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The Architecture of the Video Game Stray (2022):
The Feline Quadruped Cyberpunk Player

Abstract

The twenty-first century was marked by emerging ways of space- and place-making. The architecture of the virtual environments of video games is one of the alternative practices in which the discipline of architecture got involved. This essay looks at the architecture and spatial storytelling in the videogame *Stray* (2022). The relevance of studying *Stray* does not lie only in the game's enigmatic interiors, rigorous space-oriented narrative, unique patchwork of neon-soaked, post-apocalyptic labyrinthine spaces, or the cyberpunk Kowloon-like ghettoised urban environment in which the game takes place; *Stray* is an unprecedented case study as its gameplay is narrated through a non-human perspective: through the point of view of a cat accompanied by a small flying robot called B 12. This essay provides a critical review of the game and attempts to dissect how the spatial storytelling of its post/non-human architecture is orchestrated. Spatial puzzle mechanics, the fluctuation of the game between urban, architectural, and interior scales, and the role that platforms and vertical design techniques play are the subjects of the article. The challenges of the interaction of a game character with four legs with spatial elements, video game placemaking, and spatial design of fetch quests are other topics that the essay will look into. The article is supported by comments from an unpublished interview with Viv (one of the developers of the game) and a series of detailed analytical drawings from the reconstruction of the game environments by the authors.

Introduction

Architecture is no longer the impenetrable discipline that manifests itself only in bricks and mortar. In the expansive disciplinary discourse of architecture, realms such as video games in which the "core feature" is spatiality and the "primary question is the question of space" are seen as new grounds for the practice and theory of architecture (Wang, Gao, and Shidujaman 2023, 4; Nitsche 2008, 16). Video game design is regarded as a field that provides an alternate framework for architectural production, and the spatial and architectural significance of video games has been the subject of an extensive body of research (Pearson 2020; Kim 2023; Harris and Caldwell 2023; Wood 2012; Fraile-Jurado 2023; Wang, Gao, and Shidujaman 2023; Kuhn 2016; Álvarez and Duarte 2018; Götz and Gerber 2019). The topics of virtual placemaking in video games, architectural/urban design of game worlds, the historical and educational potential of video games and spatial narratives of video games are broached by scholars from varied disciplines, who have argued that "understanding of design processes in virtual worlds, as well as the act of playing games, could become an important asset for architectural education" (Götz and Gerber 2019, 14).

Within this interdisciplinary ecology, this article looks at *Stray* (2022). From the first release of *Stray,* players and game critics noted that "the most captivating" aspect of the game is the novelty of its spatial design and the urban settings in which the game unfolds (Tommo 2022; MacDonald 2022). The game is situated in a well-realised detailed post-human urban environment inhabited by robots, and the narrative of the game is told through a non-human, animal point of view, a cat. At the outset of the narrative of *Stray,* the cat misses a jump and falls into an endless abyss that leads to the Walled City. In the Walled City, there is no sky but only a hermetically sealed ceiling. The city is controlled by an exploitative big corporation called Neco, and its sewer system is plagued by biologically modified trash-eating bacteria called Zurk. The Zurks were supposedly invented to combat the waste problem in the densely populated city. The cat meets a flying robot called B12 and becomes part of a dissident group of robots called 'outsiders,' who call each other 'companions' and are secretly planning to escape the Walled City.

Two original sources underpinned our research into *Stray:* first, the virtual mapping and reconstruction of game spaces; and, second, an interview with one of the developers of the video game. Providing an accurate two-dimensional and three-dimensional reconstruction of the game spaces was a challenge due to the spatial and representational features of the game. *Stray* does not provide in-game navigational tools or privileged points of view such as Maps of game spaces. Furthermore, the video game's camera is locked to the protagonist (the cat) and cannot be placed far from it. The farthest distance from the cat in which the camera can operate varies between one to three meters in different scenes. Moreover, the game's dystopian dark, dusty and fuggy cyberpunk aesthetics, imbued with mist and floating particles, do not offer a suitable vantage point for a detailed reading of its architecture. To resolve the issue, we managed to use a free-roaming camera through PhotoMode MOD, which is a software specifically developed for Unreal Engine 4. The virtually interactable scanned images captured by the PhotoMode MOD camera assisted us in producing the accurate 3D models that provided the necessary spatial information for reconstruction of the "physical geography" of the game (Figure 1) (Fraile-Jurado 2023, 22).

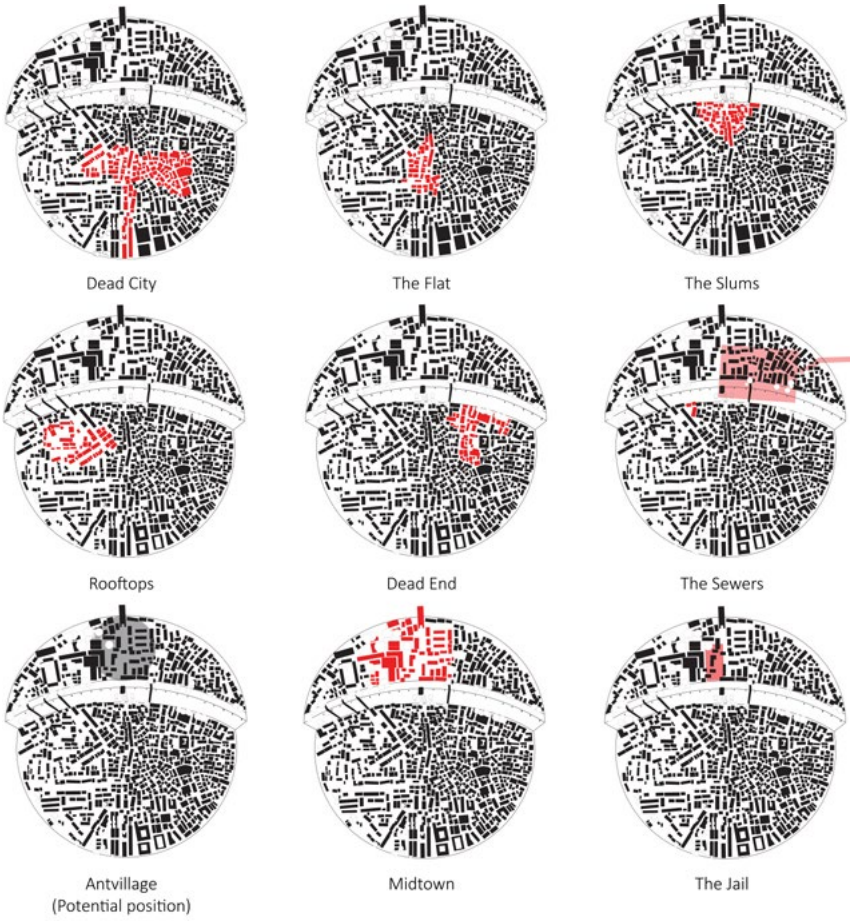

Figure 1. The detailed mapping of the Walled City and the location of the game.

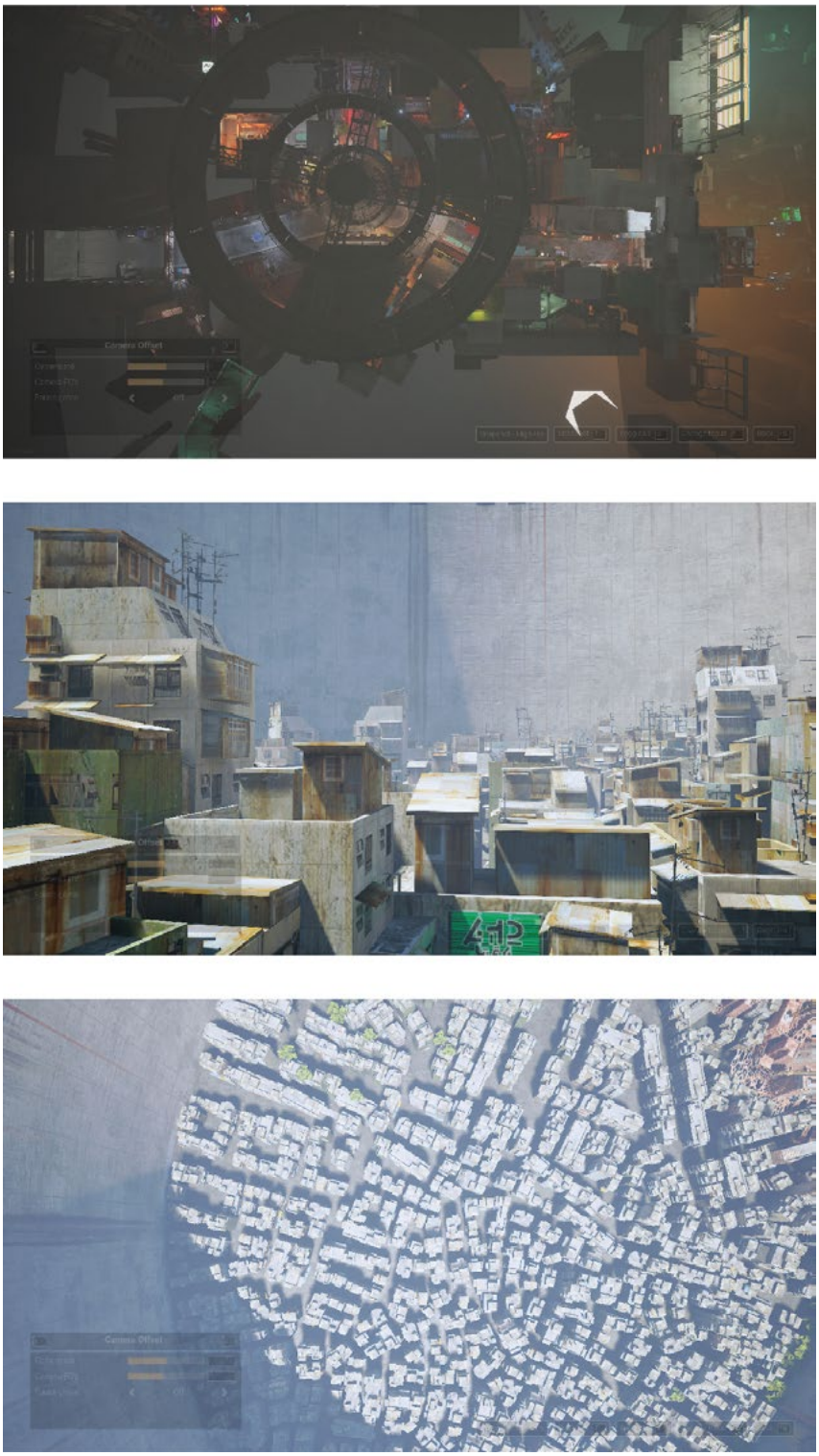

Figure 2. Screenshots from PhotoMode MOD free-roaming camera.

Kowloon, HK, Project and the Architecturally Informed Cat-Spaces

Unlike what is common practice in the entertainment industry, *Stray* was not born out of a linear narrative, synopsis or logline. *Stray* emerged from purely spatial and architectural ideas. The primary source of inspiration for the game is the densely built Walled City of Kowloon in Hong Kong, which inspired the "virtual architecture" of several video games, animation and films after

its demolition in 1993 (May 2022, 885).[1] The pre-production of the game was instigated when Viv, one of the developers of the game, shared a reference image from a "claustrophobic laneway" in Kowloon with his colleague Koola (Viv 2023).[2] Koola and Viv began to model an alleyway in the real-time video game engine Unreal Engine 4 using freely available 3D "cyberpunk style assets" such as rusty air conditioners, metal rooftops and pipes (Viv 2023) (Figure 3).

Not only on a visual and aesthetic level but also the pacing, actions, sequencing and even subcultures embedded within the gameplay stem from the Walled City of Kowloon (Figure 4). The "anarchic urban settlement" of the Kowloon Walled City, with its "makeshift verticality," was notoriously known as the "den of iniquity and lawlessness" and the locus of "pimps, addicts, prostitutes, drug dealers, sex workers, and gambling houses" (May 2022, 888; Sinn 1987, 30). Similar to what we see in *Stray,* the city was always described by its "leaking sewers and water pipes, scattered refuse, oppressive humidity and free-running rodents" (May 2022, 891; Zheng 2019, 140). Such an urban environment functioned as an ideal setting for a game that shows a tendency to make social and political commentary about notions such as spatial justice, poor working conditions, informal settlements, tight domestic settings, labour exploitation, class struggle and corporate political economy.

Figure 3. The first concept image produced for the game, showing the alley and the cat, was published on Twitter in 2015.

1 To the knowledge of the authors, narrative video games and moving images that were inspired by the Walled City of Kowloon include *Ghost in the Shell* (1995), *Kowloon's Gate* (1997), *Shenmue II* (2001), *Batman Begins* (2005), *The Dark Knight* (2008), *The Dark Knight Rises* (2012), *Call of Duty: Black Ops* (2010), *Mr Pumpkin 2: Walls of Kowloon* (2020), *Arcane* (2022) and *Stray* (2022).

2 The developers of the game, Koola and Viv, have made the decision not to reveal their identities. We set up an online interview after contacting them through their Twitter accounts: https://twitter.com/vivncolors?lang=en (Viv); https://twitter.com/Koola_UE5 (Koola).

Figure 4 . This robot on the rooftop and its action reference the politically charged photographs of Greg Girard and Ian Lambot taken at the Kowloon Walled City.

The visual impact of the Kowloon Walled City is clear in the game. However, the extraordinary factor that influenced the creation and representation of the game's spaces is its protagonist, the cat. The decision to employ the cat as the protagonist was ignited by a random jump by Koola's cat. Viv in relation to the decision stated: "At that stage, we did not make any decision to have the cat as the playing character in the actual game. In the beginning, it was just a visual choice to emphasize the impressive scale of the space by using a small character who does not belong there" (Viv 2023). *Stray* can be classified as a 3D platform game, but the significant difference between *Stray* and other non-anthropocentric platform games, such as *Sonic the Hedgehog* (1991), is that *Stray* is orchestrated in an intricate three-dimensional world and not a flat two-dimensional environment. The urban setting in which the *Stray* cat wanders, solves puzzles and eventually functions as hero is a spatially complex architectural system. The cat finds collectables from the labyrinthine and tortuous alleyways of the Walled City, embarks on undulating parkours through the intricate vertical organisation of the game space and discovers clues in the object-dense interiors.

In addition, the cat neither is scaled to become proportionate to the magnitude of the human-scale environment nor carries out human-like actions. The game exploits the 'cat-ness' of the cat in terms of scale and actions. The protagonist of *Stray* is only capable of feline actions: he/she only jumps, runs and scratches surfaces. From a level design point of view, the spatial configuration of the Kowloon-like Walled City responds effectively to the actions

and scale of the "little fuzzball" that can jump high.[3] The city is a perfect environment for a cat to crawl on the narrow pipes, jump on the bare rafters, antennas, protruded rusty air conditioners that punctuate the walls, and manoeuvre on horizontal sheet metal rooftops and makeshift bridges that infiltrate the spaces between the tightly put-together buildings. From the preliminary tests, the developers of the game realised that differences in the heights of platforms, the chaos of the patchwork of the city, the multiplicity of hiding nooks, alcoves, corners and niches, and the ample random openings into which a cat might stealthily enter make the virtual city an ultimate game environment for a cat.[4]

At a more conceptual level, the striking estrangement between the cat and the environment reinforces the message of the narrative. The incompatibility of the whimsical, animate, vulnerable character and the highly oppressive informal settlement, populated with robots, sentinels and metal-eating bacteria, imbues every moment of the game. This contrast makes the cat the titular hero of the game and an agent of hope and change. The cat is the only non-dangerous organic creature in the city, a complete *Fremdkörper* that destabilises and challenges the accepted spatial norms and orders of the Walled City. The cat empowers and enhances; he/she performs actions that the humanoid robots trudging along the street are not able to. The cat emblematises positive change and serves as an interrupter to the norms in the life of the city.

Despite the advantages that the feline protagonist offered, it posed challenges to the physics of the game. The physics of Unreal Engine 4 are fundamentally programmed for a character with two legs: a character who stands up, runs, opens his/her hands on the sides, kicks a ball, punches, and descends on two legs (Pinchuk 2016) (Figure 5). In particular, the collision physics of the cat character became the most problematic aspect of the game physics for the group. According to Viv, "There were so many problems. Jumps and falls were awkward and unnatural. The cat couldn't stand and walk on narrow things that a normal cat usually can" (Viv 2023). Due to the unsuitability of pre-set character motions, the animators of the game had to motion capture the major part of the actions and manually keyframed some of them.

3 "Little fuzzball" is what Clementine, one of the robots, calls the cat at various stages of the game.

4 One of the first visualisations for the HK project: https://www.youtube.com/watch?v=XdpviYTxChs (accessed 23 June 2023).

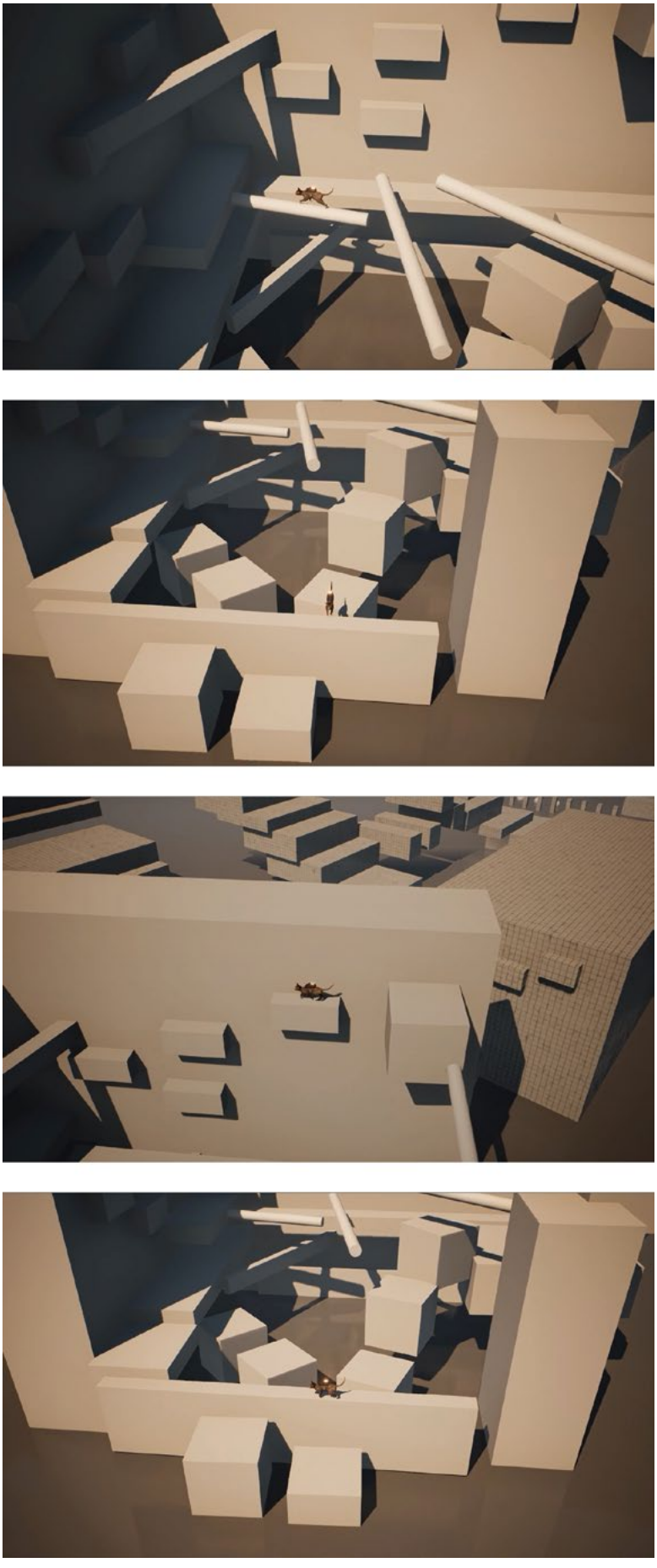

Figure 5. Collision and physics tests in Unreal Engine 4.

The other notable obstacle in developing the game was the camera setting. Camera work and the "cinematic form of presentation" of the "mediated" spaces of video games are as vital as any other time-based narrative medium (Nitsche 2008, 16). An effective design for virtual in-game cameras and their "hydraulics" is as crucial as the design of spaces (Rogers 2014, 133). It is "the necessary eye of the virtual camera that makes the interactions accessible much like architectural structures" (Nitsche 2008, 84). In *Stray*, the cat protagonist imposed unpredictable and unprecedented challenges on the camera aspect of the game's production.

A conventional third-person 'over-the-shoulder' was not possible to employ in the game due to the small scale of the cat. An over-the-shoulder camera that follows a cat would bump into barriers and objects and would look at every scene from a very low angle which makes spaces illegible. An over-the-shoulder uncontrollable camera design for the cat, who is much lower than other characters (robots), faced all the problems that an in-game virtual camera could face: issues such as "camera flipping," "obstruction" and "positioning" (Rogers 2014, 144–151). Therefore, a hybrid camera that can be categorised as a "third person" "follow" camera was programmed for *Stray*. In terms of scale, the camera fluctuates between "close-up (CU)," "medium shot (MS)" and "wide shot (WS)," and its angle varies from "high angle" to "low angle" and even to "worm's-eye view" (Rogers 2014, 144–151) (Figure 6).

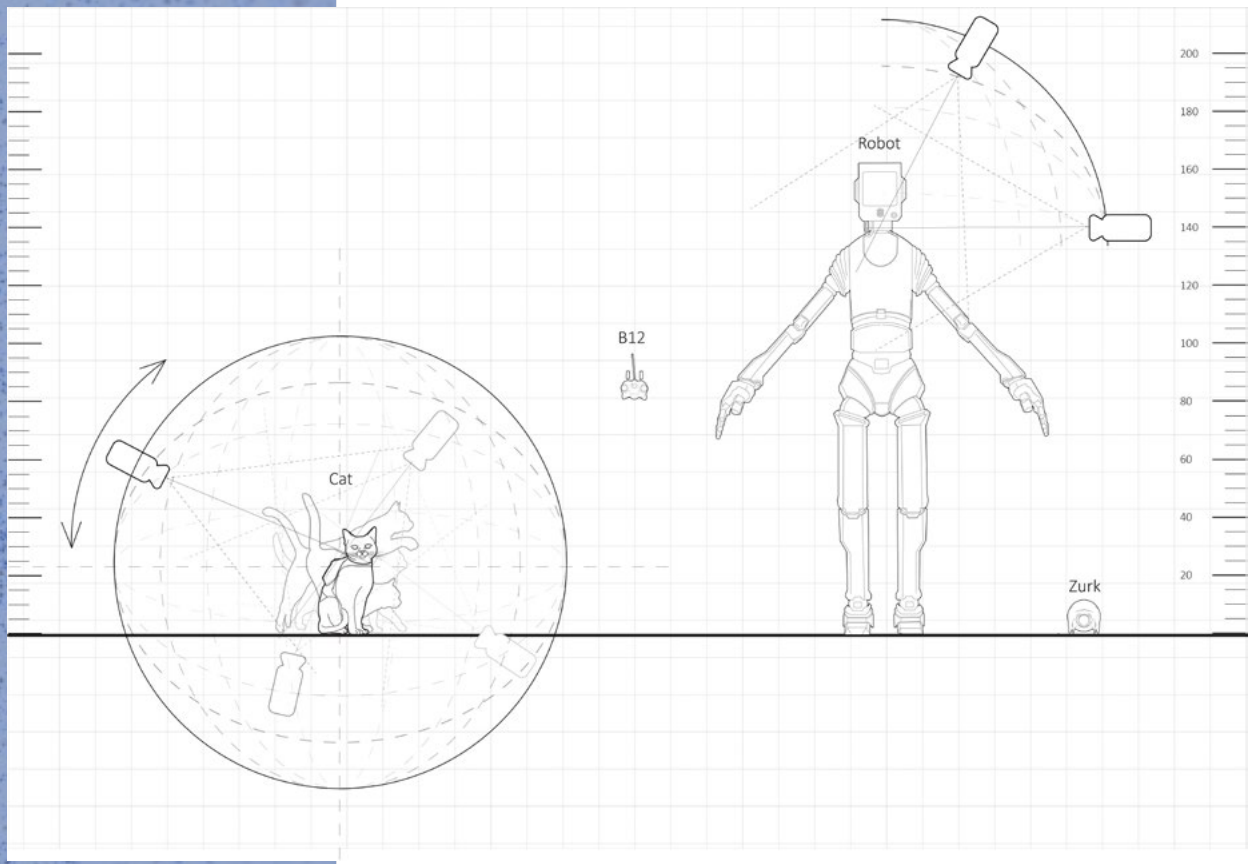

Figure 6. The drawing shows the difference between the height of a normal over-the-shoulder on a human scale, drawn on the right (the robot), and the low-angle type of camera and its range of action programmed for the cat in Stray.

Figure 7. A screenshot from the third-person camera in which the cat, B12 and a robot are shown.

Platforming

As video game theorist, educator and director Scott Rogers puts it, platforms are the "beloved" elements of the architecture of video games (Rogers 2014, 353).[5] According to Roger's rich and comprehensive categorisation of game platforms, in *Stray*, we can witness a wide range of platform categories: "moving," "tilting," "collapsing," "swinging," "pendulum," "weight balance" and "platform-barriers" (Rogers 2014, 353).

Our study elucidates that the platforming of *Stray* has three notable features: it is multi-scalar, it is three-dimensionally complex, and it is diverse in terms of height and form. Within the complex system of platforms in *Stray*, the platforms are dispersed in various forms, with alterations in angles and directions along the X, Y and Z axes. This complexity partly stems from the fact that platforming is the most crucial—if not the only—possibility for spatial design in the architecture of a cat game. Unlike other platformers, in *Stray* the platforms are also considerably diverse in their heights and forms; the huge quantity of platforms arrayed in three-dimensional space clearly has inflicted an enormous amount of work and design effort on the spatial design of the game. The other unique aspect of the platforming of *Stray* is that it takes place on different scales. The game's platforming is designed to work on at least three scales: urban scale, building scale and interior scale.

We looked at various scenes and chose one of the possible journeys of the cat in the chapter 'Dead City' to indicate the intricacy and design depth of platforming in an example. The

5 In video game design, the horizontal surfaces on which a game character operates and advances the gameplay are called platforms, the creative process of designing and arranging platforms is 'platforming,' and games that heavily rely on the movement of characters on platforms are called 'platformers.'

analysis of the scene demonstrates the complexity and diversity of height alterations in a journey that takes less than two to three minutes. We experimented with various visual and mapping methods and eventually devised a 'height map' in which changes during the journey, as well as the type of platform used in each step, are visualised (Figure 8). Further, we traced the height of each platform through vertical and horizontal red lines to produce a more readable and abstract version of the height map, on which the most hit vertical levels are visible in the dense areas. As shown on the floorplan of the scene, the path of the cat changes 11 times from one side (one wall) to another (Figure 9). Changes of direction at the planimetric level (on the plan) further add to the spatial complexity of the platforming. We also discovered that the same degree of intricacy of choreography exists on an urban scale (Figure 10) and an interior scale (Figure 11).

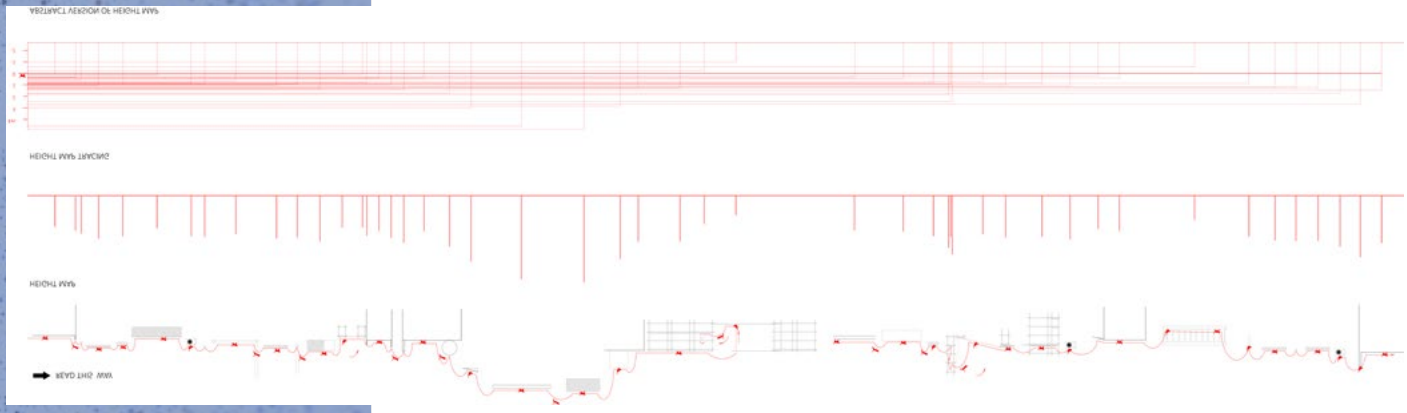

Figure 8. The height map, height tracing and abstract hit map of the scene.

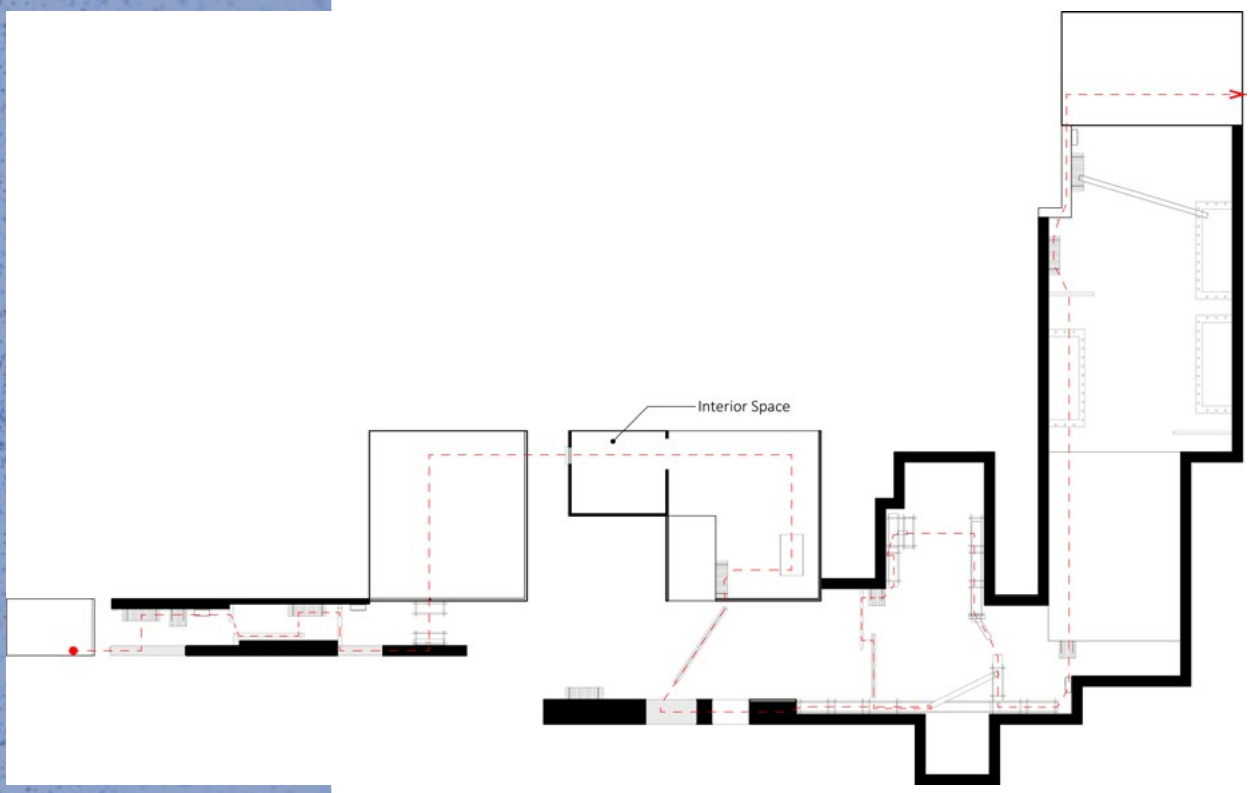

Figure 9. The floor plan of the height map.

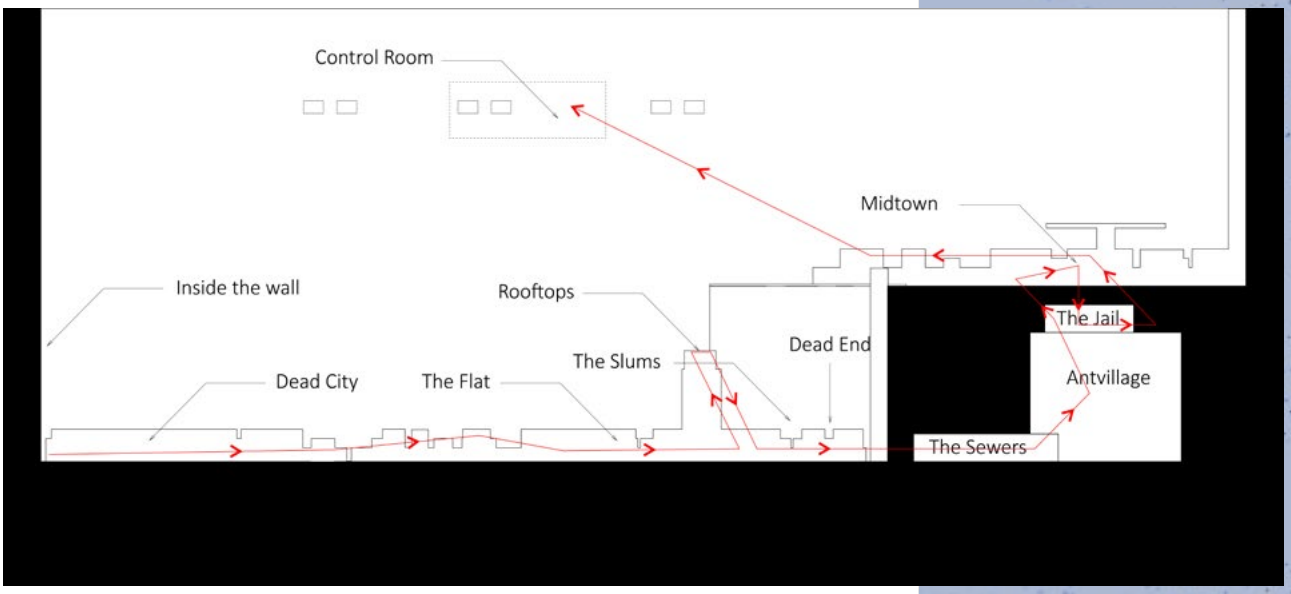

Figure 10. The change in height of the quests is shown on a macro urban level section.

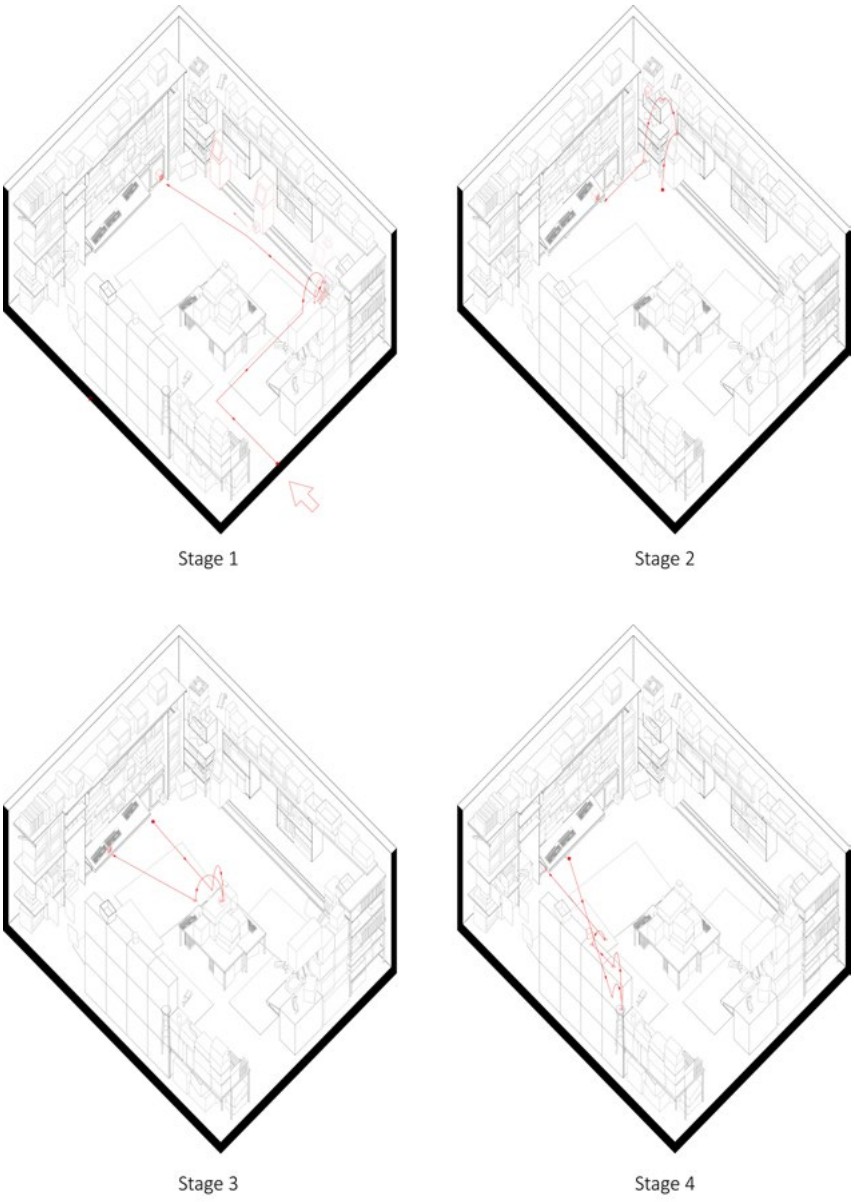

Figure 11. Axonometric drawing showing changes in height in the interior scenes.

It should be noted that complicated platforming never becomes frustrating or unresolvable in the game. The complexity of platforming is fathomable through a strategic method. In *Stray*, players are indirectly trained to cope with the mechanics of the spatial puzzles. We discerned that the new game mechanics are first introduced to players at an isolated, singular and relatively easily intelligible site. Then, when the cat manages to pass this, the same mechanics get deployed as the component of a more complex spatial system. In effect, *Stray* uses the technique that Rogers calls changing "the context of mechanics" (Rogers 2014, 368). For example, the cat first learns how to use himself as a decoy to mislead Zurks (Figure 12), employ a floating I-beam as a seesaw to lead Zurks astray (Figure 13), push the barrels to jump higher (Figure 14) and efficiently exploit rotating platforms to cross the voids in separated stages (Figure 14). After that, all of the mechanics are assembled in one sequence of fast movement in a fast-paced chapter, 'Tower' (Figure 15). After the four stages of unconscious training, when a player arrives at the 'Tower,' he/she is familiar with the physical puzzles and can solve them without much deliberation.

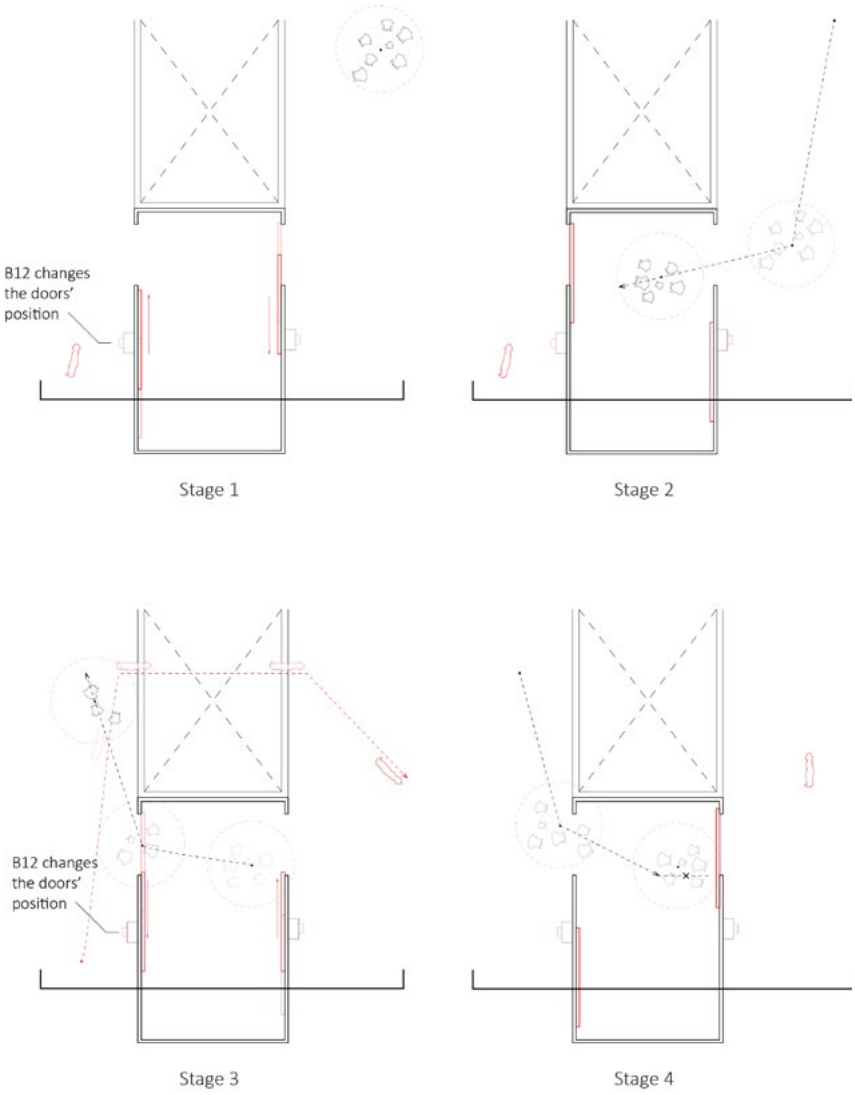

Figure 12. The cat uses him/herself as a decoy and gets the Zurks caught in the space on the other side of the doors.

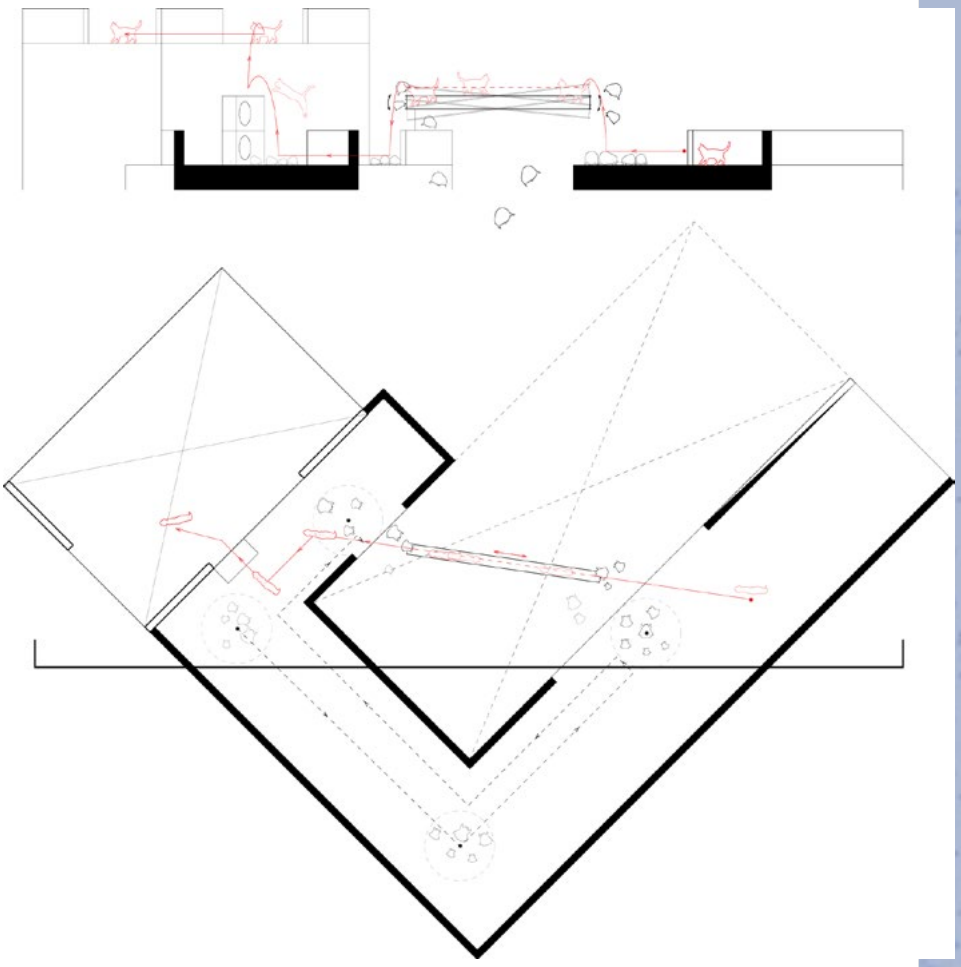

Figure 13. The cat plays with the weight and uses the I-beam as a seesaw to mislead Zurks.

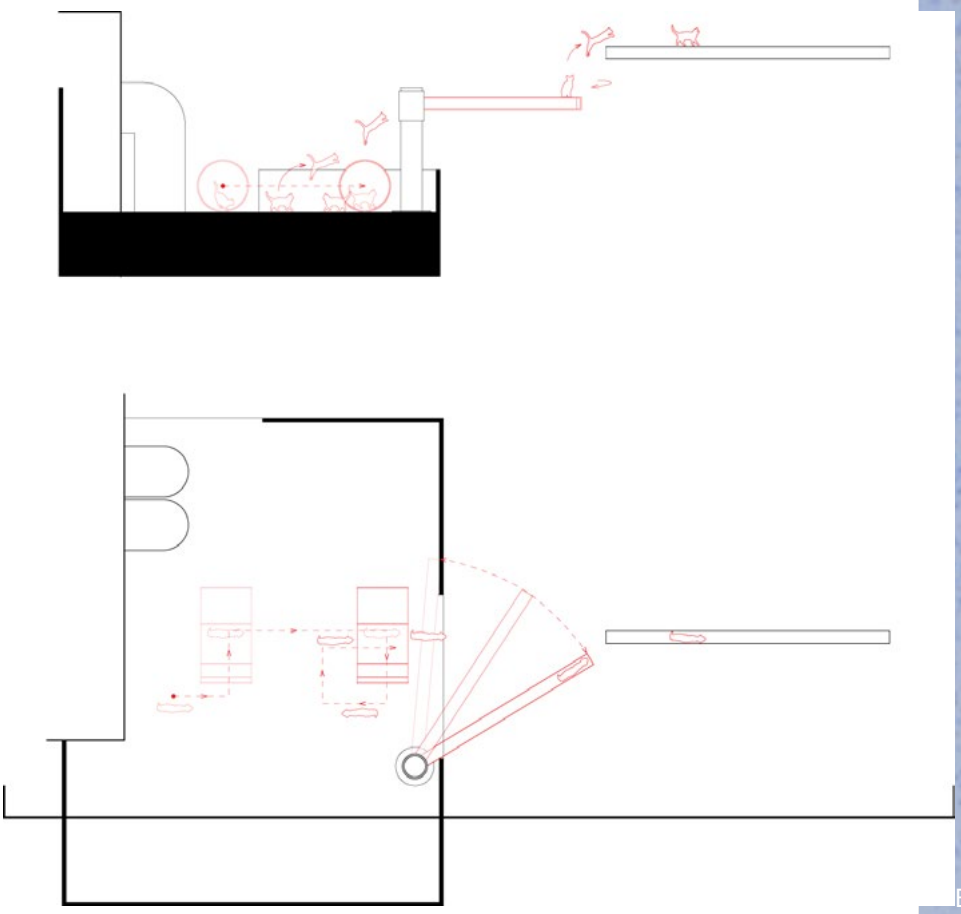

Figure 14. The cat pushes the barrel and uses it to jump on higher surfaces, then explores the mechanics of the rotating platform.

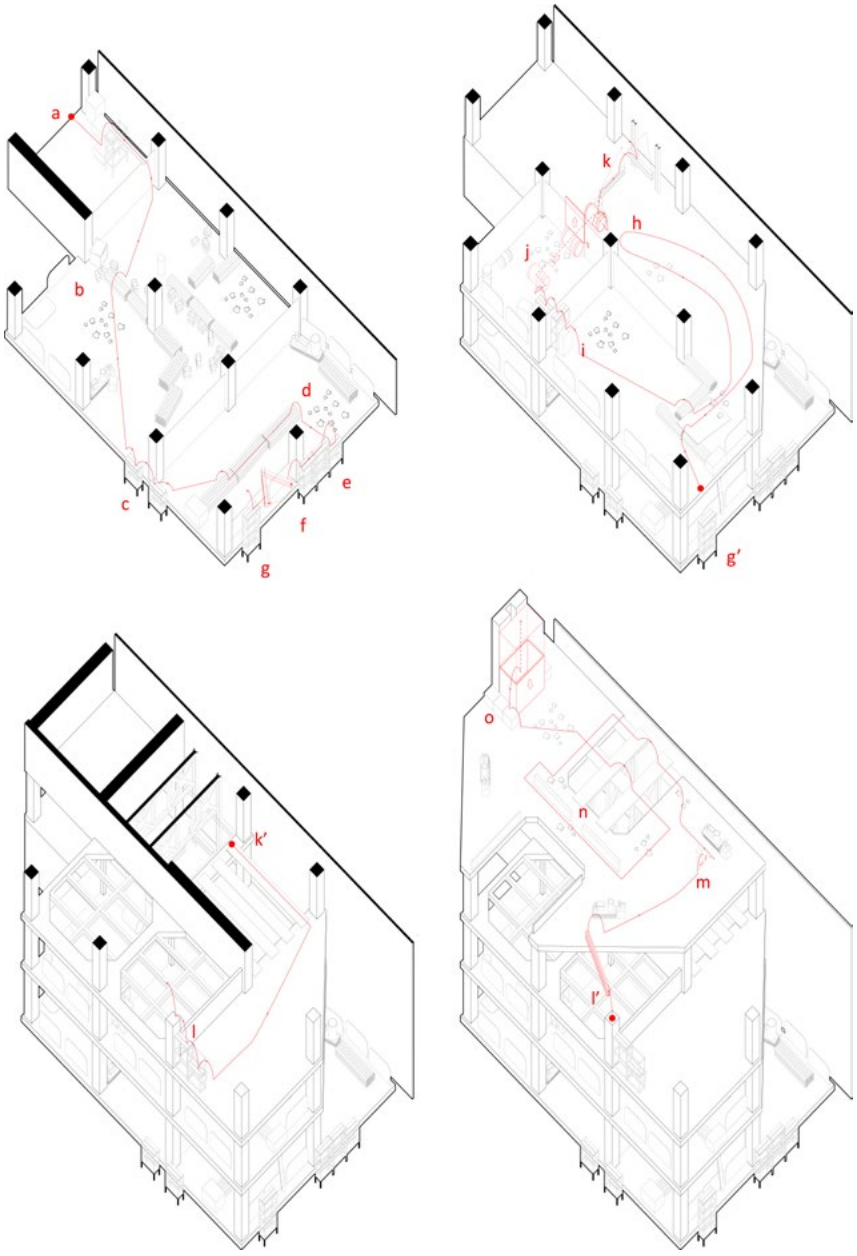

Figure 15. F–g, the cat uses the rotating platform; j–k, the cat pushes the barrel forward; k–k' / l–l,' the cat uses the floating I-beam to reach a higher level; m–o, the cat makes the Zurks follow him/her.

Spatial Design of the Fetch Quests and Visual Clues

Level design is the main undertaking, and arguably imposes the most spatial responsibility, in the video game design process. Level design is defined as the architecture of "game environments" that conditions the "gameplay by steering the player through a sequence of designer-controlled steps, while simultaneously providing a visually engaging experience" (Ma et al. 2014, 95). Any 2D or 3D video game entails "virtual environments that players must traverse to advance through the story" and each of the levels usually includes a "series of spaces, or rooms, with connections" (Ma et al. 2014, 95; Salmond 2016, 12–20). Every level is usually designed to guide a player to fulfil one or several 'quests', and between the phases of a quest, a player has some time to explore game spaces.

First-person shooters such as *Doom* (1993), *Metro* 2033 (2010), *Counter-Strike* (1999), *Call of Duty* (2017) and *Dusk* (2018) are often the most studied cases in terms of level design. These games, however, often guide the players to go through a flat sequence of movement, on the ground level. A choreographed physical journey of the game protagonist from one level of height—particularly through a complex, three-dimensional and winding journey—to another is not part of the principal level design strategies of the above-mentioned games. In *Stray*, on the contrary, the chasing scenes, fetch quests and even side quests are not planned to take place on the ground plane; they all follow a constantly ascending-descending vertical pattern.[6] In *Stray,* at both the urban scale and the interior scale, the fetch quests are shaped around the complex platforming and vertical choreography of the gameplay. The congested configuration of the steep structure of the Walled City serves the quests that perform at different heights effectively. In relation to the importance of a vertical design for quests, Viv stated:

> We put characters and collectables in different parts of the city... we thought it would be very cool to send the cat to get something from one apartment in one tower, another item from the first floor of a flat in another neighbourhood and then send him to get something from the third floor of another apartment somewhere else... we thought, we can think of so many fun locations and encounters in the middle, commuting to different locations.

Through the carefully constructed virtual model of the city in Unreal Engine 5, we mapped the movements of the cat's spatial journeys for fetch quests in the 'Slum' and in 'Midtown'. In addition to the spatial richness of the programme and sequencing of the quests, we found that each quest forces the cat to engage in ping-pong manoeuvres between varying levels of the buildings. The floor plans in Figures 16–17 showcase the choreography of a quest in a distinctly dense area of the city, while Figure 18 demonstrates how the quest is configured through an undulating, zigzag-shaped vertical move within a very compact segment of the urban environment.

6 A 'fetch-quest' is a "long search over space and time for something which is difficult to find" and is a 'side-quest,' an "(optional) collection of tasks not connected with the main quest" (Harris and Caldwell 2023, 3).

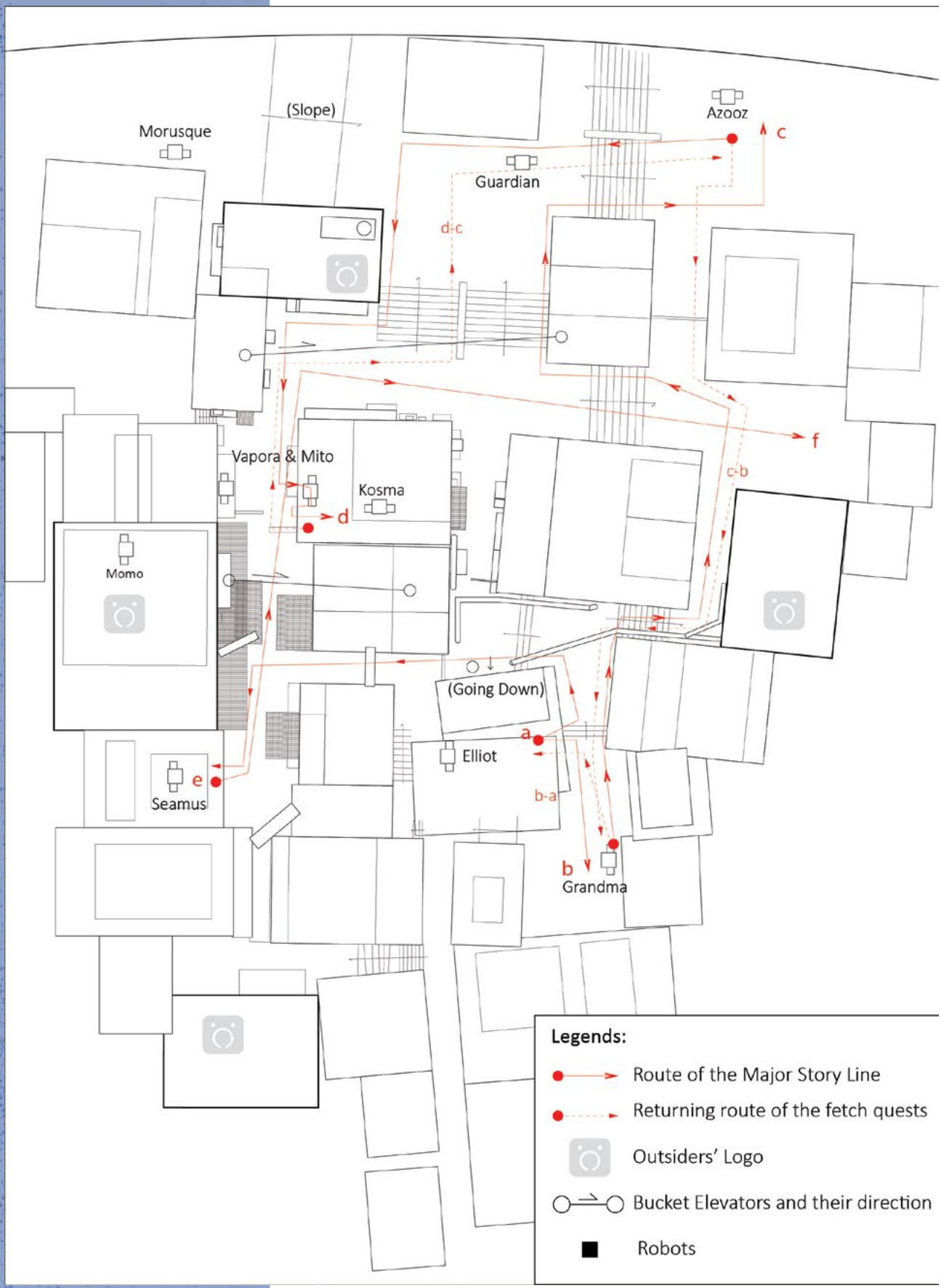

Figure 16. A–b, Grandma asks for the Electrical Cable to make a Phocho; b–c, Azooz asks for a Super Spirit Detergent in exchange for the Electrical Cable; c–d, the cat gets the Super Detergent from the laundry; d–c, the cat gives the Super Detergent to Azooz; c–b, the cat delivers the Electrical Cable to Grandma; b–a, the cat gives the Phocho to Elliot for him to fix the tracker; a–e, the cat gives the tracker to Seamus; e–f, the cat follows Seamus to the 'Dead End' to look for Doc.

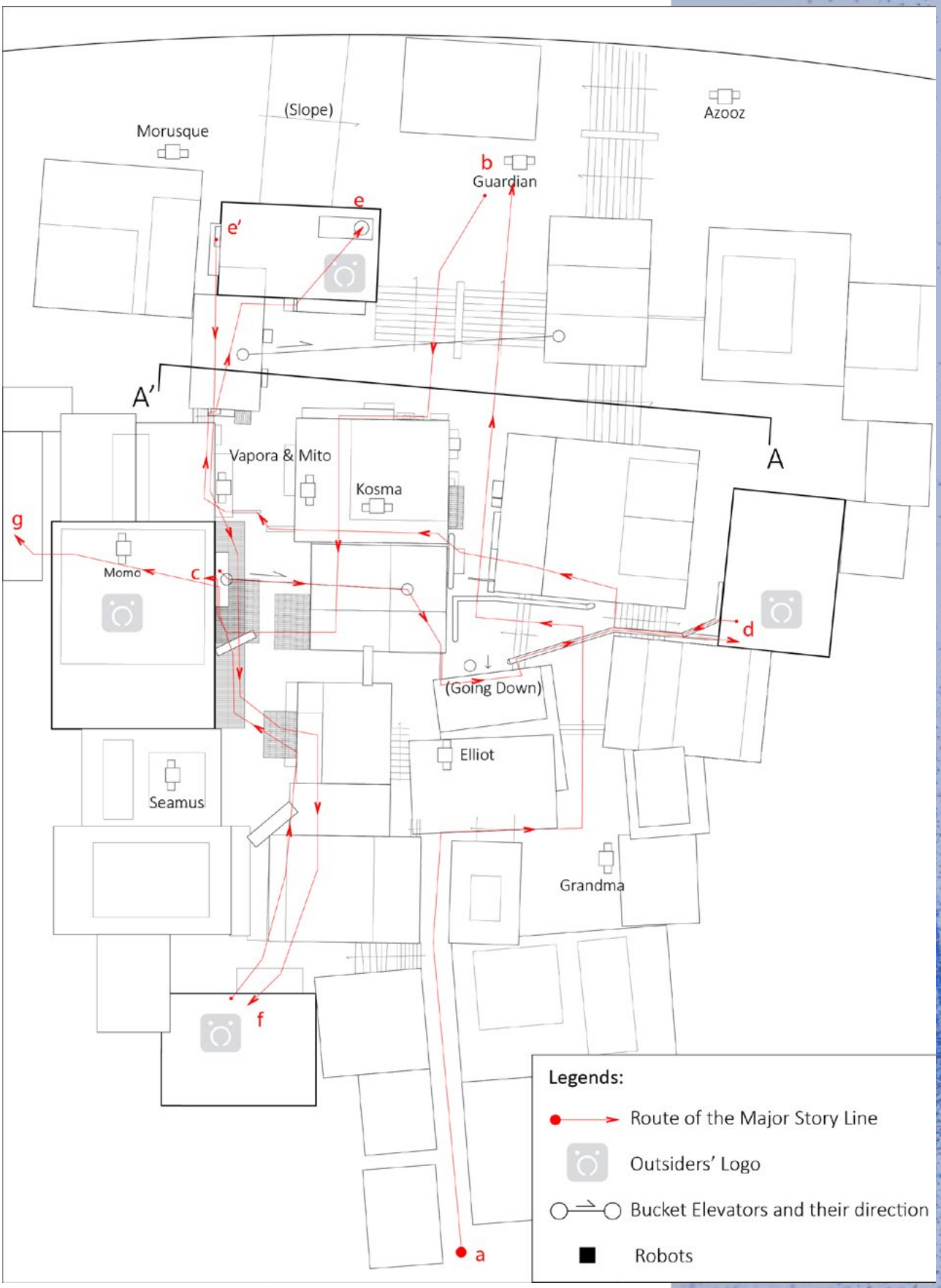

Figure 17. A–b, the cat meets with Guardian; b–c, the cat finds Momo; c–d, the cat finds Clementine's Notebook; d-e, the cat discovers Zbaltazar's Notebook; e–f, the cat finds Doc's Notebook; f–g, the cat returns to Momo's place.

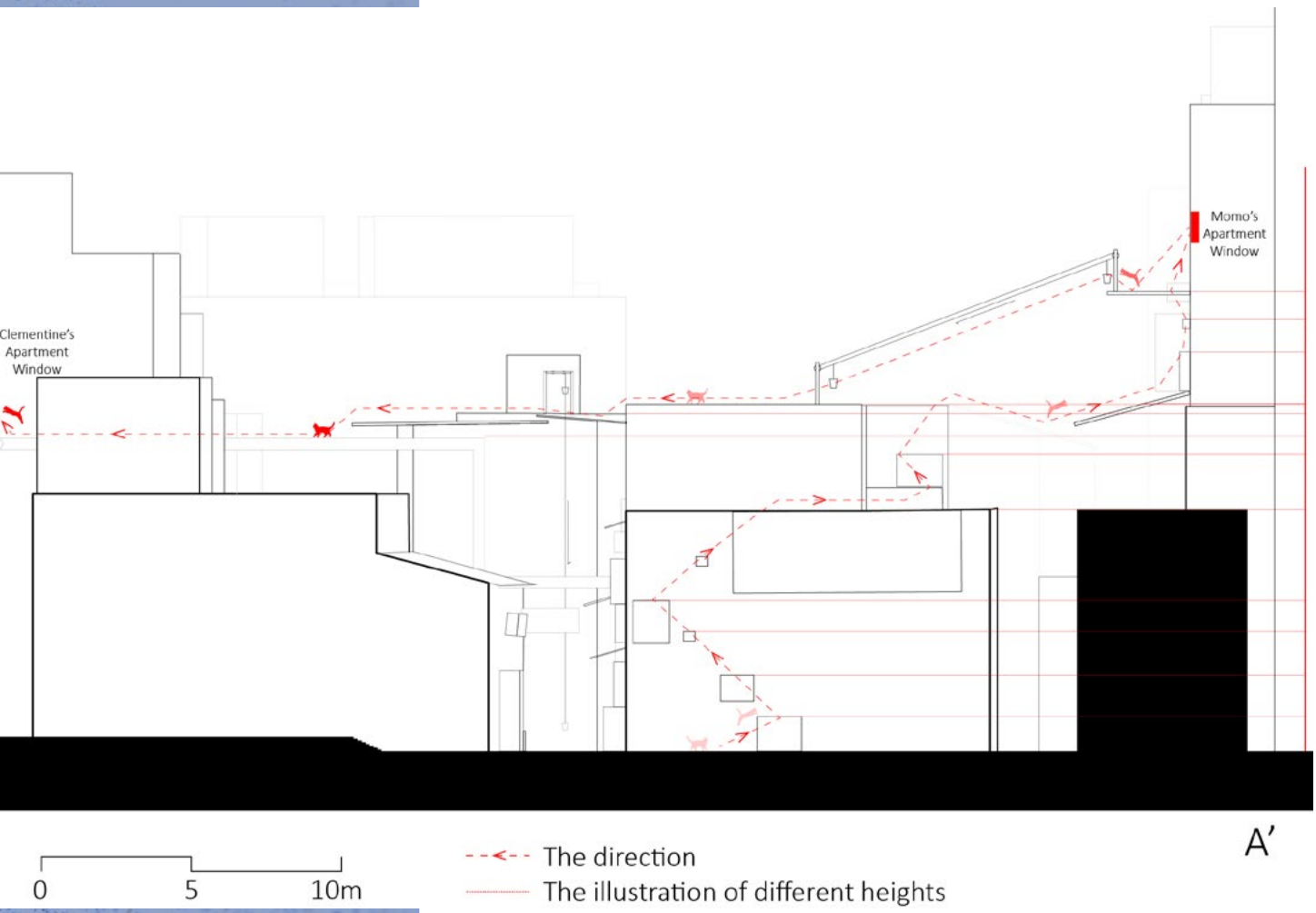

Figure 18. The vertical organisation of the quest.

This spatially complex and multiphase nature of quests that make the cat travel between urban locations can become rather confusing. The developers of the game attempted to tackle the issue through what they call "visual clues" (Viv 2023). Viv remarked that the employment of "urban signs" and "lighting" is how the level designers managed to make the spatial puzzles solvable. He points out one of the examples from the game in which a blue emoji neon sign is utilised to indicate the next destination of the cat: "We thought, what if they cannot find where they should go? We put the blue face in the sightline of the camera so the user sees where the next outsider is and can at least see the direction of the next step of the quest" (Viv 2023). In the mentioned quest, the cat is supposed to enter four apartments and collect items or meet people in each of the apartments. The composition of the scene is arranged with careful consideration given to space syntax and sightlines. As soon as a player exits one of the apartments, he/she notices the blue emoji sign of the first apartment within the range of the camera vision (Figure 19). The use of visual clues in the space syntax, supported by lighting, is also observable in other scenes. For instance, in a scene where the cat is chased by the Zurks, the alleys that are lit with red light are dead ends, while those with blue lighting are where the cat can continue his/her pathway (Figure 20).

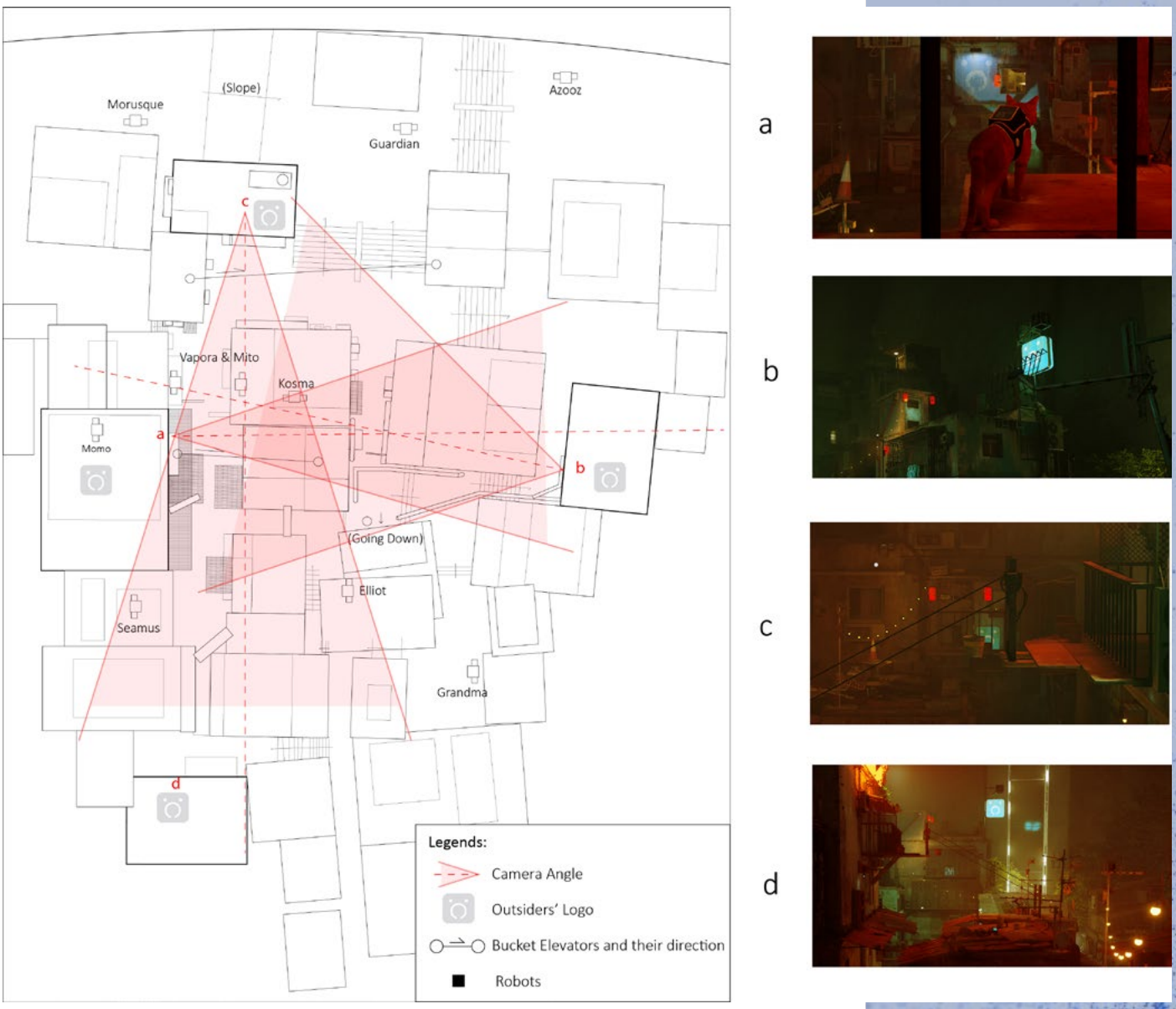

Figure 19. The locations of the three apartments and blue emoji signs (map on the left), and what a user sees when leaving each apartment, with the blue emoji signs in the images (screenshots on the right).

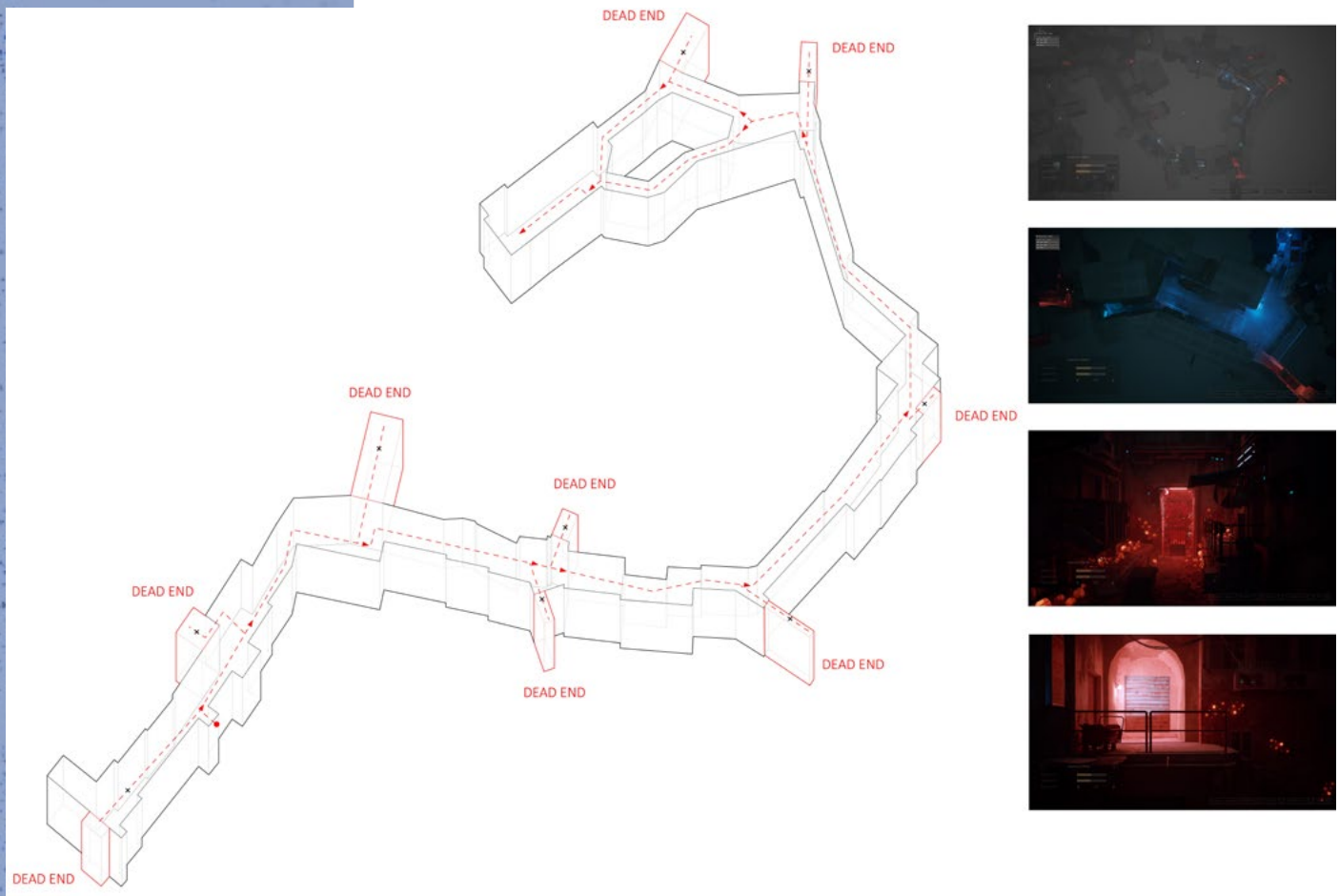

Figure 20. The itinerary of the chase (diagram on left), and screenshots showing blue and clear alleyways as well as red dead ends.

Placemaking and Repetition

As is clearly shown in Figures 16 and 17, the quests involve a rhythmic repetition. The cat is forced to return to one location several times and traverse one specific alleyway repeatedly as part of the sub-quests. Viv describes the feature as an exercise of "familiarisation": "We wanted to familiarise the player with the space by making the cat frequent certain places in the Slum and Dead City over and over again, to become one of them, a citizen of the Walled City, by wandering through the alleyways. This makes a player learn the spaces subliminally, and find his way instinctively, almost blindly. By repeating the journey, the player also puts himself in the shoes of the cat" (Viv 2023).

The significance of repetition in game spaces has already been underscored by scholars. Richard Coyne builds upon the point made by the historian Johan Huizinga that repetition is the "inner structure of the game" (Huizinga 1998, 10). He suggests that it is the "unimpeded repetition," "furious search" and going "around and around" that defines the essence of a game (Coyne 2003, 201). Viv, however, implicitly attributes an aspect to repetition which is more relevant to architecture; he draws a direct equation

between the repetition and video game 'place-making.' Within the discourse of video game design, the notion of (spatial) 'immersion' is a semantic equivalent of what we call 'place-making' in the built environment-related disciplines (Wang, Gao, and Shidujaman 2023, 20). Video game theorist Aylish Wood calls this kind of enhancement of immersion and familiarisation the technique of "recursive space" and finds it one of the principal modalities of engagement with game environments (Wood 2012, 105). Through the employment of recursive spaces, the game manages to achieve a sort of "environmental storytelling" that lays a strong foundation for "the preconditions for an immersive narrative experience" (Jenkin 2004, 122).

As highlighted by Viv, the act of familiarising players with spaces amplifies the sense of immersion. By attuning the player to the spaces, the game turns the virtual 'spaces'—or "non-places"—into 'places' and engages in a practice of place-making (Myers 2002). This exercise of place-making in *Stray* happens through the repetition of visits and numerous passages in the game spaces. The apparent aim of repetitious journeys, at the most basic level, is fulfilling the quests, but the frequent visits have another significant goal: place-making through familiarising the player with game spaces.

Marc Bonner, architecture and video game theorist, draws upon the work of game scholar Gordon Calleja and argues that the repetition that "rhythmises and regulates" strengthens "spatial and kinaesthetic involvement" and "incorporation" of the players in the game spaces (Bonner 2020, 216). Calleja has proposed that the success of immersion and place-making in games is not dependent only on "an engaging activity" but also on a "world to be navigated": "When a player plots a route through a geographical expanse and then navigates it, it is more likely that she will feel a sense of habitation" (Calleja 2011, 27–30). According to Bonner, in these rhythmic repetitions a designer "must play multiple sizes of space, interior–exterior dynamics, while remaining effectually complex at the same time" (Bonner 2020, 218).

Through countless passages as part of convoluted quests, *Stray* makes its player part of the environment and makes him/her engender a 'mental map' of the Walled City: a cognitive map in which all the corners, shops, pathways and characters of the Slum and Midtown become well known to the player. *Stray* transforms virtual spaces into intimate places to which the cat (and the player) feels a sense of belonging. This transformation is not executed through superficial stylistic fixations or the 'look' of the game, but by triggering "emotional and cognitive responses" through the arrangement of spatial journeys (Kim 2023, 19). As urban designers Ricardo Álvarez and Fábio Duarte argue, place-making in video games is not an outcome of "realistic environments" and visual "form" but of how the game conditions "people's responses, which ranges from behaviours to affections" (Álvarez and Duarte 2018, 209).

Conclusion

Stray proves the fact that the role of the architect of the video game does not stay on the surface of the "visual surplus" production for the games (Mitchell 2002, 1). The architecture of video games is not just the business of crafting *doppelgängers* and replicas, the "placement of the camera" and "spatial configurations"; it has its deep roots in the "understanding and selection of circumstances, parameters, and rules, derived from the real and implemented in the virtual" (Goïtz and Gerber 2019, 14; Álvarez and Duarte 2018, 208).

Two decades ago, influential game scholar Espen Aarseth insisted that video game spaces are "implemented" and not simply visualised, represented or simulated (Aarseth 2000, 154). In contrast with what Luke Pearson, one of the pioneers of video game studies in architecture, suggests, video games are not to be regarded as "representations of reality". Nor are they restricted within the realms of "representation," "interface" and "simulation" in Baudrillard's sense (Pearson 2015, 269; Baudrillard 1988, 173–180). Rather, based on our study of *Stray,* we propose that video games have the capacity to create their own spatial realities. Within the discipline of video game studies, there are longstanding arguments positing that video game architecture is beyond 'look' and 'cinematic atmosphere'. Not dissimilar to real architectural spaces, game spaces are "constructed environments" with advanced and complex spatial organisations sited within "embedded relationships among objects that enable dynamic experiences" (Squire and Jenkin 2002, 65).

As was indicated in the case of *Stray,* the architect of a video game engages in a rigorous process of spatial planning through narrative and ludic techniques associated with level design. Through techniques such as 'recursive space' and triggering mental and cognitive responses, the game succeeds in the practice of what we call "video game place-making." In *Stray,* the architect of the video game orchestrated and conditioned players' behaviour not only through atmospheric and visual immersive techniques of video game design but also through spatial organisation.

Stray was inspired by a real urban/architectural case (the Walled City of Kowloon), but the novelty of the game comes from the fact that it challenges the pervasive anthropocentric game design approaches. The experiments of *Stray* show the potential for a new category of game design centred around non-human spatial narratives; a game design process that "rejects speciesism" and provides unique opportunities for users to experience game spaces from the perspectives of "non-human lifeforms"; in this case, the perspective of a feline quadruped cyberpunk *flâneur* (Roudavski 2021, 156).

By providing an analytical view into *Stray*, we attempted to demonstrate that the architecture of video games, as a field of study and praxis, should not be limited to being either a source of representational ideas or a 'simulating' machine serving the *real* architecture. We propose that the architecture of video games has

an evident potential to be promoted from its 'sideline' position. It should be recognised as a distinctive spatial design expertise, which is slightly different from the conventional skillset of an architect but is highly relevant and similar to it. The critical role of game architects should also be recognised. Video game architecture is a *real* emerging 'playground' for a discipline that already suffers from the *crisis of reality* in it is inherited territory. Game design architecture is an expertise that is not officially taught at video game schools but can benefit from the knowledge, design skills and spatial intelligence of an architect.

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