PROJECT ISLAND

Open World Urban Environment Art

CONTENTS

This project that was done for my final year project at the University for the Creative Arts aims to create a seamless and dynamic urban open-world environment that allows many types of gameplay and narratives.

This document includes a short making process and behind-the-scenes breakdown.

More screenshots and videos are available at:

https://www.therookies.co/entries/33352

https://www.artstation.com/ks741119

https://www.youtube.com/@syiastudios

Land Shapes

At the pre-production stage, a number of random land shapes were generated using Perlin noise. Then, started to think about the overall layout of the roads and structures.

Urban
Natural
Transport
Airfield
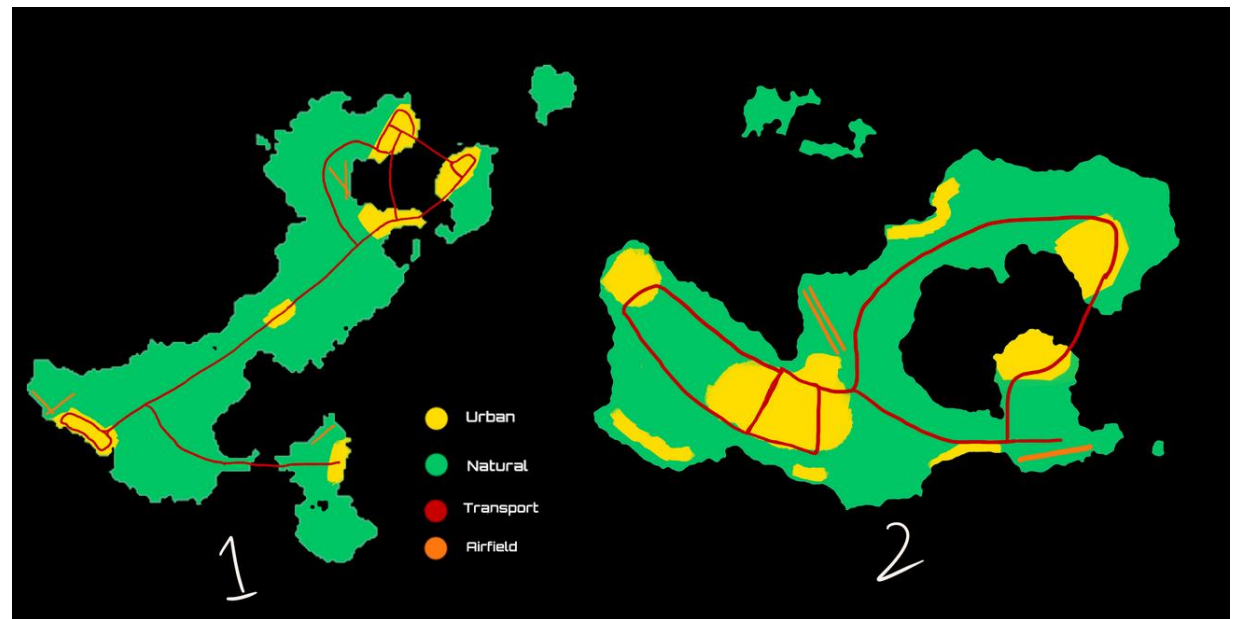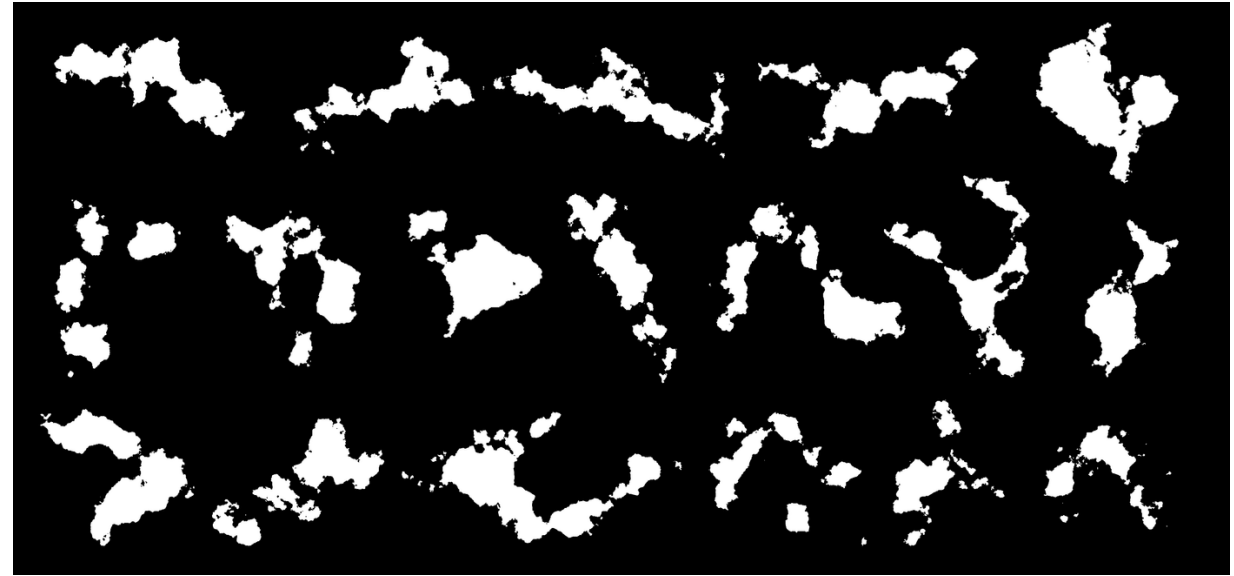
Smoothing out edges using filters

Defining zones

Adding basic road layout

Adding advanced roads

Adding buildings and places

Map Design Procedure

Started by zoning the island and then drawing a basic road outline followed by connecting towns with motorways as well as designing an appropriate intersection depending on the location. Finally, buildings and facilities were added according to the zones and the surroundings.

Finished concept map

Photobashed map

Influence map
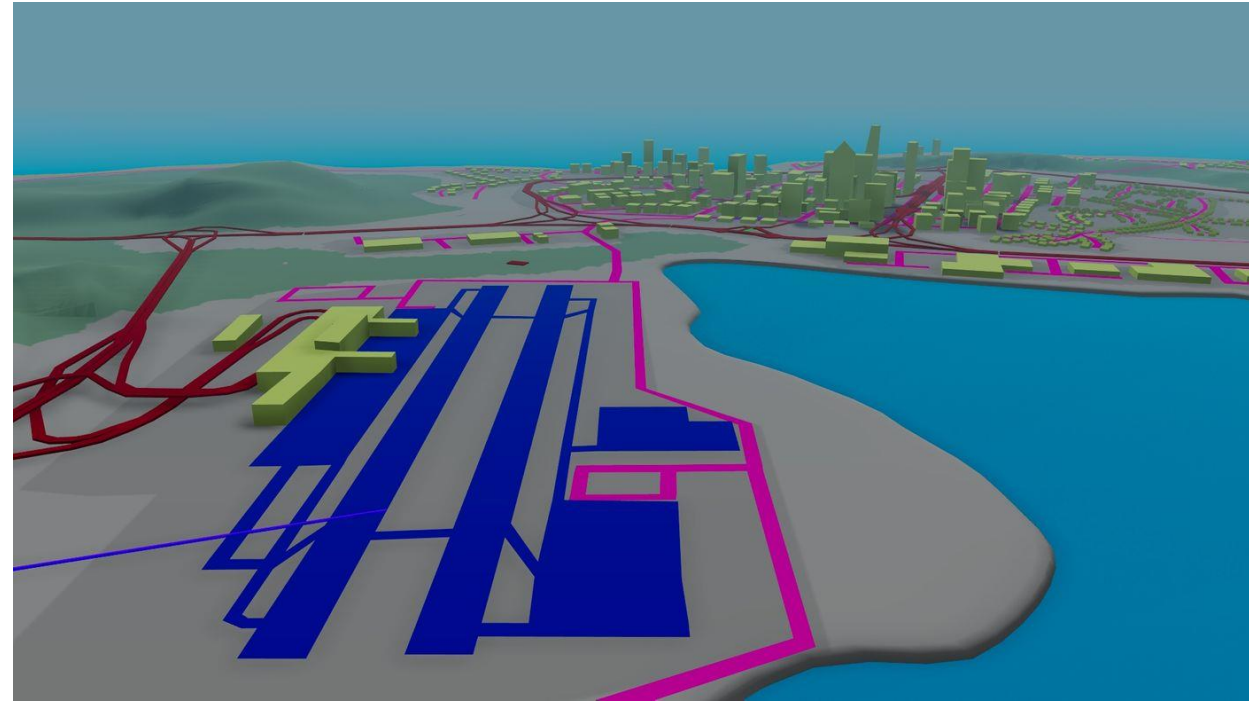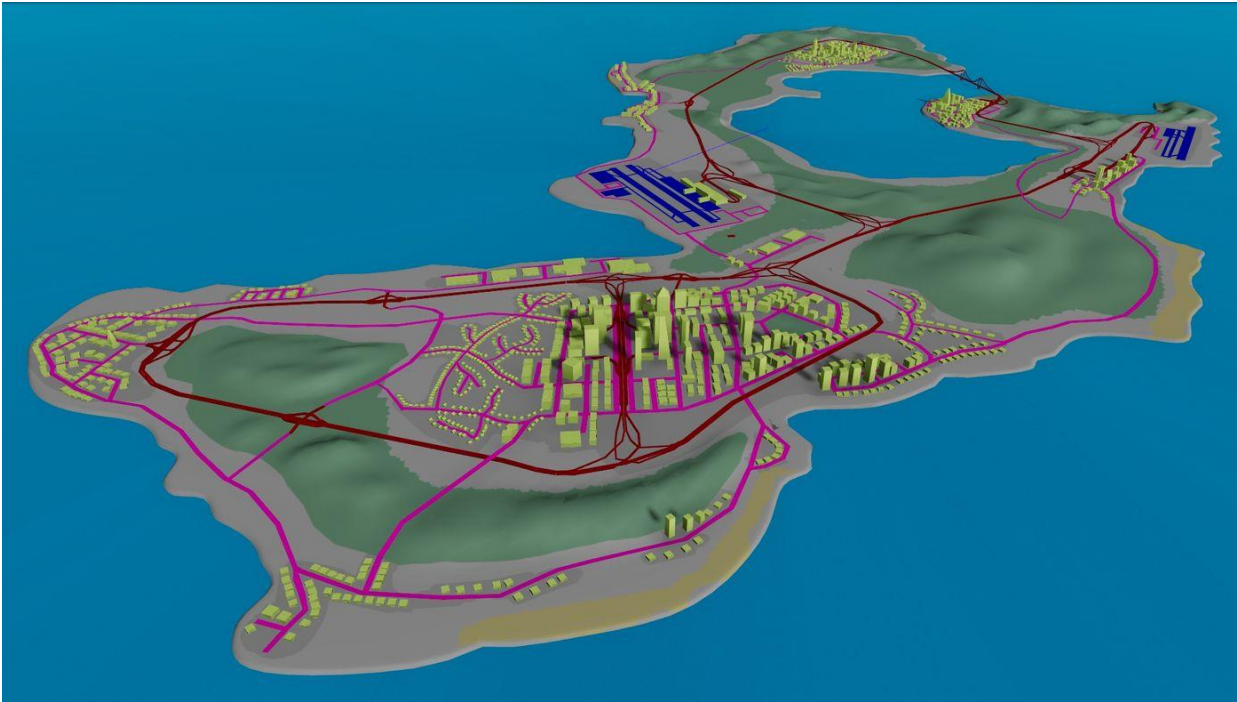
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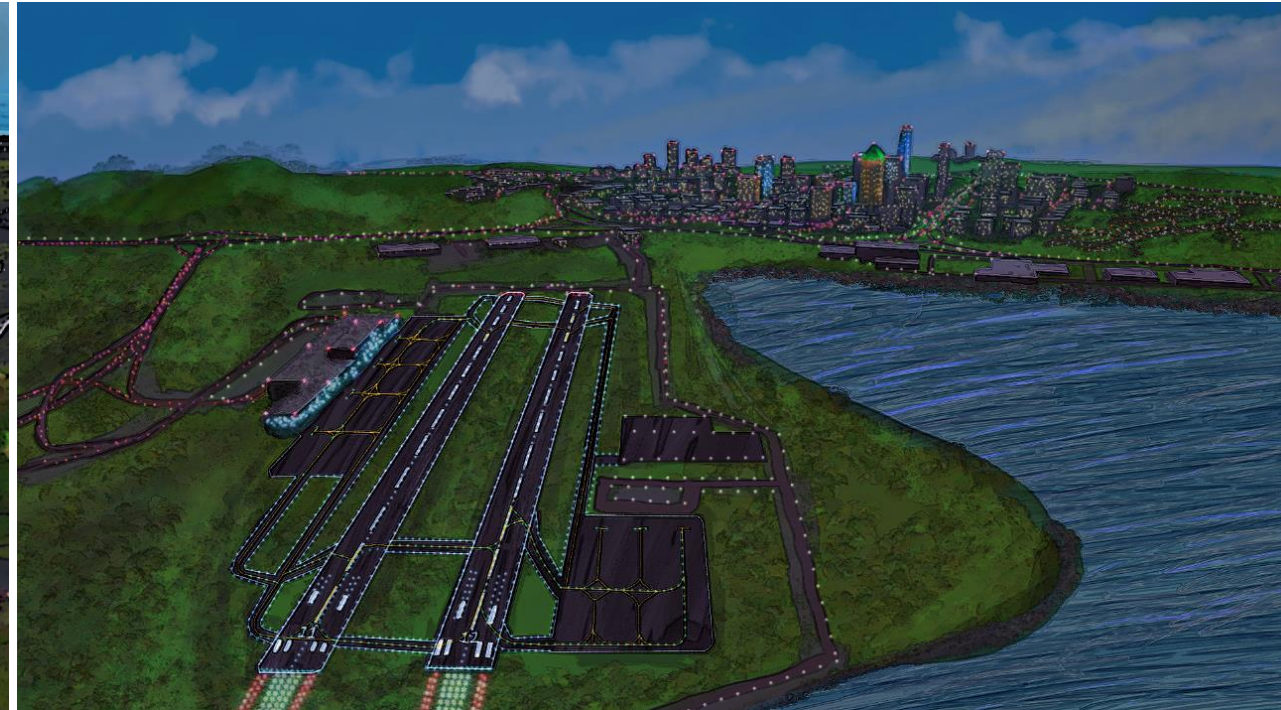
Concept Paintings
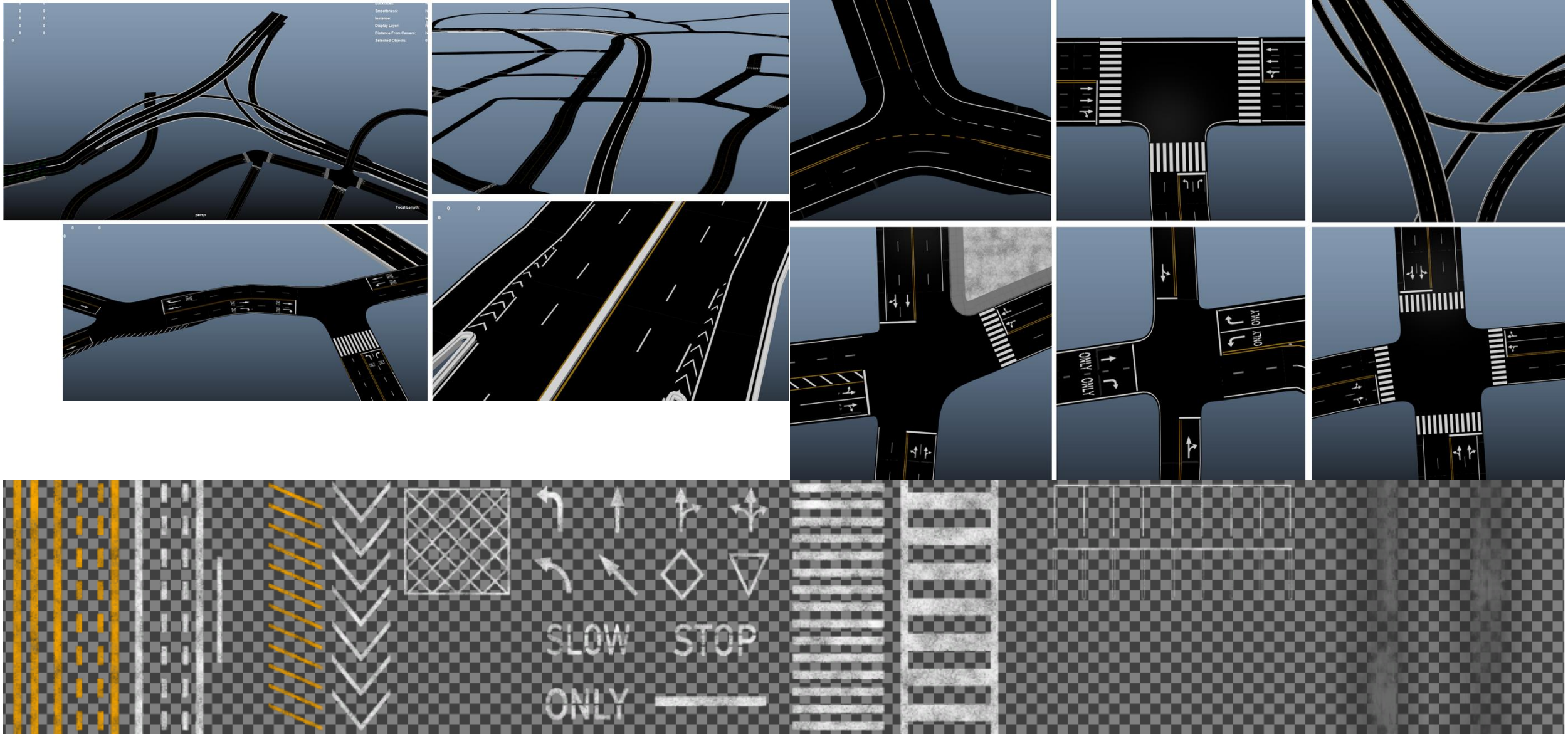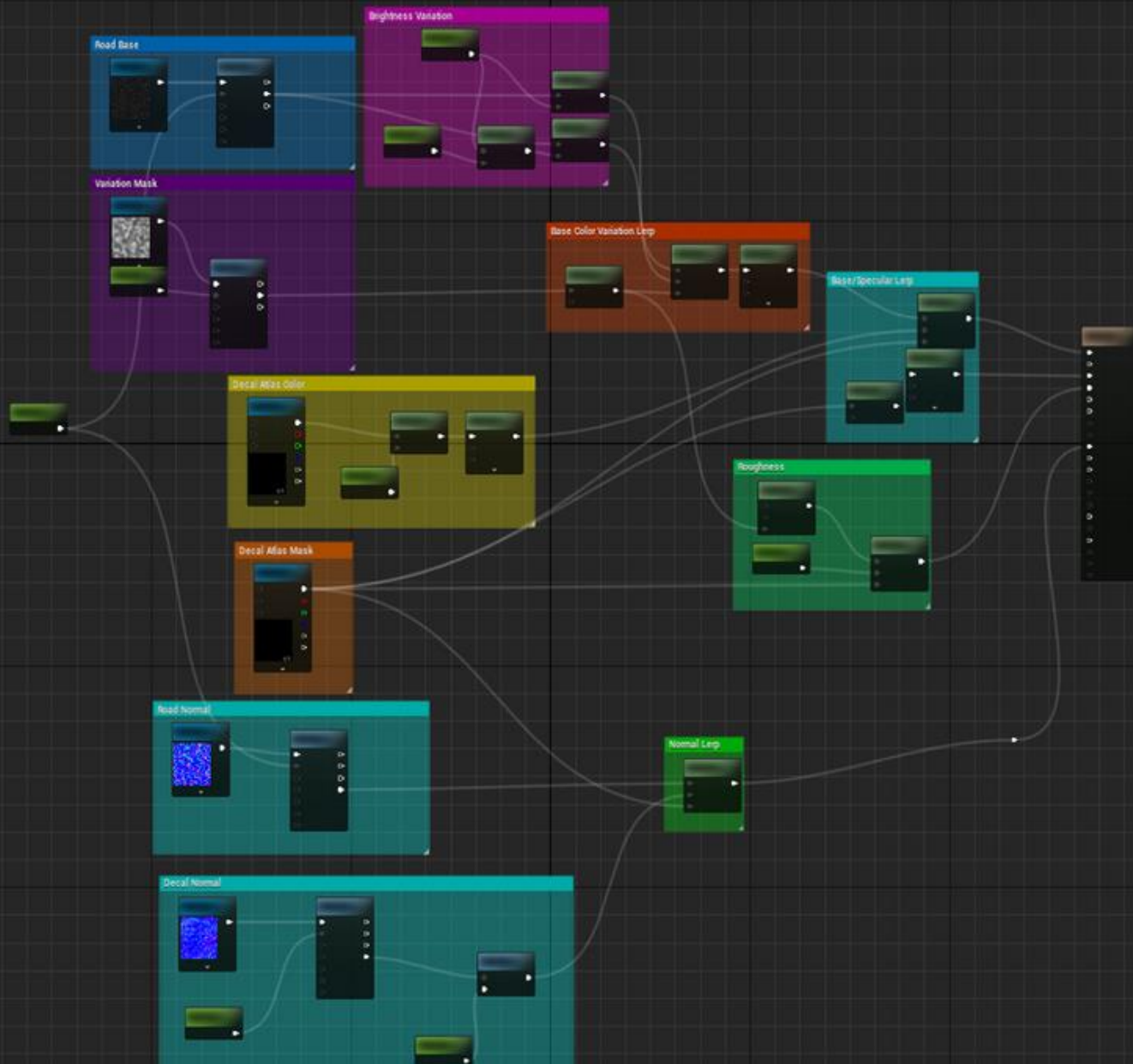
Global Scalar Parameter Values

|	
ColorBoost	0.2
DecalNormal_Strength	1.12148
DecalNormalSize	350.0
Grunge_Size	5000.0
☑ Road_Brightness	10.0
RoadContrast	1.4
RoadNormalSize	300.0
SecondReflection	0.45

Road Material

This material uses 2 worlds aligned tileable textures for base colour and normal and masked by decal atlas and noise grunge mask textures. Scalar parameters can be adjusted for different color variations/contrast
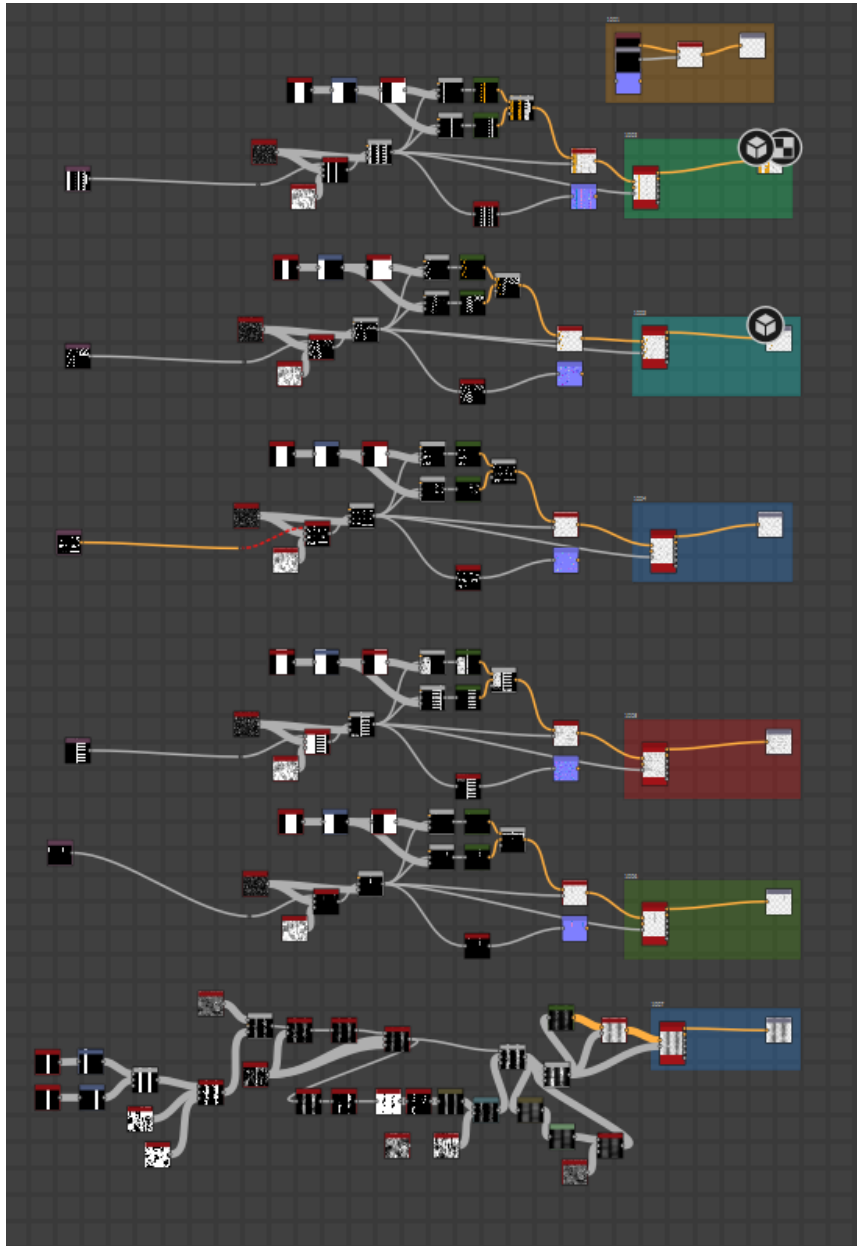
Texture assembly
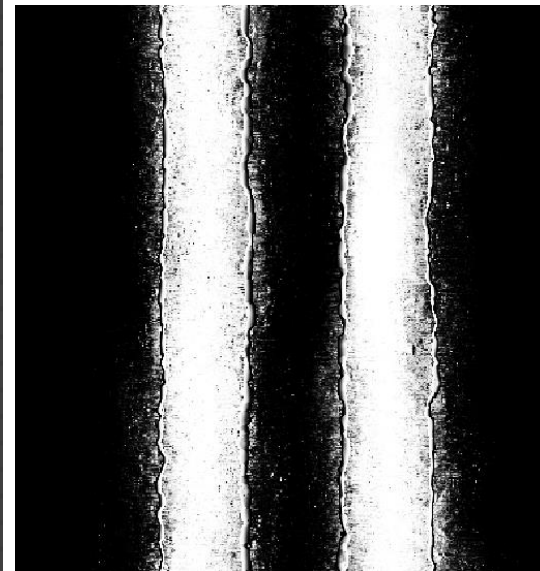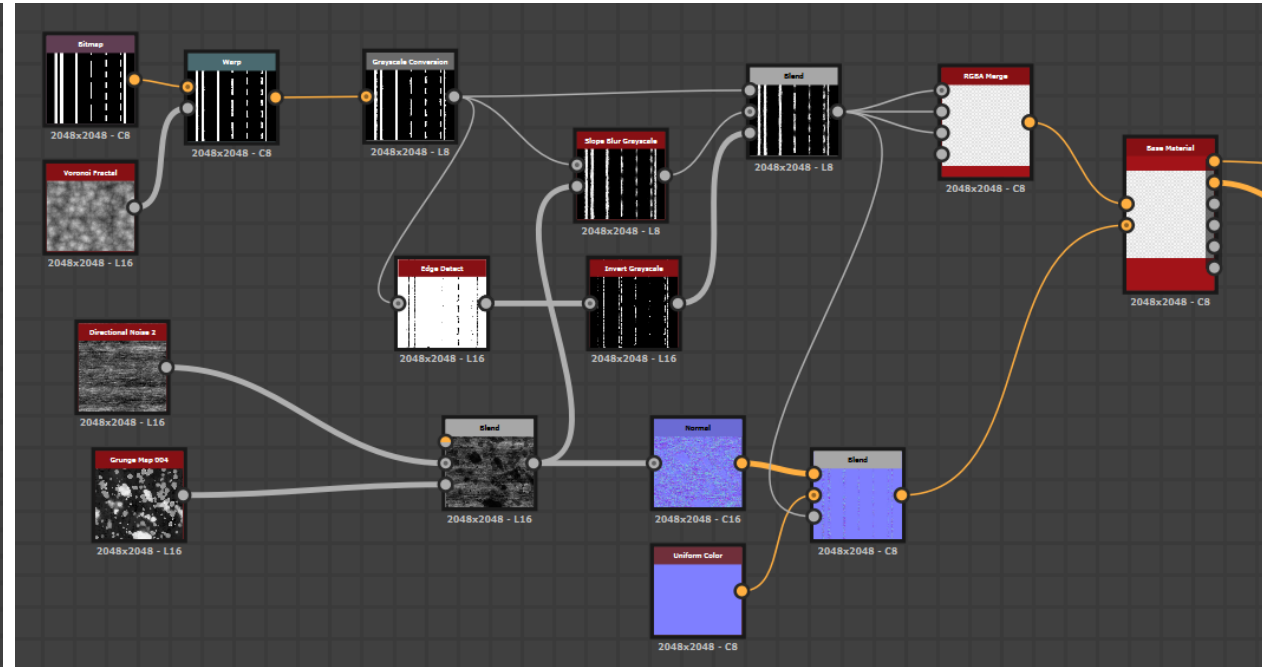
Preview details

A finished road construction along with proxy buildings.
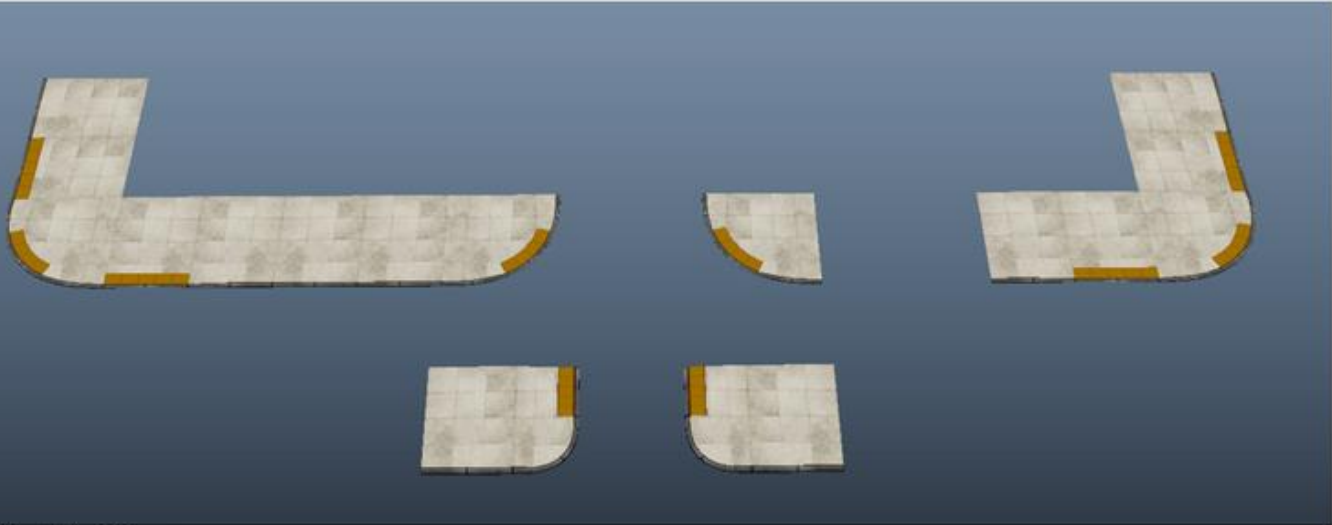
City Modules
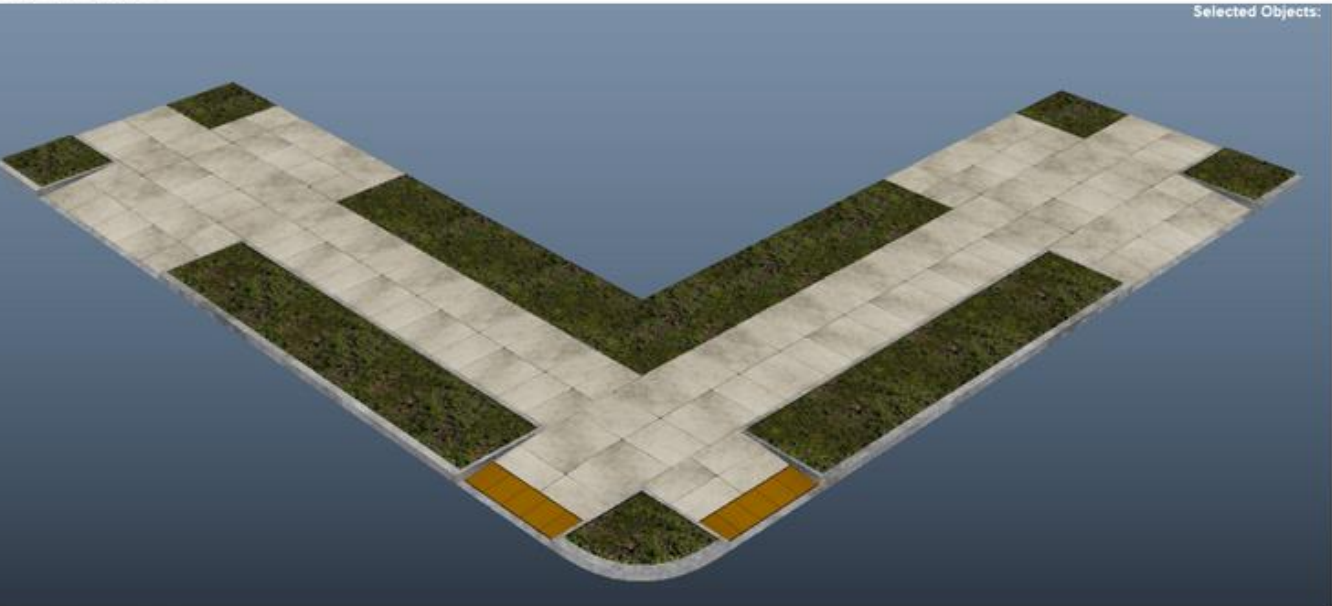
Suburb Modules

Example

Modular pavement models
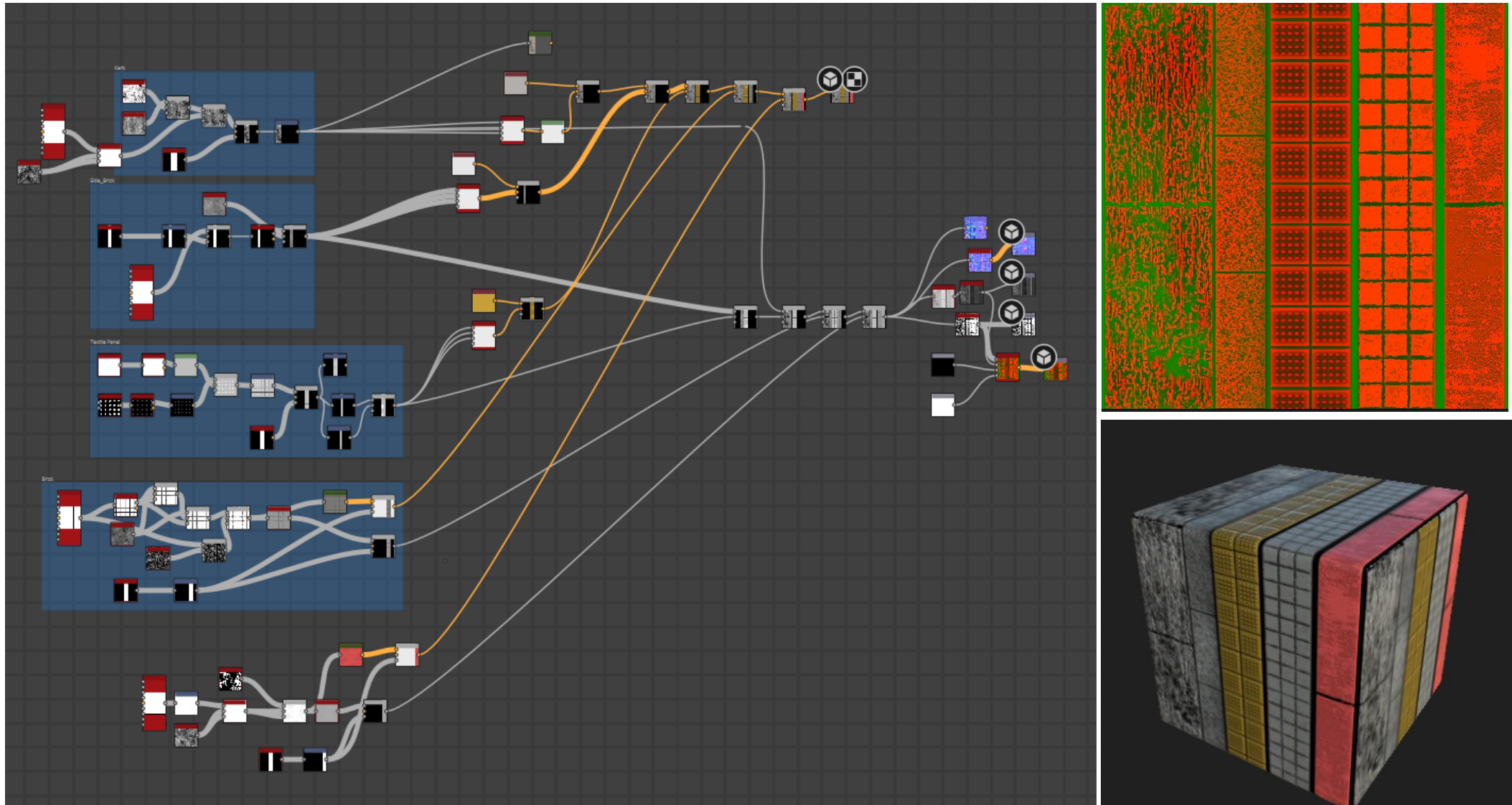
Texture structure (MRO packed)

Modular Parts

Assembly

In-game
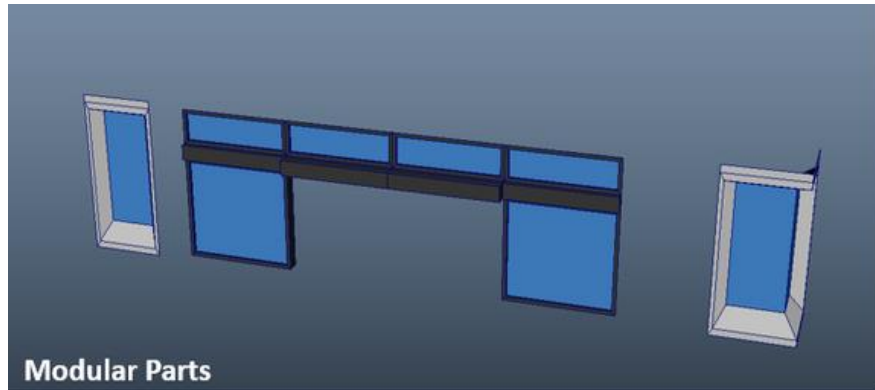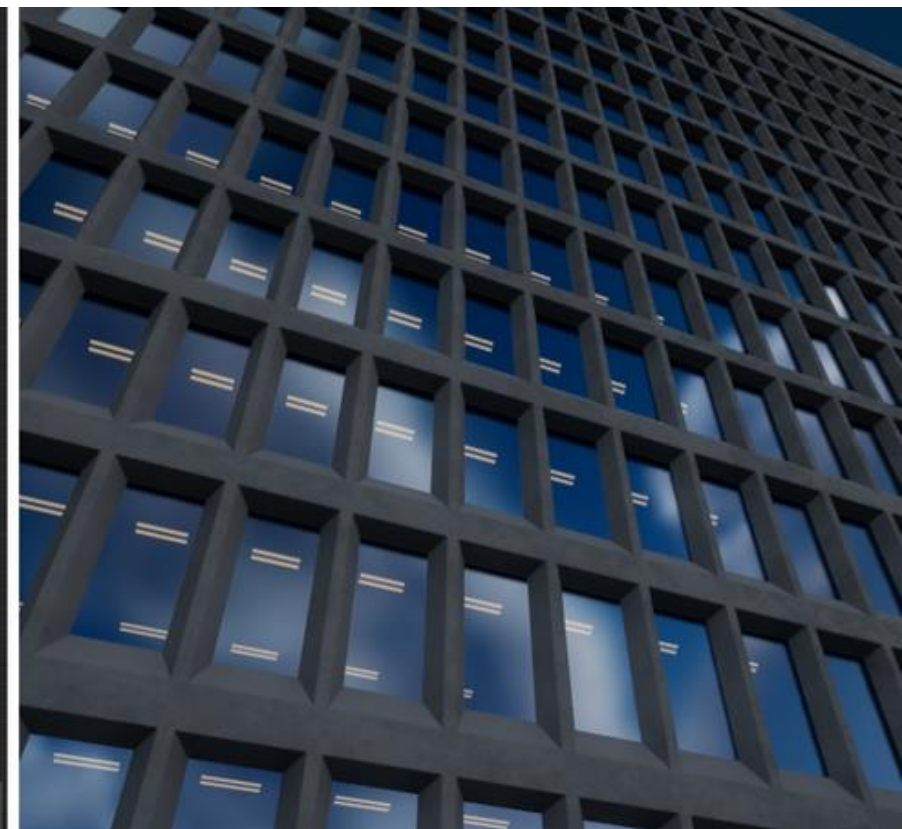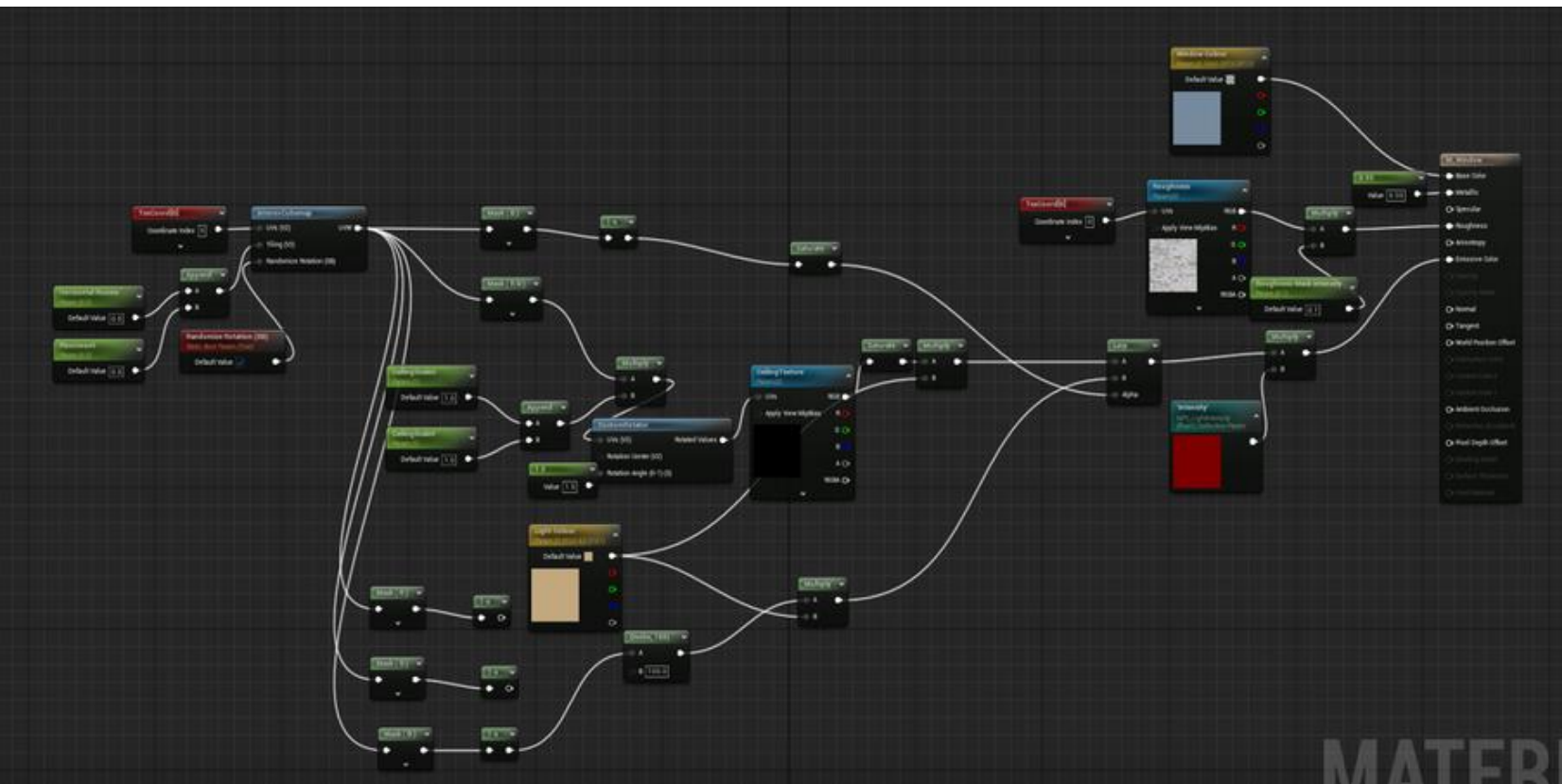
Buildings were modelled by assembling modular parts. The glass shader includes interior cubemap function which creates a fake depth to a flat surface.
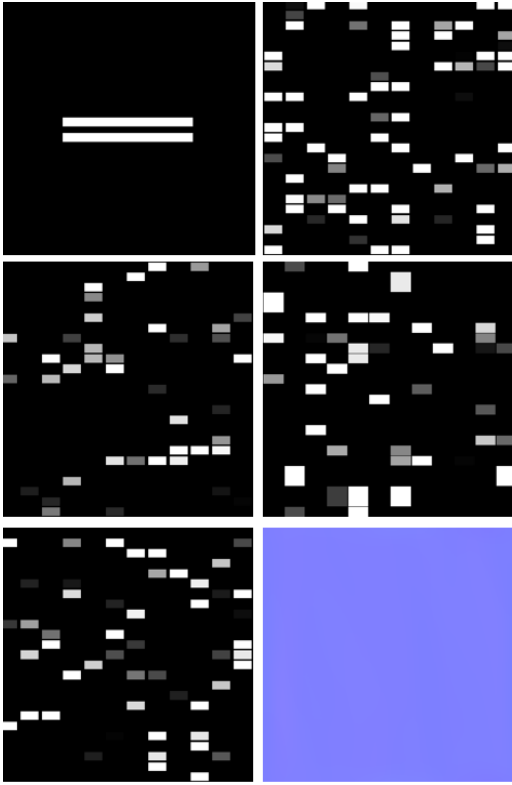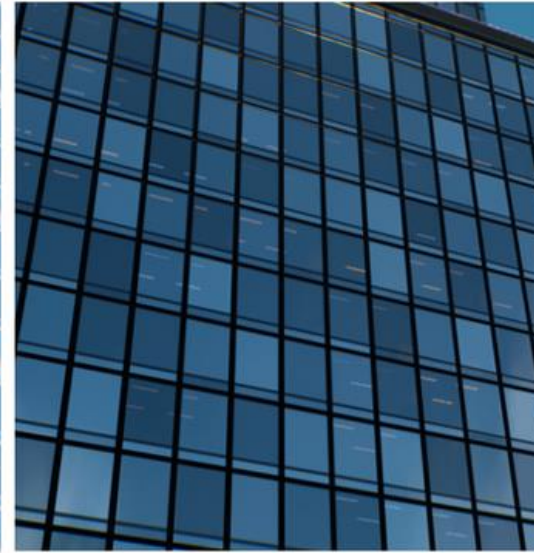
Input Maps
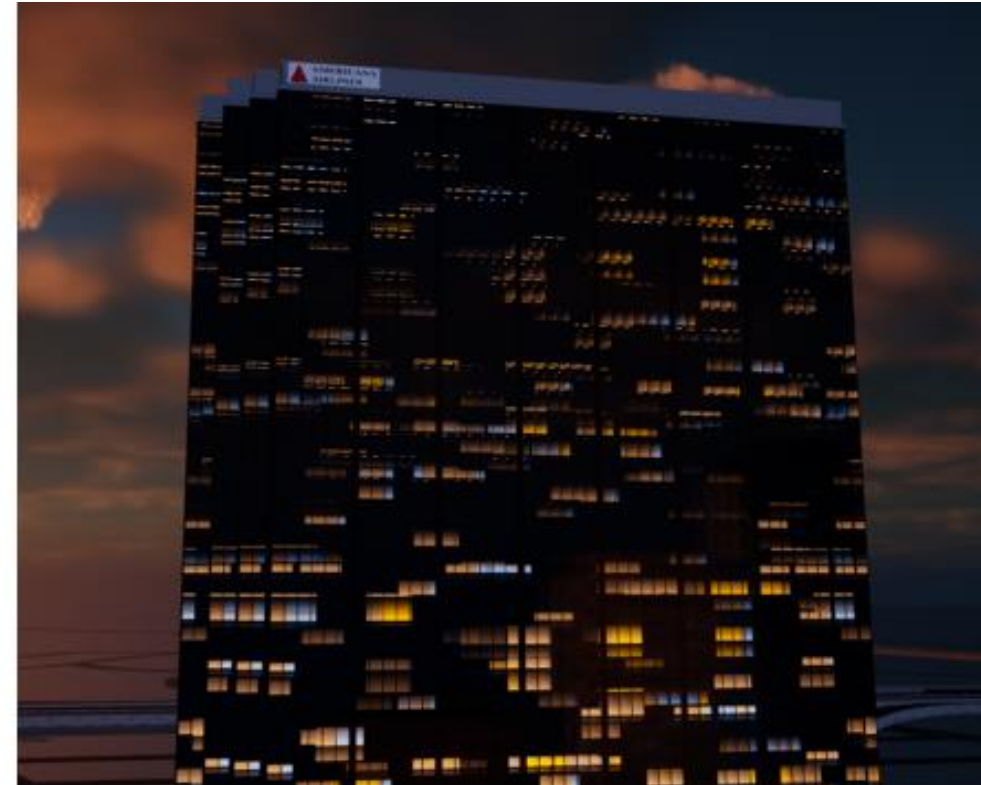
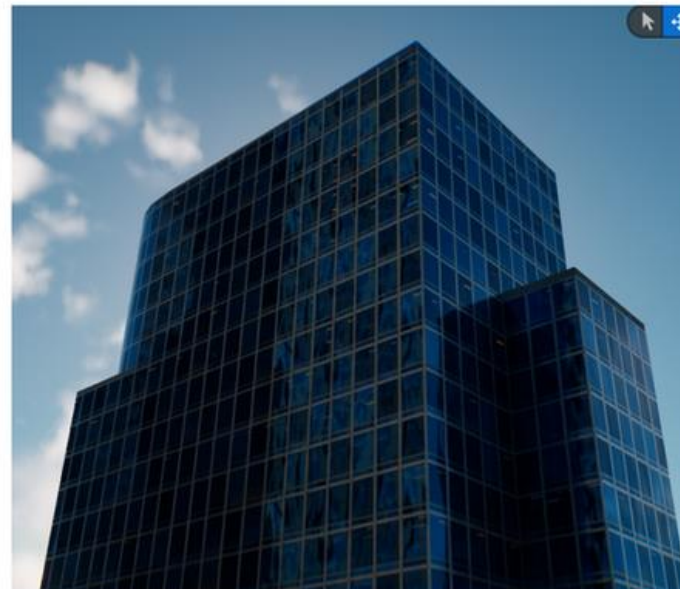The building shader has various input maps, creating distorted reflections and colour variations.

Light Mask Example

Colour Variation Mask Example
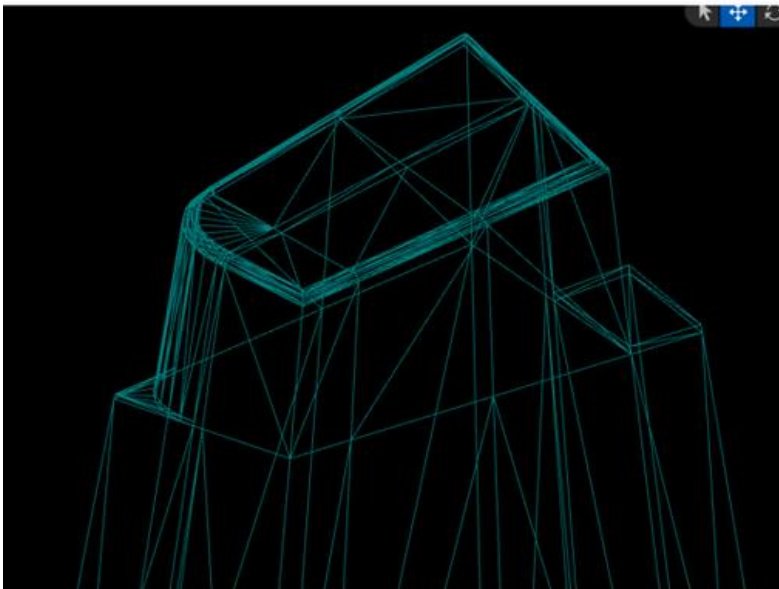
Wireframe

Lit

Tileable textures and trim sheets using packing method is extremely useful for creating variations and reducing polycounts of the assets as seen in these examples
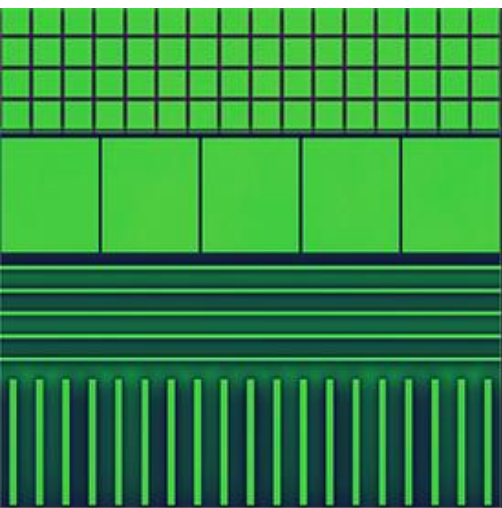
Building Tiles
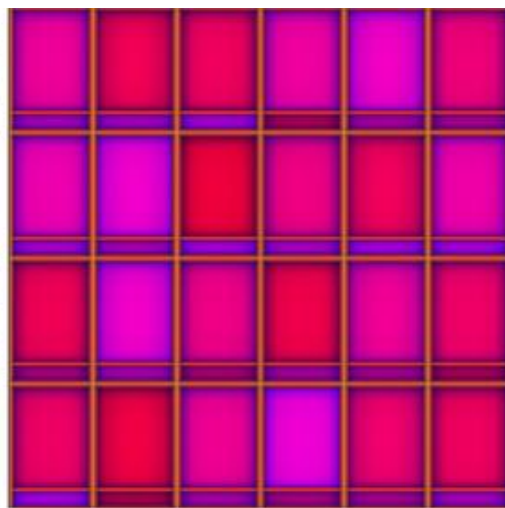
Glass Tile
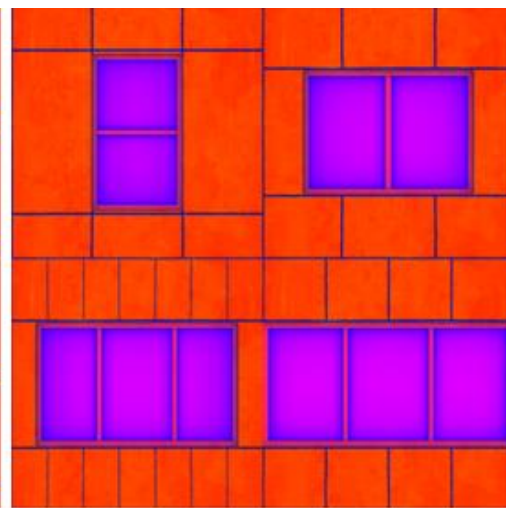
Modern Windows
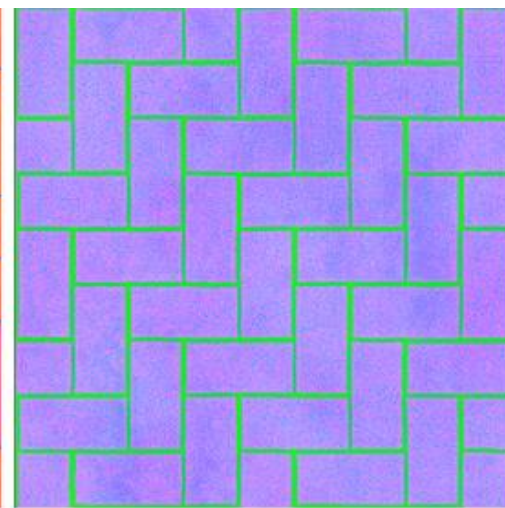
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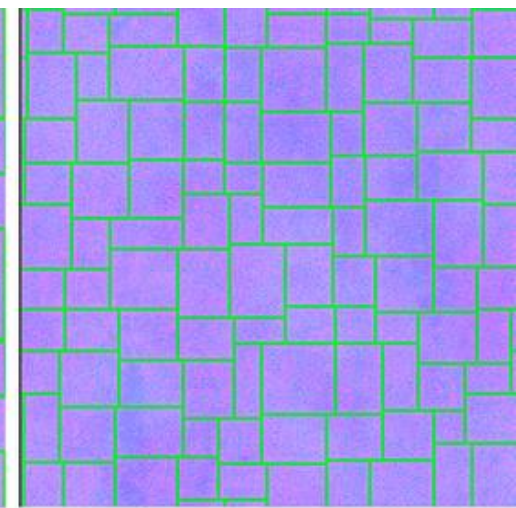
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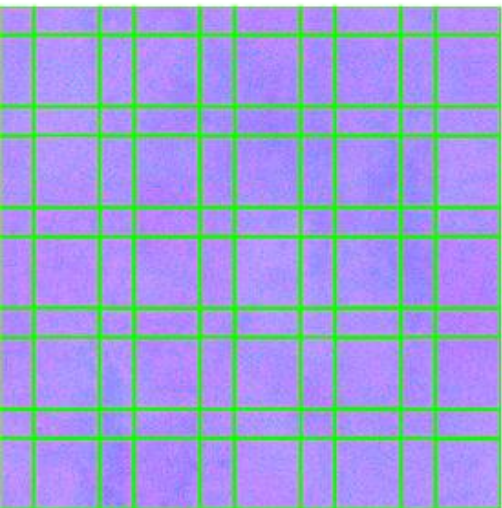
Patterned Pavement 3
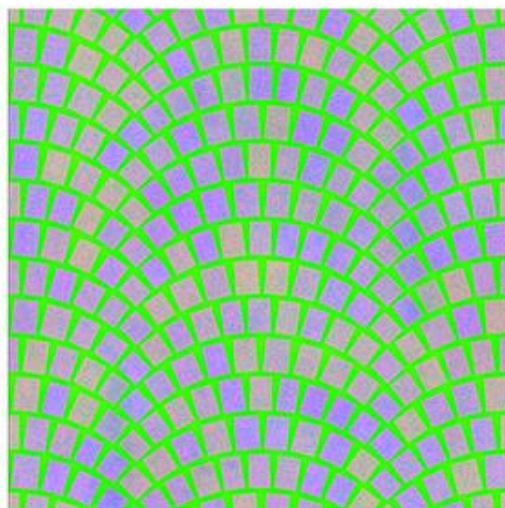
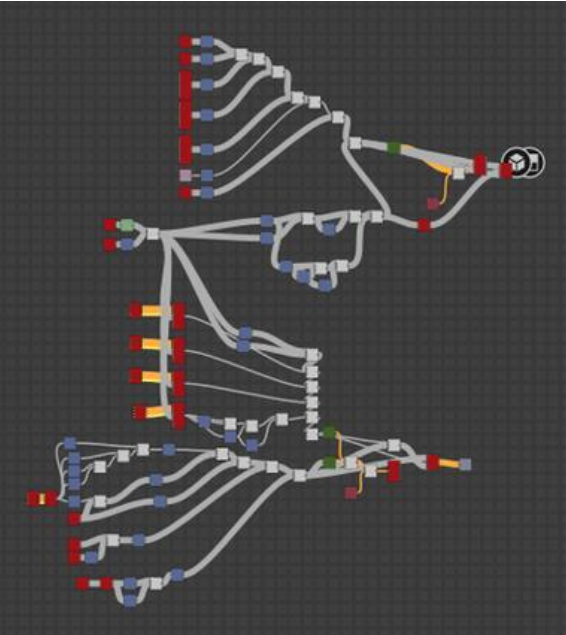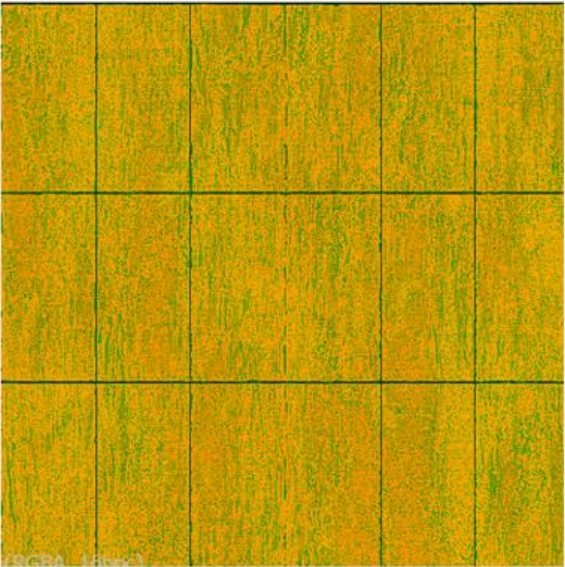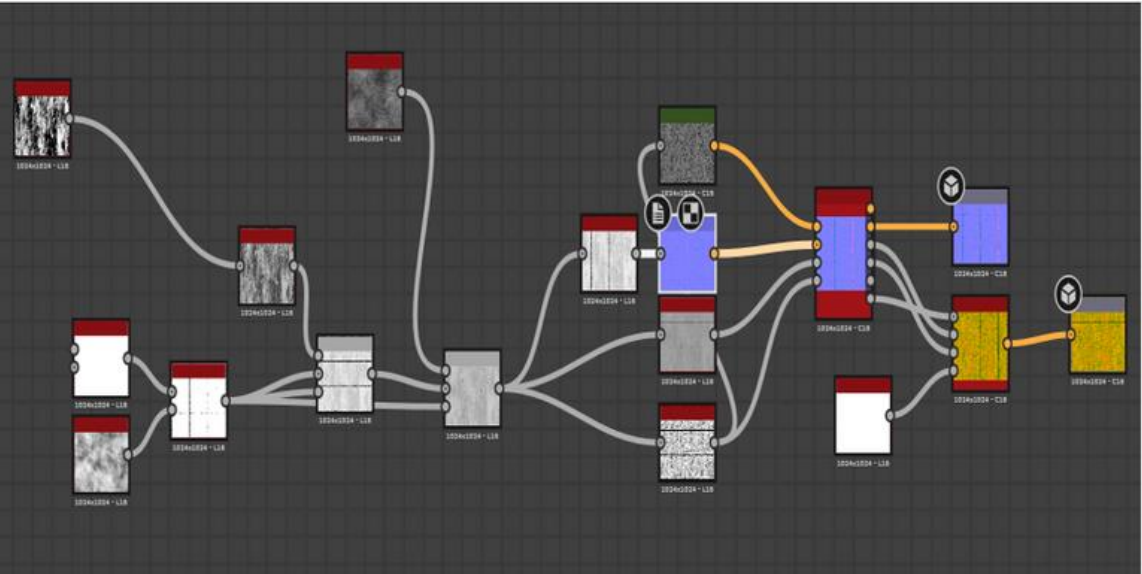Patterned Pavement 4
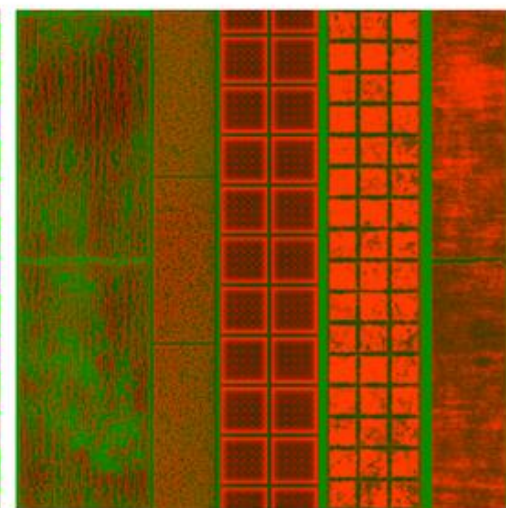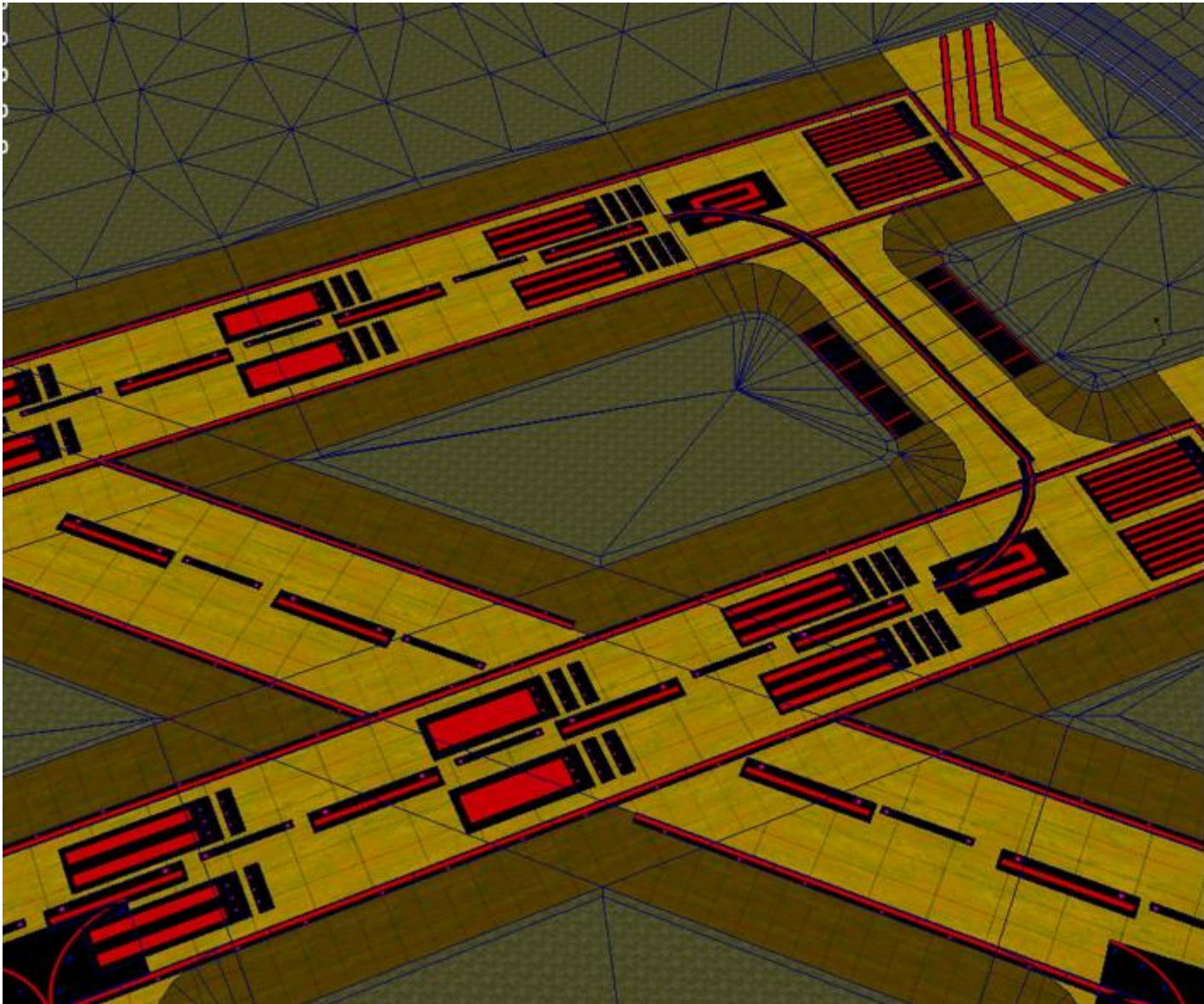
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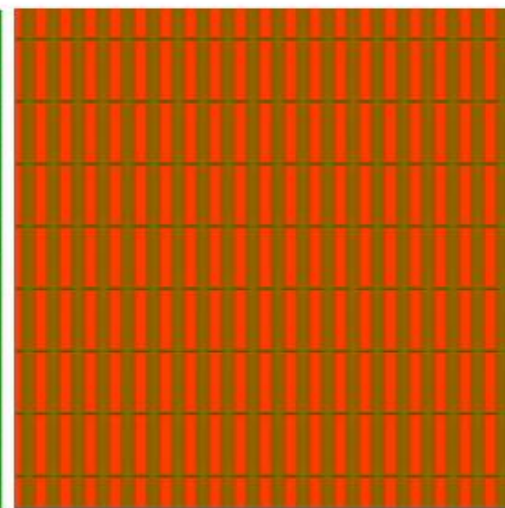
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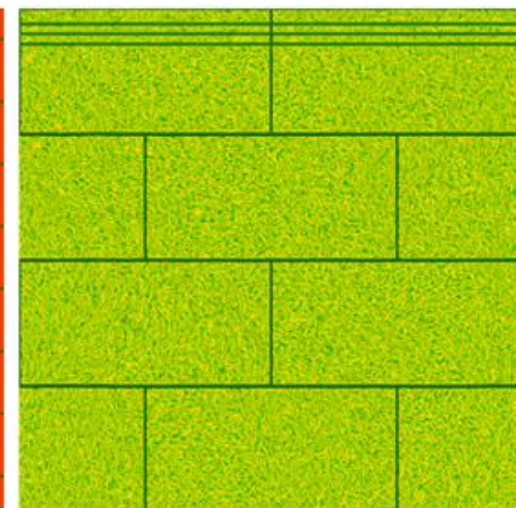
Stairs Tile
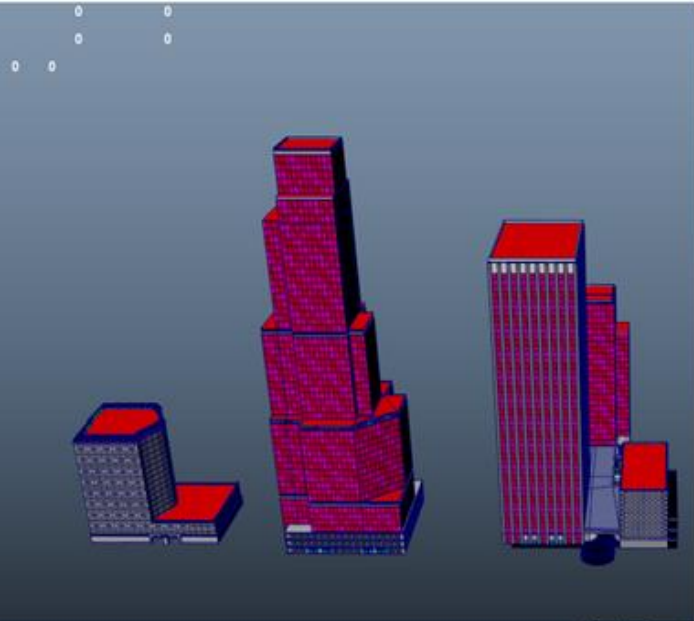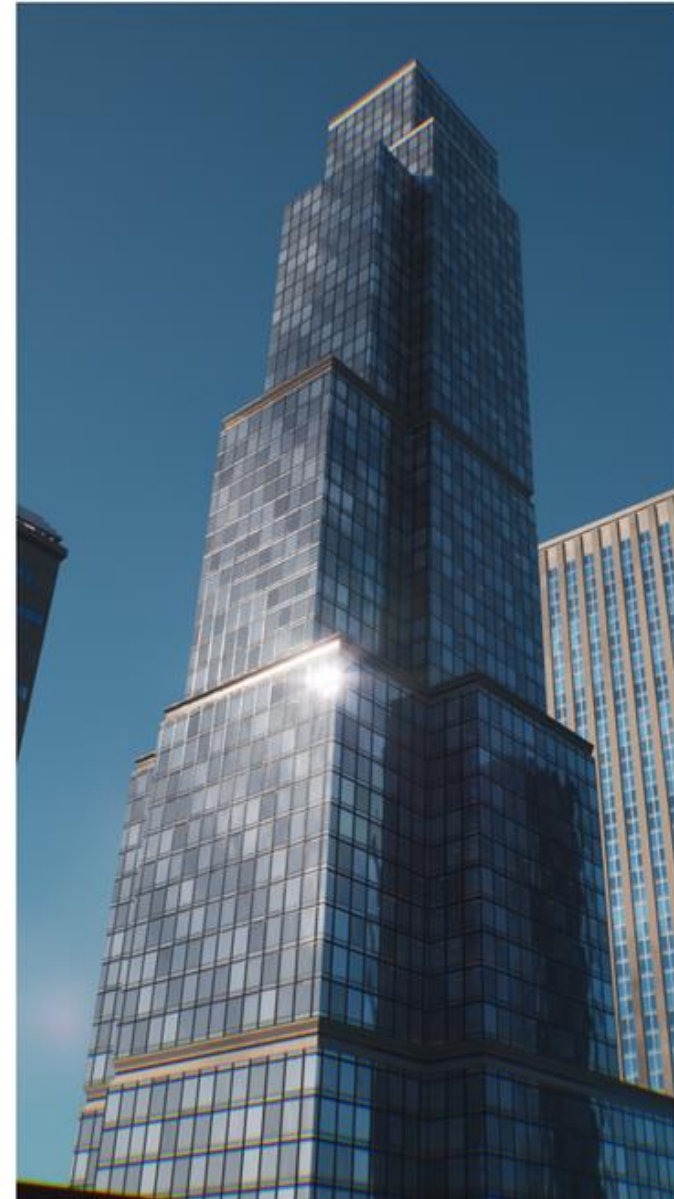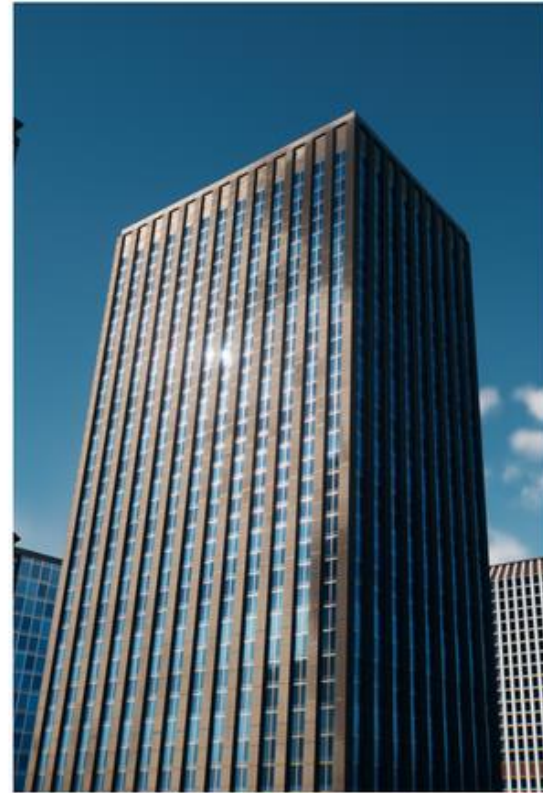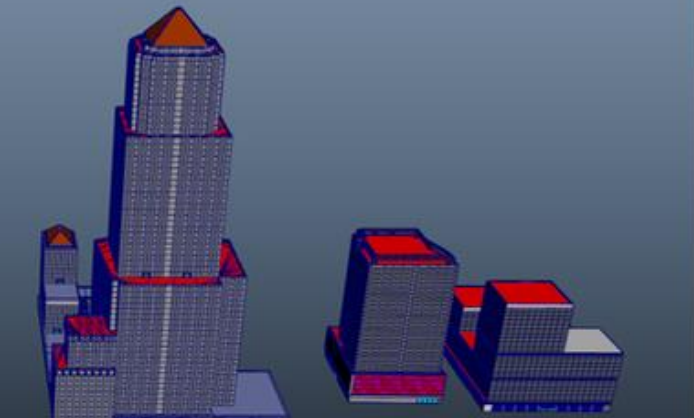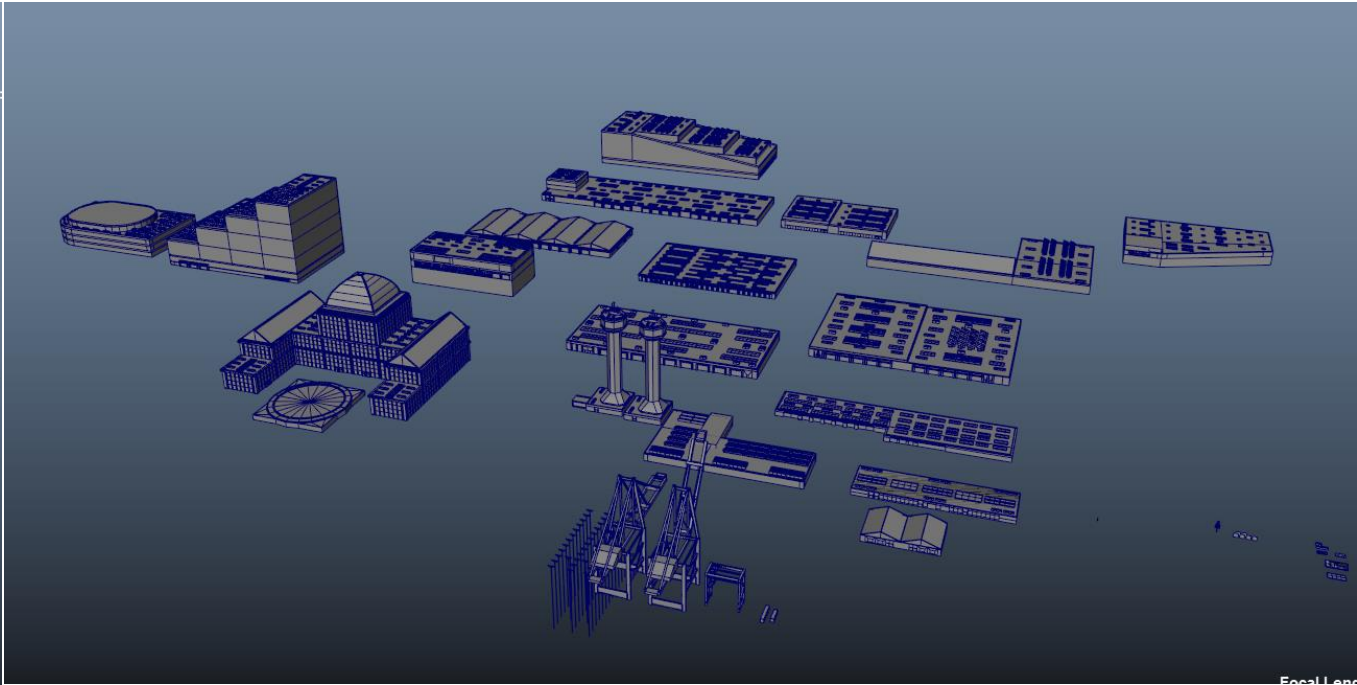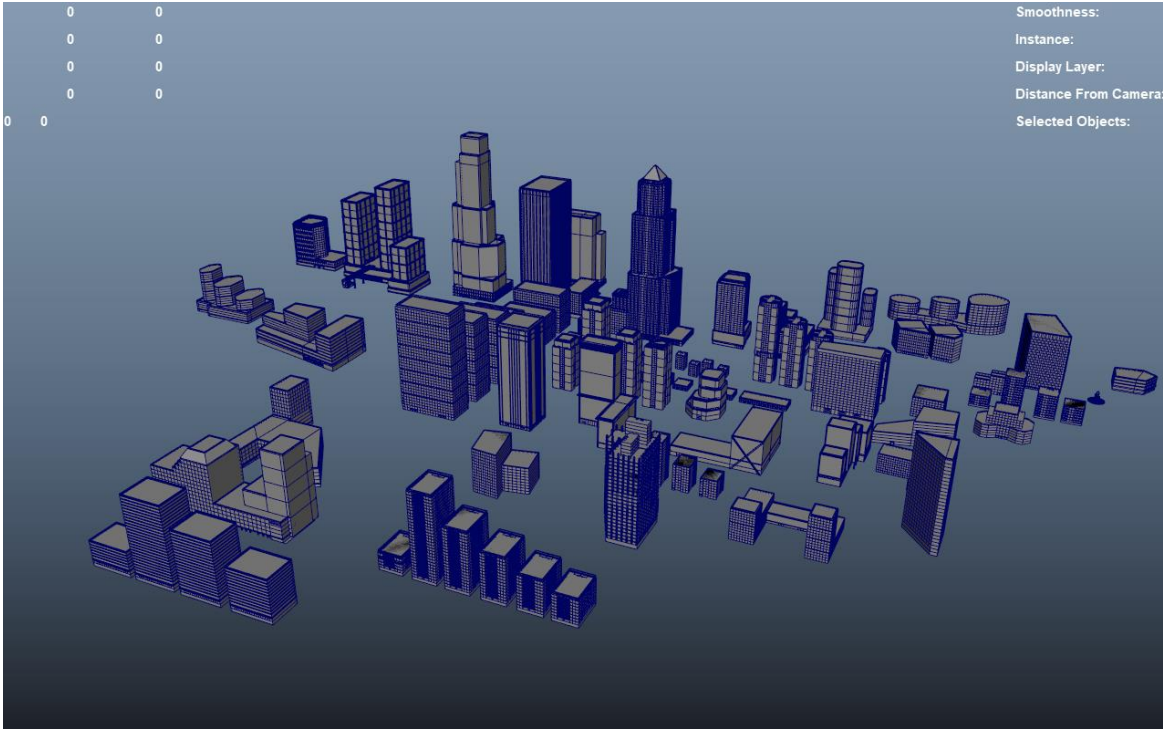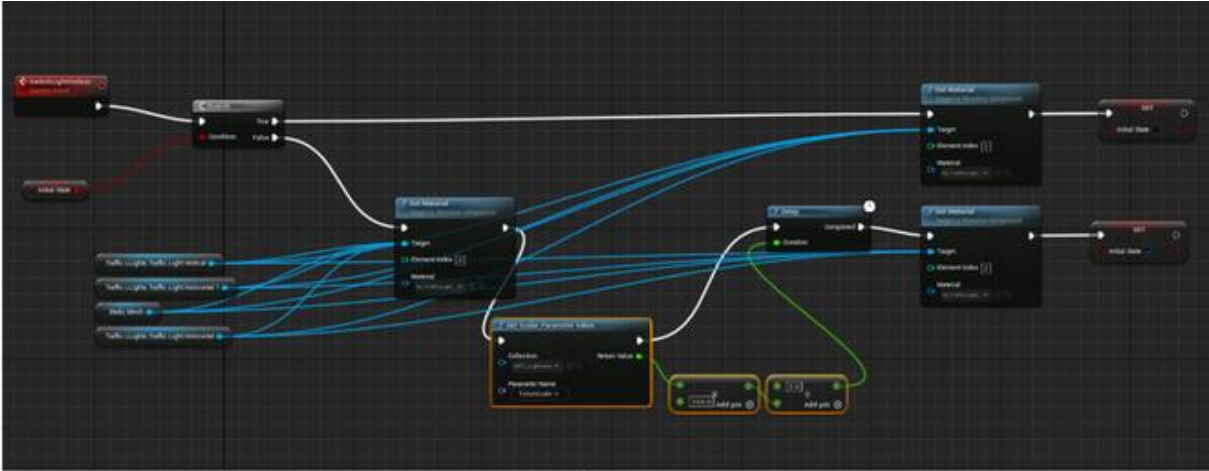
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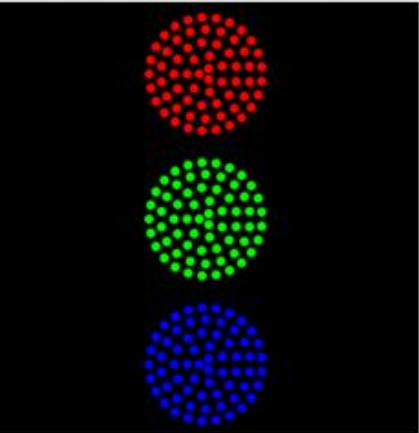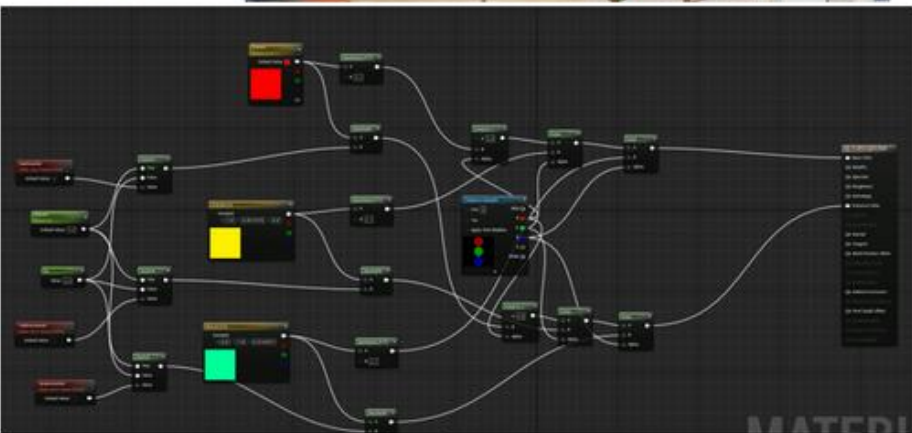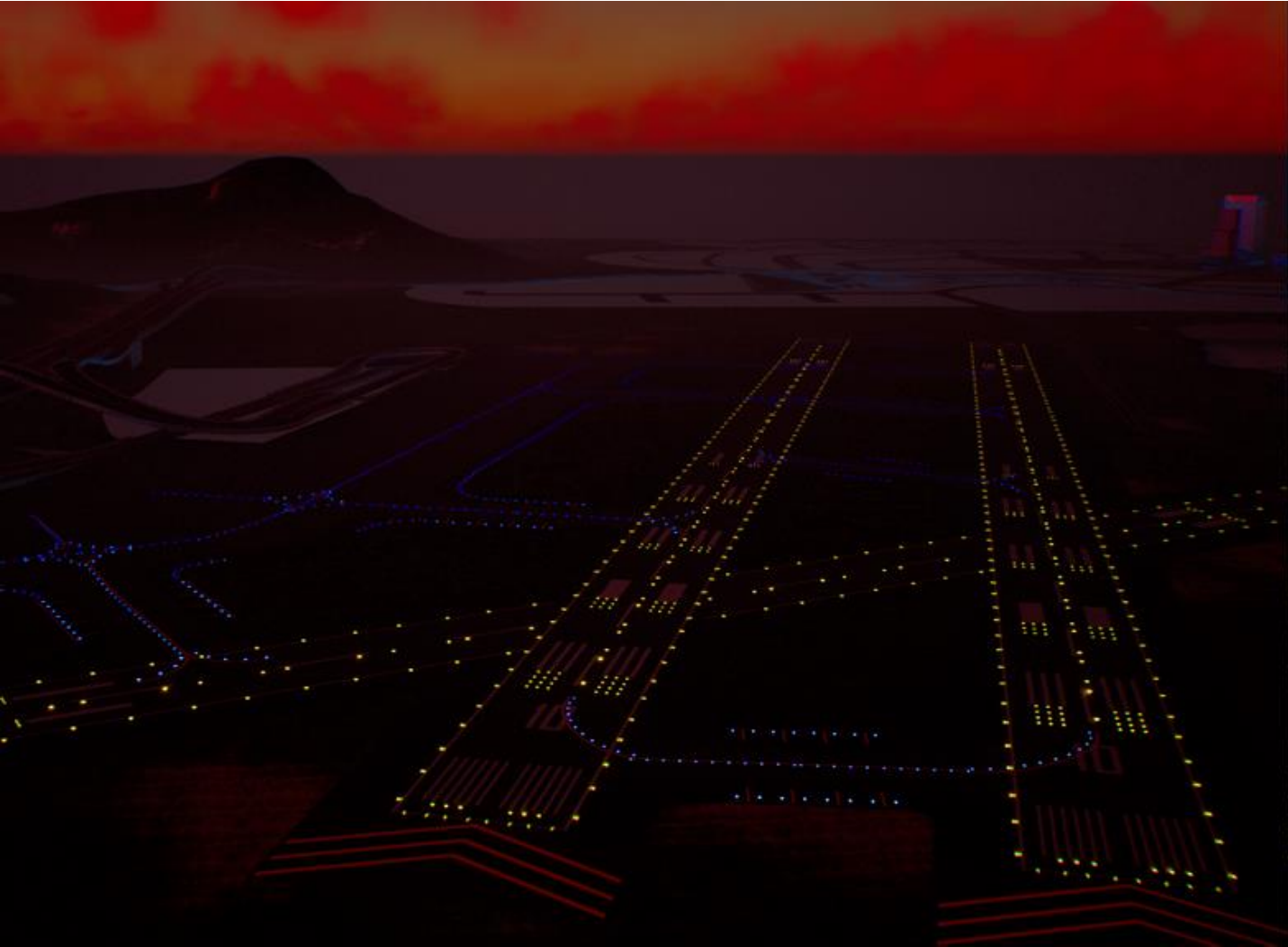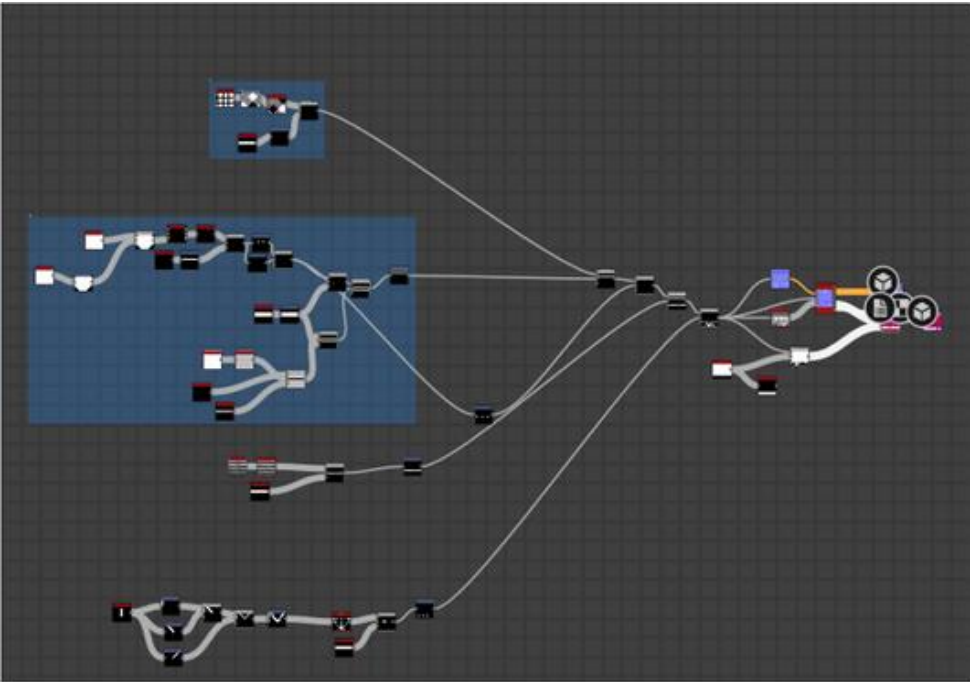
Mask

Shader
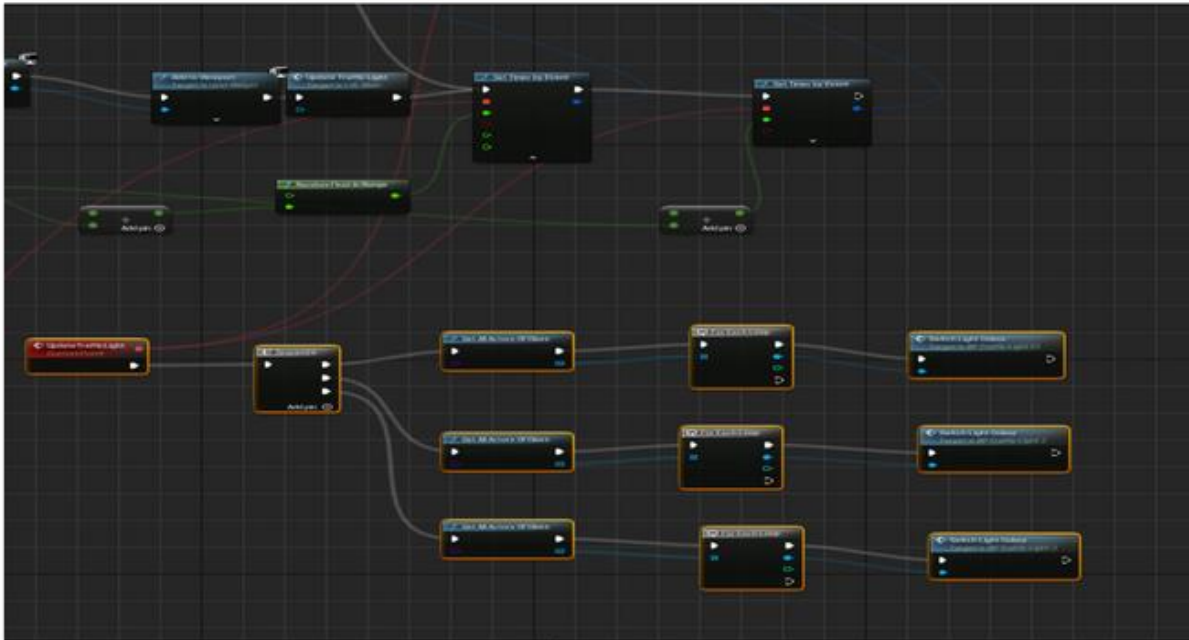
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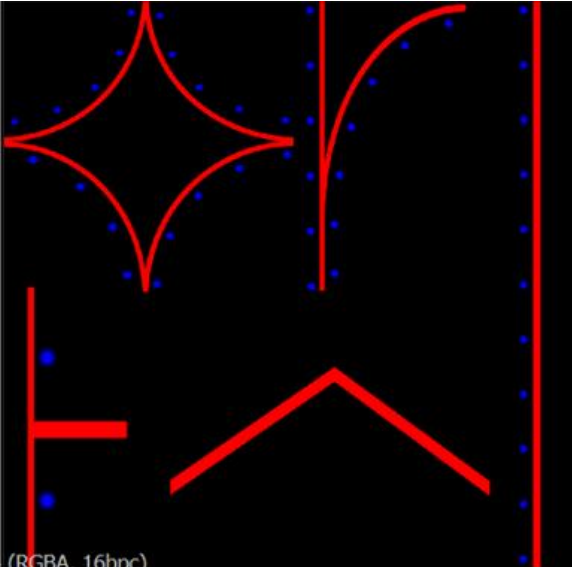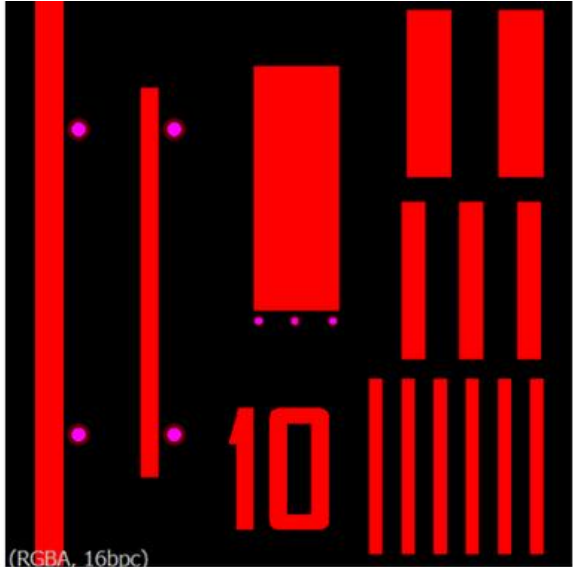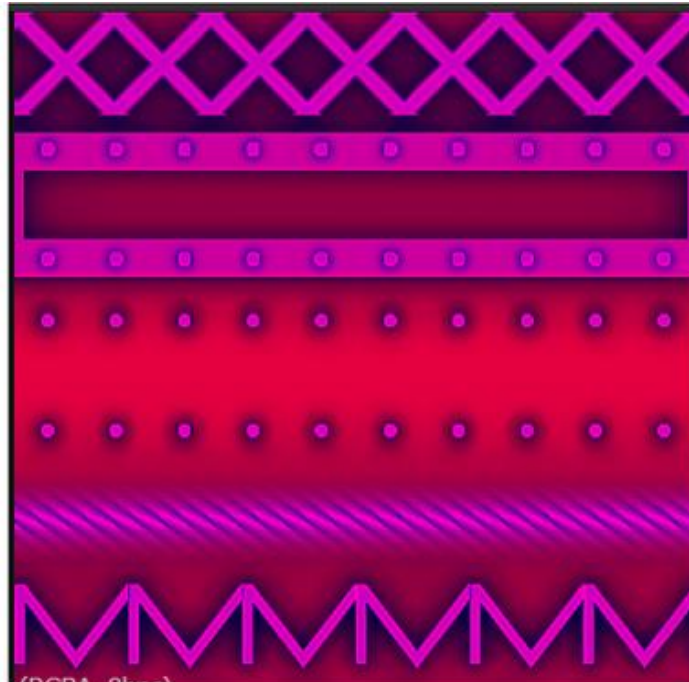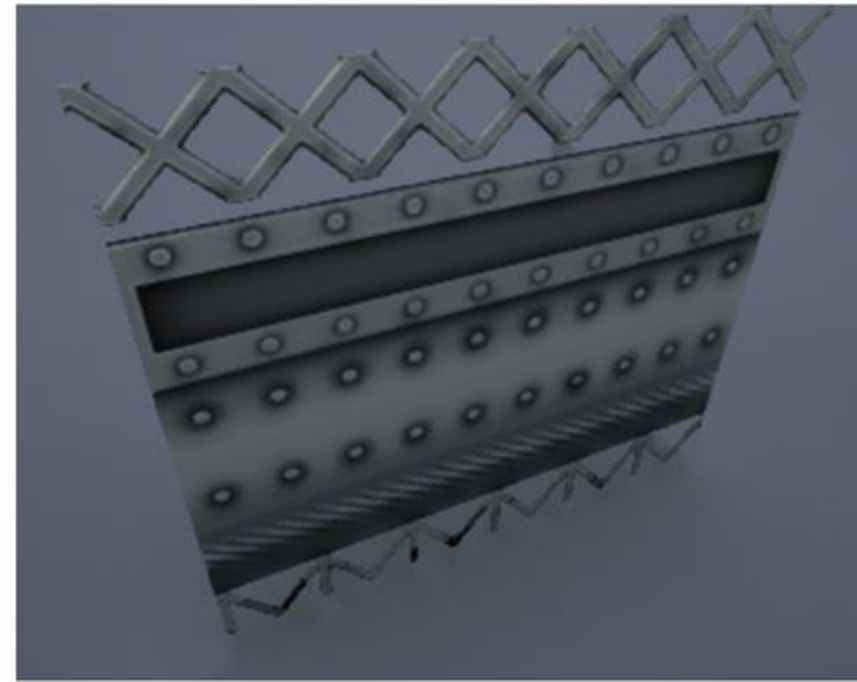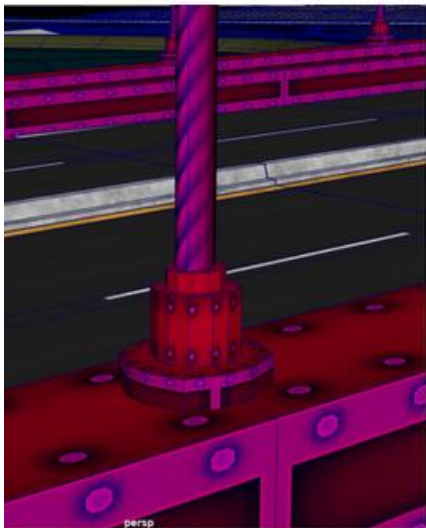
Runway Decal Mask Textures

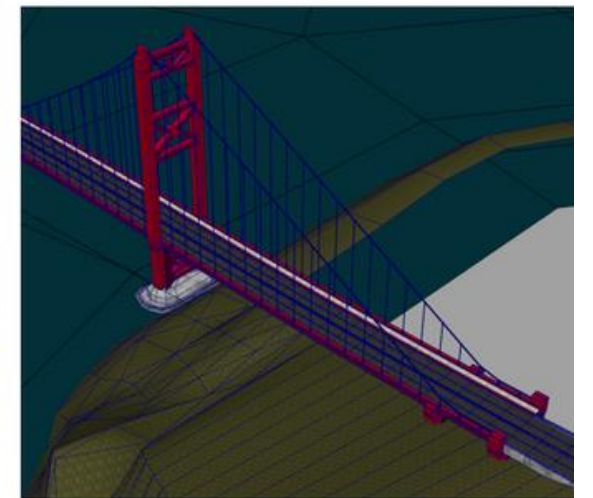Runway Panel Texture

Bridge Trim Sheet

R: AO A: Opacity

Material Preview
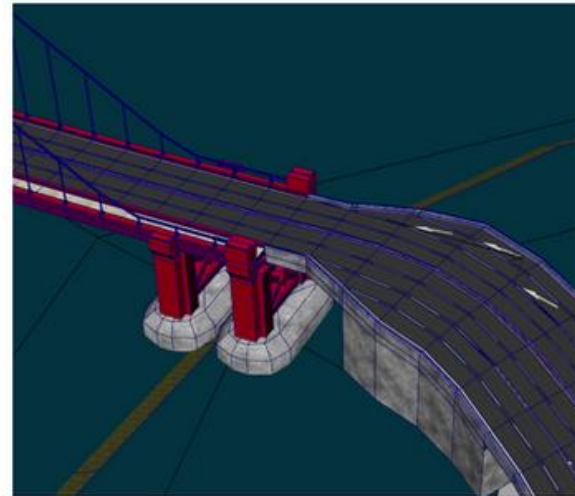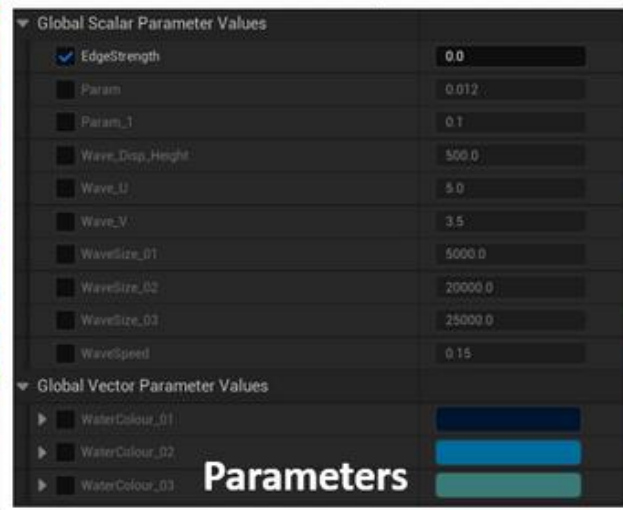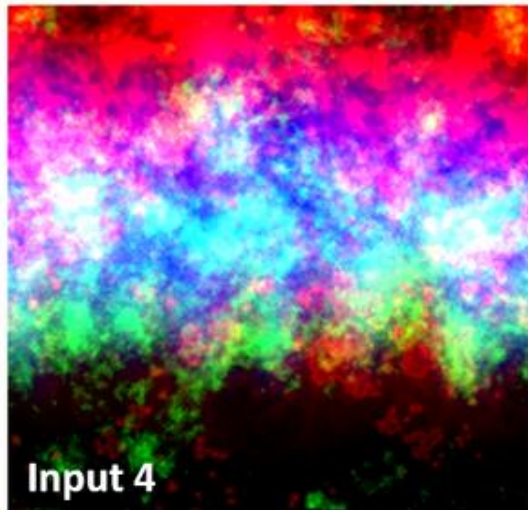
Initial Construction

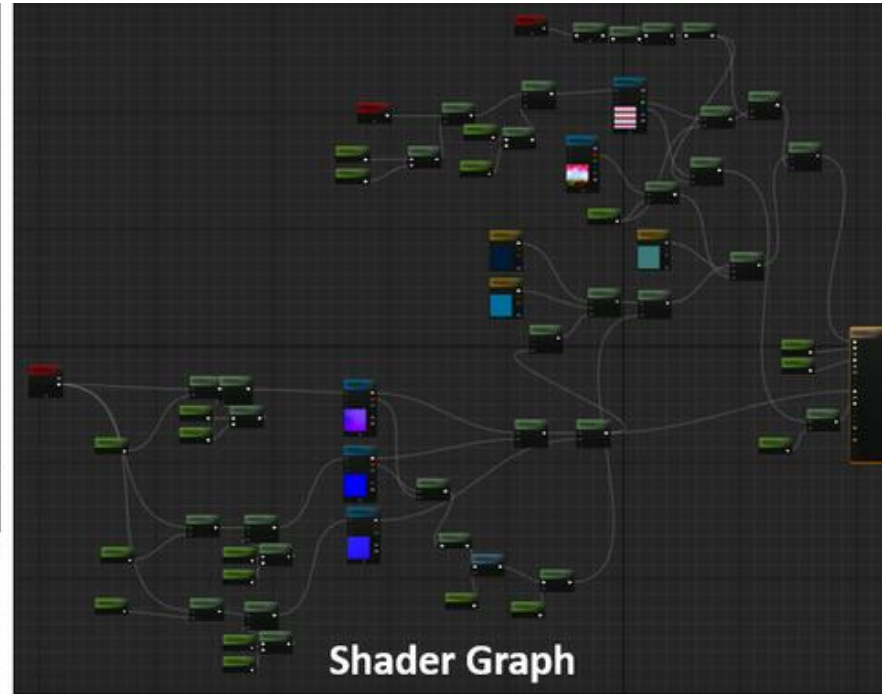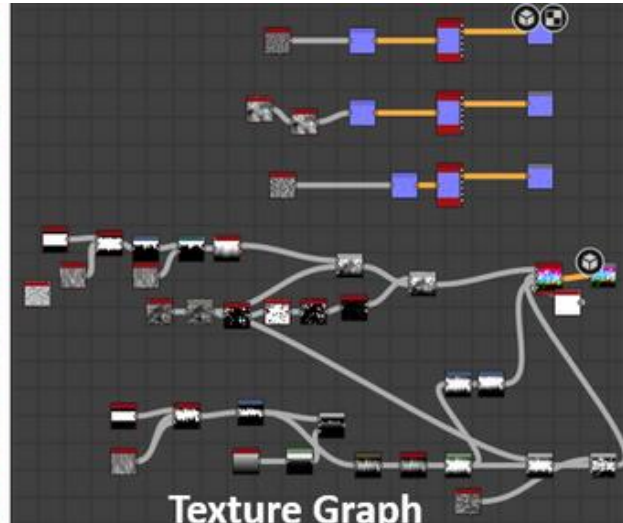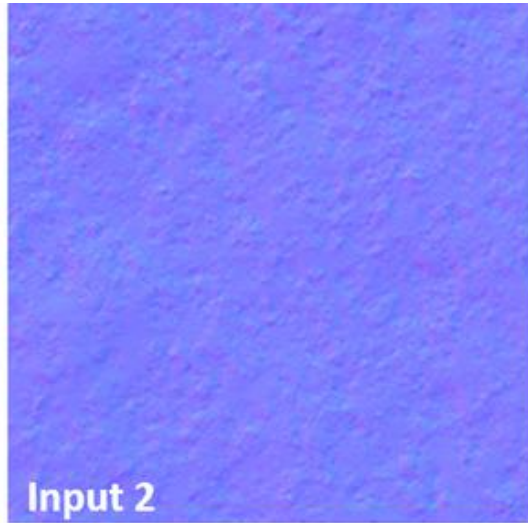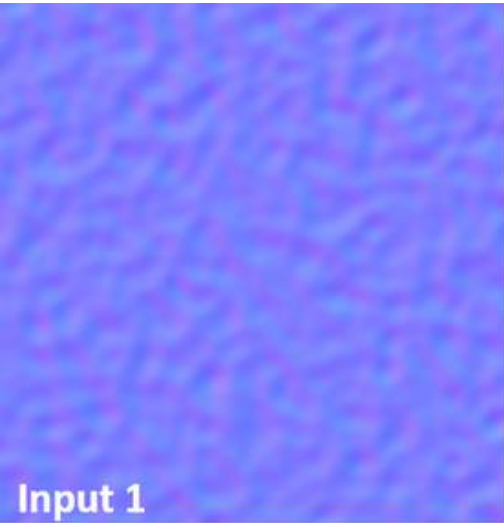Detailing with trim sheets

Blending with existing roads

Input 1

Input 2

Input 3

Input 4

Texture Graph

Shader Graph
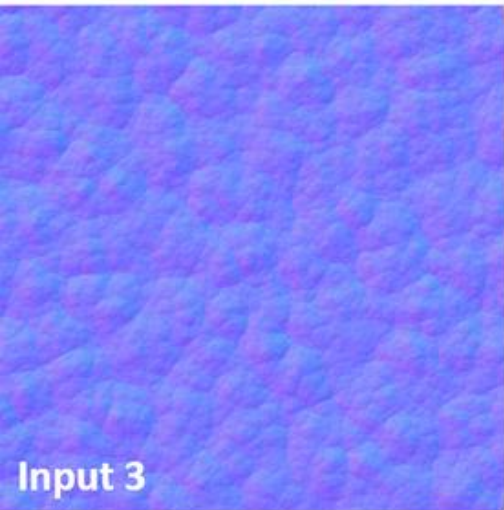
Global Scalar Parameter Values

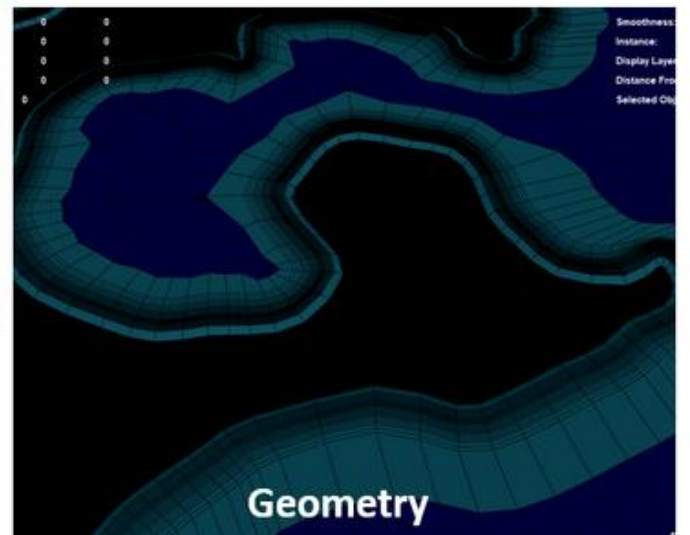|		
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☐ Param		0.012
☐ Param_1		0.1
☐ Wave_Disp_Height		500.0
☐ Wave_U		5.0
☐ Wave_V		3.5
☐ WaveSize_01		5000.0
☐ WaveSize_02		20000.0
☐ WaveSize_03		25000.0
☐ WaveSpeed		0.15

▼ Global Vector Parameter Values

▶ ☐ WaterColour_01		
▶ ☐ WaterColour_02		
▶ ☐ WaterColour_03		

Parameters

Geometry

Ocean Shader in Action

This shader features dynamic colours, animated foams, wave textures and displacement.

Multiple macro detail textures were layered and mixed to avoid visible tiling and animated elements were implemented by offsetting UVs
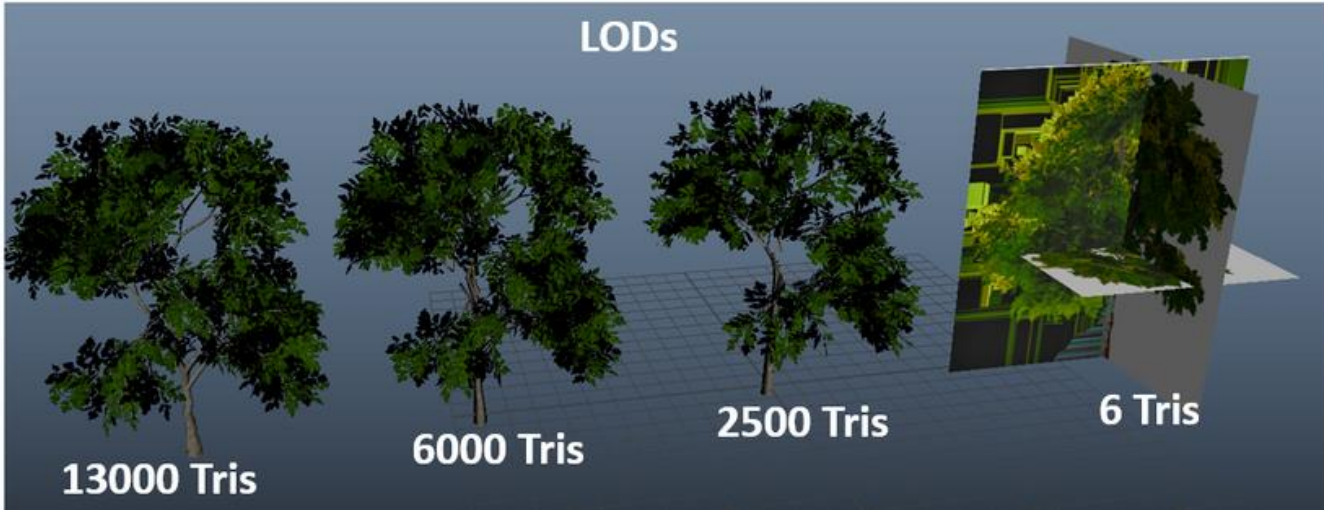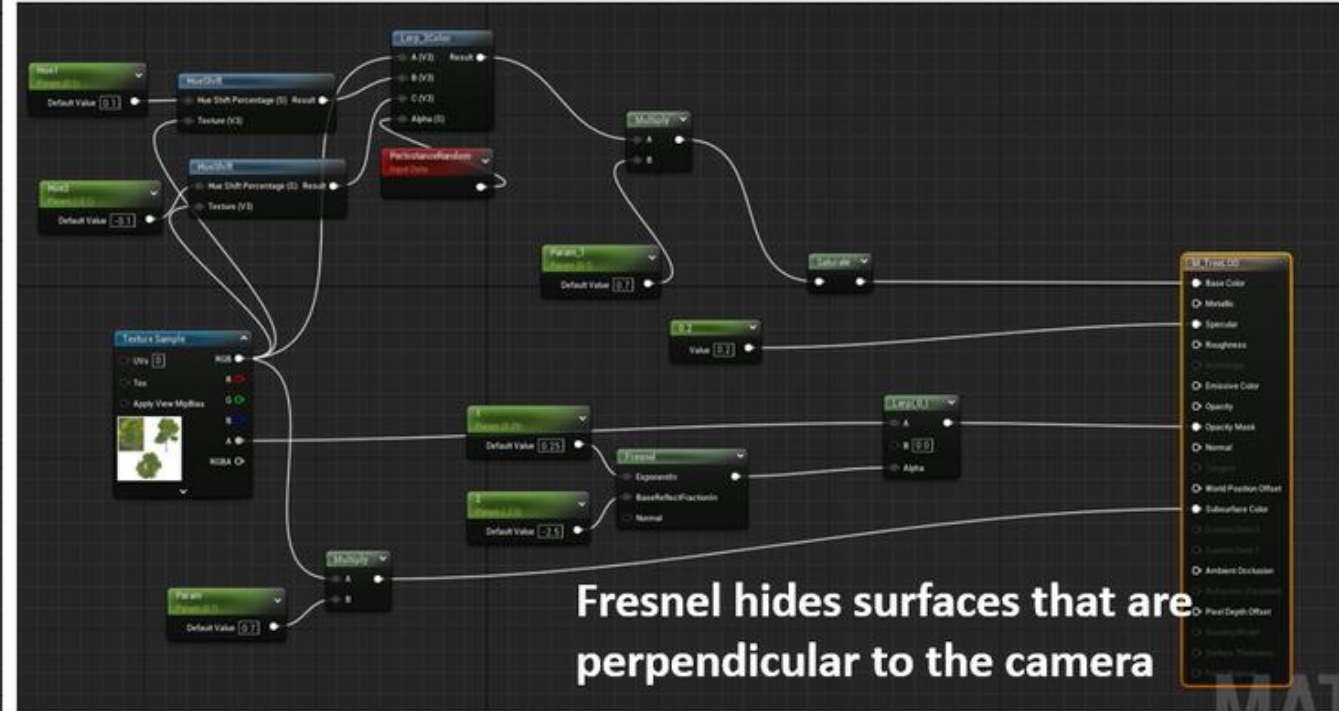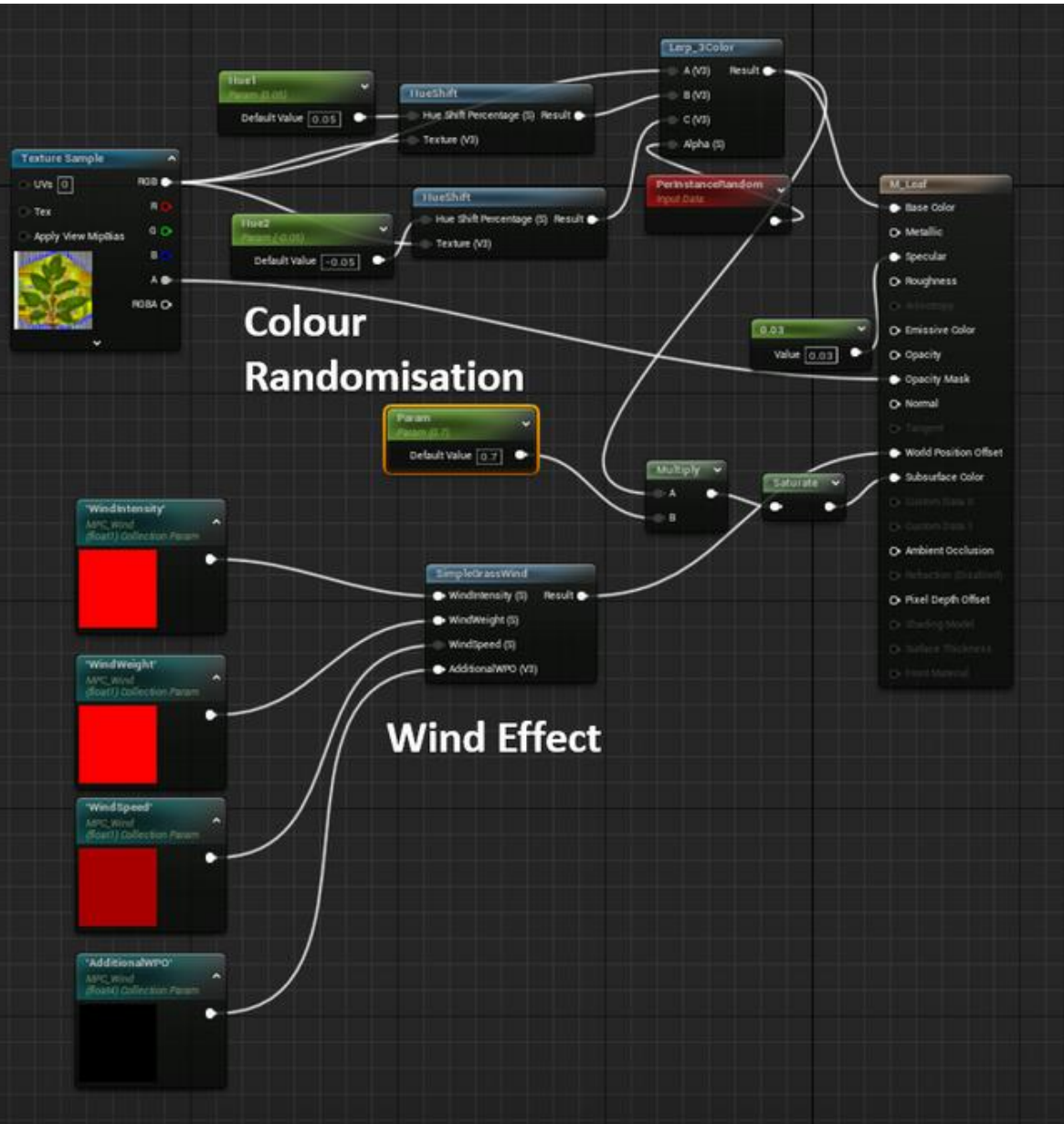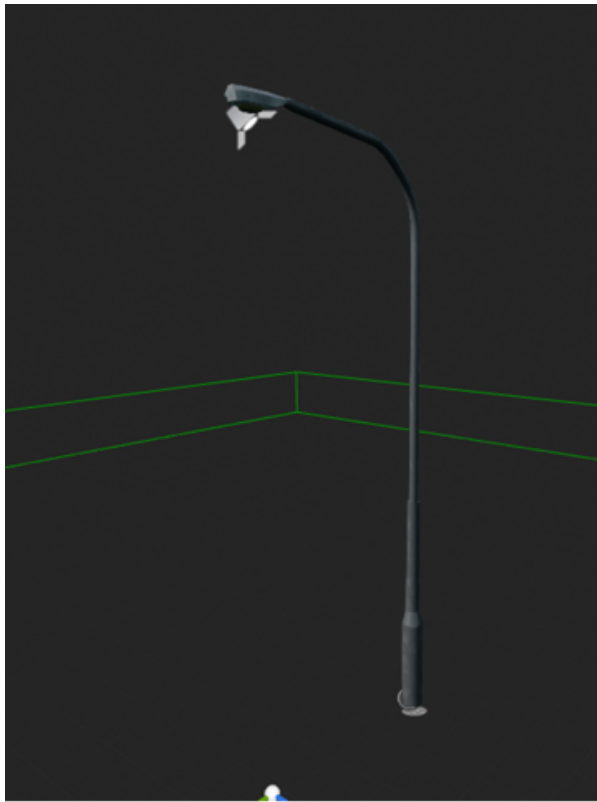
LODs

13000 Tris

6000 Tris

2500 Tris

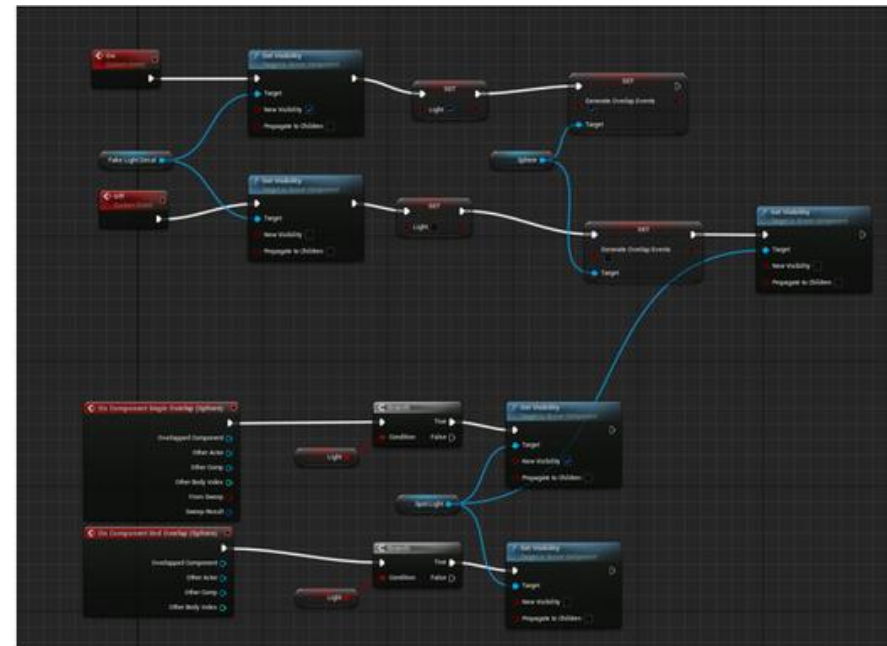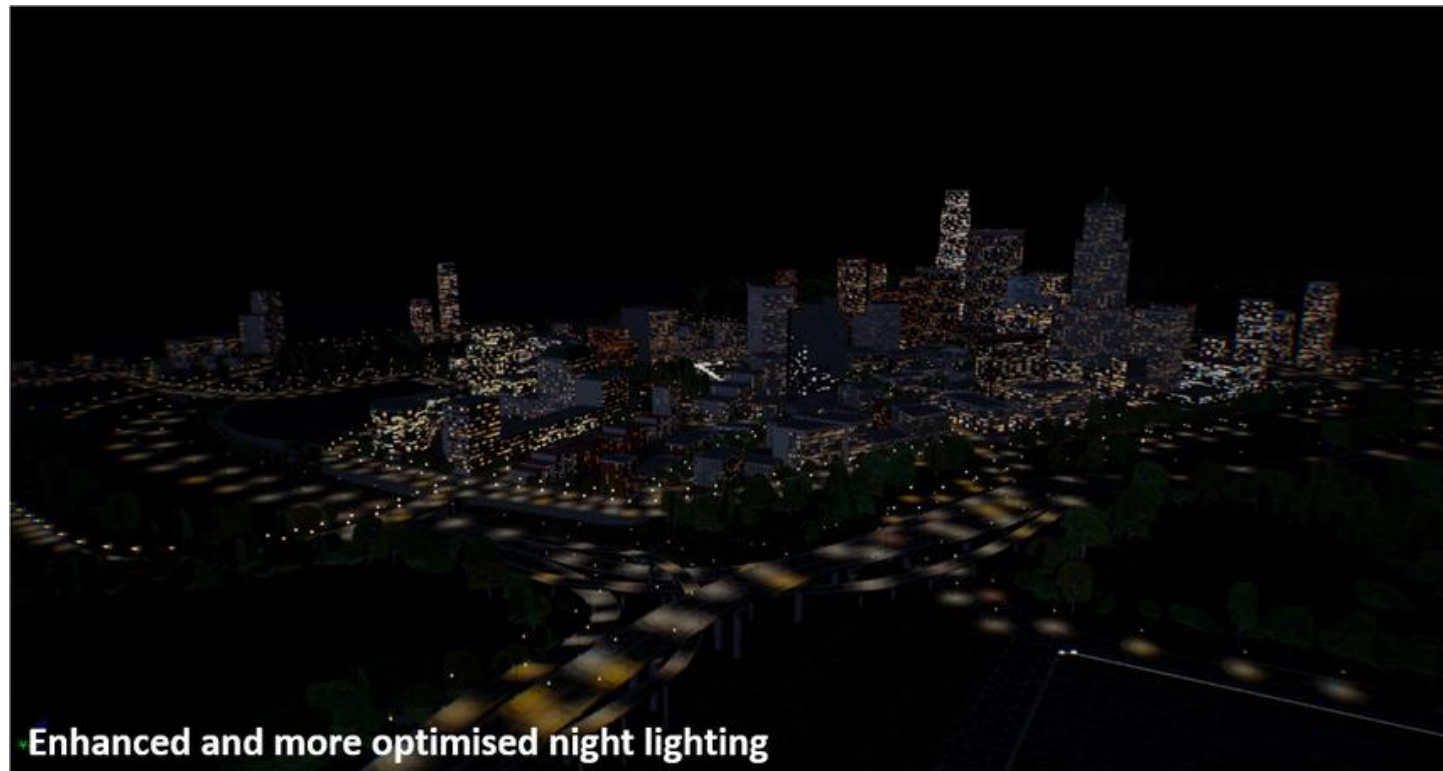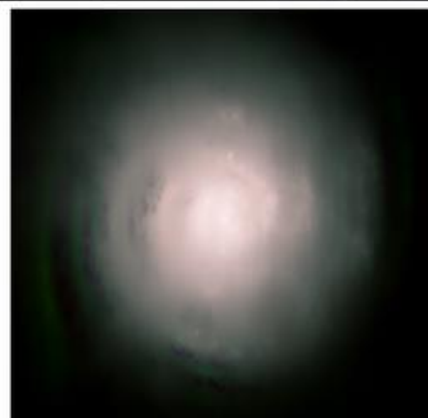6 Tris

Photogrammetry textures

LOD card texture (rendered in Arnold)

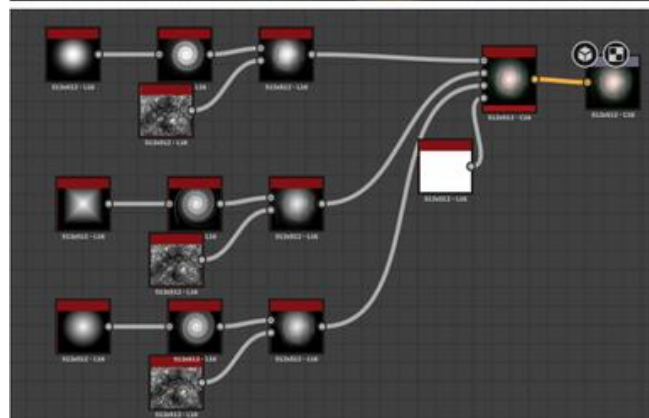Colour Randomisation

Wind Effect

Fresnel hides surfaces that are perpendicular to the camera

Blend distance makes decals disappear when too close
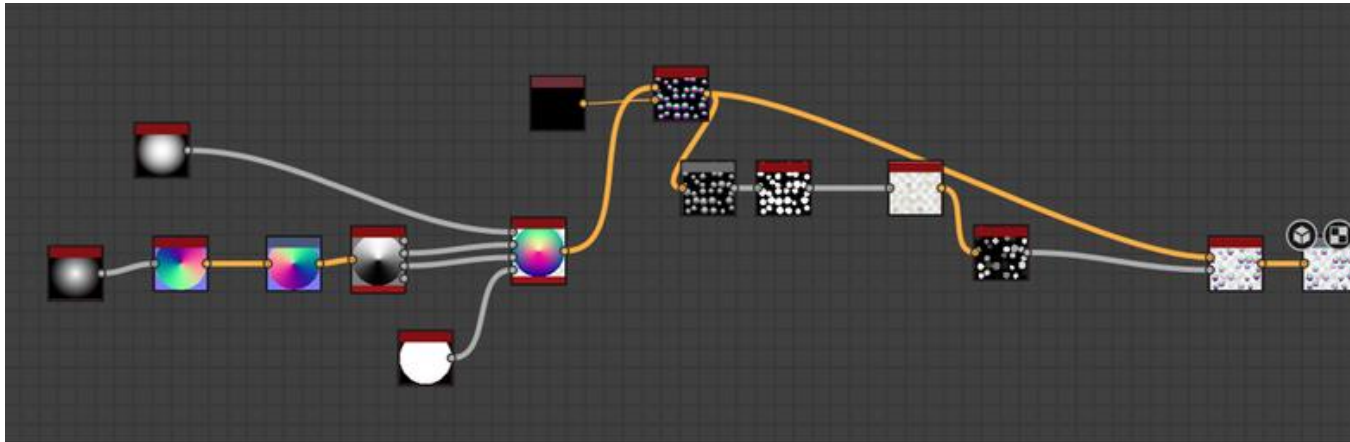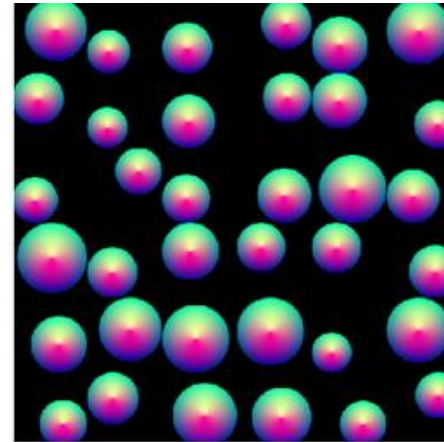
Enhanced and more optimised night lighting

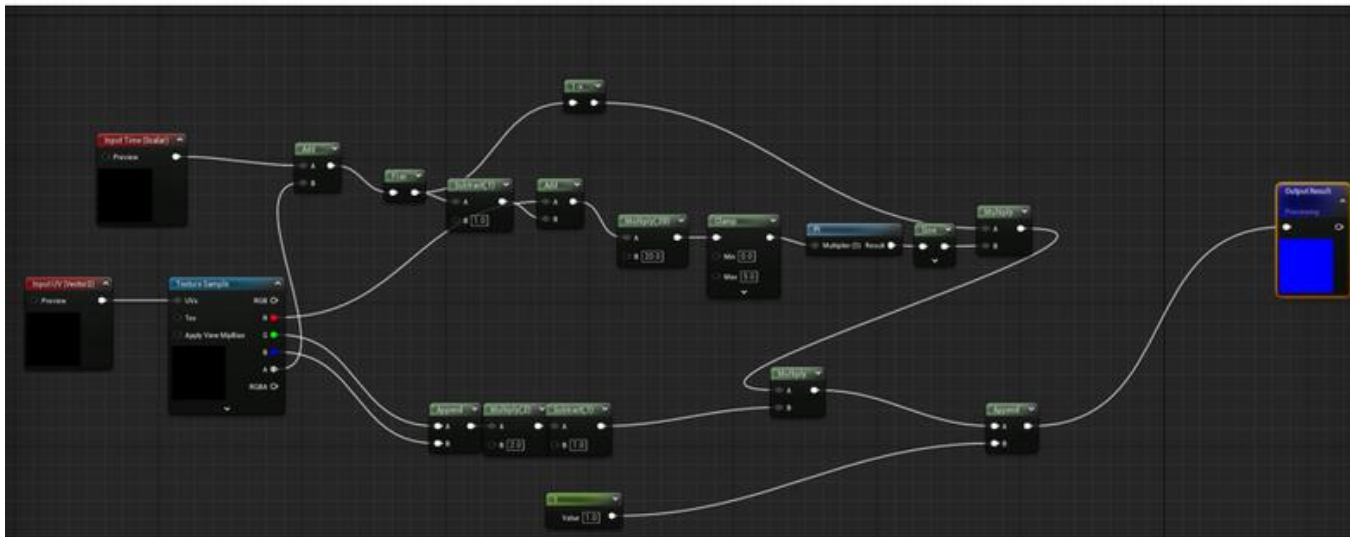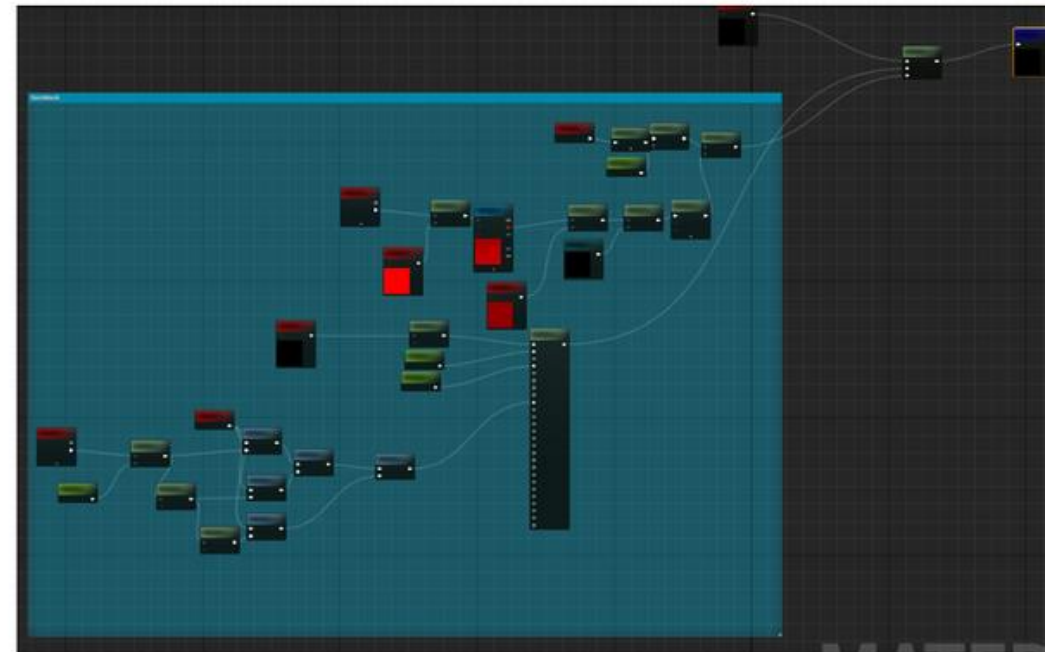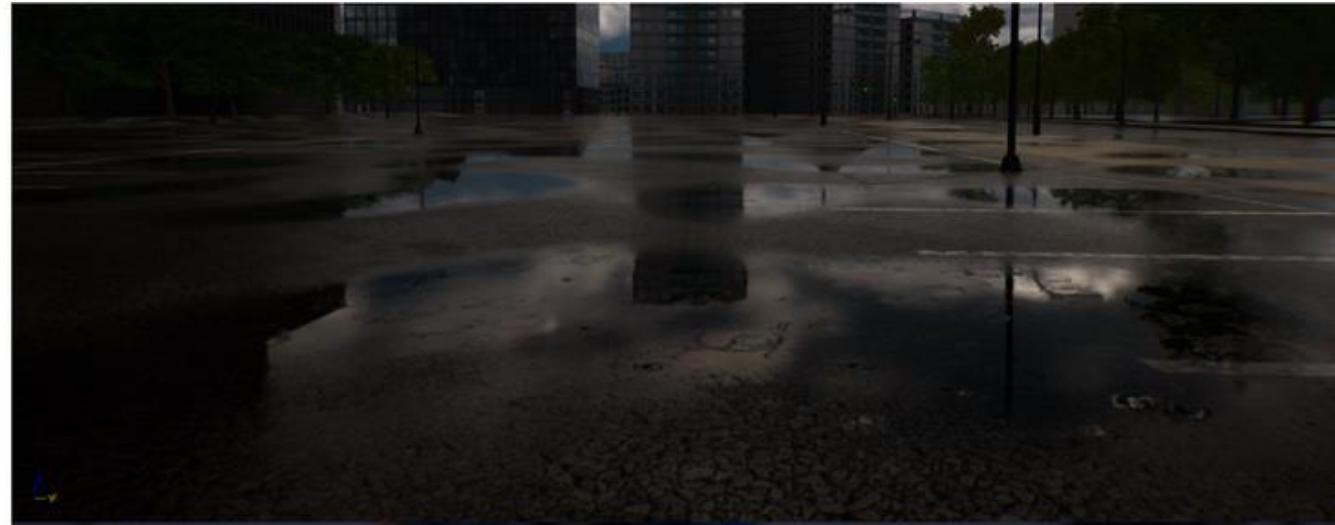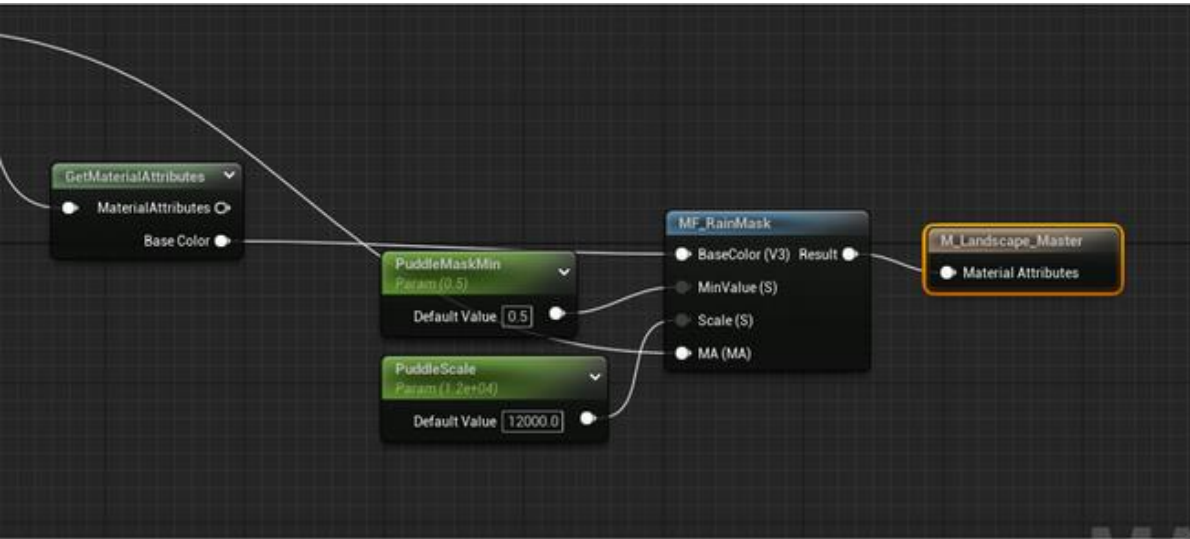Light Trigger System

Light Mask
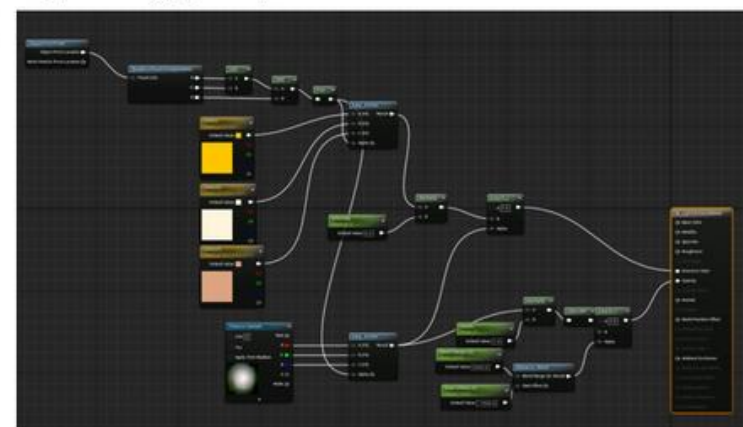
Fake Light Colour Variation

Ripple Mask Graph

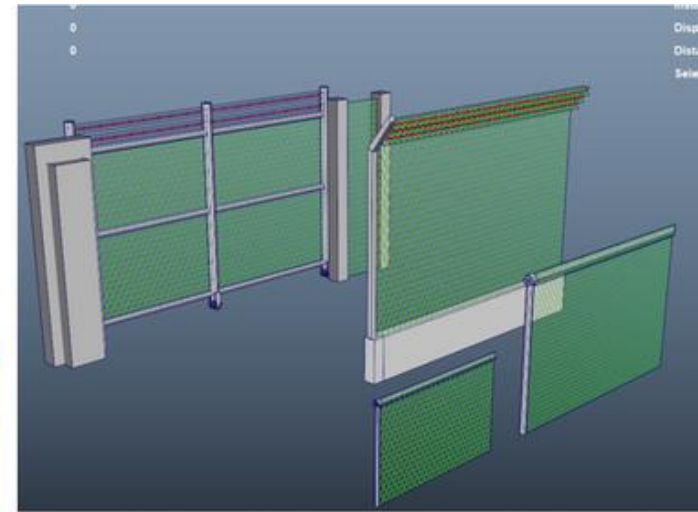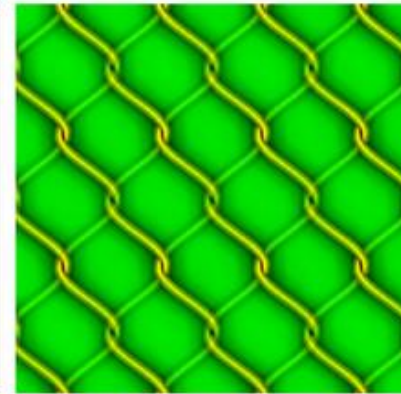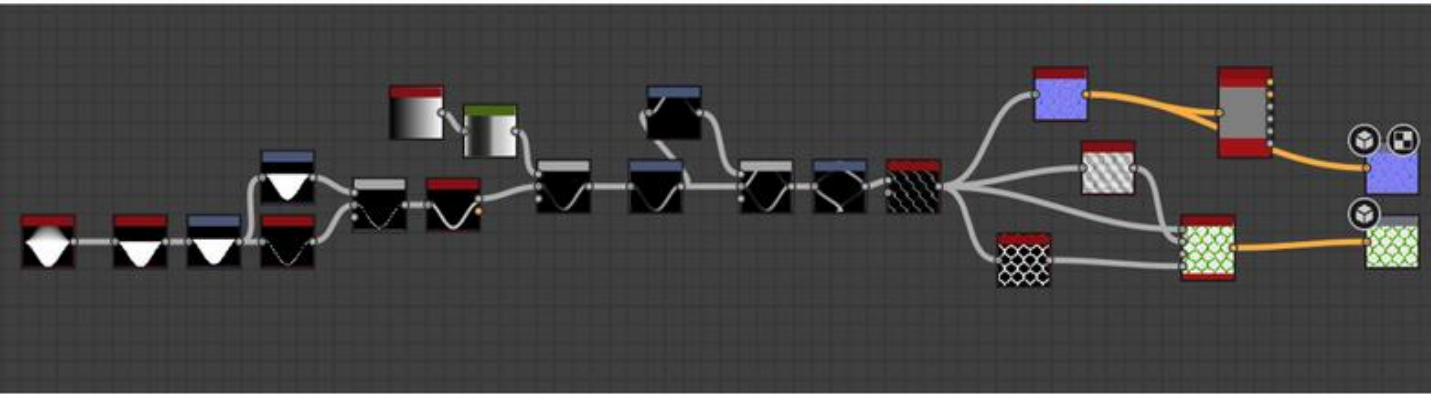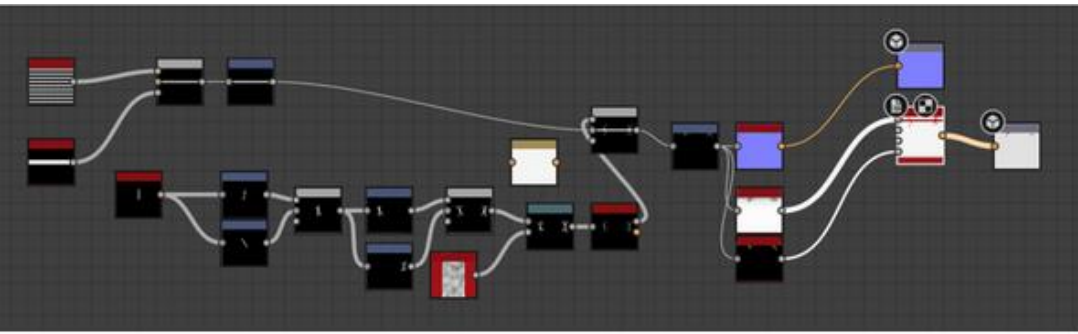Ripple Mask Texture

Ripple Material Function

Puddle Material Function

Material function blended with the existing material attributes, in this example, landscape material. Two parameters control the minimum wetness and puddle scale.
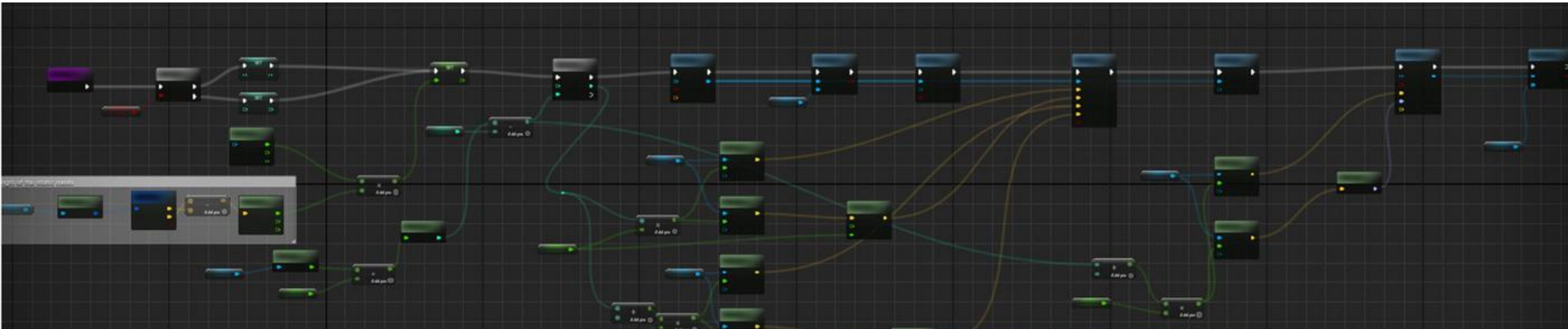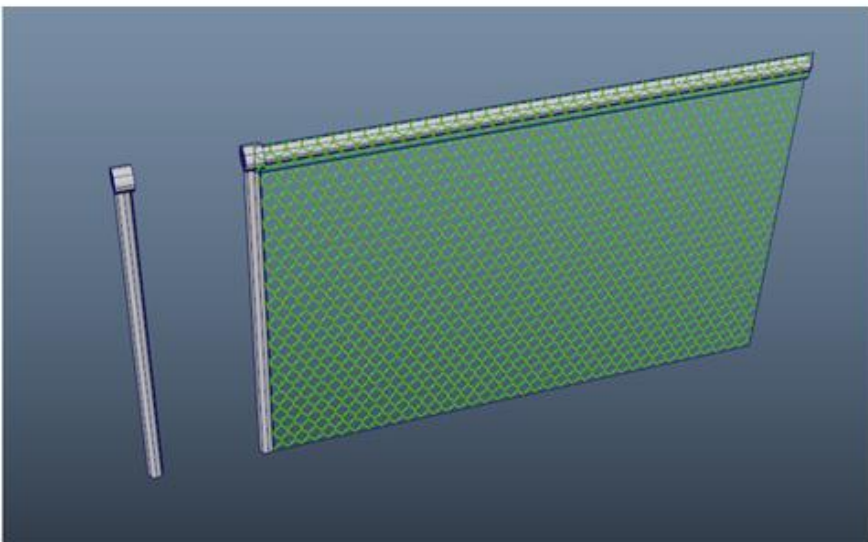
Material In-action

Metal Fence Textures

Models

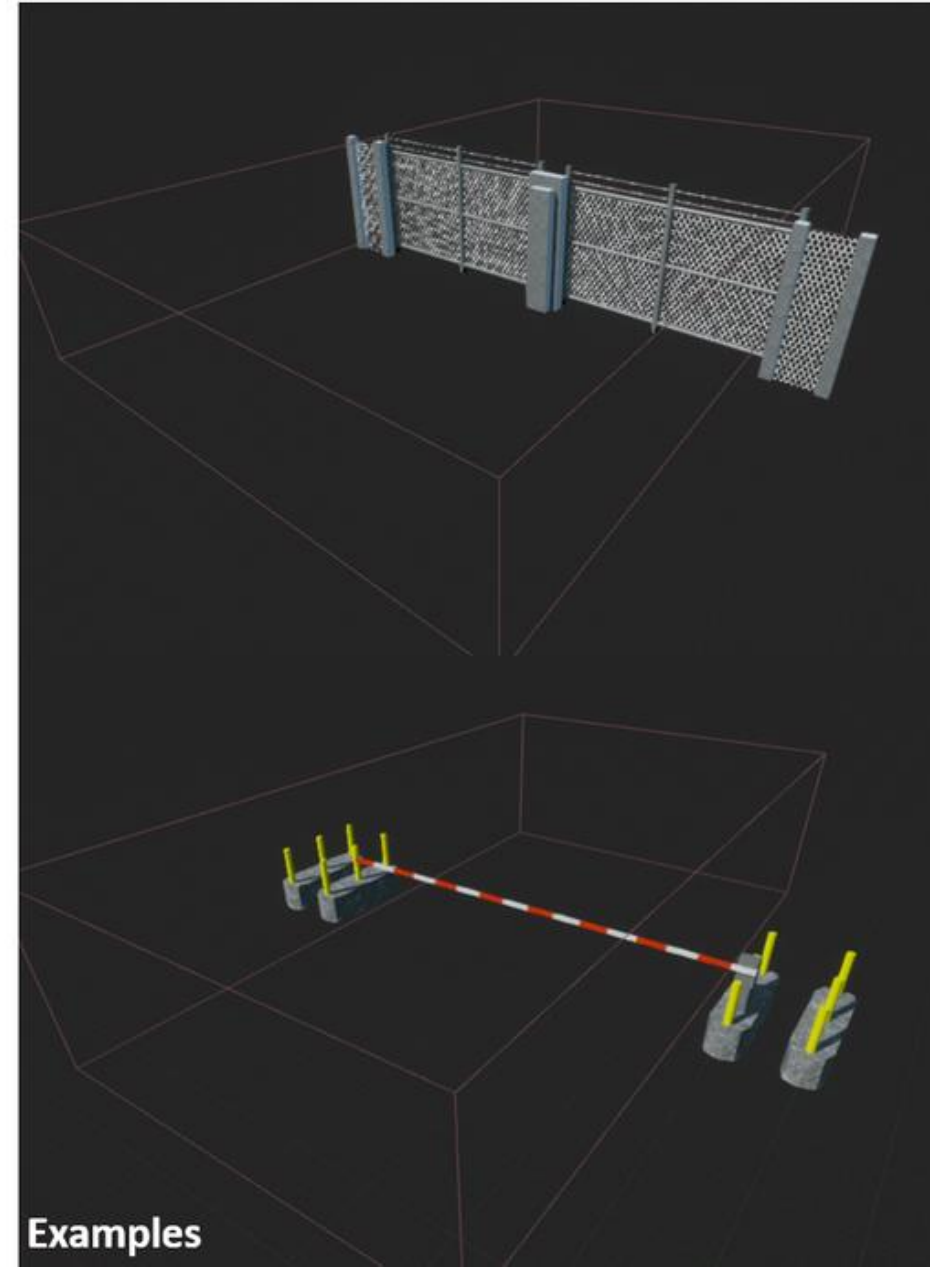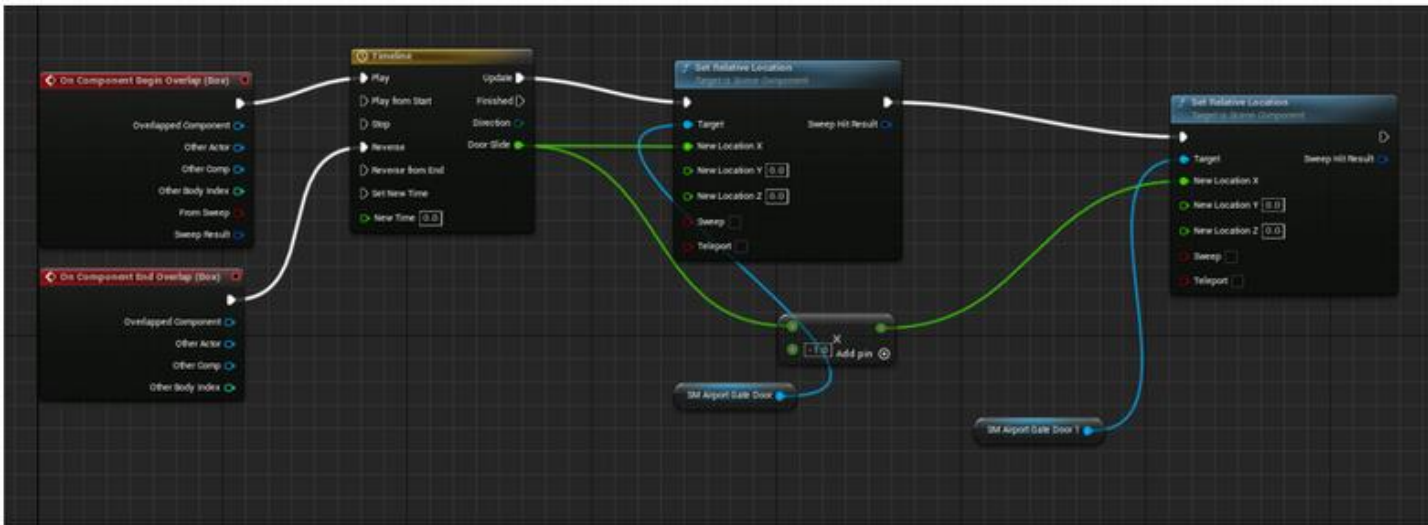**In-engine Result**

Spline Layout Blueprint

Start/End Parts

Placement Example

Animation using Timeline and Overlap Events
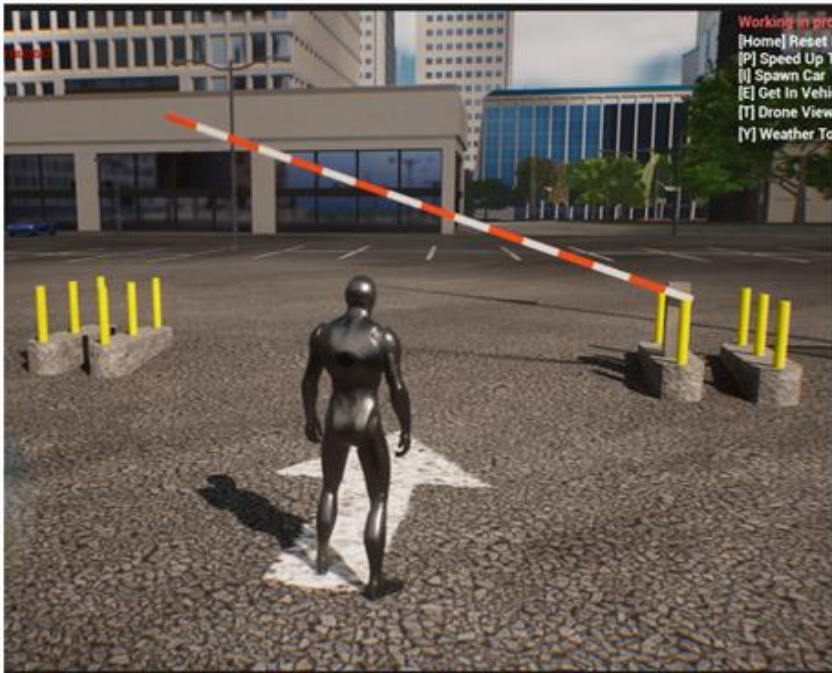
Gate opens when overlaps

Examples

Overview of the island (Approx. 40 square km)

Every major region of the map has been populated with light actors (over 4000 lights)

Various methods were used for optimisation; including world partition streaming, LODs, HLOD, merging actors, texture atlasing, and instancing.
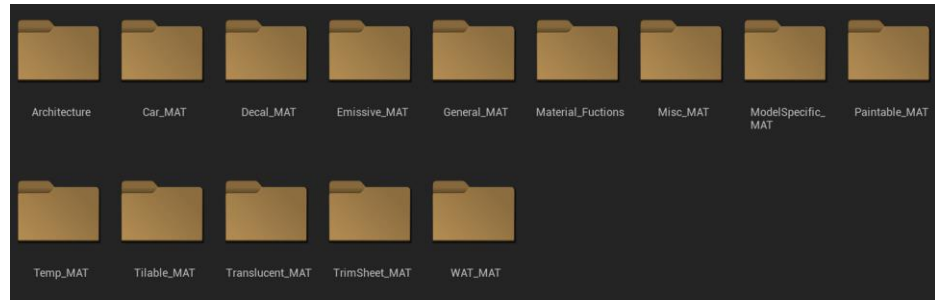
Material Categories

Major materials

Main blueprints

Day-night Cycle

Season/Weather Control

Key parameter collections

The variable environment factors are controlled by those blueprints by changing these parameters which affects materials, and other attributes in actors in the level.
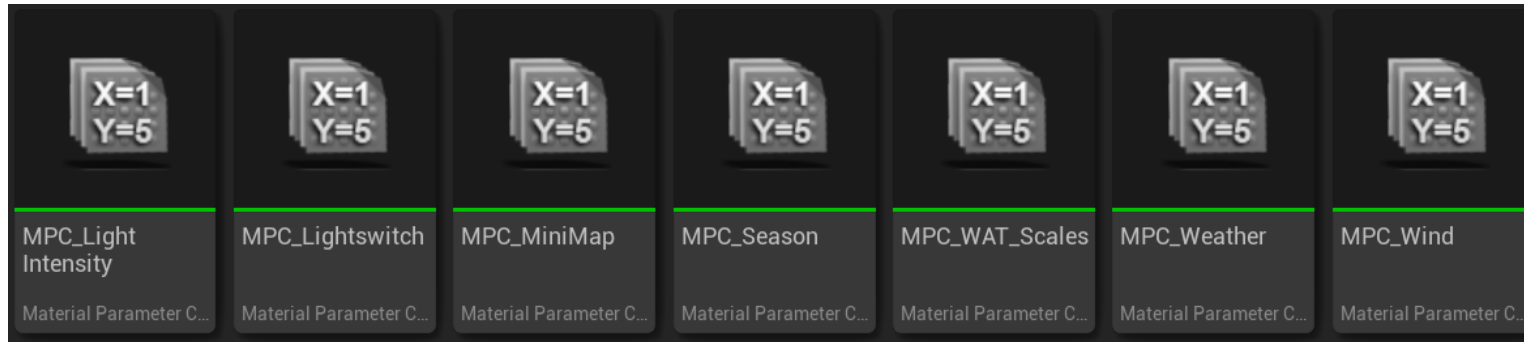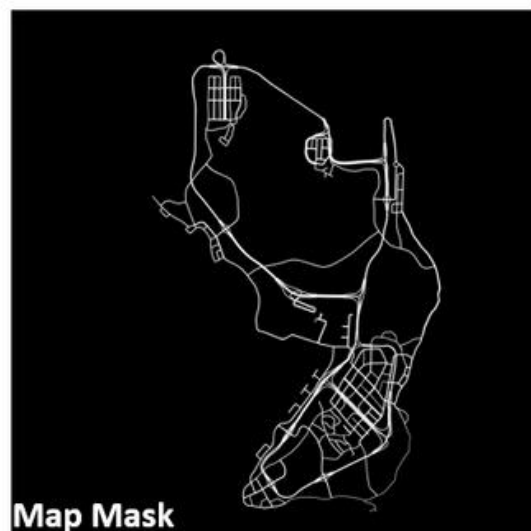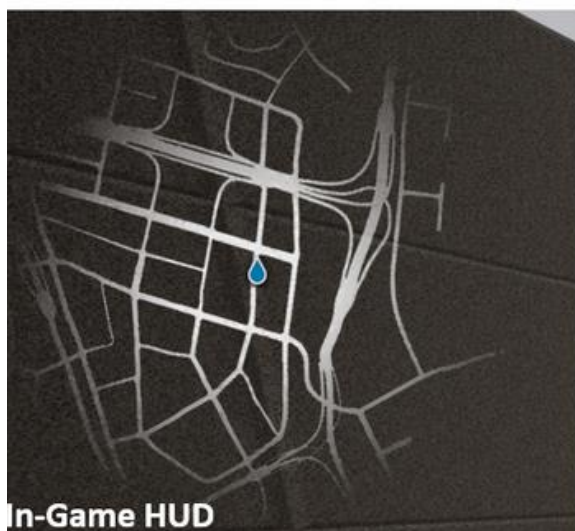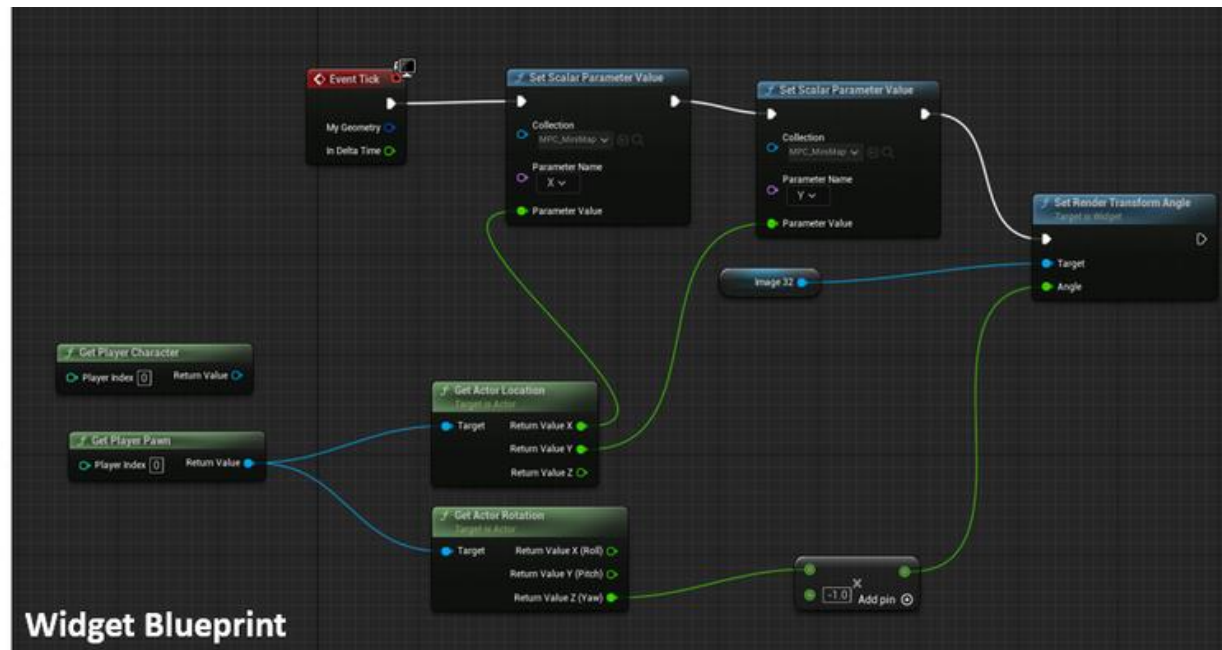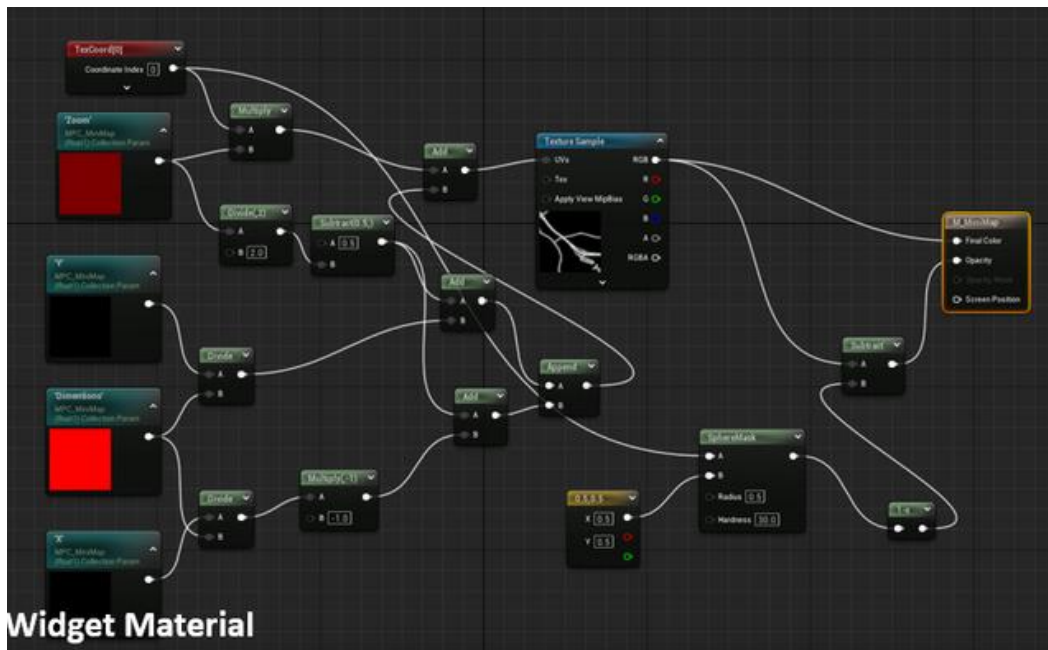
Widget Material

Widget Blueprint

**In-Game HUD**

Map Mask

Mini Map Widget

Something to help navigate when playtesting and constructing the scene.

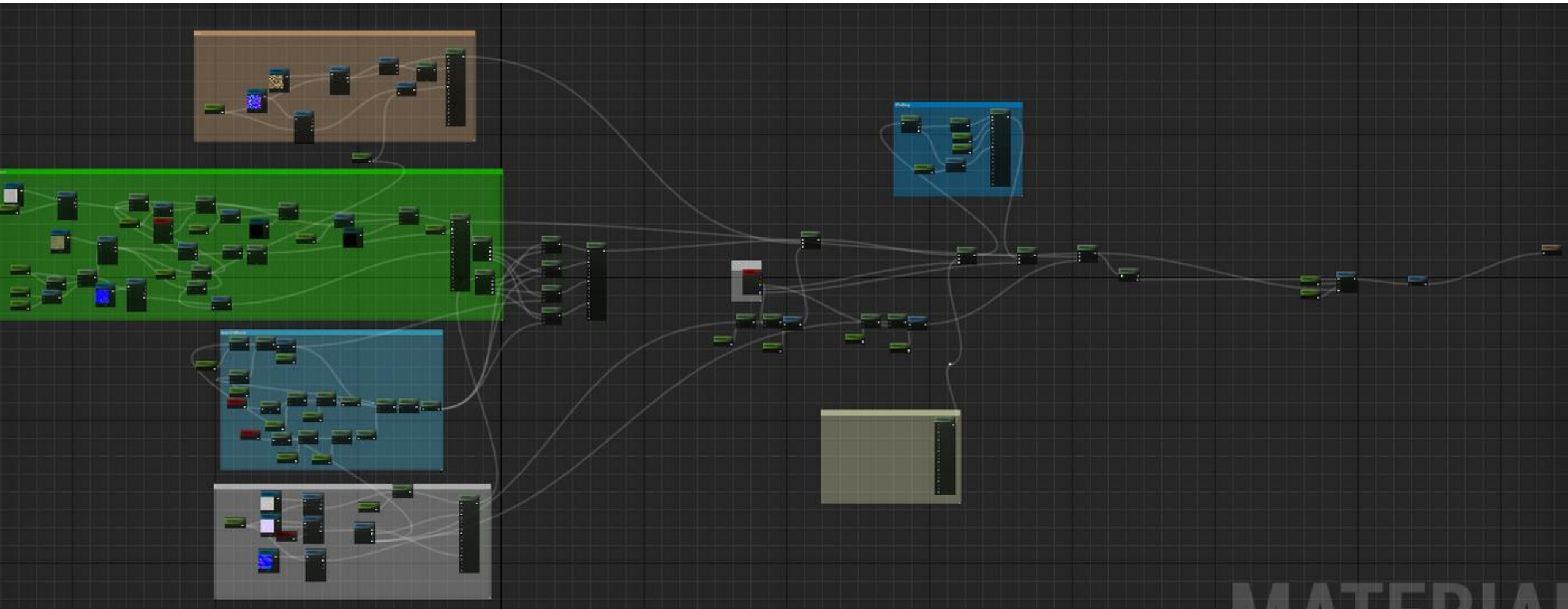The road network was rendered from the top with flat colour to use it as a mask.

The widget material consists of 4 scalar parameters including zoom, y offset, x offset, and dimensions.

Basically, this widget works by offsetting the texture based on player pawn's location.
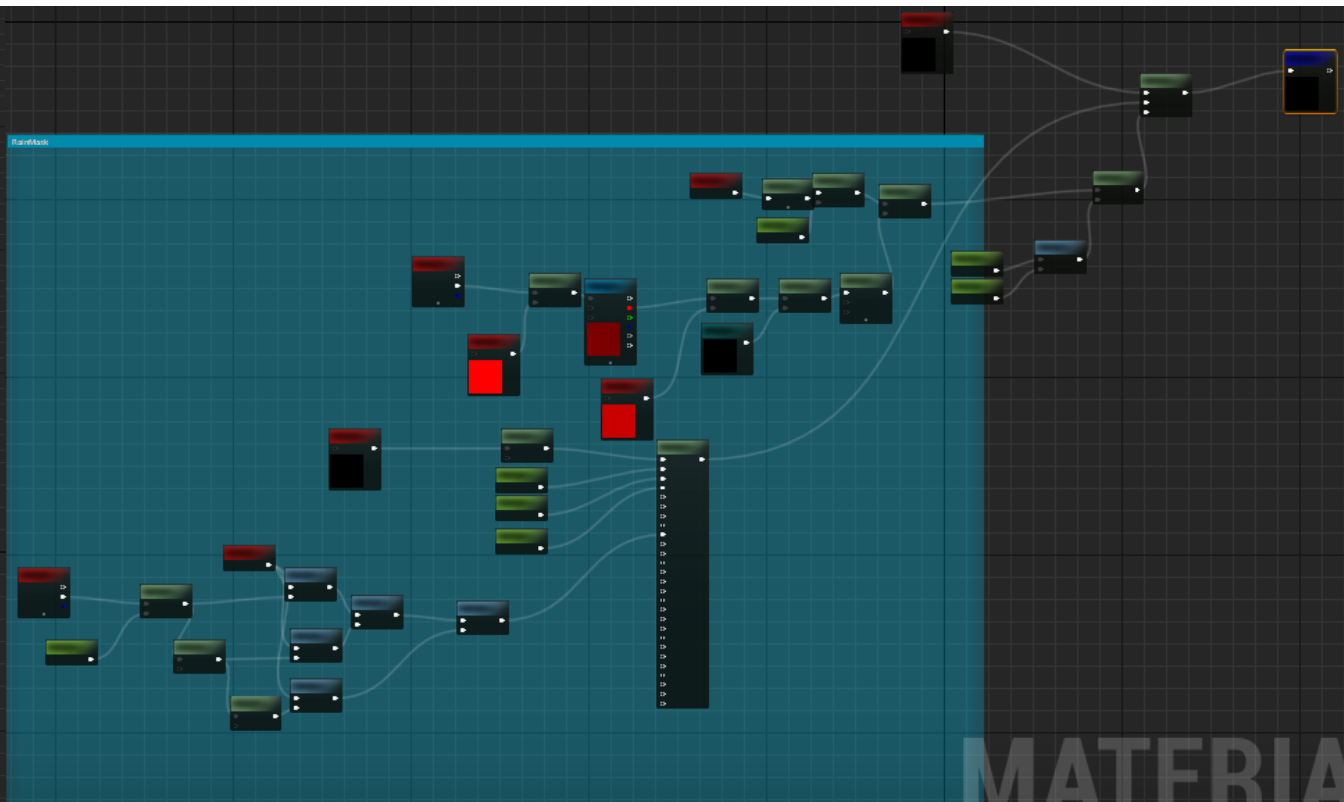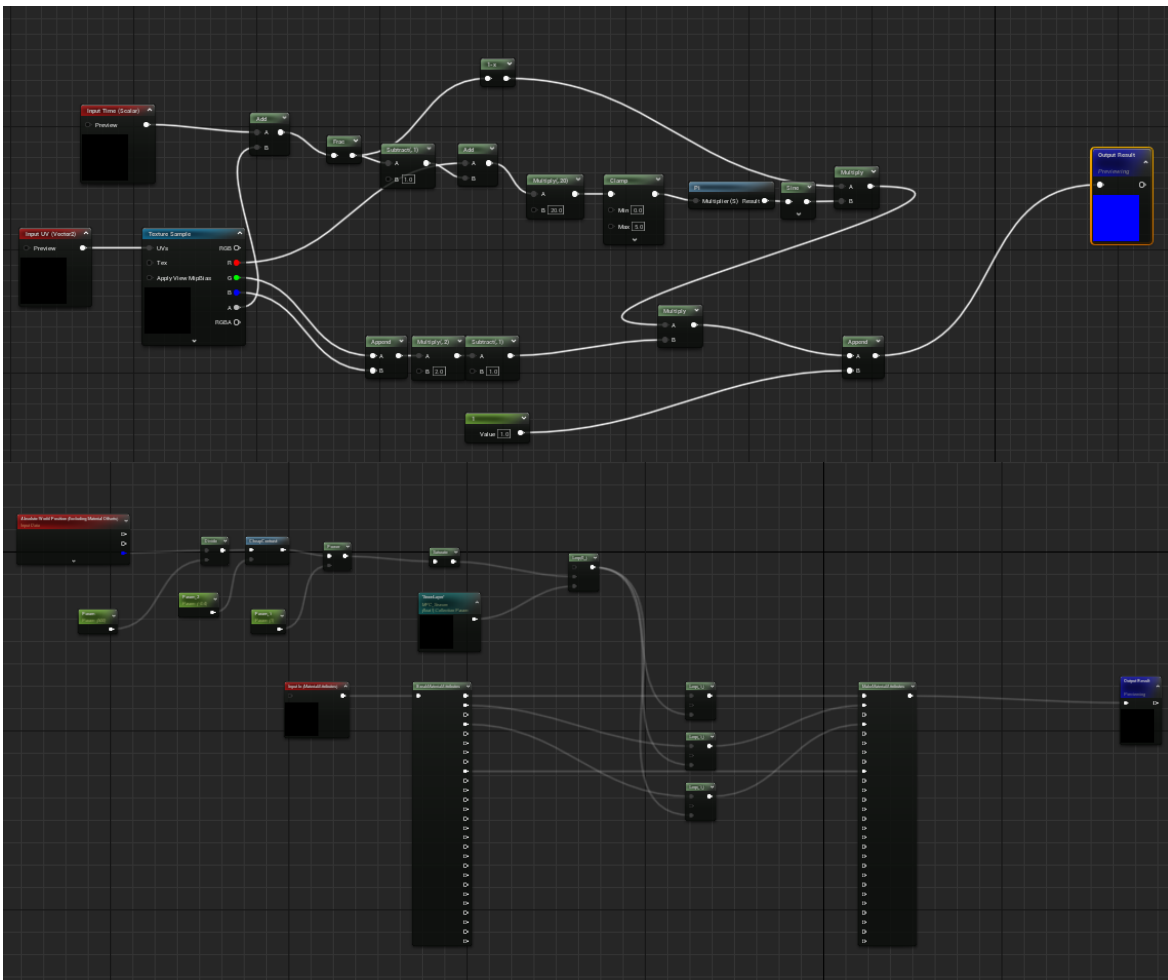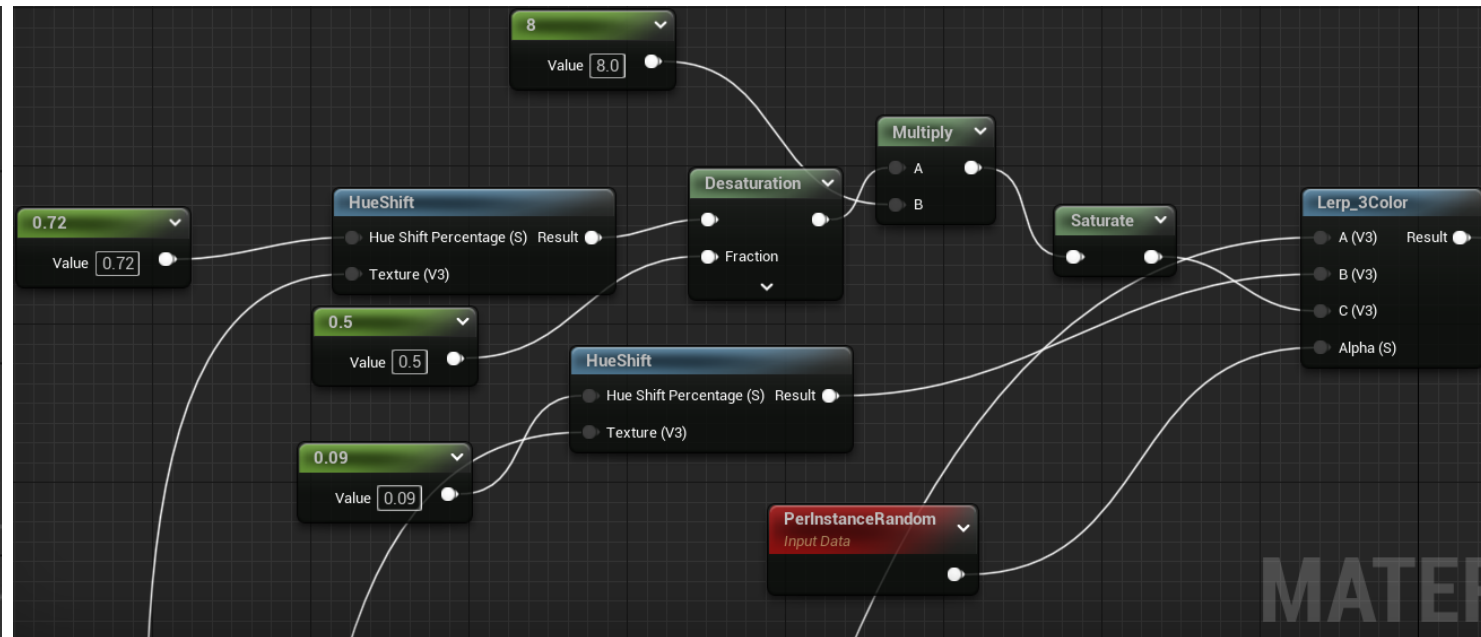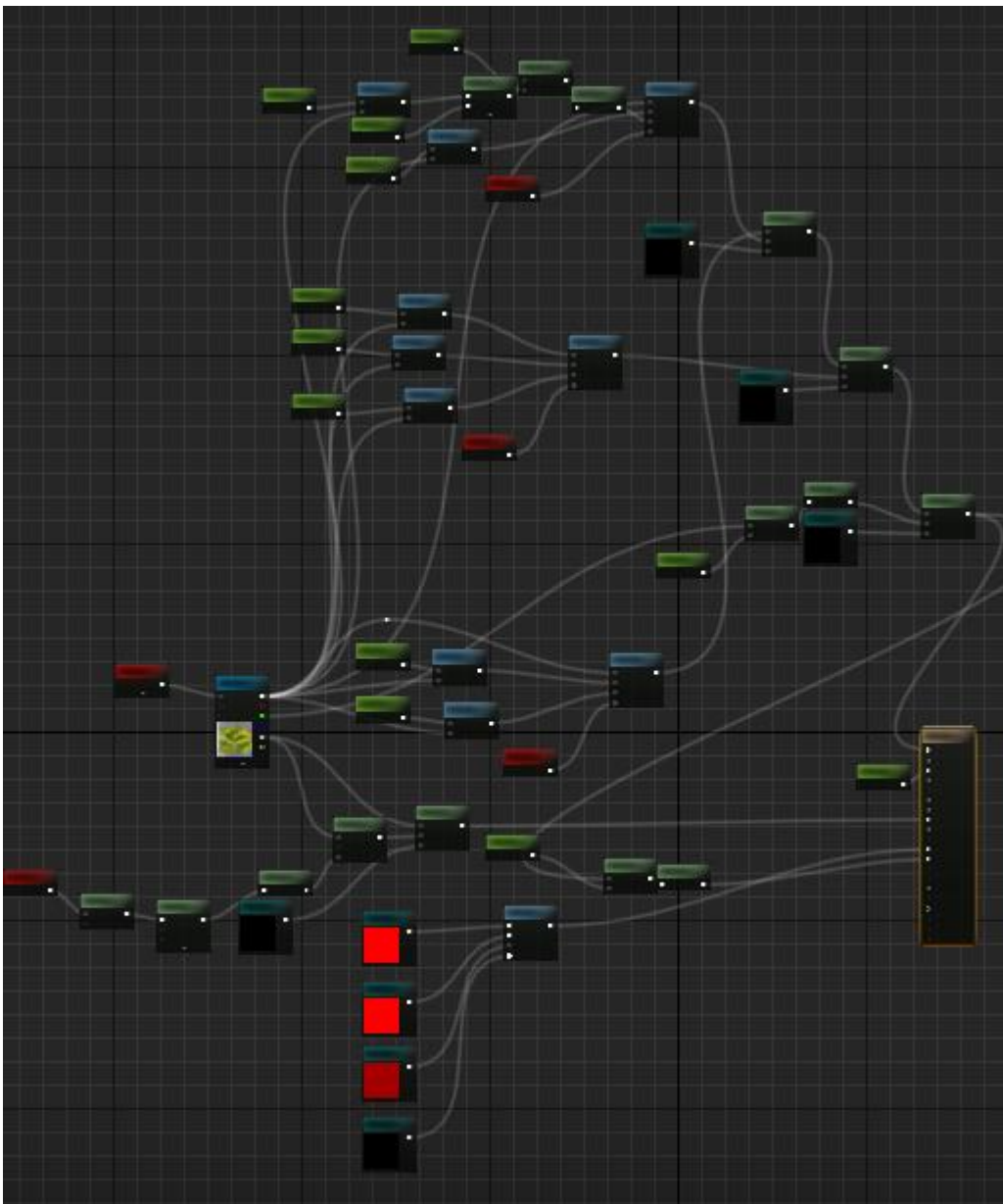
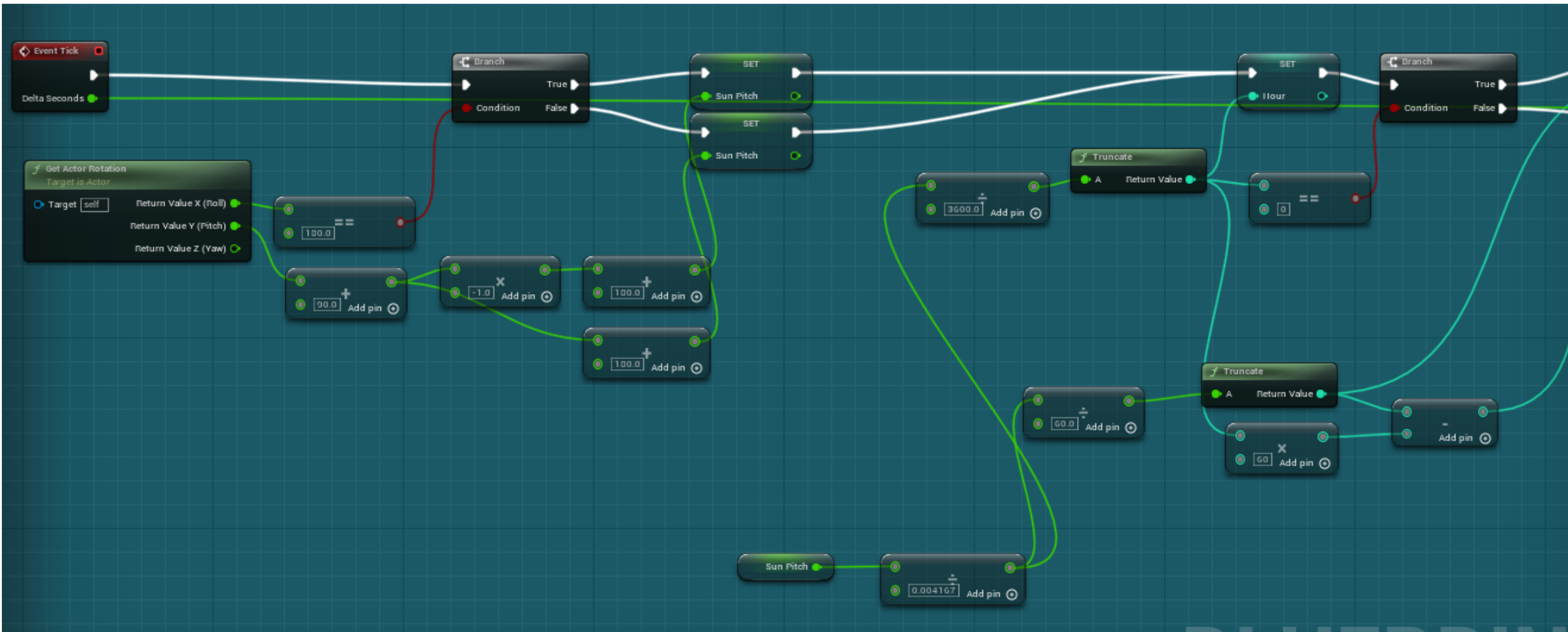Material functions associated with weather-specific shaders.

Paintable landscape material

Foliage colour variation and season-specific hue offset
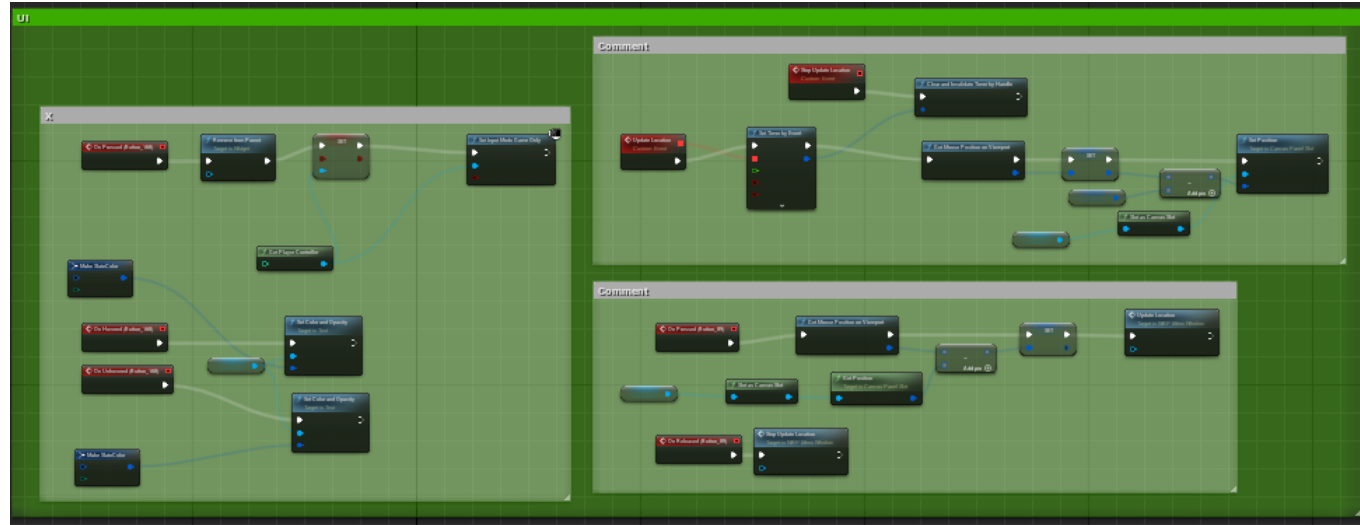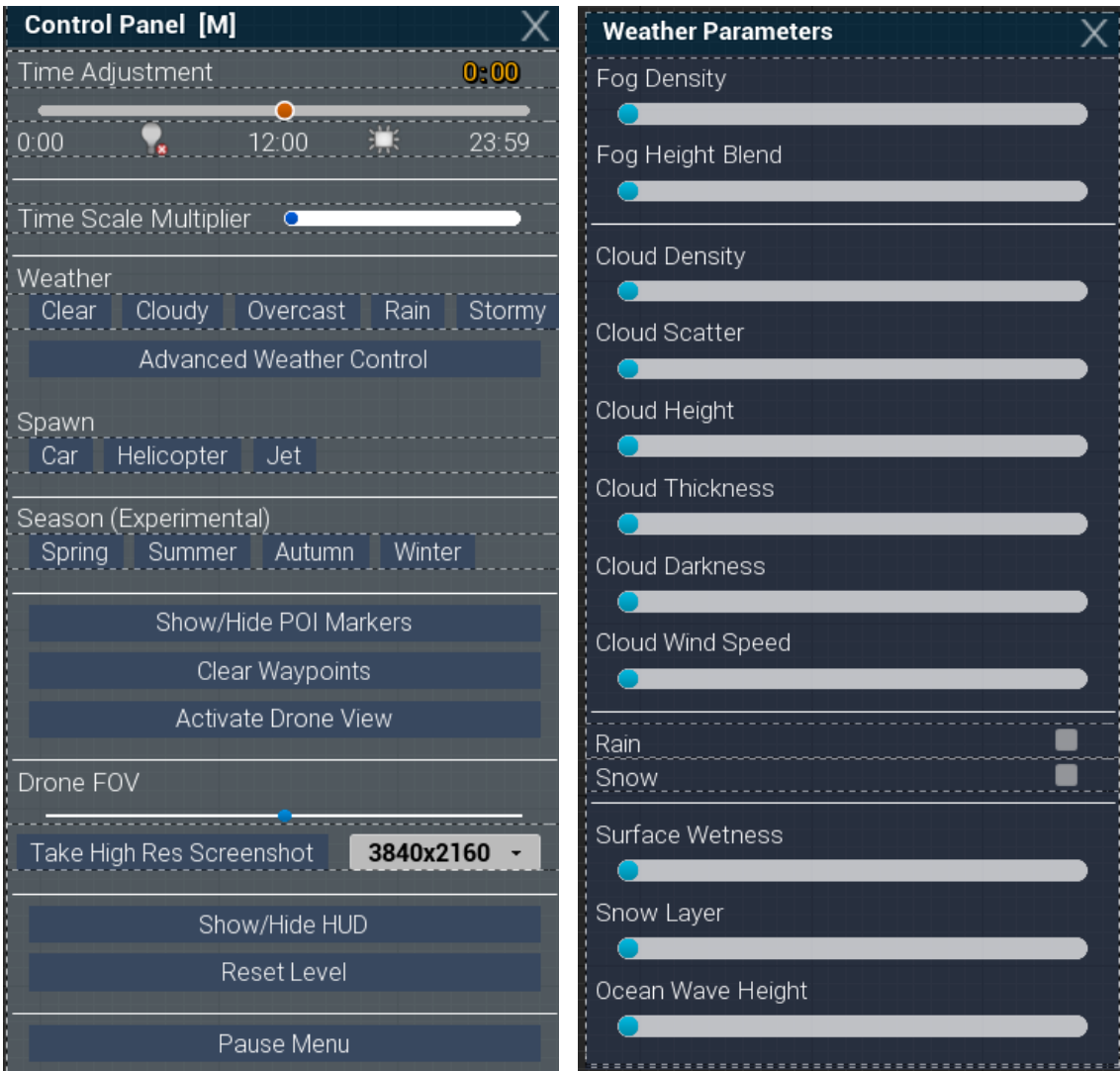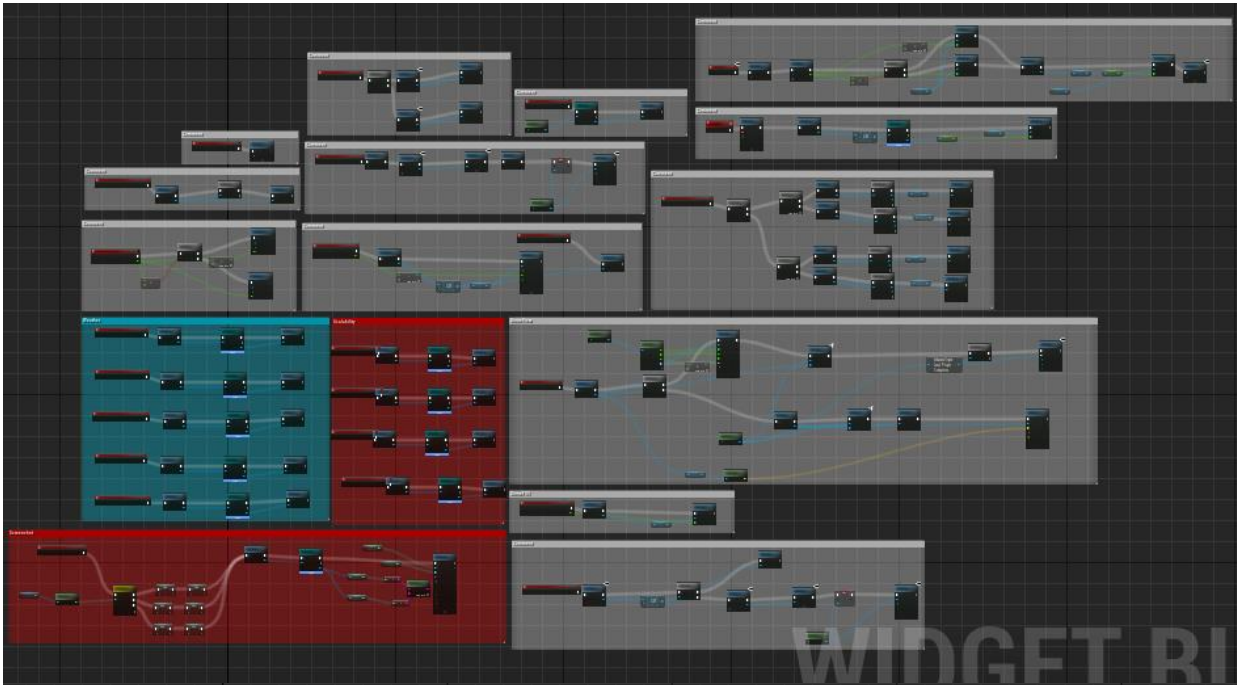
Examples

The rotation of the sunlight is converted to 360 degree format 24 hour time is set accordingly.
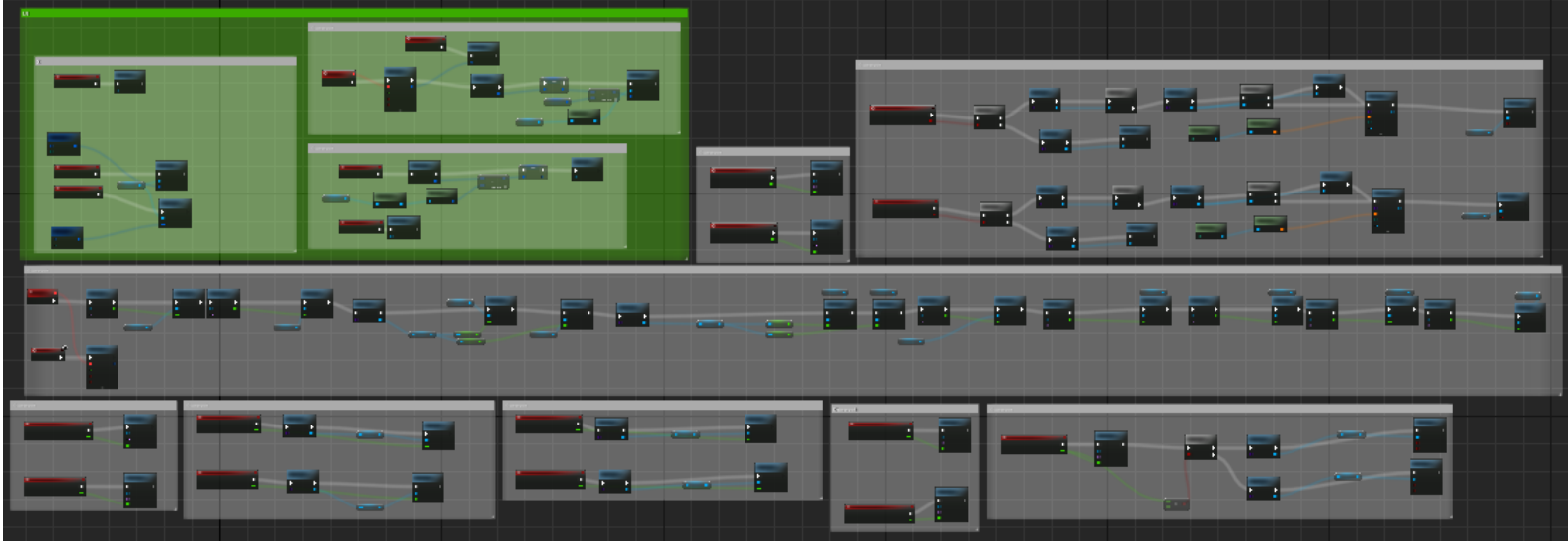
Interactive Control UI inspired by MSFS 2020

Draggable UI

Time controls

Weather parameter controls