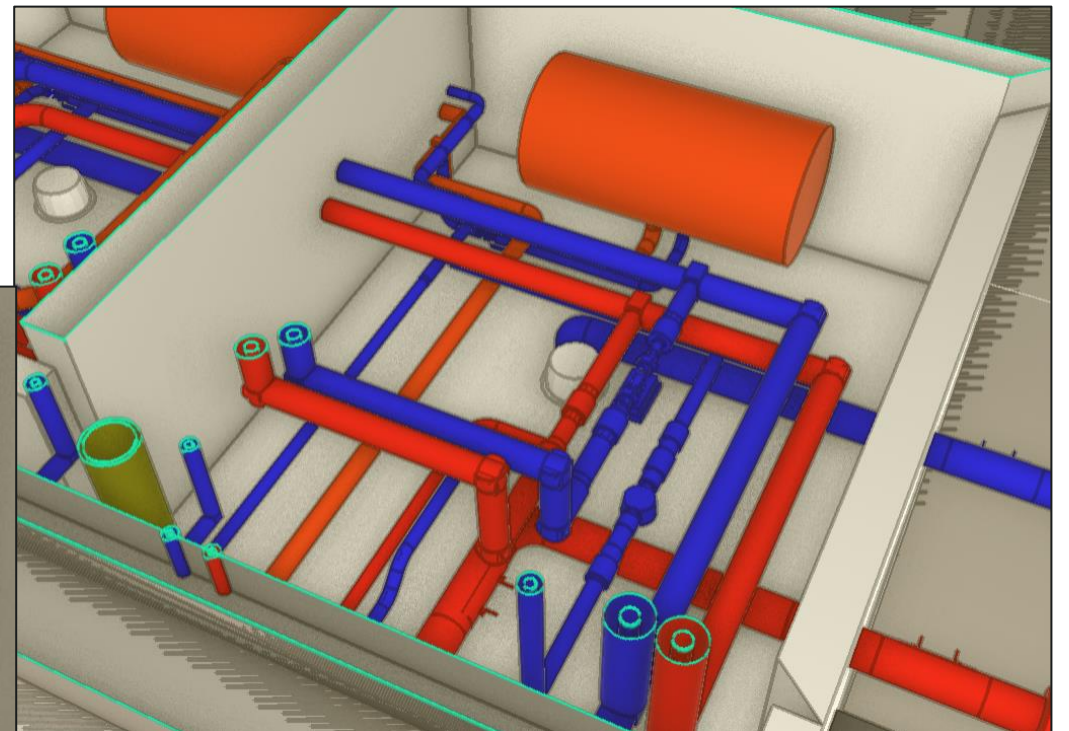
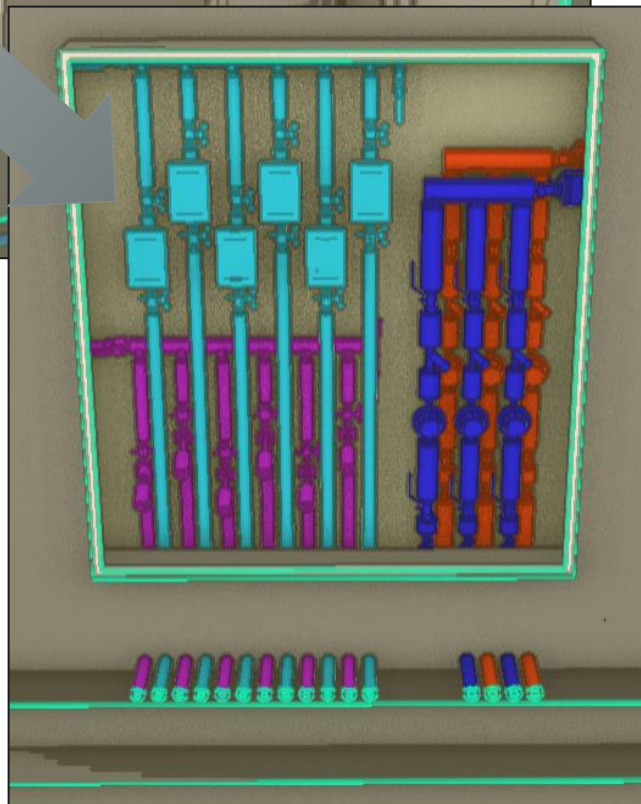
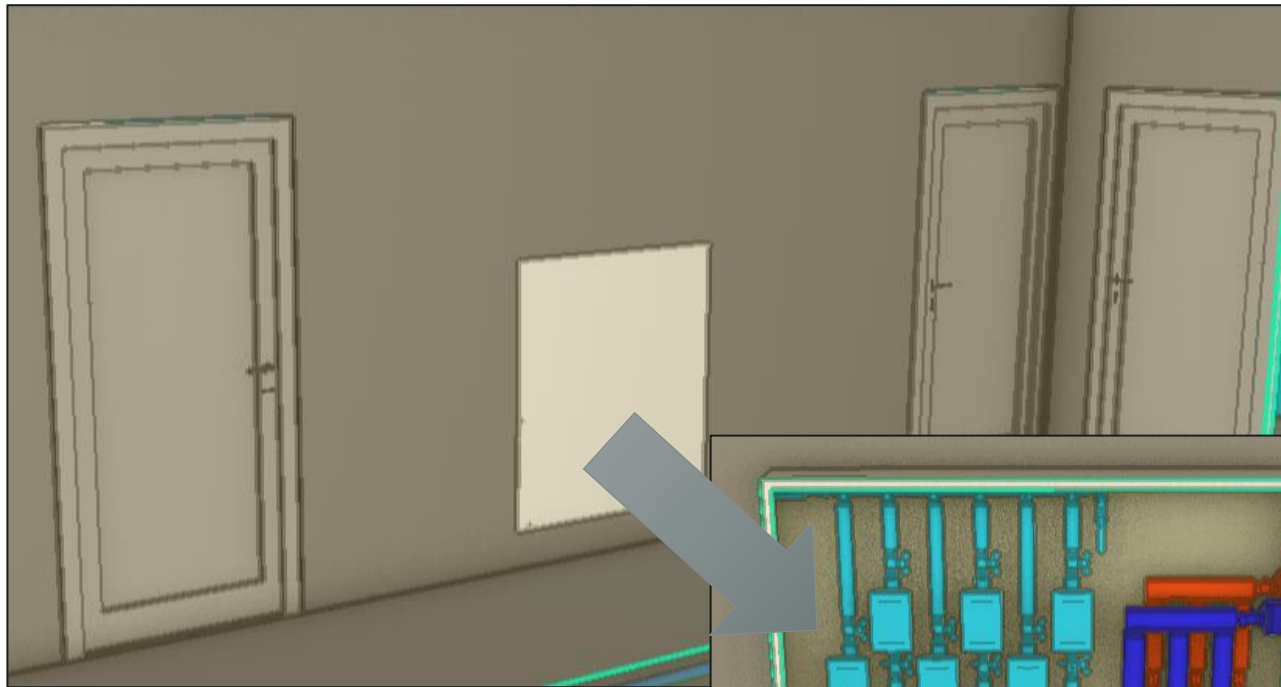
Nepieciešamo element modeļu neesamība vai neprecizitātes

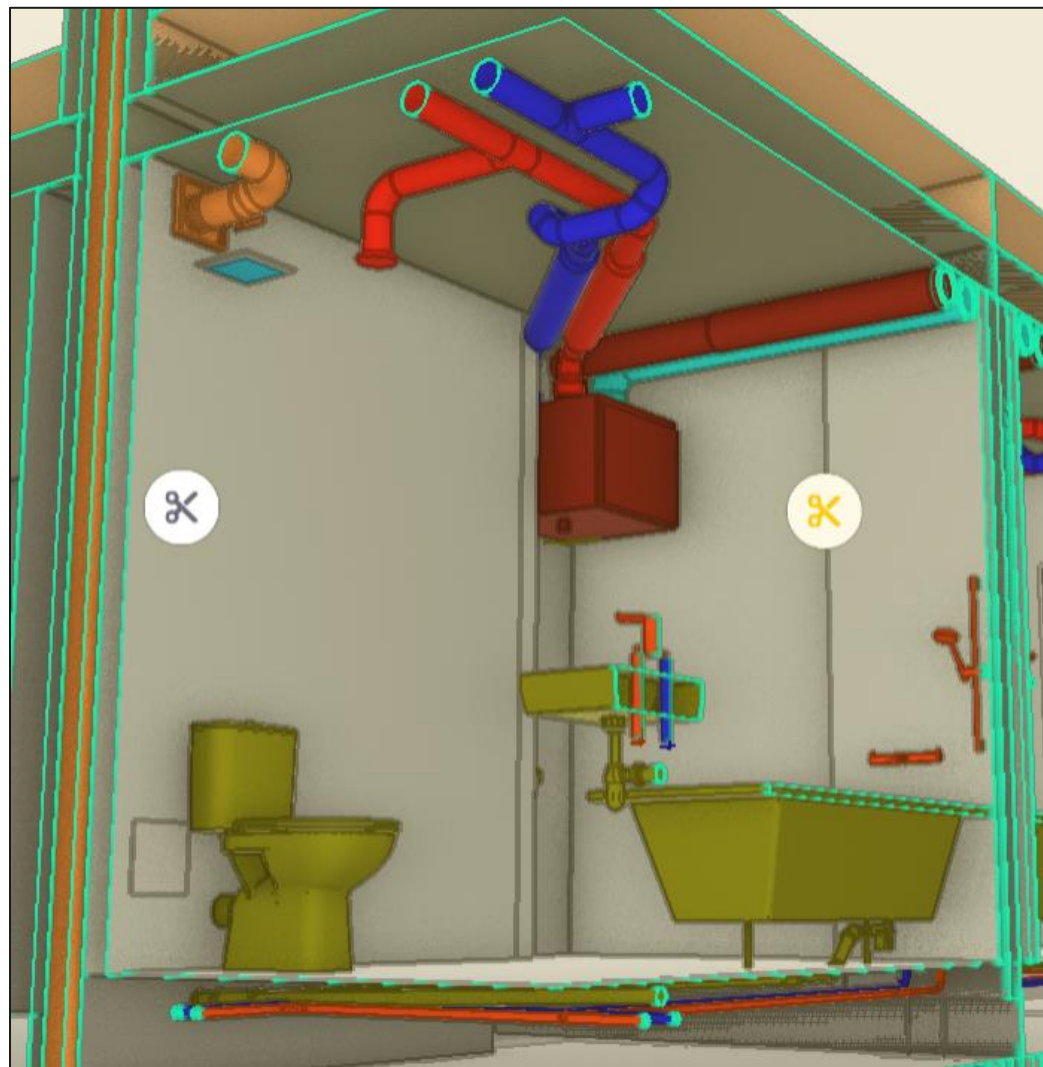
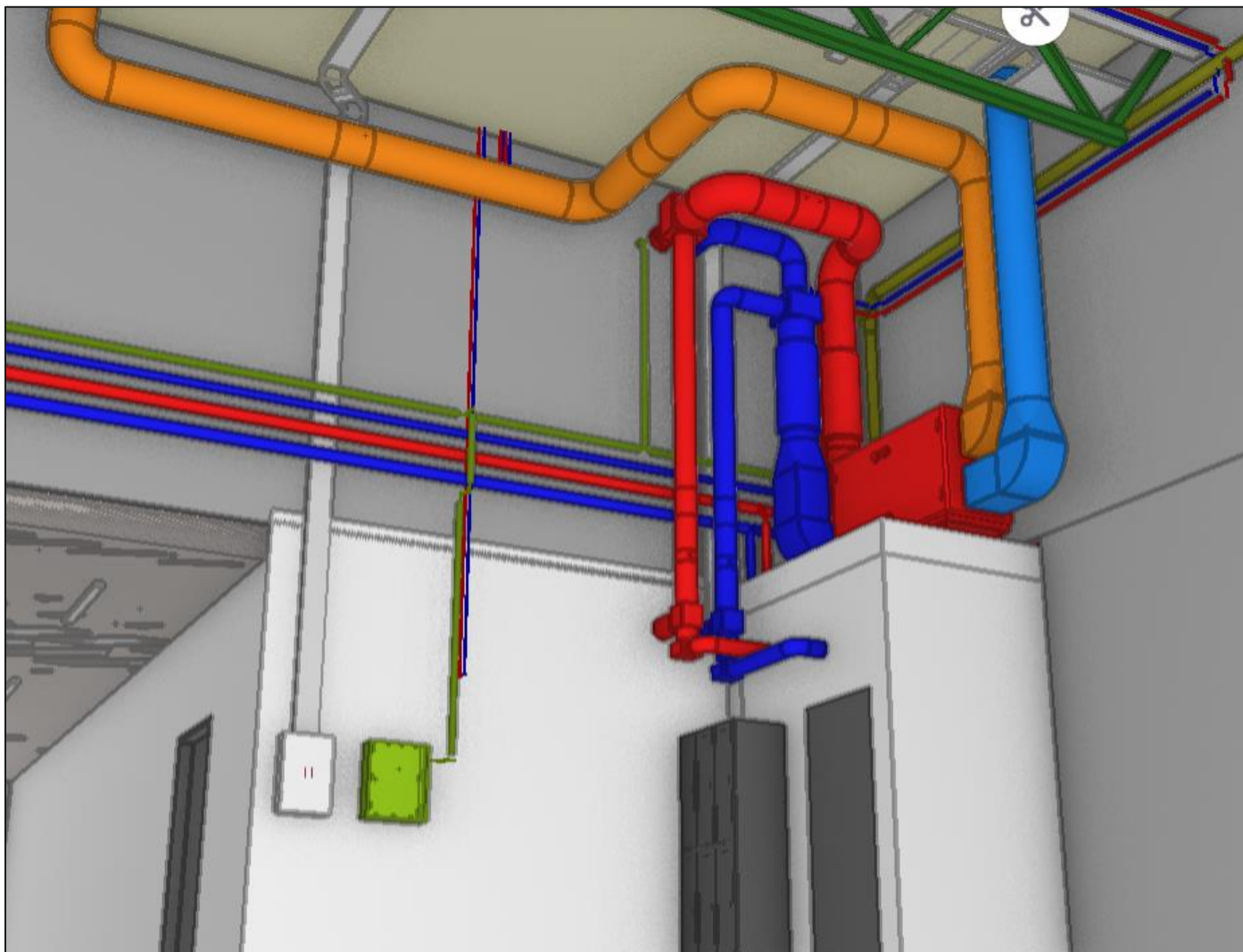
Jo vairāk iespēju – jo vairāk problēmu un prasību!!!

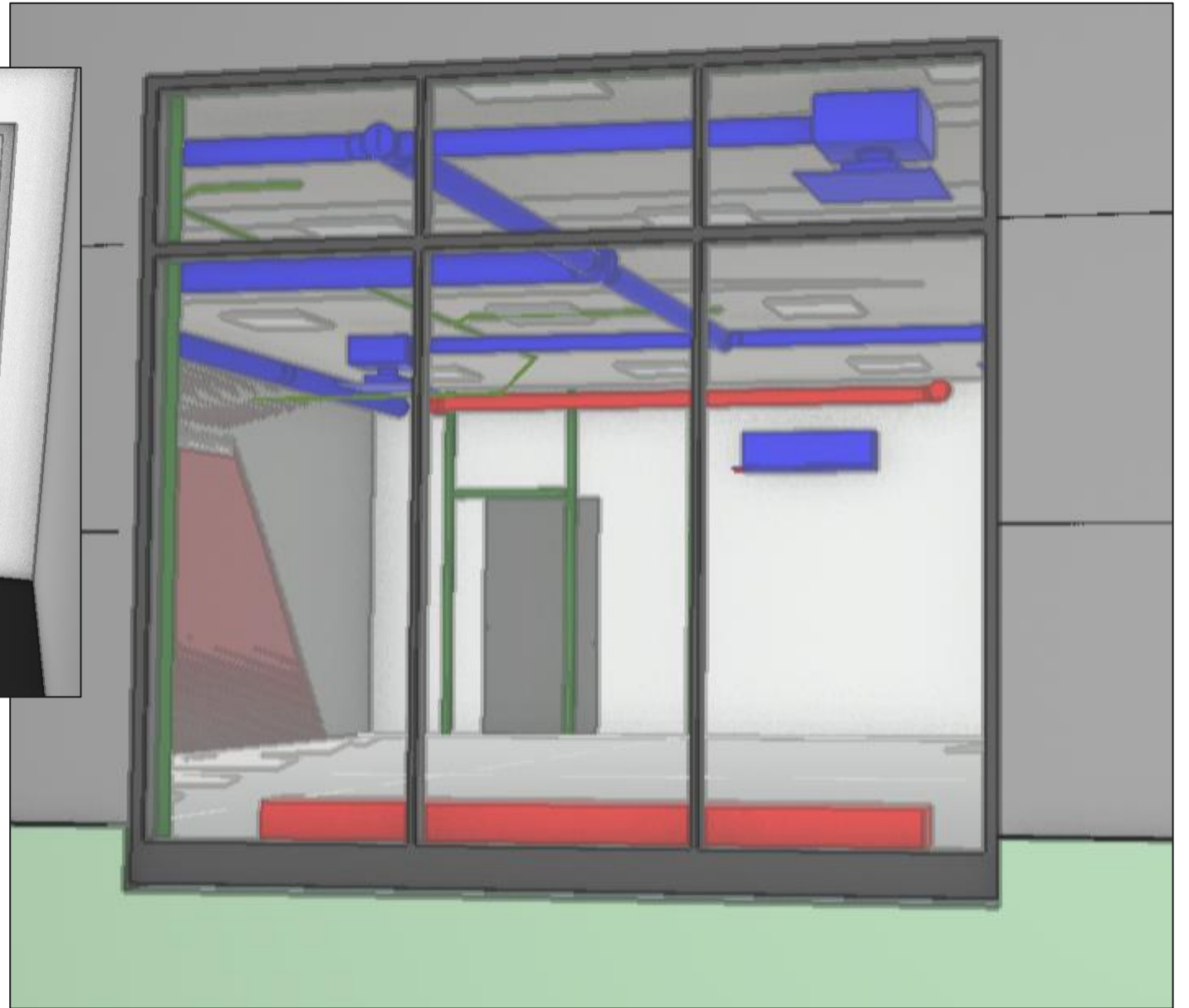
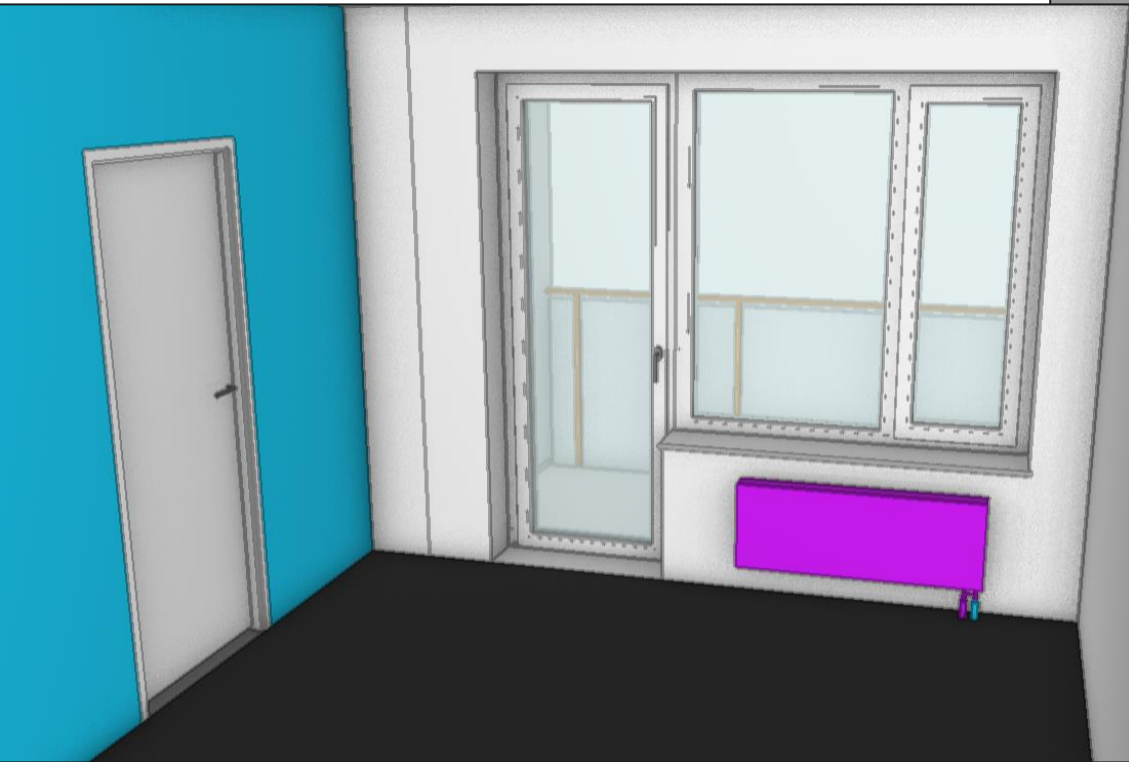
DETALIZĀCIJAS LĪMENIS ...

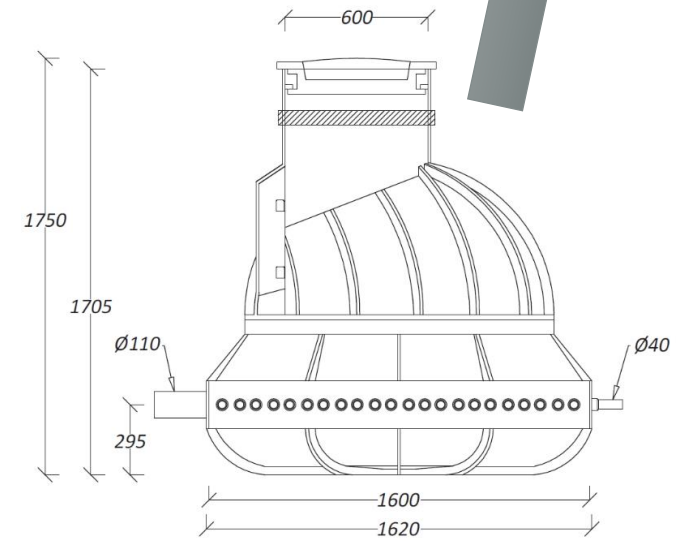
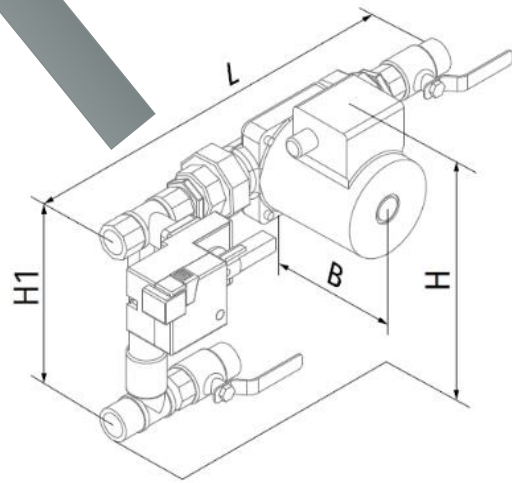
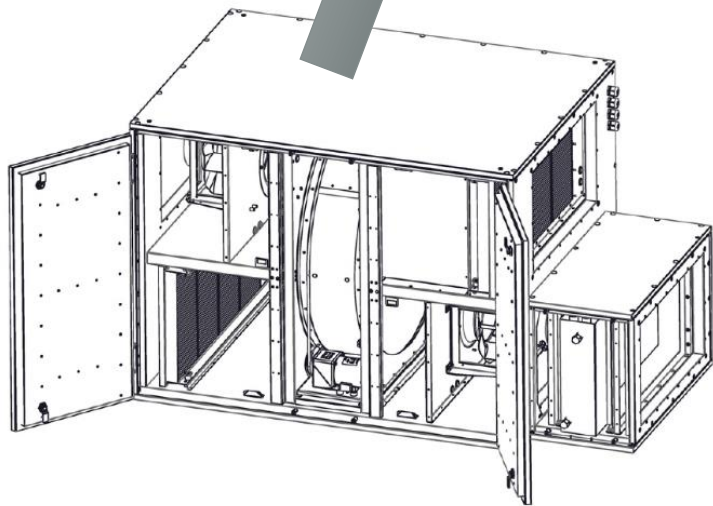
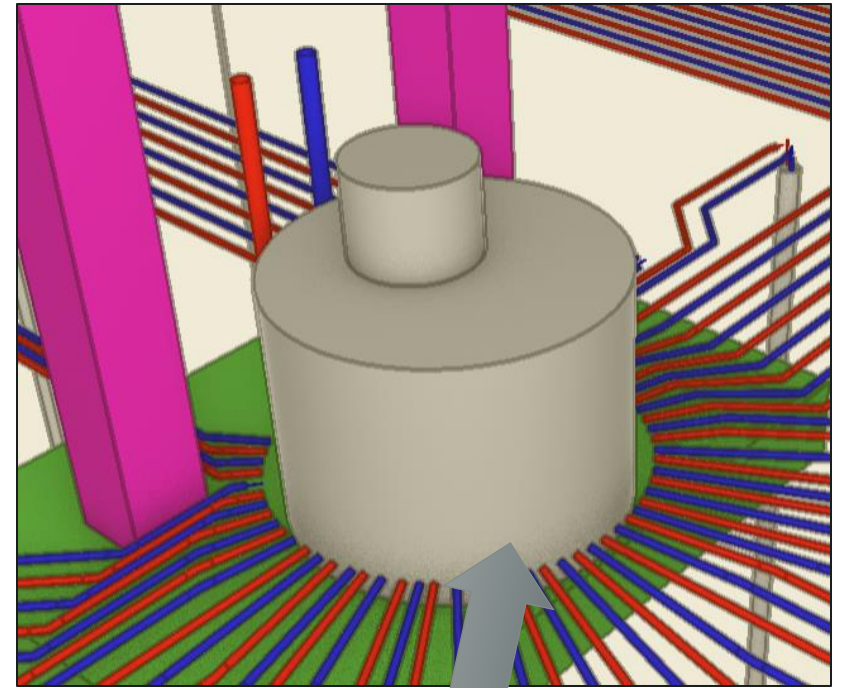
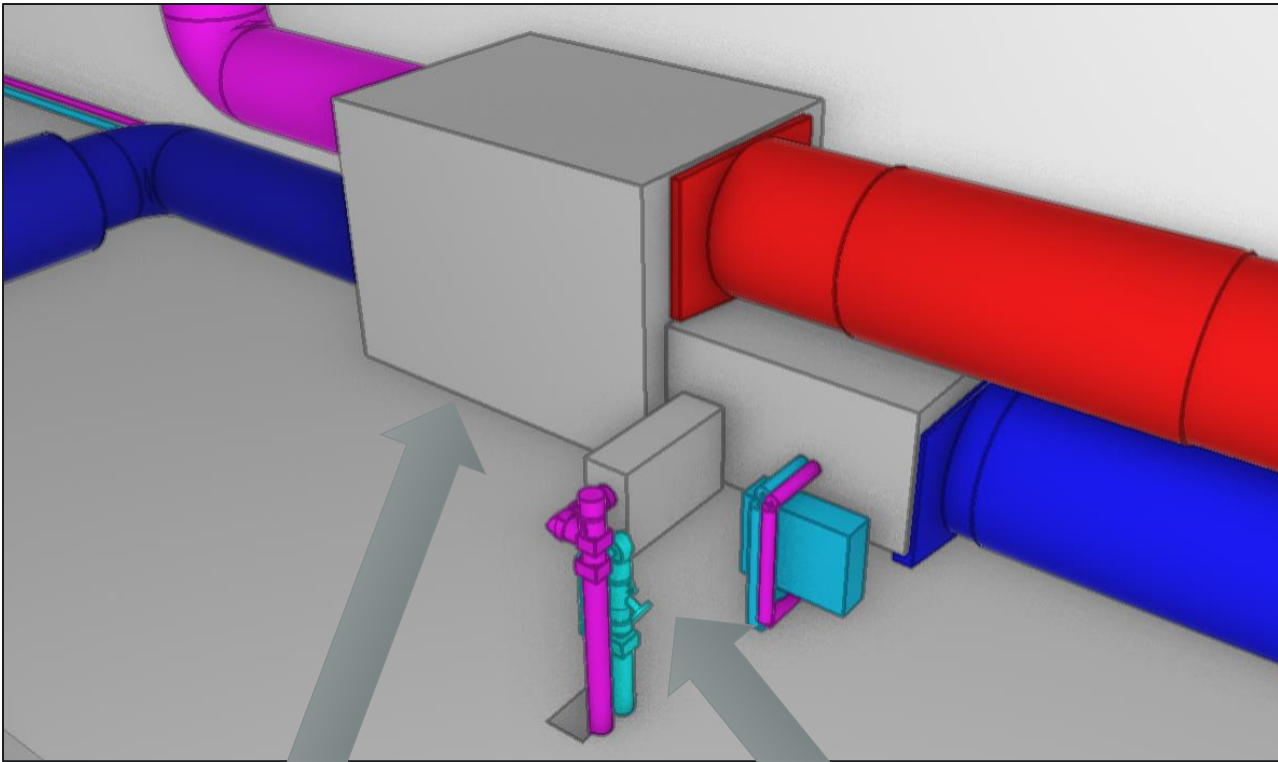


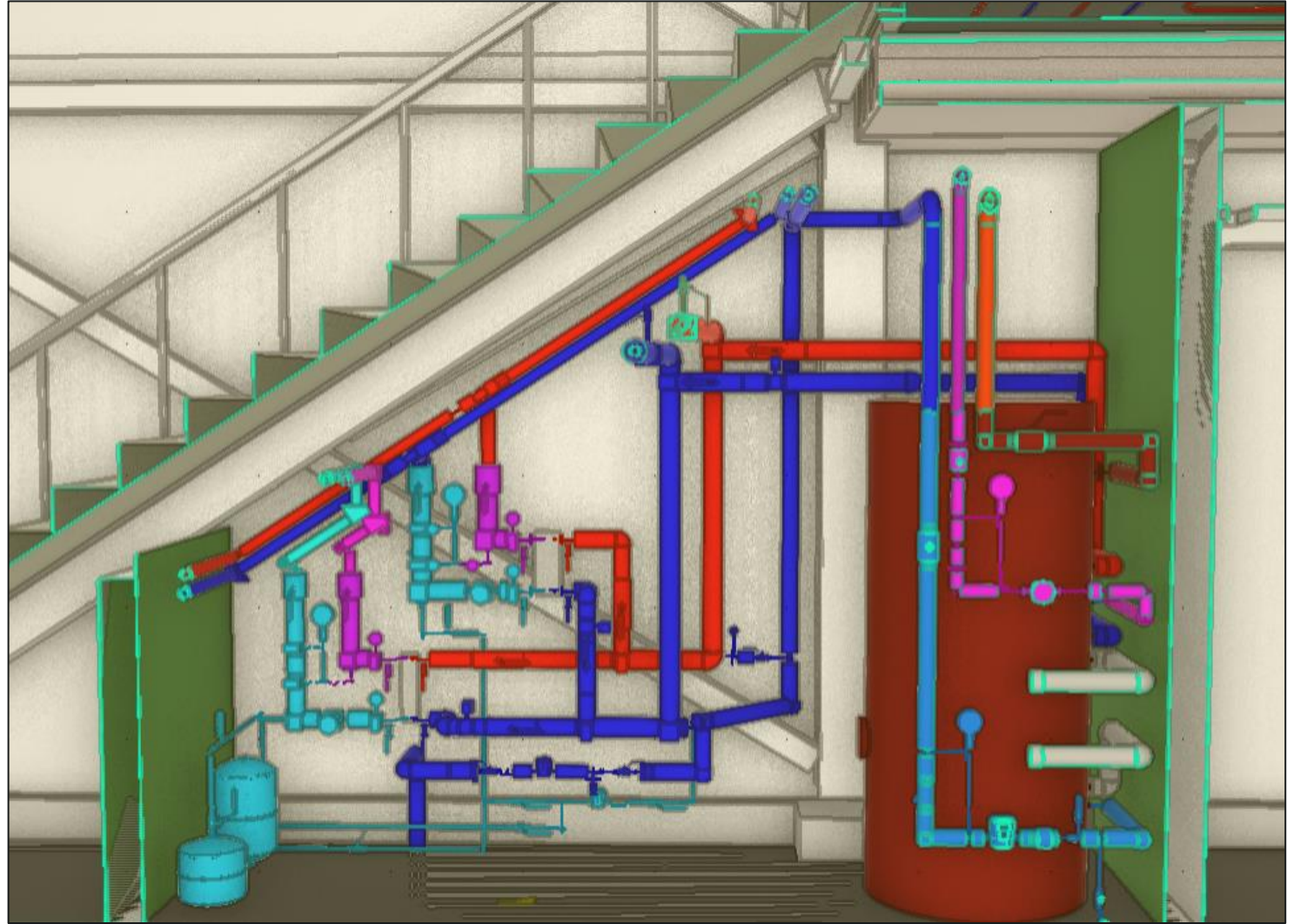
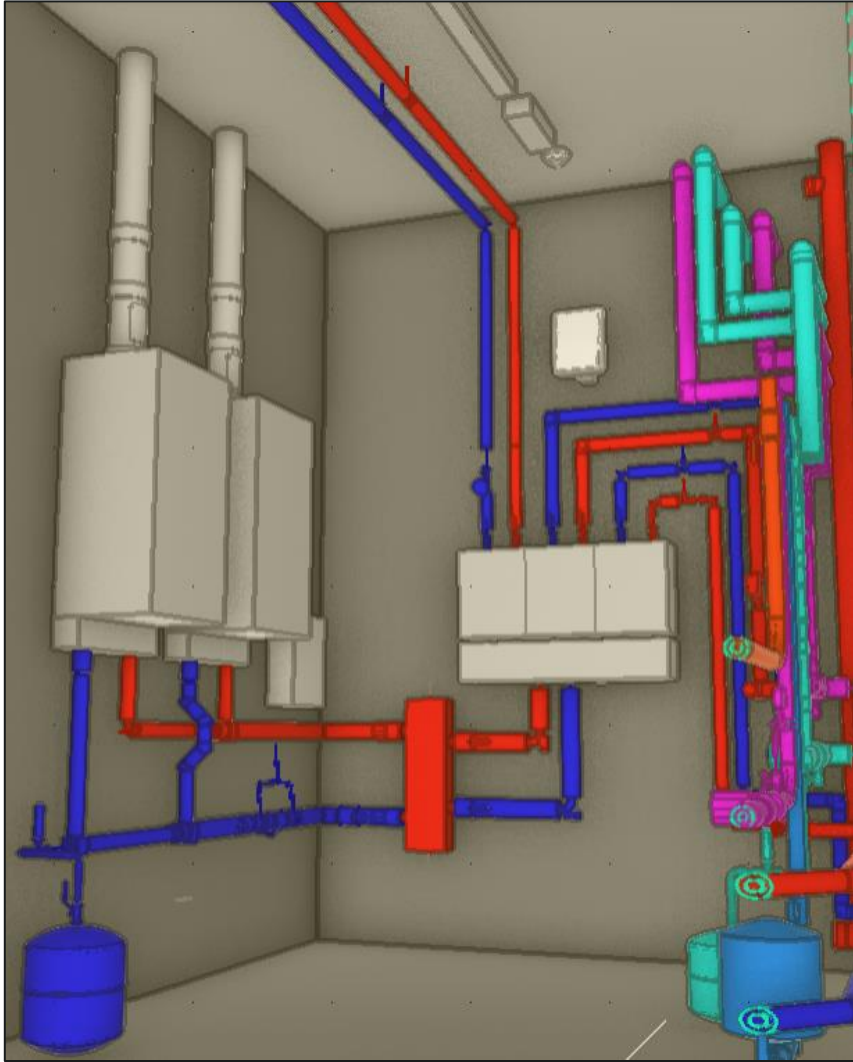


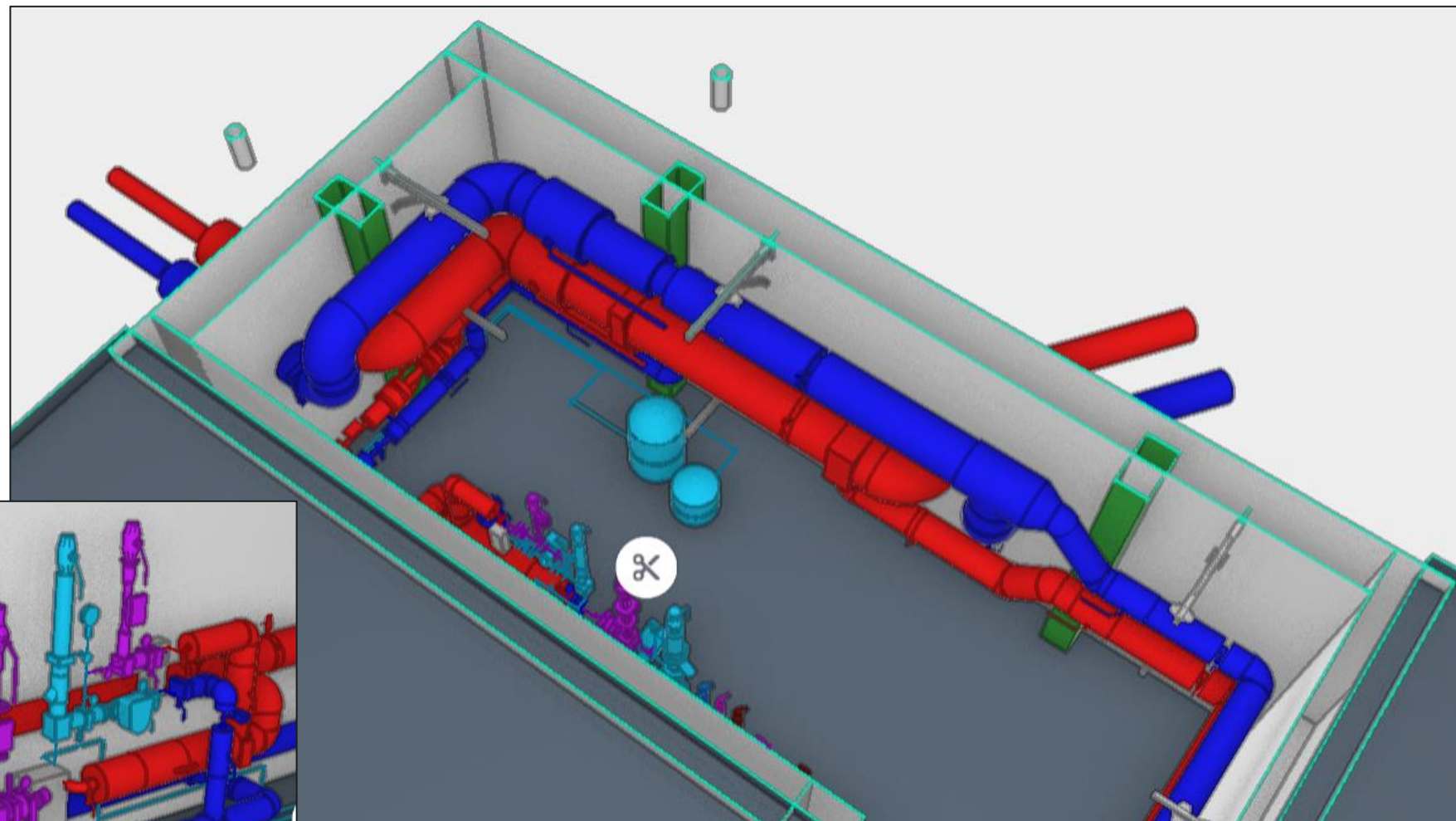
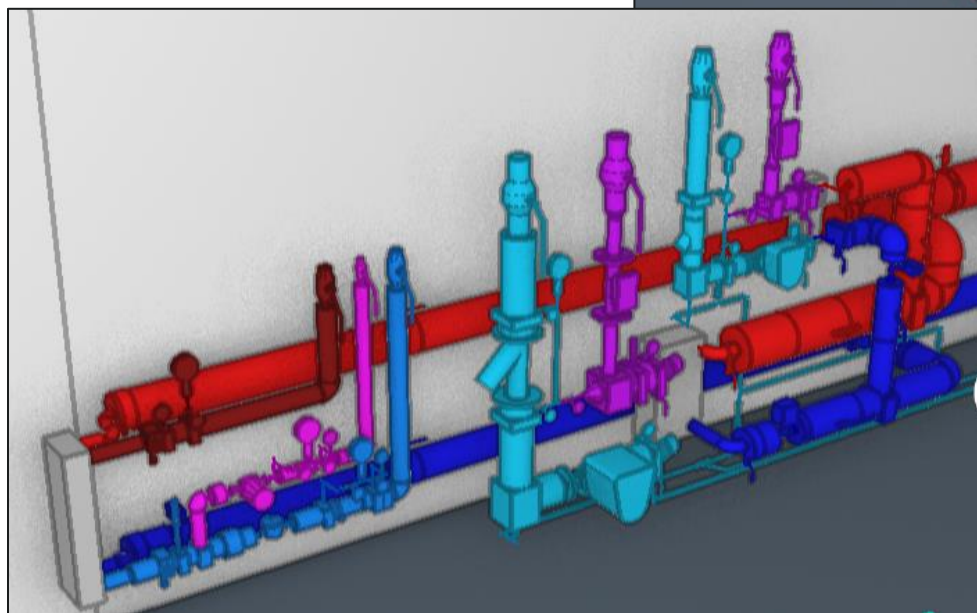


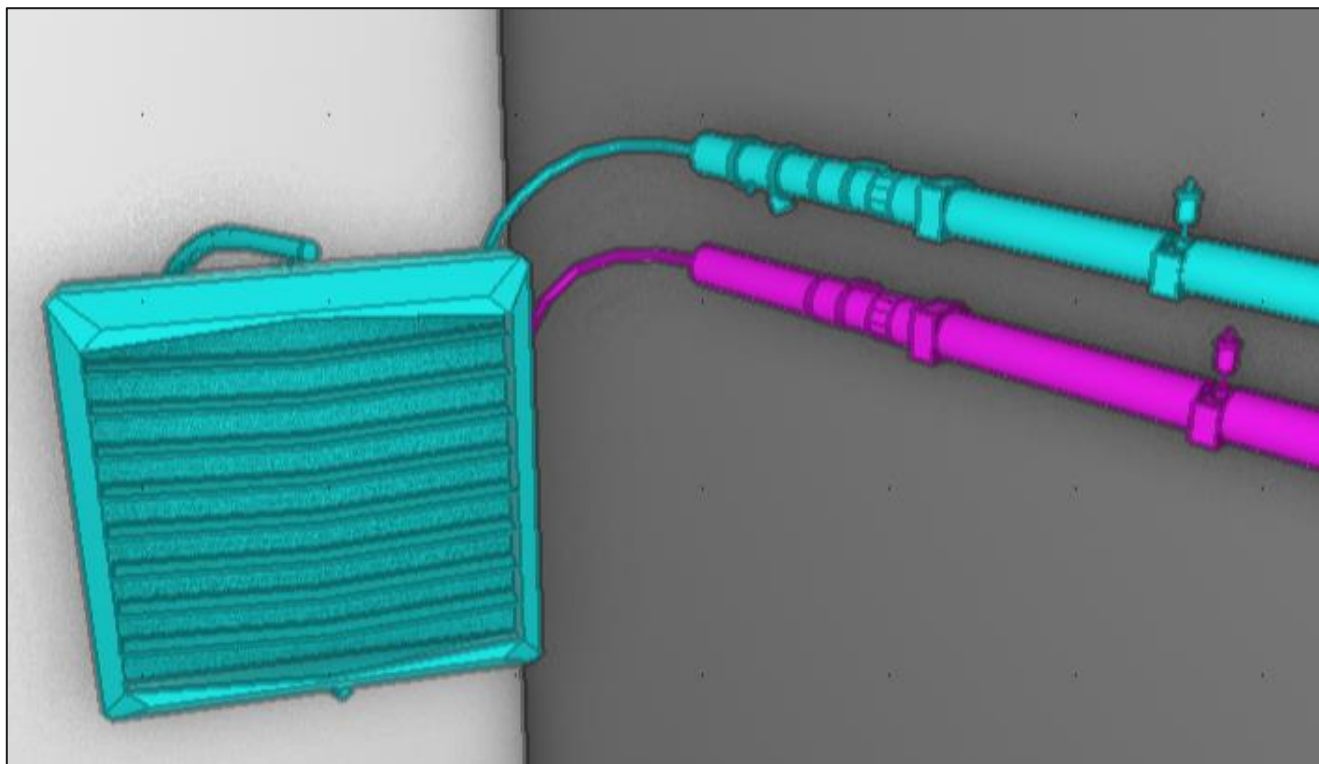
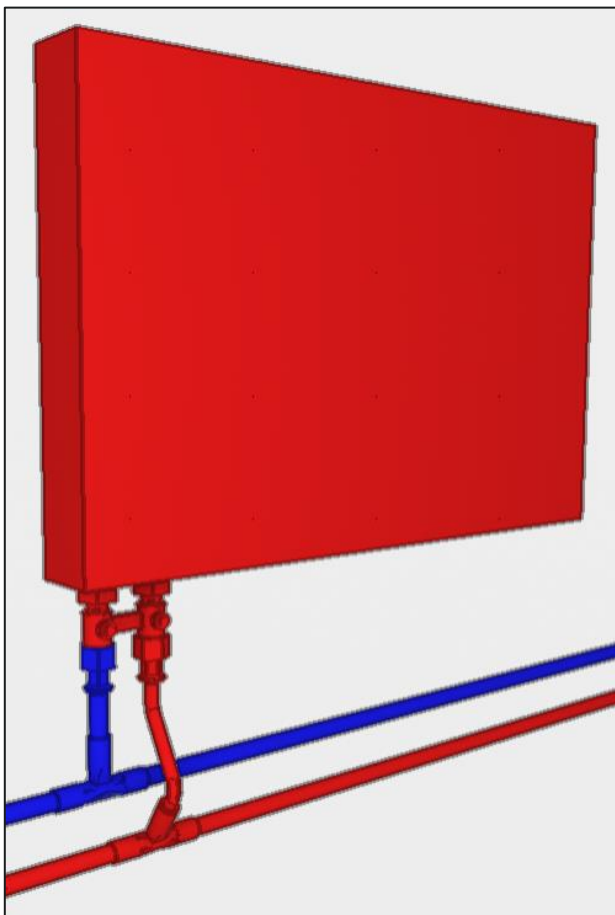




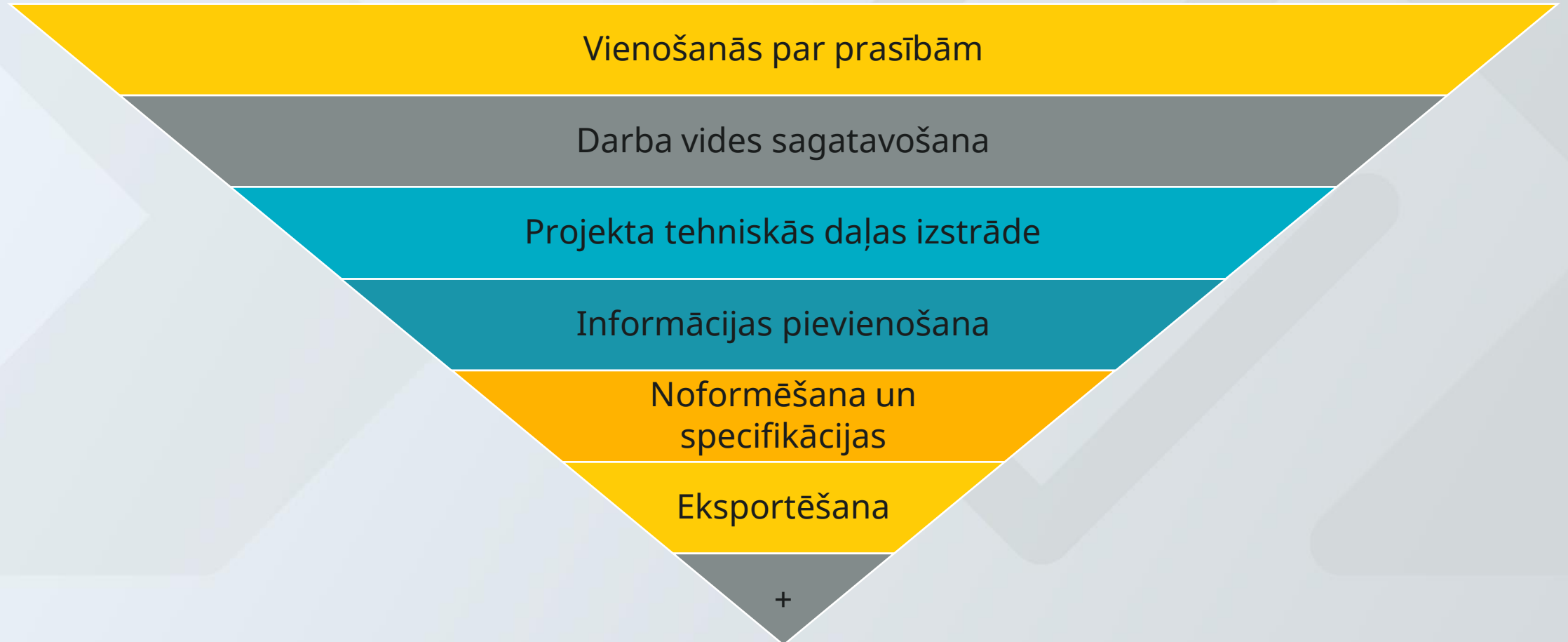








PROJEKTA IZSTRĀDES POSMI



GRAFISKĀS DETALIZĀCIJAS LĪMENIS

LOD 100

- Modeļa elements ir attēlots ar simbolu vai citu vispārīgu apzīmējumu, ar mērķi parādīt elementa esamību, bet ne formu, lielumu vai precīzu atrašanās vietu.
- Jebkura informācija, kas iegūta no LOD 100 elementiem, ir uzskatāma par aptuvenu.

LOD 200

- Modeļa elements ir grafiski attēlots kā vispārīgs objekts vai sistēma ar aptuveniem daudzumiem, lielumu, formu, atrašanās vietu un orientāciju. Modeļa elements var būt gan atpazīstams attiecībā uz objektu, kuru tas pārstāv, gan kalpot kā telpu izcelšanas vai rezervēšanas apjoms. Modeļa elementam var pievienot arī negrafisko informāciju.
- Modelim jābūt pietiekami precīzam, lai nodrošinātu, ka projekts atbilst noteiktajiem ierobežojumiem (piemēram, normatīvu aktu prasībām attiecībā uz būvprojektu minimālā sastāvā) pirms projekta detalizācijas.
- Jebkura informācija, kas iegūta no LOD 200 elementiem, ir uzskatāma par aptuvenu.

LOD 300

- Modeļa elements ir grafiski attēlots kā konkrēts un precīzs objekts vai sistēma pēc noteiktā daudzuma, lieluma, formas, atrašanās vietas un orientācijas. Izstrādātā elementa daudzumu, lielumu, formu, atrašanās vietu un orientāciju var izmērīt tieši no modeļa, neizmantojot nemodelēto informāciju (piemēram, piezīmes). Modeļa elementam var pievienot arī negrafisko informāciju.
- Modeļi var izmantot, lai pārbaudītu visas normatīvās prasības (piemēram, normatīvu aktu prasības attiecībā uz būvprojektu), ja vien tās nav saistītas ar konkrētu zīmolu, modeļi vai materiālu (minētais ir attiecināms arī uz nākamajiem LOD līmeņiem).

Nodevumi: 3D BIM modeļi

3D BIM modeļi/Detailizācijas līmenis

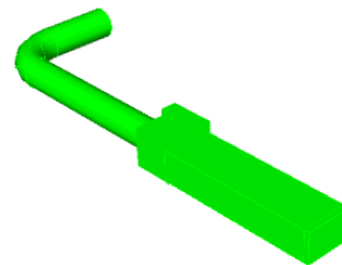
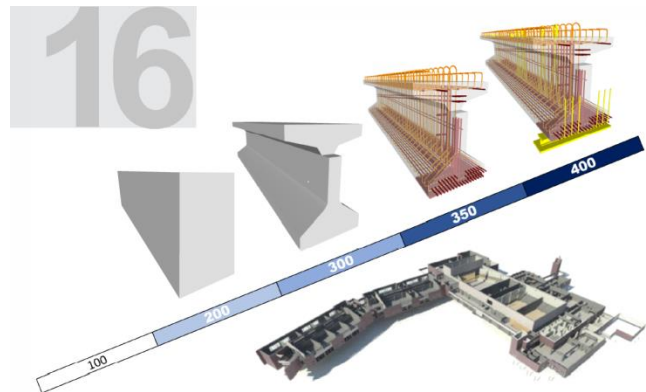
	LOD 200	LOD 300	LOD 300	LOD 350	LOD 350	LOD 350
AR						
BK	N/A	LOD 200	LOD 300	LOD 300	LOD 300	LOD 300
AVK-A	N/A	LOD 200	LOD 300	LOD 300	LOD 300	LOD 300
AVK-V	N/A	LOD 200	LOD 300	LOD 300	LOD 300	LOD 300
AVK-K	N/A	LOD 200	LOD 300	LOD 300	LOD 300	LOD 300
SM	N/A	LOD 200	LOD 300	LOD 300	LOD 300	LOD 300
UK	N/A	LOD 200	LOD 300	LOD 300	LOD 300	LOD 300
EL	N/A	LOD 200	LOD 300	LOD 300	LOD 300	LOD 300
ESS	N/A	LOD 200	LOD 300	LOD 300	LOD 300	LOD 300
TS	N/A	LOD 200	LOD 300	LOD 300	LOD 300	LOD 300
Savietotais modelis	N/A	●	●	●	●	●

DETALIZĀCIJAS LĪMEŅI

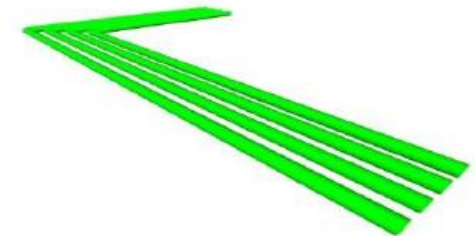
LOD (Level of Development) līmeņi:

LOD 100 – Elements tiek attēlots kā 2D simbols

LOD 200 – Elements attēlots shematiski, kā telpa ko tas aizņem

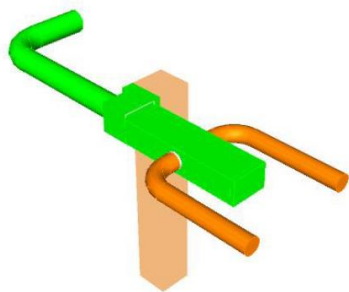


173 D3060.10-LOD-200 Supply Air

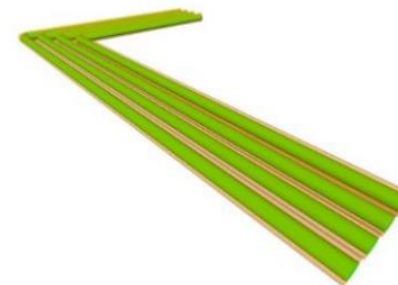


169 D3050.10-LOD-200 Facility Hydronic distribution

LOD 300 – Elements attēlots pareizajos izmēros, formā un novietojumā

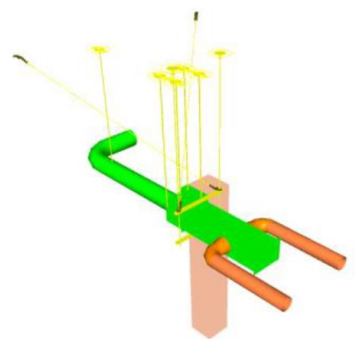


174D3060.10-LOD-300 Supply Air

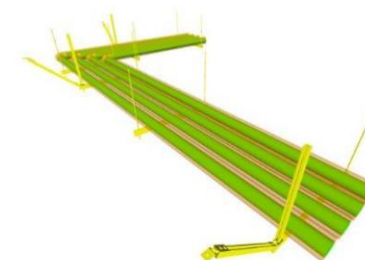


170 D3050.10-LOD-300 Facility Hydronic Distribution

LOD 350 – Elements tiek attēlots ar nepieciešamajiem stiprinājumiem un



175D3060.10-LOD-350 Supply Air



171D3050.10-LOD-350 Facility Hydronic Distribution

IEKĻAUJAMĀS INFORMĀCIJAS APJOMS

"Tīkli" - Informācijas prasības tīkliem (caurules, gaisa vadi, u.c.)								
Atribūts	Piemērs	Projekta posms						Apraksts
		KC	ST	DT	AP	BV	IM	
01_Nosaukums	Apkures caurule (tupgaita)		•	•	•	•	•	Vispārīgs nosaukums
02_Sistēma	AVK-A		•	•	•	•	•	Inženiertīklu sistēma
03_Materiāls	PPR			•	•	•	•	Elementa materiāls
04_Tips	PN20			•	•	•	•	Elementa tips
05_Šķērsriezums	25x2.3			•	•	•	•	Elementa šķērsriezums
06_Biezums	2.3mm			•	•	•	•	Elementa biežums
07_Izolācija	Nē			•	•	•	•	Elementa izolācija
"Aprīkojums"* - Informācijas prasības aprīkojumam (armatūra, sūkņi, iekārtas, u.c.)								
Atribūts	Piemērs	Projekta posms						Apraksts
		KC	ST	DT	AP	BV	IM	
01_Nosaukums	Ūdens sūknis		•	•	•	•	•	Vispārīgs nosaukums
02_Sistēma	UK		•	•	•	•	•	Inženiertīklu sistēma
03_Tehniskie raksturlielumi	1500w, Q=100-350 l/min, D50/32			•	•	•	•	Elementa tehniskie raksturlielumi
04_Ražotājs	Pedrollo					•	•	Elementa ražotājs
05_Produkta ID	FM 32/160C					•	•	Elementa modelis/produkts
06_BMS_protokols	ModBus					•	•	Ja pieejams, tad norādīt protokola veidu
07_Tehniskā specifikācija	*Fails					•	•	Elementa ražotāja tehniskā specifikācija

SPECIFIKĀCIJU NOFORMĒŠANA

4.8. Materiālu apjomu saraksts

Projektēšanas laikā, kontroles punktos Detalizētais BIM un Apstiprinātais BIM nepieciešams iesniegt esošo BIM modeļu materiālu apjomu specifikācijas. Materiālu specifikācijā jānorāda visi 3D BIM modelī uzrādītie elementi un to daudzums.

Materiālu apjomu specifikācijas veidot pēc šāda parauga:

Nr.	Projekta daļa/ sistēma	Stāvs	Zona*	Klasifikācija	Apraksts	Mērvienība	Daudzums

*Ja attiecināms

Description		Klasifikācija	^
Kombinētais automātiskais balansējošais vārsts AB-PM DP 5-22 kPa	☆	Classification.Uniclass.EF.Description	☆
System Type	☆	Air conditioning	
T11		Classification.Uniclass.EF.Number	☆
Material	☆	EF_65_80	
Metāls		Classification.Uniclass.Pr.Description	☆
Size	☆	Supply and return air handling units	
15-15		Classification.Uniclass.Pr.Number	☆
Insulation Type	☆	Pr_60_65_03_87	
Insolation_thickness_mm	☆	Classification.Uniclass.Ss.Description	☆
0		Mechanical and whole building ventilation systems	
Manufacturer	☆	Classification.Uniclass.Ss.Number	☆
Danfoss		Ss_65_40_33_52	
Product Code	☆		
AB-PM, DN10, 1/2" a-a			
Design Part	☆		
AVK-A			

BIM
=
INFORMATION

REVIT PAMATFUNKCIJAS, DARBA VIDES SAGATAVOŠANA

Apmācību modulis
“BIM modelēšana AVK un UK projektēšanā ar priekšzināšanām”

GALVENĀS FUNKCIJAS UN SAĪSINĀJUMI

Move (MV)

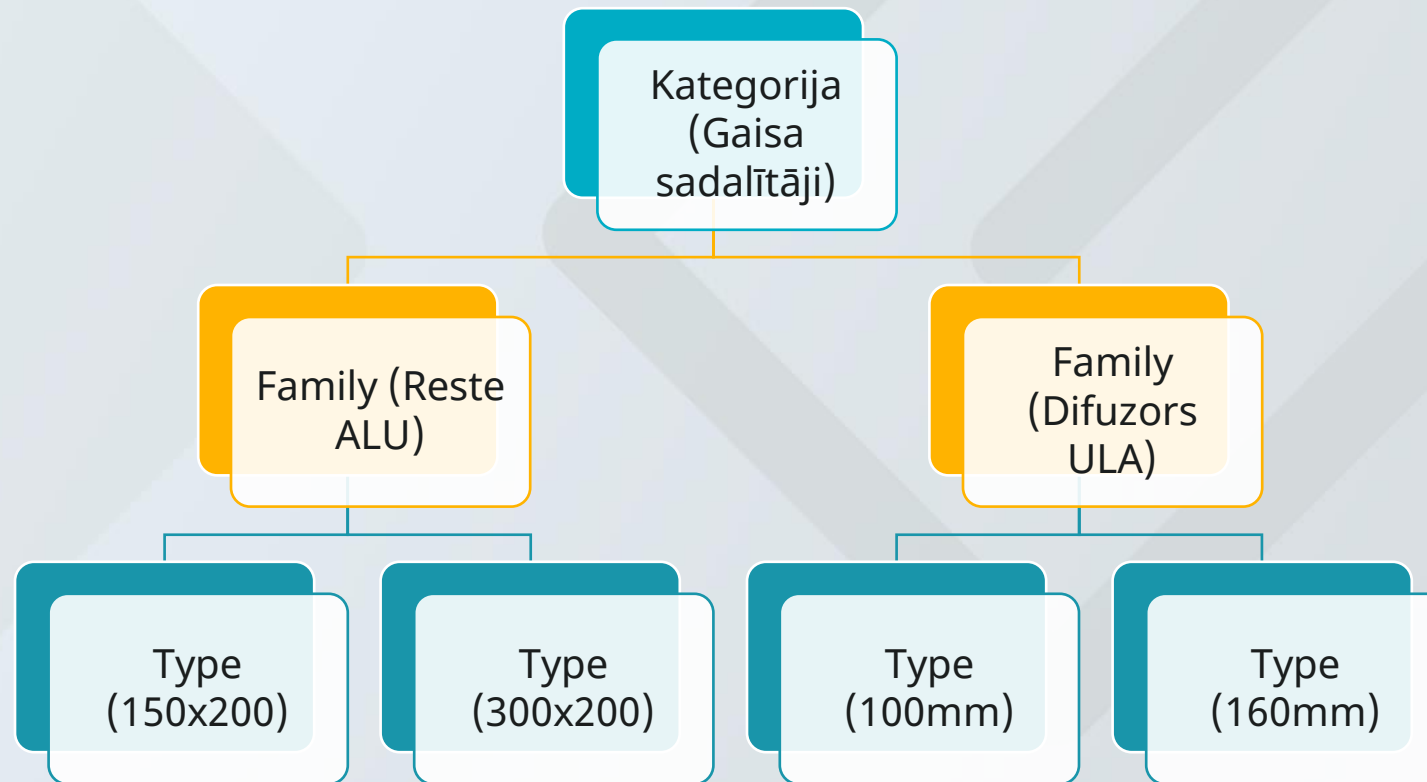
Copy selection (CS)

Visibility (VV)

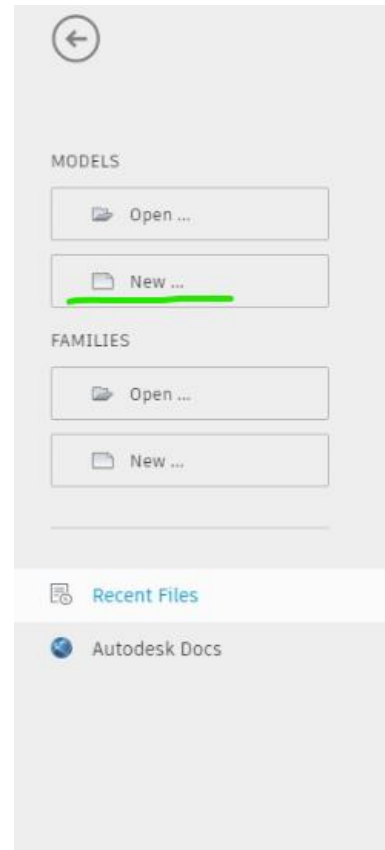
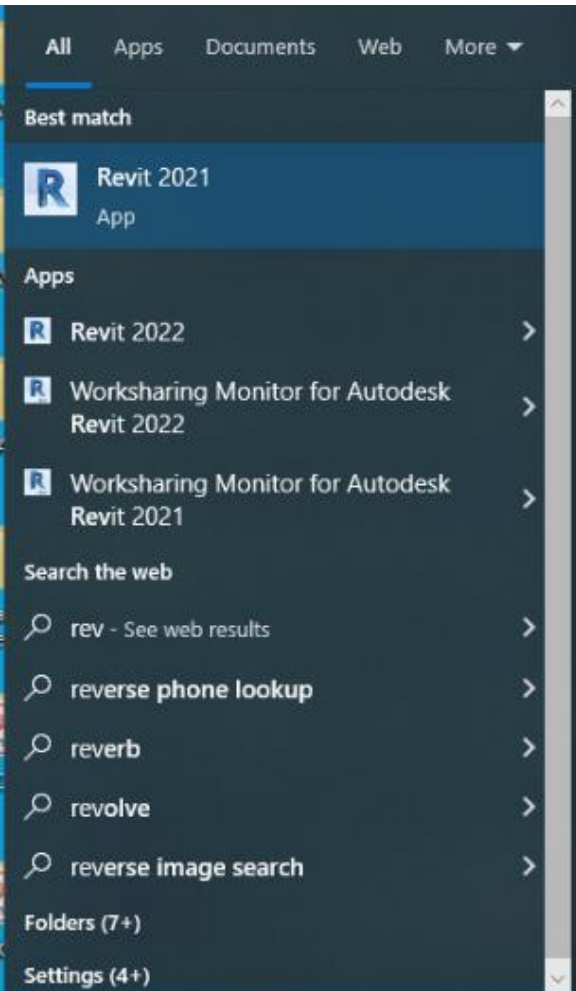
Temporary hide (HH)

Select system elements (Tab, vairākkārtīgi)

REVIT TIPOLOĢISKĀ UZBŪVE



ATVĒRT NEPIECIEŠAMO REVIT VERSIJU



Recent Files

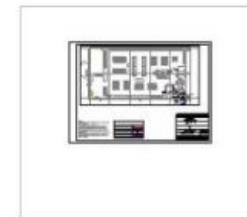
MODELS



U34-A-UK_K-01



UK_Elvi Zvejniekiems



UK_Elvi Ragana



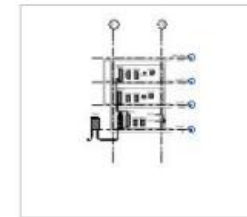
UK_Elvi Sigulda



Sample Architecture Proj...



Sample Structure Project



Sample Systems Project

IZVEIDOJAM JAUNU FAILU BALSTĪTU UZ *METRIC* SAGATAVI

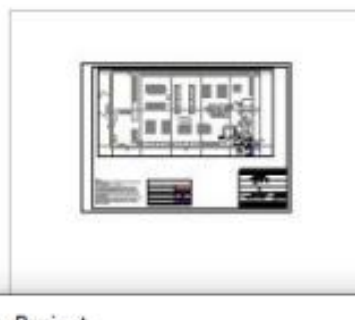
MODELS



U34-A-UK_K-01



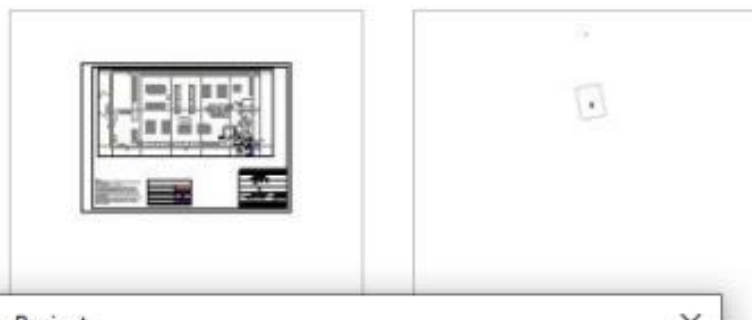
UK_Elvi Zvejniekiem



Sample Architecture Proj...



Sample Structure Project



Sample Systems Project



U34-A-AR-01.ifc



New Project

Template file

Imperial-Construction Template

<None>

Imperial-Construction Template

Imperial-Architectural Template

Imperial-Structural Template

Imperial-Systems Template

Metric-Construction Template

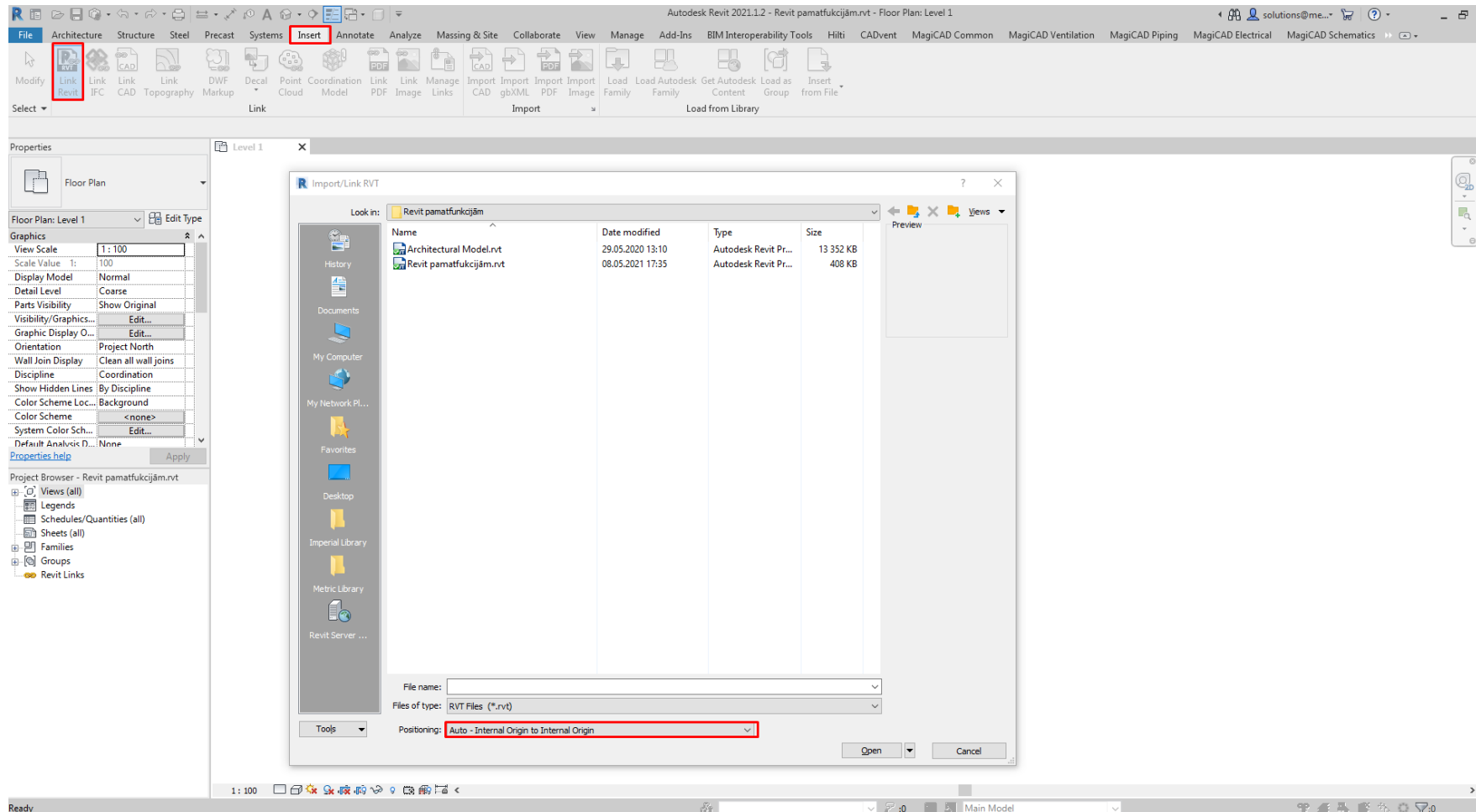
Metric-Architectural Template

Metric-Structural Template

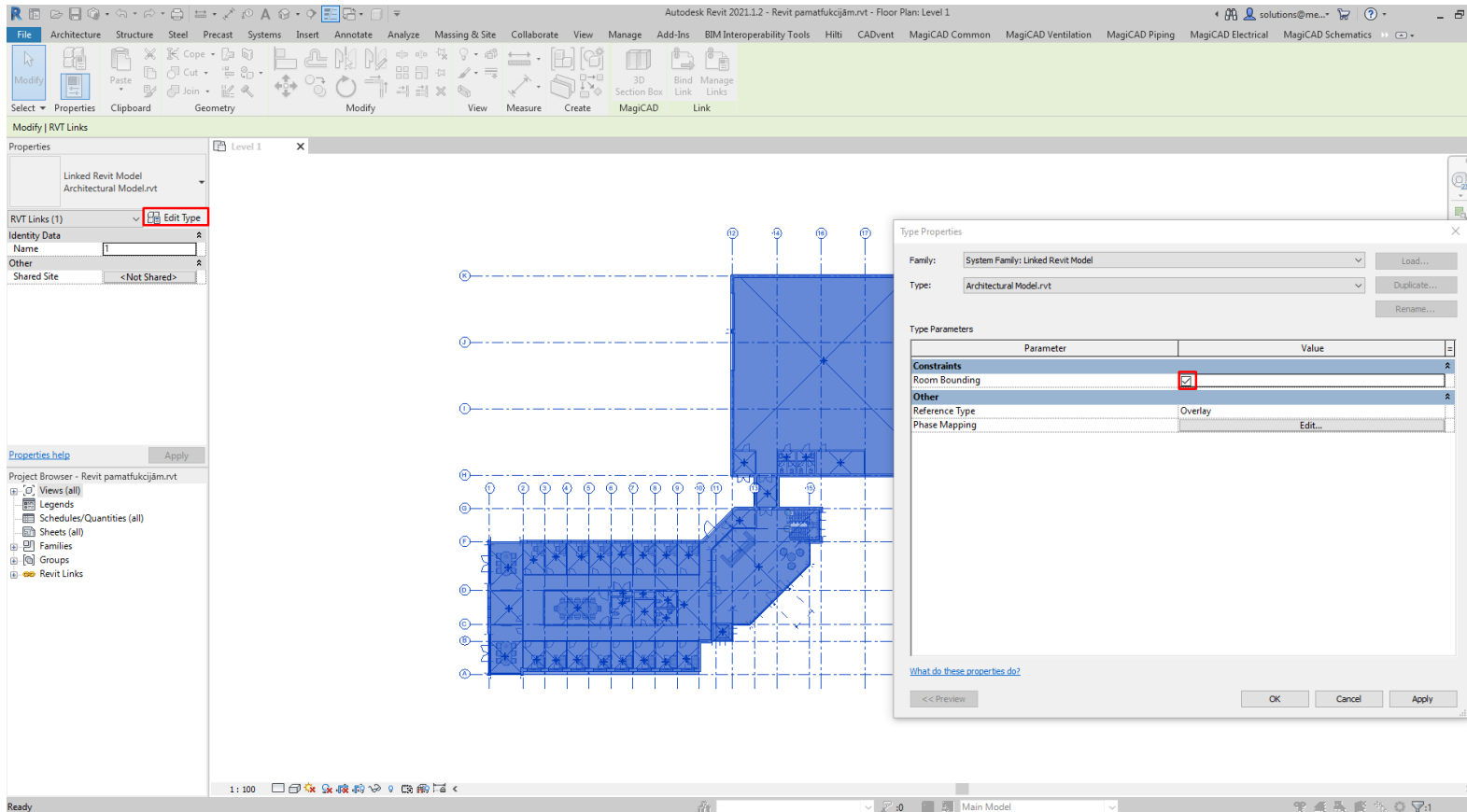
Browse...

Help

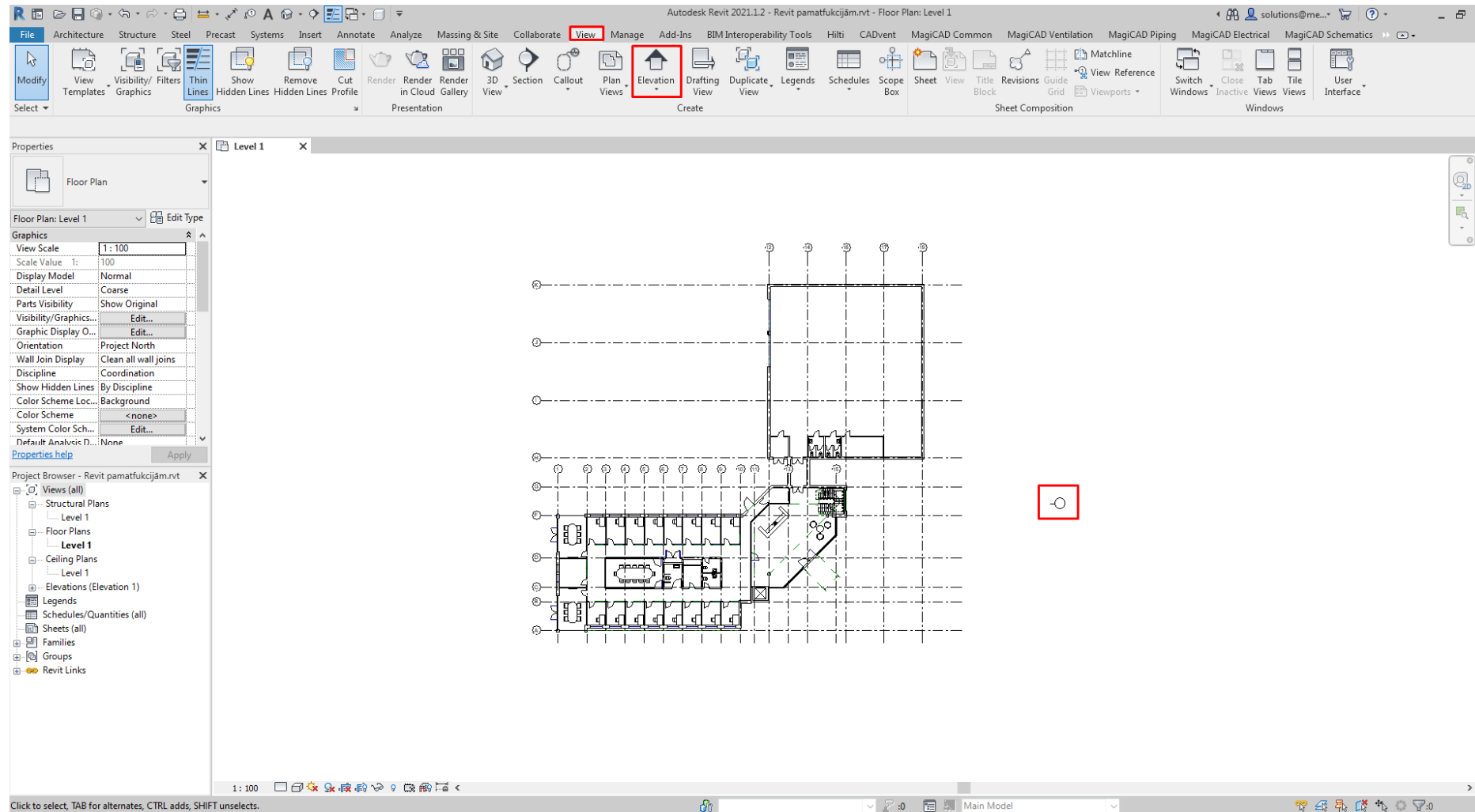
AR MODEĻA PIEVIENOŠANA (1)



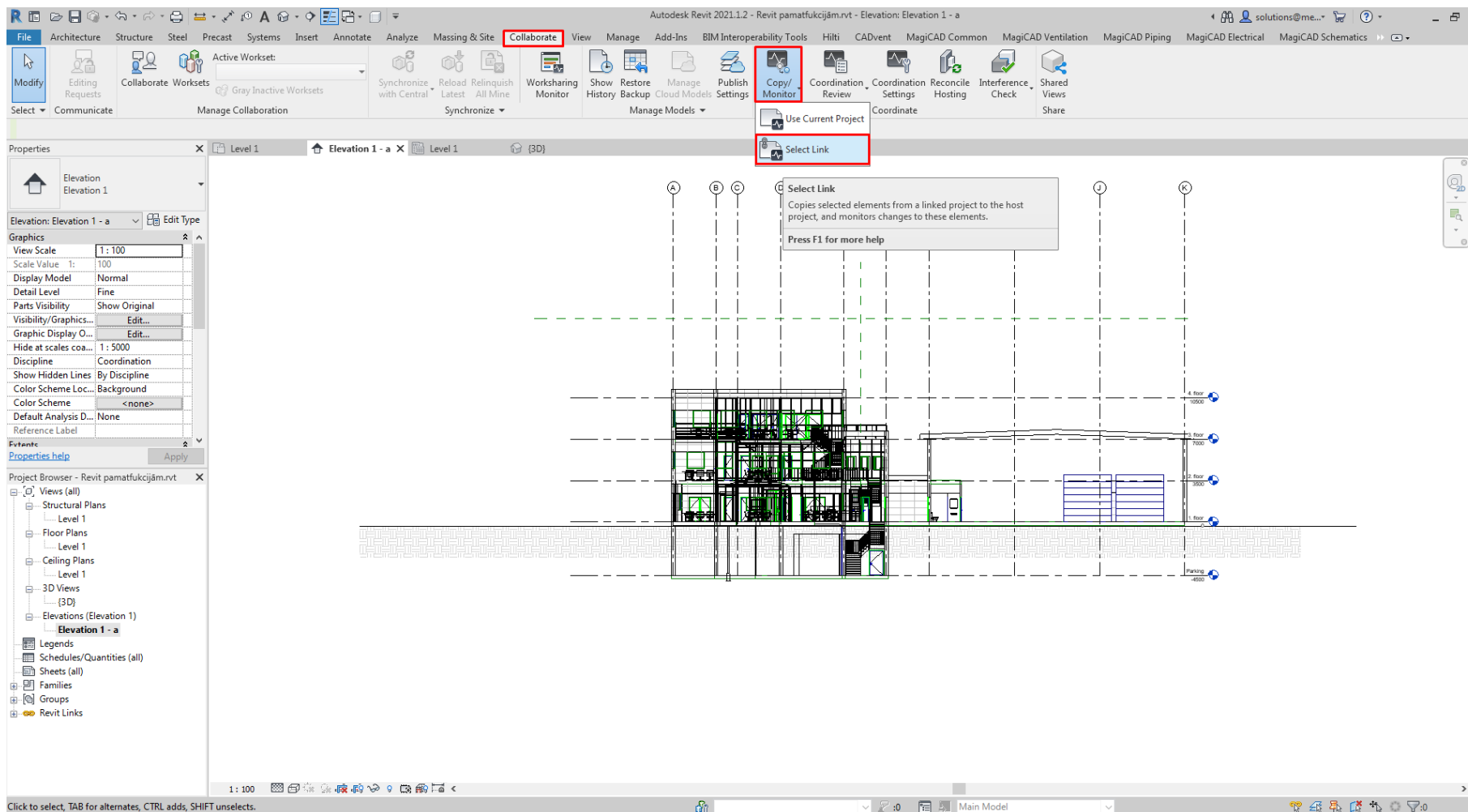
AR MODEĻA PIEVIENOŠANA (2)



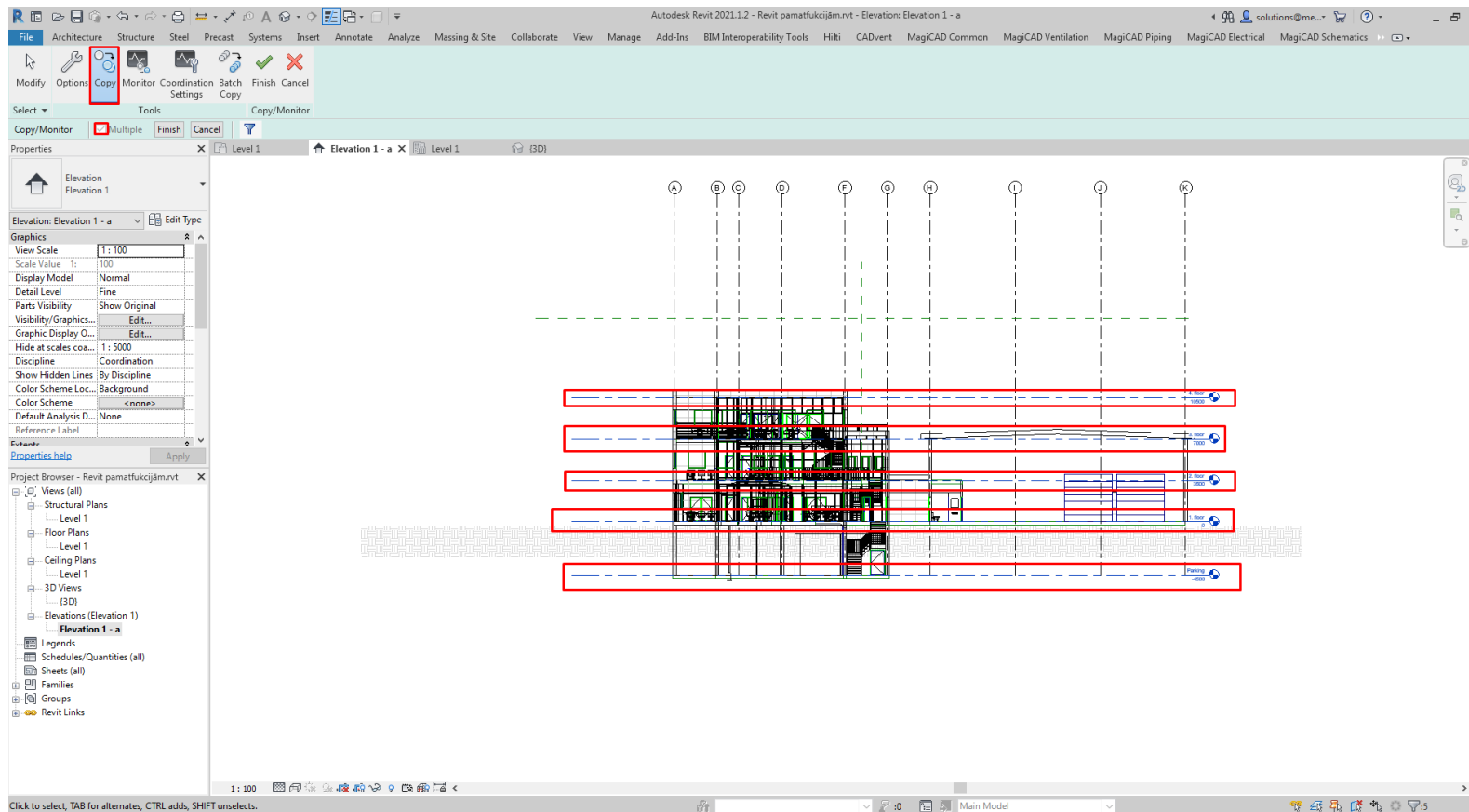
STĀVU PLĀNU IZVEIDE (1)



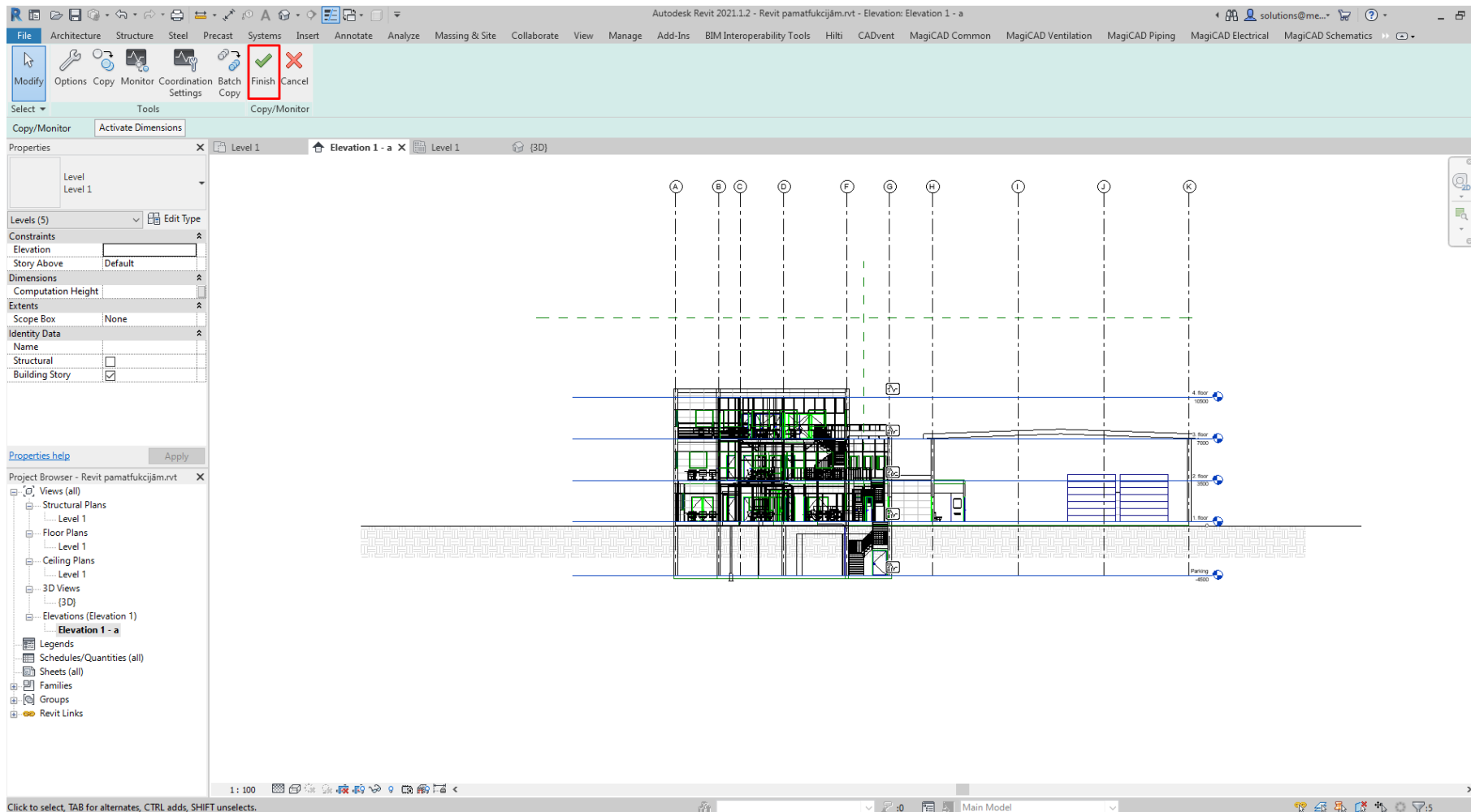
STĀVU PLĀNU IZVEIDE (2)



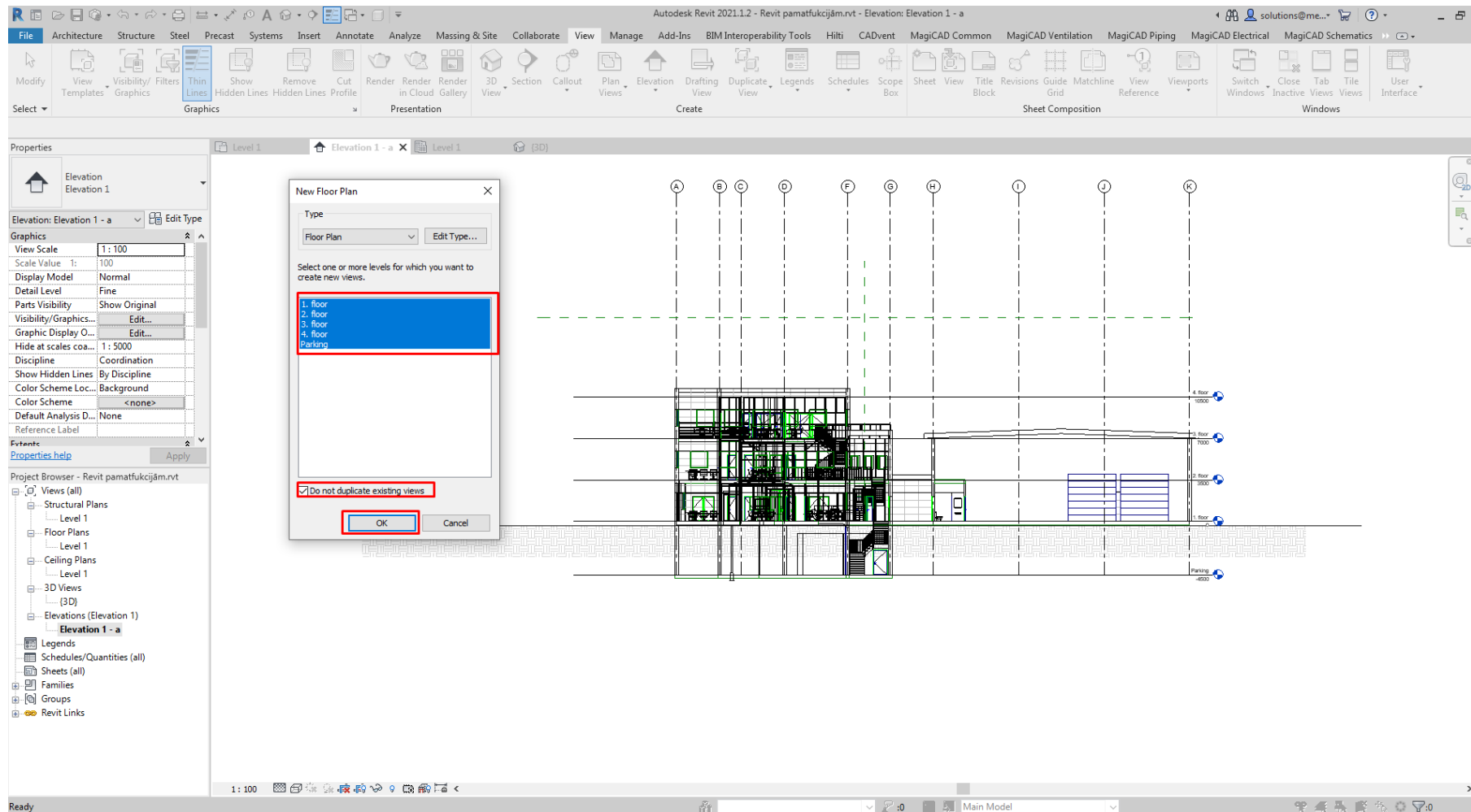
STĀVU PLĀNU IZVEIDE (3)



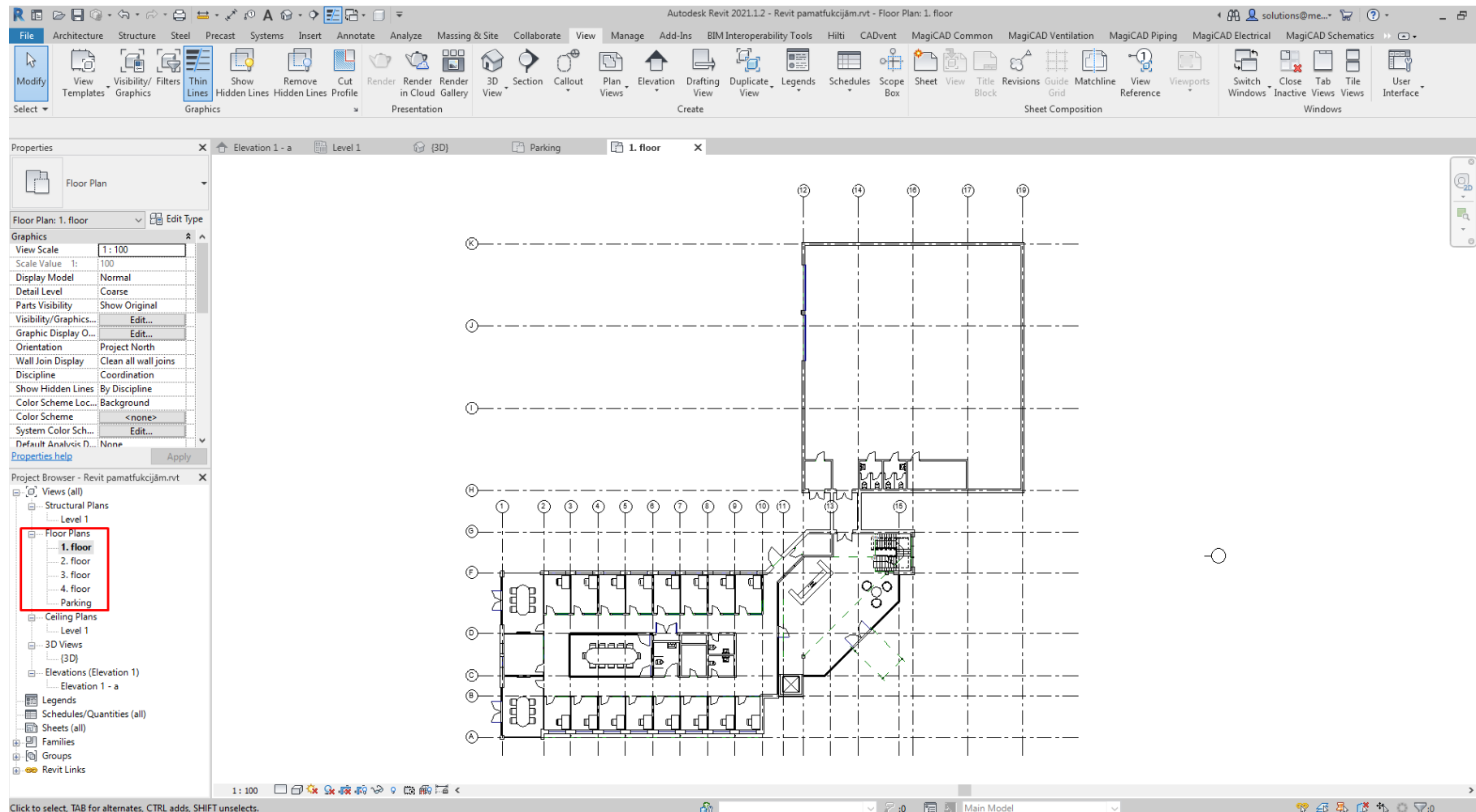
STĀVU PLĀNU IZVEIDE (4)



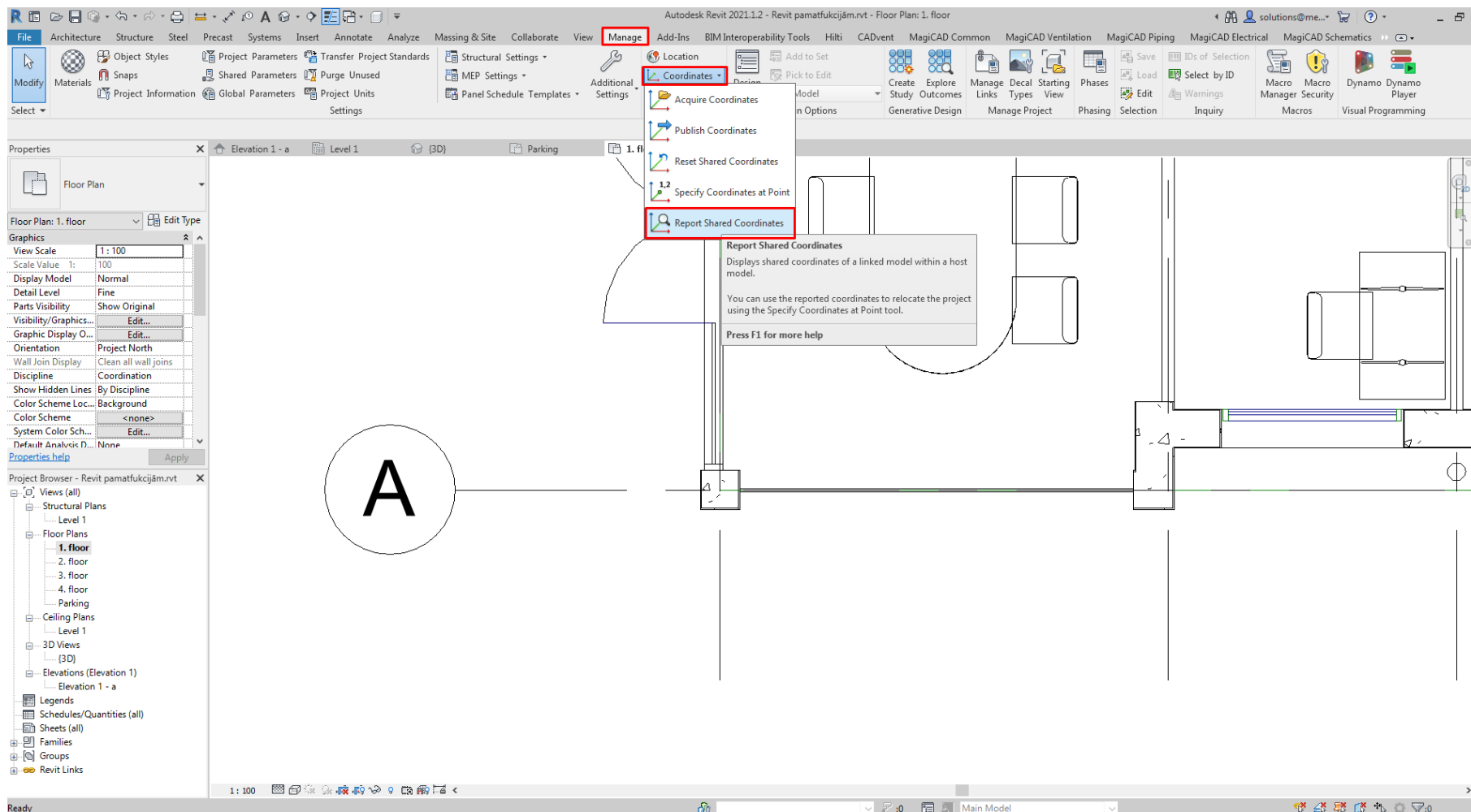
STĀVU PLĀNU IZVEIDE (6)



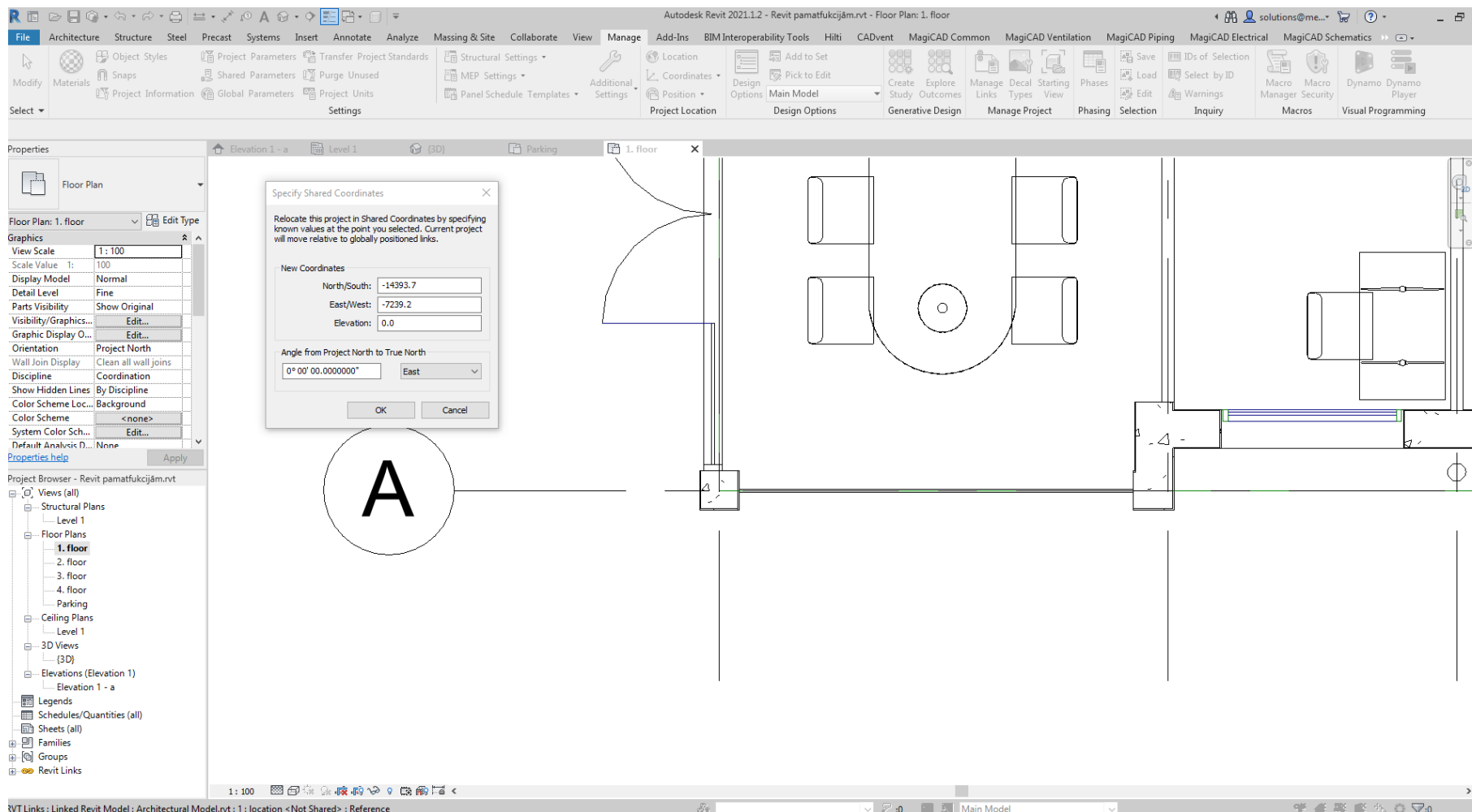
STĀVU PLĀNU IZVEIDE (7)



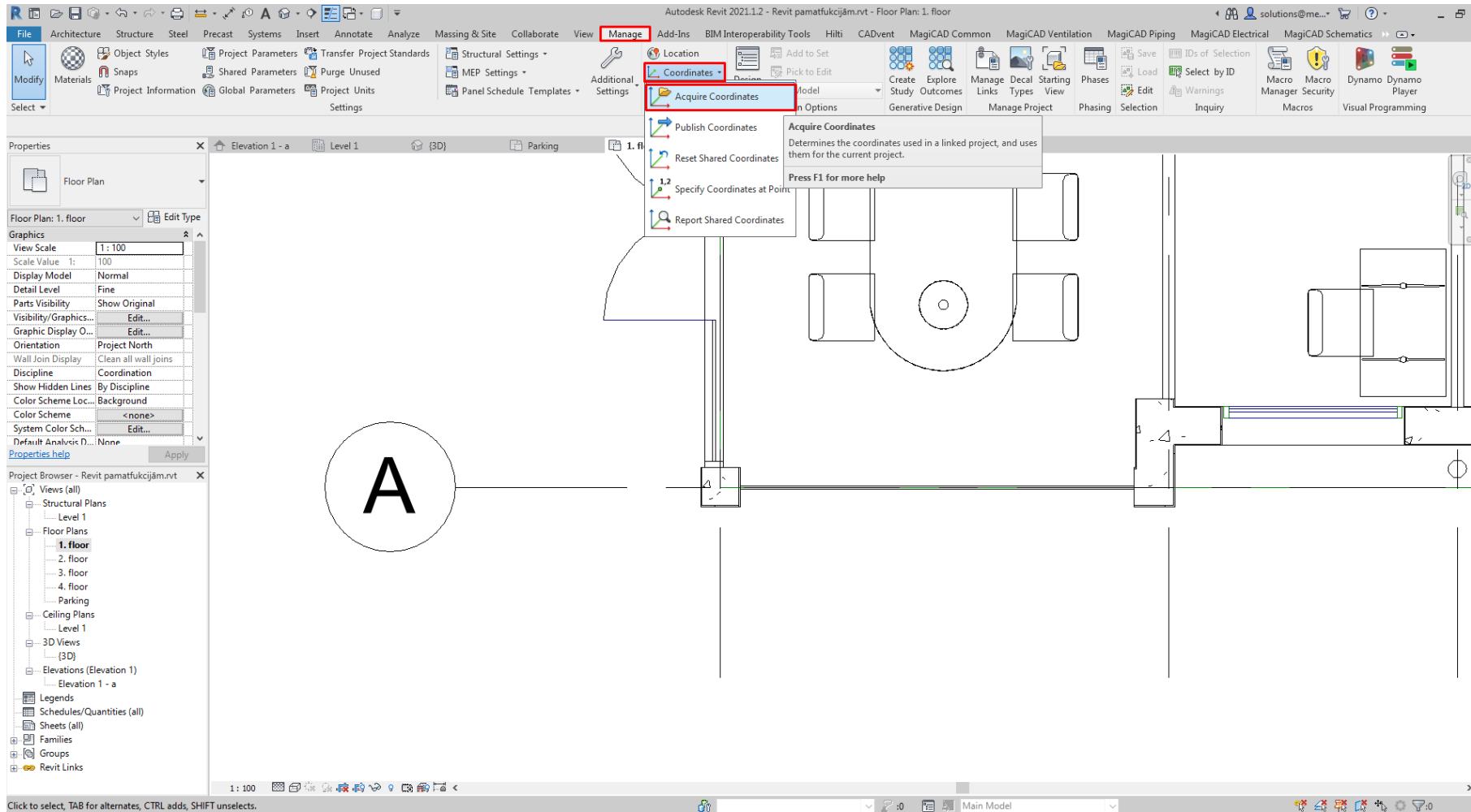
KOORDINĀŠU SALĀGOŠANA



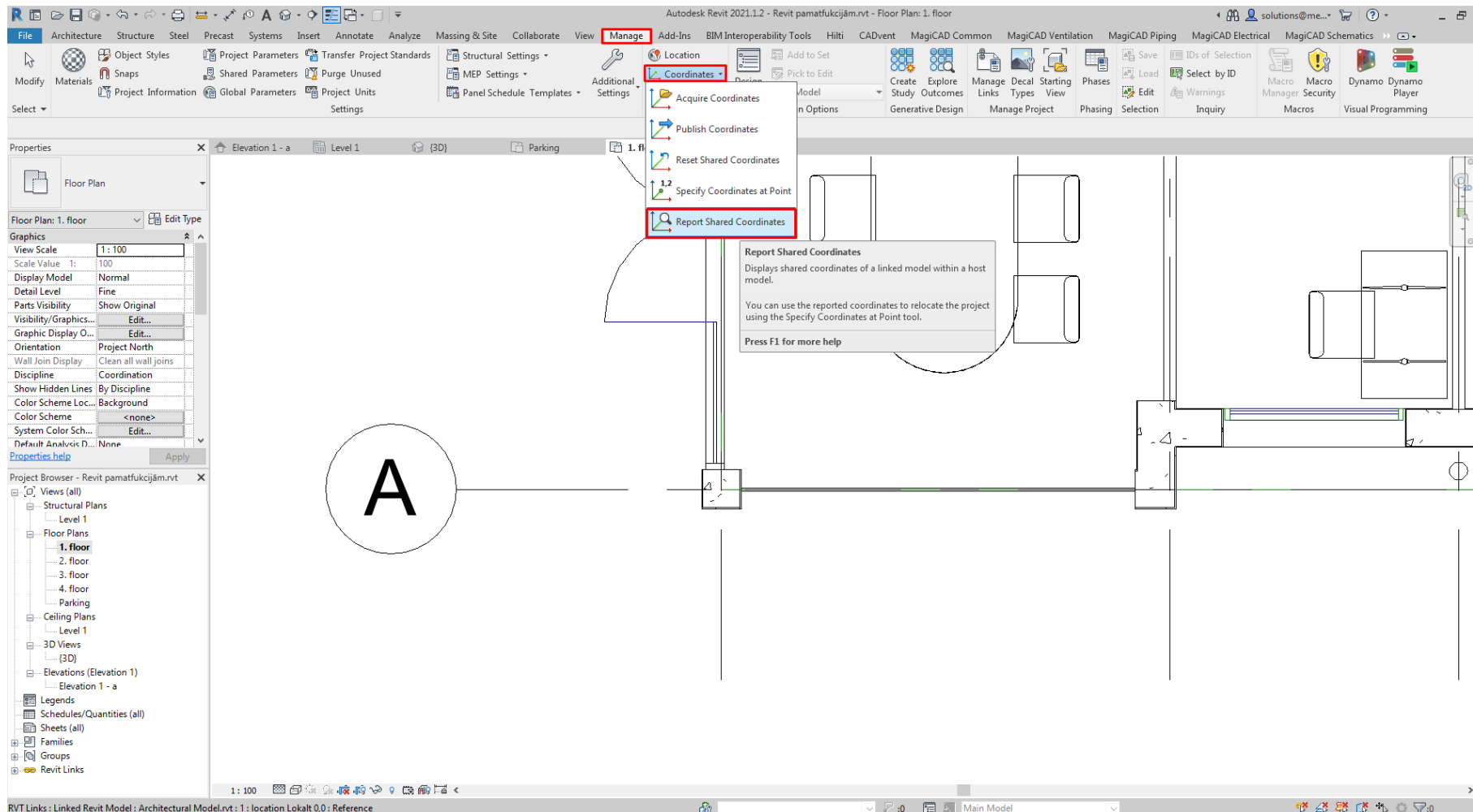
KOORDINĀŠU SALĀGOŠANA (2)



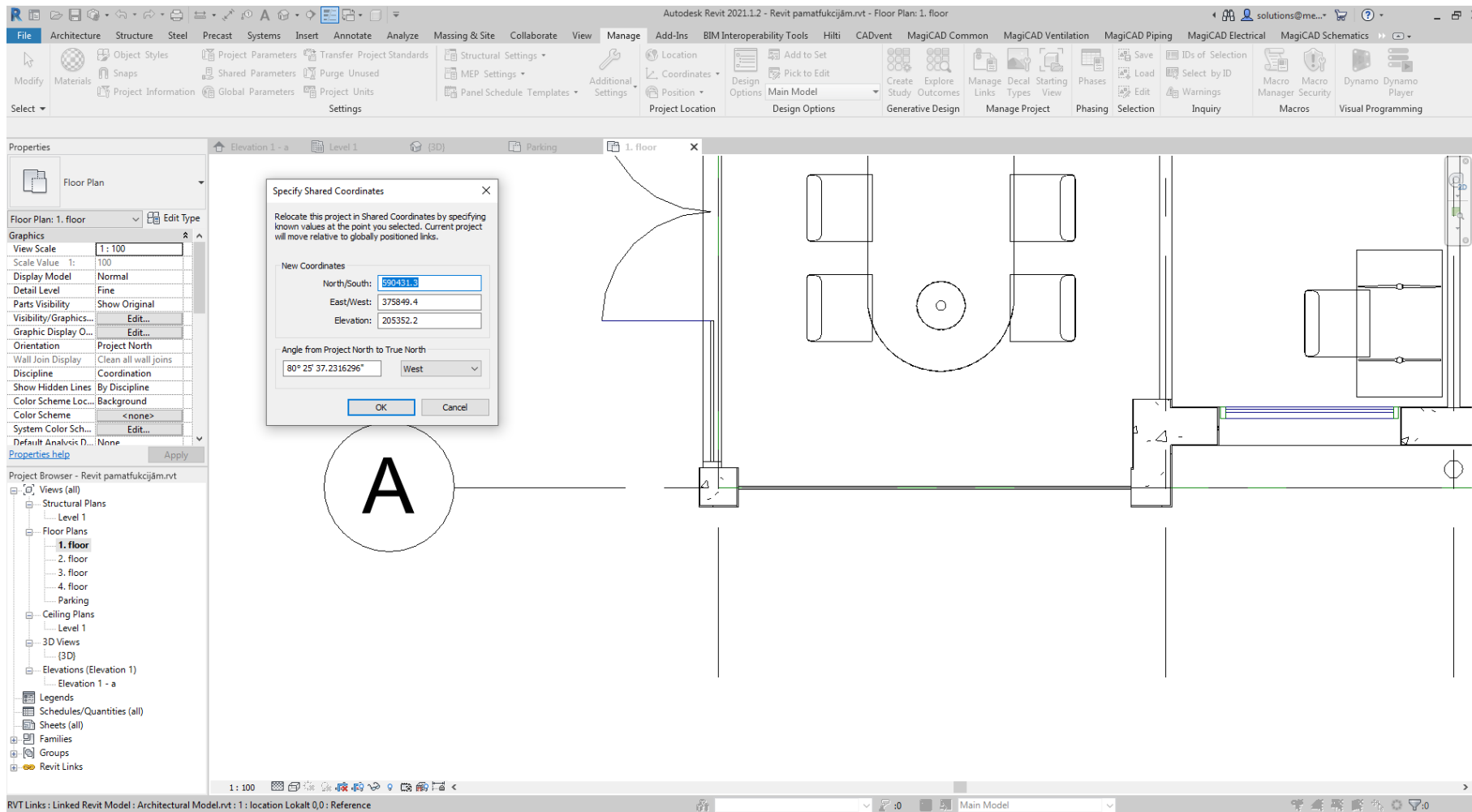
KOORDINĀŠU SALĀGOŠANA (3)



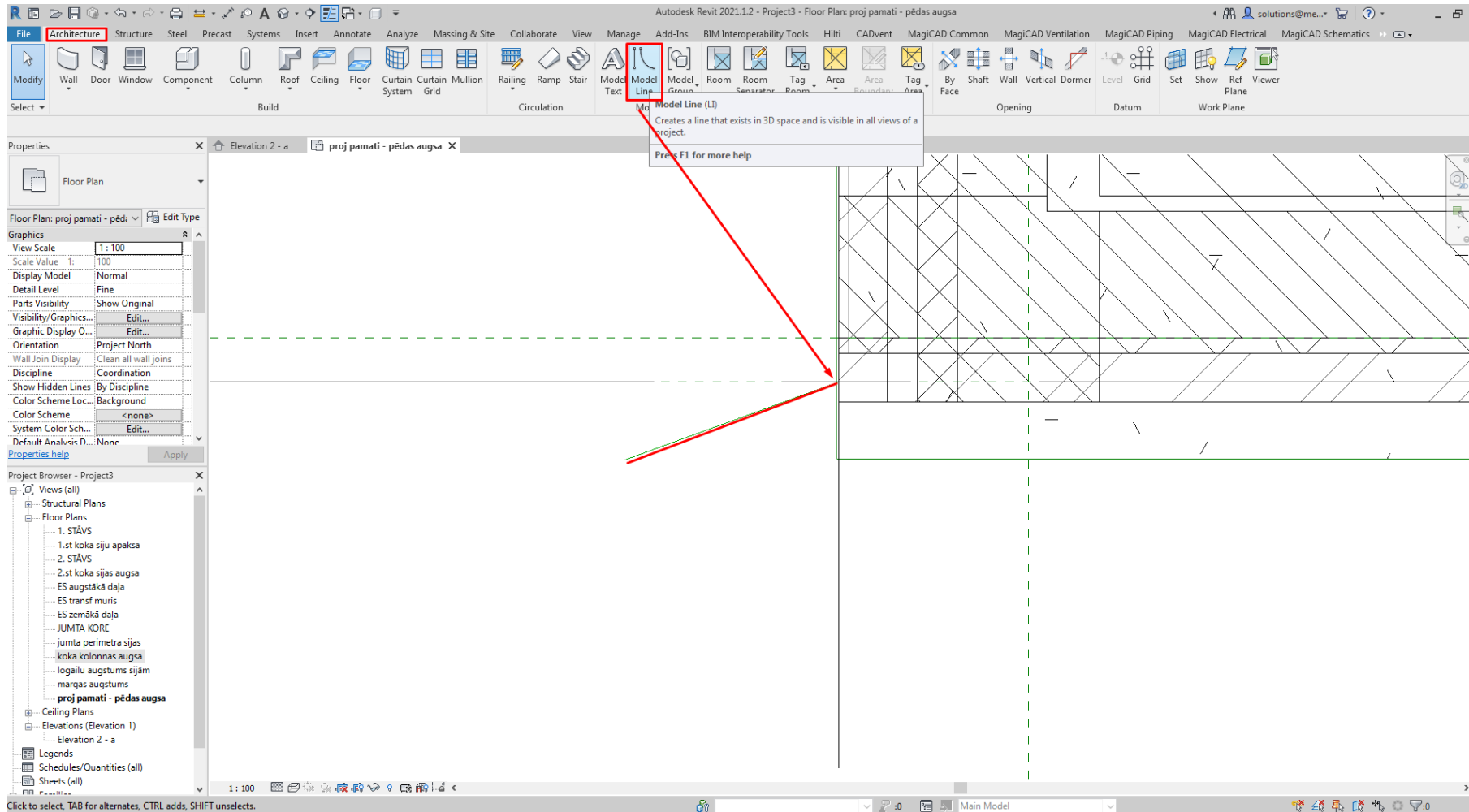
KOORDINĀŠU SALĀGOŠANA (4)



KOORDINĀŠU SALĀGOŠANA (5)



JĀ NESANĀK IEGŪT PIESAISTES PUNKTU



PRAKTISKAIS DARBS NR.1

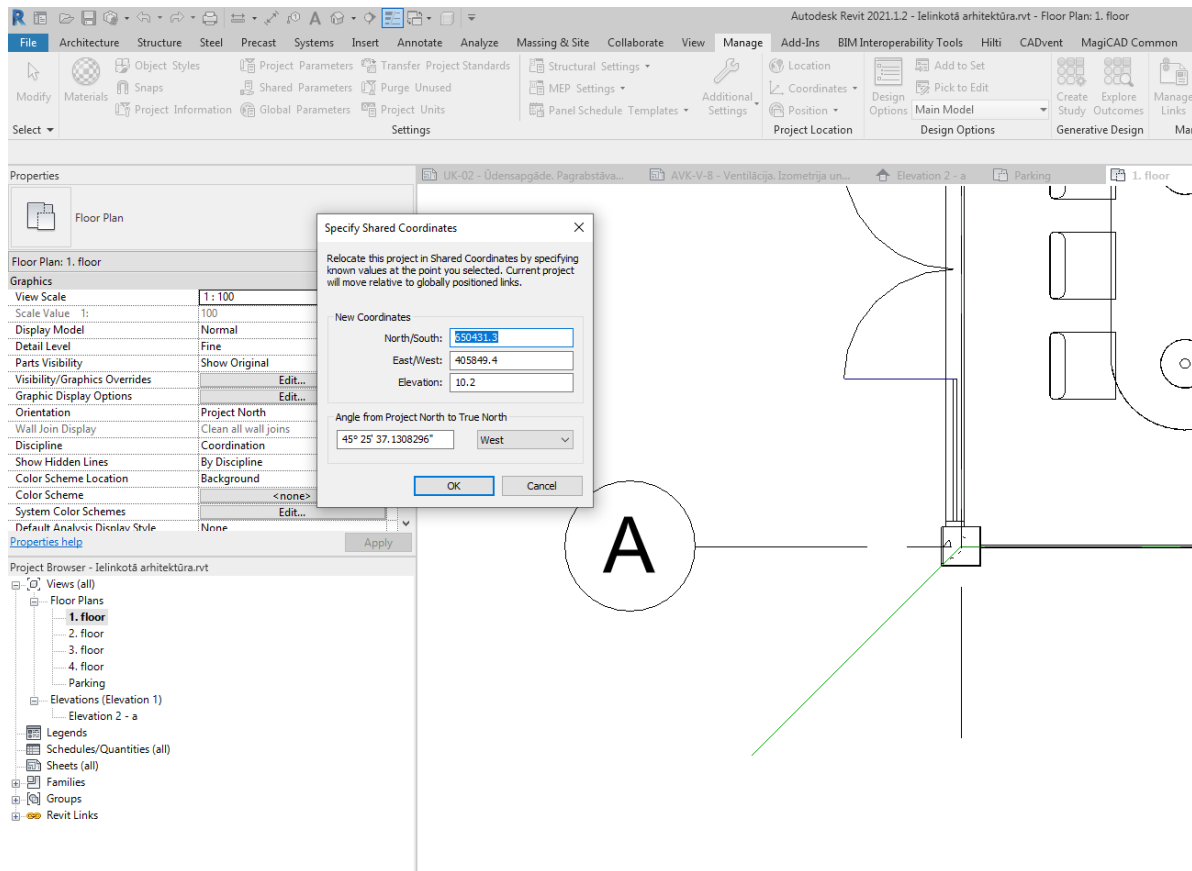
Atvērt tukšu failu

Pievienot AR modeli

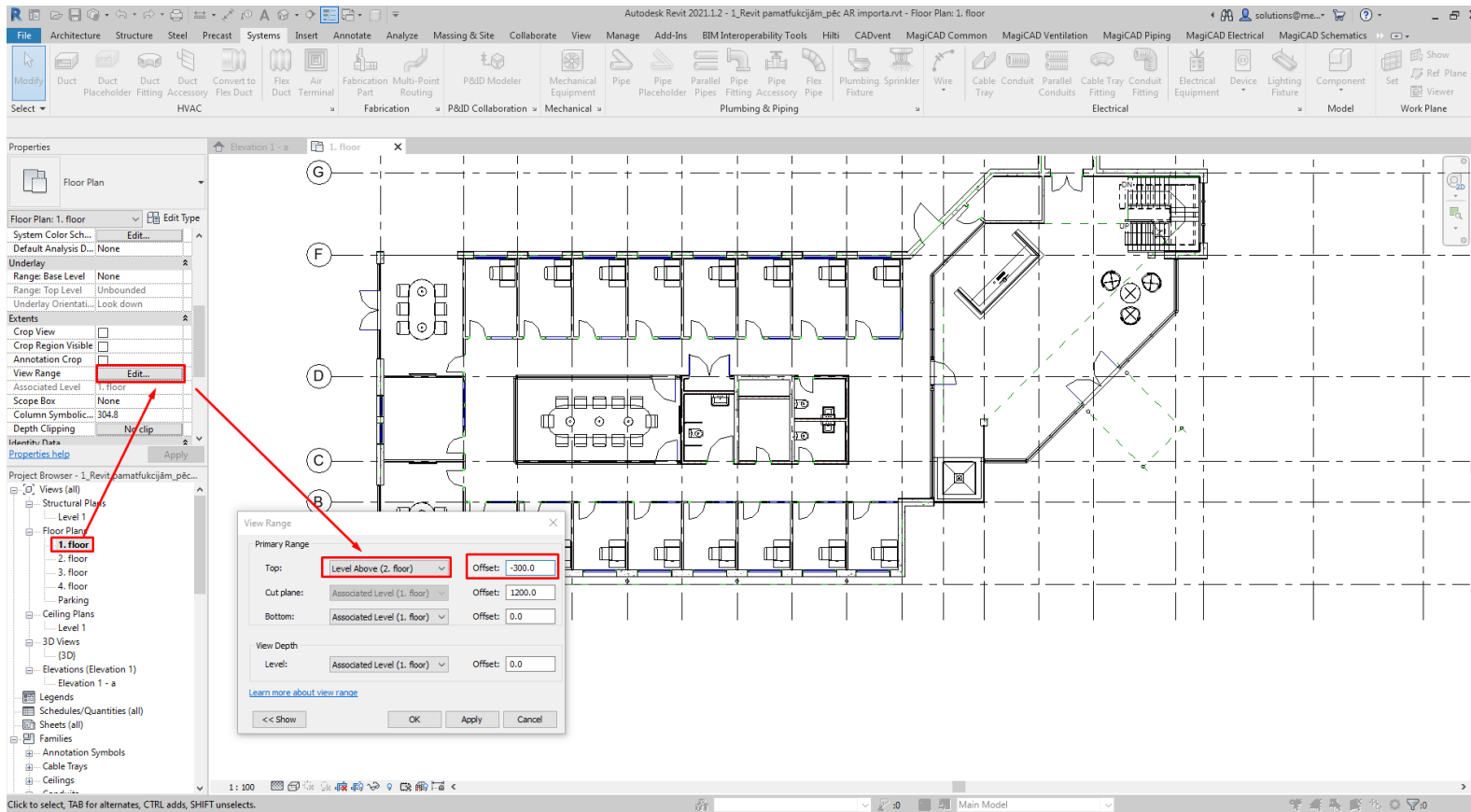
Nokopēt stāvu plānu sadalījumu no AR modeļa

Sasinhronizēt koordinātes ar AR modeli

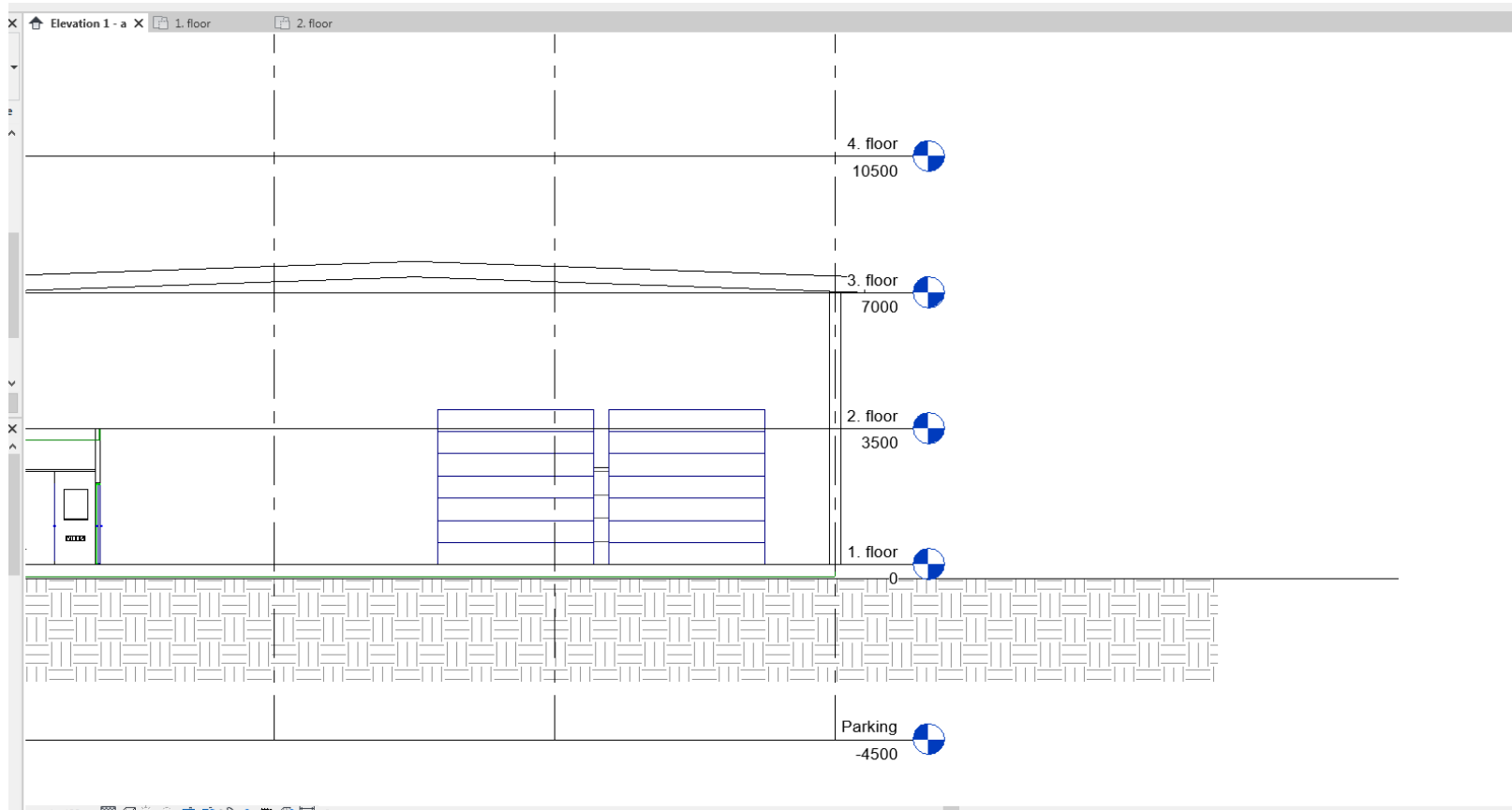
IEGŪSTAMĀIS REZULTĀTS



SKATA AUGSTUMA REGULĒŠANA (1)



SKATA AUGSTUMA REGULĒŠANA (2)

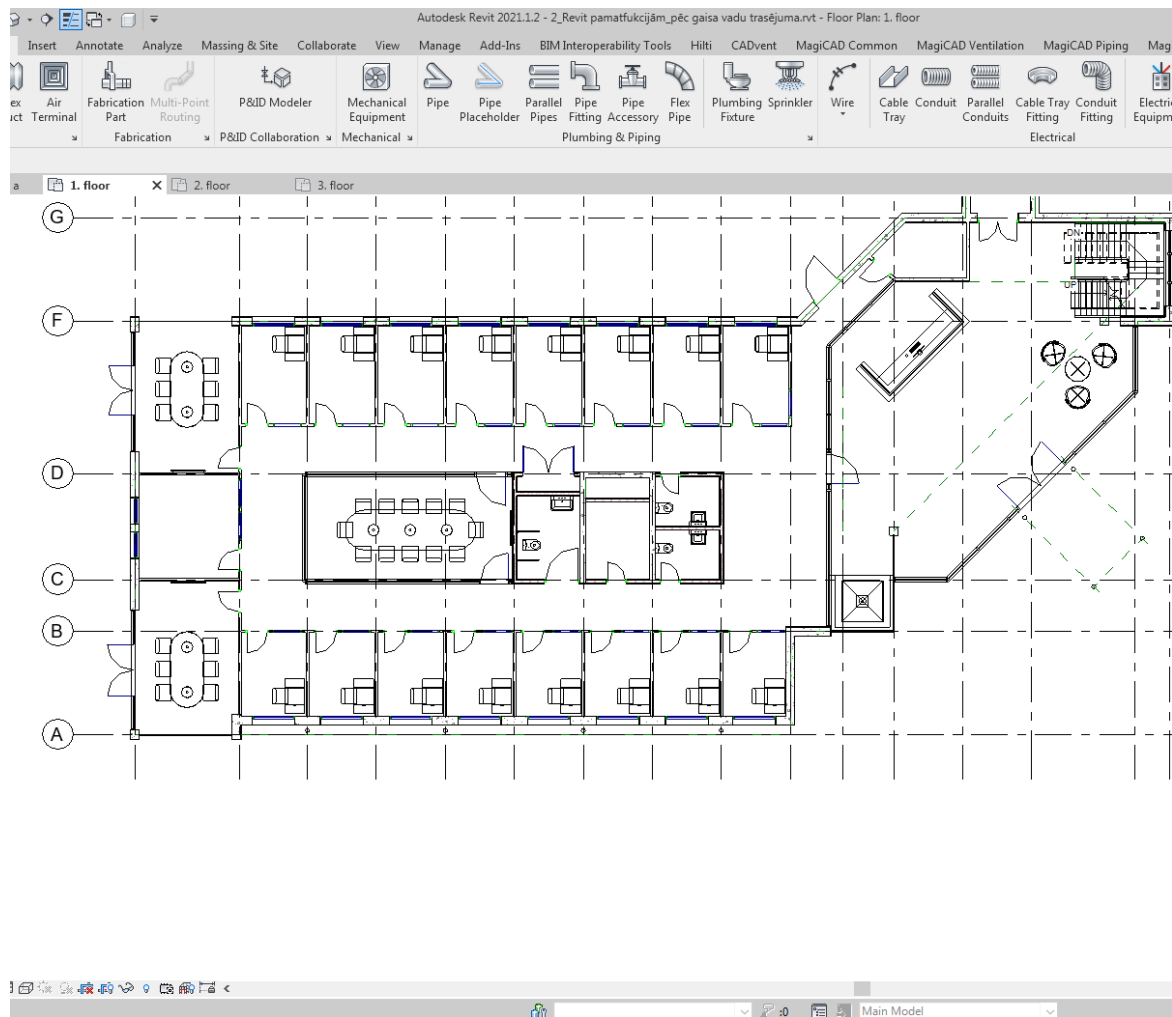


INŽENIERSISTĒMU MODELĒŠANA

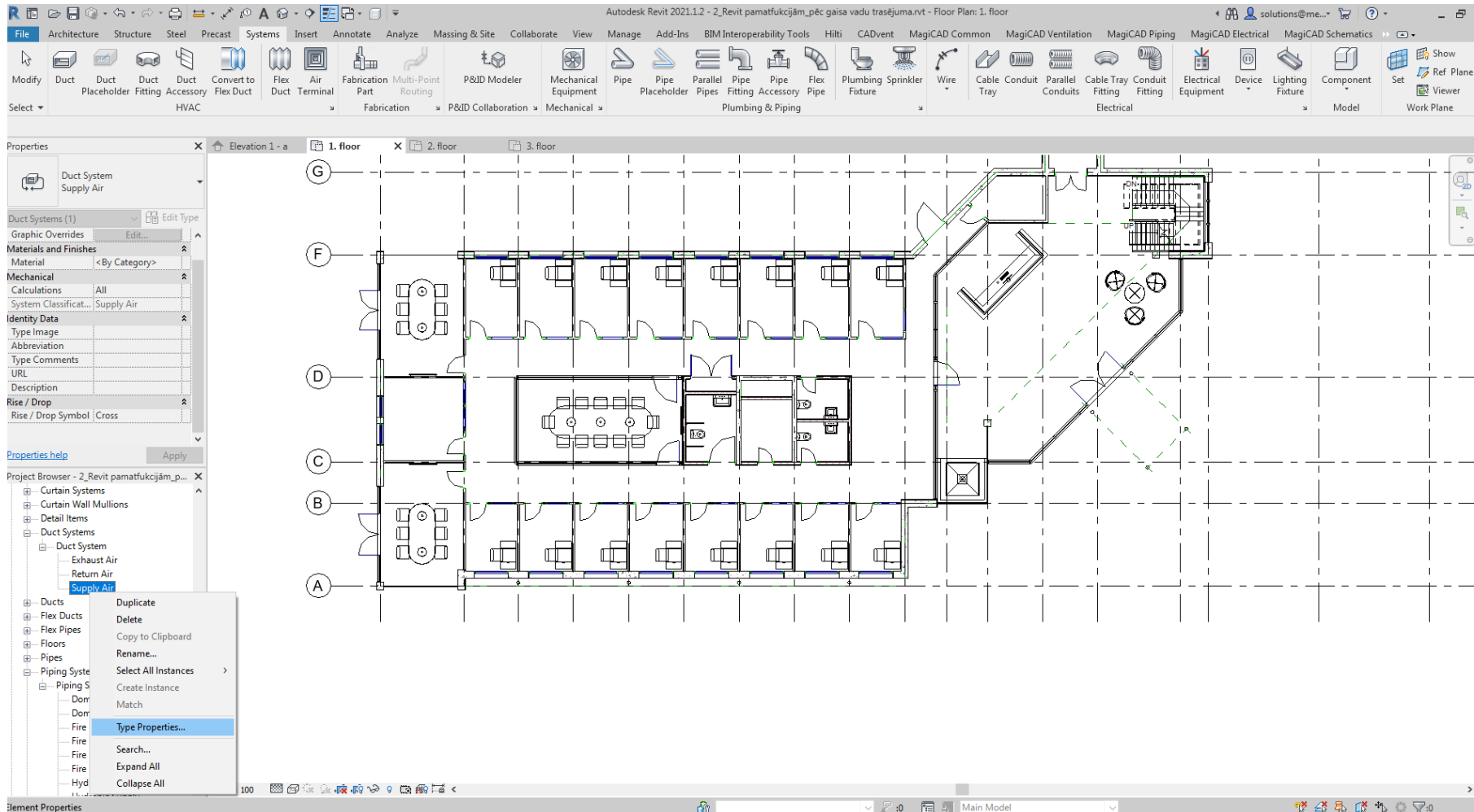
Apmācību modulis

“BIM modelēšana AVK un UK projektēšanā ar priekšzināšanām”

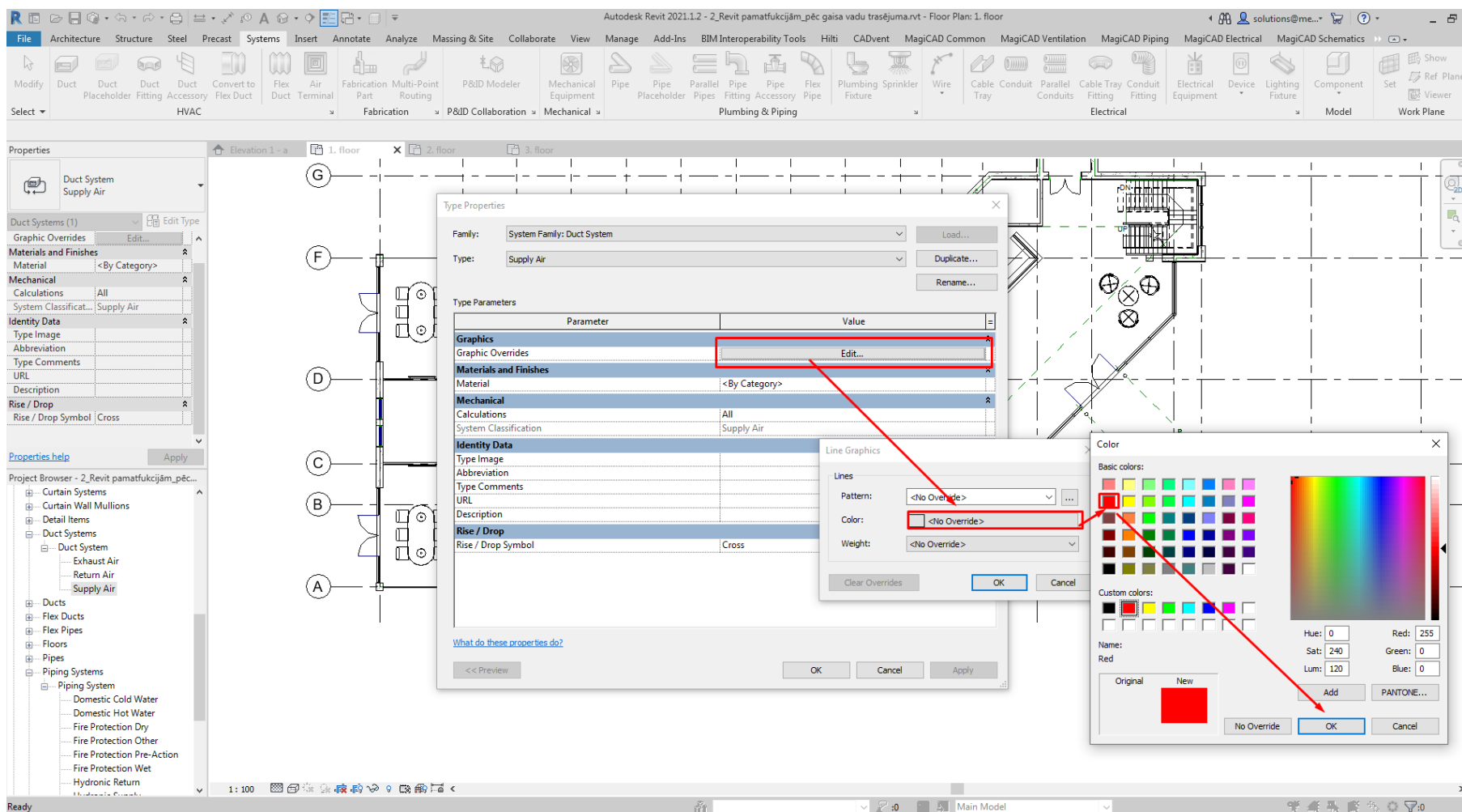
INŽENIERSISTĒMU KLASIFIKĀCIJA



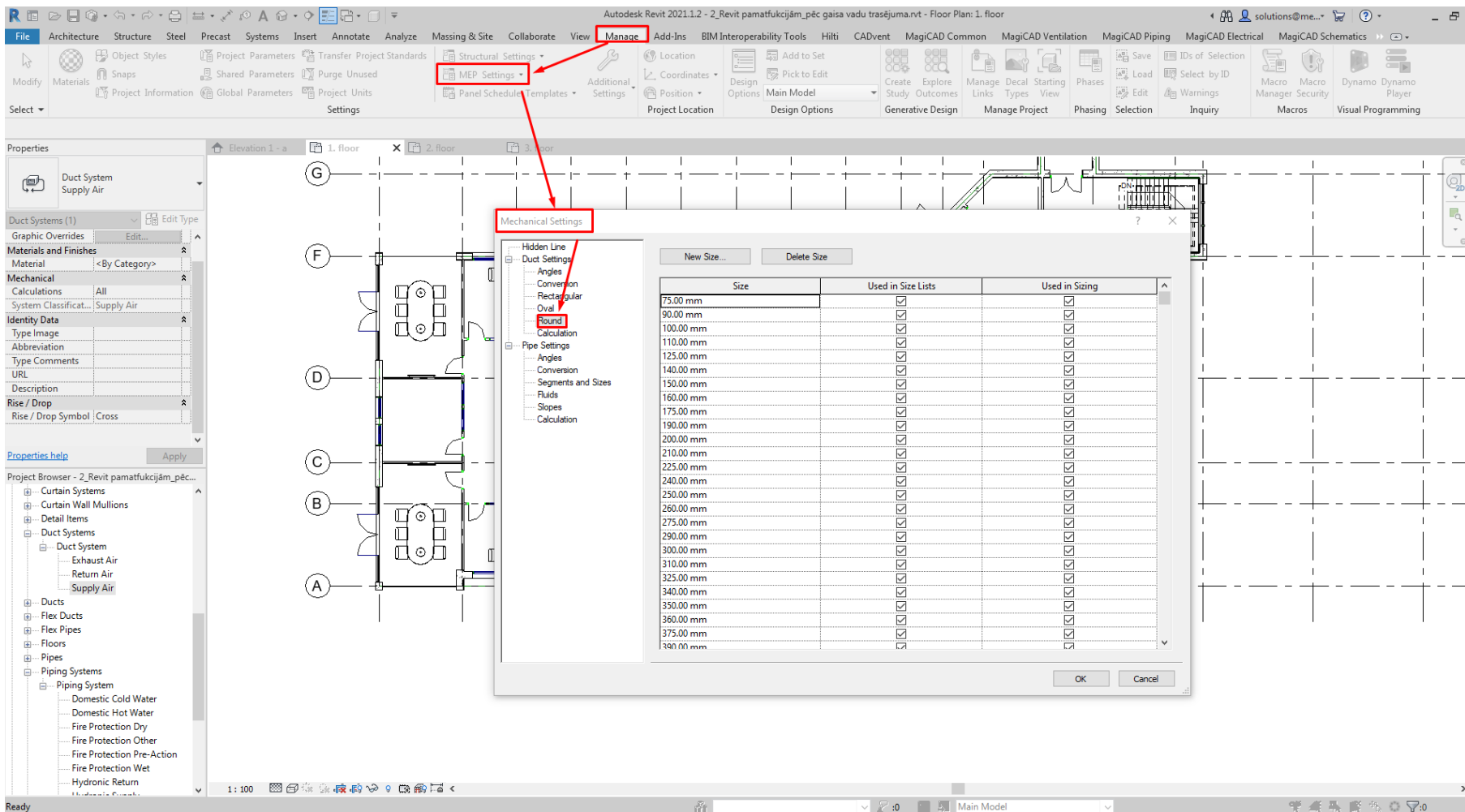
KRĀSAS NOMAIŅA SISTĒMAI (1)



KRĀSAS NOMAIŅA SISTĒMAI (2)



CAURULVADA PIEEJAMO IZMĒRU DEFINĒŠANA (1)



Autodesk Revit 2021.1.2 - 2_Revit pamatfunkcijām_pēc gaisa vadu trasējuma.rvt - Floor Plan: 1. floor

File Architecture Structure Steel Precast Systems Insert Annotate Analyze Massing & Site Collaborate View **Manage** Add-Ins BIM Interoperability Tools Hilti CADvent MagiCAD Common MagiCAD Ventilation MagiCAD Piping MagiCAD Electrical MagiCAD Schematics

MEP Settings Mechanical Settings

Hidden Line

Duct Settings

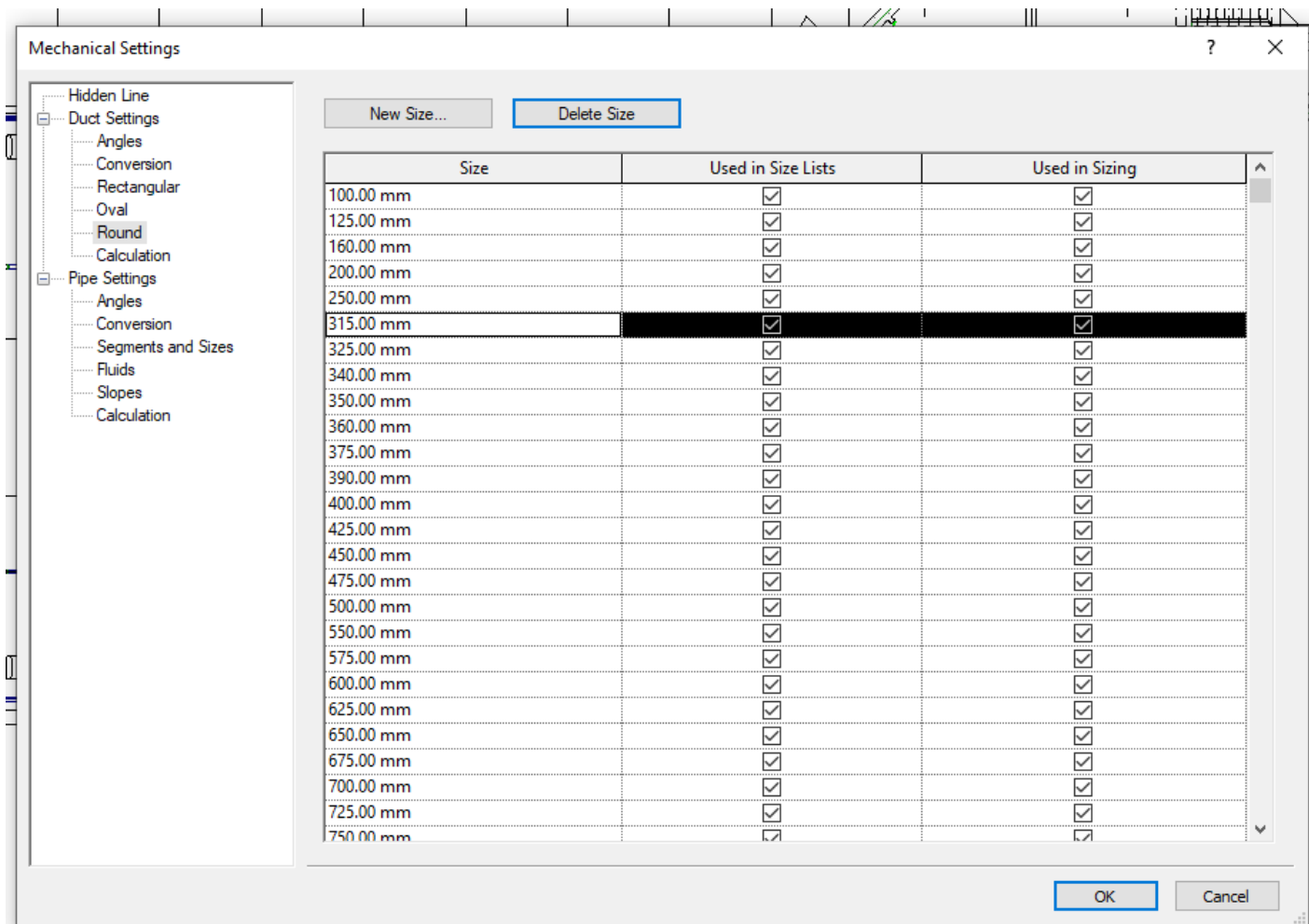
- Angles
- Conversion
- Rectangular
- Oval
- Round**
- Calculation

Pipe Settings

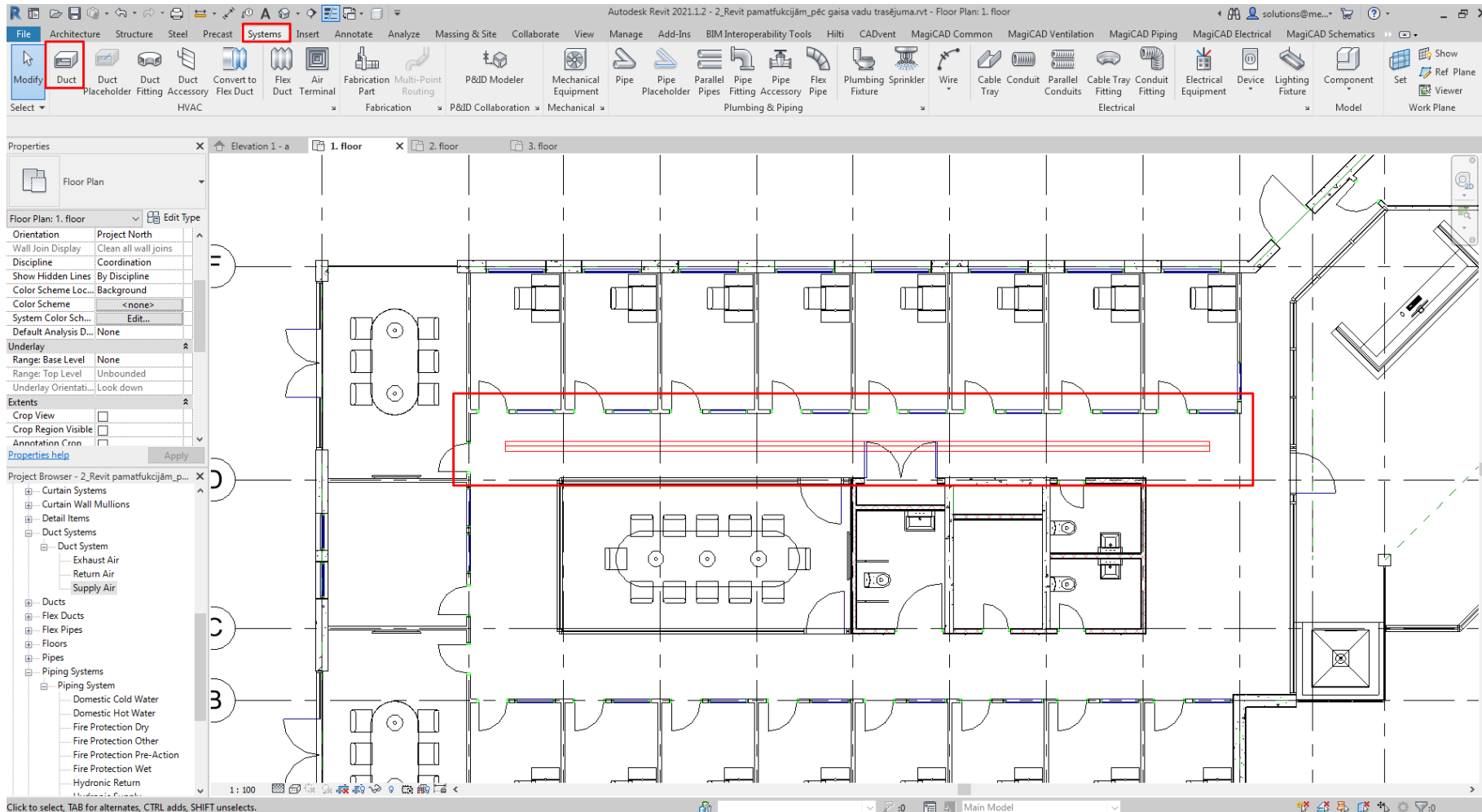
- Angles
- Conversion
- Segments and Sizes
- Fluids
- Slopes
- Calculation

Size	Used in Size Lists	Used in Sizing
75.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
90.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
100.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
110.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
125.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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150.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
160.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
175.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
190.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
200.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
210.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
225.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
240.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
250.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
260.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
275.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
290.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
300.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
310.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
325.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
340.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
350.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
360.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
375.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
300.00 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

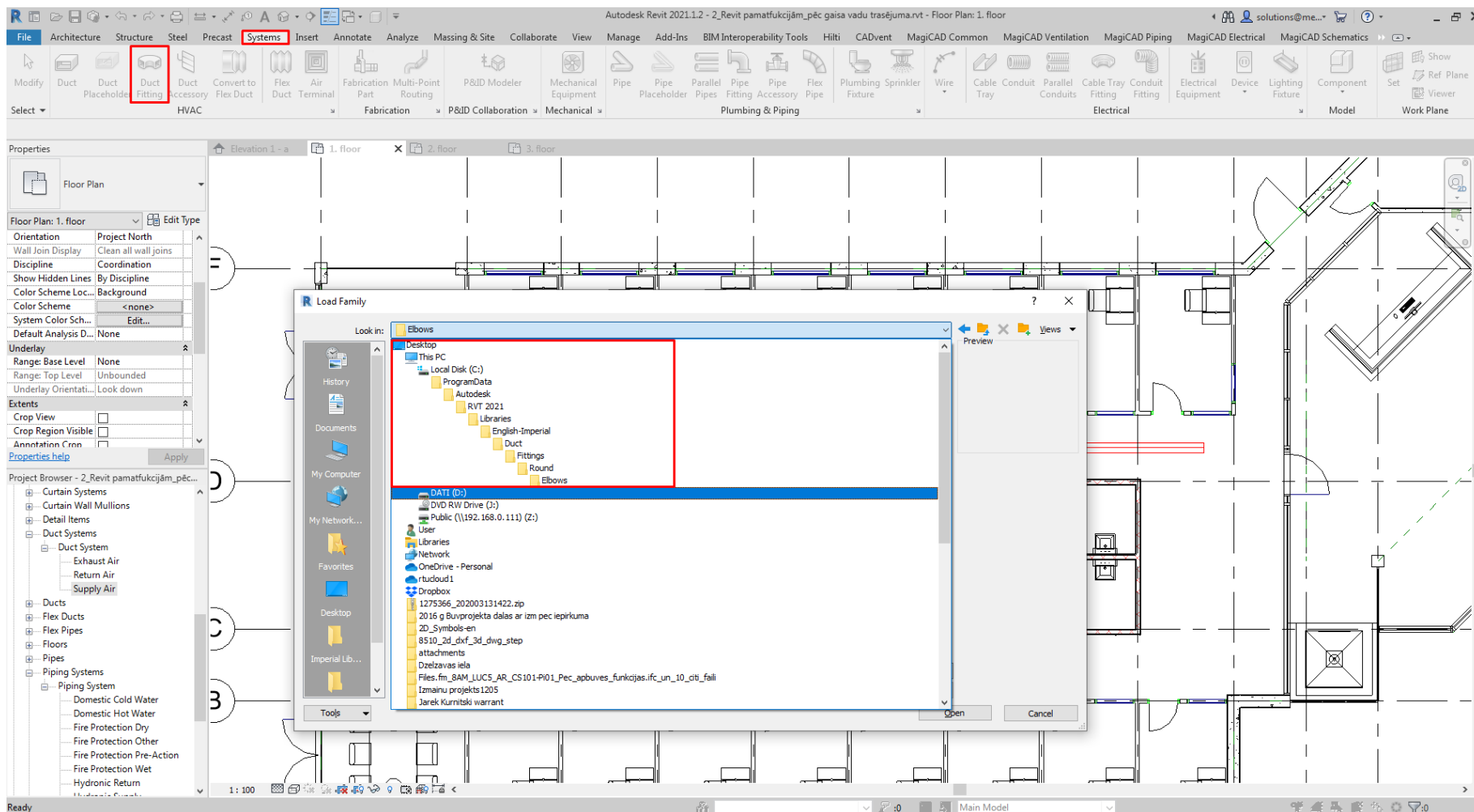
CAURULVADA PIEEJAMO IZMĒRU DEFINĒŠANA (1)



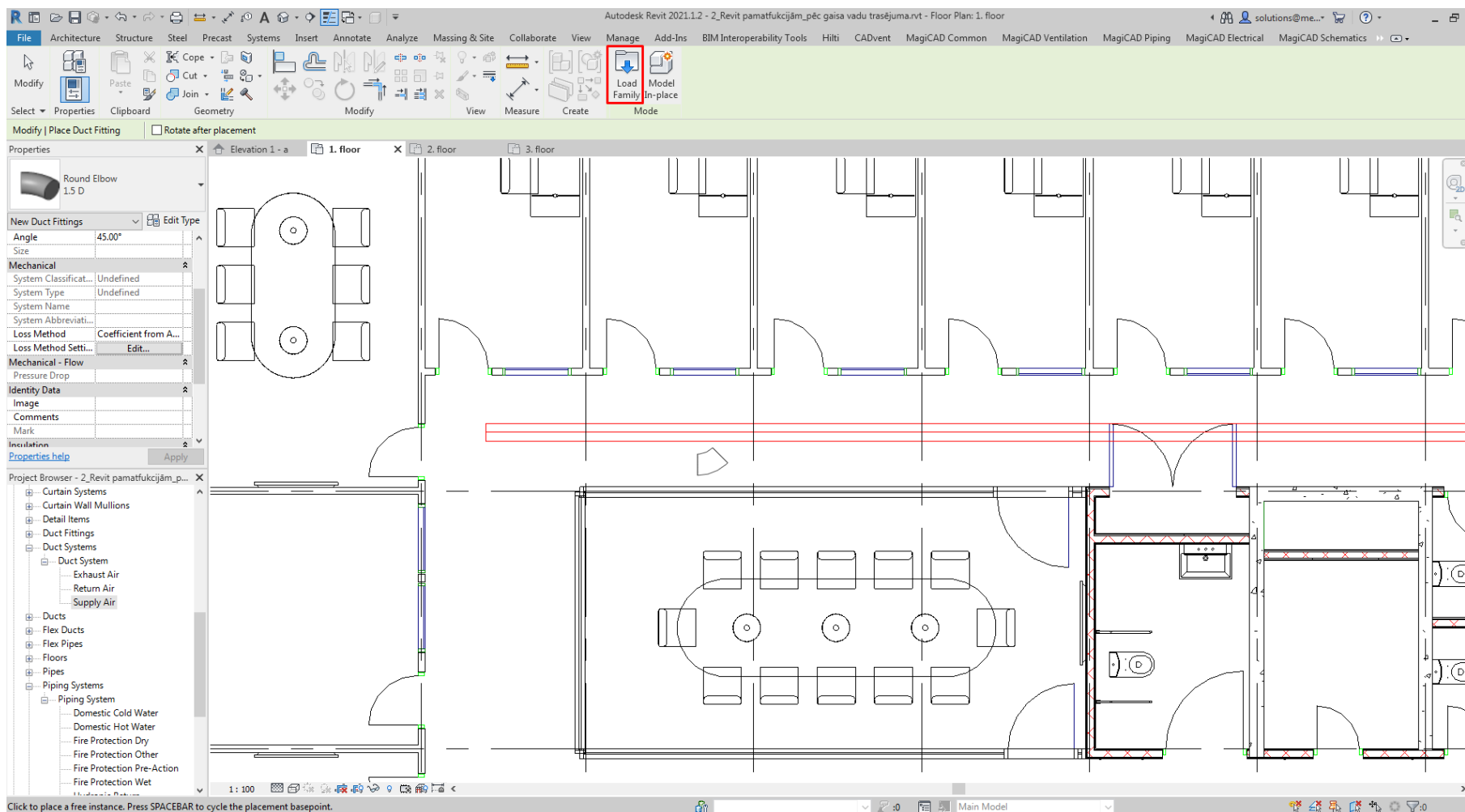
CAURUĻVADA TRASĒJUMS



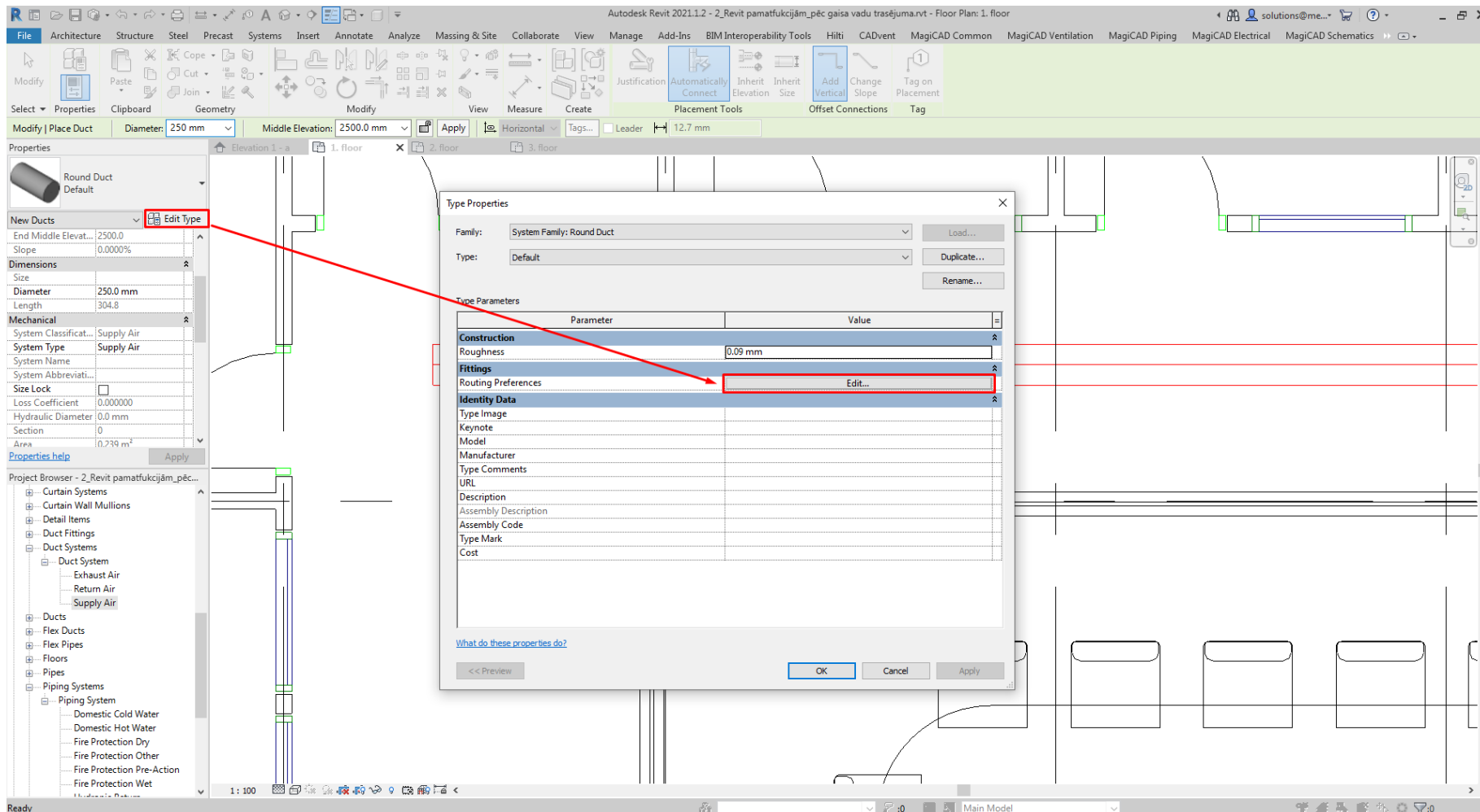
PIEEJAMO VEIDGABALU PIEVIENOŠANA (1)



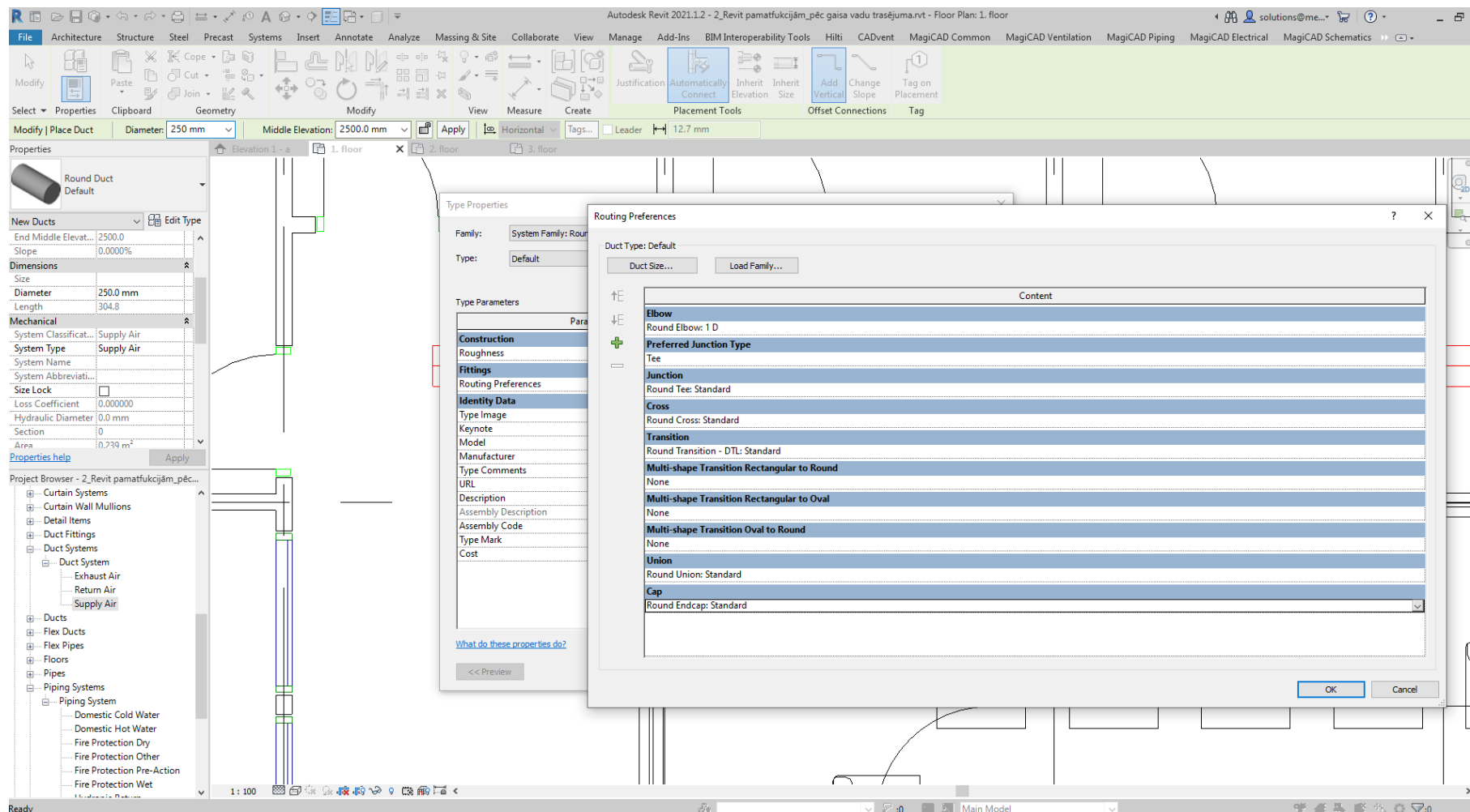
PIEEJAMO VEIDGABALU PIEVIENOŠANA (2)



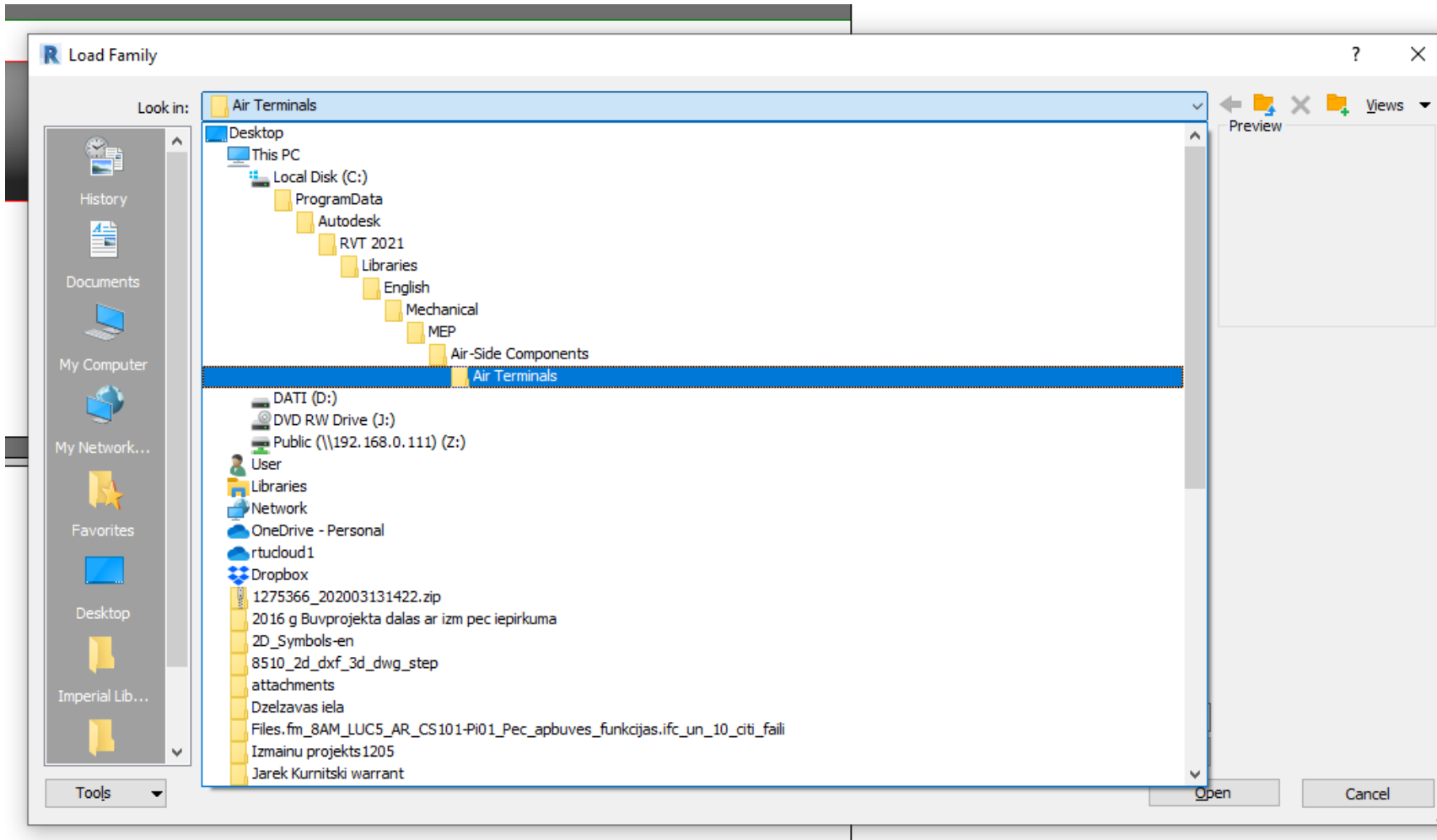
PIEEJAMO VEIDGABALU PIEVIENOŠANA (3)



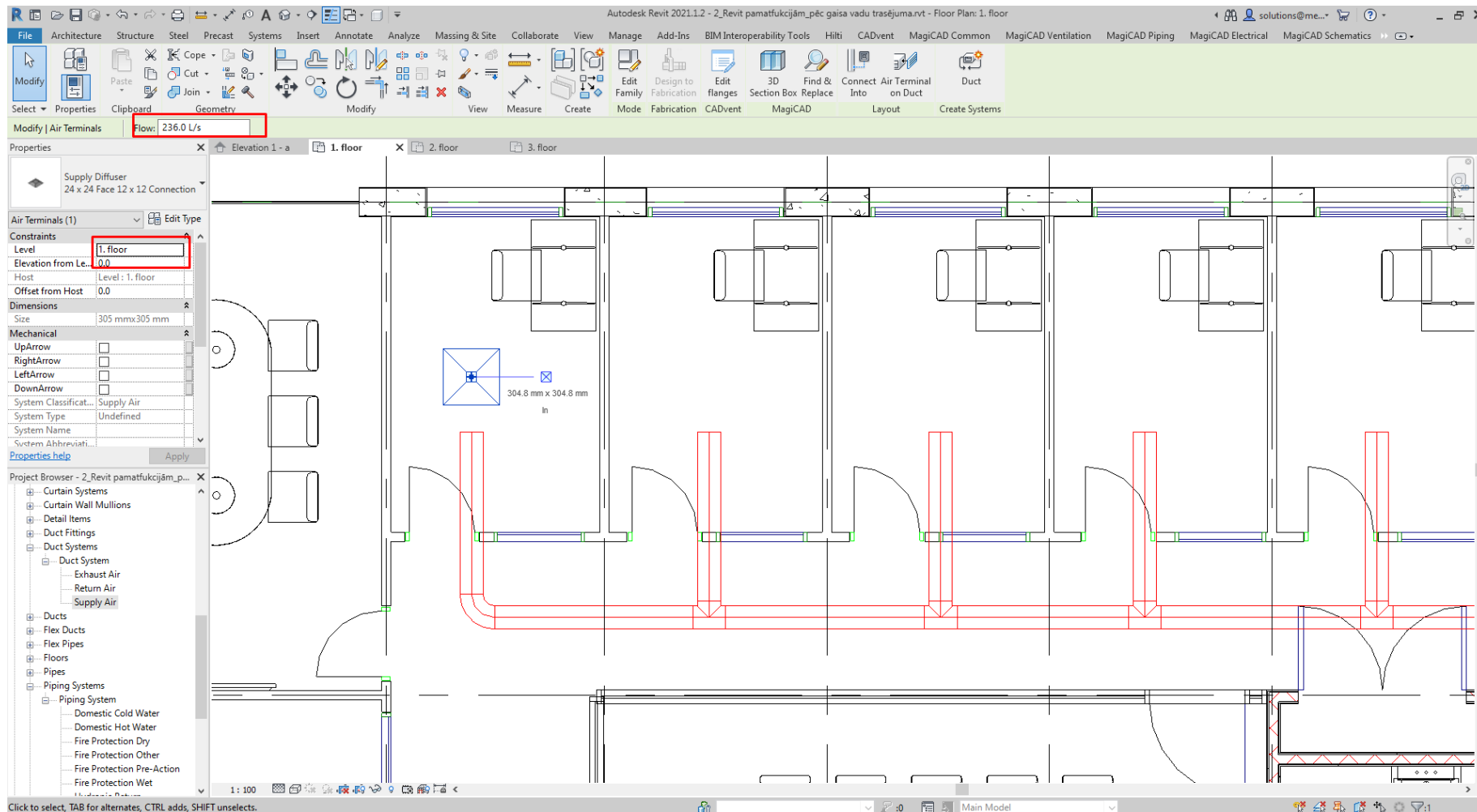
PIEEJAMO VEIDGABALU PIEVIENOŠANA (4)



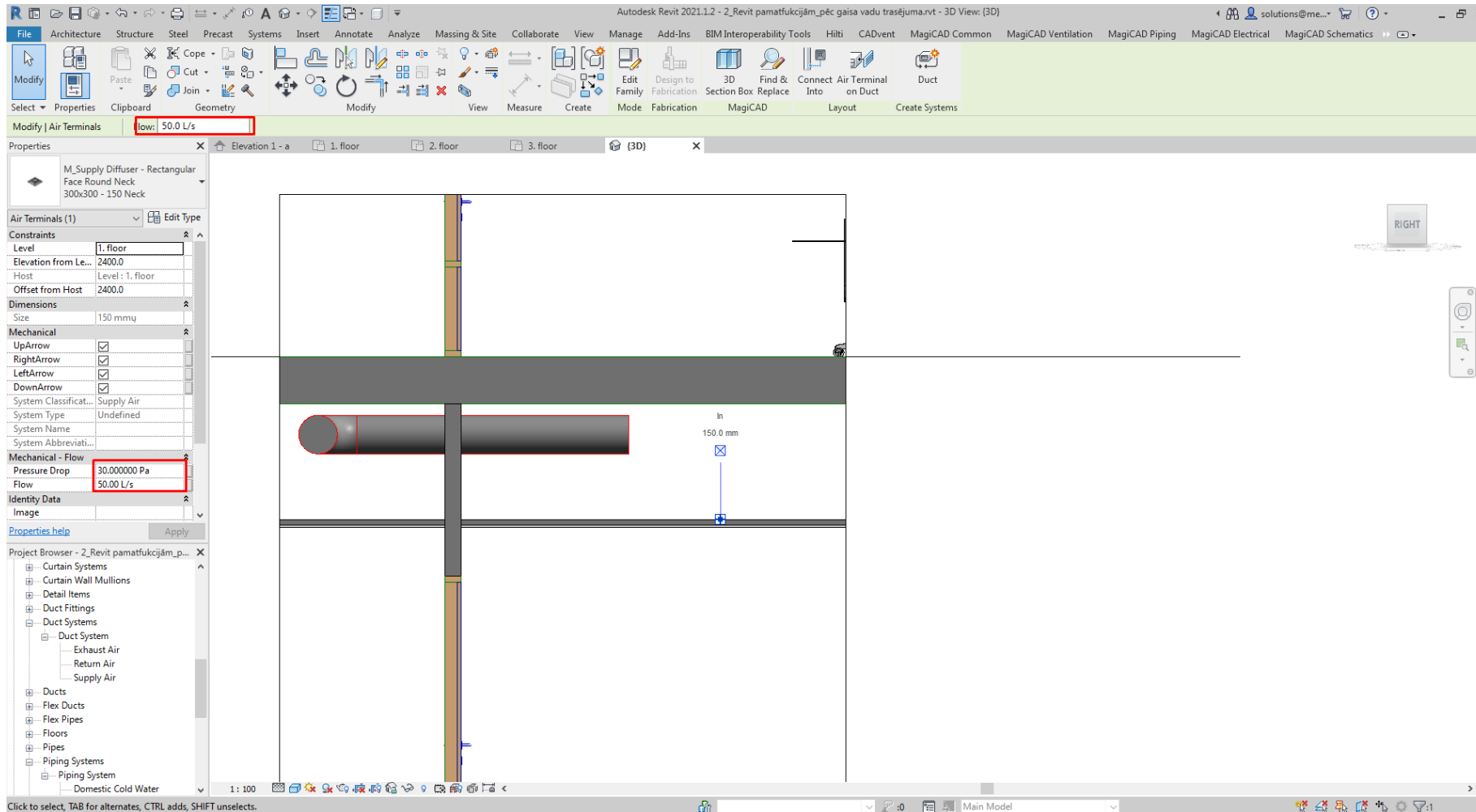
DIFUZORU PIEVIENOŠANA (1)



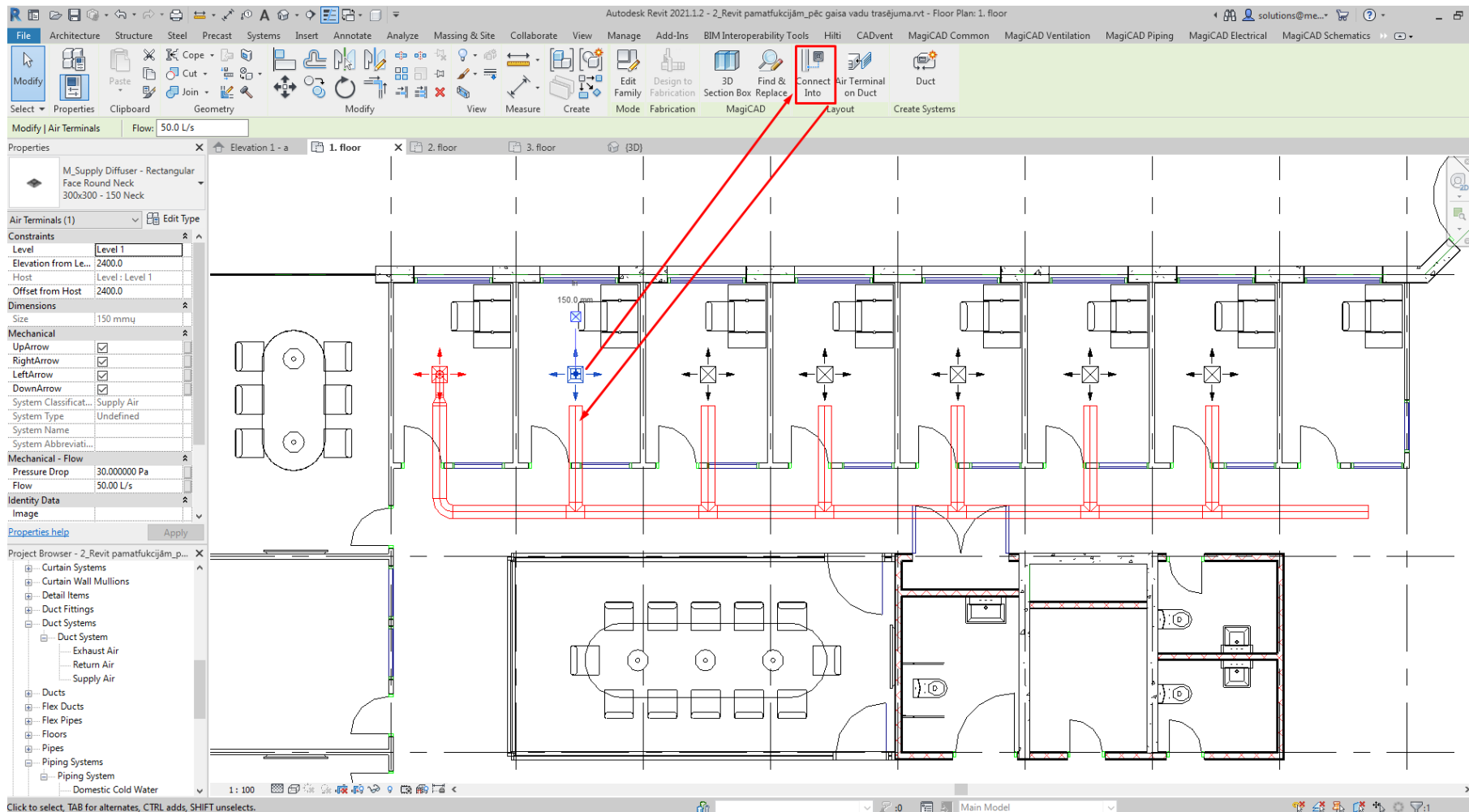
DIFUZORU PIEVIENOŠANA (2)



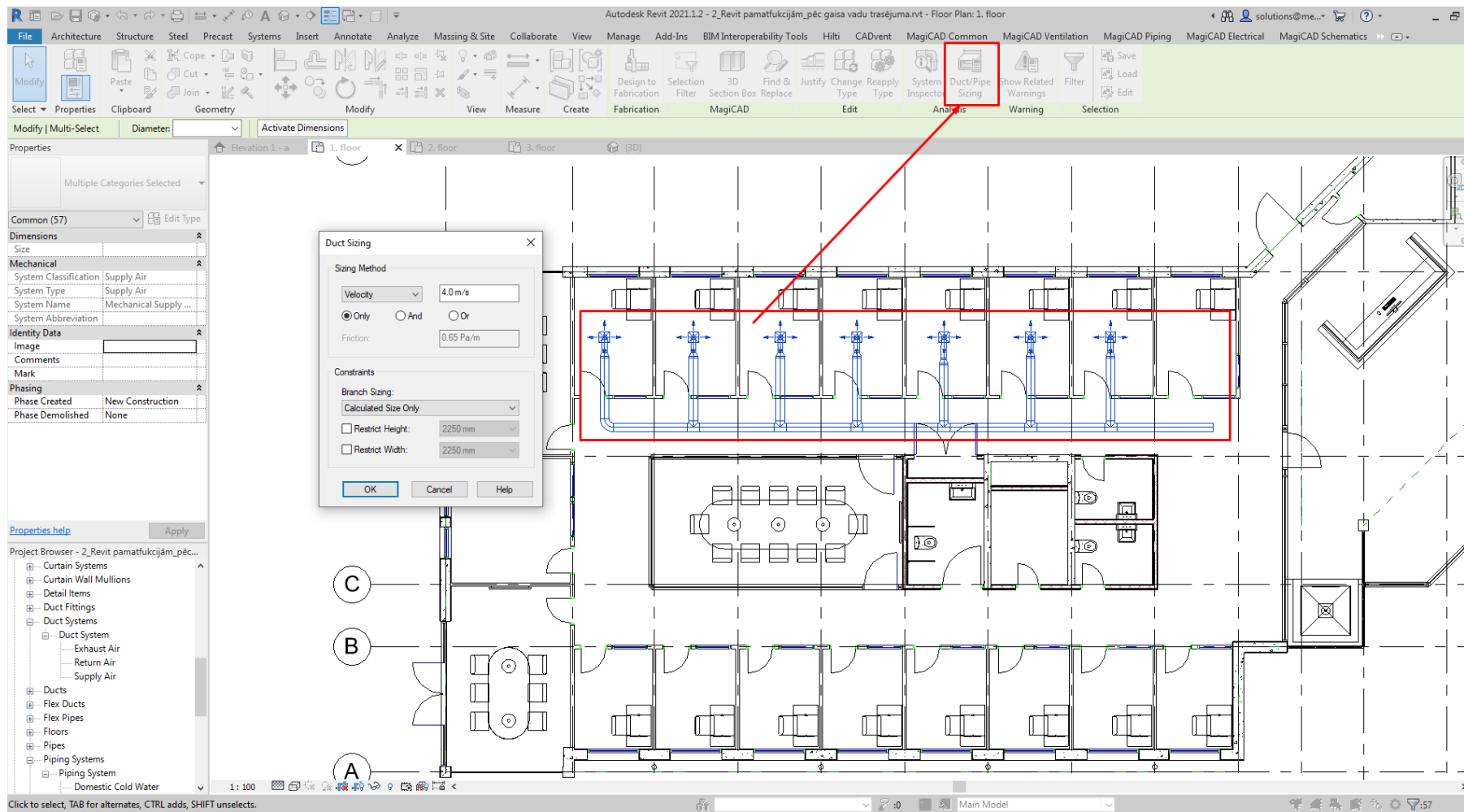
DIFUZORU PIEVIENOŠANA (3)



DIFUZORU PIEVIENOŠANA (4)



DIMENSIONĒŠANA



PRAKTISKAIS DARBS NR. 2

Atvērt Revit failu mapē 2. uzdevumam

Iezīmēt **nosūces (return)** ventilācijas sistēmu, zilā krāsā, iepriekš aplūkotajām telpām 1. stāvā

Gaisa vadus izvietot augstumā 2700 mm

Nosūces difuzorus paredzēt DTR-160-450(E)600+TRI-160(N) ar gaisa plūsmu 50 l/s

Pielietot gaisa vadus Lindab Safe ar atbilstošajiem veidgabaliem

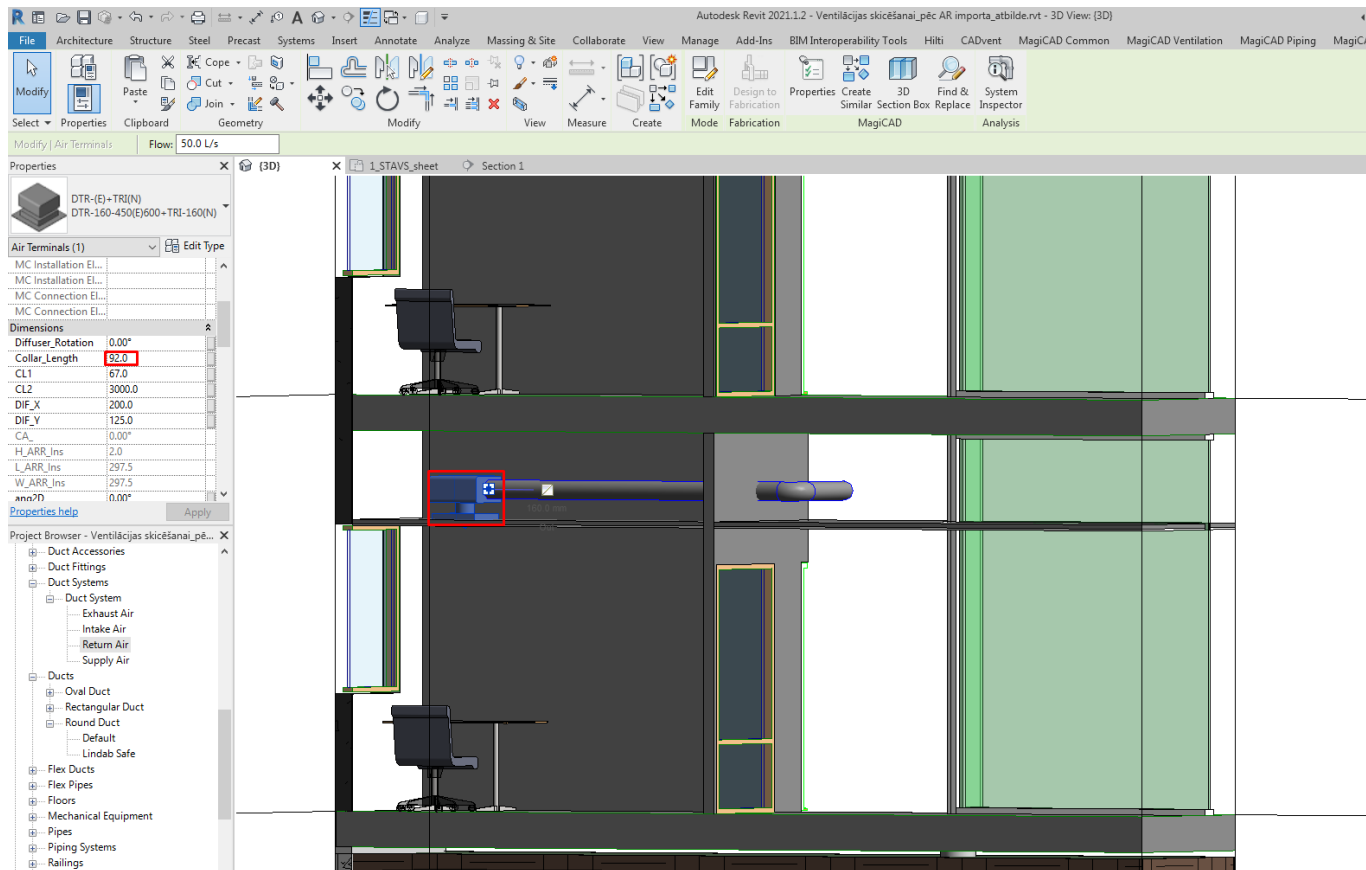
Nodimensionēt sistēmu pielietojot pieļaujamo gaisa plūsmas ātrumu 4 m/s

Sameklēt lielākā gaisa vada izmērus ar datiem

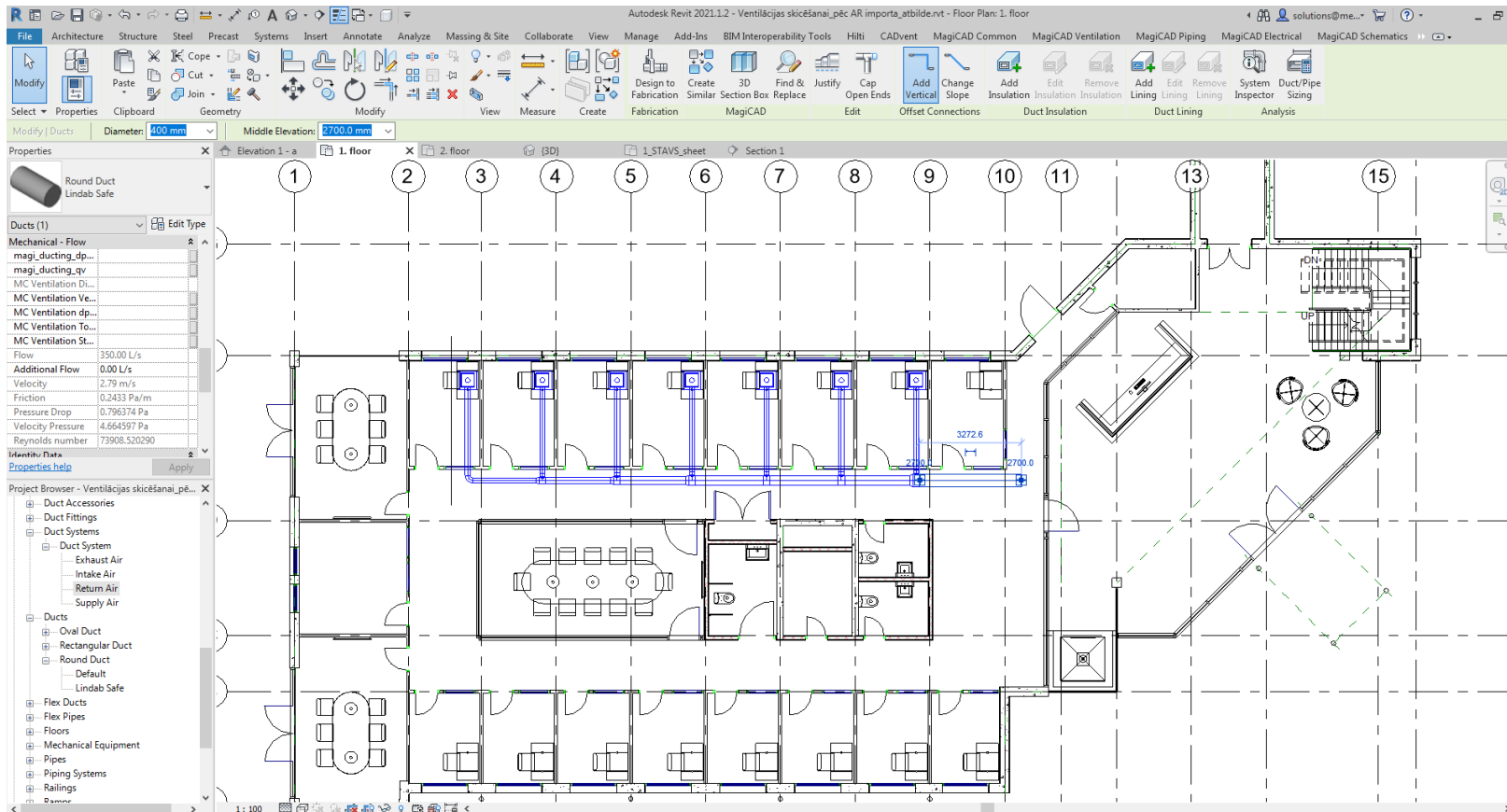
Pievienot plūsmas regulēšanas vārstus

Uzskicēt stāvvadu ticamā vietā

SADALES KĀRBAS PAGARINĀJUMS



ATBILDE

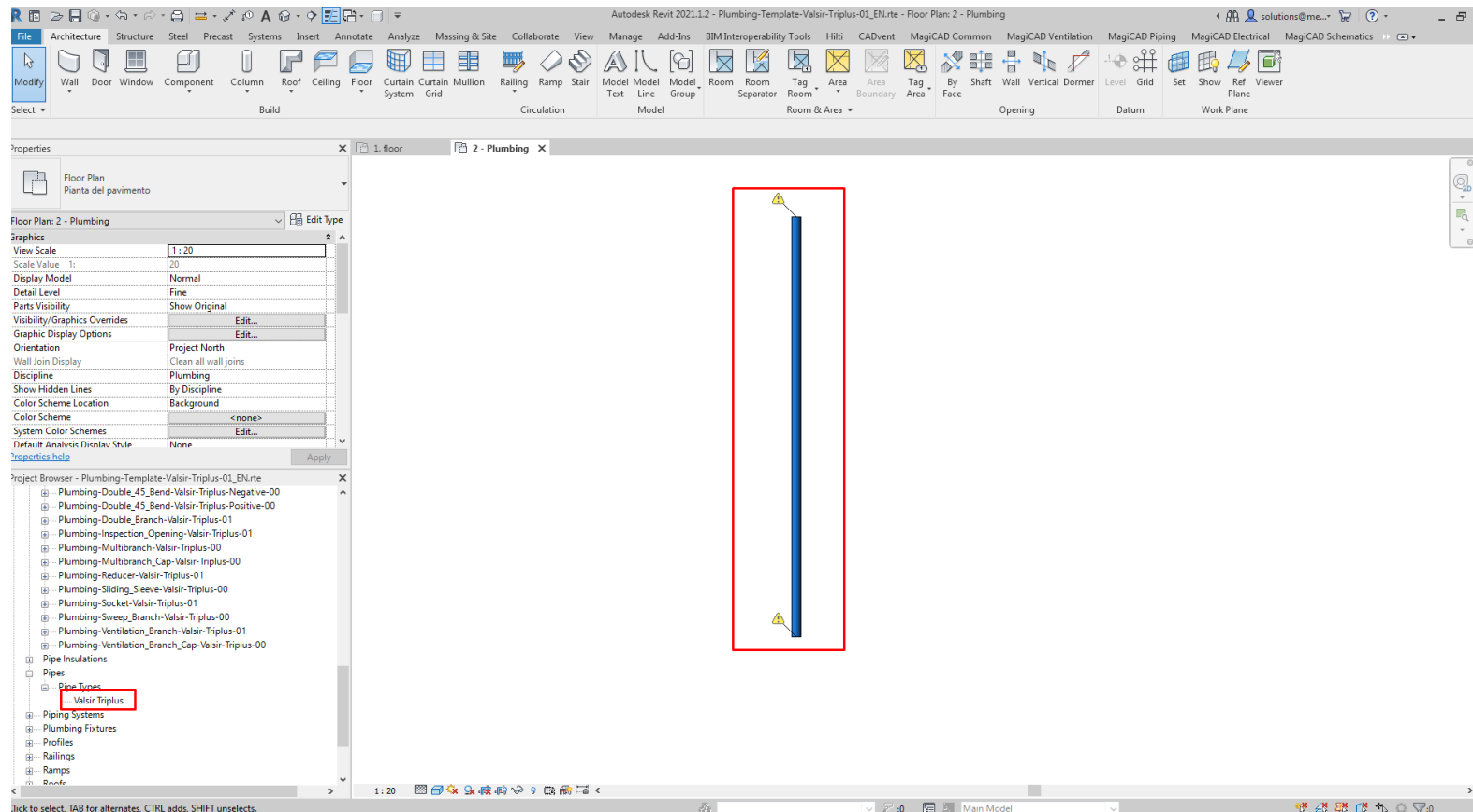


UK TĪKLU MODELĒŠANA. KANALIZĀCIJA

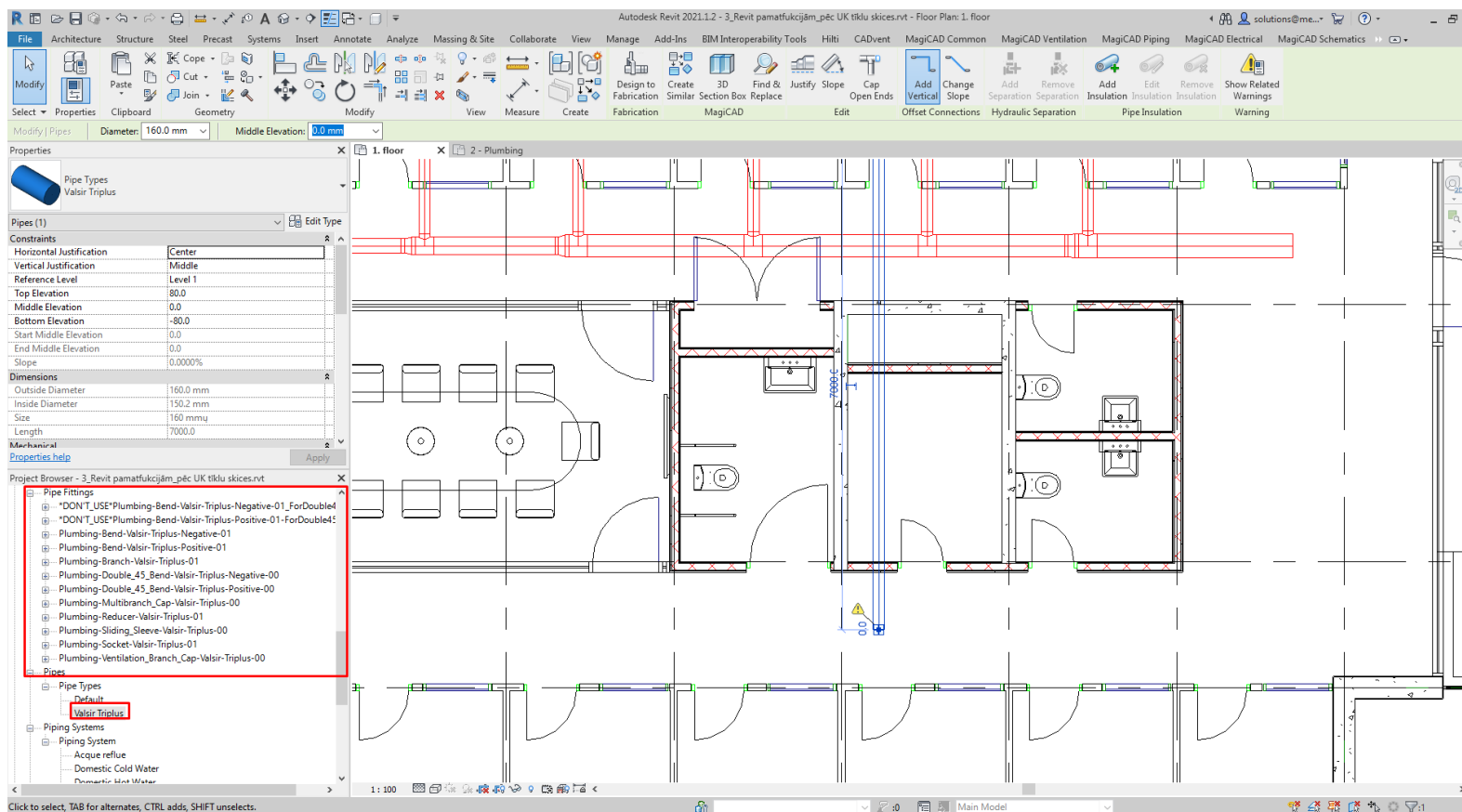
Apmācību modulis
“BIM modelēšana AVK un UK projektēšanā ar priekšzināšanām”

JAUNA CAURUĻU TIPIA PIEVIENOŠANA (1)

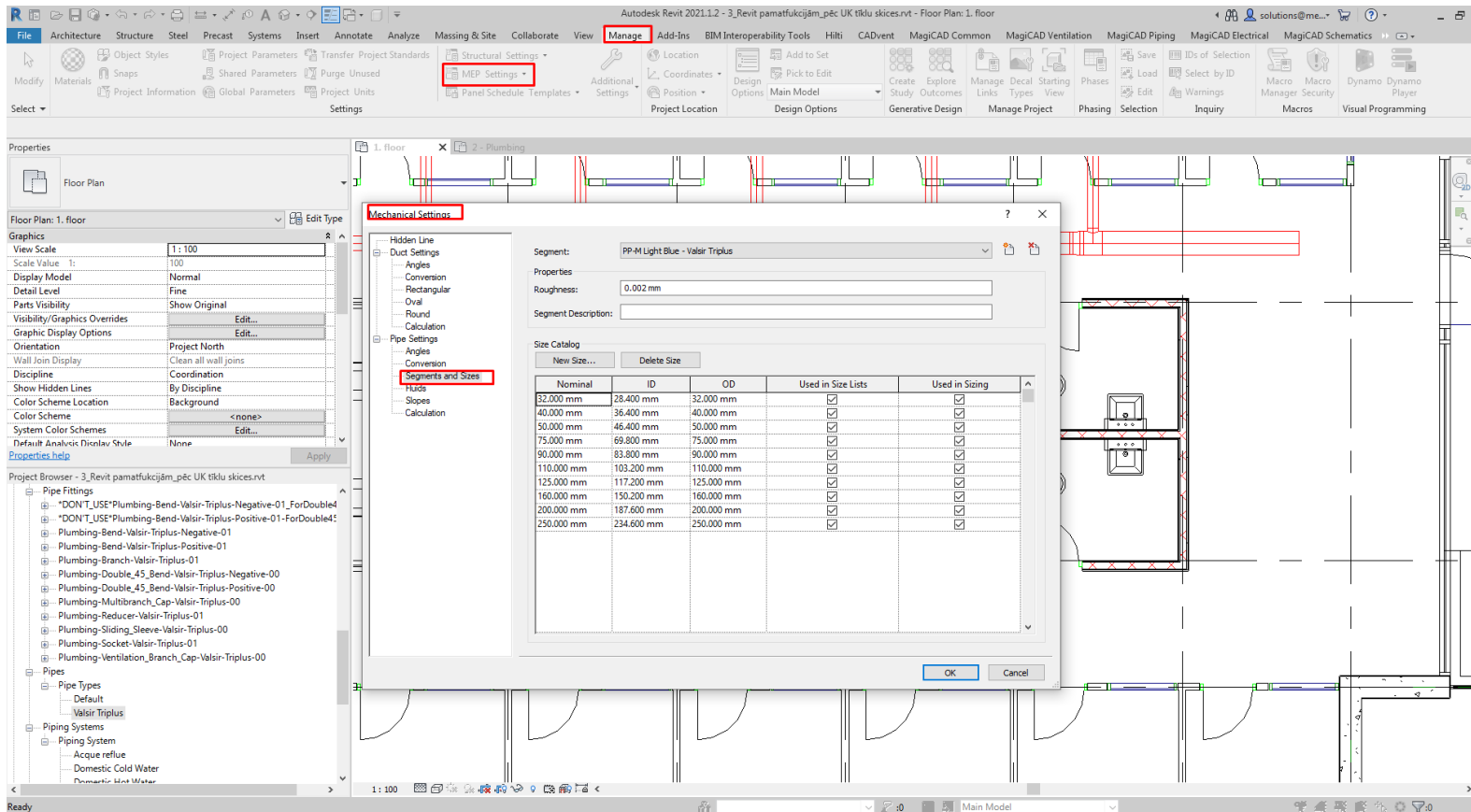
Atvērt sagatavoto failu - *Plumbing-Template-Valsir-Triplus-01_EN.rte* , uzzīmēt vienu cauruli un iekopēt pamatfailā (fails kurā darbojamies)



JAUNA CAURUĻU TIPIA PIEVIENOŠANA (2)



PĀRBAUDAM CAURUĻVADU IZMĒRUS



Autodesk Revit 2021.1.2 - 3_Revit pamatfunkcijām_pēc UK tiklu skices.rvt - Floor Plan: 1. floor

File Architecture Structure Steel Precast Systems Insert Annotate Analyze Massing & Site Collaborate View **Manage** Add-Ins BIM Interoperability Tools Hilti CADvent MagiCAD Common MagiCAD Ventilation MagiCAD Piping MagiCAD Electrical MagiCAD Schematics

MEP Settings

Properties

Floor Plan: 1. floor

View Scale: 1:100

Scale Value: 100

Display Model: Normal

Detail Level: Fine

Parts Visibility: Show Original

Visibility/Graphics Overrides: Edit...

Graphic Display Options: Edit...

Orientation: Project North

Wall Join Display: Clean all wall joins

Discipline: Coordination

Show Hidden Lines: By Discipline

Color Scheme Location: Background

Color Scheme: <none>

System Color Schemes: Edit...

Default Analysis Discipline Style: None

Apply

Project Browser - 3_Revit pamatfunkcijām_pēc UK tiklu skices.rvt

- Pipe Fittings
 - *DON'T_USE*Plumbing-Bend-Valsir-Triplus-Negative-01_ForDouble4
 - *DON'T_USE*Plumbing-Bend-Valsir-Triplus-Positive-01_ForDouble4
 - Plumbing-Bend-Valsir-Triplus-Negative-01
 - Plumbing-Bend-Valsir-Triplus-Positive-01
 - Plumbing-Branch-Valsir-Triplus-01
 - Plumbing-Double_45_Bend-Valsir-Triplus-Negative-00
 - Plumbing-Double_45_Bend-Valsir-Triplus-Positive-00
 - Plumbing-Multibranch_Cap-Valsir-Triplus-00
 - Plumbing-Reducer-Valsir-Triplus-01
 - Plumbing-Sliding_Sleeve-Valsir-Triplus-00
 - Plumbing-Socket-Valsir-Triplus-01
 - Plumbing-Ventilation_Branch_Cap-Valsir-Triplus-00
- Pipes
 - Pipe Types
 - Default
 - Valsir Triplus
 - Piping Systems
 - Piping System
 - Acque refluxe
 - Domestic Cold Water
 - Domestic Hot Water

Mechanical Settings

Segment: PP-M Light Blue - Valsir Triplus

Properties

Roughness: 0.002 mm

Segment Description:

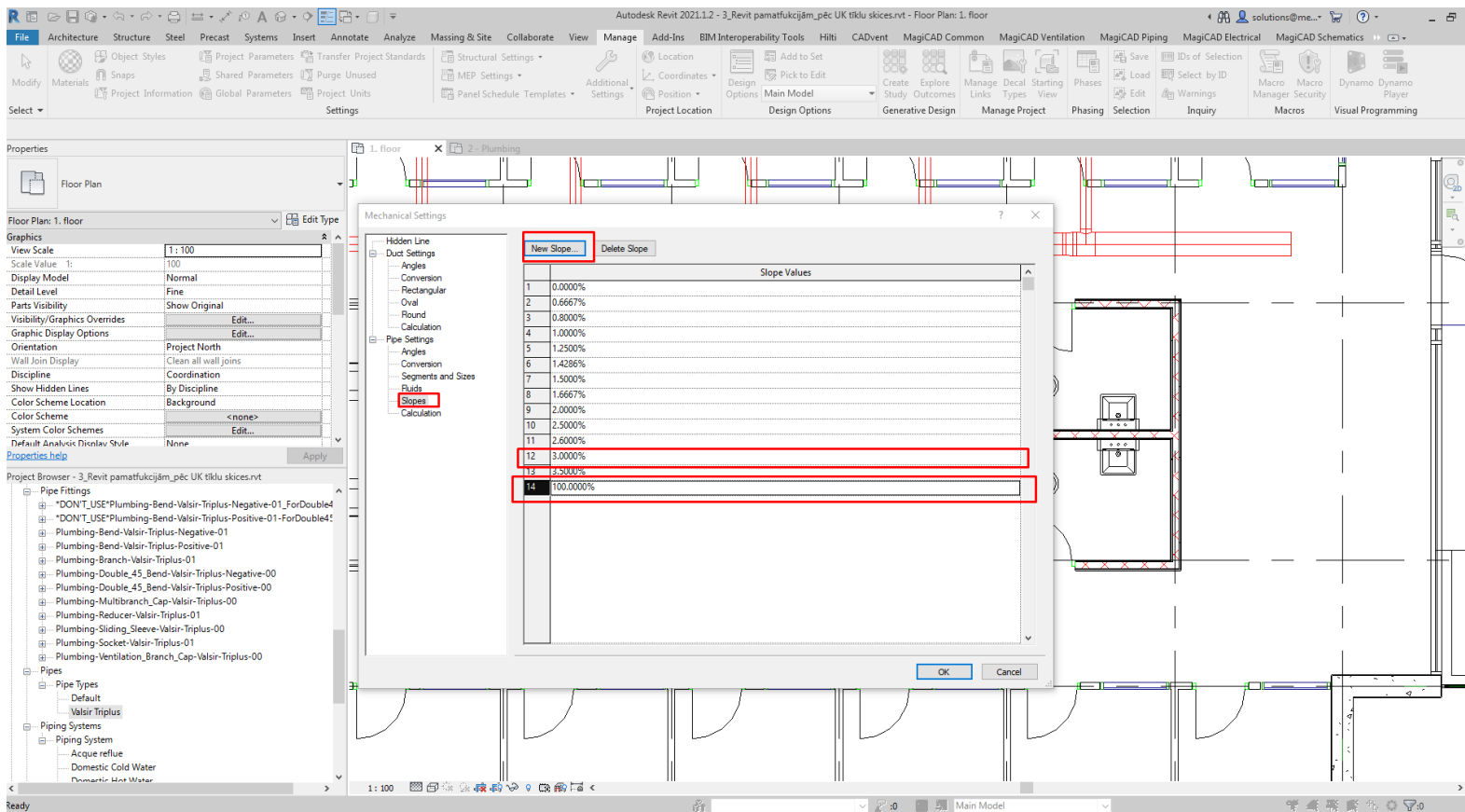
Size Catalog

New Size... Delete Size

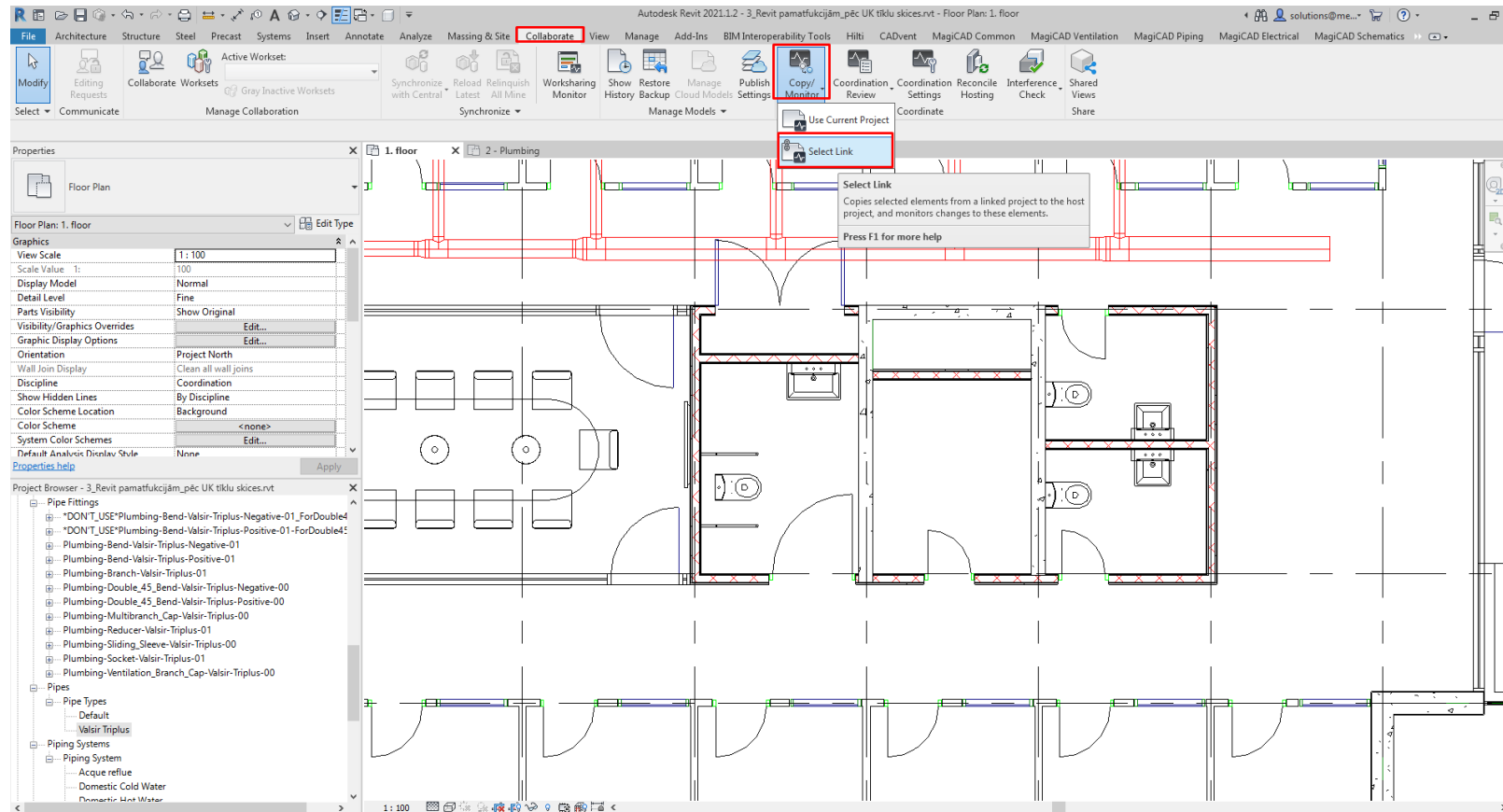
Nominal	ID	OD	Used in Size Lists	Used in Sizing
32.000 mm	28.400 mm	32.000 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
40.000 mm	36.400 mm	40.000 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
50.000 mm	46.400 mm	50.000 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
75.000 mm	69.800 mm	75.000 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
90.000 mm	83.800 mm	90.000 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
110.000 mm	103.200 mm	110.000 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
125.000 mm	117.200 mm	125.000 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
160.000 mm	150.200 mm	160.000 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
200.000 mm	187.600 mm	200.000 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
250.000 mm	234.600 mm	250.000 mm	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

OK Cancel

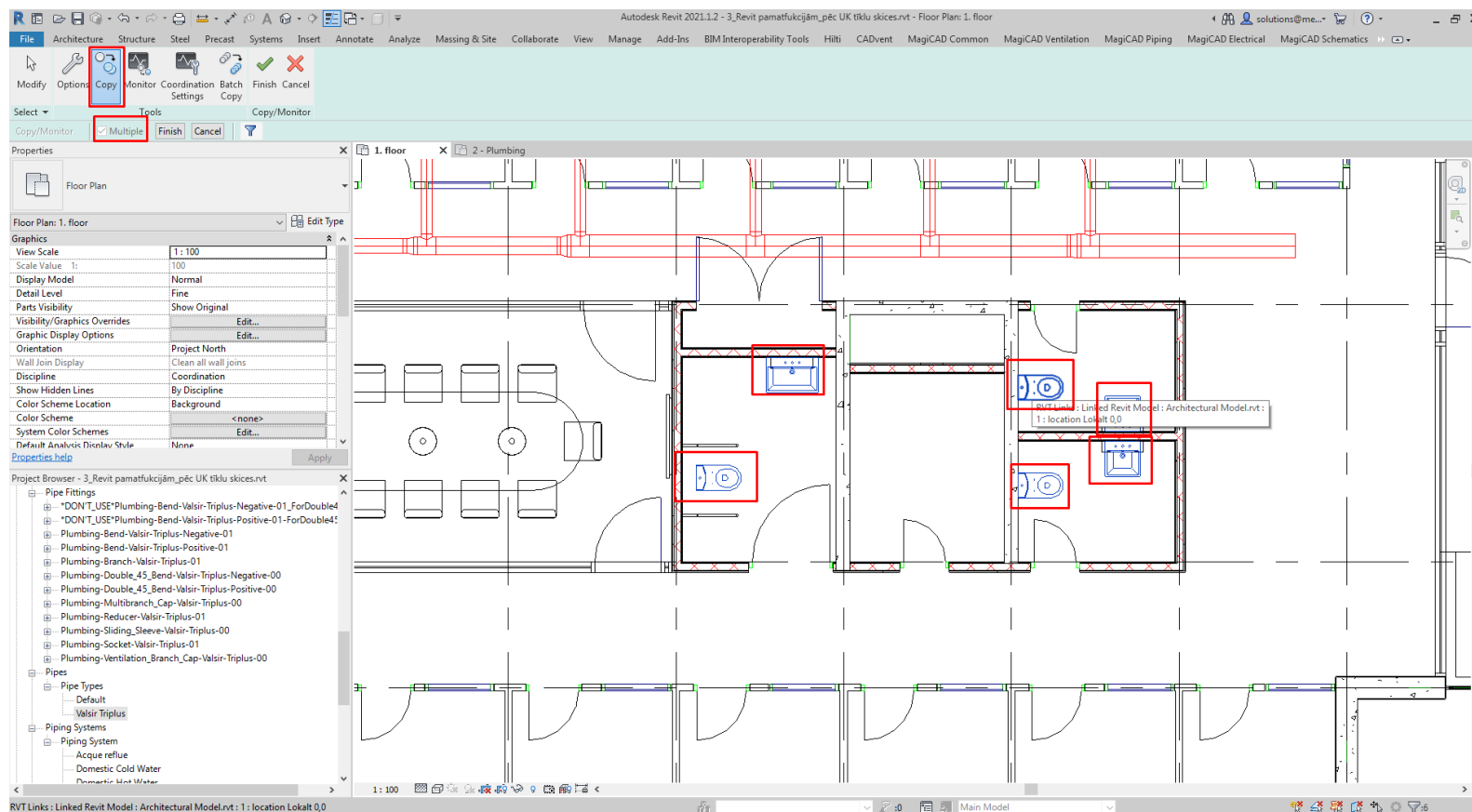
NEPIECIEŠAMO SLĪPUMU PIEVIENOŠANA



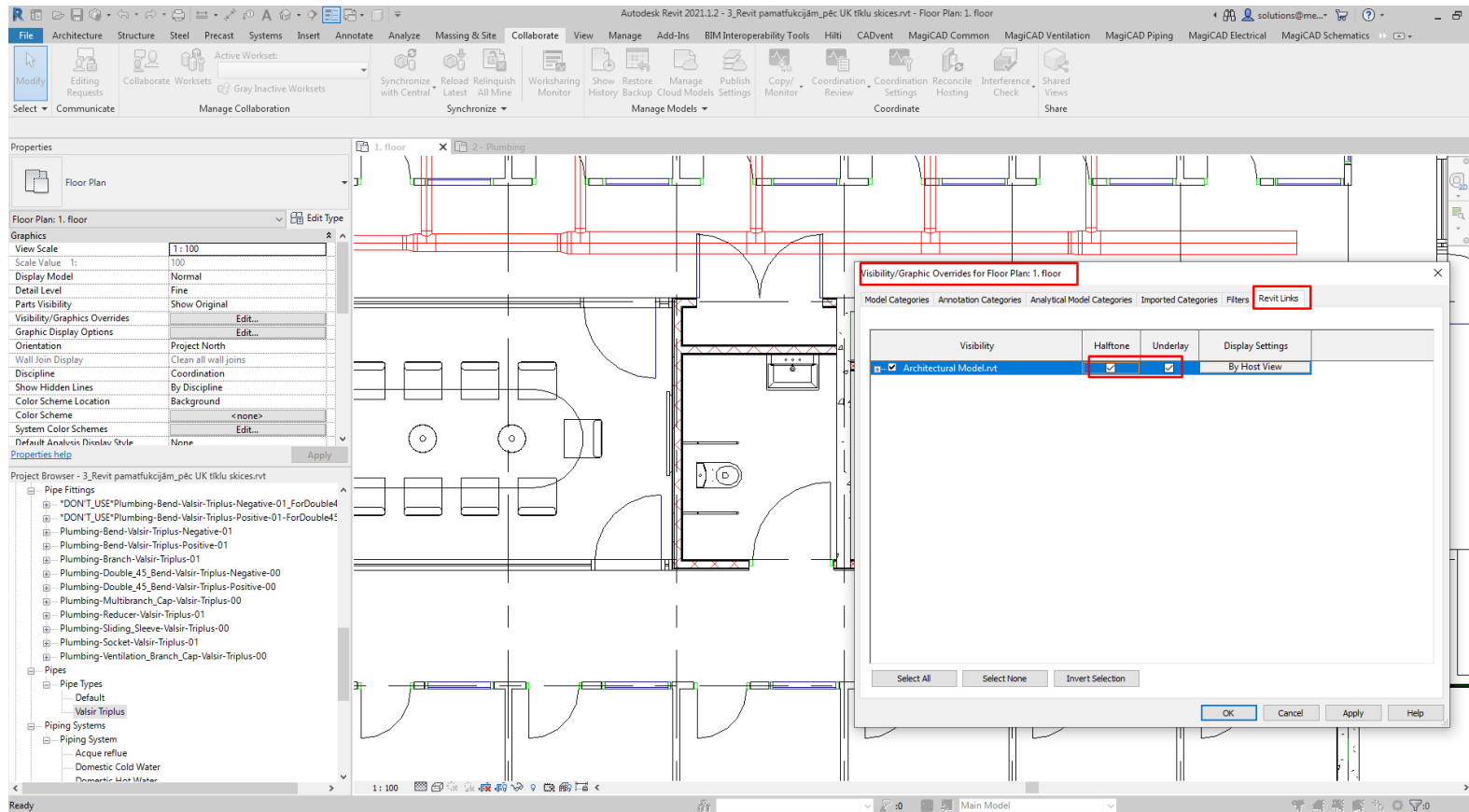
SANIEKĀRTU IENEŠANA NO AR MODEĻA (1)



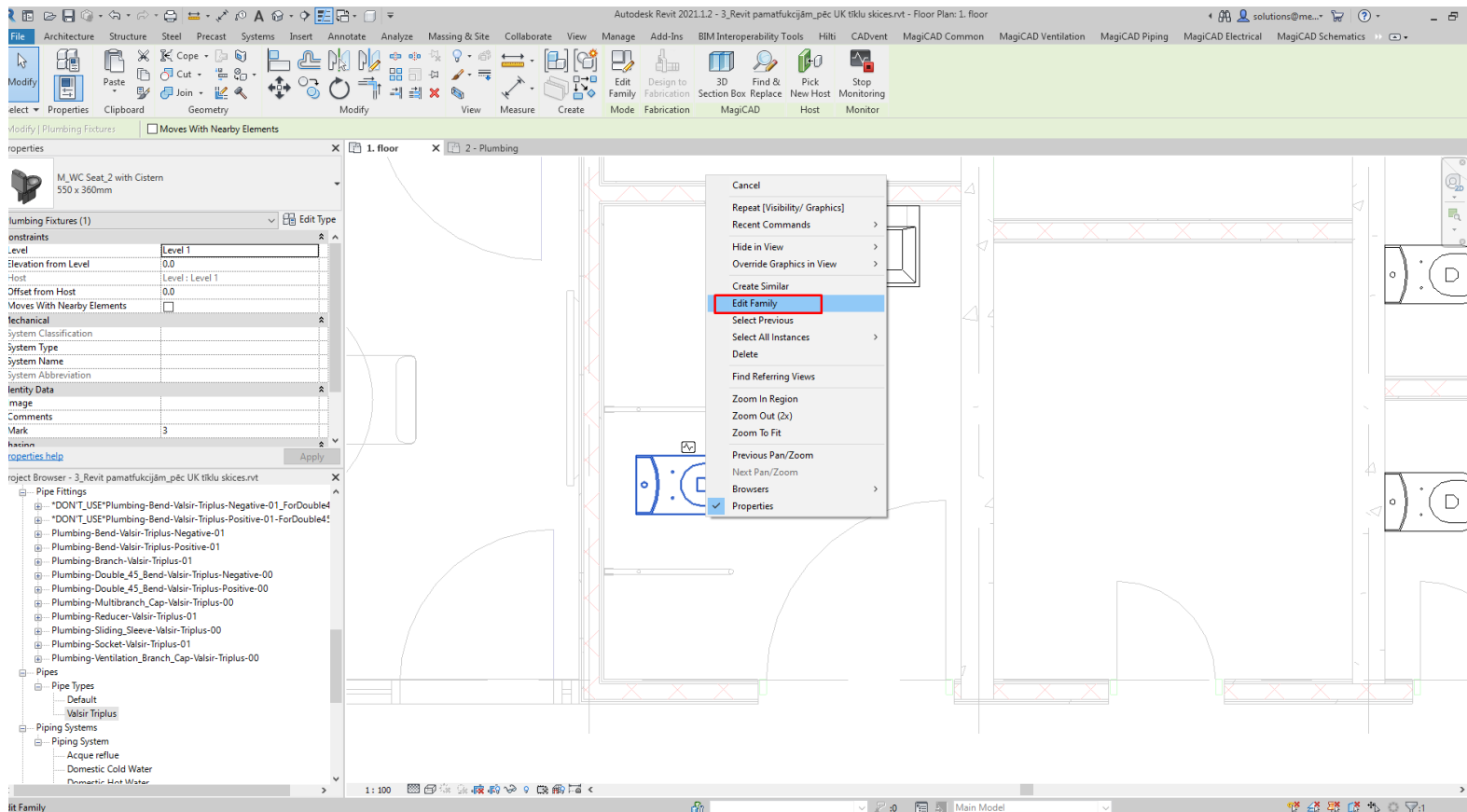
SANIEKĀRTU IENEŠANA NO AR MODEĻA (2)



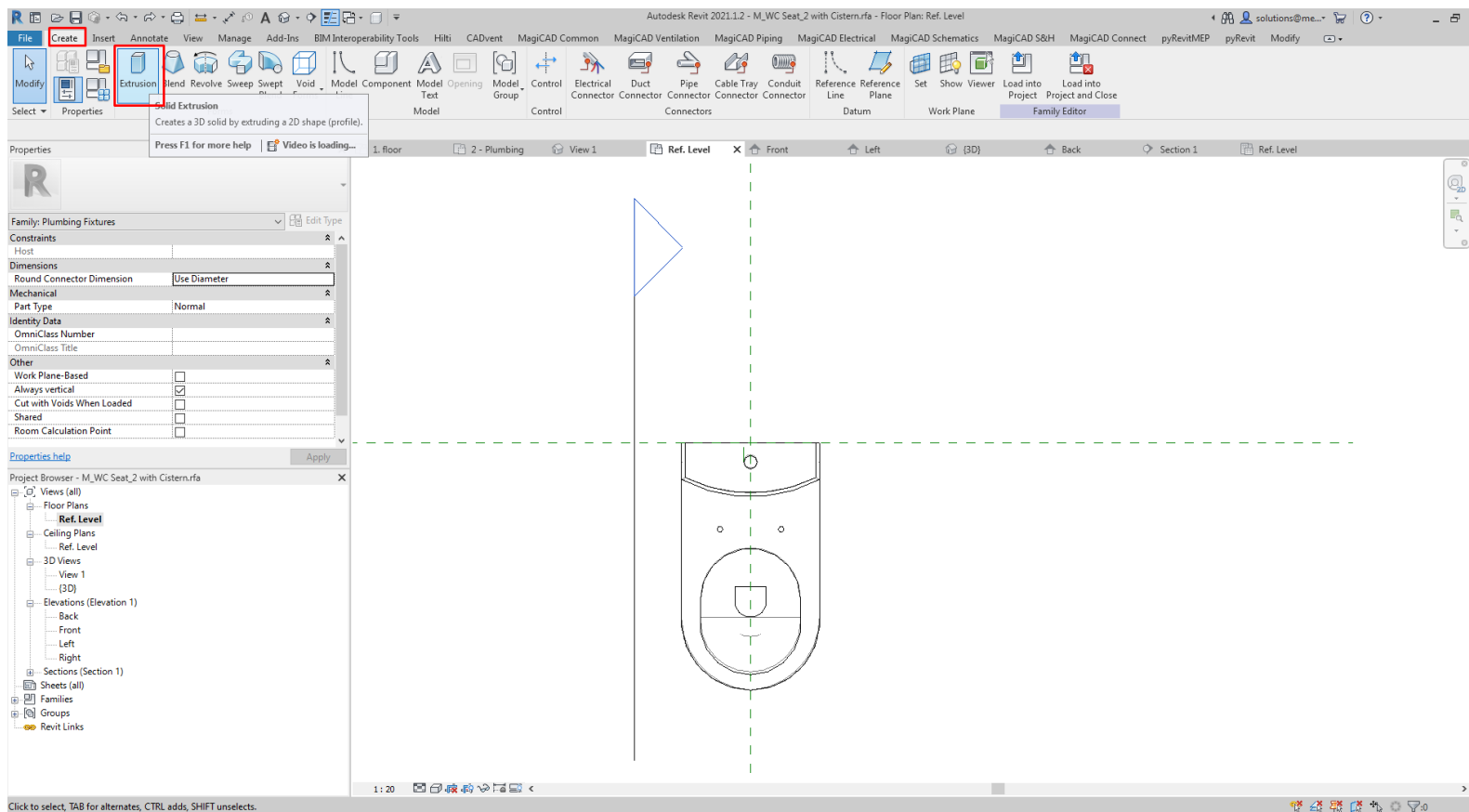
FONA PADARĪŠANA PELEĒKA



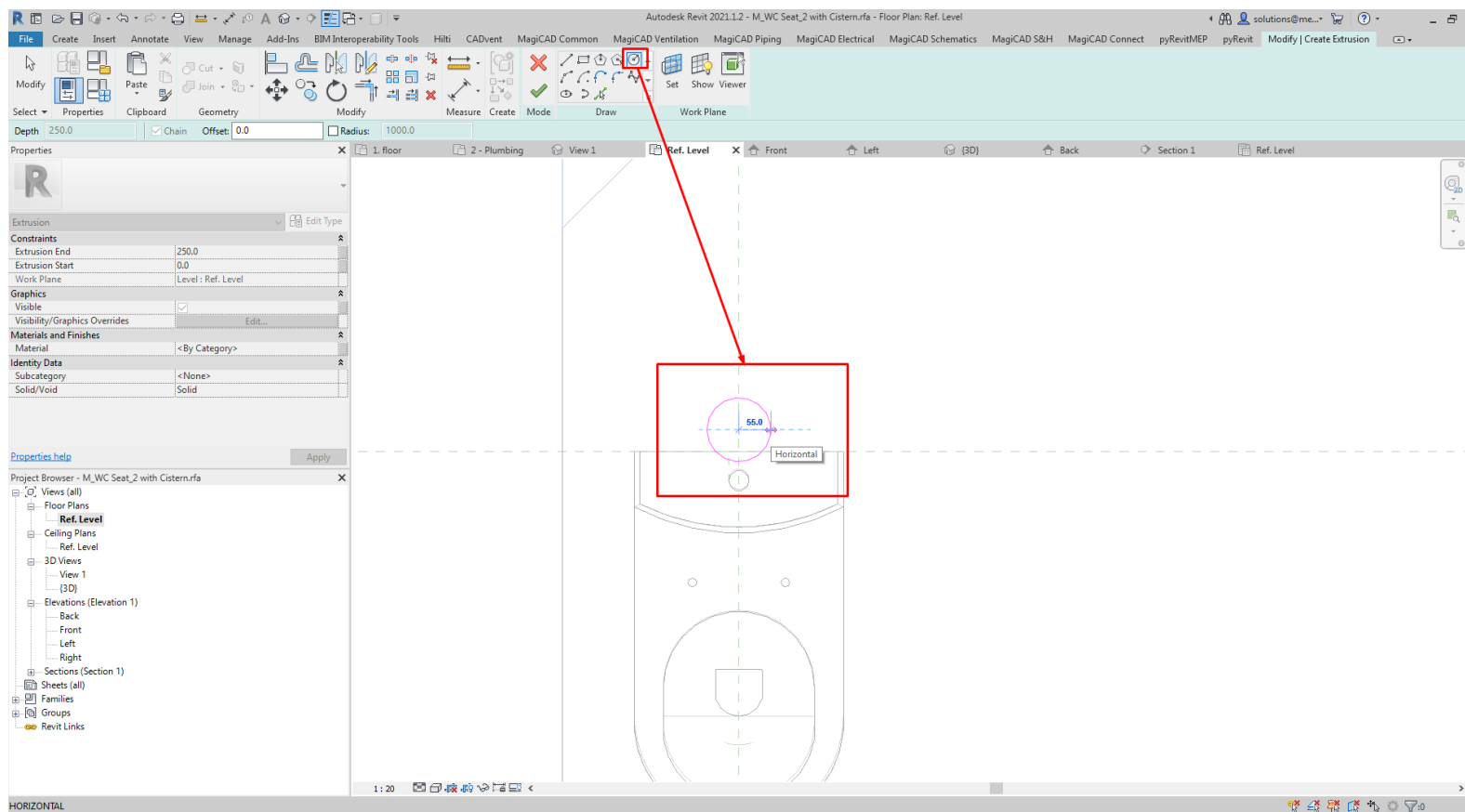
FAMILY REDIĢĒŠANA (1)



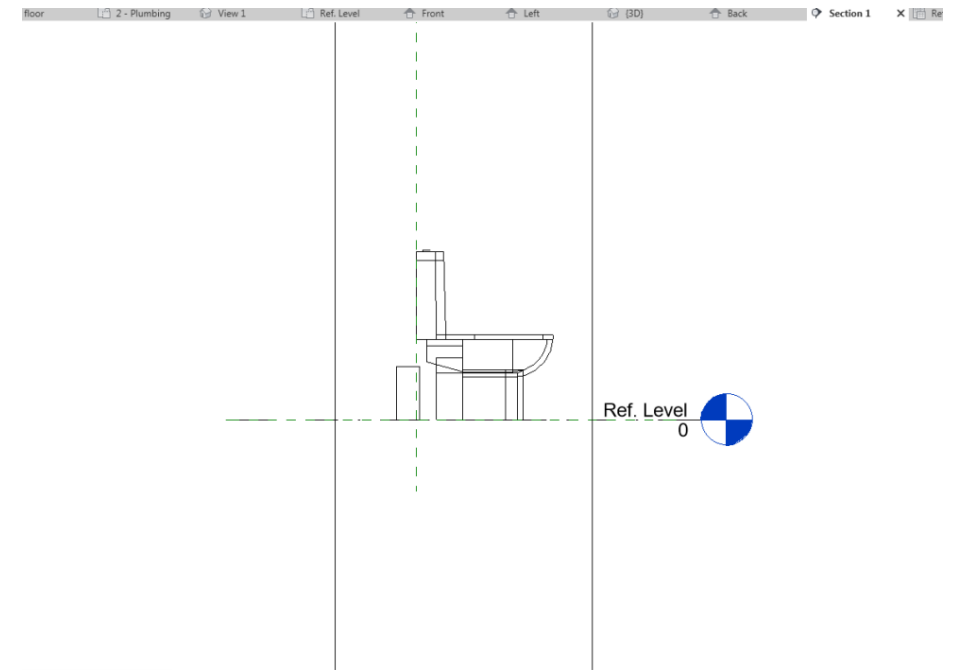
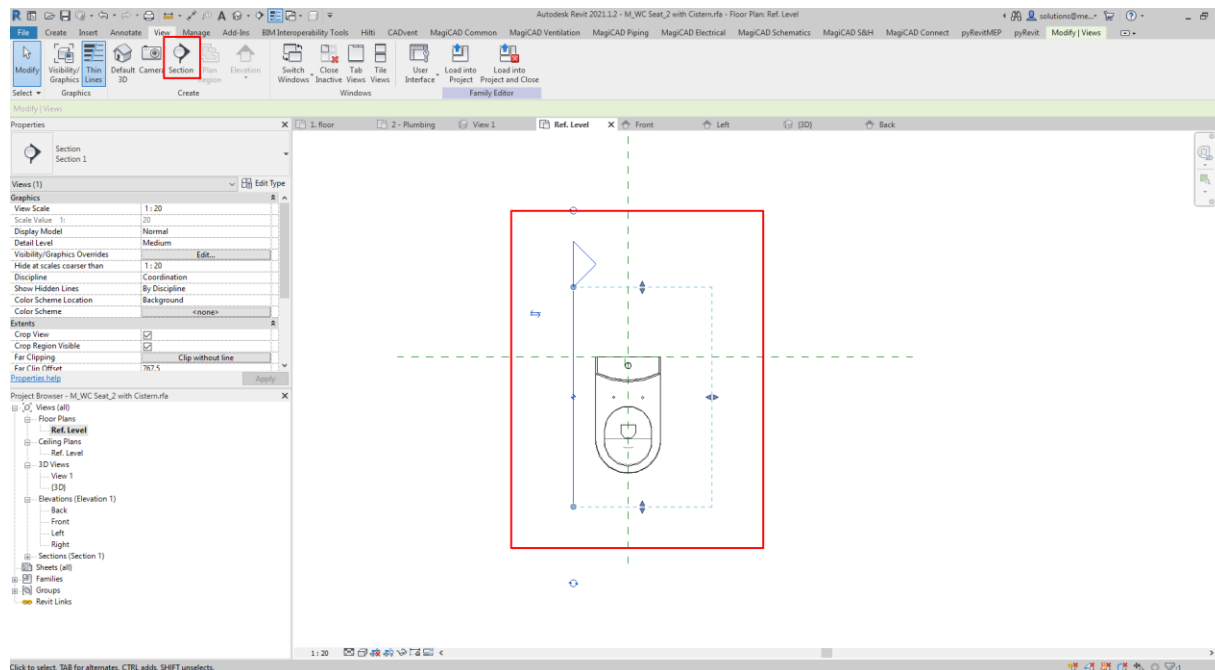
FAMILY REDIĢĒŠANA (2)



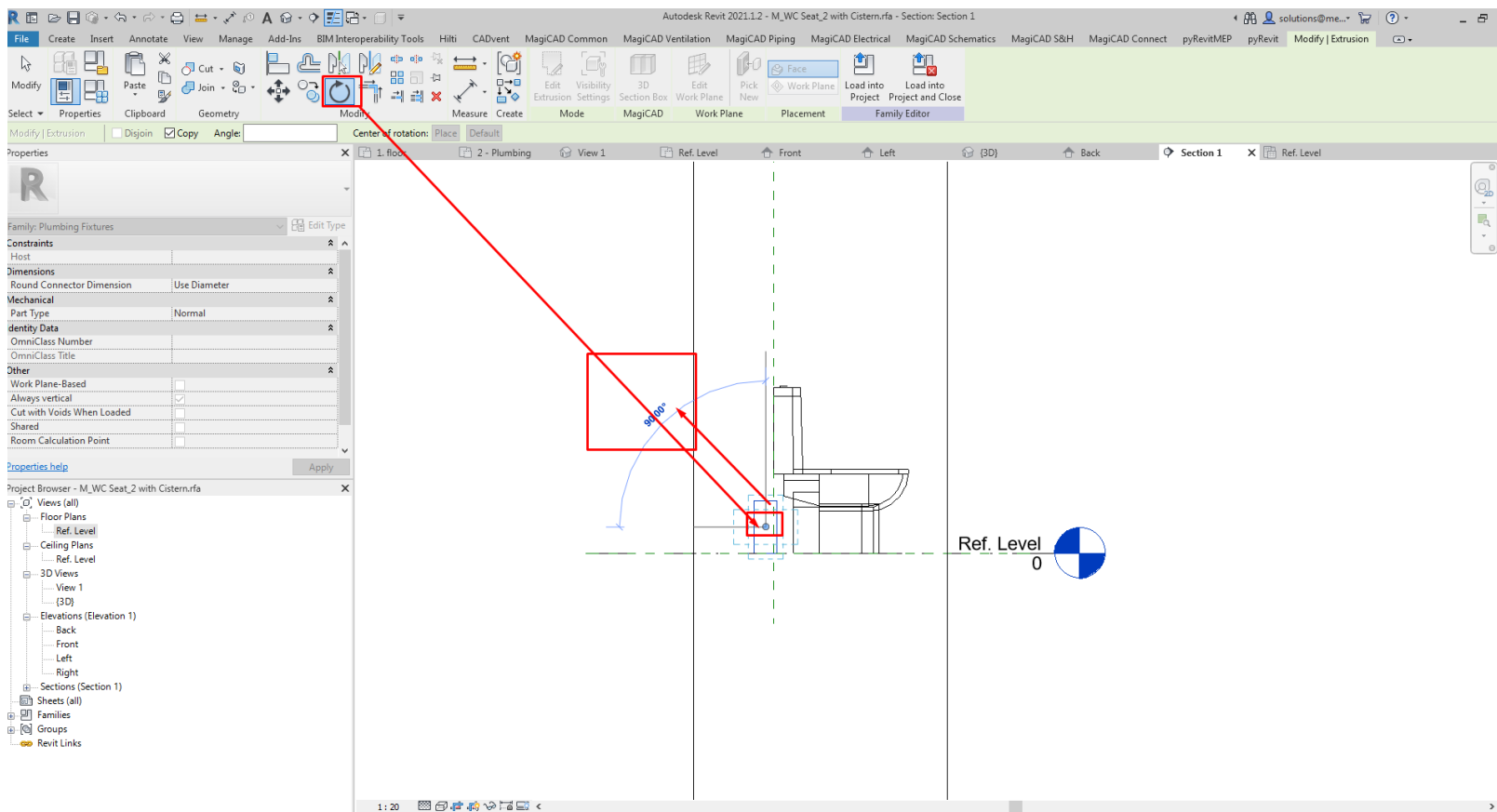
FAMILY REDIĢĒŠANA (3)



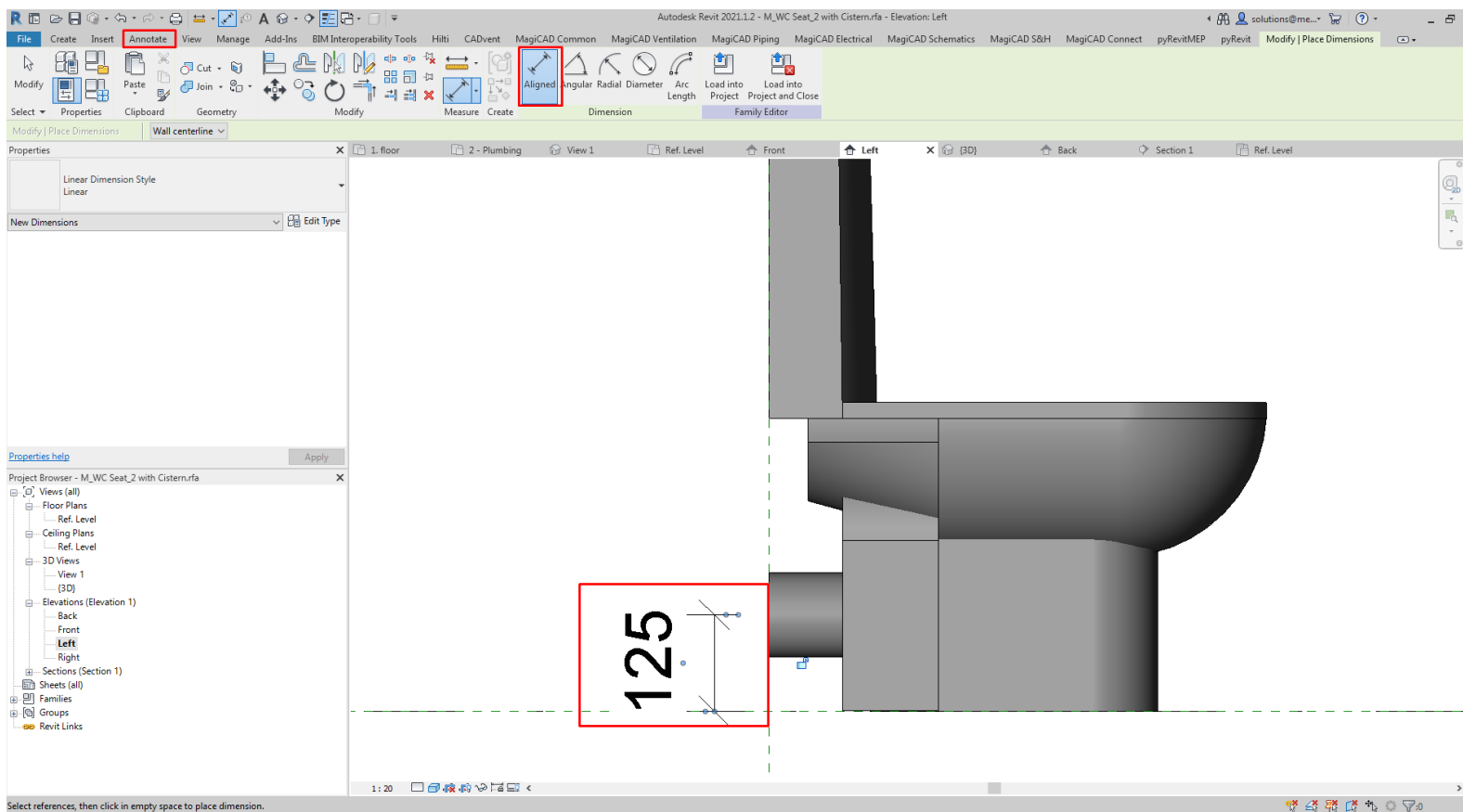
FAMILY REDIĢĒŠANA (4)



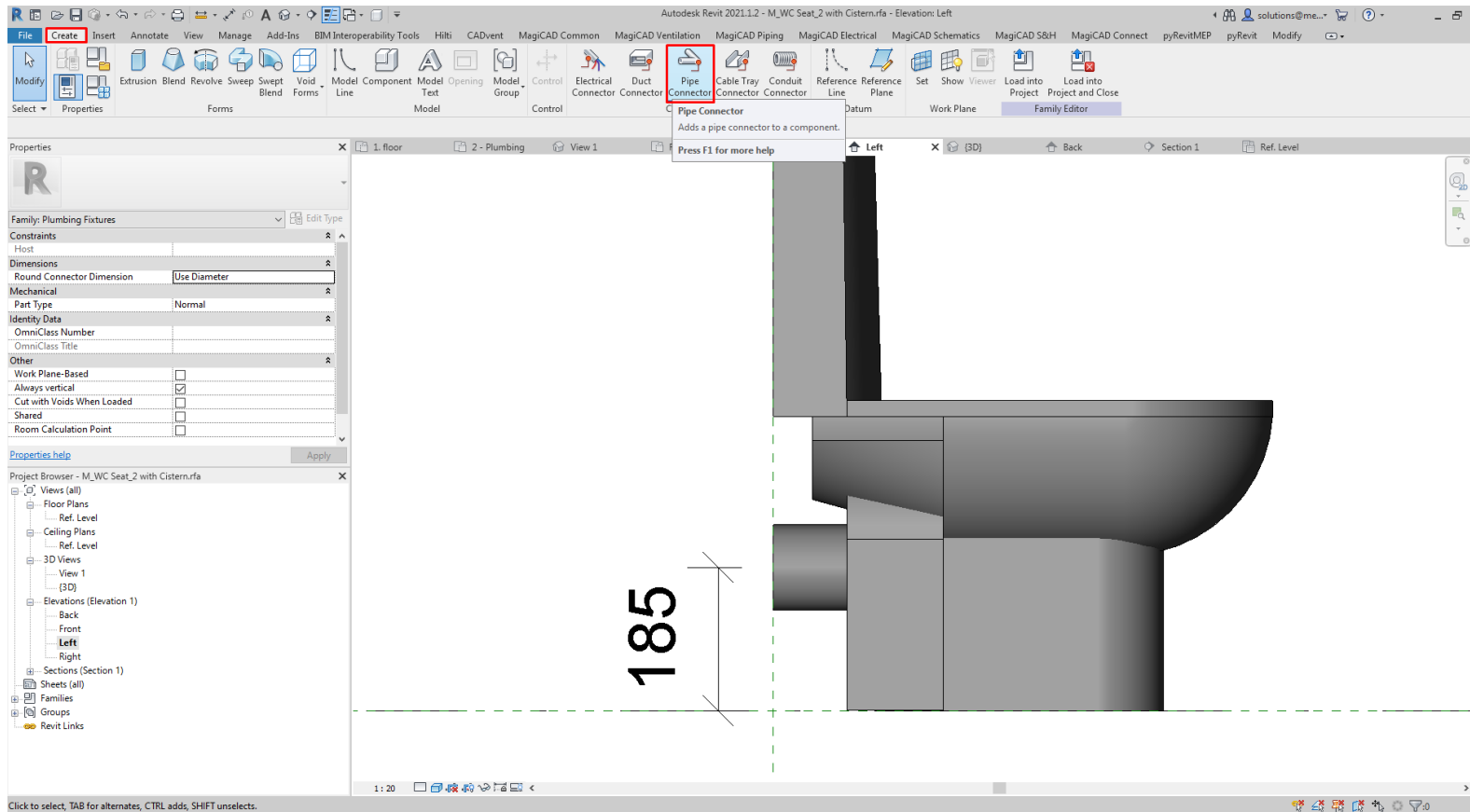
FAMILY REDIĢĒŠANA (5)



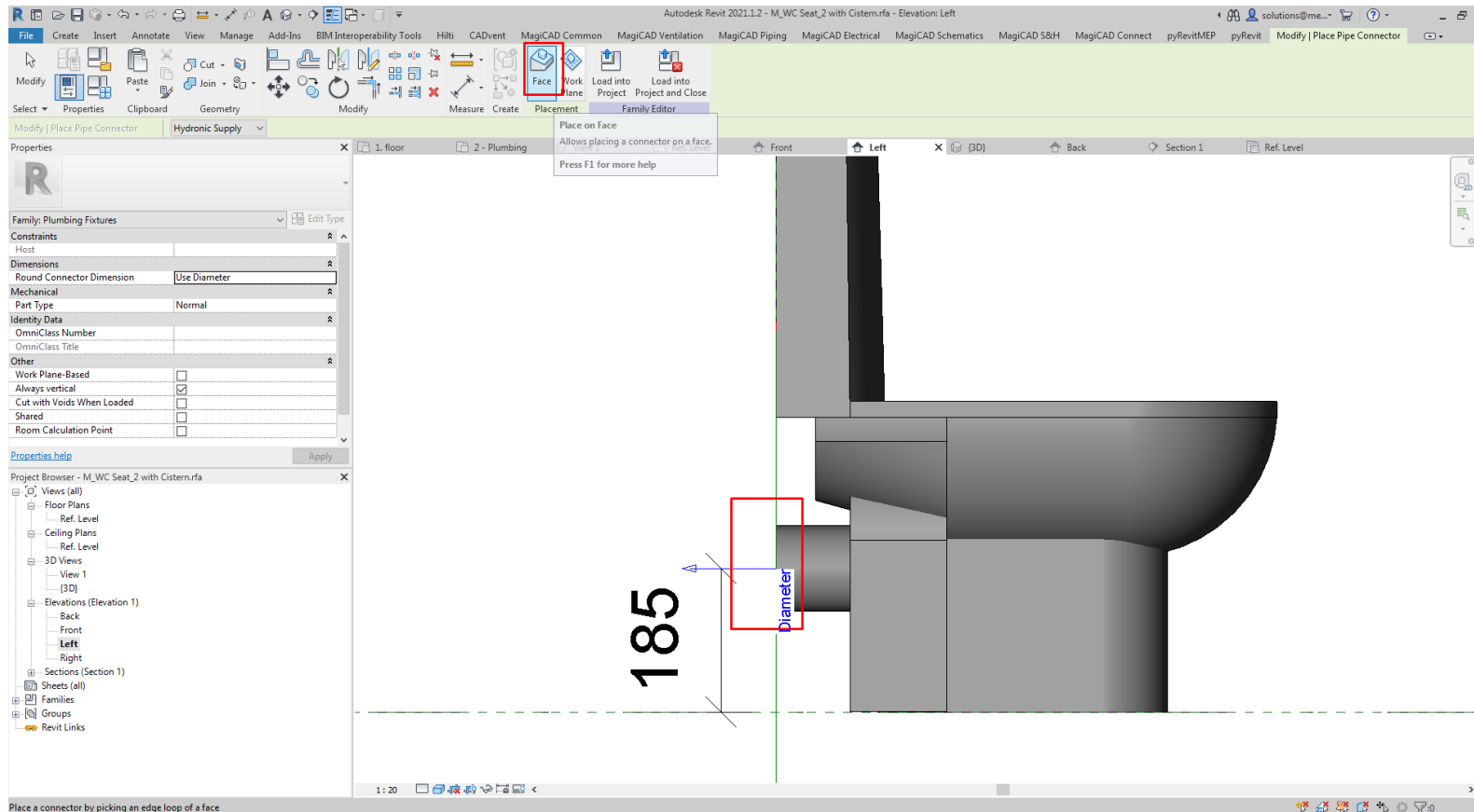
FAMILY REDIĢĒŠANA (6)



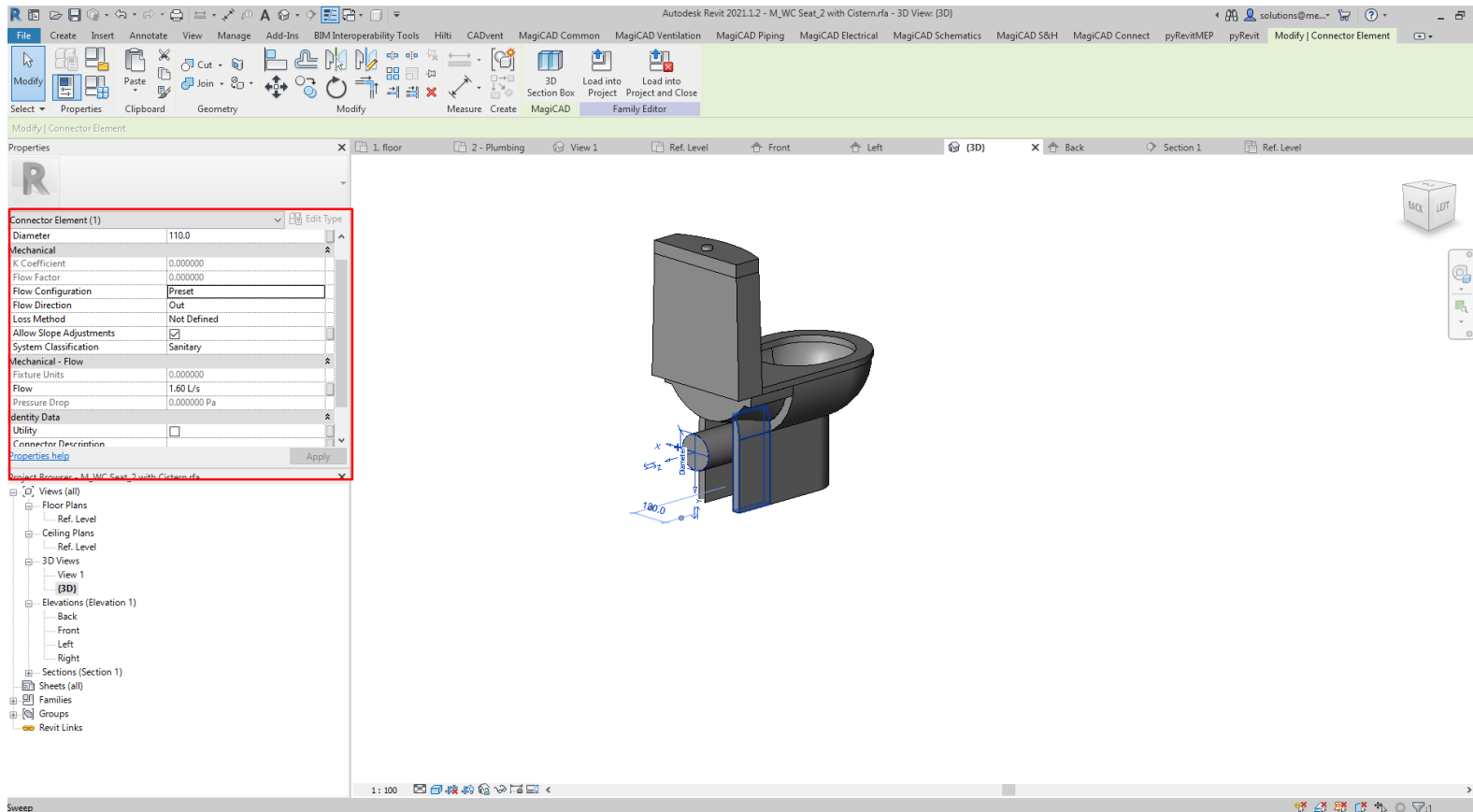
SISTĒMAS PIEVIENOJUMA IZVEIDE (1)



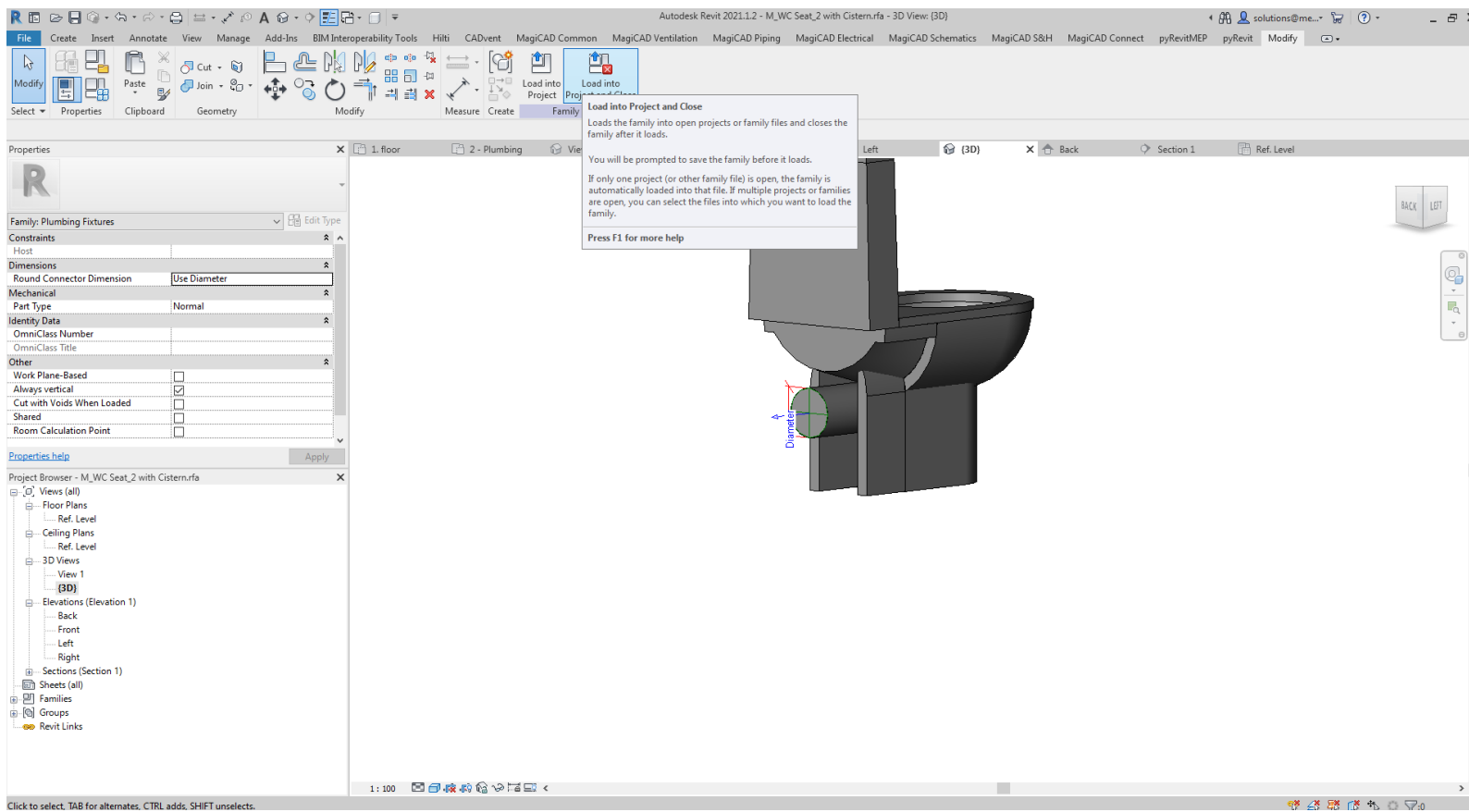
SISTĒMAS PIEVIENOJUMA IZVEIDE (2)



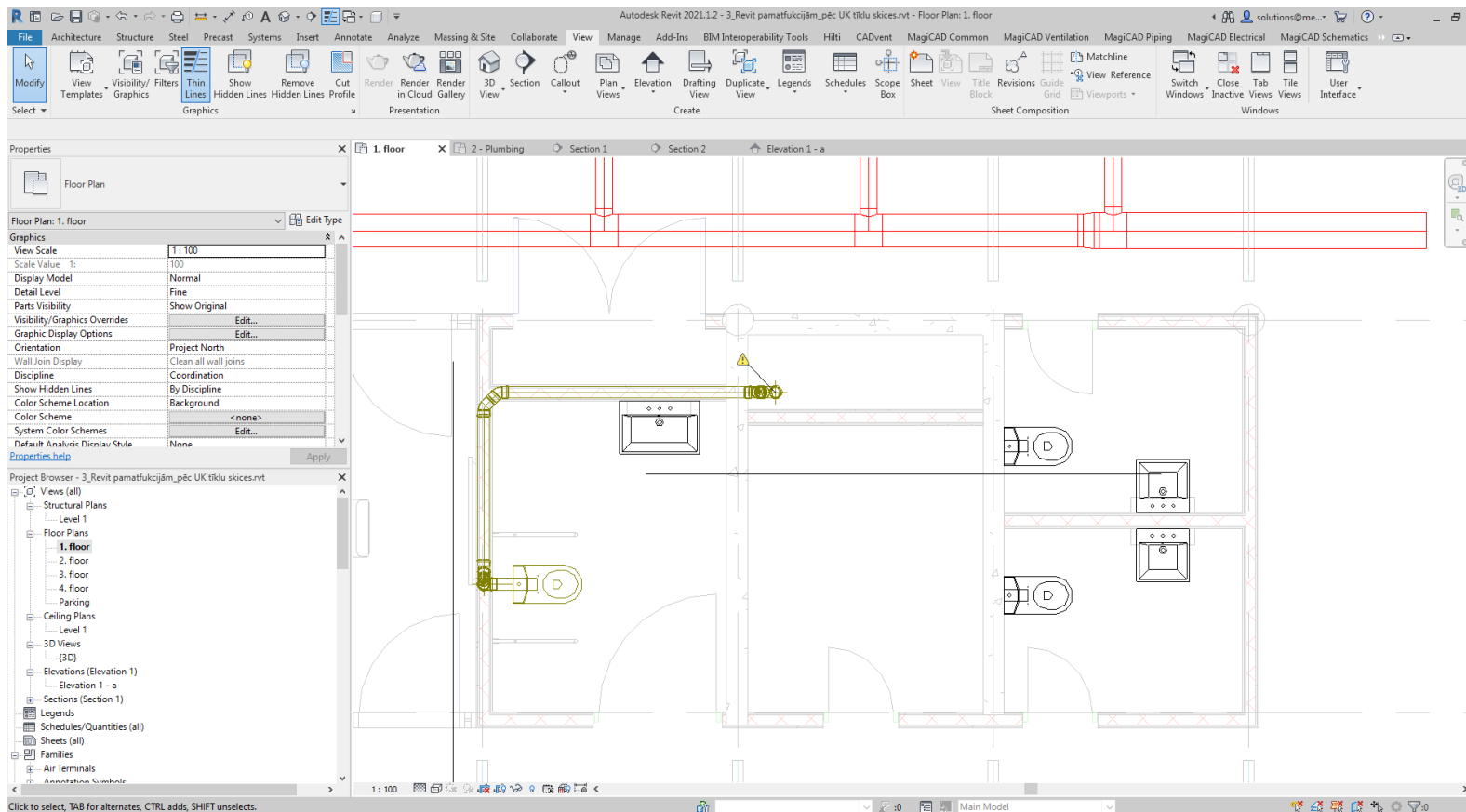
SISTĒMAS PIEVIENOJUMA IZVEIDE (3)



IELĀDĒŠANA MODELĪ

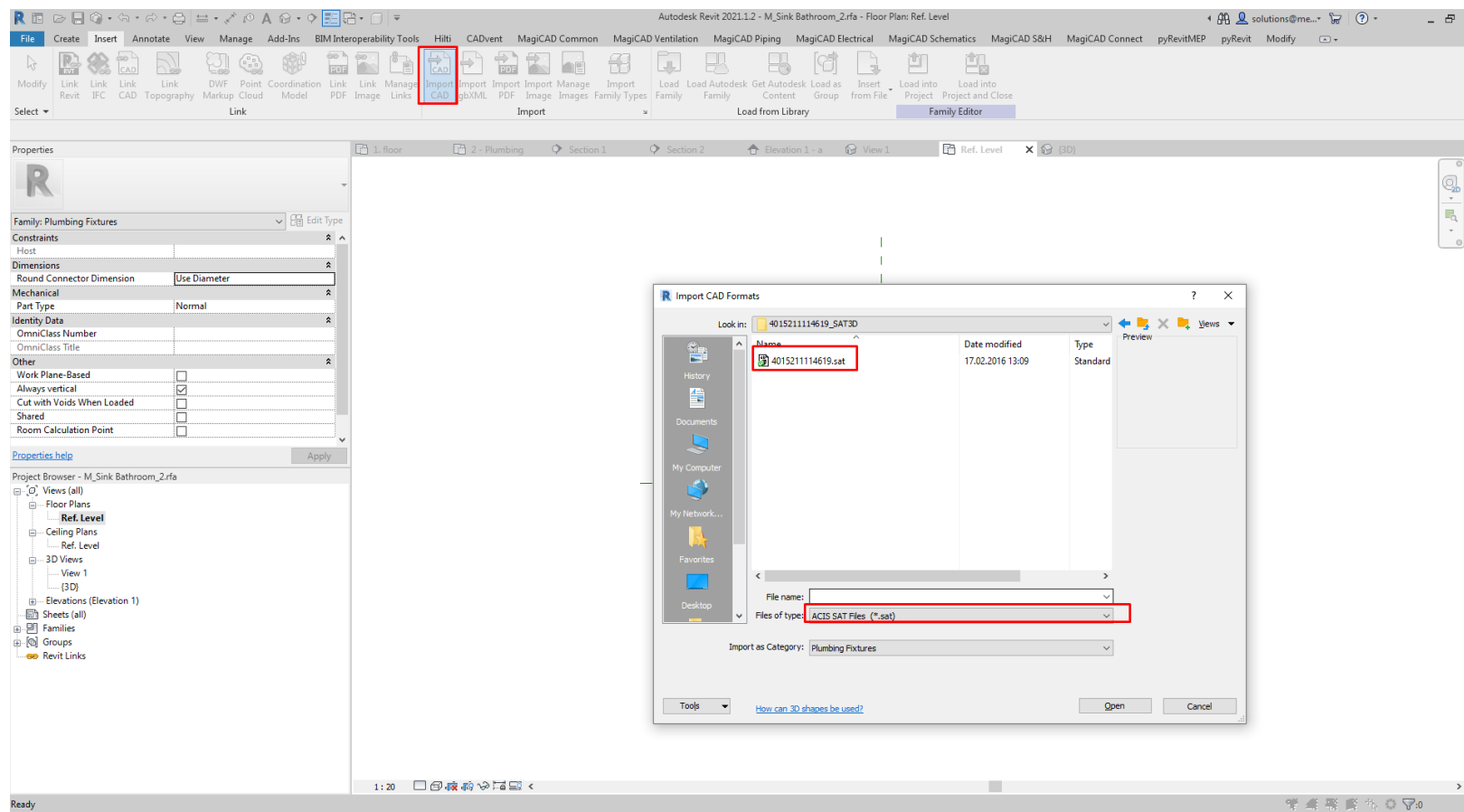


KANALIZĀCIJAS SISTĒMAS RASĒŠANA

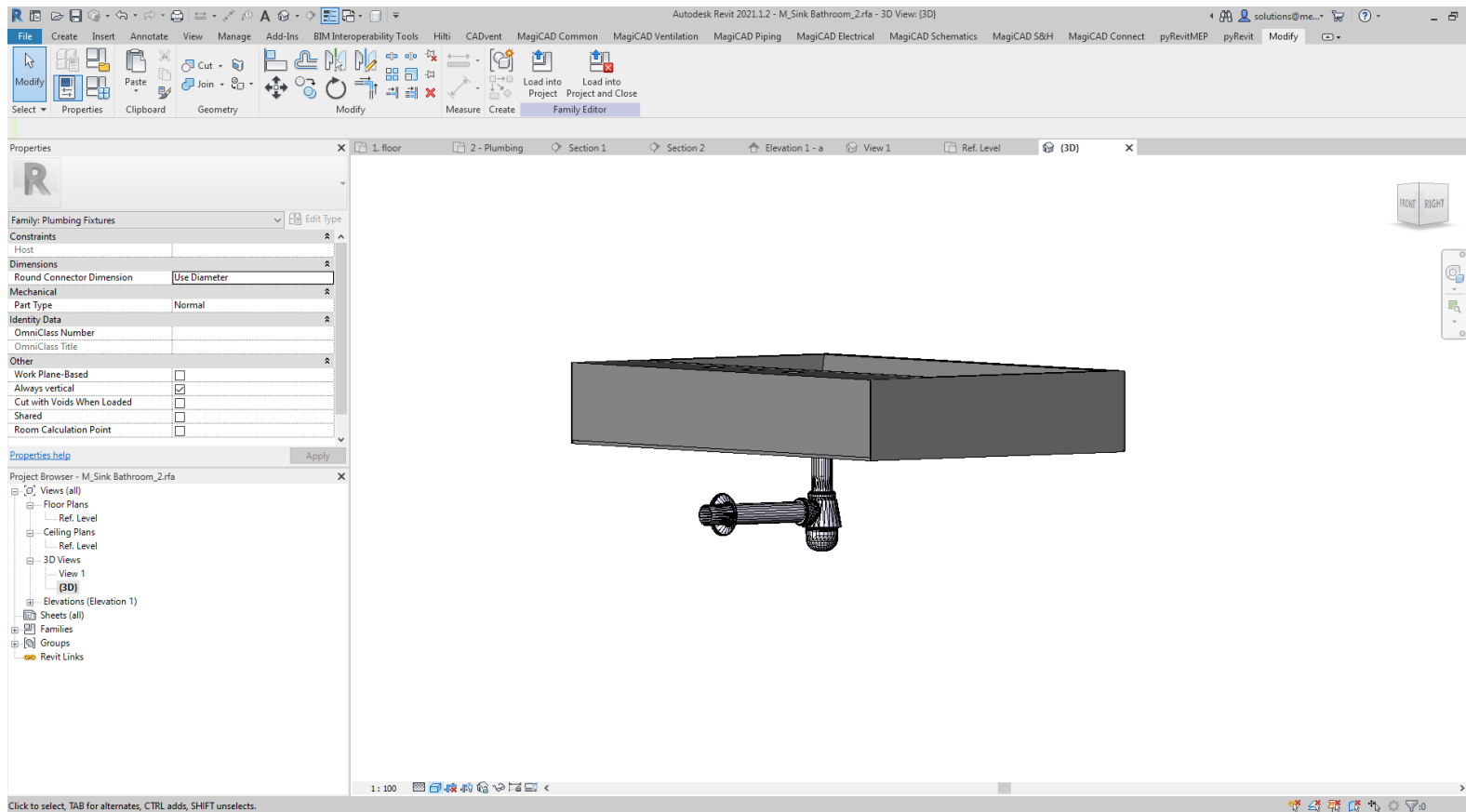


ROKU MAZGĀTNES SIFONA UN PIESLĒGUMA IEVĪETOŠANA (1)

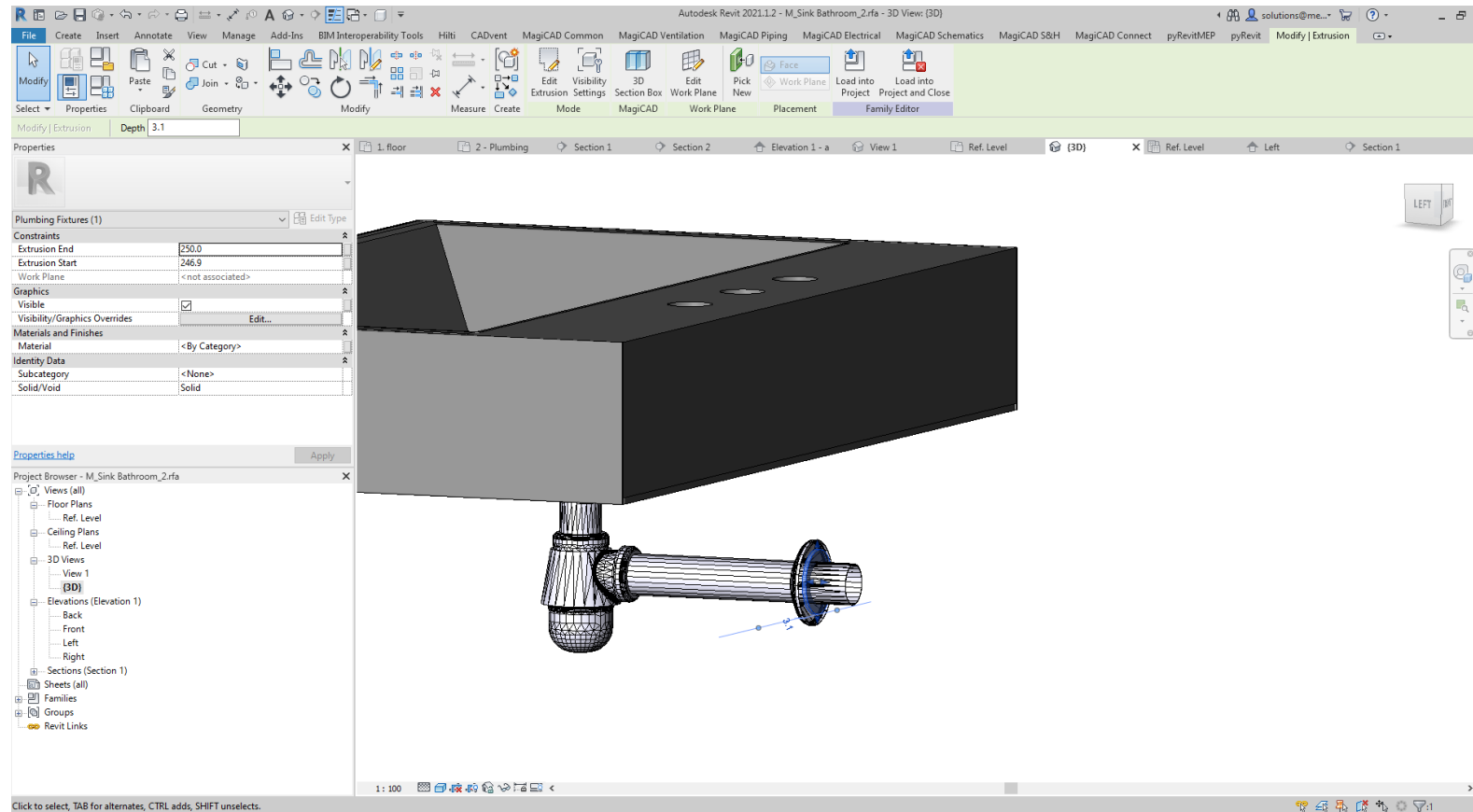
<https://www.viega.com/en/products/Spare-parts/Drainage-technology/Drains-for-washbasins-and-bidets/Bottle-odour-trap-5555.html>



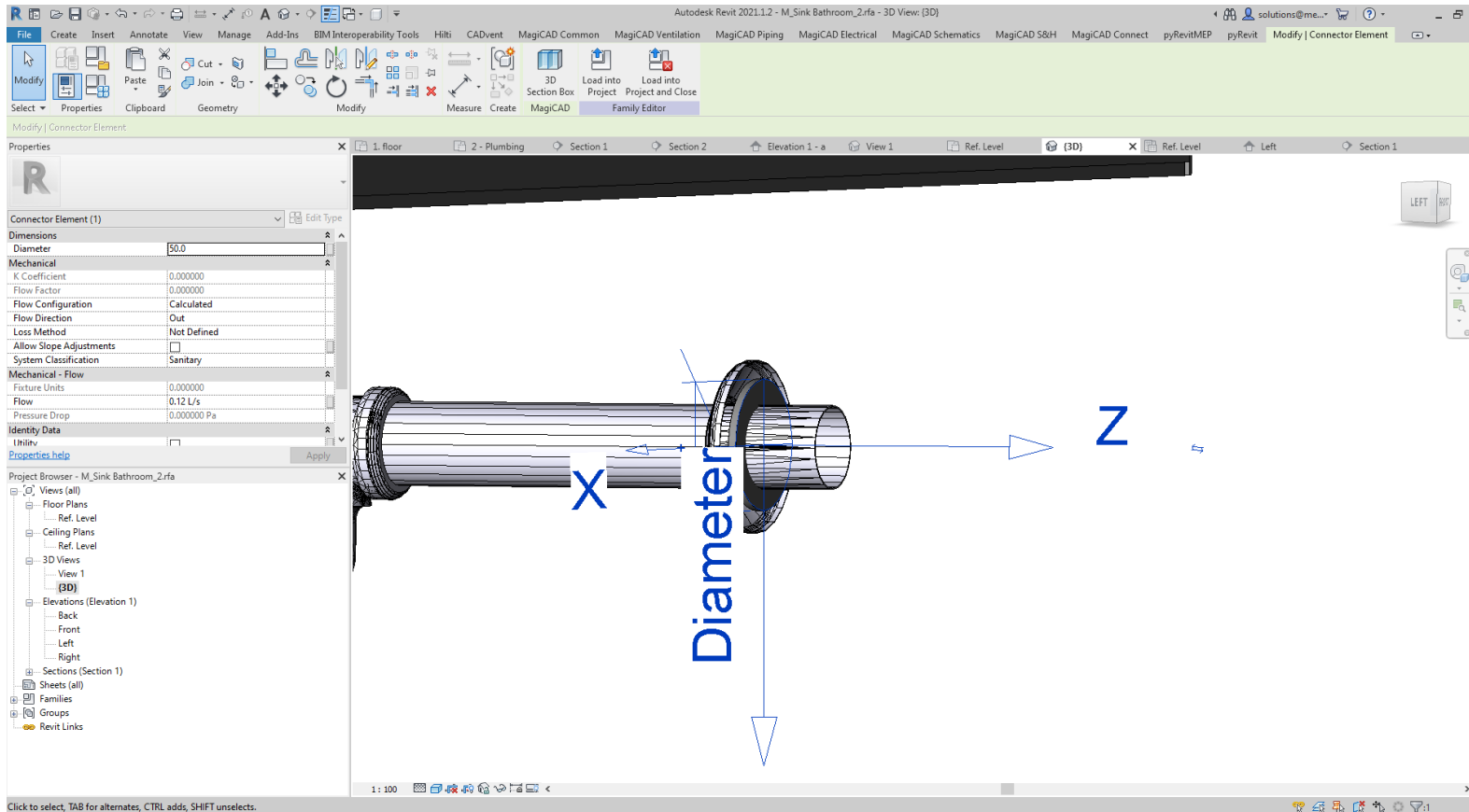
ROKU MAZGĀTNES SIFONA UN PIESLĒGUMA IEVIEĻŠANA (2)



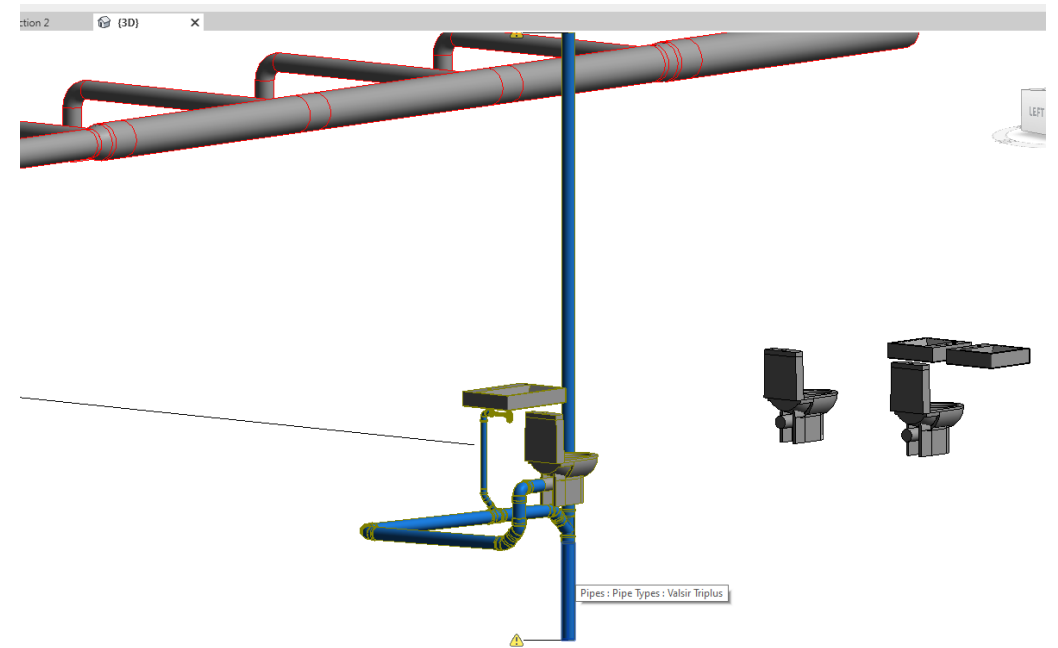
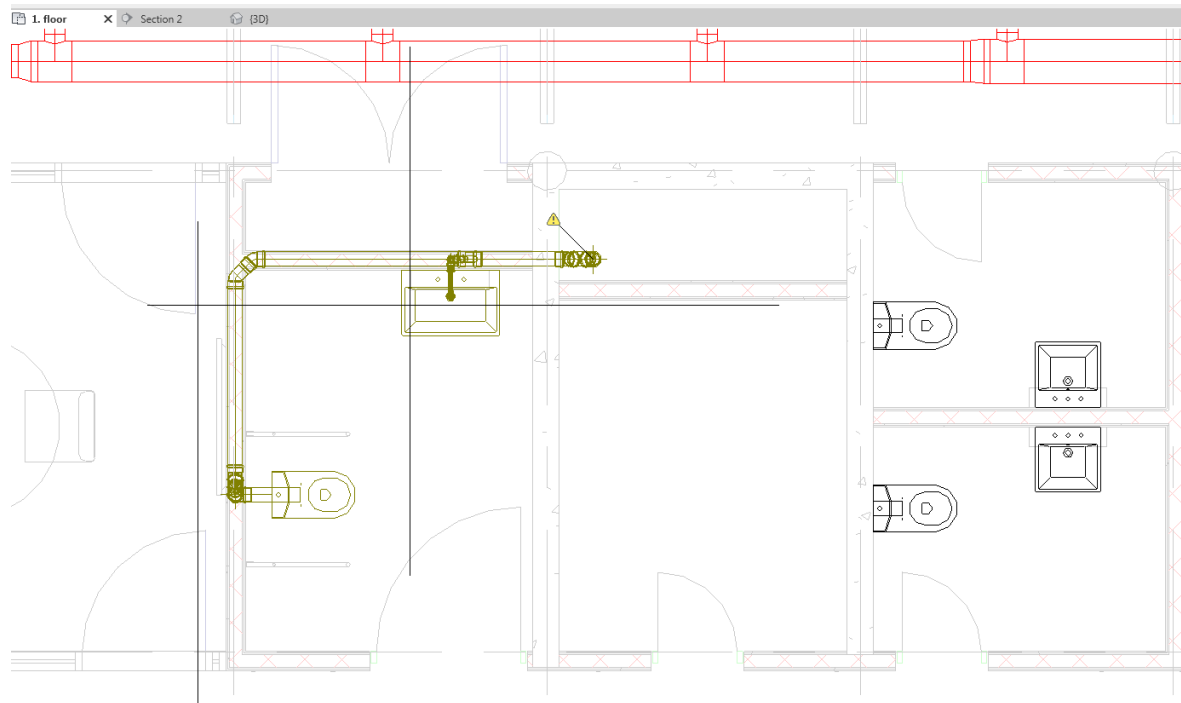
ROKU MAZGĀTNES SIFONA UN PIESLĒGUMA IEVIETOŠANA (3)



ROKU MAZGĀTNES SIFONA UN PIESLĒGUMA IEVIEĻŠANA (4)



SISTĒMAS RASĒŠANA



PRAKTISKAIS DARBS NR. 3

Atvērt revit failu mapē 3. uzdevumam

Iezīmēt **kanalizācijas** trasējumu atbilstoši trasējumam nākamajā slaidā

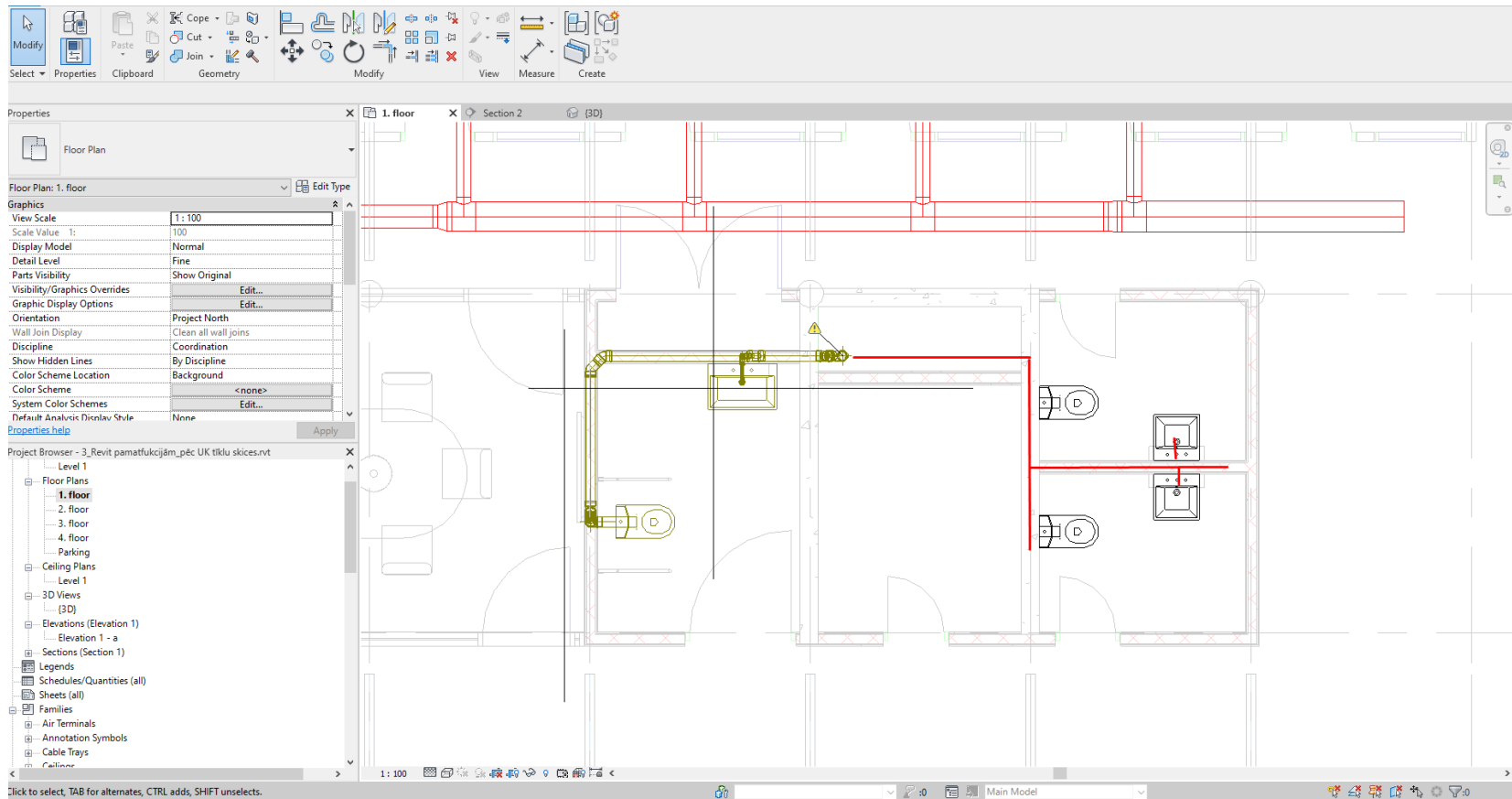
Cauruļvadus zīmēt ar atbilstošu slīpumu 110 mm caurulei 2%, 50 mm caurulei 3%

Pieslēgumi sanmezglēm bez slīpuma

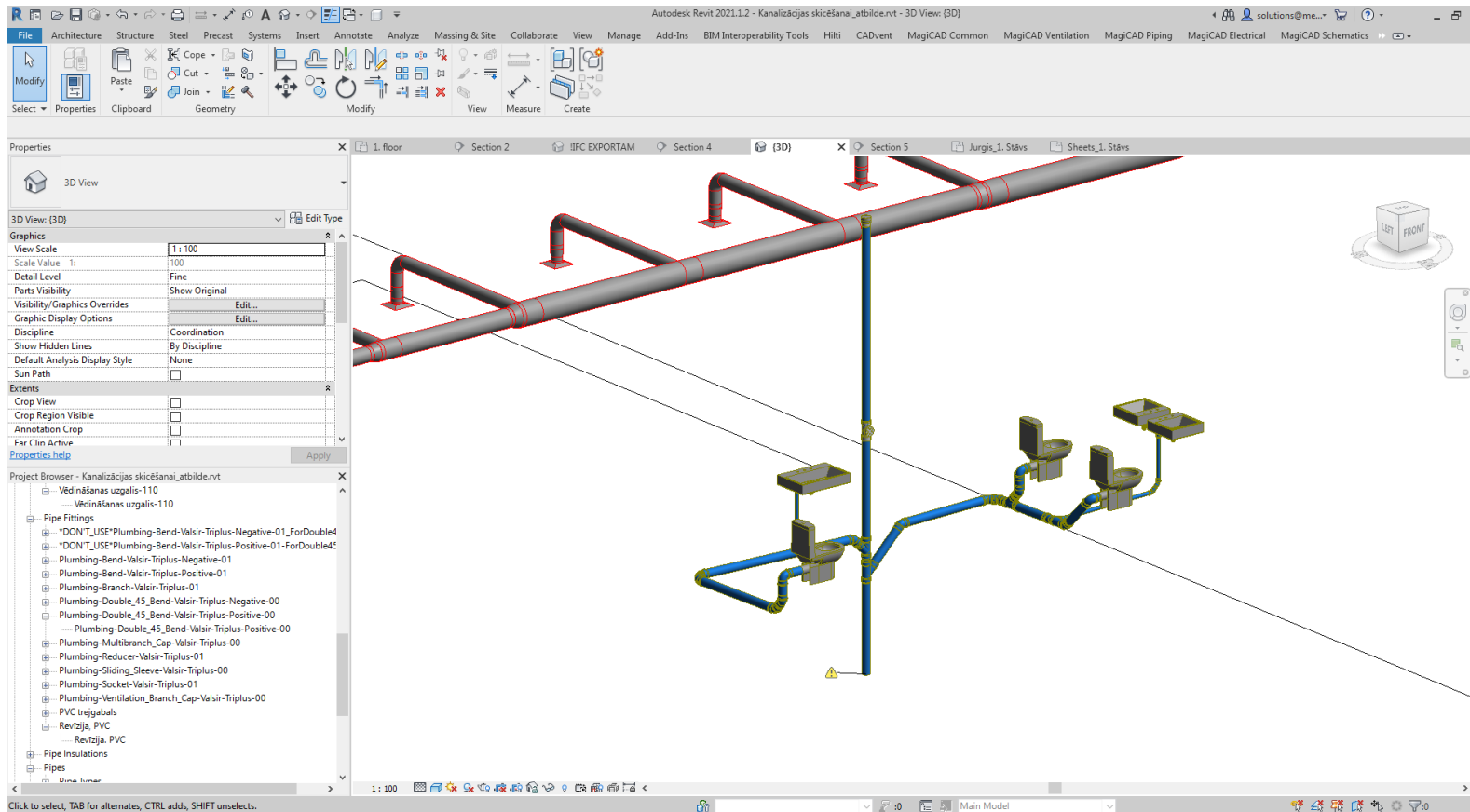
Visi pagriezieni jāmodelē 2x45° izpildījumā

Pievienot revīziju uz stāvvada un jumtiņu izvadam virs ēkas

NEPIECIEŠMAIS TRASĒJUMS



ATBILDE



ŪDENSAPGĀDE

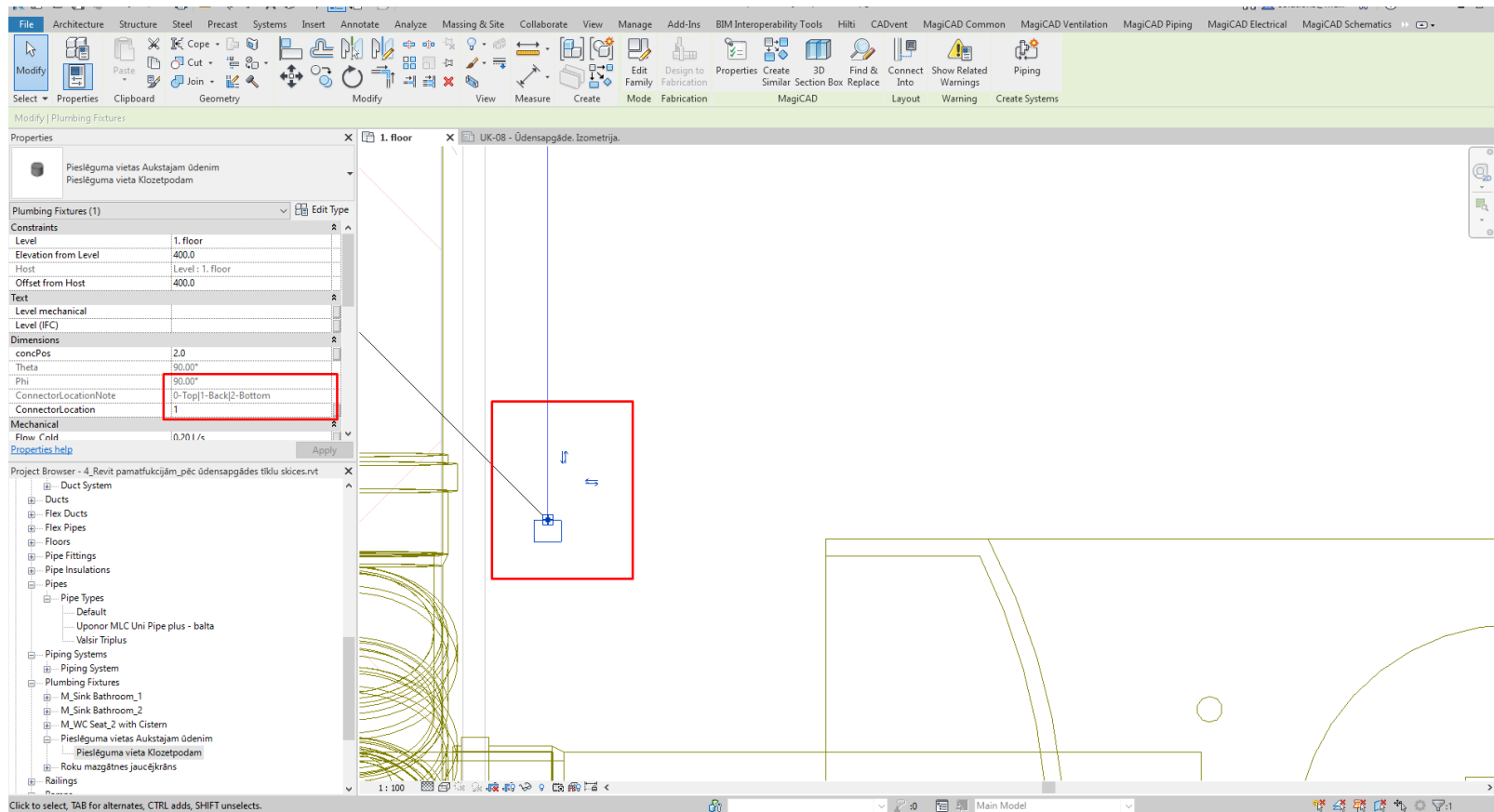
Apmācību modulis

“BIM modelēšana AVK un UK projektēšanā ar priekšzināšanām”

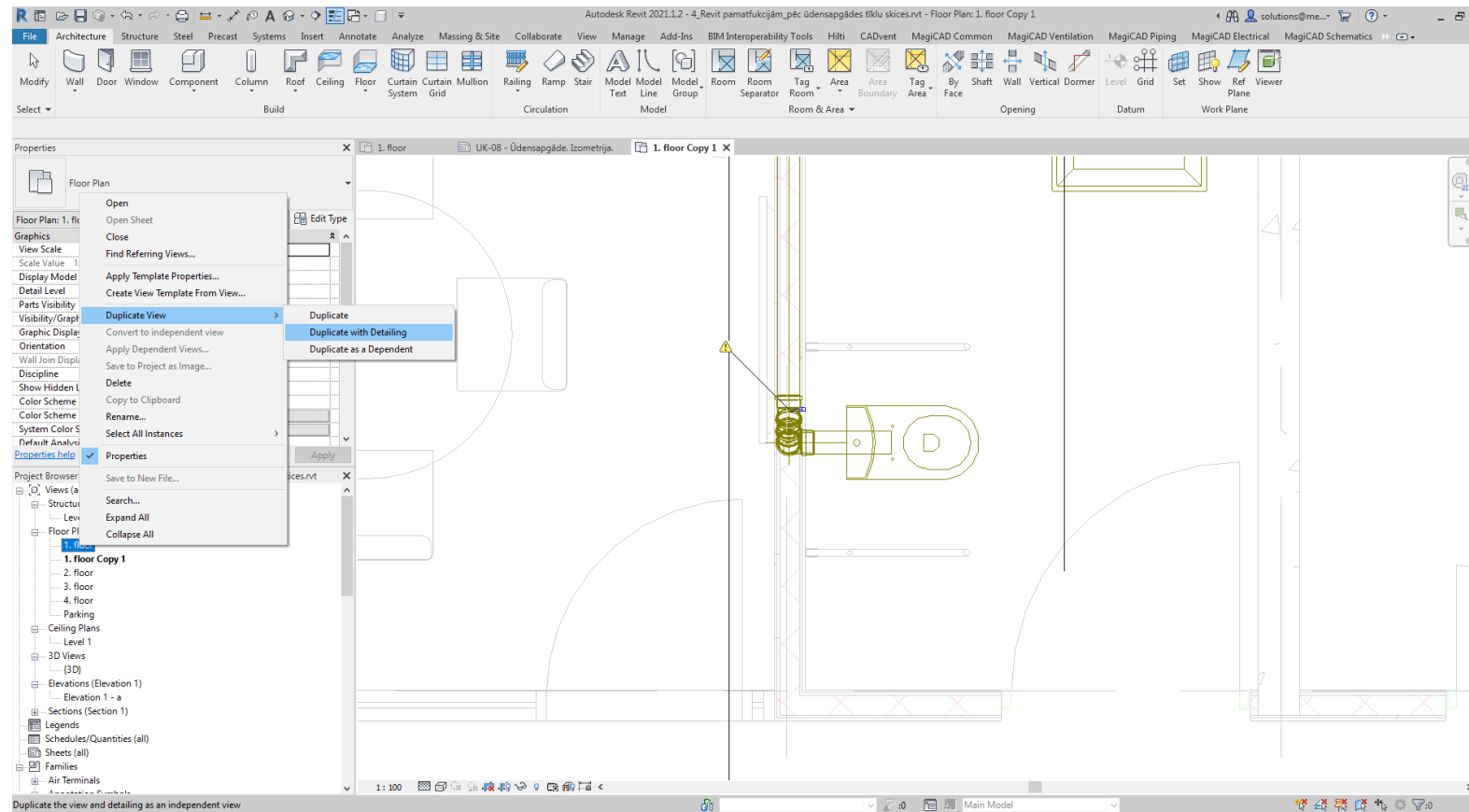
IELĀDĒJAM NEPIECIEŠAMOS FAMILYS

....Revit faili\Revit pamatfunkcijām\Families\Ūdensapgāde
Atveram, visu iezīmējam un iekopējam darba failā

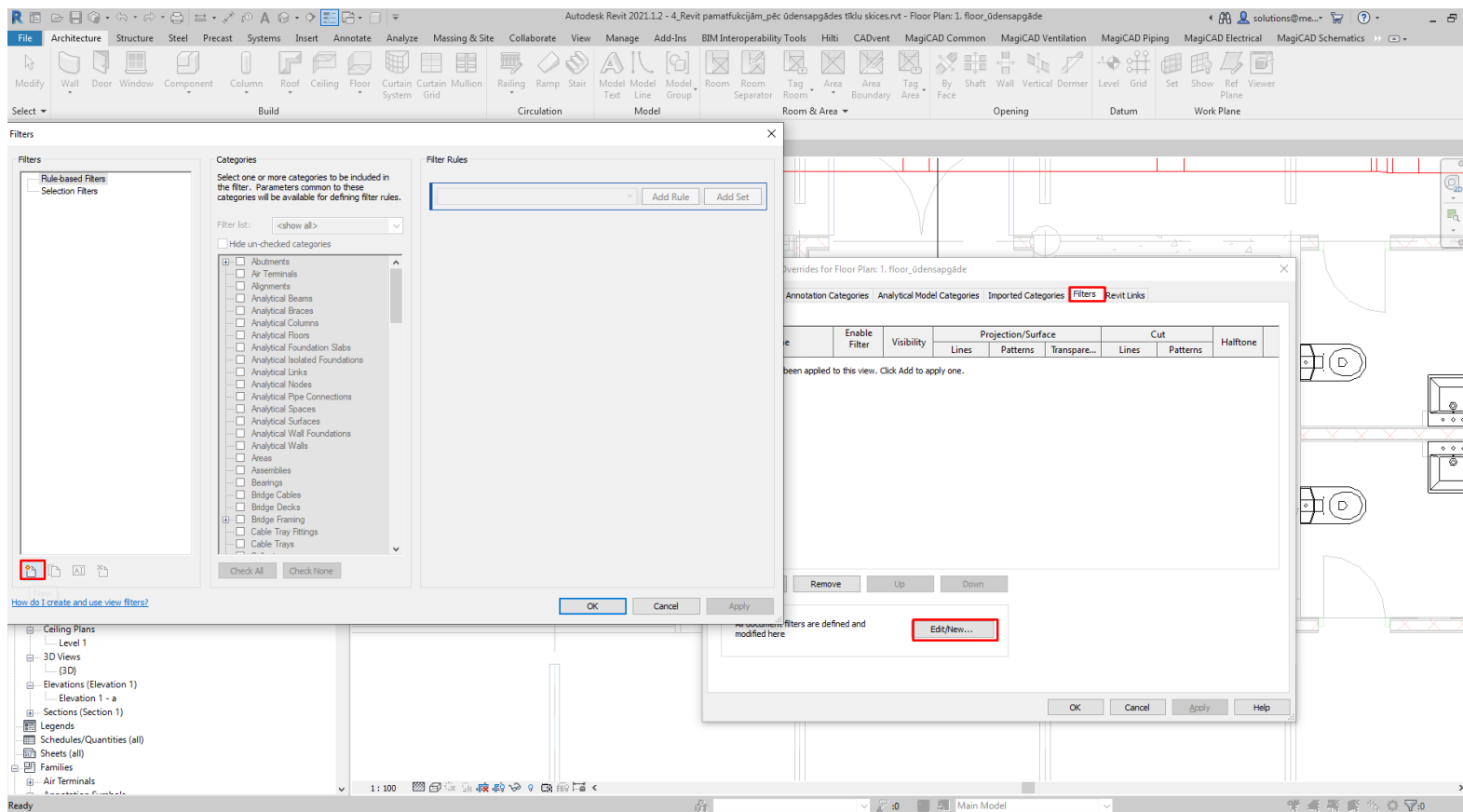
PIESLĒGUMS SANMEZGLAM



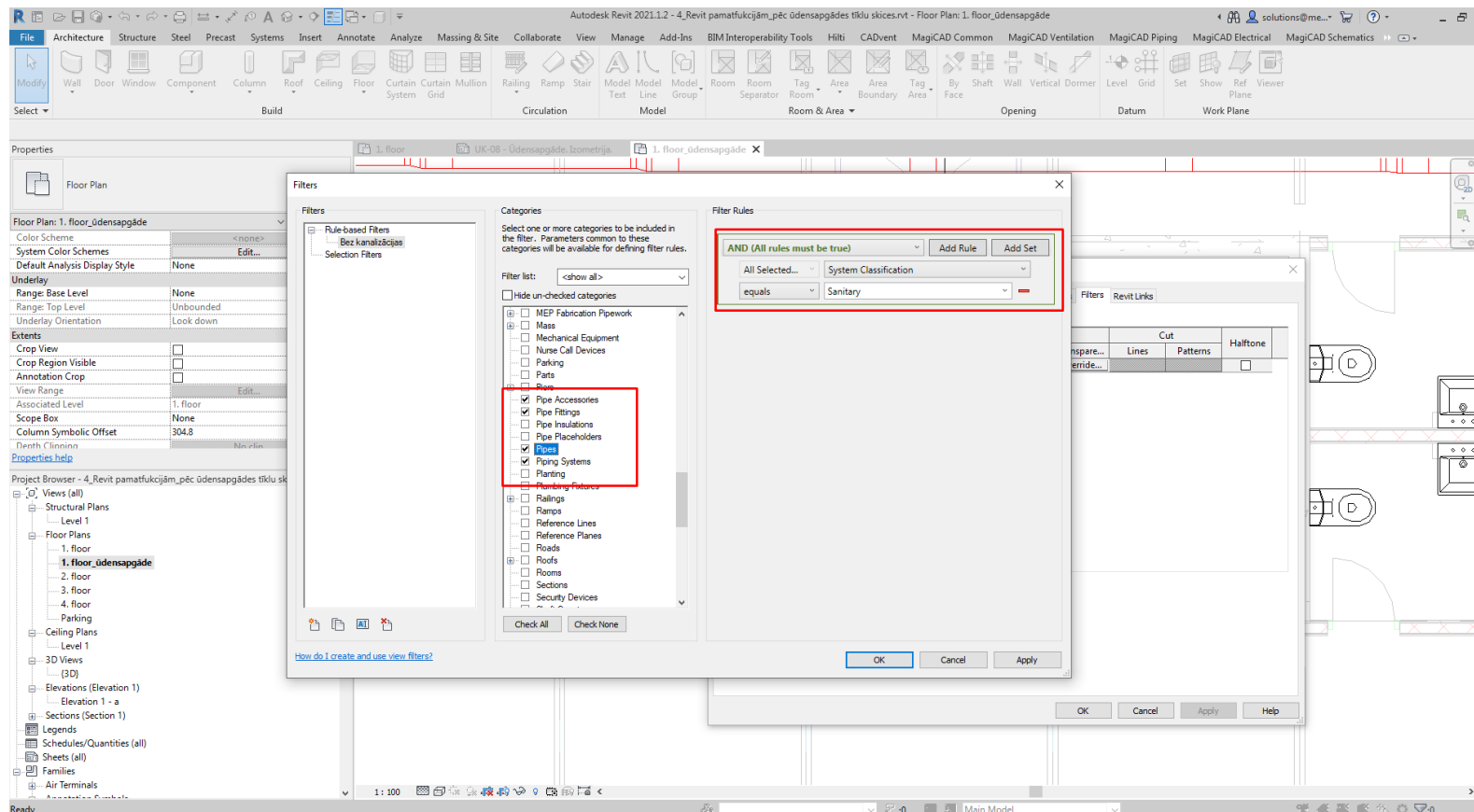
IZVEIDOJAM JAUNU PLĀNU, BEZ KANALIZĀCIJAS



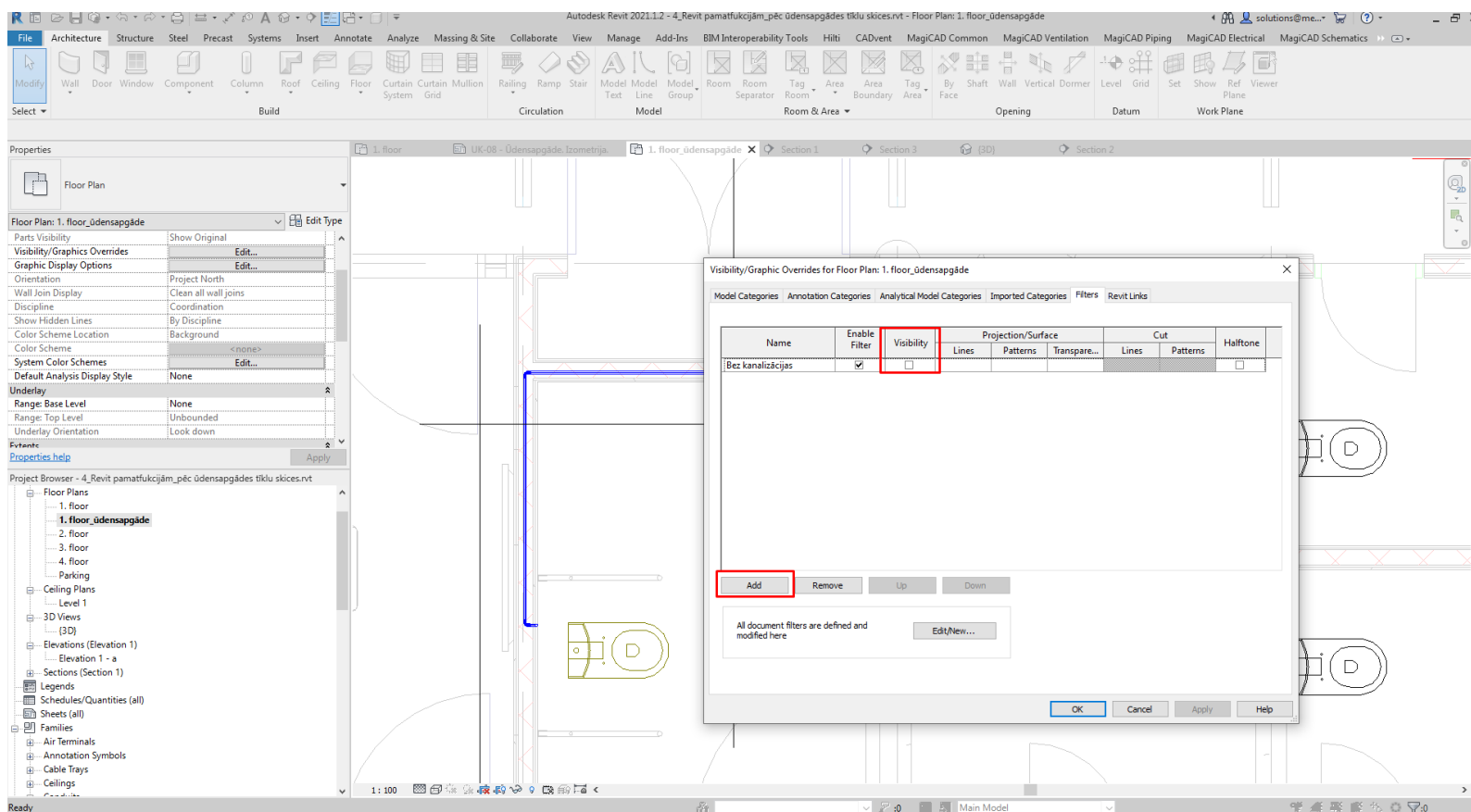
FILTRU IZVEIDE (1)



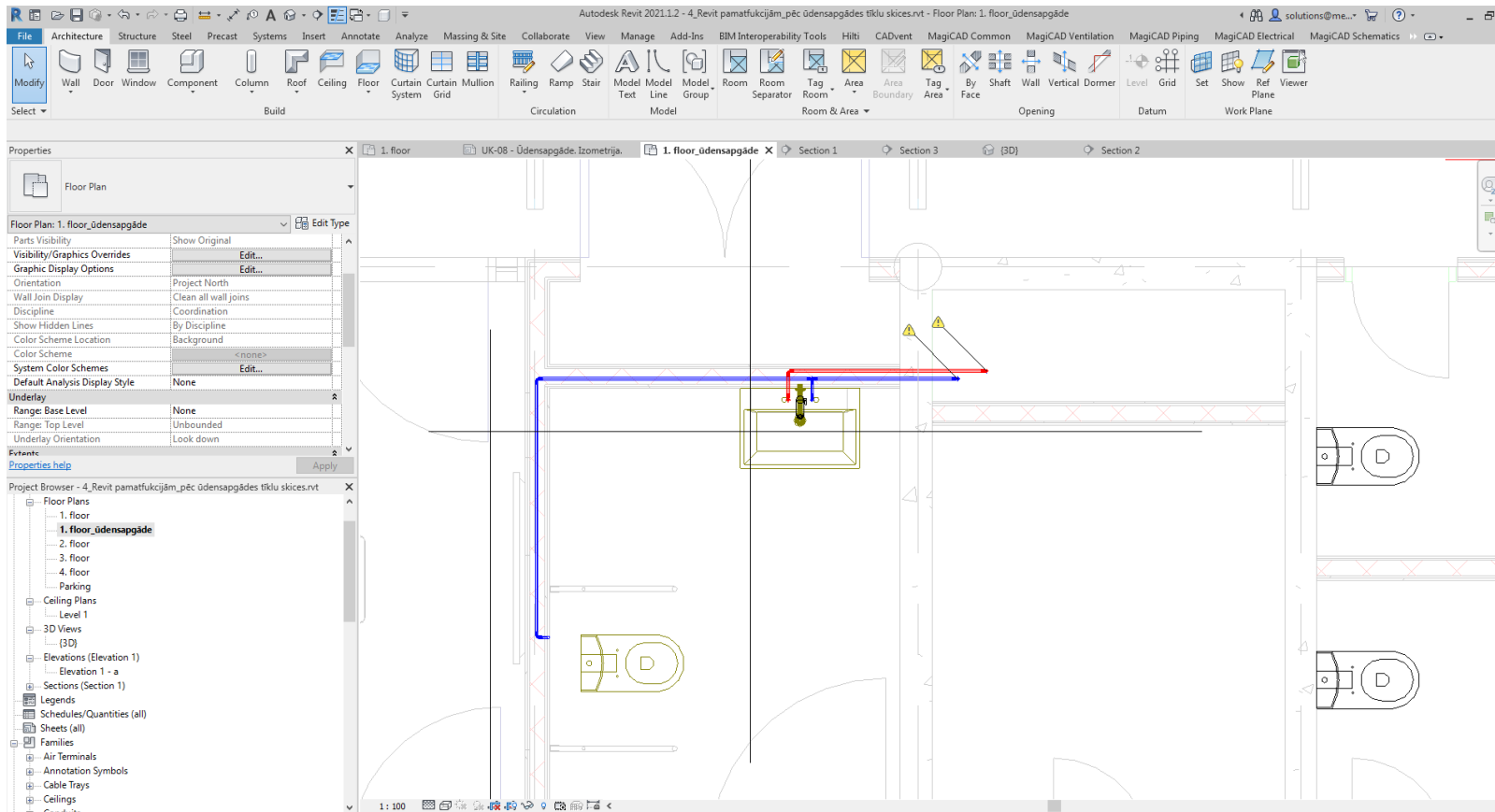
FILTRU IZVEIDE (2)



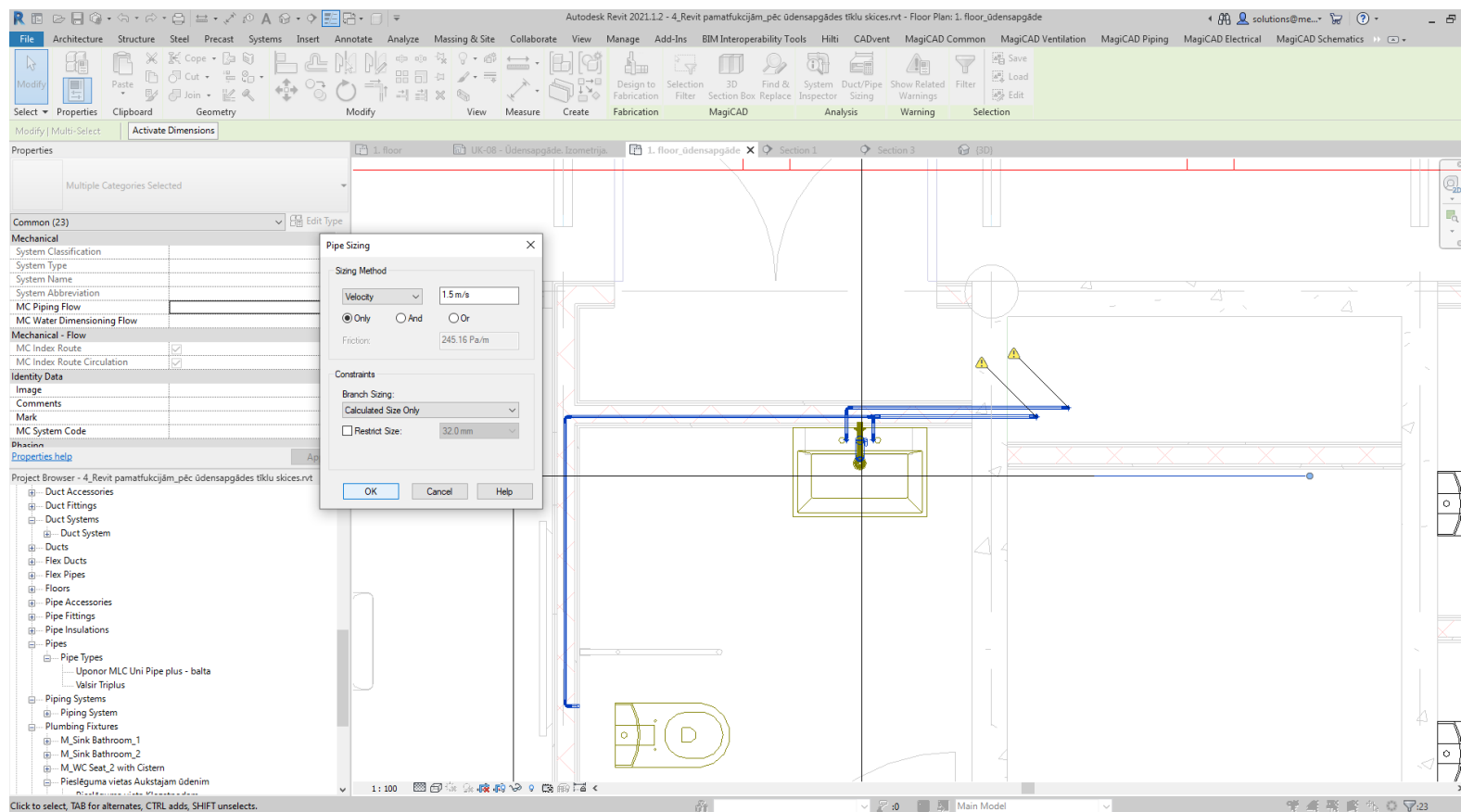
FILTRU IZVEIDE (3)



ŪDENSAPGĀDES SISTĒMAS IZZĪMĒŠANA



ŪDENSAPGĀDES SISTĒMAS DIMENSIONĒŠANA



FIXTURE UNITS

TABLE E103.3(2)
LOAD VALUES ASSIGNED TO FIXTURES*

FIXTURE	OCCUPANCY	TYPE OF SUPPLY CONTROL	LOAD VALUES, IN WATER SUPPLY FIXTURE UNITS (wsfu)		
			Cold	Hot	Total
Bathroom group	Private	Flush tank	2.7	1.5	3.6
Bathroom group	Private	Flushometer valve	6.0	3.0	8.0
Bathtub	Private	Faucet	1.0	1.0	1.4
Bathtub	Public	Faucet	3.0	3.0	4.0
Bidet	Private	Faucet	1.5	1.5	2.0
Combination fixture	Private	Faucet	2.25	2.25	3.0
Dishwashing machine	Private	Automatic	—	1.4	1.4
Drinking fountain	Offices, etc.	$\frac{3}{8}$ " valve	0.25	—	0.25
Kitchen sink	Private	Faucet	1.0	1.0	1.4
Kitchen sink	Hotel, restaurant	Faucet	3.0	3.0	4.0
Laundry trays (1 to 3)	Private	Faucet	1.0	1.0	1.4
Lavatory	Private	Faucet	0.5	0.5	0.7
Lavatory	Public	Faucet	1.5	1.5	2.0
Service sink	Offices, etc.	Faucet	2.25	2.25	3.0
Shower head	Public	Mixing valve	3.0	3.0	4.0
Shower head	Private	Mixing valve	1.0	1.0	1.4
Urinal	Public	1" flushometer valve	10.0	—	10.0
Urinal	Public	$\frac{3}{4}$ " flushometer valve	5.0	—	5.0
Urinal	Public	Flush tank	3.0	—	3.0
Washing machine (8 lb)	Private	Automatic	1.0	1.0	1.4
Washing machine (8 lb)	Public	Automatic	2.25	2.25	3.0
Washing machine (15 lb)	Public	Automatic	3.0	3.0	4.0
Water closet	Private	Flushometer valve	6.0	—	6.0
Water closet	Private	Flush tank	2.2	—	2.2
Water closet	Public	Flushometer valve	10.0	—	10.0
Water closet	Public	Flush tank	5.0	—	5.0
Water closet	Public or private	Flushometer tank	2.0	—	2.0

TABLE 709.2

DRAINAGE FIXTURE UNITS FOR FIXTURE DRAINS OR TRAPS

FIXTURE DRAIN OR TRAP SIZE (inches)	DRAINAGE FIXTURE UNIT VALUE
$1\frac{1}{4}$	1
$1\frac{1}{2}$	2
2	3
$2\frac{1}{2}$	4
3	5
4	6

For SI: 1 inch = 25.4 mm.

PRAKTISKAIS DARBS NR. 4

Atvērt revit failu mapē 4. uzdevumam

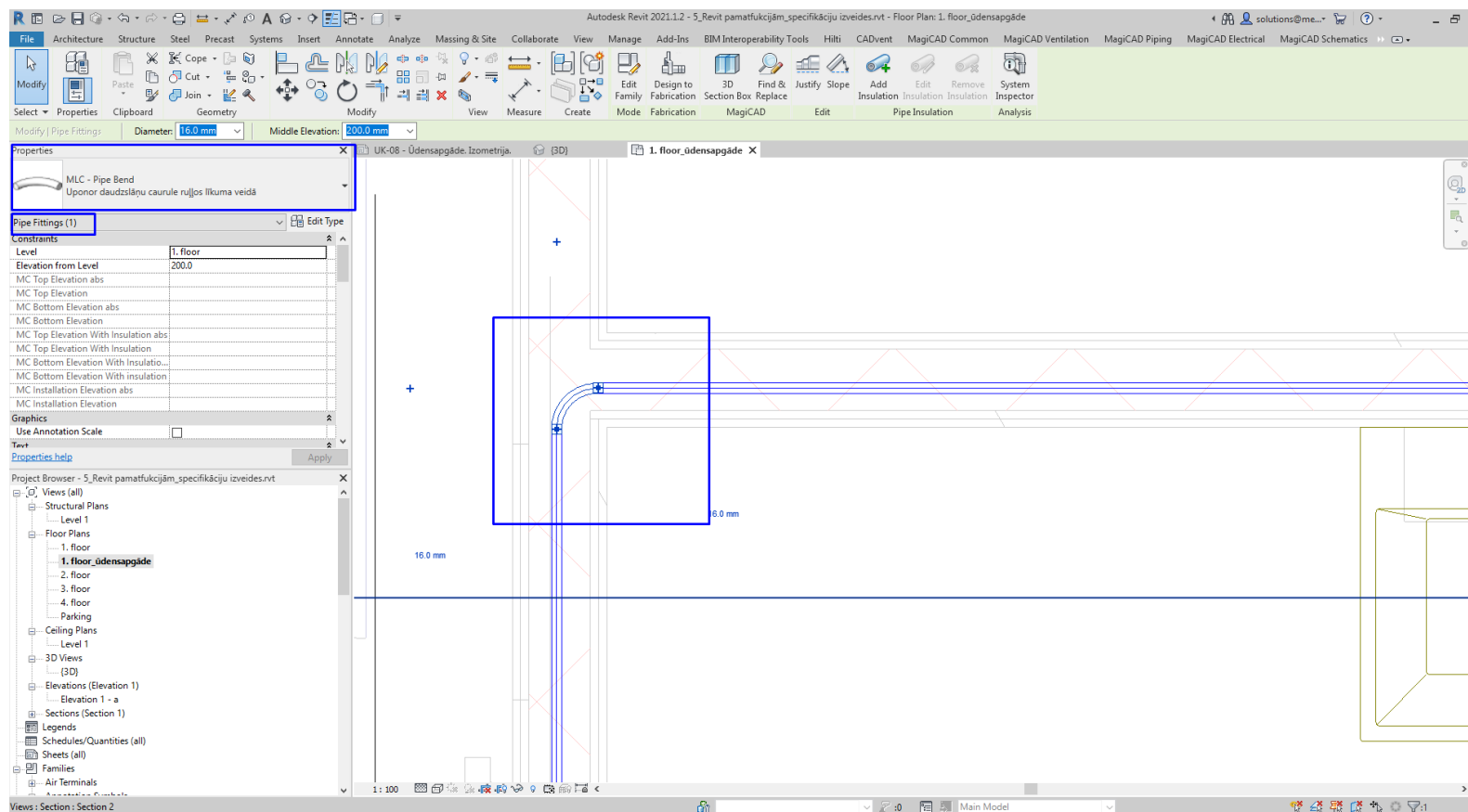
Izveidot jaunu plāna skatu bez kanalizācijas

Iezīmēt **ūdensapgādes** trasējumu atbilstoši trasējumam nākamajā slaidā

Dimensionēt sistēmu pie pieļaujama plūsmas ātruma 1.5 m/s

Pievienot noslēgvārstus uz atzariem no maģistrāles

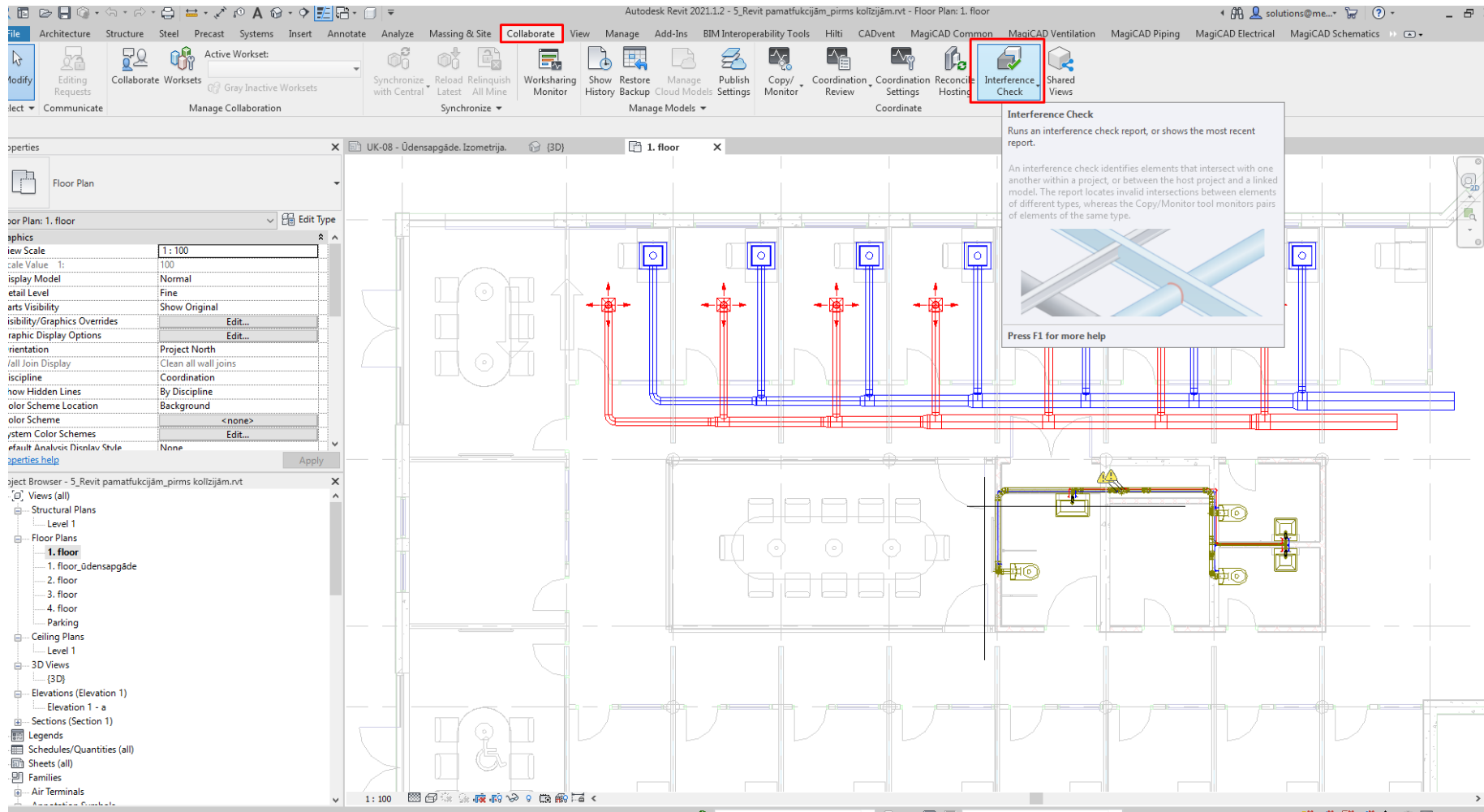
CAURUĻVADU LĪKUMU TIPU NOMAIŅA



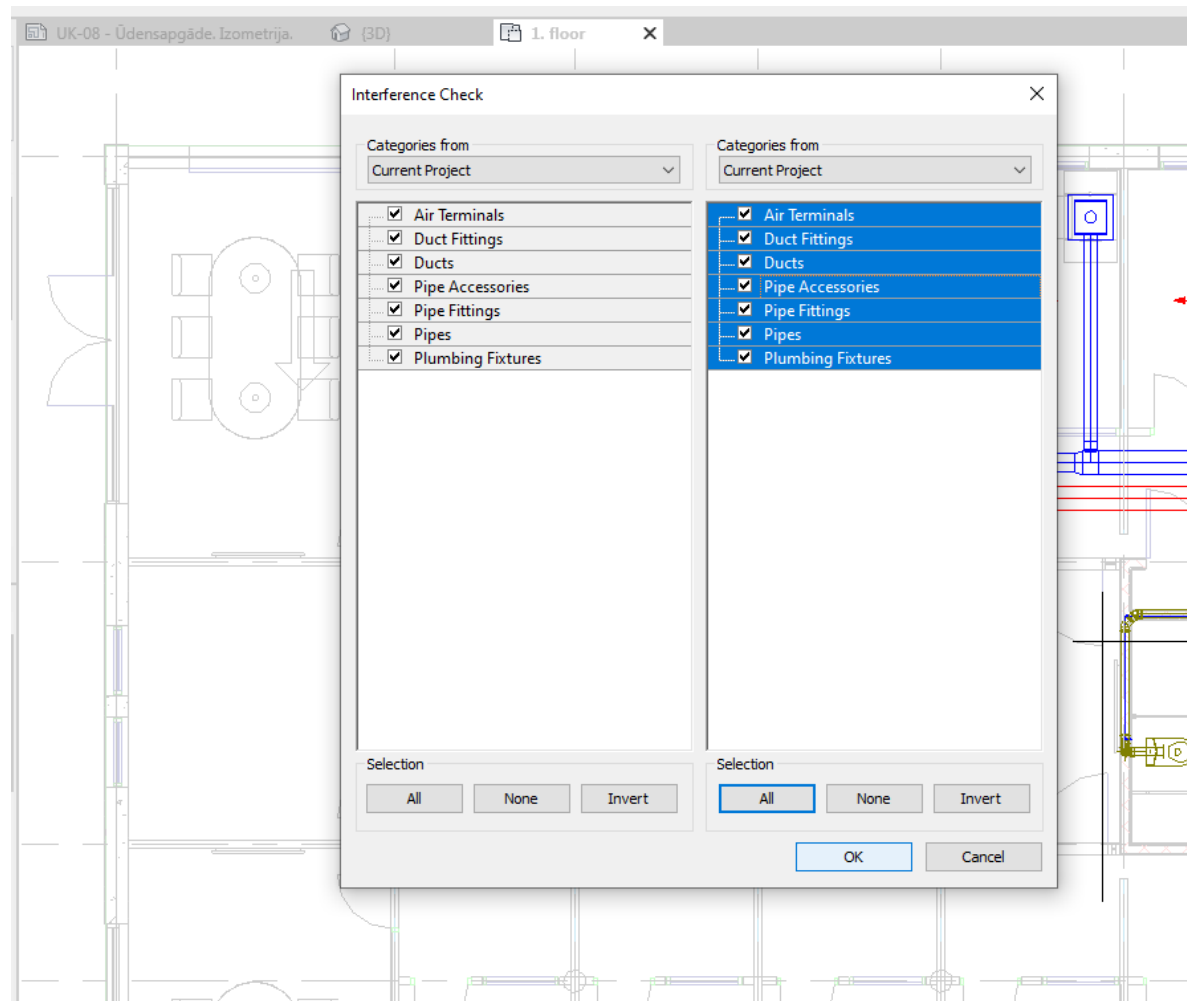
SAVSTARPĒJO KOLĪZIJU KONTROLE

Apmācību modulis
“BIM modelēšana AVK un UK projektēšanā ar priekšzināšanām”

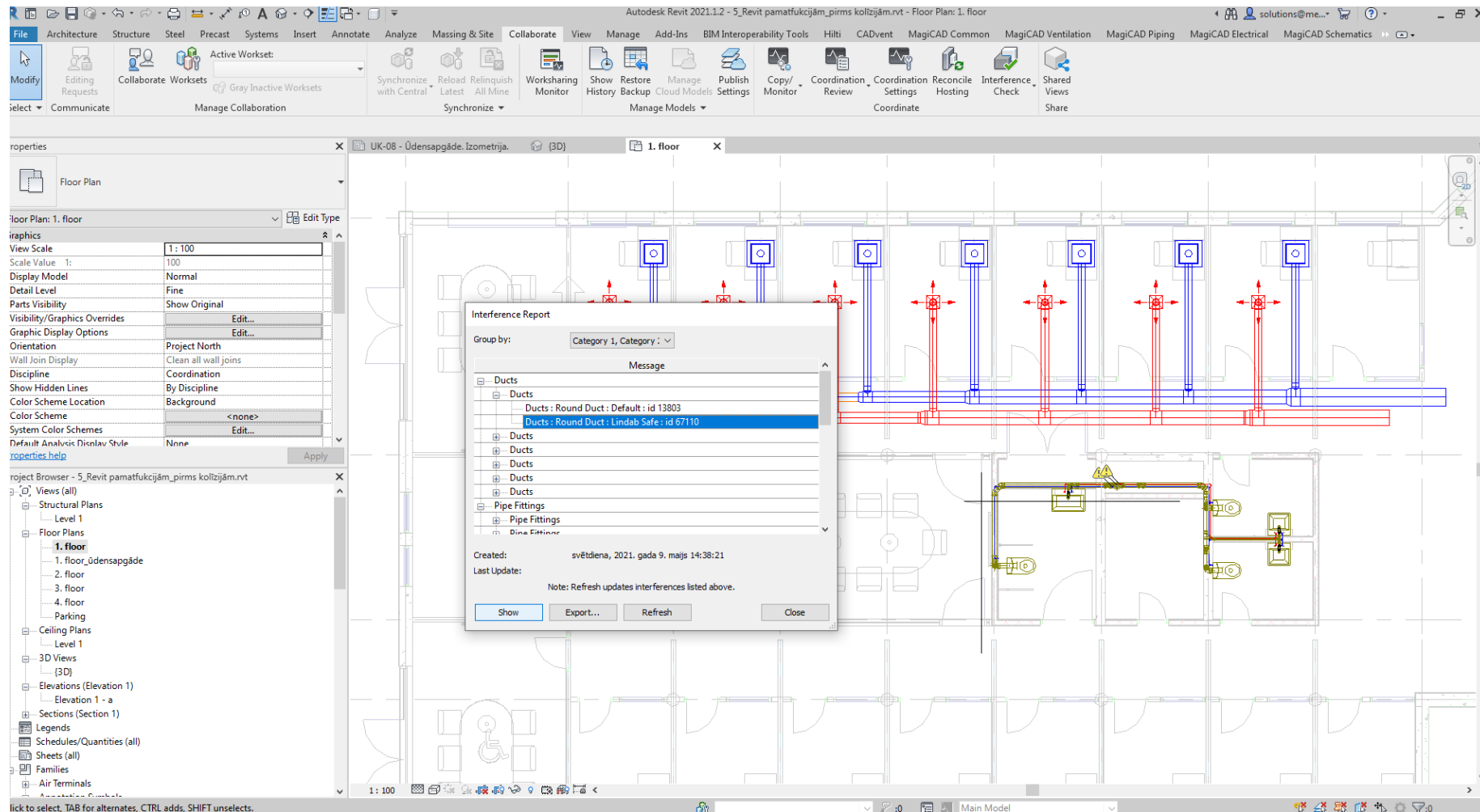
KOLĪZIJU IDENTIFICĒŠANA



KOLĪZIJU IDENTIFICĒŠANA



KOLĪZIJU IDENTIFICĒŠANA



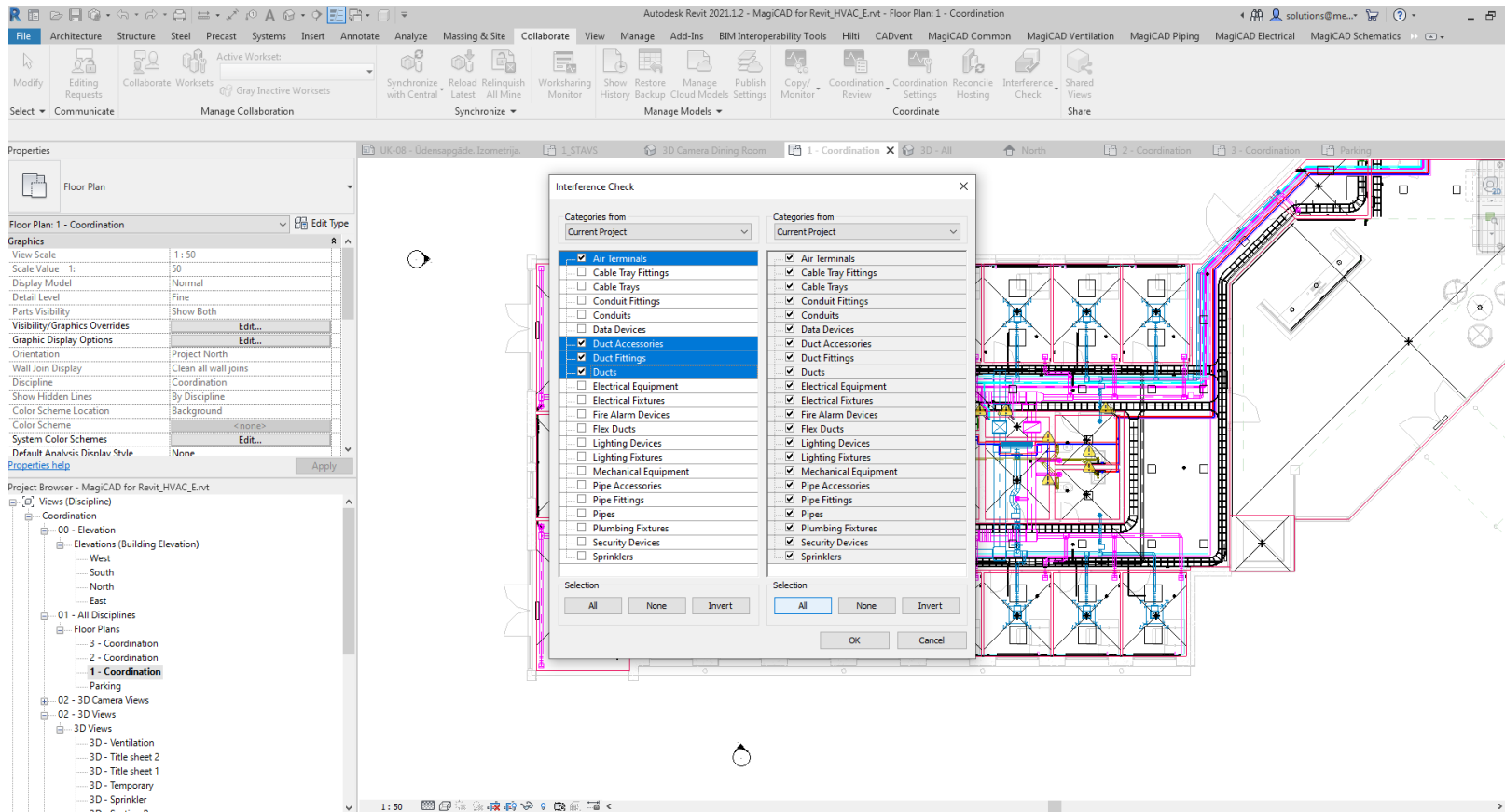
PRAKTISKAIS DARBS NR. 5

Atvērt revit failu mapē 5. uzdevumam

Veikt automātisko kolīziju pārbaudi starp nākamajā slaidā norādītajiem elementiem (pēc izvēles var aplūkot arī citas sadaļas, piemēram EL)

Identificēt problēmvietas un veikt izmaiņas, lai novērstu kolīzijas

Veikt automātisko pārbaudi un pārliecināties, ka kolīziju nav



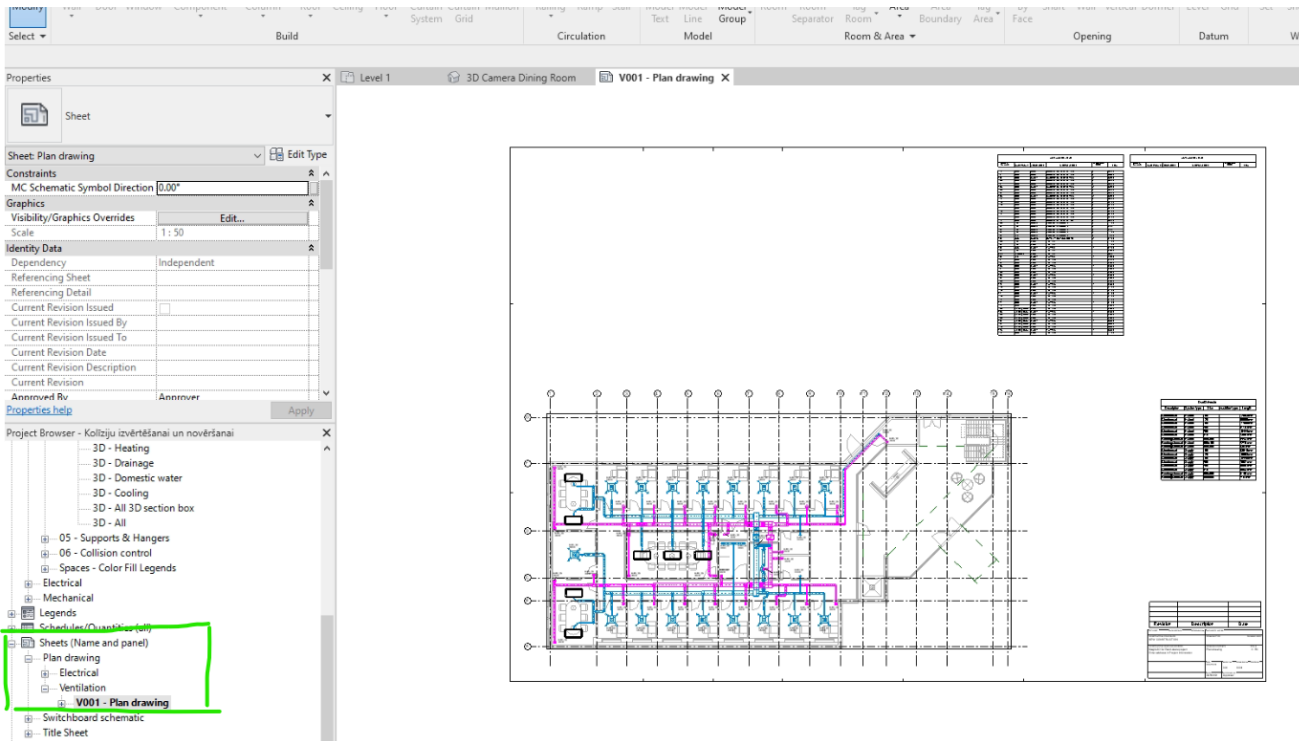
GATAVA MODEĻA CAURSKATĪŠANA (SKATI, SPECIFIKĀCIJAS, PIESAISTES, ELEMENTU AIZVIETOŠANA)

Apmācību modulis

“BIM modelēšana AVK un UK projektēšanā ar priekšzināšanām”

MODEĻA IZSKATĪŠANA

Atvērt revit failu mapē 5. uzdevumam
Atvērt kādu no gatavajām lapām un izskatīt

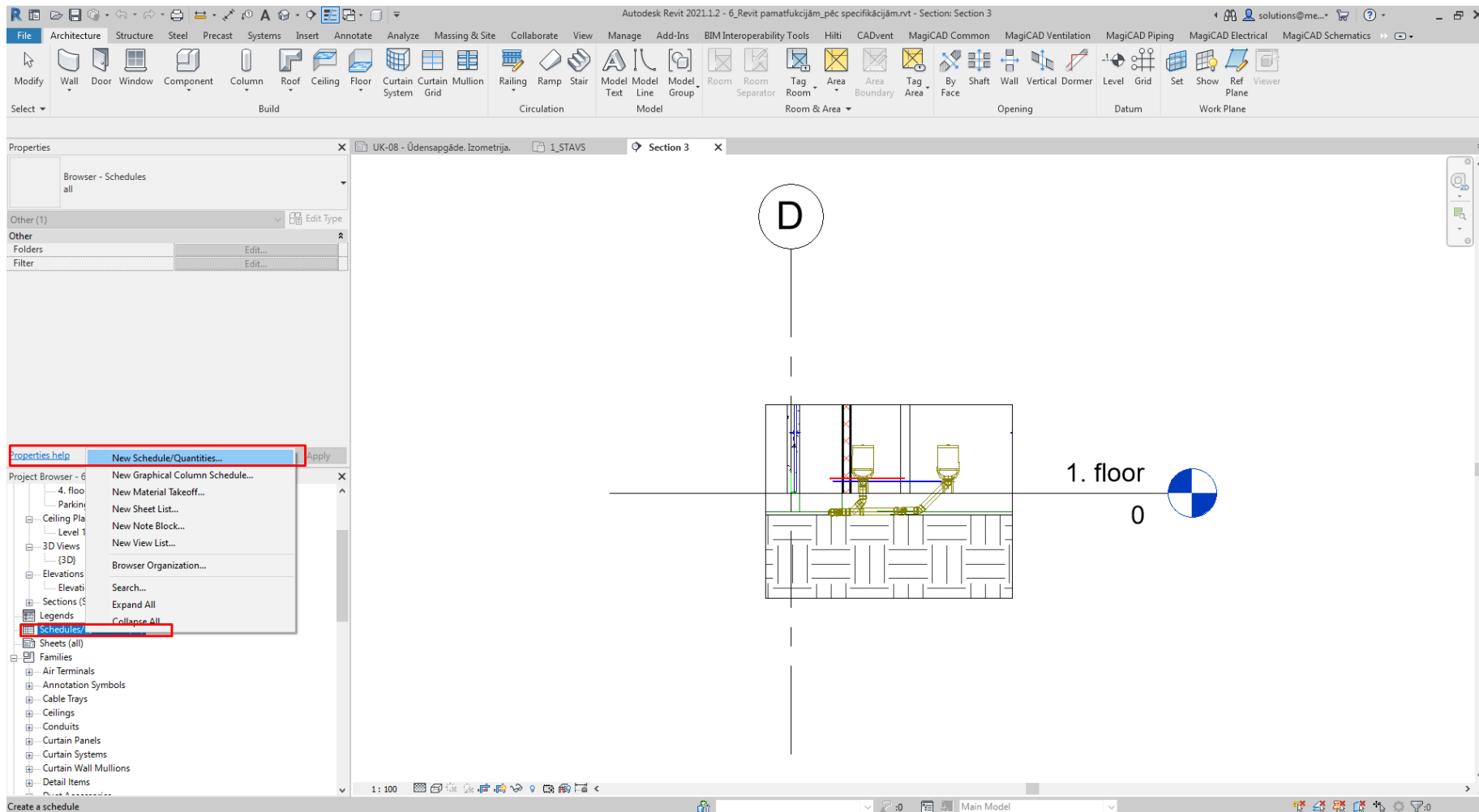


SPECIFIKĀCIJU IZVEIDE

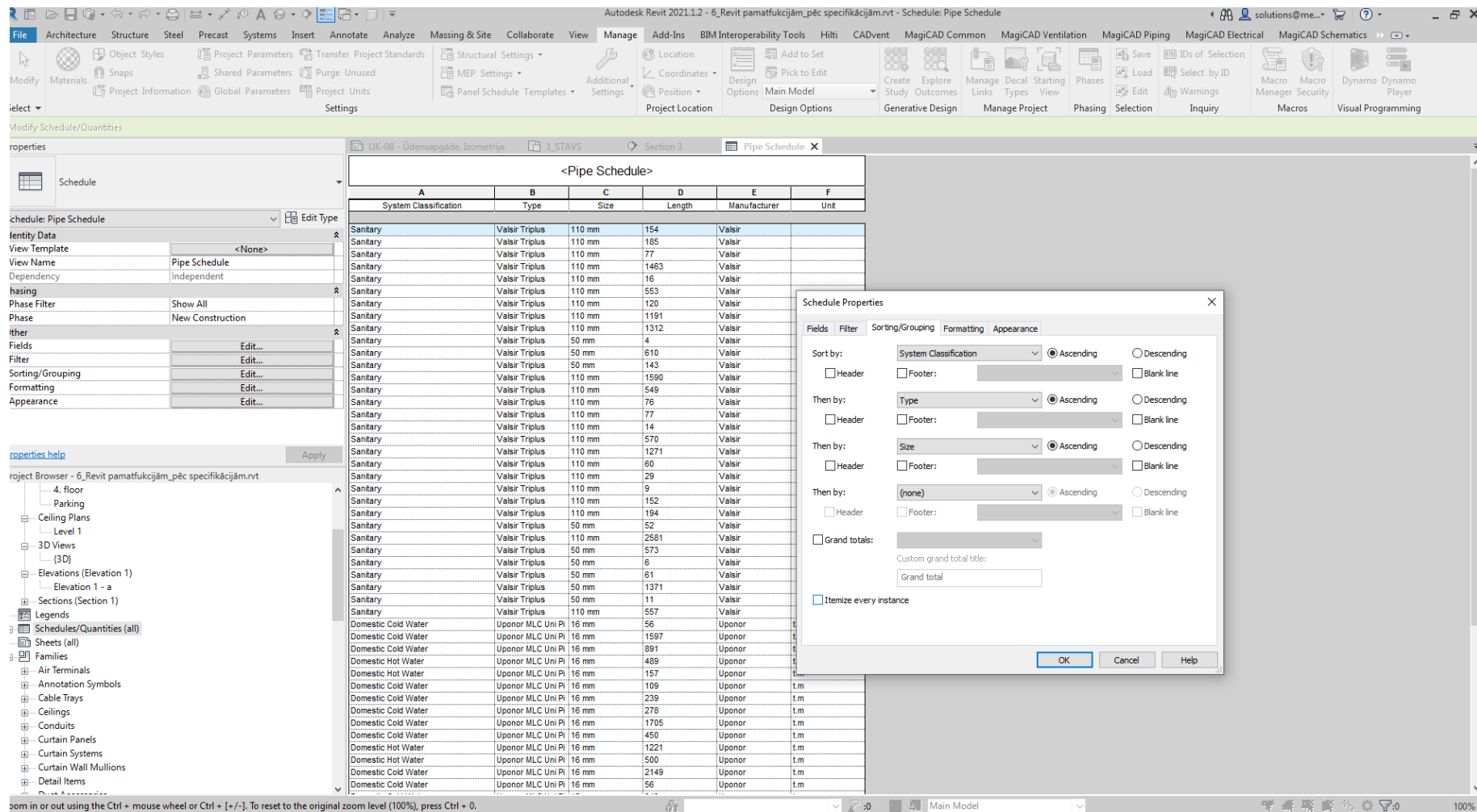
Apmācību modulis

“BIM modelēšana AVK un UK projektēšanā ar priekšzināšanām”

SPECIFIKĀCIJU IZVEIDE



SPECIFIKĀCIJU IZVEIDE (3)



Autodesk Revit 2021.1.2 - 6_Revit pamatfunkcijām_pēc specifikācijām.rvt - Schedule: Pipe Schedule

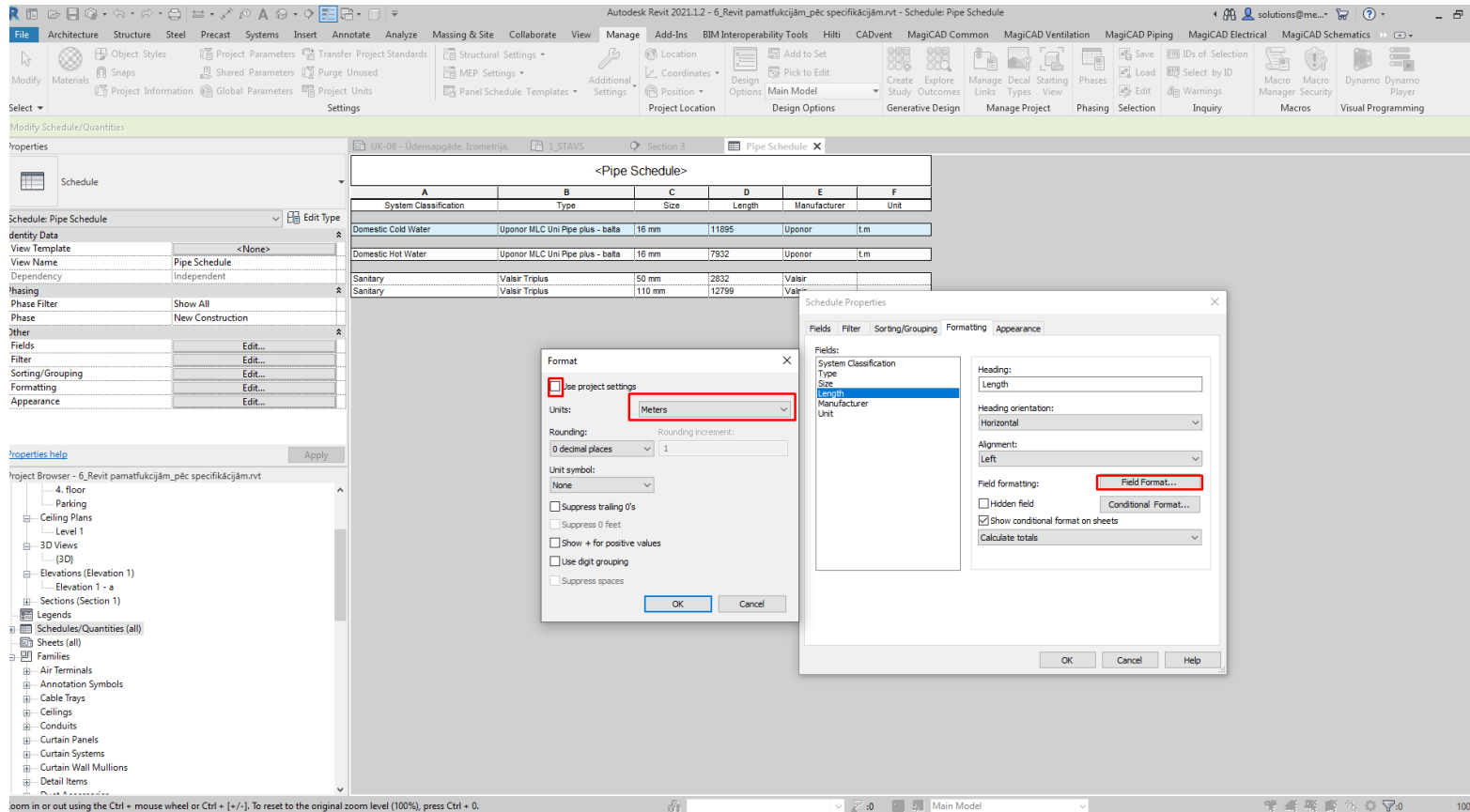
UK-08 - Ūdensapgāde, Izometrija | 1_STAVS | Section 3 | Pipe Schedule

A	B	C	D	E	F
System Classification	Type	Size	Length	Manufacturer	Unit
Sanitary	Valsir Triplus	110 mm	154	Valsir	
Sanitary	Valsir Triplus	110 mm	185	Valsir	
Sanitary	Valsir Triplus	110 mm	77	Valsir	
Sanitary	Valsir Triplus	110 mm	1463	Valsir	
Sanitary	Valsir Triplus	110 mm	16	Valsir	
Sanitary	Valsir Triplus	110 mm	553	Valsir	
Sanitary	Valsir Triplus	110 mm	120	Valsir	
Sanitary	Valsir Triplus	110 mm	1191	Valsir	
Sanitary	Valsir Triplus	110 mm	1312	Valsir	
Sanitary	Valsir Triplus	50 mm	4	Valsir	
Sanitary	Valsir Triplus	50 mm	610	Valsir	
Sanitary	Valsir Triplus	50 mm	143	Valsir	
Sanitary	Valsir Triplus	110 mm	1590	Valsir	
Sanitary	Valsir Triplus	110 mm	549	Valsir	
Sanitary	Valsir Triplus	110 mm	76	Valsir	
Sanitary	Valsir Triplus	110 mm	77	Valsir	
Sanitary	Valsir Triplus	110 mm	14	Valsir	
Sanitary	Valsir Triplus	110 mm	570	Valsir	
Sanitary	Valsir Triplus	110 mm	1271	Valsir	
Sanitary	Valsir Triplus	110 mm	60	Valsir	
Sanitary	Valsir Triplus	110 mm	29	Valsir	
Sanitary	Valsir Triplus	110 mm	9	Valsir	
Sanitary	Valsir Triplus	110 mm	152	Valsir	
Sanitary	Valsir Triplus	110 mm	194	Valsir	
Sanitary	Valsir Triplus	50 mm	52	Valsir	
Sanitary	Valsir Triplus	110 mm	2581	Valsir	
Sanitary	Valsir Triplus	50 mm	573	Valsir	
Sanitary	Valsir Triplus	50 mm	6	Valsir	
Sanitary	Valsir Triplus	50 mm	61	Valsir	
Sanitary	Valsir Triplus	50 mm	1371	Valsir	
Sanitary	Valsir Triplus	50 mm	11	Valsir	
Sanitary	Valsir Triplus	110 mm	557	Valsir	
Domestic Cold Water	Uponor MLC Uni Pi	16 mm	56	Uponor	t
Domestic Cold Water	Uponor MLC Uni Pi	16 mm	1597	Uponor	t
Domestic Cold Water	Uponor MLC Uni Pi	16 mm	891	Uponor	t
Domestic Hot Water	Uponor MLC Uni Pi	16 mm	489	Uponor	t
Domestic Hot Water	Uponor MLC Uni Pi	16 mm	157	Uponor	t
Domestic Cold Water	Uponor MLC Uni Pi	16 mm	109	Uponor	t,m
Domestic Cold Water	Uponor MLC Uni Pi	16 mm	239	Uponor	t,m
Domestic Cold Water	Uponor MLC Uni Pi	16 mm	278	Uponor	t,m
Domestic Cold Water	Uponor MLC Uni Pi	16 mm	1705	Uponor	t,m
Domestic Cold Water	Uponor MLC Uni Pi	16 mm	450	Uponor	t,m
Domestic Hot Water	Uponor MLC Uni Pi	16 mm	1221	Uponor	t,m
Domestic Hot Water	Uponor MLC Uni Pi	16 mm	500	Uponor	t,m
Domestic Cold Water	Uponor MLC Uni Pi	16 mm	2149	Uponor	t,m
Domestic Cold Water	Uponor MLC Uni Pi	16 mm	56	Uponor	t,m

Schedule Properties dialog:

- Sort by: System Classification (Ascending)
- Then by: Type (Ascending)
- Then by: Size (Ascending)
- Then by: (none) (Ascending)
- Itemize every instance:

SPECIFIKĀCIJU IZVEIDE (4)



The screenshot shows the Autodesk Revit 2021.1.2 interface with the 'Pipe Schedule' window open. The window displays a table with columns A through F, representing different pipe types and their properties. Two dialog boxes are overlaid on the schedule: 'Format' and 'Schedule Properties'.

A	B	C	D	E	F
System Classification	Type	Size	Length	Manufacturer	Unit
Domestic Cold Water	Uponor MLC Uni Pipe plus - balta	16 mm	11895	Uponor	l.m
Domestic Hot Water	Uponor MLC Uni Pipe plus - balta	16 mm	7932	Uponor	l.m
Sanitary	Valair Triplus	50 mm	2832	Valair	
Sanitary	Valair Triplus	110 mm	12769	Valair	

Format Dialog:
- Use project settings:
- Units: Meters
- Rounding: 0 decimal places, Rounding increment: 1
- Unit symbol: None
- Suppress trailing 0's:
- Suppress 0 feet:
- Show + for positive values:
- Use digit grouping:
- Suppress spaces:

Schedule Properties Dialog:
- Fields: System Classification, Type, Size, Length, Manufacturer, Unit
- Heading: Length
- Heading orientation: Horizontal
- Alignment: Left
- Field formatting: Field Format...
- Show conditional format on sheets:
- Calculate totals:

SPECIFIKĀCIJU NOFORMĒŠANA

4.8. Materiālu apjomu saraksts

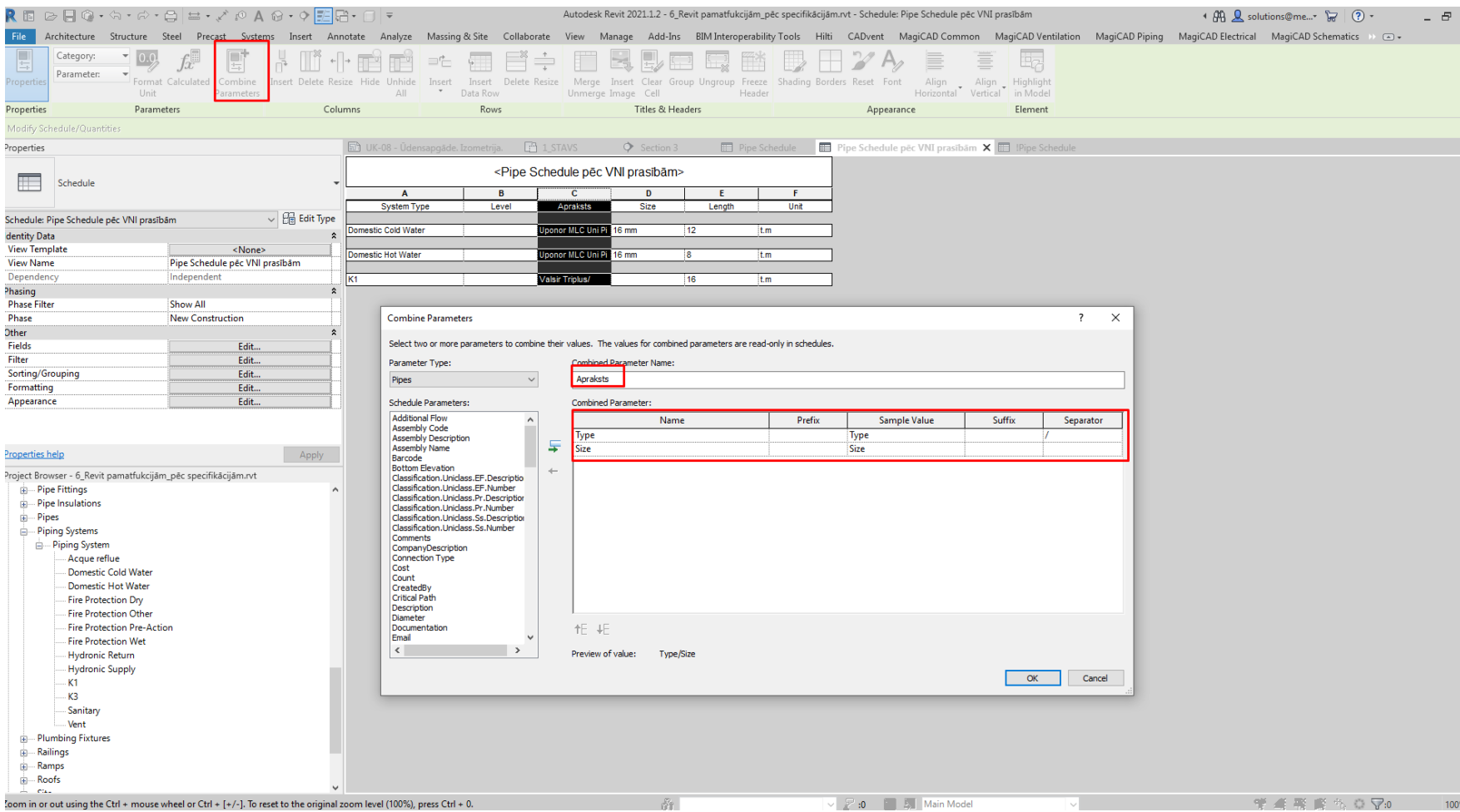
Projektēšanas laikā, kontroles punktos Detalizētais BIM un Apstiprinātais BIM nepieciešams iesniegt esošo BIM modeļu materiālu apjomu specifikācijas. Materiālu specifikācijā jānorāda visi 3D BIM modelī uzrādītie elementi un to daudzums.

Materiālu apjomu specifikācijas veidot pēc šāda parauga:

Nr.	Projekta daļa/ sistēma	Stāvs	Zona*	Klasifikācija	Apraksts	Mērvienība	Daudzums

*Ja attiecināms

PARAMETRU APVIENOŠANA



Autodesk Revit 2021.1.2 - 6_Revit pamatfunkcijām_pēc specifikācijām.rvt - Schedule: Pipe Schedule pēc VNI prasībām

File Architecture Structure Steel Precast Systems Insert Annotate Analyze Massing & Site Collaborate View Manage Add-Ins BIM Interoperability Tools Hilti CADvent MagiCAD Common MagiCAD Ventilation MagiCAD Piping MagiCAD Electrical MagiCAD Schematics

Properties Parameters Columns Rows Titles & Headers Appearance Element

Modify Schedule/Quantities

Properties

Schedule

Schedule: Pipe Schedule pēc VNI prasībām Edit Type

Identity Data

View Template <None>

View Name Pipe Schedule pēc VNI prasībām

Dependency Independent

Phasing

Phase Filter Show All

Phase New Construction

Other

Fields Edit...

Filter Edit...

Sorting/Grouping Edit...

Formatting Edit...

Appearance Edit...

Properties help Apply

Project Browser - 6_Revit pamatfunkcijām_pēc specifikācijām.rvt

- Pipe Fittings
- Pipe Insulations
- Pipes
- Piping Systems
 - Piping System
 - Acque reflux
 - Domestic Cold Water
 - Domestic Hot Water
 - Fire Protection Dry
 - Fire Protection Other
 - Fire Protection Pre-Action
 - Fire Protection Wet
 - Hydronic Return
 - Hydronic Supply
 - K1
 - K3
 - Sanitary
 - Vent
 - Plumbing Fixtures
 - Railings
 - Ramps
 - Roofs

<Pipe Schedule pēc VNI prasībām>

A	B	C	D	E	F
System Type	Level	Apraksts	Size	Length	Unit
Domestic Cold Water		Uponor MLC Uni Pi	16 mm	12	t.m
Domestic Hot Water		Uponor MLC Uni Pi	16 mm	8	t.m
K1		Valst Triplus/		16	t.m

Combine Parameters

Select two or more parameters to combine their values. The values for combined parameters are read-only in schedules.

Parameter Type: Pipes

Combined Parameter Name: Apraksts

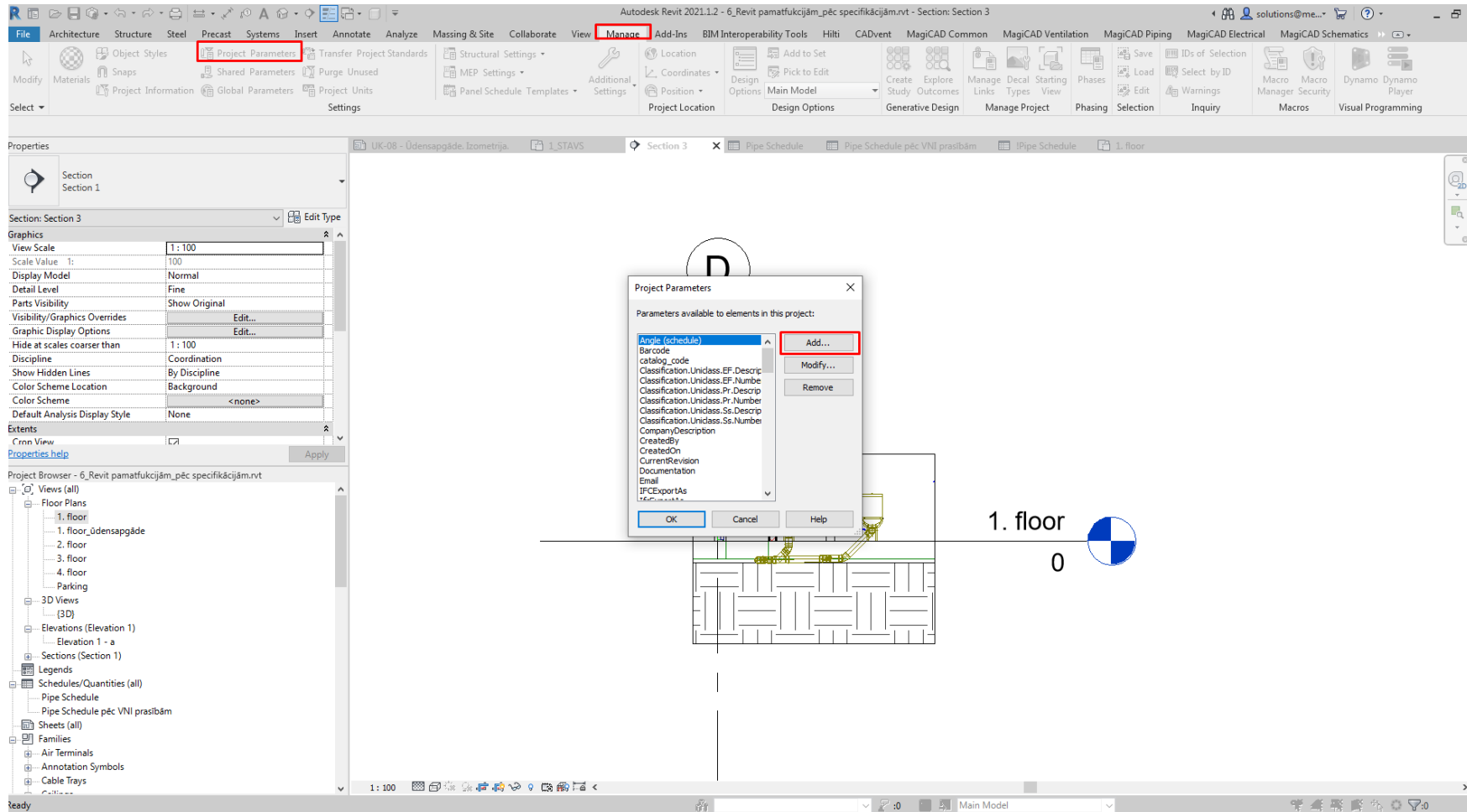
Schedule Parameters:

Name	Prefix	Sample Value	Suffix	Separator
Type		Type		/
Size		Size		

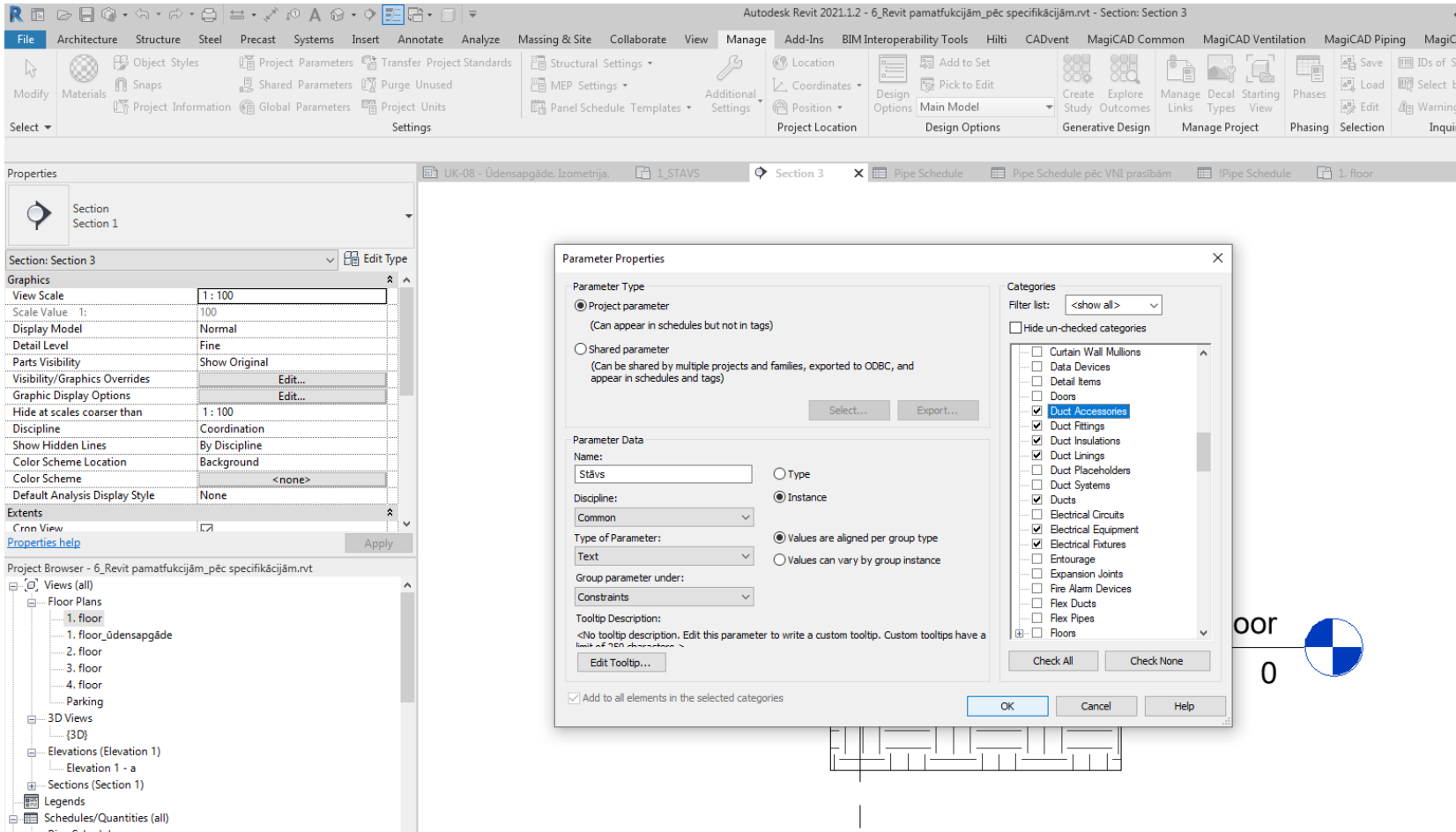
Preview of value: Type/Size

OK Cancel

JAUNU PARAMETRU PIEVIENOŠANA



JAUNU PARAMETRU PIEVIENOŠANA



The screenshot displays the Autodesk Revit 2021.1.2 interface. The main window shows a section view of a building. The 'Properties' panel on the left is set to 'Section: Section 1'. The 'Parameter Properties' dialog box is open, showing the 'Parameter Type' section with 'Project parameter' selected. The 'Parameter Data' section shows the name 'Stāvs' and the discipline 'Common'. The 'Categories' list on the right includes 'Duct Accessories', 'Duct Fittings', 'Duct Insulations', 'Duct Linings', 'Duct Placeholders', 'Duct Systems', 'Ducts', 'Electrical Circuits', 'Electrical Equipment', 'Electrical Fixtures', 'Entourage', 'Expansion Joints', 'Fire Alarm Devices', 'Flex Ducts', 'Flex Pipes', and 'Floors'. The 'Check All' button is highlighted. The 'OK' button is also visible.

SPECIFIKĀCIJAS NOFORMĒJUMS

UK-08 - Ūdensapgāde. Izometrija. 1_STAVS Section 3 Pipe Schedule Pipe Schedule pēc VNI prasībām !Pipe Schedule

<Pipe Schedule pēc VNI prasībām>

A	B	C	D	E
System Type	Stāvs	Apraksts	Length	Unit
Domestic Cold Water	1. stāvs	Uponor MLC Uni Pipe plus - balta/16 mm	11.45	t.m
Domestic Cold Water	Pagrabs	Uponor MLC Uni Pipe plus - balta/16 mm	0.45	t.m
Domestic Hot Water	1. stāvs	Uponor MLC Uni Pipe plus - balta/16 mm	7.43	t.m
Domestic Hot Water	Pagrabs	Uponor MLC Uni Pipe plus - balta/16 mm	0.50	t.m
K1	1. stāvs	Valsir Triplus/50 mm	0.06	t.m
K1	1. stāvs	Valsir Triplus/110 mm	2.83	t.m
K1	Pagrabs	Valsir Triplus/50 mm	2.77	t.m
K1	Pagrabs	Valsir Triplus/110 mm	9.97	t.m

Apply

PRAKTISKĀ DARBA UZDEVUMS

Atvērt revit failu mapē 6. uzdevumam

Pievienot jaunu parametru «Stāvs» nepieciešamajām kategorijām

Piešķirt korektā stāva nosaukumu elementiem

Izveidot specifikāciju kādam no elementu veidiem pēc izvēles, atbilstoši VNI noformējuma un informācijas prasībām

Izveidot telpu eksplikāciju, kas sadalīta pa stāviem pielietojot schedule rīku

PROJEKTA NOFORMĒŠANA

Apmācību modulis
“BIM modelēšana AVK un UK projektēšanā ar priekšzināšanām”

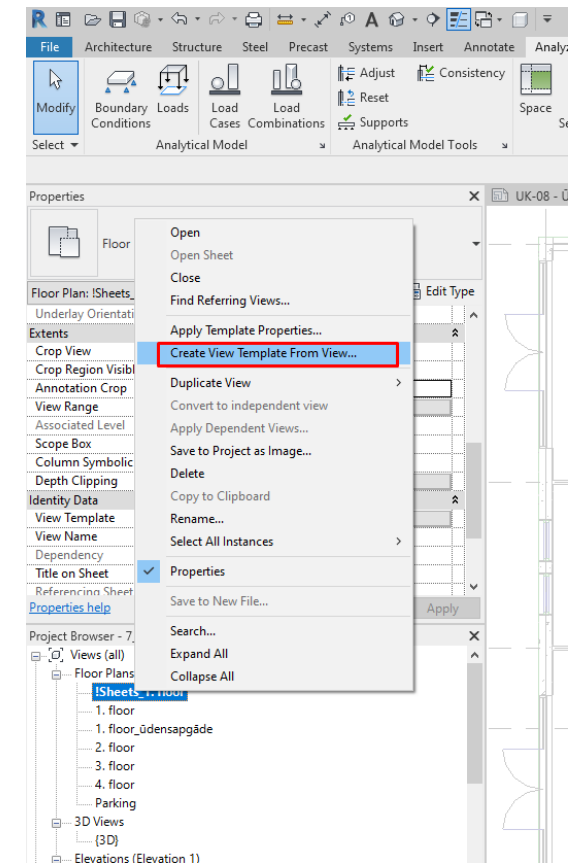
LAPU NOFORMĒJUMS

Izveidojam jaunu plānu skatu, kuru noformēt un likt uz lapām

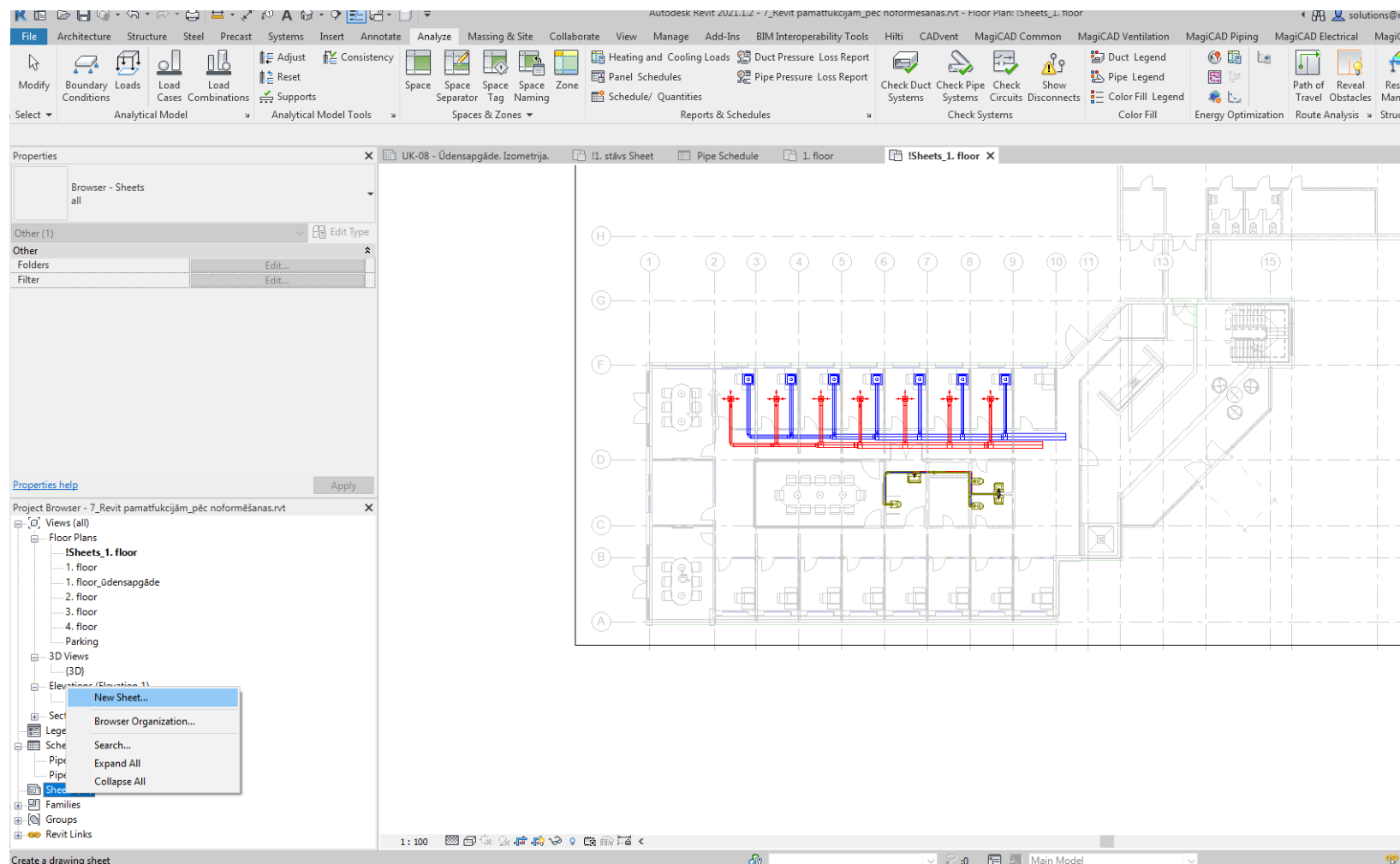
Noformējam kā vēlamies, lai izskatās (noņemam griezumus, sakārtojam krāsas, skatu stilu, utt.)

Uzliekam Crop view, lai samazinātu izmēru

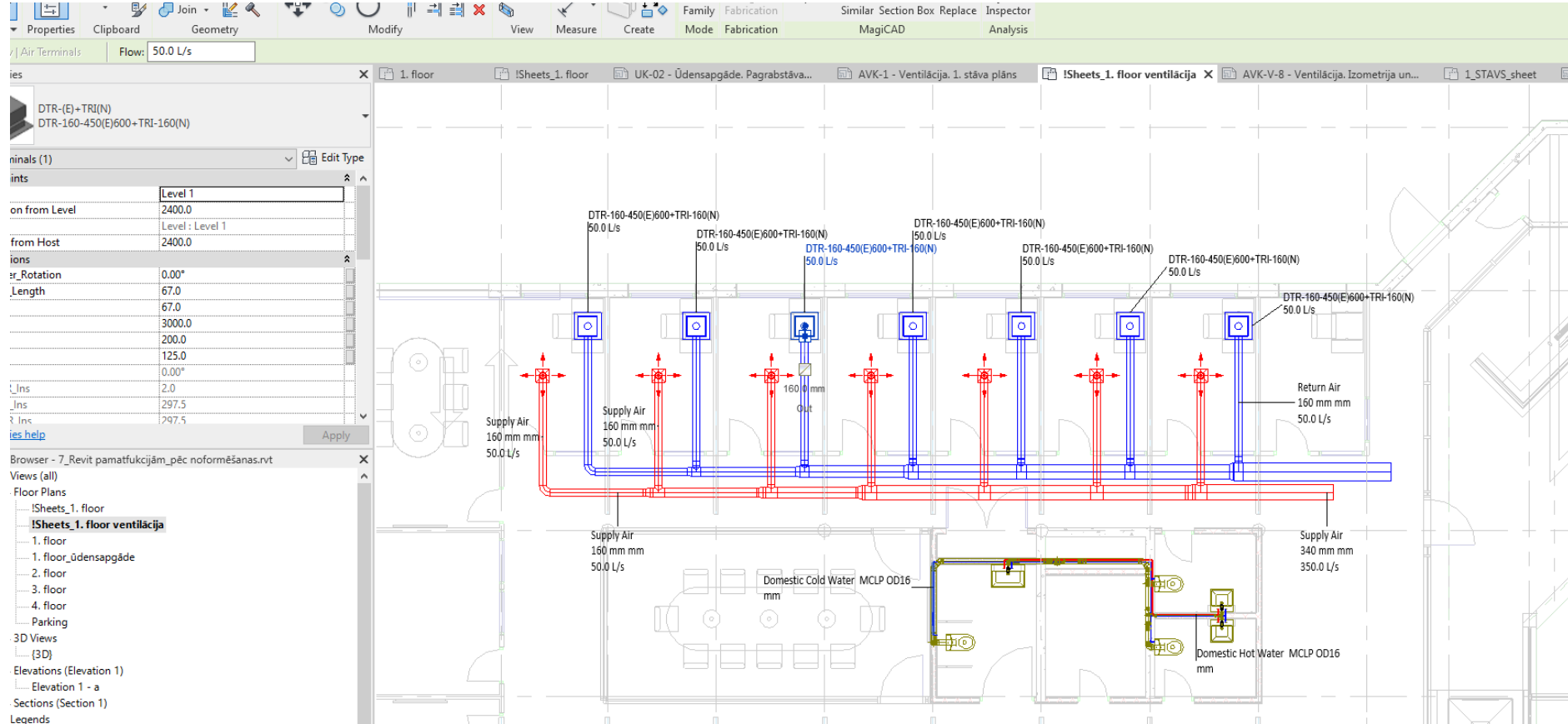
Saglabājam gala skatu kā view template



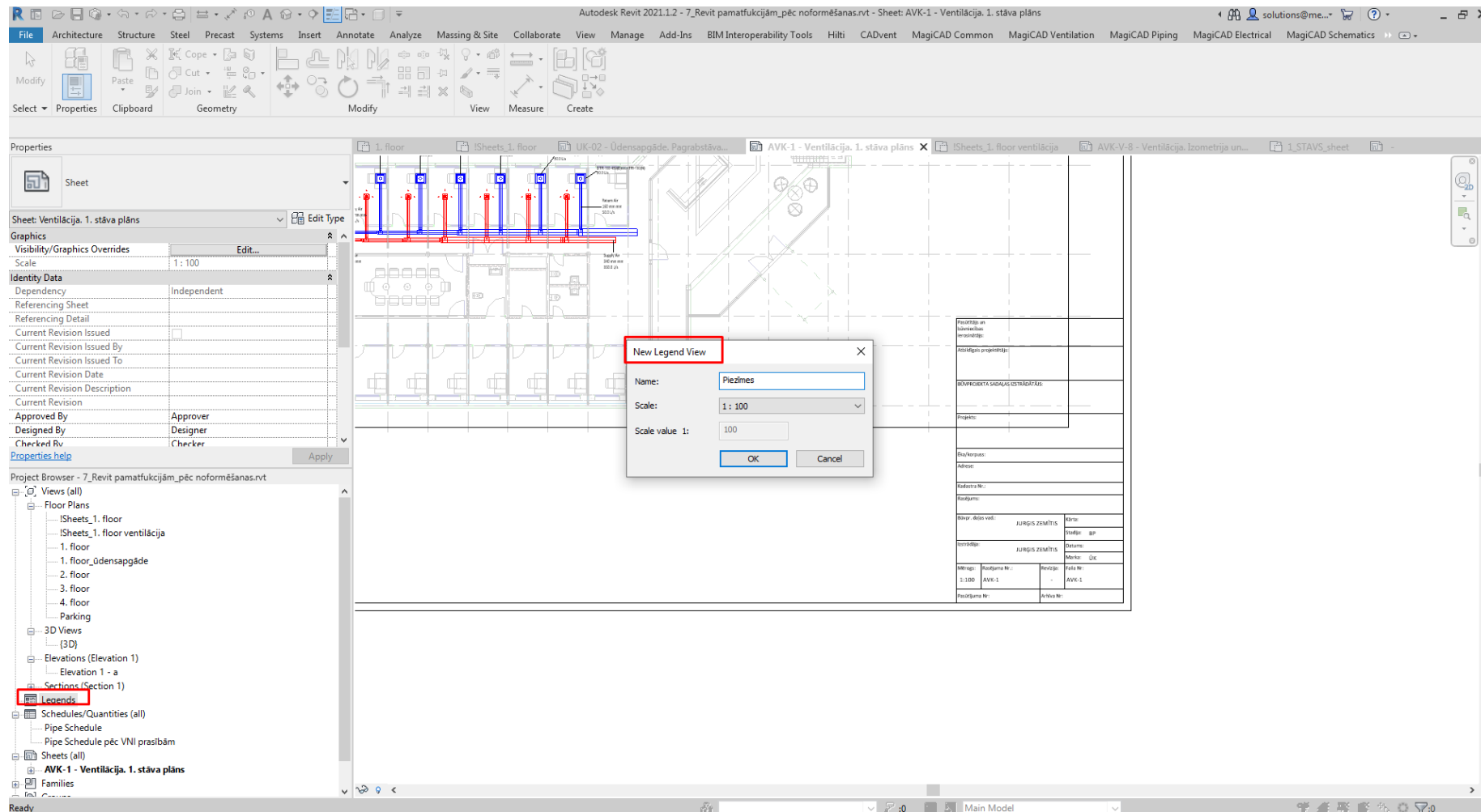
IZVEIDOJAM JAUNU LAPU



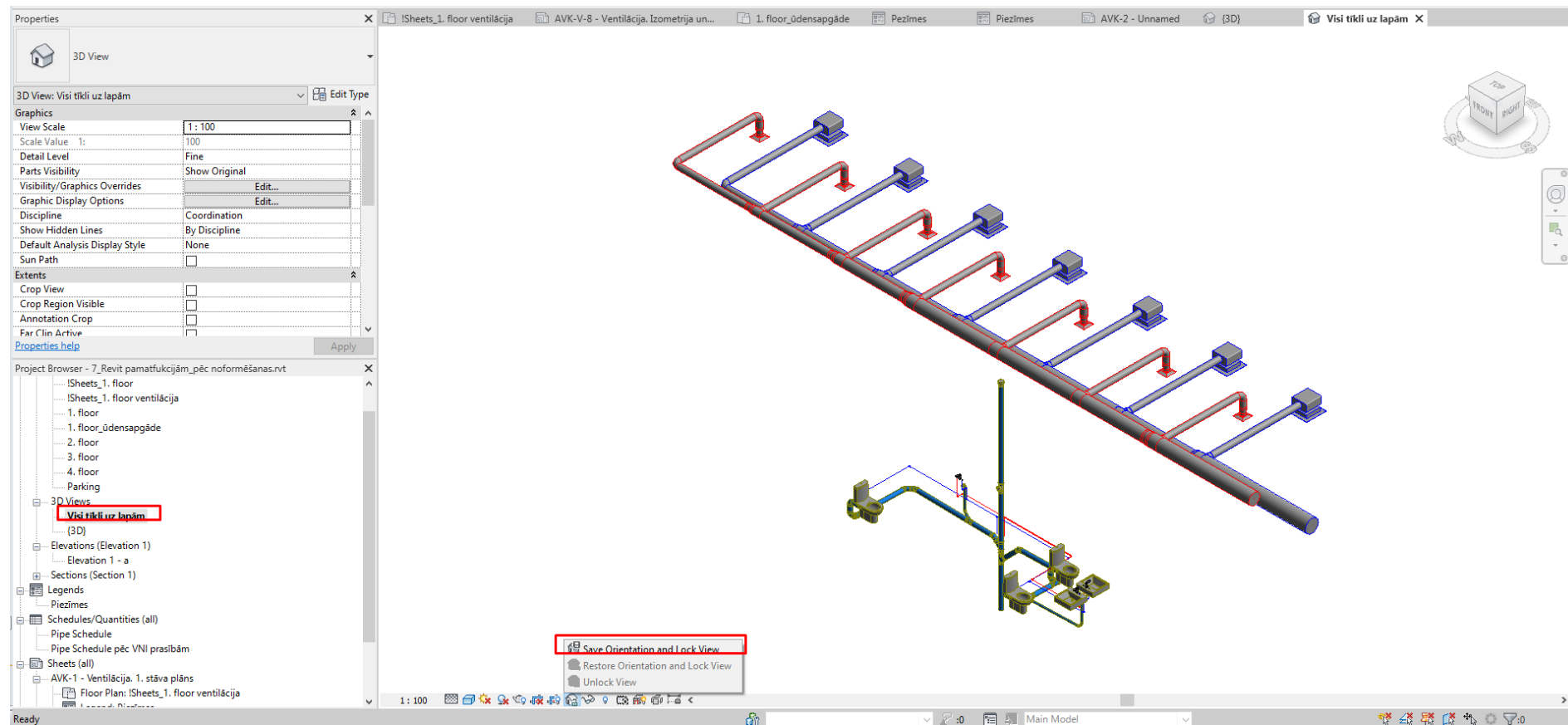
IELĀDĒJAM NEPIECIEŠAMOS APZĪMĒJUMA TIPUS



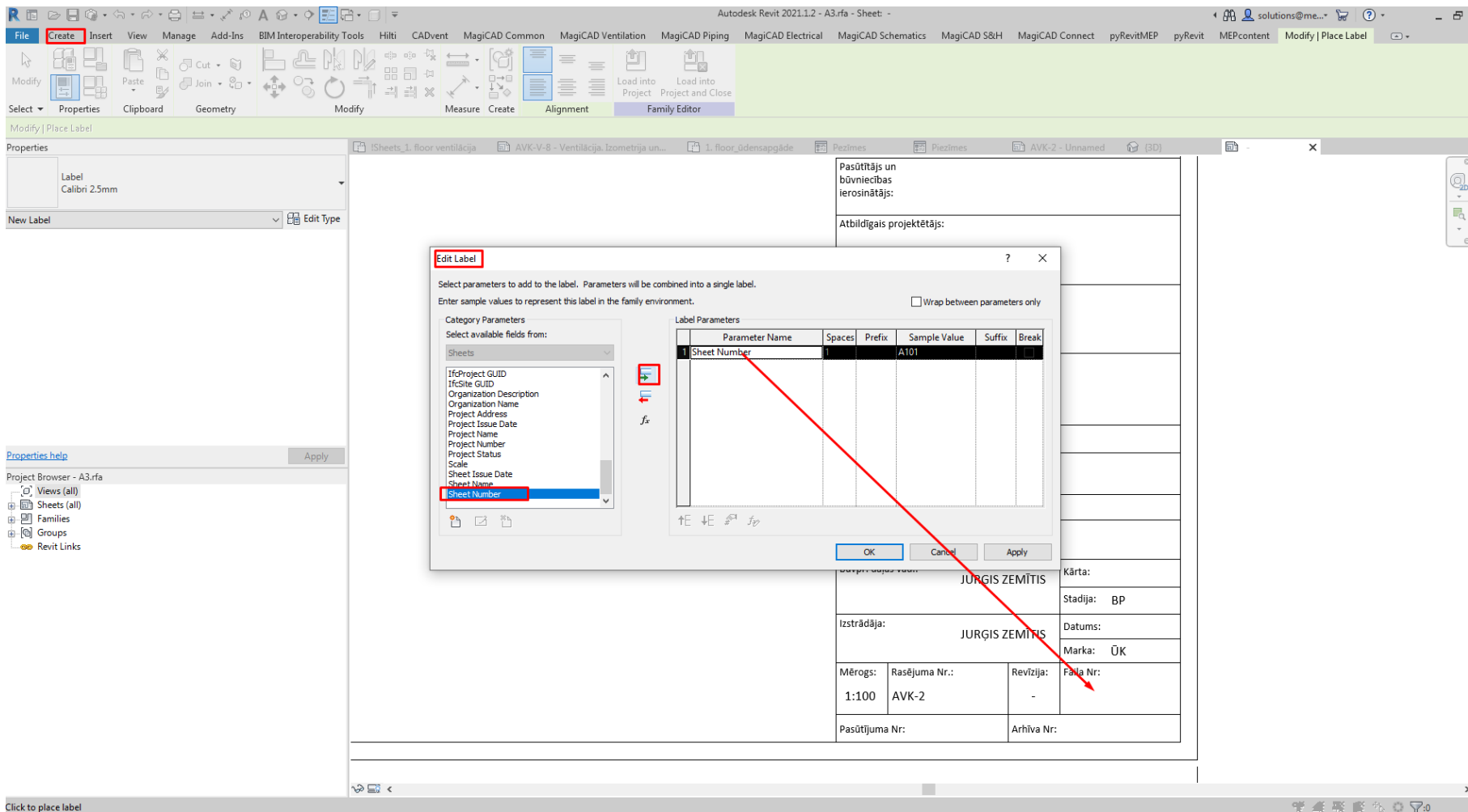
PIEZĪMJU PIERAKSTĪŠANA



3D SKATA IZVIETOŠANA UZ PLĀNIEM



RAKSTLAUKUMA LAUKU AUTOMATIZĀCIJA



Autodesk Revit 2021.1.2 - A3.rfa - Sheet -

File Create Insert View Manage Add-Ins BIM Interoperability Tools Hiti CADvent MagiCAD Common MagiCAD Ventilation MagiCAD Piping MagiCAD Electrical MagiCAD Schematics MagiCAD S&H MagiCAD Connect pyRevitMEP pyRevit MEPcontent Modify | Place Label

Modify | Place Label

Properties

Label
Calibri 2.5mm

New Label Edit Type

Properties help Apply

Project Browser - A3.rfa

- Views (all)
- Sheets (all)
- Families
- Groups
- Revit Links

ISheets, 1. floor ventilācija AVK-V-8 - Ventilācija, Izometrija un... I. floor, ūdensapgāde Pezīmes Pezīmes AVK-2 - Unnamed (3D)

Pasūtītājs un būvniecības ierosinātājs:

Atbildīgais projektētājs:

Edit Label

Select parameters to add to the label. Parameters will be combined into a single label.
Enter sample values to represent this label in the family environment. Wrap between parameters only

Category Parameters
Select available fields from:
Sheets

- IfcProject GUID
- IfcSite GUID
- Organization Description
- Organization Name
- Project Address
- Project Issue Date
- Project Name
- Project Number
- Project Status
- Scale
- Sheet Issue Date
- Sheet Name
- Sheet Number**

Label Parameters

Parameter Name	Spaces	Prefix	Sample Value	Suffix	Break
Sheet Number	1		A101		

OK Cancel Apply

Kārta: JURĢIS ZEMĪTIS

Stadija: BP

Izstrādāja: JURĢIS ZEMĪTIS

Datums:

Marka: ŪK

Mērogs: 1:100	Rasējuma Nr.: AVK-2	Revīzija: -	Paša Nr.:
Pasūtījuma Nr.:	Arhīva Nr.:		

Click to place label

PRAKTISKĀ DARBA UZDEVUMS

Atvērt revit failu mapē 7. uzdevumam

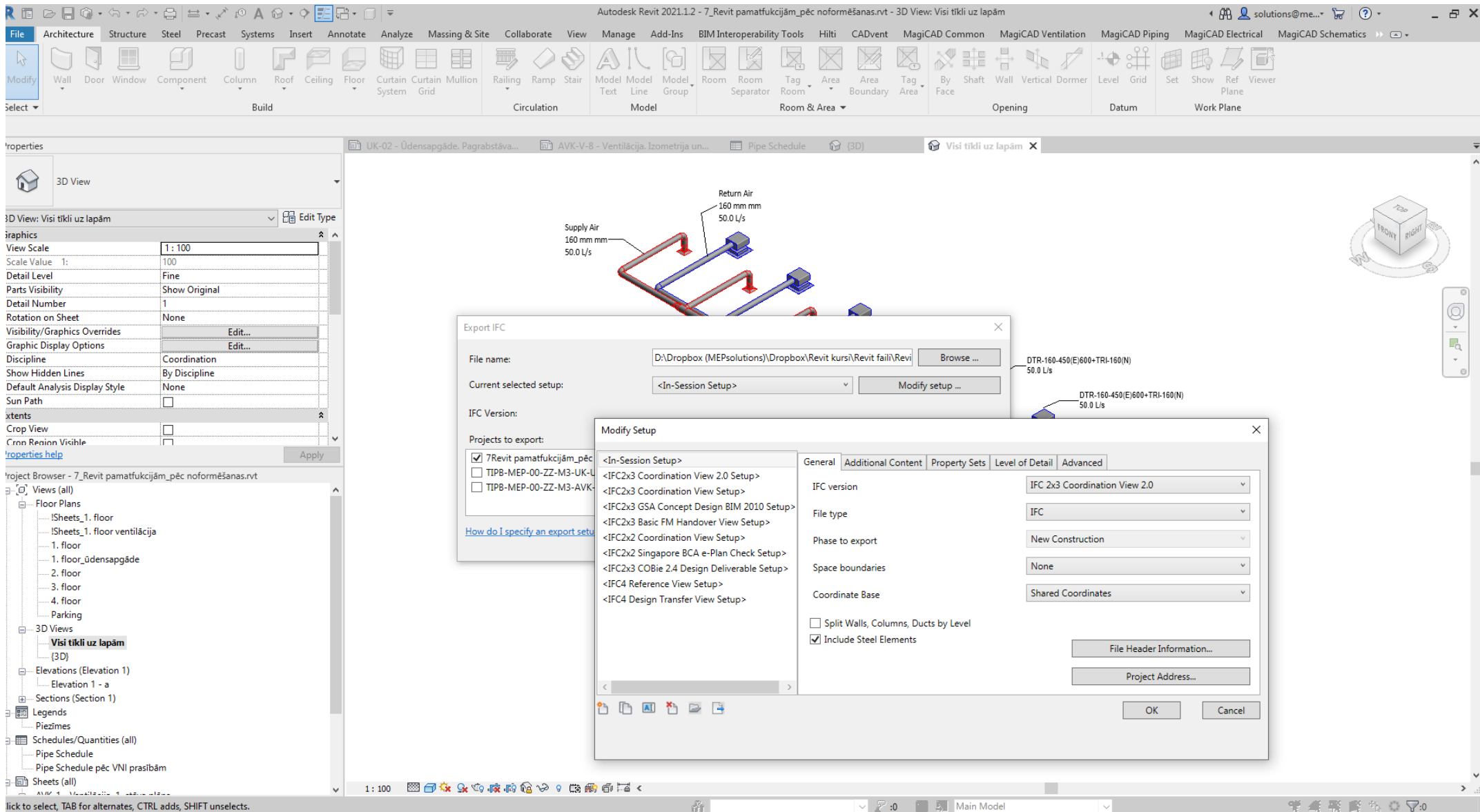
Pēc izvēles vienai no sistēmām sagatavot plāna skatu, izslēdzot pārējos tīklus

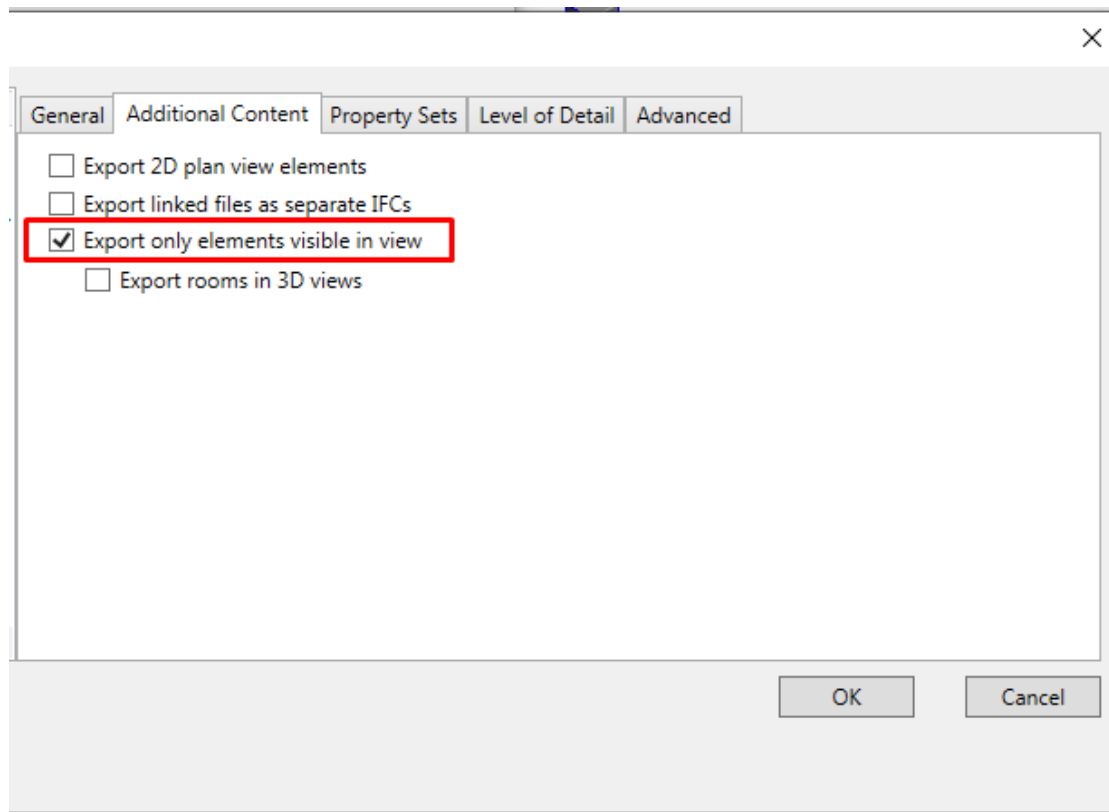
Pievienot apzīmējumus detaļām

Izvedot lapu, uz kuras uzlikt sagatavoto plānu

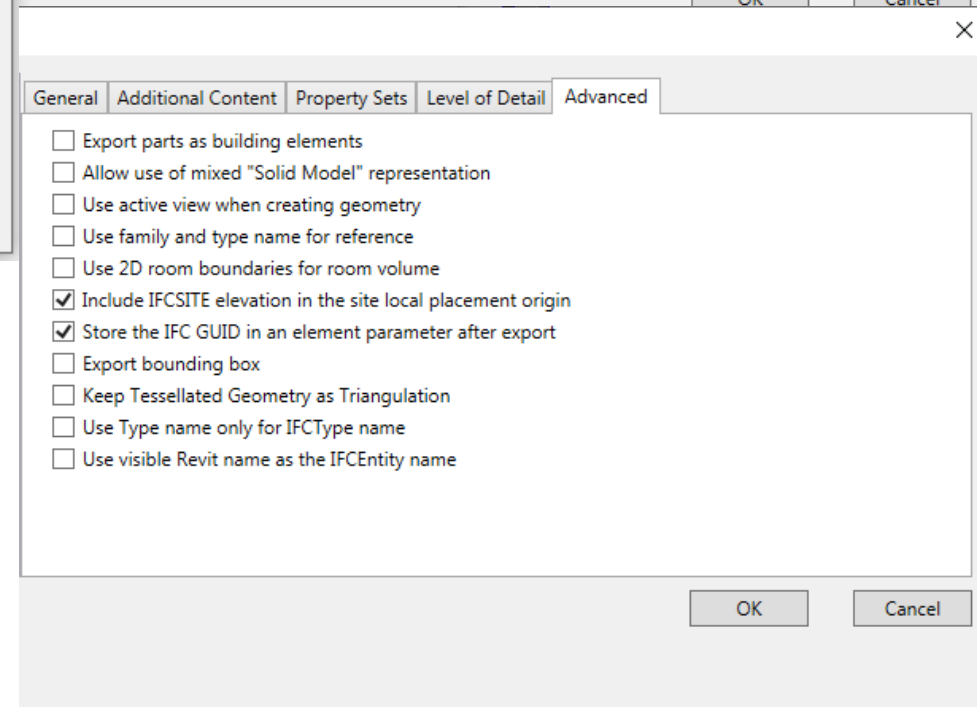
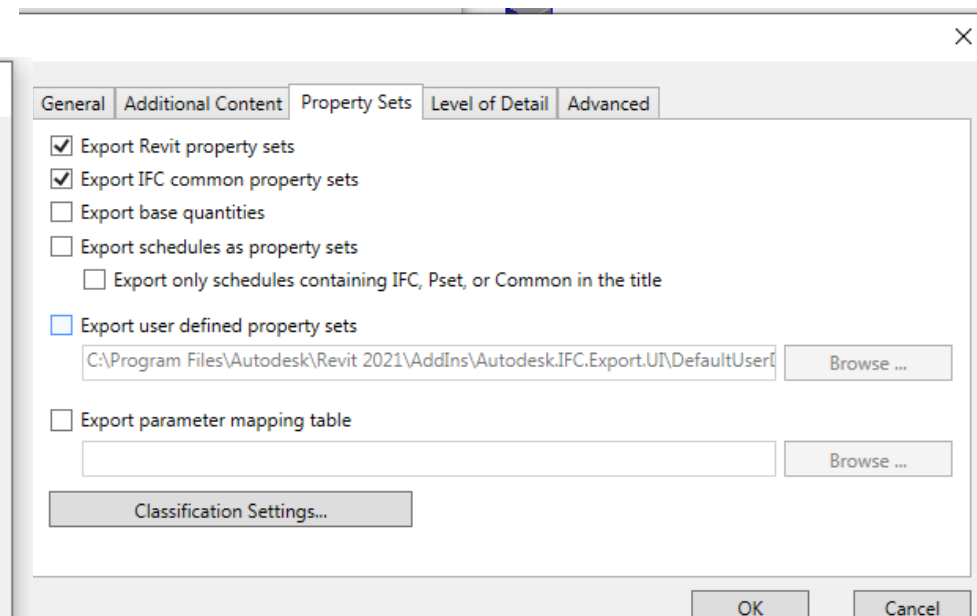
IFC MODEĻU EKSPORTĒŠANA

Apmācību modulis
“BIM modelēšana AVK un UK projektēšanā ar
priekšzināšanām”





AR modeļa eksportam nevajag šo
ieslēgt, lai būtu asis IFC modelī

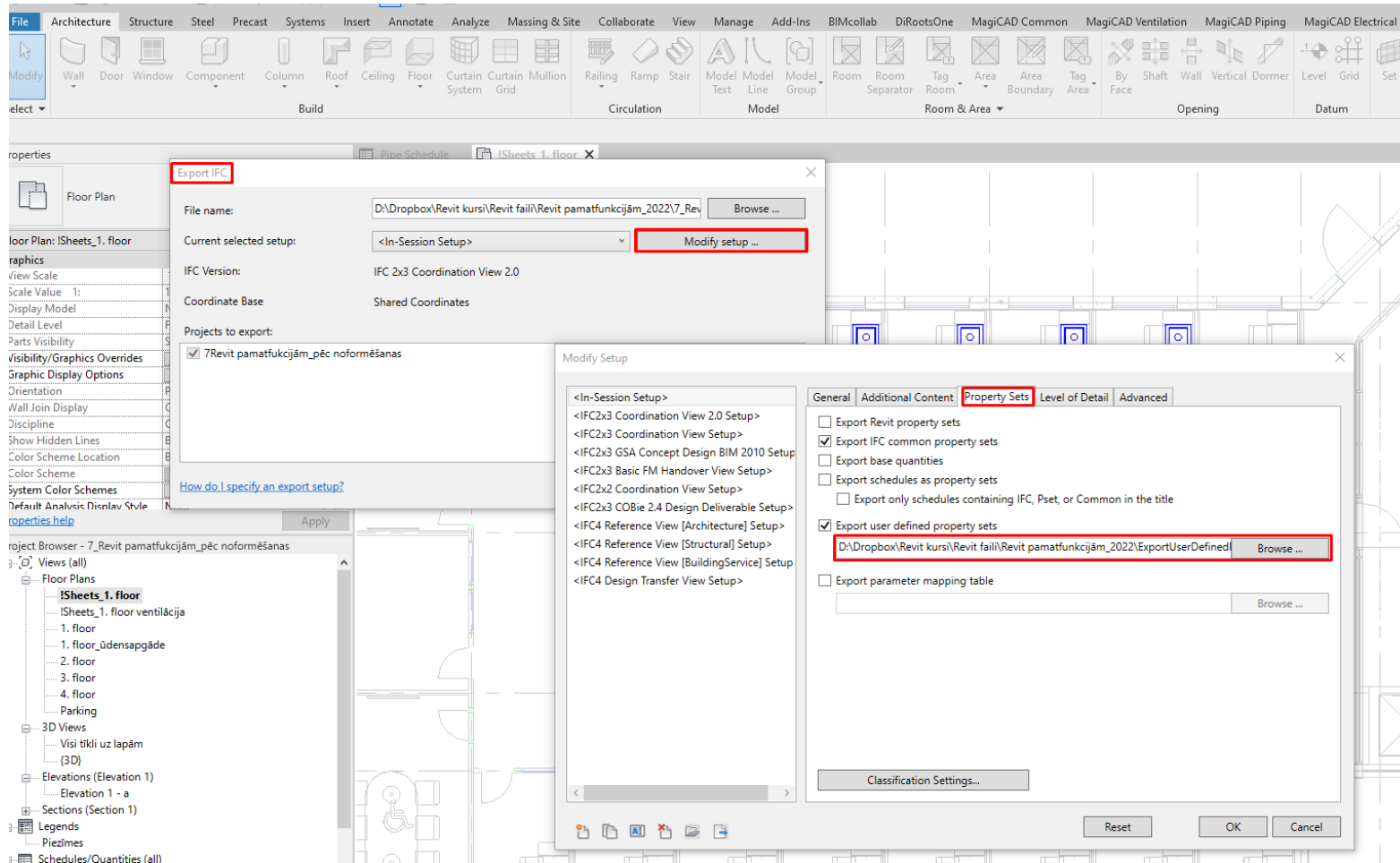


KĀ IZVEIDOT SAVU DATU KOPU?

Informācija jāpievieno katram būves elementam vienotā atribūtu kopā ar nosaukumu **RPC**

Tīkli (caurules, gaisa vadi, u.c.)							
Atribūts	Piemērs	Projekta posms					Apraksts
		DB	BE	BP	BD	NE	
01_Nosaukums	Apkures caurule (tupgaita)	M					Vispārīgs nosaukums
02_Materiāls	PPR	M					Elementa materiāls
03_Tips	PN20	M					Elementa tips
04_Šķērsriezums	25 mm	M					Elementa šķērsriezums
07_Biezums	2.3 mm	M					Elementa sienīgas biezums
46_Sistēma	AVK-A	M					Inženiertīklu sistēma
47_Izolācija	Nē	M					Elementa izolācija
70_Klasifikācijas kods	BE_19_01_01_00_Apkures sistēmas	M					
Aprīkojums (armatūra, sūkņi, iekārtas, u.c.)							
Atribūts	Piemērs	Projekta posms					Apraksts
		DB	BE	BP	BD	NE	
01_Nosaukums	Ūdens sūknis	M					Vispārīgs nosaukums
46_Sistēma	UK	M					Inženiertīklu sistēma
48_Tehniskie raksturlielumi	1500w, Q=100-350 l/min, D50/32	M					Elementa tehniskie raksturlielumi
49_BMS_protokols	ModBus						Ja pieejams, tad norādīt protokola veidu
53_Ražotājs	Pedrollo				M		Elementa ražotājs
54_Produkta ID	FM 32/160C				M		Elementa modeļa Nr./produkts
67_Tehniskā specifikācija	hipersaite					M	Elementa ražotāja tehniskā specifikācija
70_Klasifikācijas kods	BE_19_07_01_00_Aukstā ūdens apgādes	M					

NEPIECIEŠAMS DEFINĒT *PROPERTY SET*

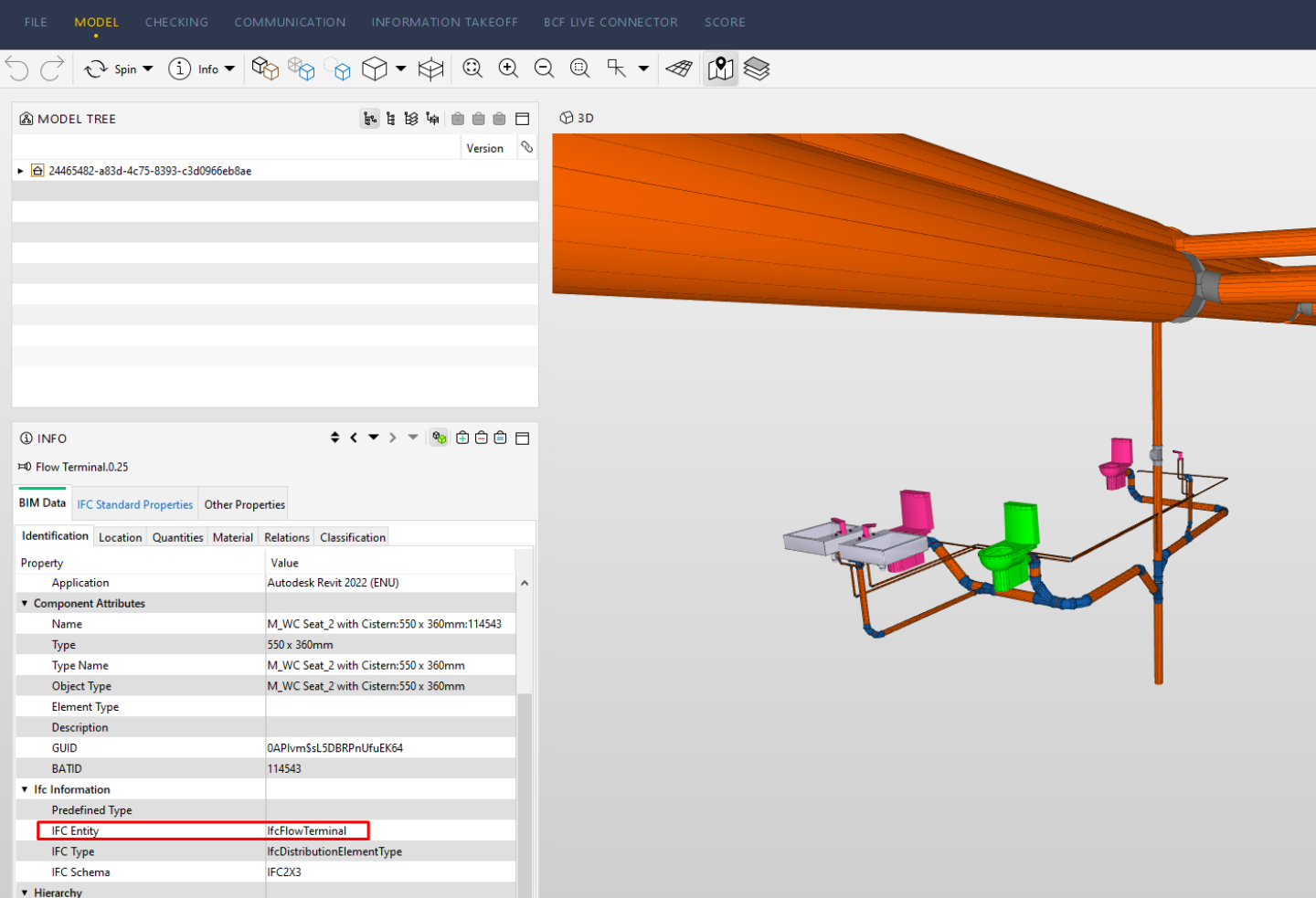


```

#
# User Defined PropertySet Definition File
#
# Format:
#   PropertySet:      <Pset Name>      I[nstance]/T[type]      <element list separated by ','>
#     <Property Name 1>      <Data type>      <[opt] Revit parameter name, if different from IFC>
#     <Property Name 2>      <Data type>      <[opt] Revit parameter name, if different from IFC>
#     ...
#
# Data types supported: Area, Boolean, ClassificationReference, ColorTemperature, Count, Currency,
#   ElectricalCurrent, ElectricalEfficacy, ElectricalVoltage, Force, Frequency, Identifier,
#   Illuminance, Integer, Label, Length, Logical, LuminousFlux, LuminousIntensity,
#   NormalisedRatio, PlaneAngle, PositiveLength, PositivePlaneAngle, PositiveRatio, Power,
#   Pressure, Ratio, Real, Text, ThermalTransmittance, ThermodynamicTemperature, Volume,
#   VolumetricFlowRate
#
# Example property set definition for COBie:
#
PropertySet:      RPC      T      IfcElementType
    01_Nosaukums      Text      Type Name
    02_Materiāls      Text      Material
    03_Tips      Text      Type Name
    04_Šķērsriezums      Text      Size

```

LAI ATDALĪTU SPECIFISKI PA IFC TIPIEM



The screenshot displays the Revit software interface. The top menu bar includes FILE, MODEL, CHECKING, COMMUNICATION, INFORMATION TAKEOFF, BCF LIVE CONNECTOR, and SCORE. Below the menu is a toolbar with various icons for navigation and editing. The left side features a MODEL TREE and an INFO panel. The main area shows a 3D model of a plumbing system with orange pipes and pink, green, and blue fixtures.

MODEL TREE

- 24465482-a83d-4c75-8393-c3d0966eb8ae

INFO

⇒ Flow Terminal.0.25

BIM Data | IFC Standard Properties | Other Properties

Property	Value
Application	Autodesk Revit 2022 (ENU)
▼ Component Attributes	
Name	M_WC Seat_2 with Cistern:550 x 360mm:114543
Type	550 x 360mm
Type Name	M_WC Seat_2 with Cistern:550 x 360mm
Object Type	M_WC Seat_2 with Cistern:550 x 360mm
Element Type	
Description	
GUID	0AP1vmSsL5DBRPnUfuEK64
BATID	114543
▼ IFC Information	
Predefined Type	
IFC Entity	IfcFlowTerminal
IFC Type	IfcDistributionElementType
IFC Schema	IFC2X3
▼ Hierarchy	

MODEL TREE

24465482-a83d-4c75-8393-c3d0966eb8ae

3D

INFO

Pipe.0.48

BIM Data | IFC Standard Properties | Other Properties

Identification | Location | Quantities | Profile | Relations | Classification

Property	Value
Application	Autodesk Revit 2022 (ENU)
▼ Component Attributes	
Name	Pipe Types:Valsir Triplus:114654
Type	Valsir Triplus
Type Name	Pipe Types:Valsir Triplus
Object Type	Pipe Types:Valsir Triplus
Element Type	
Description	
GUID	0APlvM\$S\$L5DBRPnUfuEK4r
BATID	114654
▼ Ifc Information	
Predefined Type	NOTDEFINED
IFC Entity	IfcFlowSegment
IFC Type	IfcPipeSegmentType
IFC Schema	IFC2X3
▼ Hierarchy	

```
#
# User Defined PropertySet Definition File
#
# Format:
#   PropertySet:      <Pset Name>      I[nstance]/T[type]      <element list separated by ', '>
#   <Property Name 1>  <Data type>      <[opt] Revit parameter name, if different from IFC>
#   <Property Name 2>  <Data type>      <[opt] Revit parameter name, if different from IFC>
#   ...
#
# Data types supported: Area, Boolean, ClassificationReference, ColorTemperature, Count, Currency,
#   ElectricalCurrent, ElectricalEfficacy, ElectricalVoltage, Force, Frequency, Identifier,
#   Illuminance, Integer, Label, Length, Logical, LuminousFlux, LuminousIntensity,
#   NormalisedRatio, PlaneAngle, PositiveLength, PositivePlaneAngle, PositiveRatio, Power,
#   Pressure, Ratio, Real, Text, ThermalTransmittance, ThermodynamicTemperature, Volume,
#   VolumetricFlowRate
#
# Example property set definition for COBie:
#
PropertySet:  RPC          T          IfcFlowTerminal
              01_Nosaukums Text       Family Name
              02_Materiāls Text       Material
              03_Tips      Text       Type Name
              46_Sistēma   Text       46_Sistēma
#
PropertySet:  RPC          T          IfcFlowSegment
              01_Nosaukums Text       Type Name
              02_Materiāls Text       Material
              03_Tips      Text       Type Name
              04_Šķērsgriezums Text       Size
#
```


PRAKTISKĀ DARBA UZDEVUMS:

Atvērt revit failu mapē 7. uzdevumam

Izveidot IFC, kurā būtu Datu kopa ar nosaukumu «Kursi»

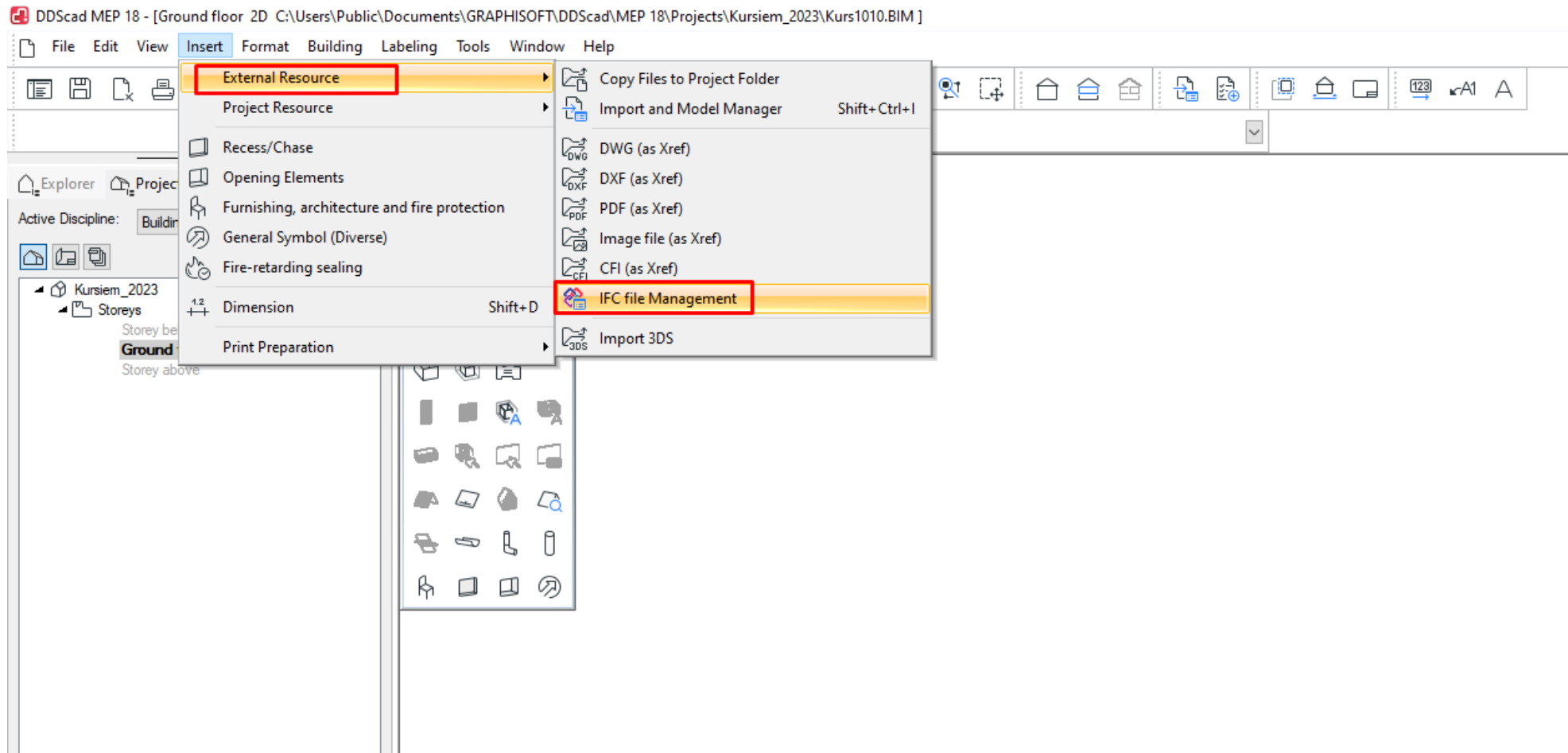
Šajā datu kopā jābūt redzamai informācijai pie **cauruļvadu veidgabaliem:**

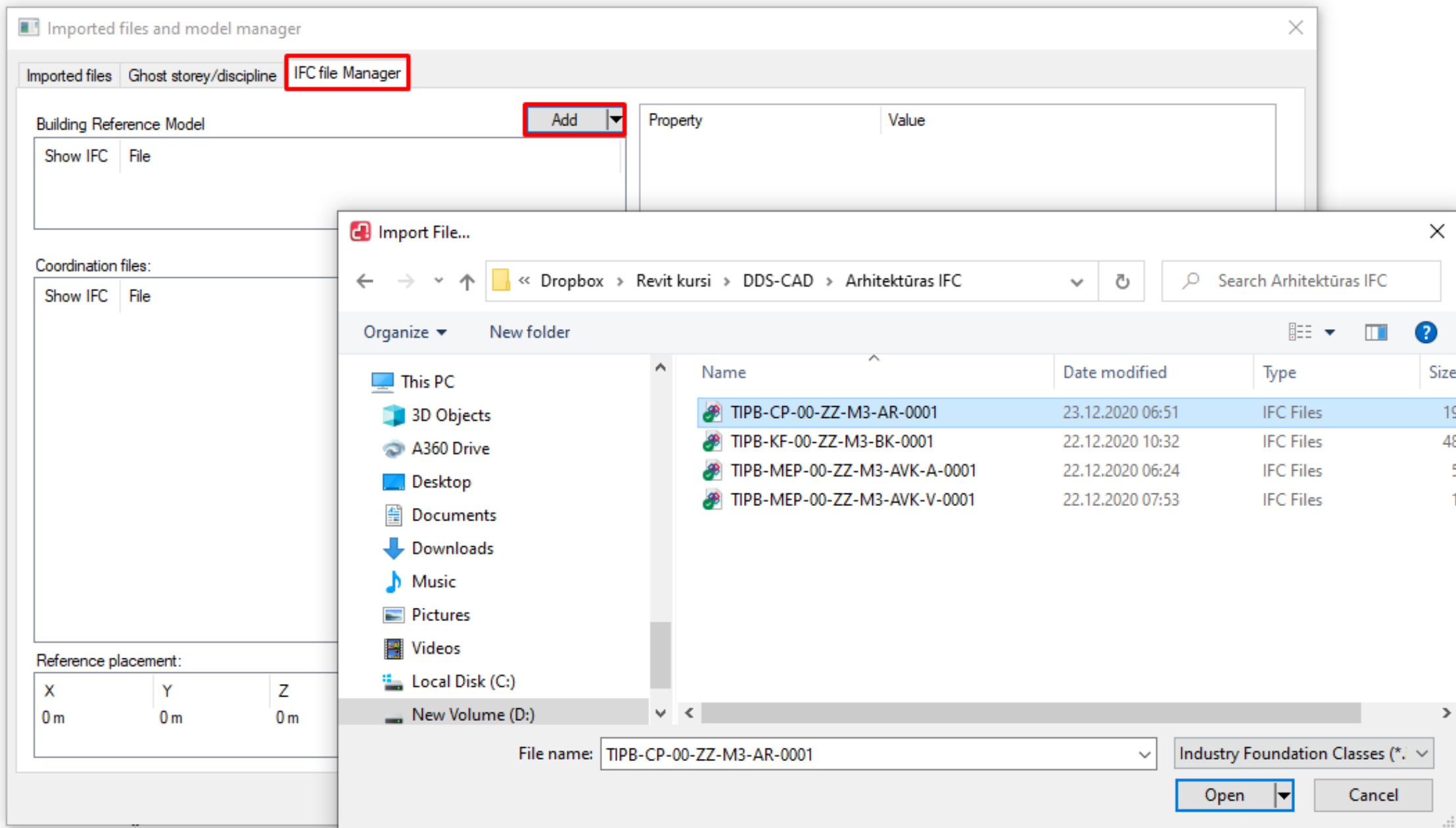
Tīkli (caurules, gaisa vadi, u.c.)							
Atribūts	Piemērs	Projekta posms					Apraksts
		DB	BE	BP	BD	NE	
01_Nosaukums	Apkures caurule (tupgaita)	M					Vispārīgs nosaukums
02_Materiāls	PPR	M					Elementa materiāls
03_Tips	PN20	M					Elementa tips
04_Šķērsriezums	25 mm	M					Elementa šķērsriezums
07_Biezums	2.3 mm	M					Elementa sienas biezums
46_Sistēma	AVK-A	M					Inženiertīklu sistēma
47_Izolācija	Nē	M					Elementa izolācija
70_Klasifikācijas kods	BE_19_01_01_00_Apkures sistēmas	M					

IESKATS INŽENIERTĪKLU PROJEKTĒŠANĀ AR DDS-CAD

Apmācību modulis
“BIM modelēšana AVK un UK projektēšanā ar priekšzināšanām”

AR IFC IMPORTĒŠANA

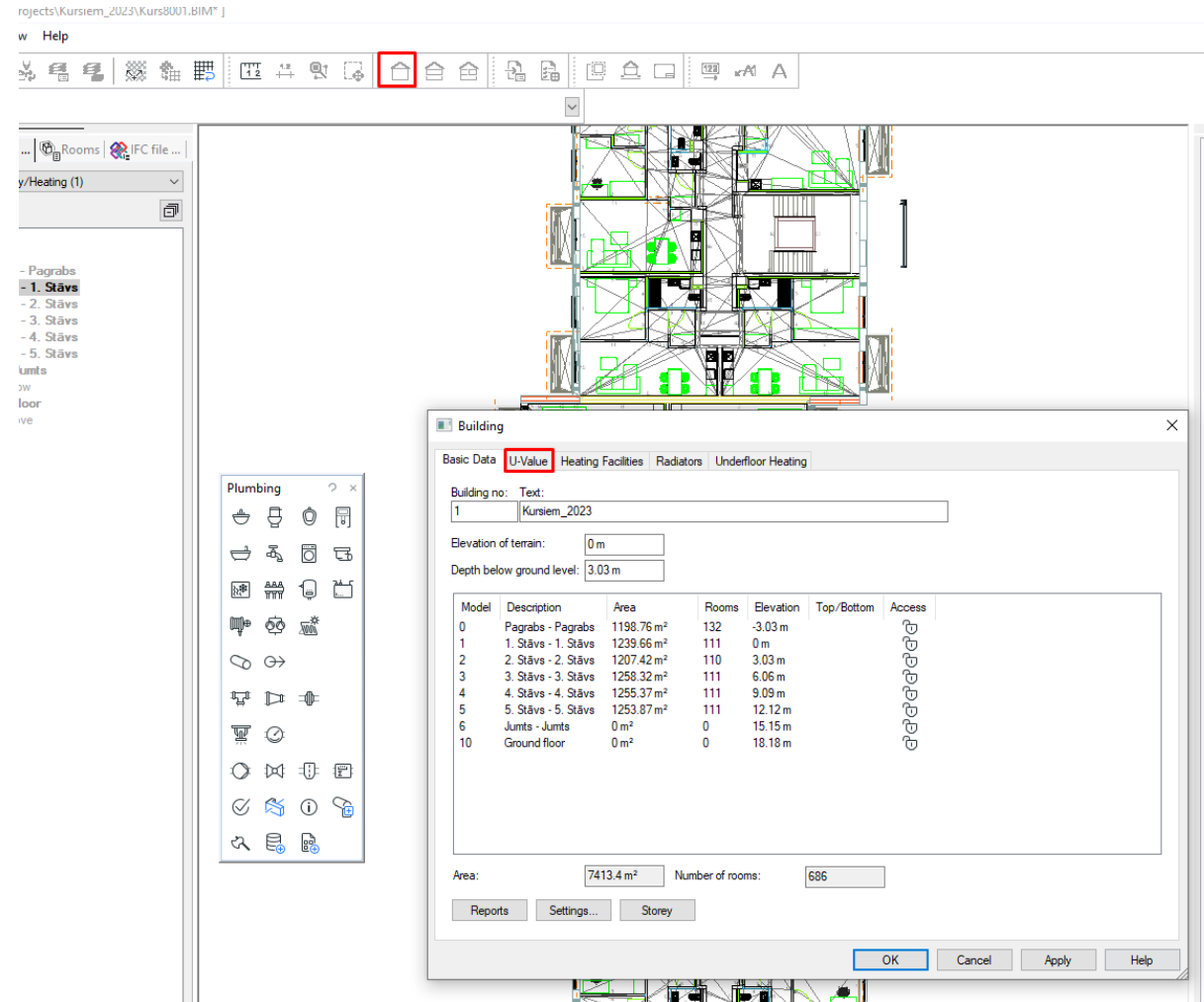




U-VĒRTĪBU DEFINĒŠANA

projects\Kursiem_2023\Kurs8001.BIM*

w Help



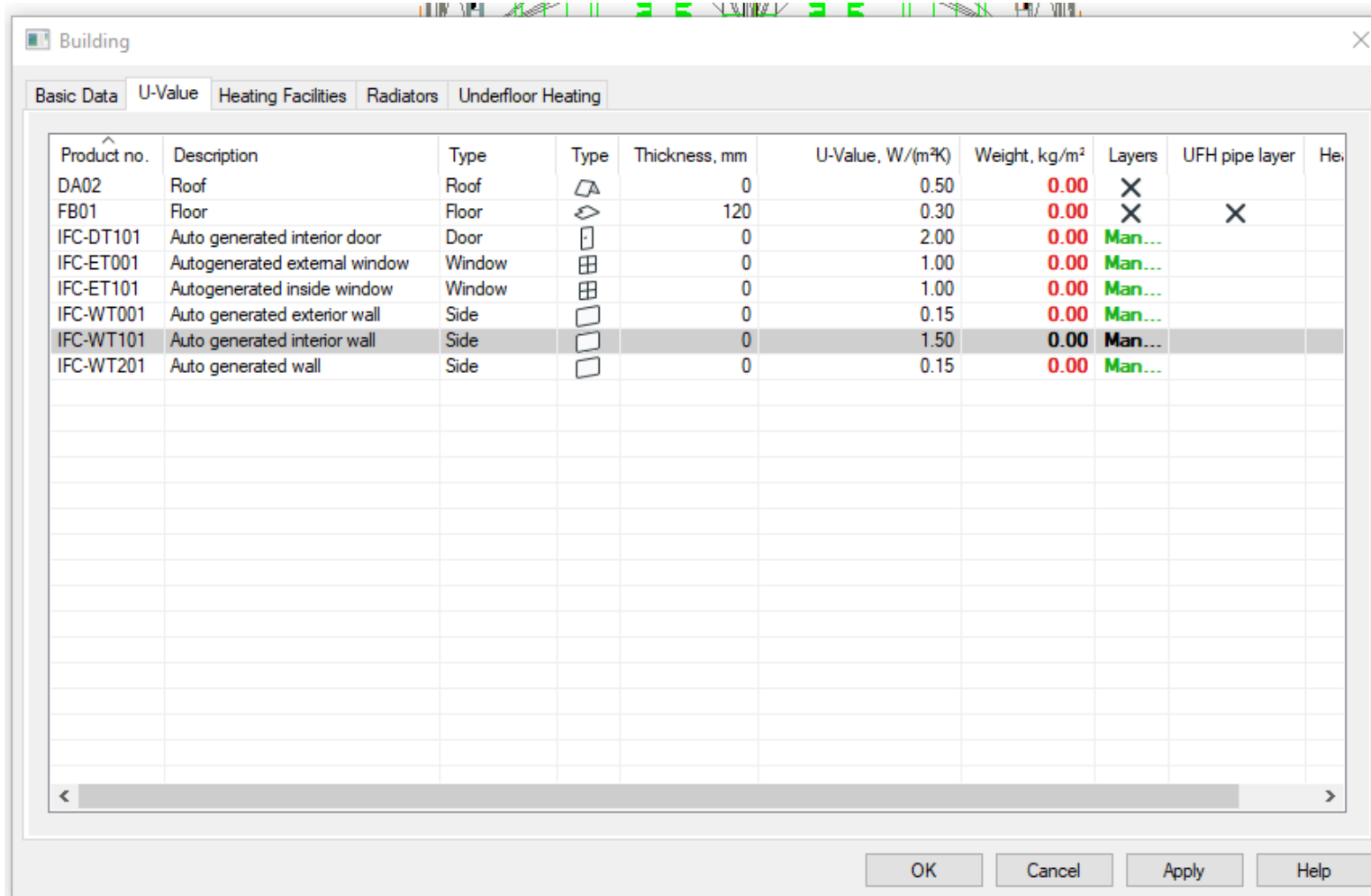
The screenshot shows a BIM software interface with a building model in the center. A 'Building' dialog box is open, displaying the 'U-Value' tab. The dialog box contains fields for 'Building no.' (1), 'Elevation of terrain' (0 m), and 'Depth below ground level' (3.03 m). Below these fields is a table with columns: Model, Description, Area, Rooms, Elevation, Top/Bottom, and Access. The table lists various building levels and their properties. At the bottom of the dialog box, there are buttons for 'Reports', 'Settings...', 'Storey', 'OK', 'Cancel', 'Apply', and 'Help'.

Model	Description	Area	Rooms	Elevation	Top/Bottom	Access
0	Pagrabs - Pagrabs	1198.76 m ²	132	-3.03 m		
1	1. Stāvs - 1. Stāvs	1239.66 m ²	111	0 m		
2	2. Stāvs - 2. Stāvs	1207.42 m ²	110	3.03 m		
3	3. Stāvs - 3. Stāvs	1258.32 m ²	111	6.06 m		
4	4. Stāvs - 4. Stāvs	1255.37 m ²	111	9.09 m		
5	5. Stāvs - 5. Stāvs	1253.87 m ²	111	12.12 m		
6	Jumts - Jumts	0 m ²	0	15.15 m		
10	Ground floor	0 m ²	0	18.18 m		









Area: 7413.4 m² Number of rooms: 686

Reports Settings... Storey OK Cancel Apply Help

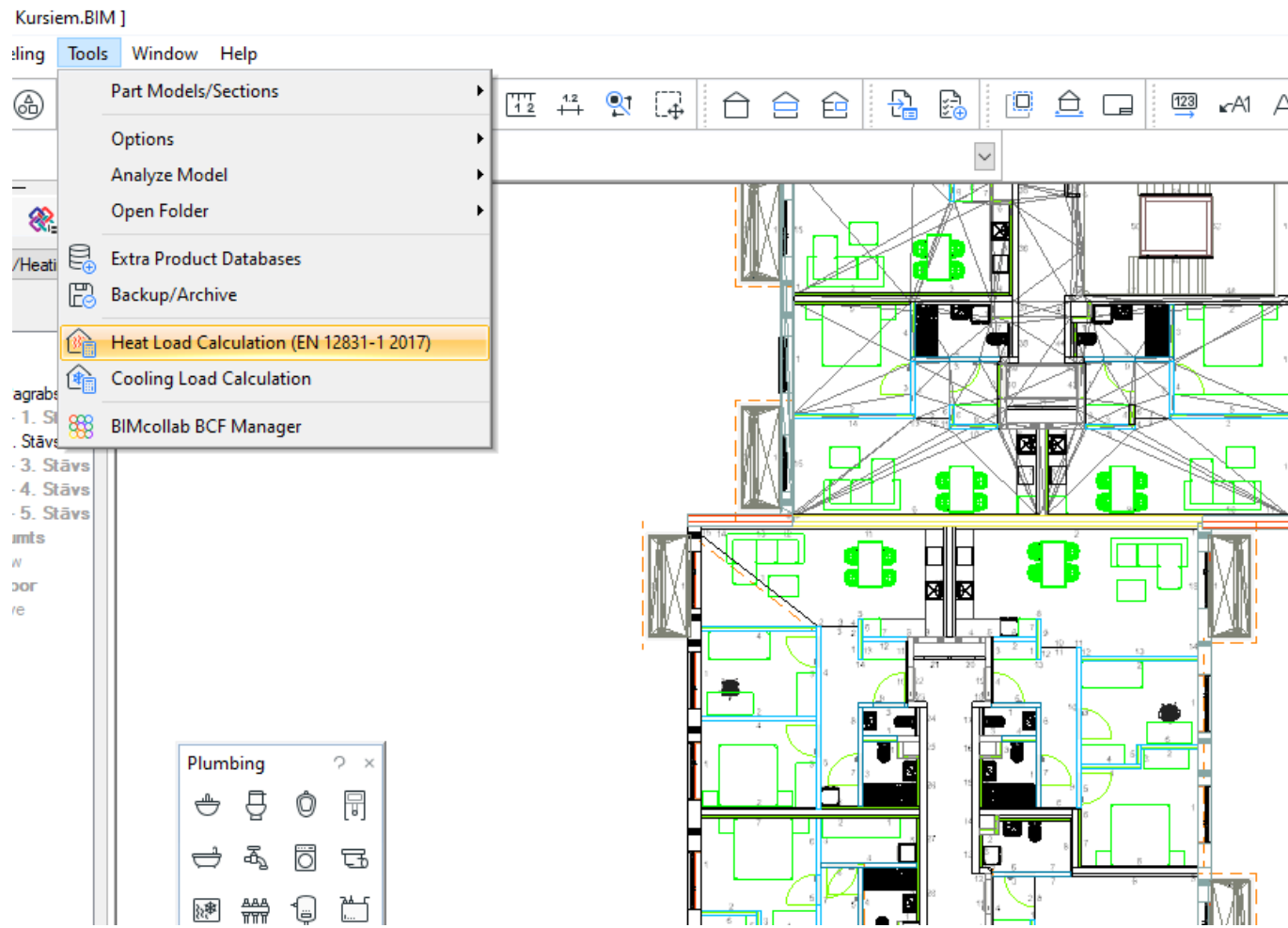
MANUĀLA U-VĒRTĪBA, VAI PROGRAMMAS APRĒĶINĀTA



The screenshot shows a software window titled "Building" with a tabbed interface. The "U-Value" tab is active, displaying a table of building components. The table has the following columns: Product no., Description, Type, Type (with icons), Thickness, mm, U-Value, W/(m²K), Weight, kg/m², Layers, UFH pipe layer, and He. The data rows are as follows:

Product no.	Description	Type	Type	Thickness, mm	U-Value, W/(m²K)	Weight, kg/m²	Layers	UFH pipe layer	He.
DA02	Roof	Roof		0	0.50	0.00	X		
FB01	Floor	Floor		120	0.30	0.00	X	X	
IFC-DT101	Auto generated interior door	Door		0	2.00	0.00	Man...		
IFC-ET001	Autogenerated external window	Window		0	1.00	0.00	Man...		
IFC-ET101	Autogenerated inside window	Window		0	1.00	0.00	Man...		
IFC-WT001	Auto generated exterior wall	Side		0	0.15	0.00	Man...		
IFC-WT101	Auto generated interior wall	Side		0	1.50	0.00	Man...		
IFC-WT201	Auto generated wall	Side		0	0.15	0.00	Man...		

SILTUMA ZUDUMU APRĒĶINS



ĀRA GAISA TEMP. DEFINĒŠANA

Heat load EN 12831-1

Level structure

- Site
 - Building
 - Building Entity

Design criteria

Site | Building | Building Entity | Room

Property	Value
Location	
Postal code	
Town	
Height of reference site	0 m
Climate data	
External design temperature refere...	-20 °C
Annual mean external temperature	0 °C

Advanced view

Content of selected level structure

Rooms | Components

SILTUMA ATGŪŠANAS JAUDAS DEFINĒŠANA

Heat load EN 12831-1

Level structure

- Site
 - Building**
 - Building Entity

Design criteria

Site Building **Building Entity** Room

Property	Value
Geometry	
Area	
Height	
Volume in envelope	
Heating	
Temperature building entity	
Ventilation	
Passive preheating	<input type="checkbox"/>
Heat recovery factor	80 %
Supply air flow	
Exhaust air flow	

Results

Property	Value
Heat load	
Total	0 W
Heat transfer coeffici...	0 W/K
Area related	0 W/m ²
Volume related	0 W/m ³
Transmission heat loss	
Exterior	0 W
Ground	0 W
Unheated space	0 W
Neighbor building	0 W
Transmission total	0 W
Heat transfer coeffici...	0 W/K
Ventilation heat loss	
External air	0 W
Supply air	0 W
Transfer air	0 W
Ventilation total	0 W
Heat transfer coeffici...	0 W/K

Advanced view

Content of selected level structure

Summary Comments

IEGŪTIE REZULTĀTI

Heat load EN 12831-1

Level structure

- Site
 - Building
 - Building Entity

Design criteria

Property	Value
Geometry	
Area	7347.57 m ²
Height	14.79 m
Gross volume	23441.2 m ³
Volume in envelope	19698.9 m ³
Depth below ground level	3.03 m
Elevation of terrain	0 m
Water table distance	> 1 m
Heating	
External design temperature	-16.6 °C
Thermal bridge addition	0.05 W/(m ² K)
Thermal bridge addition definition	Not defined
Thermal storage capacity	50 Wh/(m ² K)
Thermal storage capacity category	Not defined

Results

Property	Value
Heat load	
Transmission	103080 W
Ventilation	68600 W
Max. addition	0 W
<hr/>	
Total	171680 W
Heat transfer coefficient...	4447 W/K
Area related	23.4 W/m ²
Volume related	8.7 W/m ³
<hr/>	
Transmission heat loss	
Exterior	96390 W
Ground	6691 W
Unheated space	0 W
Neighbor building	0 W

Property	Value
Ventilation heat loss	
External air	68600 W
Supply air	0 W
Transfer air	0 W
<hr/>	
Ventilation total	68600 W
Heat transfer coefficient...	1777 W/K

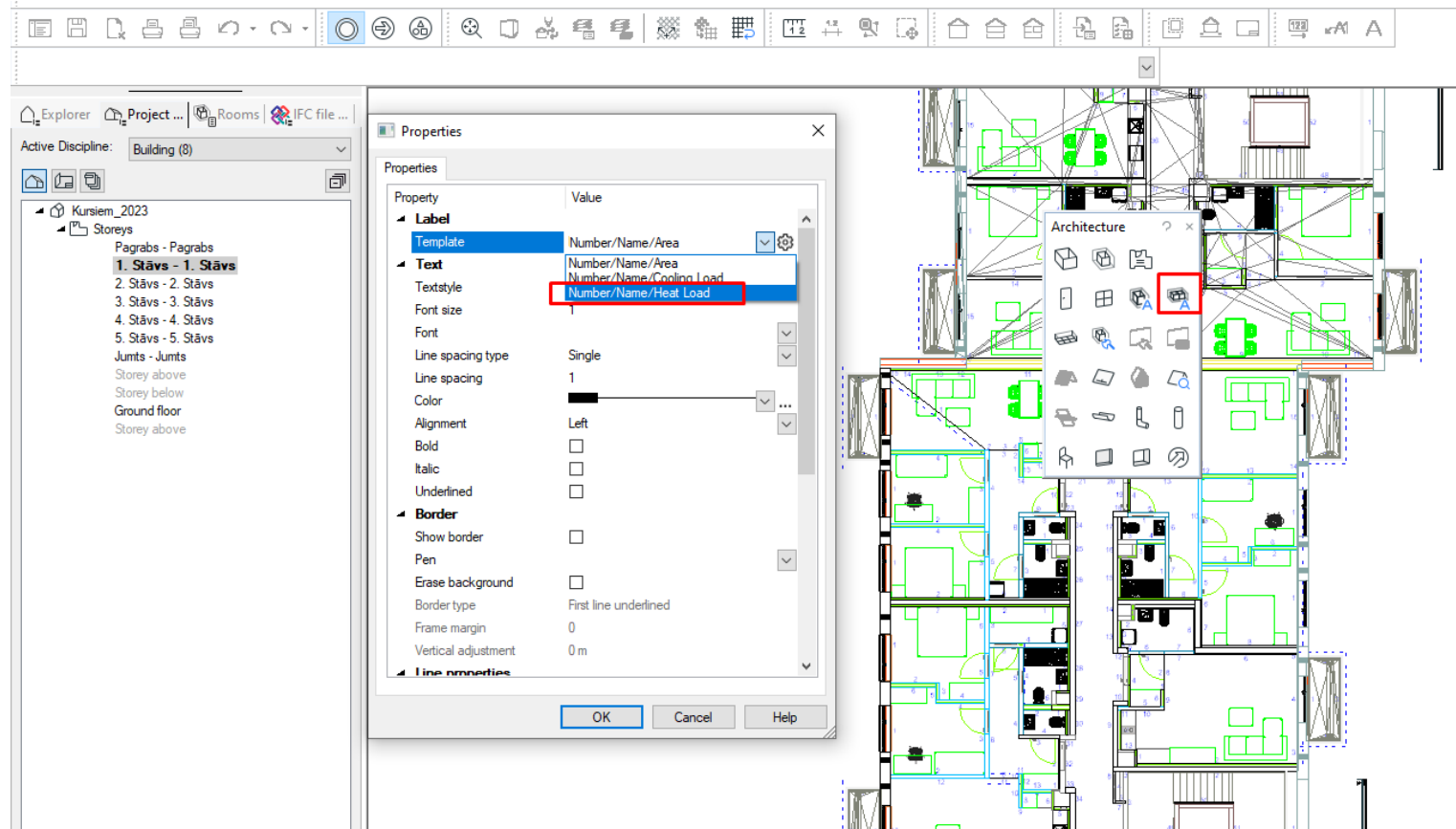
Advanced view

Simple view

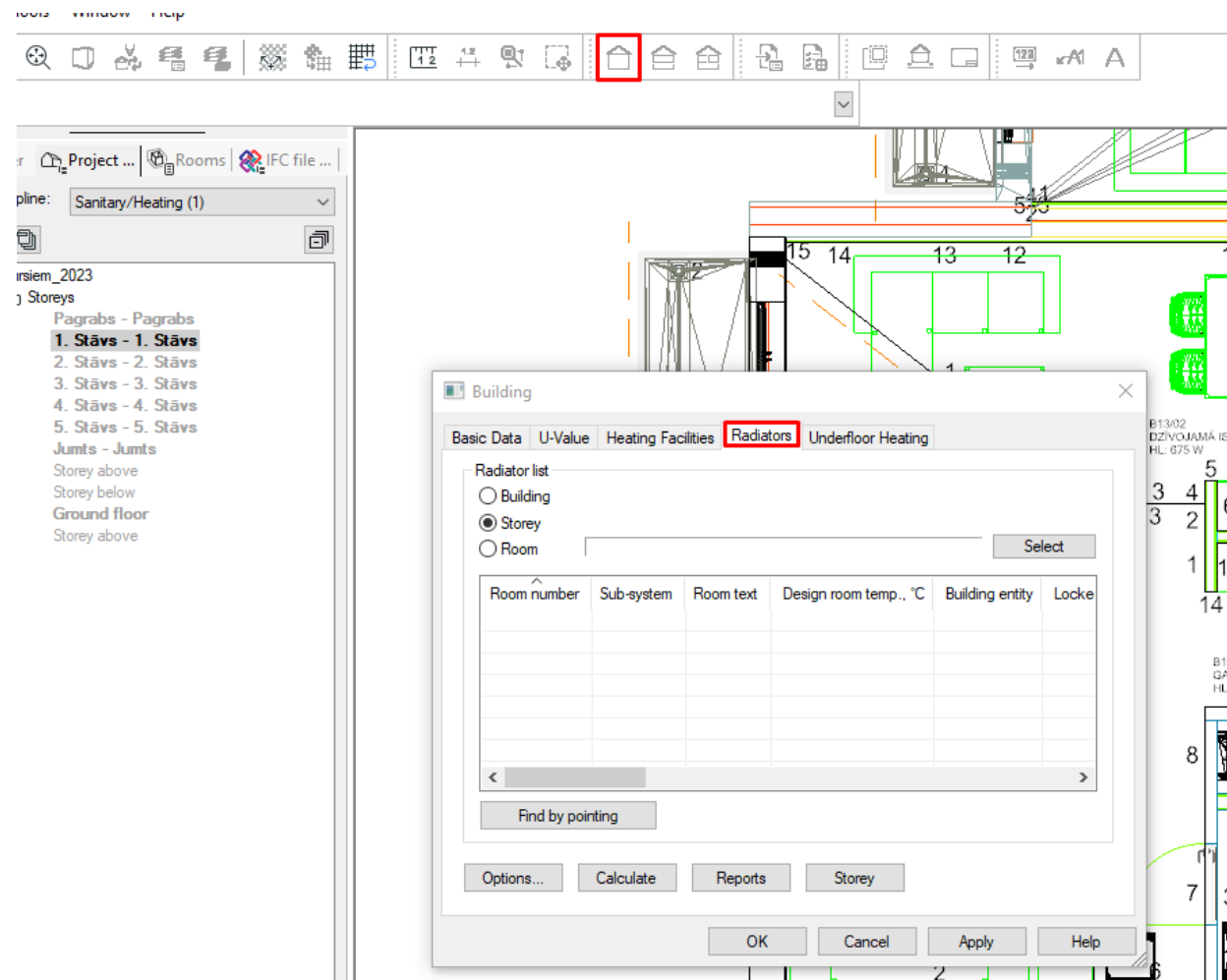
Content of selected level structure

Rooms Components

IINFORMĀCIJAS PIEVIENOŠANA RASĒJUMĀ



AUTOMĀTISKA RADIATORU IZVIETOŠANA



Building

Basic Data U-Value Heating Facilities Radiators Underfloor Heating

Radiator list

Building

Storey

Room

Room number	Sub-system	Room text	Design room temp.

Find by pointing

Options... Calculate Reports Storey

OK Cancel

Options

Just calculate the Supply temperature

Supply temperature °C

Temperature difference K

Return temperature °C

Reduction factor for niche installation

Adjust the radiators

Install radiators

Manufacturer

Type

Distance to wall mm

Distance to floor mm

Consider only rooms without radiators

Set radiators in windowless rooms

Don't install in rooms with less than W

Max. radiator output W

Consider only sill heights ...

from mm to mm

Radiator	Target values	Tolerance: Min.	Max.	Priority
Length:	<input type="radio"/> = Fixed <input type="text" value="1000"/> mm	<input type="text" value="80"/> %	<input type="text" value="100"/> %	<input type="text" value="3"/>
	<input checked="" type="radio"/> = Window width - <input type="text" value="120"/> mm			
Height:	<input type="radio"/> = Fixed <input type="text" value="Height 605"/> mm	<input type="text" value="80"/> %	<input type="text" value="100"/> %	<input type="text" value="2"/>
	<input checked="" type="radio"/> = Sill height - <input type="text" value="80"/> mm			
Width:	<input type="text" value="300"/> mm	<input type="text" value="10"/> %	<input type="text" value="500"/> %	<input type="text" value="4"/>
Output:	Heat load divided by number of radiators	<input type="text" value="100"/> %	<input type="text" value="120"/> %	<input type="text" value="1"/>

OK Cancel Help

Building

Basic Data U-Value Heating Facilities Radiators Underfloor Heating

Radiator list

Building

Storey

Room Select

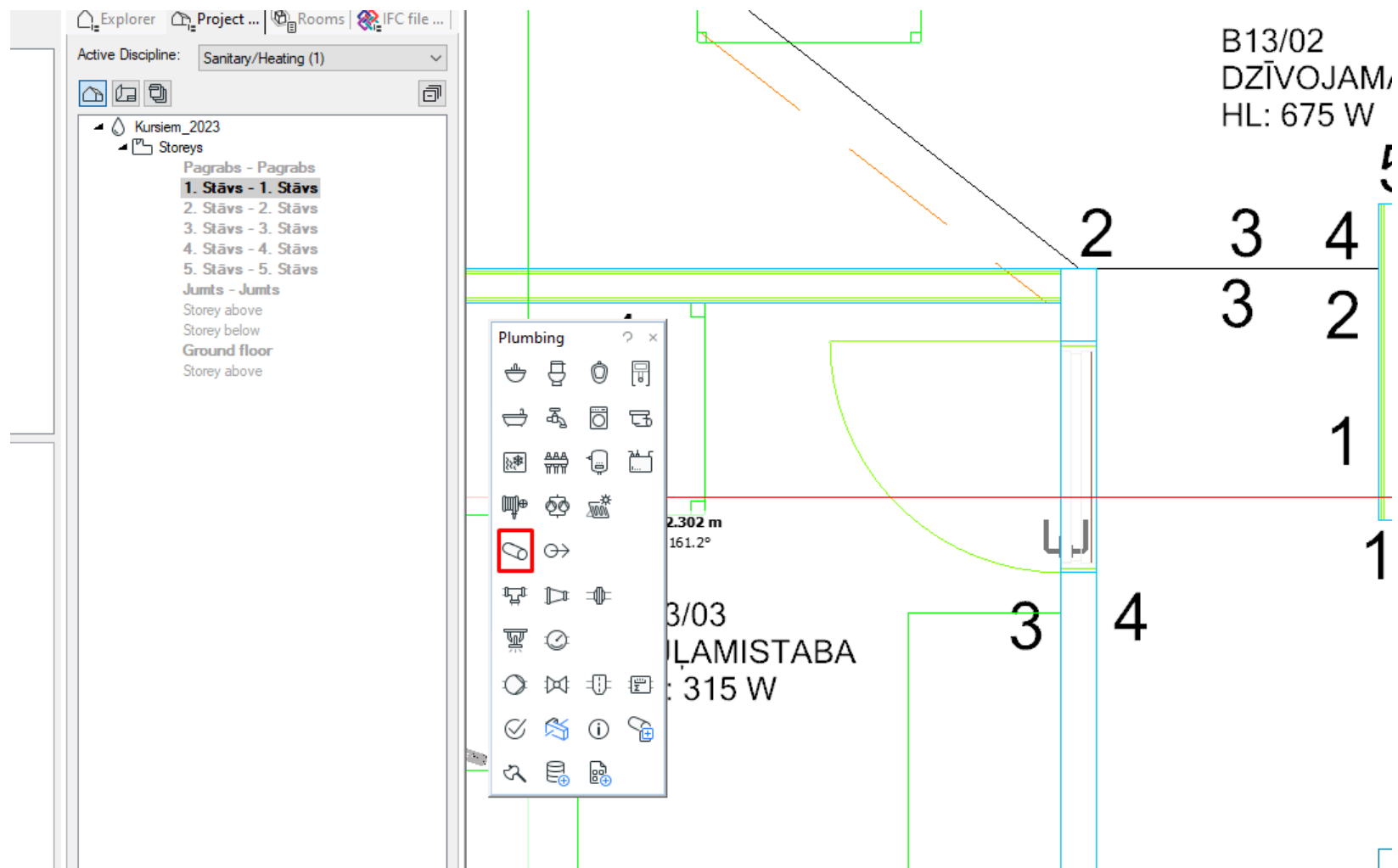
Room number	Sub-system	Room text	Design room temp., °C	Building entity	Locked	Length, mm	Height, mm	Width, mm	Target, W	Qh_max, W	Qh, W	%	Dimensioned	Manufacturer	Type	Desig
02.?A10/01		KAPŅU T...	22			905	605	63	729	743	729	1...	✓	Generic man...	Valve radiator pl...	
02.?A10/01		KAPŅU T...	22			905	605	63	729	743	729	1...	✓	Generic man...	Valve radiator pl...	
02.?A10/01		KAPŅU T...	22			905	605	63	729	743	729	1...	✓	Generic man...	Valve radiator pl...	
02.?A11/01		GAITENIS	22			405	505	63	161	170	161	1...	✓	Generic man...	Valve radiator pl...	
02.?A11/02		GUĻAMI...	22			605	605	63	259	296	259	1...	✓	Generic man...	Valve radiator pl...	
02.?A11/03		GUĻAMI...	22			805	505	63	310	336	310	1...	✓	Generic man...	Valve radiator pl...	
02.?A11/04		DZĪVOJA...	22			805	605	63	565	661	565	1...	✓	Generic man...	Valve radiator pl...	
02.?A11/07		BALKONS	22			805	505	63	288	336	288	1...	✓	Generic man...	Valve radiator pl...	
02.?A12/01		GAITENIS	22			405	605	63	176	198	176	1...	✓	Generic man...	Valve radiator pl...	
02.?A12/02		DZĪVOJA...	22			905	605	63	675	743	675	1...	✓	Generic man...	Valve radiator pl...	
02.?A12/03		GUĻAMI...	22			505	605	63	230	247	230	1...	✓	Generic man...	Valve radiator pl...	
02.?A12/04		GUĻAMI...	22			505	605	63	243	247	243	1...	✓	Generic man...	Valve radiator pl...	
02.?A12/07		BALKONS	22			805	605	63	393	394	393	1...	✓	Generic man...	Valve radiator pl...	
02.?A13/03		DZĪVOJA...	22			805	505	63	484	564	484	1...	✓	Generic man...	Valve radiator pl...	
02.?A13/04		BALKONS	22			805	505	63	303	336	303	1...	✓	Generic man...	Valve radiator pl...	
02.?A14/01		GAITENIS	22			405	605	63	190	198	190	1...	✓	Generic man...	Valve radiator pl...	

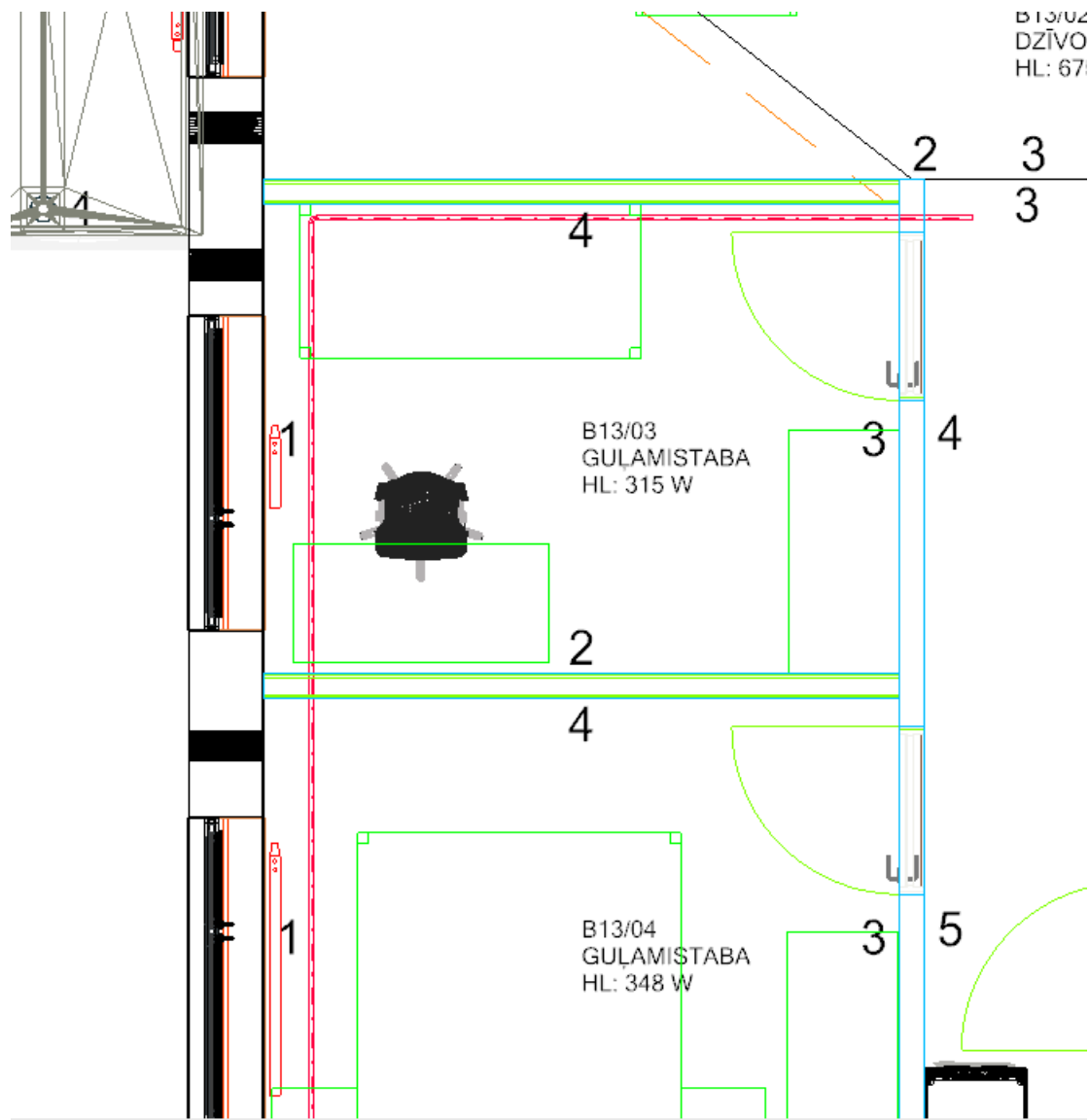
Find by pointing

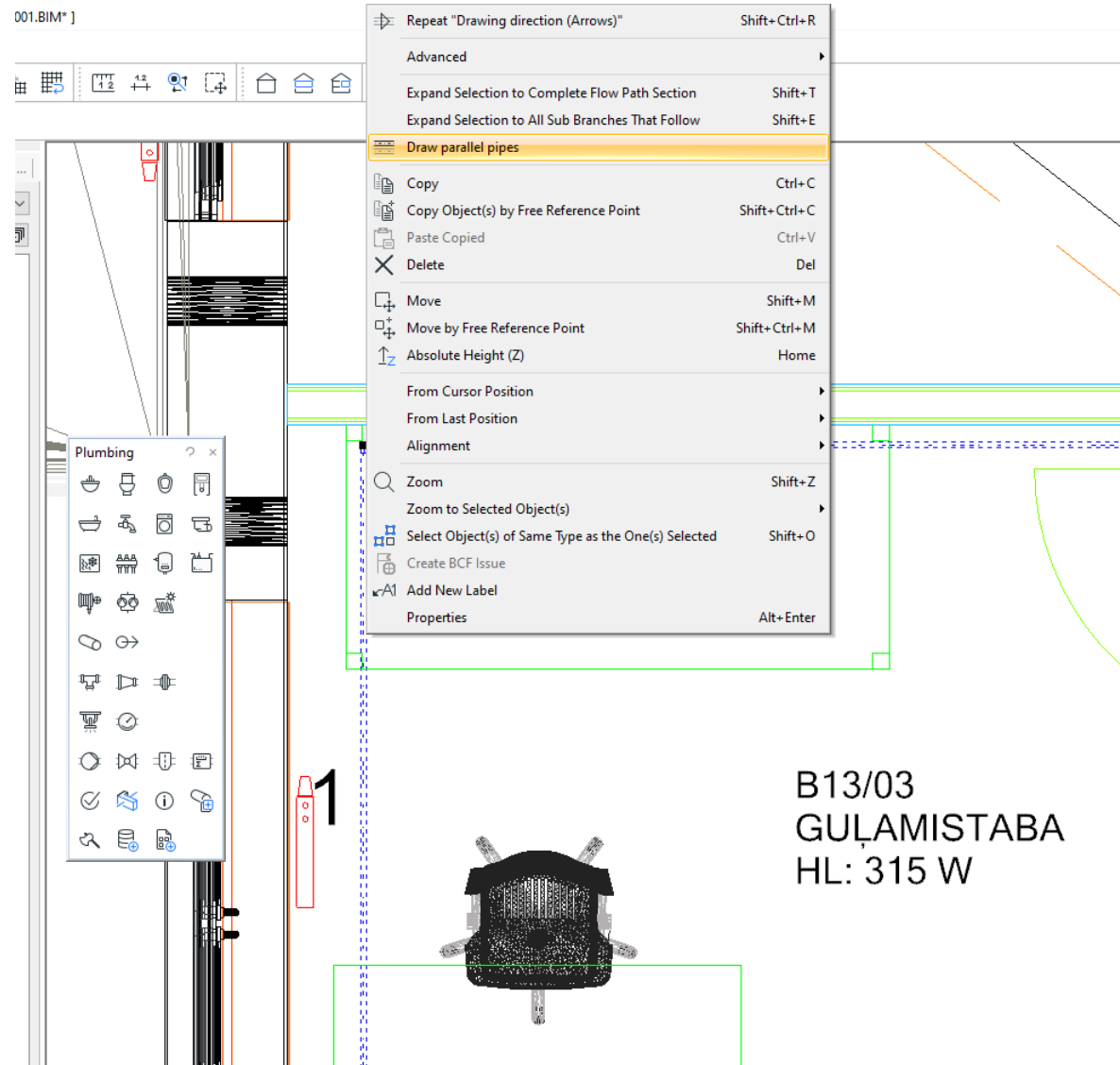
Options... **Calculate** Reports Storey

OK Cancel Apply

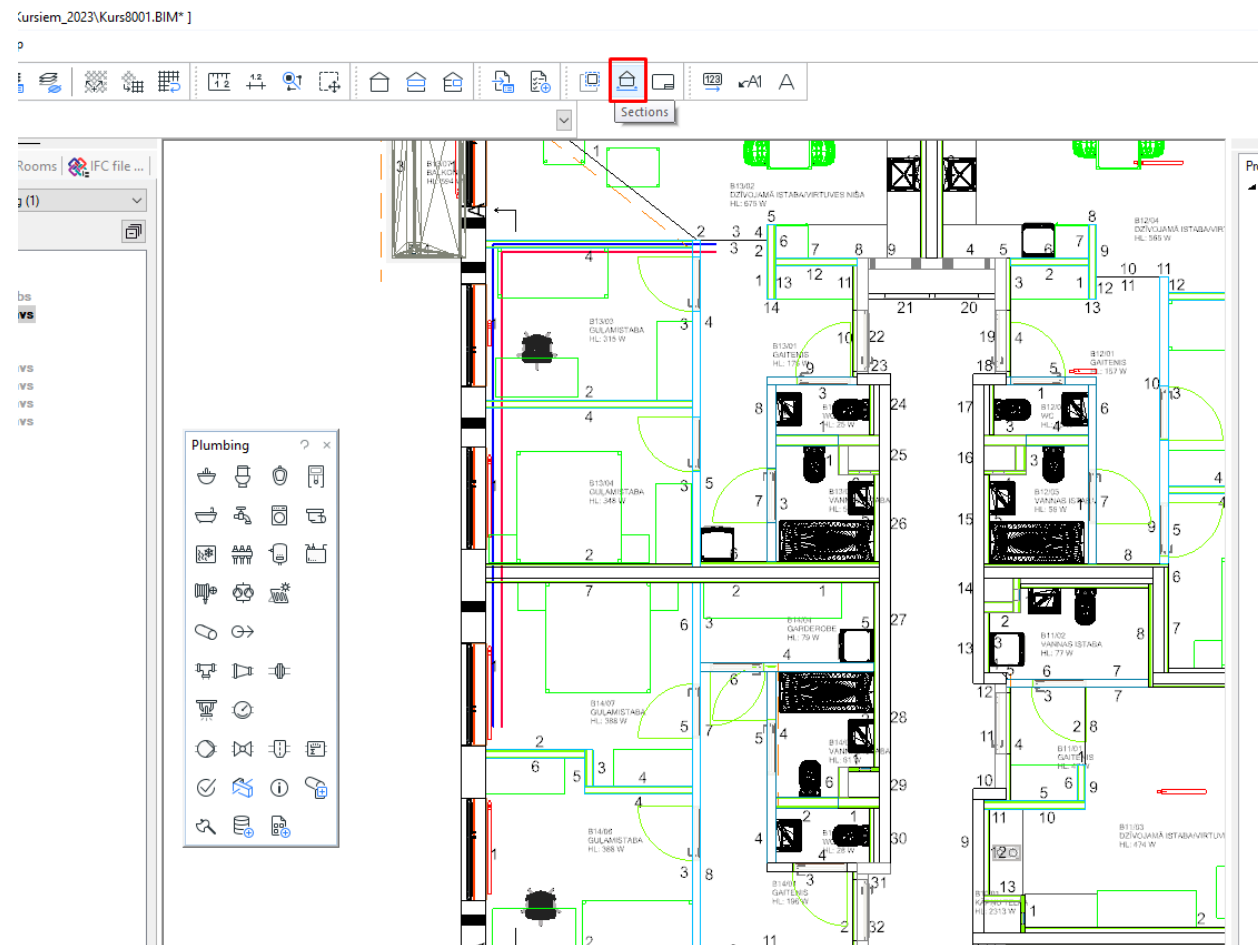
CAURUĻVADU MODEĻĒŠANA



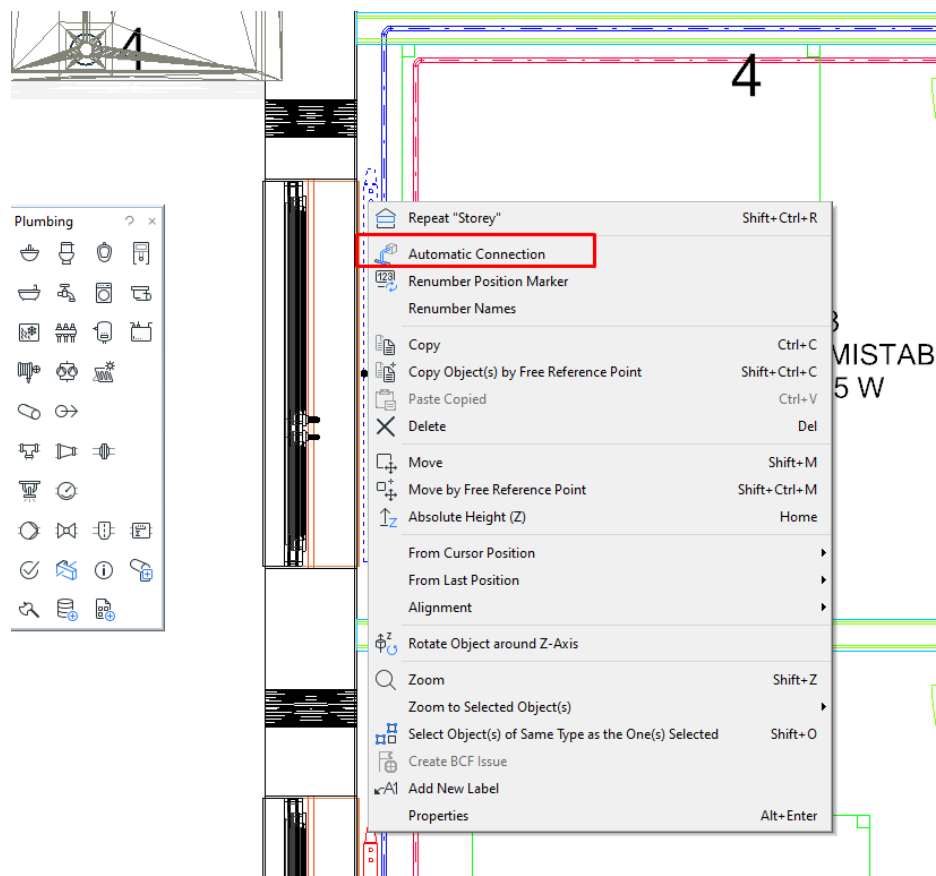


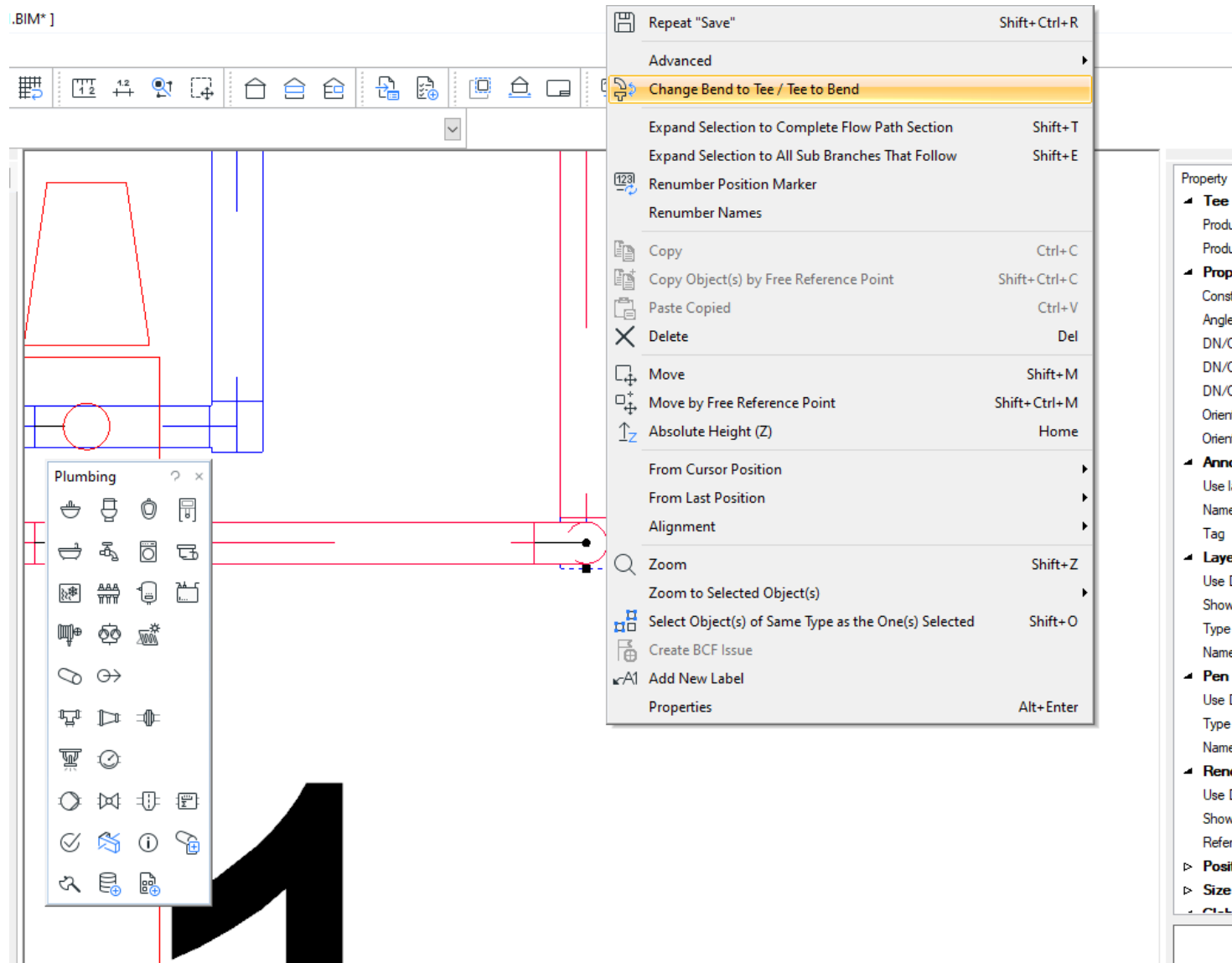


GRIEZUMA IZVEIDE



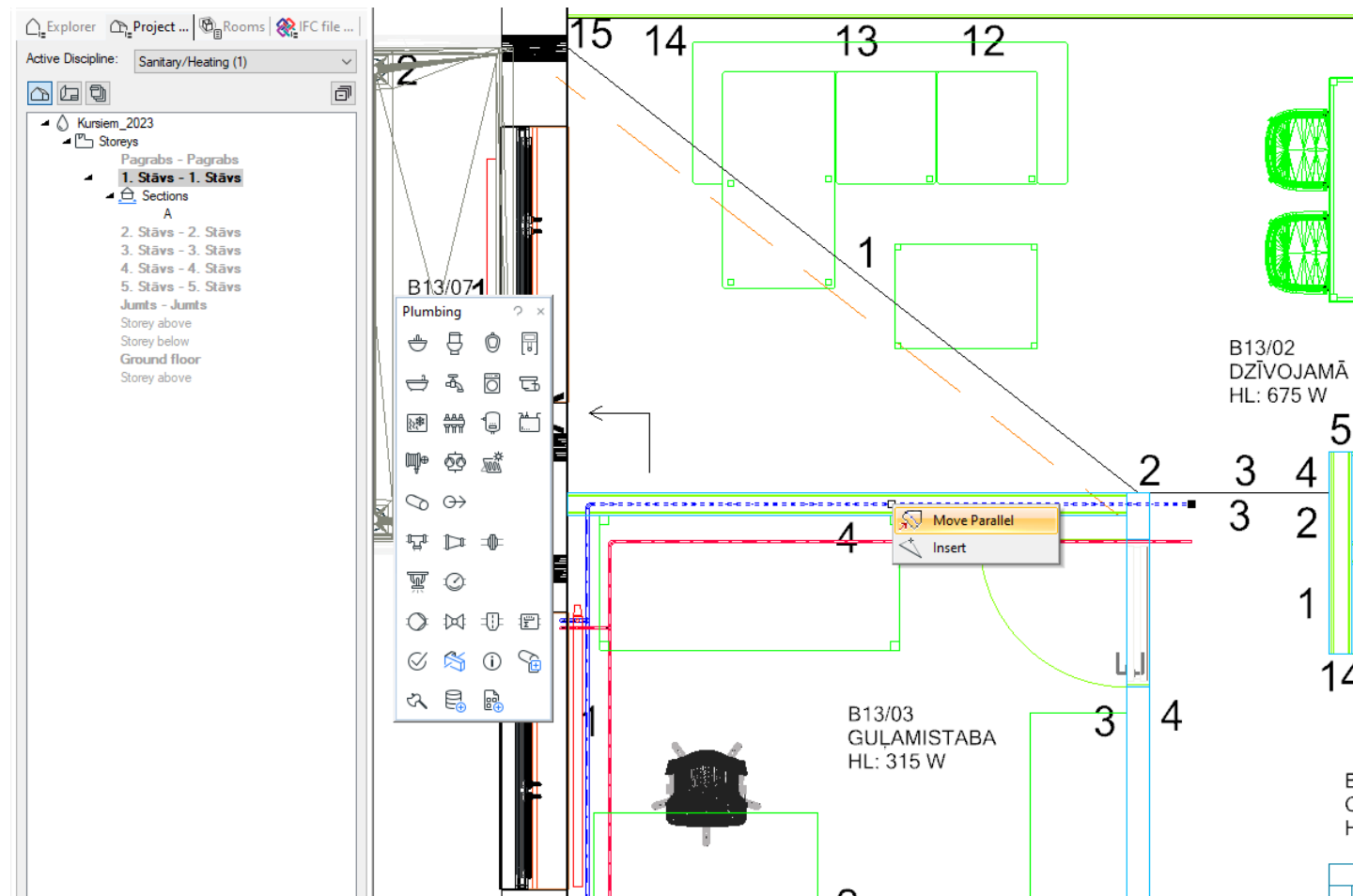
AUTOMĀTISKĀ SAVIENOŠANA



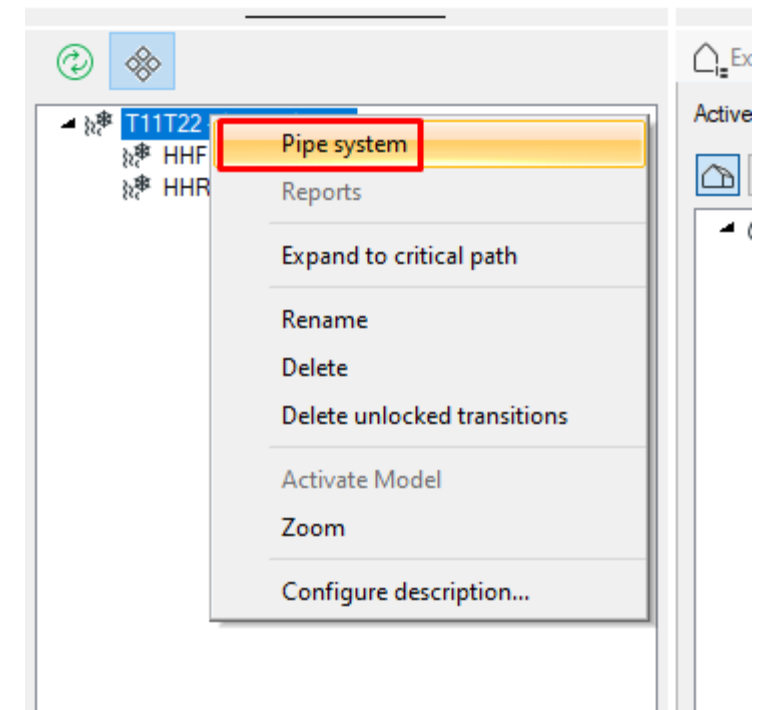
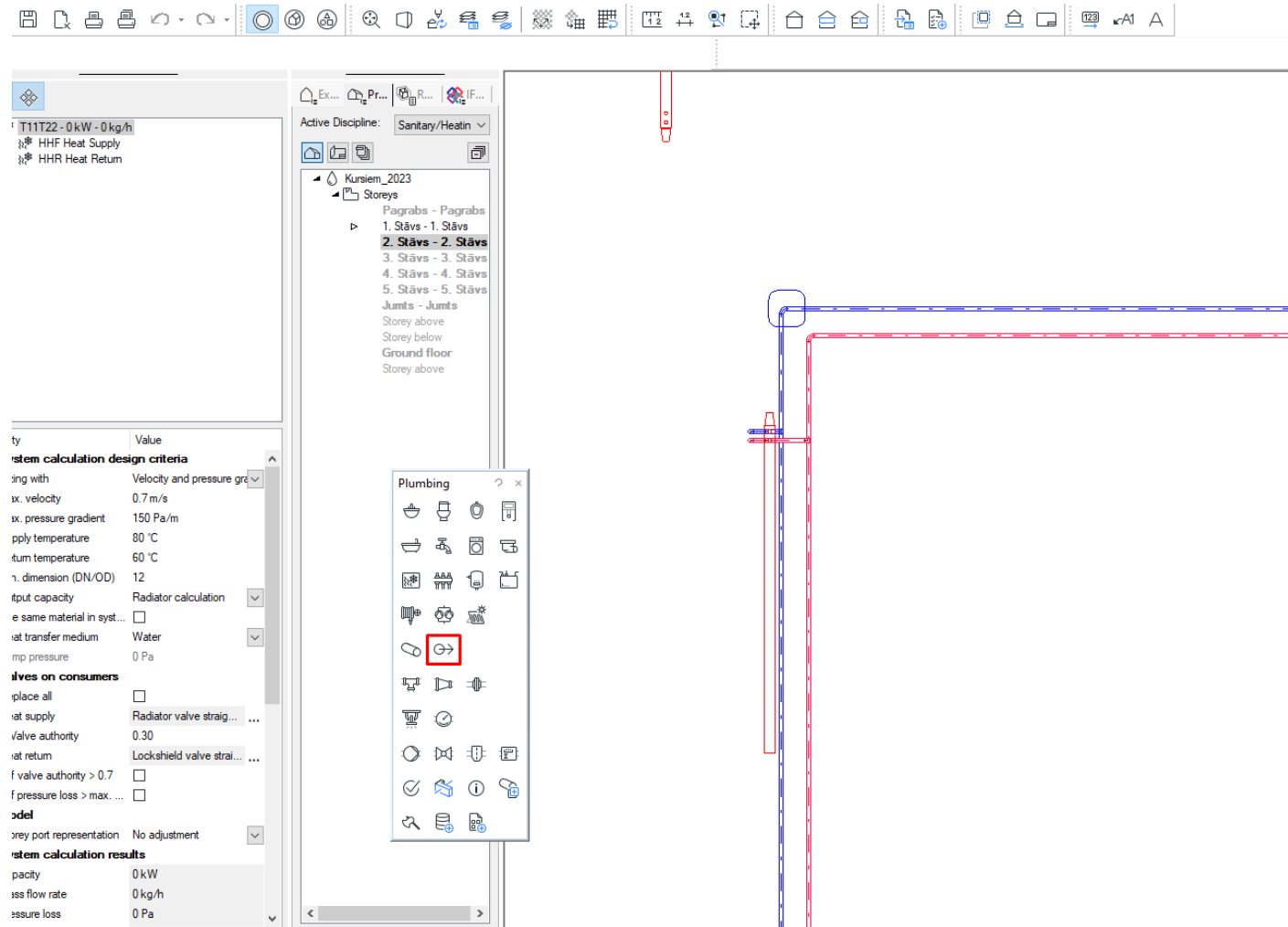


CAURUĻVADU NOBĪDE

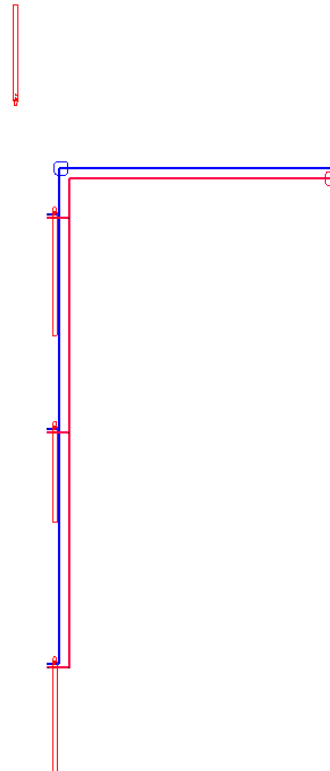
Nospiest -> Pa vidu uz
baltā ar labo -> Move
paralell -> Ar klaviatūras
bultiņām norādīt
virzienu



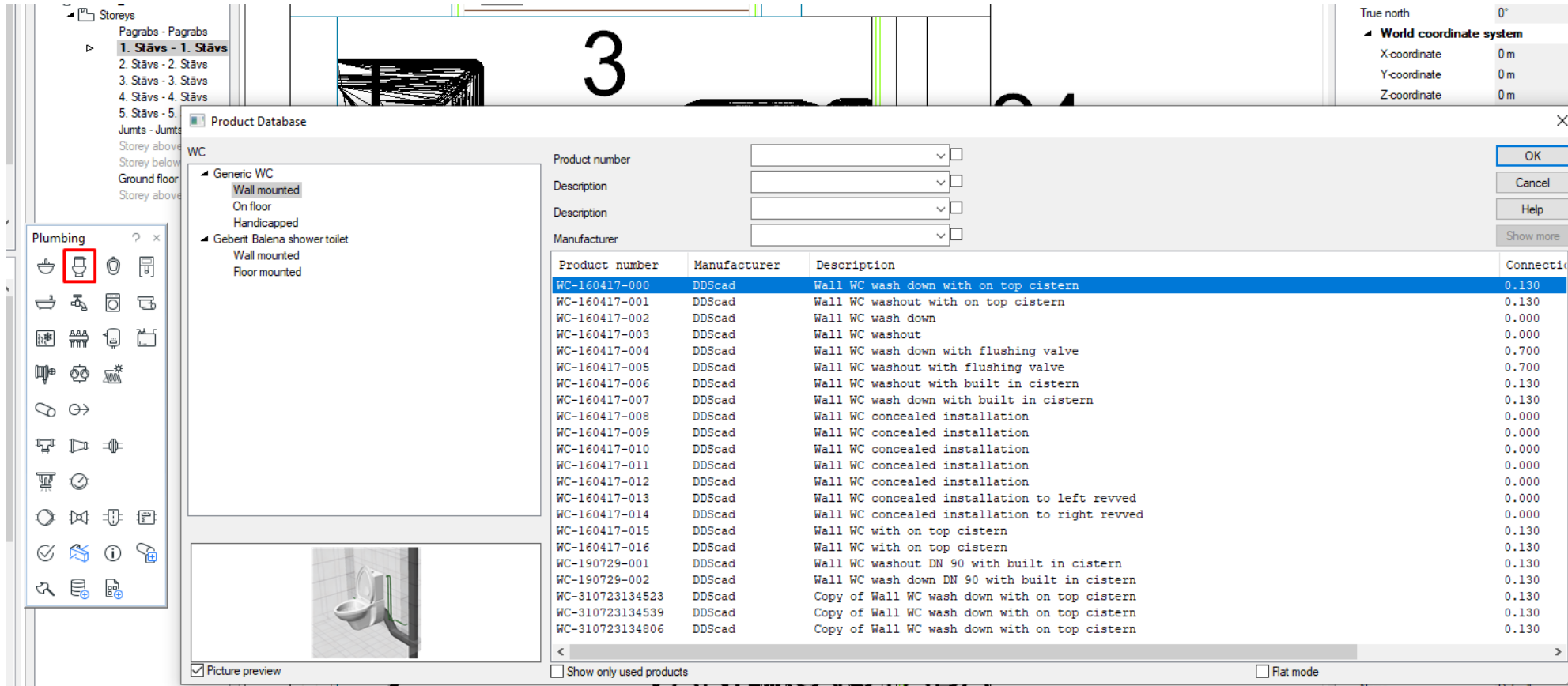
APRĒĶINA PUNKTU PIEVIENOŠANA



SPECIFIKĀCIJAS IEGŪŠANA



SANIEKĀRTU PIEVIENOŠANA



True north 0°

World coordinate system

- X-coordinate 0 m
- Y-coordinate 0 m
- Z-coordinate 0 m

Product Database

WC

- Generic WC
 - Wall mounted
 - On floor
 - Handicapped
- Gebert Balena shower toilet
 - Wall mounted
 - Floor mounted

Product number

Description

Description

Manufacturer

Product number	Manufacturer	Description	Connectio
WC-160417-000	DDSca	Wall WC wash down with on top cistern	0.130
WC-160417-001	DDSca	Wall WC washout with on top cistern	0.130
WC-160417-002	DDSca	Wall WC wash down	0.000
WC-160417-003	DDSca	Wall WC washout	0.000
WC-160417-004	DDSca	Wall WC wash down with flushing valve	0.700
WC-160417-005	DDSca	Wall WC washout with flushing valve	0.700
WC-160417-006	DDSca	Wall WC washout with built in cistern	0.130
WC-160417-007	DDSca	Wall WC wash down with built in cistern	0.130
WC-160417-008	DDSca	Wall WC concealed installation	0.000
WC-160417-009	DDSca	Wall WC concealed installation	0.000
WC-160417-010	DDSca	Wall WC concealed installation	0.000
WC-160417-011	DDSca	Wall WC concealed installation	0.000
WC-160417-012	DDSca	Wall WC concealed installation	0.000
WC-160417-013	DDSca	Wall WC concealed installation to left revved	0.000
WC-160417-014	DDSca	Wall WC concealed installation to right revved	0.000
WC-160417-015	DDSca	Wall WC with on top cistern	0.130
WC-160417-016	DDSca	Wall WC with on top cistern	0.130
WC-190729-001	DDSca	Wall WC washout DN 90 with built in cistern	0.130
WC-190729-002	DDSca	Wall WC wash down DN 90 with built in cistern	0.130
WC-310723134523	DDSca	Copy of Wall WC wash down with on top cistern	0.130
WC-310723134539	DDSca	Copy of Wall WC wash down with on top cistern	0.130
WC-310723134806	DDSca	Copy of Wall WC wash down with on top cistern	0.130

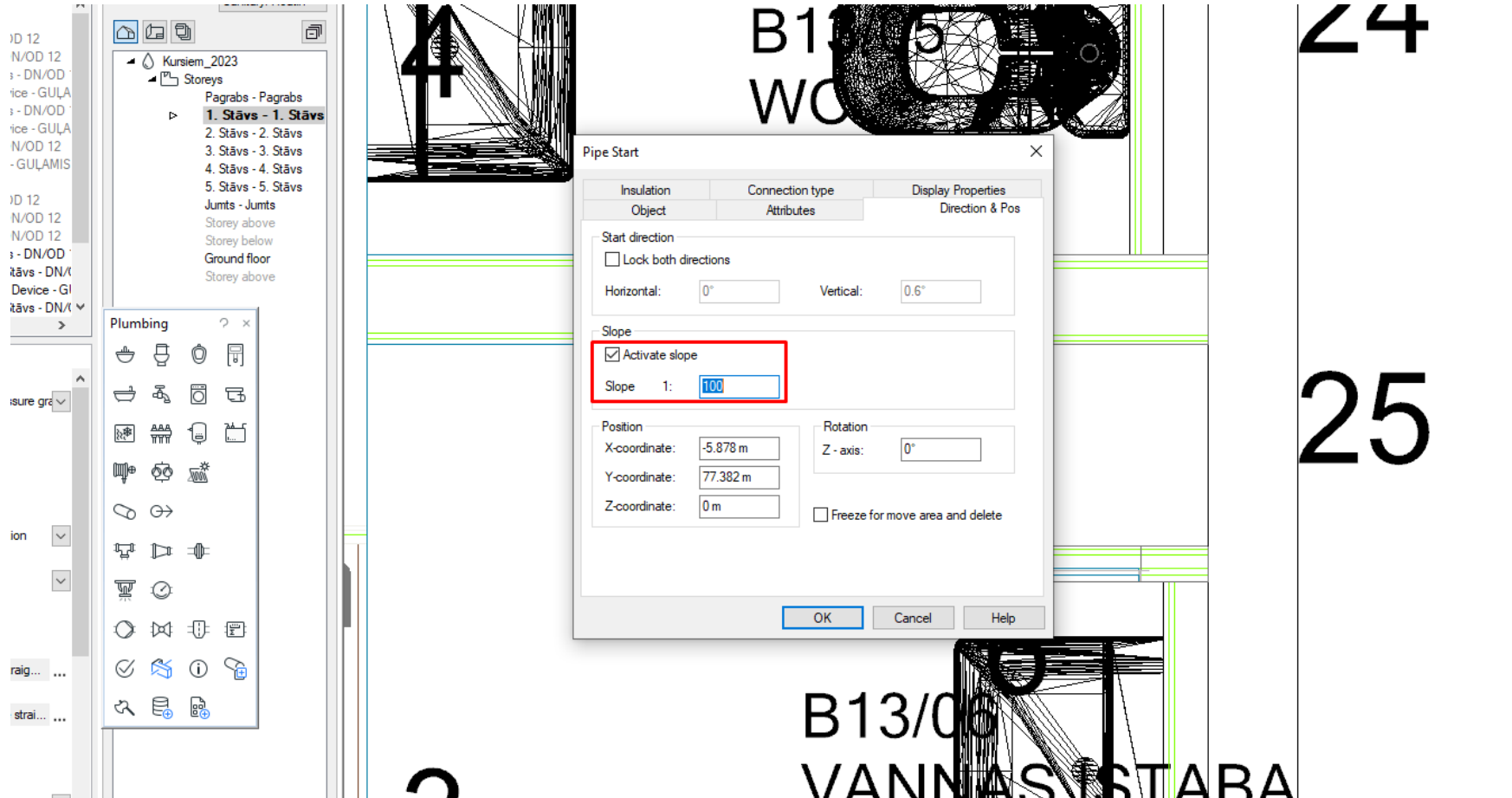
OK Cancel Help Show more

Picture preview

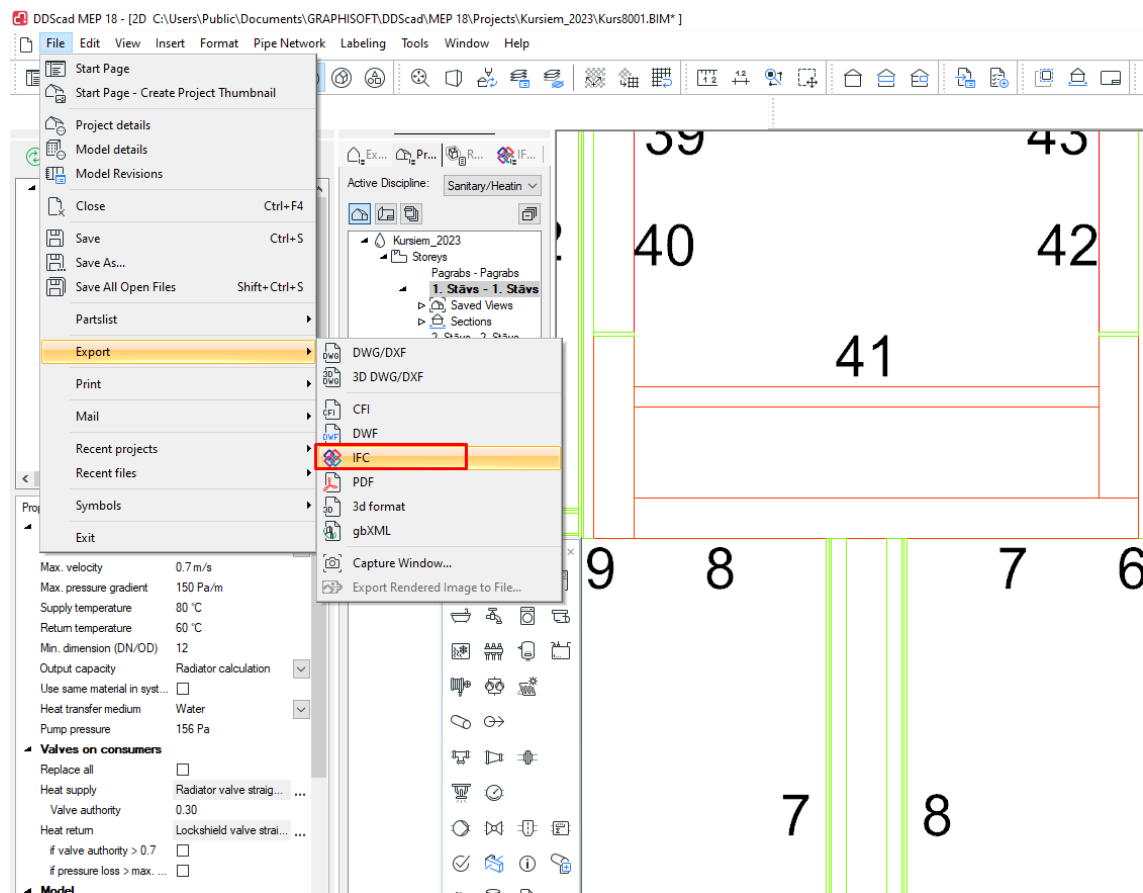
Show only used products

Flat mode

CAURUĻVADU AR SLĪPUMU MODEĻĒŠANA



IFC IZVEIDE



PALDIES PAR UZMANĪBU!