



Building Beauclair

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THE
WITCHER
WILD HUNT

EXPANSION PACK
BLOOD AND WINE

GDC
17







The challenge

GDC

THE
WITCHER
WILD HUNT

EXPANSION PACK
BLOOD AND WINE



The challenge

- A new setting



THE
WITCHER
WILD HUNT



THE
WITCHER
WILD HUNT



THE
WITCHER
WILD HUNT



The challenge

- a new setting



The challenge

- a new setting
- a new, huge city



The challenge

- a new setting
- a new, huge city
- art goals for Beauclair



The challenge

- a new setting
- a new, huge city
- art goals for Beauclair
- tech goals for Beauclair



The challenge

- a new setting
- a new, huge city
- **art goals for Beauclair**
- **tech goals for Beauclair**



Presentation Road Map

Designing the city

Our artistic vision

Technical challenges and solutions

Performance goals

Pipeline improvements

Q&A





Let's begin!

GDC

THE
WITCHER
WILD HUNT
EXPANSION PACK
BLOOD AND WINE



Pre-planning

- navigation in an urban space is hard
- big landmarks taken from books

City



Mount Gorgon



Elven Palace



Navigation





WEST

SOUTH

NORTH

EAST



- streets
- plazas
- gates





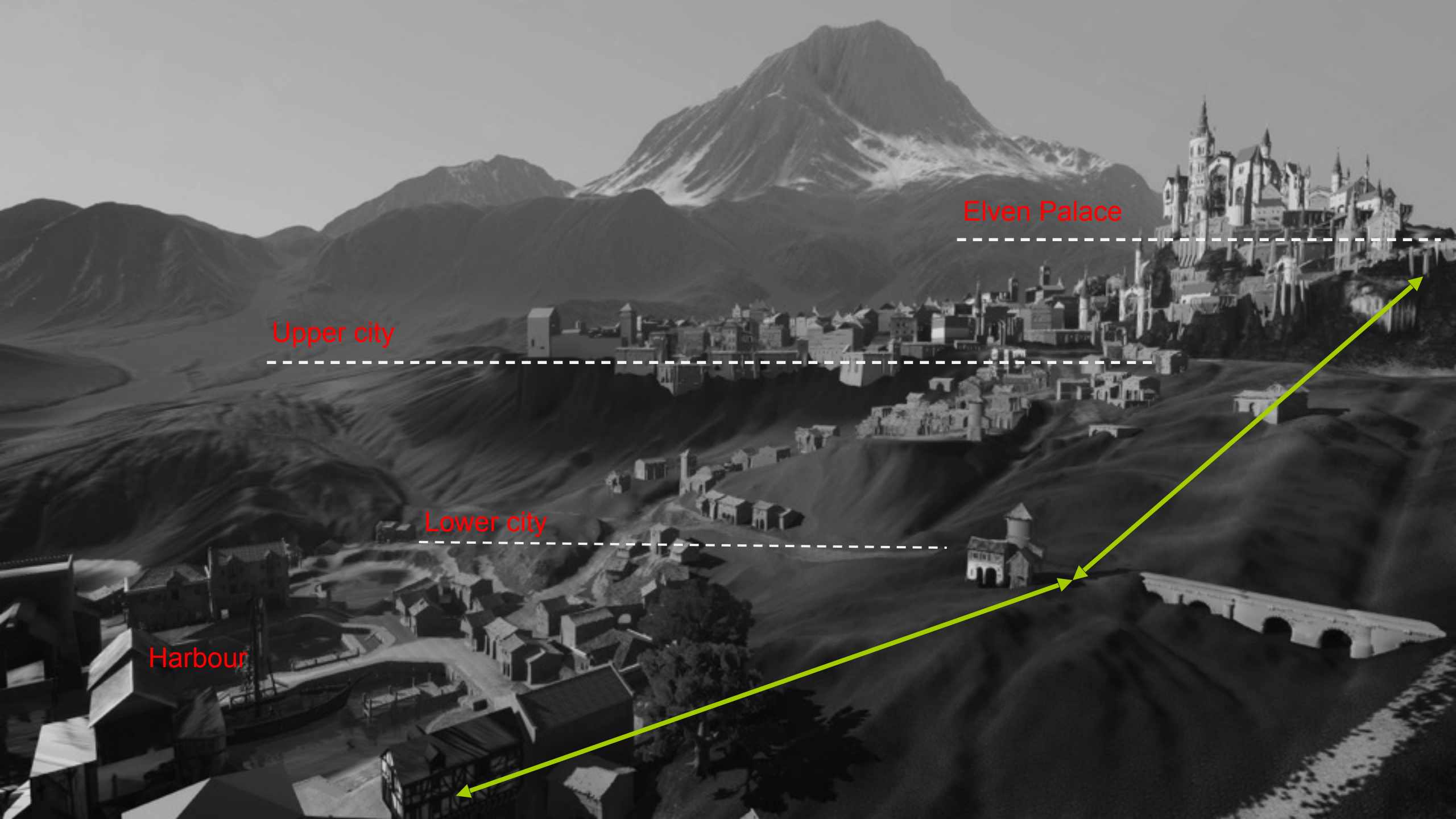












Elven Palace

Upper city

Lower city

Harbour



But is it good?

- can't always see distant landmarks
- how does the player know where they are?
- long views = expensive and risky









Refining the original layout



In-city landmarks



In-city landmarks



In-city landmarks



In-city landmarks



The Temple













Elven Palace









City Hall















From prototype to reality

- technical restrictions we learned during prototyping
- long views vs. our technical restrictions



Solving problems with more prototypes













The main square

- the most demanding location in Beauclair
- lots of open space
- lots of content







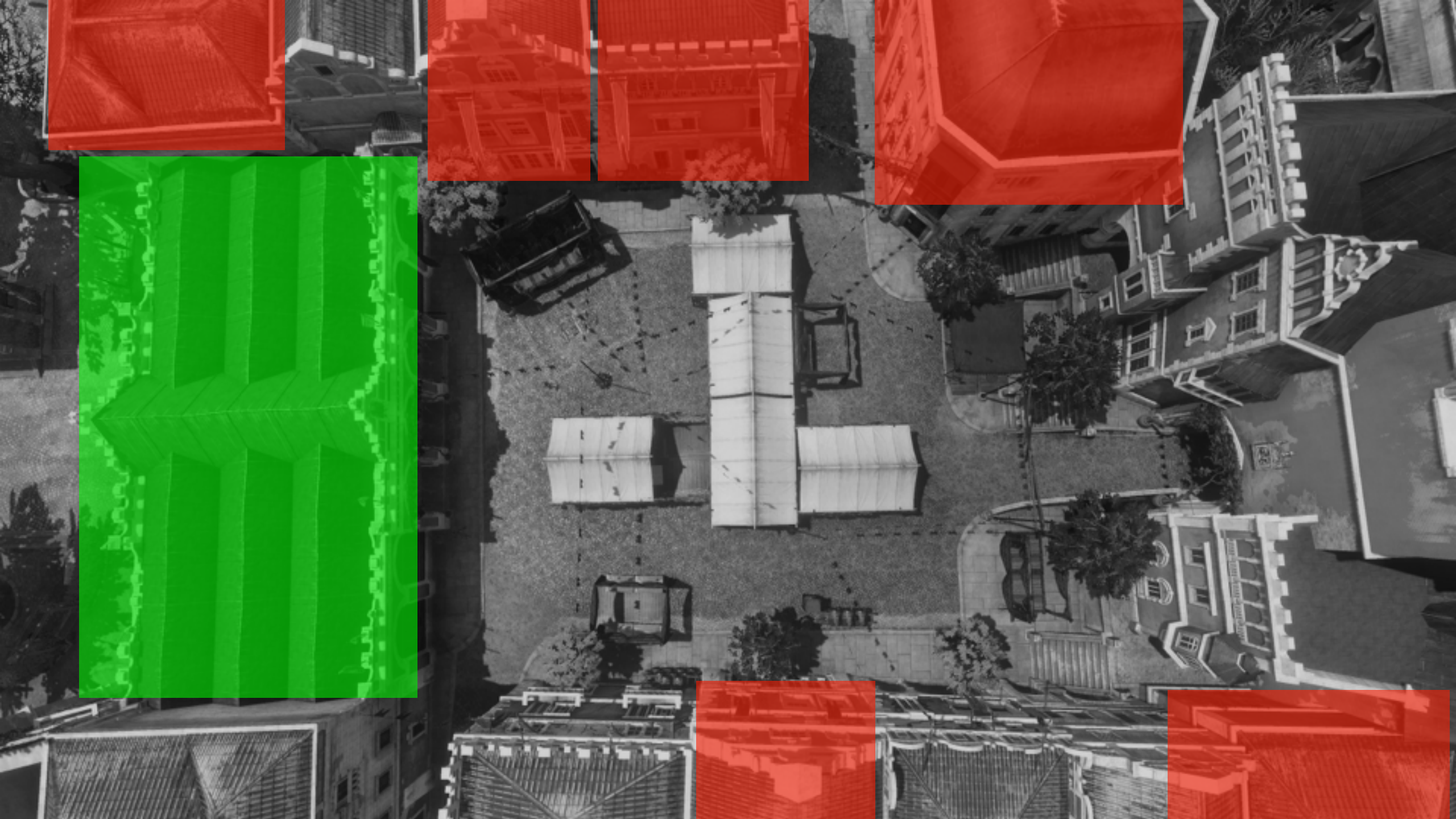


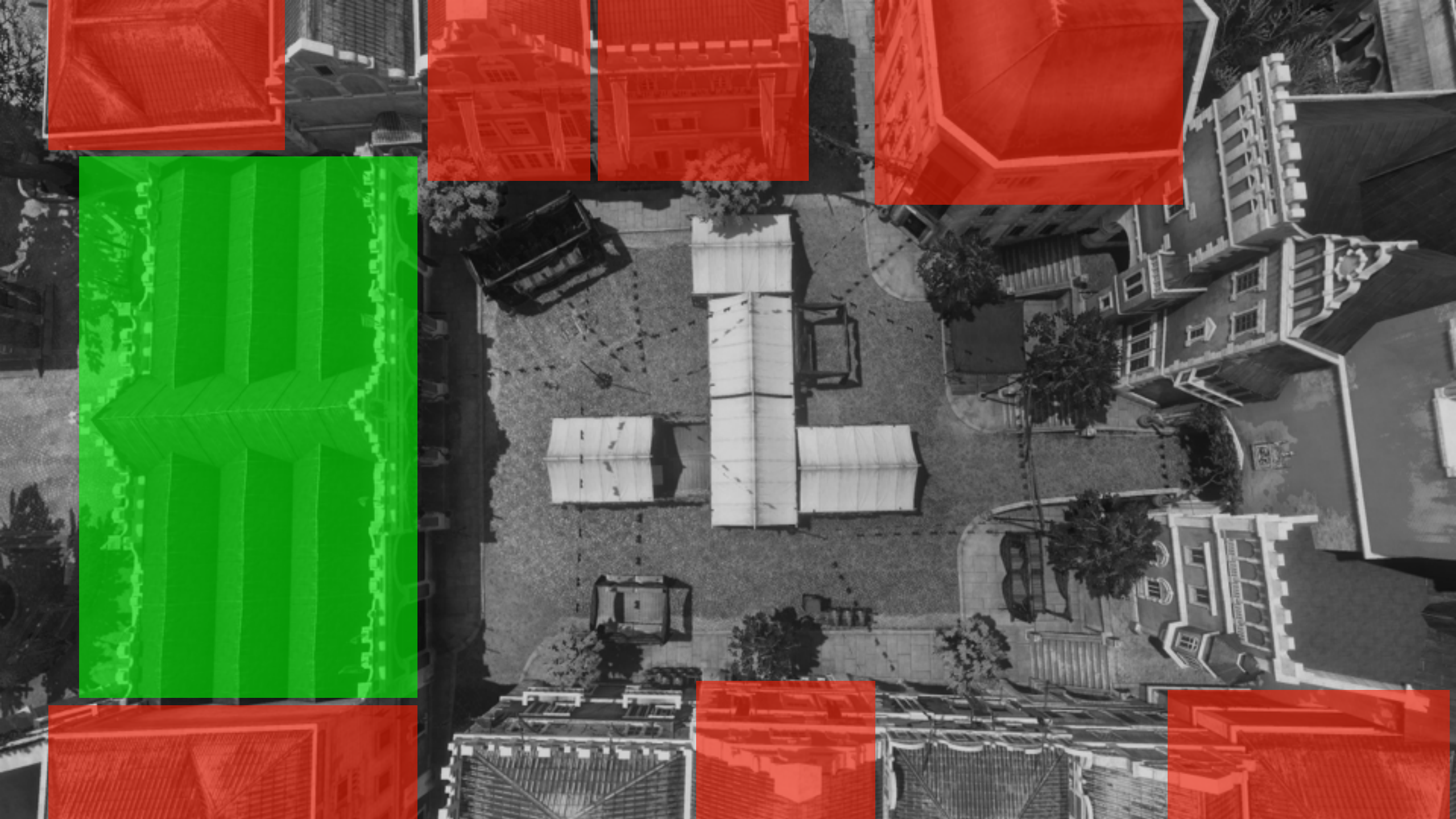


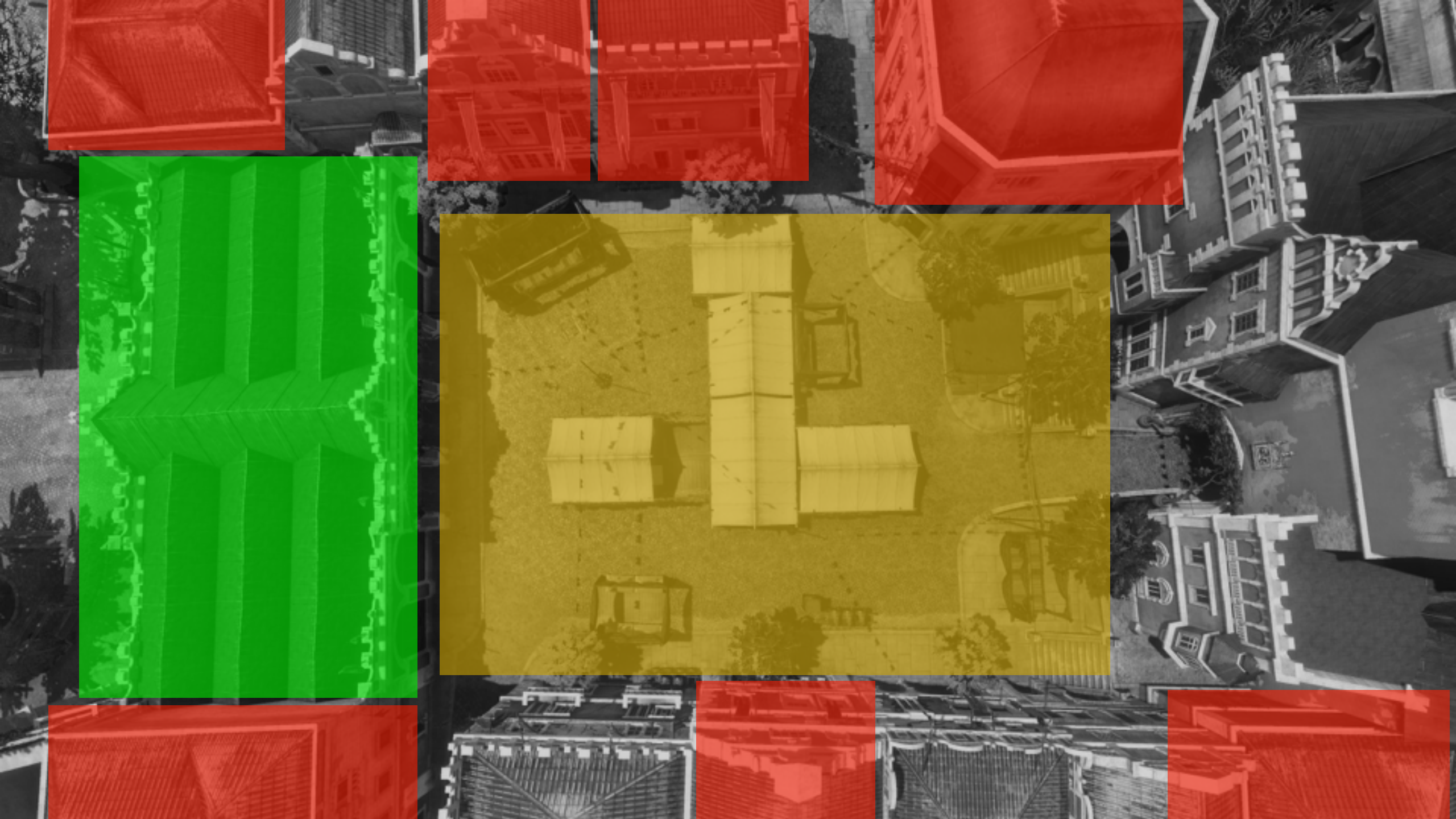


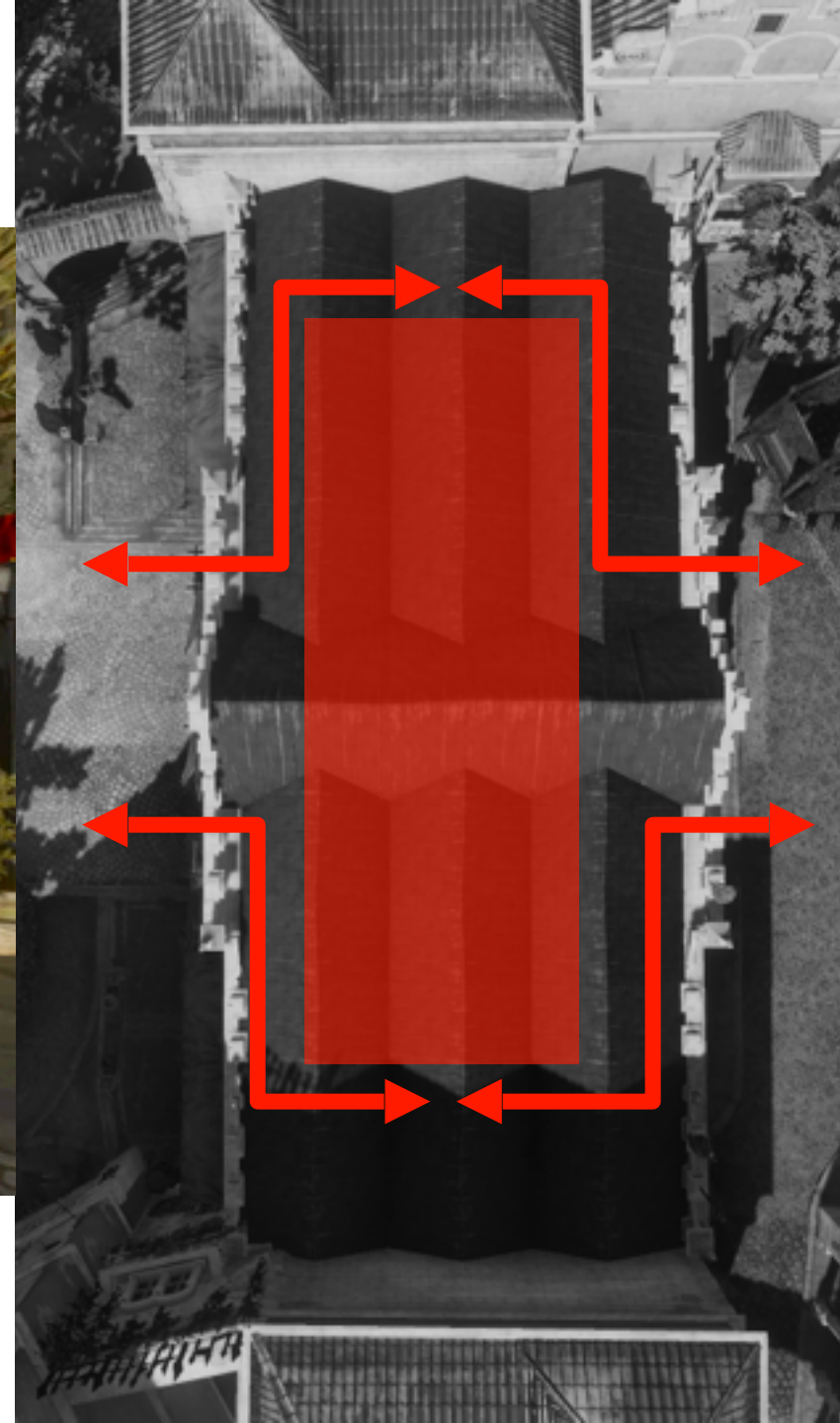


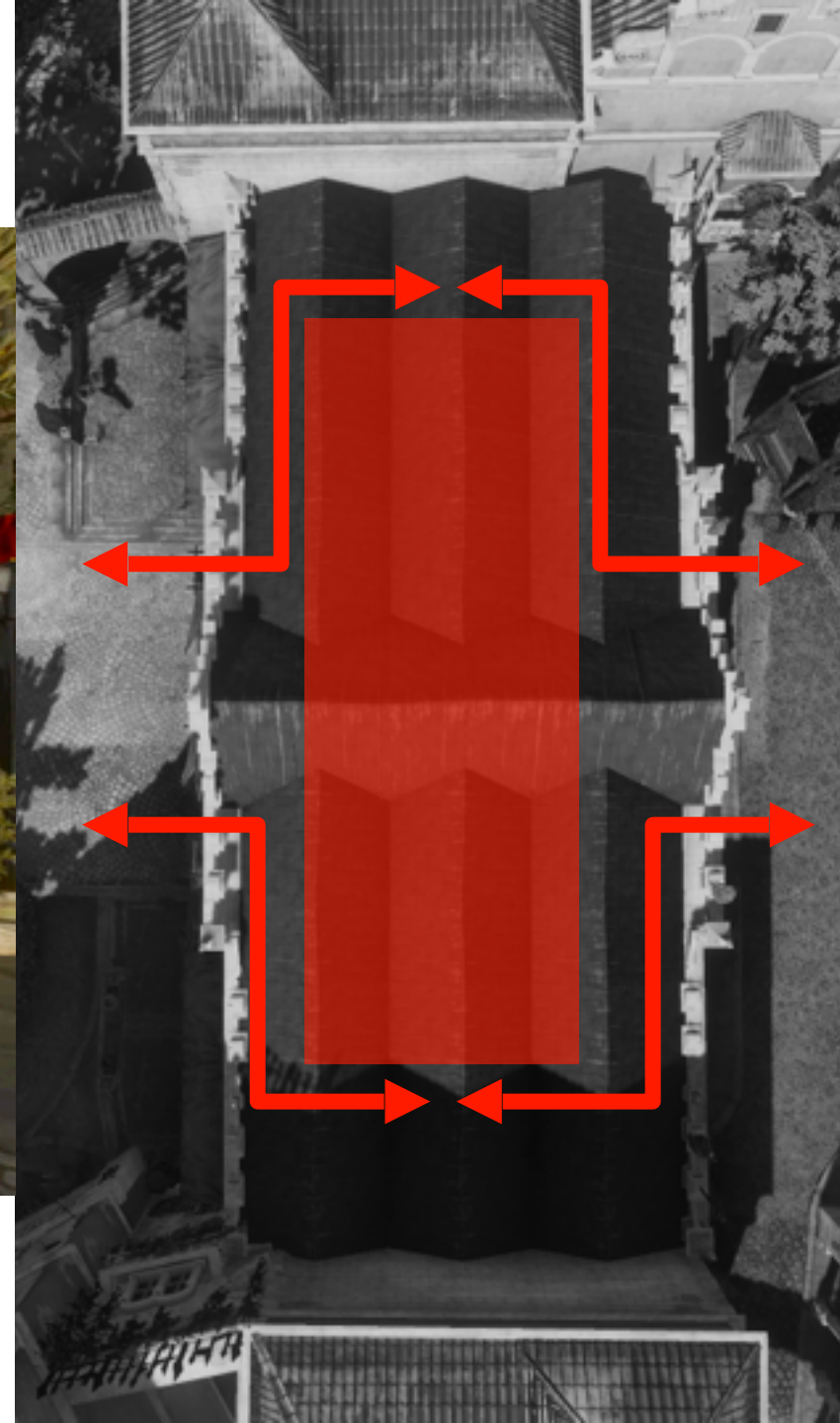


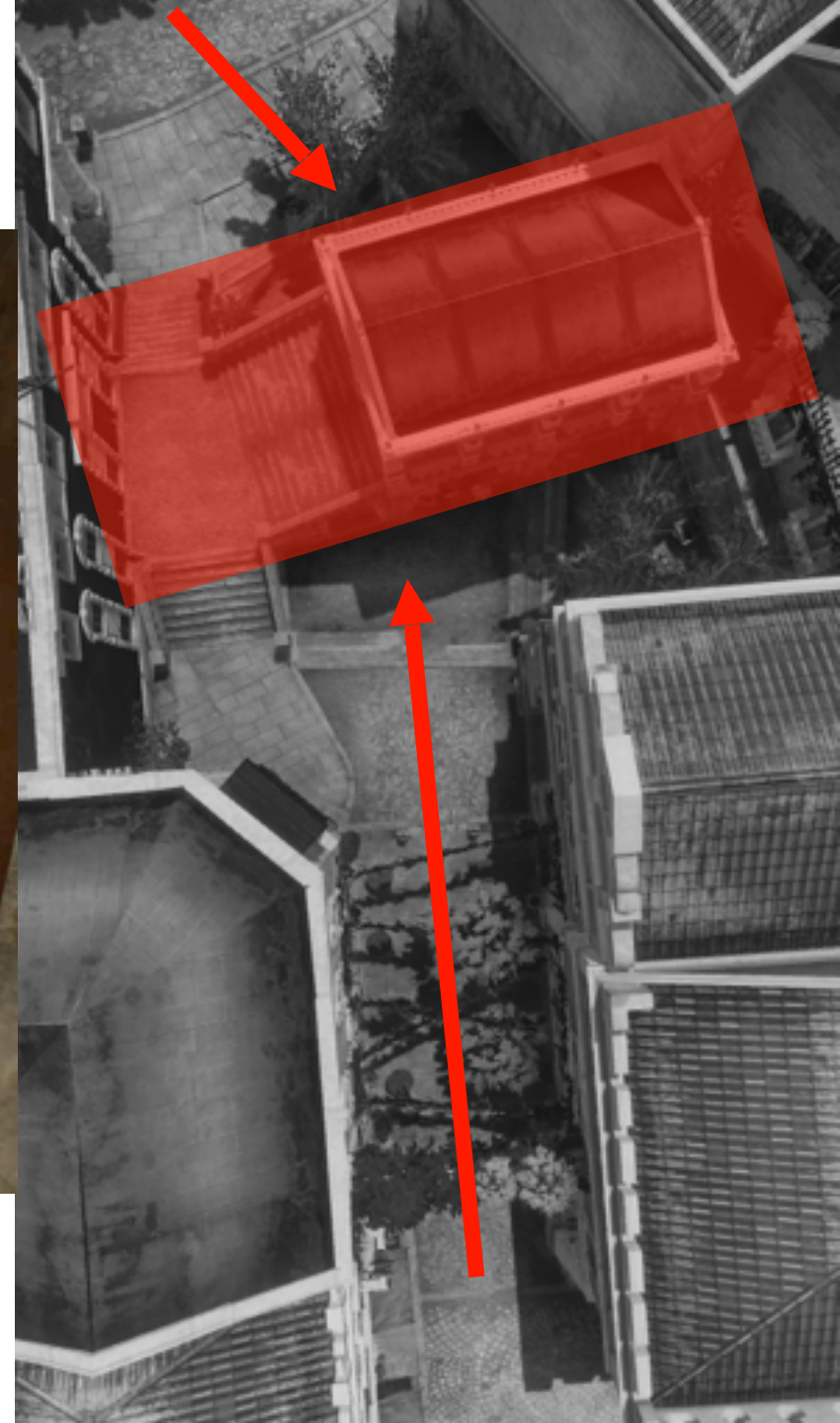


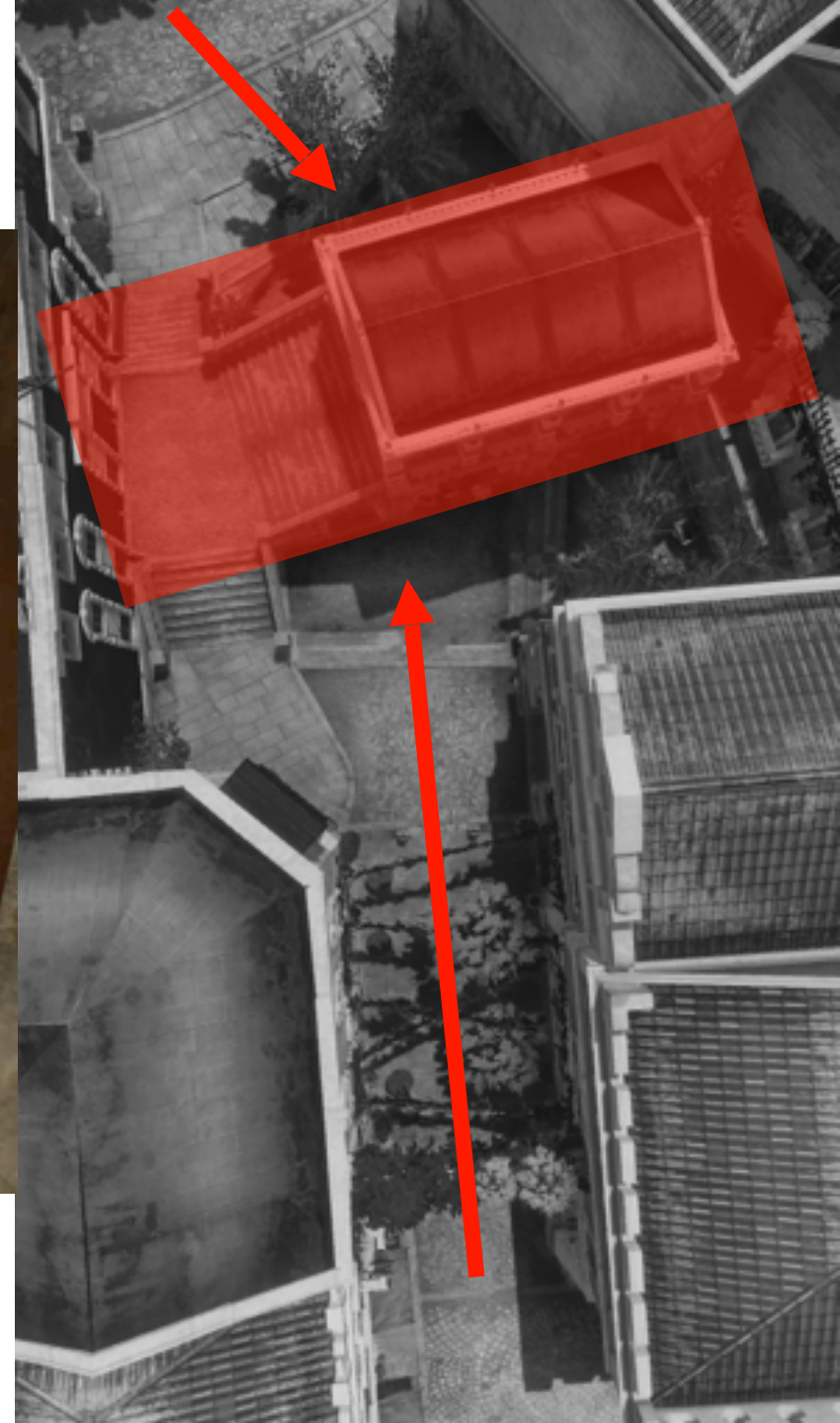


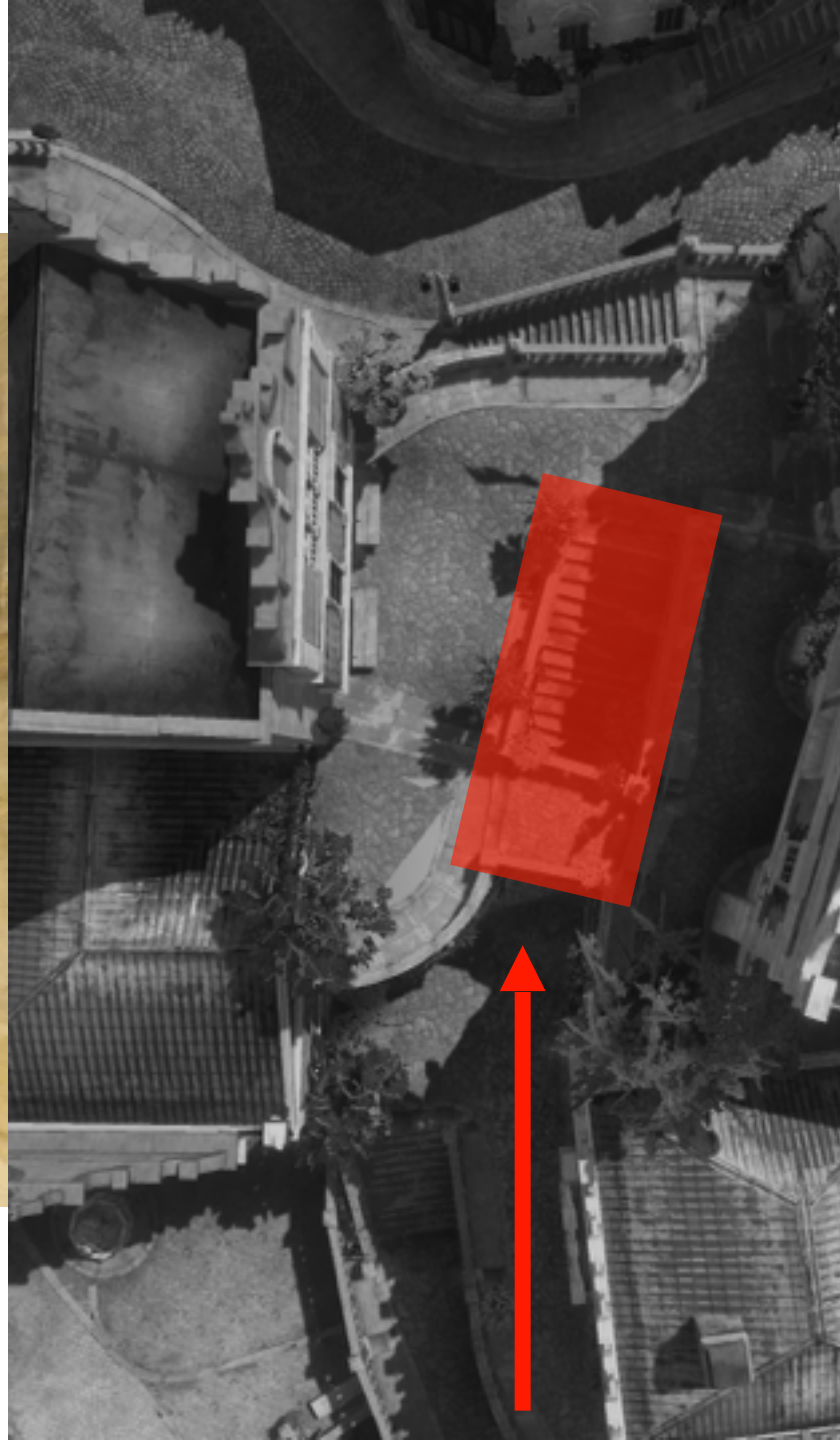


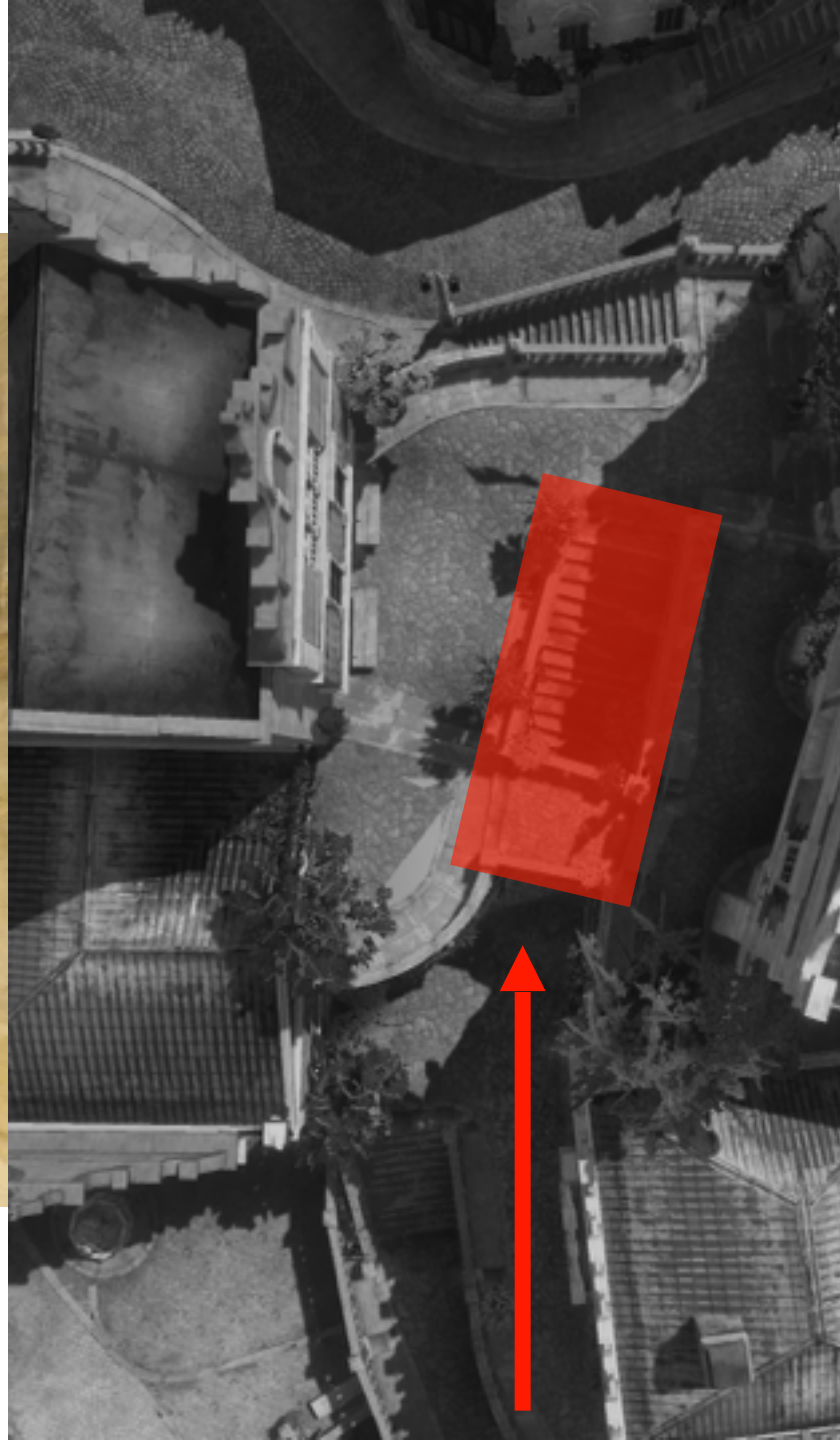






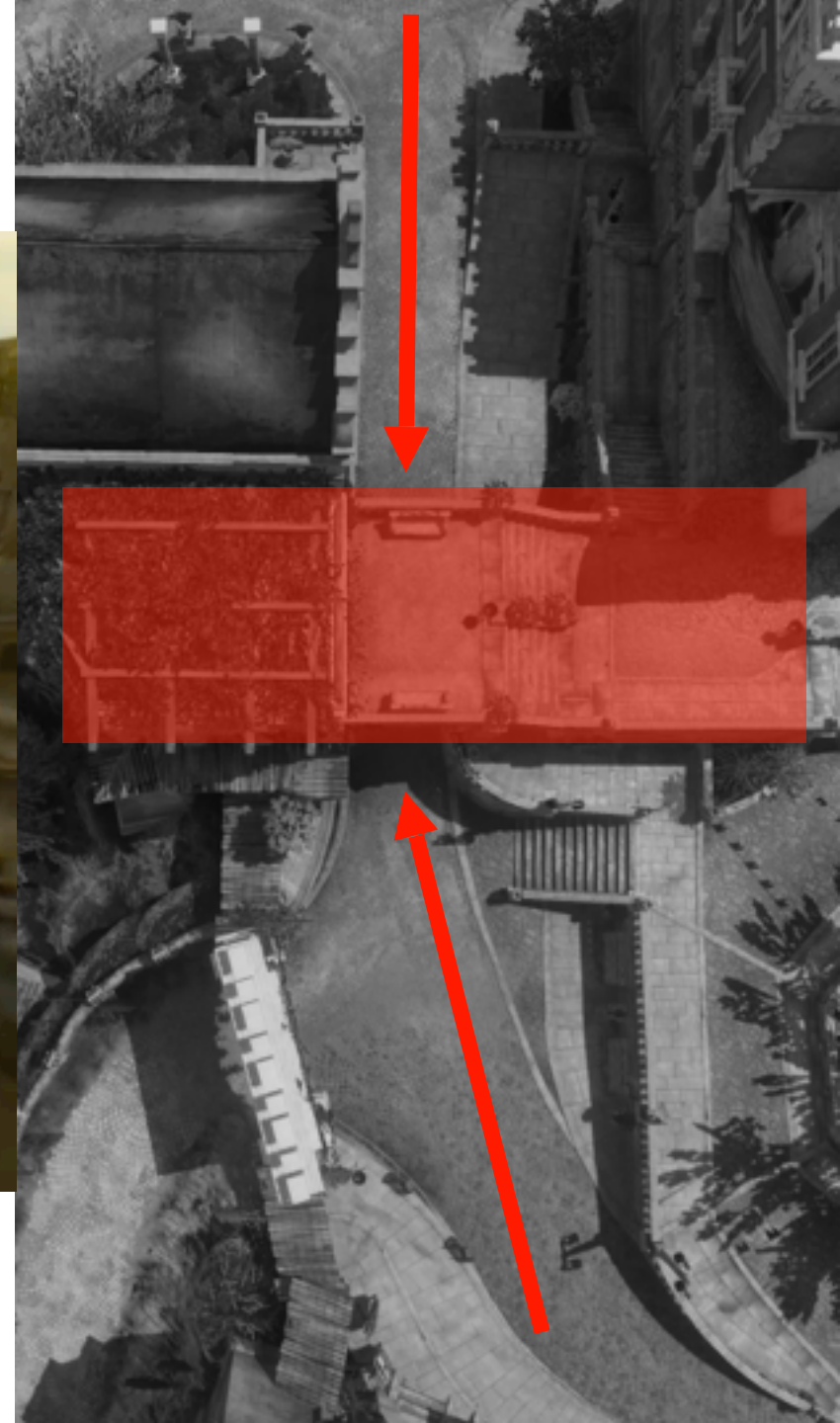


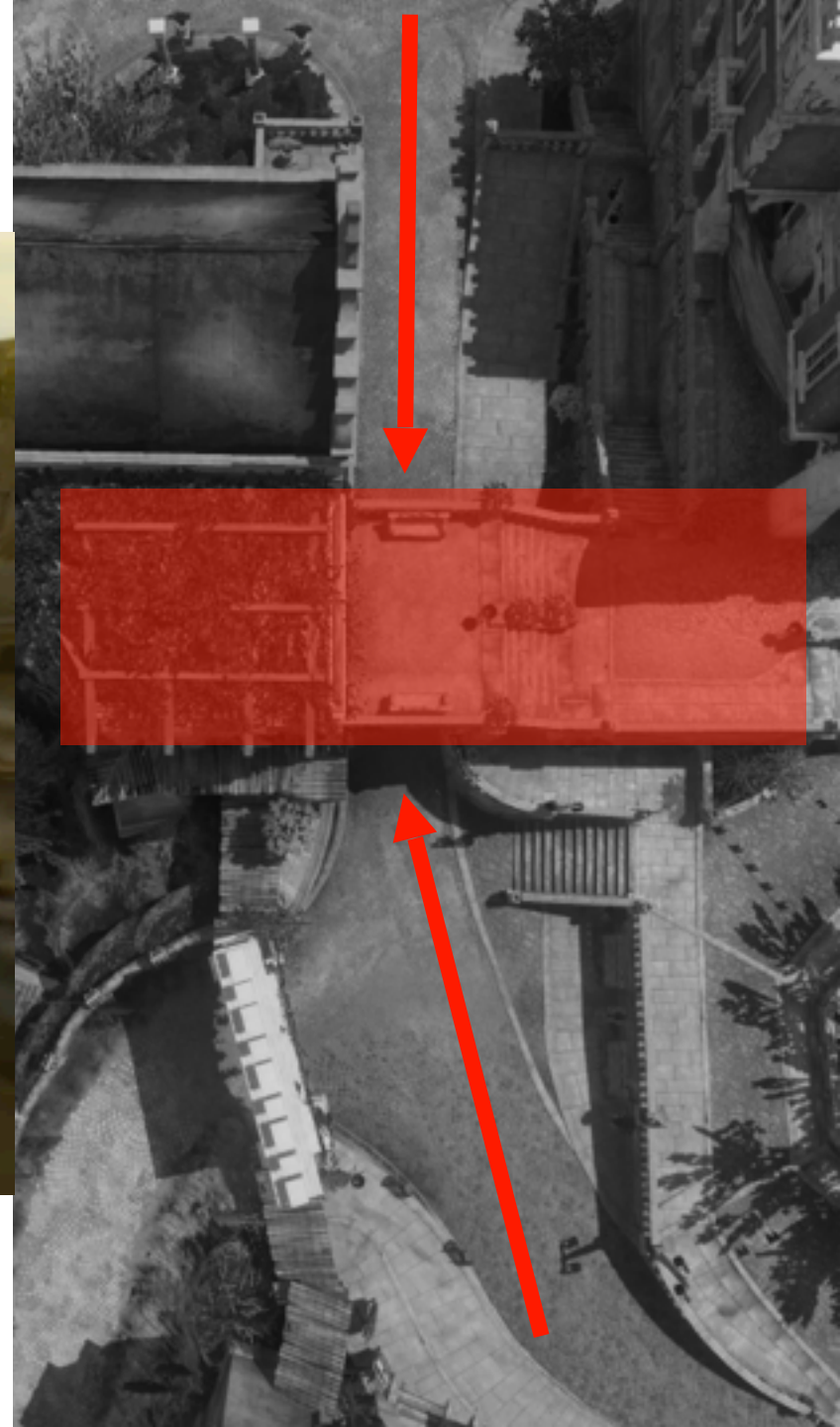


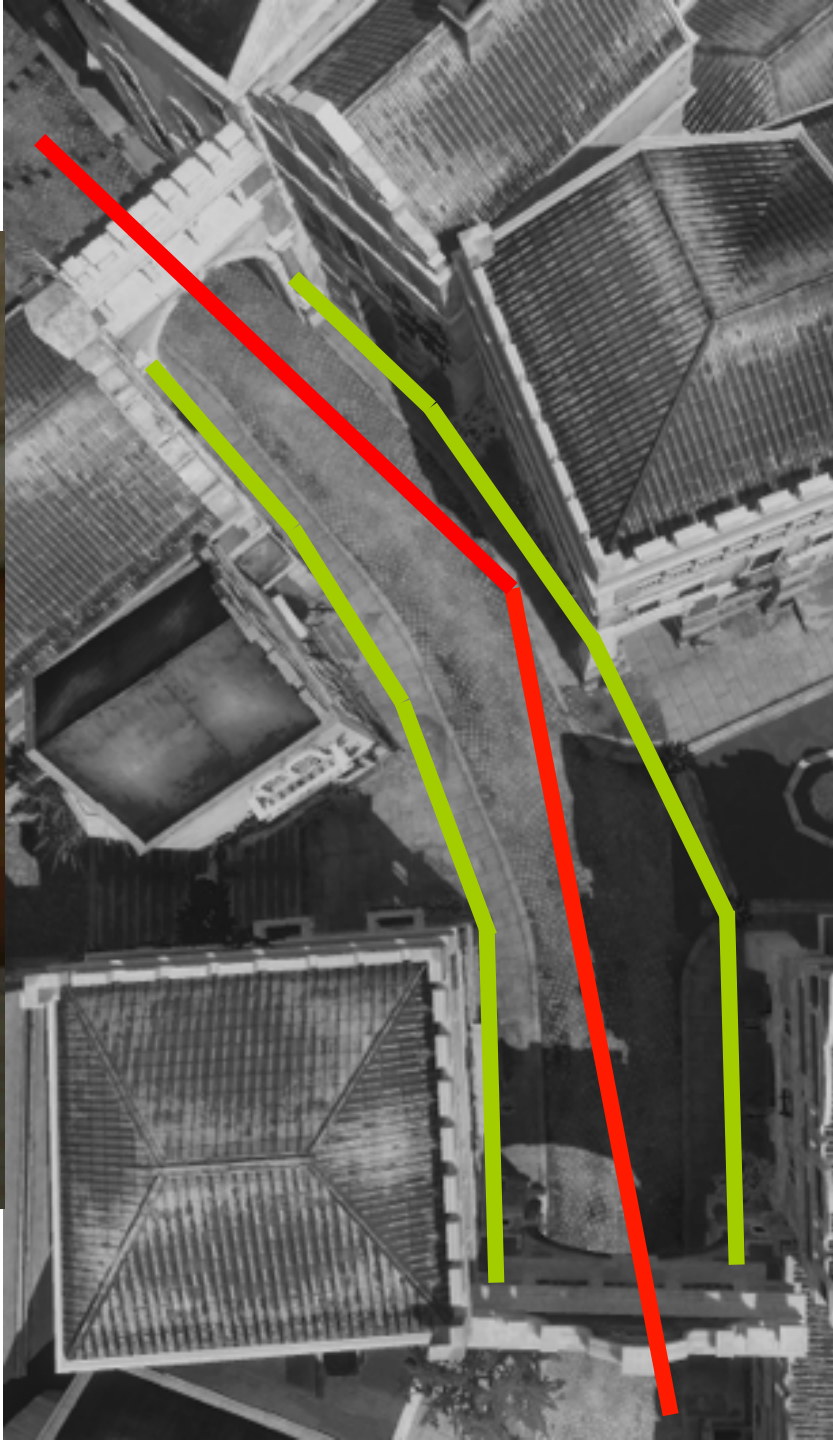


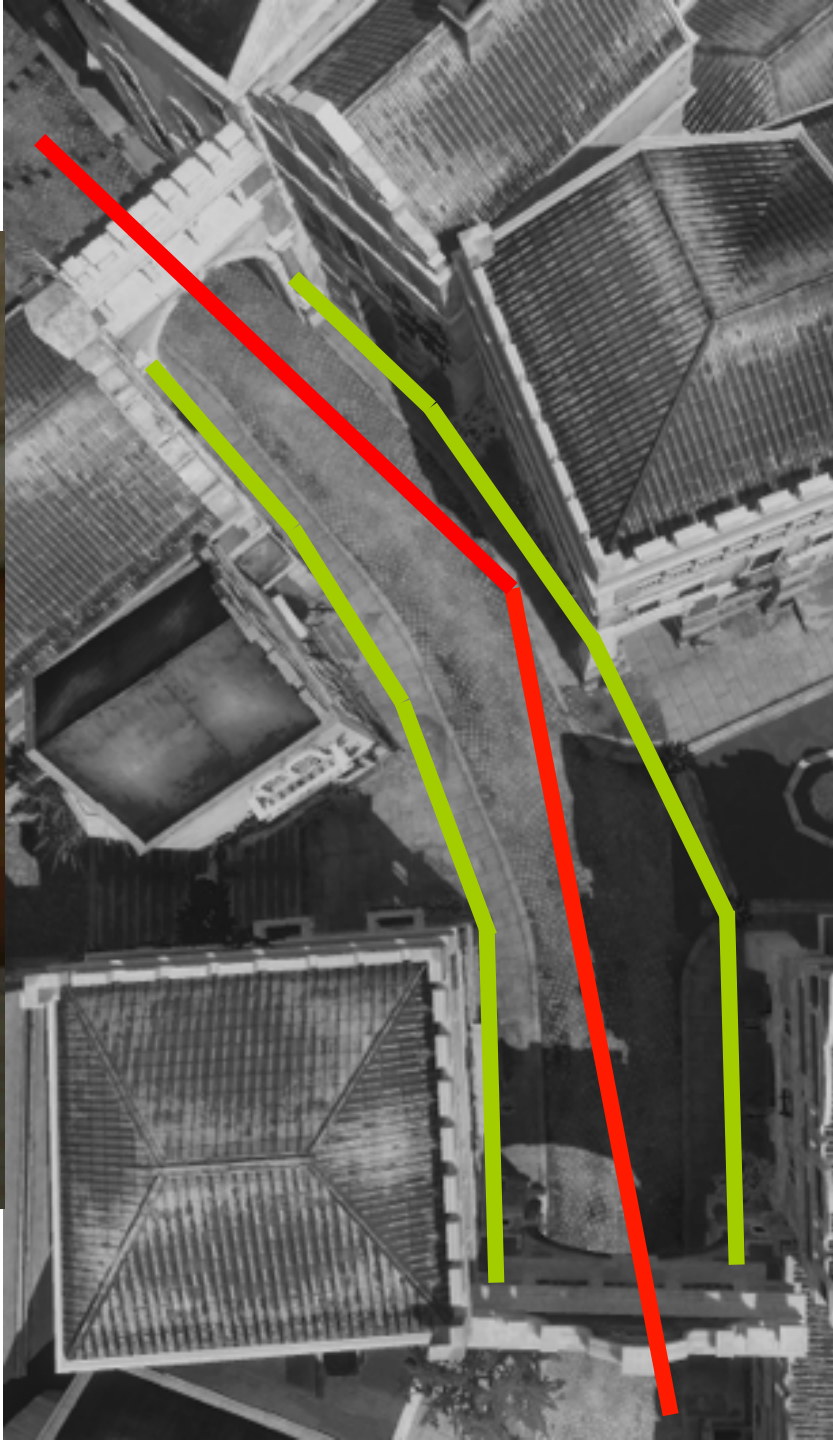










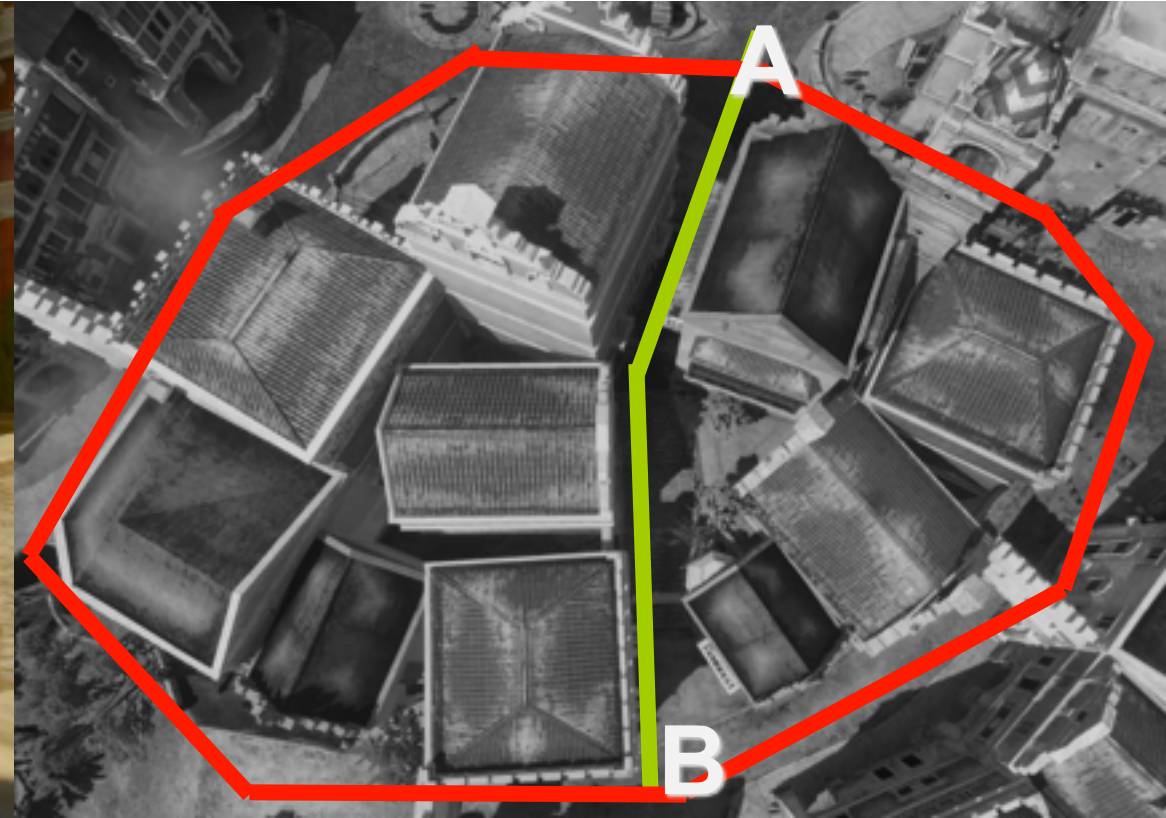




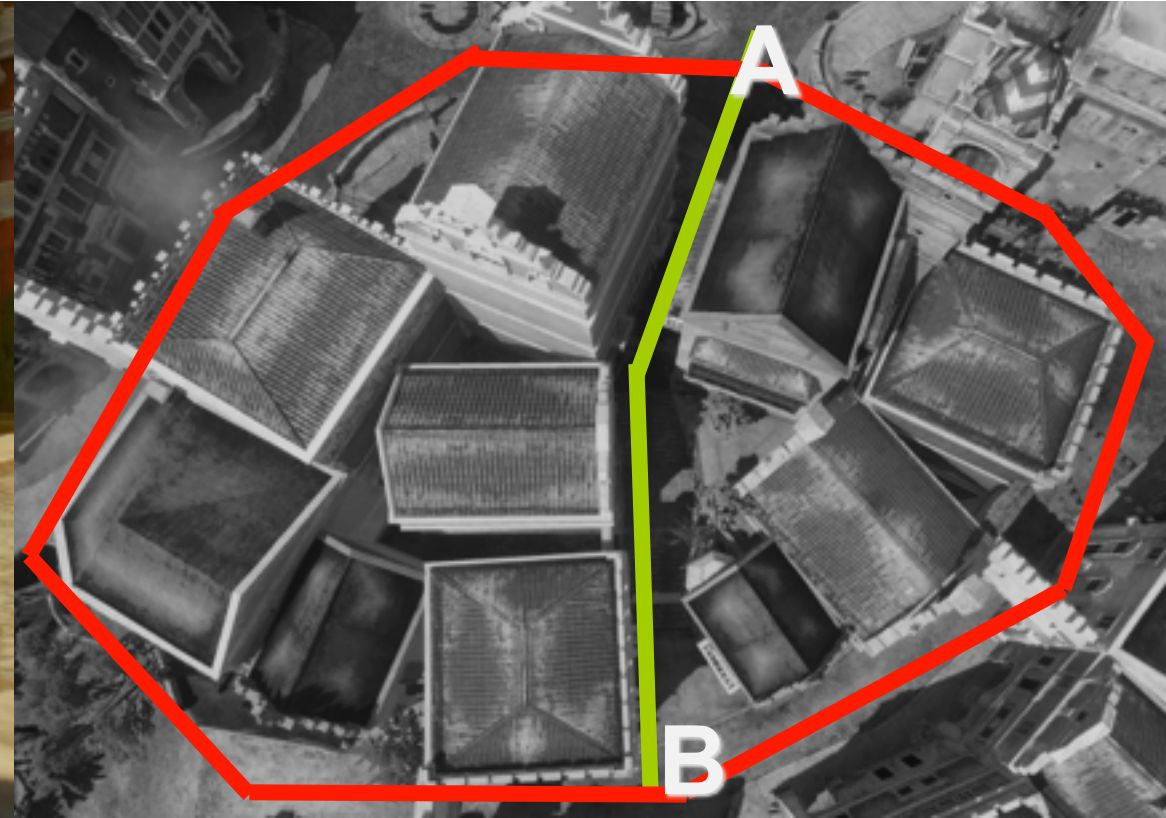
In a nutshell

- controlling visibility with blackout
- teams test and give feedback
- implementing and iterating feedback
- result: higher quality layout

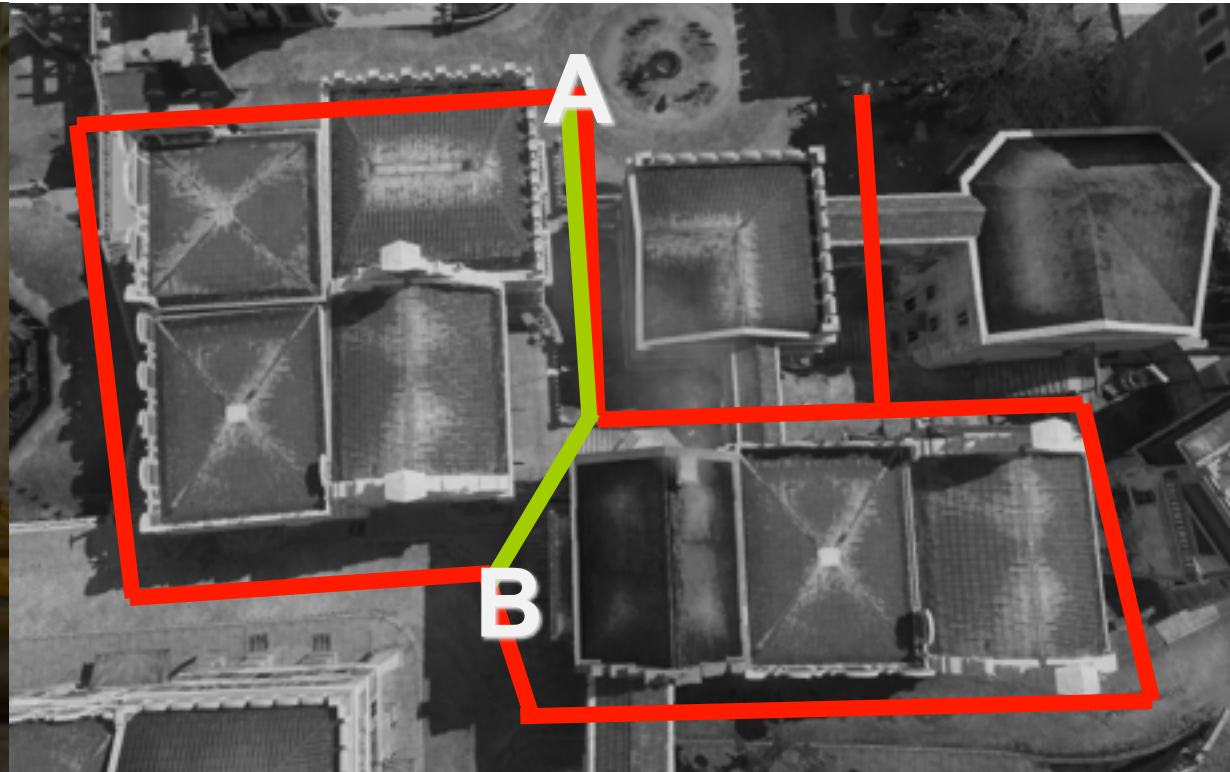
Feedback



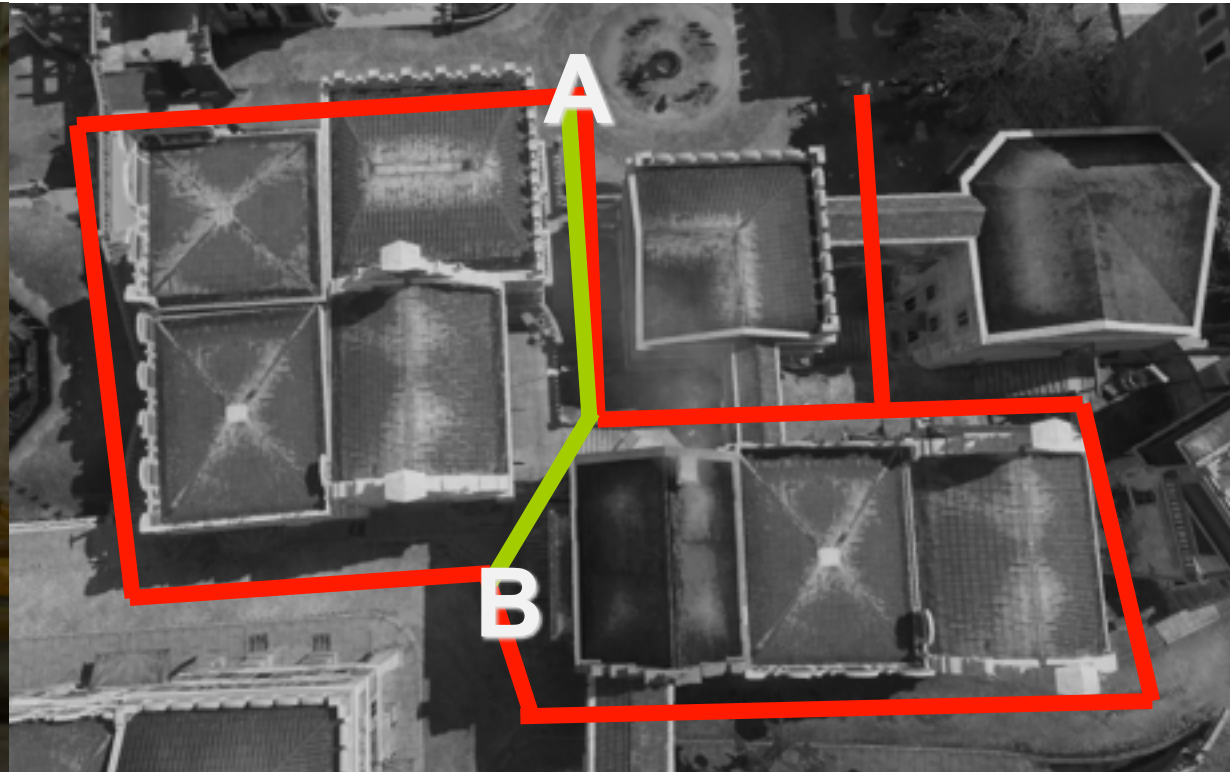
Feedback



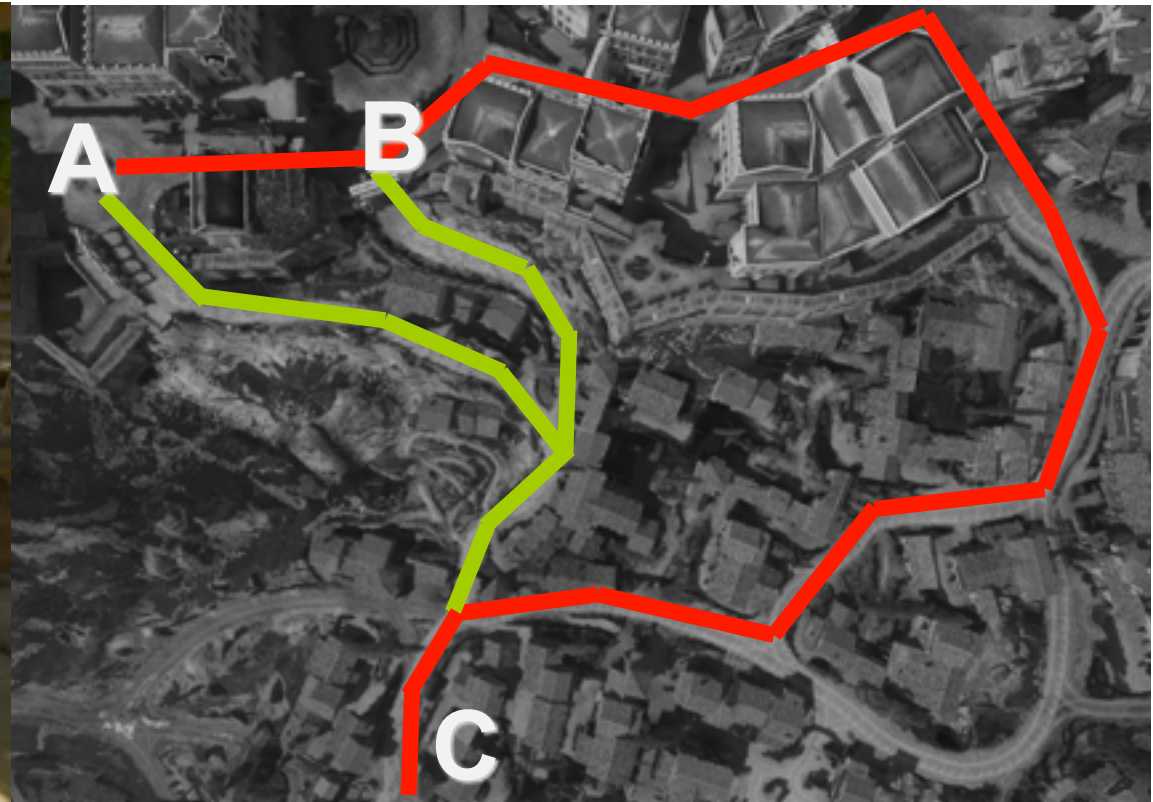
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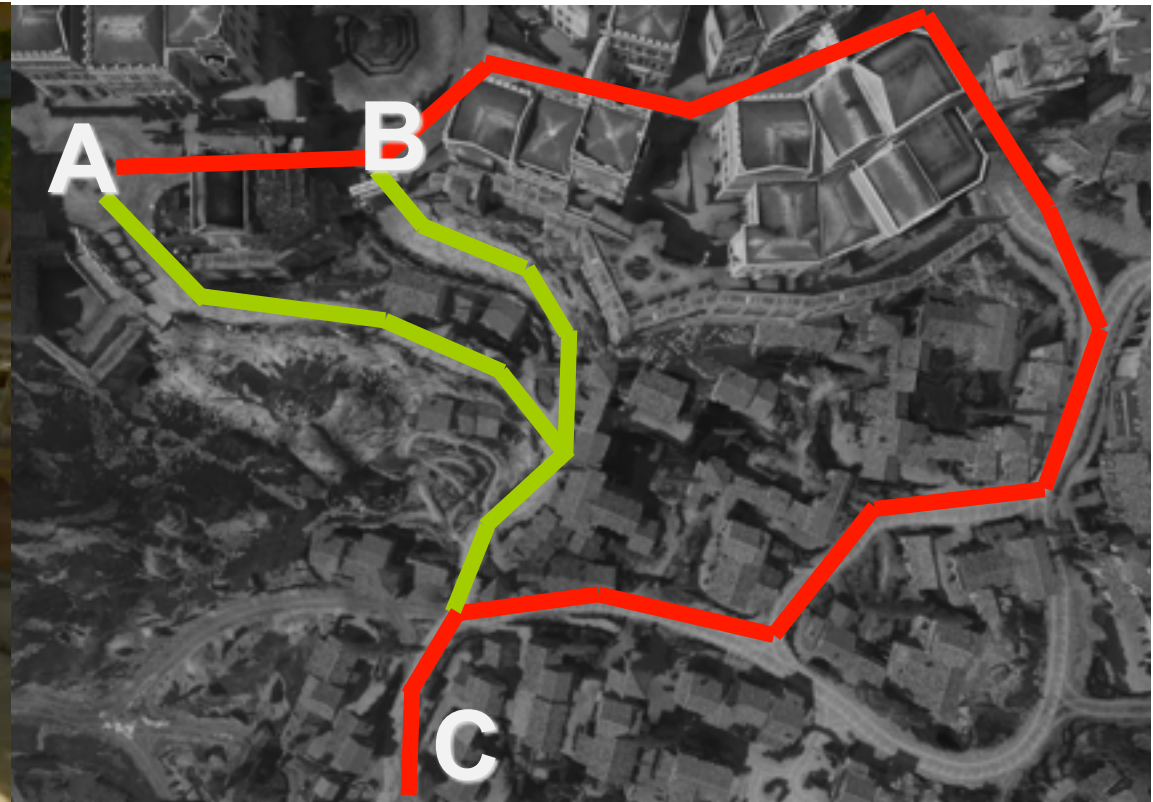
Feedback



Feedback



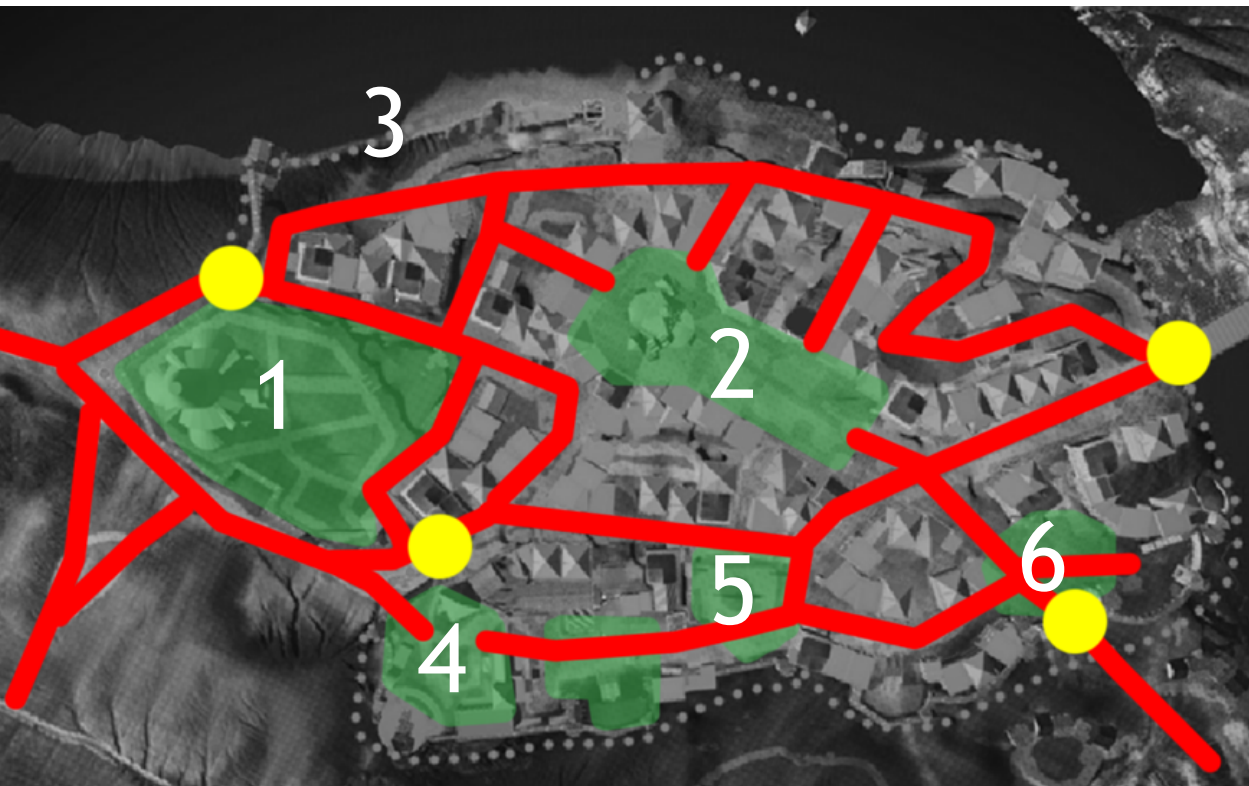
Feedback



Final layout



Old vs. new









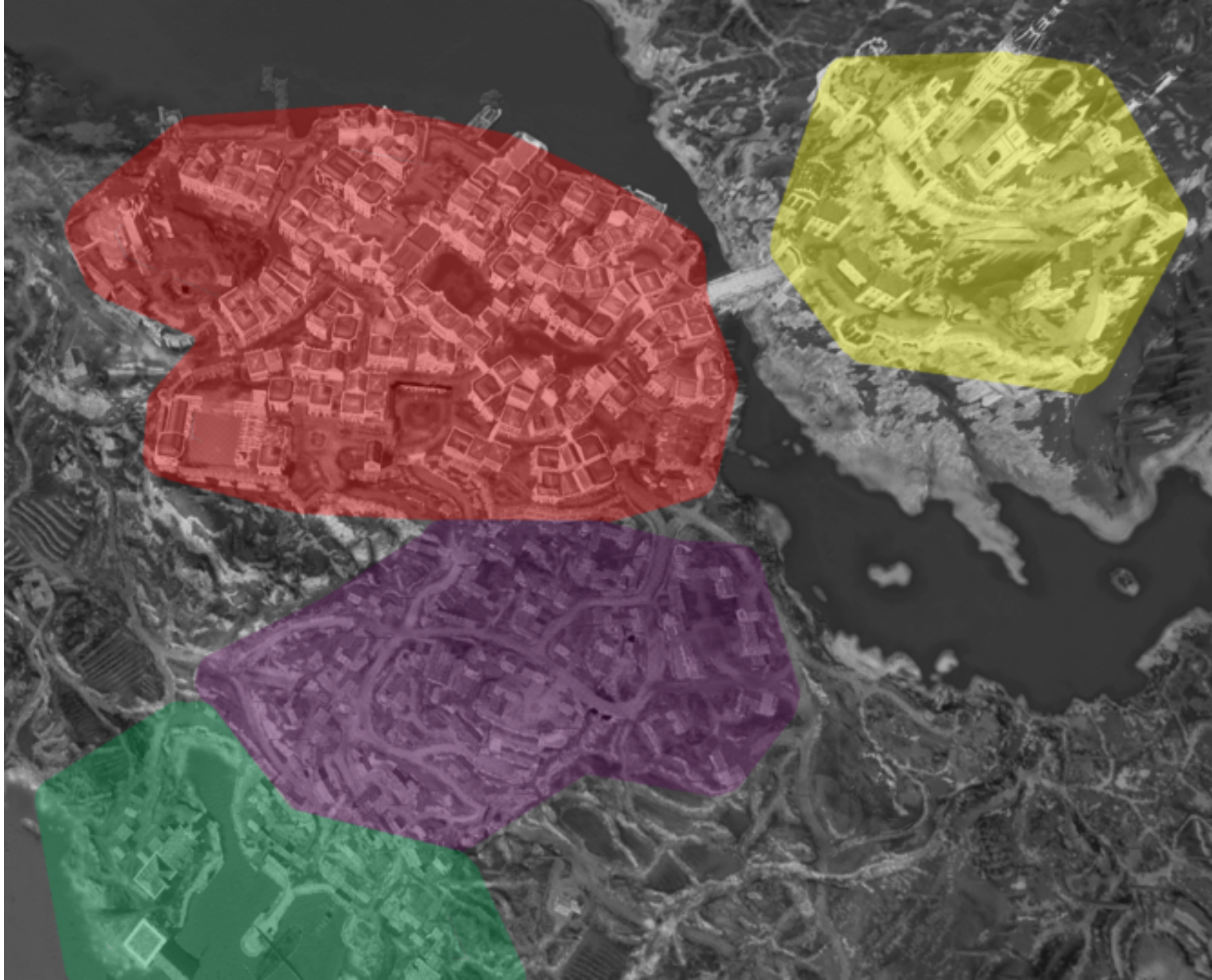
Focus points

- importance of navigation
- controlling visibility
- feedback and iterations
- finding and solving problems early

Actually building the city



-  Elven Palace
-  Upper city
-  Lower city
-  Harbour





Our Budgets

- meshes **200 MB**
- textures **200 MB** (*resident textures*)
300 MB
- chunks **1 500**
- triangles **500 000**



Keeping an eye on budgets

- defined QA monitoring places

Harbour



Lower city



Upper city



Main square



The Temple



Mandragora





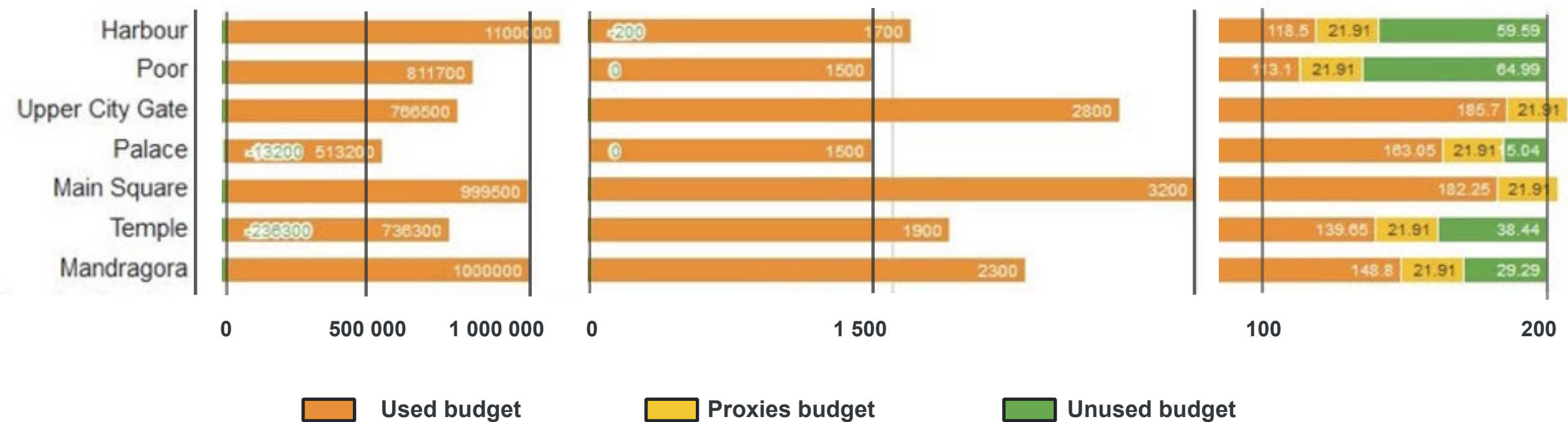
Not there yet

- careful with memory and performance
- sharp textures and materials
- create things efficiently
- lots of visual variety

Peak of static triangles

Peak of chunks number

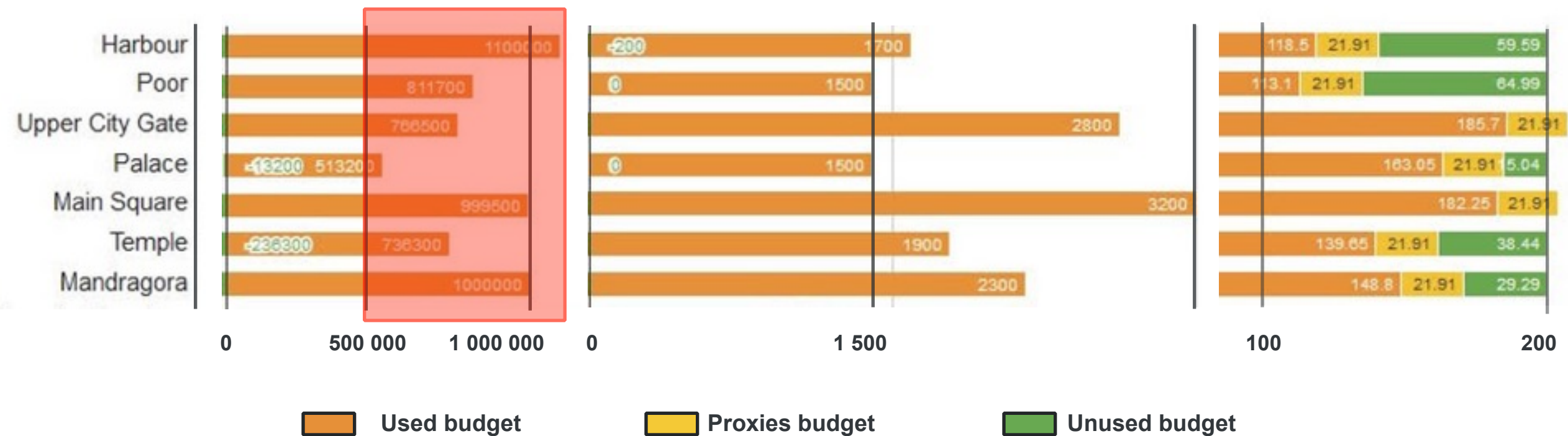
Mesh memory (MB)



Peak of static triangles

Peak of chunks number

Mesh memory (MB)



Peak of static triangles

Peak of chunks number

Mesh memory (MB)



Peak of static triangles

Peak of chunks number

Mesh memory (MB)



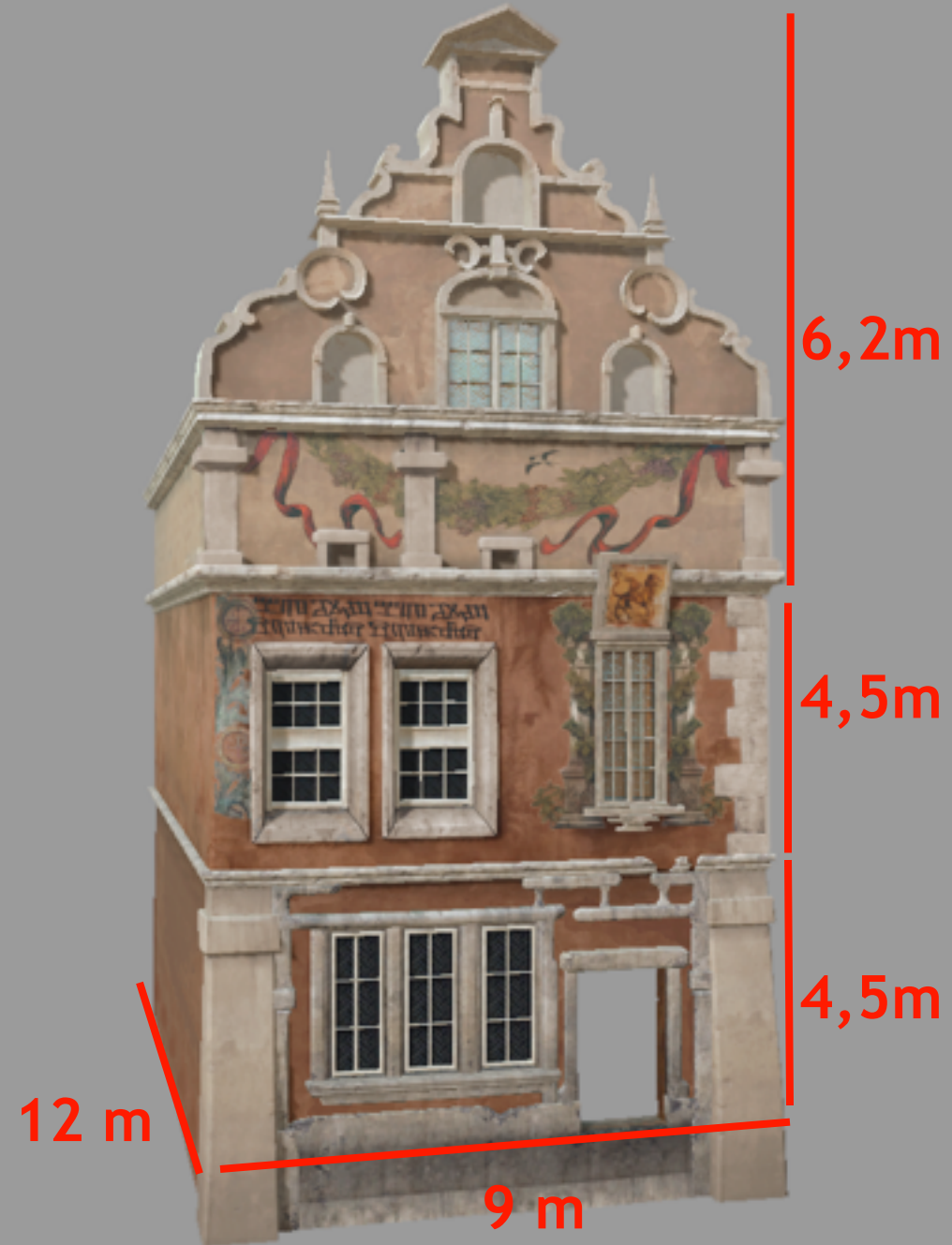
Rich house





Exterior

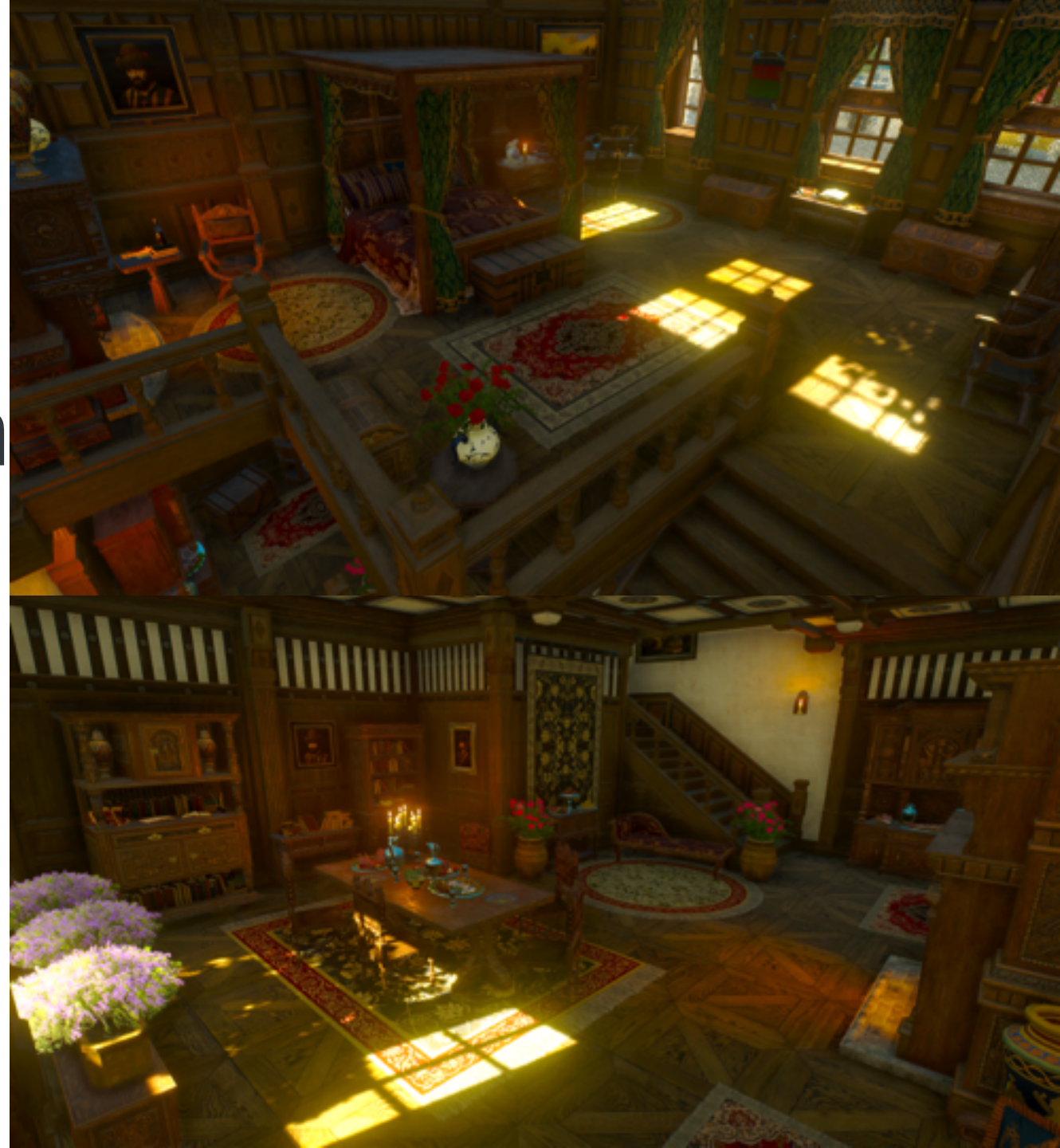
- triangles **12 553**
- chunks **51**
- mesh **3,29 MB**
- texture **14,17 MB**





Interior decoration

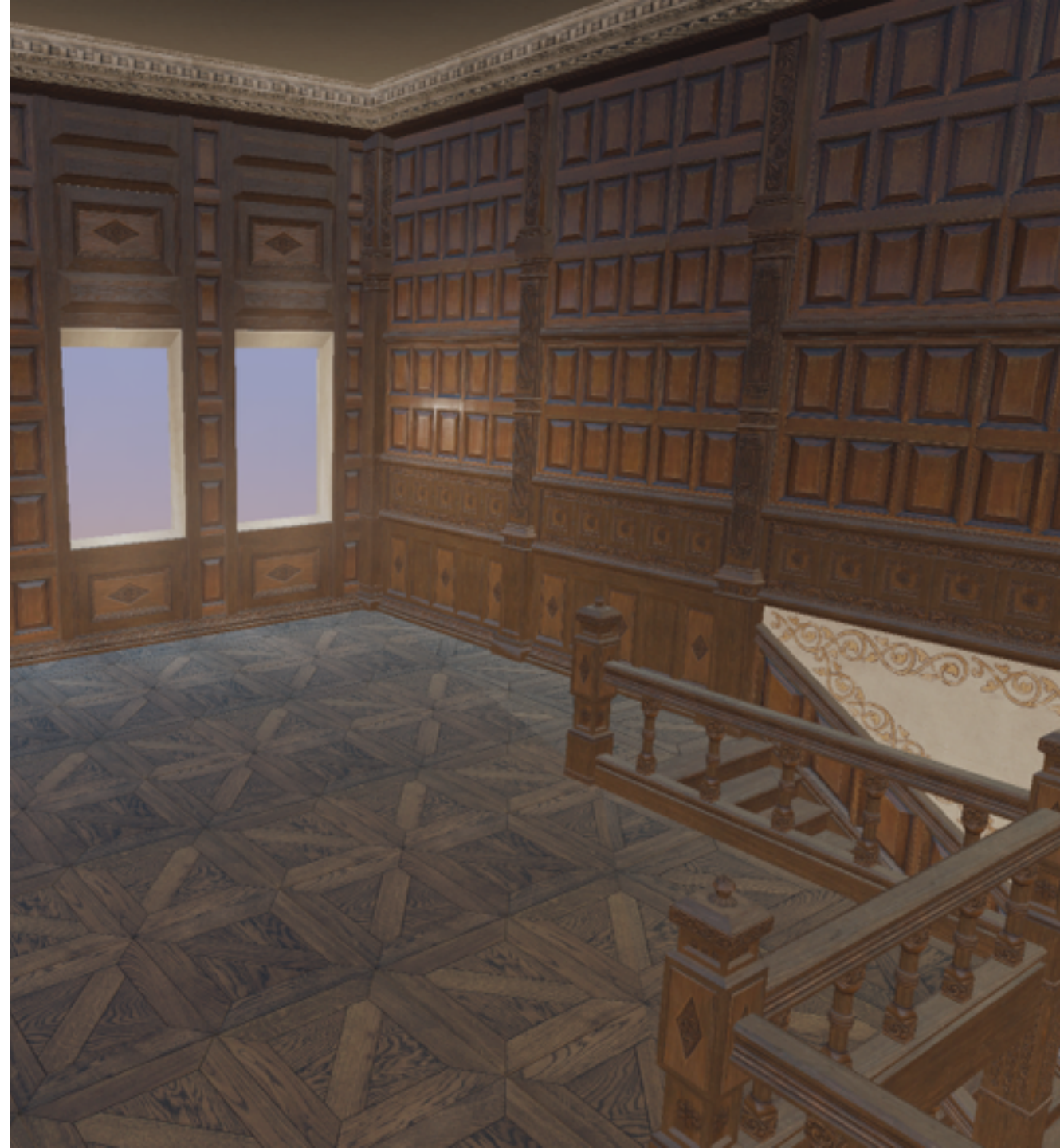
- static triangles **155 073**
- texture data **44,8 MB**
- mesh data **26,87 MB**
- chunks **157**





Interior walls

- static triangles **41 381**
- texture data **13.54 MB**
- mesh data **12.4 MB**
- chunks **16**





Ouch!

- texture **25% (!)** of our budget
- mesh **25% (!)** of our budget
- static triangles **40% (!)** of our budget
- chunks of that **11%** of our budget



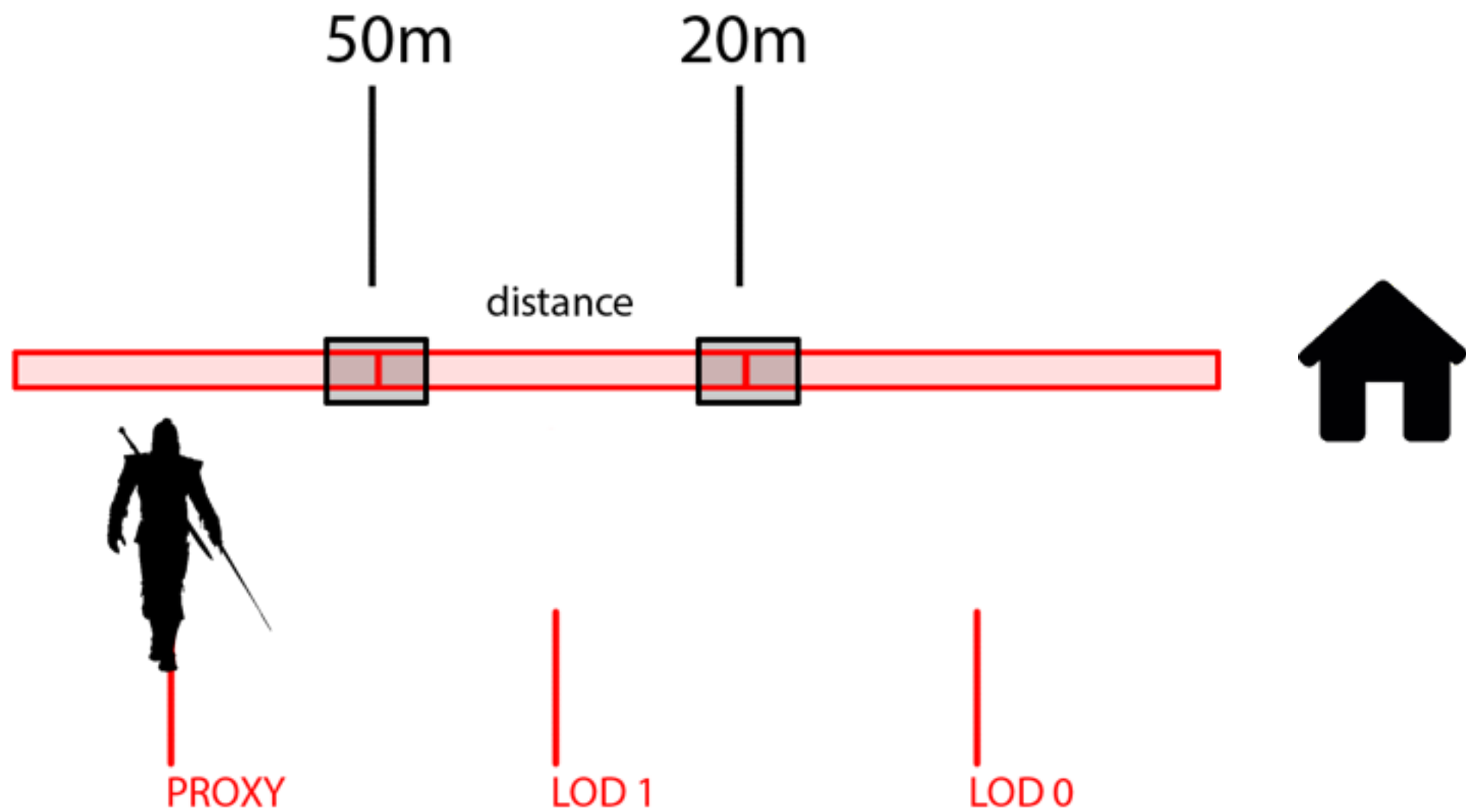
What to do?

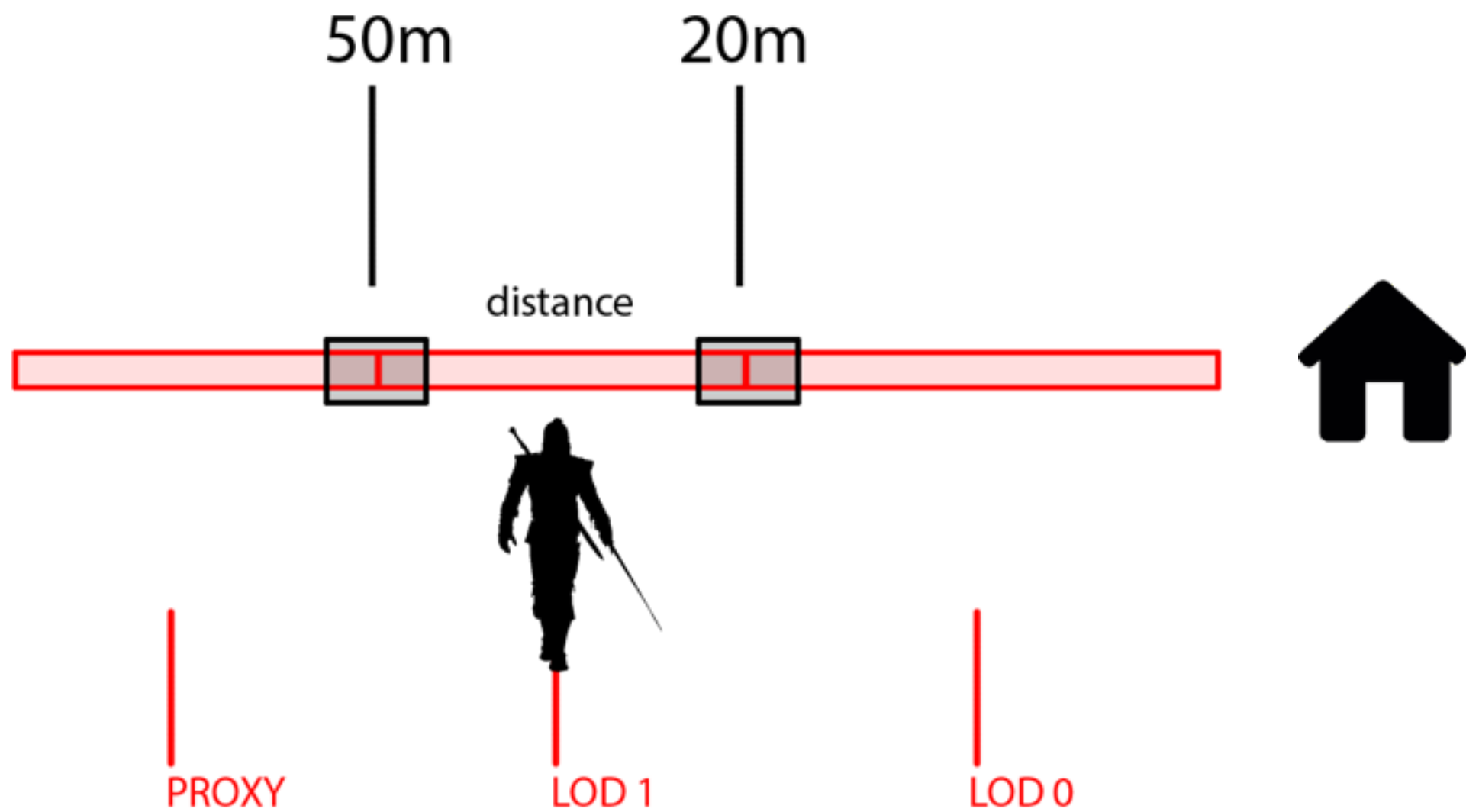
- don't try to re-invent the wheel
- if it works, use it

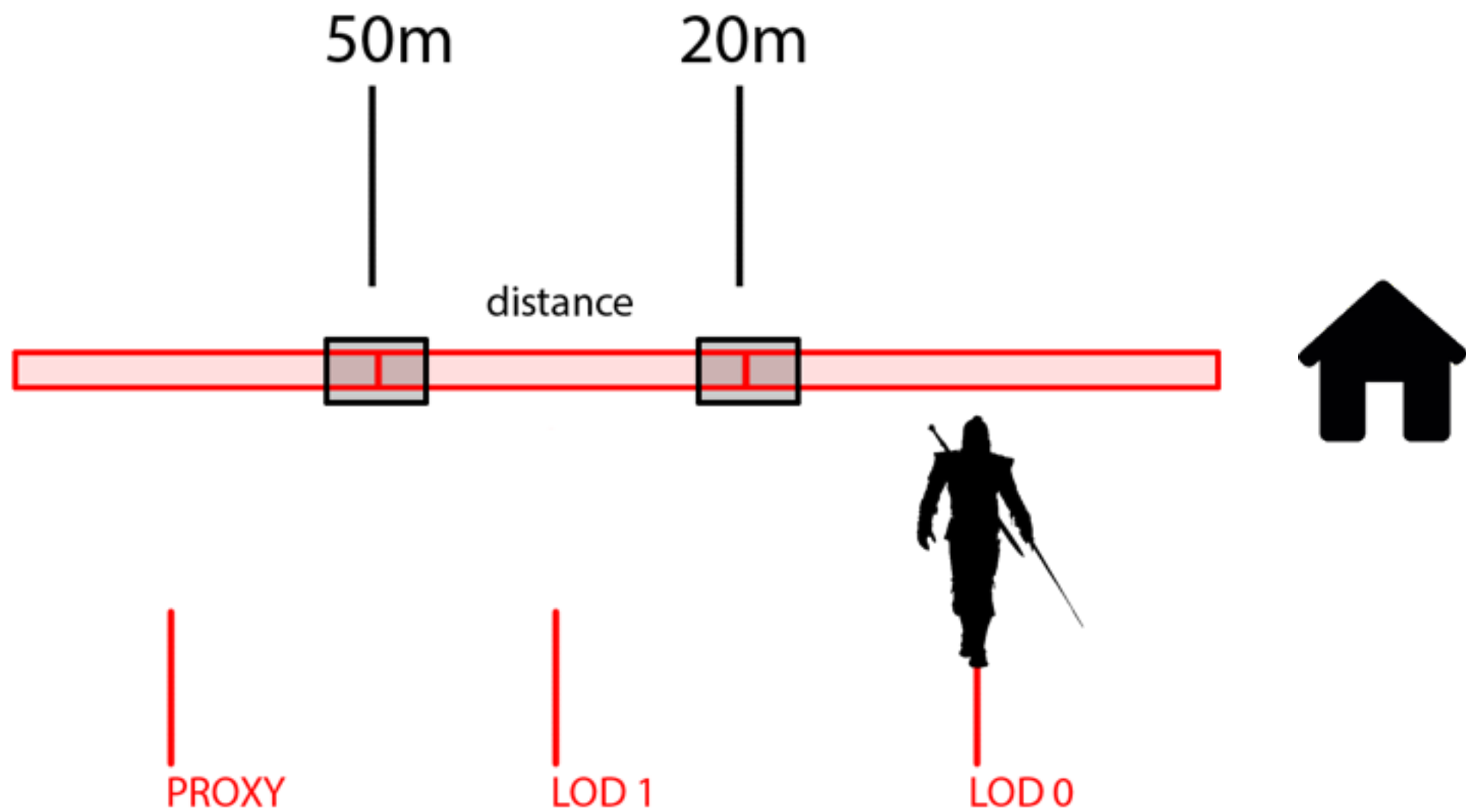


Solutions

- streaming
- LOD's
- technical tricks







LOD 00



triangles **29 412**
chunks **122**
texture **14.2 MB**

LOD 01



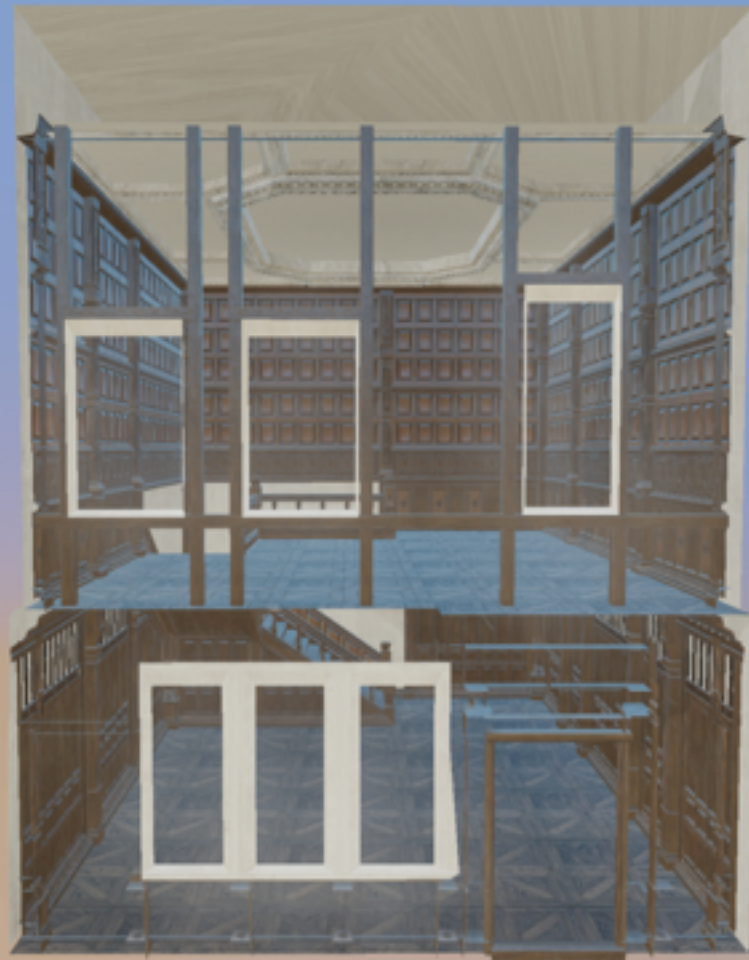
triangles **15 890**
chunks **63**
texture **14.2 MB**

PROXY



triangles **4 944**
chunks **2**
texture **0.5 MB**

base mesh



triangles **41 381**
chunks **16**
texture **13.5 MB**

LOD 01



triangles **666**
chunks **5**
texture **13.5 MB**







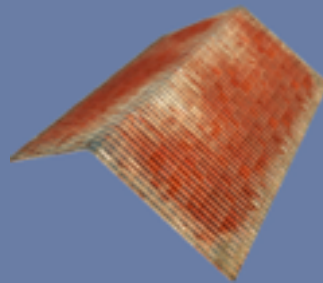
Are we clear of risk?

- need to hit smooth frame rate, for target hardware
- big views, many meshes
- heavy scenes

Rendering big scenes with a lot of polygons

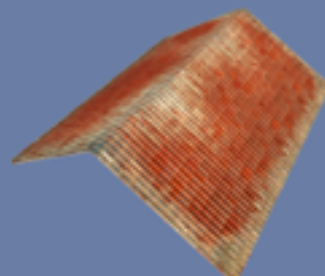






3 448 triangles





3 448 triangles

6 279 triangles





2 826 triangles





Focus points

- knowing our limits
- working with demanding assets
 - streaming
 - LOD's
- tech support
- UMBRA improvement with heavy scenes
- customizable assets

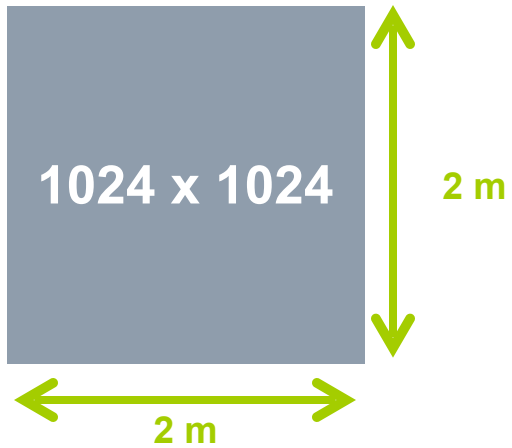


Texture work

- need custom look
- crisp materials
- twice more dense texel
- big walls and surfaces



Textures



0,6 MB

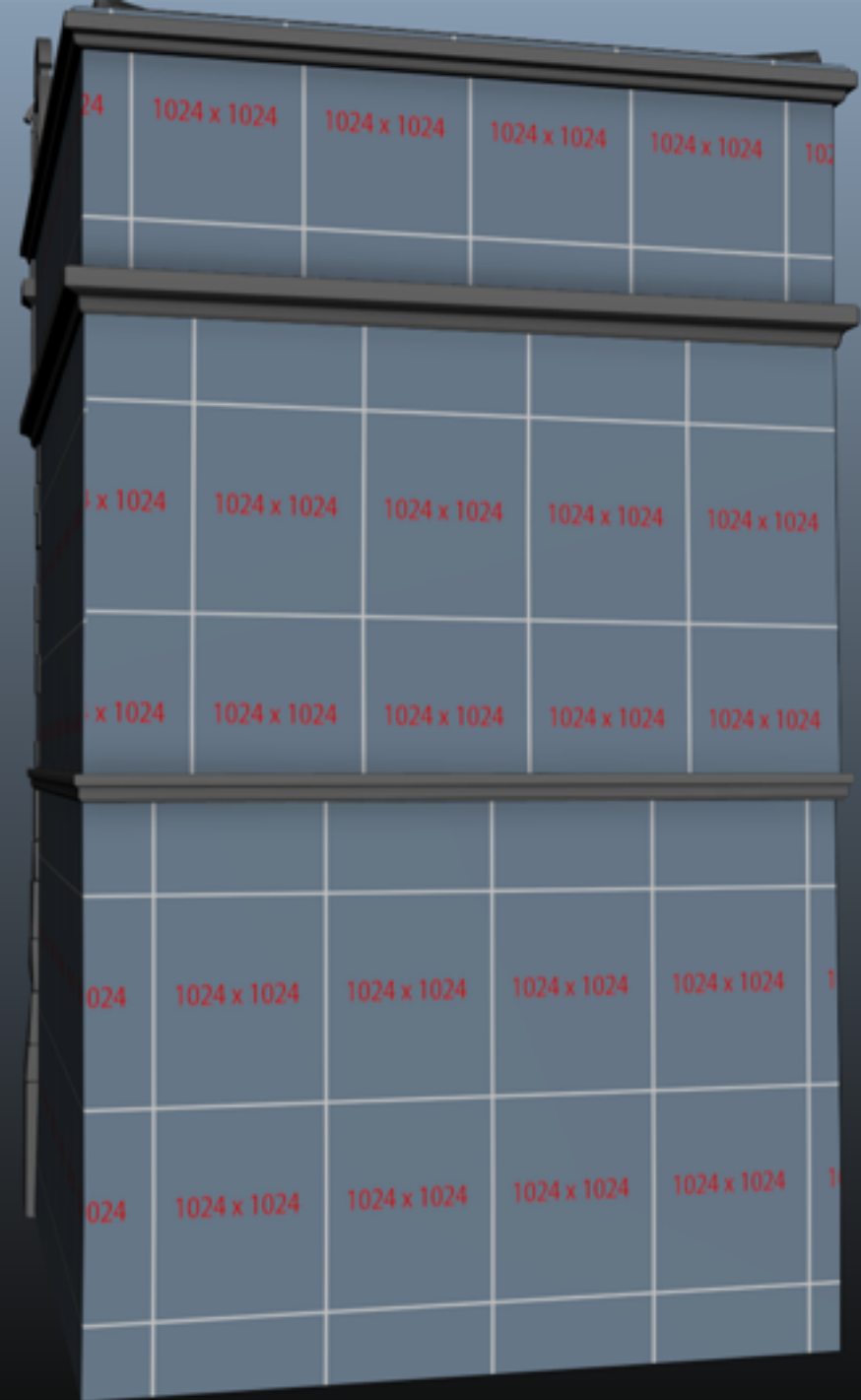
5120 x 6144

18 MB

4.5 MB *each channel*

4 sides of one building

72 MB





Ouch!

four sides of one building

72 MB ~25% of texture budget

**Texture budget - 300 MB*



Impossible for us

- big walls and surfaces
- can't afford custom textures
- need custom look



Cooperation

- close cooperation with tech art
- long talks and looking for solutions

0

16

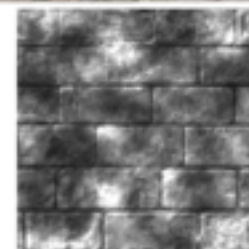
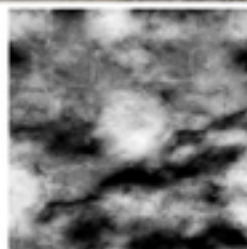
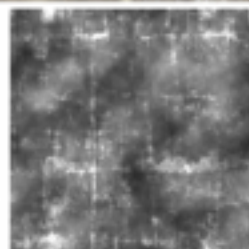
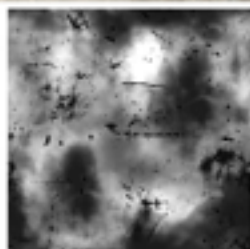
32

48

64

80

96



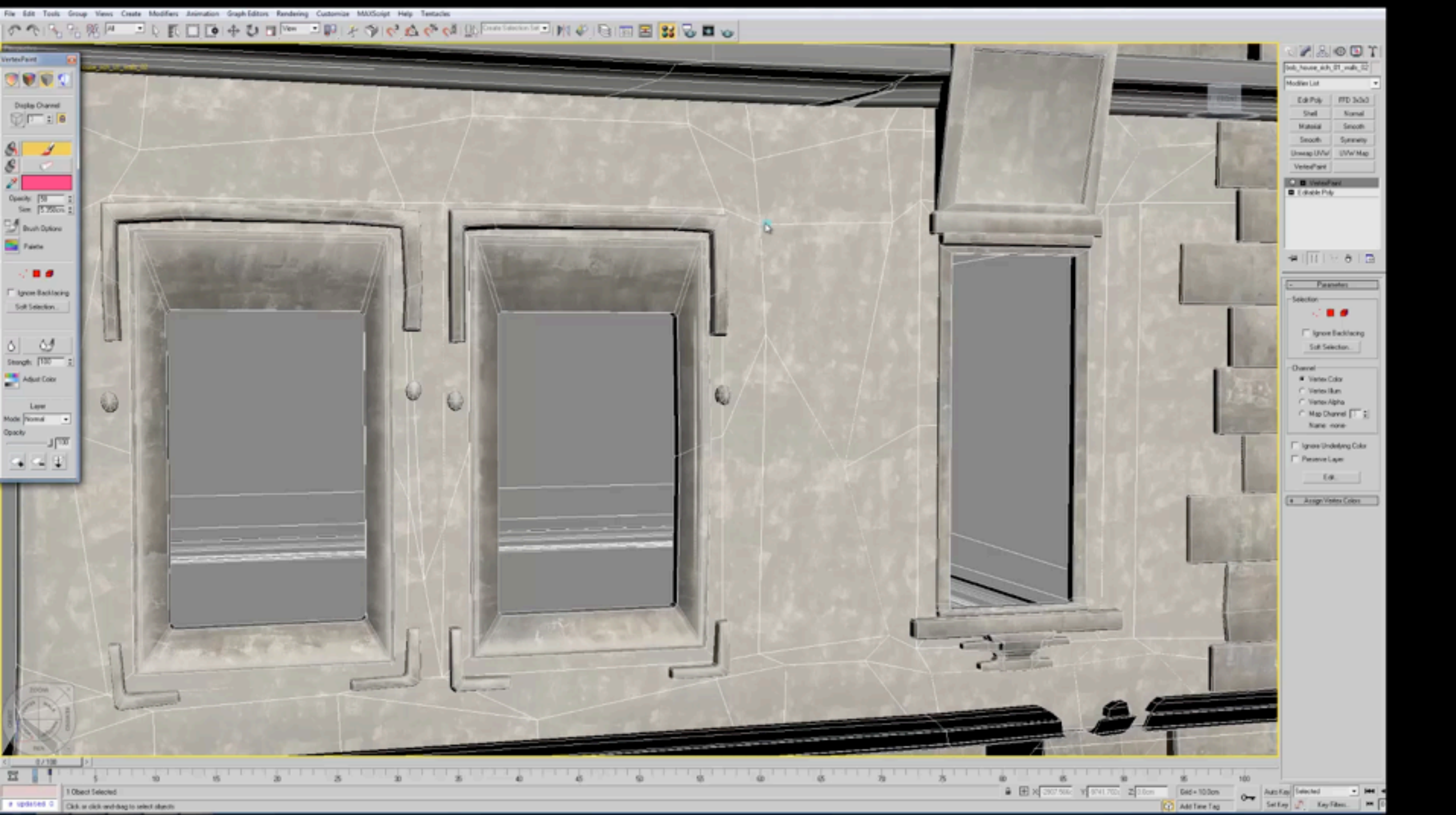


Usable for all assets

- small props & big assets
- difference in rich & poor look
- custom objects













The screenshot shows the Blender 2.79 interface with the 'Materials' panel selected in the left sidebar. The 'Properties' panel on the right shows the 'Material' tab. The 'Material Properties' panel is also visible, showing the 'Material Instance' settings. The 'Material Instance' settings include 'Import File' (set to '11_01_01_00-00-00'), 'Base Material' (set to 'diff bob1\data/environment/architectur'), and 'Material Parameters' (set to 'Building'). The 'Material Parameters' section includes 'BottomMaskRange' (0), 'DiffuseOverride' (blue), 'DiffuseOverrideColor' (white), 'HighMask' (0), 'LowMask' (0), 'Mask' (environment/skybox/textures/clouds), 'MaskTop' (0), 'MaskBottom' (0), 'MaskLeft' (0), 'MaskRight' (0), 'MaskFront' (0), 'MaskBack' (0), 'MaskTopLeft' (0), 'MaskTopRight' (0), 'MaskBottomLeft' (0), 'MaskBottomRight' (0), 'MaskFrontLeft' (0), 'MaskFrontRight' (0), 'MaskBackLeft' (0), 'MaskBackRight' (0), 'MaskTopFront' (0), 'MaskTopBack' (0), 'MaskBottomFront' (0), 'MaskBottomBack' (0), 'MaskLeftFront' (0), 'MaskLeftBack' (0), 'MaskRightFront' (0), 'MaskRightBack' (0), 'MaskTopLeftFront' (0), 'MaskTopLeftBack' (0), 'MaskTopRightFront' (0), 'MaskTopRightBack' (0), 'MaskBottomLeftFront' (0), 'MaskBottomLeftBack' (0), 'MaskBottomRightFront' (0), 'MaskBottomRightBack' (0), 'MaskFrontLeftFront' (0), 'MaskFrontLeftBack' (0), 'MaskFrontRightFront' (0), 'MaskFrontRightBack' (0), 'MaskBackLeftFront' (0), 'MaskBackLeftBack' (0), 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The screenshot shows the Blender 2.79 interface with the Properties panel open for a material. The 'Material' tab is selected, showing a list of materials and a 'Material Properties' section. The 'Material Properties' section includes a 'Diffuse Override' color picker set to blue, a 'Mask' value of 1, and a 'Pattern' dropdown set to 'Pattern/Texture'. The 'Material' list shows 'Material' as the selected material.



Examples of how it's used

- same mesh, different look
- using the same textures
- cheap





Focus points

- learning and controlling our limits
- finding optimal ways to support our goals
 - blend shader
- not sacrificing art vision
- customizability of the assets



Creating a living world

- assets done
- solutions are ready
- areas of open world need to be decorated
- time is the enemy



Hand made

- perfect solution for art
- unique look
- taking loads of time
- hard task for artists



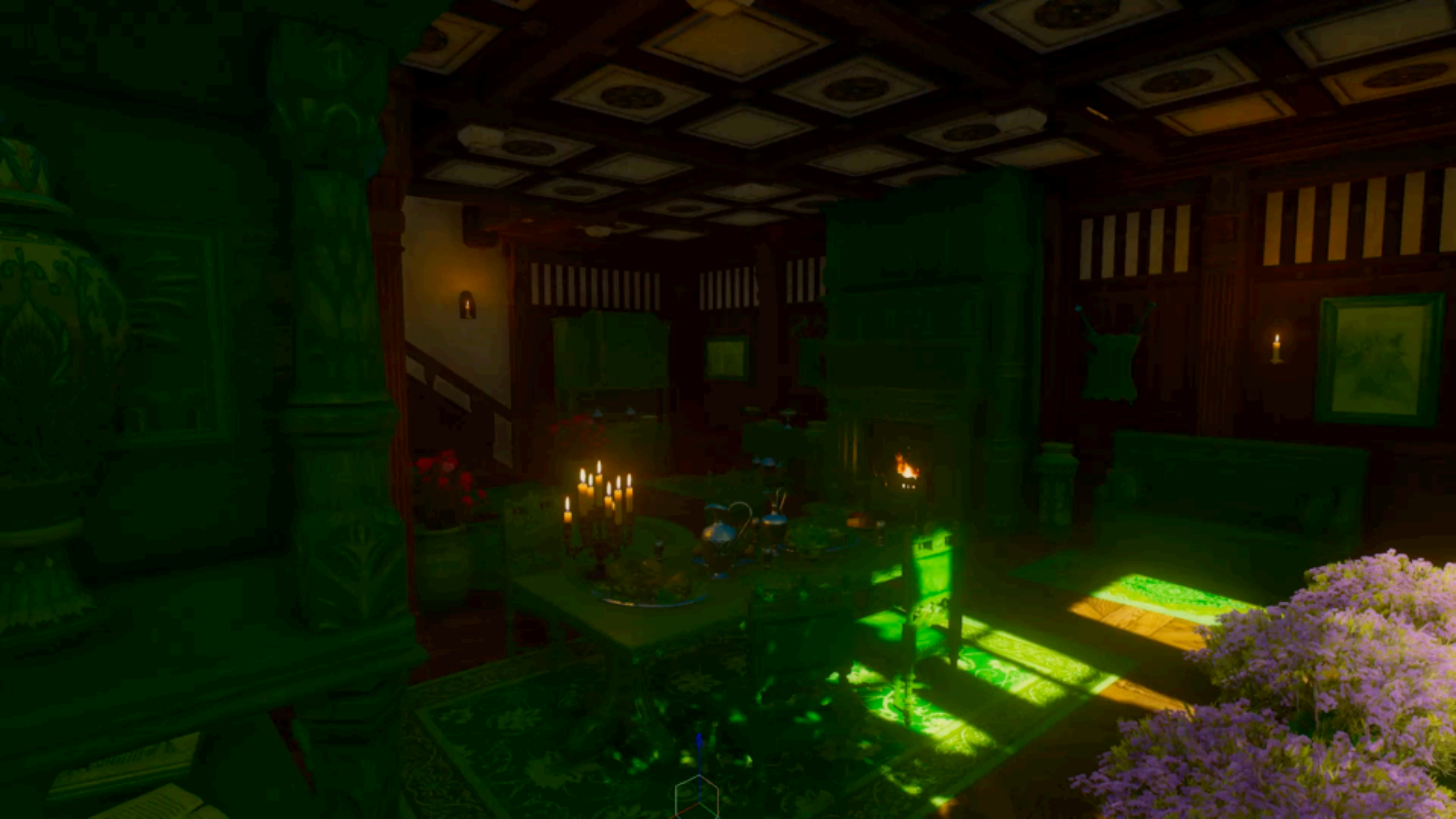
We need to speed this up

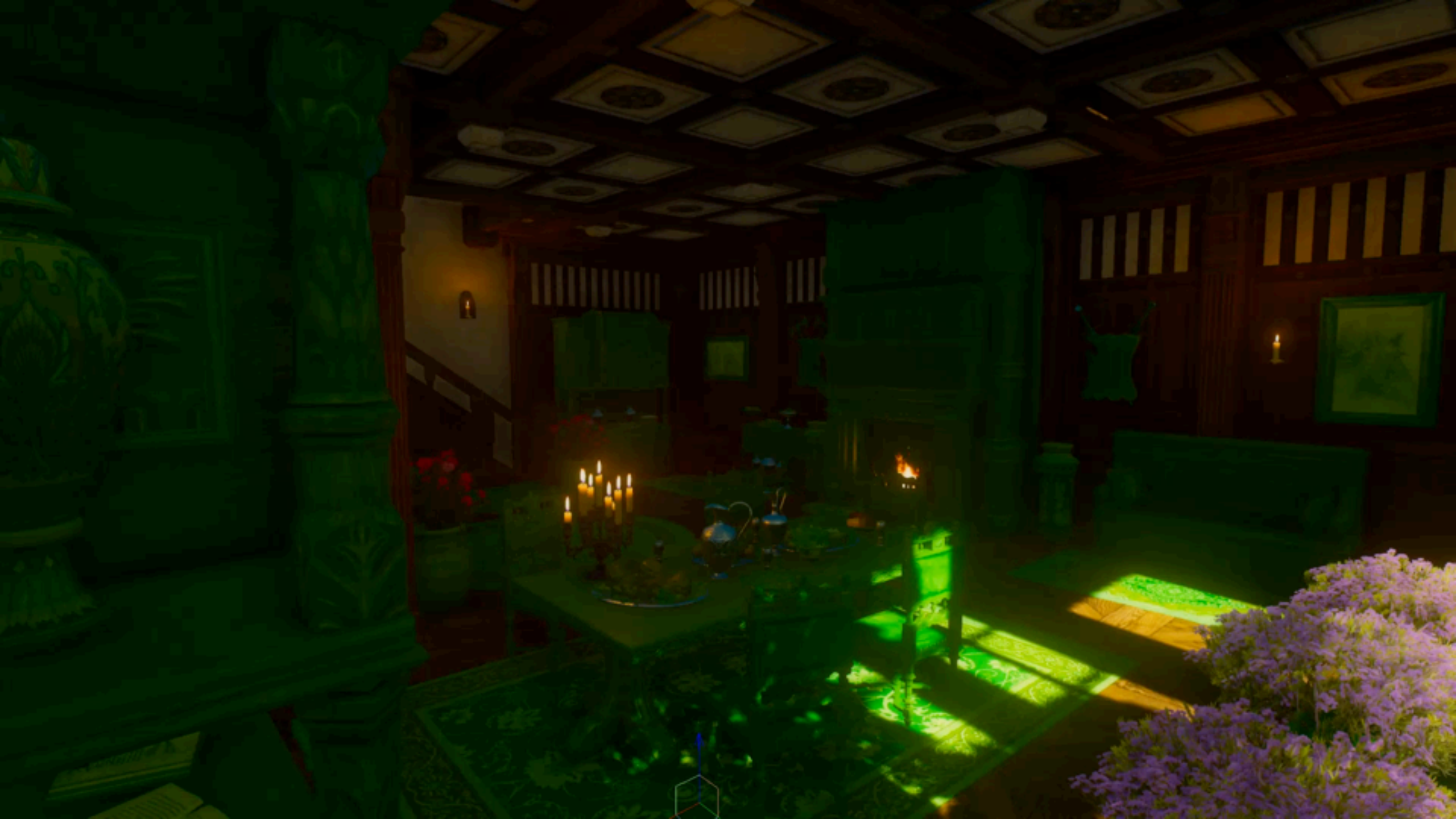
- keep custom and unique feel
- needs to be much faster

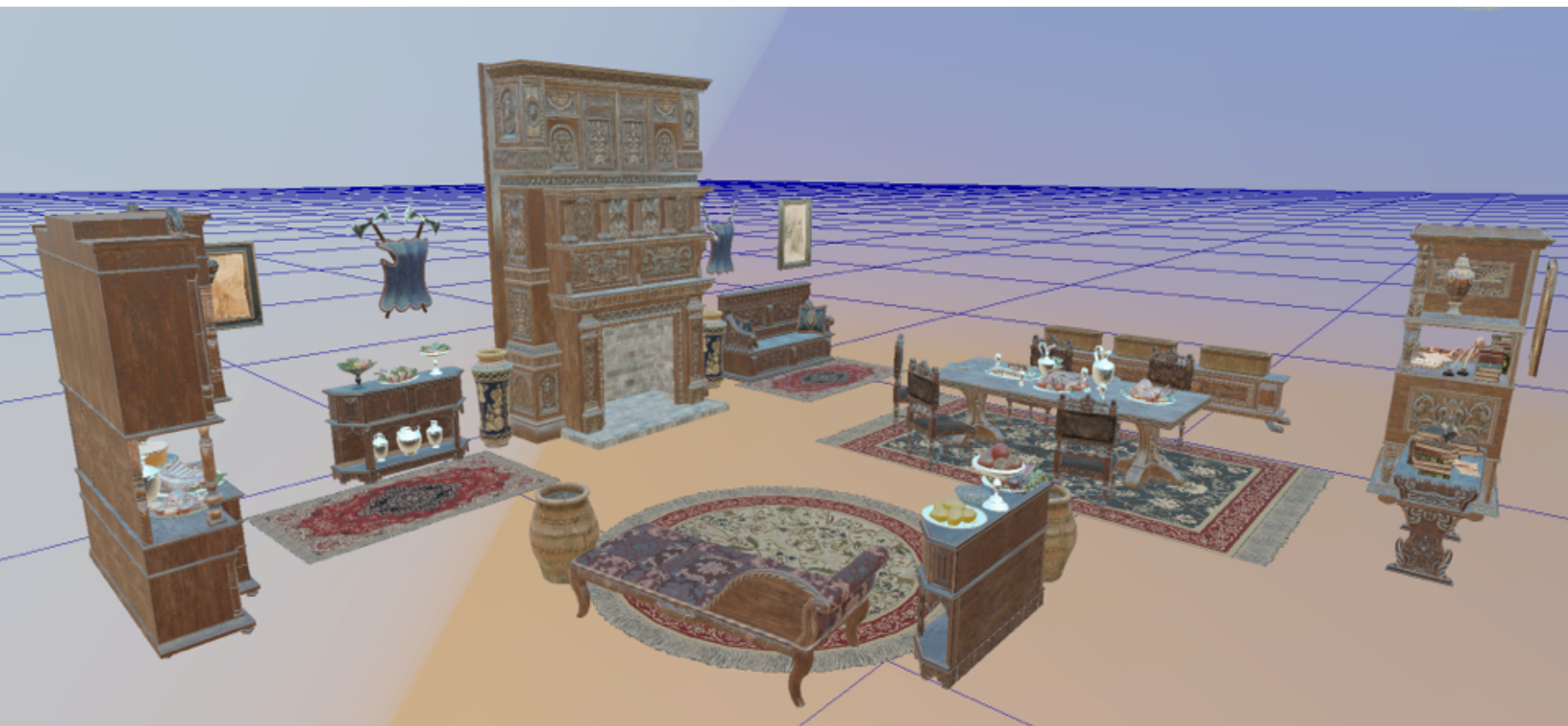


Entities

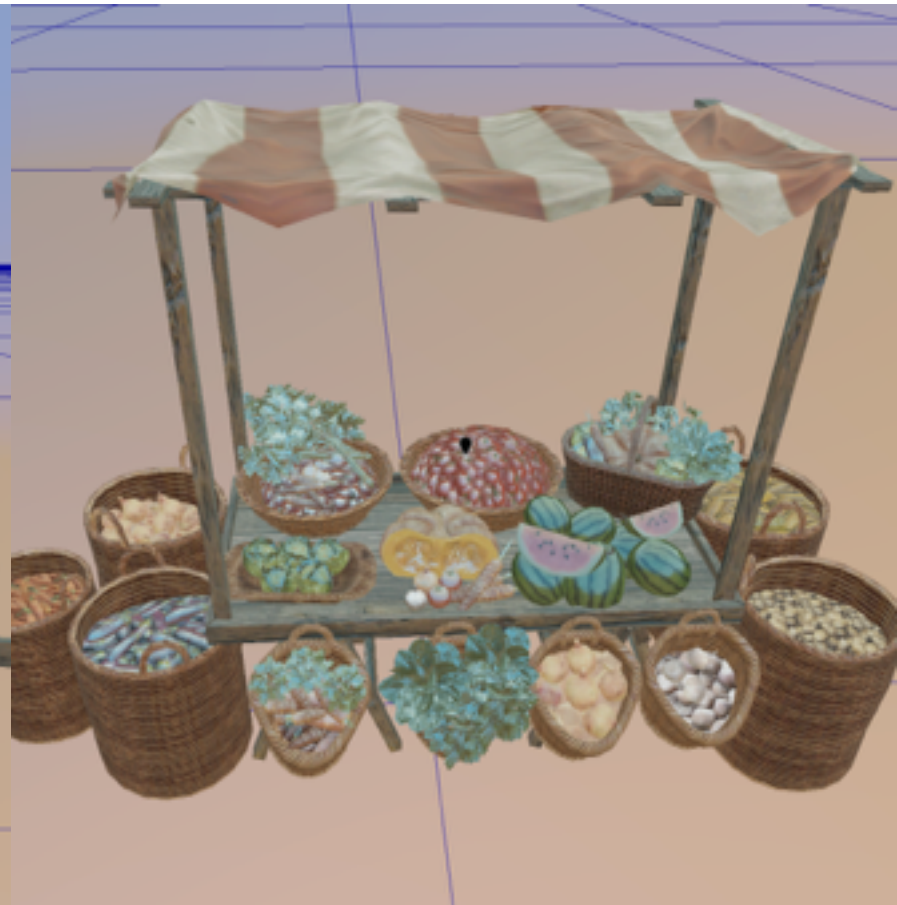
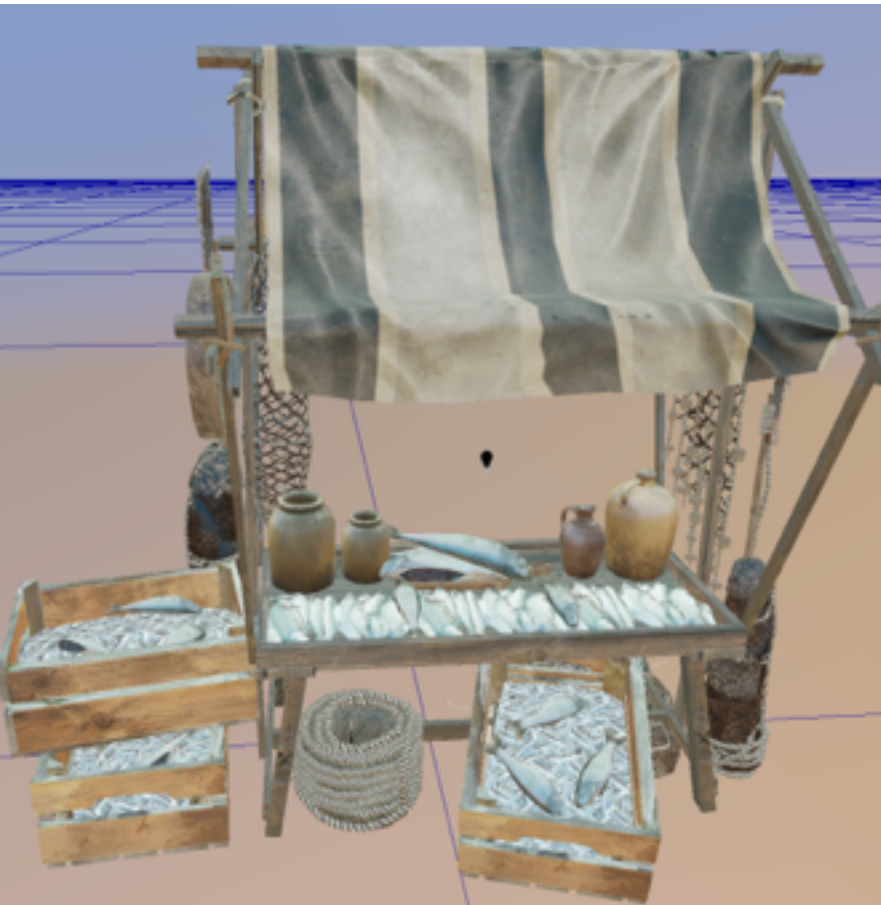
- the base for sets of decoration
- great for small and big sets of deco
- speeds up the process
- easy to use and customize















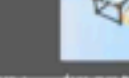



















street_trader

 <p>deco_mer_trader_marketplace_h Entity template Component count: 29 Streamed at 112m</p>	 <p>deco_mer_trader_marketplace_butcher_a Entity template Not loaded, 518.37 KB</p>	 <p>deco_mer_trader_marketplace_butcher_b Entity template Not loaded, 481.97 KB</p>
 <p>deco_mer_trader_marketplace_butcher_a_dynamic Entity template Not loaded, 28.73 KB</p>	 <p>deco_mer_trader_marketplace_c Entity template Component count: 21 Streamed at 88m</p>	 <p>deco_mer_trader_marketplace_d_dynamic Entity template Not loaded, 48.61 KB</p>
 <p>deco_mer_trader_marketplace_d Entity template Component count: 22 Streamed at 115m</p>	 <p>deco_mer_trader_marketplace_e Entity template Component count: 25 Streamed at 15m</p>	 <p>deco_mer_trader_marketplace_f Entity template Component count: 40 Streamed at 15m</p>
		



street_trader

 <p>deco_mer_trader_marketplace_h Entity template Component count: 29 Streamed at 112m</p>	 <p>deco_mer_trader_marketplace_butcher_a Entity template Not loaded, 518.37 KB</p>	 <p>deco_mer_trader_marketplace_butcher_b Entity template Not loaded, 481.97 KB</p>
 <p>deco_mer_trader_marketplace_butcher_a_dynamic Entity template Not loaded, 28.73 KB</p>	 <p>deco_mer_trader_marketplace_c Entity template Component count: 21 Streamed at 88m</p>	 <p>deco_mer_trader_marketplace_d_dynamic Entity template Not loaded, 48.41 KB</p>
 <p>deco_mer_trader_marketplace_d Entity template Component count: 22 Streamed at 115m</p>	 <p>deco_mer_trader_marketplace_e Entity template Component count: 25 Streamed at 15m</p>	 <p>deco_mer_trader_marketplace_f Entity template Component count: 40 Streamed at 15m</p>
		







Focus points

- using deco sets to save time
- creating automated solutions without sacrificing "handmade quality"
- decorating complex locations in minutes



Building Beauclair – Summary

- **Pre-planning and testing**
 - importance of navigation
 - blackout
- **Identifying and solving technical problems**
 - closing off very long in-city views
 - iterating



Building Beauclair – Summary

- **Keeping content within the limits**
 - streaming
 - LOD's
 - UMBRA
 - blend shader
- **Populating locations with content**



Achieved

- long vistas over Toussaint
- unique character of assets
- different feel of districts



Improvements

- very dense content and crowds on streets
- twice the texel density on materials
- faster decorating pipeline



Takeaways

THE
WITCHER
WILD HUNT

EXPANSION PACK
BLOOD AND WINE

GDC 17



Q&A

THE
WITCHER
WILD HUNT

EXPANSION PACK
BLOOD AND WINE

GDC 17



Thank you!

KACPER NIEPOKÓLCZYCKI

SENIOR ENVIRONMENT ARTIST, CD PROJEKT RED

THE
WITCHER
WILD HUNT

EXPANSION PACK
BLOOD AND WINE

GDC
17