



HARMONIA

User Guide

Scene staging toolkit for architectural visualisation

Version 15.0.0 · Unreal Engine 5.7 and 5.8



About this guide

Harmonia is a set of tools for lighting, building, judging and delivering architectural visualisation scenes in Unreal Engine. It comes in two halves, and this guide follows the same split.

- **Part One — Lighting** — the Harmonia Lighting widget and the rig it drives. This is where you set up the sky, the sun and the look of the shot, and where you animate lighting in Sequencer.
- **Part Two — Tools** — everything else, reached from a compass in the corner of the level viewport: the asset library, scatter, floor and mesh tools, framing guides, clay studies, the sun calculator and the capture tools.

The two halves are launched differently and are worth learning in that order. The lighting widget comes from the toolbar's quick-add menu; everything in Part Two comes from the viewport compass. Neither appears anywhere else in Unreal's menus.

How each chapter is arranged

- **What it's for** — one paragraph, in plain terms.
- **Open it** — the exact click path.
- **Walkthrough** — numbered steps for the most common job.
- **Controls** — a table of the settings that matter, with defaults.
- **Watch out** — the traps. These are the things that cost people an afternoon.

Note Distances are in Unreal's world units — centimetres — unless a field says otherwise. A few of the lighting controls are shown in metres or kilometres, and those say so on the field itself. Angles are always in degrees.

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All settings, in one place

1. The lighting rig and the widget

Harmonia's lighting is one Blueprint actor — the rig — driven from one floating panel: the Harmonia Lighting widget. The rig owns the backdrop, the sky, the sun, the fog and the post process. The widget is how you talk to it. Everything in Part One happens in that widget.

Open it Level Editor toolbar ► the quick-add (+) menu ► under HARMONIA, click **Harmonia**. The widget opens as a dockable tab.

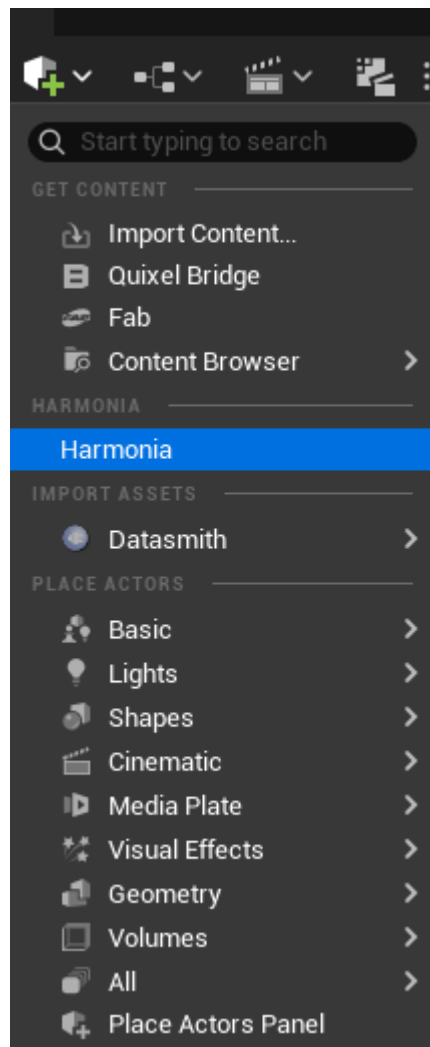


Fig. 2 — The quick-add menu, with Harmonia under its own heading

Adding the lighting system

The first time you open the widget in a level with no rig, almost everything is inert: every row reads “Undefined Object”, and only one control is live — the big **Add Lighting System** button. That is the widget telling you it has nothing to talk to yet, not that something is broken.

1. Open the widget from the quick-add menu.
2. Click Add Lighting System. The rig is spawned into the current level and every control in the widget comes alive, bound to it.

3. Dock the widget somewhere you can keep it — beside the Details panel works well.

Note Once a rig exists, the Add Lighting System button greys out. That is the button telling you the level already has one.

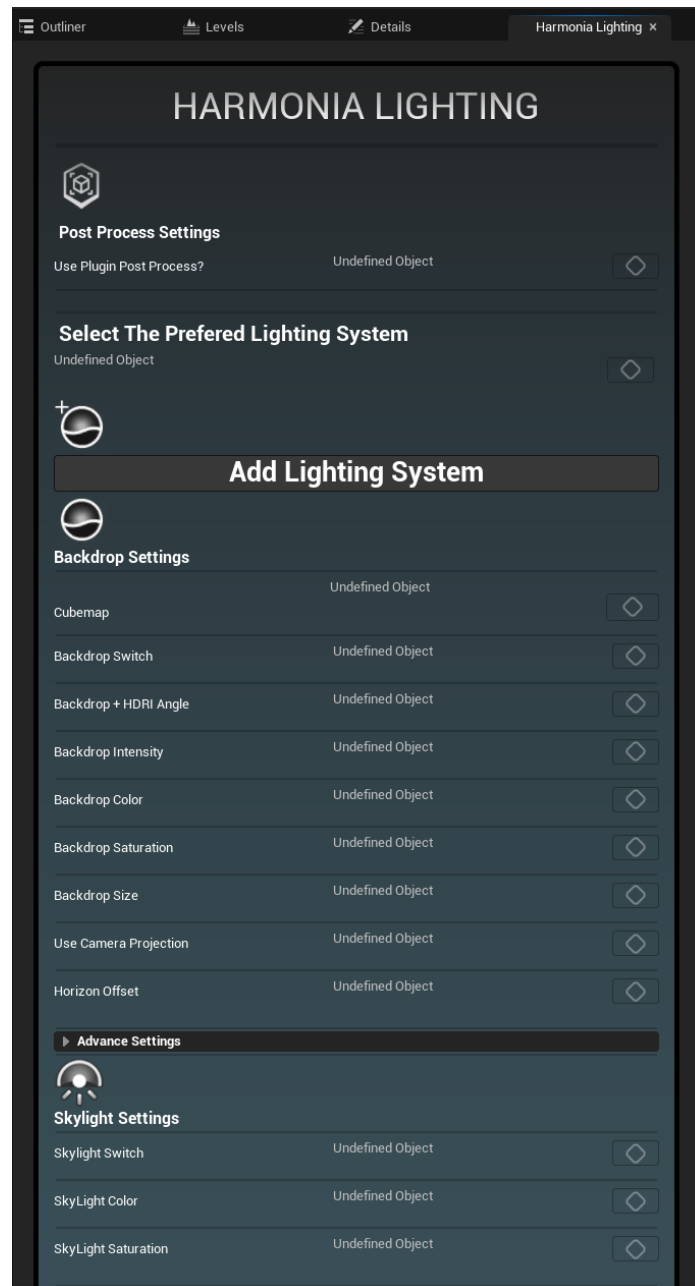


Fig. 3 — The widget before a lighting system exists

One rig, one level

There is exactly one lighting rig per level, and the rule reaches further than you might expect: while the level holding the rig is loaded, you cannot add a rig to any other level either. The button stays greyed out across the whole loaded world.

To put a rig in a different level, unload or delete the level that already holds one. The button becomes available again immediately.

Tip This is deliberate. Two rigs in one world would both be driving the same sky, sun and fog, and the result would be whichever one updated last — a bug that is very hard to see and very easy to create.

Keep the widget open

The values live on the rig actor, so nothing is lost when you close the widget — but the widget is the only comfortable way to reach them. That is why it is dockable: lighting is something you adjust constantly while you work, not once at the start. Dock it and leave it.

2. Post Process Settings

Harmonia ships its own post process, which the rig applies to the whole level. It covers the path-tracer quality settings, exposure, and the grade — white balance, saturation, contrast, tint and vignette. It sits at the top of the widget because it applies to both lighting systems equally.

Use Plugin Post Process?

This is the master switch, and it is the first decision to make.

Watch out If your scene already has its own Post Process Volume, switch this OFF. Leaving both active puts two post processes on the same scene and they will fight. Turn Harmonia's off and carry on using yours.

With the switch on, expand **Expand To View The Settings** to reach everything below.

Path tracer quality

Control	What it does	Default
Max Number Of Bounces	How many times light is allowed to bounce before the path tracer stops following it. Higher means more accurate indirect light and a slower render.	10
Sample Per Pixel Count	How many samples the path tracer accumulates per pixel. This is the grain-versus-time dial.	50
Max Path Intensity	Clamps how bright any single light path may be. Lowering it kills fireflies — those isolated white speckles — at the cost of a little energy in very bright highlights.	10.0

Note These govern the viewport and Sequencer renders. They are **not** connected to the Screenshot tool in Part Two, which is a separate tool with its own sample count that takes over for the duration of a capture. Setting one does not affect the other.

Exposure and grade

Control	What it does	Default
Exposure Compensation	Overall brightness of the image, in stops.	4.0
Bloom Mode Selection	Which bloom algorithm to use. Convolution is the physically based one and the more expensive.	Convolution
Bloom Amount	How much bloom. Zero switches it off.	0.0
Bloom Threshold	Brightness a pixel must exceed before it blooms. A negative value means everything contributes.	-1.0
White Balance	The colour temperature the image is balanced to, in kelvin.	6500.0

Control	What it does	Default
Temperature	6500 K is neutral daylight.	
Global Saturation	Saturation across the whole image.	1.0
Per Channel Saturation	A group holding Red, Green and Blue Channel Saturation, for correcting a colour cast rather than the overall intensity.	1.0 each
Highlight Contrast	Contrast applied to the bright end of the range.	1.0
Shadow Contrast	Contrast applied to the dark end.	1.0
Tint Amount	Strength of the colour tint.	0.0
Vignette Intensity	Darkening toward the frame corners.	0.0

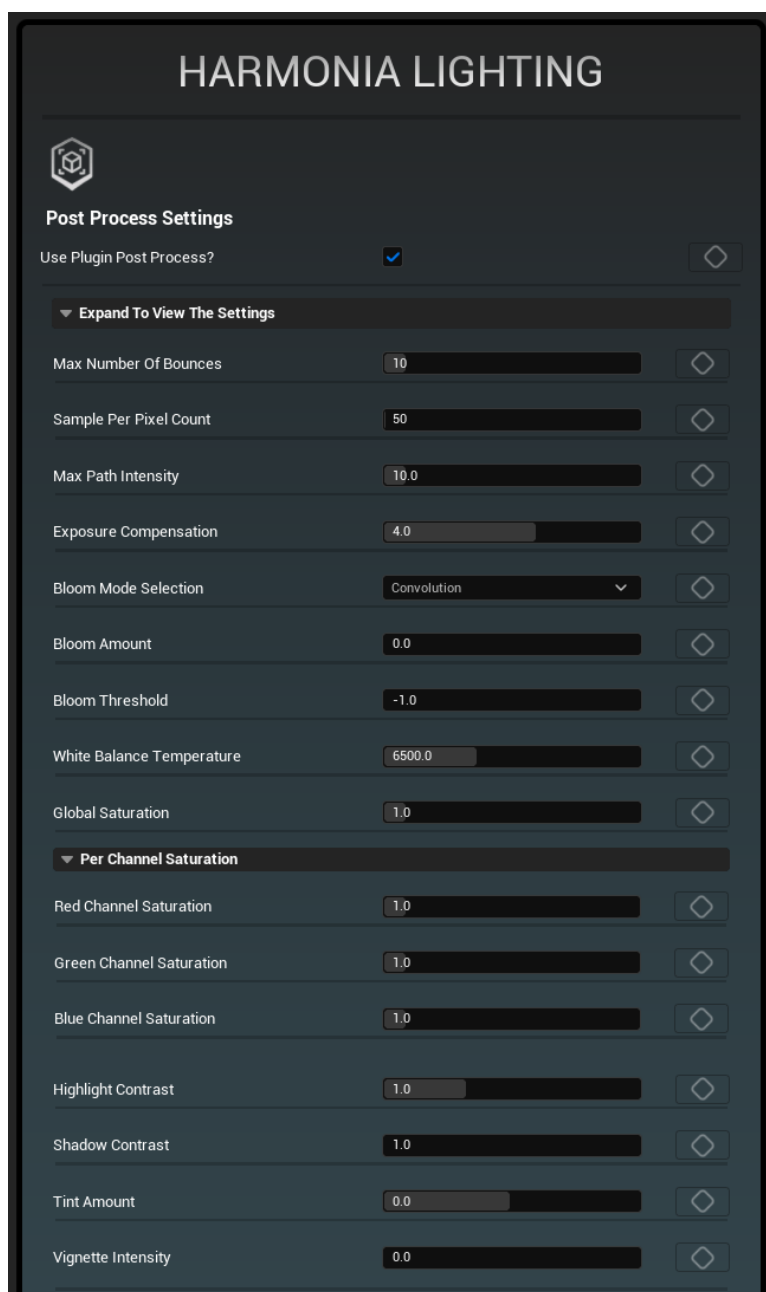


Fig. 4 — Post Process Settings, expanded

3. Choosing your lighting system

Under **Select The Preferred Lighting System** you pick one of two ways to light the scene. The choice changes which sections of the widget appear below it.

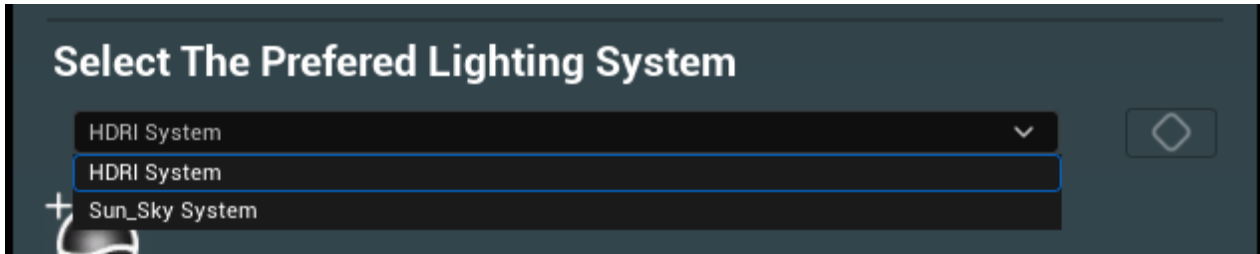


Fig. 5 — The lighting system selector

System	What it gives you	Reach for it when
HDRI System	A photographic sky: a real HDRI image wrapped on a backdrop, lighting the scene and appearing in reflections.	You have an HDRI that matches the look you are after.
Sun_Sky System	A simulated sky: Unreal's atmosphere model with volumetric clouds, all driven procedurally.	No HDRI gives you what you want — a specific cloud condition, a sky you need to art-direct, or a time of day you cannot source.

It is an artistic choice rather than a technical one. Neither is more correct.

What each system shows you

Section	HDRI System	Sun_Sky System
Post Process	shared	shared
Backdrop	yes	—
Skylight	yes	—
Directional Light	yes — own values	yes — own values
Exponential Height Fog	shared	shared
Sky Atmosphere	—	yes
Volumetric Clouds	—	yes

Switching is safe

Both systems keep their own settings. Switch from HDRI to Sun_Sky and back and everything you had is still there — including two independent sets of directional light values, so the sun you tuned for the HDRI is not overwritten by the sun you tuned for the atmosphere.

Tip The system selector is itself keyable. You can key both sets of values into one Level Sequence and flip the lighting system partway through — two complete lighting setups in a single sequence. See chapter 10.

4. The Backdrop

HDRI System only. The backdrop is a large mesh with your HDRI applied to it, surrounding the scene. What makes it useful is what it does **not** do: the backdrop itself contributes nothing to the lighting.

Note A second mesh — the sky mesh — sits outside the backdrop, invisible to you, and that is what actually lights the scene through the skylight. Because the two are separate, you can move, resize, brighten or desaturate the backdrop purely to make the picture look right, and the lighting will not shift underneath you. That separation is the heart of the HDRI system.

Main controls

Control	What it does	Default
Cubemap	The HDRI texture. Pick it from the asset dropdown.	qwantani_8k
Backdrop Switch	Shows or hides the backdrop mesh.	on
Backdrop + HDRI Angle	Rotates the HDRI. This turns both the visible backdrop and the sky mesh that lights the scene, so the light and the picture stay in agreement.	0.0°
Backdrop Intensity	How bright the backdrop reads. Picture only — no effect on lighting.	5.0
Backdrop Color	Tints the backdrop.	white
Backdrop Saturation	Saturation of the backdrop.	1.0
Backdrop Size	Scales the backdrop mesh and the sky mesh together. 15000 m has been large enough for every project this was built for; adjust it if your scene is unusually large.	15000.0 m
Use Camera Projection	On, the HDRI stays centred on the camera. Off, you are free to move the HDRI up and down independently — which some views need.	off
Horizon Offset	Moves the backdrop mesh and the sky mesh up or down together, to place the horizon line where the shot wants it.	0.0 m

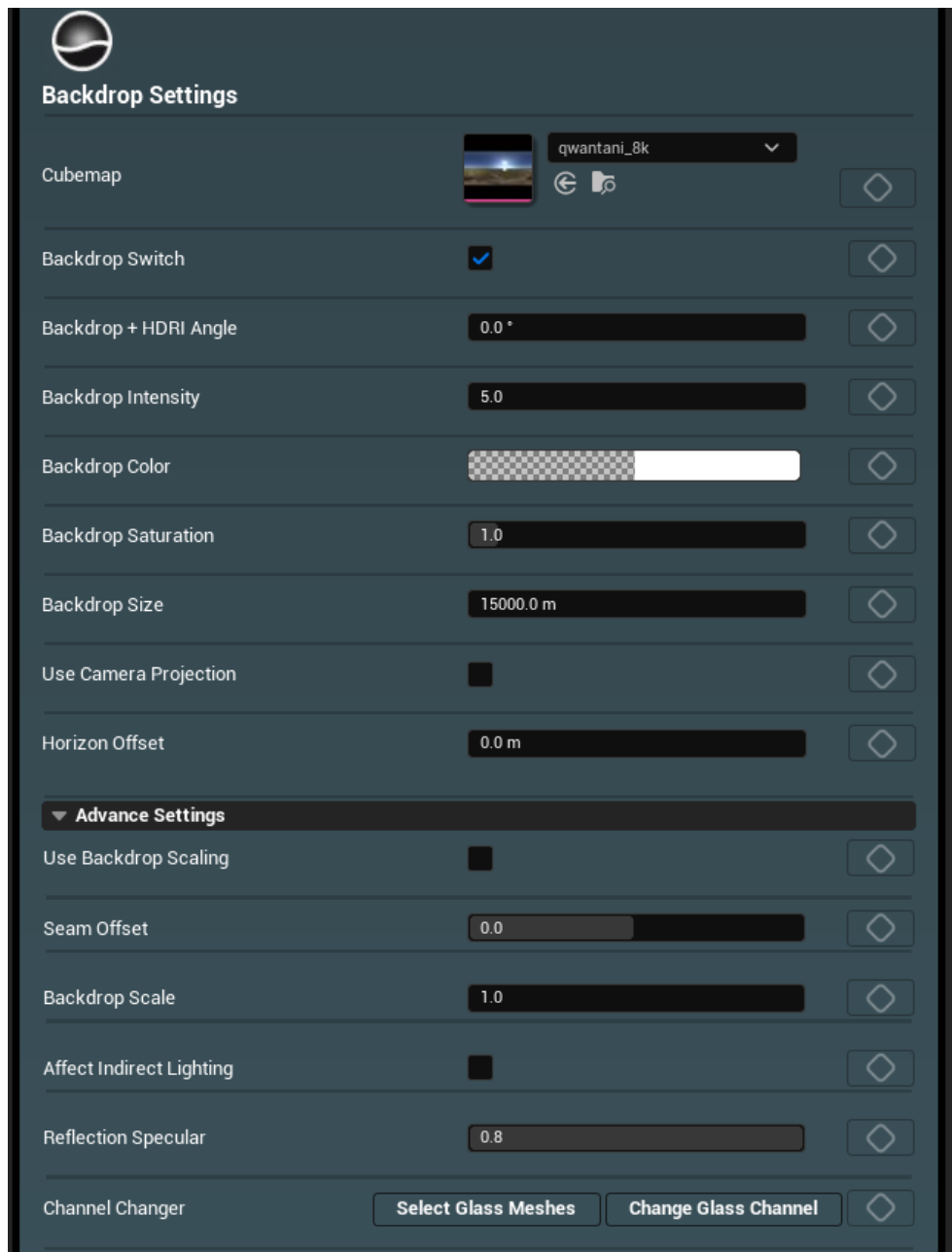


Fig. 6 — Backdrop Settings

Advance Settings

Control	What it does	Default
Use Backdrop Scaling	Enables the manual scale below.	off
Seam Offset	Rotates where the HDRI's seam falls, so you can hide the join behind something.	0.0
Backdrop Scale	Manual scale multiplier, once scaling is enabled.	1.0
Affect Indirect Lighting	Lets the backdrop contribute to indirect light. Off by default — that is the separation described above.	off
Reflection Specular	How strongly the backdrop shows up in specular reflections.	0.8

Channel Changer — fixing glass reflections

Glass is the one surface where the backdrop-versus-skylight split becomes visible in the wrong way. By default glass reflects the skylight, which is usually far brighter than the backdrop and does not match what you can see through the window. The result is glass that reads as a bright blank panel instead of reflecting the sky you put behind it.

The Channel Changer moves glass onto its own lighting channel so it reflects the **backdrop** instead.

Note The tool finds glass by material name: it selects meshes whose material descends from a master called MM_Glass. That master belongs to your own project's material set — Harmonia does not ship it. If your glass uses a differently named master, Select Glass Meshes will find nothing; select the glass by hand instead and use Change Glass Channel on that selection.

1. Click Select Glass Meshes. Everything in the level whose material descends from the MM_Glass parent is selected for you.
2. Click Change Glass Channel. The selected meshes move to the glass lighting channel.
3. Look at the glass: the reflection should now match the backdrop you can see through it.

Tip The symptom to watch for is glass that looks blown out or flat, with a reflection brighter than the sky visible behind it. The glass channel state can also be keyed into a sequence.



Before — glass reflecting the skylight



After — glass reflecting the backdrop

Fig. 7 — Glass reflections before and after the channel change

5. The Skylight

The skylight is the ambient light coming from the sky — the soft, directionless illumination that fills shadows. In the HDRI system it is driven by the sky mesh, and it is the main reason an HDRI-lit interior looks the way it does.

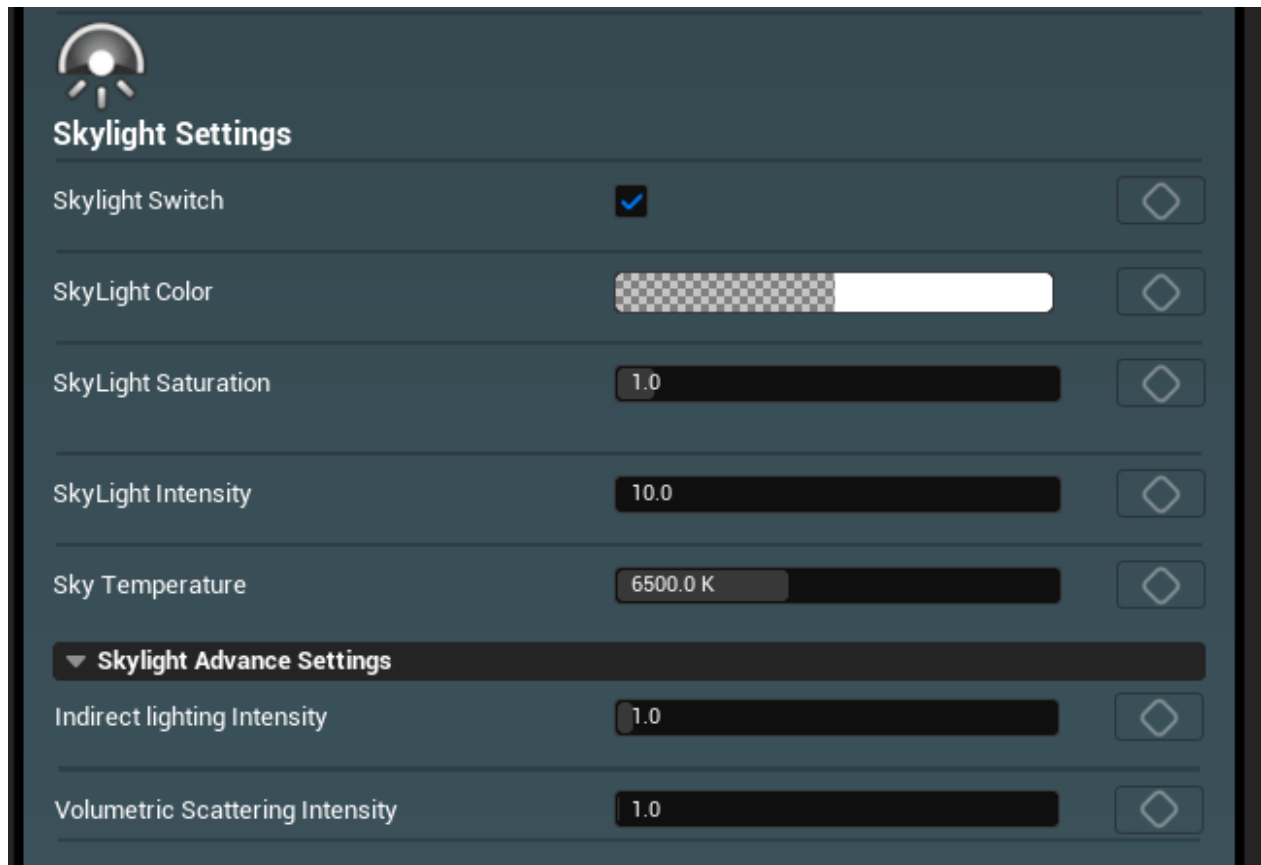


Fig. 8 — Skylight Settings

Note This section belongs to the HDRI system. The Sun_Sky system has no skylight controls at present — its ambient light comes from the Sky Atmosphere instead.

Control	What it does	Default
Skylight Switch	Turns the skylight on or off.	on
SkyLight Color	Tints the ambient light.	white
SkyLight Saturation	How saturated the sky's own colour is when it lights the scene. Below 1 pulls colour out of the ambient light.	1.0
SkyLight Intensity	How strong the ambient fill is. This is the main dial for how open or how moody the shadows read.	10.0
Sky Temperature	Colour temperature of the skylight, in kelvin.	6500.0 K

Skylight Advance Settings

Control	What it does	Default
Indirect lighting Intensity	Scales the skylight's contribution to bounced light only.	1.0
Volumetric Scattering Intensity	How much the skylight contributes to fog and atmospheric scattering.	1.0

6. The Directional Light

The directional light is the sun: the single light that casts the scene's sharp shadows. It is available in both systems, and each system remembers its own values, so the sun you set up for an HDRI and the sun you set up for the atmosphere never overwrite each other.

Tick **Enable Directional Light** and the section heading changes to “Directional Light On”.

Automatic HDRI sun masking

In the HDRI system, enabling the directional light does something extra and automatic. Most HDRIs already have the sun burned into the image, so adding a directional light on top would give you two suns and two sets of shadows.

Harmonia scans the HDRI, finds the sun in it, and masks it out — a soft feathered removal, not a hard hole. You get one sun: the directional light. And because the HDRI's own sun is gone, you can rotate the directional light **independently of the HDRI**, putting the shadows exactly where the shot needs them while keeping the sky you chose.

Tip That independence is the reason to enable the directional light at all. If you are happy with the light the HDRI gives you as-is, you do not need it.

Controls

Control	What it does	Default
Directional Light Intensity	Sun brightness in lux.	20.0 lux
Directional Light Temperature	Colour temperature of the sun, in kelvin. Lower is warmer.	5500.0 K
Directional Light Source Angle	Angular size of the sun disc. Larger values soften the shadow edges — the single most useful control for making shadows feel right.	1.0
Directional Light Pitch (Y axis)	The sun's height. 180 places it flat on the horizon; add the elevation angle to raise it.	210.0°
Directional Light Yaw (Z Axis)	The sun's compass direction, measured from project north.	0.0°
Directional Specular Scale	How strongly the sun shows in specular highlights.	1.0
Directional Indirect Intensity	The sun's contribution to bounced light.	1.0
Volumetric Scattering Intensity	Sun_Sky only — the sun's contribution to fog and god rays.	1.0

Note Pitch and Yaw use the convention “180 + elevation”, which is exactly what the Sun Calculator in Part Two

produces. The default pitch of 210° is therefore a sun 30° above the horizon. You can copy the calculator's numbers straight into these two fields, or switch on its auto-update and let it drive them live while you scrub the time of day.

The defaults above are the HDRI system's. Sun_Sky keeps a completely separate set of the same controls, so tuning the sun in one system never disturbs the other — and Sun_Sky adds Volumetric Scattering Intensity, which HDRI does not have.

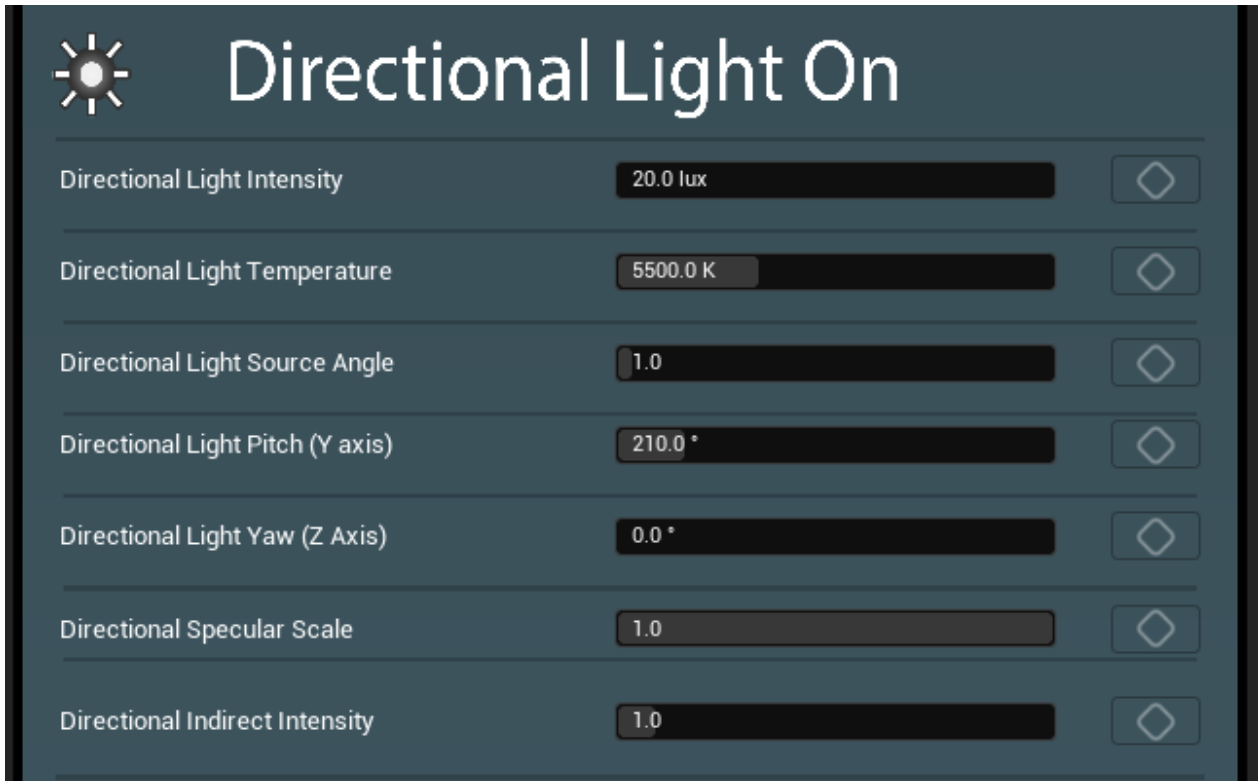


Fig. 9 — Directional Light On

7. Exponential Height Fog

Atmospheric haze, shared by both lighting systems. It thins out with altitude, which is what makes it read as distance rather than as a grey wash. Tick **Enable Exponential Height Fog** and the heading changes to “Exponential Height Fog On”.

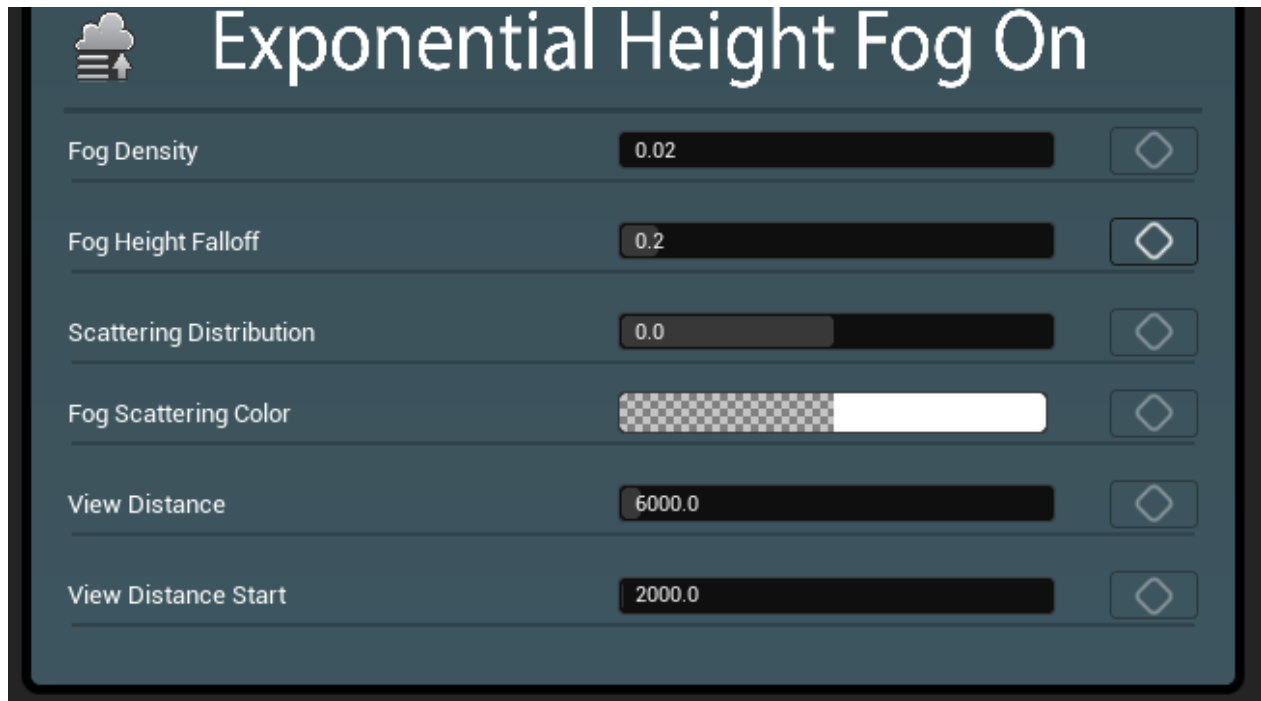


Fig. 10 — Exponential Height Fog On

Control	What it does	Default
Fog Density	Overall thickness. Small numbers go a long way.	0.02
Fog Height Falloff	How quickly the fog thins as it rises. Lower values keep it uniform with height; higher values hug the ground.	0.2
Scattering Distribution	How directionally the fog scatters light. Near zero gives you visible side-lit shafts; high values do not.	0.0
Fog Scattering Color	Tints the fog.	white
View Distance	How far out the fog extends. It must clear the far edge of your scene or the distance will simply have no fog.	6000.0
View Distance Start	How far from the camera the fog begins. See the warning below — this one does not survive into a path-traced render.	2000.0

Watch out View Distance Start has no effect in the Path Tracer. Unreal does not support a fog start distance in path tracing, so the value is simply ignored there — the fog begins at the camera regardless of what you set. It still behaves as expected in the raster viewport, which is exactly what makes it easy to miss: you dial it in while working, then the path-traced render comes back with fog closer than you intended. If you need the distance held back in a path-traced shot, you have to get there another way.

Tip For visible light shafts through a window, keep Scattering Distribution low. Turning it up is the intuitive move and it is the wrong one — it kills the effect.

8. Sky Atmosphere

Sun_Sky System only. This is the physical model that produces the sky colour — why the sky is blue overhead and orange at the horizon at sunset. The two families of controls correspond to the two kinds of particle light scatters off.

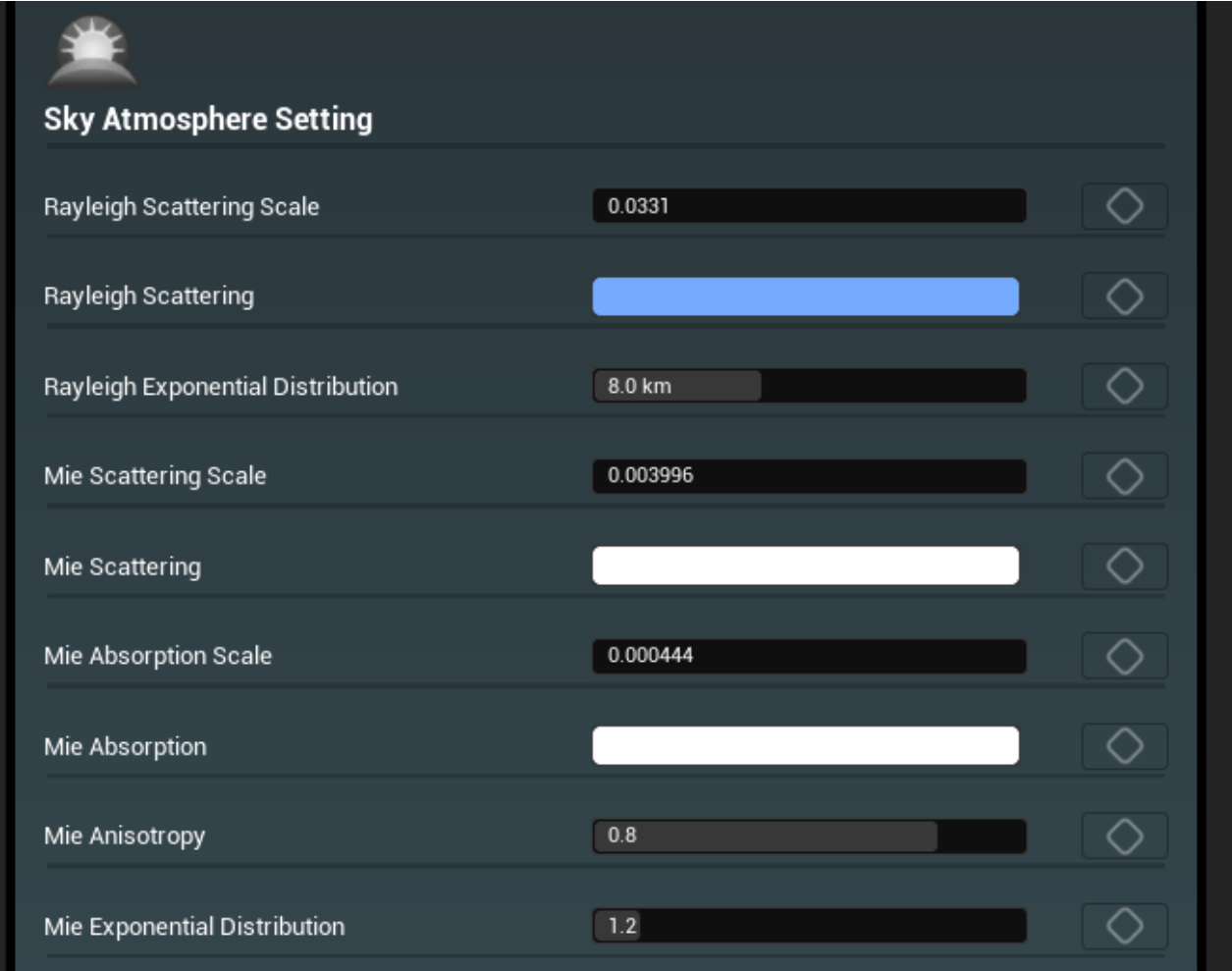


Fig. 11 — Sky Atmosphere Setting

- **Rayleigh** — scattering off air molecules. This is what makes the sky blue and sunsets red. Adjust it to change the fundamental colour of the sky.
- **Mie** — scattering off larger particles — dust, haze, pollution. This is what produces the white glow around the sun and the milkiness of a hazy day.

Control	What it does	Default
Rayleigh Scattering Scale	Strength of molecular scattering — how blue the sky is.	0.0331
Rayleigh Scattering	The colour of that scattering.	blue
Rayleigh Exponential Distribution	The altitude over which molecular scattering thins out.	8.0 km
Mie Scattering Scale	Strength of haze scattering.	0.003996

Control	What it does	Default
Mie Scattering	The colour of the haze.	white
Mie Absorption Scale	How much light the haze absorbs rather than scatters. This is what makes air read as dirty rather than merely thick.	0.000444
Mie Absorption	The colour of that absorption.	white
Mie Anisotropy	How strongly haze scatters light forward. High values concentrate the glow tightly around the sun.	0.8
Mie Exponential Distribution	The altitude over which haze thins out. Lower than the Rayleigh figure, because dust sits nearer the ground.	1.2

9. Volumetric Clouds

Sun_Sky System only. Real volumetric clouds sitting in a layer above the scene, lit by the sun and casting light and shadow down onto it.

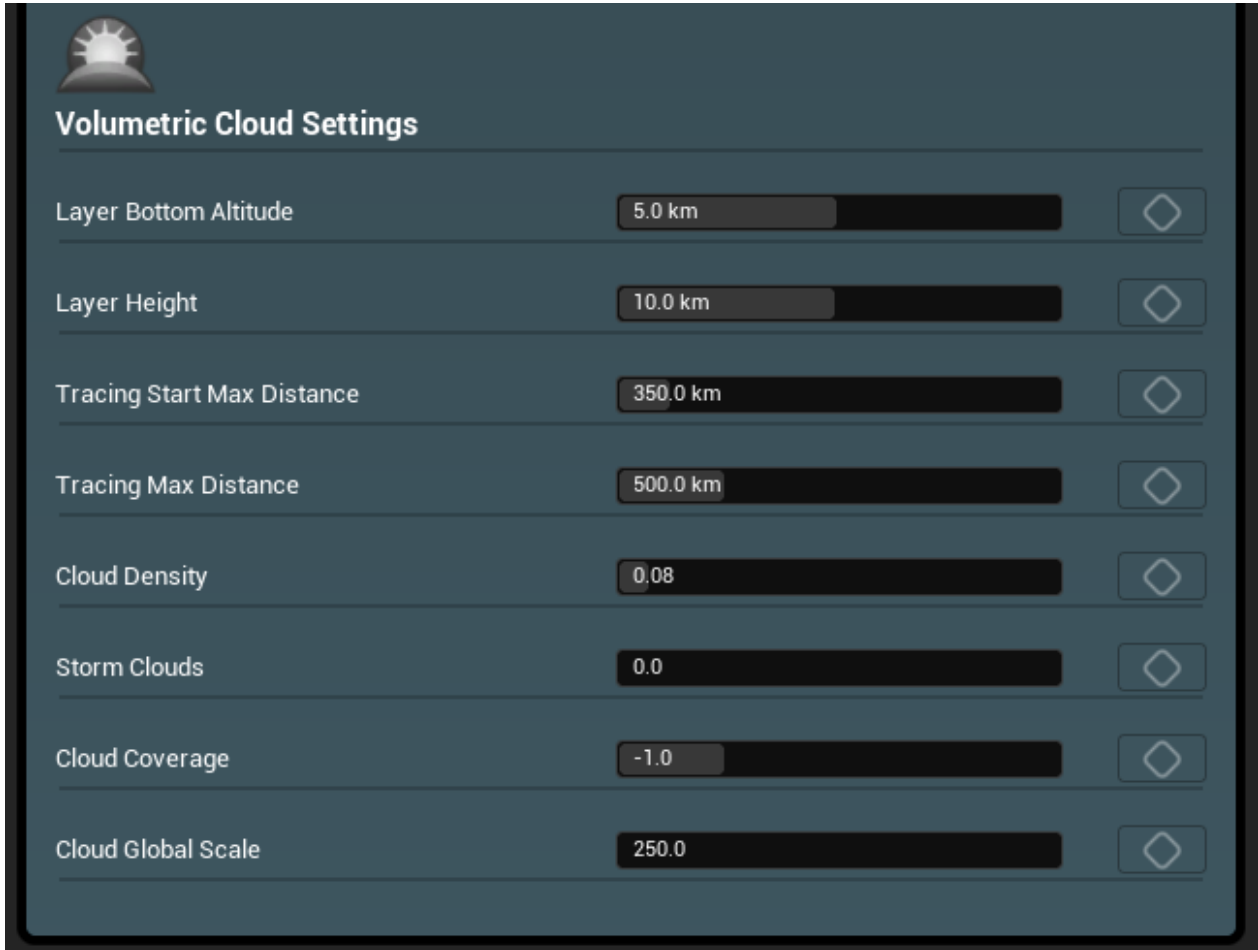


Fig. 12 — Volumetric Cloud Settings

Control	What it does	Default
Layer Bottom Altitude	Height at which the cloud layer starts.	5.0 km
Layer Height	Thickness of the layer. Together with the altitude this sets whether you get low flat cloud or towering weather.	10.0 km
Tracing Start Max Distance	How far away the renderer begins tracing clouds.	350.0 km
Tracing Max Distance	How far out clouds are traced at all. Beyond this there are none.	500.0 km
Cloud Density	How thick and opaque the cloud material is.	0.08
Storm Clouds	Pushes the cloud shape toward heavy, dark, vertically developed storm formations.	0.0
Cloud Coverage	How much of the sky is covered. Lower values give clear	-1.0

Control	What it does	Default
	sky with scattered cloud.	
Cloud Global Scale	Overall size of the cloud formations. Larger values give broader, slower-reading shapes.	250.0

Note Clouds are expensive. If the viewport slows sharply after switching to Sun_Sky, the cloud layer is the first thing to test by switching it down.

10. Animating lighting in Sequencer

Every row in the widget has a diamond button on its right. That button is how lighting gets animated — and how Harmonia keeps you from wrecking your editor lighting by accident.

The four states

State	Meaning	What to do
Disabled	You are not in a Level Sequence. Nothing can be keyed.	Open a sequence if you want to animate.
White	You changed a value inside a sequence, so a track was created automatically and given your new value.	Press it to turn that value into a keyframe.
Orange	The value is keyed.	Nothing — this is the finished state.
Red	A track already existed and you have changed the value away from it. The track is dirty.	Press it to commit the new value as a key.

Note The automatic track creation is the important part. Inside a sequence, changing a value never touches the level's own lighting — it goes onto a track instead. That is what stops sequence work from silently altering the lighting everyone else opens the level with.

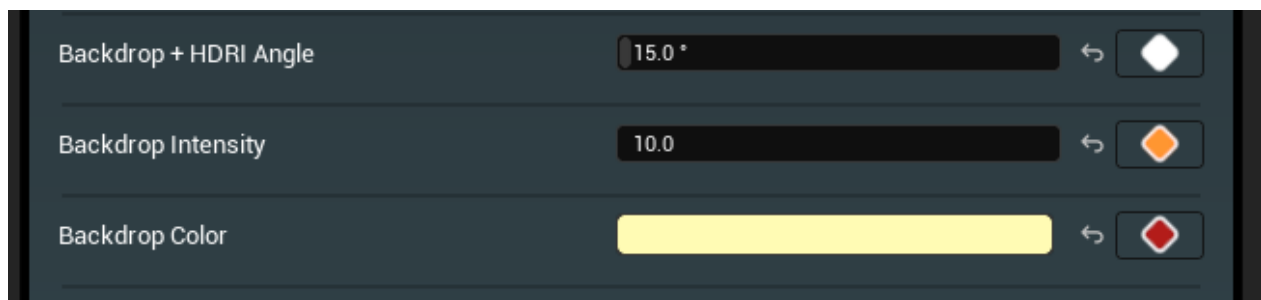


Fig. 13 — The diamond button: white, orange and red

What can be keyed

Effectively everything. The widget has typed keying paths for numbers, switches, colours, rotations, dropdowns and whole-integer values, plus three that are less obvious:

- **The cubemap itself** — so you can change HDRI partway through a sequence.
- **The lighting system selector** — so you can key both an HDRI setup and a Sun_Sky setup into one sequence and flip between them. Because each system keeps its own values, both survive.
- **The glass lighting channel** — so a glass reflection change can be part of the animation.

Watch out

- **Outside a sequence, the diamonds do nothing** — and values you change go straight onto the rig, where they are saved with the level and affect everyone. That is the correct way to set the level's own lighting — just know which mode you are in.
- **A white diamond is not yet a keyframe** — it means a track exists holding that value. Until you press it, there is no key at the playhead.
- **Red means unsaved** — if you scrub away from that point without pressing the diamond, the change is lost and the existing key takes over again.

Harmonia also watches for this in the background — see the Sequencer guard and the lighting-level edit guard in Part Two.

11. The compass and the Harmonia panel

A small compass sits in the top-left corner of every level viewport. It turns as you orbit, so its needle always points at project north, and it shows the camera's bearing in degrees underneath. Click it and the Harmonia panel opens: the project's north setting at the top, and below it the launcher for all twelve tools.

Watch out The compass is the only way into the panel and everything it launches — none of it has a menu or toolbar entry of its own. (Two things in Part Two live outside the panel: the lighting widget's quick-add menu in Part One, and the Movie Render Graph node in chapter 24, which you add inside a graph asset.) Switch the compass off in Project Settings and the panel becomes unreachable until you switch it back on there.



Fig. 14 — The compass widget, close up

Opening, closing and getting it out of the way

- **Open** — left-click the compass disc.
- **Close** — click the compass again, or click anywhere else in the viewport.
- **Minimise** — hover the compass and click the small bar at its top-left. The compass shrinks to a round orb that still tracks north. Click the orb to bring it back.
- **Turn it off entirely** — Project Settings ▶ Plugins ▶ Harmonia ▶ Compass Overlay.

Each level viewport has its own compass and its own panel — opening the panel in one viewport does not open it in the others.

Tip You never need to hide the panel before capturing an image. Harmonia's own screenshot and sun-study tools hide the compass, the panel, tooltips, guides and any open dialog for the duration of the shot, and put everything back afterwards.

North Offset — do this first on a new project

North Offset tells Harmonia which world direction counts as true north. Every sun angle the Sun Calculator produces is measured from it, so setting it correctly is the first thing to do on a new project. Zero degrees means north points along world +X.

1. Click the compass to open the panel.
2. Either drag the North Offset (°) slider or type a value in the box beside it — then press Set The New North to save it.

3. Or aim the viewport camera along the direction you know is north and press Set North = Current View, which saves immediately.

Watch out The slider and the number box do not save on their own. Change the value, close the panel without pressing Set The New North, and north silently reverts to what it was. Set North = Current View is the one control that commits on click.

Values snap to half a degree. North Offset is written to the project's shared config file, so it travels to the rest of the team.



Fig. 15 — The North Offset row, with Set The New North revealed by a pending change

The twelve tools

Below the north controls is a grid of twelve launchers, three across and four down:

Row	Left	Middle	Right
1	Stats	Texture Cap	Screenshot
2	Presets	Sun Calculator	Tools
3	Library	Scatter	Floor
4	White Override	Guides	Mesh Tools

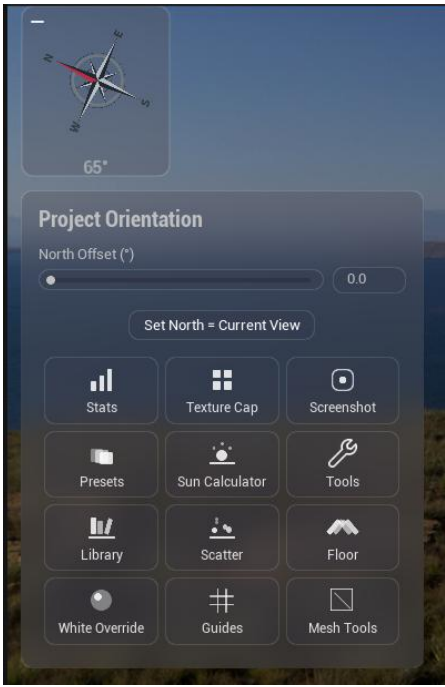
Eight of them open as a tab inside the panel itself. Four — Library, Scatter, Floor and Mesh Tools — open their own separate window instead, because they need far more room than a viewport overlay can give them. Clicking a tool that is already open just brings its window back to the front; you never get two copies.

Why the grid keeps collapsing into a row of icons

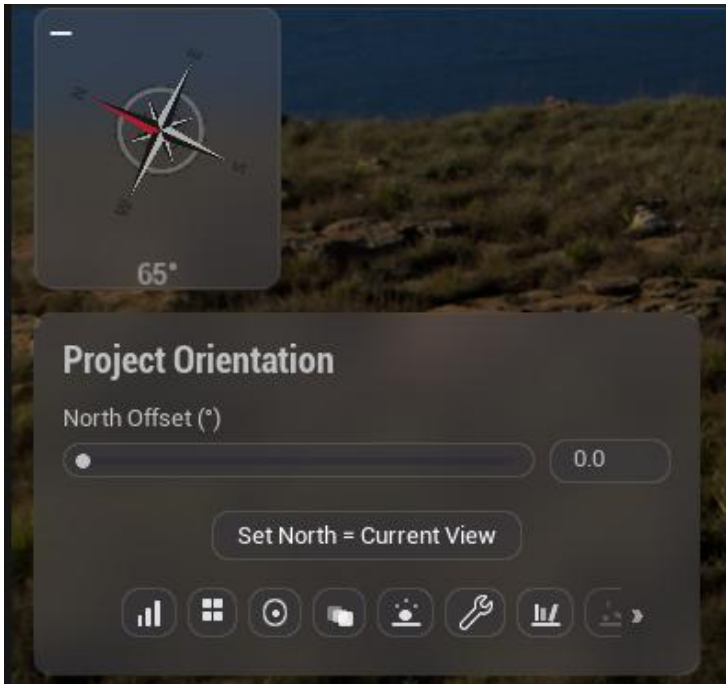
The moment you open any tab, the twelve labelled tiles fold up into a single row of icon-only buttons to make space for the tab's contents. The same fold happens when the viewport is too short for the full grid. This is automatic and is not a setting. Hover any icon to see which tool it is.

If a scrolling row has more content off-screen, a small chevron appears in the gutter on that side. It is deliberately static and never animates, so it is easy to miss — no chevron on a side means you are already at that end.

Note If the viewport gets so short that even the icon row will not fit, the panel closes itself. Nothing is lost — make the viewport taller and reopen it.



Tiles — plenty of vertical room



Folded — a tab is open, or the viewport is short

Fig. 16 — The tile grid, and the same panel folded into the icon row

Making the interface a comfortable size

Harmonia picks a base size from whichever monitor the editor window is on. Project Settings ► Plugins ► Harmonia ► Overlay UI ► Overlay UI Scale is a multiplier on top of that, from 0.75 to 1.25, and it applies live — no restart. On a 1080p monitor the automatic part is already at its smallest, so the range will feel narrower than the numbers suggest.

In the same settings page, Compass Overlay ► Compass Overlay Opacity (default 0.6) controls how strongly the compass reads over your scene.

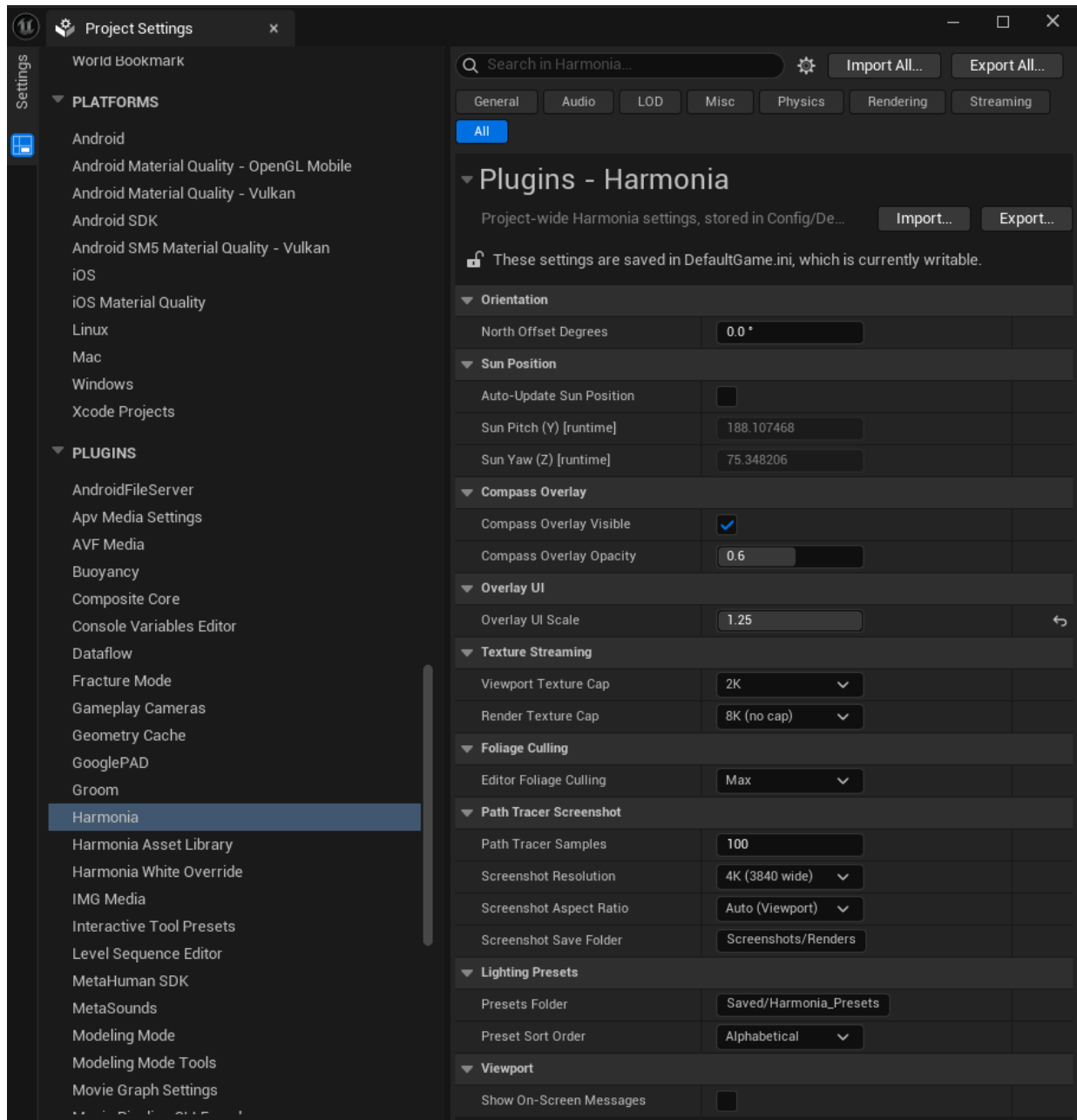


Fig. 17 — The Harmonia settings page

Harmonia's own windows

The four standalone tool windows have no Windows title bar. Drag them by the blank part of their frosted strip, and double-click that strip to maximise or restore. While a window is maximised, dragging the strip does nothing — double-click to restore first. The three buttons at the right are minimise, maximise and close; only close turns red on hover.

12. Asset Library

The Asset Library is a shared shelf of props, materials and HDRIs for the whole studio. One machine publishes chosen assets out of its project into a plain folder on a server; everyone else points their editor at that folder and gets a searchable visual browser they can drag straight into a level. An asset always travels with everything it needs, so dragging one tile in brings its materials and textures with it.

Open it Compass ► Library (row 3, left). Opens its own window.

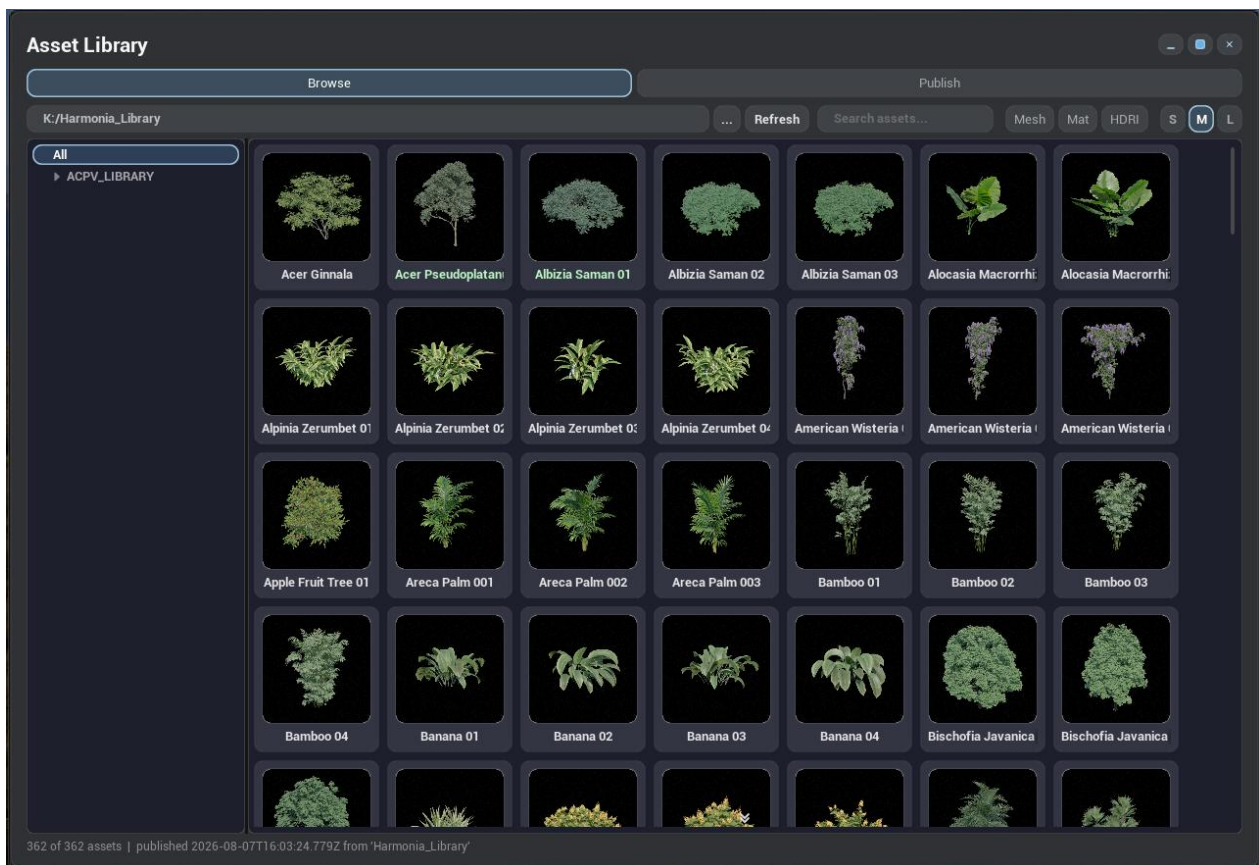


Fig. 18 — The Browse tab

Browse: finding and using an asset

1. On the Browse tab, click the ... button and pick the shared library folder — the one containing the file HarmoniaLibrary.json. The grid fills in and the status line reports how many assets there are, when the library was published and from which project.
2. Narrow it down: click a folder in the left tree (or All for everything), tap the Mesh, Mat or HDRI chip to show one type at a time, and type in the search box — it matches names and tags, and a space you type counts as an underscore.
3. Set the tile size with S, M or L, and drag the divider between tree and grid for more room. Both are remembered.
4. Drag a tile into the level viewport (or into the Content Browser) to bring the asset in. Double-clicking imports it without placing it. Right-click gives you Show Details... and Import into Project.

The folder path is saved automatically, so next time the library loads on its own.

Tip A tile whose caption is green is already in your project. That green caption is the only reliable confirmation an import worked — the status line is overwritten within a few frames as the grid refreshes, so do not wait for a message.

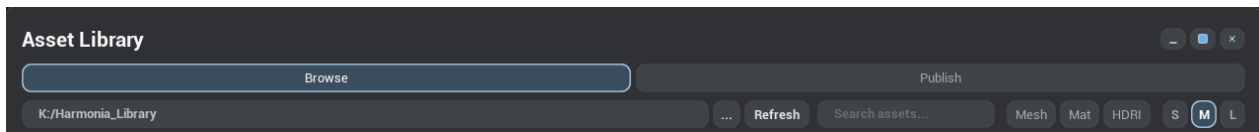


Fig. 19 — The browse toolbar

Asset Details — checking before you import

Right-click a tile and choose Show Details... to open a second window with a large preview, the triangle count and the real-world bounding size, both recorded at publish time. A grey bar representing a 1.75 m person is drawn beside a bar for the asset's own height, so you can judge scale at a glance.

The same window is where tags live. Type a word in the tag box and press Enter to add it; click the ✕ on a chip to remove it. Tags are written straight into the shared library, so everyone pointed at that folder sees them, and they survive re-publishing.

Watch out A tag is only added when you press Enter. Type a word and click away and it is discarded.

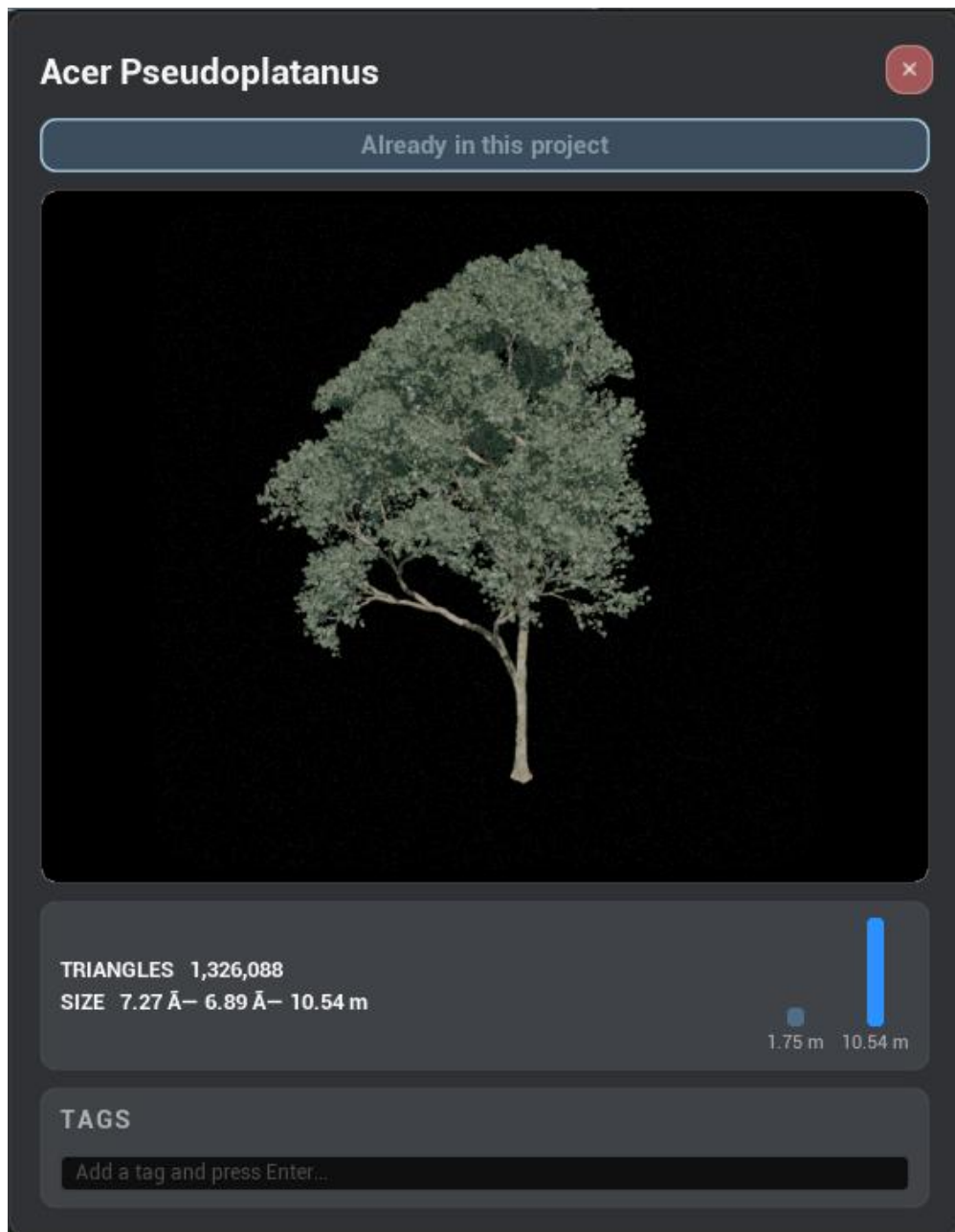


Fig. 20 — The Asset Details window

Publish: putting assets into the library

1. Click the Publish tab. The first click builds the project's folder tree, which takes a moment on a big project.
2. Set the output folder with the ... button.
3. In the folder tree, click the rows you want to publish — clicking a row ticks it and everything inside it. Use the arrow at the left of a row to expand it without changing the tick. Each row carries two count chips: green is how many of that folder's assets are already in the library, amber is how many are not.
4. In ASSETS TO PUBLISH, click any individual asset you want to leave out. The counter above reads x / y selected.
5. Press Process Library. Answer the save prompt for any unsaved content, then wait for the progress dialog.
6. Read the summary on the status line: assets published, files copied, files already up to date, thumbnails rendered, and any problems.

Publishing only ever adds and updates. Assets published earlier that you did not tick this time stay in the library untouched.

Watch out for	What happens
Remove has no confirmation	It deletes whatever is ticked — the same ticks Process Library uses — from the shared library, with no prompt. Untick before you press it.
Publishing edits your source meshes	Before copying, the publisher switches on auto-compute LOD screen size on every static mesh in the batch that lacks it, and asks you to save. Cancel that prompt and the whole publish aborts.
The tree caches its counts	Add or delete assets in the project while the window is open and the tree will lie to you until you press Rescan.
Only three kinds of asset can be published	Static meshes, material instances and HDRI cube textures. Anything else travels only as a hidden dependency of one of those.
Dependencies outside your project are not copied	Exactly like Unreal's own Migrate. An asset leaning on engine or plugin content finds it only if the receiving project has that content too.

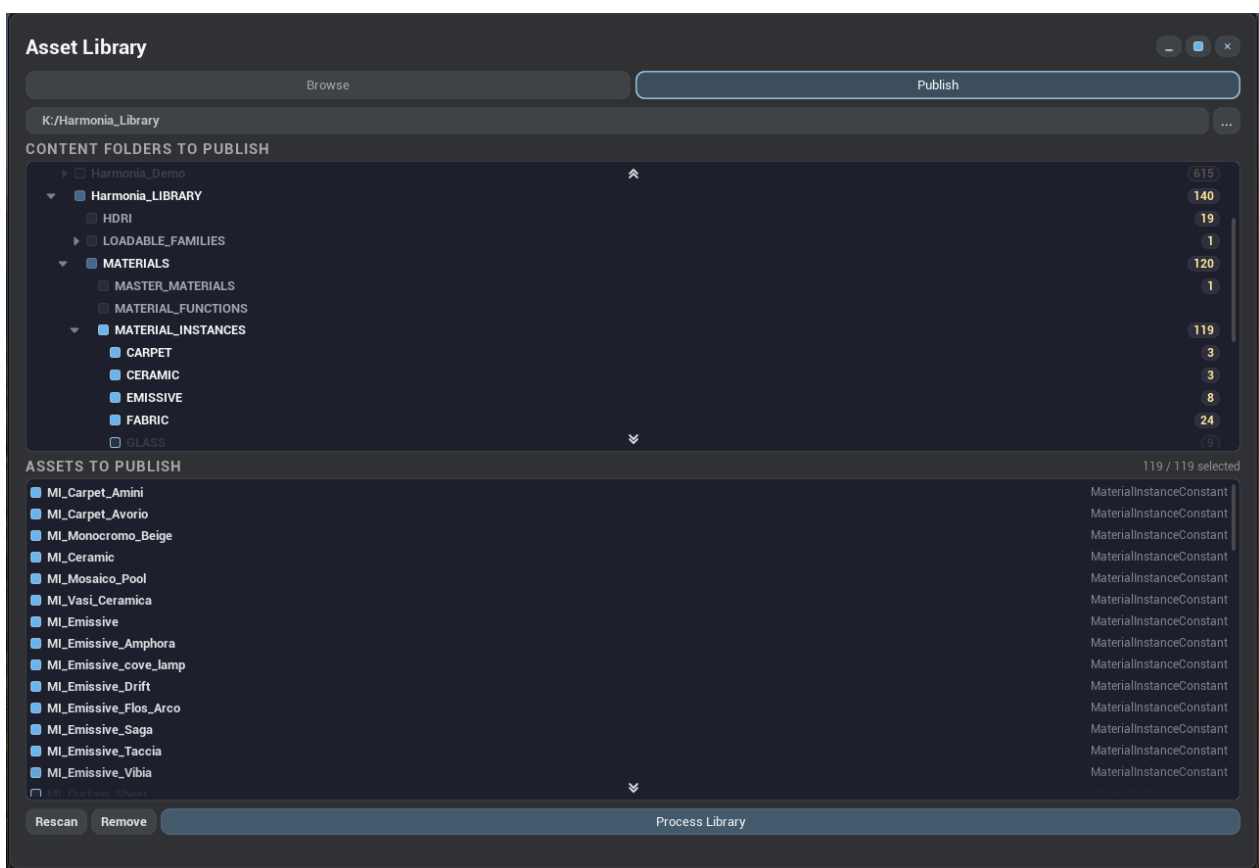


Fig. 21 — The Publish tab

Watch out

- **A drag imports before you drop** — the moment the drag leaves the tile, the asset and its dependencies are copied into your project. Abandoning the drag mid-air still leaves them there.
- **Importing never overwrites** — if a package with the same path already exists locally it is skipped silently, so a stale local copy stays stale. There is no “update from library” action.
- **A silent empty grid means the folder could not be reached** — the automatic load when the window opens reports nothing on failure. Press Refresh, or re-pick the folder with ..., to see the real error.
- **There is no Load button** — despite the first-run message saying so. Use ... to pick a folder, or Refresh after typing a path by hand.

- **The library path is per user, per project** — pointing a whole team at the share means each artist sets it once on their own machine.
- **Previews are cached on your own disk** — which is why tiles still appear when the server is offline. An asset whose preview was never cached shows a plain black tile. Refresh re-checks against the server.
- **Previews are rendered lit, not path-traced** — with a black background and fixed exposure, so a tile will not match how the asset looks in a path-traced viewport.
- **Two thumbnail settings do nothing** — Thumbnail Samples Per Pixel is never read, and Floor Under Meshes never builds its ground plane. Ignore both.
- **Re-publishing is fingerprint-driven** — a preview is re-rendered only when the asset file itself changed. Changing thumbnail resolution or the environment cubemap has no visible effect until the assets change.

13. Scatter

Scatter places large numbers of static meshes without hand-placing each one: along or inside a drawn line, sprinkled over the up-facing surfaces of chosen meshes, or hand-painted with a brush. Each scatter is a single actor that owns its settings and everything it generates, so you can retune spacing, density, seed, rotation and scale and watch it regenerate. Because the copies are drawn as instances of one mesh, tens of thousands of plants stay cheap and do not flood the Outliner.

Open it Compass ▶ Scatter (row 3, middle). Opens its own window.

The three kinds of scatter

Kind	What it does	Made with
Spline	Places meshes along an editable line, or fills the area inside a closed loop.	+ Spline Scatter
Surface	Sprinkles meshes over the up-facing faces of one or more chosen meshes.	+ Mesh Scatter
Brush	No procedural generation at all — everything is hand-painted.	+ Brush Scatter

Note The kind is fixed when the scatter is created and cannot be changed afterwards. Pick deliberately.

Walkthrough: planting over a lawn or terrain

1. Select the mesh you want to plant on, then click + Mesh Scatter — the selected mesh is adopted as the first target surface. (Otherwise press Add under Target Surfaces and click meshes in the viewport, or select them and press + From Selection.)
2. Drag a static mesh from the Content Browser onto the drop a Static Mesh here slot. Press + Add Mesh for a second and third species, then set each row's share field so the mix reads the way you want.
3. Leave Auto Count on and set Density (per m²); the computed total appears beside it. Switch Auto Count off if you would rather type an exact Instances number.
4. Set Max Slope (deg) so nothing plants on banks or walls, and Min Distance (cm) if copies are interpenetrating.
5. Open a mesh row's Transform block and set Scale / Min / Max for size variation and Random Yaw (deg) for spin. Use Offset Z to sink plants slightly into the ground.
6. Press Dice until the arrangement reads well.

Every field regenerates the scatter about a quarter of a second after you stop dragging, so you can scrub values and watch the result. On very heavy scatters switch Preview off while tuning, then press Rebuild.

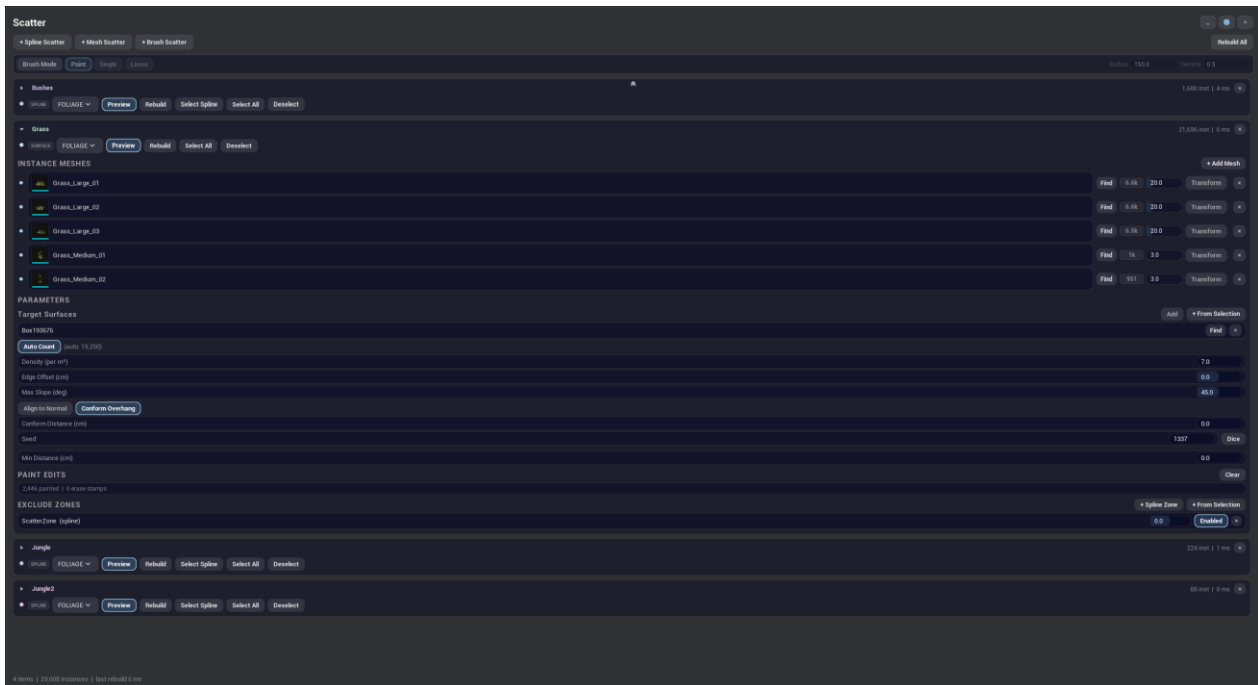


Fig. 22 — The Scatter window with one surface scatter open

Walkthrough: lining a path with a spline scatter

1. Click + Spline Scatter. A short three-point curve appears in front of the camera and the actor is selected.
2. Shape the line in the viewport as you would any spline. Use Linear / Curve under SPLINE POINTS to change corner style on the points you have picked, and Sharpen / Round to tighten or open the curve through them.
3. Drop your mesh into the mesh slot and set Spacing (cm) for the gap between copies.
4. Turn Align to Spline on to make copies face along the path. Add Offset (cm) to push them to one side, and Jitter (cm) or Random Offset L / R (cm) for a natural, uneven verge.
5. Leave Conform to Ground on so copies sit on the real ground rather than at the height of the line.
6. For a double avenue, turn on Mirror Line, set Mirror Distance (cm), then edit the second line freely. Reset Mirror snaps it back to a clean parallel copy.
7. To fill an area instead of a line, turn on Fill Closed Area — the loop closes automatically — then use Edge Offset (cm) to hold the fill back from the boundary.

Tip Add several meshes and turn on Alternate Meshes to cycle them strictly in order along the line — bollard, lamp, bollard, lamp — instead of picking at random.

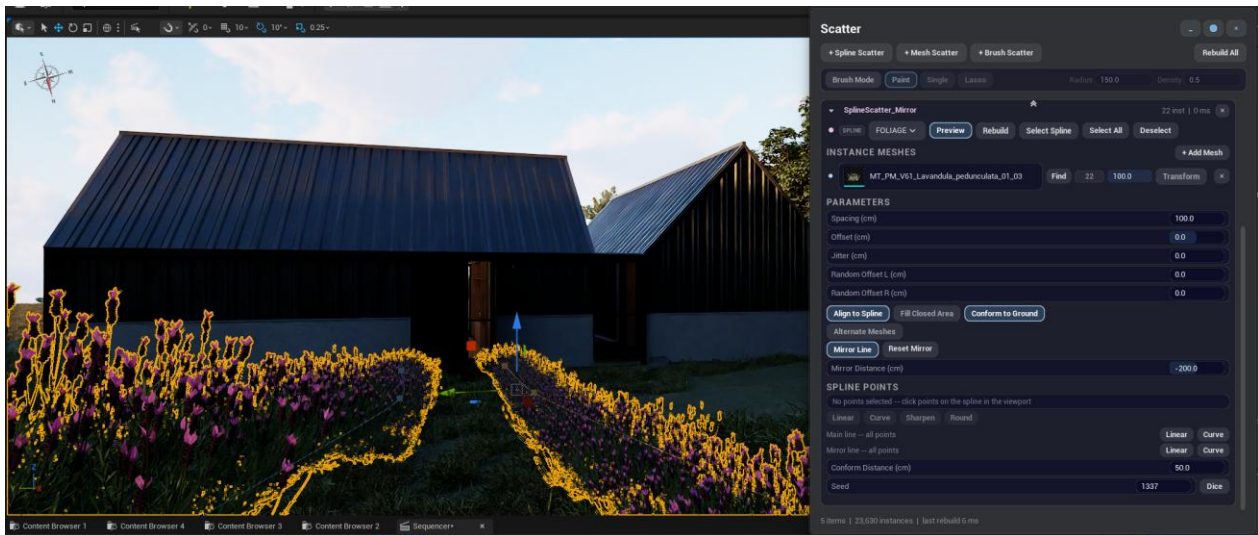


Fig. 23 — A spline scatter with its mirror line

The brush: painting, erasing and hand-fixing

1. Click Brush Mode. The shortcut hint line appears under the strip.
2. Click the card of the scatter you want the brush to affect — its border lights up. With several scatters in the level, painting and adding do nothing until you do this.
3. On each mesh row, use the Brush chip to choose which meshes the brush may place.
4. With Paint active, set Radius and Density, then drag in the viewport to lay copies down. Hold Shift and drag to erase. The disc under the cursor is blue for painting, red for erasing.
5. Switch to Single to click one copy and select it, or Ctrl+click to place exactly one copy. Switch to Lasso and drag a loop to select many at once (Ctrl adds to the selection).
6. With a selection, use the normal move/rotate/scale gizmo. Alt+drag duplicates. Delete removes the selection, Esc deselects.

Brush shortcut	Action
Left-drag	Paint (in Paint mode)
Shift + left-drag	Erase
Left-click	Pick one instance (in Single mode)
Ctrl + left-click	Add one instance where you clicked (Single mode)
Drag a loop	Lasso-select; Ctrl adds to the existing selection
Alt + gizmo drag	Duplicate the selection instead of moving it
Delete / Esc	Delete the selection / deselect

Watch out Erasing does not delete generated copies. It leaves a permanent keep-clear mark that is re-applied on every rebuild. Only Clear in the PAINT EDITS block removes those marks. Hand-painted copies inside the brush are deleted outright.

Note Moving, rotating or scaling a generated copy silently converts it into a hand-placed one and stamps a keep-clear mark where it used to be. It will no longer change when you re-roll the seed.

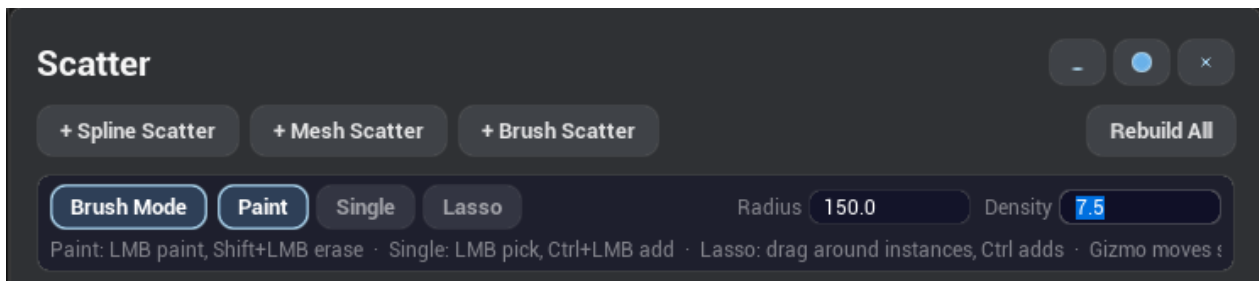


Fig. 24 — Brush controls and the shortcut hint line

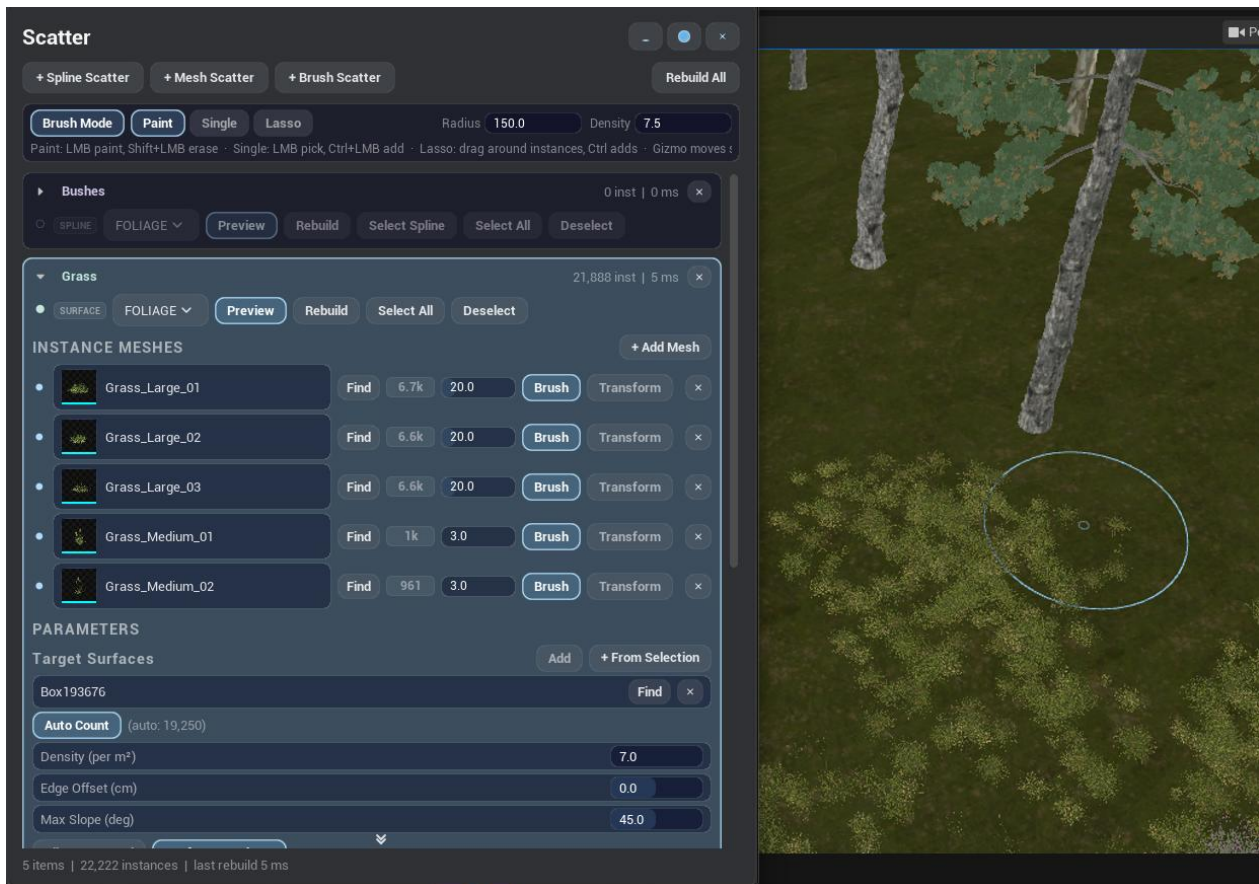


Fig. 25 — Painting in the viewport

Exclusion zones

Zones carve areas back out of a scatter — paths, terraces, building footprints. The EXCLUDE ZONES section appears on surface scatters, and on spline scatters only while Fill Closed Area is on.

1. Press + Spline Zone to drop a red 4 × 4 m loop over the surface, then reshape it around the area you want kept clear. The scatter regenerates as you edit the loop.
2. Or select existing geometry — a building, a terrace slab, a road mesh — and press + From Selection to use its plan-view outline as the exclusion.
3. Fine-tune each zone with its offset field: positive pushes the scatter further away, negative lets it creep into the rim.
4. Use the row's Enabled chip to test with and without a zone, and the X to drop it from the list. The zone actor itself stays in the level.

Watch out Zones exclude by top-down footprint only — height is ignored. A zone at any height cuts a hole all the way through the scatter. A mesh used as a zone falls back to a simple box outline above roughly 40,000

triangles.

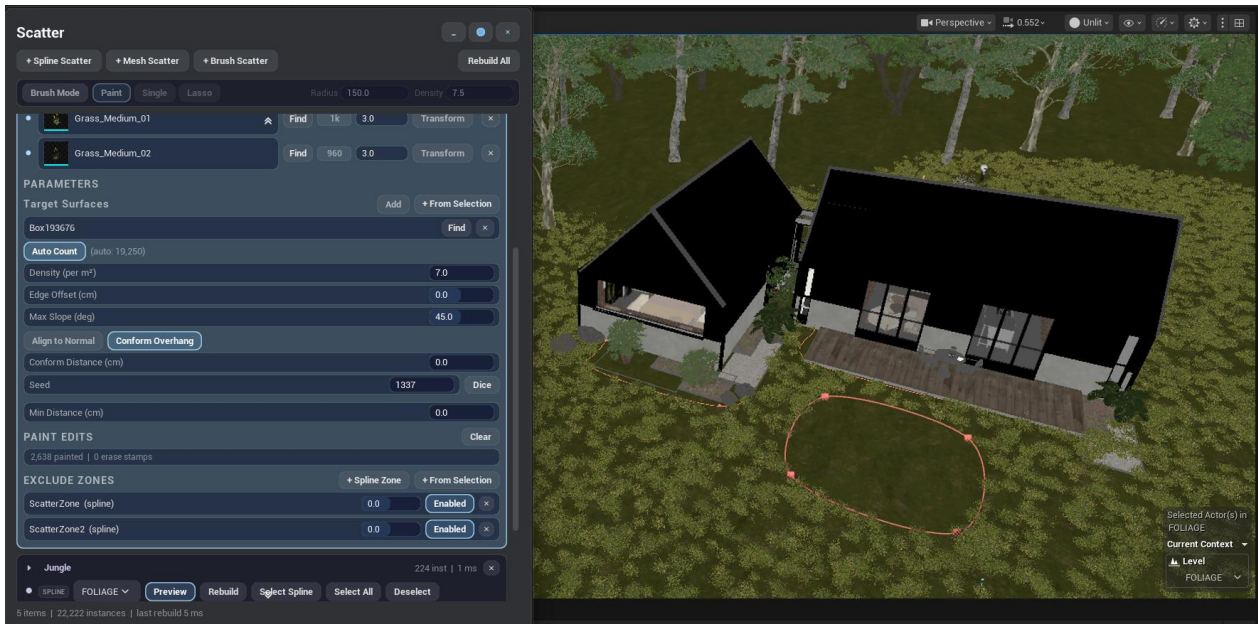


Fig. 26 — An exclusion zone cutting a hole in a scatter

Controls worth knowing

Control	What it does	Default
Seed / Dice	Same settings plus same seed reproduce the same scatter on any machine. Dice rolls a new one and regenerates.	1337
Min Distance (cm)	Closest two copies may sit. Crowded candidates are dropped, not nudged aside, so a large value thins the scatter.	0
Conform to Ground / Conform Overhang	Drops each copy onto the real scene surface rather than the height of the line or plane.	On
Conform Distance (cm)	Furthest a copy may travel to find ground. 0 means an unlimited search — lower it if plants snap up onto canopies or soffits.	0
Max Slope (deg)	Faces steeper than this are excluded, and also define where the edge of the surface is.	45
Align to Normal	Tilts copies to lie against the slope instead of standing upright.	Off
Random Yaw (deg)	Random heading around the aligned direction. 360 is fully random.	360
Preview	Off stops this scatter regenerating. Edits are remembered but not shown — an amber dot marks the owed rebuild.	On
Level dropdown	Moves the actor into another loaded level. The engine destroys and recreates it.	Persistent

Watch out

- **With more than one scatter, pick a card first** — painting and single-add refuse to do anything until you click a card to choose the working scatter. The amber warning in the brush strip is the only sign.
- **Brush Mode switches itself off when you close the window** — a live brush with no visible controls would be a trap. Reopen the window to get it back.
- **Mesh shares are weights, not percentages** — adding or removing a mesh rescales them all so they total 100 again, so the numbers you typed will change.
- **Removing a mesh slot deletes its hand-painted copies** — removing the last remaining slot empties it rather than deleting the row, and still deletes those copies.
- **Conform only finds things with collision** — and it never treats another scatter or a zone actor as ground. Archviz meshes without collision will not catch instances.
- **Mirror Distance stops re-seeding once you edit the mirror** — after you move one of its points by hand, only Reset Mirror will overwrite it — and that discards those edits.
- **Every rebuild marks the level as needing to be saved** — including rebuilds triggered by a slider drag.
- **Scattered copies have no collision and cannot be clicked** — they never affect navigation, they do cast shadows, and the brush picks them by proximity rather than by clicking.
- **There are hard ceilings** — 250,000 generated copies per scatter; each paint stamp caps at 2,000 copies with density clamped to 500 per square metre.

Tip Path tracing works. While any viewport is in Path Tracing mode, Harmonia suspends the engine's instanced-mesh ray-tracing culling so scattered copies actually appear in the render, and hands the setting back when you leave that view mode.

14. Floor Generator

The Floor Generator builds real parquet, plank and tile geometry from meshes you already have. Point it at a slab or floor plate, choose a pattern, and it lays boards across that footprint, trims them to the outline, gives them thickness and a chamfered top edge, unwraps them, and deals each board a material slot at random. Everything updates live as a preview. One button then commits it to a normal Static Mesh asset with a lightmap channel and one material section per variant. The same tool tiles walls, following the wall around corners and stopping cleanly at openings.

Open it Compass ► Floor (row 3, right). Opens its own window.

Walkthrough: tiling a room floor

1. Select the slab, screed or floor plate in the viewport.
2. Open the Floor Generator and press + Floor. A floor is created, the selected meshes are adopted as its boundary, the slab is hidden and the preview appears in its place.
3. In FLOOR PATTERN pick a pattern chip. The BOARD SIZE fields below change to match.
4. Set the board size. Press the = chip beside a size row to open it into a range and enter up to / down to values for mixed plank lengths.
5. In GROUT, set the joint width. Turn on Fill with a material if you want a visible grout bed rather than empty space.
6. In PROFILE, check Extrude and Bevel are on. The bevel is what makes the joints read under a grazing light — a floor without one looks like a printed texture.
7. In RANDOM IDS, raise Random IDs to the number of wood or tile variants you want, then drag a material onto each numbered slot row (and onto the G row if you filled the joints).
8. Open GENERAL and change Seed until you like the arrangement.
9. In BAKE, check the Folder path, then press Bake to Static Mesh.

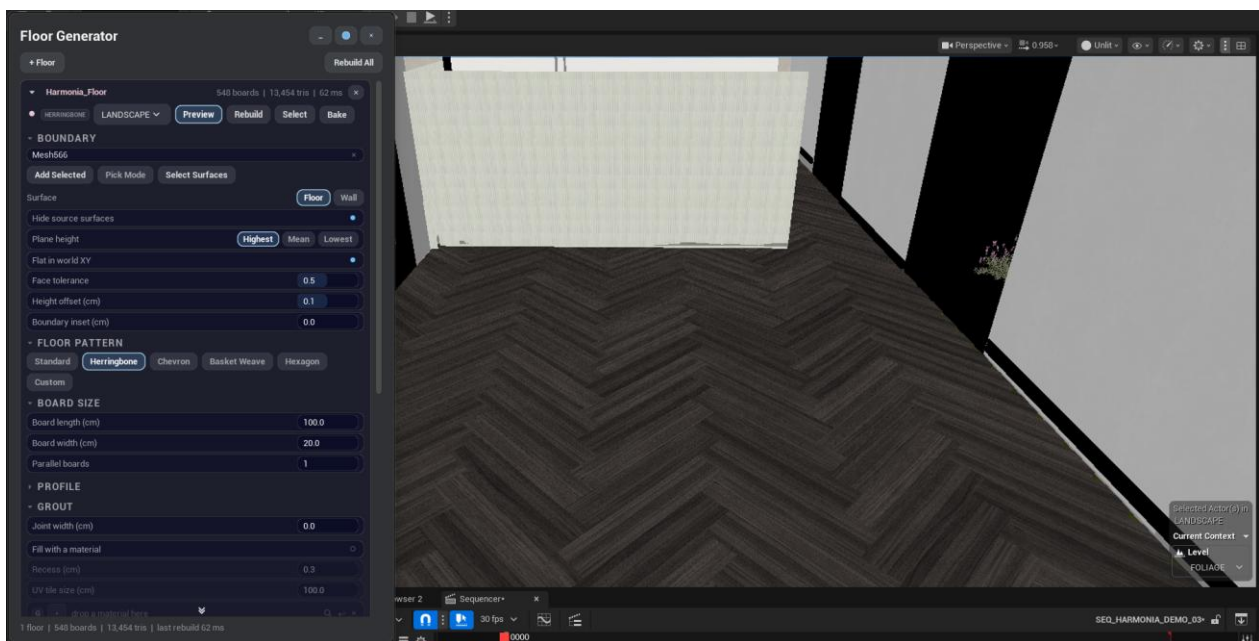
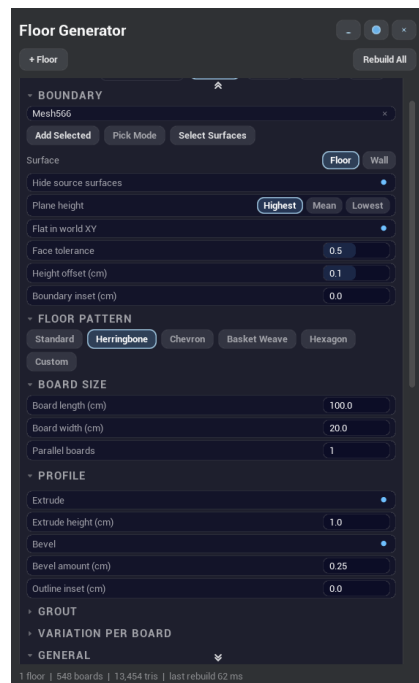


Fig. 27 — The Floor Generator window with one floor card expanded

The six patterns

Pattern	What it lays
Standard	Running-bond planks: a length per board, a height per row, and a row-to-row stagger. The classic plank floor.
Herringbone	Interlocking L-shaped pairs of planks. Can be doubled or tripled into multi-plank arms.
Chevron	Mirrored angle-cut planks meeting on a vertical seam, columns alternating direction.
Basket Weave	Square cells of parallel sub-boards, each cell rotated 90° from its neighbours.
Hexagon	Pointy-top regular hexagon tiles.
Custom	A course sequence you build yourself — A A A B C, repeating — where every course has its own length, height and stagger.



Herringbone



Standard

Fig. 28 — The six pattern chips, and how BOARD SIZE changes with the pattern

Exact values versus varying ones

Most size rows carry a small = / ~ chip at the right. While it shows =, the row is a single number. Press it and it shows ~, opening the row into three fields: up to and down to give the range, and bias weights the random draw within it — 0.5 is an even spread, lower favours the low end.

Note The rows under VARIATION PER BOARD are always ranges — they carry no = / ~ chip at all, because a fixed jitter value would defeat the point.

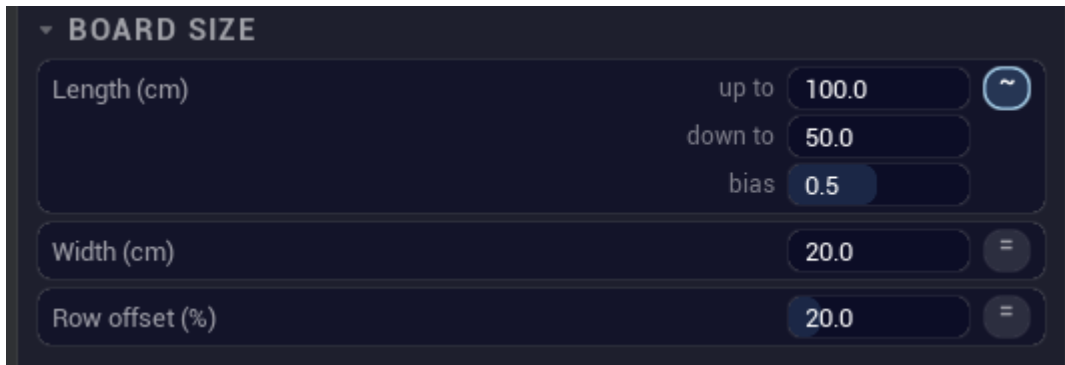


Fig. 29 — An exact value versus a varying one

Tiling a wall

1. Select the wall mesh, press + Floor, then in BOUNDARY set Surface to Wall. FLOOR PATTERN and BOARD SIZE are replaced by a WALL TILE section and one course is seeded automatically.
2. Pick a tile shape: 4 Rectangular, 3 Triangle or 6 Hexagon.
3. For rectangular tiles, build the course list exactly as for the Custom floor pattern — each course is a band of tiles sharing a height. Triangles and hexagons ignore the course list and say so.
4. If the tiles land on the wrong face, tick Face the other side. This also flips which way the thickness and bevel point.
5. If the wall's footprint changes with height — a plinth, a battered wall — set Plan section height (0-1) to pick which horizontal slice the tiles follow.

Note Face tolerance means opposite things in the two modes. On a floor it rejects faces leaning too far from the plane; on a wall it rejects faces tilted too far from vertical.

Materials: two ways to vary the planks

Approach	Use it when	How
Random IDs	The planks need genuinely different textures.	Raise Random IDs to the number of variants and drop a material on each numbered slot. The bake produces one material section per slot.
Plank Variation	The planks need different tones off one texture.	Tick Vary planks, set Variations and the brightness / gamma ranges. Each plank gets its own values carried in a UV channel (2 by default).

For Plank Variation to show, the material has to read the data the floor writes. The panel prints the exact recipe on screen — wire base colour through a Power node driven by the green channel of that UV set, then multiply by its red channel.

Watch out On a Custom pattern, Material per board type and Random IDs are alternatives, not additions. Turning on per-course materials removes the Random IDs field entirely: a plank's look then comes from its course, not from a random draw.

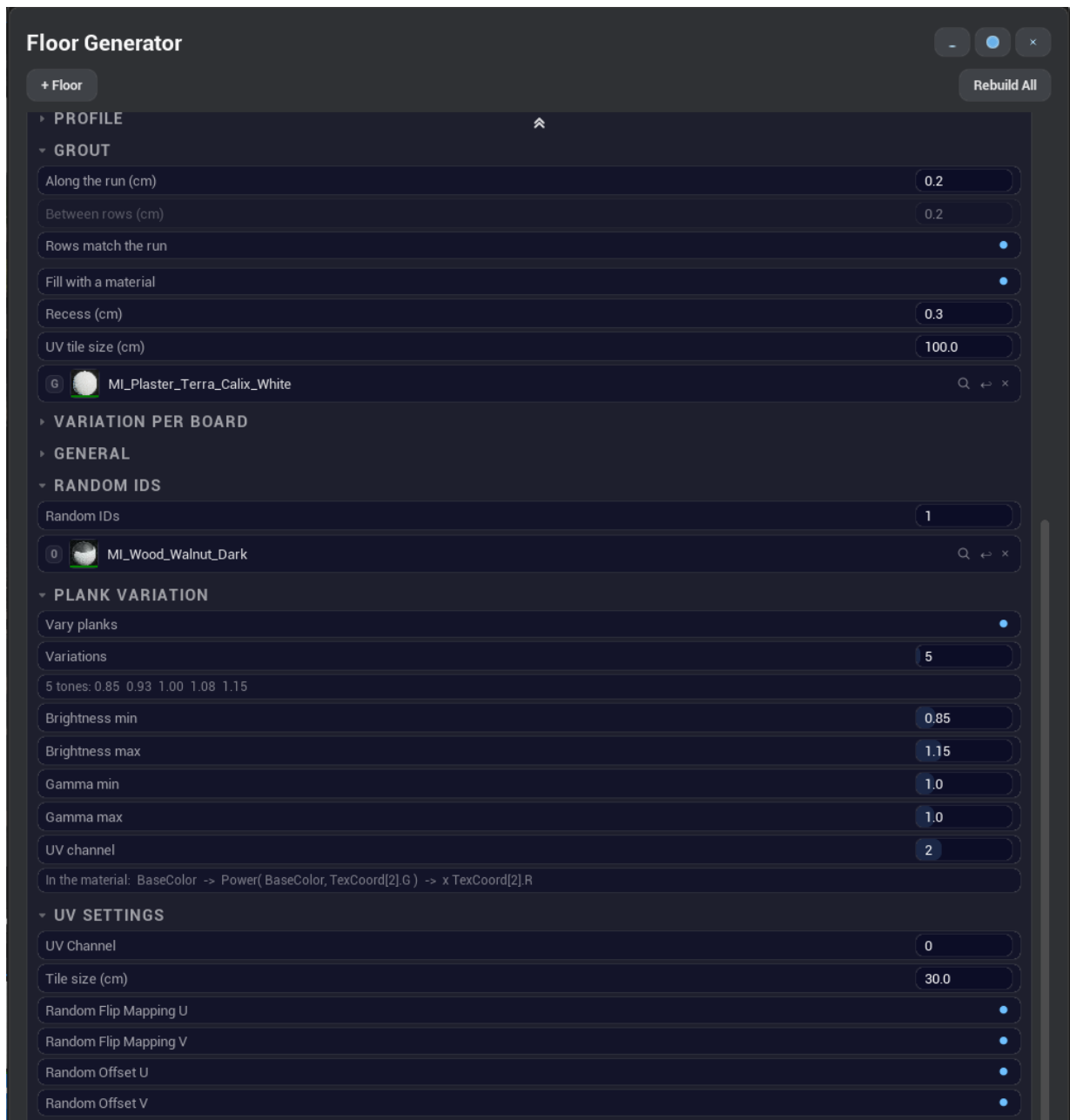


Fig. 30 — Material slots: one per random ID, plus the grout slot

Baking

Bake to Static Mesh writes the geometry to a Static Mesh asset in the folder shown (default /Game/Harmonia/Floors), spawns a Static Mesh Actor at the same place with the same materials, switches the preview off and makes your original slab visible again. On the baked asset, material sections are named for what fed them: Grout for the joint, Board_A ... Board_Z when courses drive the slots, otherwise ID_00, ID_01 and so on.

Watch out for	What happens
Baking never overwrites	If an asset of that name exists, a numeric suffix is added (_01, _02 ...). Rebaking after a tweak leaves the earlier asset behind — clean up unwanted versions yourself.
Bake uses the settings, not what is on screen	If the preview is off or stale, baking silently regenerates first, so you get the current settings rather than the last thing you looked at.

Watch out for	What happens
The generator stays in the level	Baking leaves a second object behind: the generator actor with all its settings. Delete it or leave it, but the preview will not come back on its own.
Plank variation can collide with the lightmap	The bake generates lightmap UVs into channel 1. If you pointed the plank-variation UV channel at 1, the lightmap moves elsewhere rather than overwriting your data.

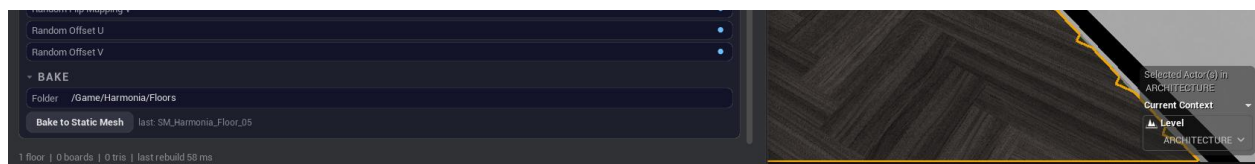


Fig. 31 — The BAKE section, after a successful bake

Watch out

- **Adding a floor hides your slab** — Hide source surfaces is on by default. This is editor-only visibility, nothing is saved onto those actors, and it is restored when you switch the preview off, bake, or delete the floor.
- **Only static-mesh geometry counts as a boundary** — instanced and foliage components are skipped entirely.
- **Plane height set to Mean will bury the floor** — in any surface with a camber or a fall. Mean is the true average height, not a safe height — which is why Highest is the default.
- **There is a hard ceiling of 400,000 boards** — beyond it the rebuild refuses and the card shows “needs attention”. A mistyped board size is the usual cause.
- **Rotation is per plank, not per floor** — setting the top of the Rotation range to 20 scatters planks anywhere between 0 and 20 degrees. Use Direction (deg) in GENERAL to rotate the whole pattern.
- **Rotation jitter is silently clamped** — if you ask for more yaw than the spacing can absorb. An amber note gives the limit actually used; widening the joint or raising Outline inset lifts it.
- **Tilt along length needs far smaller numbers than Tilt across width** — on a long plank the length axis is many times longer, so the same angle throws a much bigger step at the end joint.
- **Edits made while the preview is off do not apply themselves** — a small amber dot on the Preview chip means a rebuild is owed. Turn the preview back on, or press Rebuild.
- **Preview collision is off by default** — so the Scatter tool cannot drop anything onto a live floor preview until you tick it — at the cost of a physics rebuild on every regeneration.
- **Flip normals should never be needed** — the generator already emits correct winding. It exists only for exotic cases such as a floor on the underside of a soffit.

15. Mesh Tools

Mesh Tools fixes the two things that arrive broken from a 3ds Max or Datasmith import. Smooth rebuilds hard edges from an angle threshold, the way Max's Auto Smooth does, without moving a single vertex. Project UV lays one continuous world-space UV field across an entire selection from one shared origin, so a wall that was exported as twenty unrelated chunks finally has UVs that meet where the geometry meets. Both replace round-tripping each mesh back through Max — which loses its material assignments on the way home.

Open it Compass ► Mesh Tools (row 4, right). Opens its own window.

Watch out Both tools change the mesh ASSET, not just the actor you clicked. Every other actor in every other level using the same mesh gets the change too. That is deliberate — no new asset appears and nothing needs reassigning — but it is the opposite of how a per-object modifier behaves.

Smooth — the Auto Smooth replacement

1. Select one or more static mesh actors. The header at the top of the window updates by itself within about a quarter of a second.
2. Make sure the Smooth chip is active — it is when the window opens.
3. Set Angle threshold. 30 matches 3ds Max's Auto Smooth default; lower towards 0 for a more faceted look, raise towards 180 to smooth more.
4. Choose Max (unweighted) to match what you saw in Max, or Unreal (weighted) for the engine's own convention.
5. Leave Fix build settings on.
6. Optionally turn on Live preview and drag the threshold to find the value by eye.
7. Press the button at the bottom — it reads Smooth N mesh(es), or Apply preview (adds one undo step) if a preview is pending.
8. Save the affected mesh assets.

Nothing is moved. Only which edges are hard, and how the surface normals are averaged. Positions, UVs, material slots, collision, Nanite settings and LOD setup all come out unchanged. Smoothing never asks about shared meshes, because hard edges are a property of the shape itself — one shared mesh smoothed once is correct for every copy.

Tip If a run reports 0 hard edges on a mesh you know is faceted CAD geometry, your Angle threshold is set too high. Boundary edges, non-manifold edges and degenerate triangles are always made hard regardless of the threshold.

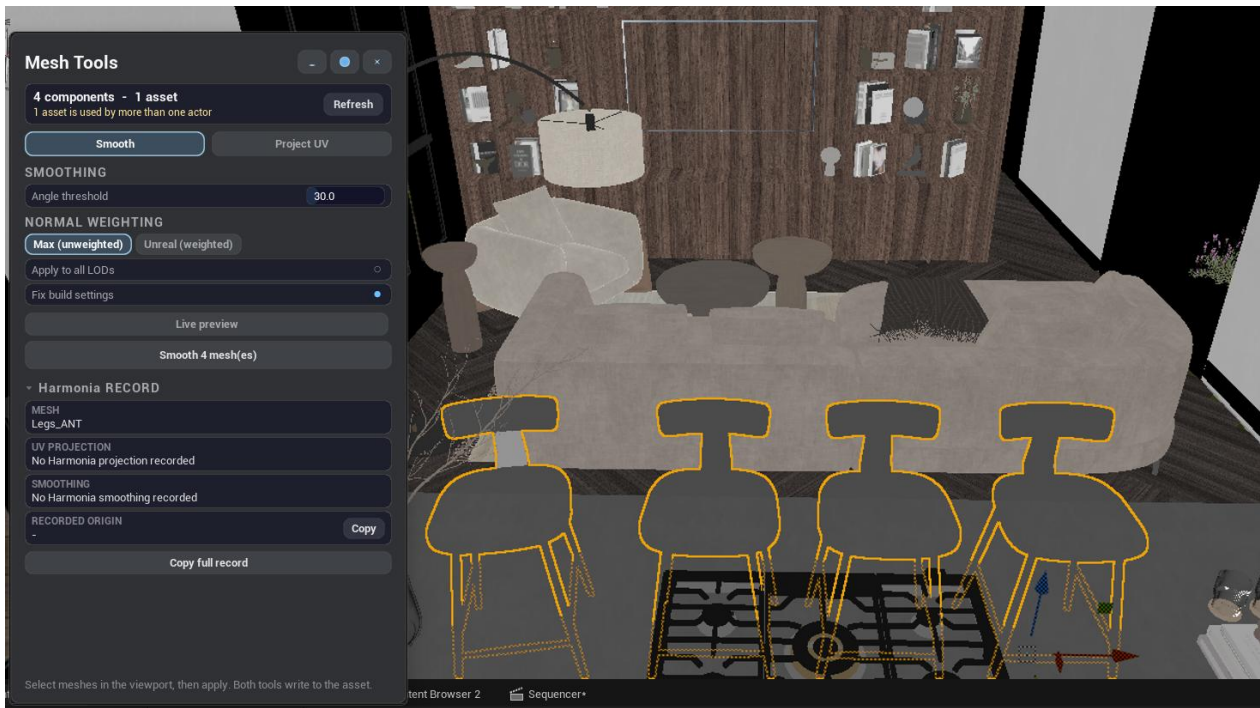


Fig. 32 — The Mesh Tools window with a live selection

Project UV — one mapping across many meshes

1. Select every chunk that should share the mapping. The header shows the component and asset counts, and an amber line if any of those meshes are reused elsewhere in the level.
2. Click the Project UV chip.
3. Under PROJECTION pick a shape — Box handles a mixed selection of walls, floors and ceilings in one pass; Planar for a single flat surface; Cylindrical for columns and curved walls; Spherical for domes.
4. Set the orientation: click X, Y or Z for the common cases, or type exact pitch / yaw / roll.
5. Under SCALE leave World scale selected and set cm per tile U and V. 100 means one texture tile per metre. Keep U and V equal unless the material is deliberately non-square.
6. Open PLACEMENT to nudge the result — Offset U / V slide the texture in tiles, Flip U / V mirror it.
7. Open OUTPUT and check UV channel. 0 is the normal texture channel and is what imported meshes want.
8. If the amber shared-assets line appeared, open SHARED ASSETS and choose Skip shared or Make unique.
9. Press Project N mesh(es) as one group, confirm the dialog if one appears, and save the affected assets.

Because the whole selection is evaluated from a single point in world space, chunks that meet in space also meet in UV space.

Meshes used more than once

Choice	What it does	Right for
Skip shared	Leaves any mesh used more than once in the level untouched, and lists it afterwards.	The safe default.
Make unique	Gives each selected copy its own new mesh asset and projects each one in its own position.	Twelve mirrored balcony railings. Catastrophic for twelve identical chairs.

Watch out A mesh counts as shared if it is used more than once anywhere in the LEVEL, not just inside your selection. With Skip shared on, a projection can appear to “not work” on exactly the instanced objects — railings, chairs — you most wanted it on.

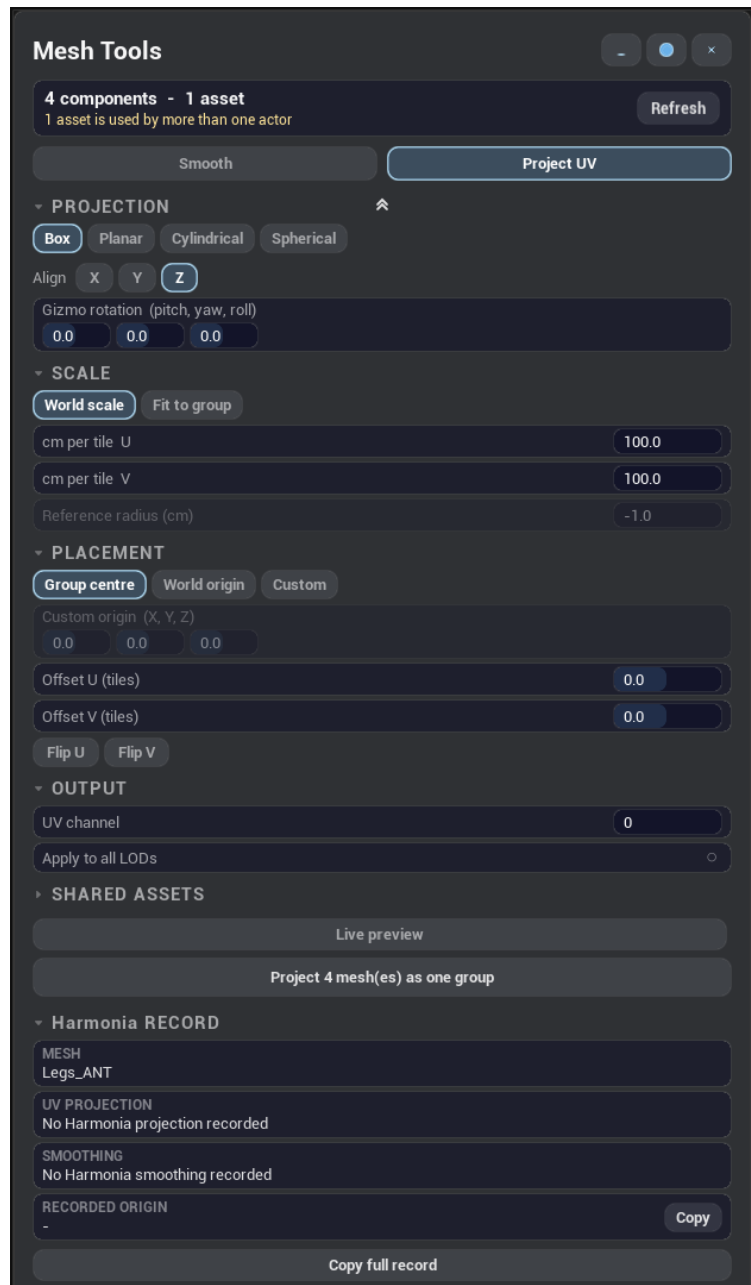


Fig. 33 — The Project UV tool

The viewport gizmo

With Project UV showing, Live preview on, and something selected, a transform gizmo appears in the viewport at the projection origin. Turn any of those three off and it disappears — it has no button and no entry in the editor's mode toolbar.

- **Move arrows** — slide the projection origin. The first drag switches the origin mode to Custom permanently — it does not switch back.
- **Rotation rings** — re-aim the projection; the Gizmo rotation fields follow.
- **Scale handles** — red changes cm per tile U, green changes cm per tile V, blue does nothing. Scaling also forces the scale mode to World scale.

Tip Set the viewport's transform coordinate system to Local, or the gizmo's arrows follow the world axes instead of the projection frame you can see drawn.

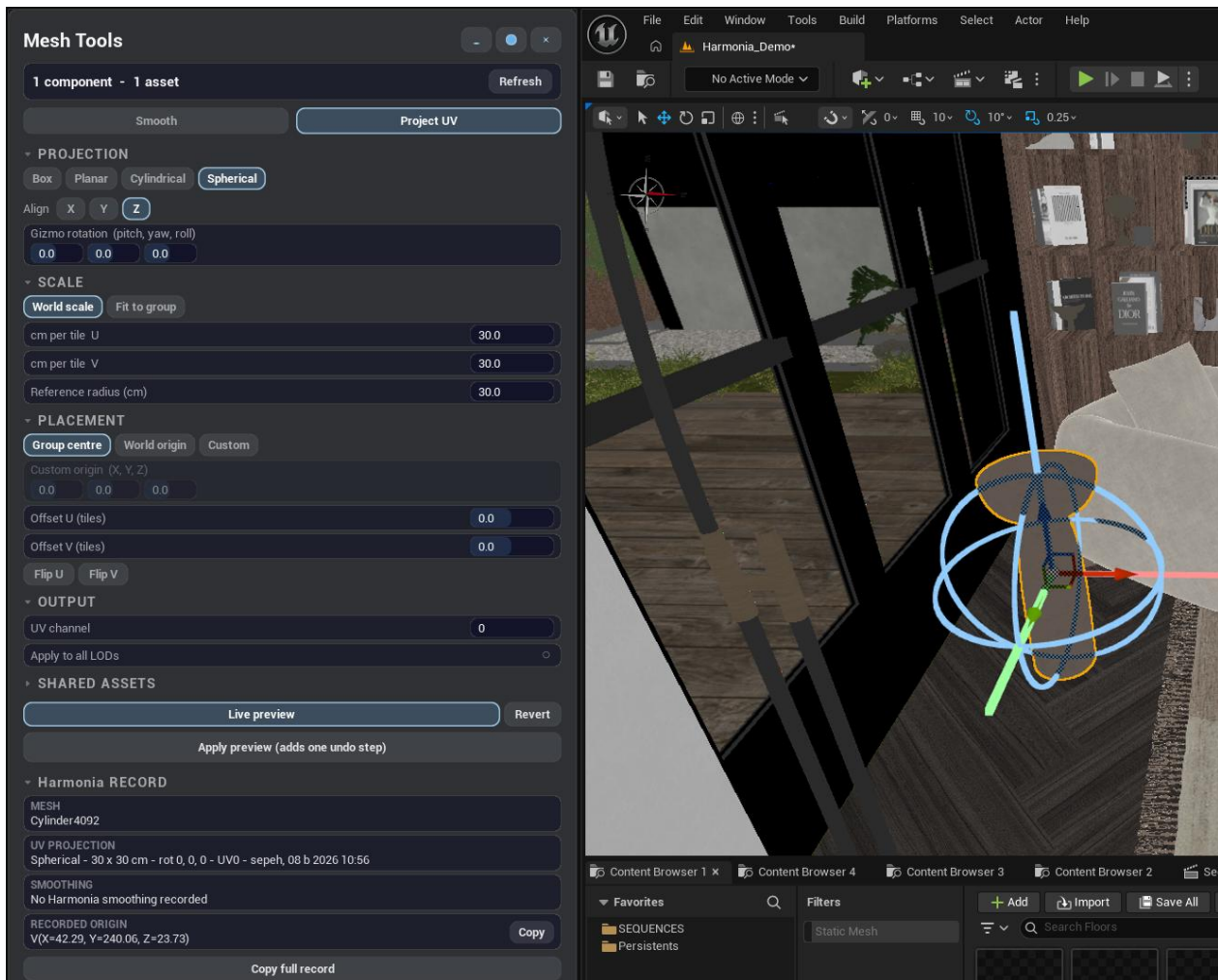


Fig. 34 — The projection gizmo in the viewport

Live preview is real, not an overlay

There is no cheap way to preview UVs or smoothing, so live preview writes to the asset for real and rebuilds the mesh. This has three consequences worth remembering:

- Turning live preview OFF does not undo anything. You still have to press Apply or Revert.
- Ctrl+Z does not reach preview changes. Preview writes stay off the undo stack so a drag does not bury your history — and Revert stays off it too, so undo cannot bring an abandoned preview back. Only Apply creates an undo step.
- It is heavy. Every update rewrites the asset and triggers a full mesh rebuild, Nanite included. Above 12 components or 1,500,000 triangles you get a warning first, and the chip relabels itself with the measured seconds per update.

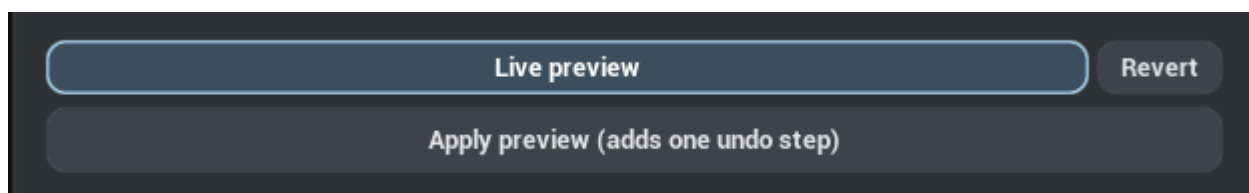


Fig. 35 — Applying a preview is one undo step; the preview itself is not

The Harmonia record

Because these tools have no modifier stack, each mesh carries a record of what was done to it — projection shape, tile size, rotation, channel, origin, who did it and when — stored on the asset itself, so it survives saving and reopening the project.

This is how you extend an existing UV field onto more meshes later: select one mesh that already has the mapping, press Copy next to RECORDED ORIGIN (which both copies the point and loads it into the Custom origin fields), then select the new meshes, match the shape and tile size, click Custom under PLACEMENT and project.

Note The record readout describes only the FIRST mesh in your selection. With a mixed selection, do not assume the others have the same history.

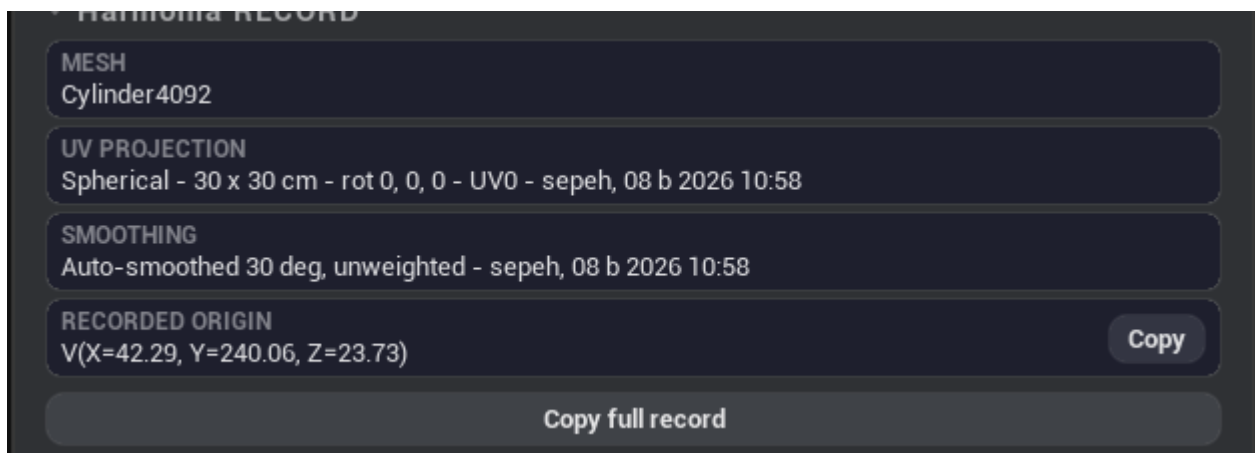


Fig. 36 — The Harmonia record

Watch out

- **UV channel 0 is overwritten with no backup** — that is the point for an imported mesh, but check the record first if the mesh might have been unwrapped by hand.
- **Projecting into channel 1 is usually wasted** — that is normally the generated lightmap channel, and the next build discards it.
- **Projecting into channel 0 repoints the lightmap source to channel 0 too** — so the build does not re-pack lightmaps from geometry you just re-parameterised.
- **Turning Fix build settings off throws your smoothing away** — the next mesh build re-derives normals from scratch. Leave it on.
- **The shared-asset dialog is a confirmation, not the choice** — you pick Skip shared or Make unique in the panel before pressing Apply. Cancel aborts the whole run.
- **Every setting in this window is session-only** — close the editor and threshold, tile size, rotation, channel and shared policy all return to their defaults. The record on each mesh is the thing that persists.
- **Modified meshes are marked dirty but not saved for you** — save them before closing the project or the work is lost.
- **Changing the selection with a preview pending pops the keep/revert question** — and selection tracking freezes until you answer. So does closing the window.

16. White Override

White Override turns the whole scene into a clay model: every opaque surface is swapped for a flat white material so you can judge lighting, form and composition without albedo getting in the way. A second mode puts a UV checker on those same surfaces instead, so you can see at a glance where texel density and UV scale are wrong.

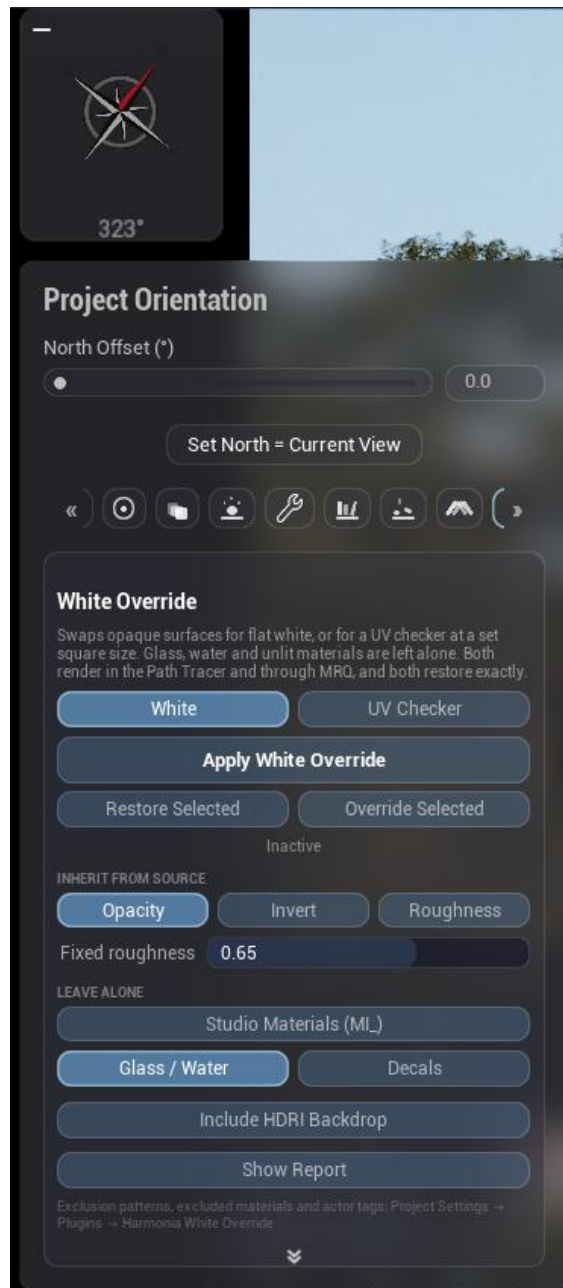


Fig. 37 — The White Override panel, idle and ready to apply

This is not a viewport visualisation mode. The swap is a real material assignment, so the clay look renders through the Path Tracer and through Movie Render Queue exactly as you see it. Every original material is written into a hidden record stored in the level, so one button puts the scene back — including material slots that were empty.

Open it Compass ► White Override (row 4, left). Opens as a tab inside the panel.

A quick clay lighting study

1. Open the White Override tab and leave the mode chip on White.
2. Set Fixed roughness if 0.65 is not the read you want, or turn on the Roughness inherit chip to keep the source material's variation.
3. Click Apply White Override. A progress window appears, then an amber WHITE OVERRIDE ACTIVE banner shows at the top of the viewport.
4. Read the status line — it should say Active, with counts of the slots and components that were swapped. If the skipped count looks wrong, click Show Report.
5. Judge the lighting. Take Path Tracer stills or an MRQ render if you want — the clay renders exactly as it looks.
6. Click Restore Original Materials. The status line goes back to Inactive and the banner disappears.

Note Nothing needs saving for this round trip. Applying and restoring deliberately leave the level's saved/unsaved state exactly as they found it, so a Save All or an autosave partway through will not write clay materials to disk.



Fig. 38 — The banner that tells you the viewport is lying to you

Checking UV scale with the checker

1. Make sure no override is currently running — the mode chips are locked while one is. If one is running, click Restore Original Materials first.
2. Click the UV Checker mode chip. A Square size (cm) field appears below it.
3. Set the square size — 30 cm by default; you can type 1 to 1000.
4. Click Apply UV Checker.

5. Drag the Square size (cm) field. The squares re-tile live, no re-apply needed.
6. Look for surfaces where the squares are noticeably bigger, smaller, or stretched — those UVs are off.



Fig. 39 — UV Checker mode adds the square-size field

Clay everything except the piece you are reviewing

1. Apply the override normally so the whole scene goes clay.
2. Select the actors you want to see in their real materials.
3. Click Restore Selected. Those actors come back; the rest stays clay and the override keeps running.
4. Click Override Selected to send them back to clay.
5. Finish with Restore Original Materials, which clears whatever is left.

Override Selected also works from a completely clean scene — select some actors, press it, and you get an override scoped to just that selection.

What it swaps, and what it leaves alone

Setting	What it does	Default
Opacity (inherit)	Reuses each source material's cutout so leaves, grilles and cut-out foliage keep their shape.	On
Invert (inherit)	Flips the cutout. Turn it on when leaves come out with their middles cut away. Takes effect on the next Apply.	Off
Roughness (inherit)	Samples the source roughness map instead of the fixed value, so worn and polished variation survives.	Off
Fixed roughness	The single roughness value every clay surface uses.	0.65
Studio Materials (Ml_)	Leaves materials whose name carries the studio prefix in their real look. Works per material slot, not per object.	Off

Setting	What it does	Default
Glass / Water	Keeps see-through surfaces real — translucent, thin-translucent, single-layer-water and additive blends.	On
Decals	Reads backwards from the others: chip ON means decals stay visible. Off hides them, because decal content is mostly albedo detail.	Off
Include HDRI Backdrop	Off leaves the lighting rig immune — backdrop mesh, sky dome and sun finder keep their real materials.	Off

The clay's base colour itself is not in this panel. It lives at Project Settings ► Plugins ► Harmonia White Override ► Appearance, defaulting to a 0.75 grey — the conventional clay value, deliberately not pure white. That is the setting to change if the clay reads too bright or too dark.

Watch out Only Square size (cm) and Fixed roughness update in place. Everything in the LEAVE ALONE section, plus Invert, needs a restore and a re-apply. When in doubt, restore and re-apply.

If a level was saved while clay

Open such a level and a dialog appears naming who applied the override, when, and how much of the level is affected. Click Restore Original Materials — the level is put back and deliberately left marked as modified, so save it to get the fix onto disk. Keep White For Now dismisses the prompt without restoring.

Afterwards, check two things: the panel's status line should read Inactive, and the World Outliner should contain no actor named `Harmonia_WhiteOverride_RESTORE_DATA`.

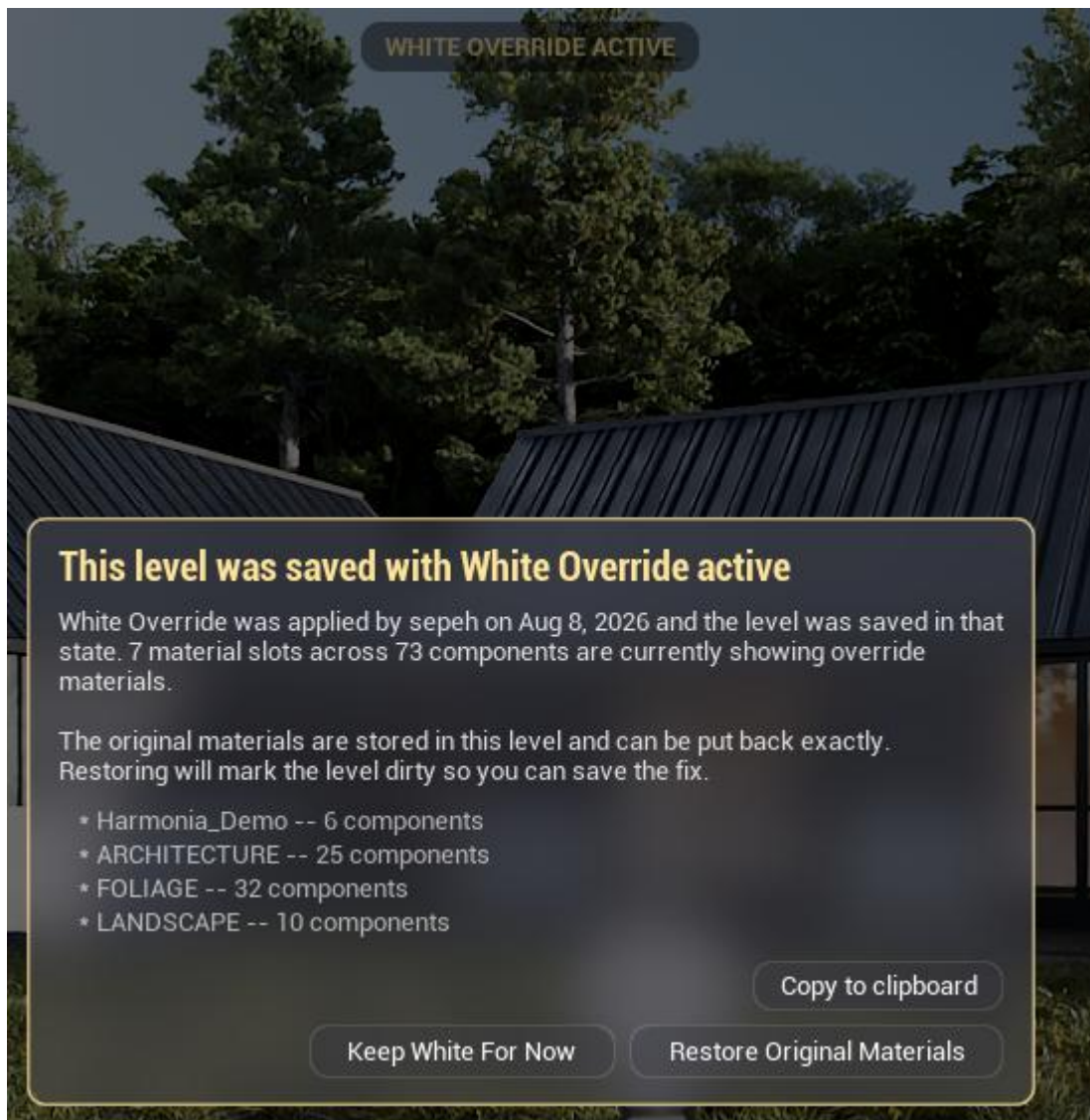


Fig. 40 — The recovery dialog

Watch out

Watch out Never apply an override on top of an existing one. The tool refuses and tells you why — applying again would record the WHITE materials as the originals and lose the real ones permanently. This is the one genuinely destructive mistake available here, and it is blocked, but understand what the refusal means: restore first.

- **Never delete `Harmonia_WhiteOverride_RESTORE_DATA`** — that hidden actor holds the only copy of the original materials for the level. Deletion is blocked while it holds entries. Restore is what removes it, automatically, once the level is genuinely back to normal.
- **`Ctrl+Z` is not the way to undo an override** — the restore data is deliberately kept off the undo stack. Use Restore Original Materials.
- **Restore before rendering the finished shot** — the banner hides itself during captures, so its absence in a render does not mean the clay is off.
- **Normals are never inherited** — on purpose and with no option: the source's UV tiling cannot be recovered, so an inherited normal map would render at the wrong scale. Clay surfaces are smooth even where the original had bump detail.

- **A few coloured leaves in a clay scene are expected** — a masked material whose cutout channel cannot be worked out is left in its original material rather than guessed at, because guessing would delete the geometry. They appear in the report as LEFT ORIGINAL. If a whole library behaves this way, set the mask channel explicitly in Project Settings.
- **Unloaded streaming sublevels cannot be restored** — the record for them is kept and reported rather than dropped. Load every sublevel before restoring.
- **New geometry turns white by itself** — actors you spawn, paste or drag in while the override is running are clayed automatically about a quarter of a second later, and added to the restore record.
- **Do not delete or rename materials during a clay pass** — originals that no longer exist cannot be put back. The restore reports each one by actor, component and slot.
- **Closing the editor does not restore the scene** — deliberately: if you never saved, disk is already correct. If you did save while clay, the recovery prompt catches it next time you open the level.

17. Composition Guides

Composition Guides draws framing constructions — thirds, phi, golden spiral, safe frames, custom grids — directly over the ordinary perspective viewport, so you can judge a framing without switching to a cinematic viewport or placing a camera actor. It can also letterbox the viewport to a target aspect ratio and dim the excluded margins, so a 3:2 still can be framed inside a 16:9 viewport.

Open it Compass ► Guides (row 4, middle). Opens as a tab inside the panel.

Note The lines are pure viewport chrome. They never appear in a path-traced screenshot, a Movie Render Queue render or a Movie Render Graph output — and because they never touch the scene, switching a guide on or off does not restart path-tracer accumulation. You can flip a spiral while a path-traced view is converging.

Framing a shot

1. Open the Composition Guides tab.
2. Click a construction chip — Thirds, for example. Picking any construction also switches the guides on, so you do not need to press Show Guides first.
3. Fly the viewport camera until the horizon or the main vertical lands on a guide line.
4. If white lines wash out against a bright sky, leave Contrast Outline on and lower Opacity a little.
5. Press Hide Guides when done — or leave them on, since they never reach a render.

The eleven constructions

Chip	What it draws
Thirds	A 3×3 division of the frame — the rule of thirds.
Quarters	One vertical and one horizontal centre line, edge to edge.
Crosshair	A small cross at the frame centre only.
Rabatment	Strikes a square in from each short side and draws the two edges where those squares end.
Phi Grid	Like thirds, but divided at 0.382 and 0.618 — lines tighter to centre.
Spiral	The Fibonacci / golden spiral, with optional golden-rectangle subdivisions.
Triangles	One corner-to-corner diagonal plus a perpendicular dropped onto it from each of the other two corners.
Diagonal	A 45-degree line struck inward from each of the four corners.
Armature	Both diagonals plus all four reciprocals — the densest construction here.
Safe Frames	Nested action-safe and title-safe rectangles plus a centre mark.
Custom	Any column × row subdivision you set.



Fig. 41 — The Composition Guides panel with Thirds selected

Framing a 3:2 still inside a 16:9 viewport

1. Pick the construction you want, then click the Aspect Mask chip. Dimmed bars appear and the construction shrinks to fit the unmasked rectangle.
2. Click the 3:2 quick chip — or type an exact figure into Ratio (W/H) for a ratio the four chips do not cover.
3. Adjust Mask dim if the bars are too dark or too faint to judge the picture against.
4. Turn on Border so the exact edge of the intended crop is drawn as a line.
5. Compose the shot inside the bright rectangle only.

Watch out The mask is a viewing aid, not a render setting. It does not change the resolution or aspect of any screenshot or render you take afterwards — match it to whatever output size you plan to render.



Fig. 42 — Aspect Mask on: a 3:2 frame inside a 16:9 viewport

Appearance

Control	What it does	Default
Colour swatches	Six one-click line colours: White, Black, Grey, Red, Cyan, Yellow.	White
RGB	Free-form colour without opening a picker. The viewport recolours live as you drag.	1, 1, 1
Opacity	How strongly the lines read over the picture. Secondary lines — spiral squares, the title-safe rectangle — are drawn fainter than this.	0.55
Thickness	Line width in screen pixels.	1.0 (0.5–6.0)
Contrast Outline	Lays a wider dark line under every guide so a white guide stays readable against a blown sky.	On



Fig. 43 — Guide lines with Contrast Outline on

Watch out

- **Flip H and Mirror Diagonal are the same setting** — the spiral's Flip H chip and the Triangles construction's Mirror Diagonal chip write to one stored value. Flipping a spiral silently mirrors your triangles construction too. Flip V affects the spiral only.
- **Clicking any construction chip switches the guides ON** — even if you had just pressed Hide Guides. Clicking any quick ratio chip switches the Aspect Mask on the same way.
- **The spiral will not touch the sides of a 16:9 viewport** — it is built on a golden rectangle inscribed and centred in the frame. That is the construction being correct. Use the Aspect Mask with a ratio near 1.6 to make the frame match the spiral.
- **Columns and Rows accept 24 typed, but only 12 dragged** — if you want 18 columns you have to type it. A custom grid of 1×1 draws nothing at all — turn on Border if you want to see the frame.
- **Safe-frame percentages are not in the panel** — Safe Frames always draws at 90% action-safe and 80% title-safe; those two figures are not exposed anywhere in the interface.
- **Mask dim at 0 hides the bars but still insets the guide** — the construction is still built inside the smaller masked rectangle, so the guide will look mysteriously inset.
- **Guide settings are per user, not per project** — deliberately, so a guide someone left switched on never travels through source control. It also means all your level viewports show the same construction at once.
- **Guides paint underneath the panel** — a guide line can disappear behind the panel while you are adjusting it. Close the panel — it is pinned to the compass and cannot be dragged elsewhere — to check the full frame.
- **Guides never intercept clicks** — they are fully click-through; selection and gizmo drags pass straight through them.

Note Two status banners are drawn by the same overlay at top centre and appear even when guides are switched off: WHITE OVERRIDE ACTIVE in amber, and SUN AUTO-UPDATE ACTIVE in blue. They are not part of any guide construction, and they too are hidden during captures.

18. Sun Calculator and Hourly Sun Study

The Sun Calculator turns a real-world site, a date and a time of day into the exact Pitch and Yaw numbers a directional light needs — measured against the project's own north direction. Read the sunrise and sunset extremes for a date, click any number to copy it, or switch on live auto-update so the scene's lighting rig follows the calculator as you scrub the hour.

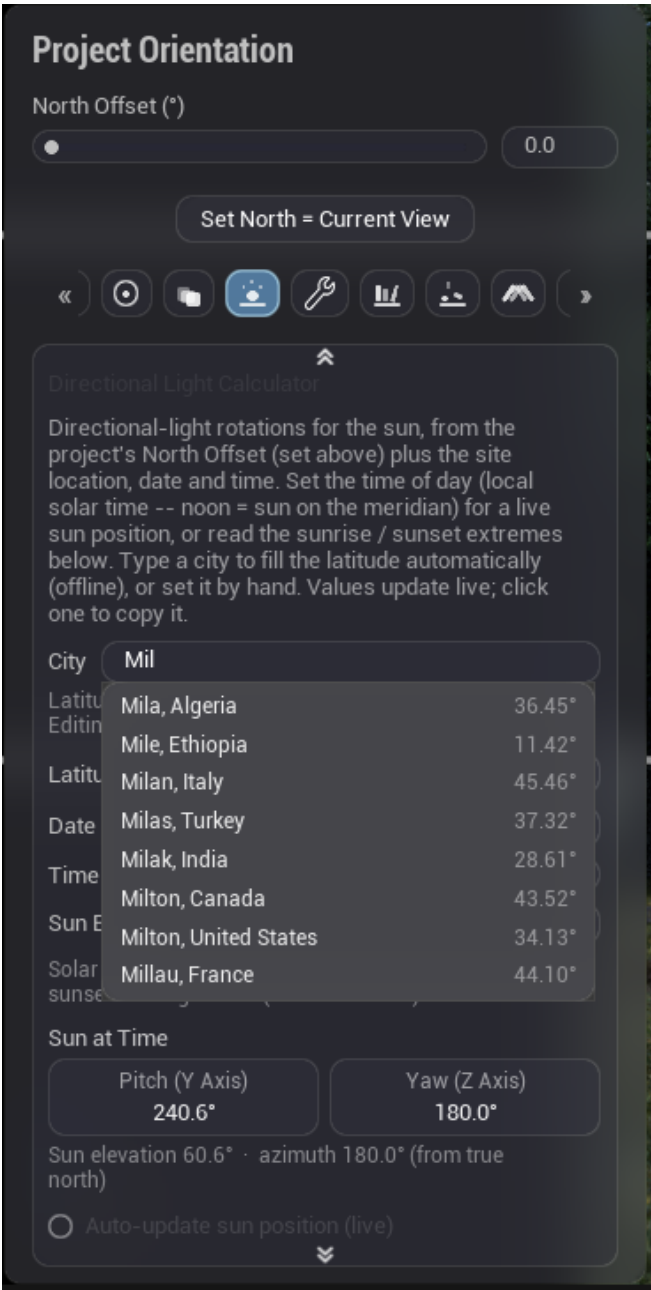


Fig. 44 — City lookup resolving a site offline

Open it Compass ► Sun Calculator (row 2, middle). Opens as a tab inside the panel.

Watch out Set North Offset before you use this tab. Every Yaw the calculator produces is the sun's compass

bearing added to the project's north offset — get north wrong and every sun angle is wrong by the same amount. See chapter 11.

Matching a real-world sun

1. Type the project's city in the City box and pick it from the drop-down, or press Enter for the top match. The status line under the box turns green with the resolved latitude. If the site is not listed, type the Latitude by hand instead.
2. Set Date (Month / Day). Both boxes start on today's date, and changing the month clamps the day to that month's real length.
3. Drag the Hour wheel to scrub the time of day. You can also scroll the wheel to step one unit, or click it and type.
4. Either switch on Auto-update sun position (live) to have the scene's sun follow the calculator as you scrub — or leave it off and click the Pitch (Y Axis) and Yaw (Z Axis) cells under Sun at Time to copy each number and paste it into your own directional light.

Watch out The time of day is LOCAL SOLAR TIME, not clock time. 12:00 means the sun is at its highest for that site, not noon on a watch. There is no time-zone or daylight-saving correction, so the hour you set will not line up with a real-world timestamp.

Clicking a value cell copies the plain number with no degree sign, ready to paste straight into a rotation field.

The screenshot shows a dark-themed interface for sun position calculations. At the top, a status line reads: "Latitude this is from the city (online, no internet). Editing it by hand overrides the city." Below this are several input fields and readouts:

- Latitude (°)**: 45.47
- Date (Month / Day)**: 8 / 8
- Time (Hour / Min)**: 11 12 13 : 59 00 01
- Sun Elevation (°)**: 0.0
- Solar declination** 16.0° · **sunrise bearing** 66.8° · **sunset bearing** 293.2° (from true north)
- Sun at Time**
 - Pitch (Y Axis)**: 240.6°
 - Yaw (Z Axis)**: 180.0°
- Sun elevation** 60.6° · **azimuth** 180.0° (from true north)
- Auto-update sun position (live)**: A blue toggle switch is currently turned on.
- Sunrise**
 - Pitch (Y Axis)**: 180.0°
 - Yaw (Z Axis)**: 66.8°
- Sunset**
 - Pitch (Y Axis)**: 180.0°
 - Yaw (Z Axis)**: 293.2°

Fig. 45 — The live sun readouts and the auto-update toggle

Reading the sunrise and sunset extremes

Sun Elevation (°) sets how high above the horizon you want the sunrise and sunset sun to sit. 0 puts it exactly on the horizon; 2 to 6 gives a typical golden-hour look. The four Sunrise / Sunset cells update accordingly, and clicking any of them copies that number.

Note Sun Elevation affects the Sunrise and Sunset cells only. The Sun at Time cells work out their own elevation from the clock. And auto-update only ever drives Sun at Time — the sunrise and sunset numbers are never applied for you.

Field	What it is	Default
City	Offline search across a bundled list of over 31,000 places. Suggestions appear from the second character, up to eight at a time.	empty
Latitude (°)	Decimal degrees, positive north. Typing here by hand detaches whatever city was resolved.	45.47
Date (Month / Day)	The calendar date the sun is calculated for.	today
Time (Hour / Min)	Local solar time. Drag the wheel sideways, scroll it, or click and type.	12 : 00
Sun Elevation (°)	Height above the horizon used for the Sunrise and Sunset rows only.	0.0
Pitch (Y Axis)	180 plus the sun's height. 180 is flat on the horizon; it clamps there at night rather than dipping below.	—
Yaw (Z Axis)	North offset plus the sun's compass bearing.	—

Note At high latitudes on certain dates there is no sunrise or sunset at all. The four Sunrise / Sunset cells go blank, an amber polar-day / polar-night notice replaces the declination and bearings line above them, and clicking those cells copies nothing. Sun at Time keeps working.

The Hourly Sun Study

The Hourly Sun Study renders one path-traced frame for every daylight hour of the chosen date into a timestamped folder — a whole day of light in one unattended pass.

1. Set the city (or latitude) and the date first. The study uses whatever is currently in those fields.
2. Set Samples per frame. Lower than your hero-shot value is usually right, since this renders many frames.
3. Set the Output folder, or click ... to browse. Leave it blank to reuse the Screenshot tab's folder.
4. Frame the camera on the shot you want. The study renders whatever the viewport is looking at and never moves the camera.
5. Click Capture Sun Study and leave the machine alone. The overlays disappear and the viewport goes to the Path Tracer while the batch runs.
6. Press Esc at any point to stop early. Frames already written are kept.
7. When it finishes, the Sun Study Complete dialog offers Open Folder.

Frames are named by hour — 05h00.png, 06h00.png and so on — inside a folder called SunStudy_ followed by the date and time of the run, so repeat runs never overwrite each other.

Watch out for	What happens
Every frame is 2K wide	regardless of the Screenshot tab's resolution setting. Only the aspect ratio is taken from that tab.
Only whole daylight hours are rendered	so a winter date produces far fewer frames than a summer one. A date with no daylight at all is blocked with a dialog before the run starts.
The batch forces auto-update on for its duration	and puts your original setting — and your original time of day — back when it finishes or is cancelled. Do not be alarmed if the sun jumps.
An hour that takes over 10 minutes is abandoned	counted as a failure, and the batch moves on, leaving a gap in the sequence and an amber status. Lower the sample count if this happens.
Esc is swallowed globally during a run	it will not deselect or close anything else. It is picked up at the next quarter-second poll, so the current frame usually finishes first.
The panel closes and reopens at the end	the whole overlay is rebuilt from scratch when the run finishes. This is expected.

Watch out

- **Almost nothing on this tab is saved** — city, latitude, date, hour, minute, sun elevation, the study's samples and output folder all live only for the current editor session. Only the Auto-update toggle, the sun position it last pushed, and North Offset persist.
- **At night the Pitch stops at 180** — the light lies flat on the horizon rather than dipping under it, because values below 180 have no meaning for this rig. Scrubbing through the small hours shows the Yaw moving while the Pitch sits still.
- **City suggestions need two characters and show only eight matches** — if the place you want is small it may not be in the list at all — type the latitude by hand.
- **You cannot start a study while a screenshot is running** — the button greys out during any other capture.

Note The bundled city data comes from GeoNames (geonames.org) under CC BY 4.0. That credit appears in the City field's tooltip and must remain in any redistribution of the plugin.

19. Lighting Presets

The Presets tab is a thumbnail grid of saved lighting states. It captures the current lighting rig's settings to a file, renders a thumbnail of each, and puts a saved look back on the scene — or into an open Level Sequence — with one click.

Open it Compass ► Presets (row 2, left). Opens as a tab inside the panel.

Watch out Presets need the BP_Harmonia_Lighting rig actor in the current level. Without it, saving and applying both refuse with a dialog. The rig itself is covered in Part One.

Saving and applying

1. Dial the lighting in the scene the way you want it.
2. Frame the camera on a view that will read well as a thumbnail, then click the + tile. The viewport briefly switches to the Path Tracer to shoot the thumbnail, then returns.
3. Hover the new tile and click the pencil icon to give it a proper name. Press Enter to commit.
4. To apply a saved look, click its thumbnail.

Watch out Clicking a preset does something completely different depending on whether Sequencer is open. With no Level Sequence open, it changes the level's own lighting — a persistent change saved with the level that affects everyone who opens it, which is why you get a confirmation. With a Level Sequence open, the values are written into the sequence as track defaults and the live scene is left alone.

Managing the grid

Control	What it does
Sort button	A-Z, Newest or Favorites first. The choice is saved in project settings.
★ (hover icons)	Marks a favourite; the star turns gold. Favourites float to the top under the Favorites sort.
↺ (hover icons)	Re-records the current lighting and shoots a fresh thumbnail into this same preset. Confirms first.
✎ (hover icons)	Renames. Enter or click-away keeps it; Escape abandons.
✕ (hover icons)	Deletes the preset — settings file and thumbnail — from disk.
⇄ (panel header)	Point the grid at a different preset folder, for example a shared network library.
⇓ (panel header)	Copy preset files in from another folder.

Watch out Deleting a preset has no confirmation dialog and no undo — one click on the ✕ removes the file and its thumbnail from disk. It sits at the left-hand end of the hover icons, apart from the star, refresh and rename group.

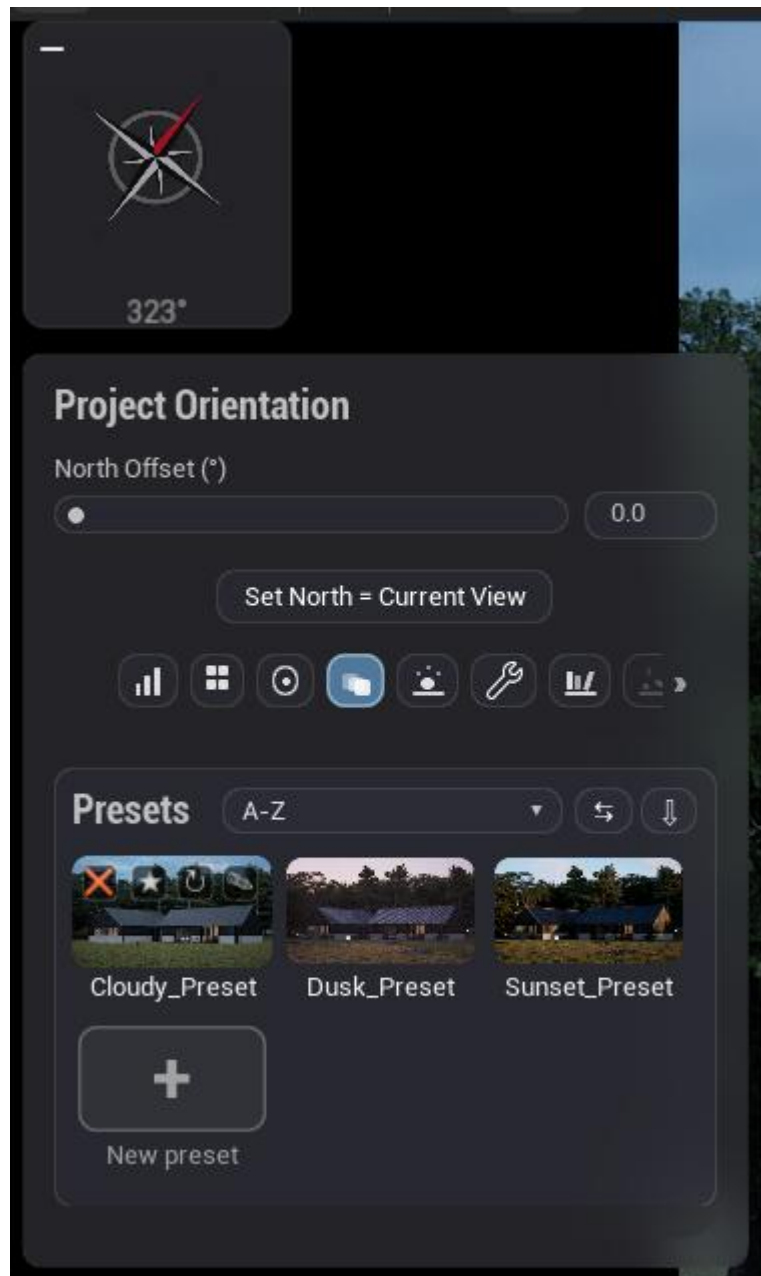


Fig. 46 — A preset tile with its hover actions revealed

Watch out

- **A preset does not capture everything on the rig** — it stores the rig's instance-editable numbers, checkboxes, dropdowns, colours and HDRI cube-map references. Other property types are not saved and will not come back.
- **A missing HDRI does not block the apply** — everything else still applies and you get a Missing HDRI asset list. The lighting will look wrong until you re-assign the texture.
- **Switching the preset folder does not move anything** — your old presets stay where they were; the grid simply lists what is in the new folder. Use the ↓ button if you actually want to copy them across.
- **The thumbnail is shot from the current viewport view** — using the Path Tracer, so the viewport flips view mode for a moment. Frame the camera before you click +.

20. Screenshot

Renders a single high-resolution path-traced still from the current viewport camera. You pick sample count, resolution, aspect and an output folder, press one button, and the tool switches the viewport to Path Tracing, hides every overlay so nothing lands in the image, waits for the render, moves the finished PNG into your folder and puts your view mode back.

Open it Compass ▶ Screenshot (row 1, right). Opens as a tab inside the panel.

Taking a shot

1. Frame the shot in the level viewport. You do not need to switch to Path Tracing yourself.
2. Set Samples. More samples means less grain and a longer wait. The slider is coarse and log-scaled — click the number box to type an exact value.
3. Pick a resolution chip: 2K (2048 wide), 4K (3840 wide) or 8K (7680 wide).
4. Pick an aspect chip: Auto keeps the viewport's shape, or force 16:9, 4:3 or 1:1.
5. Set the output folder — type into Save folder, or click ... and browse. A path inside the project is stored relative, so it still works on a teammate's machine.
6. Click Take Screenshot. The button reads Capturing... and the overlay UI vanishes from the viewport while the shot renders.
7. When the Screenshot Saved dialog appears, click Open Folder to jump straight to the file. The panel rebuilds itself at this point — a brief blink is normal.

The saved file is named after the Level Sequence currently focused in Sequencer, or after the project if no sequence is focused, followed by a date and time stamp.

Control	What it does	Default
Samples	Path-tracer samples per pixel. This is the wait: the tool accumulates exactly this many, plus 8 frames for the denoiser.	100 (1–16384)
Resolution	Output width. Height comes from the aspect below.	4K (3840 wide)
Aspect	Auto matches the current viewport; the fixed ratios ignore it.	Auto
Save folder	Where captures are written. Relative paths resolve against the project root; the folder is created if missing.	Screenshots/Renders
Open Save Folder	Opens Explorer with the last saved capture selected. Hidden until a capture has succeeded this session.	hidden

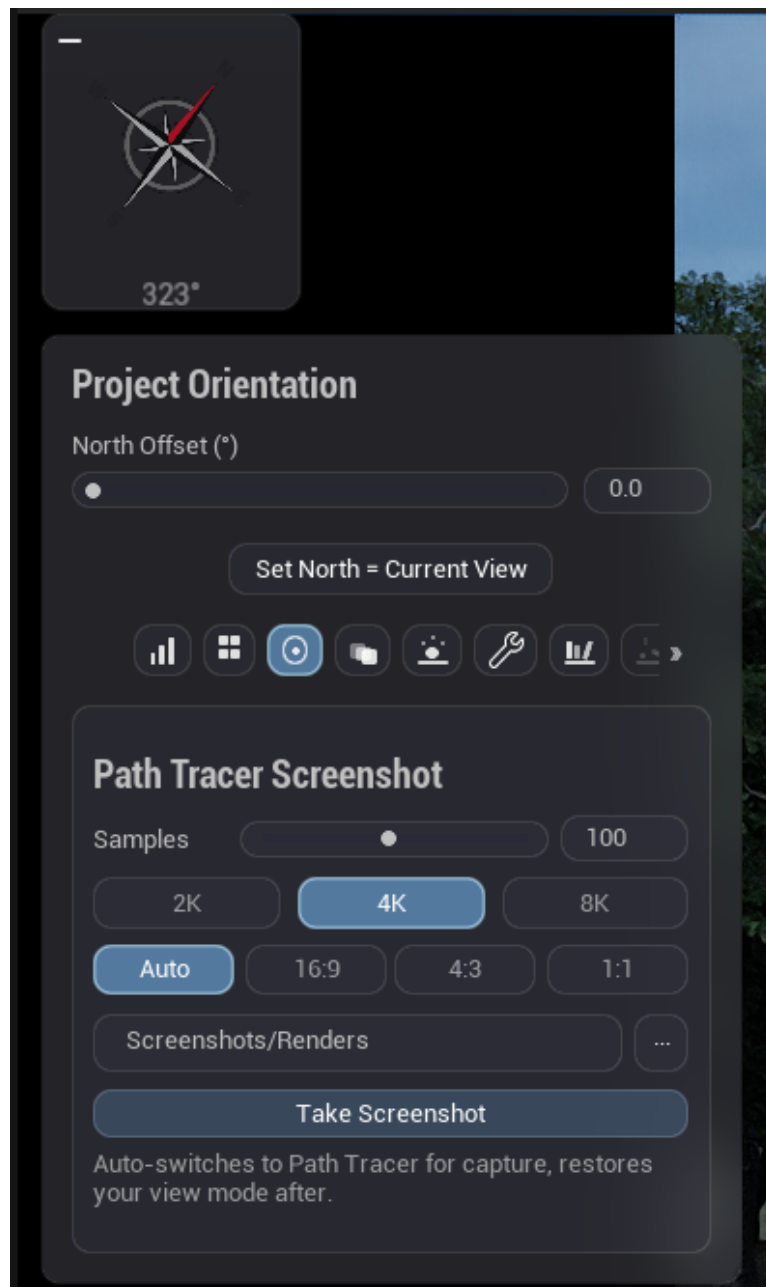


Fig. 47 — The Screenshot tab, ready to capture

Watch out

- **Sample count is the wait, and pixel count multiplies it** — set 2000 samples and the shot really is a couple of thousand frames long. At the same samples, an 8K shot is about four times an equivalent 4K one.
- **There is a hard 10-minute ceiling per capture** — if nothing has landed by then the tool gives up, restores your viewport and shows an amber failure line. A very high sample count at 8K can genuinely exceed this.
- **The tab's Samples value beats a Post Process Volume** — the tool overrides the project's path-tracer sample count for the duration and restores it afterwards, so a samples value set in a PPV does not apply to the shot.
- **The last moments of a capture can pause** — the engine writes the PNG into the project's own screenshot folder first and the plugin then moves it into your folder, retrying while the file is still locked.
- **The file name depends on Sequencer** — close Sequencer between two shots and the names will not match.

- **Open Save Folder points at the last capture, not the current folder** — change the save folder after a capture and the button still opens the old location until you take a new shot. It is also hidden again after an editor restart.
- **The panel visibly blinks and reopens after every capture** — this is deliberate: the engine's high-resolution capture leaves the overlay's click handling broken otherwise. It is not a crash.
- **Committing matters** — typing or dragging Samples does not save it until you press Enter in the box or release the slider. Closing the panel mid-drag can lose the change.

21. Texture Cap

Texture Cap forces every material texture down to a maximum size. A heavy archviz scene that stutters at full-resolution textures usually becomes workable at 1K or 2K. There are two independent caps: one for the viewport you work in, and one that the plugin swaps in by itself whenever a sequence render is running — so previewing cheap and rendering expensive no longer need a manual toggle.

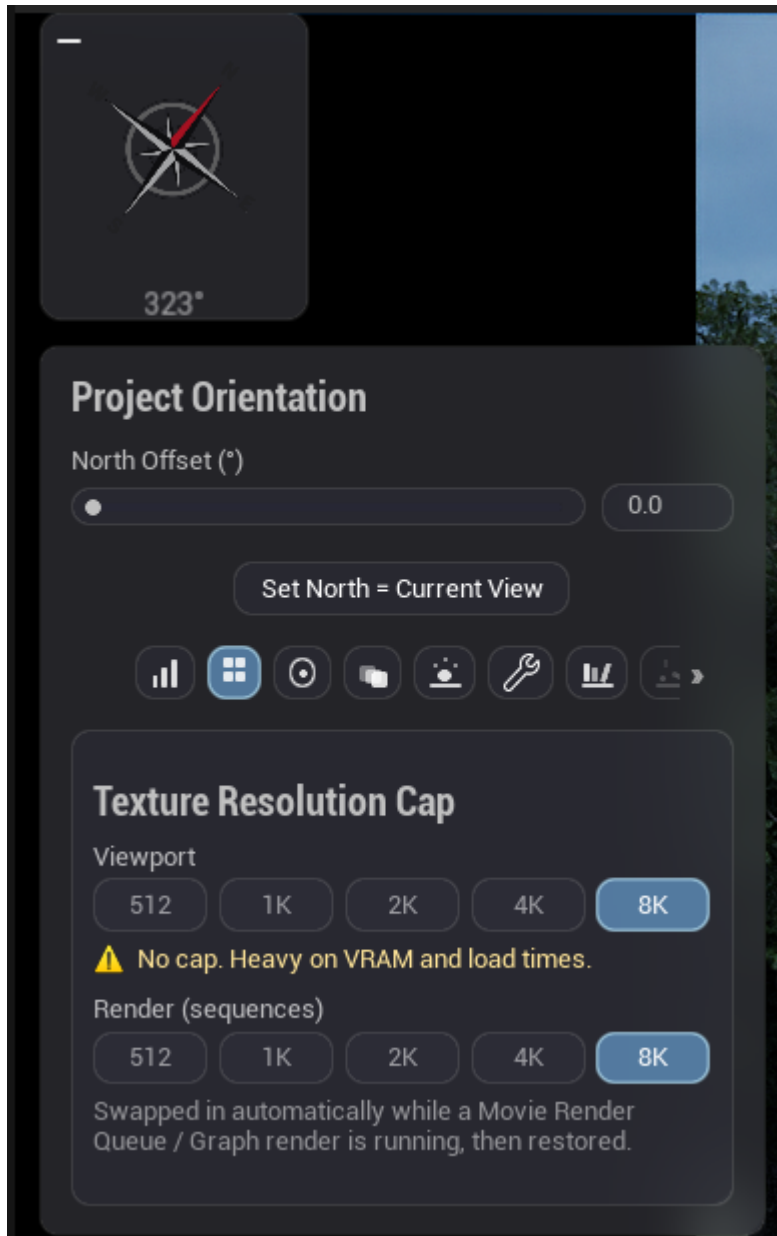


Fig. 48 — Both texture caps, with the no-cap warning showing

Open it Compass ► Texture Cap (row 1, middle). Opens as a tab inside the panel.

Making a heavy scene workable

1. Open the Stats tab first and watch Project VRAM and System VRAM. If the used figure is close to the total, texture memory is your bottleneck.
2. Switch to the Texture Cap tab.
3. Under Viewport, click 2K — the tab describes this one as best for previewing — or 1K for very heavy scenes.
4. Wait for the “Applying texture resolution cap...” progress dialog to finish. Every loaded texture is being rebuilt and the editor is blocked meanwhile.
5. Go back to Stats and confirm the VRAM figure has dropped.
6. Click 8K when you need to inspect real texture detail again.

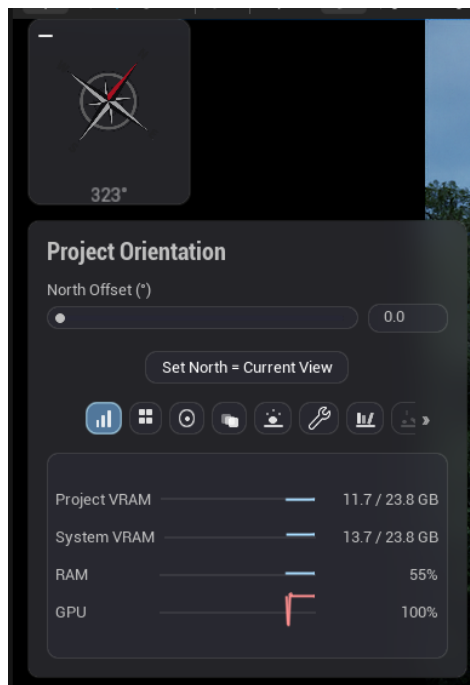
Keeping previews cheap and renders full quality

1. Under Viewport, pick a low cap you can work in comfortably — 1K or 2K.
2. Under Render (sequences), pick 8K (no cap), or 4K if you want a ceiling on render memory too.
3. Close the panel and work normally at the low cap.
4. Start your Movie Render Queue or Movie Render Graph job as usual. Within half a second the plugin notices and installs the render cap by itself, then puts the viewport cap back when the job finishes.

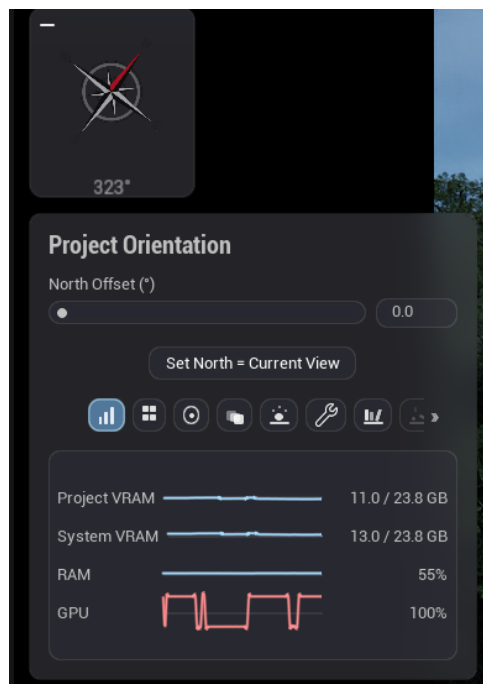
The same automatic swap brackets Harmonia's own screenshot captures and the thumbnail renders it makes when you save a lighting preset.

Cap	Means	Status line reads
512	512 px	Minimum VRAM. Fastest preview; softest detail.
1K	1024 px	Very low VRAM. Good for heavy scenes.
2K	2048 px	Low VRAM. Best for previewing.
4K	4096 px	Balanced quality and memory.
8K	no cap at all	⚠ No cap. Heavy on VRAM and load times.

Watch out 8K genuinely means no cap, not a cap at 8192 — that is why its status line is the amber warning one. And a cap only ever clamps downward: if your project already limits a texture group more tightly, that tighter limit stays.



8K — no cap



2K cap

Fig. 49 — Project VRAM at 8K versus 2K

Watch out

- **Changing a cap blocks the editor** — every texture already loaded is re-cooked. On a large archviz scene expect it to sit still for a while. Do not do it mid-render-setup.
- **Some texture types are never capped** — interface textures, lightmaps and shadowmaps, skyboxes, colour lookup tables, IES profiles, terrain height and weight maps, render targets and 2D pixel art. A cap will not soften your baked lighting or your sky.
- **The automatic render cap only sees local jobs** — the plugin polls this machine's render queue twice a second. Renders dispatched to a farm are not covered.

- **Editing the viewport cap mid-render appears to do nothing** — it is stored but not applied until the render ends. Changing the render cap mid-render, by contrast, does take effect immediately.
- **Both caps are written into the project's config, not a personal file** — on a shared project this means your choices can travel to everyone — unless the file is read-only, in which case they quietly fall back to your own per-user config instead.

22. Stats

A live read-out of video memory, system memory and GPU load, so you can see a scene creeping toward the limit before the editor starts crawling. Nothing on this tab is clickable — it is a read-out only.

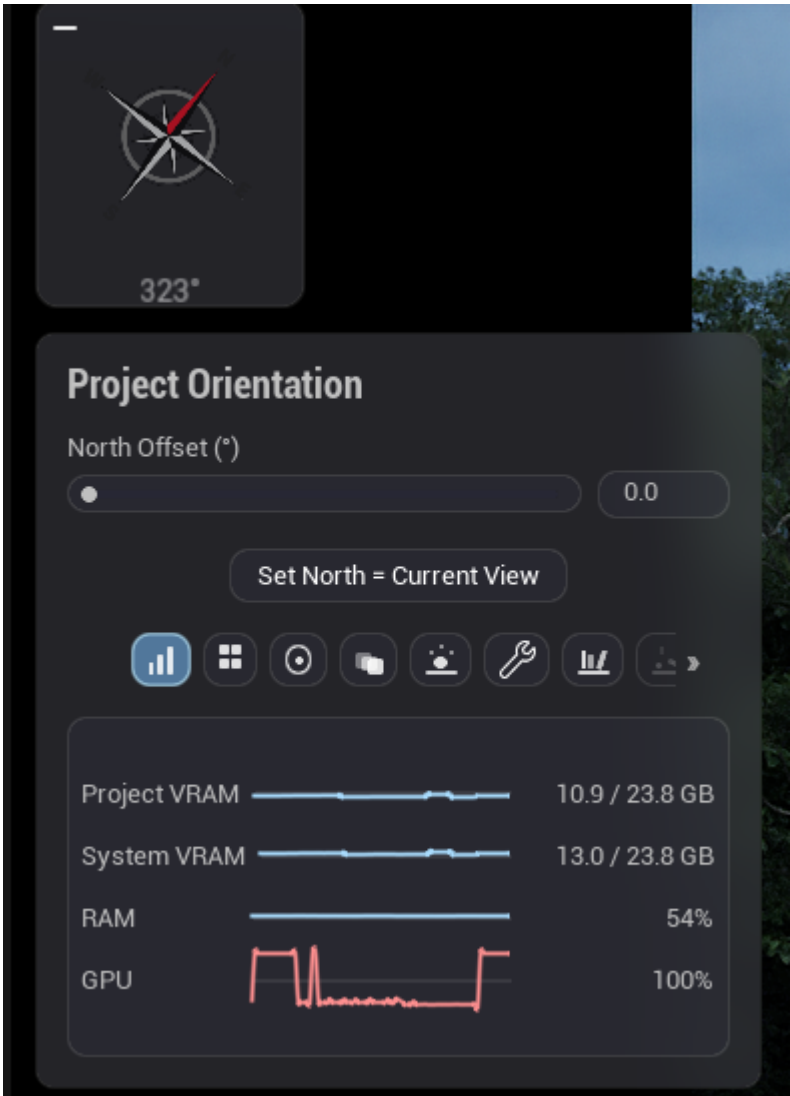


Fig. 50 — The Stats tab under load

Open it Compass ▶ Stats (row 1, left). Opens as a tab inside the panel.

Row	What it measures	Shown as
Project VRAM	Video memory this editor process is holding on the main graphics card.	used / total GB
System VRAM	The same, totalled across every program using the card. This is the number that decides whether you are actually out of memory.	used / total GB
RAM	Physical system memory in use across the whole machine.	percentage

Row	What it measures	Shown as
GPU	Last frame's GPU time measured against a 60 fps frame.	percentage

The lines are blue in normal territory and shift toward red as a metric passes 80%. Each graph holds 90 samples taken four times a second — roughly the last 22 seconds — and starts from empty every time the overlay is rebuilt, including after a screenshot.

Note The GPU graph is scaled against a 16.7 ms frame, so it pins at 100% for anything slower than 60 fps and cannot show you how much slower. Use it to spot the moment you cross the line, not to measure how badly. System VRAM is read from a Windows performance counter — if that counter is unavailable the row simply reads 0, which is a reporting gap rather than free memory.

23. The Tools tab

Harmonia's housekeeping panel. It prepares a Level Sequence for a foliage-heavy path-traced render in one click, thins foliage in the live viewport so the Path Tracer stays interactive while you work, silences the engine's on-screen viewport text, and sets alarms that nag you to submit your files before you go home.

Open it Compass ► Tools (row 2, right). Opens as a tab inside the panel.

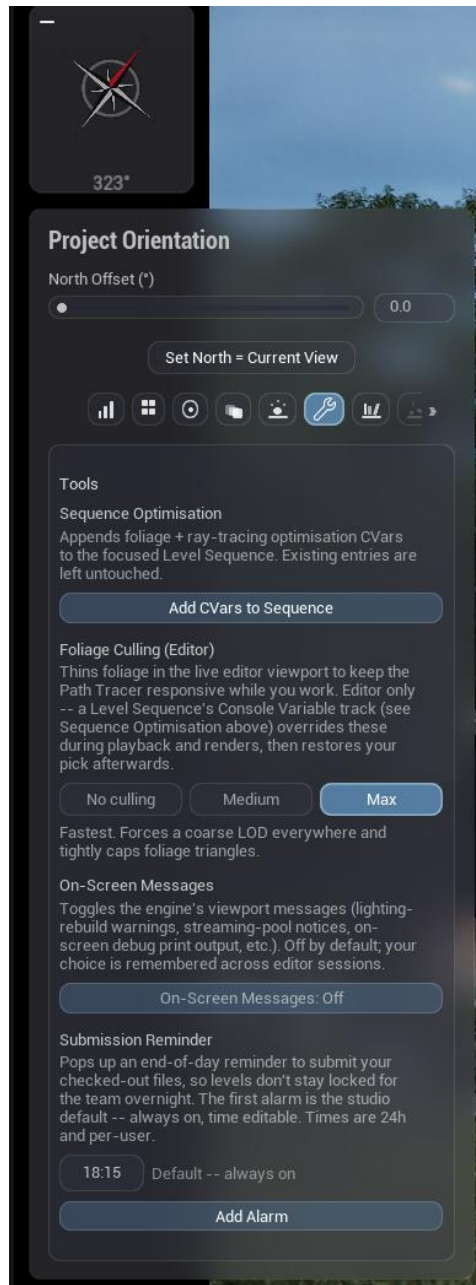


Fig. 51 — The Tools tab in full

Sequence Optimisation

Add CVars to Sequence writes three console-variable entries into the Console Variable track of the Level Sequence currently focused in Sequencer:

Console variable	Value	What it buys you
Foliage.ForceLOD	0	Every foliage instance renders at its highest detail level, regardless of distance.
r.RayTracing.Geometry.InstancedStaticMeshes.Culling	0	Instanced meshes — scatter, foliage — are not culled out of the ray-tracing scene, so they appear in the path-traced render.
foliage.MaxTrianglesToRender	1000000000000	Effectively removes the triangle budget that would otherwise thin foliage.

Because these ride on the sequence itself, they take over during playback and render and are restored afterwards — so you can work at a fast viewport preset and still render at full detail.

Watch out There is no success dialog. Confirmation is the track itself and a line in the Output Log — check the sequence's Console Variable track. Pressing the button a second time is safe: entries already present by name are skipped, but then nothing is marked as needing a save, so it will look as though nothing happened.

Note The section is created spanning the sequence's playback range as it is at that moment. If you later extend the sequence, the section does not grow with it and the new tail renders without the optimisation. Re-check it after changing sequence length.

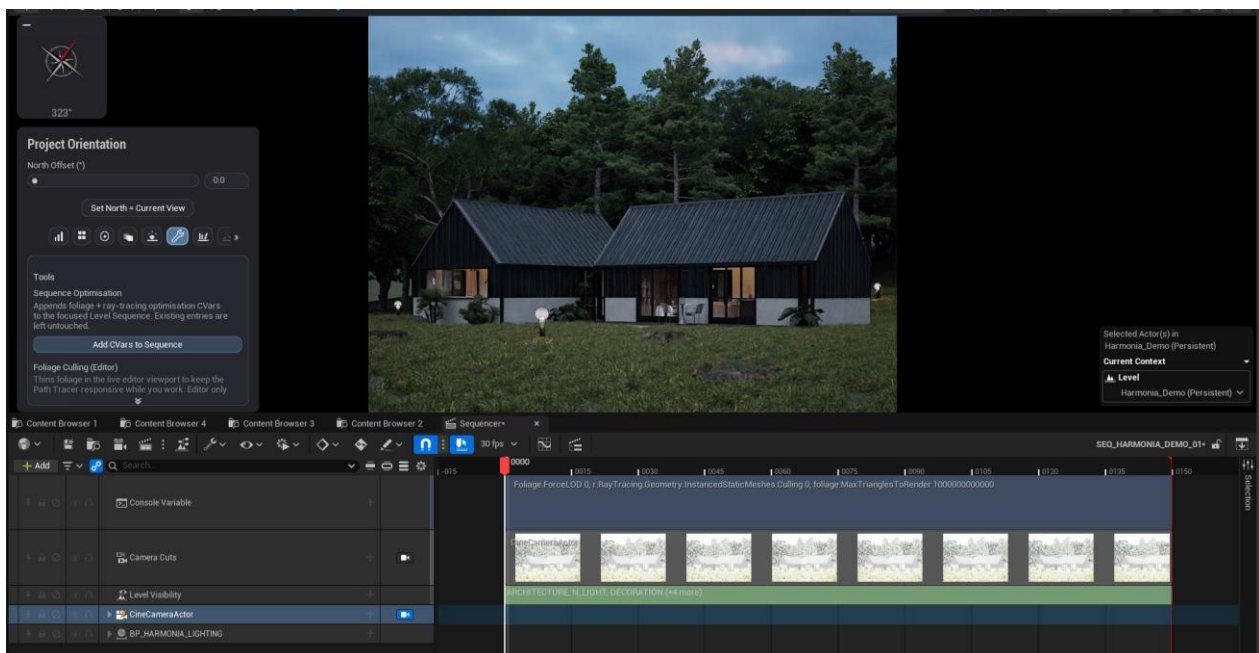


Fig. 52 — The three console variables landing on the sequence

Foliage Culling (Editor)

Three buttons that trade foliage detail against editor viewport speed, so the Path Tracer stays responsive while you work.

Watch out These are process-wide console variables, not a viewport-only preview. A render started on this machine inherits whatever preset is active — so a scene blocked out at Max can render with thinned foliage. That is exactly what Sequence Optimisation above is for: the values it writes onto the sequence override these for the duration of the render. Set the CVars on your sequence and you can work at Max safely.

Preset	What it does
No culling	Full detail: highest LOD everywhere, no ray-tracing instance culling, no triangle limit. The expensive one.
Medium	Balanced: normal distance LODs, ray-tracing instance culling back on, foliage triangle budget capped.
Max	Fastest: forces a coarse LOD on all foliage regardless of distance, keeps culling on, and caps the budget hard.

Watch out There is no button here for the untouched engine-defaults state a fresh install starts in, and you cannot get back to it from this panel. Note that the “Off (engine defaults)” entry in Project Settings ► Plugins ► Harmonia ► Foliage Culling does not restore anything either — it simply stops Harmonia touching the values, leaving whatever was last applied in place. To positively open everything back up, pick “No culling”.

Your pick is saved into the project's game config — not a personal file — and re-applied every time the editor starts. If that config is shared through revision control, your pick travels to your teammates.

On-Screen Messages

One toggle for Unreal's own yellow and red viewport text — lighting needs rebuilding, texture streaming pool over budget, and so on. Harmonia ships with this Off so that text never lands in a screenshot or a client-facing recording. If you are used to seeing engine warnings printed over the viewport and they have vanished, this is why.

Submission Reminder

1. Scroll to Submission Reminder. The first row is the studio default at 18:15, tagged “Default — always on”.
2. Click any time field and type a time. It accepts 18:15, 18.15, 18 15, the compact 1815, or just 18. Press Enter.
3. Click Add Alarm for another. New rows appear at 12:00.
4. Use a row's On / Off button to silence an alarm without deleting it, or Remove to delete it.
5. When an alarm fires, click Submit Files to open the editor's Submit Content window, or Later to dismiss it.

Tip To see what the reminder looks like without waiting for the clock, type `Harmonia.SubmitReminder.Test` into the editor console.

Watch out for	What happens
Alarms only exist while the editor is running	and a time that has already passed when you open the editor never fires retroactively. Open the editor at 19:00 and the 18:15 reminder is gone for the day.
The clock is checked every five seconds	so the reminder can appear a few seconds after the minute you set. If another Harmonia dialog is on screen it waits until that one is gone.

Watch out for	What happens
A rejected time silently reverts	type an unreadable time, or an hour above 23, and the field goes back to its previous value with no error. If the number did not stick, it was rejected.
Remove deletes immediately	no confirmation prompt.
The first alarm cannot be switched off or removed	its time can be changed, but it has no On/Off toggle and no Remove button.
Submit Files needs a live revision-control connection	otherwise you get an information dialog telling you to connect, or to submit from your external client instead.

Alarm times are stored per user and per project — your times are not pushed to your teammates.

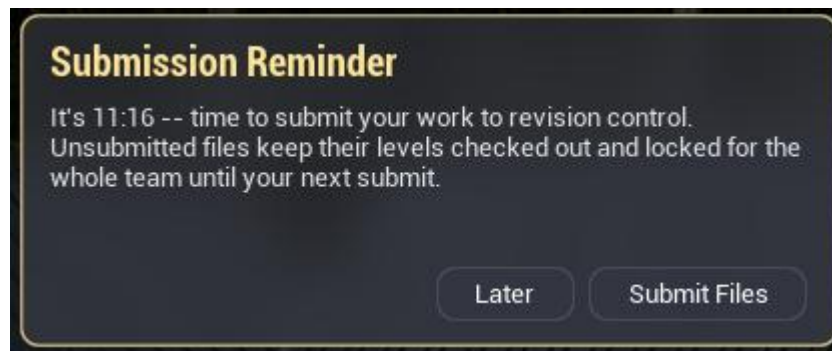


Fig. 53 — What the end-of-day reminder looks like

24. Movie Render Graph: post-process toggles

A node you add inside a Movie Render Graph asset to switch individual post-process effects off for a render — bloom, vignette, film grain and so on — without hunting through Post Process Volumes or fighting global console variables.

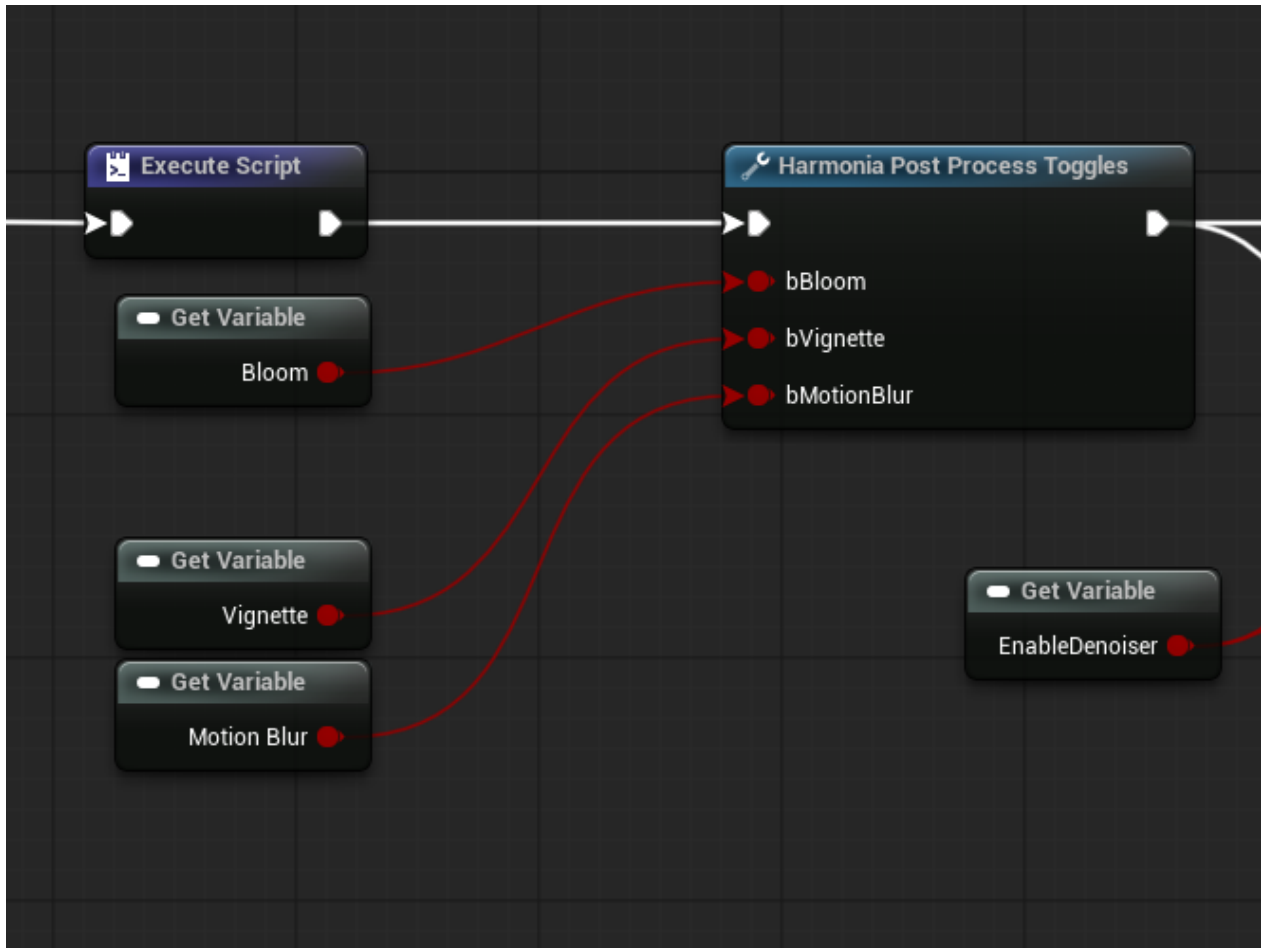


Fig. 54 — The Movie Render Graph wiring the toggles node needs

1. Open your Movie Render Graph asset.
2. Right-click in the graph, find the Harmonia category, and add Harmonia Post Process Toggles. Branch placement does not matter — it is found asset-wide.
3. Add an Execute Script node to the same graph and set its script class to `HrmMovieGraphPostProcessApplyScript`.
4. On the toggles node, tick the small override box beside an effect to take control of it, then untick the effect itself to switch it off. An effect whose override box is clear is greyed out and left entirely alone, so the renderer node's own setting still applies.
5. Render. Each unticked effect is forced off on every renderer node in the graph, which beats any global console variable.

Watch out The toggles node does nothing on its own. Without the Execute Script node carrying `HrmMovieGraphPostProcessApplyScript` in the same graph, every toggle is ignored silently. Only the first toggles node in a graph is used — a second one is ignored.

The checkboxes read Bloom, Vignette, Film Grain, Lens Flares, Chromatic Aberration and Motion Blur. All are ticked (on) by default.

Per-job overrides

To make a toggle overridable per job from the Movie Render Queue, create a boolean graph variable named exactly one of:

`Bloom` · `Vignette` · `FilmGrain` · `LensFlares` · `ChromaticAberration` · `MotionBlur`

then tick the matching override in the Queue for a specific job. A near-miss name is not matched and the override does nothing. The value that actually applies is decided in this order: the per-job checkbox in the Queue, then the graph variable's default, then the value typed on the node.

Note Three spellings of the same thing, which is worth knowing before it confuses you. In the details panel the settings read as plain words — Bloom, Motion Blur. On the node itself, a setting promoted to an input pin shows its raw property name with a leading b — `bBloom`, `bMotionBlur`. And a graph variable you create as `MotionBlur` will display as “Motion Blur”, because Unreal adds the spaces for you. Type the name without spaces; what you see afterwards is just the display.

Note Switching Motion Blur off removes only the post-process blur; the path tracer's own reference motion blur is a separate control on the Path Traced Renderer node.

25. Safety nets that run by themselves

Some of Harmonia has no interface at all. These things run in the background from the moment the editor starts. You do not switch them on, and mostly you will never notice them — but it is worth knowing they exist, because each one explains a behaviour that would otherwise look like a bug.

The Sequencer guard

With a Level Sequence open and a keyed track already on a lighting value, changing that value in a Harmonia panel writes a temporary preview keyframe at the playhead so you can see the result. It is not committed. Scrubbing the playhead, switching to another sequence, or closing the sequence throws the preview away and restores the original key.

Note Press the diamond button to commit a change before you scrub. And when you close a Level Sequence, the editor's own lighting is re-applied to the viewport a few frames later — so a brief flicker, or a one-beat delay before the lighting looks right again, is expected.

The lighting-level edit guard

The first time in an editor session that you modify the shared lighting level without a sequence open, a dialog appears — because that change reaches every artist on the project. Undo the change runs one editor undo step; Keep editing dismisses it.

- **It fires once per session** — then stays quiet until that level has actually been saved. The second, third and fourth accidental edits of the day are silent, so do not treat the absence of the warning as proof you did not touch the lighting level.
- **Undo the change is a single editor undo** — if you carried on working after the lighting edit, that undo rolls back the most recent action instead. Check the result.
- **It stays silent while a sequence is focused** — because editing lighting into sequence tracks is the intended workflow. It is also silent during a White Override pass, which dirties the level in exactly the same way.

Things Harmonia does for you at startup and in the background

What	Why you would notice
The ray-tracing geometry pool is enlarged	Heavy archviz scenes stop dropping geometry out of ray-traced and path-traced views.
Your saved texture cap is re-applied	The cap you chose survives an editor restart without you re-picking it.
Path Tracer instance culling is suspended	While any viewport is in Path Tracing mode, instanced-mesh ray-tracing culling is turned off so scattered copies actually appear in the render — and handed back when you leave that view mode. If you changed that console variable by hand in the meantime, your value is left alone.
The render texture cap is installed during renders	A Movie Render Queue or Movie Render Graph job on this machine automatically swaps the viewport cap for the render cap, and swaps it back afterwards.

What	Why you would notice
Scatters are re-primed when a level is shown again	Hiding and re-showing a streaming level does not leave its scatters empty.
Overlays are rebuilt after a capture	The panel visibly blinks and reopens after a screenshot or sun study. The engine's high-resolution capture leaves click handling broken otherwise.

Appendix — All settings, in one place

Harmonia has three settings pages, all under Edit ► Project Settings ► Plugins. Most of what you need day to day is in the panel itself; these pages hold the defaults and the long tail.

Watch out The main Harmonia page writes into the project's shared configuration file, so your choices travel to the rest of the team. If that file is read-only — checked in and not checked out, for example — the save quietly falls back to a per-user config instead, and your teammates will not see the change.

Plugins ► Harmonia

Shared with the project.

Section · Setting	What it does	Default
Orientation · North Offset	Which world direction counts as true north. 0° is world +X.	0.0 (0–360)
Sun Position · Auto-Update Sun Position	Lets the Sun Calculator drive the lighting rig live.	Off
Sun Position · Sun Pitch / Sun Yaw	The live values the calculator is pushing. Display only.	180 / 180
Compass Overlay · visible	Turns the viewport compass — and therefore every Harmonia tool — on or off.	On
Compass Overlay · opacity	How strongly the compass reads over your scene.	0.6 (0.1–1.0)
Overlay UI · Overlay UI Scale	Multiplier on the automatic per-monitor size of all Harmonia interface.	1.0 (0.75–1.25)
Texture Streaming · Viewport Texture Cap	Cap used while you work.	8K (no cap)
Texture Streaming · Render Texture Cap	Cap swapped in automatically during renders.	8K (no cap)
Foliage Culling · Editor Foliage Culling	Viewport foliage detail. “Off” leaves current values untouched rather than restoring them.	Off (engine defaults)
Path Tracer Screenshot · Path Tracer Samples	Samples per pixel for a still.	100 (1–16384)
Path Tracer Screenshot · Screenshot Resolution	Output width.	4K (3840 wide)
Path Tracer Screenshot · Screenshot Aspect Ratio	Output shape.	Auto (Viewport)
Path Tracer Screenshot · Screenshot Save Folder	Where stills are written. Relative paths resolve against the project root.	Screenshots/Renders
Lighting Presets · Presets Folder	Where presets are stored, as a settings file plus a thumbnail per preset.	Saved/Harmonia_Presets
Lighting Presets · Preset Sort Order	Order of the preset grid.	Alphabetical
Viewport · Show On-Screen Messages	Lets Unreal's own coloured viewport warnings print. Off by default so they never land in a screenshot.	Off

Plugins ► Harmonia Asset Library

Stored per user and per project — each artist sets these on their own machine.

Setting	What it does	Default
Library path	The shared folder the Browse tab reads. Written automatically every time a library loads — you rarely edit it here.	empty
Publish output path	The folder the Publish tab writes to.	empty
Thumbnail Resolution	Pixel size of the square preview images written at publish time.	512 (64–2048)
Thumbnail Environment Cubemap	An optional HDRI used purely as lighting for preview renders.	empty
Thumbnail Front Axis	Which side of a mesh the preview camera treats as the front.	+X
Thumbnail Samples Per Pixel	Has no effect — previews are rendered lit, not path-traced.	50 (unused)
Floor Under Meshes	Has no effect — the preview renderer never builds a ground plane.	On (unused)

Plugins ► Harmonia White Override

Setting	What it does	Default
Mode	White or UV Checker. Same two as the panel chips.	White
Clay base colour	How bright the clay reads. Deliberately not pure white.	0.75 grey
Studio-material filter	Three-state version of the panel chip: All materials, Skip studio materials, or Only studio materials.	All materials
Mask channel	Which texture channel holds a cutout. Auto works it out per material and deliberately skips when unsure — set it explicitly if a whole library comes out wrong.	Auto (skip when unsure)
Master materials	The two white masters the tool needs. It refuses to run unless both are present.	shipped defaults
Exclusion patterns	Name patterns and specific materials the pass always leaves alone.	shipped list