

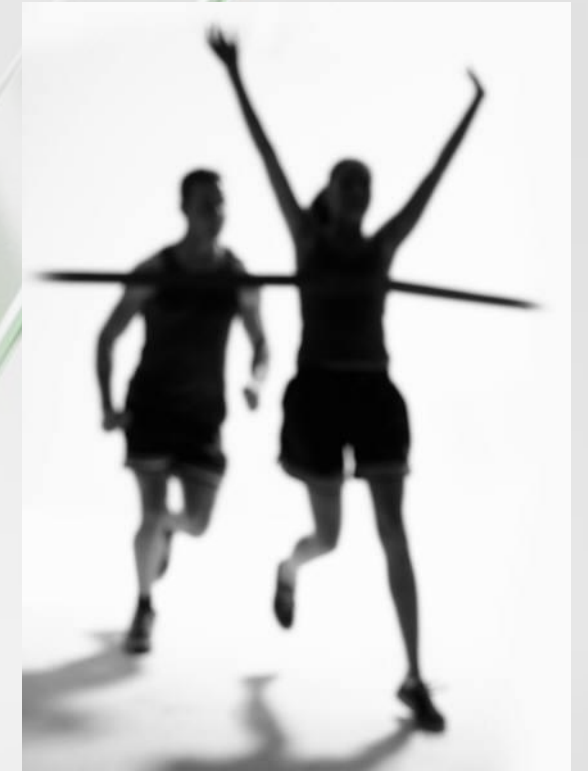
# Import Your HVAC Solution Designs into Autodesk Revit MEP 2013 and 2014

Joe Simmons - HVAC Solution, Inc.

## Going From Concept to Completion

### WHY?

It's all about getting across the finish line on time,  
on budget, and feeling good!



# Learning objectives:

- Import files from loads programs (**Trane**, Elite CHVAC, gbXML, Taco Load Tool) into HVAC Solution.
- Build your air handlers, airflow, hydronic, steam, and control schematics and then **optimize and run simulations** on systems.
- **Automatically** select equipment from HVAC manufacturers that meet system design capacities. Create equipment and control schedules, BOMs, DXF™ files and more!
- Use the new **Revit add-in** to import your schedules and schematics into Revit! Or you can map your equipment to a Revit family instance, then transfer HVAC Solution equipment design data to shared parameters of the mapped Revit family instance. We then automatically create schedules using the Revit API.

# How HVAC Solution and Revit are used to take a project from Concept to Completion

## Concept: HVAC Solution

The concept staff:

- Develops the design ideas and comes up with systems.
- Sells the design/systems to the client.
- Communicates the design for completion to the detail staff.

## Completion: Revit

The completion/detail staff:

- Details out the design given to them by the concept staff.
- Completes the design under the supervision of the concept staff.

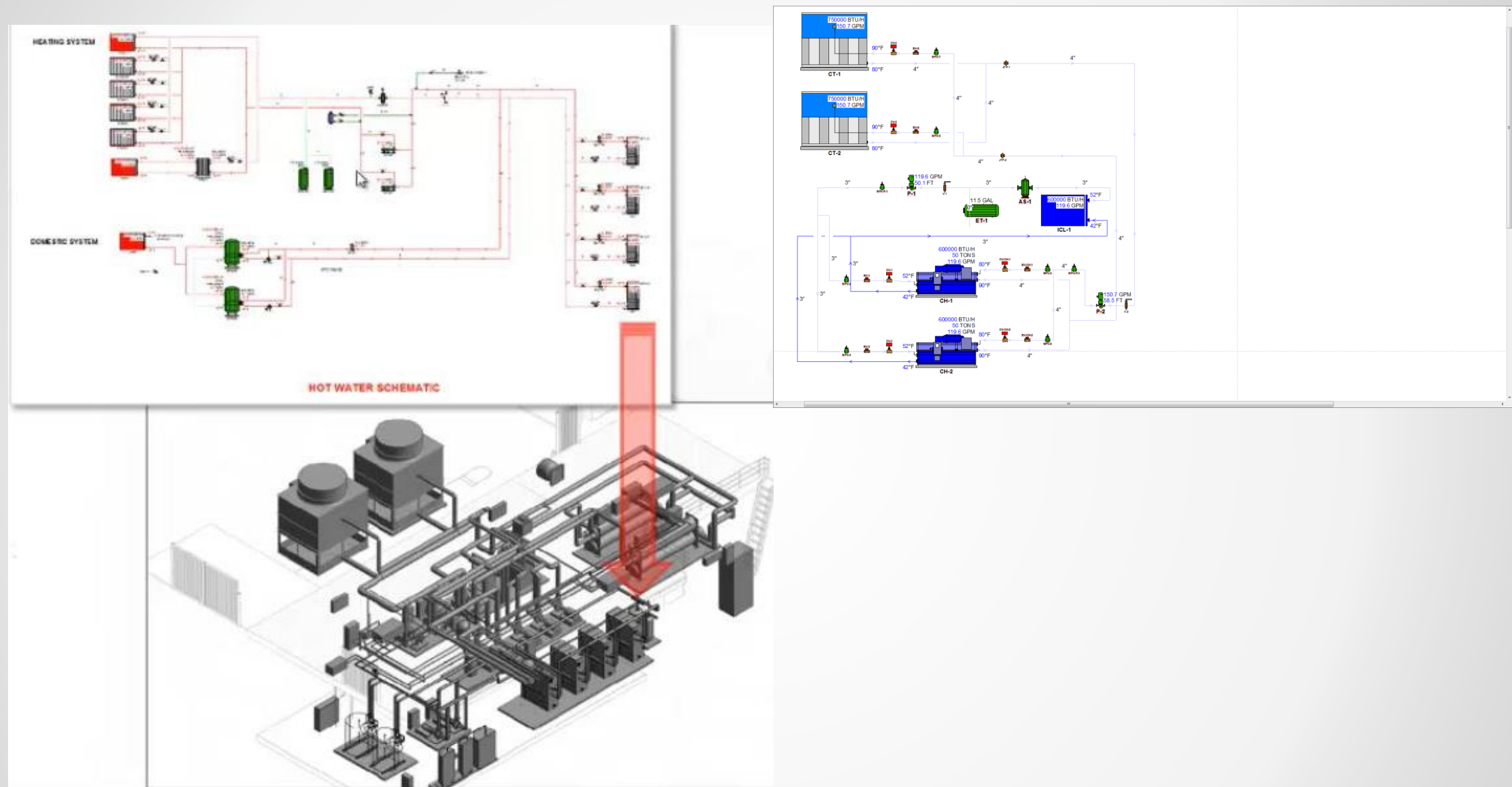


# The Concept Staff and Completion/Detail Staff can be the **same** or a **different** person

Depending on the following:

- **Knowledge** and **experience** of systems and software.
- Size and type of projects.
- Size of firm.
- Who is most cost **effective** and/or who will be most **profitable**?

# An HVAC Solution Schematic Concept



## And the Revit Completion

# Current tools employed in going from Concept to Completion

- 1) **Loads program** - Trane Trace, Elite CHVAC, gbXML, Taco Load Tool.
- 2) **HVAC Solution – Professional software.**
- 3) Integrated manufacturers **selection software!** We have over 40 manufacturer partners.
- 4) Autodesk products - **AutoCAD, Revit MEP.**

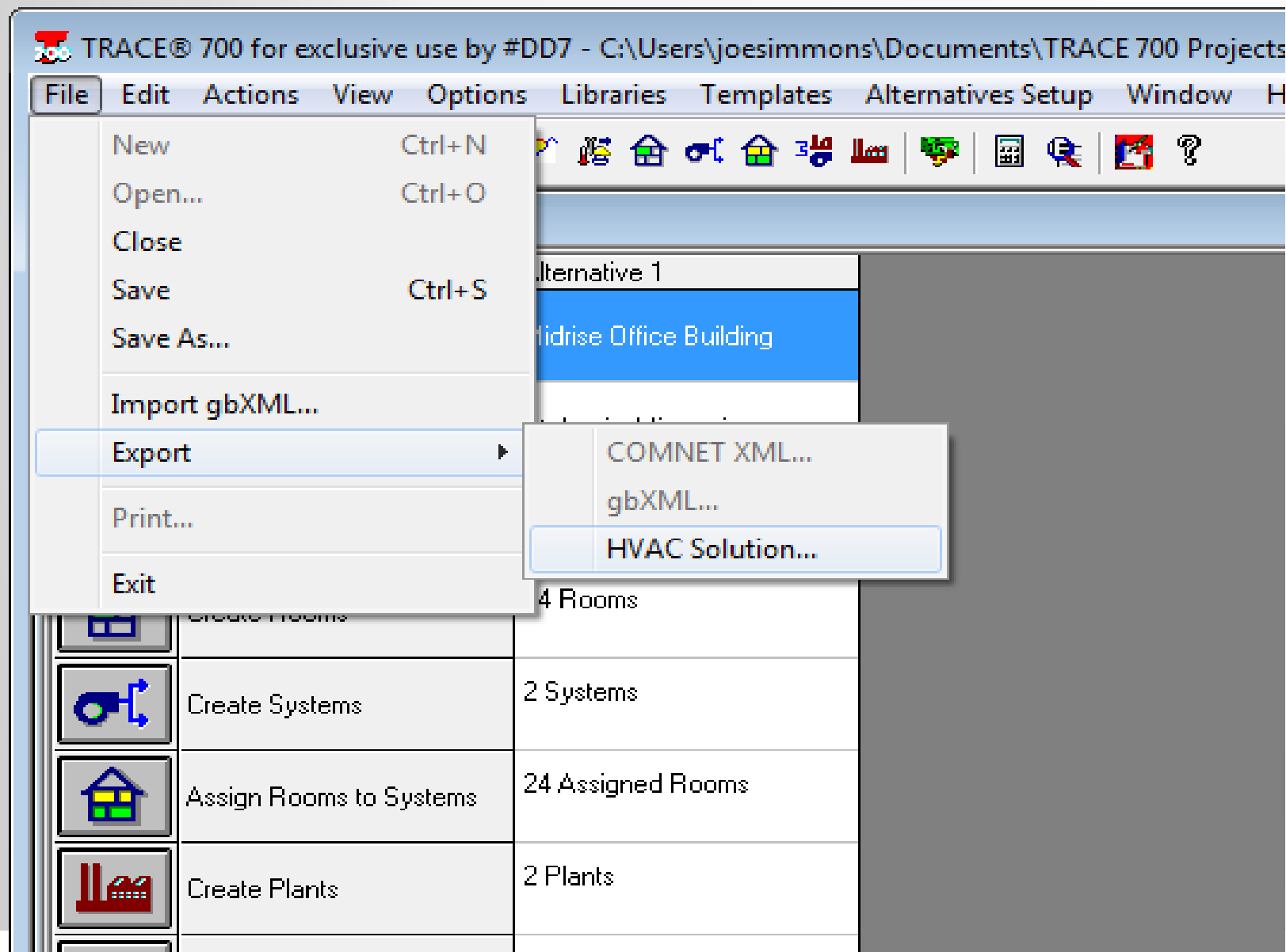
# Information required from a **loads** program for HVAC Solution

- Altitude, location
  - Outside air conditions
  - Space air temperature
  - Space heating and cooling airflows
  - Number of people
  - Space sensible heating loss
  - Exhaust airflow.
- 
- Systems should be **modeled in HVAC Solution** as closely as possible to the way they were modeled **in your loads program** to insure similar results.



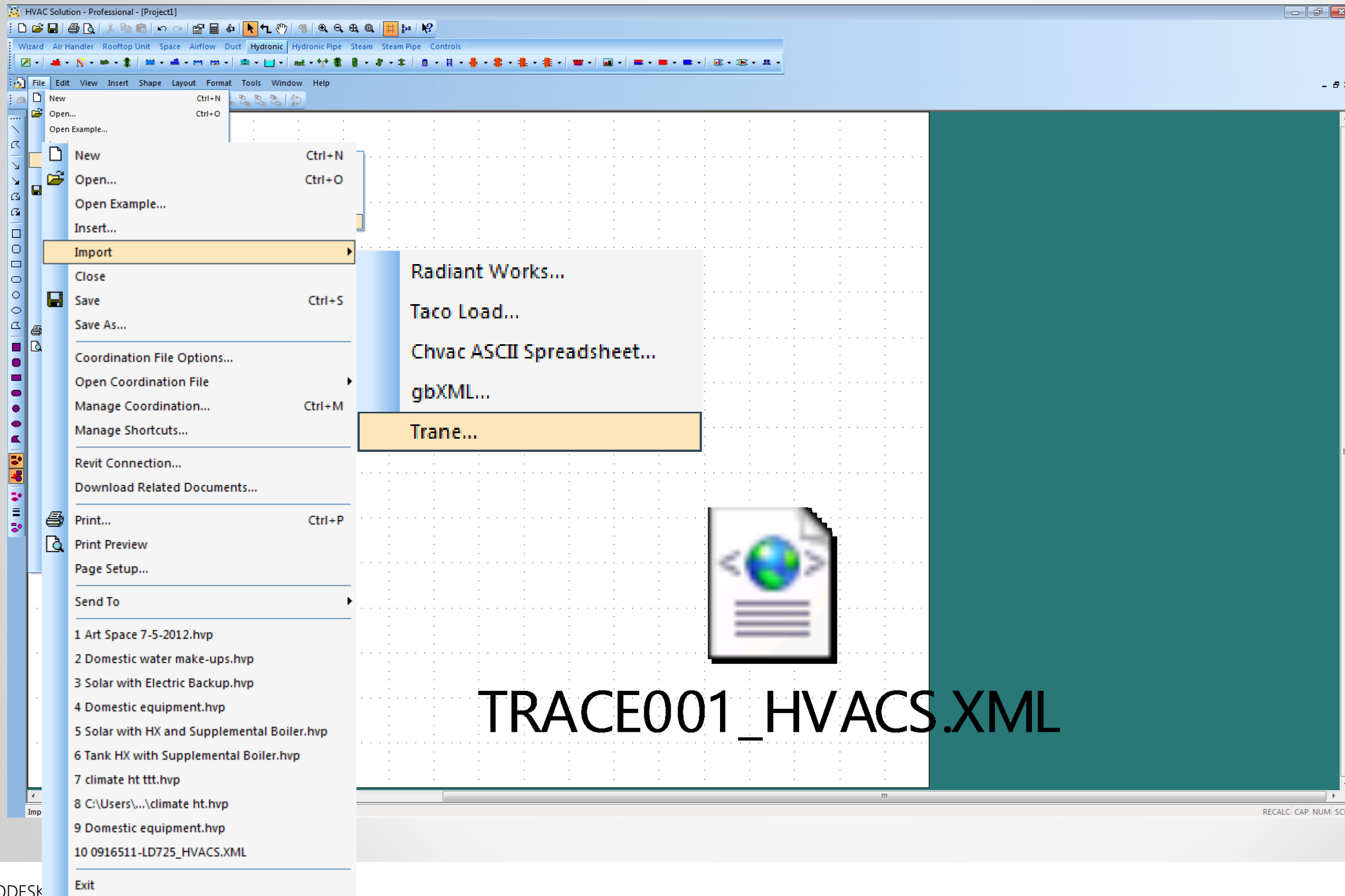
# 1) Import a file from a Trane Trace 700 loads program!

Go to “File”, “Export”, and select “HVAC Solution”. This will create the following file to import into HVAC Solution.



TRACE001\_HVACS.XML

# 1) Open up HVAC Solution. Select File, Import, Trane from the menu.



## 2) Answer questions asked by our Import Wizard and it will build the schematics for you.

Air Handler/Rooftop Unit - Systems

Systems

Number of systems:

Detail level

☒ System

☐ Terminal zone

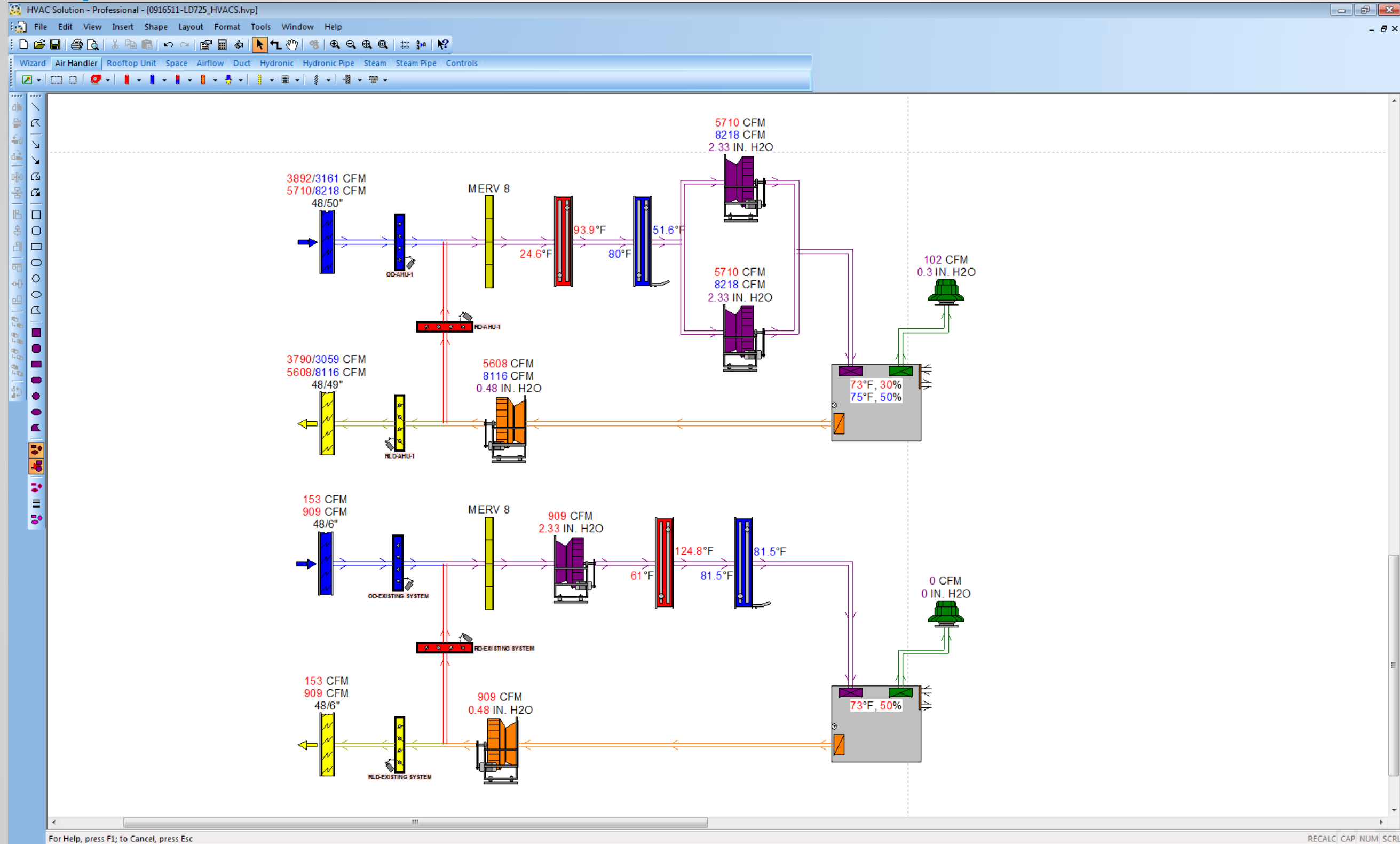
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## 2a) Air handler schematic!

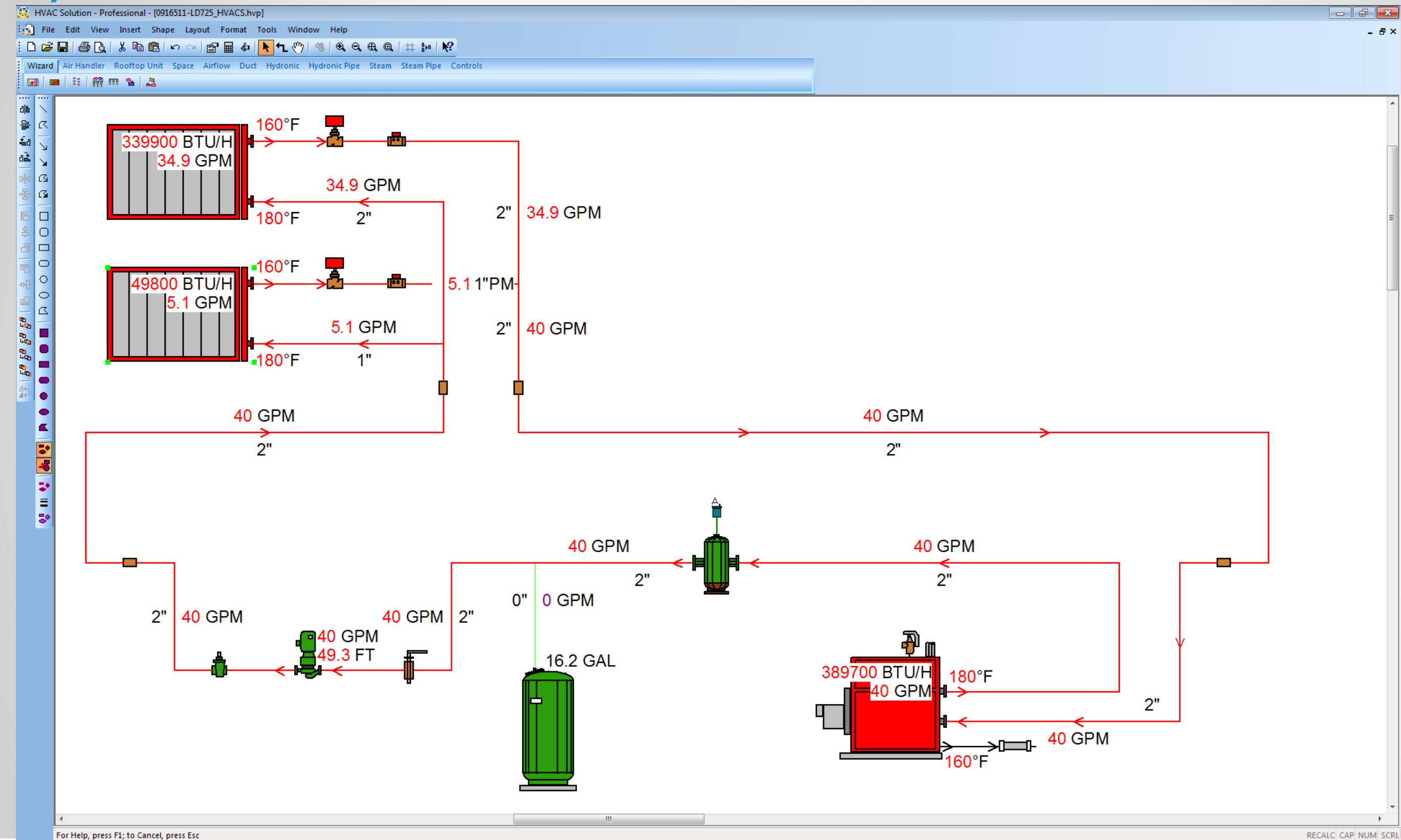


## 2b) Airflow schematic!

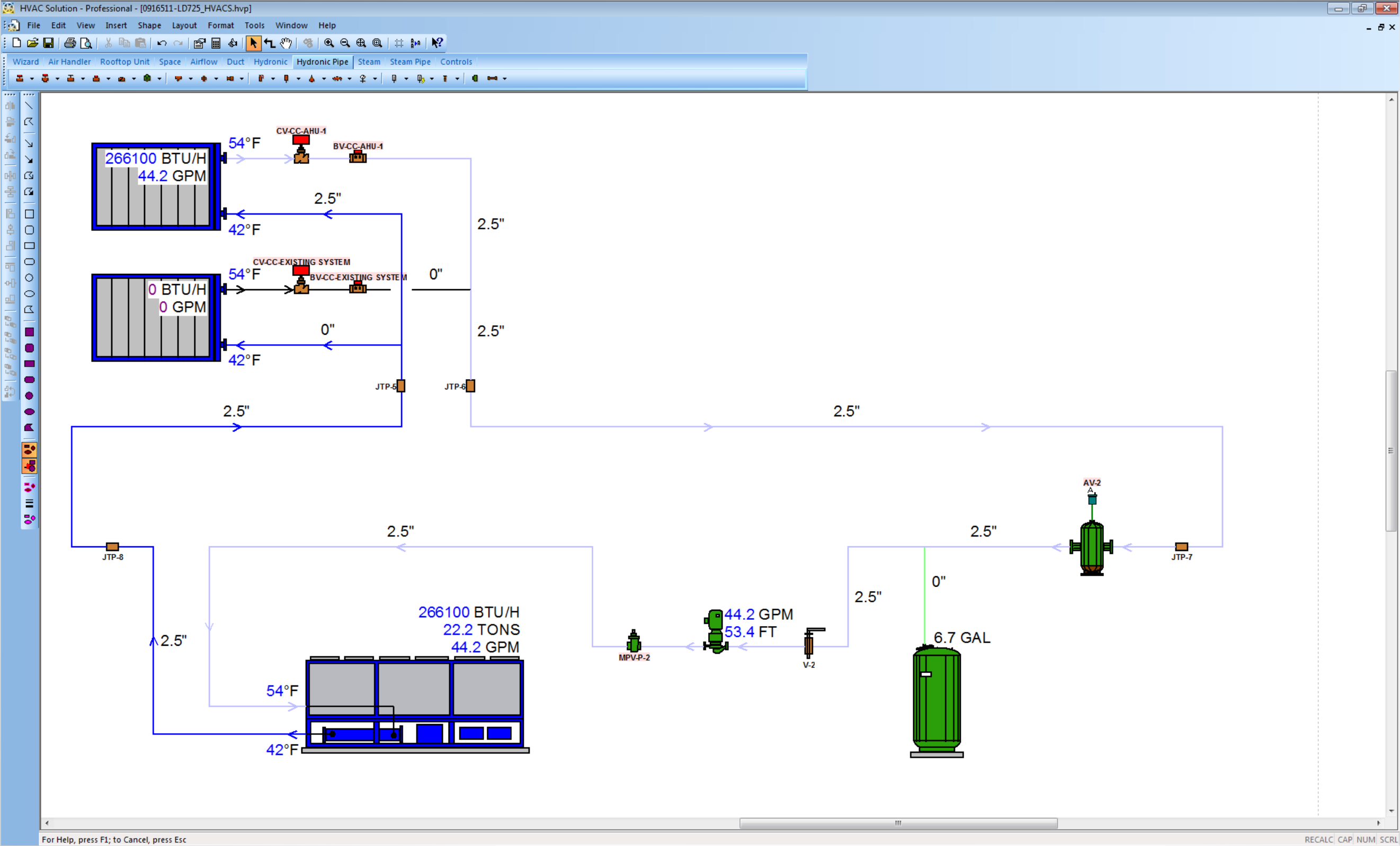




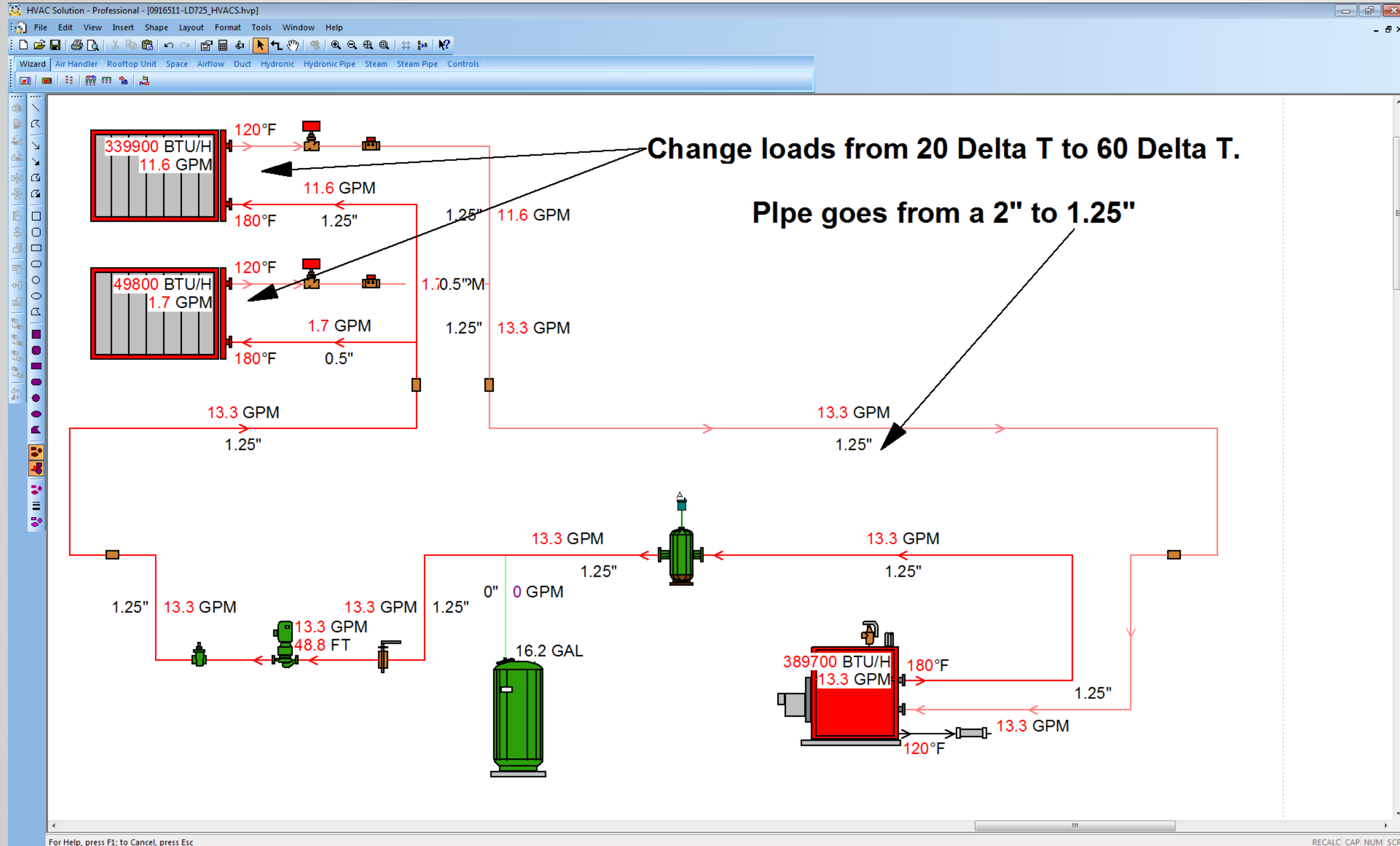
# 2c) Hot water schematic!



# 2d) Chilled water schematic!



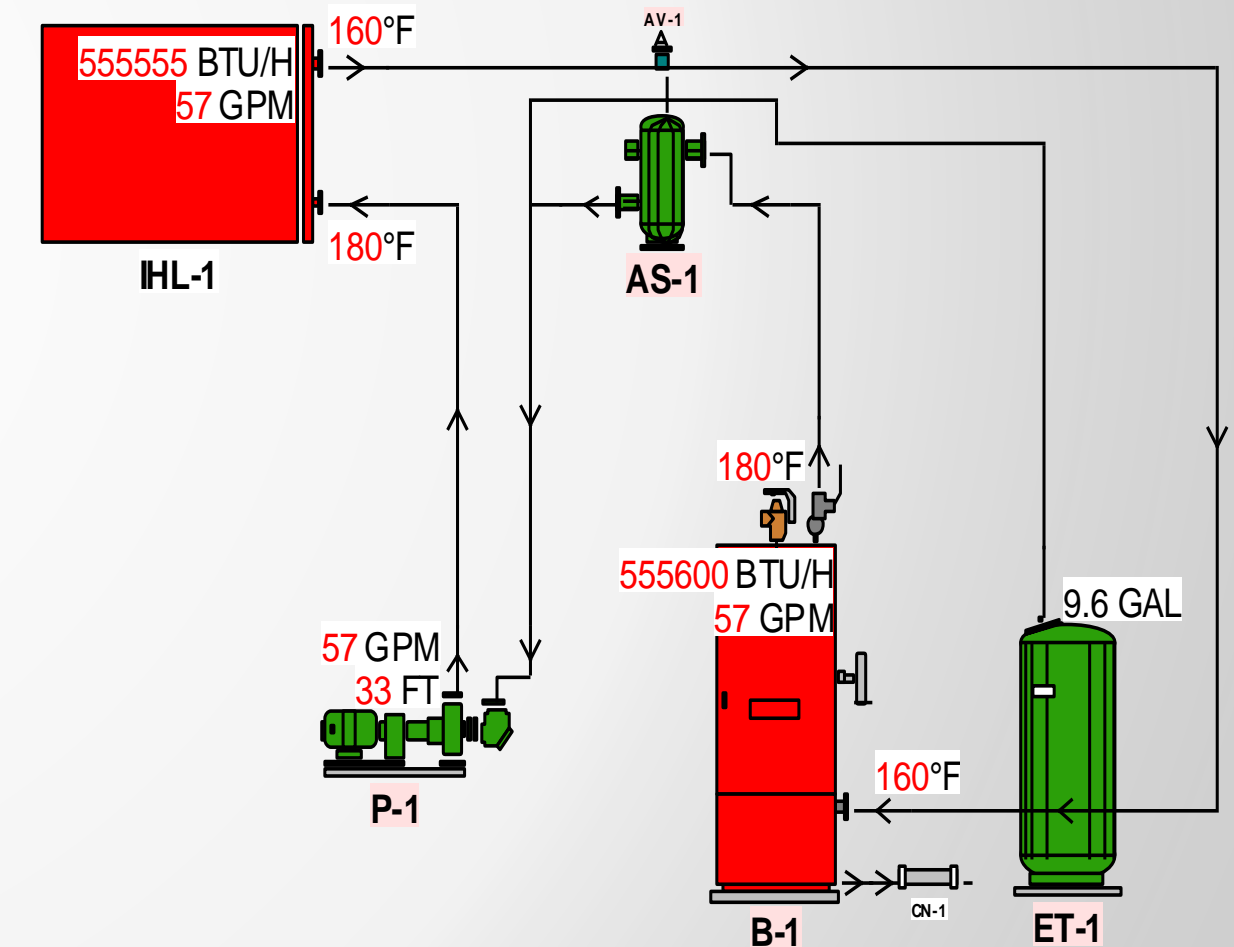
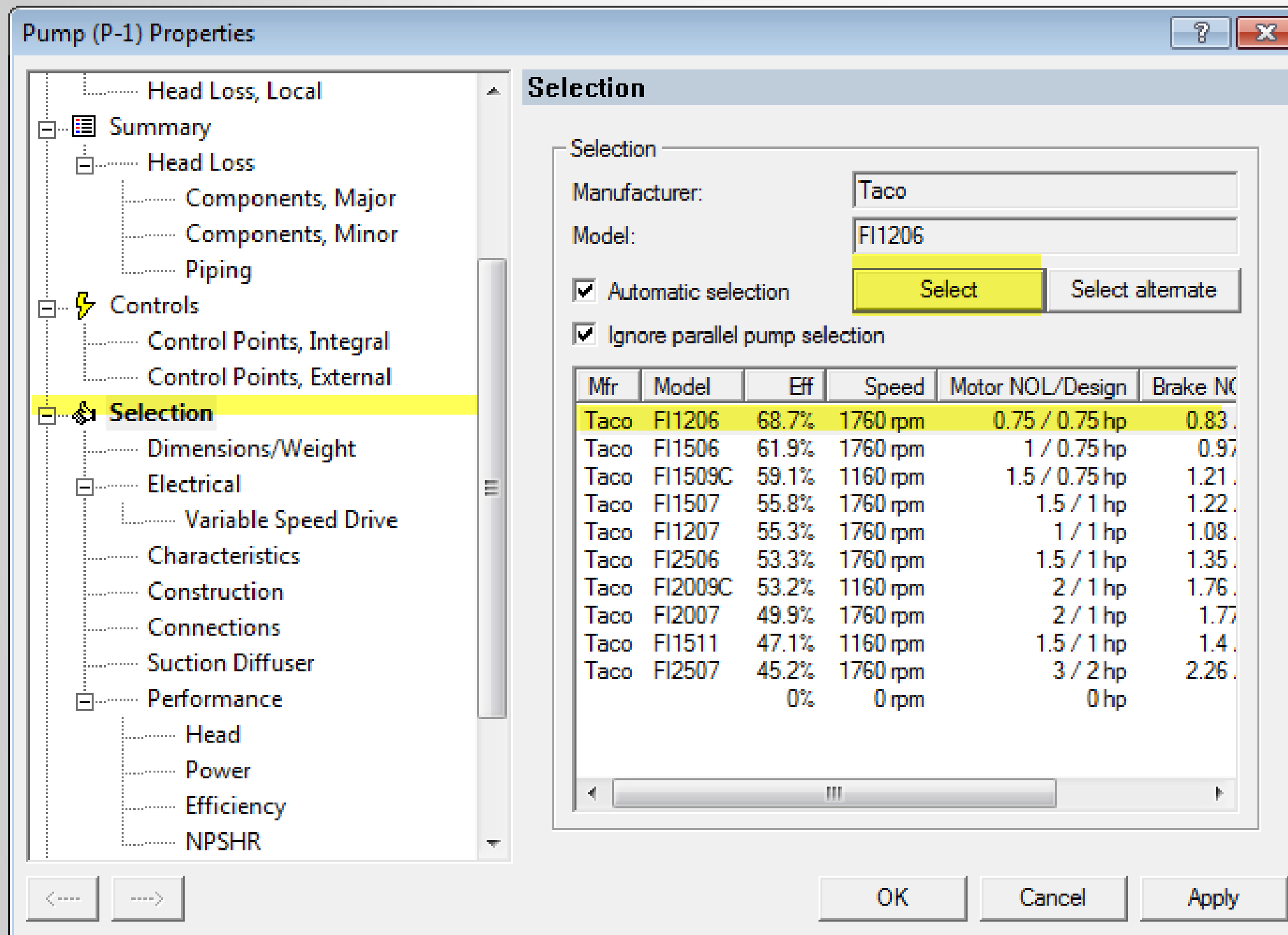
## 2e) Optimize and run simulations on systems!



## 2f) Optimize and run simulations on systems!

- Change pipe sizes and look at actual head loss.
- Change pipe material to see how roughness changes the head loss.
- Look at different pump types for greater efficiencies and lower BHP.
- Compare pipe fitting factors to actual number and type of fittings.
- See the effect of glycol and the percentage in your systems.
- Compare different piping distribution types – direct return, reverse return, and single pipe system.
- Compare different pump configurations – manifold, primary, primary secondary.

### 3) Automatically select equipment from HVAC manufacturers that meet system capacities





### 3a) **Automatically** create BOM, controls, electric equipment and transfer air schedules, reports, schematics!

<input checked="" type="checkbox"/>	Bill of Materials	Excel (.xls)
<input type="checkbox"/>	BuyTaco Quote File	Proprietary
<input checked="" type="checkbox"/>	Controls Schedule	Excel (.xls)
<input checked="" type="checkbox"/>	Detailed Report	Rich Text Format (.rtf)
<input checked="" type="checkbox"/>	Electrical Schedule	Excel (.xls)
<input checked="" type="checkbox"/>	Equipment Schedule	AutoCAD (.dxf) & Excel (.xls)
<input checked="" type="checkbox"/>	Related Documents Report	Rich Text Format (.rtf)
<input checked="" type="checkbox"/>	Schematic	AutoCAD (.dxf)
<input checked="" type="checkbox"/>	Transfer Air Schedule	Excel (.xls)

# 3b) Equipment schedules!

AIR VENT SCHEDULE						
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	LEGEND		NOTES
				MINOR HEIGHT [ft]	IFT FITTING [ft]	
AV-1			UPPER, AUTOMATIC			
AV-2			UPPER, AUTOMATIC			

AIR SEPARATOR SCHEDULE								
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	FLUID			PHYSICAL	
				FLOW RATE [GPM]	WORKING FLUID	DEAN LOSS [ft]	MAX HEIGHT [ft]	NOTES
AS-1	TACO 400SANT-S		BACK - HIGH EFF [AIR/WATER]	40	WATER	5	11.56627.125	1
AS-2	TACO 400SANT-S		BACK - HIGH EFF [AIR/WATER]	41.2	WATER	5	11.68827.125	1

1. ASME CERTIFIED

CONDENSATE NEUTRALIZER SCHEDULE									
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	QTY	TYPE	CONDENSATE DEVICE		PHYSICAL		NOTES
					INPUT LOAD [THERM]	EFFICIENCY [%]	LEGEND MINOR HEIGHT [ft]	IFT FITTING [ft]	
CN-1	AUTUM NC-1		1	STANDARD	48710	80	0.75/3.625/4	0.5	

DAMPER SCHEDULE										
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	AIR TYPE	CONTROL TYPE	BLADE OPERATION	AIR		ELECTRICAL	PHYSICAL	NOTES
						MAXIMUM AIRFLOW RATE [CFM]	STATIC PRESSURE [IN. W2O]			
DN-EXISTING SYSTEM	DN-ADD-1	BRKCN CND	ADD-1	OUTSIDE AIR	MORRLAY	OPPOSED	8210	0.026	20/160	15/95
	DN-ADD-1	BRKCN CND	EXISTING SYSTEM	OUTSIDE AIR	MORRLAY	OPPOSED	500	0.026	20/160	12/12
	DN-ADD-1	BRKCN CND	ADD-1	RETURN AIR	MORRLAY	OPPOSED	5067	0.026	20/160	12/12
DN-EXISTING SYSTEM			EXISTING SYSTEM	RETURN AIR	MORRLAY	OPPOSED	756	0	20/160	11/11
DN-EXISTING SYSTEM	DN-ADD-1	BRKCN CND	ADD-1	RELIEF AIR	MORRLAY	OPPOSED	6146	0.026	20/160	15/95
	DN-ADD-1	BRKCN CND	EXISTING SYSTEM	RELIEF AIR	MORRLAY	OPPOSED	500	0.026	20/160	12/12

FILTER SCHEDULE										
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	FILTRATION	TYPE	ARRANG.	AIR		PHYSICAL		NOTES
						CLEAN STATIC PRESSURE [IN. W2O]	DIRTY STATIC PRESSURE [IN. W2O]	NUMBER OF 12"x24" MUNNEX	NUMBER OF 12"x24" MUNNEX	
F-ADD-1		ADD-1	MERV 8	CARTIDGE	FLAT	0.5	0.8	5	0	
F-EXISTING SYSTEM		EXISTING SYSTEM	MERV 8	CARTIDGE	FLAT	0.5	0.8	0	5	

LOUVER SCHEDULE							
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	AIR TYPE	AIR		PHYSICAL
					MAXIMUM AIRFLOW RATE [CFM]	STATIC PRESSURE [IN. W2O]	MINOR HEIGHT THICKNESS [ft]
L-1	BRKCN ELF607SMA		STATIONARY	WAKE	8210	0.1	00548
L-2	BRKCN ELF607SMA		STATIONARY	RELIEF	6146	0.1	00478
L-3	BRKCN ELF607SMA		STATIONARY	WAKE	500	0.1	00128
L-4	BRKCN ELF607SMA		STATIONARY	RELIEF	500	0.1	00128

BALANCING VALVE SCHEDULE							
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	BODY CONSTRUCTION	FLUID		PHYSICAL
					FLOW RATE [GPM]	DEAN LOSS [ft]	CORRECT SIZE [ft]



## 3c) Control schedules!

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
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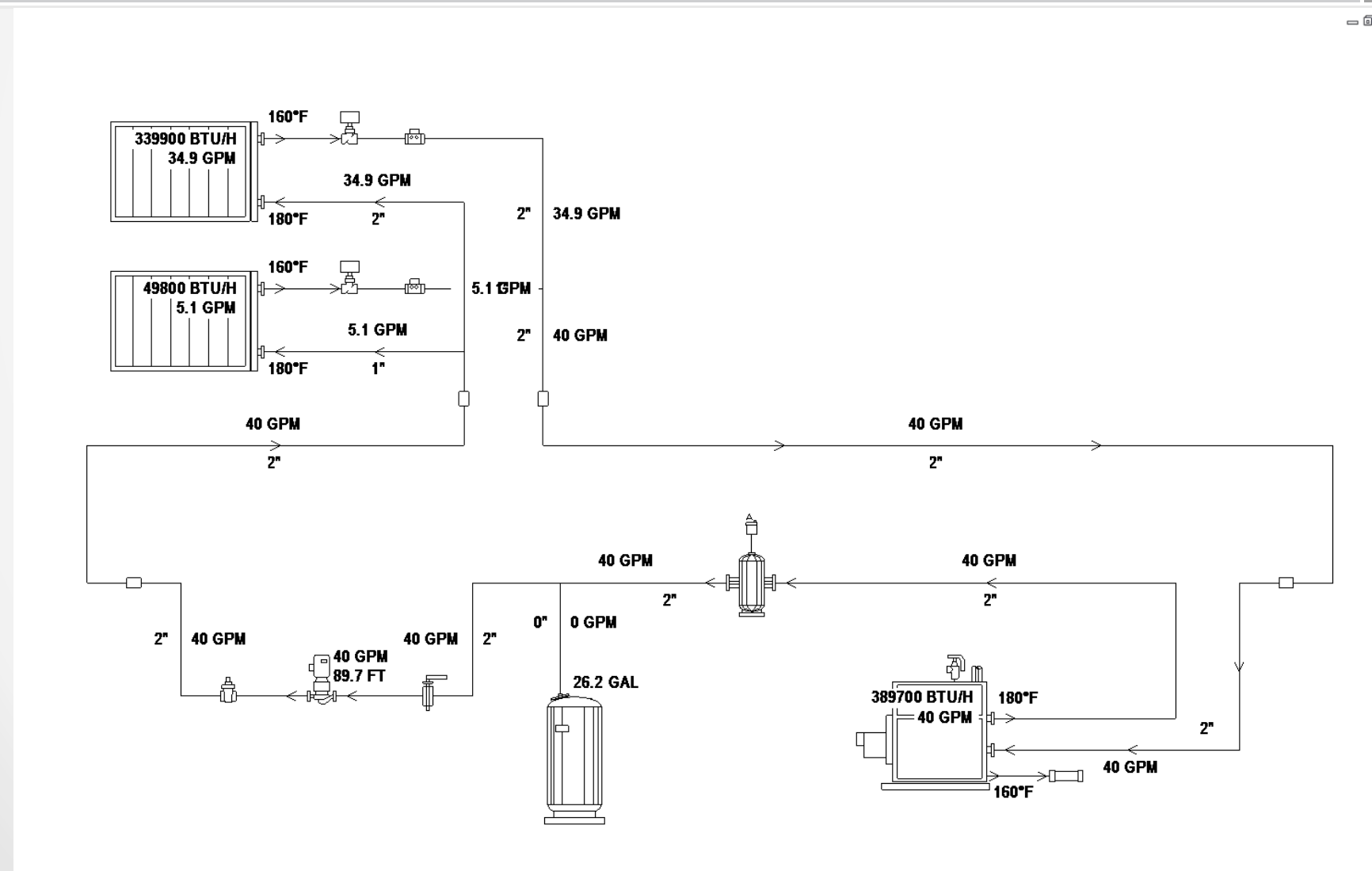
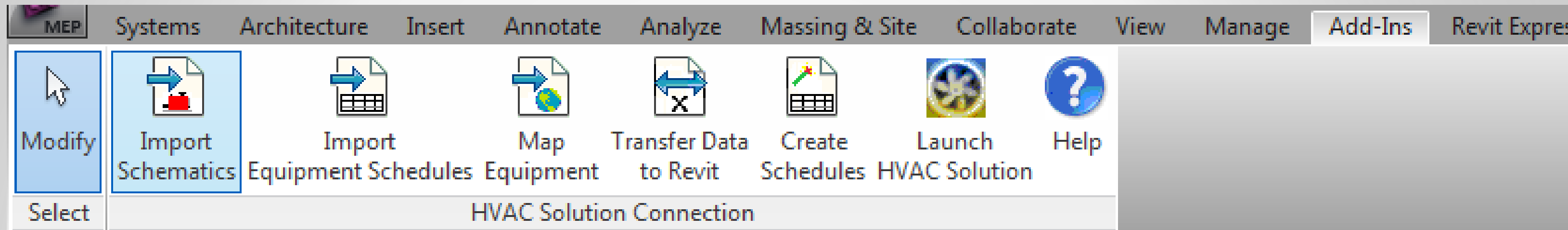
  

CONTROL POINT COORDINATION SCHEDULE						
NUMBER	EQUIPMENT		CONTROL POINT			NOTES
	DESCRIPTION	ID	DESCRIPTION	TYPE	DEVICE	
1			AIR RELATIVE HUMIDITY, OUTSIDE	AI	HUMIDITY SENSOR	
2			AIR TEMPERATURE, OUTSIDE	AI	TEMPERATURE SENSOR	
3			DAYLIGHT DETECTION	DI	PHOTO SENSOR	
4	AIR HANDLER		AIR DIFFERENTIAL PRESSURE, BUILDING INTERIOR	AI	DIFFERENTIAL PRESSURE SENSOR	
5	AIR HANDLER		AIR RELATIVE HUMIDITY, OUTSIDE	AI	HUMIDITY SENSOR	
6	AIR HANDLER		AIR TEMPERATURE, OUTSIDE	AI	TEMPERATURE SENSOR	
7	AIR HANDLER	AHU-1	AIR DIFFERENTIAL PRESSURE, RETURN	AI	DIFFERENTIAL PRESSURE SENSOR	
8	AIR HANDLER	AHU-1	AIR DIFFERENTIAL PRESSURE, SUPPLY	AI	DIFFERENTIAL PRESSURE SENSOR	
9	AIR HANDLER	AHU-1	AIR RELATIVE HUMIDITY, MIXED	AI	HUMIDITY SENSOR	
10	AIR HANDLER	AHU-1	AIR RELATIVE HUMIDITY, RETURN	AI	HUMIDITY SENSOR	
11	AIR HANDLER	AHU-1	AIR RELATIVE HUMIDITY, SUPPLY	AI	HUMIDITY SENSOR	
12	AIR HANDLER	AHU-1	AIR TEMPERATURE, MIXED	AI	TEMPERATURE SENSOR	
13	AIR HANDLER	AHU-1	AIR TEMPERATURE, RETURN	AI	TEMPERATURE SENSOR	
14	AIR HANDLER	AHU-1	AIR TEMPERATURE, SUPPLY	AI	TEMPERATURE SENSOR	
15	AIR HANDLER	AHU-1	AIRFLOW, OUTSIDE	AI	AIRFLOW STATION	
16	AIR HANDLER	AHU-1	AIRFLOW, RETURN	AI	AIRFLOW STATION	
17	AIR HANDLER	AHU-1	AIRFLOW, SUPPLY	AI	AIRFLOW STATION	
18	AIR HANDLER	AHU-1	CO2 LEVEL	AI	CO2 SENSOR	
19	AIR HANDLER	AHU-1	FREEZE DETECTION	DI	FREEZE STAT	
20	AIR HANDLER	AHU-1	SMOKE DETECTION, RETURN	DI	SMOKE DETECTOR	
21	AIR HANDLER	AHU-1	SMOKE DETECTION, SUPPLY	DI	SMOKE DETECTOR	
22	AIR HANDLER	AHU-1	START/STOP	DO	REMOTE RELAY	
23	AIR HANDLER	AHU-1	STATUS	DI	CURRENT SENSOR	
24	AIR HANDLER	EXISTING SYSTEM	AIR DIFFERENTIAL PRESSURE, RETURN	AI	DIFFERENTIAL PRESSURE SENSOR	
25	AIR HANDLER	EXISTING SYSTEM	AIR DIFFERENTIAL PRESSURE, SUPPLY	AI	DIFFERENTIAL PRESSURE SENSOR	
26	AIR HANDLER	EXISTING SYSTEM	AIR RELATIVE HUMIDITY, MIXED	AI	HUMIDITY SENSOR	
27	AIR HANDLER	EXISTING SYSTEM	AIR RELATIVE HUMIDITY, RETURN	AI	HUMIDITY SENSOR	
28	AIR HANDLER	EXISTING SYSTEM	AIR RELATIVE HUMIDITY, SUPPLY	AI	HUMIDITY SENSOR	
29	AIR HANDLER	EXISTING SYSTEM	AIR TEMPERATURE, MIXED	AI	TEMPERATURE SENSOR	
30	AIR HANDLER	EXISTING SYSTEM	AIR TEMPERATURE, RETURN	AI	TEMPERATURE SENSOR	
31	AIR HANDLER	EXISTING SYSTEM	AIR TEMPERATURE, SUPPLY	AI	TEMPERATURE SENSOR	
32	AIR HANDLER	EXISTING SYSTEM	AIRFLOW, OUTSIDE	AI	AIRFLOW STATION	
33	AIR HANDLER	EXISTING SYSTEM	AIRFLOW, RETURN	AI	AIRFLOW STATION	
34	AIR HANDLER	EXISTING SYSTEM	AIRFLOW, SUPPLY	AI	AIRFLOW STATION	
35	AIR HANDLER	EXISTING SYSTEM	CO2 LEVEL	AI	CO2 SENSOR	
36	AIR HANDLER	EXISTING SYSTEM	FREEZE DETECTION	DI	FREEZE STAT	
37	AIR HANDLER	EXISTING SYSTEM	SMOKE DETECTION, RETURN	DI	SMOKE DETECTOR	
38	AIR HANDLER	EXISTING SYSTEM	SMOKE DETECTION, SUPPLY	DI	SMOKE DETECTOR	
39	AIR HANDLER	EXISTING SYSTEM	START/STOP	DO	REMOTE RELAY	
40	AIR HANDLER	EXISTING SYSTEM	STATUS	DI	CURRENT SENSOR	
41	BOILER		FLUID TEMPERATURE, PRIMARY, RETURN	AI	TEMPERATURE SENSOR	
42	BOILER		FLUID TEMPERATURE, PRIMARY, SUPPLY	AI	TEMPERATURE SENSOR	
43	BOILER		FLUID TEMPERATURE, SECONDARY, RETURN	AI	TEMPERATURE SENSOR	

Sort By Equipment Sort By Type



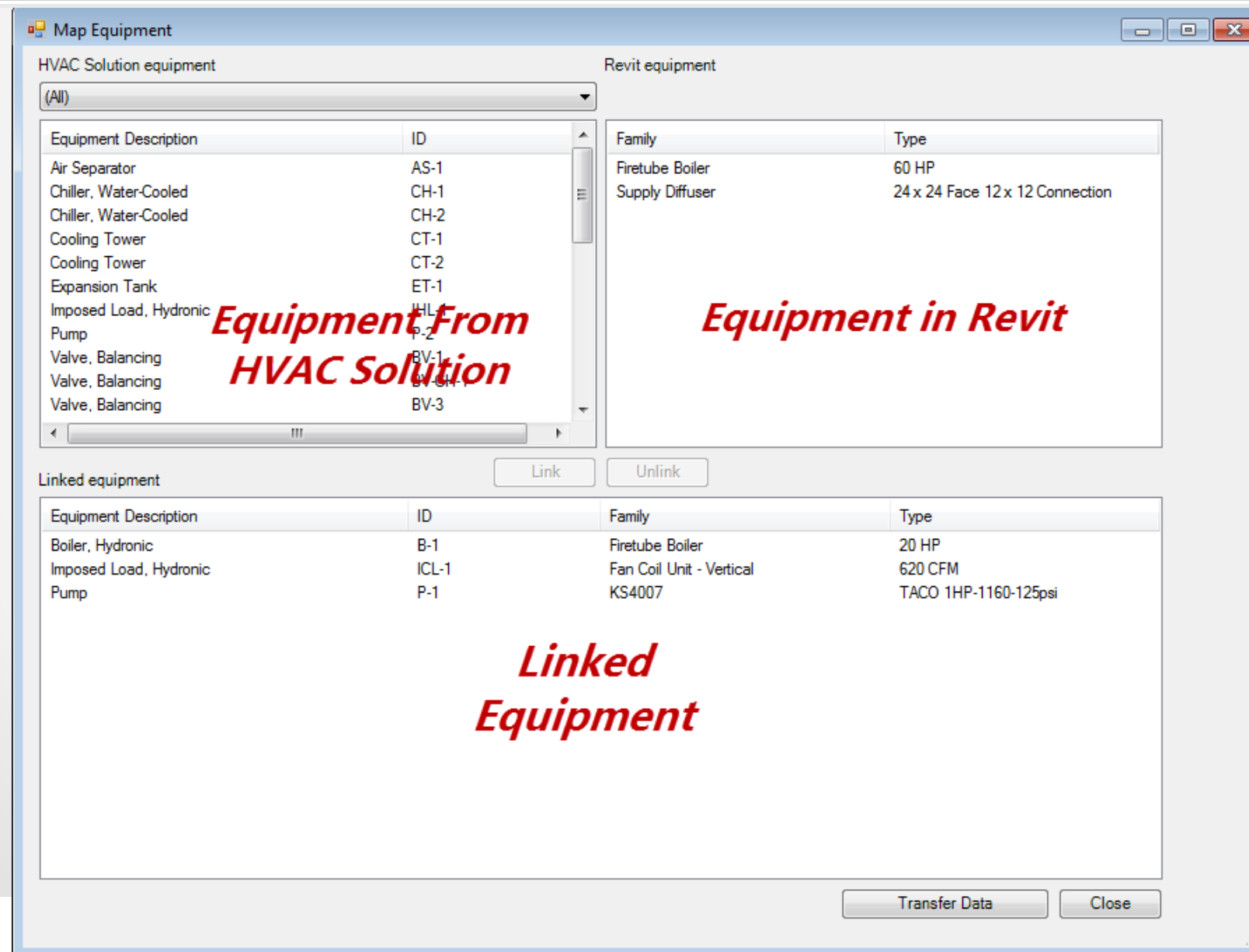
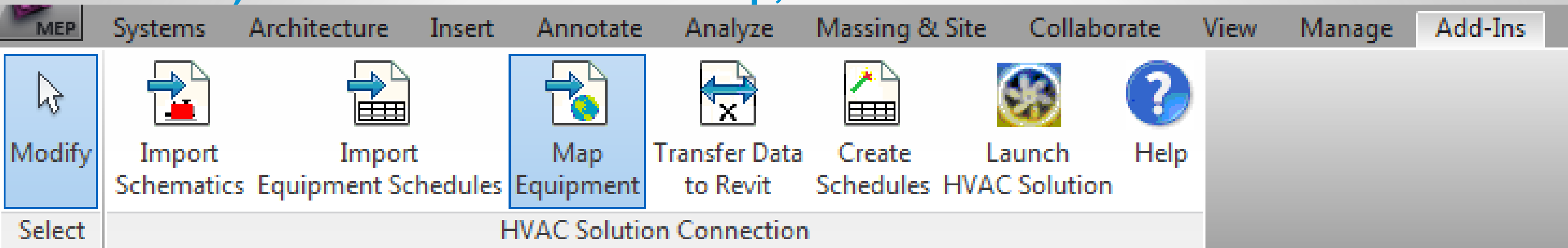
## 4a) Use the Revit add-in to import your schematics into Revit MEP!







## 4c) Use the Revit add-in to map, link and transfer data into Revit MEP!



## 4d) HVAC Solution equipment design data is placed in the mapped Revit family instance for schedule creation.

MEP Systems Architecture Insert Annotate Analyze Massing & Site Collaborate View Manage Add-Ins

Modify Select Import Schematics Import Equipment Schedules Map Equipment Transfer Data to Revit Create Schedules HVAC Solution Launch HVAC Solution Help

HVAC Solution Connection Create Schedules

Flow	0 GPM
Efficiency	%
System Classification	Power,Hydronic Supply,Hydron...
System Name	
Identity Data	⌵
Comments	
Mark	6
Phasing	⌵
Phase Created	New Construction
Phase Demolished	None
Data	⌵
Use Both Units of Measure (HV...	No
Data Provider (HVAC Solution)	HVAC Solution
Equipment Description (HVAC ...	Pump
ID (HVAC Solution)	P-2
Manufacturer (HVAC Solution)	Taco
Model (HVAC Solution)	KS1509
Location (HVAC Solution)	

The remainder of this presentation will demonstrate HVAC Solution and Revit, from Concept to Completion.



