AUTODESK UNIVERSITY

CS21830

Using the Stingray Game Engine for Pursuits and Conceptual Estimates

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Learning Objectives

- Learn what the Stingray 3D game engine is, and how it can be used for proposals in the construction industry
- Understand the workflow to create an interactive gaming environment from a 3D Revit model
- Learn how to use the add-in LIVE for conversion for 3D models to Stingray
- Learn about the benefits of using gaming in the construction industry

Description

In this class, students will learn how to use Revit software, the LIVE add-in, and Stingray game engine to create high-quality, interactive visualizations from 3D models. First, you will learn how to use the LIVE add-in to convert 3D Revit models to the game engine, Stingray. Once in Stingray engine, you will learn how to create immersive environments for your clients. In these environments, owners can explore, interact, and even edit their own projects. They can choose from various design options and view the costs associated with them. Students will learn a workflow that is simple, repeatable, and teachable, even for those unfamiliar with video games or programming. The benefits of using gaming in construction include increasing owner involvement, reducing the time and effort it takes to produce an attractive proposal, and facilitating bidding on smaller projects with a quality offering only affordable by larger projects today. Visualizations through the Stingray game engine ultimately lead to winning more work. This session features Autodesk Stingray and Revit. *AIA Approved.*

Your AU Expert(s)

Kelsey Stein specializes in Building Information Modeling (BIM)-based preconstruction services at Skanska, where she is helping to advance the use of BIM-based estimating technologies. She has 8 years of industry experience in the United States, Australia, and New Zealand. Prior to joining Skanska, she worked as an architectural designer for Populous, where she worked on arenas, stadia, and other large-scale sports architecture facilities throughout Australia and Asia. She graduated magna cum laude from Drury University with a Bachelor of Architecture degree,

and she has a Certificate of Construction Management from the University of Florida. She is also a LEED Accredited Professional. kelsey.stein@skanksa.com

Dave Tyner is an Enterprise Solutions Champion at Autodesk who's heavily focused on developing interoperable workflows within Autodesk's diverse visualization software portfolio as well as driving awareness/adoption of Autodesk's cross industry VR/AR solutions. He is a visualization specialist and Stingray contact for Autodesk's AEC community.

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Introduction

- What is Stingray?
- Why Stingray?
- How is it used for Proposals?

Example - GA Tech Living Building

- User Interface
- Design Options and Costs
- Material Options and Costs
- Exploration and Interaction
- Site Context

Workflow from Revit - LIVE - Stingray

- Prepare the Model in Revit
- Send to the Cloud Using LIVE
- Convert to a Stingray Format

Workflow within Stingray

- Create a Basic Project
- Add Project Folders
- Add Template Folders
- Add Level Flow
- Additional Features
- Deployment

Benefits

- Time and Cost Savings
- Additional Outputs
- Client Involvement

Introduction

What is Stingray?

Stingray is a game engine and design visualization software. It includes 3D game creation tools, real-time 3D rendering, and virtual reality support. Within Stingray it is possible to create incredibly complex and detailed environments. Using templates, Stingray offers a quick and easy way to create 3D immersive environments without the need for extensive programming experience. This handout will focus on streamlining the workflow for this process, providing quick turnarounds for pursuits and conceptual estimates.

Why Stingray?

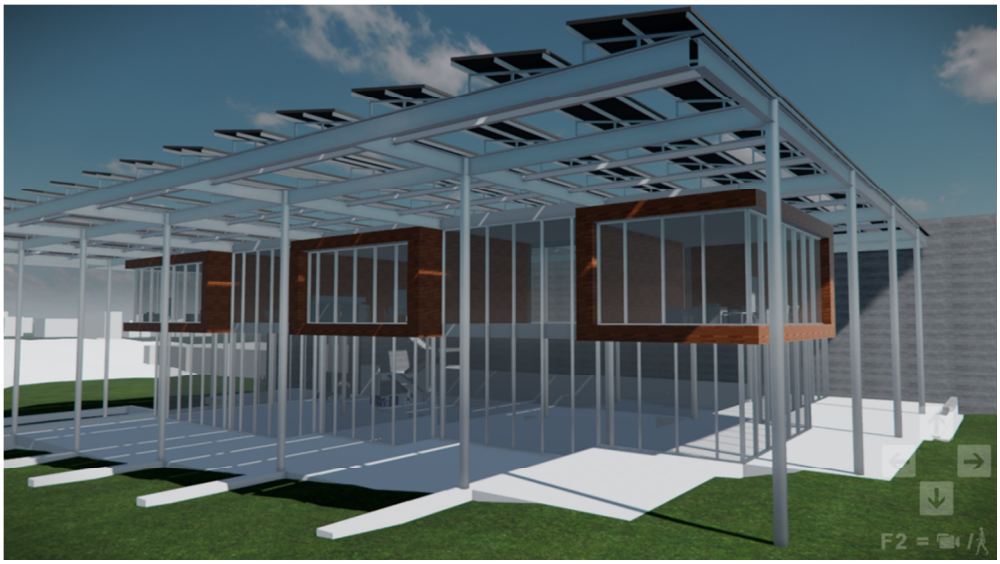
Using Stingray it is possible to show different design options, cost options, and material changes all with real-time rendering. Stingray offers a high quality level of render for very little time invested. With the addition of LIVE, it creates 3D environments straight from Revit, bypassing traditional rendering software, which is very complex, and can be time consuming to learn and produce deliverables. Stingray also supports a variety of platforms including virtual reality so it is possible to move beyond typical renderings and videos into a fully immersive 3D environment.

How is it used for Proposals?

In order to quickly create 3D environments in Stingray, it is essential to setup project templates and a Level Flow that is simple and repeatable. The project template will be the basis for all pursuits and conceptual estimates. This template will streamline the process for models, materials, and textures within Stingray. Flow is the visual programming system built into Stingray. Creating a repeatable Level Flow file will standardize the programming required within Stingray. This file can be copied into each new project and, with only a few updates, create the interactions within the 3D environment. This Level Flow file can be created in-house by someone with visual programming experience, or by an external party, such as Autodesk. Contact Dave Tyner for information about becoming part of a Stingray Cohort where this type of Level Flow is developed and taught.

Example - GA Tech Living Building

This project contains design options, cost options, and materials changes. It also shows the surrounding context. Through Stingray, you can explore and interact with this 3D environment.

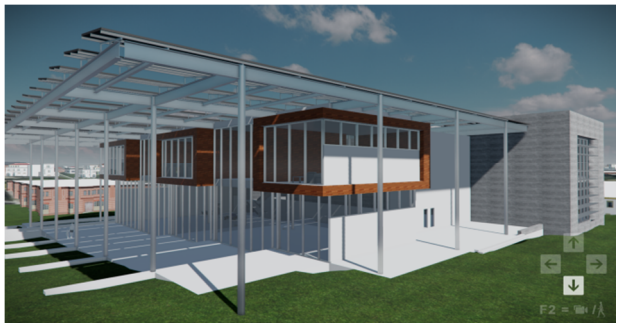


User Interface

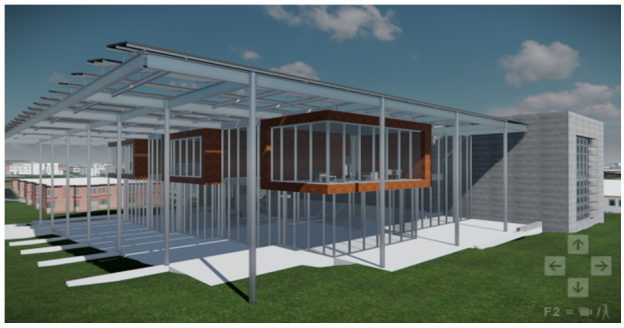
The user interface (UI) is the first screen the client sees when opening the standalone package. The UI serves as the home screen to activate the game environment after the project is deployed to a standalone package.

Design Options and Costs

Once the project is open, you can toggle through various design options using preset keys established in the Level Flow.



DESIGN OPTION 1: 35% GLAZING



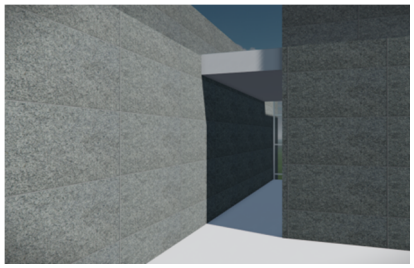
DESIGN OPTION 2: 45% GLAZING

It is also possible to show the costs associated with these different design options. You can toggle this infopad on and off with preset keys or connected it to a wireless handheld controller when using VR. This controller simulates reading from a handheld notepad.

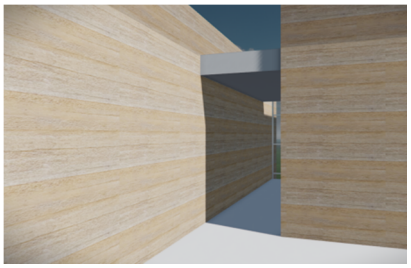
DESIGN COSTS INTERACTIVE INFOPAD

Material Options and Costs

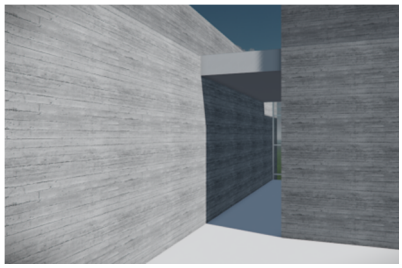
Using preset keys it is possible to change materials in the project and see the costs changes associated with those material changes. The infopad toggles between the design costs and the material costs. It can be controlled using preset keys or the handheld controllers.



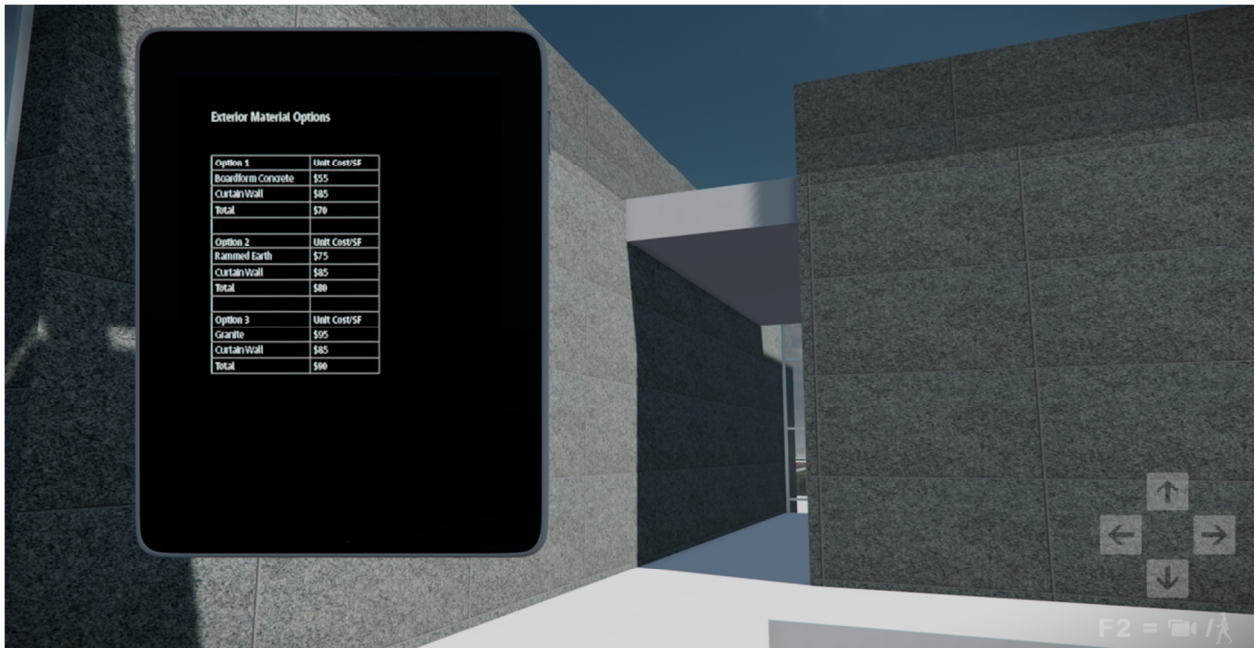
MATERIAL 1: GRANITE



MATERIAL 2: RAMMED EARTH



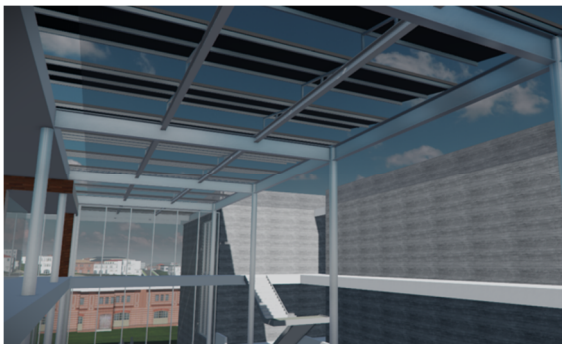
MATERIAL 3: CONCRETE



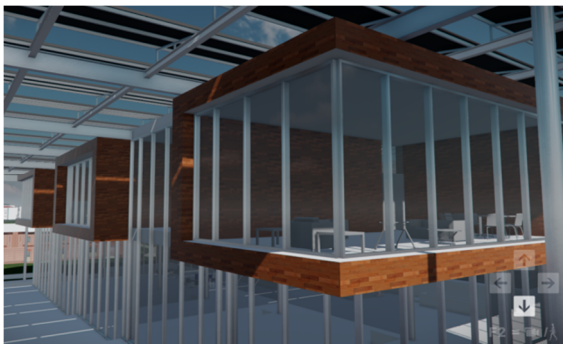
MATERIAL COSTS INTERACTIVE INFOPAD

Exploration and Interaction

You can also explore inside and outside the project using preset navigation keys. These keys move 360 degrees, allowing clients, designers, and construction managers to explore the project.



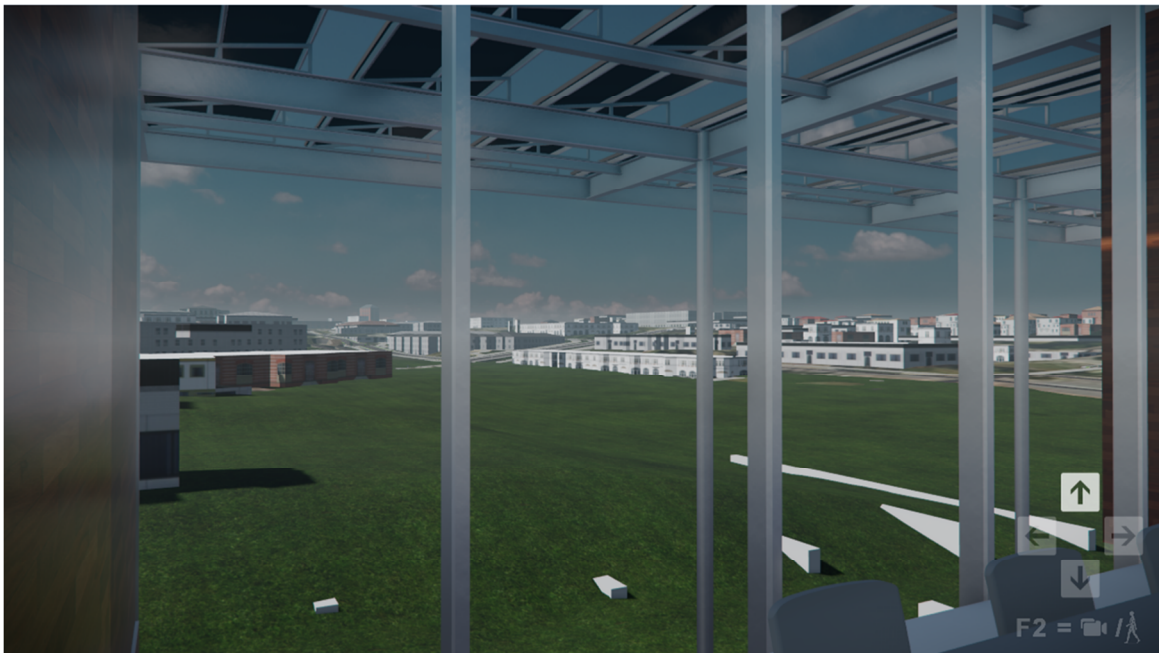
INTERIOR VIEW



EXTERIOR VIEW

Site Context

Using Infraworks 360 it is possible to import the surrounding topography, buildings, and roads. This provides site context on the exterior and realistic views of the surrounding site from inside the building.



What is the workflow from a 3D Revit model to an interactive gaming environment?

Workflow from Revit – LIVE – Stingray

There are three steps when converting 3D models from Revit to a 3D immersive environment in Stingray. First, prepare the model in Revit by assigning materials and lighting to different design options. Next, send the model to the cloud through LIVE. Finally, convert the LIVE model to a Stingray compatible format.

1. Prepare the Model in Revit
2. Send to the Cloud Using LIVE
3. Convert to a Stingray Format

Workflow within Stingray

Within Stingray, there are six small steps. First, create a basic project in Stingray. Second, copy the LIVE files into this project, overwriting the files. Third, add a previous developed project template to the project folder. Fourth, add the previously developed Level Flow file to the Level Flow tab in Stingray. Fifth, create additional features such as site, vegetation and entourage. Sixth, deploy the model to an immersive environment. There are a variety of formats available. We will discuss the workflow from Revit – LIVE – Stingray first.

1. Create a Basic Project
2. Add Project Folders
3. Add Template Folders
4. Add Level Flow
5. Additional Features
6. Deployment

Workflow from Revit – LIVE – Stingray

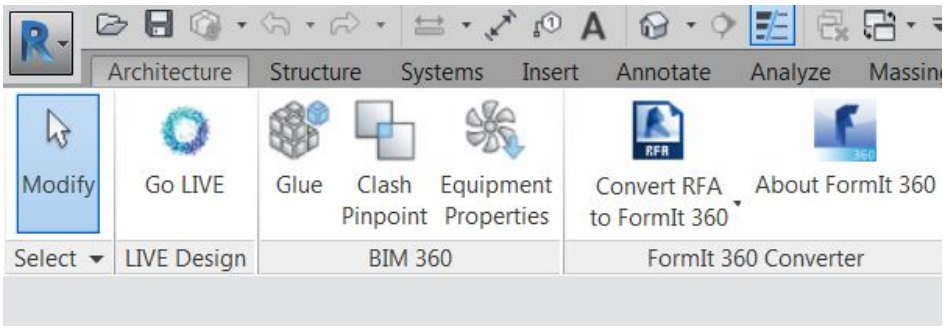
Prepare the Model in Revit

Prepare the model in Revit by adding materials and lights to multiple design options as required.

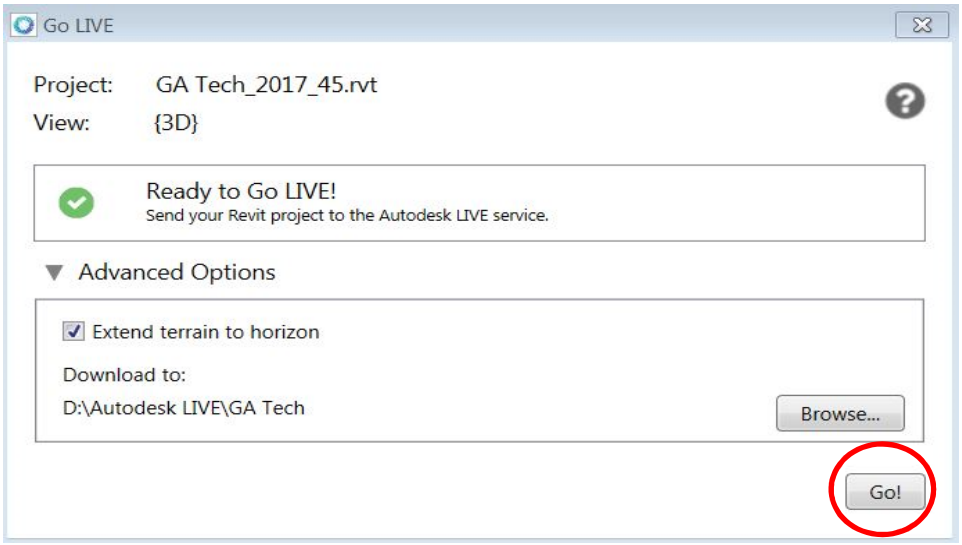
Send to the Cloud Using LIVE

LIVE is an interactive visualization service. Using the LIVE service it is possible to render 3D models from Revit and turn them into interactive environments.

- Log into A360 account in Revit.
- Choose Default 3D View.
- Under the Add-Ins Tab, LIVE Design Panel, click 'Go LIVE' button.

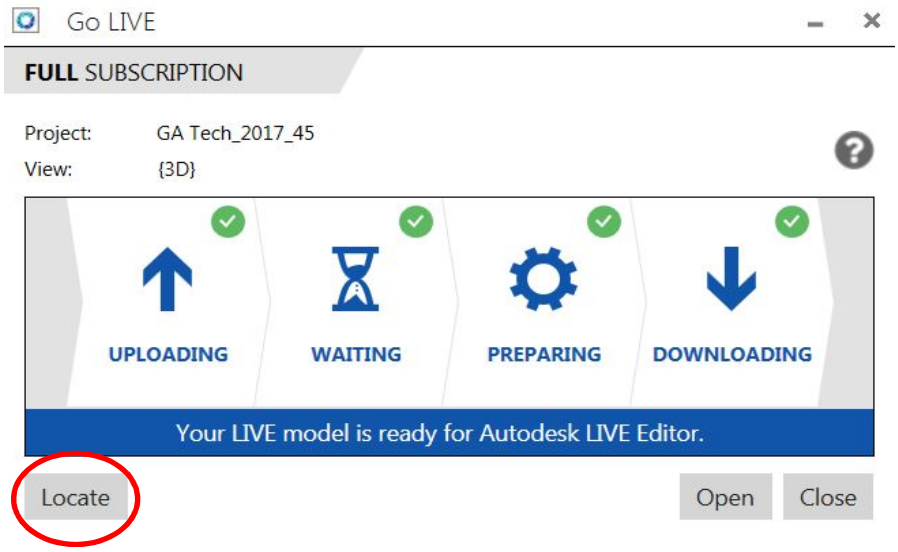


- A dialog box showing the status of the active file is displayed. Any errors will be displayed, including level of detail or custom materials. Fix any errors and then click 'Go!'

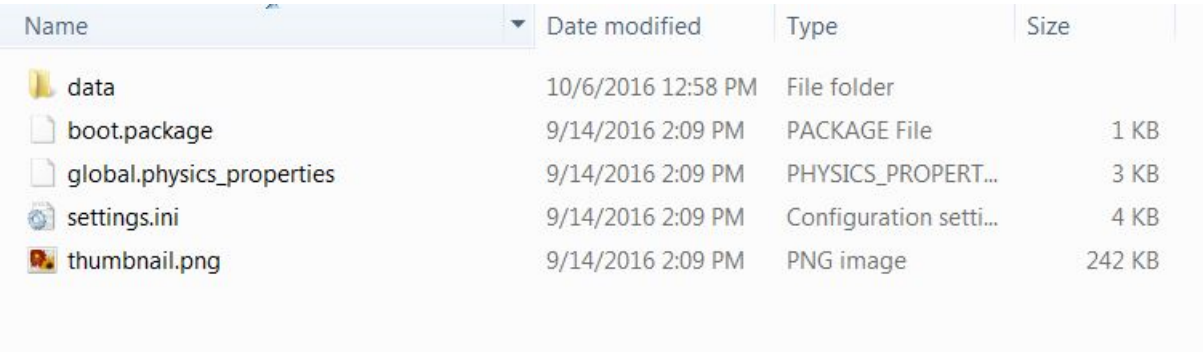


Convert to a Stingray Format

- Once the Data Prep service is complete, browse to the file location specified in the previous step.



- Save a copy if you would like to open the file in LIVE. If not, change the LIVE model file extension (*.lvmd) to .zip and extract the project files. The folder will contain a data folder along with the following files:



- Repeat this process as needed for multiple design options.

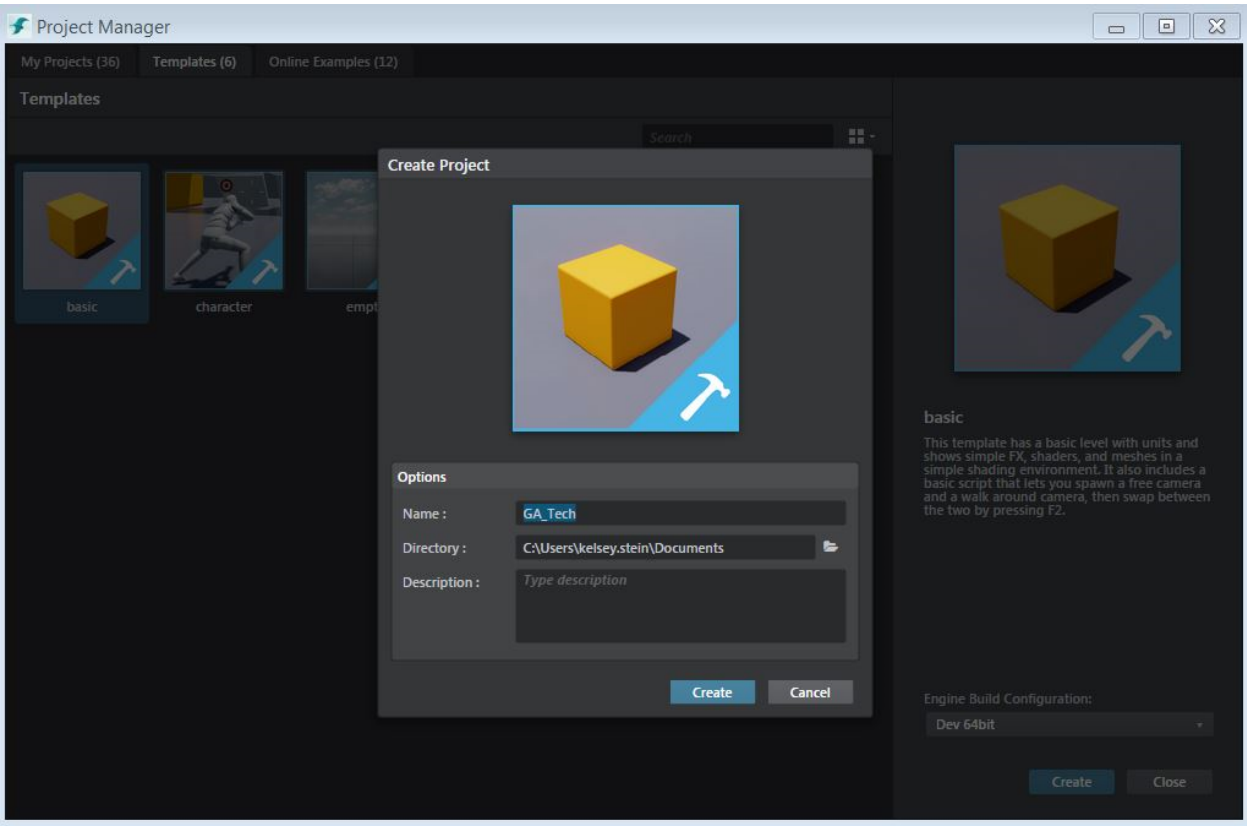
Workflow within Stingray

In order to quickly create immersive environments in Stingray for pursuits and conceptual estimates it is essential to develop a standardized project template. This template can be reused on multiple projects and will contain a variety of preselected models, materials, and textures standard to all projects, such as entourage, vegetation, and site. This template is critical for standardizing the Revit – LIVE – Stingray workflow. Cost information can also be stored here and updated as the projects change. This data can be linked to the 3D model or completed externally.

The second piece of a standardized project template is the Level Flow file. Flow is the visual programming system built into Stingray. It is much easier to use than traditional Lua scripting or C++ programming. Flow determines all of the interactions possible in the gaming environment. Using Flow it is possible to change design options, materials, or costs in the project. This Level Flow can be saved as .txt file and copied into to each new project, greatly speeding up the programming process. The Level Flow can also be edited or expanded based on each project's requirements.

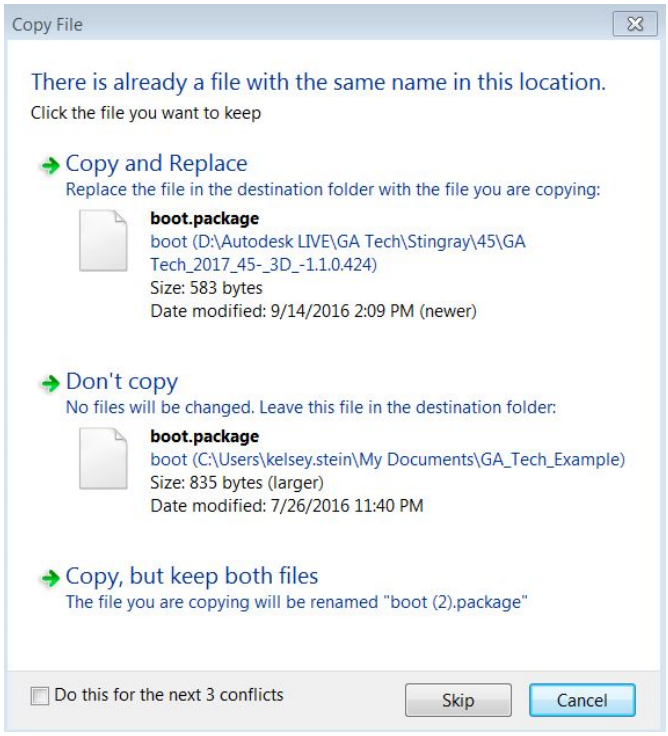
Create a Basic Project

- Create a new project using the Basic Template

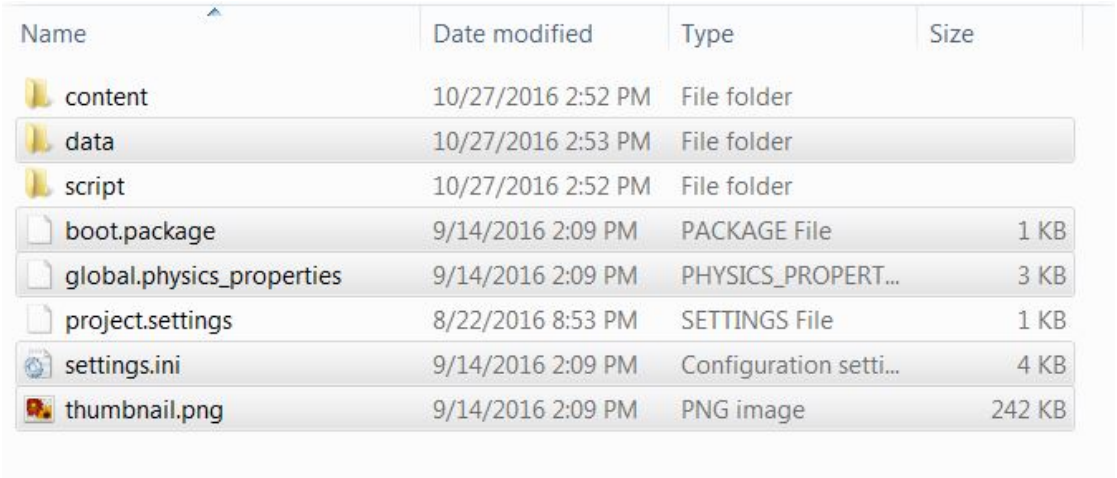


Add Project Folders

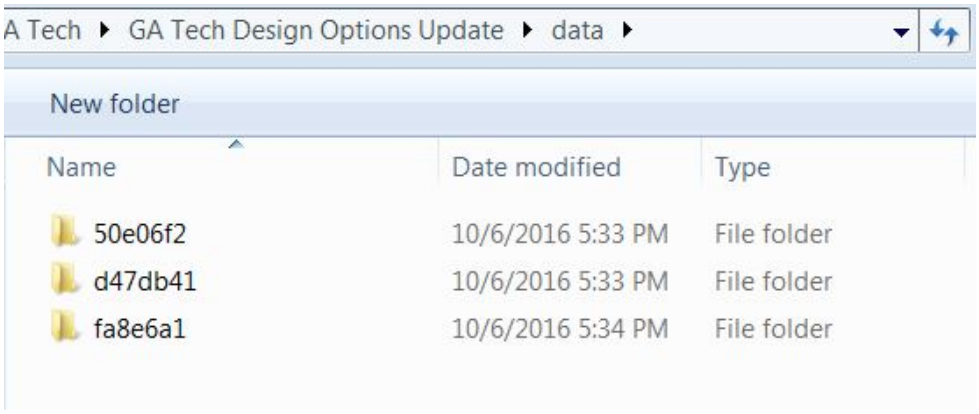
- Copy the LIVE data files into this newly created project folder. Overwrite existing files if needed.



- These files will be overwritten:



- If there are multiple design options, copy the files into the data folder. These design options will appear as separate levels in Stingray.

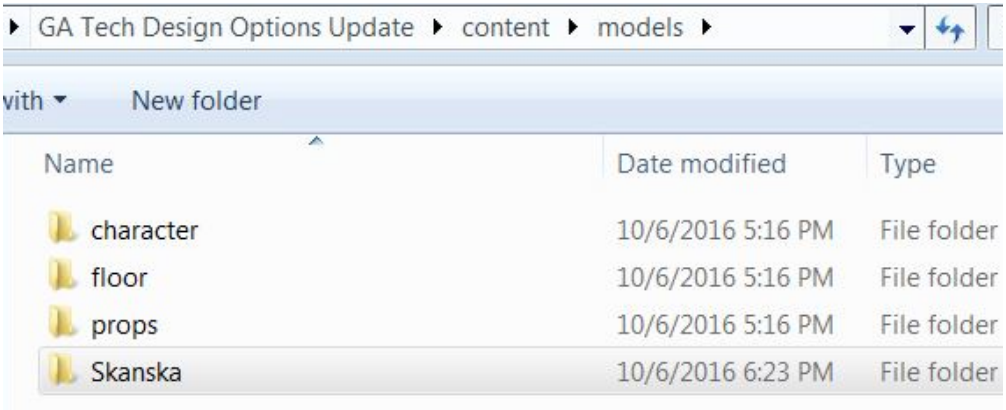


- Recompile the data in Stingray by clicking Ctrl+F6. This may take a few minutes depending upon the size of the files.

Congratulations! You now have converted a Revit model into a 3D immersive environment in Stingray and are ready to begin exploring the program! Next we will discuss setting up a project template, adding design costs, and additional features.

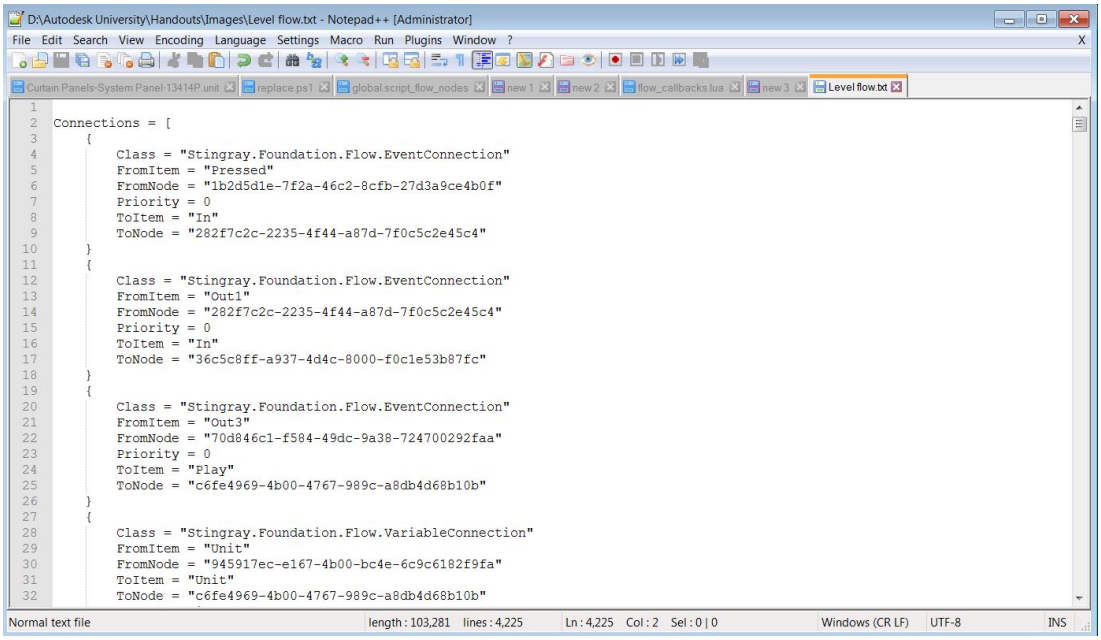
Add Template Folders

- Add a template folder to the project under the 'Contents' folder.

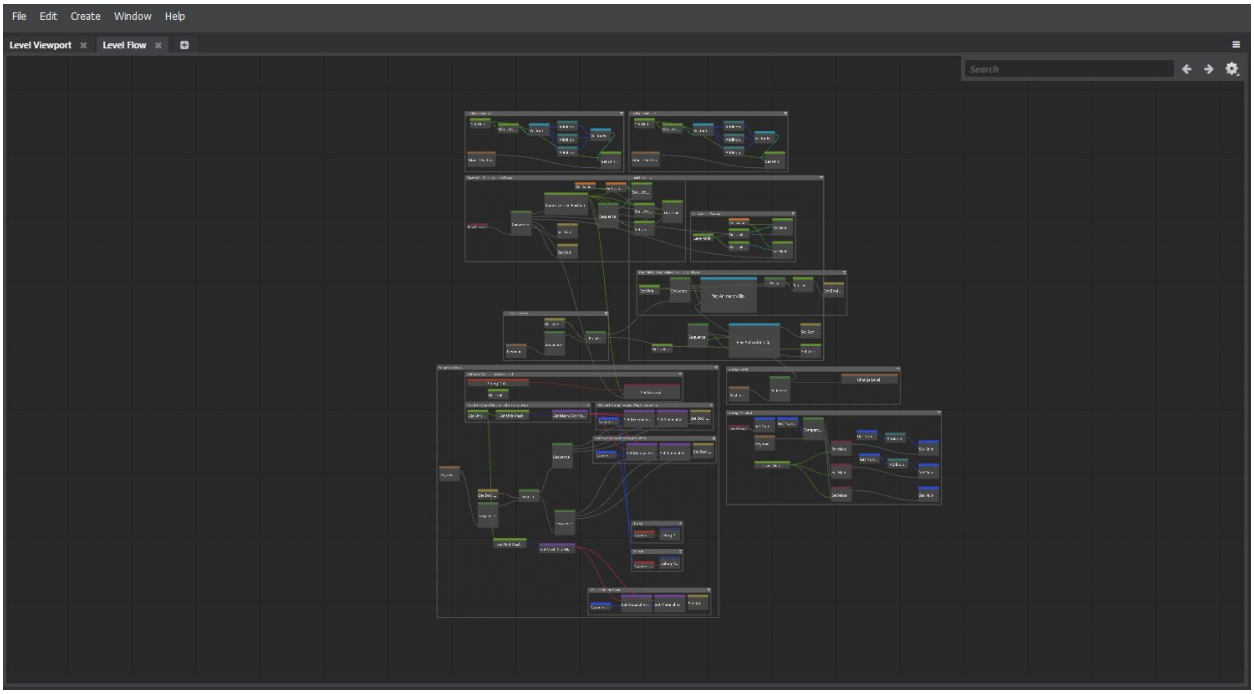


Add Level Flow

- Open Saved .txt Level Flow file



- Copy and Paste into Stingray, Level Flow Tab

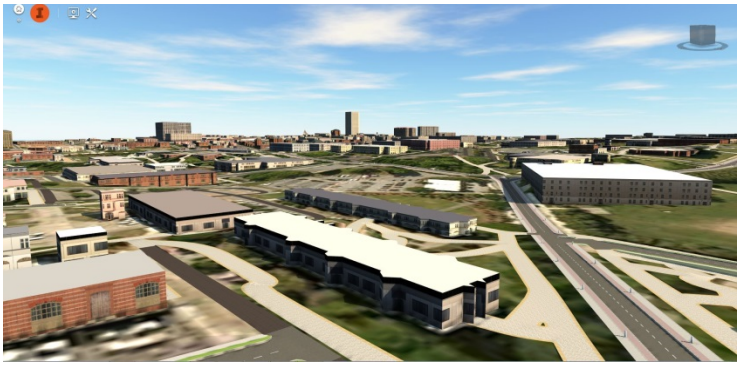


Additional Features

There are countless additional features available in Stingray. Site, entourage, and vegetation are just a few. Materials and lighting also make a great impact on the quality level of the presentation.

Infraworks Site

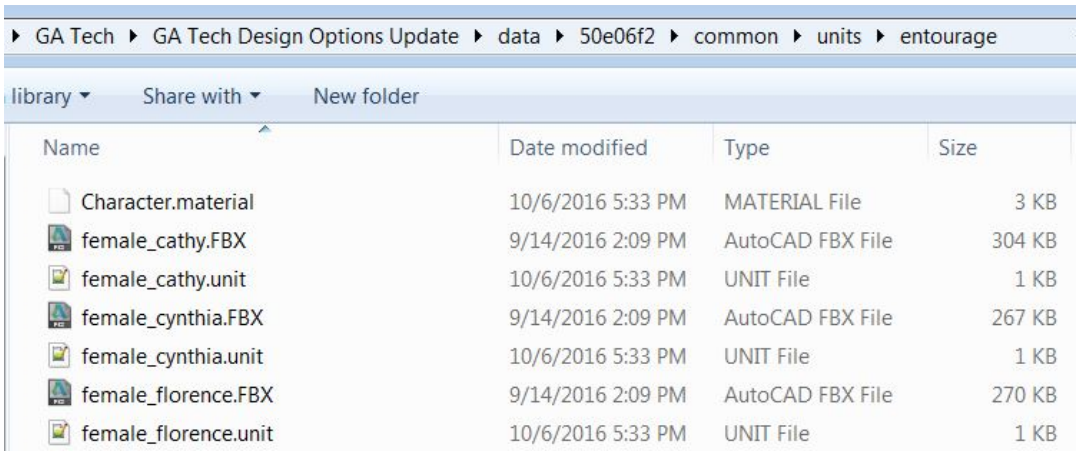
Using Infraworks 360 it is possible to import topography and buildings into Stingray. This way it is possible to place the building in its surrounding context, allowing viewers to experience not only that building, but also the surrounding environment. Please contact Kelsey Stein or Dave Tyner for this workflow.
kelsey.stein@skanksa.com dave.tyner@autodesk.com



Entourage

Projects created in LIVE automatically have entourage added. Entourage can be found in the following folder:

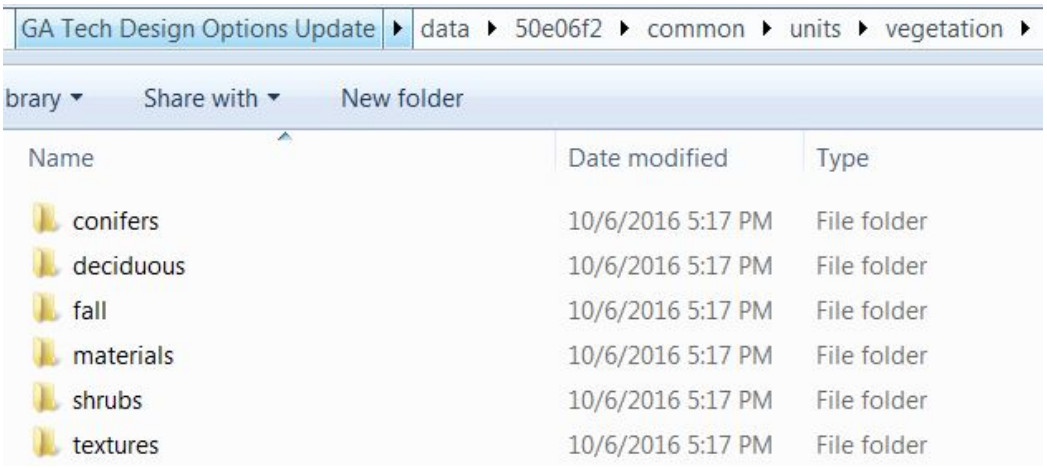
- Data\[Your Project]\common\units\entourage



Vegetation

Projects created in LIVE automatically have vegetation added. Vegetation can be found in the following folder:

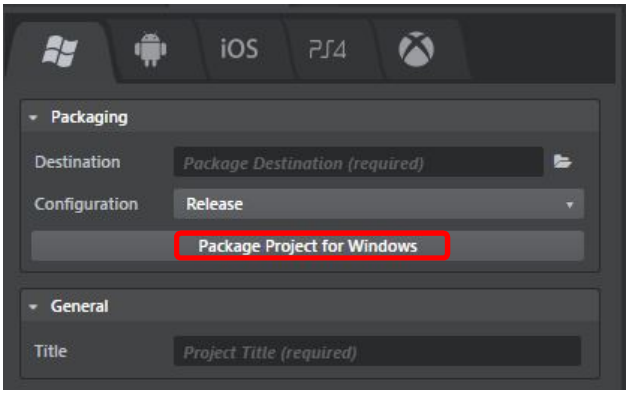
- Data\[Your Project]\common\units\vegetation



Deploy Project

There are several deployment options from Stingray. Using Stingray it is possible to deploy to Windows, Android, iOS, Ps4, Xbox, and virtual reality. Note: VR does require starting from a VR template as opposed to a Basic Template. For this project we will be deploying to Windows. This will create a simple .exe file. These files are small and are easily transferrable for presentations or pursuits.

- Deployer, choose Windows Tab
- Specify the file destination
- Specify the project title
- Click ‘Package Project for Windows’



Benefits

Time and Cost Savings

Time savings are achieved through a streamlined workflow from Revit – LIVE – Stingray, which bypasses traditional rendering software, and results in high quality projects being created in a short amount of time. Additional time savings are achieved through standardized project templates and Level Flow files. Once this workflow has been established it can result in projects being produced in as little as one-third of the time as compared to traditional rendering methods.

Cost savings are directly associated with these time savings. The combination of time and cost savings results in a greater number of projects being able to use this technology. Now, a higher quality of presentation is available to small scale projects, which were previously only available to large projects. This benefits a greater number of projects.

Additional Outputs

In addition to traditional rendering and videos, real-time rendering provides the additional output of 3D interactive environments. These environments can be explored using Windows, Android, iOS, Ps4, Xbox, and virtual reality.

Client Involvement

Additional outputs lead to increased client, designer, and contractor involvement. Using Stingray, it is possible to explore and interact with a 3D model, providing a better understanding of the project. Decreased time and effort to produce high quality projects can also result in a greater number of design options. This results in a stronger project overall and benefits all parties involved.

The benefits of using gaming in construction include increasing owner involvement, reducing the time and effort it takes to produce an attractive proposal, and facilitating bidding on smaller projects with a quality offering only affordable by larger projects today. Visualizations in the Stingray game engine ultimately lead to winning more work.