

National Aeronautics and Space Administration



# Visualizing the Future of NASA Langley Research Center

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[www.nasa.gov](http://www.nasa.gov)

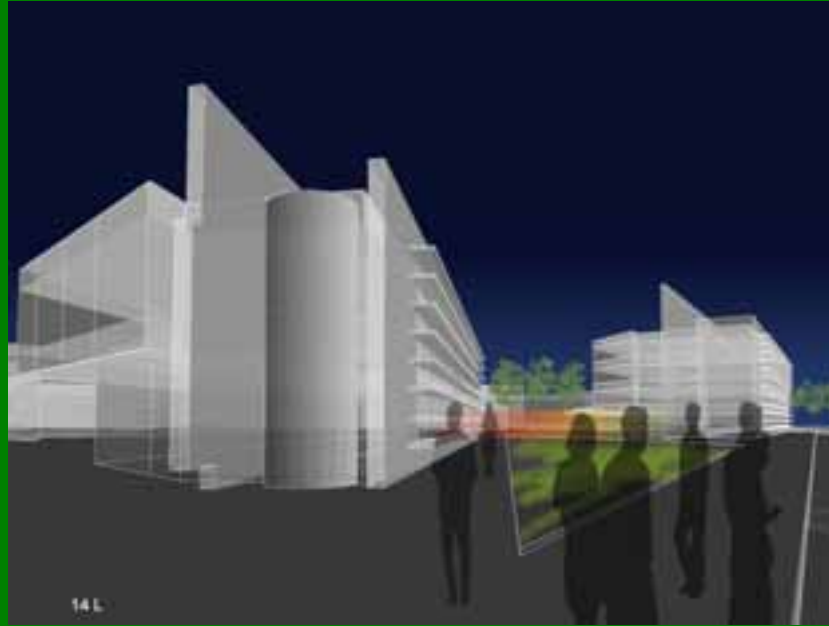
# About Langley Research Center

- Located in Hampton, VA, adjacent to Langley Air Force Base
- First construction began in 1920, as part of the former NACA (National Advisory Committee for Aeronautics)
- Facilities include wind tunnels, airplane hangars, and research laboratories
- Most facilities built during the 1950s and 1960s, and are aging



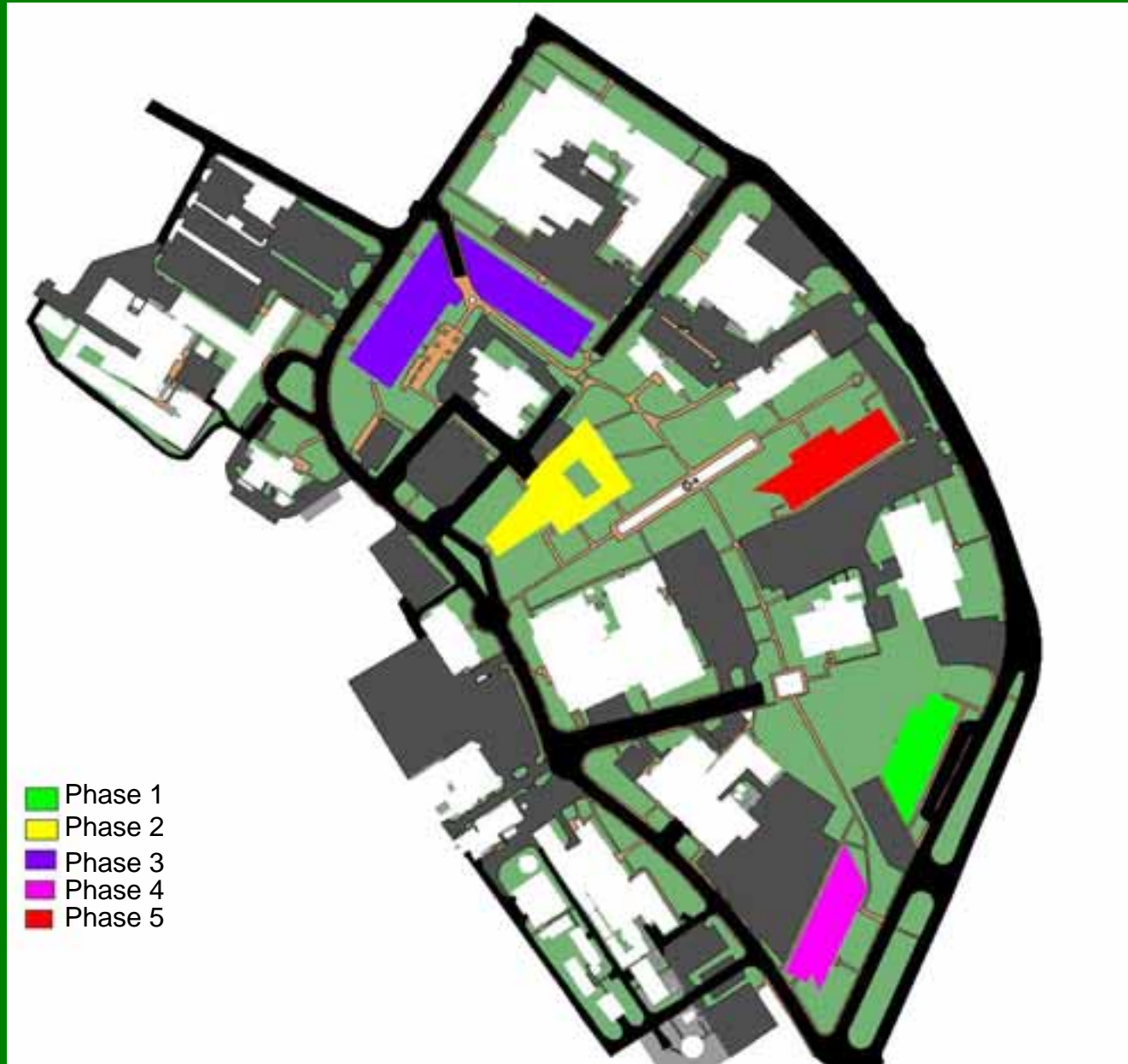
# The New Town Development Project

The New Town project is a multi-phase initiative to upgrade and update existing NASA LaRC facilities, demolish outdated and redundant buildings, and construct new modern facilities. In addition to this, plans to make the core area a more pedestrian pleasing environment have been made.



Most of the project is still in the planning and proposal stages, however, it was determined that a visualization was needed to help promote the project and acquire funding from NASA Headquarters.

# Phases of the New Town Development Project



# Project Purpose

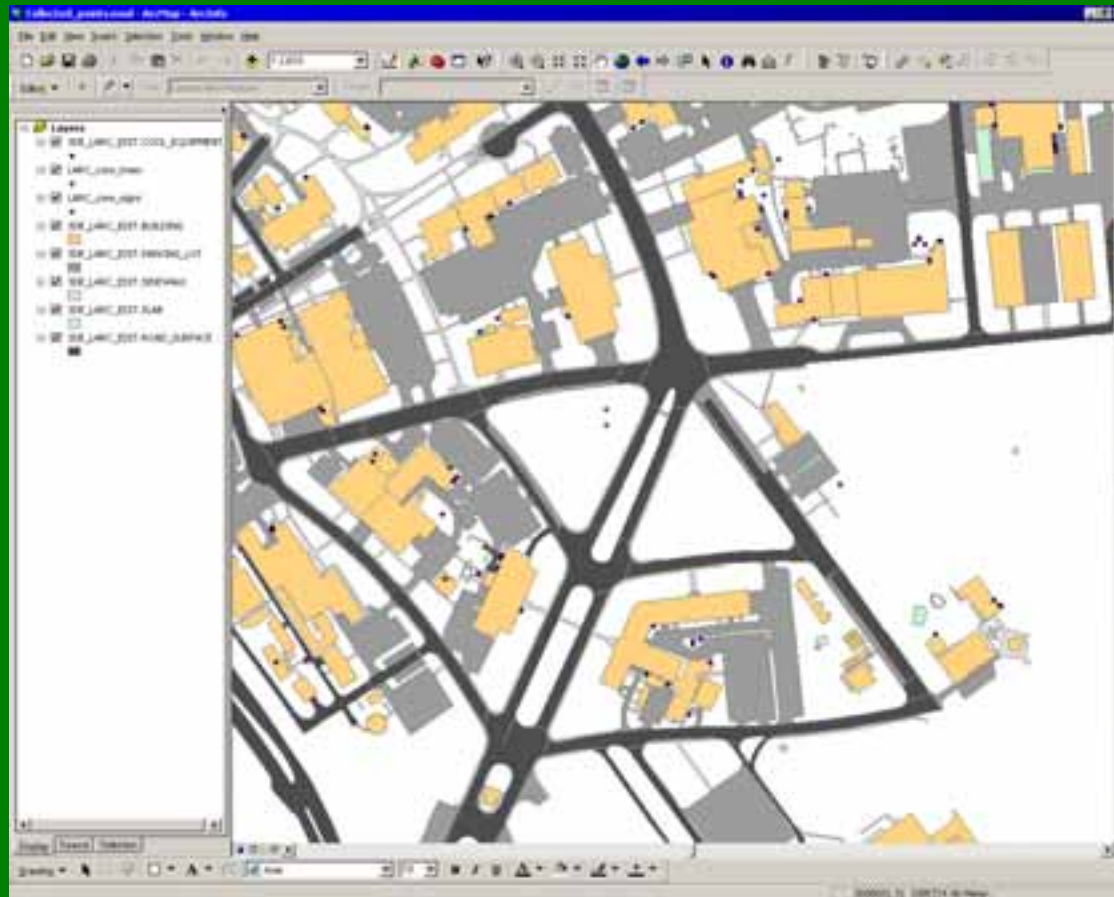
The goals of this project are to:

- Produce a 3D model of Langley Research Center
- Implement New Town proposals into the model
- Using the model, produce visualizations of the New Town plan
- Visualizations would include still imagery and rendered videos
- These visualizations are the project “deliverables”, the end product needed by Langley to secure funding for New Town



## ArcMap Preparation Work

- ArcMap data of the research center is gathered
- Map data is used as a base for creation of the model as it currently exists



- Map data can also be used as a base for individual building models

# Individual Building Production

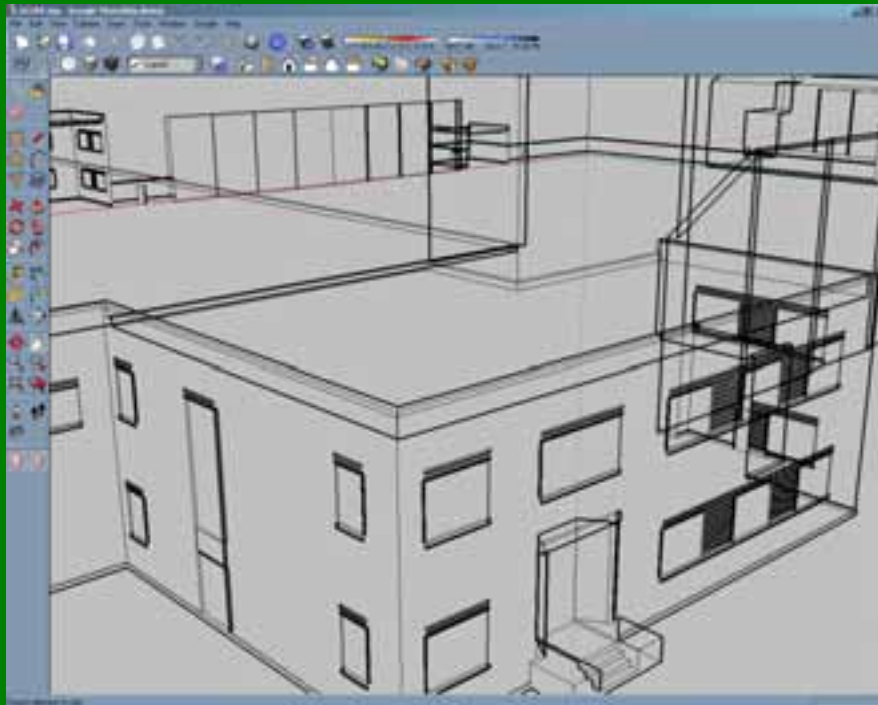
The next step is to create the individual building models that will be combined into the final 3D model for visualization production

- Digital floor plans of each build are acquired
- Field work is done to acquire photography for building reference and textures



## Individual Building Production

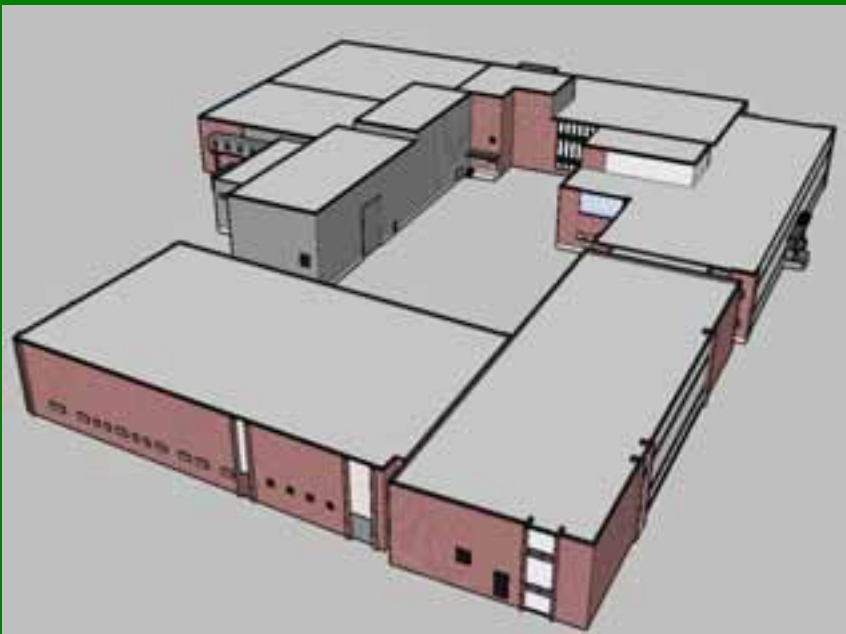
- Building is modeled in Google SketchUp
- Building textures made from photography using Paintshop Pro
- Textures then applied to buildings in SketchUp





## Individual Building Production

- Fully textured building checked for errors
- Finished building model then inserted into overall model to be correctly located
- Overall model exported as a .3DS file format



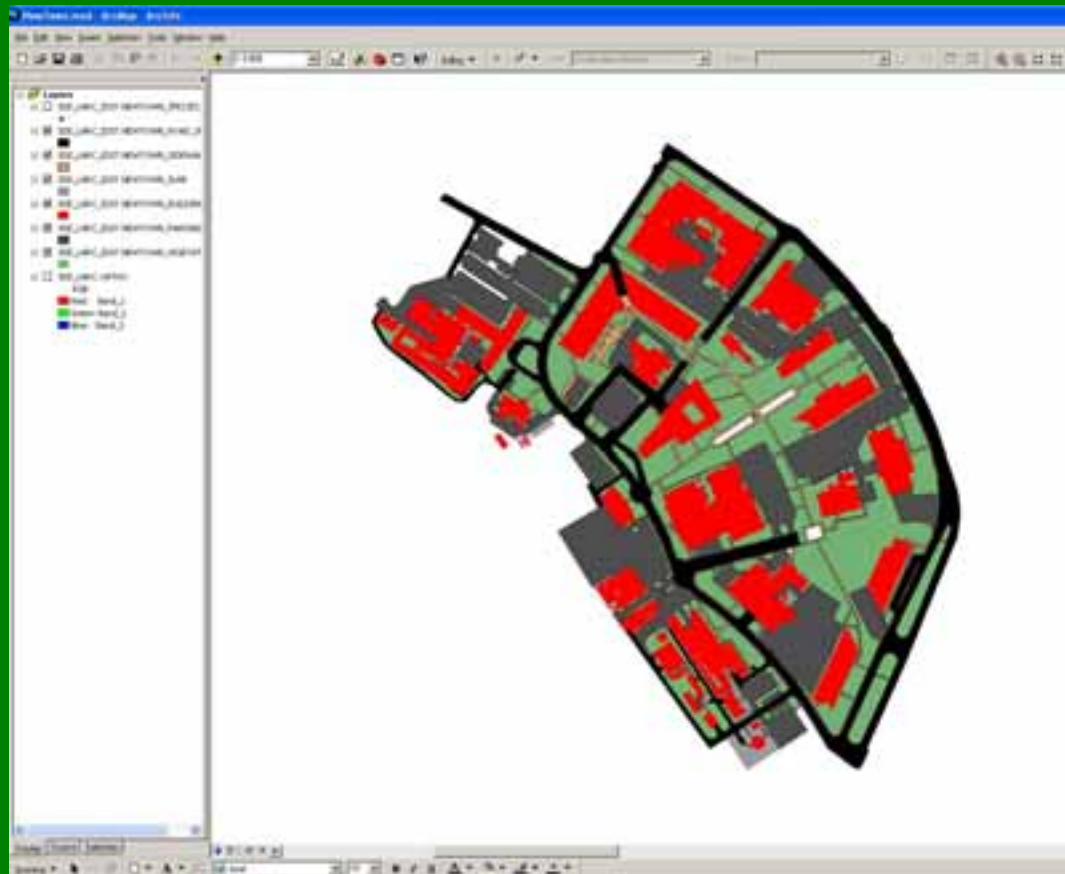
# Parking Lots, Sidewalks, and Fountains

- The conceptual designs for the core area are first put into ArcMap using the plans received.



# Parking Lots, Sidewalks, and Fountains

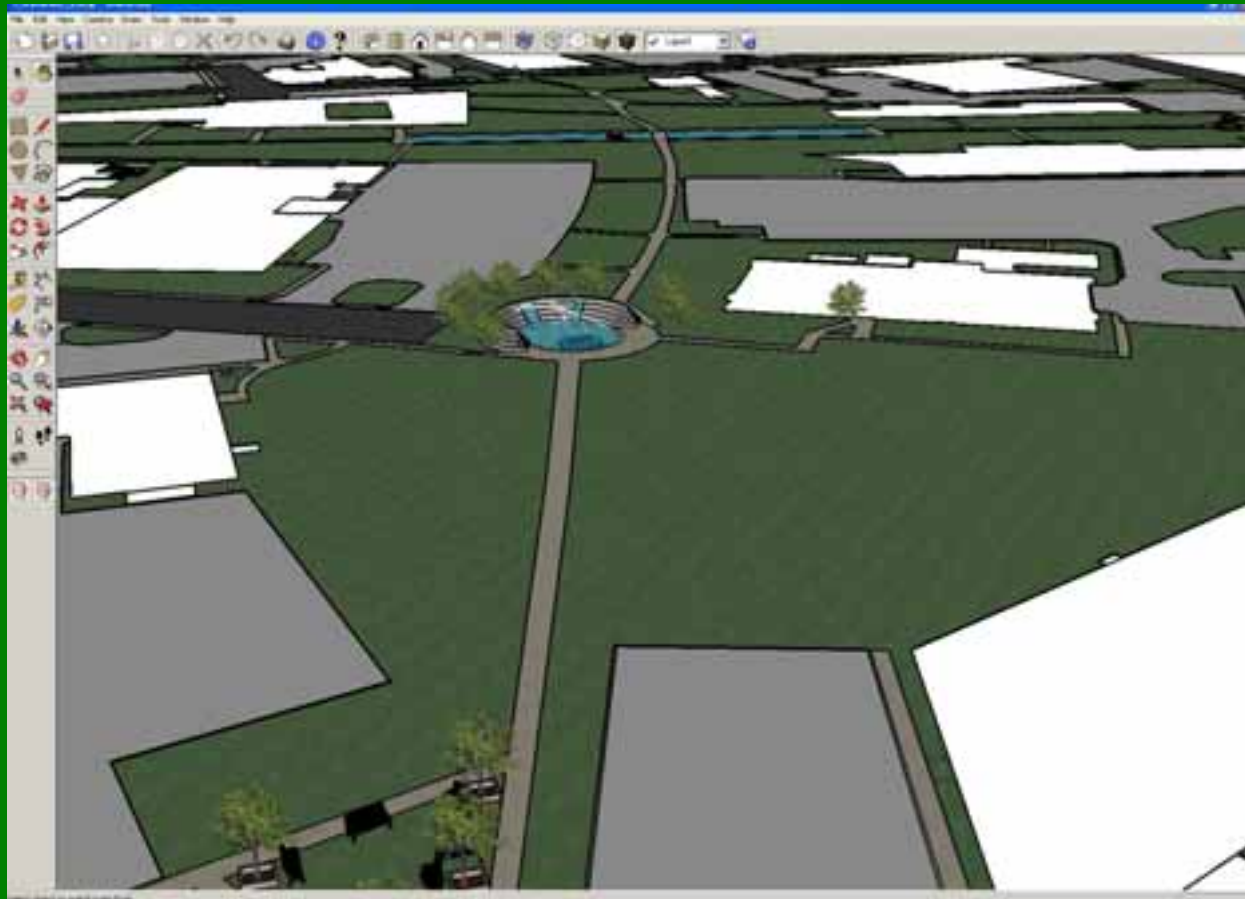
- Once the designs are put into ArcMap, then they can be exported into SketchUp to provide a 2D template.



- A clip was taken to keep from maintaining the whole center.

# Parking Lots, Sidewalks, and Fountains

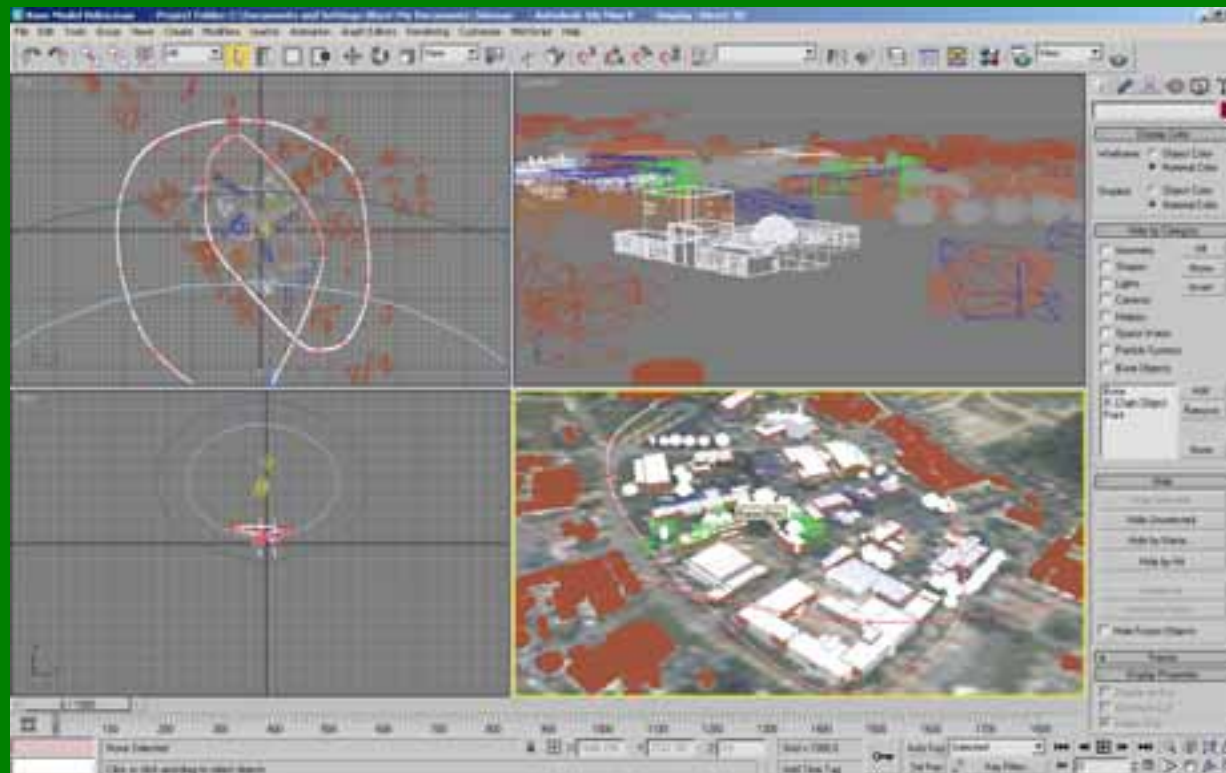
- All layers from the New Town clip in ArcMap are exported as .dwg files.
- They can then be imported into Google SketchUp and scaled.
- In SketchUp, the 2D layout of the core area can easily be made into 3D including fountains, benches, and landscaping.





# 3D Model Assembly

- Import:
  - real property data from ArcMap
  - building and landscaping models from SketchUp
  - aerial photography from ArcMap
  - all other 3D and 2D data to be used

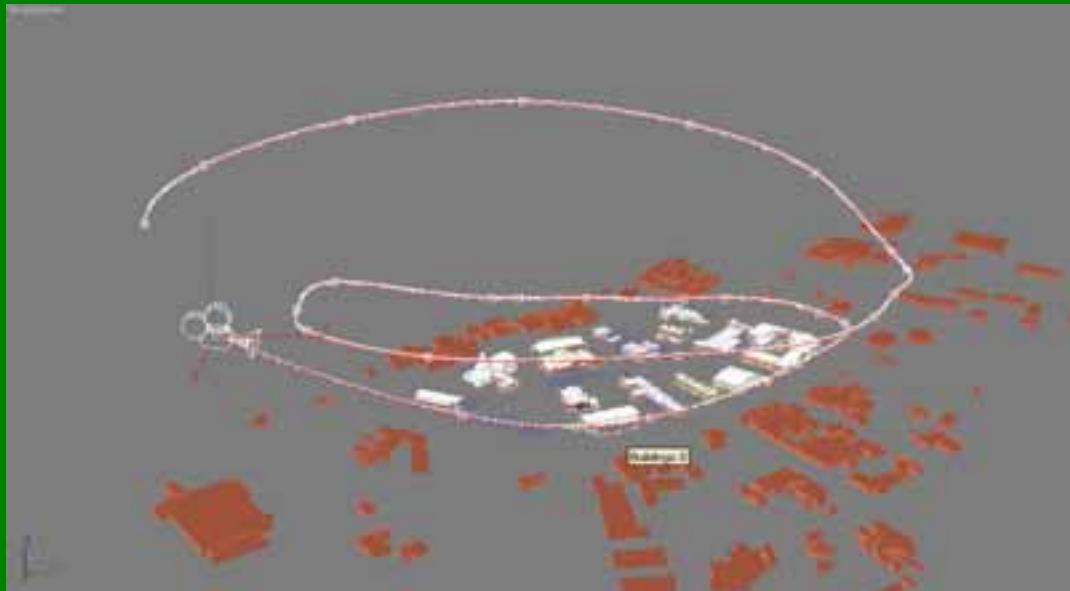




# Creating the Visual

Once everything is in the model it's time to start setting up the scene for production.

- Add light sources to help define edges with shadows
- Create camera for animation
  - Use Auto Key tool to create smooth flight patterns
- Setup render configuration and file output



# Visual Output

3D studio outputs in several different still image and video formats, at almost any resolution

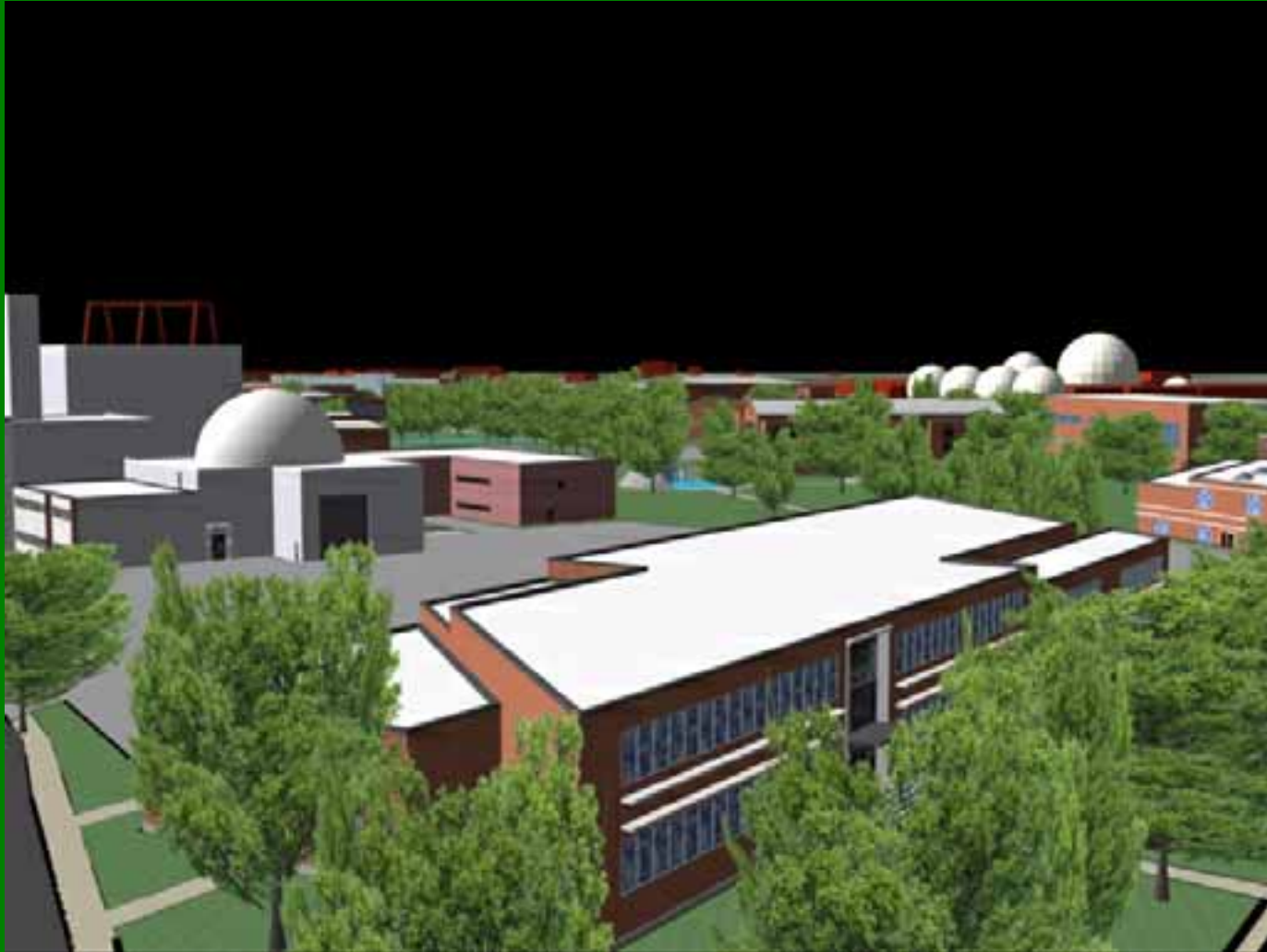


Screenshot before adding 3D sidewalks, fountains, and parking lots

Screenshot after



# Video Output



# Problems Encountered

- Problems with Google SketchUp using all the CPU usage especially the newest version of SketchUp Pro 6
- Limitations of file size in SketchUp
- Some materials for fountains are lost when exported from SketchUp
- Using networked computers can cause programs to run slow
- Long rendering times



Thank you for your time.

I will now take any questions or comments you may have.

To view 3D models go to:

<http://sketchup.google.com/3dwarehouse/>

Search using keywords "NASA Langley"