

# Using the Autodesk Revit S-File Template, Version 2011



This document helps you to get started in using the “USAF S-File Revit Template” in a BIM project. The template is intended to give users a jump-start in developing Revit project models that accommodate S-File data for USAF projects. Refer to the USAF Flight Plan for a detailed explanation of USAF space standards, required space data, BIM requirements and workflows to support the organizations standard project deliverables.

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## 1. The Revit Template Download File

The USAF Revit Space Template “zip” file contains:

- **Using the Revit USAF S-File Template.pdf** (this document)
- **USAF S-File Template\_Revit Arch 2011.rvt** (Revit file)

## 2. Familiarizing Yourself with the Template

The Revit template model was set up with special project parameters, schedules, schedule keys, and floor area views - all related to classifying and attaching information to rooms and areas in accordance with the USAF Flight Plan and requirements for developing and exporting S-File data from Revit models.

The template contains a sample building model to help familiarize users with a generic project in which S-File data fields have been set-up.

To view features of this template and the USAF-specific space/room data that is attached to the Revit model:

- In Revit, open the template file
- Click on the “**1<sup>st</sup> Floor Room Plan**” view
- Hover the cursor over any room
- When an “X” is highlighted by the cursor, (left) click the room object
- The **Properties** window (by default, on the left side of the Revit workspace) will display all of the data associated with the room object
- The USAF S-File fields for each space object will be listed under the **Other** section of the **Properties** window. These are custom parameters created for, and included in this template.

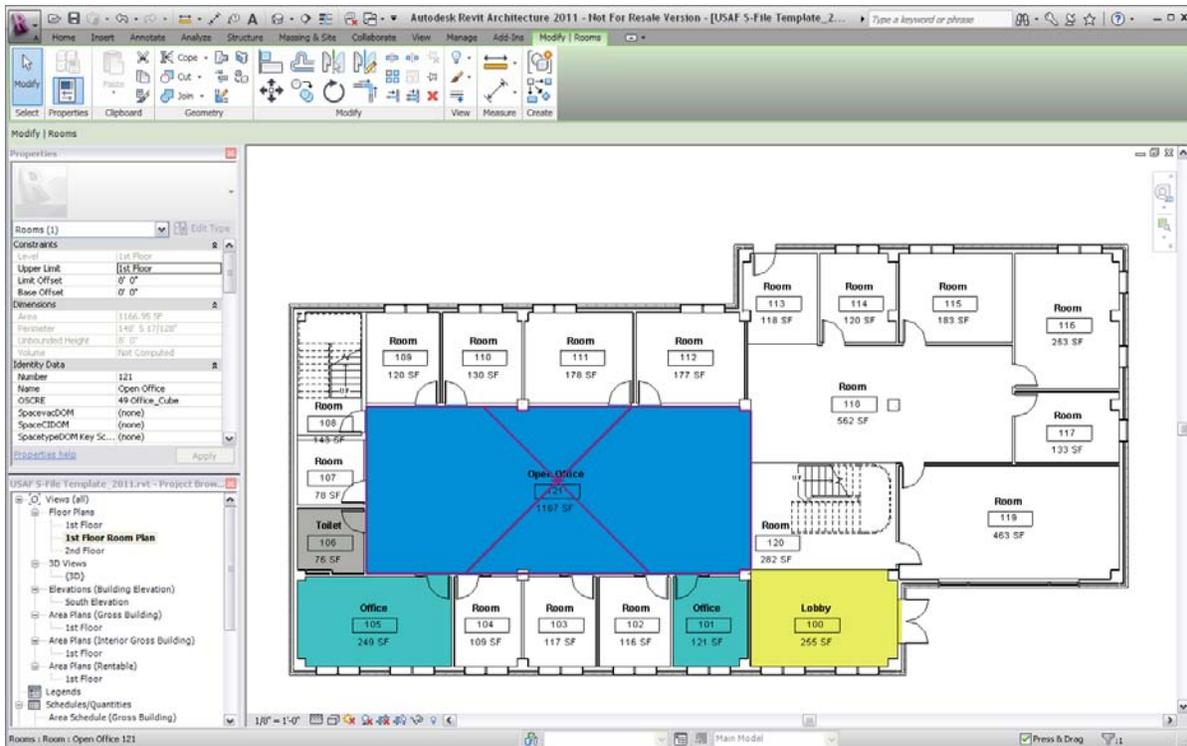


Figure 1 - A room object is selected in Revit (room name: Open Office). Object properties are listed on the **Properties Menu** (upper left side of user interface), including S-File parameter data.

## S-File Room Parameters

All of the fields contained within the USAF S-File **building\_space\_area** table have been affiliated with room objects in this template through Revit project parameters. These fields are listed below.

OBJECTID	spacevac_d	space_ht	user_flag
bspace_id	space_cl_d	space_len	cat_code
map_id	spacety_d	space_wid	unit
meta_id	space_cuse	area_size	flight
media_id	space_puse	area_u_d	organization
coord_id	address_id	perim	SHAPE
room_id	spacename	perim_u_d	oscre_I1
building_id	spacetcost	grid_value	oscre_I2
floor_id	poc_id	instln_id	SHAPE_Length
space_area	agency_id	facil_id	SHAPE_Area

Although all fields from the table are attached to room objects, the user will not necessarily populate all, or even most of the fields. Refer to the USAF BIM Flight Plan or specific project guidelines covering the fields needed to populate for specific projects.

The **oscre\_I3** field has also been included as a parameter, although it is currently not a requirement. This parameter also is not set up to export.

## Revit Schedule Keys

In the template, a few of the custom S-File parameter fields have been set up so that they can be populated via pull-down menus through use of the Revit *Schedule Key* capability. A *Schedule Key* (alternatively - and confusingly - called a *Key Schedule* in Revit online help documentation) is a special type of Revit schedule view that contains reference information to be used in populating a field in a schedule view - for example, a room name field in a room schedule. When a user proceeds to enter data in an object's field that has an affiliated "schedule key", a drop-down menu will appear, providing a list of pre-populated values to pick from.

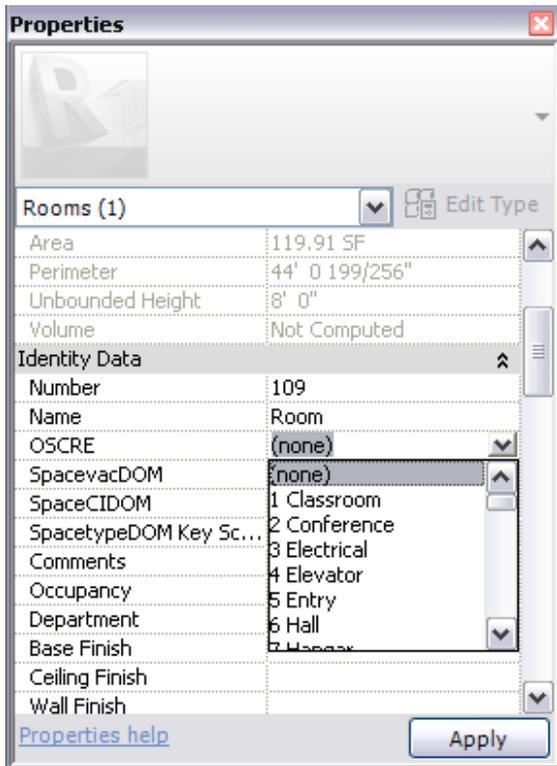


Figure 2 (left): Drop-down menu for assigning OSCRE fields to a Revit room object - populated from "OSCRE" schedule key.

In the USAF S-File Revit template, schedule keys have been provided for:

1. OSCRE - a combined OSCRE Level 1, Level 2, Level 3 and *space type description* (spacety\_p\_d) fields
2. SpaceCIDOM field (*space class* - space\_cl\_d field)
3. SpacevacDOM field (*space vacancy* - spacevac\_d field)

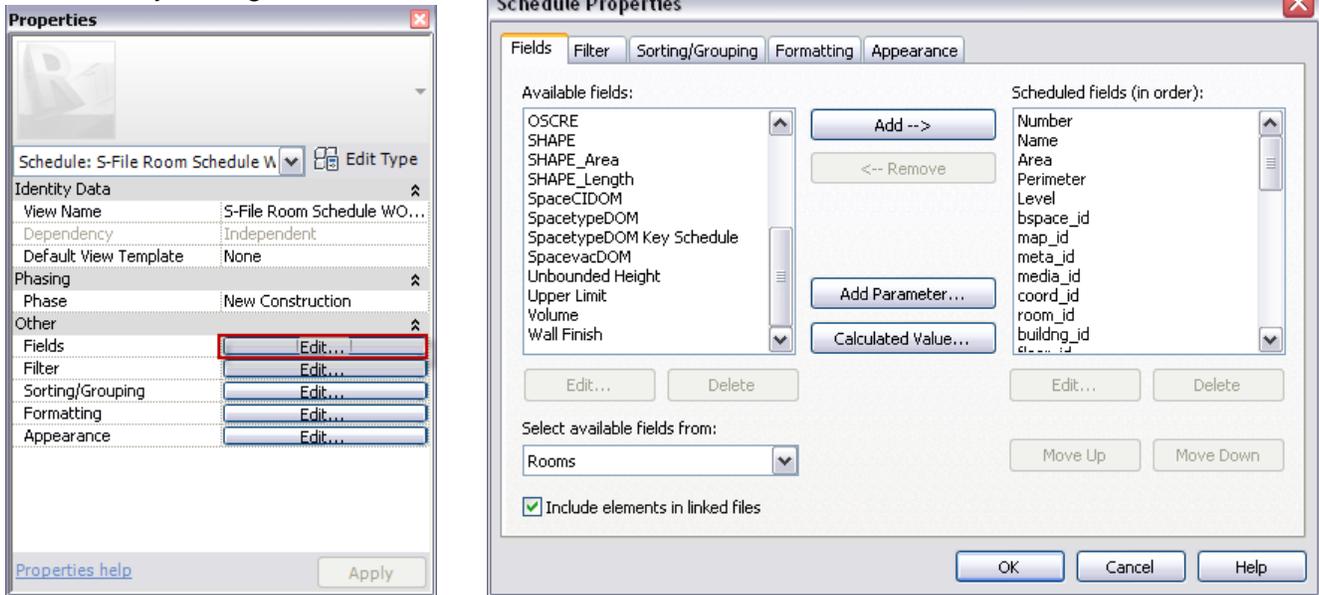
The template has combined the three OSCRE tables, along with the *space type description* table to provide a means for the user to assign the four fields to a room object in sync (see the **Entering Data** section later in this document). Refer to the **Appendix** in this document for a list of the values for each of these fields.

Project users can define additional Revit Schedule Keys for other S-File fields, if a defined list of field choices is available to them.

## S-File Room Schedules

The template includes two S-File Room Schedule views: a schedule view to use on a day-to-day basis in building the model, named **S-File Room Schedule WORKING**, as well as a schedule view to use strictly for exporting the S-File parameters out from Revit, named **S-File Room Schedule for EXPORT**.

In addition to the S-File parameter fields, the working schedule view contains standard Revit room fields such as Number, Name, Level, that are useful to refer to in the normal Revit worksession. The WORKING schedule view does not display fields for S-File parameters that will not be filled out within Revit, such as OBJECTID, SHAPE, among others. The user can adjust the inclusion, or not, of parameters by editing the Fields



Properties for that schedule view.

Figure 3: User can edit the inclusion of parameter fields in a schedule by bringing up the Schedule Properties menu (above, right) by selecting the Fields -> Edit... button on the Properties menu (above left)

Note that in the **S-File Room Schedule WORKING** view the **spacety\_p\_d** field is displayed next to the OSCRE fields, not in its proper position for export.

The **oscre\_I3** field is not included in the **EXPORT** schedule, since it is an optional field at this point in time and not included in the S-File data table.

Revit provides default parameters for rooms - number, name, area, perimeter, level, occupancy, and several others fields. The template has assigned the value of several of the default Revit fields to S-File parameters, as listed below:

<u>S-File Project Parameter</u>		<u>Default Revit parameter</u>
area_size	=	area
perim	=	perimeter

The default Revit room **name** field has not been affiliated with any S-File parameter (spacety\_p\_d, oscre\_I1, etc.), but could be, if desired.

### 3. Applying the Template to Your Project

- In your Revit worksession, open both the USAF S-File Revit template file and the Revit project model that is going to receive the template framework (either a new or existing .rvt file).
- While active in the template model:

- In the Revit Project Browser, highlight all of the views under “Schedules/Quantities”. To do this - click on the top schedule, and then while holding down the *Shift* key, select the last schedule view
- Right click the mouse, and select “Copy to Clipboard”

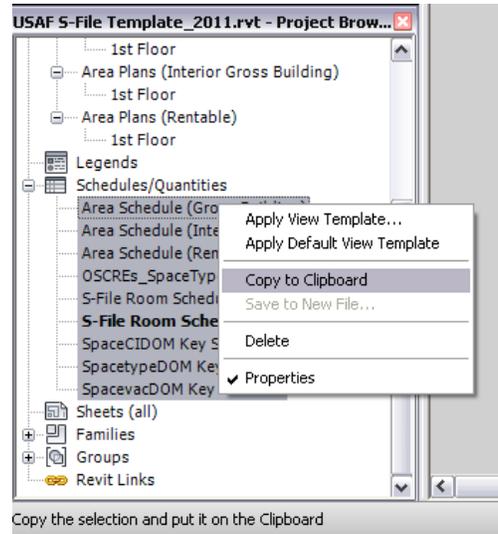


Figure 4 (right) - Revit **Project Browser** window, showing USAF S-File schedules to copy to your existing or new Revit model

- Now change your Revit view to be active in the existing project model you’ve loaded, or to a new Revit project that you have started, and:
  - On the Revit “Modify” menu tab, click on “Paste” and “Paste from Clipboard”

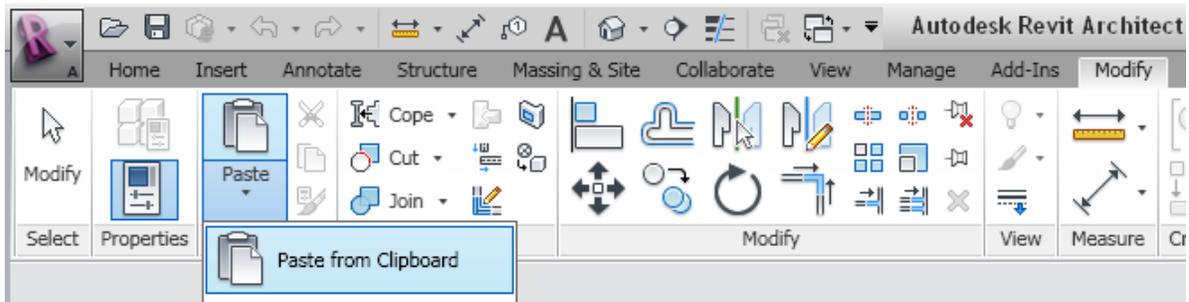


Figure 5: Revit Modify tab menu: executing the Revit command: **Paste > Paste from Clipboard** (on the **Modify** tab)

- You should see that these USAF S-File schedule views have been added under *Schedule/Quantities* in the Revit Project Browser window
- Create a new room object, or click on an existing one, and examine its properties to verify that the S-File parameters have been added to the room objects.
- While your cursor is active in the **Room Properties** menu, under the *Identity Data* section, verify that S-File schedule keys are listed. Experiment with selecting different values in those fields to validate that the schedule keys are functioning as designed.

- You should now be ready to proceed with classifying rooms according to the USAF BIM Flight Plan and your specific project's assignment guidelines.

## 4. Modeling Tips and Techniques for Rooms and Areas

Spaces can be created in Revit by modeling either rooms or areas. With both methods, the resulting spaces are automatically generated and “parametrically” associated with the bounding elements, which can be walls or room separators. As bounding elements such as walls change, associated spaces will change as well, and affiliated views - including the associated room or area schedules, will reflect the modifications, updated with new area and volumetric calculations.

### Rooms in Revit

A user creates a room in Revit by placing a room object into a location in the model that is bounded by either three or more room-bounding walls, or three or more room separation lines. If the space is bounded by walls, the room area is calculated, by default, from the inside face of the walls.

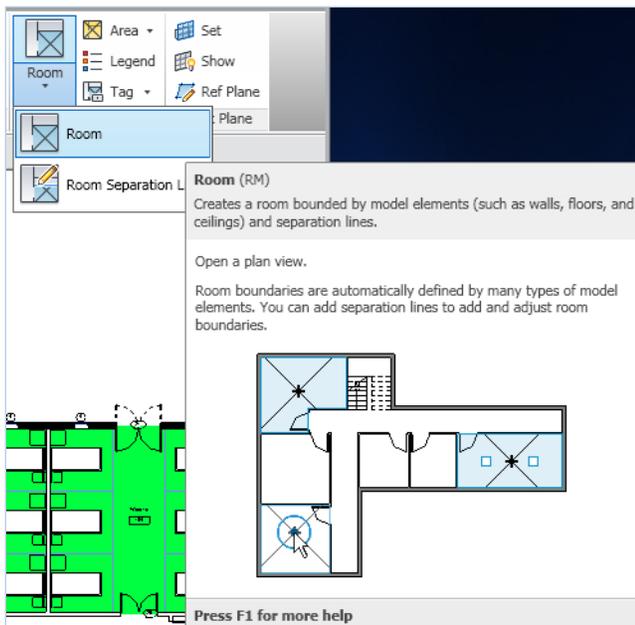


Figure 6: Revit **room** command , located on the ribbon menu's Key **Home** tab

### Revit Areas

As an alternative to using room objects, Revit has an area analysis capability that allows users to create custom area boundaries to define useable space in buildings. You can create multiple area measurement schemes with this facility. By default, Revit creates two area schemes:

- Gross Building: Total constructed area of a building
- Rentable: Area measurements that are based on the BOMA standard method for measuring floor area in office buildings.

You can define areas boundaries by drawing them or by picking walls. Once created, these area boundaries are associated parametrically with their adjacent walls or room separators. Refer to the Autodesk Revit online help facility for more information on area analysis tools. Once these discrete areas have been created, users have the option to apply area rules to them based on an area type. If

the area type is modified, Revit will automatically change the area boundary line. For example, rules may dictate that the area for office space is measured at the wall center line, while exterior area is measured to the exterior wall face.

### Columns and Shafts in Spaces

In its area calculations for a room or a space, Revit does not by default subtract column areas from the total. Net area calculations require that certain areas subtractions be factored in to the total net area of the room. To accommodate this, Revit provides an option to exclude columns and shafts from calculated areas. To ensure deduction of column, for example, in Revit area calculations, the user must review the column object's properties (on the **Properties** Menu), and adjust the **Room Bounding** property to have its value clicked on (checked), as depicted in the figure to the right.

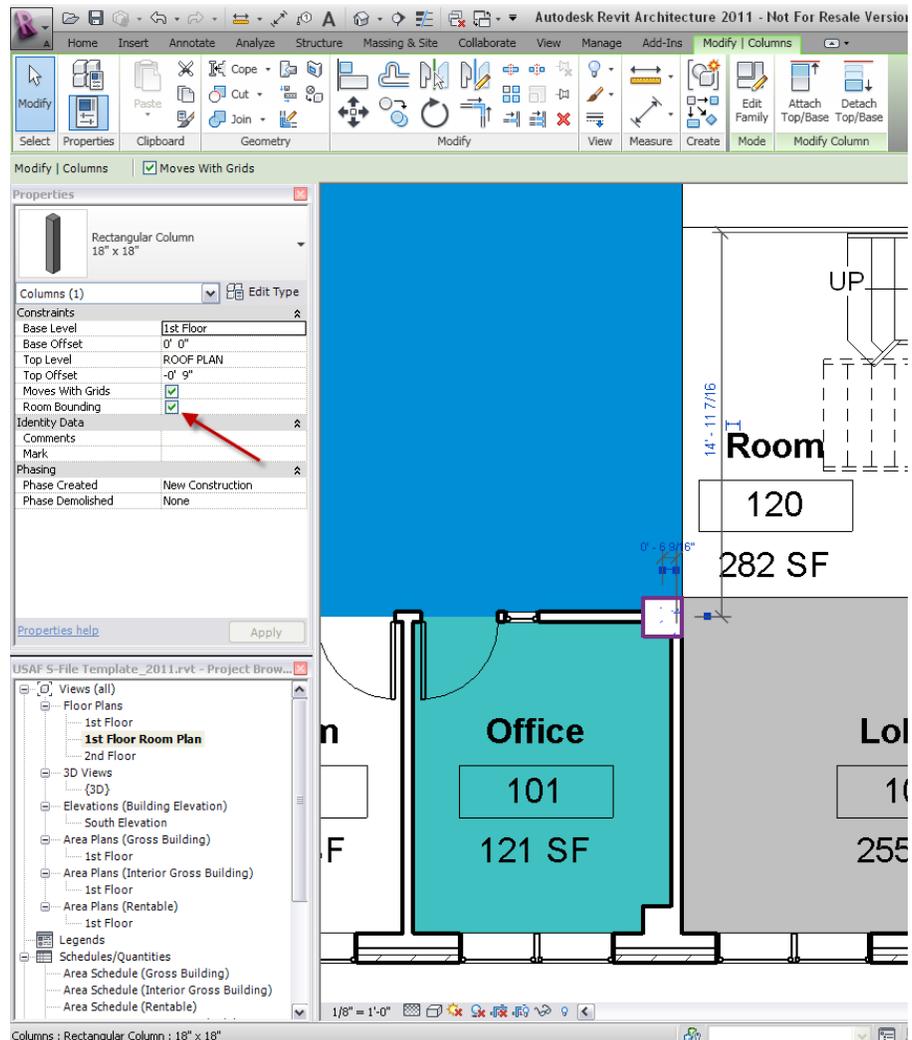


Figure 7: Portion of a Revit workspace with column object selected whose **Room Bounding** property is checked on (displayed in the Properties menu)

## Interior Gross Area

Since Revit only provides two automated area calculations by default (Gross Building and Net Rentable), the USAF user will need to create a view for **Area Plans (Interior Gross Building)** and proceed to draw their own boundaries for each floor's interior gross area using Revit's **Area Boundary Line** command. This process is similar to creating area polylines in CAD.

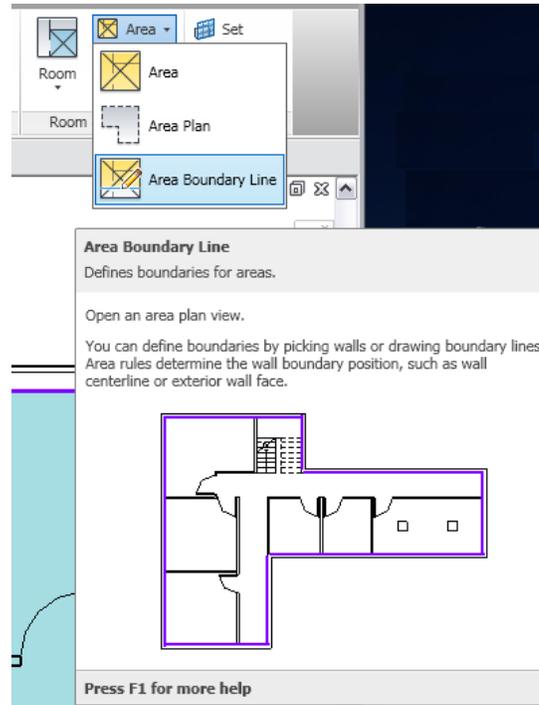


Figure 8: Revit **Area Boundary Line** command, accessed from the Room & Area section on the **Home** tab,

## 5. Entering Data for a Room/Space

Upon selecting a room object in the Revit model, the Properties menu will list the three S-File Schedule Keys under the **Identity Data** section. The user can assign data to the room object by selecting an entry from the pull-down menus for each. The OSCRE schedule key pull-down will populate four S-File parameter fields: `oscre_I1`, `oscre_I2`, `oscreI3`, `spacety_p_d`; `SpacevacDOM` will populate the `spacevac_d` field; `SpaceCIDOM` populates the `space_cl_d` field.

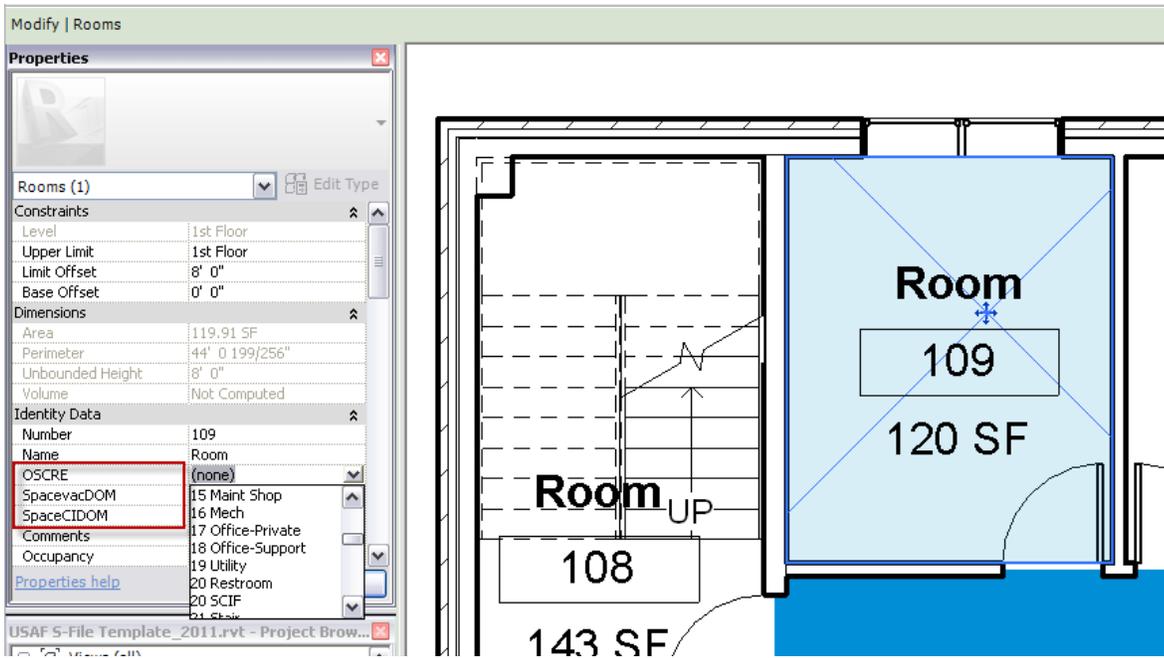


Figure 9: Revit screenshot above. With a room object selected (Room 109), **Properties** menu displays Schedule Keys (in red box).

Users can also add data to fields in a Schedule View. Users should be aware that data that already has been entered via the **Properties** menu will be frozen from changes in a schedule view.

## 6. Data Export from Schedules

To export S-File data from Revit:

1. Set your workspace active on the schedule view **S-File Room Schedule for EXPORT**
2. Click the Revit command **Export -> Reports -> Schedule**



3. The **Export Schedule** dialog box will pop up. On it, specify a file name and directory for the schedule, and click **Save**.
4. Another dialog box appears, also labeled **Export Schedule**. On it, under **Schedule appearance**, select appearance export options based on USAF workflow guidelines.

5. Also on this menu under **Output options**, specify how you want to display the data in the output file according to USAF workflow and formatting guidelines (specify: Field delimiter, Text qualifier)

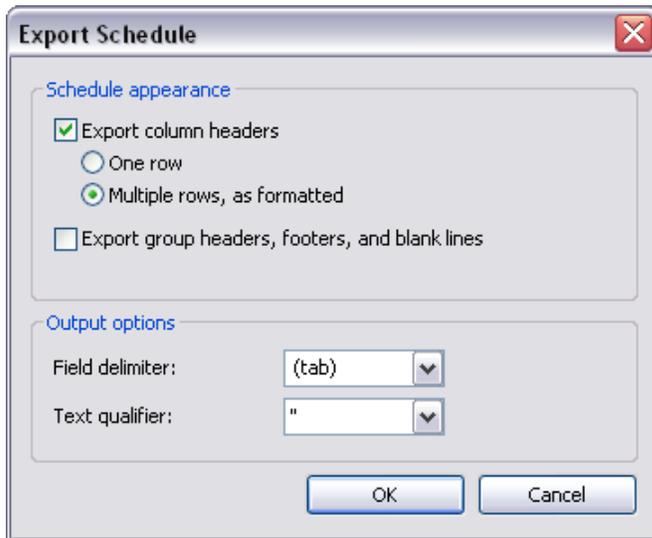


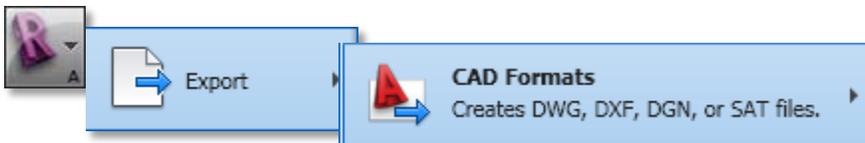
Figure 10: Options for schedule export from Revit

6. Click **OK**

The delimited text file (.txt) is a format that can be opened in a spreadsheet program, such as Microsoft® Excel or imported to a database application, such as Microsoft® Access.

## Export Rooms and Areas as Polylines

Area and room boundary geometry can be exported to a CAD format as closed polylines. Employ the Revit command Revit > Export > CAD formats > DWG (or DXF, DGN, SAT format)



This will bring up the **Export CAD Formats menu**, which provides two tabs on which the user can adjust export settings.

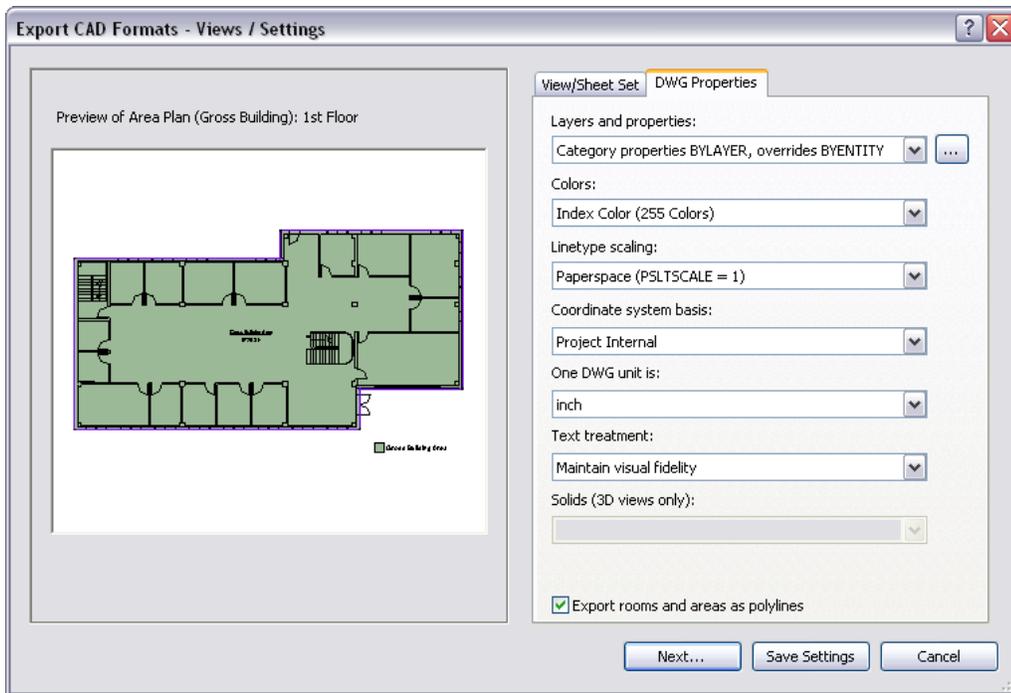


Figure 11: Revit export to CAD option menu, DWG Properties tab

On the second tab of the menu, the check box “Export rooms and areas as polylines” can be employed when rooms or areas are defined in the views to be exported. Note:

- Area polylines are generated from area plan views only.
- Room polylines are generated from floor plan views or ceiling plan views only.

For rooms, the exported polylines match the boundaries of rooms in Revit Architecture. The room boundaries are exported onto a single layer, and that layer is turned off by default in the AutoCAD file. The polylines include the following XDATA information for room boundaries: Name, Number, Occupancy, Occupant, Department, and Comments.

For areas, the polylines include the following information for area boundaries: Name and Comments.

Note: You can select **Export Rooms and Areas as Polyines** when exporting to DXF or DWG formats. This option is not available when exporting to DGN or SAT.

## Appendix: S-File Template Schedule Keys

OSCRE Level 1, Level 2, (optional), Level 3 and Space Type Domain (spacety\_p\_d) fields

spacety_p_d	oscre_I1	oscre_I2	oscre_I3
Classroom	Training	Lecture And Classroom	Classroom
Conference	Business Support	Meeting	Conference
Electrical	Core Building Service	Utility Equipment Room	Electrical
Elevator	Vertical Penetration	Mechanical Circulation	Elevator
Entry	Primary Circulation	Transitional Circulation	Entry
Hall	Primary Circulation	Corridor	Hallway
Hangar	Production	Other Production	Hangar
IDF	Environmentally Controlled	Other Environmentally Controlled	IDF
Janitors_Closet	Core Building Service	Utility Equipment Room	Janitors_Closet
Laboratory_ADP	Laboratory	Dry Lab	Laboratory_ADP
Laboratory_Elec	Laboratory	Bench Lab	Laboratory_Elec
Laboratory_Gen	Laboratory	Bench_Lab	Laboratory_Gen
Maintenance_Air	Production	Production Service And Repair	Maintenance_Air
Maintenance_Shop	Production	Production Service And Repair	Maintenance_Shop
Mechanical	Core Building Service	Utility Equipment Room	Mechanical
Office	Office	Dedicated Enclosed Workstation	Office_Private
Office_Support	Office	General File And Storage	Office_Support
POP	Core Building Service	Utility Equipment Room	Telecom
Restroom	Core Building Service	Restroom	Restroom
SCIF	Office	Shared Enclosed Workstation	SCIF
Stair	Vertical Penetration	Stairway	Stairway
Storage_Admin	Business Support	Storage	Storage_Admin
Storage_RDTE	Laboratory	Laboratory Storage	Storage_RDTE
Storage_Ware	Warehouse	Warehouse	Storage_Ware
Support	Business Support	Other Business Support	Support
Vault	Business Support	Storage	Vault
Break	Personnel Service	Wellness	Break
Briefing	Office	Shared Enclosed Workstation	Briefing
Closet	Business Support	Storage	Closet
Dormitory	Residential	Dormitory	Dormitory
Haz_Storage	Environmentally Controlled	Hazard Containment	Haz_Storage
Inaccessible	Business Support	Other Business Support	Inaccessible
Kitchen	Personnel Service	Food Service	Kitchen
Laundry	Personnel Service	Other Personnel Service	Laundry
Locker	Personnel Service	Other Personnel Service	Locker
Lounge	Personnel Service	Wellness	Lounge
Medical	Medical Practice	Medical Practice	Medical
MWR_Shop	Public Space	Recreation Non-Athletic	MWR_Shop
Playroom	Public Space	Other Public Space	Playroom
Reception	Business Support	Waiting	Reception
Recreation	Public Space	Recreation Athletic	Recreation
Storage_Sec	Business Support	Storage	Storage_Sec
	Business Support	Auditorium	Auditorium
	Personnel Service	Food Service	Dining
	Training	Training	Flight_Sim
	Environmentally Controlled	Data Center	Data_Center
	Commercial Space	Sales	Store
	Office	Dedicated Enclosed Workstation	Office_Shared
	Office	Dedicated Open Workstation	Office_Cube_Farm
	Office	Shared Open Workstation	Office_Hot_Desk

### Space Class

SpaceCIDOM
<Null>
Building space areas used for specific business purposes.
Building space areas used for common purposes (e.g., hallways).

### Space Vacancy

SpacevacDOM
<Null>
No
Unknown
Yes