SUPERNATURALLY

GAM6504 Major Project

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Aims

Core Concept

A brutally unforgiving 2.5D masocore action platformer built in Unreal Engine 5.

A hunter who left the world of the supernatural, but the supernatural would not let go of his world.

Goals

01 Lore-integrated Combat design

I needed a way to bring supernatural lore into the gameplay.

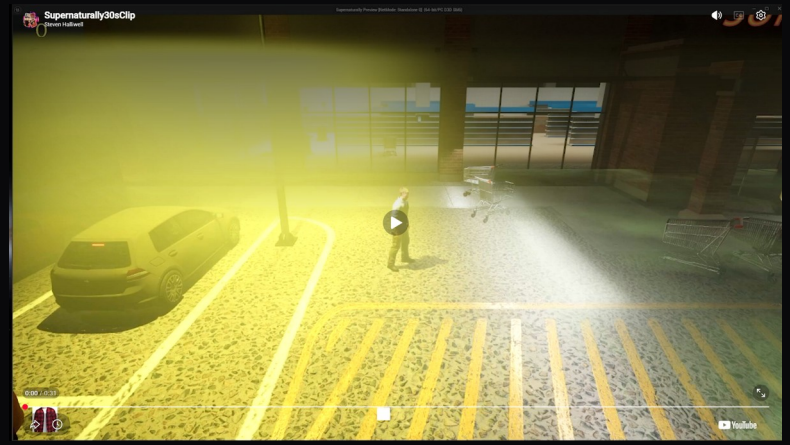
- Enemies are immune to certain weapons
- Strategic gameplay, Salt barriers have a 10-second active duration and then a 5s cooldown period.

02 Environmental storytelling

The story needs to be told through the world in which you play

- The setting is night time with a glowing unnatural fog.
- The 2.5D world is expanded into a 3D sub levels.

Project Outline



The Design Principle

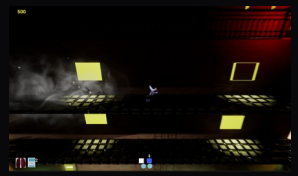
The world has rules. Players survive by learning those rules. Not by developing reflexes, not by memorising patterns, but through genuine knowledge of what monsters are and what kills them.

The Lore-First Methodology

If the mechanic would exist without the lore, the connection is not tight enough.

This test was applied before every implementation decision. If the justification required the lore to be removed in order to work, the mechanic was redesigned.

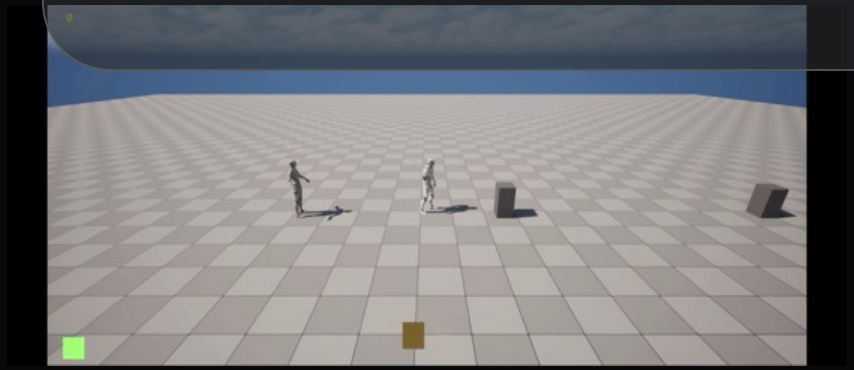
Project Media Showcase



Design Process

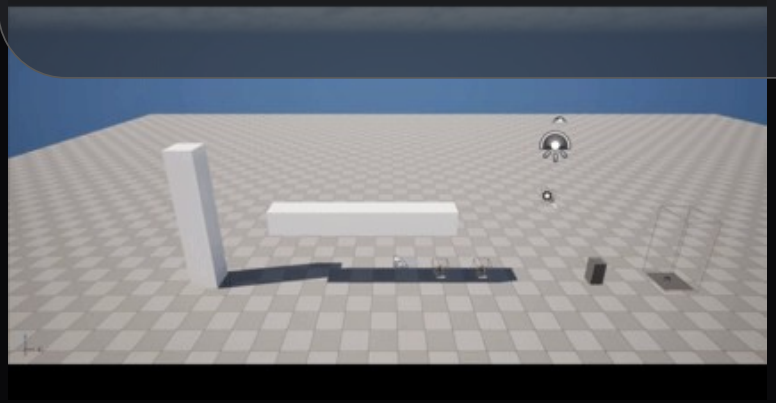
Define

Understanding the type of game I wanted to make, the people that will play it and what experience they would want from it.



Ideate

Brainstorming ideas, mechanically and spatially.



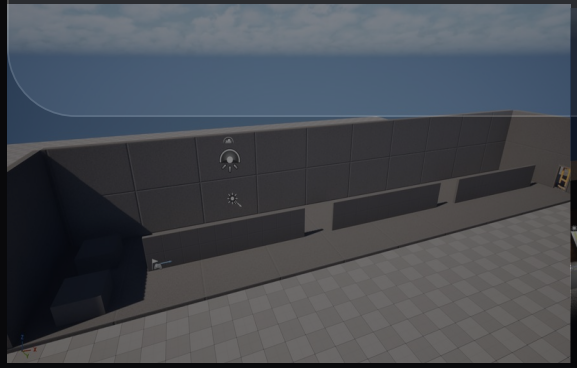
Design Process

Prototype

Creating a ‘greybox’ area or a mechanic in the ‘gym’ to test out ideas before they are implemented in the game or not.

Refine

Mechanics and areas are refined so that there are no glitches or errors within the game.



Academic Theory

MDA Framework

Hunicke, LeBlanc & Zubek (2004)

Application: Designed the aesthetic outcome first. Players feel like they survived because they understood the supernatural and lore. This allowed them to work backward to the mechanics. The Hard Lock System exists because the target aesthetic is survival knowledge to defeat the enemy.

Self-Determination Theory

Deci & Ryan (1985)

Autonomy: Chooses how to approach each encounter.

Competence: Survival feels earned through knowledge.

Relatedness: The world has internal lore accurate rules.

Flow Theory

Csikszentmihalyi (1990)

Application: Challenge matched to skill progression. The CMI research proved the Hard Lock System did not break flow through external attribution.

CMI Research

Halliwell (2026)

Application: My own empirical research forms the primary methodological basis. Visual affordances were chosen from results, not aesthetic preference.

Research Impact

0%

CMI Detected

Across all 12 participants in the Hard-Lock condition.

Design Decision

Ghost pale blue glow & Vampire red ambient selected to negate cognitive load.

73%

Internal Attribution

Players said "I need to improve my skill" rather than blaming the game.

Design Decision

Salt barrier 10s/5s timing creates a tactical window without breaking flow state.

4.2

Shots Per Kill

Hard-Lock + affordances vs universal condition.

Design Decision

Carry limits (3 iron bars, 3 stakes, 5 salt bags) force decisions without cognitive overload.

Technical Systems

Blueprint Weapon State Machine

- Data table controlled-enemy immunity
- Service Pistol: Light damage to all
- Iron Bar: One-hit ghost kill, no effect on vampires
- Wooden Stake: One-hit vampire kill, passes through ghosts

Axis-Pivot Sub-Level Geometry

- UE5 camera rig transition on trigger volume
- Collision geometry reconfiguration
- Shifts from 2.5D lateral to depth corridor

Niagara & Spatial Blocking

- Blue electric Niagara particle barrier
- Dynamic collision volume toggling
- Blocks ghost movement for 10-second duration

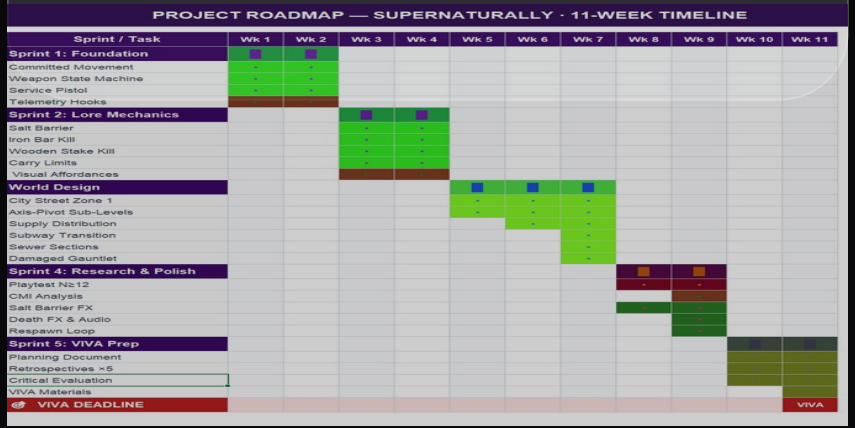
Resource Scarcity Logic

- Carry limits based on cognitive load research
- 3 iron bars, 3 stakes, 5 salt bags max
- Forces decisions without working memory overload

Planning & Research

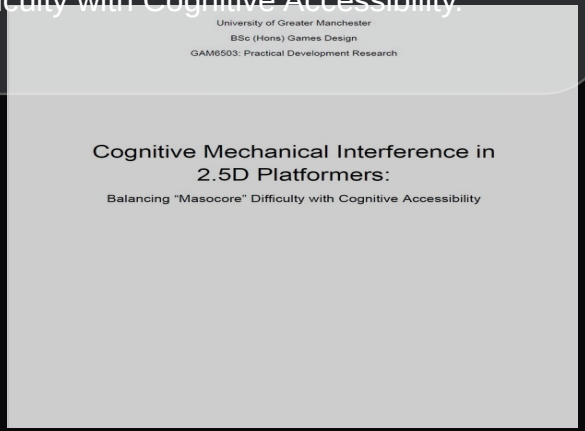
Planning

Using Agile and Sprints to make sure milestones were kept and the project remained in scope.



GAM6503 CMI Research

Research was started in the previous module. Cognitive-Mechanical-Interference in 2.5D Platformers: Balancing Masocore Difficulty with Cognitive Accessibility.



Project Management Journey

- Sprint 1: Foundation

  Core Movement & Weapon Architecture

  Implemented committed movement system and Blueprint weapon state machine.

  Telemetry for data collection was continued to be used.

- Sprint 2: Lore Mechanics

  Salt Barrier, Iron Bar & Wooden Stake. Enemy specific weapons

- Sprint 3: World Design

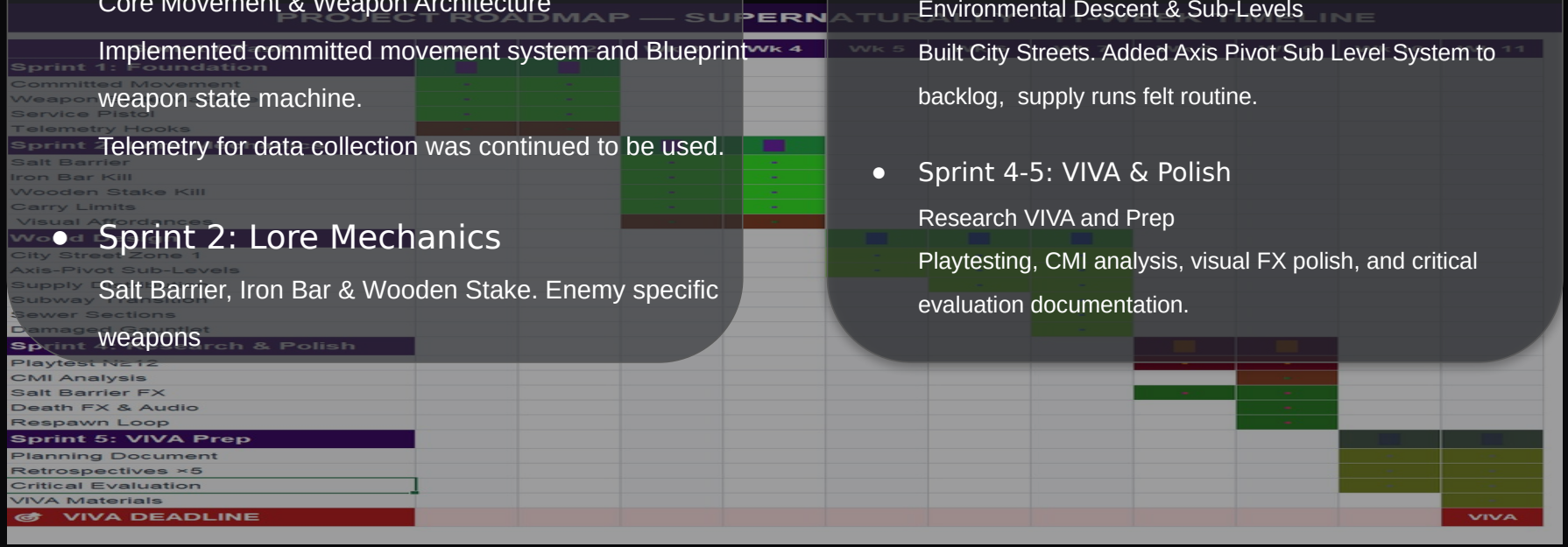
  Environmental Descent & Sub-Levels

  Built City Streets. Added Axis Pivot Sub Level System to backlog, supply runs felt routine.

- Sprint 4-5: VIVA & Polish

  Research VIVA and Prep

  Playtesting, CMI analysis, visual FX polish, and critical evaluation documentation.



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WEEKS	Wk 5–7	STATUS	In Progress	GOAL	MODULE
	Title	Epic	User Story / Task	Status	Acceptance Criteria
	City Street — Zone 1	LEVEL-DESIGN	*and ladders as platforms in a familiar urban setting*	In Progress	Min 3 fire escape platforms, min 2 ladder traversals in Zone 1.
	Axis-Pivot Sub-Level System	LEVEL-DESIGN	*to pivot the spatial axis so supply runs feel dangerous*	In Progress	Player can move into screen depth.
	Sub-Level Supply Distribution	LEVEL-DESIGN	*As a player I need supplies in sub-levels so entry is always risk vs. reward*	To Do	Each sub-level: 1–2 salt, 1 throwable. No guaranteed full restock.
	Subway Transition — Zone 2	LEVEL-DESIGN	*As a designer I need the subway to architecturally signal that safety is over*	To Do	Lighting drops. Audio shifts. Geometry narrows at transition.
	Sewer Sections — Zone 3	LEVEL-DESIGN	*As a player I need the sewers to feel like creature territory*	To Do	Older architecture. Enemies faster/more confident. Resource scarcity peaks.
	Damaged Section — Zone 4 Gauntlet	LEVEL-DESIGN	*As a designer I need a another pivot sub-level before the boss*	To Do	Crumbling Chaos Physics floors. No new resources. Intentional depletion.

- Sprint 3: World Design

  Environmental Descent & Sub-Levels

  Built City Streets. Added Axis Pivot Sub Level System to backlog, supply runs felt routine.

- Sprint 4-5: VIVA & Polish

  Research VIVA and Prep

  Playtesting, CMI analysis, visual FX polish, and critical evaluation documentation.

WEEKS	Wk 3–4	STATUS	Complete	GOAL	MODULE
	Title	Epic	User Story / Task	Status	Acceptance Criteria
	Salt Barrier System	CORE-MECH	*to create a 10s ghost barrier*	Done	5s cooldown. Ghost pathfinding blocked.
	Iron Bar — Ghost One-Hit Kill	CORE-MECH	*As a player I need iron bars to one-hit kill ghosts only*	Done	Iron: ghost kill / no vampire damage. Collected from broken railings.
	Wooden Stake — Vampire One-Hit Kill	CORE-MECH	*As a player I need wooden stakes to one-hit kill vampires, passing through ghosts*	Done	Stake: vampire kill / ghost pass-through. Collected from broken fences.
	Resource Scarcity — Carry Limits	CORE-MECH	*As a player I need limited throwables so every use is a decision*	Done	Max 3 iron bars, 3 stakes, 5 salt bags. No enemy drops.
	Enemy Visual Affordances	RESEARCH	*As a designer I need distinct enemy visuals to prevent CMI under time pressure*	Done	Ghost: pale blue glow. Vampire: red ambient. Distinct silhouettes at 10m.

Issues & Solutions

Issue

Routine Supply Runs

Sprint 2 playtesting revealed that collecting supplies felt like
a routine chore without risk.

Solution

Axis-Pivot System

Added sub-levels that shift the camera and collision axis, adding supply runs feel a unique part of the gameplay.

Issue

Zone 4 Scope Creep

The Damaged Section required complex Chaos Physics crumbling floor geometry, risking overall quality with jitters.

Solution

Deliberate De-scope

Descoped mid Sprint 3. Delivering polished Zones 1-3 evidences design. Created in Sprint 4 due to extra time allowance.

Issue

Boss Encounter Complexity

Ancient Temple boss required all four weapons tested simultaneously, exceeding sprint capacity.

Solution

Descoped from project

Temple as a greybox 'should have' to evidence the level arc, with full implementation reserved for post-degree.

Critical Reflection

What Worked & Why

01

Lore First Methodology

Prevented feature creep and ensured every mechanic felt cohesive and justified.

02

Agile Adaptation

Allowed the axis-pivot sub-levels in Sprint 3, saving the pacing of the game.

03

Research Integration

Using CMI data for affordances removed subjective aesthetic debates.

Critical Evaluation

01

Technical Spikes

Should have prototyped the axis-pivot geometry in Sprint 1 as a technical mechanic, as it was the highest risk to whether it would work.

02

Enemy AI

The enemy is either patrolling or chasing the player using blueprints. Could be done using State trees for greater control.

03

Greyboxing

Should have built the Temple as a greybox in Sprint 3 to evidence the full level arc.

Conclusion & Future Development

Immediate Priorities

- Complete Temple section geometry
- Level 1 boss encounter implementation
- Zone 4 Damaged Section Chaos Physics
- Full CMI playtest N≥30 for publication

Full Game Expansion

- Creature roster: Witch, Poltergeist, Wendigo
- Procedural city street generation
- Mandatory sewer navigational puzzles
- AI-driven behaviour trees

"The world has rules. They learned to respect them."

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