



Effortless 3D Environments

Quick Start Guide

Unity version 1.0 release

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1.0 Push-button worlds at your fingertips

Thanks for choosing Mantle!

Mantle came into being to solve a problem we kept encountering: making detailed and complex environmental creation simple. It's a product we really care about and we're excited that you can use it to produce amazing environments that previously you just hadn't thought possible in such a short time.

Once you've experimented using the quick start guide below, let's talk. We want to hear what you've made, what really worked, and of course what didn't. We've got a healthy appetite for making this the easiest environment creation and simulation product around and you can reach us using any of the methods below.

Forum: mantle.tech/forum

Email: support@mantle.tech

On behalf of the whole team, thanks for helping us reshape the world ;)

Dean Gifford

CEO, Mantle Technologies

2.0 Capabilities & Requirements

2.1. Functional Capabilities

Features Included:

- Create environments within your existing Unity design workflow (Design time generation)
- Preview environments (Runtime generation)
- Render any location worldwide using OpenStreetMap vector tile format
- 3D building auto-generation
 - 3D Building extrusion
 - Basic facade generation system (simple generation)
- Environmental content auto-placement
 - Granular styling control of environment content
- Mantle Theme Styling system
 - Pre-packaged Themes to use out of the box
 - Workflow for creating your own Themes
- Transport network simulation capability
 - All transport routes processed and traffic simulation ready
 - Basic transport simulation behaviour provided
 - Supports your own custom simulation behaviours
- Environment output is Virtual Reality & Augmented Reality ready
- Mantle basic preview camera

Upcoming Features in Development

- Generation capabilities
 - 3D height-mapped terrain auto-generation
 - Mesh combined buildings
 - Mesh combined transport networks
 - Full building facade generation update
 - Style capable tunnel and bridge entrance and exits
- Styling capabilities:
 - Style creation preview support
 - Support for styling tunnel and bridge entrance and exits
 - Revised Unity plugin GUI
- Rendering capabilities:
 - Scene Level of Detail (LOD) generation support and optimisation
 - Publish environments using Mantle Engine (Runtime rendering)

2.2. Requirements

Mantle 1.0 requires:

- a copy of either Unity Personal (Free) or Unity Pro
- 70Mb free drive space for package install
- A 'reasonable' spec processor and graphics card for larger more complex scenes over 2km² that include large volumes of placed assets

3.0 Installation & Contents

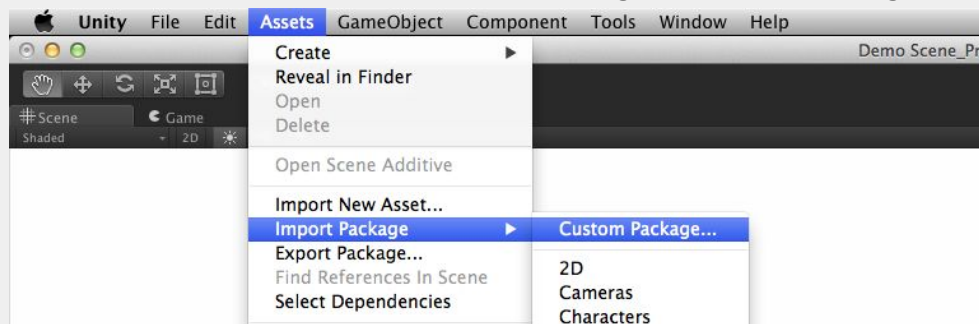
3.1. File type & Package size

The Mantle 1.0 release is a Unity package file that requires Unity Personal or Professional to use and is 15Mb in size including two provided Mantle Themes.

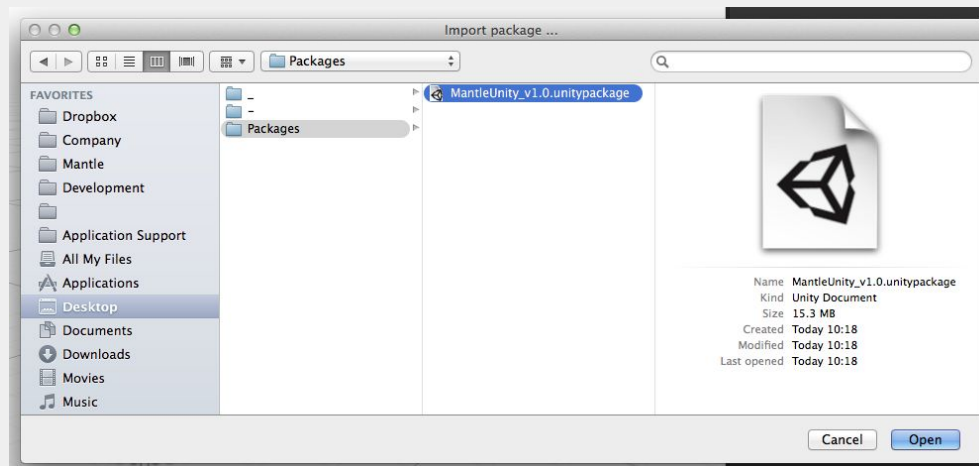
3.2. Installation

Mantle is easily added to Unity with these steps:

1. Open Unity and create a new project
2. Under the **Assets** menu choose **Import Package > Custom Package...**



3. Locate the **Mantle_v1.0.unitypackage** file



4. Wait for Unity to finish importing the Mantle package
5. Now you're ready to go!

3.3. Package Contents

On importing the Mantle preview package you'll find Mantle elements in the Unity *Project* pane under the **StandardAssets/Mantle** folder:

System Files (/System)

- Mantle core system files

Content Files (/Content)

- This guide, release notes, EULA, 3rd party copyright notices
- Two pre-created Themes (**/MantleThemes**) each in their own folder
 - *Prototype*
 - *Eltnam*
 - Each containing:
 - A variety of pre-created Styles that comprise the provided Themes (**/MantleStyles**)
 - An example scene to showcase the theme
 - A Theme information file
 - A variety of Terrain Assets comprised of 3D objects, textures and settings used to decorate environments (**/Materials, /Models, /Prefabs**)

4.0 Data Privacy

Please note Mantle collects basic usage and IP information to ensure each license is valid. We do not collect or hold personally identifying information on our servers. If you have any questions or comments regarding this please don't hesitate to contact us via **support@mantle.tech**.

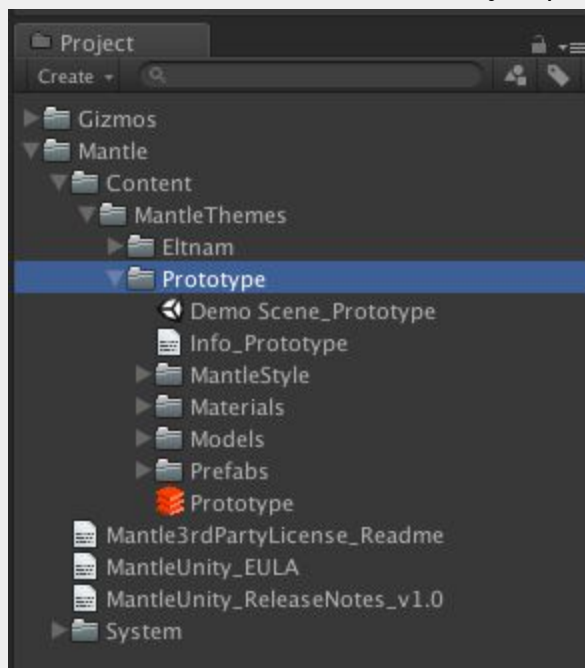
5.0 Quick Start

5.1. Let's build!

Right let's cut to the chase, you want to see what Mantle can do out of the box so let's open one of the Demo Scenes we've provided.

5.1.1. Prototype style scene - with simulation!

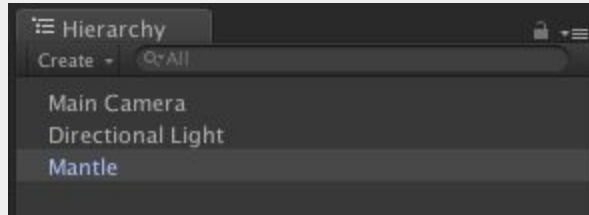
1. In the Unity *Project* pane locate the Prototype folder
 - a. either open the **/Mantle/Content/MantleThemes/Prototype** folder
 - b. or search for 'Demo Scene' in the *Project* pane search



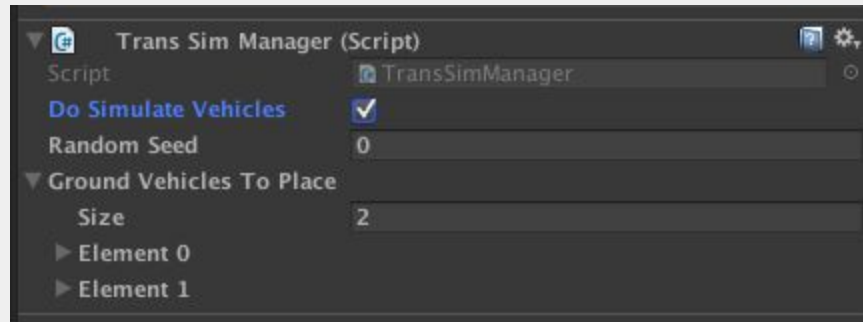
2. Double click the *Demo Scene_Prototype* scene.
3. Hit the Unity 'Play' button to kick off run time scene creation.
4. The Mantle scene will build. Note that while it does so a default build option disables the game camera. That might sound odd but it speeds up building at runtime substantially.
 - a. If you'd still like to watch the scene as it's constructed simply switch to the *Scene* view or
 - b. Locate the Mantle object in the *Hierarchy* pane and in the *Inspector* locate 'Render Options', expand it and uncheck 'No Render Until Completion'.
5. When the scene creation is complete the game camera will switch back on. We find the Scene view the most useful camera to navigate throughout the scene during runtime once the scene is constructed.

5.1.2. Prototype style scene - hold the simulation

1. Before hitting the Unity 'Play' button locate the Mantle gameObject in the *Hierarchy* pane.



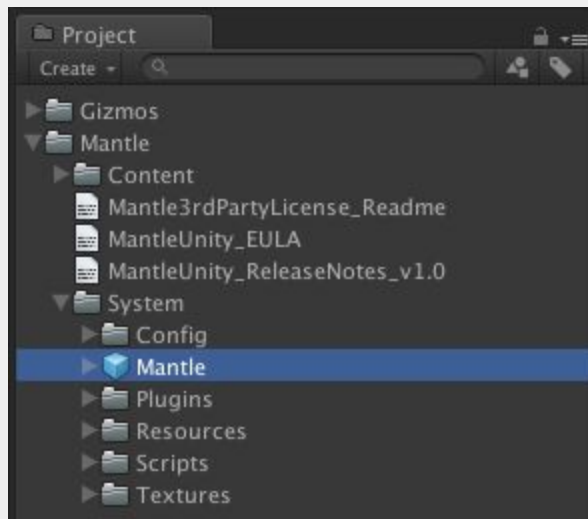
2. In the *Inspector* pane locate the Trans Sim Manager component script.



3. Set the 'Do Simulate Vehicles' checkbox to off.
4. 'Play' the scene as above. This time when the construction is complete it won't instantiate vehicles.

5.1.3. Create a new Mantle ready scene from scratch

1. Create a new Unity scene from the Unity menu under *File > New Scene*.
 2. From the Unity menu under *Tools > Mantle > Add Mantle gameObject*.
 3. Now you're ready to apply a Mantle theme and create an environment, follow the steps in 5.2.1 below.
-
1. Alternatively locate the Mantle interface prefab in the Unity *Project* pane
 - a. either open the **/Mantle/System** folder, or
 - b. search for 'Mantle' in the Project pane search.



2. Add an instance of the Mantle prefab to your scene by dragging it from the *Project* folder into either the *Hierarchy* pane or the scene window.
3. Follow the steps in 5.2.1 below.

5.2. Making it your own - Playing with Mantle

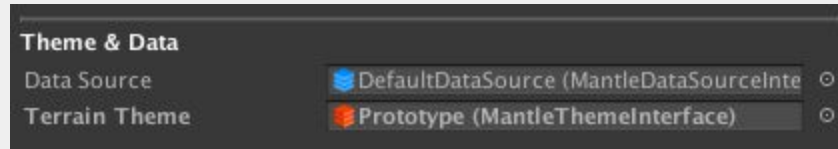
Now that you've seen the smallest hint of what Mantle can do there's a bunch of things that you'll likely want to dig into. Here's our shortlist of next steps to try:

5.2.1. Try out different Themes

Mantle's Themes are incredibly powerful and can create entirely different looking and feeling environments from the same underlying mapping data. We highly recommend loading up each provided Demo Scene that showcases the best application of each Theme's content.

If you'd like to apply different Themes to the scene you're currently in however you can just as easily 'skin' the current scene's location by applying a Theme directly to it.

1. Click on the Mantle GameObject in the scene to focus it for the Unity Inspector.
2. Locate the 'Theme & Data' section.
3. Click the locate icon next to the Terrain Theme field.



4. In the popup window all currently available Themes will be listed, choose the one you wish to apply.
5. Press Play to create the scene with the new theme.
 - a. Themes only change how scenes are styled so it's worth noting that scene dimensions, location and any simulation settings on the Mantle GameObject won't be affected by the Theme change.
6. Easy as that!

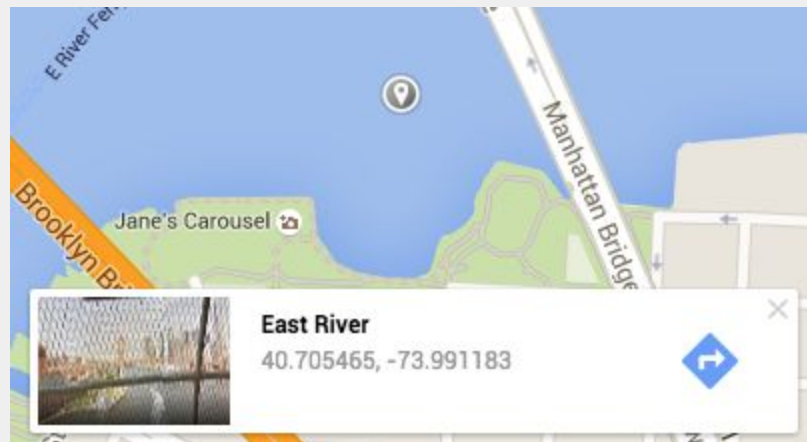
5.2.2. Choose specific scene locations

With base support for OpenStreetMap data you can literally choose any location on earth for Mantle to create.

Bear in mind that as Mantle relies on OpenStreetMap data to generate the quality of any given scene is directly reliant on the quality of the map data at the location you choose.

A location search UI is under development so you'll never have to leave Unity however currently we've found the easiest way to choose a location is via Google Maps or other mapping service that provides a decimal Latitude/Longitude.

1. In a browser use Google Maps to find the location you'd like to generate.
2. Click and hold on a point on the map that you'd like to be the center of your mantle scene.
3. A small popup will appear at the bottom of the window with the lat/long details. Copy the numerical text of the Latitude/Longitude position!



4. Return to Unity and paste the text into the *Lat Lng* field, make sure there's no extra leading or trailing spaces or characters.

A screenshot of the Unity Project Area settings panel. The panel has a title "Project Area" and a warning icon with the text "Input the lat/long coordinates to set where your Mantle scene will start building." Below this, there are four fields: "Name" with the value "Lower Manhattan", "Lat Lng" with the value "40.702833 -74.013125", "Meters North To South" with a slider set to 500, and "Meters East To West" with a slider set to 500.

5. You're ready to press Play and create the scene!
6. We promise this will be MUCH easier in the future, almost no thinking required!

5.2.3. Generate a larger scene

Likely you've already spotted it but to increase the scene size:

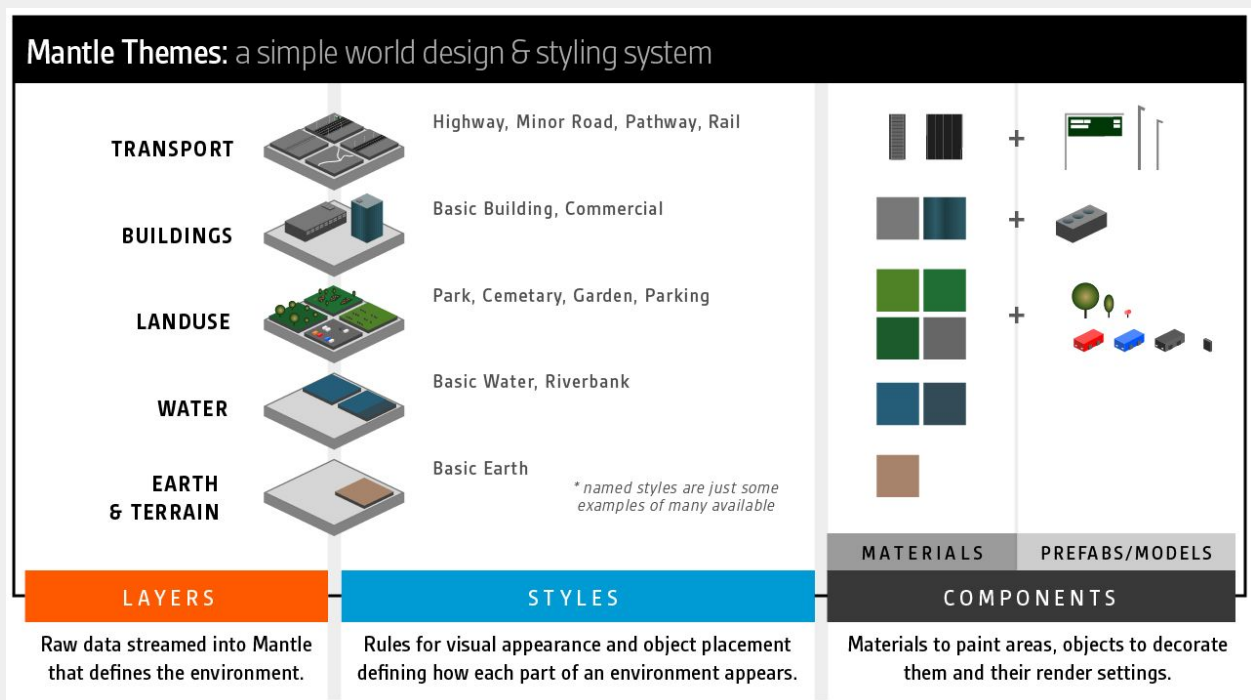
1. Drag the 'Meters North to South' slider to the right or enter the value in meters to the right of the slider
2. Do the same for the 'Meters East to West'
3. You're ready to press Play and create a larger scene!

NOTE: we have yet to include LOD support and further optimisations so max out the Mantle area size with caution! Save any work or changes prior to increasing the size. If Unity becomes unresponsive either wait a few minutes or kill the process.

5.2.4. Theme Tinkering: How Themes work

Getting under the hood and playing around with the existing themes is a great way to start understanding how themes work, what is possible and how powerful they really are. You'll be starting to think about how to create specific visual approaches in no time.

Mantle Themes are comprised of two primary types of elements, Layers and Styles.



5.2.4.1. Layers

Layers define high level environmental content such as landuse, bodies of water, buildings and transport. Each of these layers contains many subtypes such as 'cafe' or 'hospital' for buildings, 'park' or 'forest' for land use types.

Each of these layer subtypes can have a Mantle Style applied to it that defines how it is visually styled and what 3d content to populate it with.

With this approach you can visually style entire areas with granular customisation right down to how each item is placed in a scene.

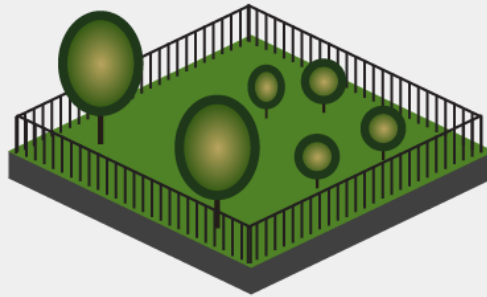
5.2.4.2. Styles

Styles are really where all the magic happens!

They control what **materials** are used to paint the outlines of a subtype like a 'park'. They also control what **items** we want to appear wherever that subtype of 'park' is shown. Importantly they control how those items should appear, at what size they should appear and a few other customisable properties that add to an overall scene's uniqueness and complexity.

Mantle controls placing terrain items through two placement methods: **Fills** and **Edges**. You can probably guess what they do. Fills place items within the border of the subtype outline. Edges place items along the border of the subtype outline. Between these two methods of item placement you can boil down the appearance of any specific subtype.

For example a 'park' Style might use terrain fill to place a variety of tree models throughout a park. Large trees might only occur a few times whereas smaller trees or even piles of leaves might occur more frequently. The terrain edge of a 'park' might place low hedges or a metal fence object around the outside to create a Style that represents how you would like 'parks' to appear automatically in your scene.



There is a lot more detail we could go into on Styles but we'll let you do some discovering and let's talk in the Mantle community!

We have a **lot** of things in store for Styles in future and we're very interested in the scenarios you'll create to help us build the most flexible approach possible.

5.2.5. Make your own changes: Layer by Layer, Style by Style

Now you have an understanding of how to think in Styles and that many of them together make a Theme. Here's some tips for how you might approach creating your own theme from scratch.

5.2.5.1. Start with a fresh copy of a blank Theme

We also provide a blank theme that renders everything as a blank white canvas for you to shape your environment's Theme.

From the Unity menu choose *Tools > Mantle > Create > Theme*.

This creates a new folder and theme, name them and you're ready to start.

5.2.5.2. Style water and earth first

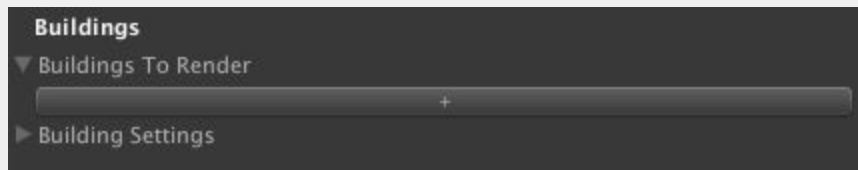
To give a sense of the macro environment you're creating we find creating a generic style for water and one for earth that contain simple material colours is often a great place to start.

5.2.5.3. Turn off unneeded subtypes or layers

By default Mantle will render all of the mapping data provided for the area you are focussing on. Some of that data may not be needed for the purpose of the Theme you are creating.

If there is an entire layer of unneeded data such as buildings, you can turn them off:

1. Navigate to the current Theme prefab
2. In the Inspector pane expand the 'Buildings to Render' item
3. Click the '+' button to add a new style definition



4. In the definition slot that appears click the dropdown menu and select 'default_fallback'



5. Ensure that the checkbox to the left of the definition slot is **unchecked**
6. This tells Mantle to ignore everything on the Building layer that doesn't have a Style set for it. With no other styles set for buildings nothing will show.

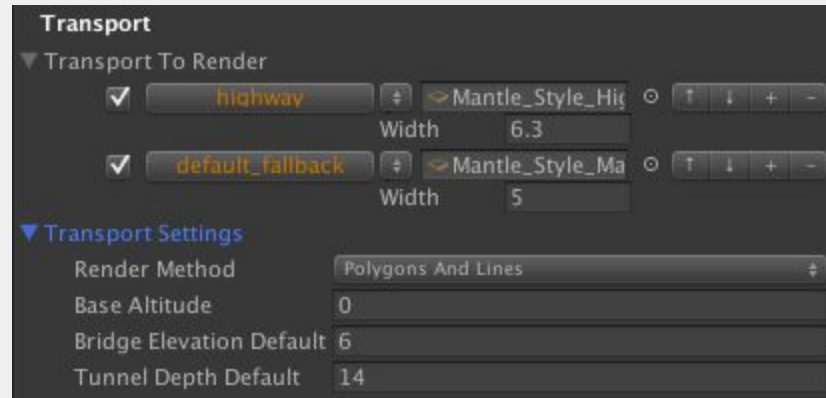
This same process works for specific subtypes as well. Instead of selecting 'default_fallback' and unchecking it, you can select the desired subtype to exclude from the dropdown list such as 'hospital' and uncheck it. All buildings marked as 'hospital' will then be ignored.

In this way you can quickly cull down your Theme to just the elements you need to create styles for.

5.2.5.4. Style transport and buildings

With the simple base layers styled add styles for each of the transport types and then move on to buildings.

Note that in the Mantle Theme some layers have their own generation options and some layer styles have custom options here as well. As an example in the case of transport this includes transport route width, bridge height and tunnel depth.



5.2.5.5. Style land uses

Now that the core scene visual layers are set, land-use types are generally what create personality and uniqueness to a Theme. What land use types you include and exclude, then how each land use type is styled with props and materials forms the majority of a theme's development workflow.

Take the time to explore how land use styles impact your environments and experiment! We'll be developing online tutorials and further technical documentation to showcase different techniques and approaches.

5.3. Visual Advice for New Scenes

Currently Mantle projects don't include metadata for storing lighting, camera and quality settings but we are working towards it. In the meantime here are some general approaches to get the most visual quality out of your scenes

5.3.1. Lighting

To visually get the most out of your scene make sure you have examined the scene's light source by selecting it in the *Hierarchy* pane. By default Unity

provides a Directional Light that controls sun location based on its X rotational axis. This is a great start to set time of day and shadow length. Shadow type and quality is also directly manipulated per light.

Experiment with the light color for warmer or cooler scenes.

Additionally open the Lighting pane through the Unity menu through *Window > Lighting*. The *Scene* tab allows control of scene based lighting such as Global Illumination settings. Note that this control is in addition to the lighting from any directional lights in your scene.

5.3.2. Camera

Adjusting a camera's projection by selecting it in the *Hierarchy* pane will allow either perspective or orthogonal views. Camera

- Perspective is generally useful for immersive interactions and 'standard' 3D environmental views.
- Orthogonal views are incredibly useful for top (plan) and side views without perspective distortion and can also create some amazing viewpoints.

5.3.3. Quality Settings

Finally each project has quality settings that adjust visual edge smoothing quality and further shadow rendering settings. Access Quality settings through the Unity menu *File > Edit > Project Settings > Quality*.

Commonly extending the shadow draw distance to over 1000 will create far more interesting scenes.