

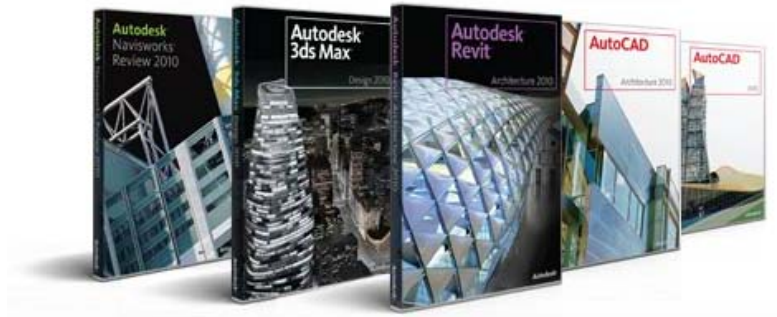
AUTODESK®  
REVIT® ARCHITECTURE 2010

AUTODESK®  
3DS MAX® DESIGN

AUTODESK®  
NAVISWORKS® REVIEW

AUTOCAD® ARCHITECTURE

AUTOCAD®



The AutoCAD® Revit® Architecture Visualization Suite combines Autodesk® Revit® Architecture, Autodesk® 3ds Max® Design, Autodesk® Navisworks® Review, AutoCAD® Architecture, and AutoCAD® software applications. This product suite gives you unmatched flexibility for understanding and communicating your designs, from concept to the final presentation. Reap the rewards of improved project understanding and increased client satisfaction gained through persuasive, compelling visualizations.

*Gain unmatched flexibility for understanding and communicating your design at every stage of the design process.*

**Explore, Validate & Communicate Your Vision**

- Use Autodesk 3ds Max Design to create clearer, more accurate visualizations derived from Autodesk Revit Architecture models.
- Experience an integrated workflow that preserves Autodesk Revit Architecture model geometry, lights, materials, camera settings when files are shared with Autodesk 3ds Max Design.
- Create more sustainable designs using lighting simulation and analysis features in Autodesk Revit Architecture and Autodesk 3ds Max Design.

**Experience an Integrated BIM Workflow**

- Work with software that supports a BIM workflow for improved project understanding and more predictable outcomes.
- Enhance the BIM process by using Autodesk Navisworks Review software to aggregate models, helping to provide fast, faithful real-time visualization and review for design validation.
- Gain the BIM competitive advantage by using Autodesk Revit Architecture software while protecting your investment in AutoCAD®-based software design data.



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## About the Scripted Demonstration

The script is organized into three sections.

On the left are the technical operations that you will perform to demonstrate the concepts that you are discussing. The content of the technical operations section is not exhaustive and assumes that you already have an understanding of the features being demonstrated. Additional information about the operation of these features is contained in either the Autodesk Revit Architecture Help file, available from the Help drop-down menu or the New Features Workshop.

Key customer benefits have been placed on the right side of the script. These benefits identify areas where the AutoCAD Revit Architecture Visualization Suite will be well suited for prospects.

The third section represents the narrative, with an emphasis on customer problems and solutions that you will use to describe your actions to your audience.

You should first become comfortable performing the technical operations and then turn your attention to the script. The script is divided into sections that address software features and their benefit to the customer. Each section begins with an issue or challenge our customers might face, framed in the form of a question. The script, as a whole, may be presented in a seminar setting but it is designed to support a consultative selling approach, where you have already identified customer pain-points for which you can demonstrate a compelling solution using Autodesk Revit Architecture.

To become comfortable with the script, read through it several times and memorize the key parts. The rest of the script may be presented in your own words, but be careful to stick closely to the points made in the script.

Lastly, this demonstration positions the AutoCAD Revit Visualization Suite within the context of an interior design project. As a result, the project is as equally relevant and applicable for Interior Design as it is for Visualization.

Several vignettes have been added to this scripted demonstration to provide additional benefit to potential audiences. Take note of the vignettes that will resonate well with AutoCAD Revit Visualization Suite prospects (V) and Interior Design prospects (ID) and prepare your demonstration accordingly.

V	ID	
X		Collaborating with the Design Team
	X	Managing Interior Building Content
X	X	Exploring Design Options
X		Visualization Techniques
	X	Production Drawings

**Here are the important concepts to emphasize:**

*Explore, Validate, & Communicate*

- Use Autodesk 3ds Max Design to create clearer, more accurate visualizations derived from Autodesk Revit Architecture models.
- Experience an integrated workflow that preserves Autodesk Revit Architecture model geometry, lights, materials, camera settings when files are shared with Autodesk 3ds Max Design.
- Create more sustainable designs using lighting simulation and analysis features in Autodesk Revit Architecture and Autodesk 3ds Max Design.

*Experience an Integrated BIM Workflow*

- Work with software that supports a BIM workflow for improved project understanding and more predictable outcomes.
- Enhance the BIM process by using Autodesk Navisworks Review software to aggregate models, helping to provide fast, faithful real-time visualization and review for design validation.
- Gain the BIM competitive advantage by using Autodesk Revit Architecture software while protecting your investment in AutoCAD®-based software design data.

Finally, make the demonstration your own. This script is not intended to be comprehensive. If you have favorite features that are not included in the script but resonate with your customers, add them to the script. If you feel that a point needs addition emphasis, go ahead and mention it again.

**SPECIAL NOTE:**



Sections of the script with this icon indicate that there is a supporting reference AVI available. These AVIs are best viewed, after installing the TechSmith codec (TSCC.exe), with the Camtasia Player (Camplay.exe). Both of these files are available in the AVI folder.

## Preparing the Demo Station

Before performing this demonstration, read this section to get acquainted with all of the dataset files, their organization, and the necessary pre-demo work. Files that are used in the presentation are included in the accompanying Demo\_Models.ZIP.

# Scripted Demonstration

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## AutoCAD Revit Architecture Visualization Suite

The AutoCAD® Revit® Architecture Visualization Suite combines Autodesk® Revit® Architecture, Autodesk® 3ds Max® Design, Autodesk® Navisworks® Review, AutoCAD® Architecture, and AutoCAD® software applications. This product suite gives you unmatched flexibility for understanding and communicating your designs, from concept to the final presentation. Reap the rewards of improved project understanding and increased client satisfaction gained through persuasive, compelling visualizations.

### Overview of the Project

126-128 Featherston is a project being designed by Archaus Architects. For more information, visit <http://www.archaus.co.nz/>.

*(excerpt from Archaus Architects)*

“The proposed new development at 126-128 Featherston Street is expressed as 3 distinct elements. Laptop House is to be renovated and incorporated into the final building along with a new 9 storey office extension above. Norfolk House is to be demolished making way for the balance of the new 21 storey premium grade office tower.


The completed building will provide approx 13,000 m2 of office space, with floor sizes ranging from 800 m2 on the lower levels to 600 m2 on the upper levels.



There will be two balcony levels at the midpoint of the building and two penthouse office suites at the top. The new development will include ground floor retail with the upper floors offering panoramic harbor views.

The vertical projecting mullions and angled glass planes to the new 21 storey tower's crown will add a striking addition to Wellington's skyline. The development will feature state of the art air-conditioning, new miconic lifts, and aims to provide a greenstar rating of 5 stars.

Resource Consent Approval was granted in October 2007. Construction is due to commence in 2008 with an expected completion date of 2010.”


## Collaborating With the Design Team


 <b>ARCHITECTURAL DESIGN TEAM</b> <i>[Architectural_Design_Team.avi]</i>	
<p><i>Working Model: Interiors_Flr14_Start.rvt</i></p> <ol style="list-style-type: none"> <li>1. Open Default 3D view</li> <li>2. Link in base building model, '06070_Featherston_Tower.rvt' (position Origin to Origin)</li> <li>3. Zoom extents</li> <li>4. Go to West Elevation view and create several new levels based on the levels in the linked file using Copy Monitor</li> <li>5. Modify 3D extents of new Levels</li> <li>6. Make Floor Plans from the copied/monitored levels</li> <li>7. Go to Visibility/Graphics and set the linked model to Halftone</li> <li>8. Set the link to be Room Bounding via the Type Properties dialog</li> </ol>	<p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• Work with software that supports a BIM workflow for improved project understanding and more predictable outcomes.</li> <li>• Improved design collaboration within your office; Architects and Interior Designers work together on the same information; multiple solutions are managed through design options</li> </ul>
<p>The Autodesk Portfolio provides collaborative techniques that are reshaping building design processes. The Revit platform allows the building team to collaborate via a single building model that ensures consistency by coordinating views as a natural extension of the user interaction. Design Team Members working on other platforms remain connected to the Revit model via strong interoperability with DWG and other popular digital design formats.</p> <p>We start our demonstration at the early stages of the Interior Designer's involvement on the project. At this point, the shell and core are virtually locked-down and we have been given the green light to move into the project and begin the general layout of spaces and the furniture plans. Naturally, our first dilemma is to gather the design conditions upon which our design will be based.</p> <p>From the early planning stages of this project, the firm decided to use Revit and a Building Information Modeling approach to designing and documenting the mid-rise tower. This methodology holds the keys to many design efficiencies and will provide the Interior Designer with a fantastic starting point. As I link in the Architect's model, understand that embodied in this three dimensional model is a tremendous amount of graphical and non-graphical information that will magnify the advantages of Building Information Modeling.</p> <p>Take for example the level elevations that the architect carefully considered when designing this tower. Although this is a decision that was initially made a long time ago, it has a large effect on virtually every discipline that works on this design. Further, there is no guarantee that it won't change based on any number of influences. By using Revit, I can first reference and copy levels from the Architects model into the Interior Design model; and second rely on a monitoring system to inform me should any change happen to those levels. For example, if every level above Level 20 is shifted up 500MM to allow for additional clearance on the mechanical level, Revit will notify me.</p> <p>The levels from the architectural model still hold more value too. With a couple of clicks, Revit will prepare all new floor and ceiling plans for me to begin designing. As those plans are created, Revit organizes them within a tree structure in the Project Browser. This is where all of my model views and sheet layouts will be organized without any extra input or management.</p>	

 <b>AUTOCAD USERS</b> <i>[AutoCAD_Users.avi]</i>	
<p><i>Continue working in Interiors_Flr14_Start.rvt</i></p> <ol style="list-style-type: none"> <li>1. Import '14_N - Floor Plan Sketch - Opt 1.dwg' (Current View Only, Center to Center, Invert Colors)</li> <li>2. Dialogue Box: Talk about the import options</li> <li>3. Unpin the import and move into place with relation to the Revit model</li> <li>4. Set the Import to 'Foreground'</li> <li>5. Show Override by Instance from RCM</li> <li>6. Draw/Pick several walls, place several doors</li> </ol>	<p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• Gain the BIM competitive advantage by using Autodesk Revit Architecture software while protecting your investment in AutoCAD®-based software design data.</li> </ul>
<p>A Strong suit of any tool in the Autodesk portfolio is the ability to communicate well with DWG. This means that existing investment in AutoCAD remains absolutely relevant when making the switch to BIM. During the BIM process, AutoCAD can be used in various stages of the design.</p> <p>In this case a lead member of the design team begins brainstorming some basic plan layouts in AutoCAD. While the intention has always been (and will be) BIM processes, their decision to use AutoCAD was based on personal familiarity with AutoCAD and the knowledge that Revit supports DWG in ways that many tools can't.</p> <p>What's most important to note, is that given Revit's DWG interoperability, AutoCAD can play a valuable part in the BIM process. After we import the plan layout from our lead designer, we can quickly transform their AutoCAD work into valuable Revit building information. Here I create standard interior partition walls (gyp on aluminum stud on gyp) simply by picking the DWG line work.</p> <p>Now that we're working in Revit, wall joins will automatically clean up; views remain coordinated; the model is managing non-graphical information like linear feet of wall and material takeoffs. All the while protecting your investment in AutoCAD while gaining the BIM competitive advantage by using Revit Architecture</p>	
 <b>EXTENDED DESIGN TEAM</b> <i>[Extended_Design_Team.avi]</i>	
<p><i>Continue working in Interiors_Flr14_Start.rvt</i></p> <ol style="list-style-type: none"> <li>1. Duplicate the 14th Floor (w/o detailing), and rename the view</li> <li>2. Import the power &amp; signal plan from Engineer: '14_N_PowerSignal_Opt1.dwg'</li> <li>3. Show layer override in VV</li> <li>4. In the View Properties dialog, change Discipline</li> </ol>	<p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• Work with software that supports a BIM workflow for improved project understanding and more predictable outcomes.</li> </ul>

<p>to Electrical</p> <ol style="list-style-type: none"> <li>5. Change Project Browser Organization to 'By Discipline'</li> <li>6. Create a new sheet and place Power &amp; Signal plan on the sheet</li> </ol>	
<p>Instead of just using AutoCAD to provide early planning layouts, I'd like to take the AutoCAD workflow one step further and demonstrate how AutoCAD based products such as AutoCAD MEP can be integrated into the BIM process. We'll do this in the context of the collaborative workflow between Electrical Engineer (using AutoAD MEP) and Interior Designer (still using Revit).</p> <p>In this scenario, the ID and EE need to share design files on a more frequent and repetitive basis. Again, we rely on DWG, however this time we use a file linking strategy to provide the ability to incorporate changes in the electrical layout as its design progresses. We begin by linking in the EE's most recent submission – you can see that they've started work on the 14<sup>th</sup> floor but are clearly not finished. Revit provides some very nice controls over the DWG that we didn't explore in the previous segment. Once brought into the Revit model, we can see the entire AutoCAD MEP layer structure and even control our view's appearance by overriding any of those layer graphics. Say, for example, we want all of the layers to appear as black linework or halftone on this sheet (create a sheet and place the P/S plan on it).</p> <p>Anyhow, within a couple of days, the EE sends a new version of their electrical plan. Instead of losing any view settings and work that was previously done to create sheet layouts, etc...we can simply update the link to show the revised electrical plan.</p> <p>We step through this process to demonstrate that any existing investments that you have in AutoCAD (or any technology that uses DWG) can be easily incorporated with Revit to facilitate existing design processes or help transition your way to a full BIM environment.</p>	

## Managing Interior Building Content

 <p><b>LEVERAGING EXISTING CONTENT</b> [Leveraging_Existing_Content.avi]</p>	
<p><i>Working Model: Interiors_Flr14_Mid1.rvt</i></p> <ol style="list-style-type: none"> <li>1. Open plan view '14 Furniture (Scheme 1)'</li> <li>2. In the Design Options panel of the Manage tab, choose to edit 'Scheme 2'</li> <li>3. Create a Group and name it 'Private Office Furniture'</li> <li>4. In the SEEK toolbar, search for 'Desk RFA'</li> <li>5. On the SEEK website, pick the ** desk and open it in the SEEK Viewer</li> <li>6. iDrop the desk into the Revit project/group</li> <li>7. Open the Chair Family and describe how to use existing DWG libraries to create RFAs</li> <li>8. Load the Chair Family into the project/group and finish editing the group</li> <li>9. Place the group in all of the private offices on the south side of the building</li> <li>10. Edit a group, add a guest chair, update all of</li> </ol>	<p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• Connect Interior Designer and Architects with building product manufacturers</li> <li>• Reduce the need to consult static catalogs or conduct tedious web searches</li> <li>• Gain the BIM competitive advantage by using Autodesk Revit Architecture software while protecting your investment in AutoCAD®-based software design data.</li> </ul>

<p>the groups</p> <p>11. Point out the conflict in the last office between the guest chair and the door – show how individual elements can be excluded on an instance basis, if necessary</p>	
<p>Revit presents tremendous efficiencies for getting you on your way to a productive BIM process.</p> <p>We'll create this office layout as a Revit Group. Groups allow me to create a single layout and then place it numerous times in the model. As you'll see, when a change is made to any instance of the group, those changes will propagate throughout the entire model.</p> <p>Out of the box, Revit provides comprehensive generic content libraries. Generic libraries can be used to provide general intent or can be quickly modified to represent specific catalogue components. The generic content spans the likes of walls, windows and doors, furniture and furniture systems, title blocks and annotations.</p> <p>However, there will be times when you need either custom or manufacturer's content or you have content that you've already created in AutoCAD that you'd like to use in your Revit project. Revit provides integrated access to many manufacturer-specific content libraries via Autodesk SEEK, for enhanced productivity. You simply enter a search word and Revit will direct your browser to the SEEK libraries and return the results of your search. SEEK is a powerful tool that accepts content from both manufacturers and the larger Revit community and allows interior designers to get product information when they need it. Once you find your desired desk, we'll use the i-drop functionality to drag the family right into Revit and place it within the group.</p> <p>Everyone is aware of the prevalence of AutoCAD in the Interior Design industry. You are likely to have a library of AutoCAD blocks sitting on a network drive within your office. These may be libraries of 2d or 3d objects, detail drawings or building components. Fortunately, this content is not wasted when transitioning to BIM. Revit allows you to easily repurpose all of this valuable information. Here's a chair that was built using just imported 2D AutoCAD linework. The process is really quite easy: first, the plan and elevation sketches were imported into a Revit family and second, we specified in which type of drawing (plan, section, or elevation) each sketch should appear. This is a fairly basic scenario, but you could also import 3D AutoCAD geometry to accompany the 2D linework.</p> <p>Now that we've created the group, we'll place several instances of it in all of the executive offices. If I am to add a new component to the group, the edits I make will propagate to every instance, thus ensuring another level of coordination. Furthermore, if any of the instances create a conflict with other model geometry, there's no need to create a new group. Revit allows you to exclude individual members of the group on per-instance basis in these special cases, while ensuring the rest of the grouped elements stay consistent.</p>	
<p> <b>PARAMETRIC REVIT FAMILIES</b> [Parametric_Revit_Families.avi]</p>	
<p><a href="#">Continue working in Interiors_Flr14_Mid1.rvt</a></p> <ol style="list-style-type: none"> <li>1. Change door types and discuss parametric design</li> <li>2. Create a new door type</li> </ol>	<p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• Work with software that supports a BIM workflow for improved project understanding and more predictable outcomes.</li> </ul>

The powerful Revit Family Editor allows you to create any custom content on-the-fly. You don't have to be a programmer to create parametric content in Revit Architecture. Let's say we want to create a new door type – simply select the door family and choose to duplicate an existing type. Then, enter new parameters to customize your door within the constraints of the family.

There are thousands of family components available for your use. You can modify existing families easily or create your own from scratch. Even while working in a current project, you can easily access the family editor and make changes to the content. Update the project, and quickly see the impacts of those changes.

## Exploring Design Options



### DESIGN OPTIONS

[Design\_Options.avi]

[Continue working in Interiors\\_Flr14\\_Mid1.rvt](#)

1. Open 2 Views (Working Plan (Scheme 1) & Working Plan (Scheme 2))
2. Open Design Options Dialogue to give overview of Design Options capabilities
3. Close Scheme 1 plan and continue your work in Scheme 2 plan
4. Place Interior Elevation in the Corridor (facing west) and name the new view
5. Open Interior Elevation and adjust crop boundaries
6. Open Default 3D view and 'Orient to View' to Interior Elevation
7. Resize the section box to display below ceiling (add a poche fill by switching to course - toggle between shaded, hidden line, etc)
8. Tile the Views - set current Option to Option 2 for each view
9. Design a layout on the west side of the building including walls, doors, and furniture layouts
10. Place Rooms
11. Make a Room Schedule – show settings
12. Close Elevation & 3D views
13. Rearrange plan and schedule views
14. Change the Room Names in the Schedule and in the plan and point out the bi-directional associativity

#### Benefits

- Develop and study multiple simultaneous design alternatives to make key design decisions
- Present multiple schemes to your clients easily
- Substitute each option into the model for visualization, quantification, and other data analysis to better inform decision making

A normal design process often requires that we try out different alternatives for a specific area of our project. Normally I would have to duplicate the file or use a layer system that would allow me to keep the 2 or more ideas within my project file. This often leads to non-aligned files and non-standard layering systems which can cause delays and extra work to get the file back in shape when I decide which idea is the definitive one. Revit Architecture has a phenomenal way of handling as many options of a design as

needed. Here we see two different options for our space. In this scenario, we're developing multiple plan layouts that will demonstrate how the floor can be arranged to accommodate different styles and varying programs.


Now, I'll create a new interior elevation. You'll notice that as I place the annotation in plan, a new view is automatically added to the project browser. Revit automatically manages all of the views (sections, plans, elevations, 3D, schedules, renderings, and sheets) via the project browser. It provides quick access to any view without the need to sift through complex file structures.


Each view stores a setting that controls which Design Option is visible. In this case, we'll start a new Design Option and begin to layout walls to define offices. Next we'll place a series of rooms. A room is a container for various pieces of information and also serves as the container that transfers valuable energy data via gbXML to analysis tools such as Green Building Studio and Ecotect. All room data, such as room name, number, purpose, wall and floor finishes, perimeter, volume, etc. are stored inside of the room. Furthermore, all of this information can be scheduled with just a few clicks.

Once the schedule is created, it provides a fast way to access and edit room properties. For example, I can start changing finish options or room names directly from the schedule. All the while, Revit will coordinate all of the room data throughout the project. You'll notice in the plan view that the changes I made to room names in the schedule have been automatically updated.

Finally, I can take the new views and schedules that we created and place them onto a sheet for presentation to the owner or potential renters.

## Visualization Techniques

 <b>PRESENTATION SHEET LAYOUTS</b> <i>[Presentation_Sheet_Layouts.avi]</i>	
<p><i>Working Model: Interiors_Flr14_Mid2.rvt</i></p> <p>Create 2 presentation sheets</p> <p>Sheet 1</p> <ol style="list-style-type: none"> <li>1. Create a Color Fill Plan (color by department, Scheme 1)</li> <li>2. Create a 3D Section Box View and orient to the color fill plan (set view scale to 1:50)</li> <li>3. Create a new sheet using A0 Metric template</li> <li>4. Add both views to the sheet</li> <li>5. Activate the 3D View, adjust the perspective, turn on and adjust crop region</li> <li>6. Deactivate the 3D View and adjust position on the sheet</li> </ol> <p>Sheet 2</p> <ol style="list-style-type: none"> <li>1. Create a new sheet (A0 Metric)</li> <li>2. Insert 3 Images onto sheet (textured glass.jpg, CONFERENCE ROOM WALL PATTERN.jpg, trees-cutout.jpg)</li> </ol>	<p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• Create compelling presentation sheets quickly</li> <li>• Revit virtually eliminates defects caused by un-coordinated or poorly detailed drawings</li> </ul>

<ol style="list-style-type: none"> <li>3. Add 3D perspective view 'Meeting Hub - Shaded (Scheme 1)' and adjust size of view</li> <li>4. Arrange images and view on sheet</li> </ol>	
<p>Revit integrates the design and presentation environments and ensures coordination via its parametric change engine. This streamlines and simplifies the process of creating compelling design presentations. With the ability to work in any view you desire, whether it be plan, elevation, 3d, or even on a sheet, creating presentations becomes more organic and integrated with the rest of your design workflow.</p> <p>Here are some examples of presentation drawings that can be created with just a few clicks. First, let's create a color fill plan. These can often be tedious and manual to create, but with the power of BIM, these become a byproduct of the existing design intent. I'll simply place a color fill legend and Revit automatically assigns colors by name, department, or number. Naturally, we are free to create our own custom schemes and also assign colors that are more aesthetically appealing from Revit's Pantone library.</p> <p>Next, I'll create a new 3D view and orient it's extents to the color floor plan that we were just working on. Now, I'll place both views on a sheet. If the 3D perspective isn't quite the angle we desire, I can simply activate the view directly from the sheet, and rotate it into place.</p> <p>Revit's interoperability with common file formats allows us to incorporate other media into our sheets for presentation drawings. Let's say, for example, a designer has been working on the entry and common meeting space. They've developed several exciting sketches that tell a colorful story and speak to the look and feel of the space. Rather than trying to recreate the imagery, we've scanned the image to JPG and imported it directly onto the sheet. Another image that we'd like to include is a photograph. We'll place the photo on the same sheet. And lastly, we place a 3D view of the live Revit model to establish the connection between the intent and the reality.</p>	
<div style="display: flex; align-items: center;">  <div> <p><b>IN PROCESS VISUALIZATION</b>  <i>[In_Process_Visualization.avi]</i></p> </div> </div>	
<p><i>Working Model: Interiors_Flr14_End.rvt</i></p> <ol style="list-style-type: none"> <li>1. Open the 3d Perspective view 'Meeting Hub (Scheme 3)' discuss In process rendering</li> <li>2. Show the simplicity of the render dialogue box and what it's setting do.</li> <li>3. Change settings to Draft quality and Artificial Lights only.</li> <li>4. Start rendering but cancel after a few boxes have rendered (note: AVI for this sections shows Exposure control)</li> <li>5. Open the final rendering from desktop and explain saving to desktop vs. project; put them on a sheet; etc</li> <li>6. Open the walkthrough via the Project Browser</li> <li>7. Change view to Shaded with Edges</li> <li>8. Play a few frames of the walkthrough then open the recorded AVI from your desktop and play AVI</li> </ol>	<p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• Better design insight through in-process visualization and analysis</li> <li>• Documents and presentations are clear and complete</li> <li>• Use the power of the Mental Ray rendering engine to quickly produce high quality photorealistic views of the model without leaving Revit</li> <li>• Generate animated walkthroughs directly from the design</li> </ul>

The Revit model contains a variety of valuable information that is leveraged in many different ways. In the course of design, we constantly consider the effects of materiality. One of the benefits of storing that information in the Revit model is that Revit can provide photo-real visualizations with very little additional effort.

The material libraries, sun and sky properties, and render engine are the same foundation from which Autodesk’s premier visualization tool, 3ds Max-Design, is built. The Revit implementation of these tools delivers has been streamlined and optimized for the interior designer’s workflow.

For example, this interior perspective already contains all of the material information as a by-product of the normal design workflow. Without any additional effort, we can immediately render this view to get a good sense of where we are with the design. In dedicated visualization tools, the quality of a rendering is often controlled by numerous levers and controls. In Revit, I’m simply going to choose ‘Draft’ render quality and click render. Revit automatically adjusts advanced render settings to produce a quick rendering. When the need arises to develop presentation renderings, we’ll simply change to a higher quality setting. Revit will again adjust the advanced render settings and all we have to do is click render again.

In the same regard, other render controls have been configured to deliver broad control in a streamlined user interface. For example, lights can be quickly grouped, enabled, and disabled. And simplified exposure controls offer critical post production capabilities.

In addition to single frame rendering, Revit also offers the capabilities to build 3D walkthroughs to be visualized inside of Revit or exported to AVI.



**ADVANCED VISUALIZATION**

[09\_Advanced\_Visualization.avi]

*Working Model: 09\_Adanced\_Visualizaiton.max*

*If you are not familiar with 3ds Max-Design, play the accompanying video and voice it over.*

1. Render the model from Revit (with Revit materials, lights, etc)
2. Open the Material Explorer and add a custom materials to the walls, floor, and couches
3. Re-render the scene with custom materials
4. Isolate one of the couches
5. Use the a swift Loop and Push/Pull tool from the Graphite Modeling Tools to distort the cushion
6. Turn off Revit Furniture Layer and turn on the New Furniture layer
7. Restore the Materials from the Interior-Desinger-Suite scene state.
8. Show final render output

**Benefits**

- Use Autodesk 3ds Max Design to create clearer, more accurate visualizations derived from Autodesk Revit Architecture models
- Experience an integrated workflow that preserves Autodesk Revit Architecture model geometry, lights, materials, camera settings when files are shared with Autodesk 3ds Max Design
- Work with software that supports a BIM workflow for improved project understanding and more predictable outcomes

In today’s world, firms compete for projects in various different ways. Competition within the world of highest quality visualization is especially exciting because of its lifelike realism. 3ds Max-Design is Autodesk’s premier visualization tool and widely accepted as the standard for comparison in architectural design. It provides advanced control over, amongst other things, materials, lights, rendering, and geometric manipulation. The combination of in-process design visualization in Revit Architecture and strong interoperability, via FBX, to advanced visualization in 3ds Max-Design creates nearly limitless

possibilities when visualizing your designs before they are real.

While we still have the perspective of the Entry and Meeting area open in Revit, I'm going to switch into 3ds Max-Design. You'll notice that our perspective in 3ds Max-Design is the same as the perspective in Revit. That's because FBX transfers more than just geometry into 3ds-Max-Design. In fact, lights (and their definitions), sun settings, materials, and camera perspectives all transfer.

Now that we're in 3ds Max-Design, we'll take a few moments to demonstrate some of the various controls and flexibilities. First, you'll notice that the workflow is optimized for visualization – the materials dialogue box floats and offers drag and drop access to every material that exists in the scene. Quick access begs the designer to try out new material combinations.

I'll turn on a render region and allow the scene to render. Because 3ds Max-Design is a purpose built for visualization and analysis, it can take full advantage of your computer's hardware configuration. The result is very fast render times. Additionally, 3ds Max-Design can render across multiple machines for even faster render times.

Next let's take a look at how the Graphite Modeling Tools lend to lifelike realism. I've isolated a chair and am aiming to deform the cushions to give them a billowy, comfortable, and realistic look and feel. I'll add several loops to the cushion and then begin distorting the surface. With little effort, you can start to visualize the lifelike irregularities of a cushion.

Finally, I'll leave isolation mode and fast forward to a later stage in the visualization. At this point, I've replaced some of the more schematic furniture with real geometric representations and also placed some extra content, such as wall hanging and a vase of flowers, to make the scene even more realistic. Recall the interesting patterns that we used for our presentation drawings in Revit. The intent is to apply the same pattern to the surface of the curved meeting room glass. And now, I'd like to visualize how that will affect the larger space.

Given a few minutes to render, here is the output that can result from 3ds Max-Design. While we've only rendered a single frame here, 3ds Max-Design can also generate cinema-quality walkthroughs and animations.



**REAL TIME DATA AGGREGATION AND REVIEW**

[Real\_Time\_Walkthroughs.avi]

*Working Model: 06070-Revit-Tower-Autodesk.nwc*

*If you are not familiar with 3ds Max-Design, play the accompanying video and voice it over.*

1. Walk around the exterior of the building
2. Open the 14<sup>th</sup> Floor – Plan View Viewpoint and walk around the proposed space
3. Open the Interior Scheme 1 > Scheme 1 Walkthrough
4. Demonstrate nested image links
5. Add a comment to the designer to move the conflicting furniture
6. Generate several dimension lines from the model

**Benefits**

- Enhance the BIM process by using Autodesk Navisworks Review software to aggregate models, helping to provide fast, faithful real-time visualization and review for design validation
- Work with software that supports a BIM workflow for improved project understanding and more predictable outcomes

Autodesk Navisworks Review software extends access to existing design data to drive insight and predictability to improve productivity and project quality. Users can combine 3D design data with geometry from Revit and information created with other design tools for real-time visualization and collaborative review, regardless of file size or format. Dynamic navigation and an intuitive review toolkit improve understanding of even the most complex 3D models.

This model aggregates design information from Architect, Interior Designer, Structural Engineer, Civil Engineer, and could easily aggregate more. Users can easily create real time fly around and walkthroughs. You'll notice in the Saved Viewports Browser that NavisWorks Review is capable of interpreting the same design options from the Revit model that we were working on before. Automated walk troughs can be stored as well as manually driven walkthroughs from the keyboard and mouse. Additional design information such as renderings can be inserted into the NavisWorks model for reference.

NavisWorks Review also provides the ability to capture notes or comments from the Reviewer. By capturing notes and attaching them to the model, teams can communicate more freely and collaboratively. Here, we notice that a collision has occurred between a column and a group of furniture. As a result, we'll create a comment that identifies the conflict and suggest that the furniture arrangement be moved to avoid the conflict. Ultimately, the comments can be tabulated and returned to the design team. In this case, we will be certain to move the furniture system.

The NavisWorks model contains rich information. We can pull off dimensions to understand scale and space. NavisWorks Review enables us to experience the entire project, before it's real.



**LINKING TO ANALYSIS**

[Linking\_to\_Analysis.avi]

*Working Model: [11\\_Linking\\_to\\_Analysis.max](#)*

*If you are not familiar with 3ds Max-Design, play the accompanying video and voice it over.*

1. Turn off Sun & Sky and Glass Layer
2. Turn on the Pseudo Color Exposure Control and adjust the Control Settings
3. Turn off and move several luminaries in the
4. Create a Light Meter and calculate the results
5. Show the various methods of presenting lighting analysis results

**Benefits**

- Create more sustainable designs using lighting simulation and analysis features in Autodesk Revit Architecture and Autodesk 3ds Max Design.

By this point in my design, I have developed a lighting layout for both of my design options based on some luminary : SF ratios from past projects. As I prepare for LEED submittals, I've brought a lighting expert onto the project to verify sufficient lighting in the entry and common areas near the reception. The lighting expert receives an FBX export from Revit and quickly imports the design data into 3ds Max-Design. All geometry, lighting, and materials have come straight from the Revit model. After rendering the image, we see that the lighting is a little bit flat. Some areas are over-lit while other areas are under-lit.

First, we'll use the pseudo color light analysis as a guide to help me position lighting and quickly understand approximate light levels in real time. We'll turn off the daylight system in order to focus on the artificial light plan. I'm shifting the color overlay settings so that the reds (the high end of the color spectrum) are reporting light levels in excess of 300lx. If it wasn't clear before, now it's obvious which areas are over/under-lit. This pseudo-color overlay updates in real time. So any changes that I make during my interaction with the model are immediately updated in the viewport. You can see those effects


as I turn lights (or geometry) off or move them around...

Keep in mind that all of the light data that is organized by the Revit model transfers into 3ds Max – Design via FBX as a matter of consequence. The lighting expert maintains the freedom to experiment with the scene. They can easily swap out different light sources (which contain IES data) and visualize their impact on the scene. Here we’re loading light data from my standard light library and you can quickly see the effect that each light source will have on the TV Wall.

In another space, we find that the lighting is too strong. By turning off two of the six overhead lights, I achieve luminance levels that are more appropriate for a waiting area. As it turns out, there has been significant over lighting in the common areas near the entrance of the office. Now that I’ve used the pseudo color overlay to approximate lighting levels in my scene, I’ll now turn to a set of certified (by the NRC) lighting analysis tools. The output can be used to validate LEED credits and further analysis. This data can also be exported to a text file for added control.

Finally, various overlay options can be added to renderings to help communicate the new design ideas. Here you can visualize the difference between the original lighting scheme and the newly proposed lighting scheme. Interestingly, we were able to reduce the number of required luminaries by two thirds and have run analysis several analyses for LEED certification.

## Production Drawings

 <b>PRODUCTION DRAWINGS</b> <i>[Production_Drawings.avi]</i>	
<p>1. Show completed Production Drawings as you wrap up the demo</p>	<p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>• Better documents mean fewer problems and less time spent in construction phase</li> <li>• Revit virtually eliminates defects caused by un-coordinated or poorly detailed drawings</li> <li>• Architecture and Interior Design coordination is assured by the system</li> </ul>
<p>Back inside of Revit, we’ll turn our head to final production drawings. Instead of walking through all of the steps, we’ll simply step through some of the drawings for this project and point out a few of Revit’s efficiencies along the way.</p> <p>Keep in mind that Revit manages a single database model. In Revit, sheet sets are also a part of the Revit model. As a result, changes to the design are not only automatically coordinated in every view, but on every sheet as well.</p> <p>This is just a small sampling of drawing types, but it will give you a sense for the variety of documents that can easily be created in Revit. Revit allows you to create compelling presentations as a by-product of the work you've done up until now. It also enables you to continue to produce the valuable assets that are required by your profession, your clients and your existing workflows.</p>	