

BUSTAN

(Arabic: بستان) agricultural garden - a farm near the house which includes fruit trees, vegetable seedlings, shrubs, and spices. Found in basic rural traditional syrian houses.

2019.10.31

Group 5:

Yarai Zenteno 4922204

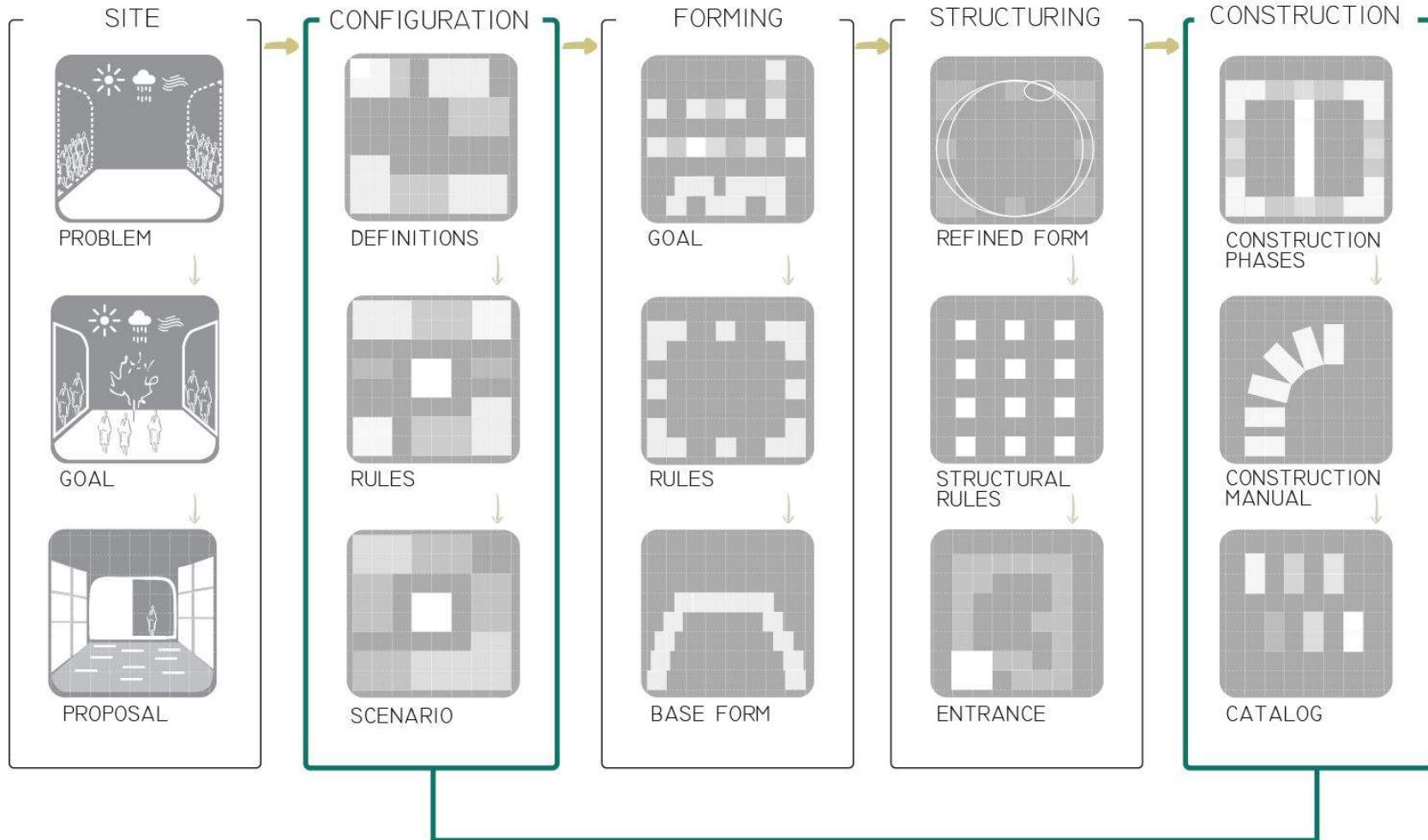
Kazi Fahriba Mustafa 4842960

Patrattakorn Wannasawang 4892380

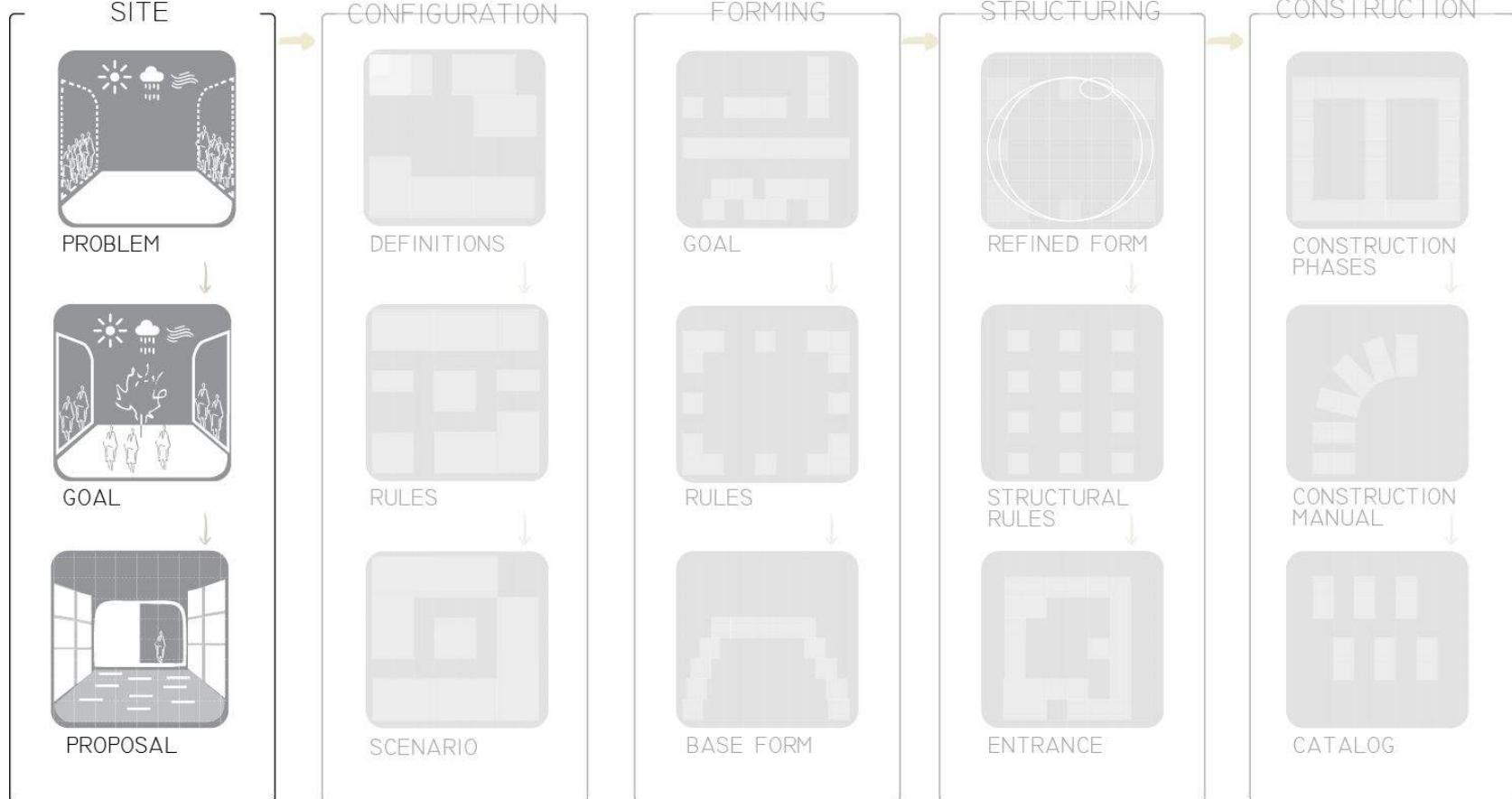
Akash Changlani 4813715

Elisa Vintimilla 4833600

Shasan Choksi 4906691



OUTPUTS FOR ZAATARI: APP



SITE

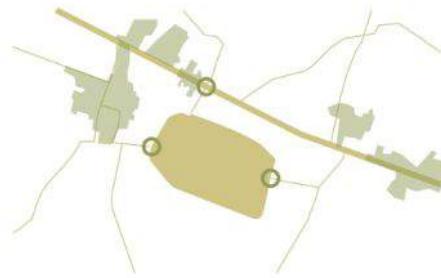
SITE INFORMATION

SITE ANALYSIS

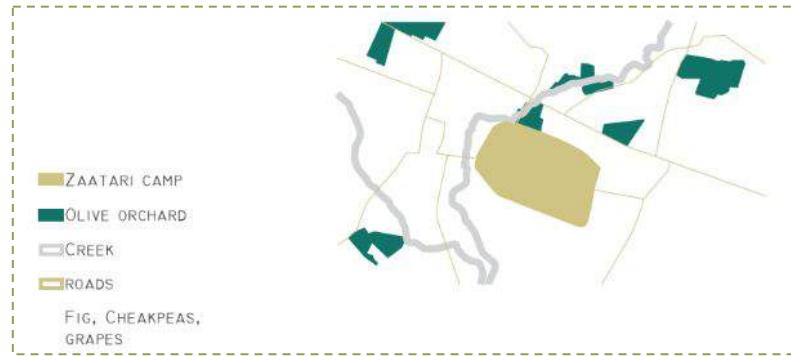
URBAN CONTEXT

SITE POTENTIALS

SITE LIMITATIONS

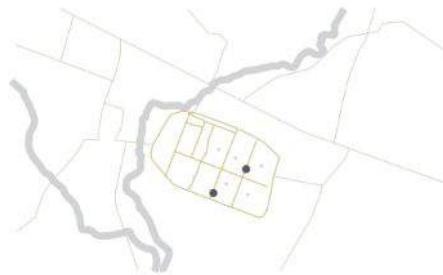


- ZAATARI CAMP
- EXISTENT VILLAGES
- MAIN ROAD
- ENTRANCES

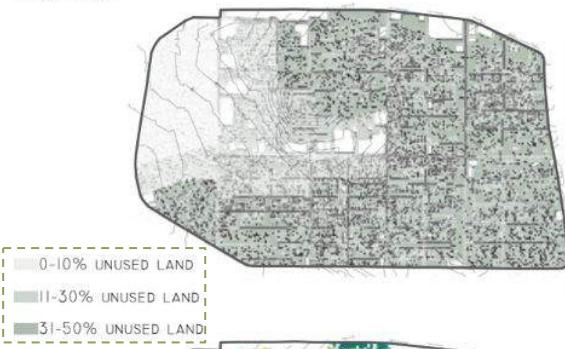


- ZAATARI CAMP
- OLIVE ORCHARD
- CREEK
- ROADS
- FIG, CHEAKPEAS,
GRAPES

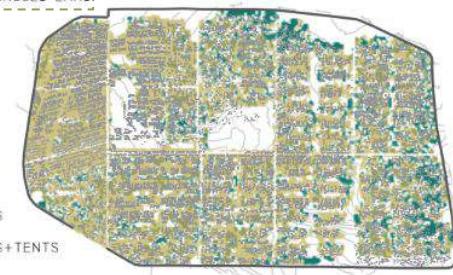
- MAIN WATER RESERVOIR
- WATER RESERVOIR
- CREEK
- CAMP ROADS



- CAMP ROADS
- MAIN ROADS
- COMMERCE

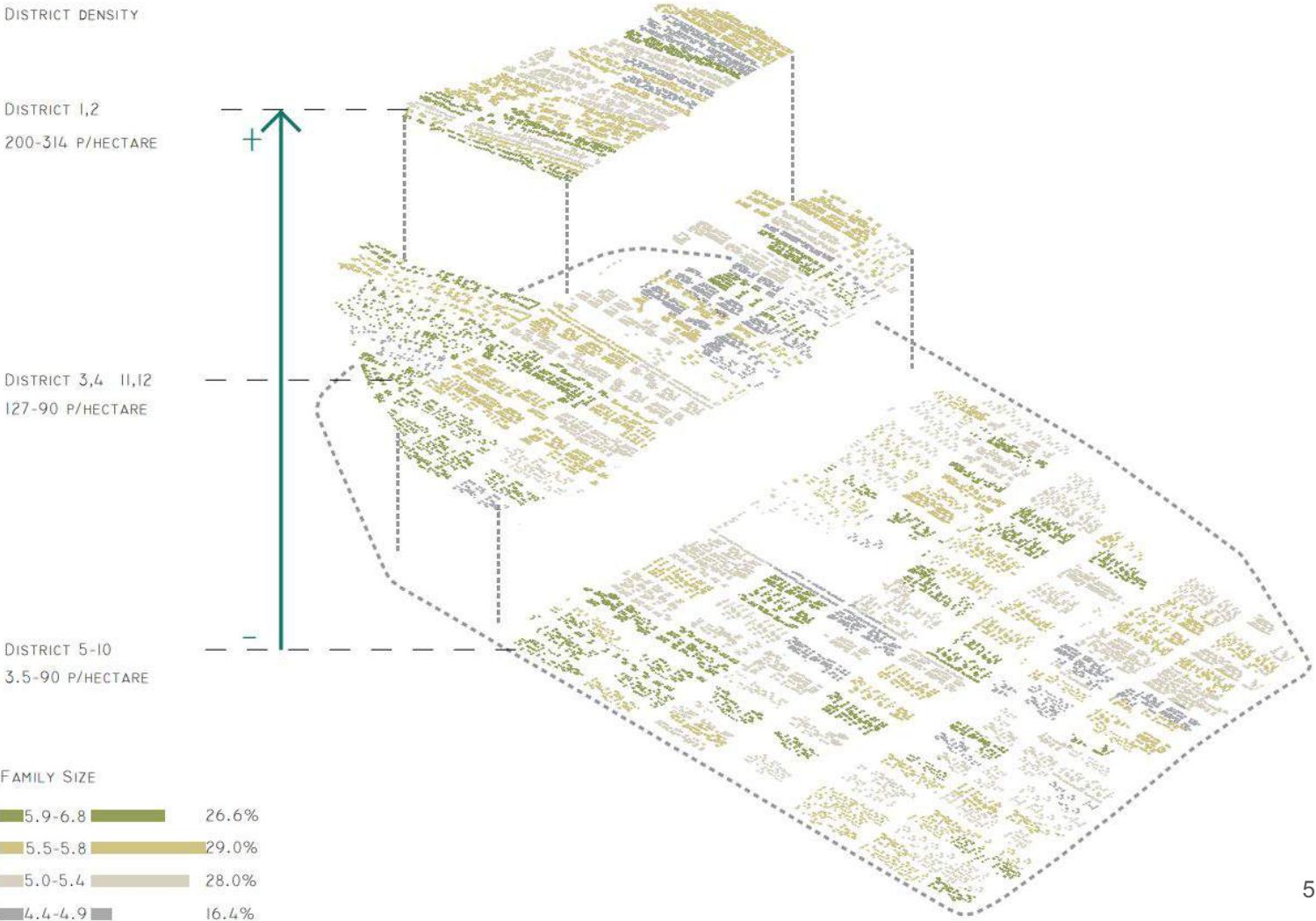
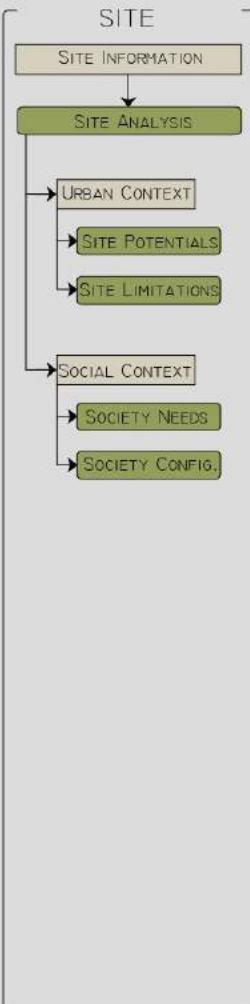


- 0-10% UNUSED LAND
- 11-30% UNUSED LAND
- 31-50% UNUSED LAND



- CARAVANS
- CARAVANS+TENTS
- TENTS

*graphs based on Krujitz, R., 2014



SITE

SITE INFORMATION

SITE ANALYSIS

URBAN CONTEXT

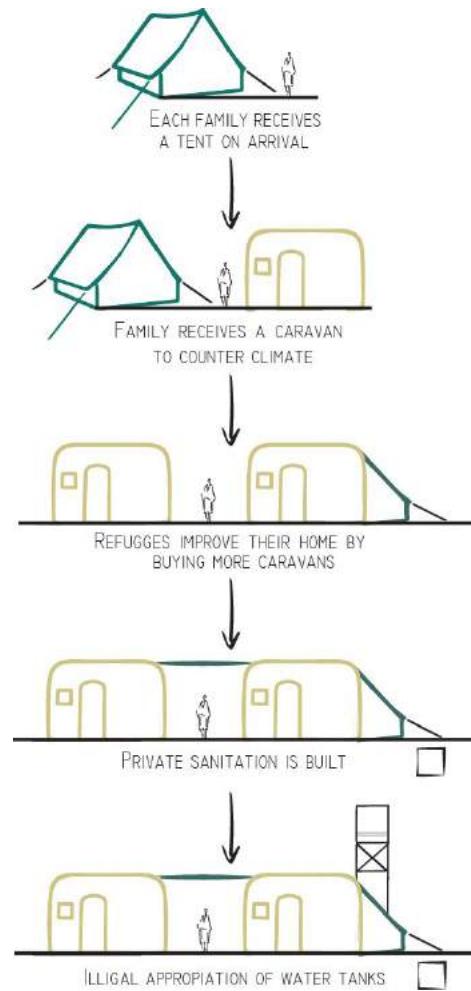
SITE POTENTIALS

SITE LIMITATIONS

SOCIAL CONTEXT

SOCIETY NEEDS

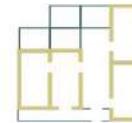
SOCIETY CONFIG.



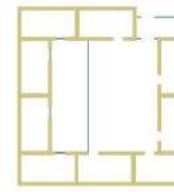
X2 X10
ENCLOSED SPACES



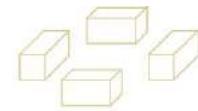
X4 X8
FORMING CORRIDORS



X4 X10
ADDITION OF IWAN



X9 X10
CREATION OF COURTYARDS



4 CARAVANS PLACED
(PRIVACY, SAFETY)



X6
COMMON FAMILY SIZE

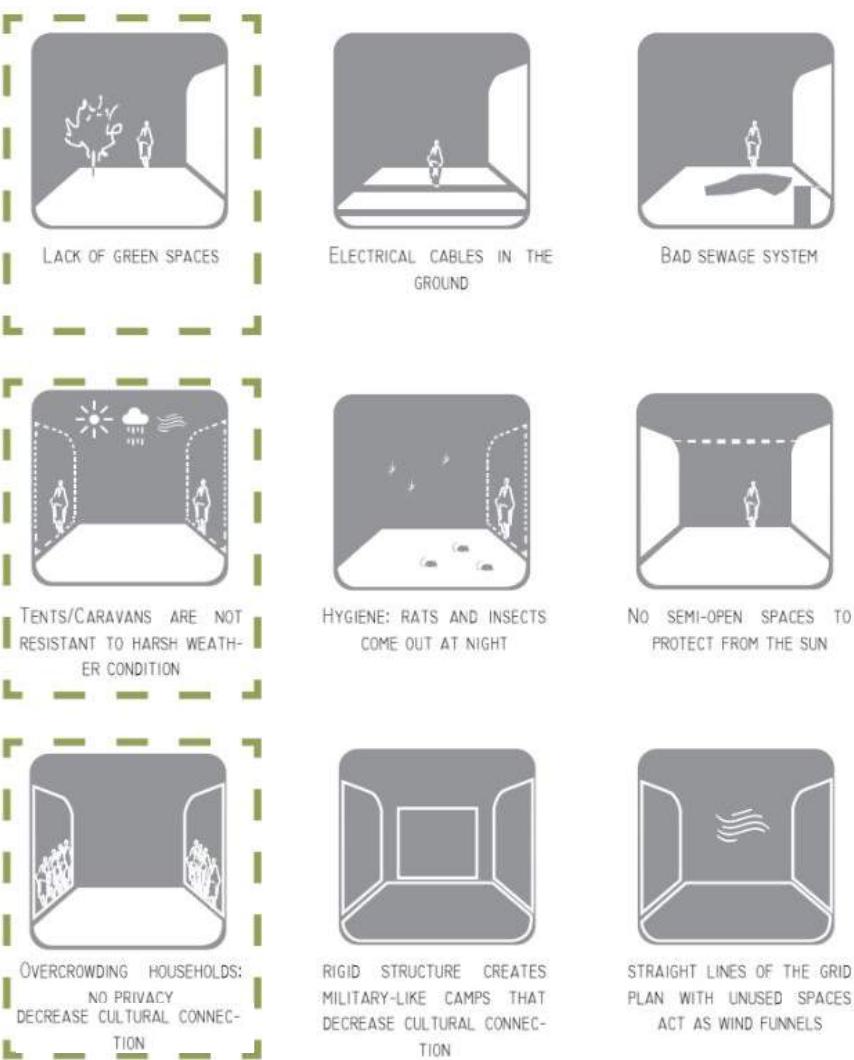
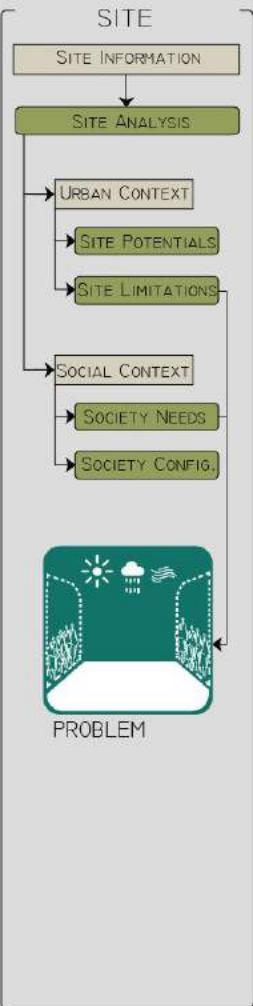


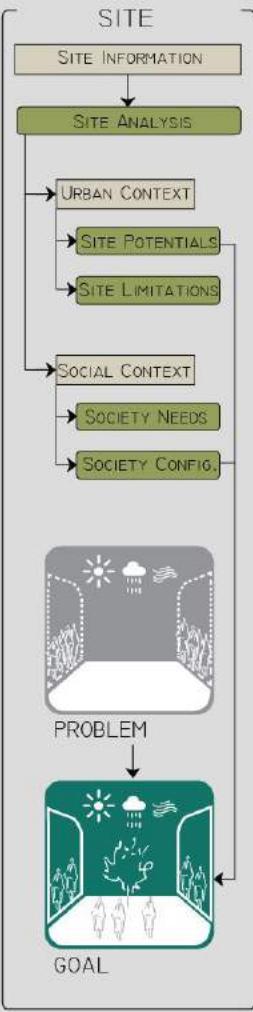
X16
COMMON CLUSTER



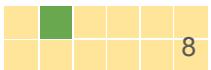
PROGRAMME

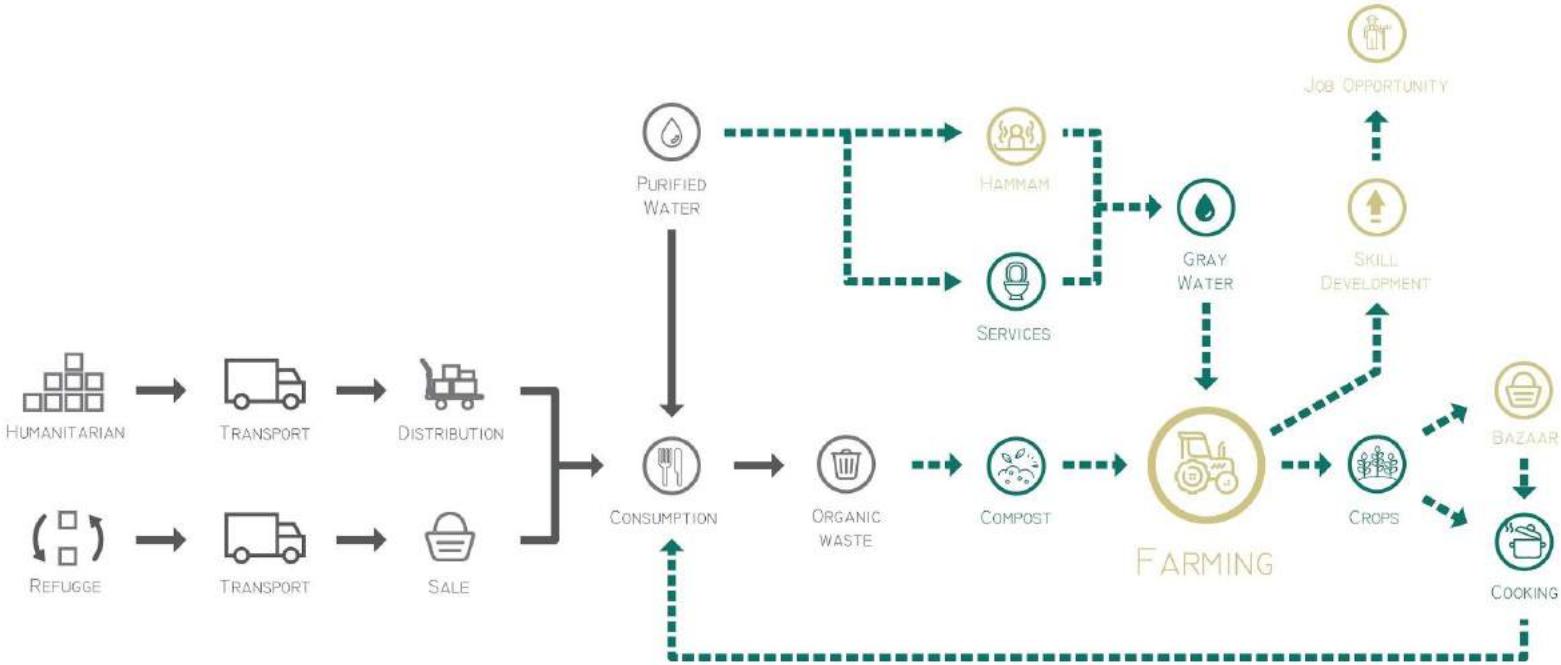
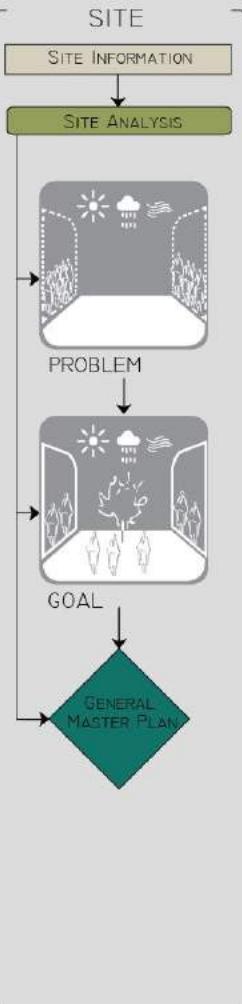
*graphs based on Stromme, L., 2013

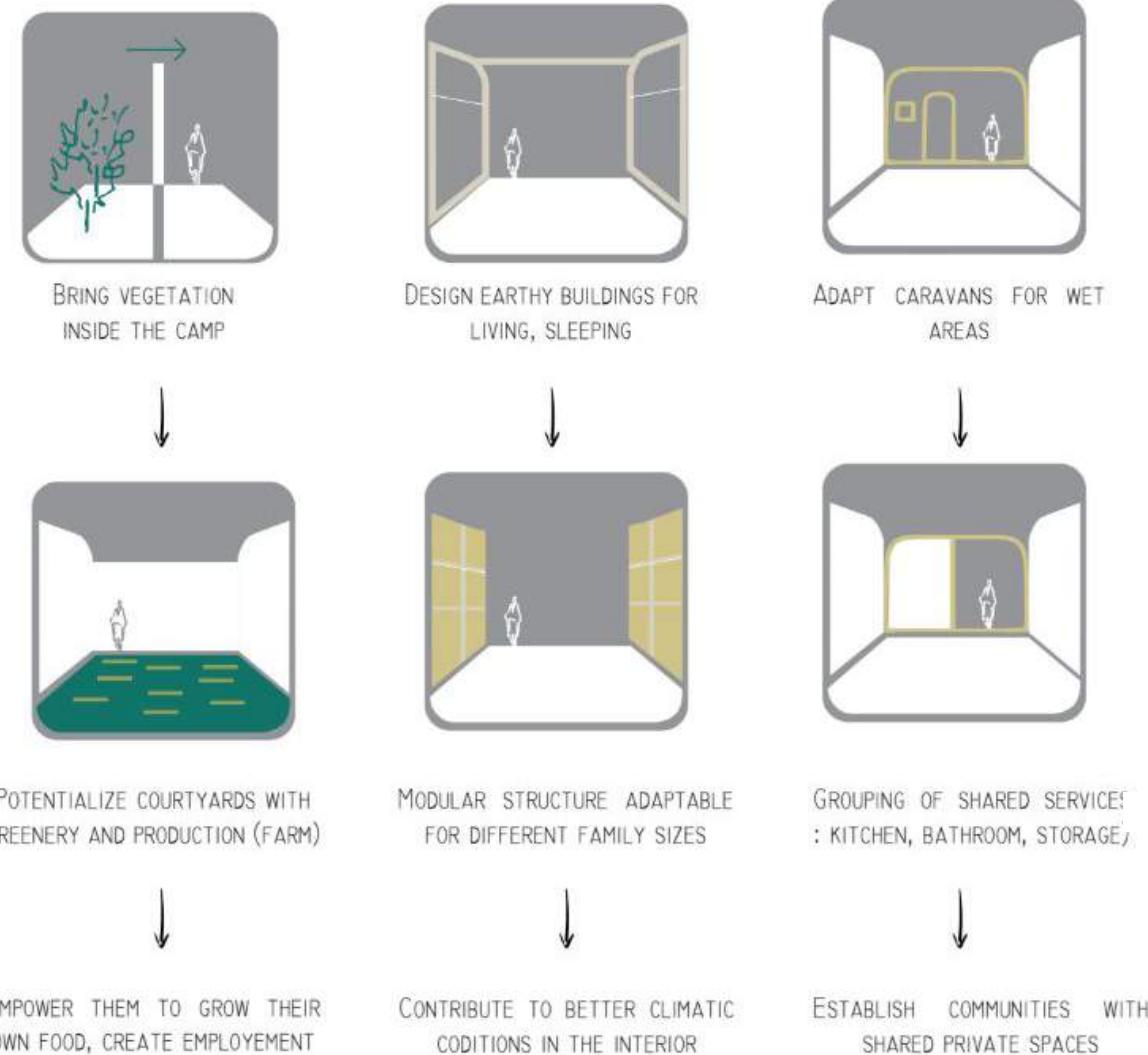
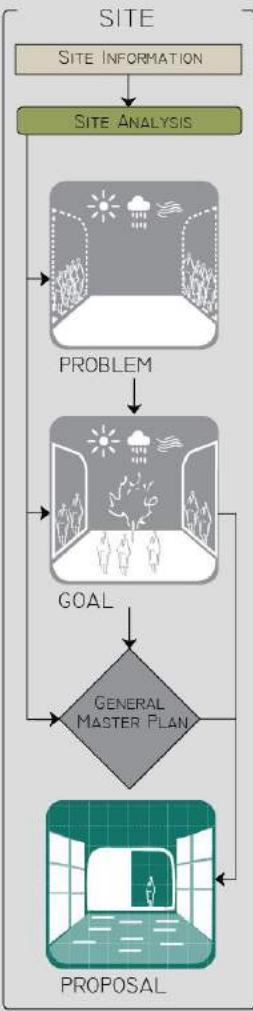


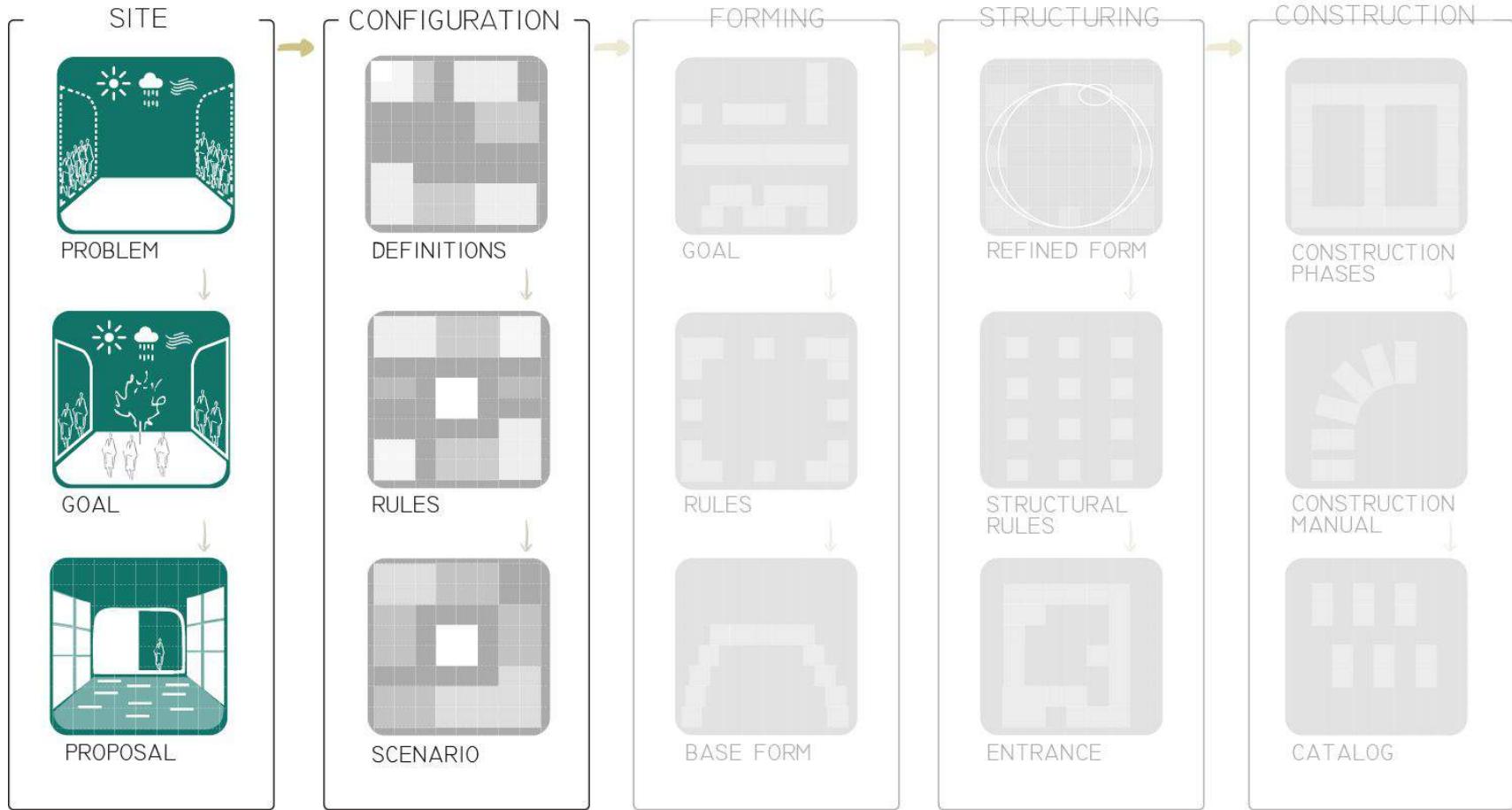


TO IMPROVE THE REFUGEES' LIFE BY CREATING A CO-HOUSING SYSTEM THAT ADDS VALUE TO THE LAND, ENHANCES LIVING CONDITIONS AND ECONOMIC DEVELOPMENT THROUGH AGRICULTURE.









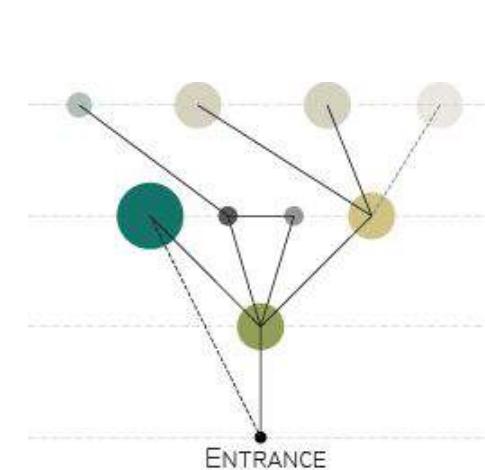
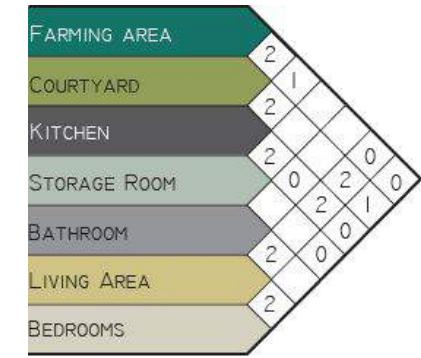
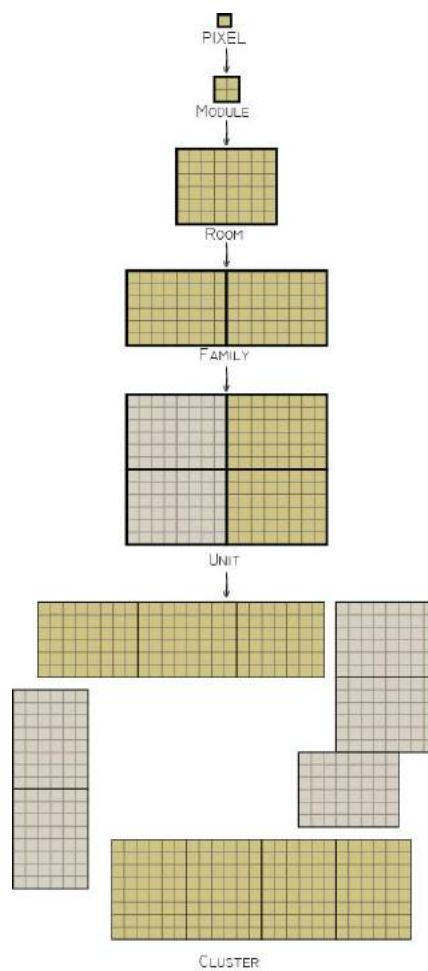
CONFIGURATION



PROPOSAL



DEFINITIONS



CONFIGURATION



PROPOSAL

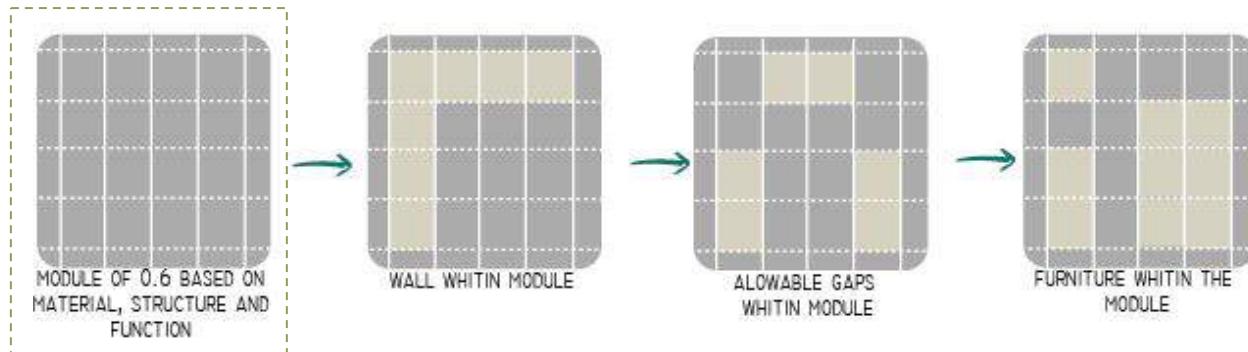
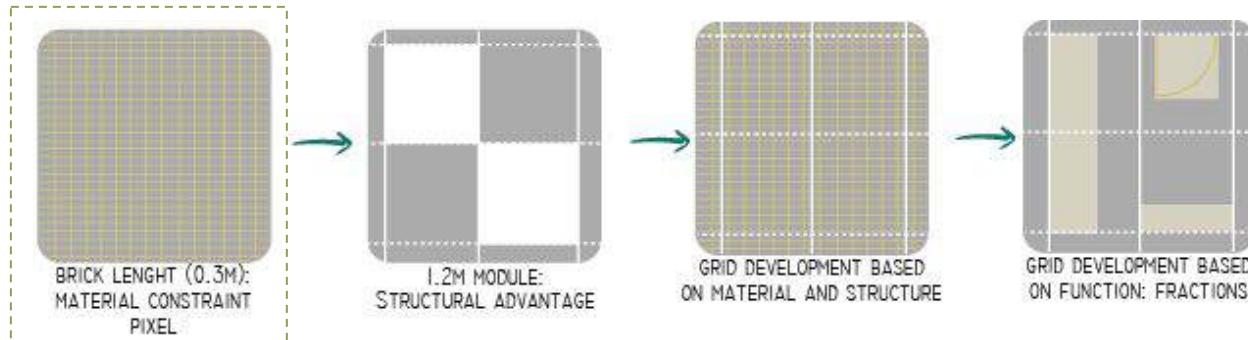
DEFINITIONS FOR
CONFIGURATION

DEFINE SPACES:
PROGRAMME

DEFINE RELATION:
REL-CHART

DEFINE ORDER:
SPACE SYNTAX

MODULE SIZE
DEFINITION



CONFIGURATION



PROPOSAL

DEFINITIONS FOR
CONFIGURATION

DEFINE SPACES,
PROGRAMME

DEFINE RELATION,
REL-CHART

DEFINE ORDER:
SPACE SYNTAX

MODULE SIZE
DEFINITION

CONFIGURATION
RULES FOR ROOMS

BEDROOM MODULE

42 MODULES
FOR 1 TO 2 PEOPLE

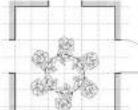


48 MODULES
FOR 2 TO 4 PEOPLE



LIVINGROOM MODULE

42 MODULES
FOR 1 TO 6 PEOPLE



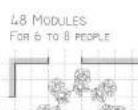
48 MODULES
FOR 2 TO 4 PEOPLE



60 MODULES
FOR 6 TO 8 PEOPLE

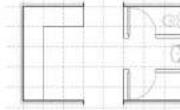


48 MODULES
FOR 6 TO 8 PEOPLE



KITCHEN & BATHROOM MODULE

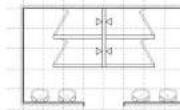
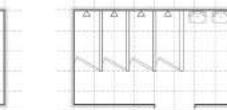
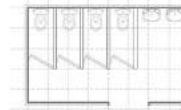
FOR 1 FAMILY



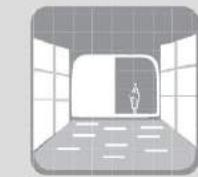
FOR 2 - 4 FAMILIES



FOR 4+ FAMILIES



CONFIGURATION



PROPOSAL

DEFINITIONS FOR CONFIGURATION

DEFINE SPACES: PROGRAMME

DEFINE RELATION: REL-CHART

DEFINE ORDER: SPACE SYNTAX

MODULE SIZE DEFINITION

CONFIGURATION RULES FOR ROOMS

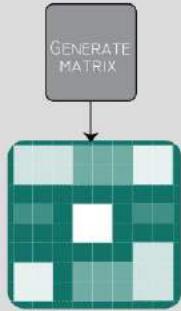
COHERENT SIZES?

YES

GENERATE MATRIX

NUMBER OF PEOPLE	FAMILY TYPE	SLEEPING (B) NUMBER OF MODULES	LIVING (L) NUMBER OF MODULES	COURTYARD (C) NUMBER OF MODULES $C=1/3*B$	FARMING (F) NUMBER OF MODULES $F=1/2*L$	TOILETS (T) NUMBER OF CARAVANS	KITCHEN (K) NUMBER OF CARAVANS K+T	STORAGE (S) NUMBER OF CARAVANS 5H/2k
1		→ 42		14		1/2		
2		→ 42-48		14		1/2		
3		→ 48-84-90-96		14		1/2		
4		→ 48-90-96		14-16		1/2		
5		→ 90-96-126-138		16-18		1/2		
6		→ 96-126-138		16-18		1/2		
7		→ 96-138-144		16-18-20		1/2		
8		→ 96-136-138-144-168-192		16-18-20		1/2		
9		→ 138-144-168-192		18-20		1/2		

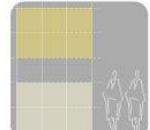
CONFIGURATION



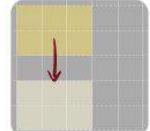
CLUSTER

UNIT

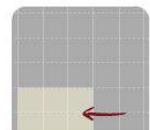
FAMILY



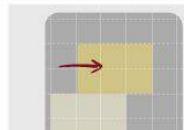
NUMBER OF ROOMS DEPENDS ON FAMILY SIZE



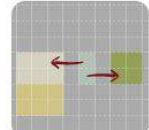
BEDROOM ALWAYS CONNECTED TO LIVING



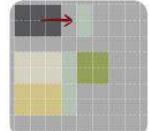
ENTRANCE ALWAYS TO THE LIVING



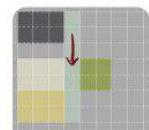
ROOM SHIFTING: MIN. 3 MODULES AND IN 3 MODULES RANGE



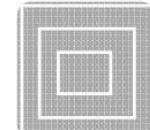
LIVING AND COURTYARD CONNECTED WITH VARANDAH (3 MODULES WIDTH)



SERVICES CONNECTED TO FAMILY THROUH VARANDAH



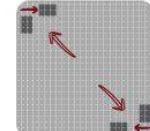
WALKING DISTANCE FROM SERVICES TO FAMILY = LENGTH OF VARANDAH (MAX. 72 MODULES)



DEFINITION OF CLUSTER SIZE BY DENSITY FROM CONTEXT



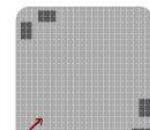
SIZE THE FARM TO UNITS



SERVICES TO OPPOSITE CORNERS: SERVICE PLAZAS (MIN 48 MODULES)



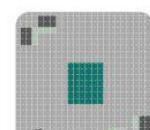
PUT IN THE UNITS LEAVING AT LEAST 3 MODULES BETWEEN UNIT AND FARM



ENTRANCE ON ONE SIDE AT LEAST 8 MODULES FREE



SIZE THE LENGTH OF VARANDAH BETWEEN UNIT AND FARM



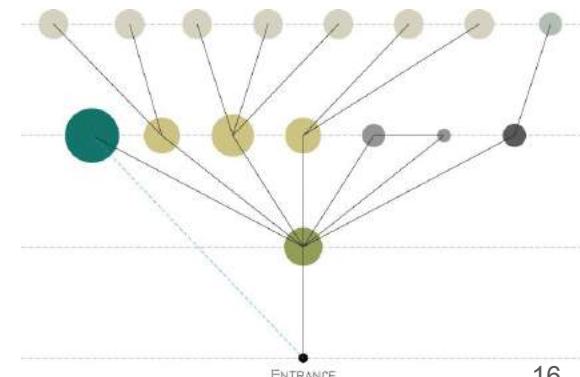
FARM TO THE MIDDLE



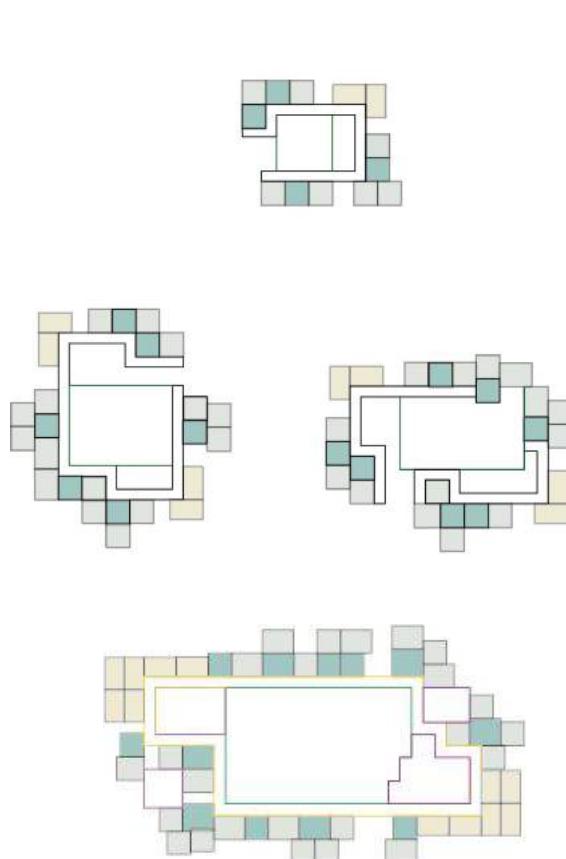
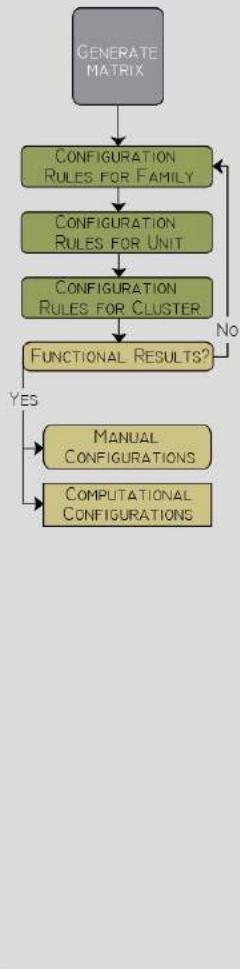
MODULES LEFT ARE COURTYARD



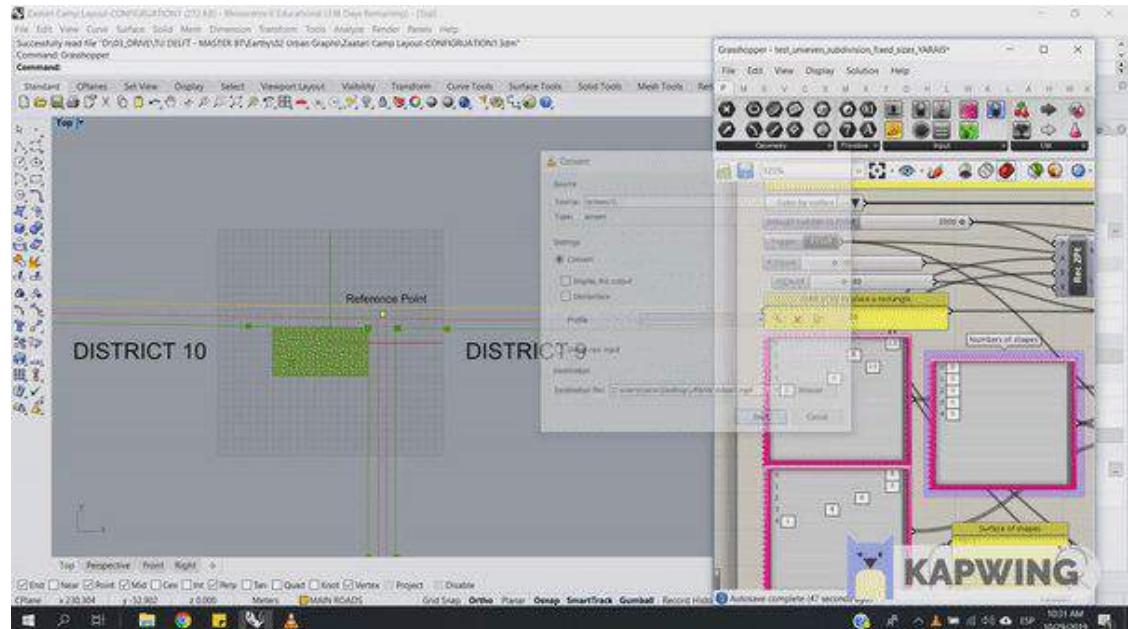
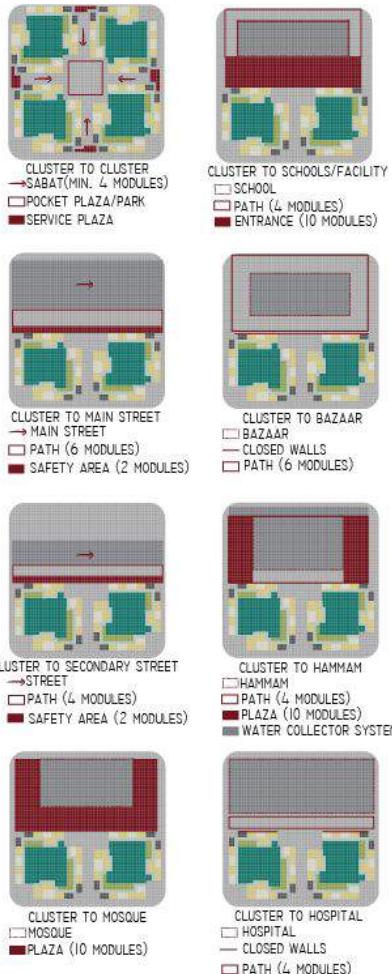
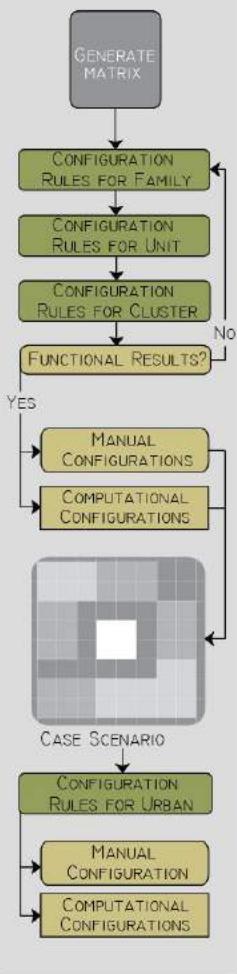
0 NO CONNECTION
1 VISUALLY CONNECTED
2 PHYSICALLY CONNECTED
3 PHYSICALLY CONNECTED EITHER ONE OF THIS PROGRAM



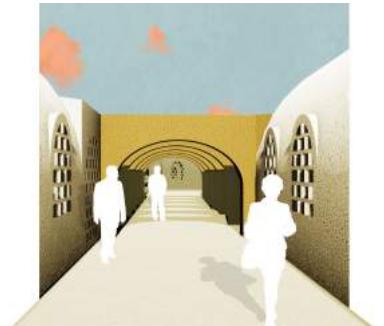
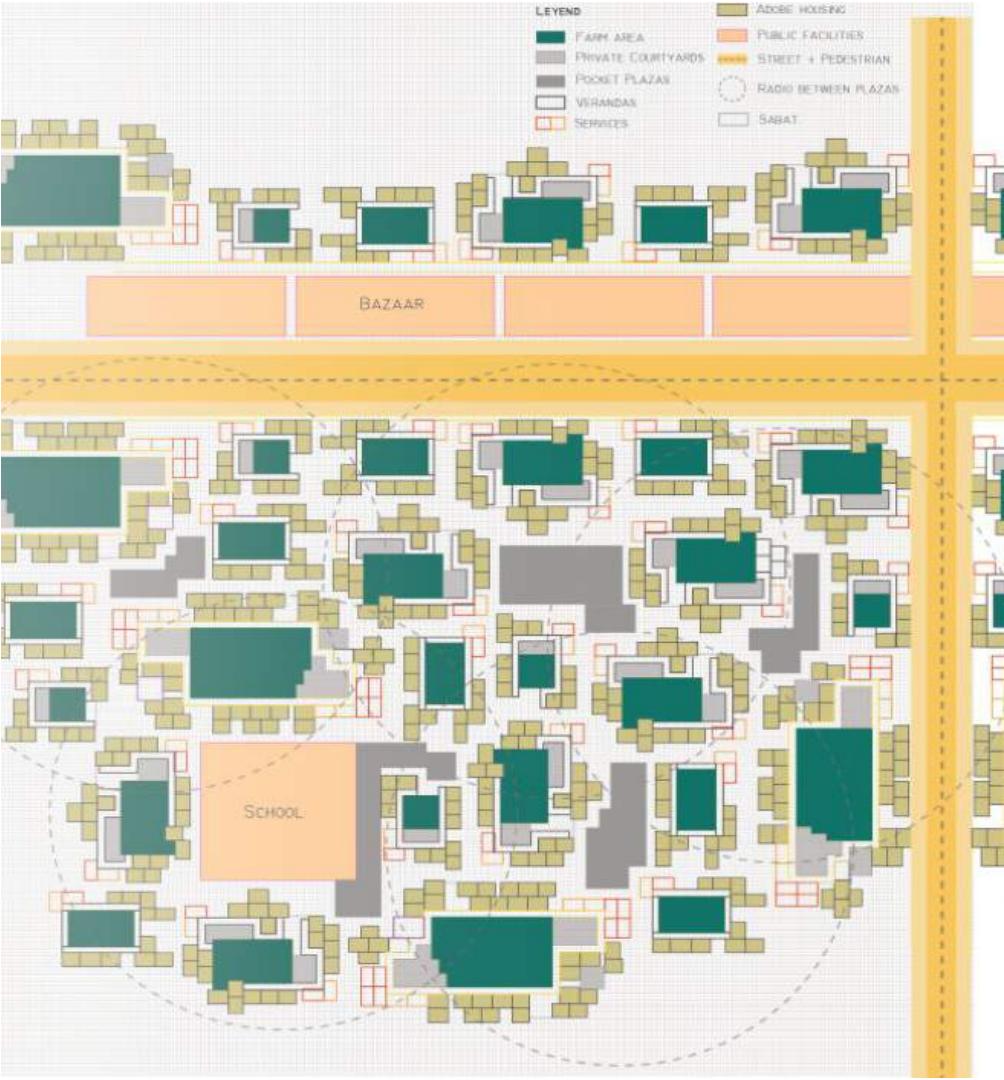
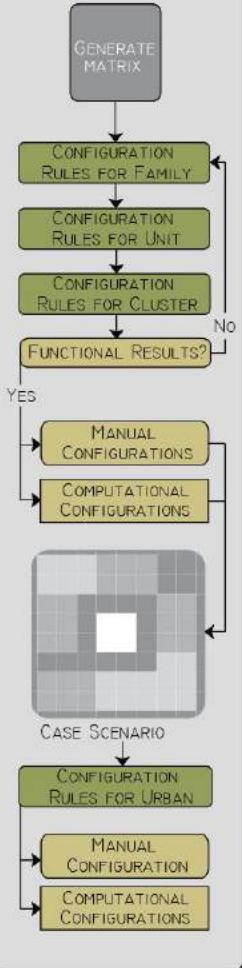
CONFIGURATION



CONFIGURATION



CONFIGURATION

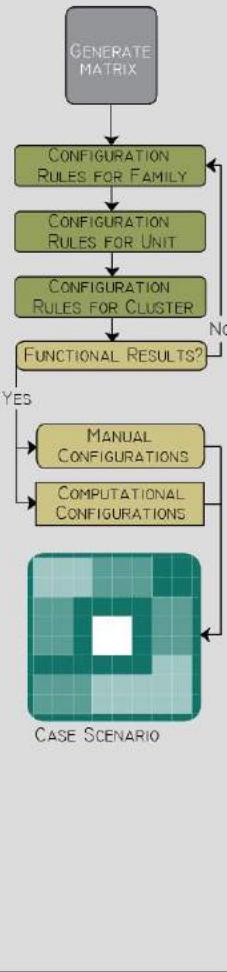


SABAT

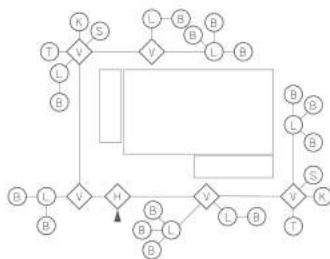
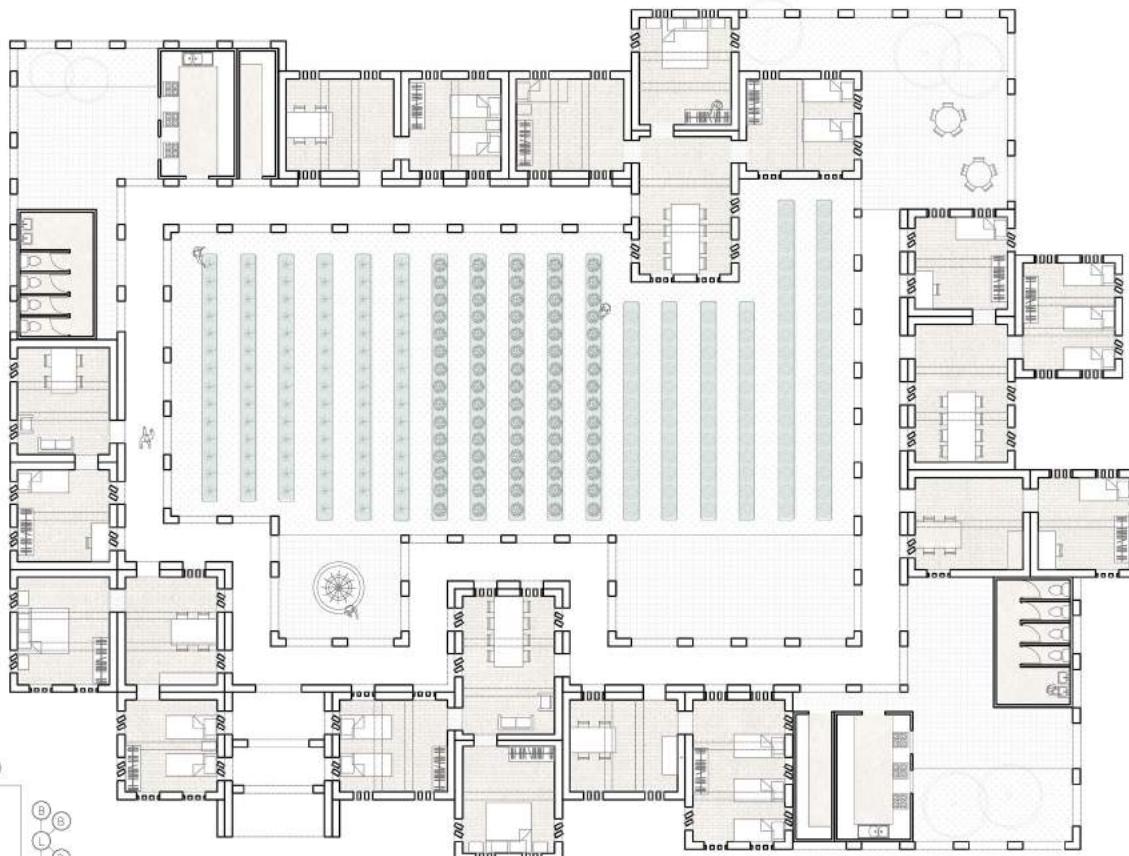


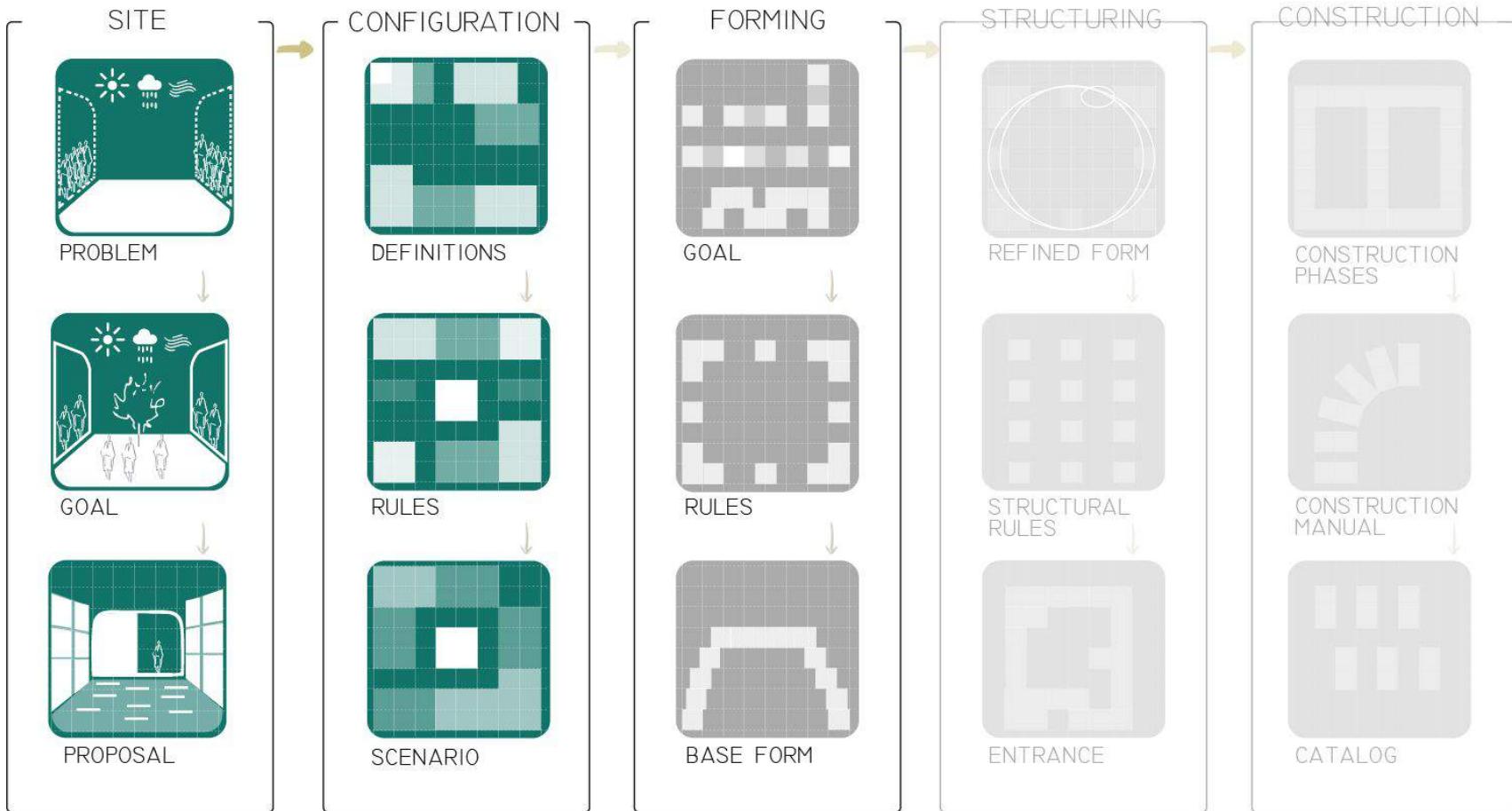
PLAZAS

CONFIGURATION



Scenario: 7 families (21 people)

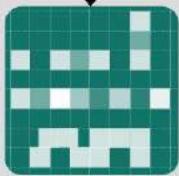




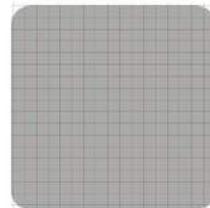
FORMING



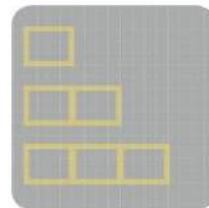
CASE SCENARIO



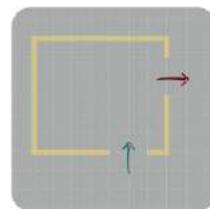
FORMING GOALS



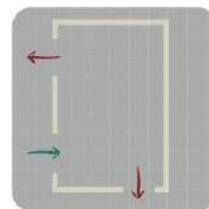
MODULAR



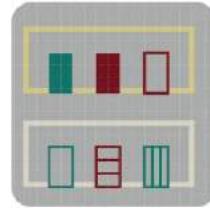
REPLICABLE



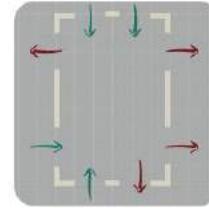
BEDROOM CONFIGURATION:
MIN. 2 MODULAR
OPENINGS



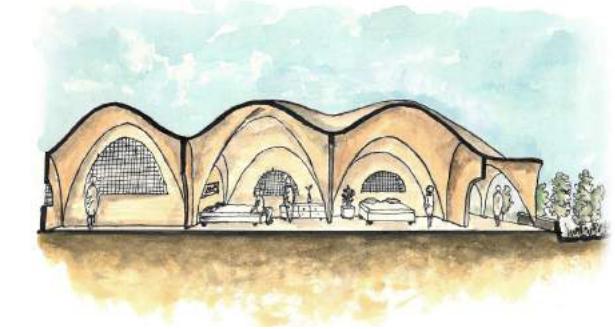
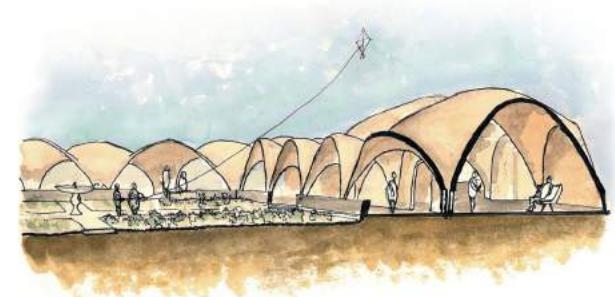
LIVING CONFIGURATION:
MIN. 3 MODULAR
OPENINGS



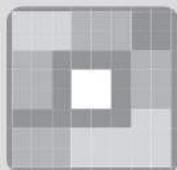
FREE FACADE:
OPENINGS
FLEXIBILITY



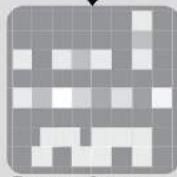
VARIATION IN CONFIGURATION:
MAX. NUMBER OF OPENINGS
MIN. SUPPORT



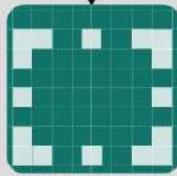
FORMING



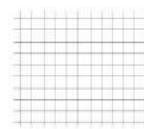
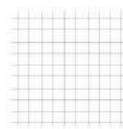
CASE SCENARIO



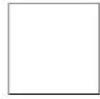
FORMING GOALS



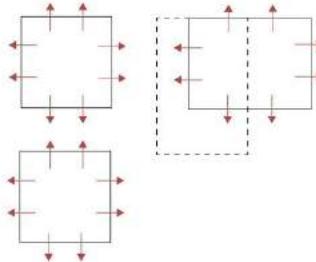
FORMING RULES



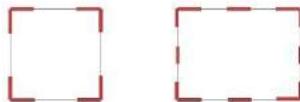
GRID



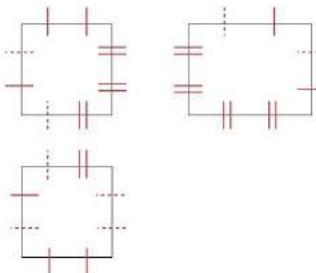
SHAPES



GENERATIVE DESIGN
MODULAR PLANNING



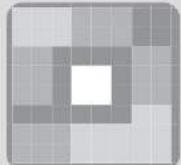
STRUCTURE



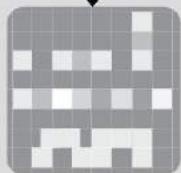
TYPE OF OPENINGS/
CONNECTIONS

— DOOR
— WINDOW
---- NO OPENING

FORMING



CASE SCENARIO

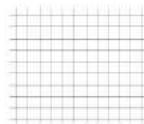
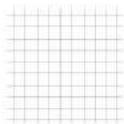


FORMING GOALS



FORMING RULES

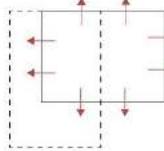
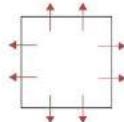
EXTRACT ONE UNIT



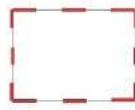
GRID



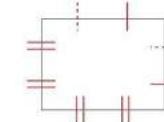
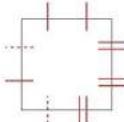
SHAPES



GENERATIVE DESIGN
MODULAR PLANNING



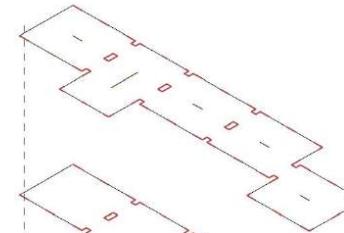
STRUCTURE



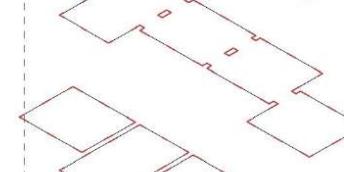
DOOR
WINDOW
NO OPENING

TYPE OF OPENINGS/
CONNECTIONS

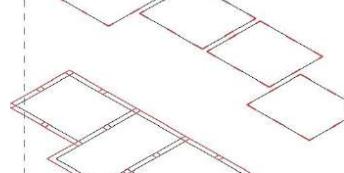
DEVELOPMENT OF UNIT DESIGN



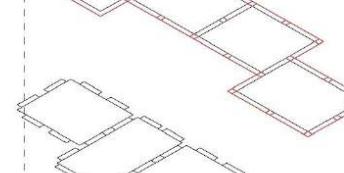
TOP RIDGE POINTS OF EACH ROOM IS DRAWN TO MAINTAIN THE SAME CEILING HEIGHT THROUGHOUT.



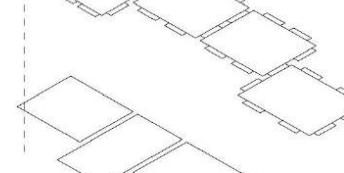
A CONNECTED CEILING IS CREATED BETWEEN THE ROOMS



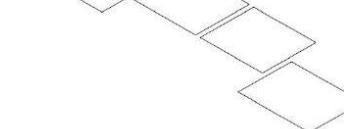
THE INNER BOUNDARY LAYER OF THE ROOMS WERE ISOLATED WITH ONLY THE SUPPORT EDGES



THE WALLS FOR THE ROOMS WERE CREATED HIGHLIGHTING THE SUPPORT POINTS

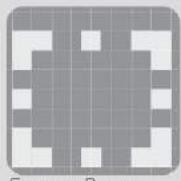


CONNECTIONS BETWEEN THE ROOMS WERE CREATED AS OPENINGS



FEW OPTIONS OF RECTANGULAR ROOMS WITHIN THE GRID WERE CONNECTED TO CREATE A UNIT

FORMING



FORMING RULES

EXTRACT ONE UNIT

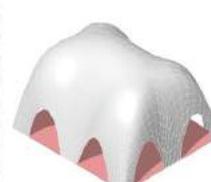
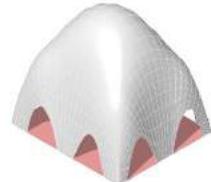
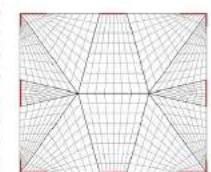
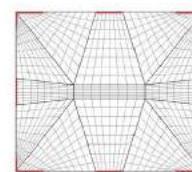
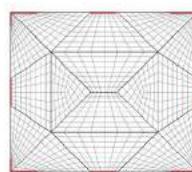
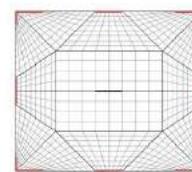
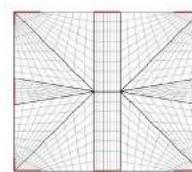
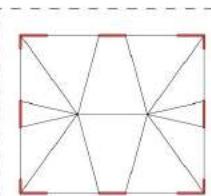
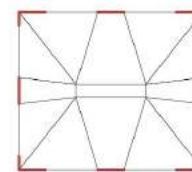
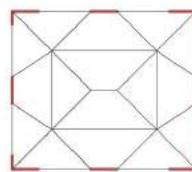
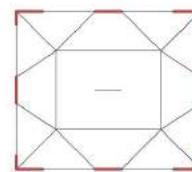
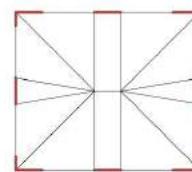
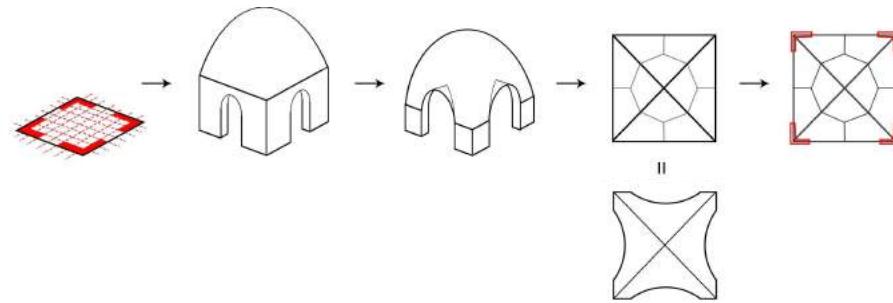
SET BOUNDARY
AND SUPPORTS ROOM

TESSALATION OPTIONS

GENERATE MESH

DYNAMIC RELAXATION

CHOOSE ONE



FORMING



FORMING RULES

EXTRACT ONE UNIT

SET BOUNDARY
AND SUPPORTS ROOM

TESSALATION OPTIONS

GENERATE MESH

DYNAMIC RELAXATION

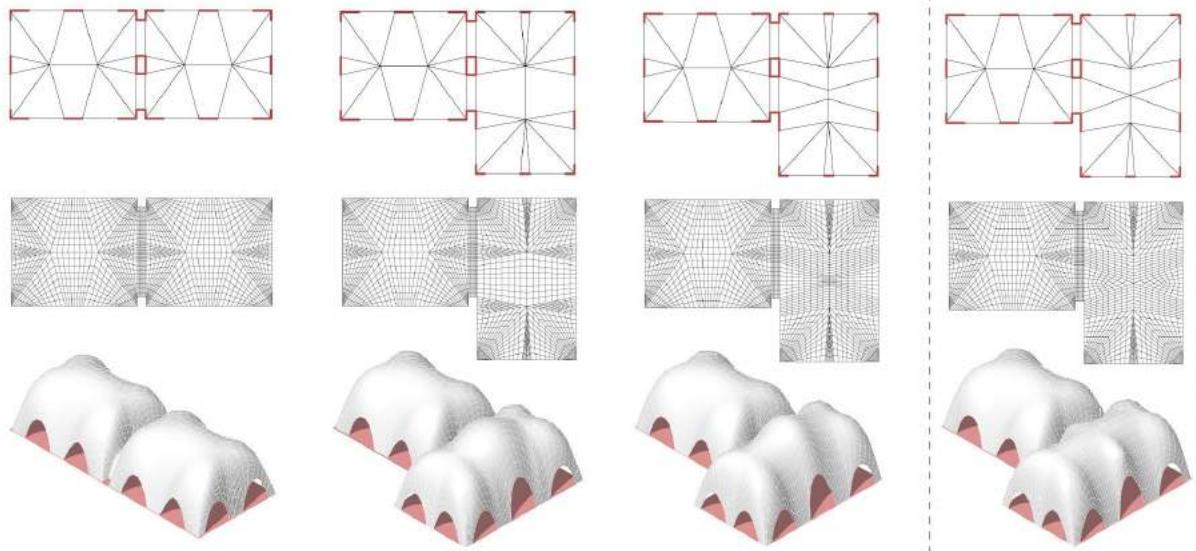
CHOOSE ONE

SET BOUNDARY AND
SUPORTS ADJECENT ROOM

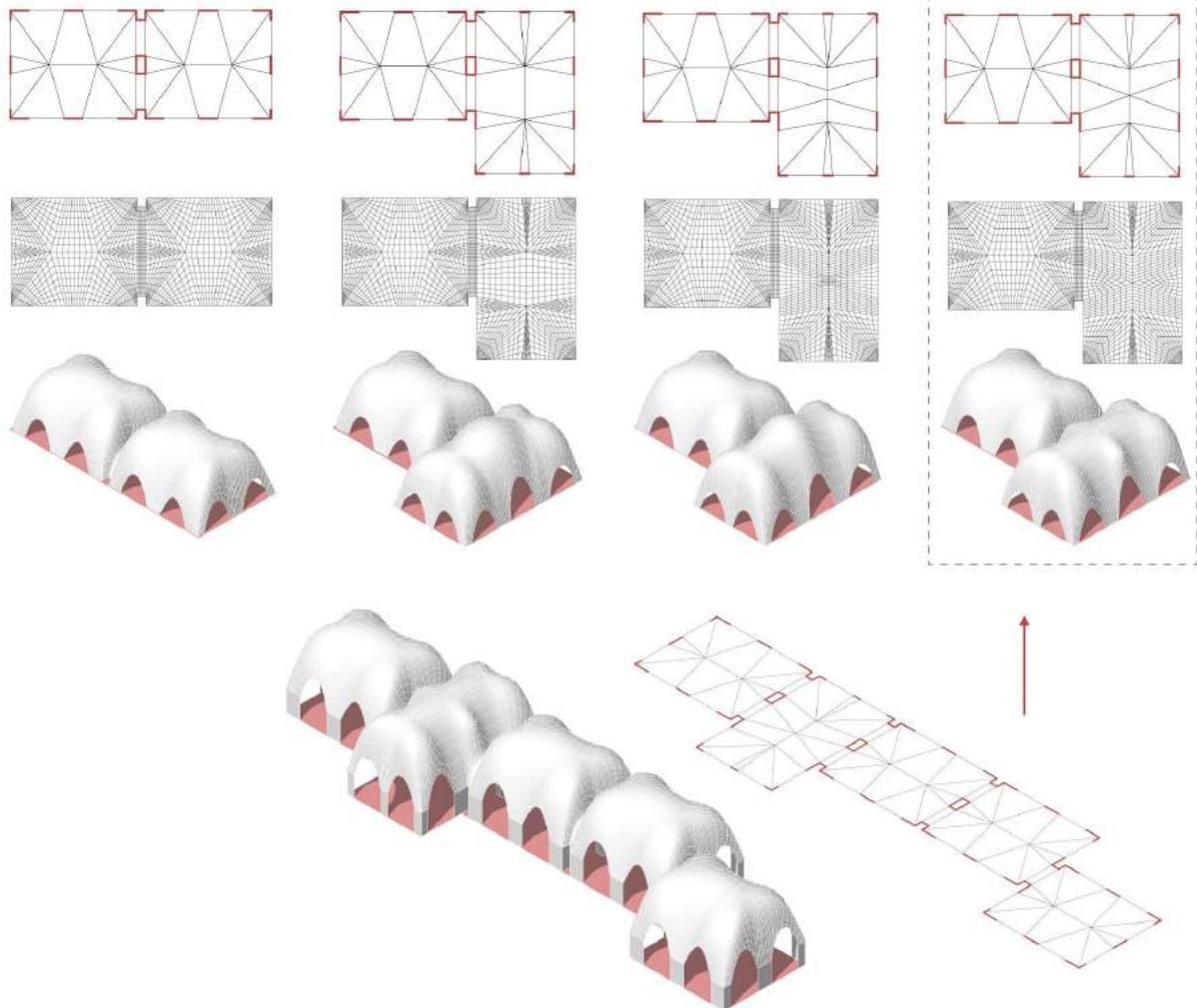
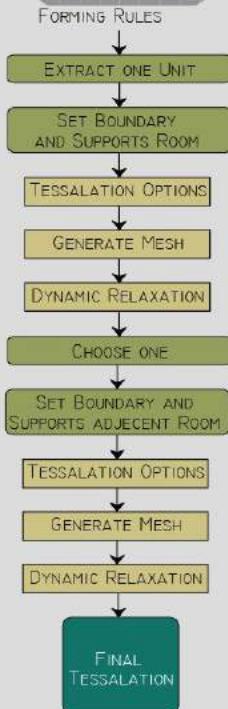
TESSALATION OPTIONS

GENERATE MESH

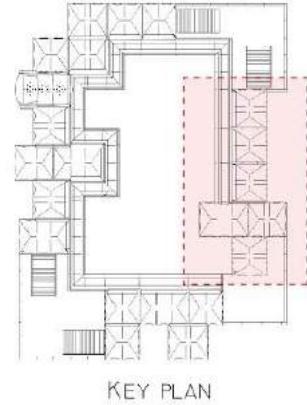
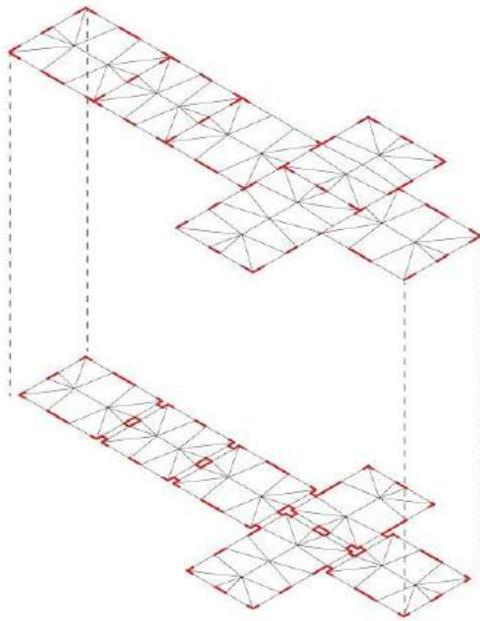
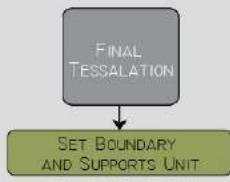
DYNAMIC RELAXATION



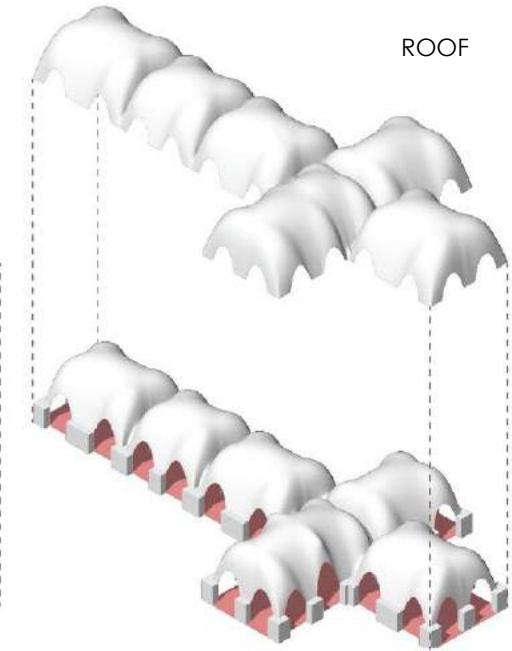
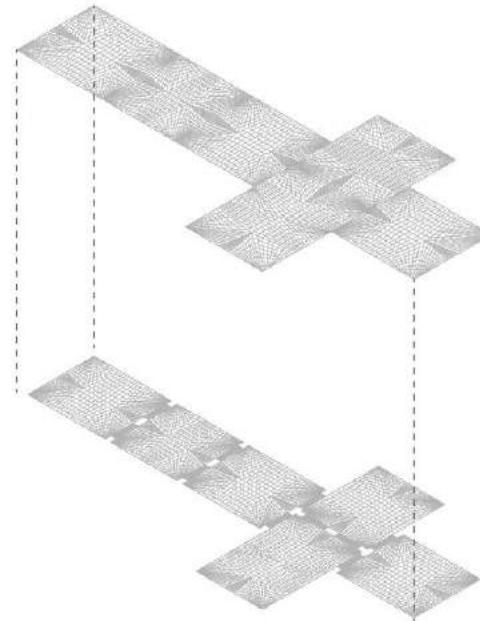
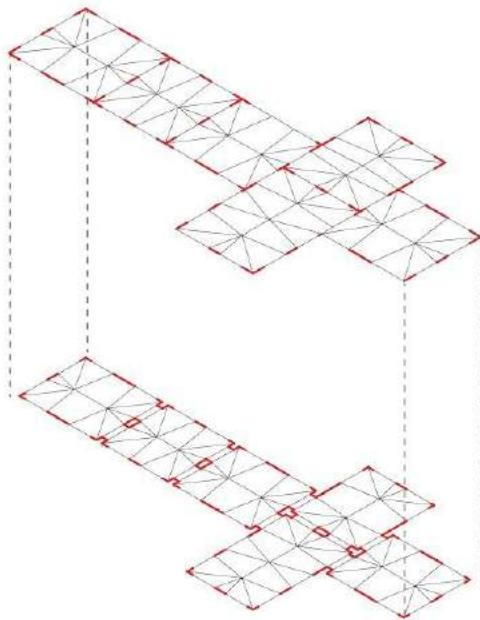
FORMING



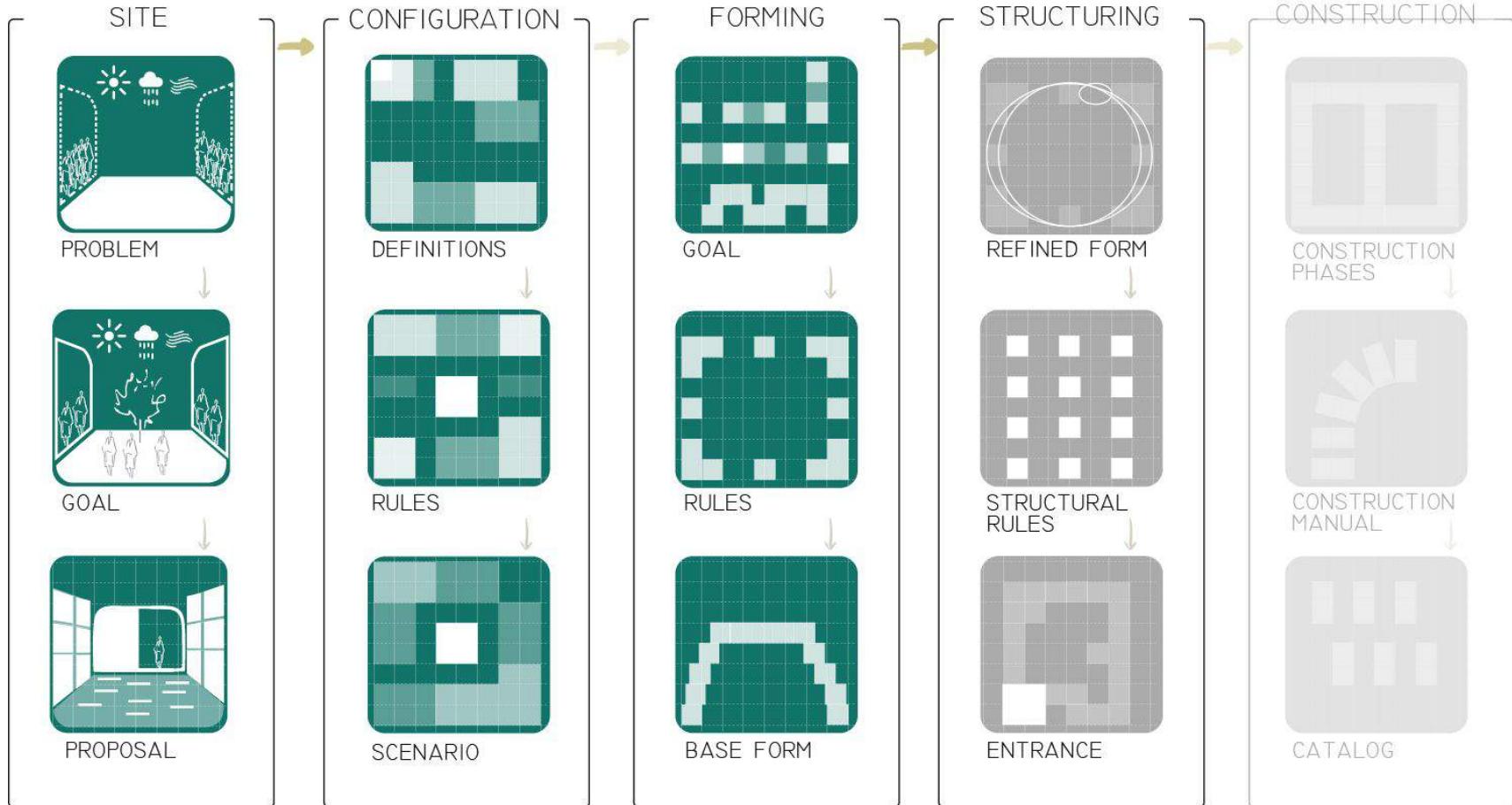
FORMING



FORMING



ROOF



STRUCTURING



RESULTS FROM THE BRICK WORKSHOP REPORT

SPECIMEN TYPE	AREA(MM2)	AVG. MAXIMUM FORCE (N)	AVG. MAXIMUM DEFORMATION (MM)	YOUNG'S MODULUS(E) (N/MM2)	COMPRESSIVE STRENGTH (N/MM2)
LARGE ADOBE	17325	11341.382	7.366	35.01	0.65
SMALL ADOBE	8800	5832.17	12.48	54.02	6.63
WOOD CHIP	12150	31682.28	11.66	33.37	2.61
STRAW	12150	44592.73	13.63	36.44	3.67
COTTON	8800	65597.79	9.98	81.94	7.43
PLASTIC MESH	8800	43408.75	9.98	54.41	4.93
SPONGE	8800	18955.03	9.96	23.8	2.15

LITERATURE STUDY

COMPRESSIVE STRENGTH (N/mm²) SOURCE

0.5 - 8 (ILLAMPAS R., IOANNOU I., & CHARMPIS D., 2011)
2.88 (AVG) (GUBASHEVA S., 2017)

YOUNG MODULUS (N/mm²)

98 - 211 (GUBASHEVA S., 2017)
117.3 - 138.3 (MARTINS, T.(2006))

SAFETY FACTOR

2.5

FOR COMPRESSIVE STRENGTH OF (MIN)
0.34 N/mm²

(OSKOUEI, A.V., AFZALI, M., & MADABIPOUR, M., 2017)

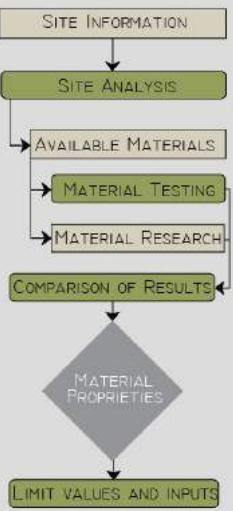
CHOSN SAFETY FACTOR 1.5

REASONS:

- MIN. COMPRESSIVE STRENGTH 2 N/mm²
- ABSENCE OF 1ST FLOOR
- NO EXTERNAL SNOW LOAD

YOUNG MODULUS (N/mm ²)	150
COMPRESSIVE STRENGTH LIMIT (N/mm ²)	2
SAFETY FACTOR	1.5
ALLOWABLE COMPRESSIVE STRENGTH (N/mm ²)	1.3
ALLOWABLE TENSILE STRENGTH (N/mm ²)	0.13

STRUCTURING



LIMIT VALUES

YOUNG MODULUS (N/MM ²)	150
COMPRESSIVE STRENGTH LIMIT (N/MM ²)	2
SAFETY FACTOR	1.5
ALLOWABLE COMPRESSIVE STRENGTH (N/MM ²)	1.3
ALLOWABLE TENSILE STRENGTH (N/MM ²)	0.13

KARAMBA INPUTS

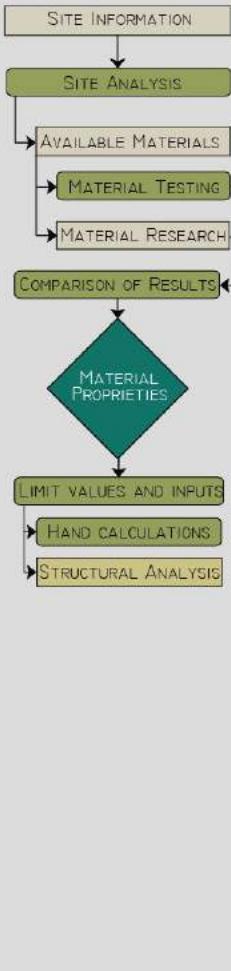
YOUNG MODULUS (N/MM ²)	150
YIELD STRENGTH (N/MM ²) [1]	0.5
SHEAR MODULUS (N/MM ²) [2]	60
SPECIFIC WEIGHT* (KN/M ³) [3]	15

STRUCTURAL ANALYSIS

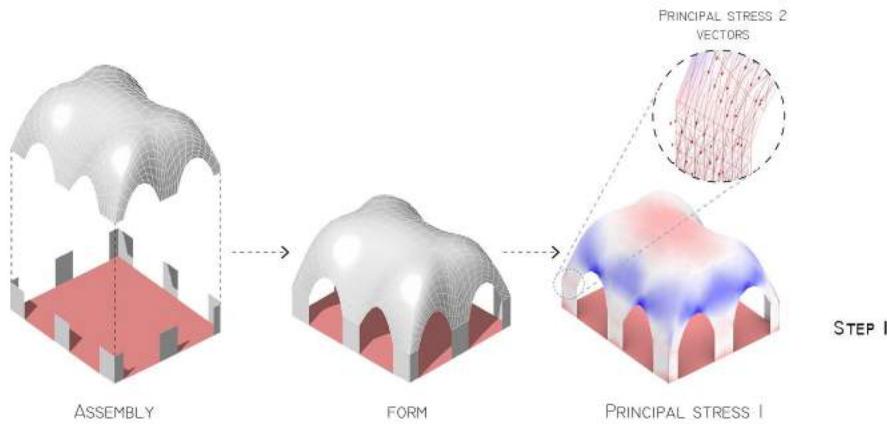
KARAMBA RESULTS

HAND CALCULATIONS

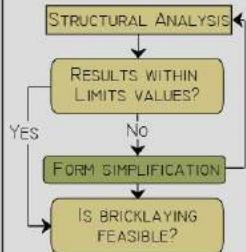
STRUCTURING



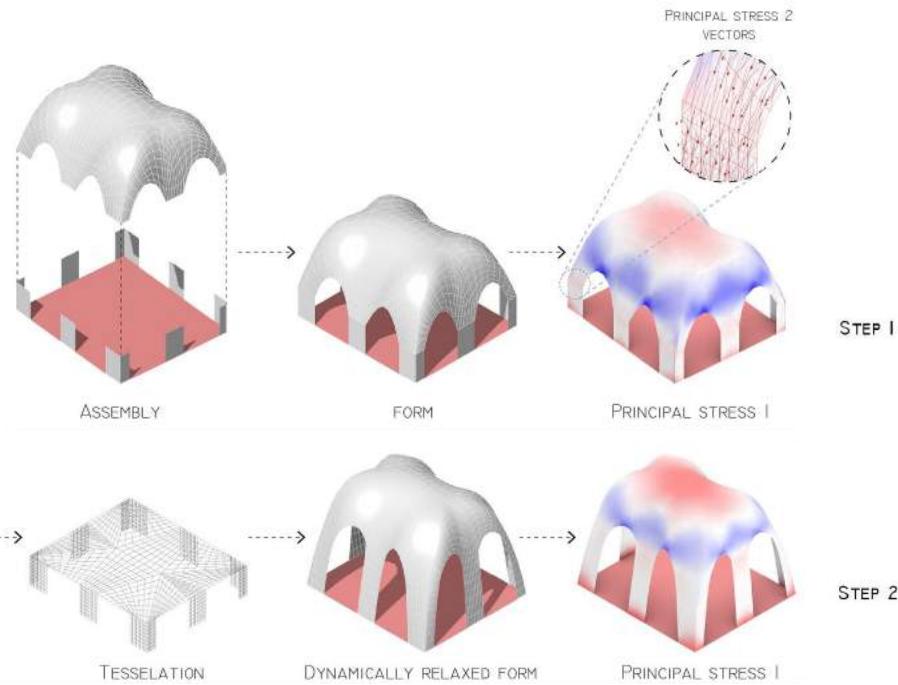
	DEFLECTION (CM)	MAX. COMPRESSIVE STRESS (N/MM ²)	MAX. TENSILE STRESS (N/MM ²)
STEP I	0.25	0.077	0.093



STRUCTURING



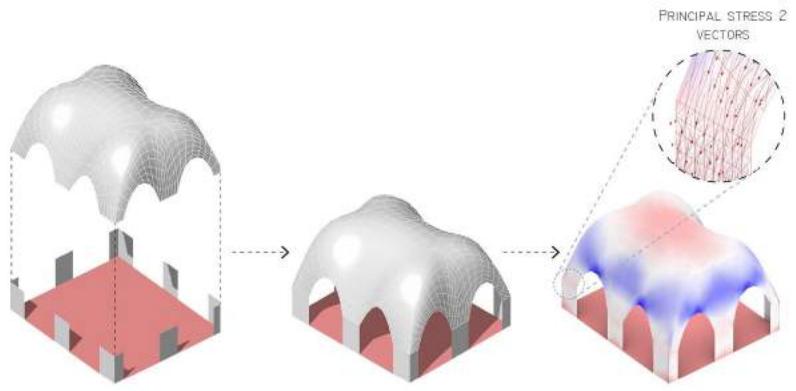
	DEFLECTION (cm)	MAX. COMPRESSIVE STRESS (N/MM ²)	MAX. TENSILE STRESS (N/MM ²)
STEP 1	0.25	0.077	0.093
STEP 2	0.22	0.039	0.033



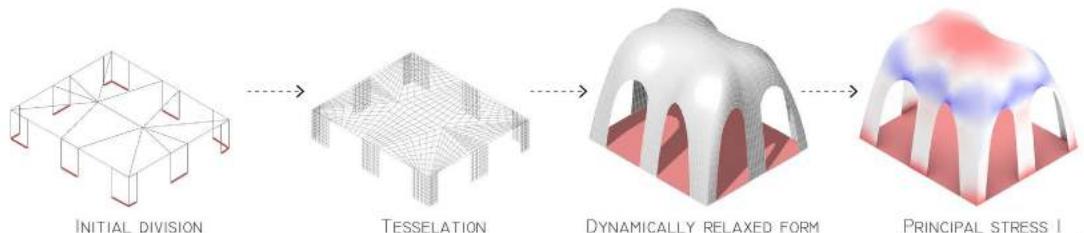


SIMPLIFICATION OF FORM

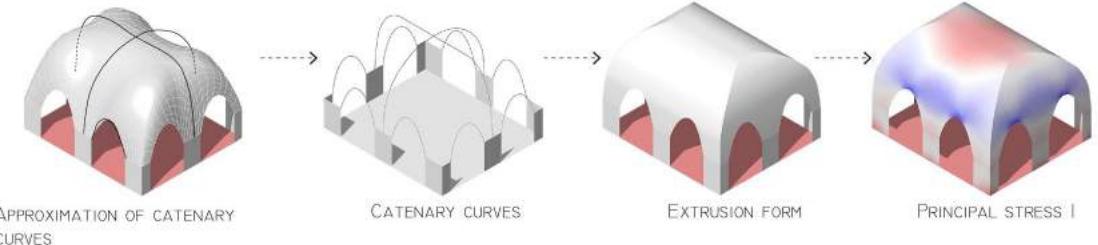
	DEFLECTION (cm)	MAX. COMPRESSIVE STRESS (N/MM ²)	MAX. TENSILE STRESS (N/MM ²)
STEP 1	0.25	0.077	0.093
STEP 2	0.22	0.039	0.033
STEP 3	0.32	0.075	0.084



STEP 1

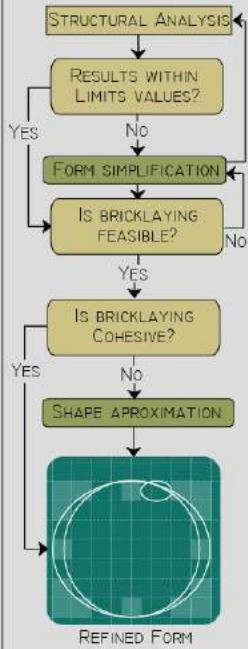


STEP 2

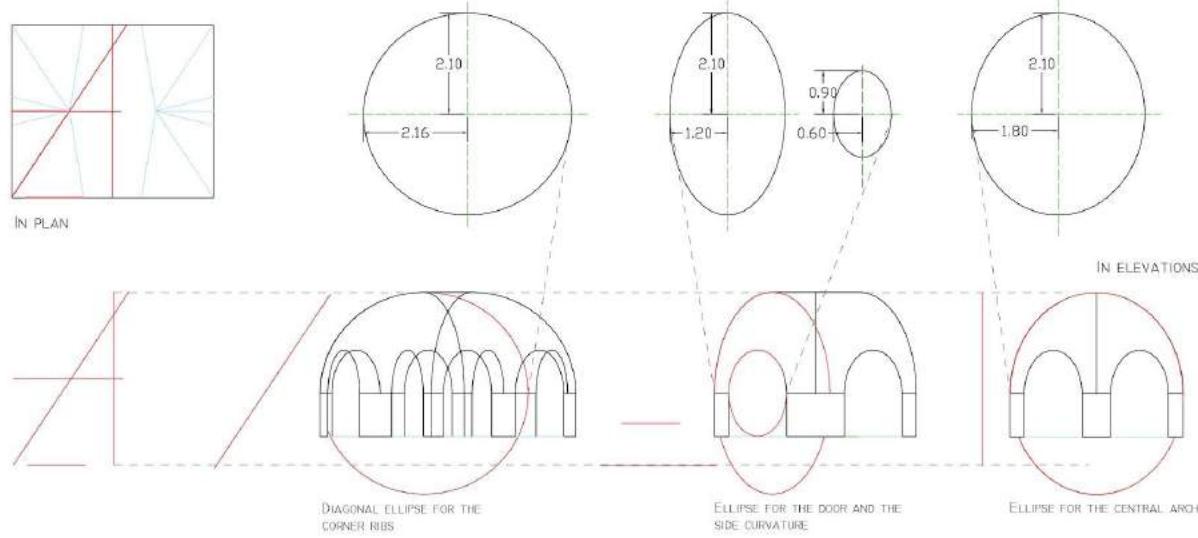


STEP 3

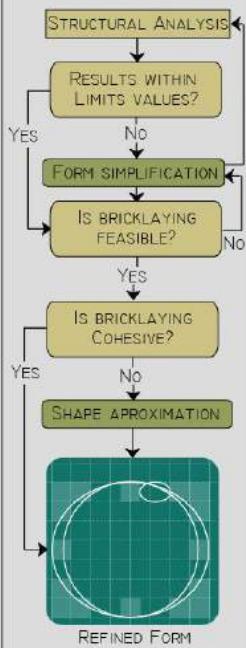
STRUCTURING



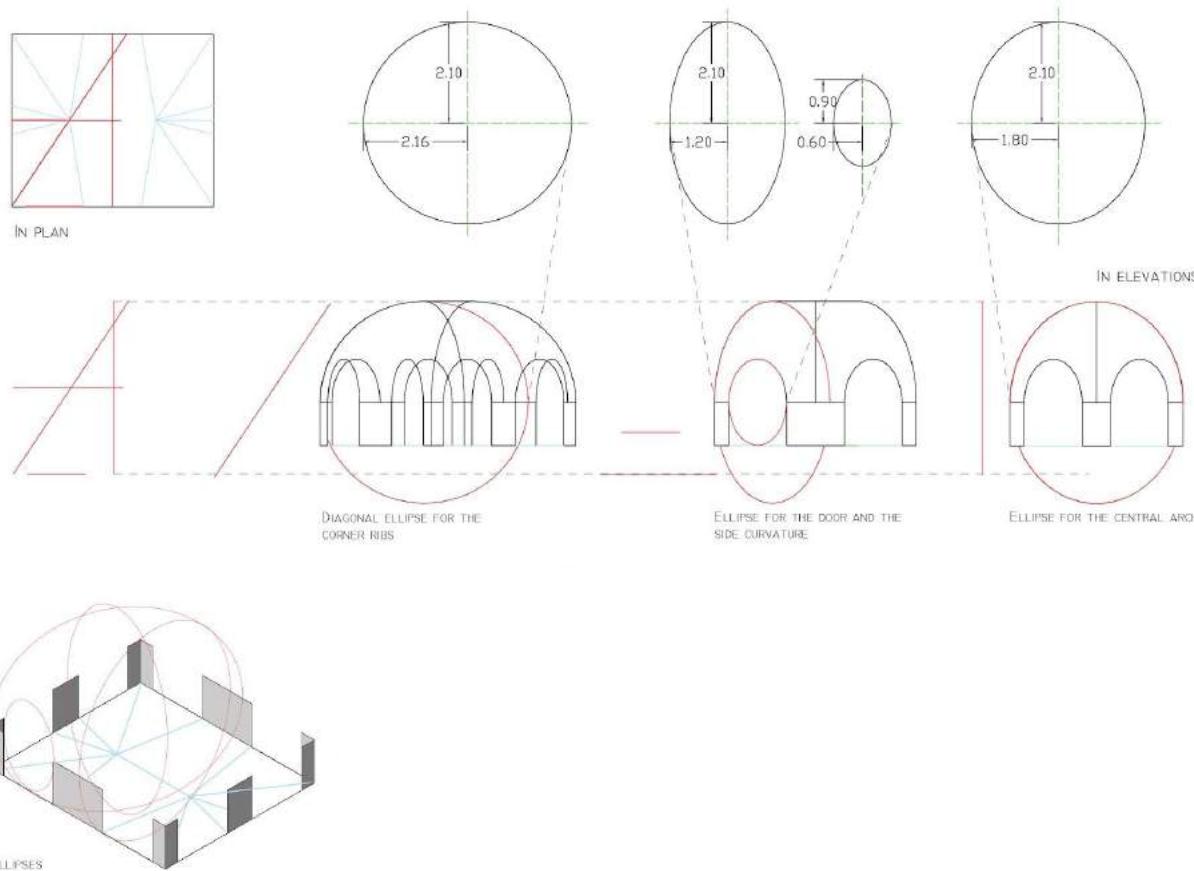
TRANSLATION OF FORM INTO ELLIPSE



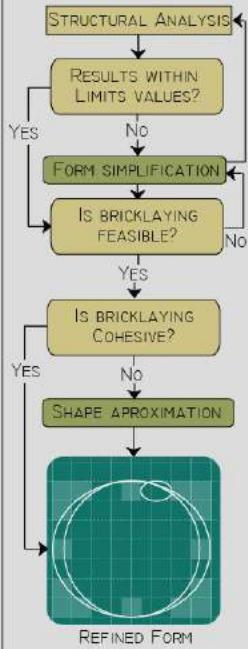
STRUCTURING



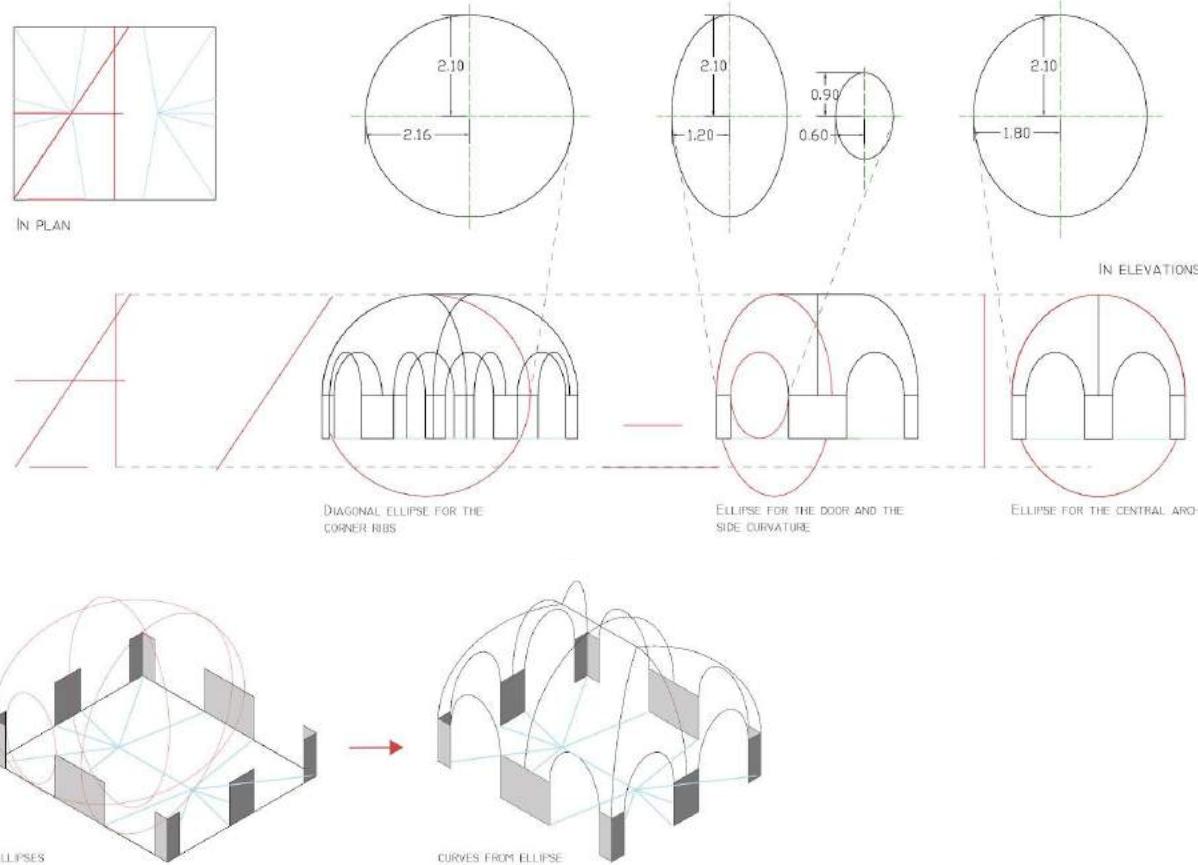
TRANSLATION OF FORM INTO ELLIPSE



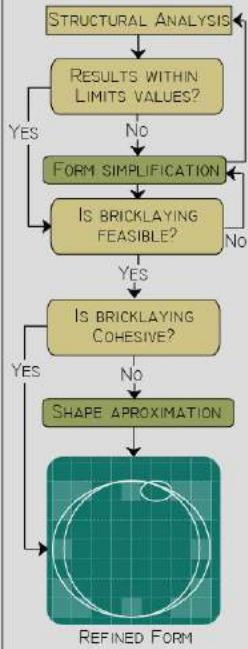
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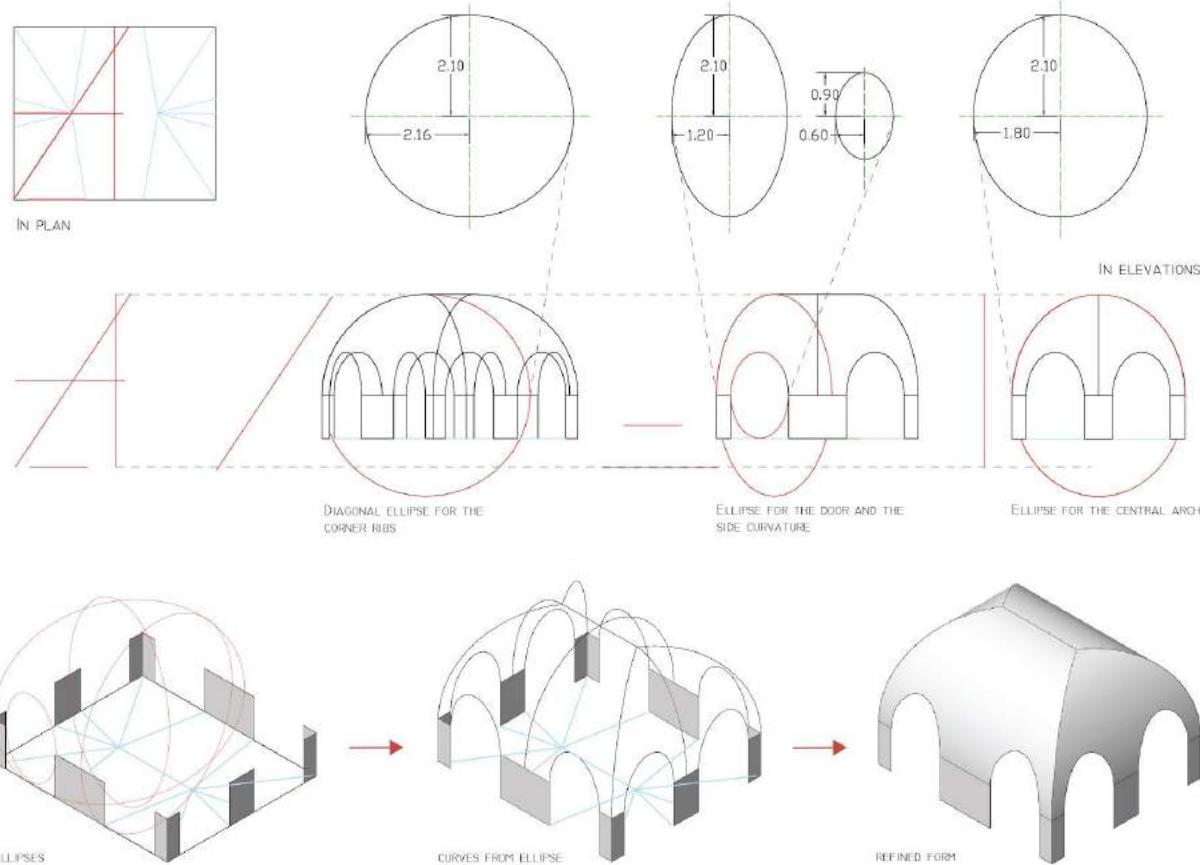
TRANSLATION OF FORM INTO ELLIPSE



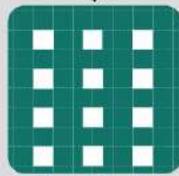
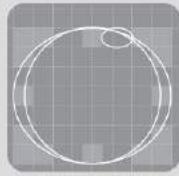
STRUCTURING



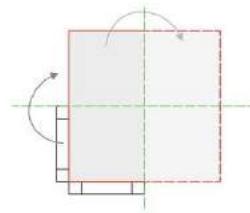
TRANSLATION OF FORM INTO ELLIPSE



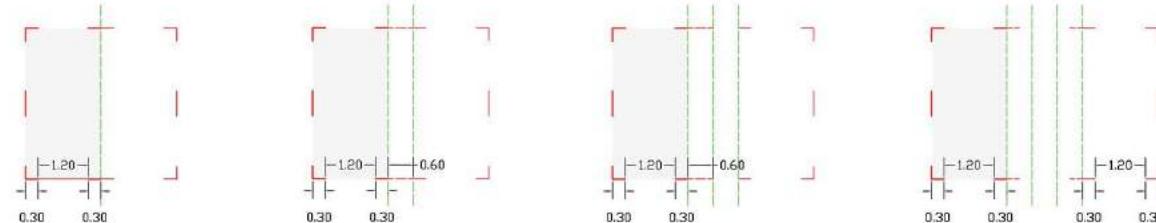
STRUCTURING



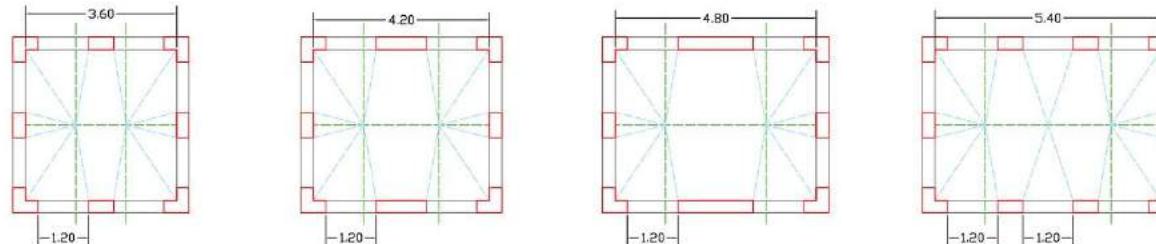
STRUCTURAL RULES
ACCORDING TO FORMING



- 0.3 PIXEL SIZE
- 0.6 MODULE SIZE
- 3 MODULES OF $0.6 = 1.8$
- WALL 2 PIXELS + OPENING 1.2 = 1.8



ROOM GENERATION SYSTEM

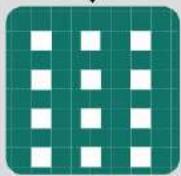


OPENING PROPORTIONS

STRUCTURING

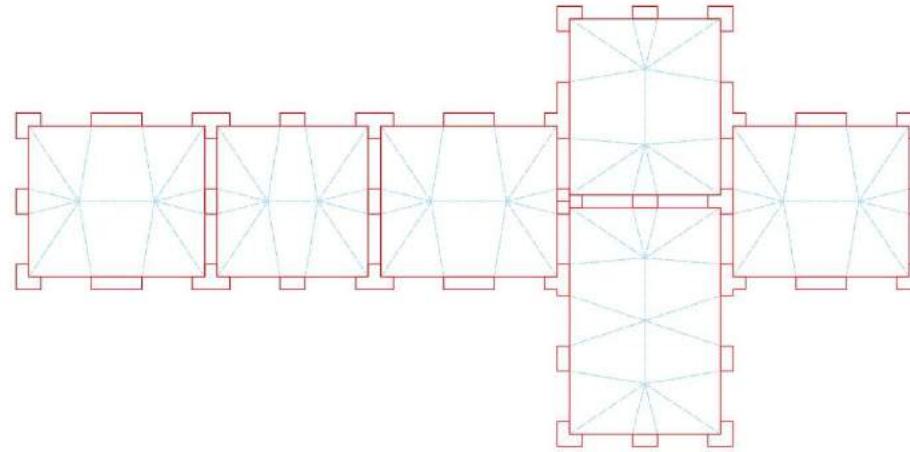


REFINED FORM



STRUCTURAL RULES
ACCORDING TO FORMING

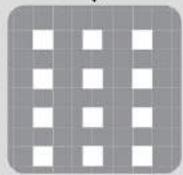
UNIT
ARRANGEMENT



STRUCTURING



REFINED FORM

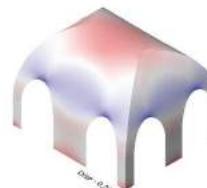


STRUCTURAL RULES
ACCORDING TO FORMING

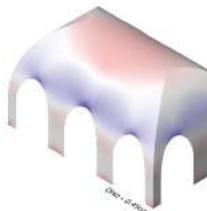
STRUCTURAL ANALYSIS



3.6 X 3.6 ROOM



3.6 X 4.2 ROOM



3.6 X 5.4 ROOM

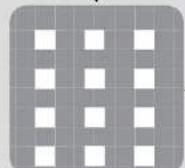
STRUCTURAL ANALYSIS OF THE FINAL FORM

ROOM TYPE (M)	DEFLECTION (CM)	MAX. COMPRESSIVE STRESS (N/MM ²)	MAX. TENSILE STRESS (N/MM ²)
3.6x3.6	0.25	0.063	0.103
3.6x4.2	0.28	0.058	0.106
3.6x5.4			
STEP 1	0.45	0.087	0.129

STRUCTURING



REFINED FORM



STRUCTURAL RULES
ACCORDING TO FORMING

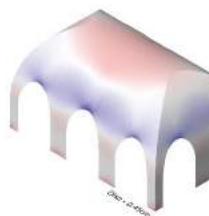
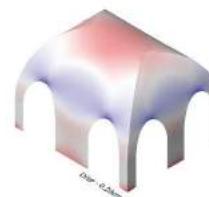
STRUCTURAL ANALYSIS

RESULTS WITHIN
LIMITS VALUES?

NO

YES

SET STRUCTURE



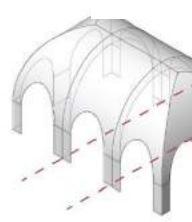
3.6 X 3.6 ROOM



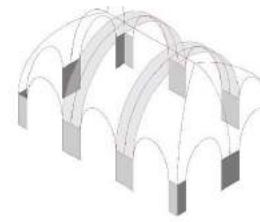
3.6 X 4.2 ROOM



3.6 X 5.4 ROOM



BEAMS



ARCHES

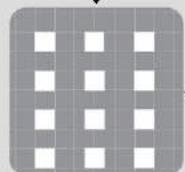
STRUCTURAL ANALYSIS OF THE FINAL FORM

ROOM TYPE (M)	DEFLECTION (CM)	MAX. COMPRESSIVE STRESS (N/MM ²)	MAX. TENSILE STRESS (N/MM ²)
3.6x3.6	0.25	0.063	0.103
3.6x4.2	0.28	0.058	0.106
3.6x5.4			
STEP 1	0.45	0.087	0.129
STEP 2	0.3	0.156	0.112

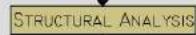
STRUCTURING



REFINED FORM



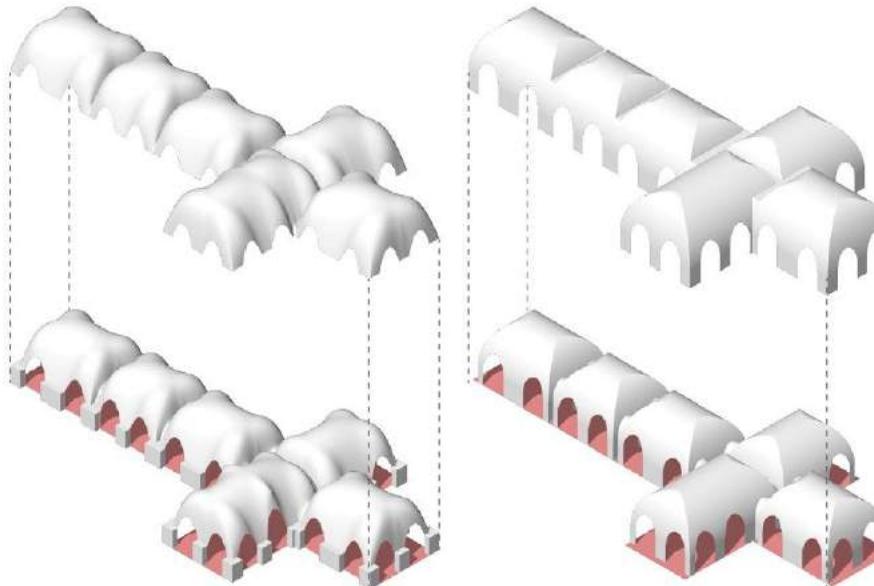
STRUCTURAL RULES
ACCORDING TO FORMING



RESULTS WITHIN
LIMITS VALUES?

No

YES

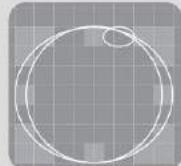


DYNAMIC RELAXATION OF
ROOF AND CEILING SURFACE

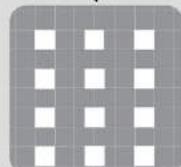
SIMPLIFIED SURFACE FOR
ROOF AND CEILING

STEP 1

STRUCTURING



REFINED FORM



STRUCTURAL RULES
ACCORDING TO FORMING

STRUCTURAL ANALYSIS

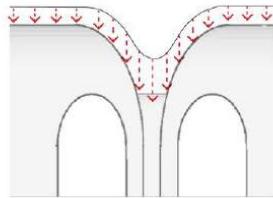
RESULTS WITHIN
LIMITS VALUES?

No

YES

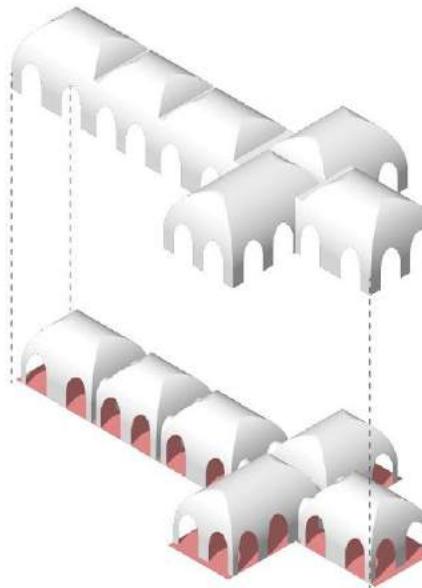
SET STRUCTURE

VALIDATION OF UNIT



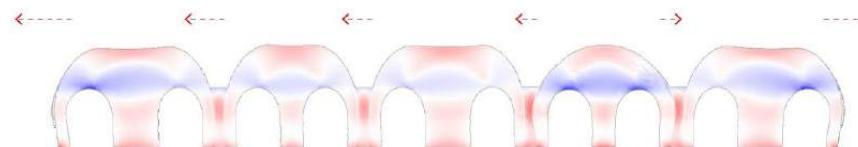
NON-UNIFORM LOAD DISTRIBUTION

	DEFLECTION (CM)	MAX. COMPRESSIVE STRESS (N/MM ²)	MAX. TENSILE STRESS (N/MM ²)
STEP 1	0.33	0.068	0.14



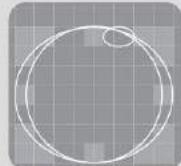
SIMPLIFIED SURFACE FOR
ROOF AND CEILING

STEP 1

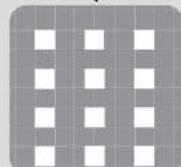


DEFORMATION OF CEILING SURFACE

STRUCTURING



REFINED FORM



STRUCTURAL RULES
ACCORDING TO FORMING

STRUCTURAL ANALYSIS

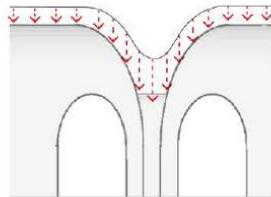
RESULTS WITHIN
LIMITS VALUES?

NO

YES

SET STRUCTURE

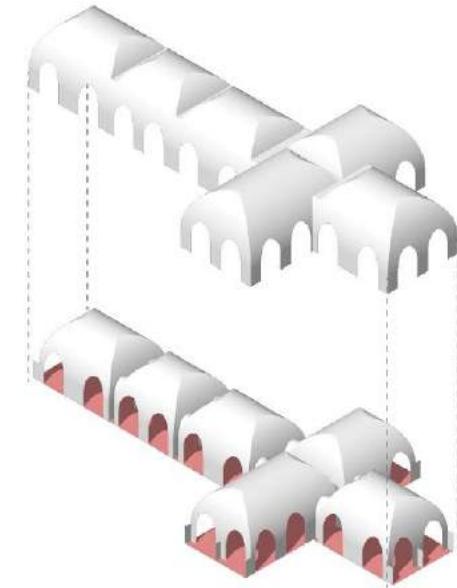
VALIDATION OF UNIT



NON-UNIFORM LOAD DISTRIBUTION

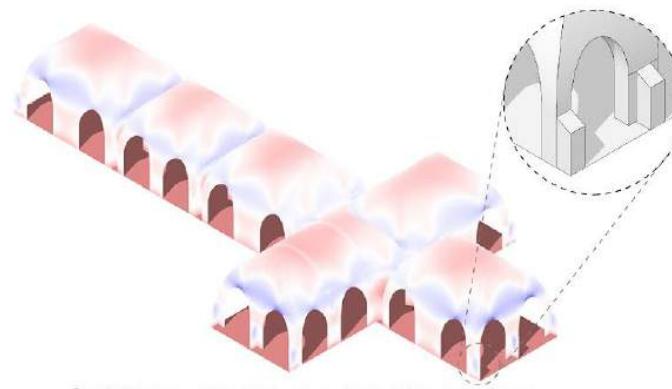
	DEFLECTION (CM)	MAX. COMPRESSIVE STRESS (N/MM ²)	MAX. TENSILE STRESS (N/MM ²)
STEP 1	0.33	0.068	0.14
STEP 2	0.3	0.092	0.112

STRUCTURAL ANALYSIS OF A UNIT



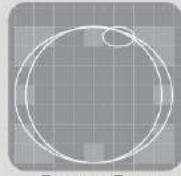
PROPOSING BUTTRESS

STEP 2



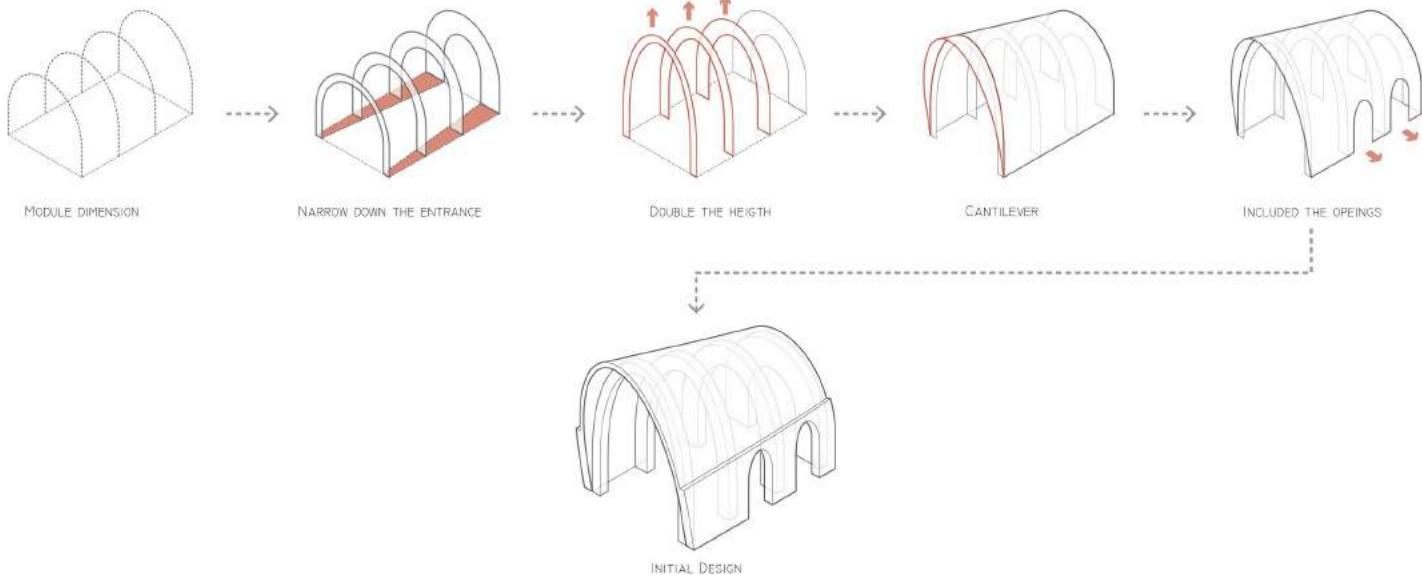
STRUCTURAL ANALYSIS OF A UNIT WITH BUTTRESS

STRUCTURING



REFINED FORM

ENTRANCE FORMING



STRUCTURING

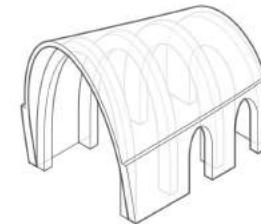


REFINED FORM

ENTRANCE FORMING

STRUCTURAL ANALYSIS

Entrance structural development 1

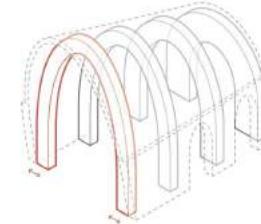


INITIAL STRUCTURE TEST



TOO MUCH TENSION ON THE FIRST RIB

STEP 1

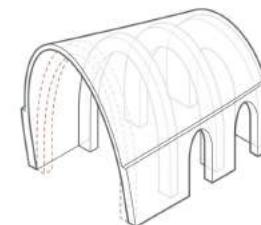


INCREASE FIRST RIB DEPTH TO 45 CM



REDUCED THE INTENDED EFFECT

STEP 2



REMOVED FIRST RIB

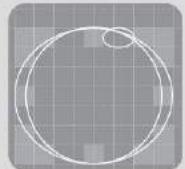


TOO MUCH DEFORMATION

STEP 3

STRUCTURE	DESIGN	FUNCTION
STRUCTURE	DESIGN	FUNCTION
STRUCTURE	DESIGN	FUNCTION

STRUCTURING



REFINED FORM

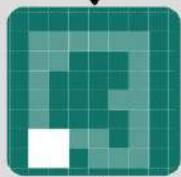
ENTRANCE FORMING

STRUCTURAL ANALYSIS

RESULTS WITHIN LIMITS VALUES?

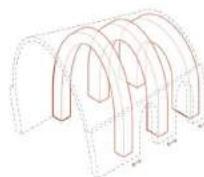
No

YES



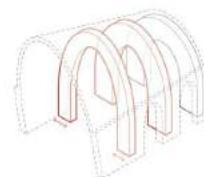
ENTRANCE PROPOSAL

OPTION 1



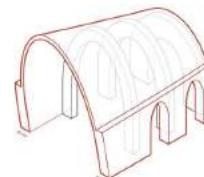
INCREASED RIBS THICKNESS TO 45 CM

OPTION 2



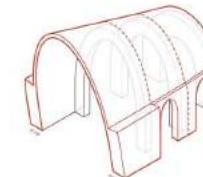
INCREASED RIBS DEPTH BY 30 CM

OPTION 3



INCREASE BASE WALL THICKNESS TO 45 CM

OPTION 4



INCREASED THE THICKNESS OF FIRST PORTION OF BASE WALL TO 60 CM

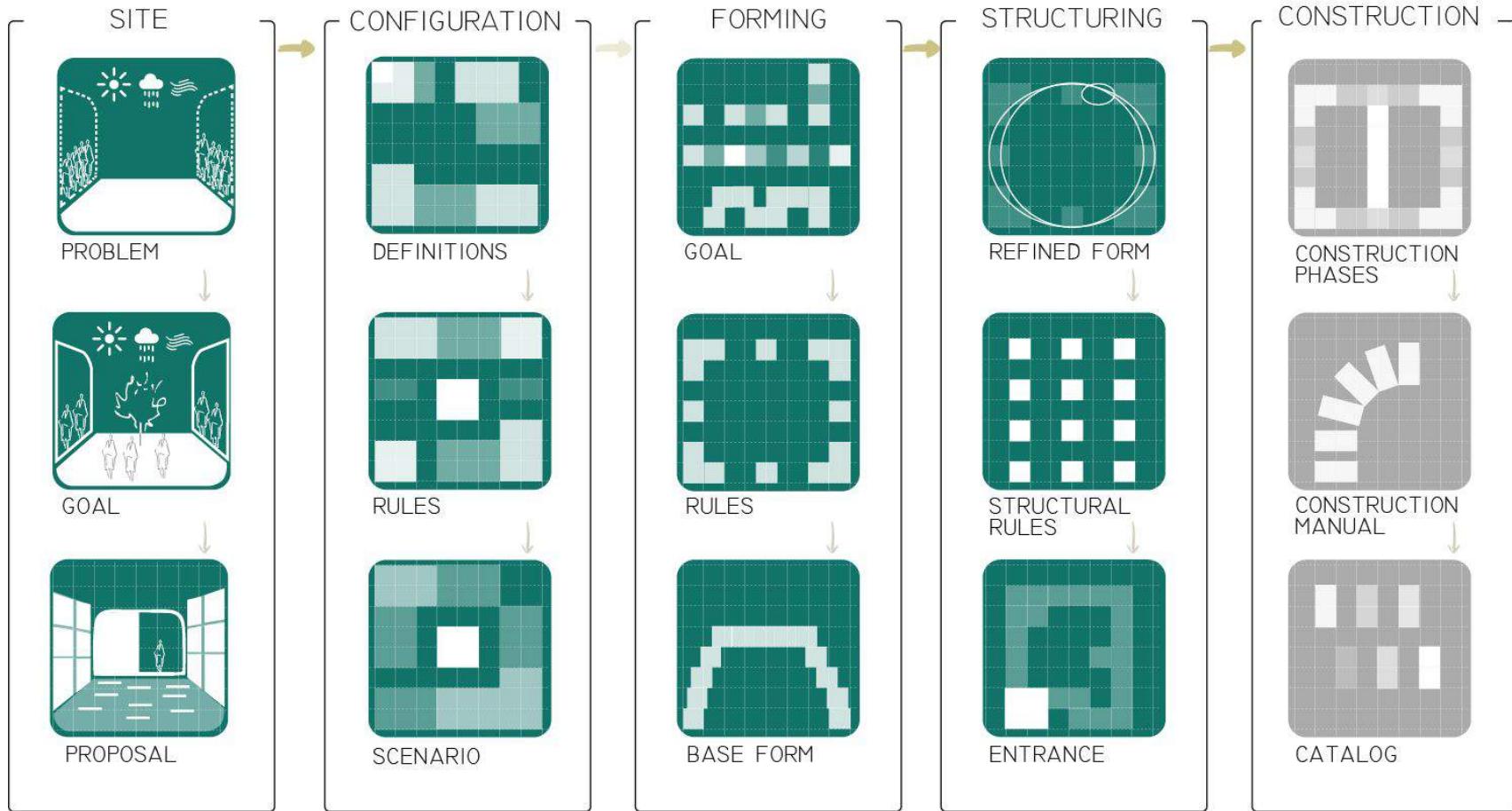
ASSUMING FROM OPT 4



INCREASE THE THICKNESS AS GRADIENT



OPTION 1	OPTION 2	OPTION 3
OPTION 4	OPTION 1	OPTION 4
OPTION 4	OPTION 2	OPTION 3
OPTION 1	OPTION 2	OPTION 3
OPTION 4	OPTION 2	OPTION 3



CONSTRUCTION

OPTIONS
FOR CONSTRUCTION PHASES

- BRICKLAYING PROCESS
- STRUCTURAL ANALYSIS

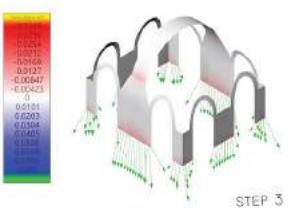
RESULTS WITHIN
LIMITS OF MATERIAL?

YES



CONSTRUCTION
PHASES

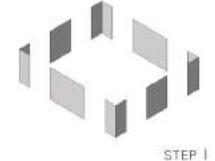
No



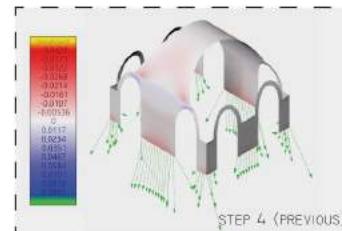
STEP 3



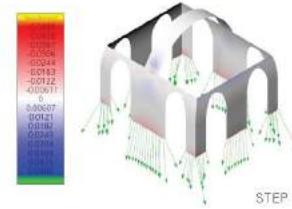
STEP 2



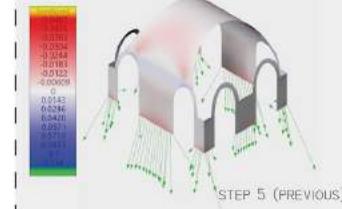
STEP 1



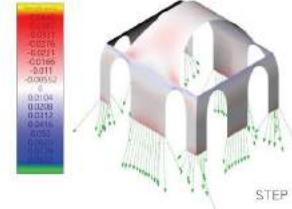
STEP 4 (PREVIOUS)



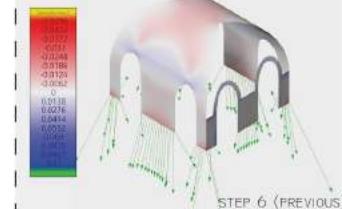
STEP 4



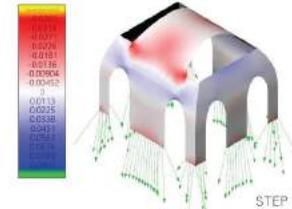
STEP 5 (PREVIOUS)



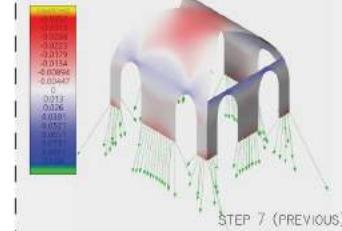
STEP 5



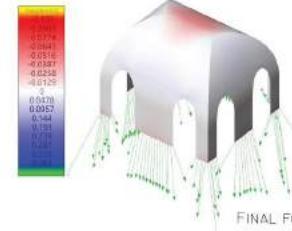
STEP 6 (PREVIOUS)



STEP 6



STEP 7 (PREVIOUS)



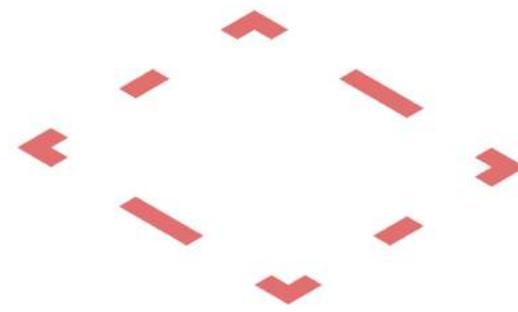
FINAL FORM

STRUCTURAL ANALYSIS
FOR EACH STEP OF CONSTRUCTION

CONSTRUCTION



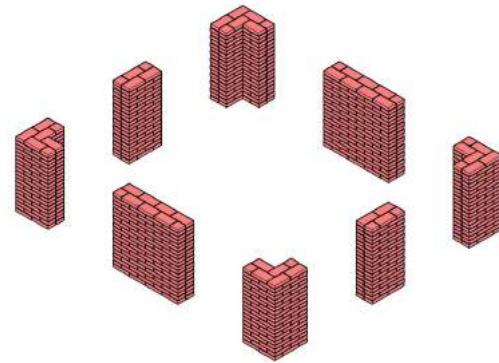
CONSTRUCTION
PHASES



CONSTRUCTION



CONSTRUCTION
PHASES

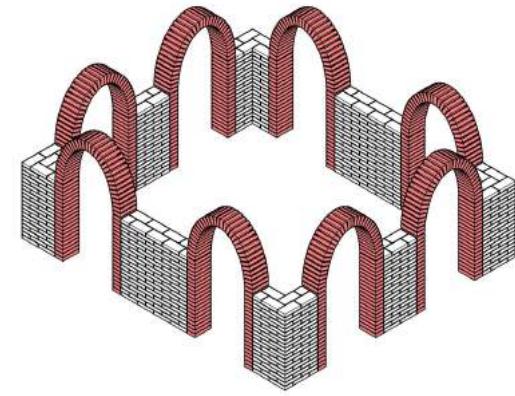


STEP 1: WALL MADE TILL
SILL LEVEL

CONSTRUCTION



CONSTRUCTION
PHASES

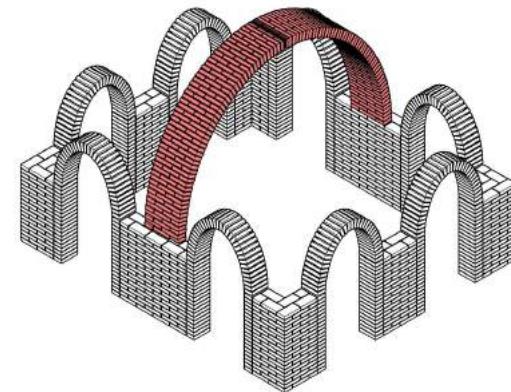
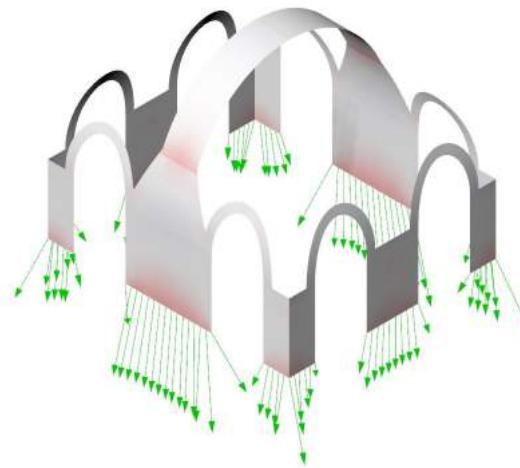
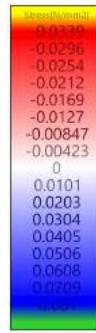


STEP 2: OPENING ARCHES
MADE USING COMPASS

CONSTRUCTION



CONSTRUCTION
PHASES

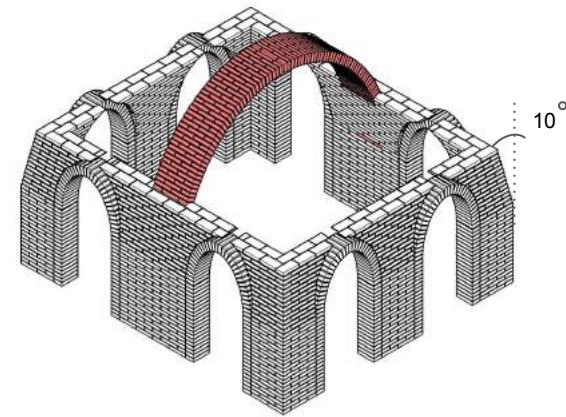
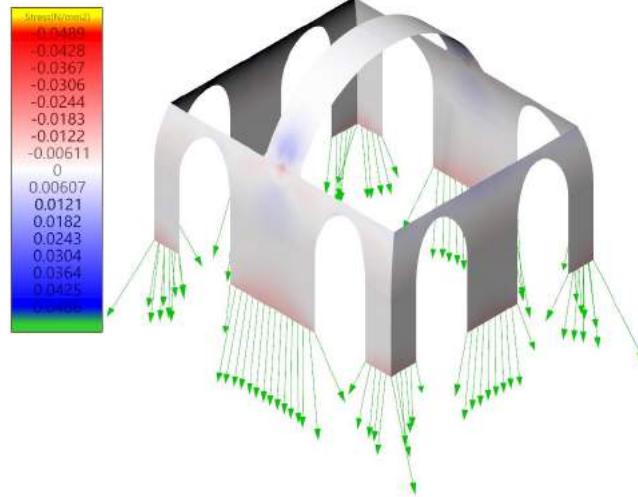


**STEP 3: CENTRAL ARCH
MADE USING COMPASS**

CONSTRUCTION



CONSTRUCTION
PHASES

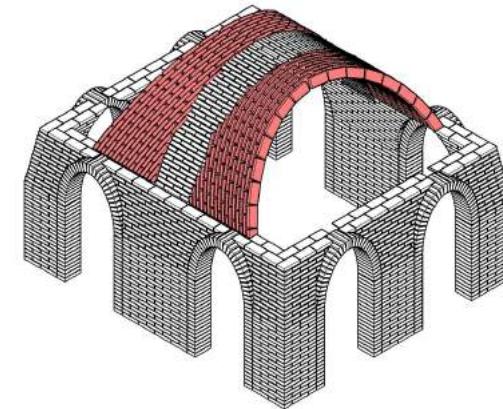
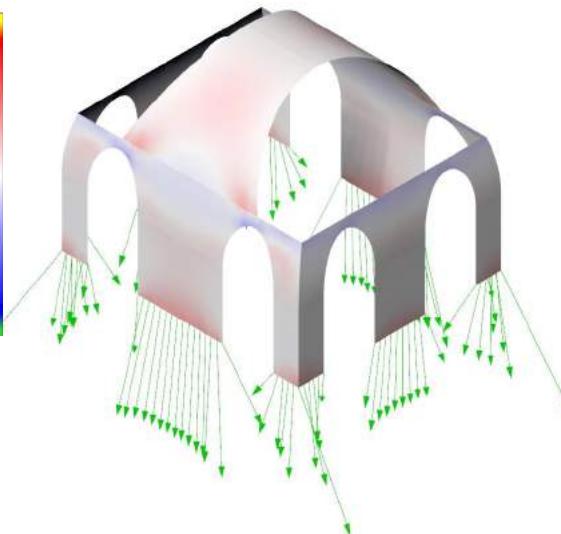
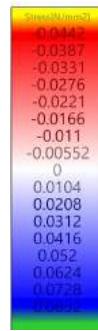


STEP 4: WALL MADE TILL THE TOP OF THE OPENING ARCHES TO PROVIDE THE BINDING STABILITY

CONSTRUCTION



CONSTRUCTION
PHASES

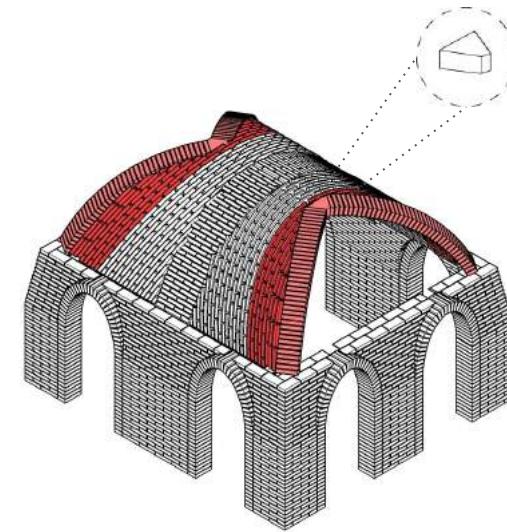
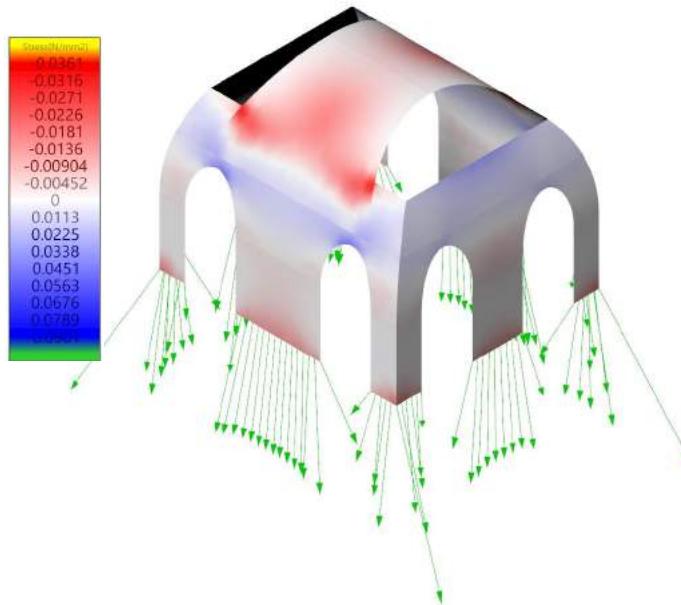


STEP 5: THE VAULT IS MADE BY RECLINING ADOBE
BRICKS AGAINST THE
CENTRAL ARCH WITHOUT
THE USE OF FORMWORK

CONSTRUCTION



CONSTRUCTION
PHASES



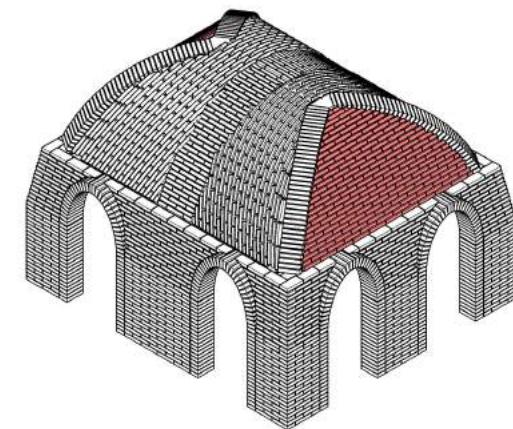
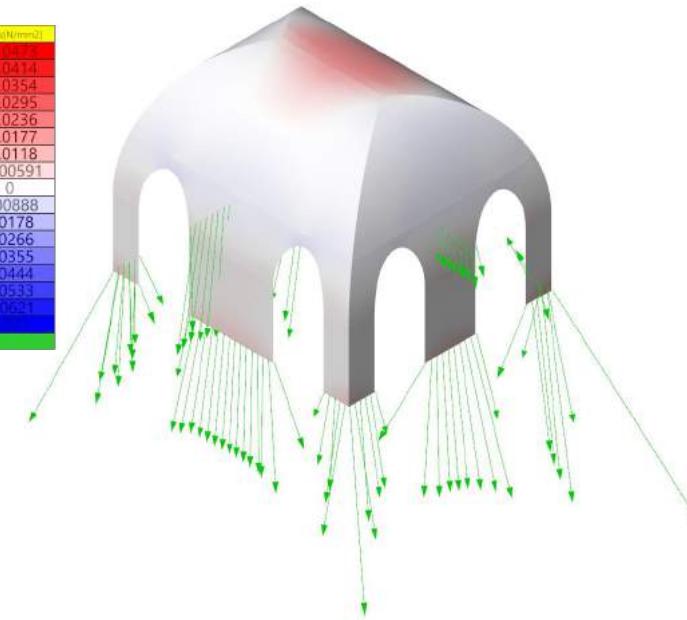
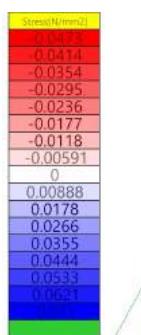
STEP 6: THE CORNER RIB ARCHES ARE MADE WITH COMPASS.

JUNCTION OF THE TWO RIBS ARCHES FROM OPPOSITE SIDES CLOSED WITH A TRIANGULAR BRICK

CONSTRUCTION



CONSTRUCTION
PHASES



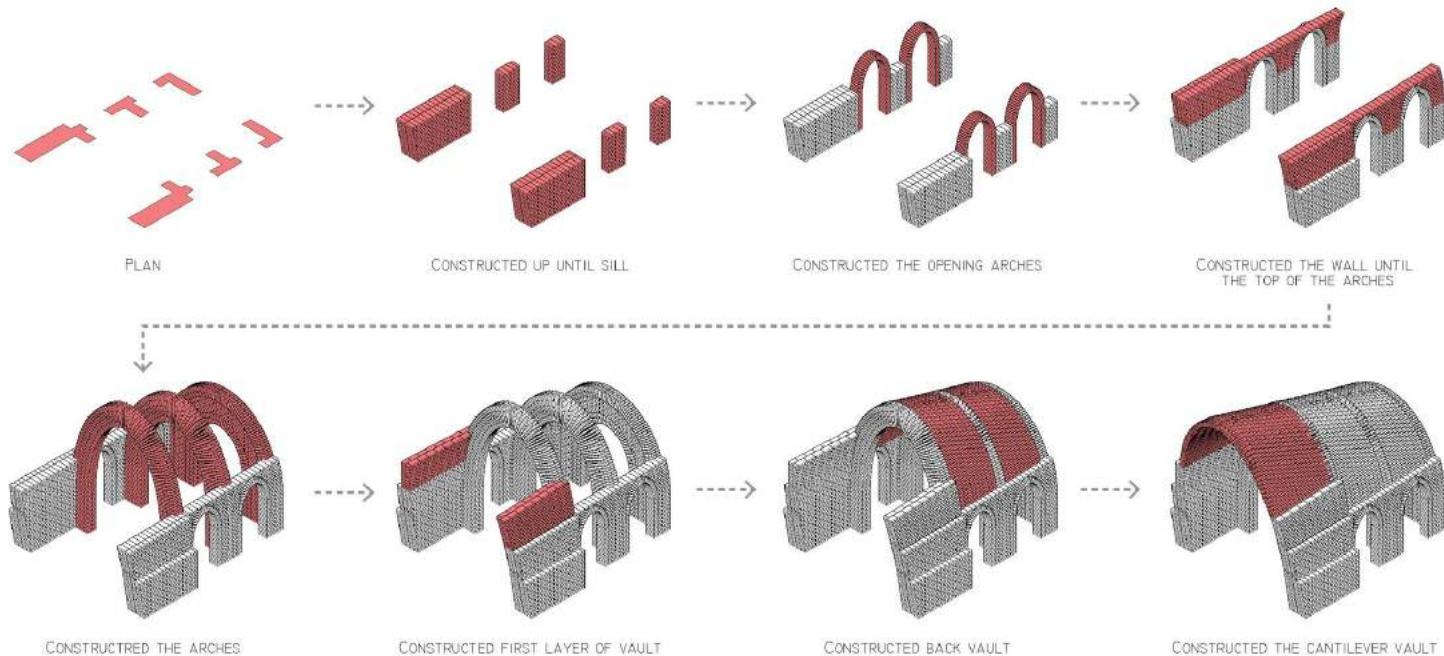
THE REMAINING BRICKS
ARE LAID TO CLOSE OFF
THE VAULT

CONSTRUCTION



CONSTRUCTION PHASES

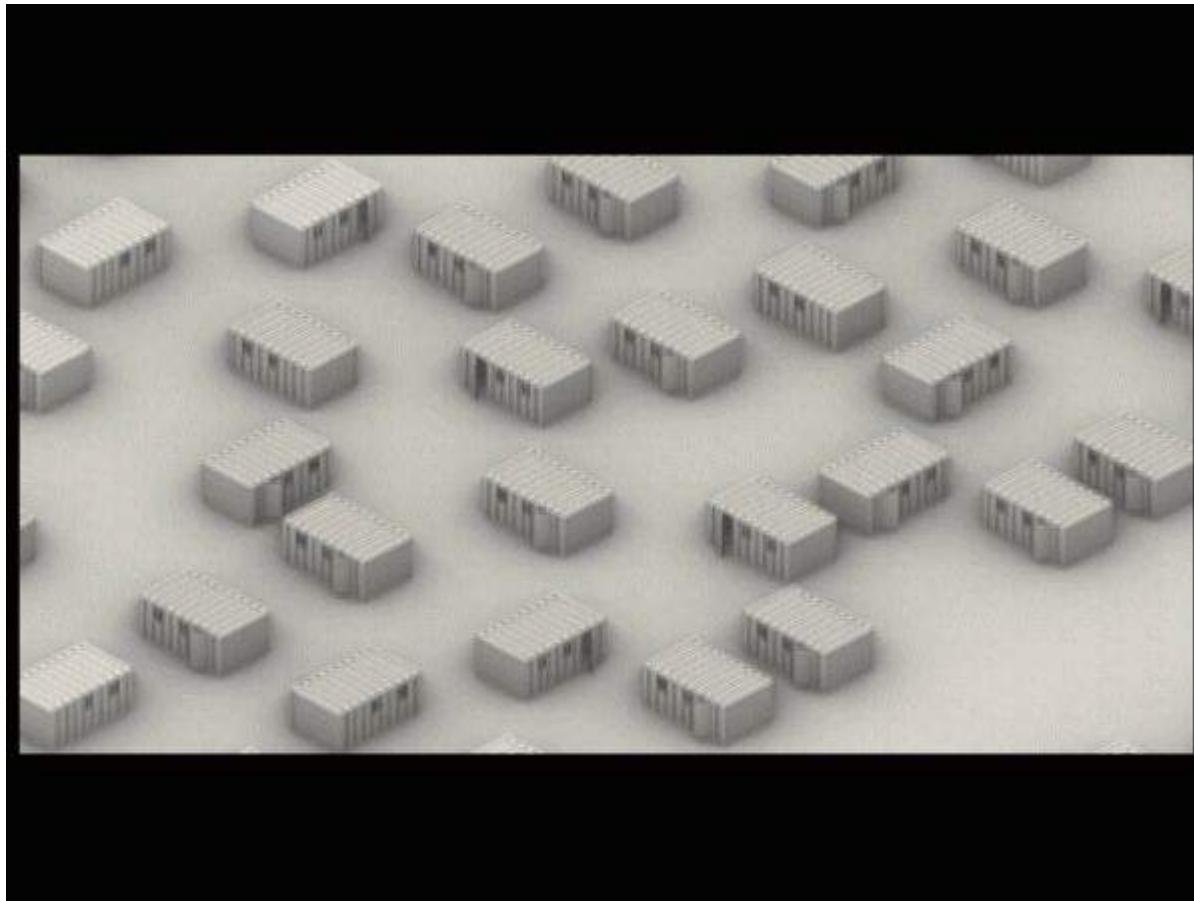
Entrance construction sequence



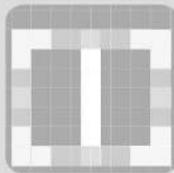
CONSTRUCTION



CONSTRUCTION
PHASES



CONSTRUCTION

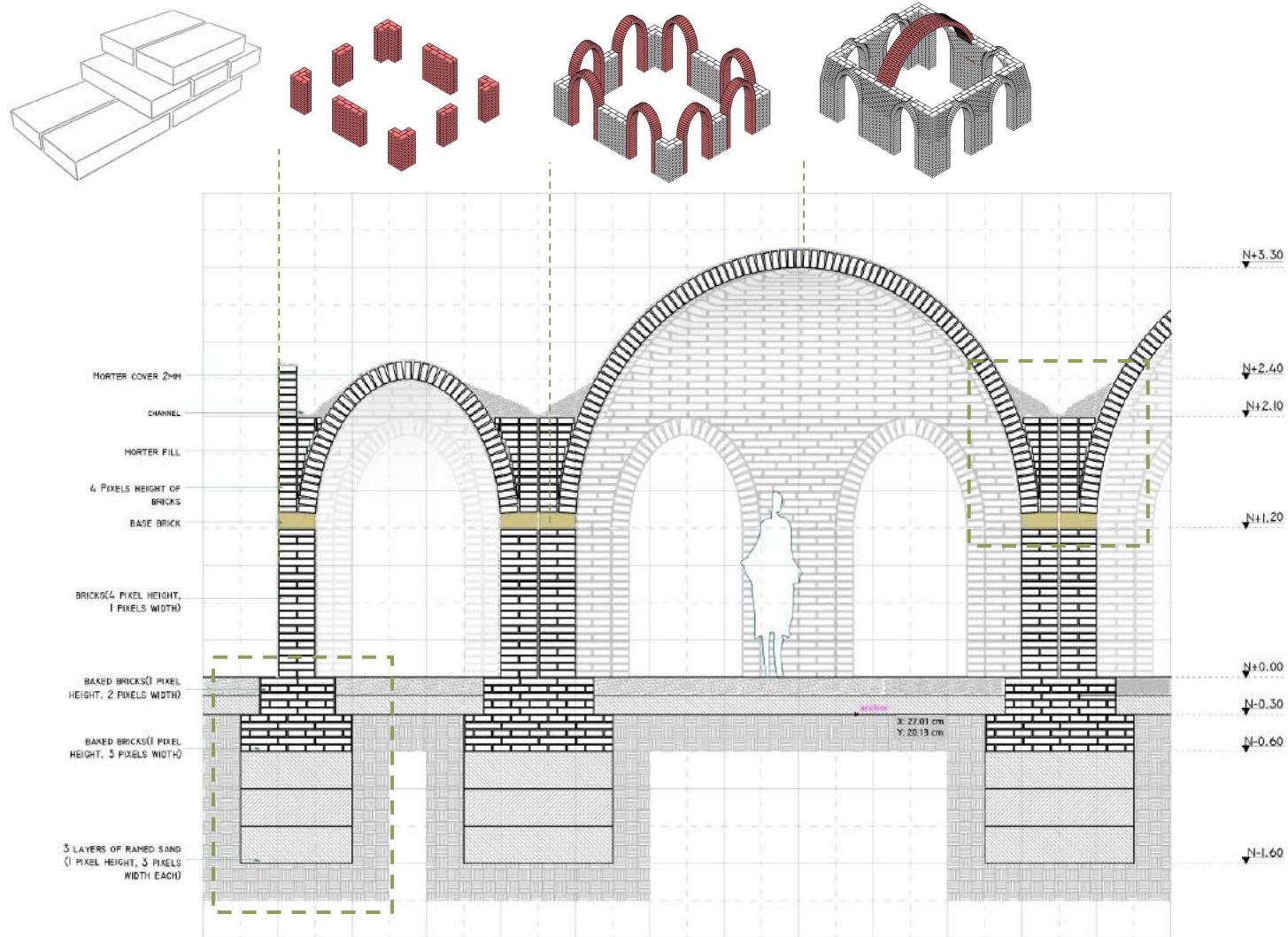


CONSTRUCTION PHASES

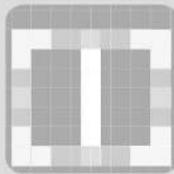
DETAILING JOINTS



CONSTRUCTION MANUAL



CONSTRUCTION

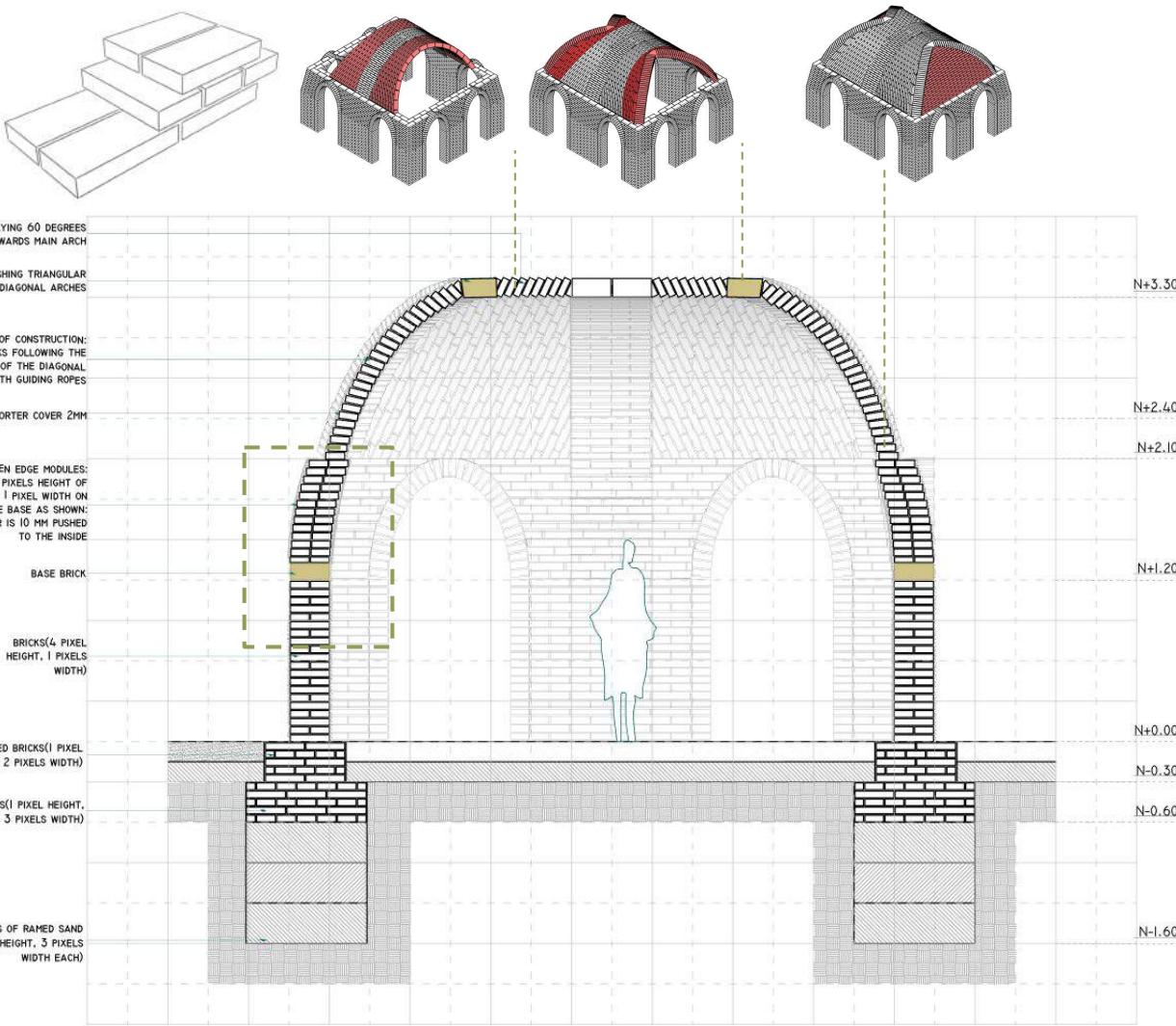


CONSTRUCTION PHASES

DETAILING JOINTS



CONSTRUCTION MANUAL

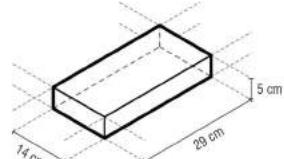
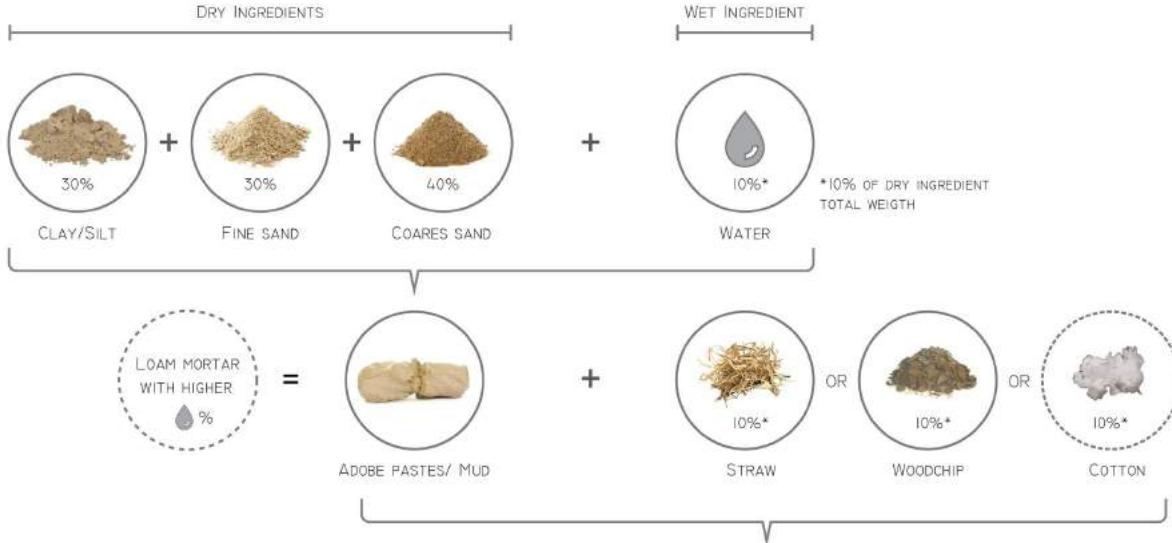


CONSTRUCTION

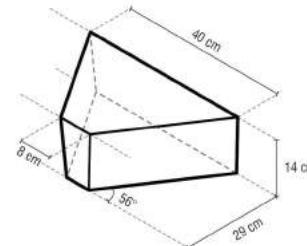


CONSTRUCTION
MANUAL

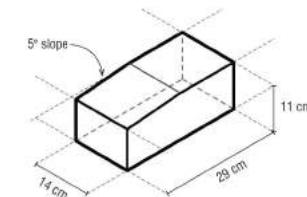
MATERIALS



NORMAL BRICK



TRIANGULAR BRICK



BASE BRICK

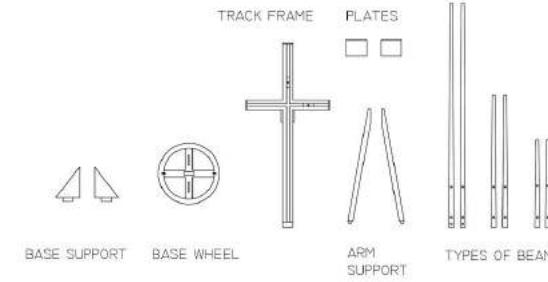
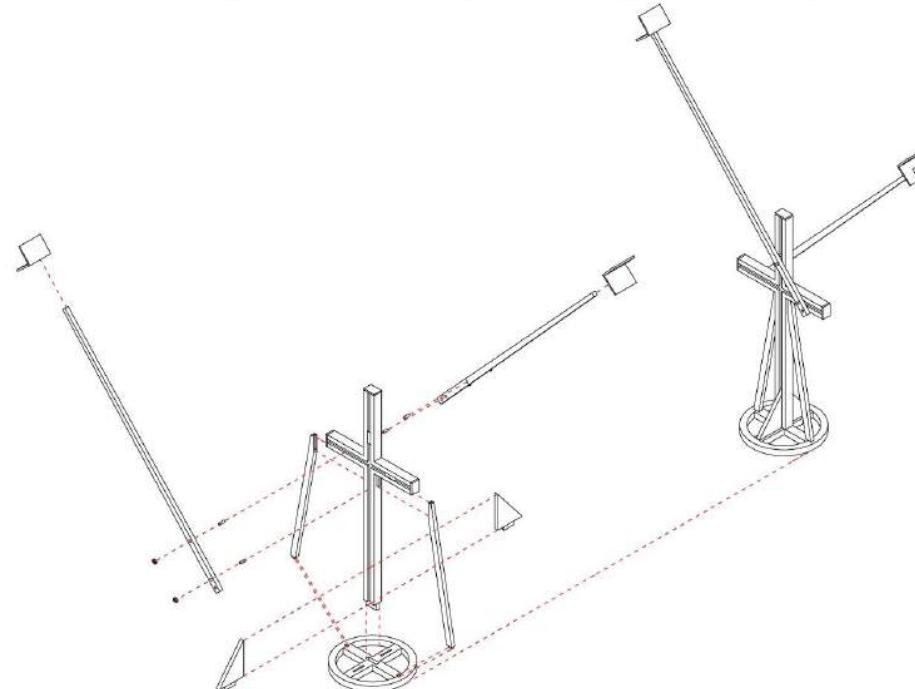
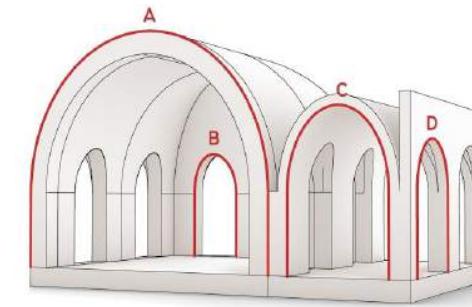
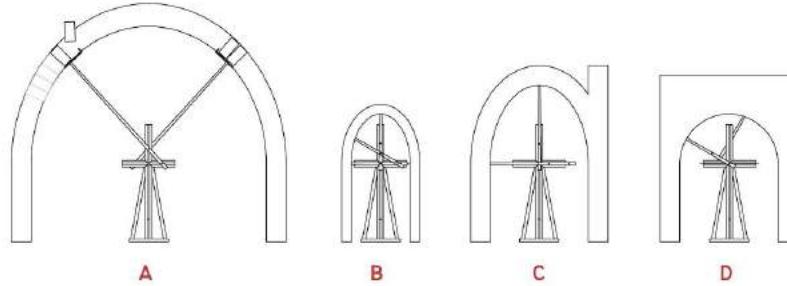
CONSTRUCTION



CONSTRUCTION
MANUAL

MATERIALS

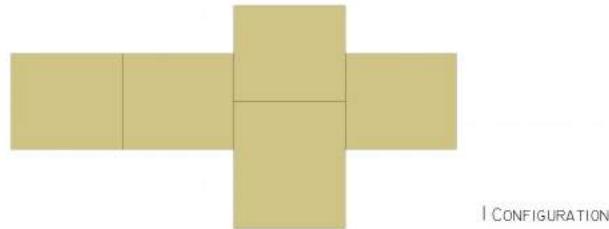
MAIN TOOL



CONSTRUCTION



CONSTRUCTION
MANUAL



CONFIGURATION

MATERIALS

MAIN TOOL

CONSTRUCTION PROCESS

CONSTRUCTION

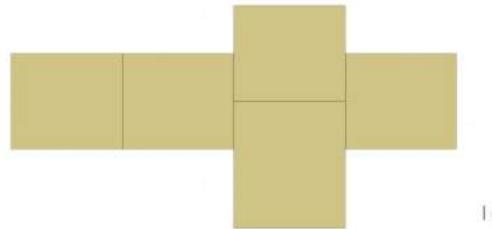


CONSTRUCTION
MANUAL

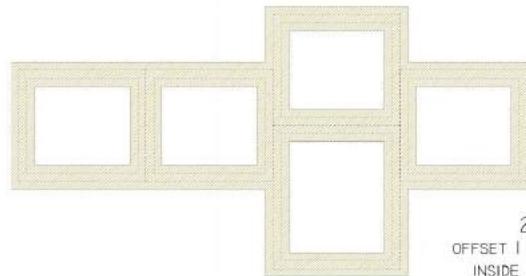
MATERIALS

MAIN TOOL

CONSTRUCTION PROCESS



| CONFIGURATION



2 FOUNDATION
OFFSET 1 PIXEL TO THE
INSIDE AND 2 PIXELS
FOR THE OUTSIDE

CONSTRUCTION

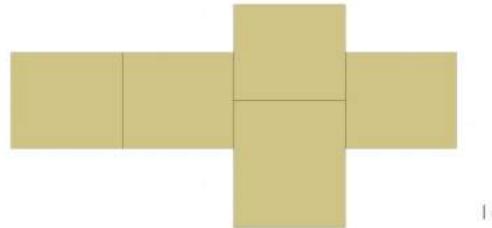


CONSTRUCTION
MANUAL

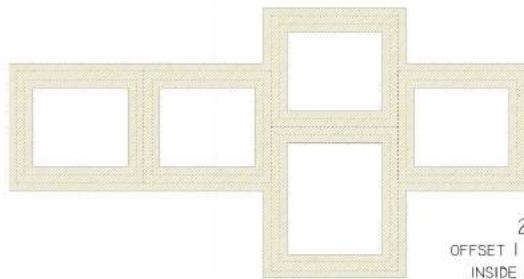
MATERIALS

MAIN TOOL

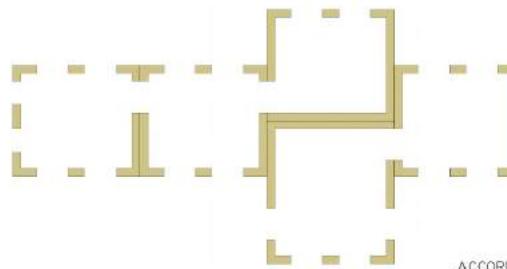
CONSTRUCTION PROCESS



1 CONFIGURATION



2 FOUNDATION
OFFSET 1 PIXEL TO THE
INSIDE AND 2 PIXELS
FOR THE OUTSIDE



3 OPENING
LOCATE THEM
ACCORDING TO DESIGN

CONSTRUCTION

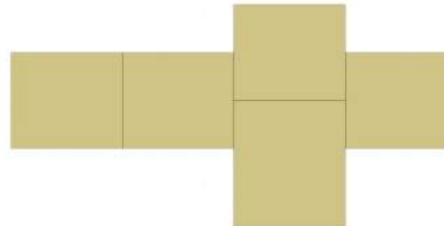


CONSTRUCTION
MANUAL

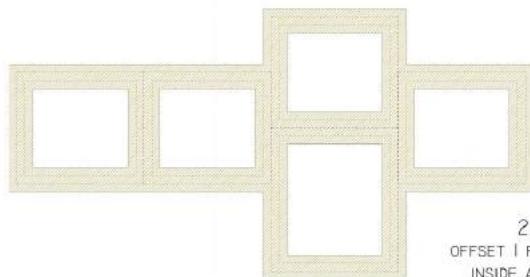
MATERIALS

MAIN TOOL

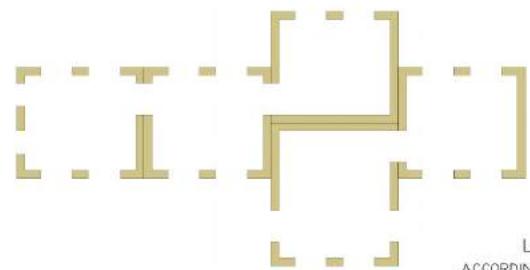
CONSTRUCTION PROCESS



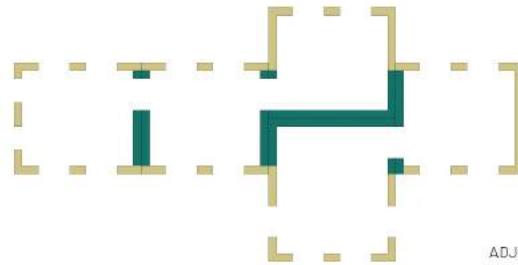
1 CONFIGURATION



2 FOUNDATION
OFFSET 1 PIXEL TO THE
INSIDE AND 2 PIXELS
FOR THE OUTSIDE



3 OPENING
LOCATE THEM
ACCORDING TO DESIGN



4 WALLS
ADJACENT WALLS,
EDGE WALLS

CONSTRUCTION

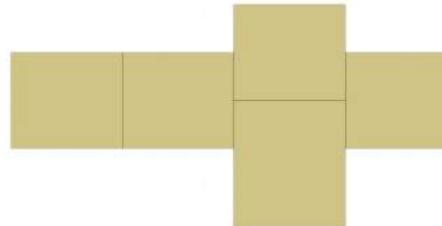


CONSTRUCTION
MANUAL

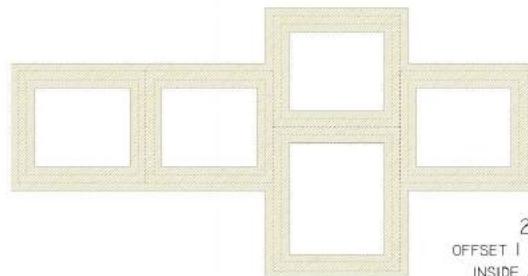
MATERIALS

MAIN TOOL

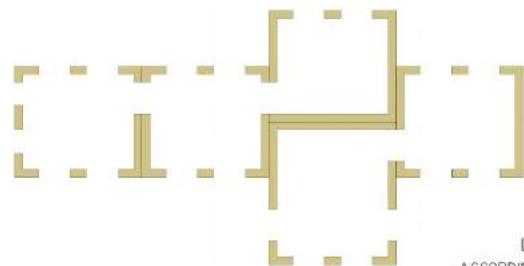
CONSTRUCTION PROCESS



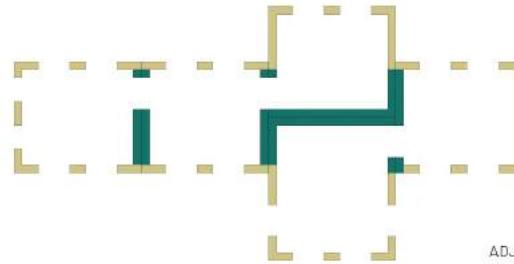
1 CONFIGURATION



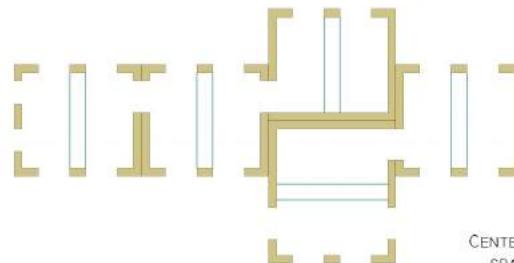
2 FOUNDATION
OFFSET 1 PIXEL TO THE
INSIDE AND 2 PIXELS
FOR THE OUTSIDE



3 OPENING
LOCATE THEM
ACCORDING TO DESIGN



4 WALLS
ADJACENT WALLS,
EDGE WALLS



5 MAIN ARCH
CENTER OF SHORTEST
SPAN OF ROOM (2
PIXELS)

CONSTRUCTION

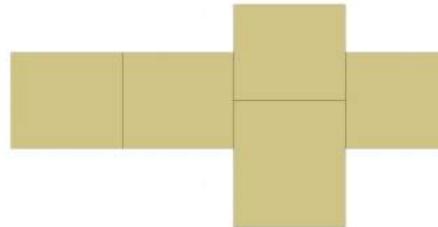


CONSTRUCTION
MANUAL

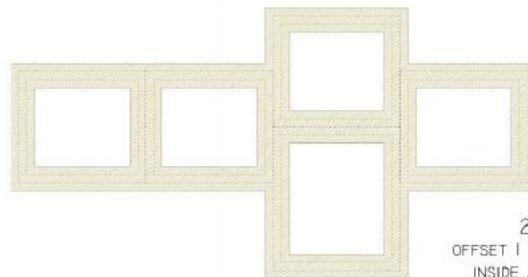
MATERIALS

MAIN TOOL

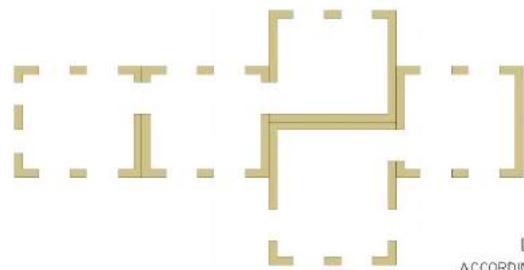
CONSTRUCTION PROCESS



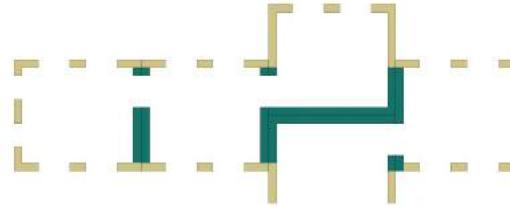
1 CONFIGURATION



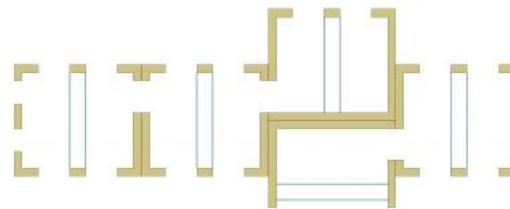
2 FOUNDATION
OFFSET 1 PIXEL TO THE
INSIDE AND 2 PIXELS
FOR THE OUTSIDE



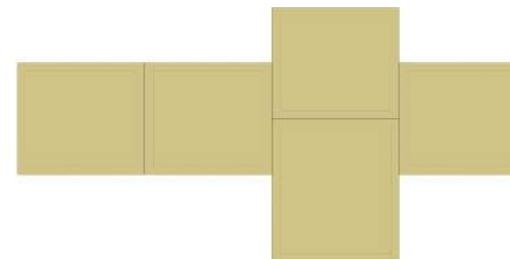
3 OPENING
LOCATE THEM
ACCORDING TO DESIGN



4 WALLS
ADJACENT WALLS,
EDGE WALLS



5 MAIN ARCH
CENTER OF SHORTEST
SPAN OF ROOM (2
PIXELS)



6 FINISHING
AND OTHER
ARCHES

CONSTRUCTION

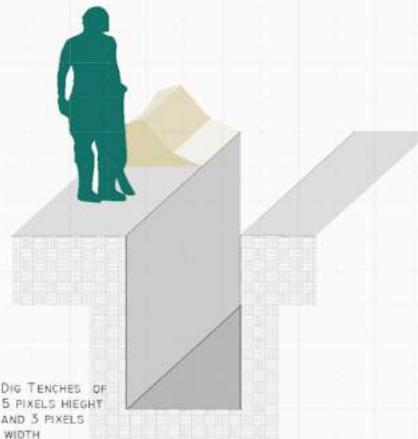


CONSTRUCTION
MANUAL

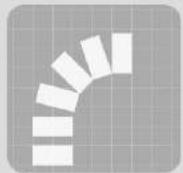
↓
MATERIALS

↓
MAIN TOOL

↓
CONSTRUCTION PROCESS



CONSTRUCTION



CONSTRUCTION
MANUAL

↓
MATERIALS

↓
MAIN TOOL

↓
CONSTRUCTION PROCESS

↓
ROOM ORIENTATION

↓
WEATHER CONDITIONS

↓
SIMULATION

↓
OPENING RULES



OPENINGS CATALOG

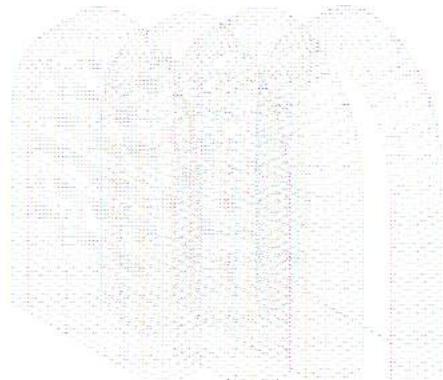


FIG. 1. Rotating configuration model

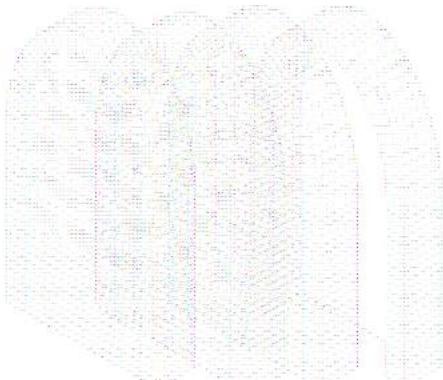


FIG. 2. Home efficient solution building

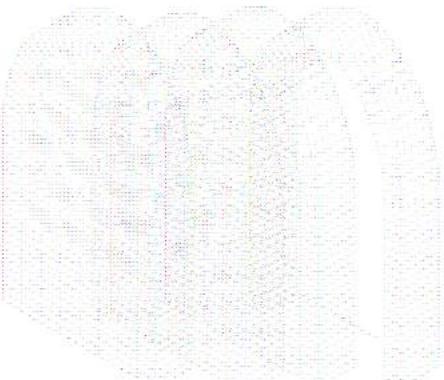
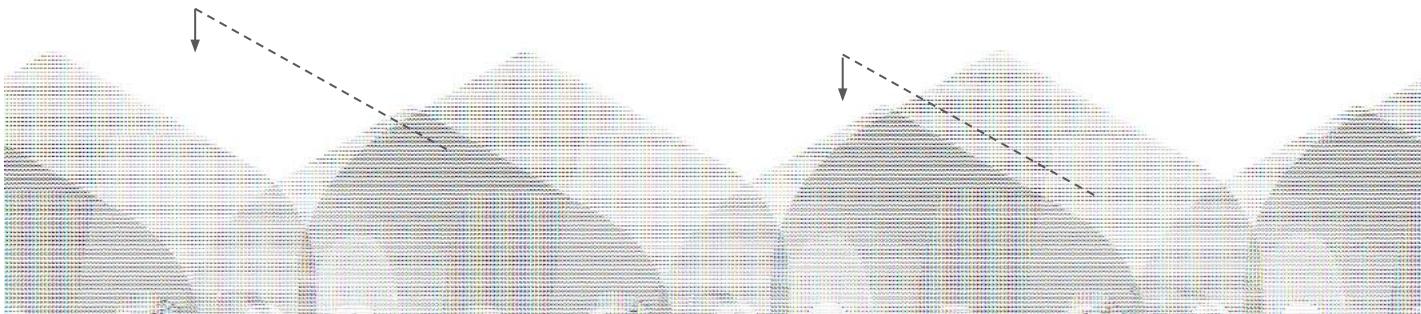
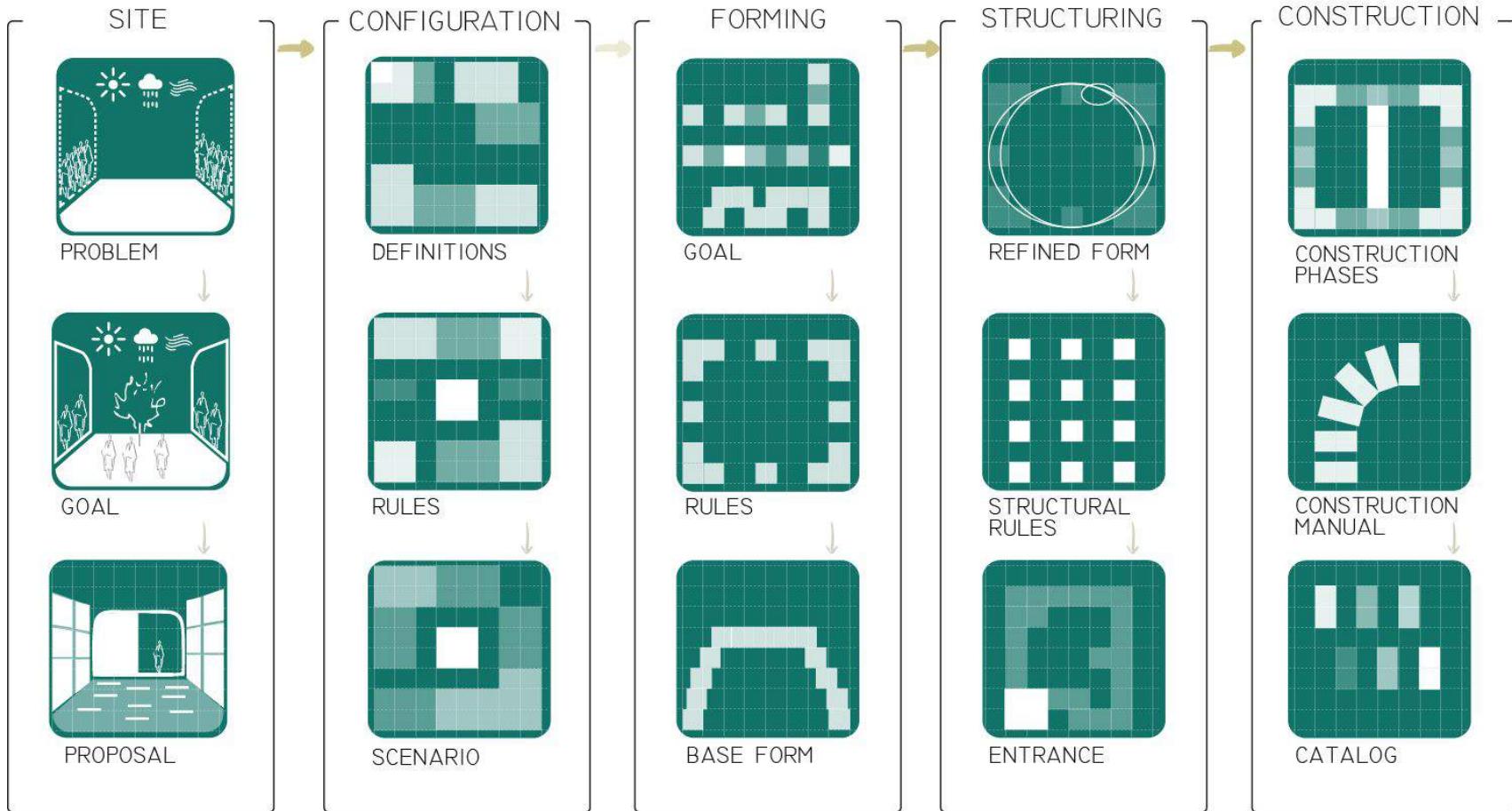
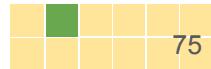
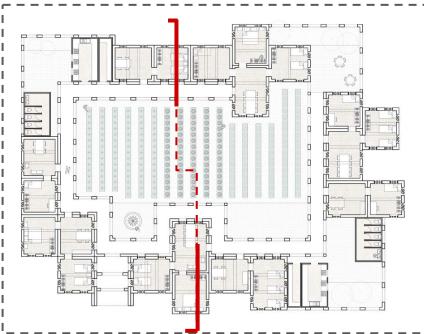
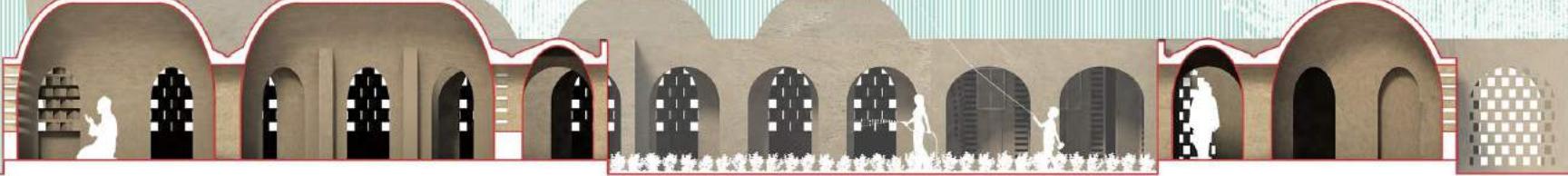
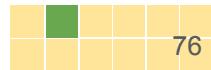
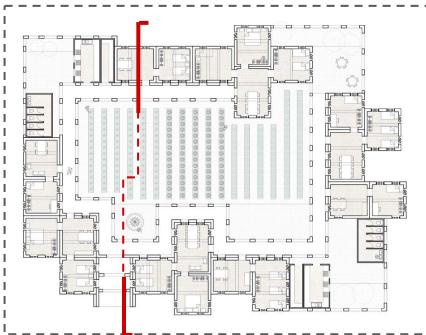


FIG. 3. Residential building solution









CHEAT SHEET : PROCESS FOR APP DEVELOPMENT

