

# a multi-species architecture

## DESIGN RESEARCH METHODOLOGY

XUAN TAN

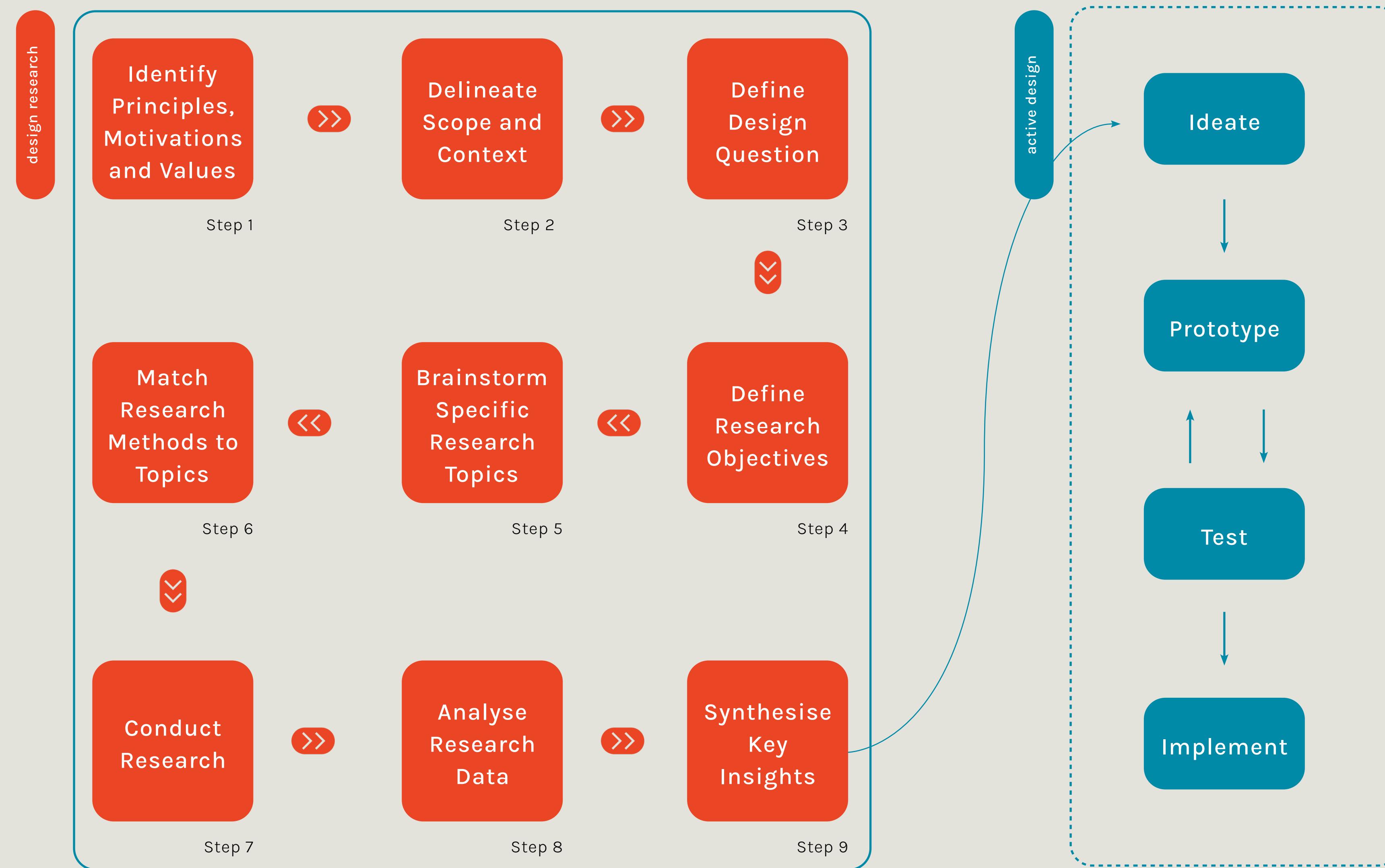
+ M. Arch, NUS

+ B. A. (Arch) (Hons), NUS

### A note on this case study:

1. The architectural design thesis is the main assessment component of the master's programme at NUS.
2. In it, we are expected to:
  - a. Independently propose an architectural research topic which is investigated and presented as a dissertation report.
  - b. Subsequently scope and frame a design question,
  - c. Conduct design research generating key insights to pre-defined research objectives,
  - d. and eventually produce a holistic architectural design proposal.
3. This document will focus on points 2b and 2c, describing the process guiding the design research phase of the architectural thesis project.
4. The purpose of design research is to generate key insights in response to pre-defined research objectives.
5. These insights then form the ingredients for crafting a focused design brief.

# the design-thinking methodology



## comments:

- + The design research phase precedes active design.
- + This deck will attempt to shed more light on the design research phase of this thesis project.

step 1

# identify principles motivations and values

## Principles, Motivations and Values

1. Non-humans deserve moral consideration simply because their lives have intrinsic value.
2. Animals should be granted equivalent stakeholders rights to occupy and thrive in urban sites.
3. We have to change the way we design and build architecture to welcome rather than expel them from the built fabric of society.

### comments:

- + Principles, motivations and values are derived from the [dissertation report](#) produced preceding the design research phase.
- + This step establishes a strong [foundation](#) for the project.
- + It ensures clarify for myself, the team or any stakeholders, what the [motivations](#) are for pursuing the research and engaging the project in the first place.

# step 2

# delineate context and scope

<b>Timeframe</b>	4 weeks
<b>Geographical Site</b>	Rochester Park Colonial Estate
<b>Demographic</b>	Wildlife Protagonist: Red Junglefowl Human Protagonist: Individual 4-unit family
<b>Architectural Vehicle</b>	Conservation black and white houses

## comments:

- + In real world conditions, there are always **limitations** to work with (budget, manpower, time etc.)
- + Thesis works benefit from a clear scoping of what the **research limits** are as early on as possible.
- + These are self-proposed and the thesis supervisor assesses if the scope is reasonable and sufficient across **breadth and depth** as required of a thesis level investigation.
- + It is appropriately refined over the course of the project if needed.

step 3

# define design question

## Design Question

How can we retrofit existing conservation properties within the Rochester park colonial estate to consider and provide for the needs of humans and the red junglefowl population alike?

## comments:

- + The design question attempts to introduce a tangible, architectural challenge that responds to the principles, motivations and values of the project.
- + Incorporating the pre-defined context and scope, I craft a clear design question to be answered.

# step 3

# define research objectives

## Research Objectives

1. Identify what junglefowls require to thrive and survive.
2. Identify architectural features of a home a 4-unit family desires, as well as understand how they occupy and live in it.
3. Identify tensions between humans and junglefowl that exist and have to be overcome; identify positive relationships to continue emulating, for this design model to succeed.
4. Understand the site holistically as per typical architectural site analysis.
5. Identify possible location(s) for interventions to be introduced.



## comments:

- + Based on the design question, I define as succinctly as possible distinct research objectives.
- + Potential research objectives can be thought of as knowledge gaps that have to be filled to answer the design question.
- + I Tag each objective to a color swatch to organise specific research topics and collected data later on.
- + This allows me to visually check very quickly, if all my objectives are being addressed adequately during the synthesis phase.

# step 5

# brainstorm specific research topics

## Wildlife Protagonist

### 1. Understanding environmental factors

- a. What does the junglefowl need to survive? ●
- b. What is the ideal terrain of the junglefowl? ●
- c. What are the physical conditions for a junglefowl to breed in? ●
- d. Where is the junglefowl found? How does it occupy the site currently? ●

### 2. Understanding Behavioural Patterns (natural)

- a. How does the junglefowl move? ●
- b. What are the typical activities the junglefowl engages in? ●

### 3. Understanding Behavioural Patterns (toward humans)

- a. How does a junglefowl react to humans? ●

### 4. Understanding Intrinsic Characteristics

- a. What are junglefowl, where do they come from? ● ●
- b. How does the junglefowl perceive and navigate the world? ●
- c. What does the lifecycle of a junglefowl look like? ●

## comments:

- + Generate as many questions as comes to mind from each research objective.
- + I consulted with a focus group of other students and my tutor to broaden the range of possible questions.
- + The 'first principles thinking' is useful in questioning assumptions and generating a large scope of questions.
- + A question bank is formed with all questions that arise out of this process.
- + I start to group the questions together based on similar themes.
- + I further tag each question with their corresponding objective color swatch.
- + The research objectives are refined if important questions arise that do not fit into any of the original categories.

# step 5

# brainstorm specific research topics

## Human Protagonist

1. Understanding attitudes towards junglefowl
  - a. How much space within a home are humans willing to dedicate to wildlife? ●
  - b. What is desirable/not desirable about having wildlife living in proximity? ●
  - c. What are some existing relationships with junglefowl? ●

2. Understanding Human Behavioural Patterns (natural)
  - a. What is a typical daily schedule of a 4-person family? ●
  - b. Where does the family spend most time in at home? ● ● ●
  - c. Where are the areas they spend the least time in? ● ● ●

3. Understanding typical desired human environments
  - a. What functions are required and essential in a home? ●
  - b. What makes a comfortable home? ●
  - c. How do we design for living in tropical environments? ●

## comments:

- + Generate as many questions as comes to mind from each research objective.
- + I consulted with a focus group of other students and my tutor to broaden the range of possible questions.
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# step 5

# brainstorm specific research topics

## Site Conditions

### 1. Macro Site Research

- a. What are the geographical bounds of the site? ●
- b. What are the main architectural, built, landscape and circulation features? ●
- c. What are the existing narrative context of the sites? ●
- d. How can the terrain of the site be described? ●

### 2. Specific Site Research?

- a. What does the building look like? ●
- b. What are the building components making up the property? ● ●
- c. What are the urban development and conservation guidelines? ●
- d. How can the building be described spatially? ●

- e. What are the main landscape features surrounding or connecting the building? ● ●

## comments:

- + Generate as many questions as comes to mind from each research objective.
- + I consulted with a focus group of other students and my tutor to broaden the range of possible questions.
- + The 'first principles thinking' is useful in questioning assumptions and generating a large scope of questions.
- + A **question bank** is formed with all questions that arise out of this process.
- + I start to group the questions together based on **similar themes**.
- + I further tag each question with their **corresponding objective color swatch**.
- + The research objectives are refined if important questions arise that do not fit into any of the original categories.

# step 6

# match research methods to topics

## Wildlife Protagonist

### 1. Understanding environmental factors

- a. What does the junglefowl need to survive? ●
- b. What is the ideal terrain of the junglefowl? ●
- c. What are the physical conditions for a junglefowl to breed in? ●
- d. Where is the junglefowl found? How does it occupy the site currently? ●

#### research methods

- + Field Study
- + Desktop Research
  
- + Field Study
- + Desktop Research
  
- + Field Study
- + Desktop Research
  
- + Field Study
- + Desktop Research

### 2. Understanding Behavioural Patterns (natural)

- a. How does the junglefowl move? ●
- b. What are the typical activities the junglefowl engages in? ●

### 3. Understanding Behavioural Patterns (toward humans)

- a. How does a junglefowl react to humans? ●

#### research methods

- + Field Study
- + Desktop Research
  
- + Field Study
- + Desktop Research

### 4. Understanding Intrinsic Characteristics

- a. What are junglefowl, where do they come from? ● ●
- b. How does the junglefowl perceive and navigate the world? ●
- c. What does the lifecycle of a junglefowl look like? ●

#### research methods

- + Desktop Research
  
- + Desktop Research
  
- + Desktop Research

# step 6

# match research methods to topics

## Human Protagonist

### 1. Understanding attitudes towards junglefowl

- a. How much space within a home are humans willing to dedicate to wildlife? ●
- b. What is desirable/not desirable about having wildlife living in proximity? ●
- c. What are some existing relationships with junglefowl? ●

#### research methods

+ Survey

+ Survey

+ Field Study  
+ User Interview  
+ Survey

### 2. Understanding Human Behavioural Patterns (natural)

- a. What is a typical daily schedule of a 4-person family? ●
- b. Where does the family spend most time in at home? ● ● ●
- c. Where are the areas they spend the least time in? ● ● ●

#### research methods

+ Diary Study  
+ User Interview

+ User Interview  
+ Contextual Inquiry

+ User Interview  
+ Contextual Inquiry

### 3. Understanding typical desired human environments

- a. What functions are required and essential in a home? ●
- b. What makes a comfortable home? ●
- c. How do we design for living in tropical environments? ●

#### research methods

+ Desktop Research  
+ Survey

+ Desktop Research  
+ Survey

+ Desktop Research

# step 6

# match research methods to topics

## Site Conditions

### 1. Macro Site Research

- a. What are the geographical bounds of the site? ●
- b. What are the main architectural, built, landscape and circulation features? ●
- c. What are the existing narrative context of the sites? ●
- d. How can the terrain of the site be described? ●

#### research methods

+ Field Study

+ Desktop Research

+ Geomapping Modeling

### 2. Specific Site Research

- a. What does the building look like? ●
- b. What are the building components making up the property? ● ●
- c. What are the urban development and conservation guidelines? ●
- d. How can the building be described spatially? ●

#### research methods

+ Field Study

+ Desktop Research

+ Field Study

+ 3D Modeling

- e. What are the main landscape features surrounding or connecting the building? ● ●

#### research methods

+ Field Study

+ Desktop Research

# step 7

# conduct research

## Wildlife Protagonist

### 1. Field Study

- + On several separate occasions, I visited the Rochester Park Colonial Estate to conduct field observations of the junglefowl.
- + Location information was recorded on physical site maps, while photographs were taken of their physical environment including feeding areas, brood and nesting sites.
- + Proximity studies were also carried out to gauge how close I could get to a junglefowl and how they reacted to my presence.

Type: Quantitative

## Human Protagonist

### 1. Survey

- + The survey was used to gauge people's understanding of the junglefowl and what attitudes they held towards them.
- + Local news agencies (ST, Today) had run stories in the past interviewing residents who had been directly affected by relocating junglefowl.
- + I approached the residents in these study areas (Sin Ming, Dover), as well as regular patrons in other observed hotspots (Bishan Park, Pasir Ris Park to complete the survey.

Type: Qualitative

### 2. Interview

- + As my proposal was scoped to retrofit a house for a family of four, I interviewed a family living in a similarly sized and planned house, to understand more deeply what they required of such a space, how they behaved and occupied a domestic setting, and any other desired qualities.
- + This interview consisted of verbal questions as well as a contextual enquiry where they drew their response on a set of prepared building technical drawings.

Type: Qualitative

## Site Conditions

### 1. Field Study

- + All architectural projects are accompanied by site research noting down key features of the site represented in layered mappings.
- + Site plans are annotated during physical site studies which are later corroborated with information retrieved from online data sources such as open source mapping tools (i.e QGIS, Google Earth, Sketchup), and official databases (i.e URA, Singstat)

- + Noting the focus of this project, a study of the landscape and its natural features was also important.

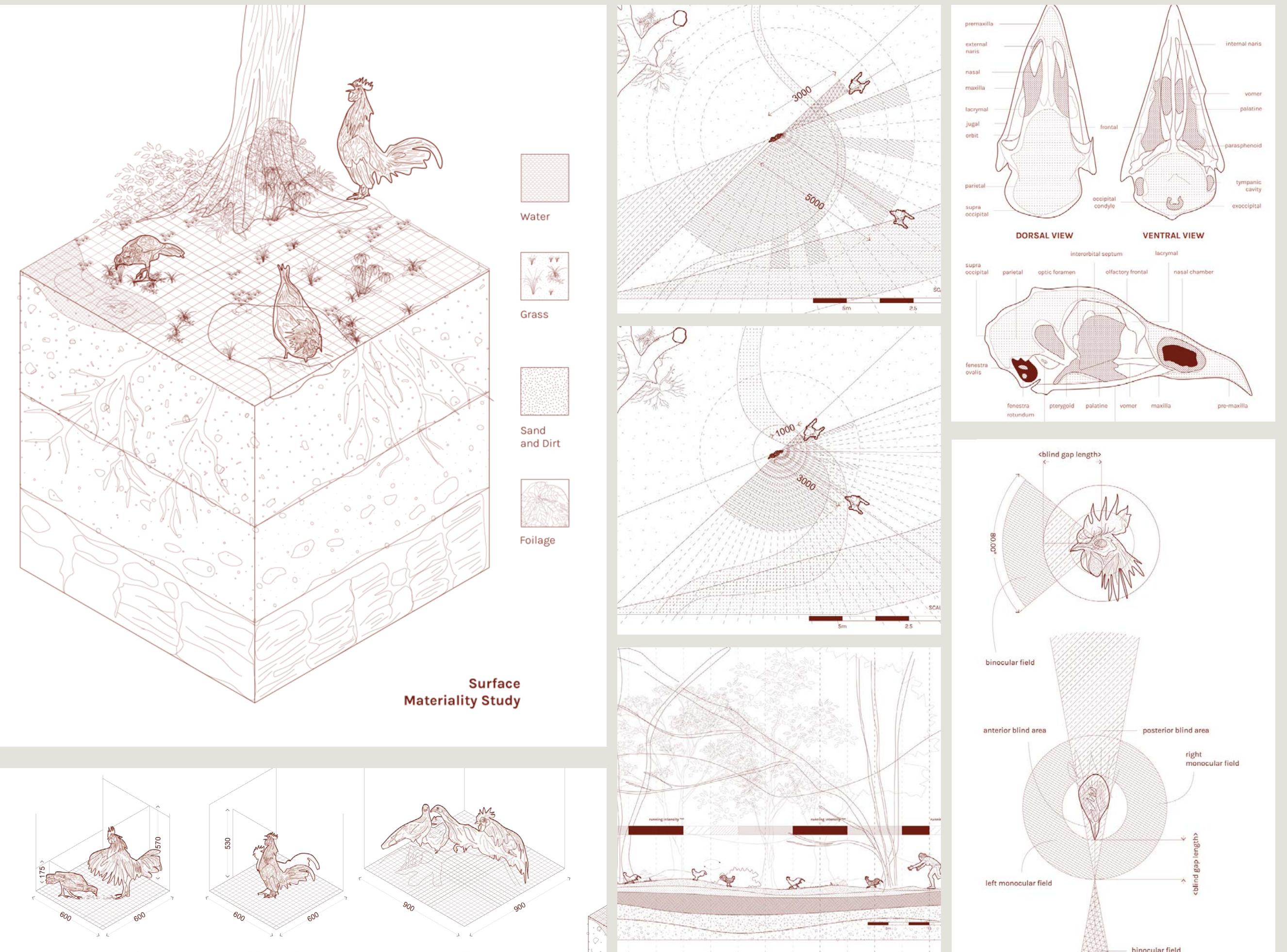
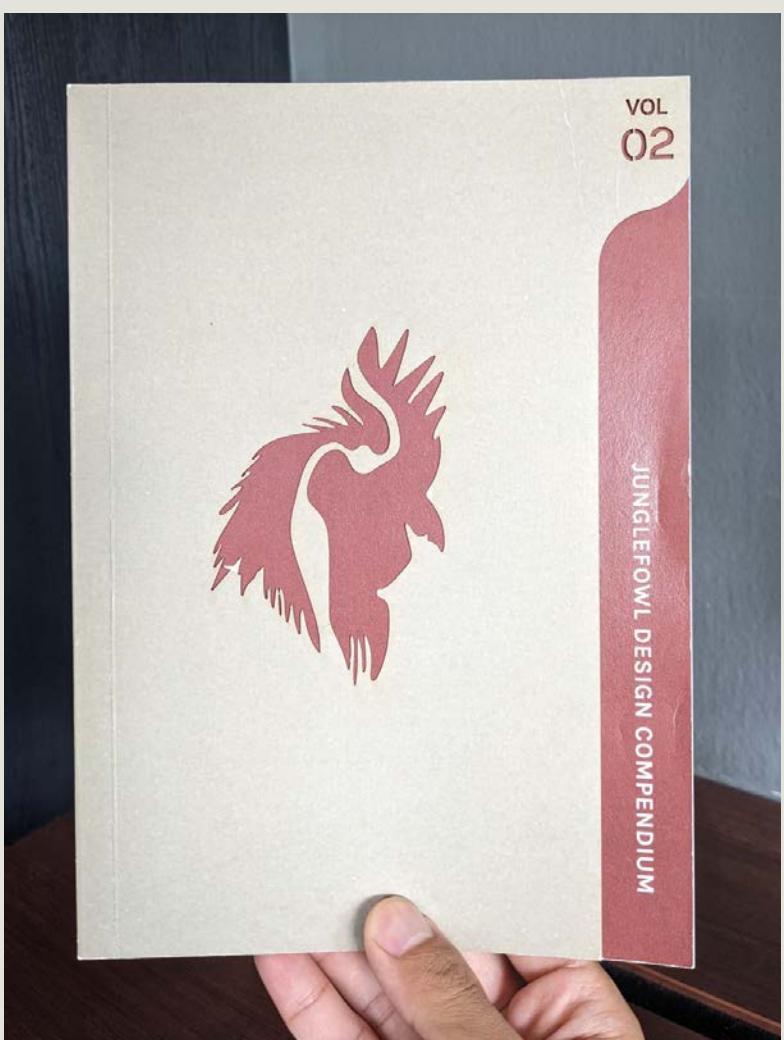
## comments:

- + Having matched the appropriate research tools to specified research topics, I spent the next 2-3 weeks collecting the data.
- + Here, I describe the processes involved in carrying out a few of these research methods.
- + The idea was to attempt to get into the minds of our research subjects, to understand their psyches and behavioural responses.
- + The analysis was carried out after which I share in the later slides.

# step 8 analyse research data

Input:  
Wildlife Protagonist  
Field Study

Output:  
Junglefowl Design  
Compendium



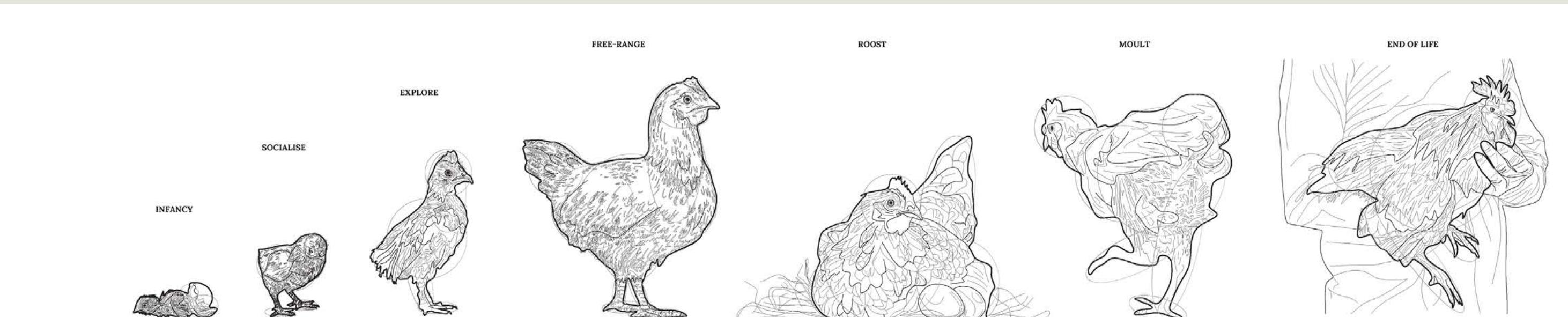
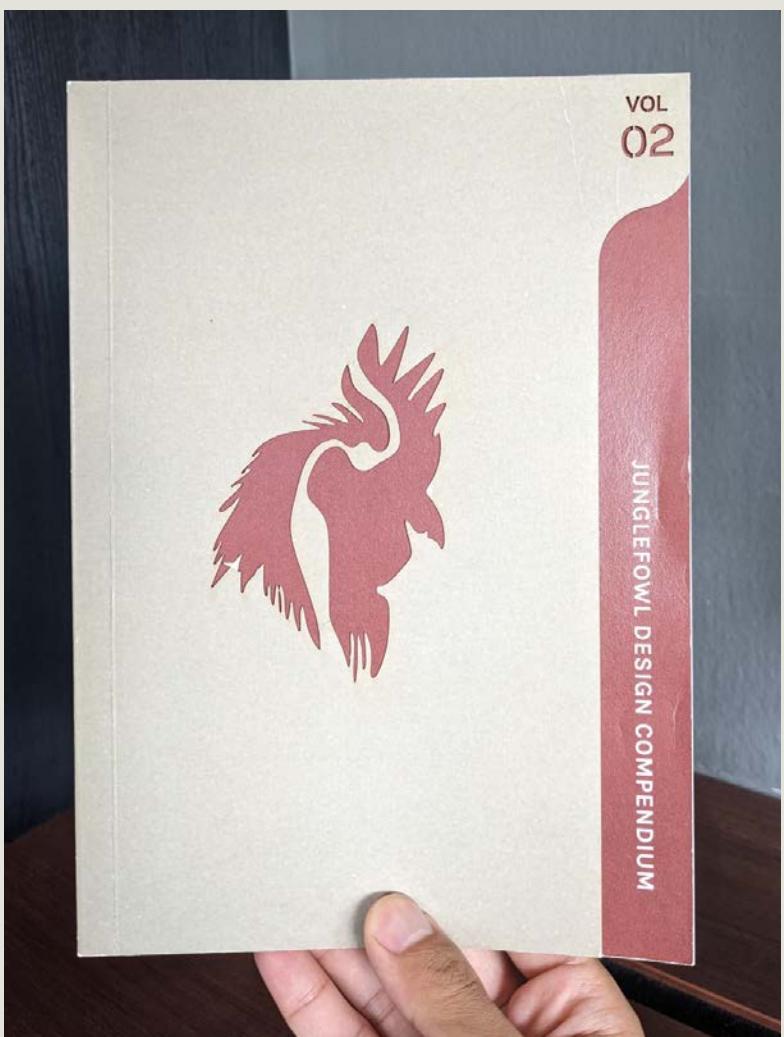
## comments:

- + Architectural research does not often include indepth study into wildlife.
- + With the lack of a template to code such information, I opted to produce a **design compendium** consolidating the data collected on the junglefowl.
- + These drawings were produced in various drafting softwares internalising data and observations obtained during field studies.
- + The resource provides a **model for designer to emulate**, should they wish to conduct a study to aid in better understand a non-human user subject.
- + Presented on the slide are a select sample of drawings in the handbook.

# step 8 analyse research data

**Input:**  
Wildlife Protagonist  
Field Study

**Output:**  
Junglefowl Design  
Compendium



Heat	Artificial Heat: 32-25 C Brooder Lamp 250- watt, red or clear bulb, about 45-60cm off the ground enough for 100 chicks (birds can choose whether they want to be close or far away from the lamp).  For a small flock, 60 watt will be enough comfortable chicks will be spread out around the lamp, not clustered. brooder guard so the chicks do not wander too far from the heat source.	Artificial Heat: 30 C					
Ventilation	Draft Free Properly ventilated	Draft Free	Out of Cage Ready	Outdoor			
Water	Clean Water	Clean Water	Clean Water	Clean Water	Clean Water	Clean Water	Clean Water
Food	Starter Growth Feed in feedpots but also sprinkle in the bedding so the chicks know how to forage	Starter Growth Feed	Grower Feed + Scraps	Chicken Feed + Scraps			
Light	22-24 Hours of Light	14 Hours of Light	14 Hours of Light	14 Hours of Light	14 Hours of Light	14 Hours of Light	
Grooming	Introductory dust-bathing, can bathe in litter also						
Waste Management	Deep Litter						
Space Requirements	0.3 sqm / chick						

Stage	Human Requirements/ Behaviour	Identify Assumption	Opportunity	Site	Intervention
1 Infancy	Satisfy curiosity without too much handling	The Brooding Cage - Thermal Environment for Chick has to be fully isolated	respecting the personal space of other species	New, bedroom?	Multisensorial chamber with child-proof touch capability
2 Socialise	Handling chicks without harming them; learn hygienic practices when handling poultry or birds	Too dangerous for children to hold animals diseases, too dangerous for animals because children can't be responsible care-givers	first contact with handling chicks properly and encouraging bond between species Learn hygienic practices	New, bedroom?	some type of glove that allows for safe interaction, complete with anti-microbial design, look into properties of anti-microbial leather, also basic handwashing regiment
3 Explore	big poultry handling; cleaning up after poultry; feeding table scraps	Chickens should be kept in cages because they are incompatible to living in a domestic setting. Pollution, noise etc There is no space in HDB homes to have a chicken coop	learning about boundaries, what is shared, what is separate	Moving around the house at human access levels	
4 Free- Range	daily space and activities, some where chicken should not be allowed	There is no space within HDB point-to allow for chicken to free range	co-existing with active species, settling into routines, the importance of outdoor living	Moving around the house at chicken access levels	
5 Roost	collecting eggs in a safe manner		collecting eggs and understand first type of food exchange between man and animal	Roost spots in home?	
6 Molt	clean environment		Aging, how to empathize for other species; dont touch them when pin feathers are growing		
7 Return	eat and understand	End of life of a meat animal should be kept as far away from our sanitized kitchen and dining tables.	Death and Return; where does the second type of food exchange come from		

## comments:

- + Where information relating to the junglefowl was difficult to find or access, I looked to its nearest relative, the domestic chicken, for key information regarding growth patterns.
- + These I translated into codified data as well as illustrative drawings.

# step 8

# analyse research data

Input:

Human Attitudes  
towards Junglefowl  
Survey

Output:

Thematic Areas and  
Key Points

## Survey: Human Attitudes Towards Junglefowl

### Open Ended Questions

- 1 Tell me about your experience encounter a wild junglefowl.
- 2 What do you understand of the government / town councils / AVA policy towards junglefowl?
- 3 Do you think junglefowl should be afforded equal consideration in urban areas and why?
- 4 Do you feel having wild junglefowl in near proximity to humans a phenomenon that should be encouraged or discouraged? Why?
- 5 If you answered encouraged in the above question, what are some actions you would take to do so?
- 6 If anything, what bothers you about an encounter with a wild junglefowl?
- 7 What would you
- 8 What do you feel about junglefowl having access to your property?  
What do you like or dislike about coexisting together with junglefowl in close proximity? Say together in the same home or if they had free access to your property/ neighbourhood.
- 9 If you have to carve out a space(s) where junglefowl are allowed to roam in your home, where would that be?
- 10 How would you describe the ideal ratio between 'wild' and 'controlled' areas in your home? Wild being what you allow nature to claim, and controlled being what you wish to remain 'human-only'.

### Yes-No Questions

Yes      No

- 1 Have you noticed an increase in junglefowl encounters/ sightings over the past 3-5 years?
- 2 Are you supportive of junglefowl being afforded equal consideration in urban areas?  
Would you be open to allowing junglefowl to have free access to your property and/or neighbourhood?
- 3
- 4 Do you think more can be done to respect the junglefowl as a member of our community?
- 5 Are you supportive of junglefowl being afforded equal consideration in urban areas?

### comments:

- + The **inductive approach** was selected as this was an unfamiliar field of research. **No codes or themes were pre-defined.**
- + Copy of original Survey to extract information of human attitudes towards junglefowl.
- + Respondents response was digitally recorded for storage and transcription later on.

# step 8 analyse research data

**Input:**  
**Human Attitudes**  
**towards Junglefowl**  
**Survey**

**Output:**  
**Thematic Areas and**  
**Key Points**

Thematic Areas
Disruptive to Society
Connecting to Nature
Useful Agents
Equal Member of Society
Residual Space
Community Spirit

Group	Dover Close	
Question 9	Extracts	Code
	What do you like or dislike about coexisting together with junglefowl in close proximity? Say together in the same home or if they had free access to your property/ neighbourhood.	
	neighbourhood feels more lively, people have a common topic of conversation	#community
	Reminds me of my younger days living in the kampong with wild chickens running around	#community
	Feel a greater connection to nature	#connect-nature
	Exciting to see their families grow, chicks are very cute	#connect-nature
	They are pretty to look at, nature is lively and lovely	#connect-nature
	Something about the crowing makes me feel connected to nature and the land	#connect-nature
	Happy that singapore while a very modern city can support these birds	#connect-nature
	Pleasant surprise, calming after long day of work	#connect-nature
	encourage curiosity in my young kids	#education
	Encourages people to be more considerate of animals	#education
	My kids are always excited, want to know more, get closer to nature	#education
	Chance to teach children about responsibility and empathy	#education
	Good activity to pass the time, looking at them, or feeding them	#leisure
	noise pollution, rooster crowing early in the morning	#noise-pollution
	sometimes can be noisy, wakes me up	#noise-pollution
	I'm afraid that they carry diseases like bird flu	#not-safe
	Sometimes they seem aggressive, scares my kids	#not-safe
	Population is growing larger, am afraid it goes out of control	#not-safe
	Dangerous for motorists, sometimes they dash across the road	#not-safe
	Rooster sometimes are quite aggressive and fight with other birds	#not-safe
	Encourages feeding which makes the birds tame, afraid they become a nuisance	#not-safe
	Very pleasant, mind their own business	#passive
	Relatively clean, droppings dont really show up as they stick to grass surfaces unlike pigeons	#passive
	No strong feelings about them, they dont bother me much	#passive
	The chirping from chicks is quite pleasant	#pleasant-noise
	eat insects, mosquitoes, cockroaches, other pests	#productive
	balance out the rat population	#productive
	digs up soil when it scavenges for food, good for the earth	#productive

**comments:**

- + Survey responses were transcribed into electronic text format, organized by question.
- + Copy of survey response for Question 9.
- + Answers have been edited for brevity and reflect key ideas.
- + Text data was migrated to an excel worksheet, with each response taking up one row.
- + Each cell was reviewed and assigned an appropriate code.
- + Using a method of affinity diagramming, similar codes were sorted together and their data read again to identify common thematic areas. 6 thematic areas were identified
- + A unique cell color was applied to each entry corresponding to thematic area.

# step 8

# analyse research data

**Input:**  
Human Attitudes  
towards Junglefowl  
Survey

**Output:**  
Thematic Areas and  
Key Points

Thematic Areas

Disruptive to Society

Connecting to Nature

Useful Agents

Equal Member of Society

Residual Space

Community Spirit

Group	Dover Close	
Question 9	What do you like or dislike about coexisting together with junglefowl in close proximity? Say together in the same home or if they had free access to your property/ neighbourhood.	
	<b>Extracts</b>	<b>Code</b>
	Feel a greater connection to nature	#connect-nature
	Exciting to see their families grow, chicks are very cute	#connect-nature
	They are pretty to look at, nature is lively and lovely	#connect-nature
	Something about the crowing makes me feel connected to nature and the land	#connect-nature
	Happy that singapore while a very modern city can support these birds	#connect-nature
	Pleasant surprise, calming after long day of work	#connect-nature
	encourage curiosity in my young kids	#education
	My kids are always excited, want to know more, get closer to nature	#education
	Chance to teach children about responsibility and empathy	#education
	Good activity to pass the time, looking at them, or feeding them	#leisure
	Very pleasant, mind their own business	#passive
	Relatively clean, droppings dont really show up as they stick to grass surfaces unlike pigeons	#passive
	The chirping from chicks is quite pleasant	#pleasant-noise
Data Overview and top 5 key points		
Theme	Connecting to Nature	
Data Overview	Greater connection to nature; exciting see families grow; chicks cute; nature is lively and lovely; crowing sounds connected to nature and land; modern city support birds happy; pleasant surprise, calm after work; encourage kids curiosity; kids excitement; kids want to know more; able to teach kids about responsibility and empathy; good activity to pass time; pleasant doesn't intrude; relatively clean; chirping sounds are pleasant	
1	The presence of the junglefowl in particular the crowing makes one feel connected to nature and the land.	
2	Seeing and interacting with the junglefowl is a good opportunity for kids to exercise curiosity and learning, while learning good values of empathy and responsibility.	
3	Presence of the birds are a calming break from the monotony of the everyday.	

**comments:**

- + Data belonging to the same thematic area was copied to a second Excel worksheet.
- + In this example, the 'Connecting to Nature' theme is shown.
- + The set was reviewed again to combine or group similar points. Each set went through one to three passes depending on the quantity of data.
- + The same process was repeated for data collected from other focus groups (surveys conducted at other locations)
- + Data within the same theme, from different focus groups were cross compared.
- + The top few key points (frequency of appearance) are highlighted alongside an overview of the data for that particular theme.

# step 8

# analyse research data

Input:  
Human Habitation  
Interview (Verbal  
Component)

Output:  
Thematic Areas and  
Key Points



Human Habitation Interview (Verbal Component)	
Routine	
1	Describe how you typically spend your day at home on a weekday.
2	Describe how you typically spend your day at home on a weekend.
3	Where Would you say you spend the most time in at home? What about the least?
Space Efficiency	
4	Is your house optimally designed? Is space being used efficiently? What about furniture, built in or installed, anything that makes the surrounding space inefficient or wasteful?
Functional Requirements	
6	What functions is your home able to provide?
7	What are the most important functions of your home?
Comfort and Aesthetics	
8	From a thermal comfort standpoint, what do you like or dislike about your home?
9	From a design and aesthetics standpoint, what do you like or dislike about your house?
Connection to Nature	
10	Describe the connection to the outdoors and landscape your home has.
11	Have you had any wildlife encounters on your property? Describe it if you have. How would you describe the ideal ratio between 'wild' and 'controlled' areas in your home? Wild being what you allow nature to claim, and controlled being what you wish to remain 'human-only'.
13	If any, how would you like to change that?
Spatial Relationship with Others	
14	What is it like living with other family members? What are some challenges you face?
15	Where are the private areas for each family member?
16	What are the shared common areas for each family member?
17	Are there any other special type of spaces of noteworthy mention?

## comments:

- + In contrast to the survey, a deductive approach was used here as I had a better idea of what information I was looking for having done interviews of the same nature before.
- + Before the interview, I created a list of pre-determined global codes.
- + Interview questions were organised by certain leading categories.
- + The recorded interview is transcribed into electronic text format.

# step 8 analyse research data

Input:  
Human Habitation  
Interview (Verbal  
Component)

Output:  
Thematic Areas and  
Key Points

Deductive Codes

- #needs
- #tasks
- #tools
- #desired-qualities
- #behaviour
- #pain-points
- #emotions
- #locations

Human Habitation Interview (Verbal Component)	
Where would you say you spend the most time in at home? What about the least?	
I think we spend most of our time in the living room and common areas. They are quite pleasant because most of them have some connection to the outdoors. We are surrounded by green on all sides and the view is quite nice. The big open windows and french doors are also great for ventilation even on the hotter days. You can also hear the birds, its quite nice. The verandah is definitely one of my favourite parts, its kinda indoors but also outdoors, its a very interesting space. I like to sit and read there quite often, and we have guests over for a bit of outdoor dining.	#tasks #tools #desired-qualities #behaviour #pain-points #emotions #locations
Ah, uhm some of the areas in our home are not that used. For example areas under the staircase, its not much space to store anything useful or even put a sofa or table. I know this because I've tried to put some furniture there, but it didn't really work out. The roof space is also not really used, I thought it could be useful as attic space, but there isn't much room to get up there, nor is it easy to. I think right now, its just the water heater and maybe a tank that is sitting up there.	
What about furniture, built in or installed, anything that makes the surrounding space inefficient or wasteful?	
I find some of the inbuilt storage a little too deep, we don't really use up all the space and makes cleaning a little difficult as well. The kitchen and laundry area in particular, have some pretty deep storage spaces. Other than that I think its pretty typical what the house has. Ah, we also kind of have this outdoor space that leads to the staircase area, we don't use it for much, just to put our bikes and some boxes for storage.	#needs #tasks #pain-points #locations

comments:

+ With the list of codes in hand, text data was analysed with interesting and relevant information highlighted and tagged with the appropriate code.

# step 8 analyse research data

**Input:**  
**Human Habitation  
 Interview (Verbal  
 Component)**

**Output:**  
**Thematic Areas and  
 Key Points**

Deductive Codes
#needs
#tasks
#tools
#desired-qualities
#behaviour
#pain-points
#emotions
#locations

Human Habitation Interview (Verbal Component)		
Code	Data	Qn Category
	ventilation	Comfort and Aesthetics
	not too hot in the afternoon	Comfort and Aesthetics
	dust from the outdoors not coming in	Comfort and Aesthetics
	good wind flow	Comfort and Aesthetics
	connection to outdoors	Connection to Nature
	view is quite nice	Connection to Nature
	surrounded by green	Connection to Nature
	can hear the birds	Connection to Nature
	morning light coming through the windows	Connection to Nature
	well kept garden, can grow plants	Connection to Nature
	can reach things easily	Functional Requirements
	things in the house are neat and organized	Functional Requirements
	easy to clean and maintain	Functional Requirements
	no leaking during heavy rains	Functional Requirements
	privacy, having one's own space	Spatial Relationship
	shared family time, talk about life	Spatial Relationship

Data Overview and top 5 key points		
Code	Data	Qn Category
	ventilation, not too hot in afternoon, dust from outdoors dont get in, good windflow, visual connection to outdoors, view is quite nice, surrounded by green, can hear the birds, morning light coming through windows, well kept garden, growing plants, reach things easily, neat and organised, clean easy to maintain, no leaking during rain, having one own space, shared family bonding time	
Data Overview	1 A naturally ventilated house with good windflow	
	2 Well organised, things are neat and can be found easily.	
	3 A combination of private spaces for each member but also well positioned common areas for communal time.	

## comments:

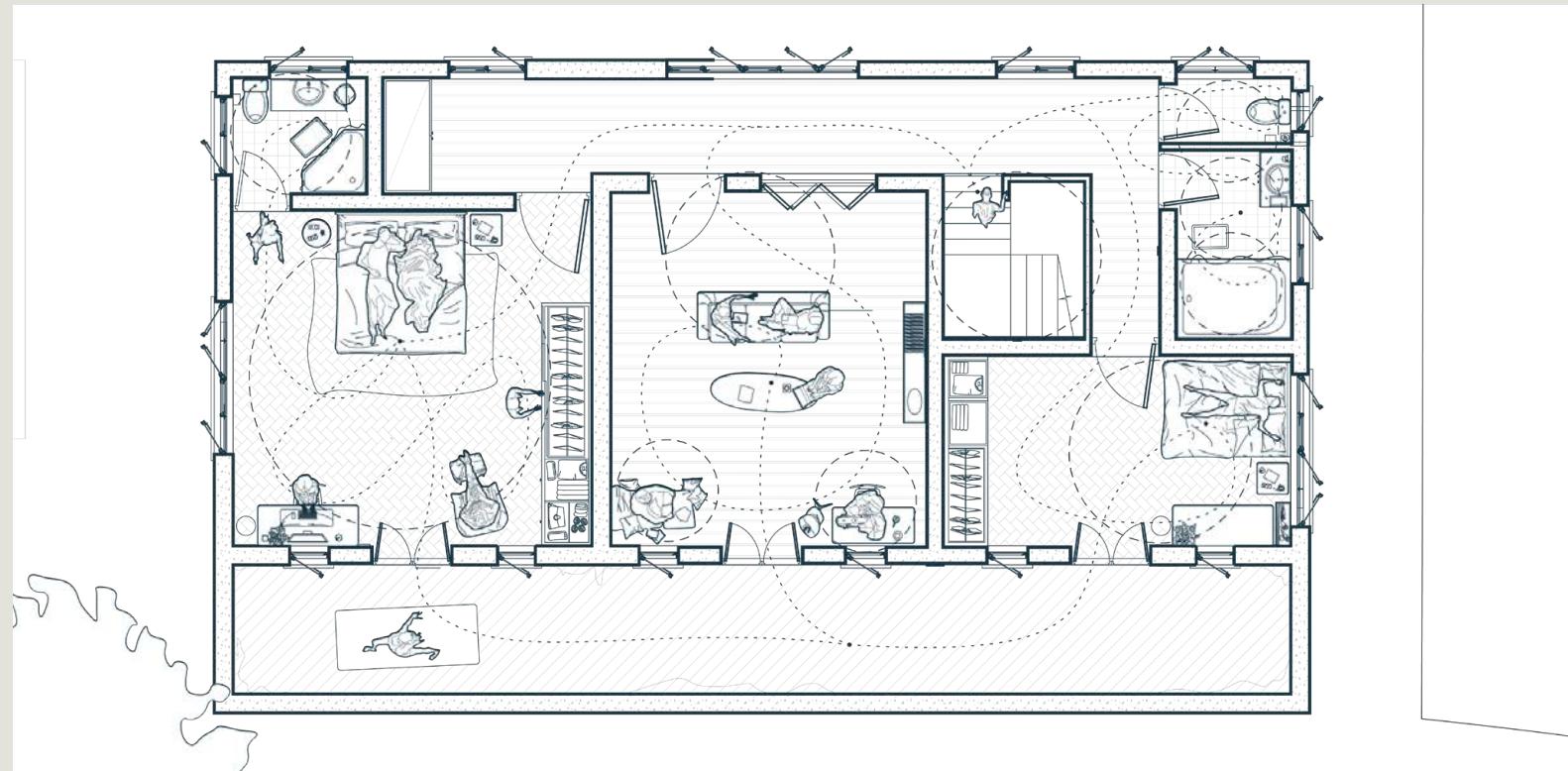
- + Highlighted data was pulled out into an excel sheet and edited for brevity and clarity keeping the color classification.
- + Using a method of **affinity diagramming**, related codes were **grouped together** and the data from the same question category was read together again.
- + Key points (frequency of appearance) pertaining to each code was highlighted presented alongside an overview of the data.

# step 8

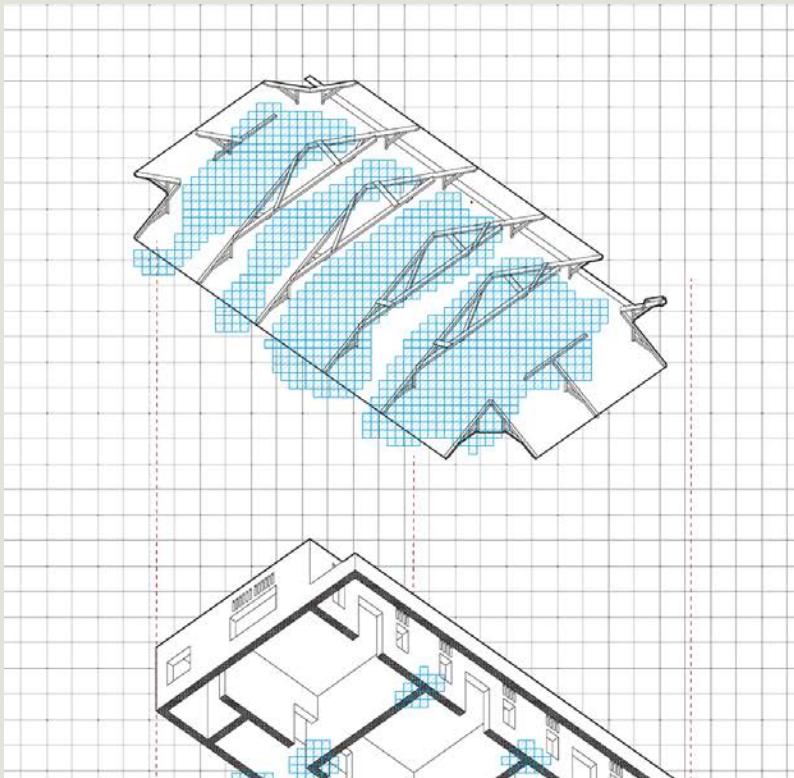
# analyse research data

Input:  
Human Habitation  
Interview (Sketch Component)

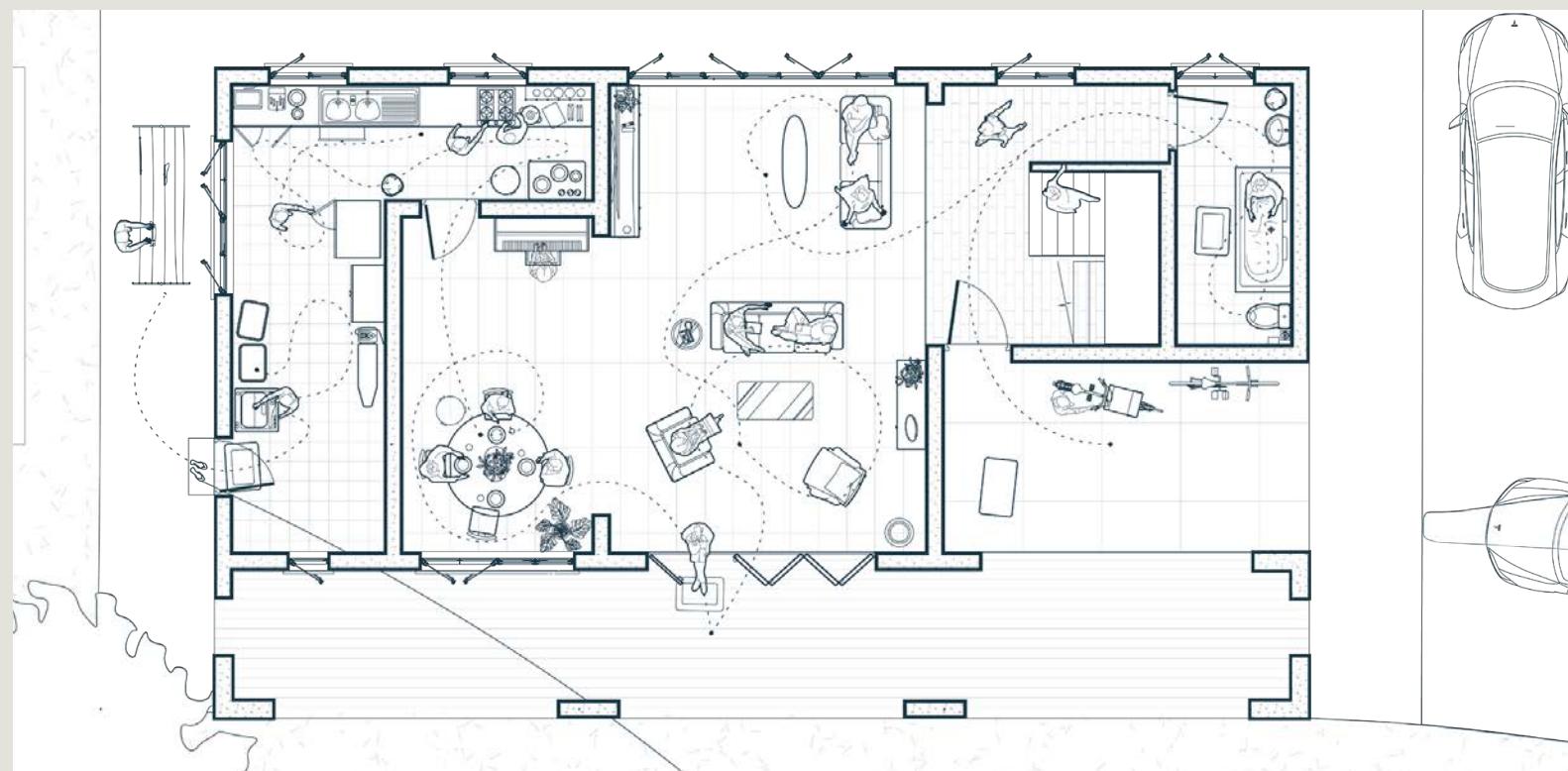
Output:  
Annotated Plans and Sections



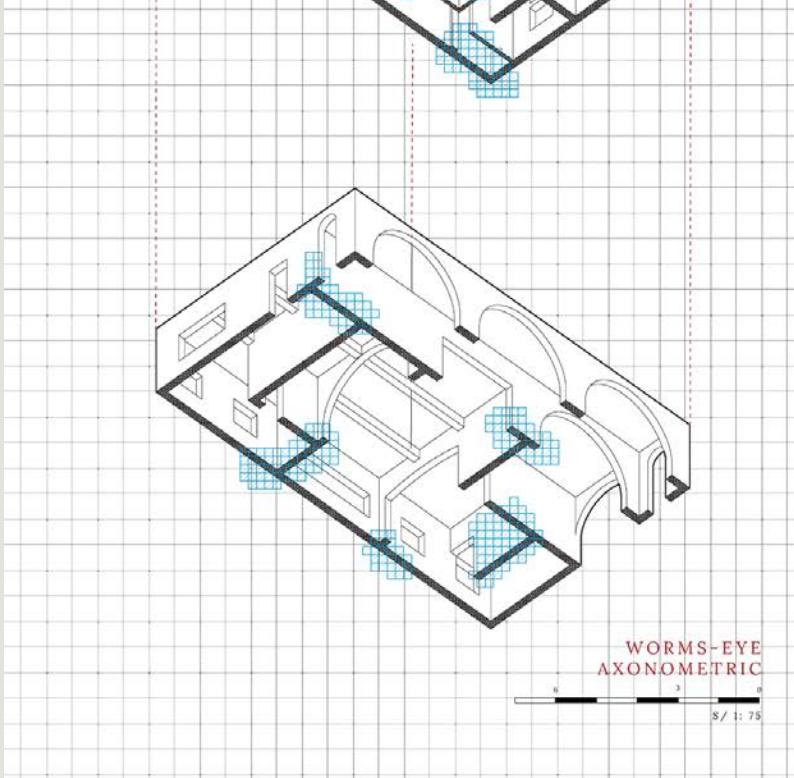
+ Second Floor



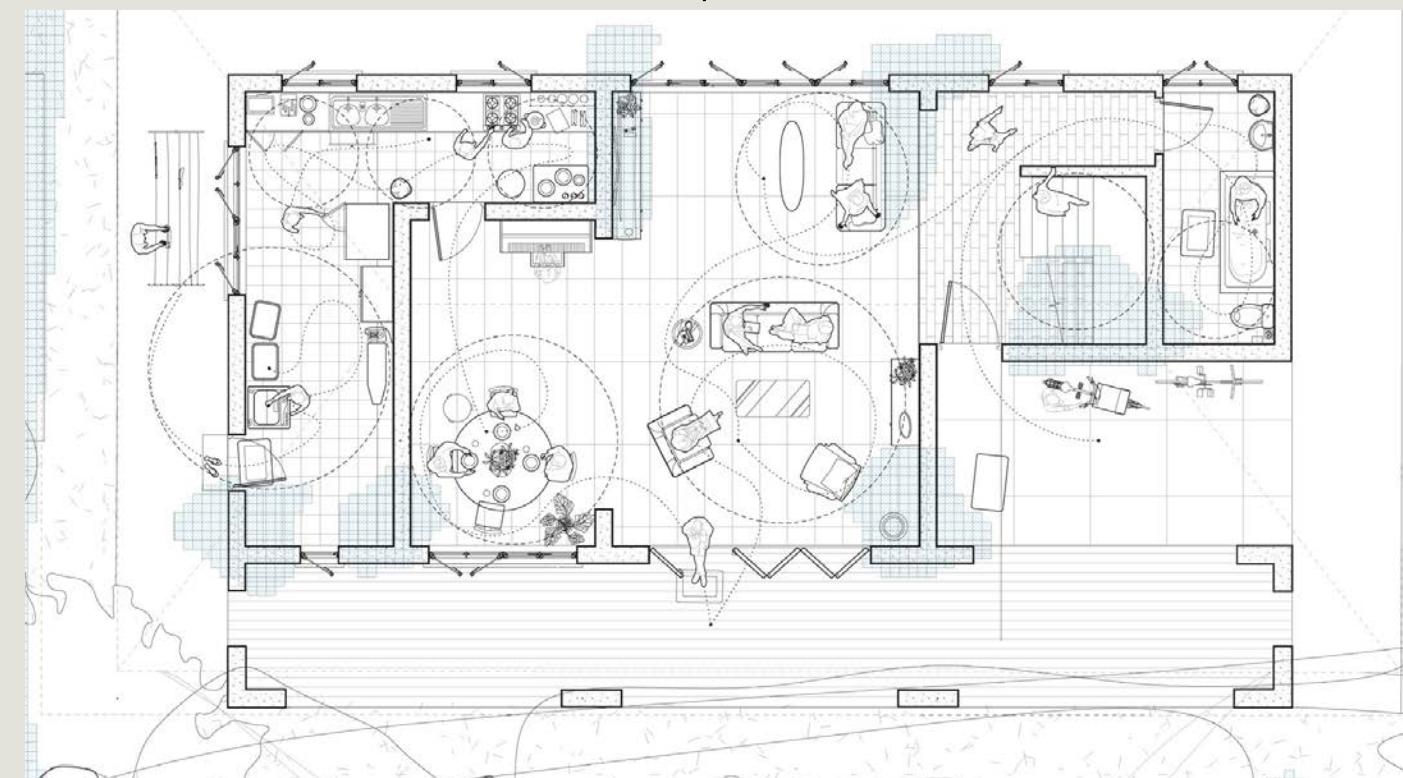
+ Second Floor (Residual Space)



+ First Floor



+ Axon View (Residual Space)



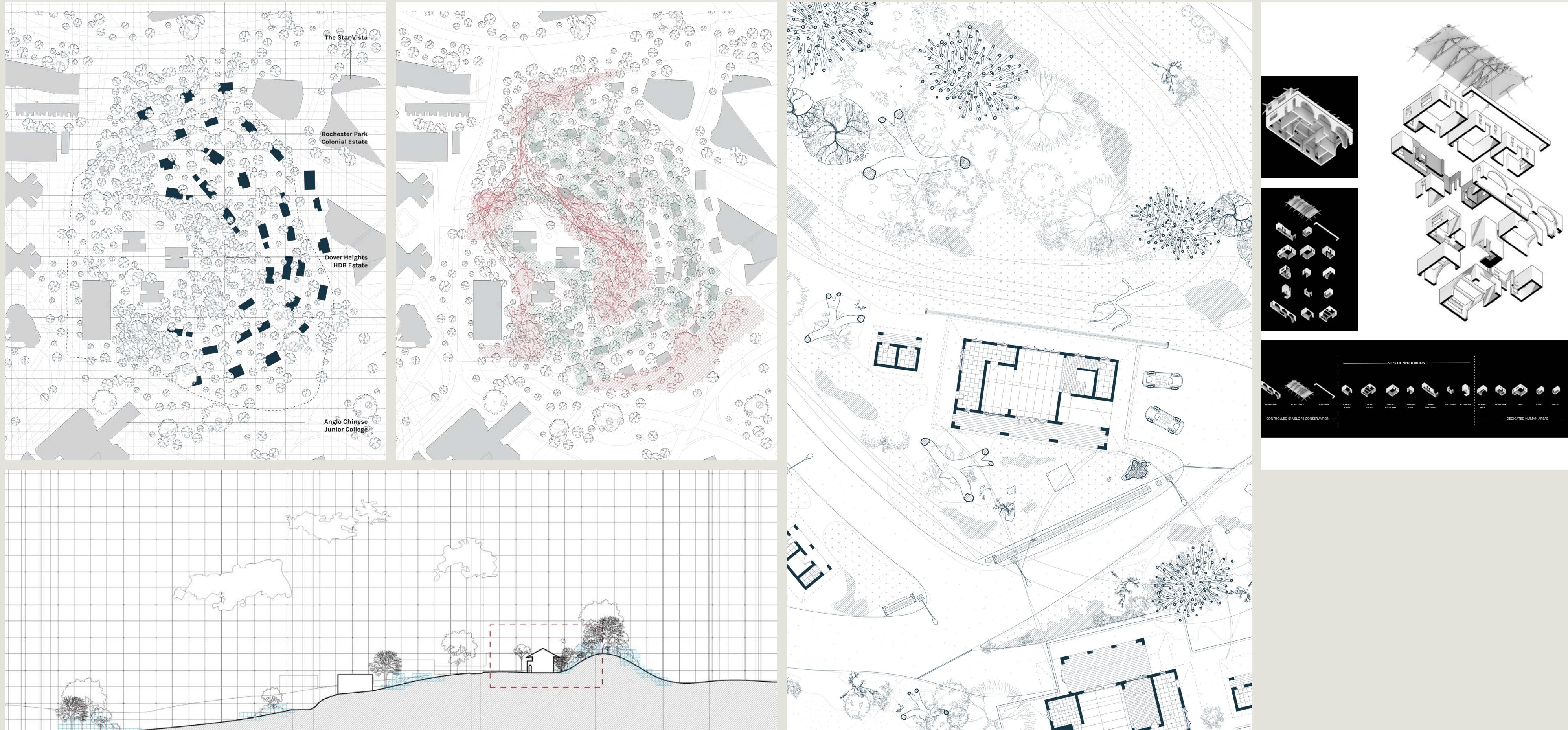
+ First Floor (Residual Space)

## comments:

- + A component of this interview required the interviewees to **sketch out** on a prepared building plan how they would typically move about the house.
- + By tracing the **most used paths** throughout the day, areas that are least used could be identified.
- + These areas I then termed **residual areas**.

# step 8

# analyse research data



Input:  
Site Survey and  
Research

Output:  
Annotated Site  
Analysis Diagrams

comments:

- + A holistic survey of the site provides a base to understand existing conditions, where the opportunities and threats are, and start planning for design interventions.

# step 9

# synthesise key insights

## Research Objectives

1. Identify what junglefowls require to thrive and survive.
2. Identify architectural features of a home a 4-unit family desires, as well as understand how they occupy and live in it.
3. Identify tensions between humans and junglefowl that exist and have to be overcome; identify positive relationships to continue emulating, for this design model to succeed.
4. Understand the site holistically as per typical architectural site analysis.
5. Identify possible location(s) for interventions to be introduced.



## comments:

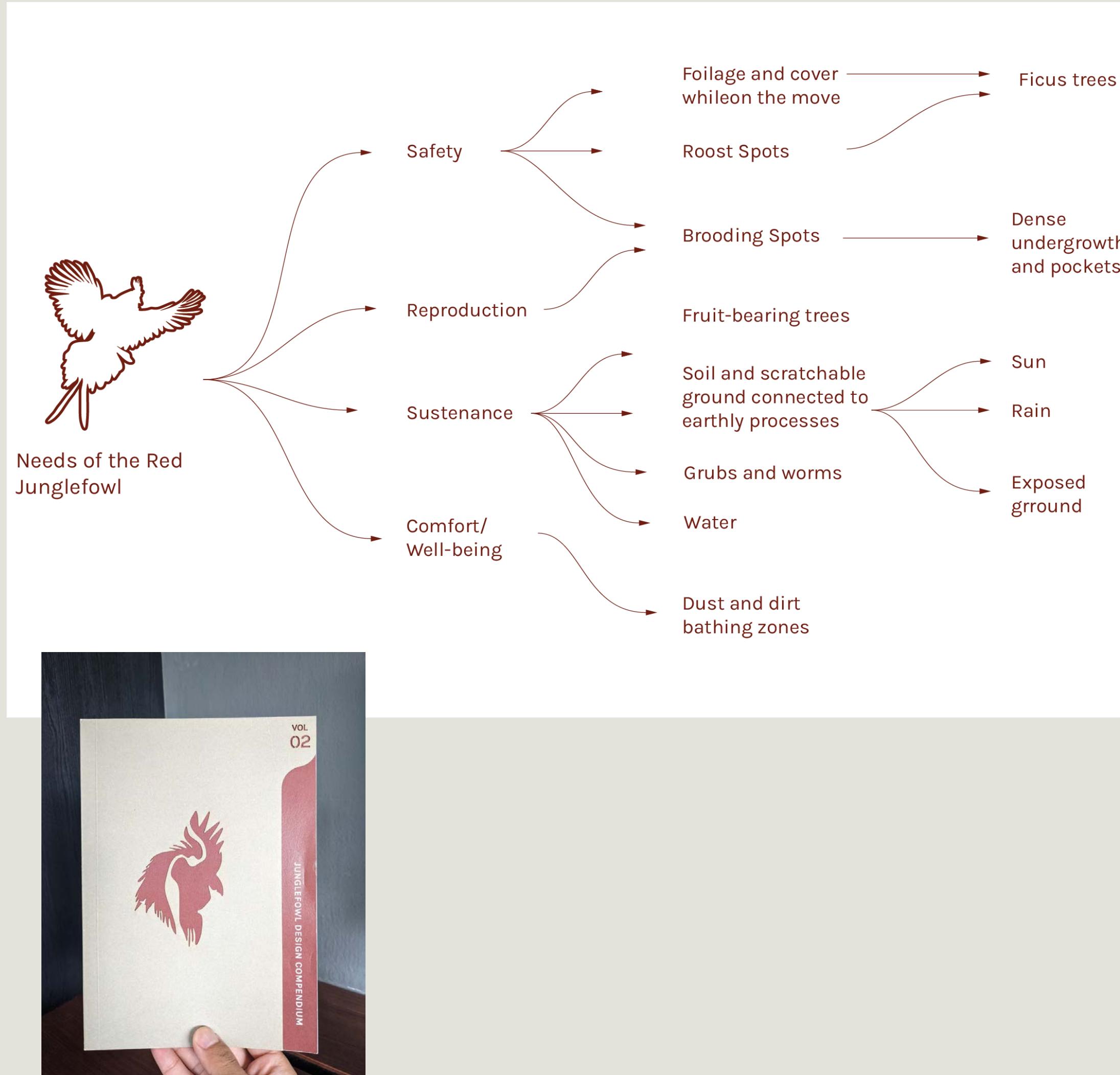
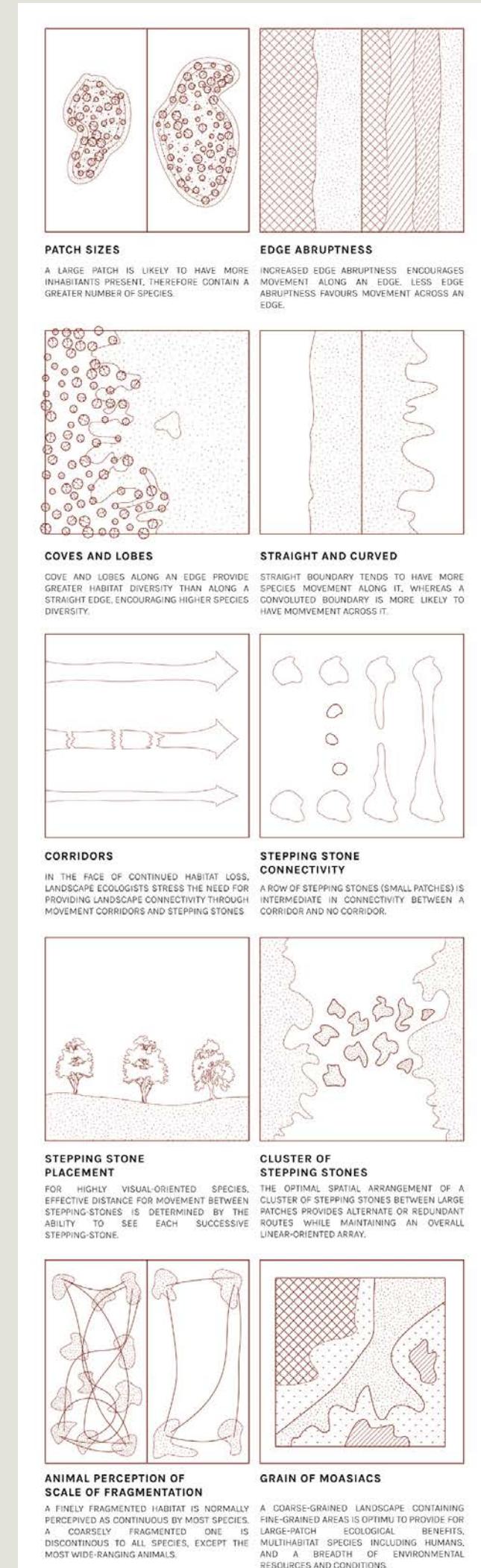
- + Synthesising key insights involved drawing connections from analysed data, making use of the in concert to answer the original research objectives.
- + Besides textual statements, insights for an architectural thesis have to be represented in appropriate visual artifacts.
- + Here I revisit the original research objectives pairing them with an appropriate textual and/or graphical insight.

# step 9

# synthesise key insights

## Research Objective 1

- + Identify what junglefowls require to thrive and survive.

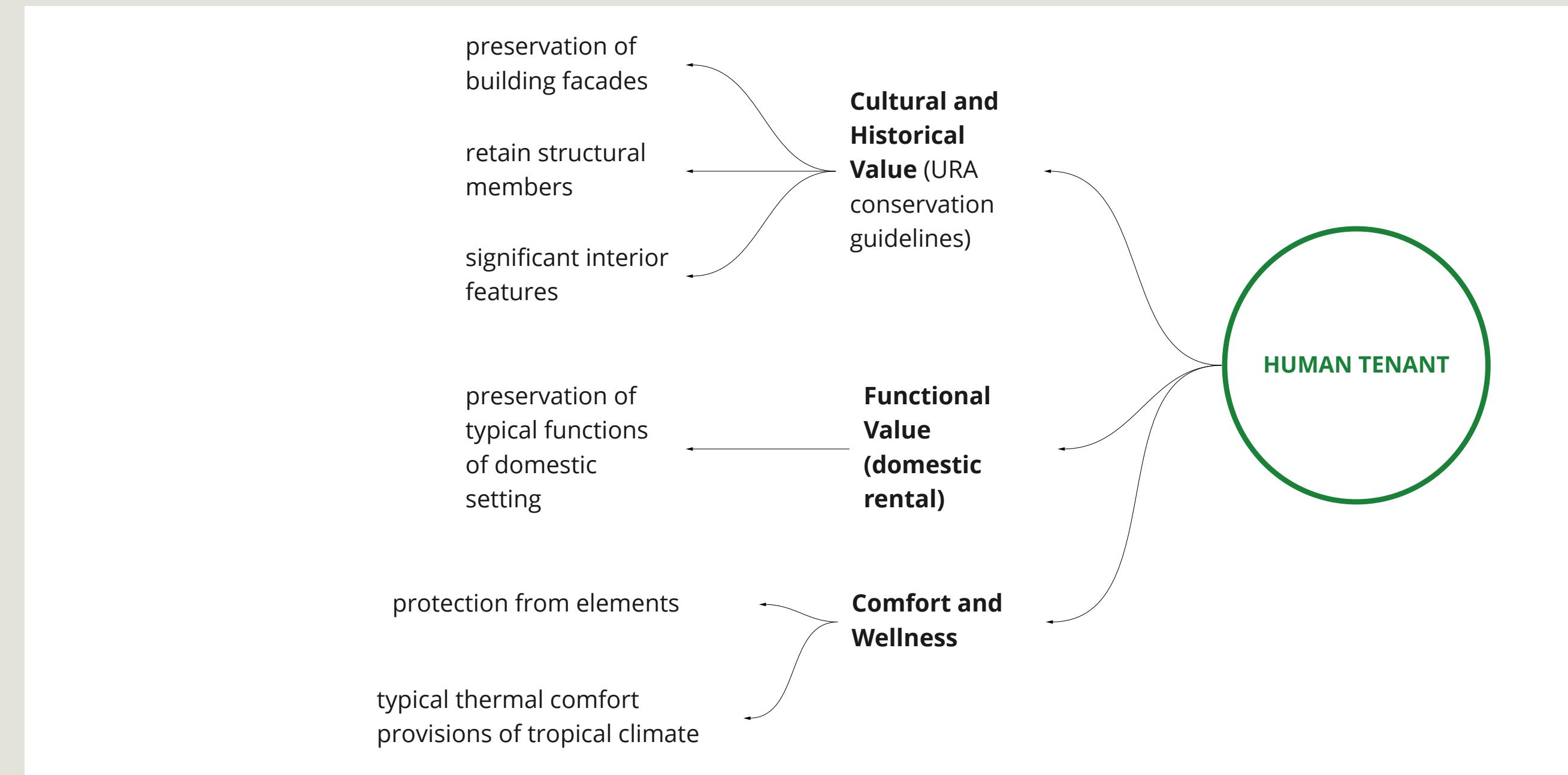


## comments:

- + The production of the **junglefowl design compendium** sufficiently addressed research objective 1.
- + A **user persona** of the junglefowl was also crafted by means of a mindmap.
- + Lastly key principles relating to ecological landscape design for wildlife was distilled into a set of easy to understand master diagrams.

# step 9 synthesise key insights

**Research Objective 2**  
+ Identify architectural features of a home a 4-unit family desires, as well as understand how they occupy and live in it.



## comments:

- + Likewise a specific **user persona** of 4 unit family was also crafted by means of a condensed mindmap.
- + Sorted data from extensive interviews were catalogued to be referred to as needed.

# step 9

# synthesise key insights

## Research Objective 3

+ Identify tensions between humans and junglefowl that exist and have to be overcome; identify positive relationships to continue emulating, for this design model to succeed.

### Tensions

1. There is a large misconception of the kinds of diseases that avian species can carry and transmit, leading to misplaced fear and uncertainty about having junglefowl exist in proximity.
2. There is an issue of noise pollution as the junglefowl crows quite early in the morning.
3. The junglefowl population is growing and there are certain fears of them overrunning estates and neighbourhoods.

### Positive Relationships

1. Interaction between junglefowl and kids are heavily encouraged as it stimulates their curiosity, encourages exploration and connection to nature.
2. The junglefowl are low maintenance, relatively clean birds, perform essential pest control and landscape care tasks, while being mostly unobtrusive and passive members of society.
3. The presence of junglefowl has greatly increased the community spirit, allowing members to reminisce past times while acting as a strong content point for social bonding.

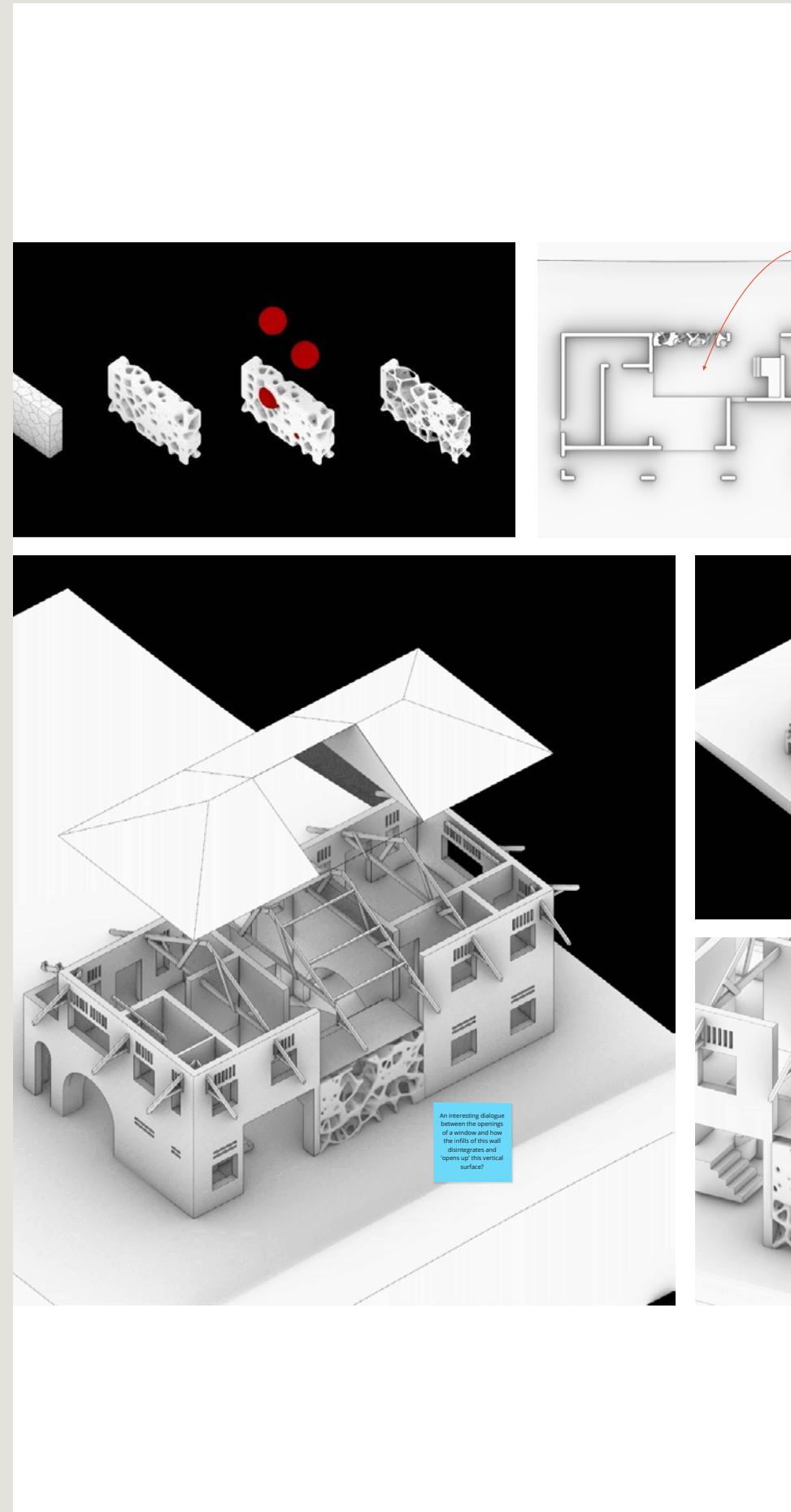
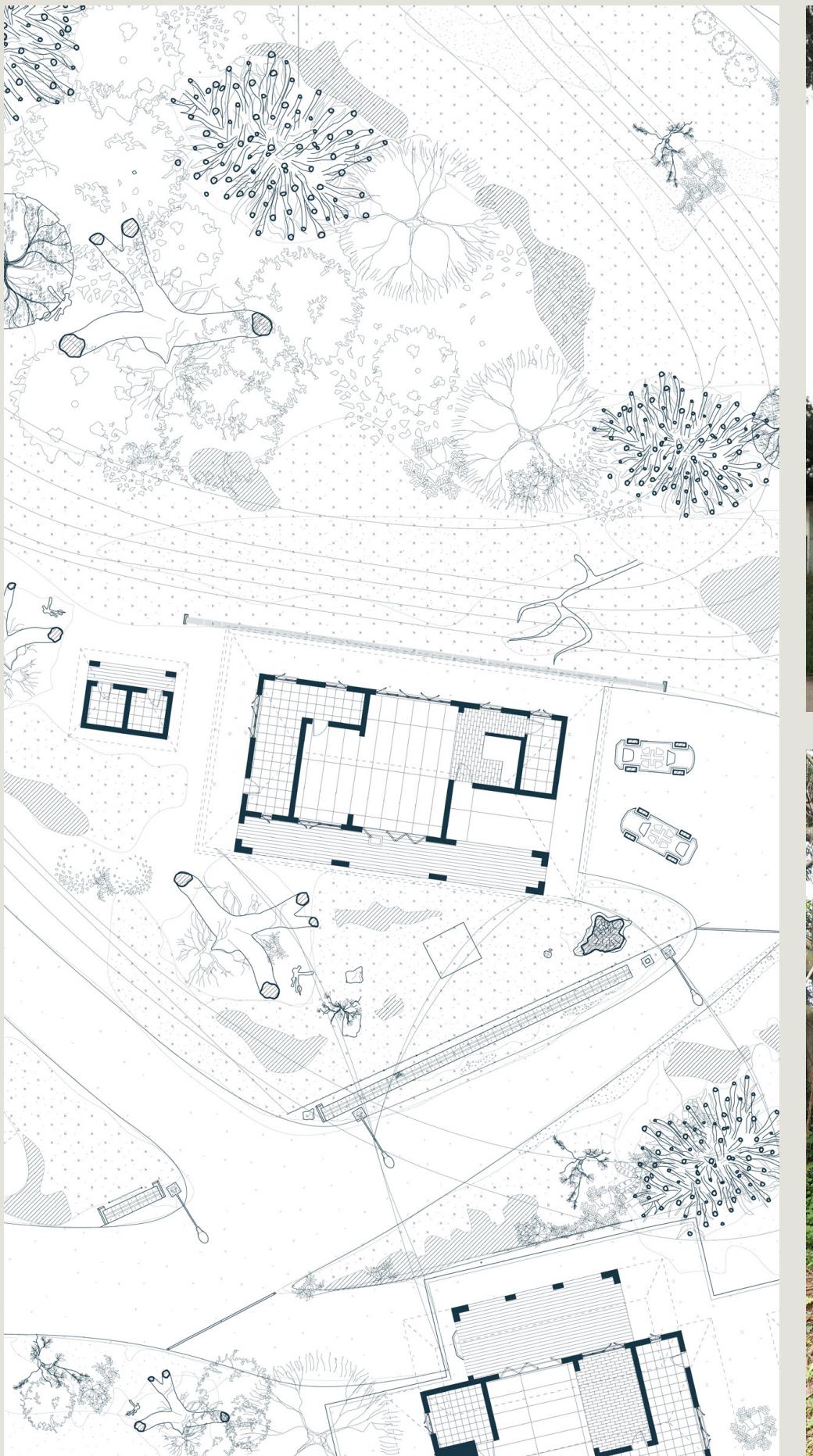
### comments:

- + Emerging themes and their key points from the surveys were compared and distilled into key insights.

# step 9

# synthesise key insights

**Research Objective 4**  
+ Understand the site  
holistically as per typical  
architectural analysis.



**comments:**

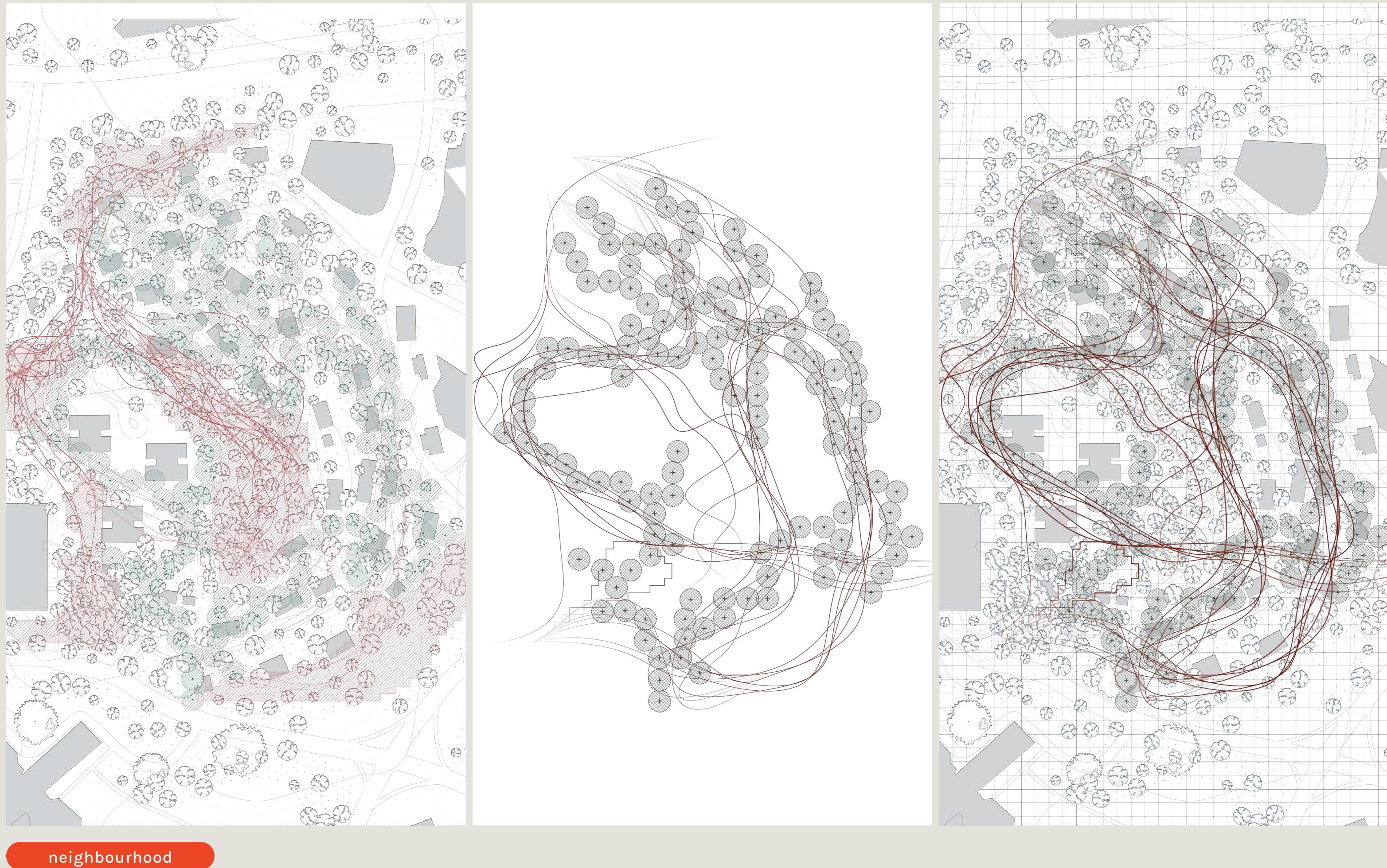
- + Site information was meticulous recorded across three main domains, Photographs, digital drawings and digitalmodels.
- + These resources continue to form the base to which design explorations can be supported from.

# step 9

# synthesise key insights

## Research Objective 5

- + Identify possible locations for intervention(s) to be introduced.



## comments:

- + Based on findings about connected landscape improving the junglefowls movement habits, I proposed a series of intervention spots on site in the form of before and after diagrams,
- + The likely improved connectivity was simulated and appropriately represented in the after diagram justifying the case for introducing the design interventions.
- + These visualisations were introduced at three scales, neighbourhood, street and house.

# step 9

# synthesise key insights

## Research Objective 5

- + Identify possible locations for intervention(s) to be introduced.



## comments:

- + Based on findings about connected landscape improving the junglefowls movement habits, I proposed a series of intervention spots on site in the form of before and after diagrams,
- + The likely improved connectivity was simulated and appropriately represented in the after diagram justifying the case for introducing the design interventions.
- + These visualisations were introduced at three scales, neighbourhood, street and house.

# step 9

# synthesise key insights

## Research Objective 5

- + Identify possible locations for intervention(s) to be introduced.



## comments:

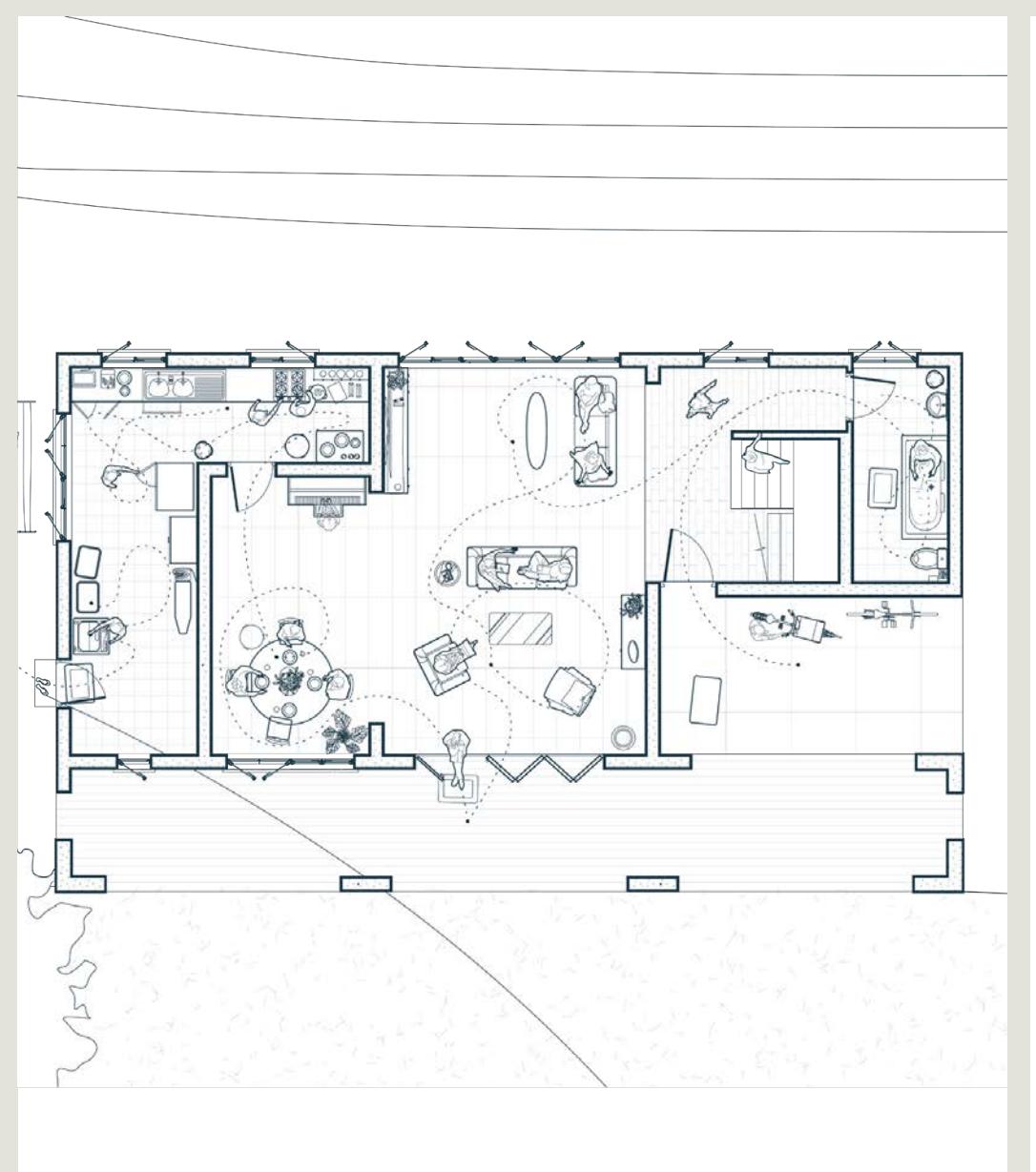
- + Based on findings about connected landscape improving the junglefowls movement habits, I proposed a series of intervention spots on site in the form of before and after diagrams,
- + The likely improved connectivity was simulated and appropriately represented in the after diagram justifying the case for introducing the design interventions.
- + These visualisations were introduced at three scales, neighbourhood, street and house.

# step 9

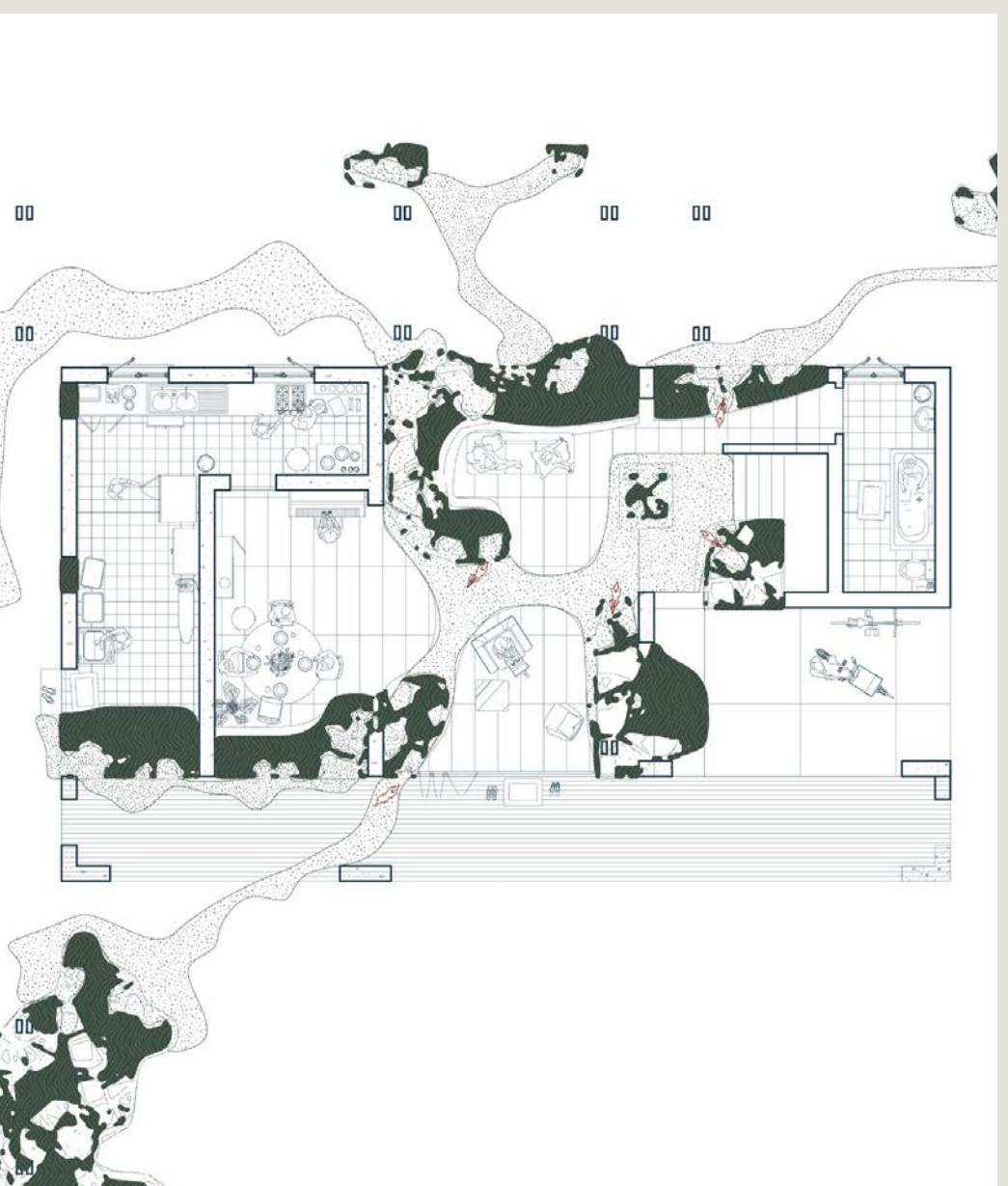
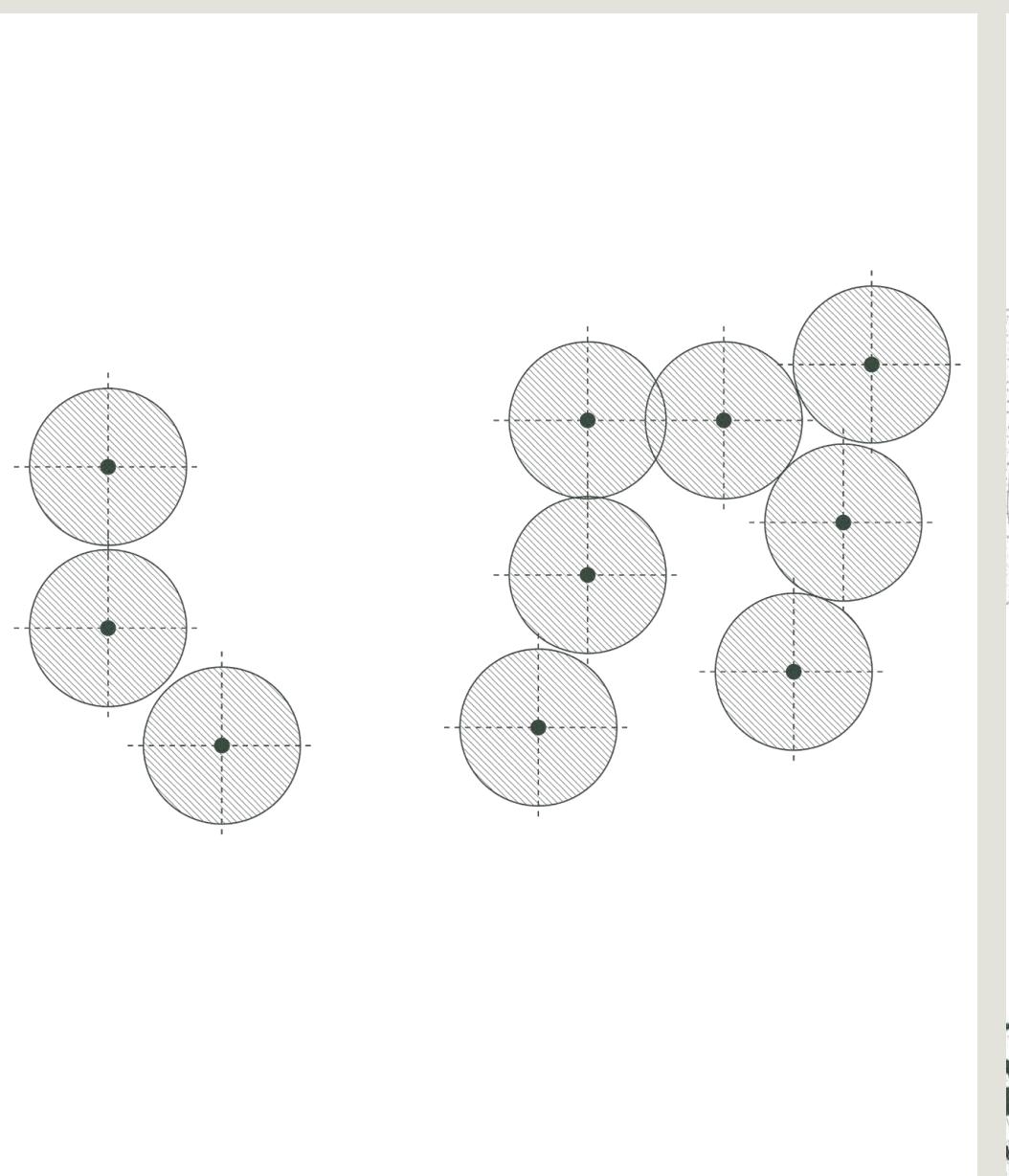
# synthesise key insights

## Research Objective 5

- + Identify possible locations for intervention(s) to be introduced.



house



## comments:

- + Based on findings about connected landscape improving the junglefowls movement habits, I proposed a series of intervention spots on site in the form of before and after diagrams,
- + The likely improved connectivity was simulated and appropriately represented in the after diagram justifying the case for introducing the design interventions.
- + These visualisations were introduced at three scales, neighbourhood, street and house.

# step 9

# synthesise key insights

Actionables  
“How can we...” Statements

1. Craft a concise design brief incorporating key insights to research objectives.
2. Research and adopt an appropriate architectural language to achieve desired design goal.
3. Research and adopt an appropriate construction technique to achieve the desired design goal.
4. Build a scale model to test prototype designs on.
5. Iterate and test prototype designs through a combination of models, annotated diagrams and simulations.

comments:

- + Armed with all the insights, the **design research phase is concluded** after several rounds of presentation and consultations with my thesis advisor.
- + The **active design stage begins** now where the prototyping of architectural solutions and iterative testing is carried out as part of crafting a holistic architectural design proposal.
- + A **list of actionables** are penned down to guide the next step of the design phase.