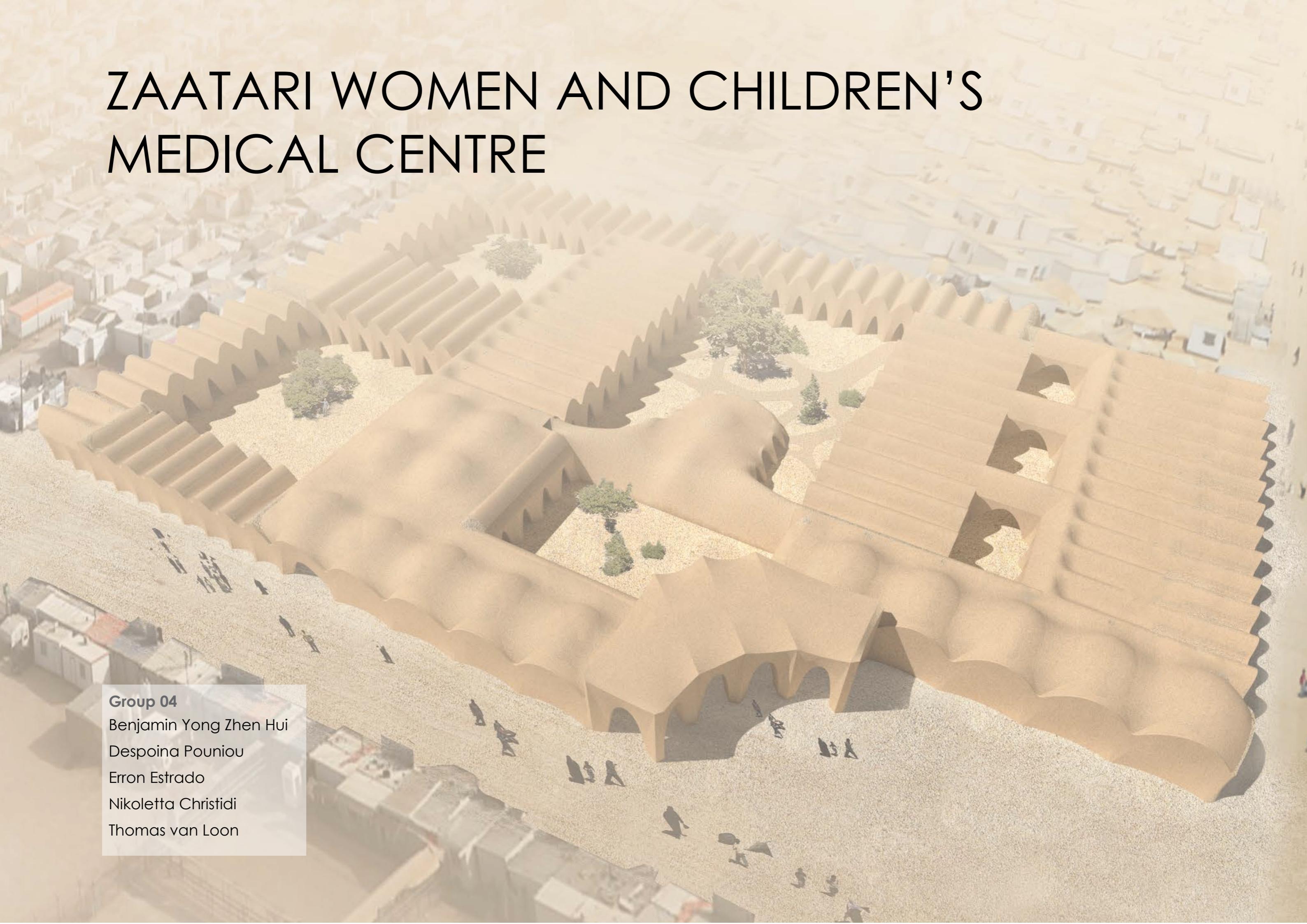
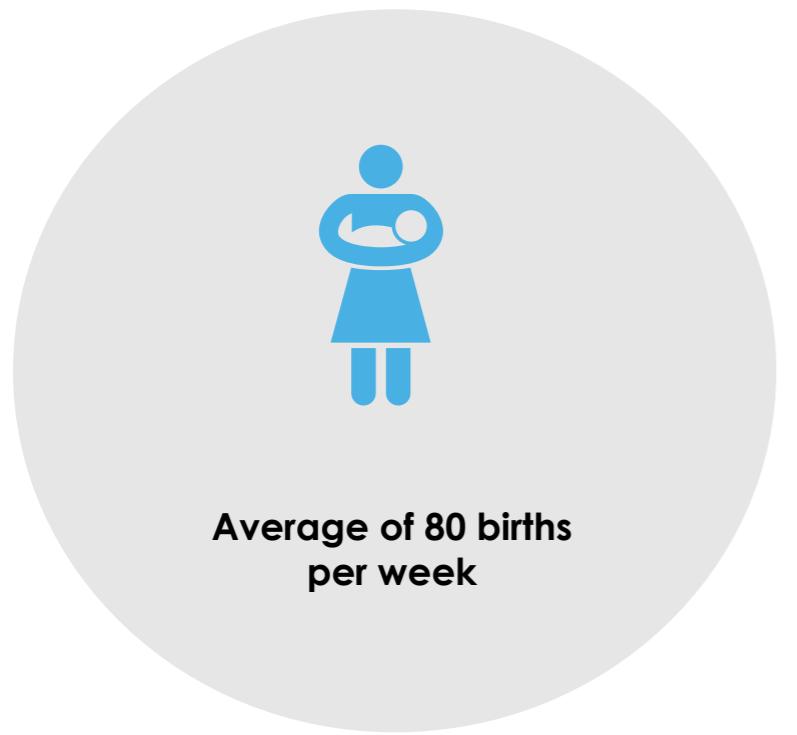


ZAAATARI WOMEN AND CHILDREN'S MEDICAL CENTRE



Group 04

Benjamin Yong Zhen Hui
Despoina Pouniou
Erron Estrado
Nikoletta Christidi
Thomas van Loon



Average of 80 births
per week

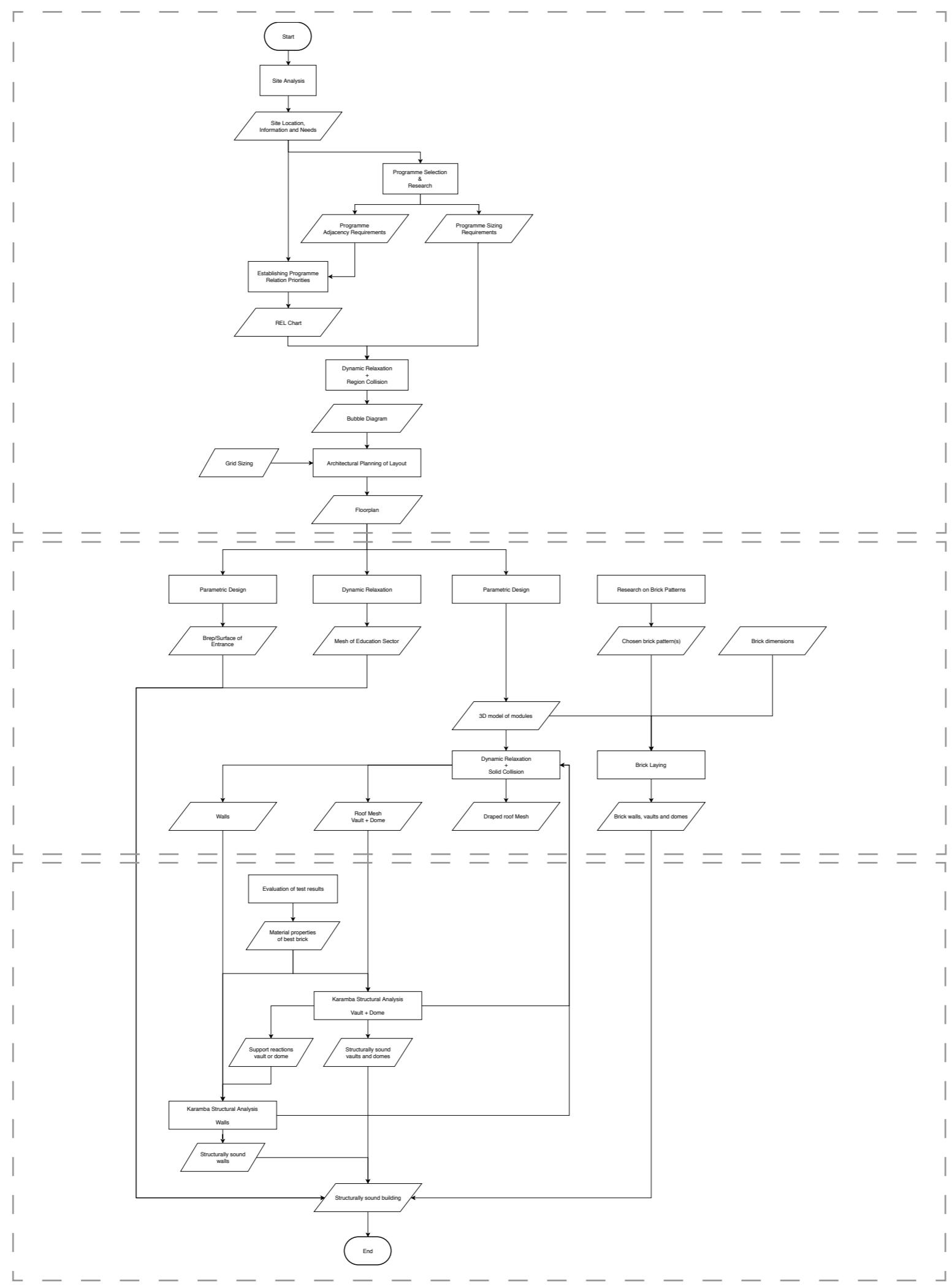


57% are under 24,
19,9% of whom are under
5 years old



1 Gynaecology, Obstetrics
and Pediatrics Facilities

2 An Education Department
to educate people



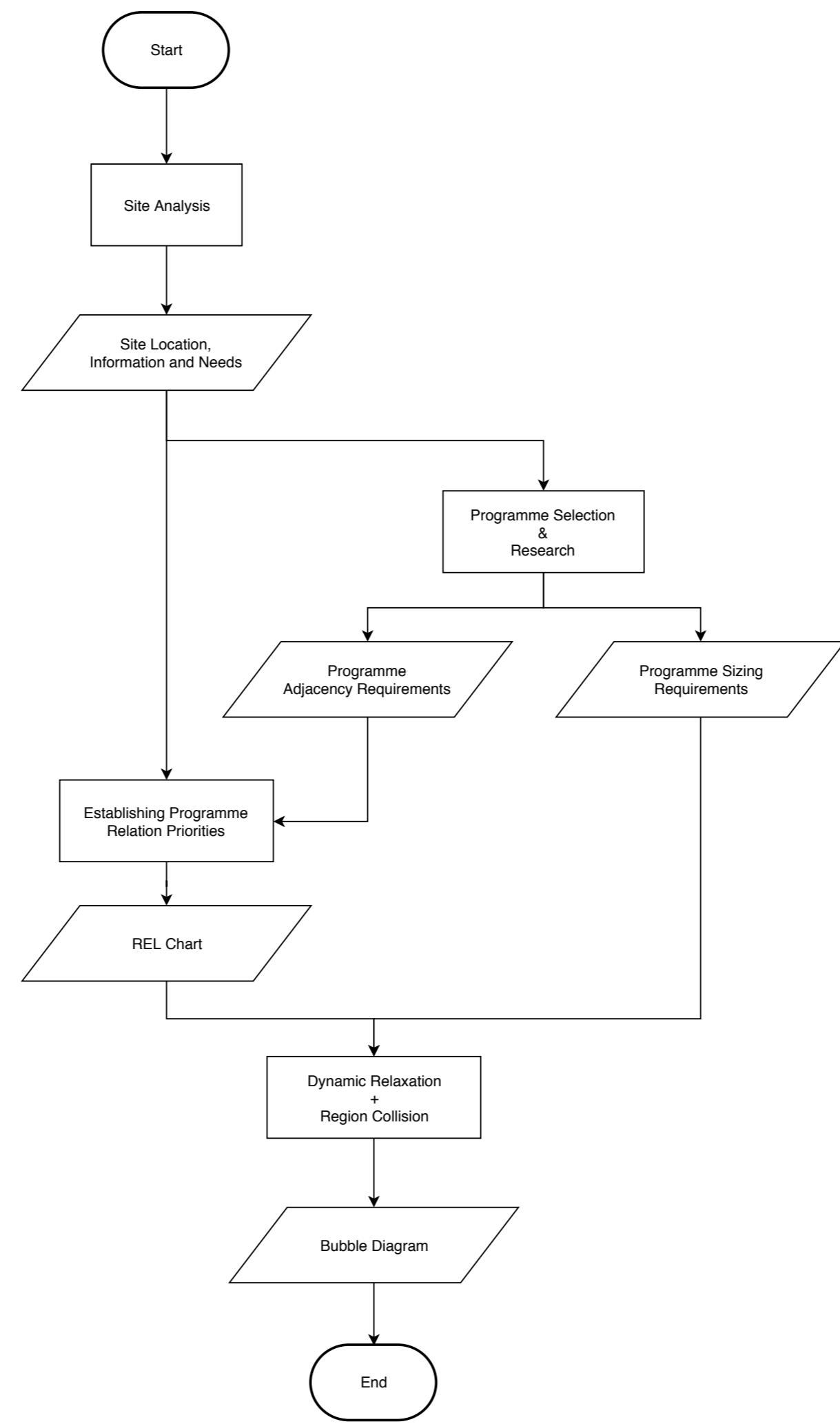
configuration

geometric
forming

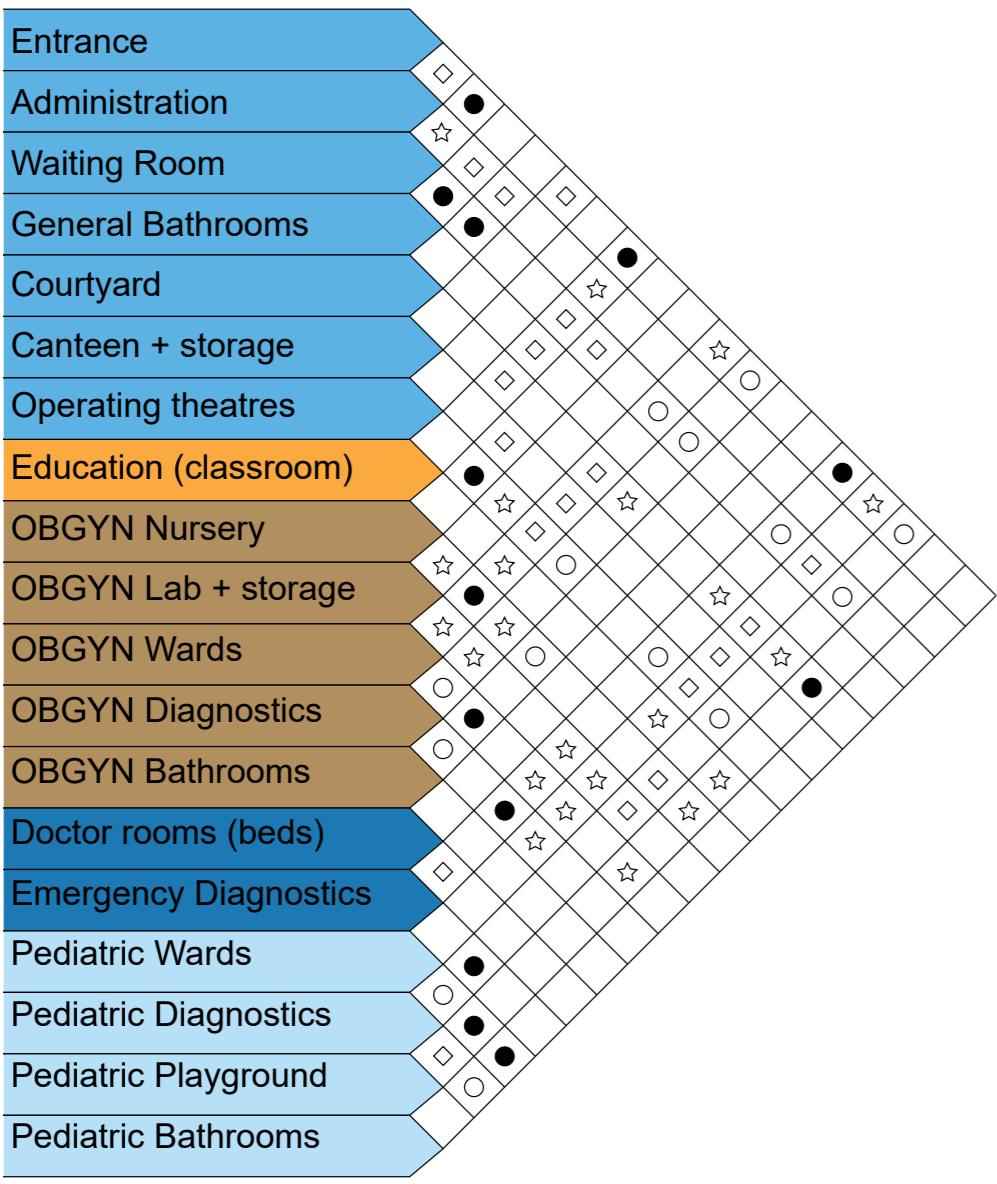
structuring

configuration

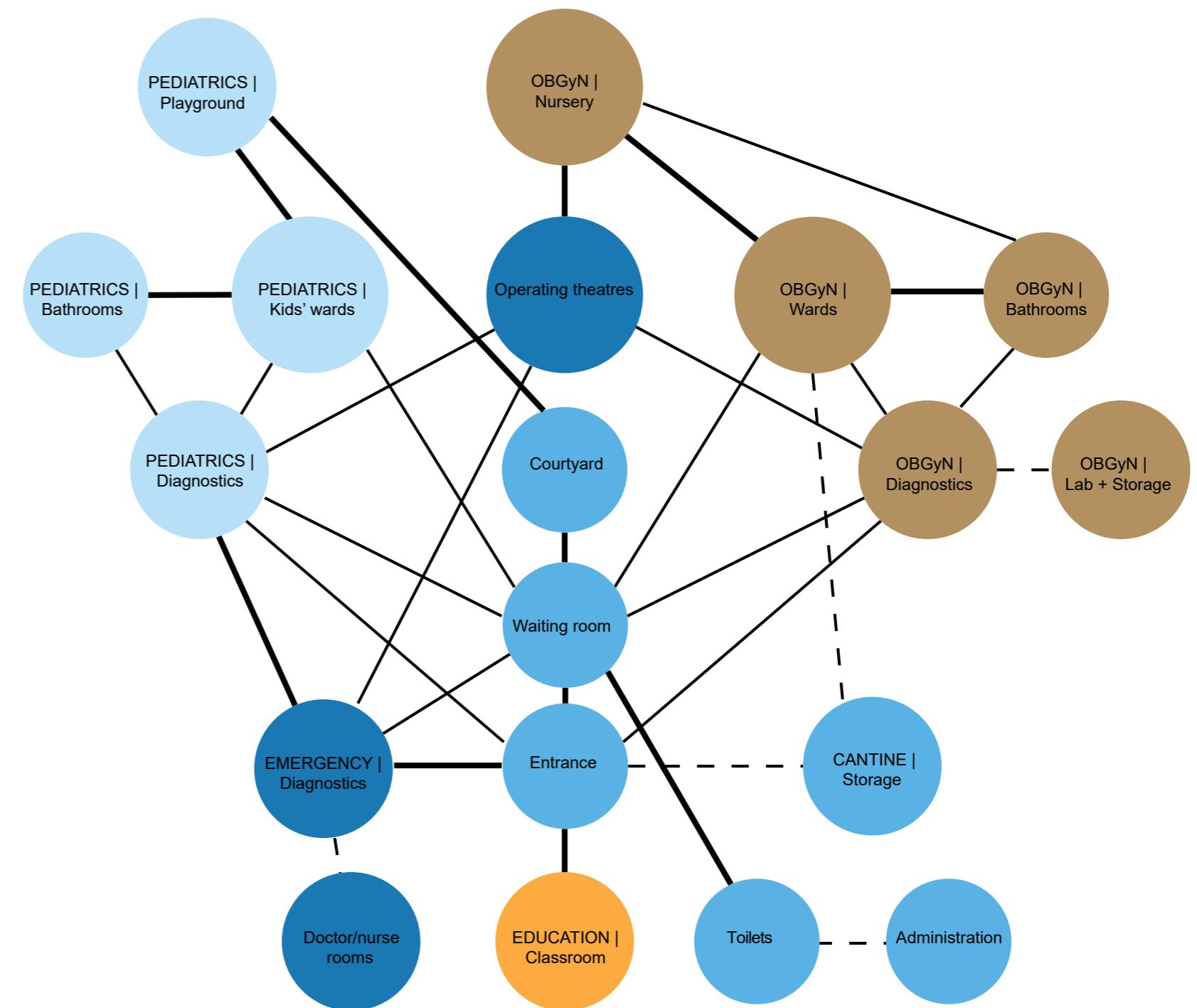
Configuration



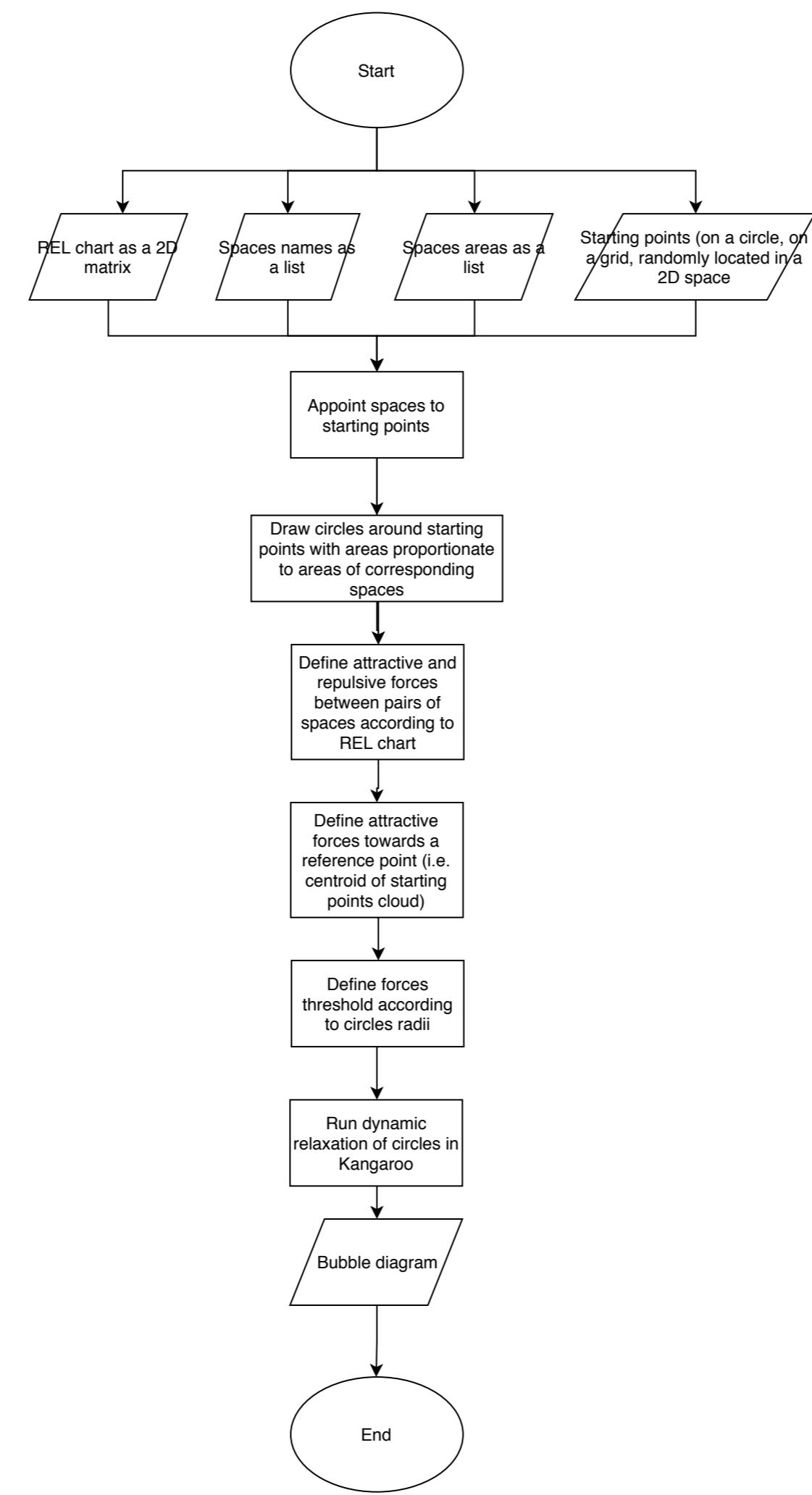




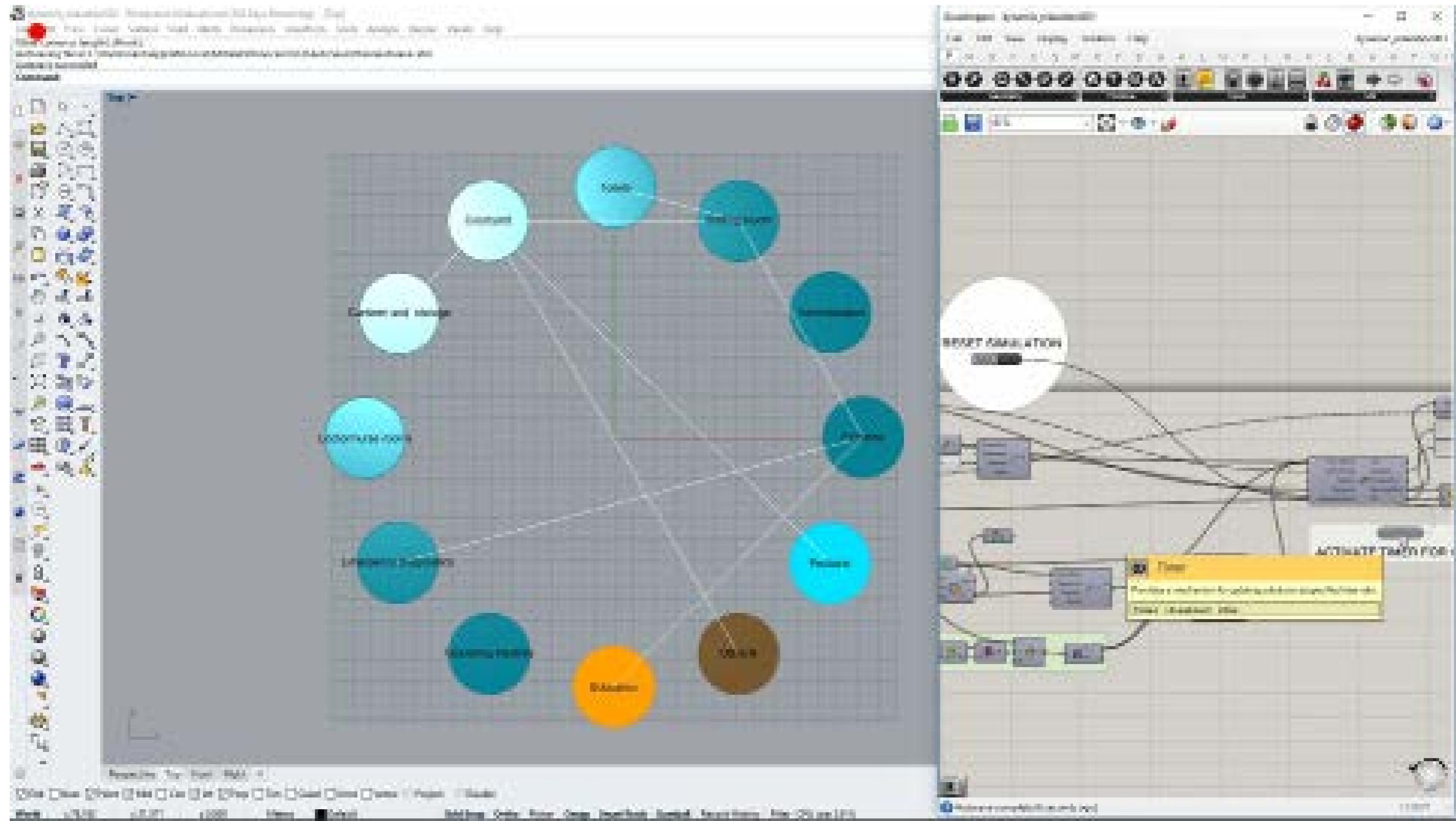
Direct conenction
 Should have a connection
 Would be nice

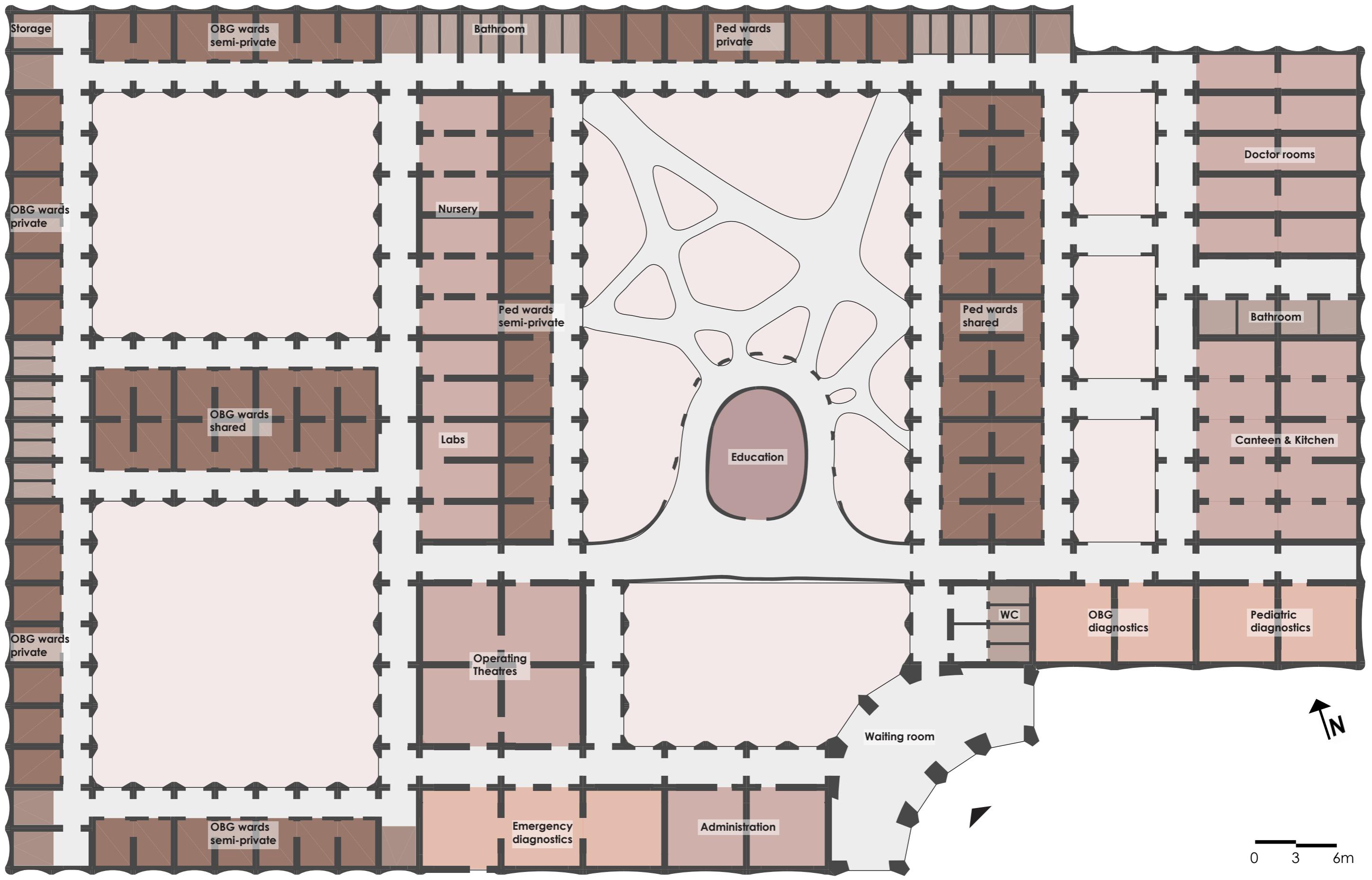


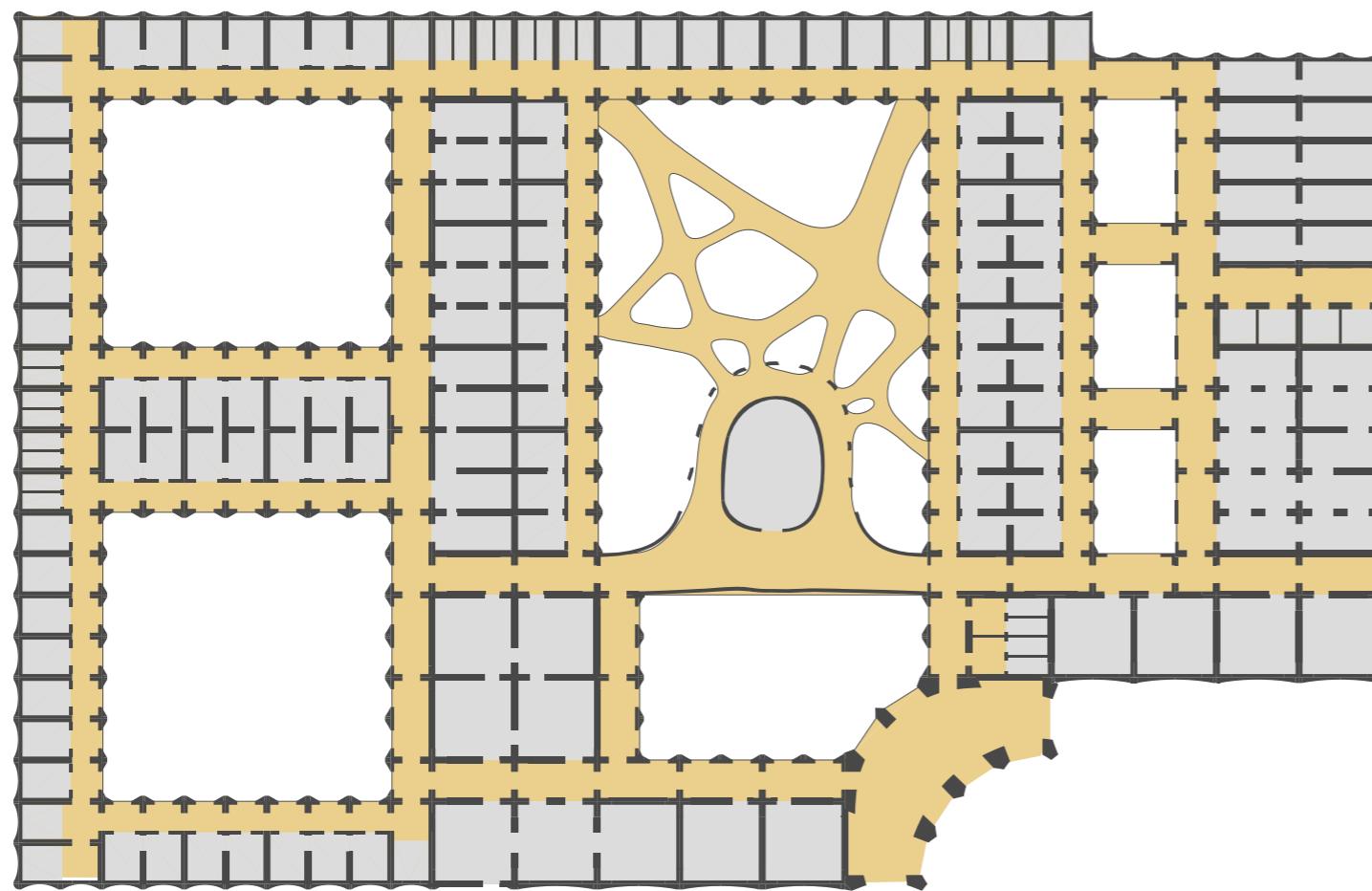
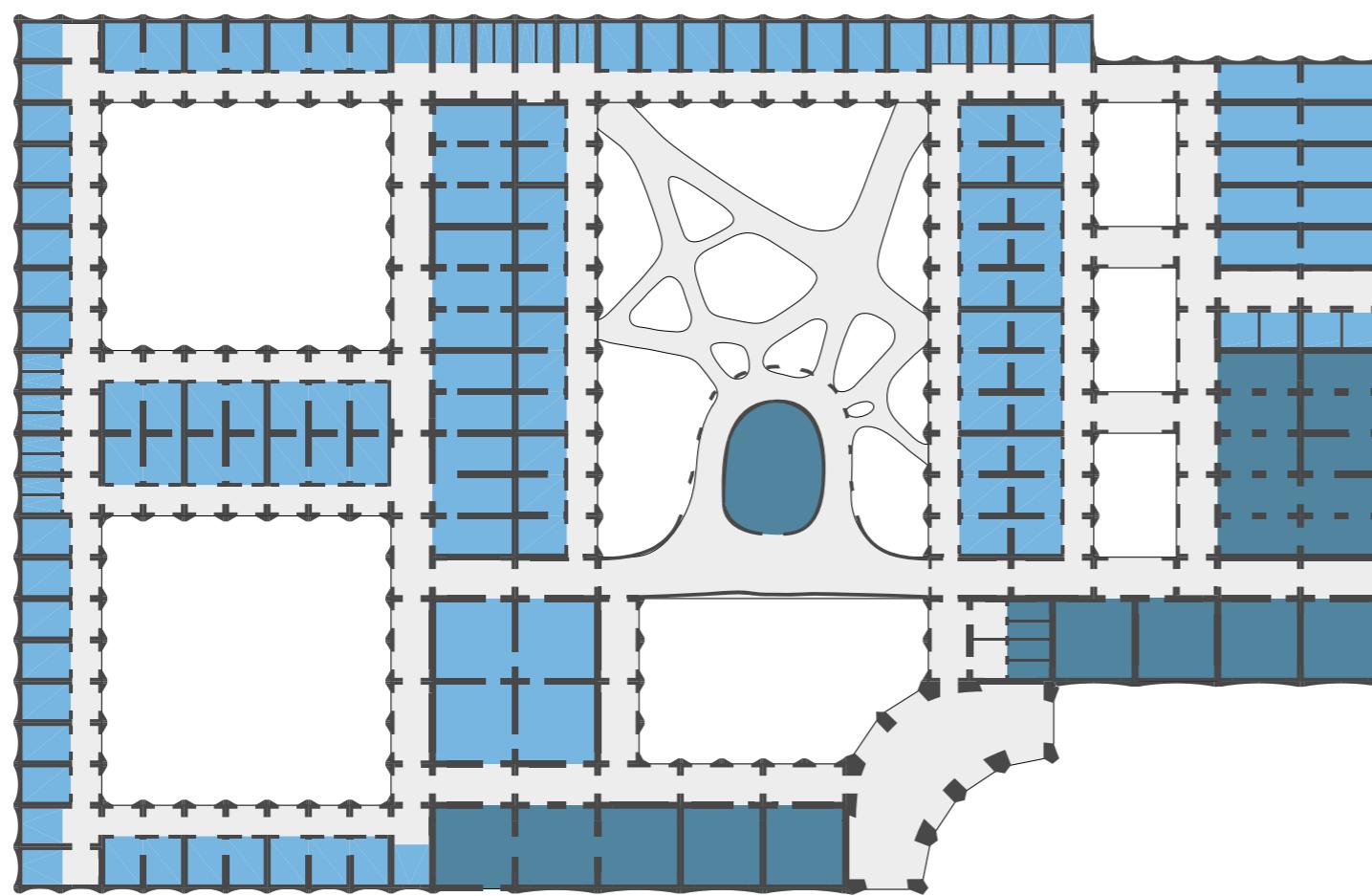
Circle Packing



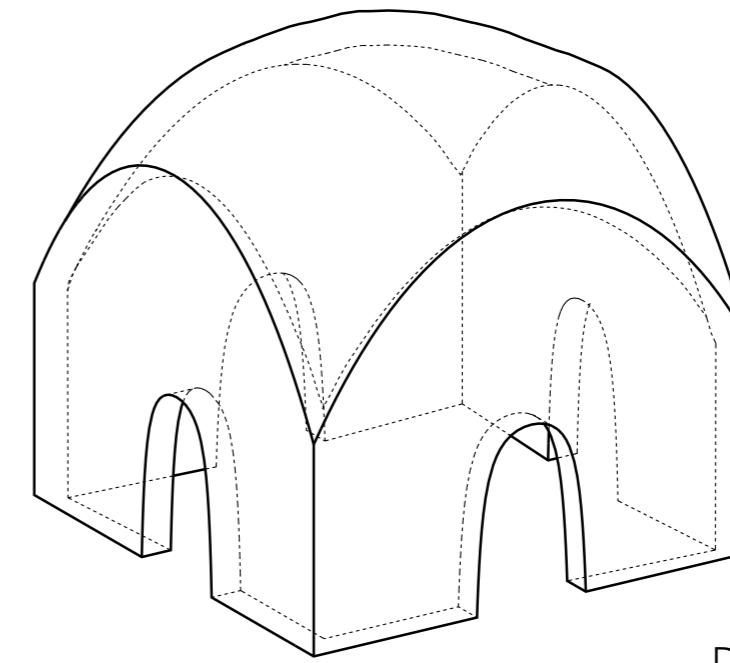
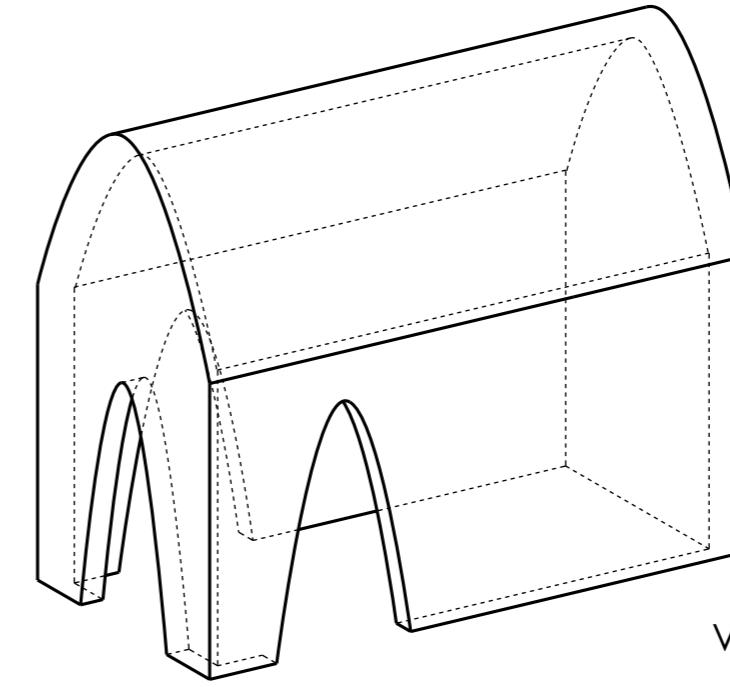
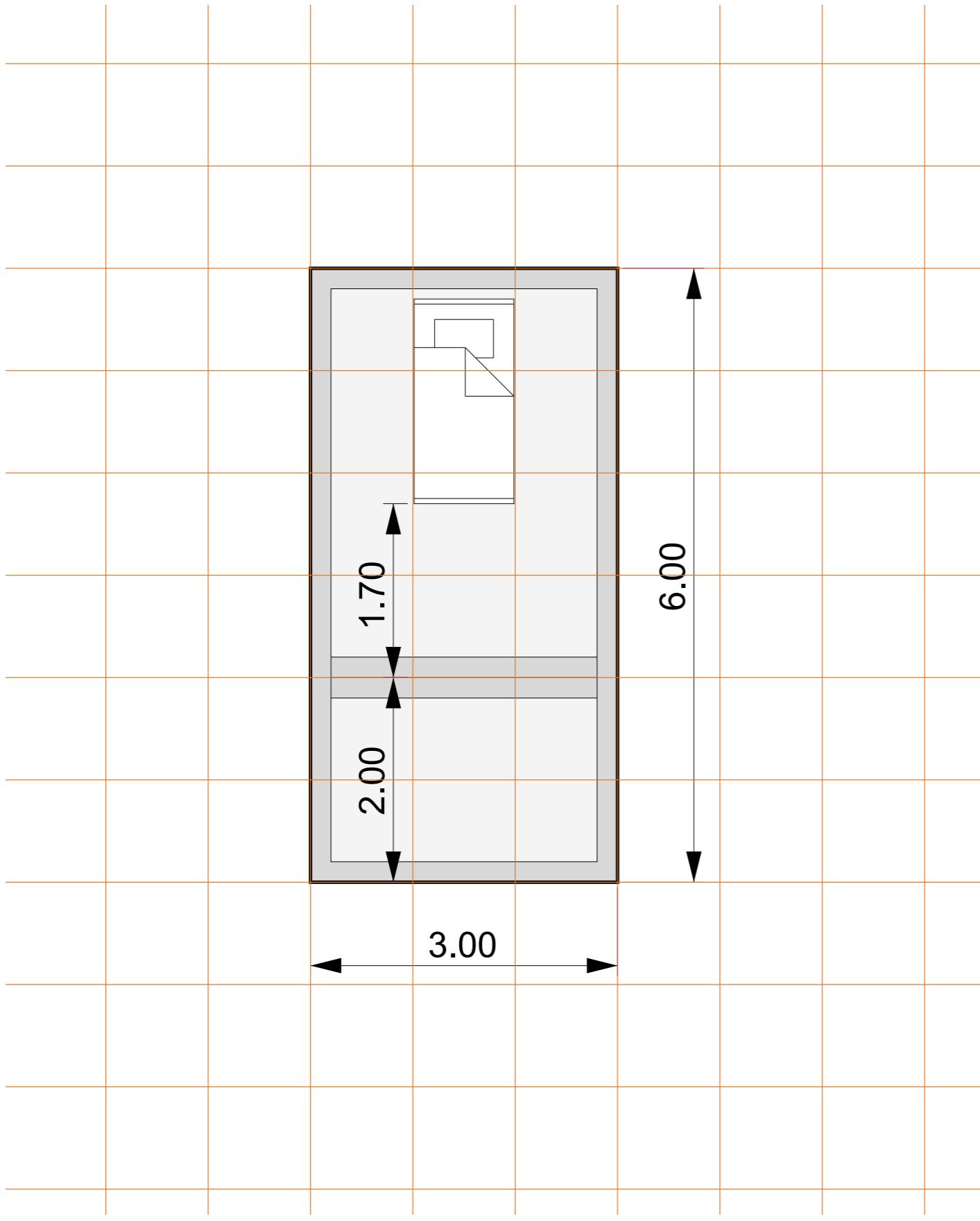
Circle Packing



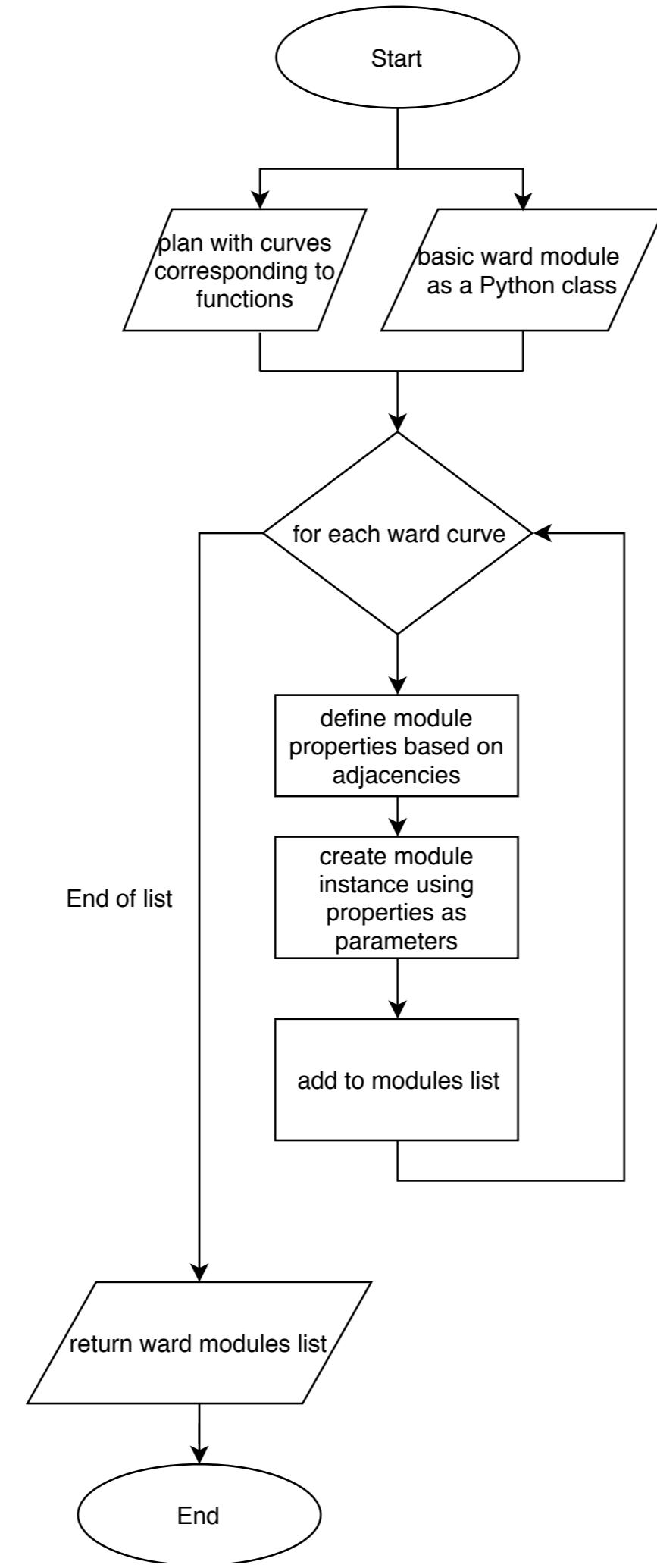




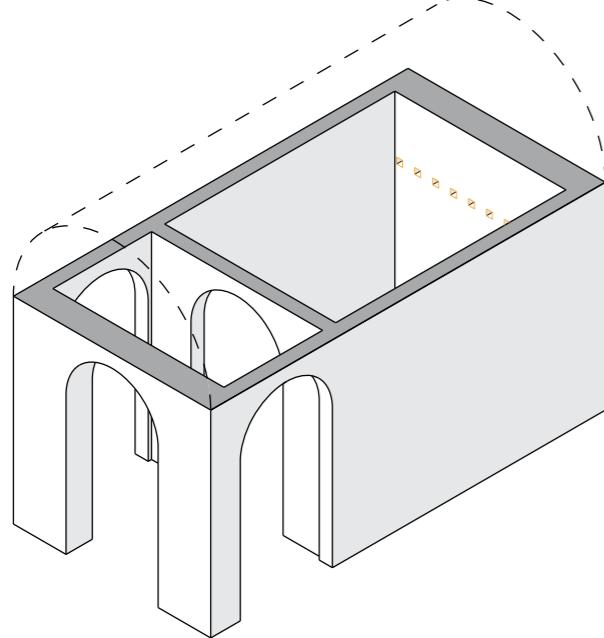
geometric forming



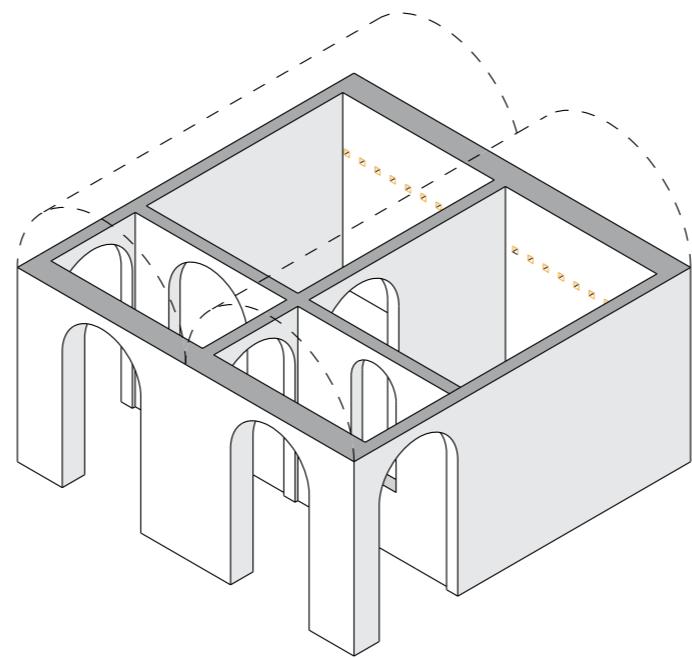
Wards creation and placement



Wards creation and placement

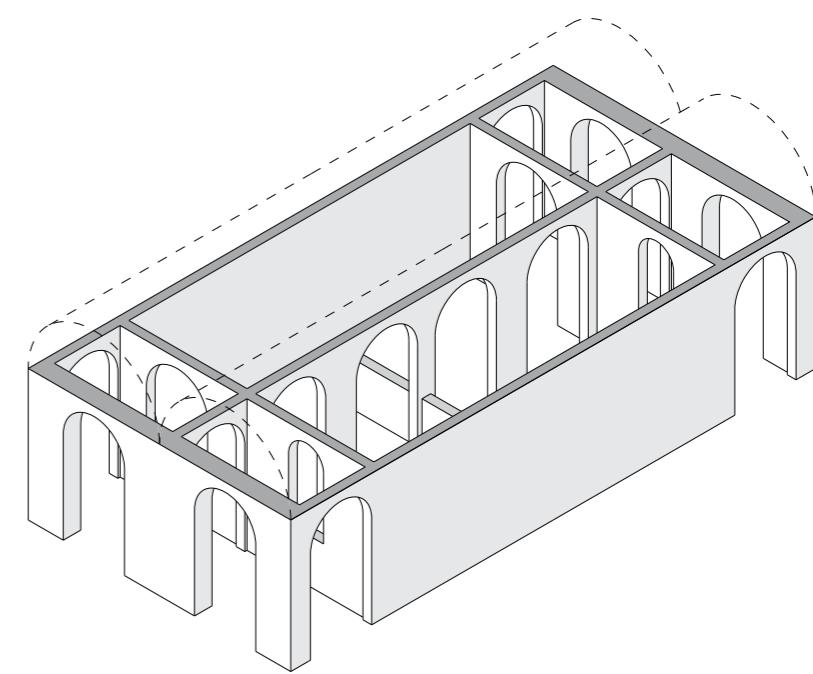


Private rooms



Semi - private rooms

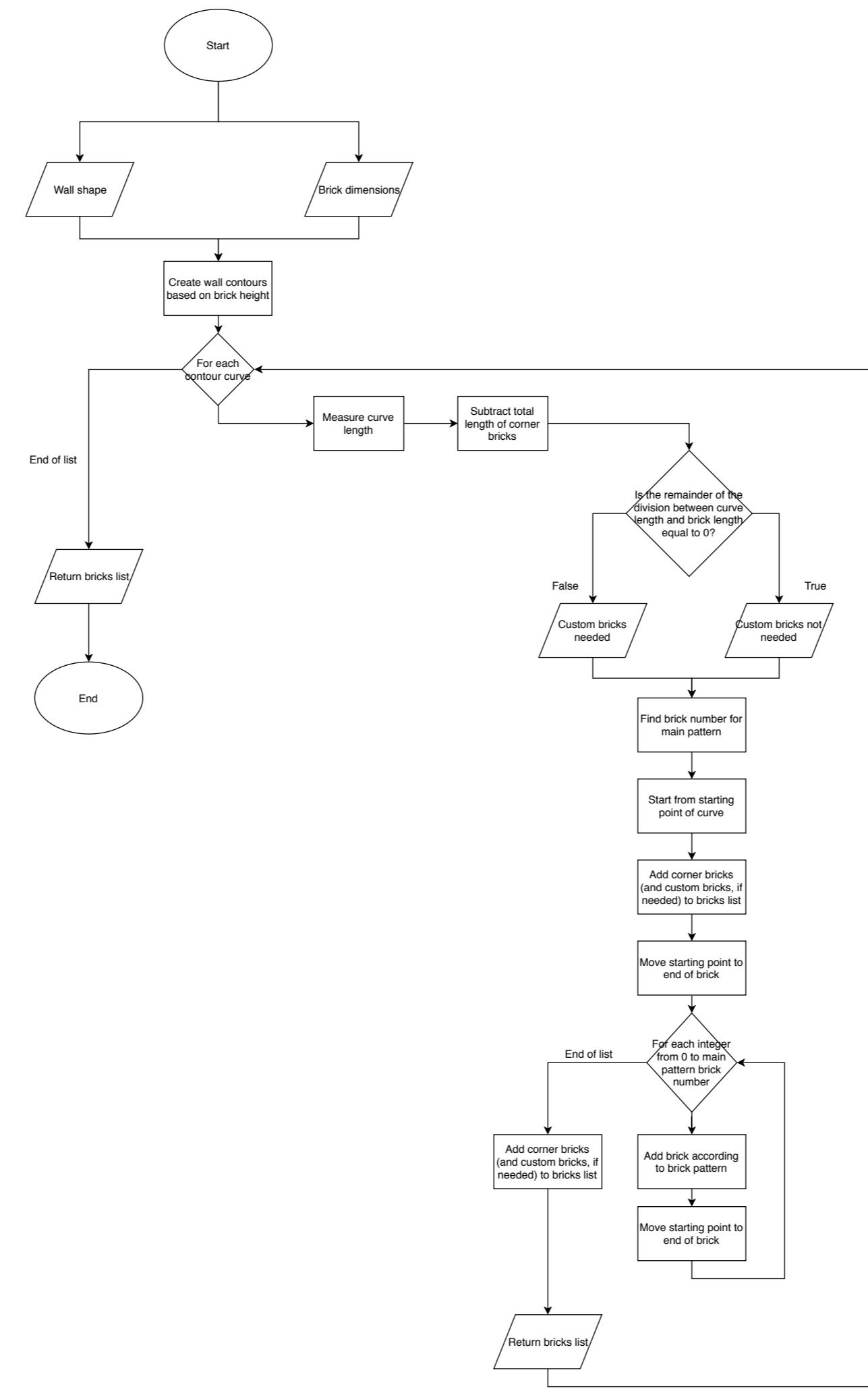
2 or 3 rooms



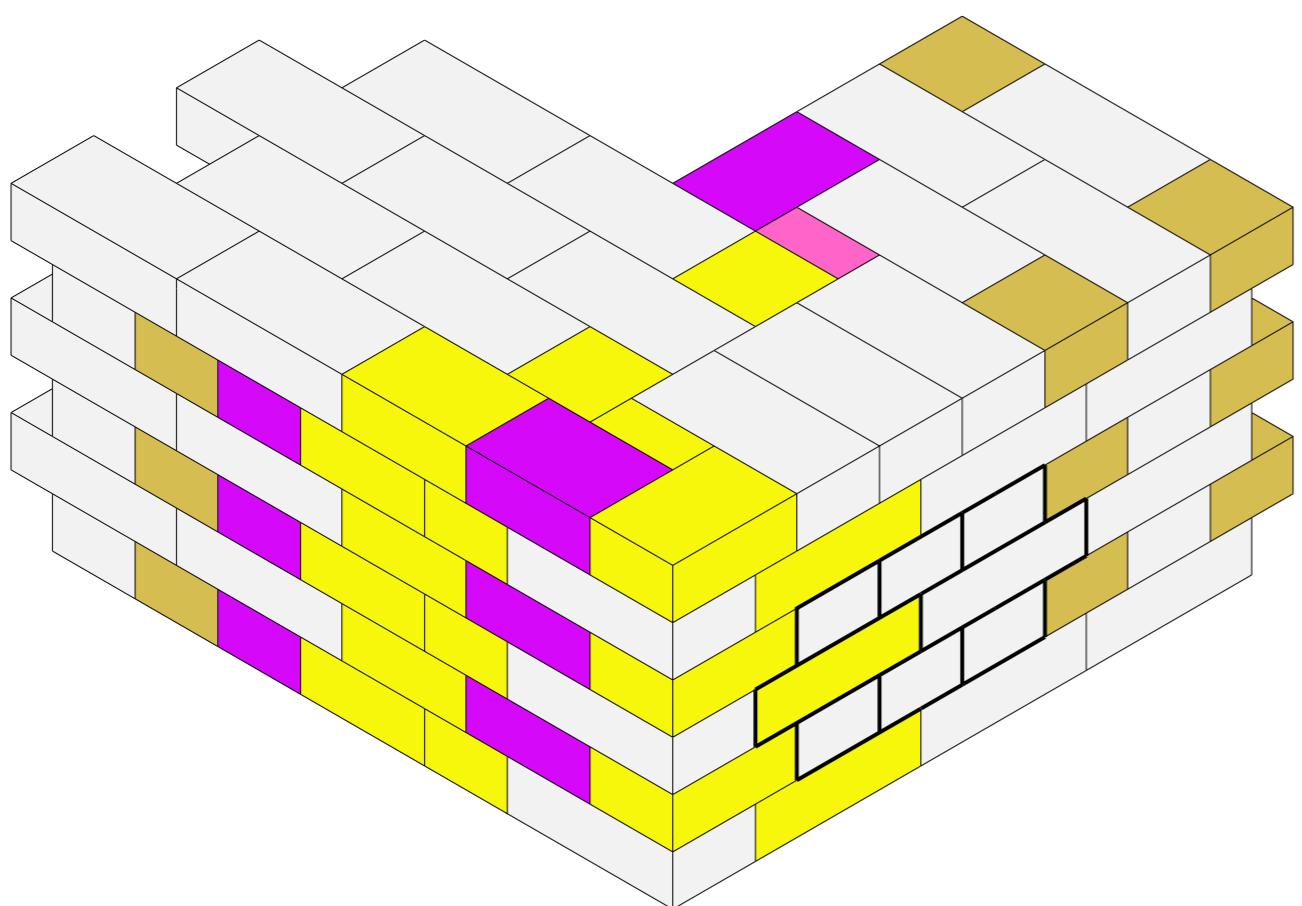
Shared rooms

4 or 6 rooms

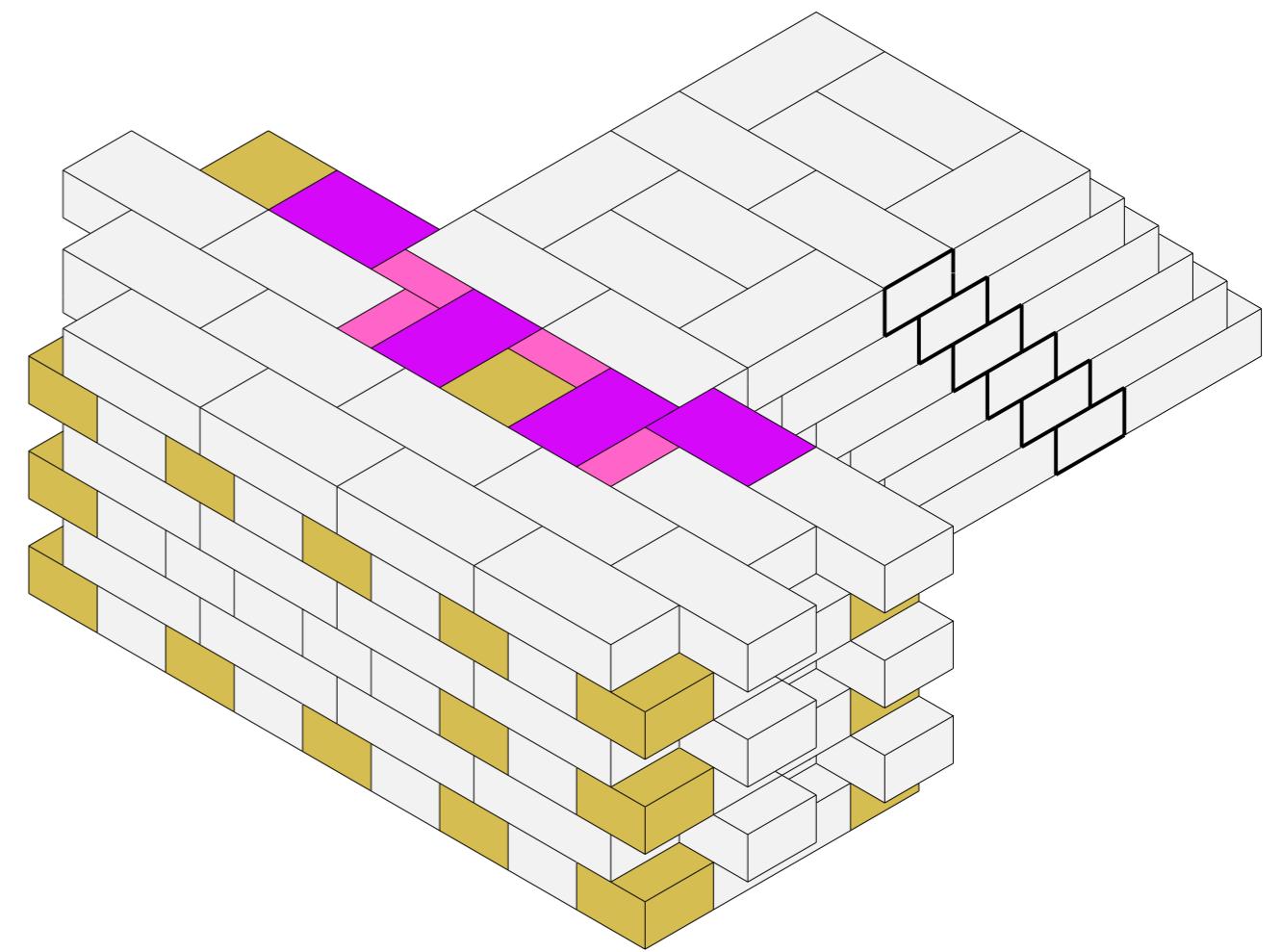
Brick Patterns



Brick Patterns



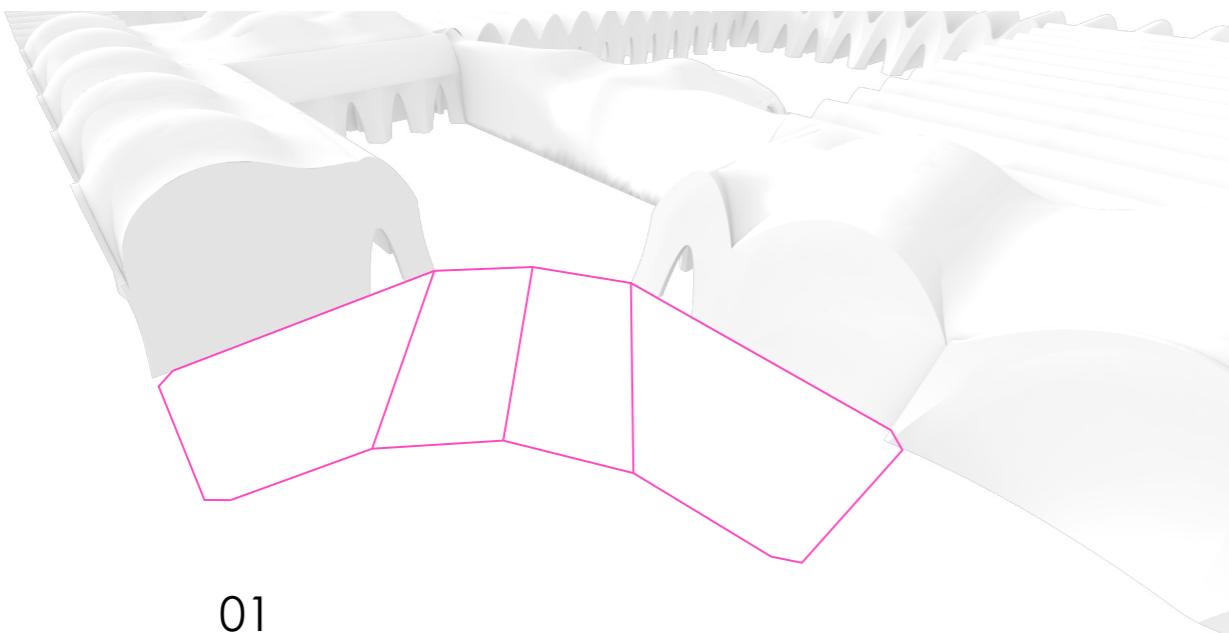
Corner Solution



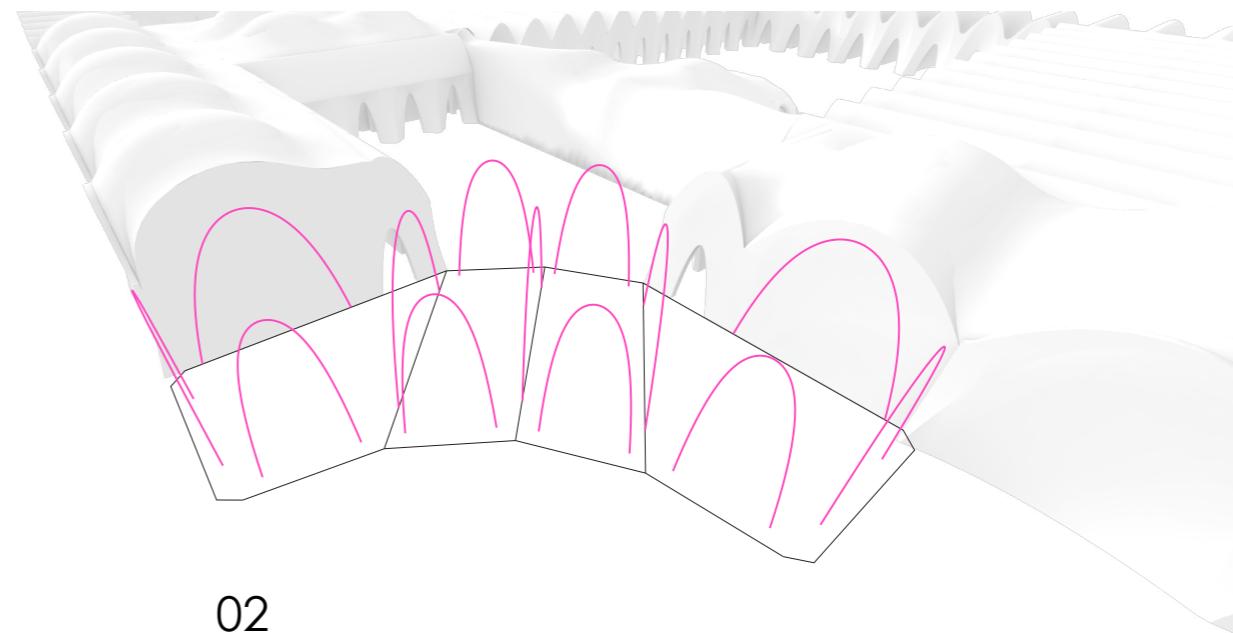
T intersection

Entrance

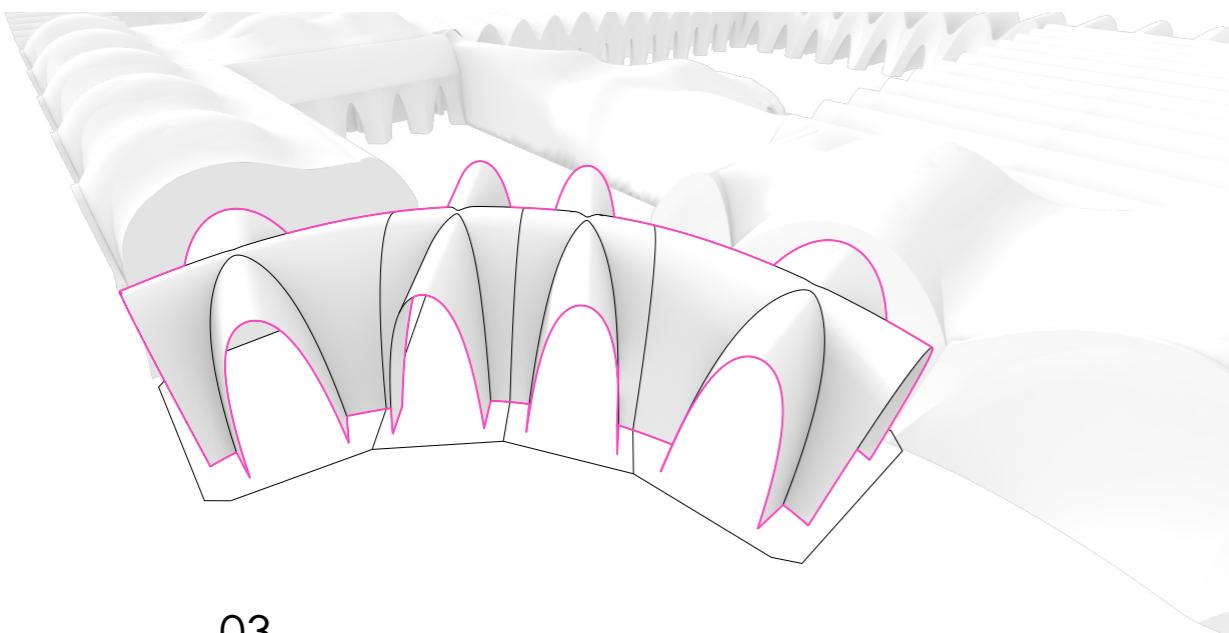
Form - finding process



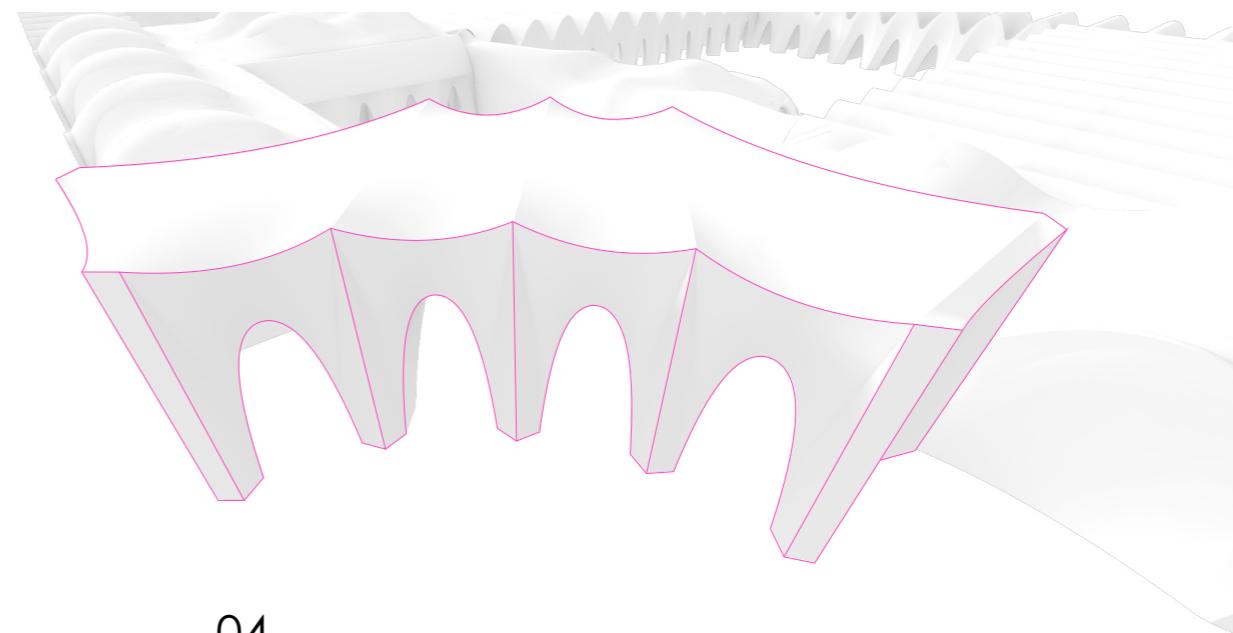
01



02



03

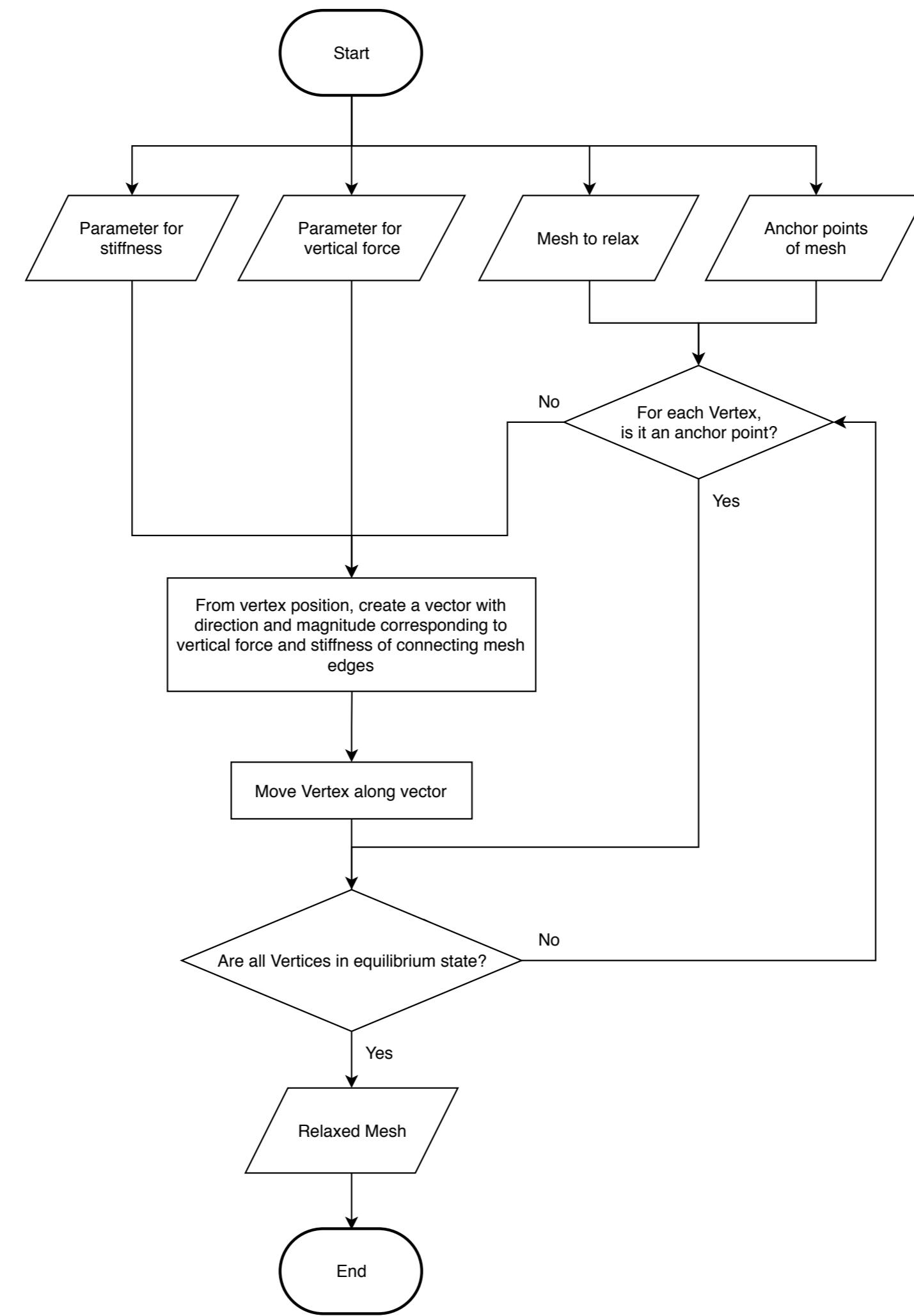


04

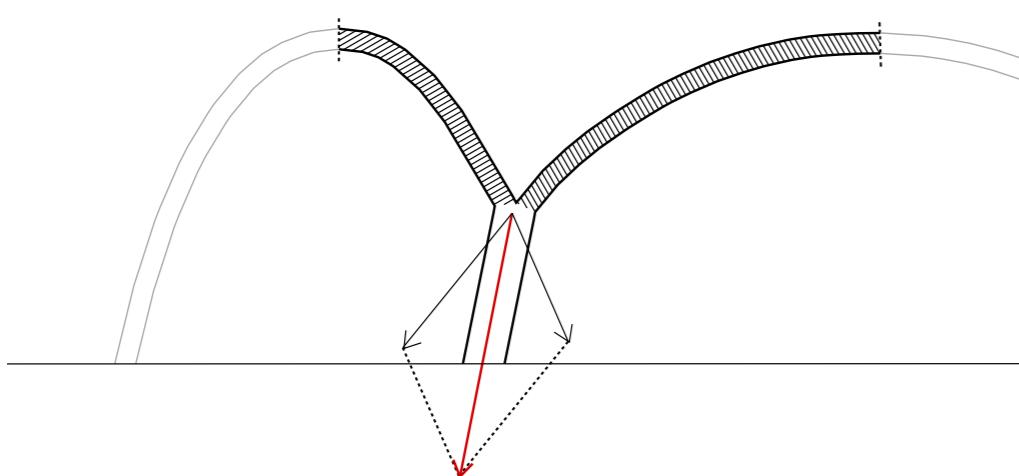
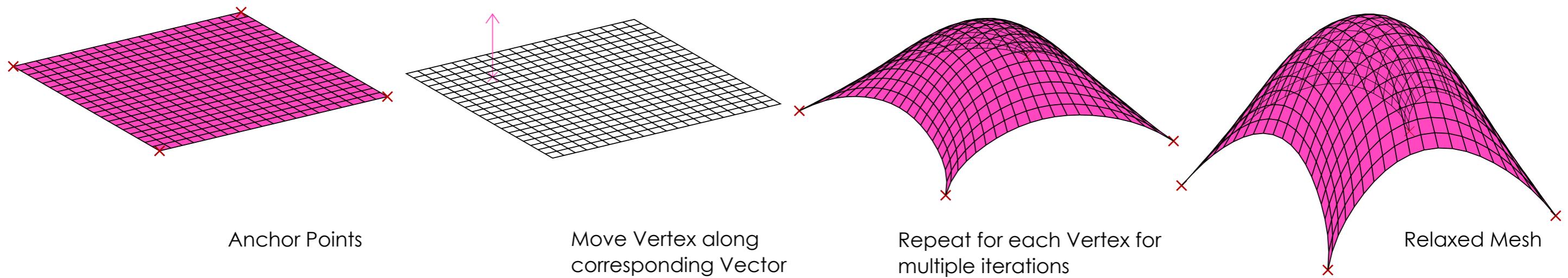


Education Sector

Form - finding process

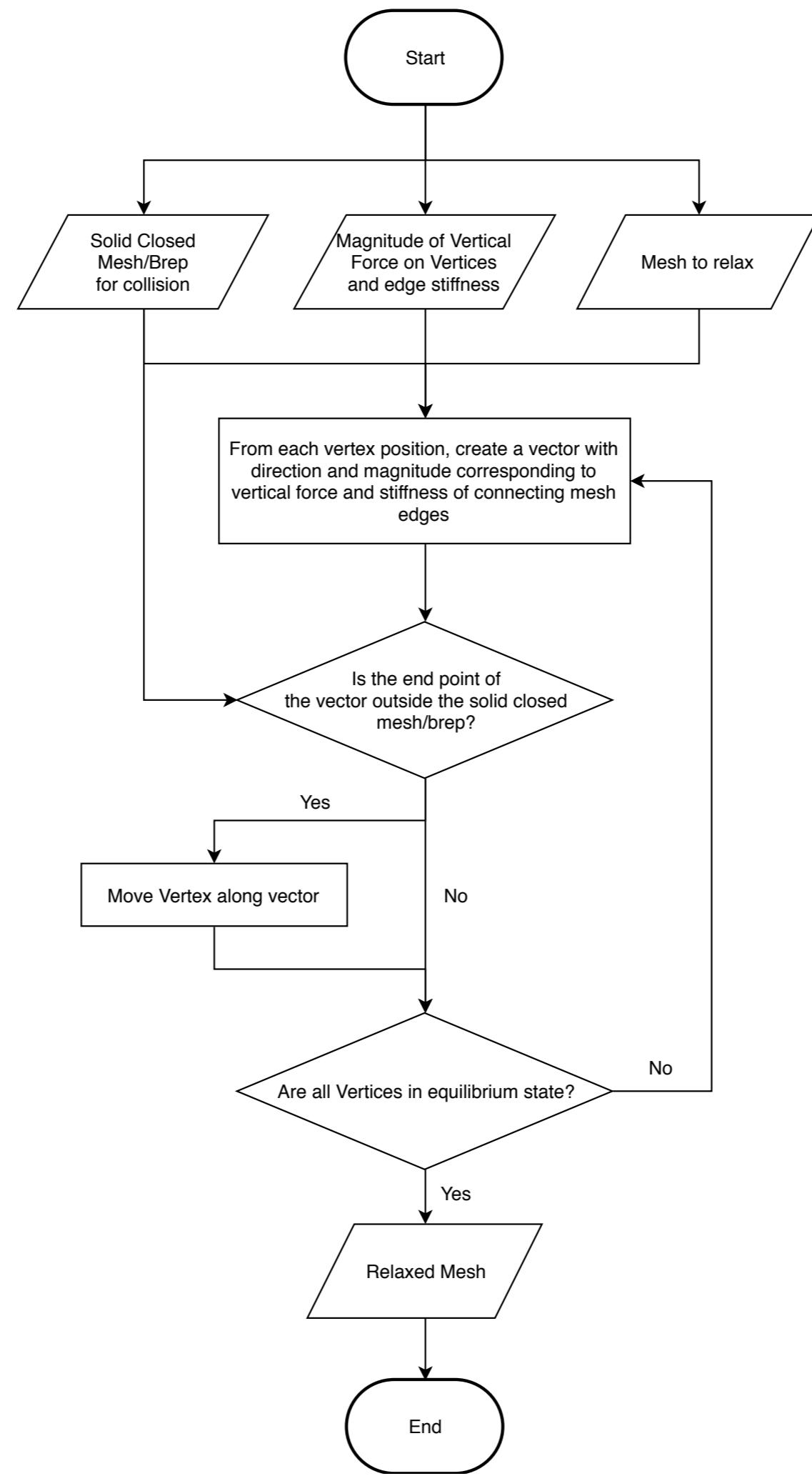


Education Sector
Form - finding process

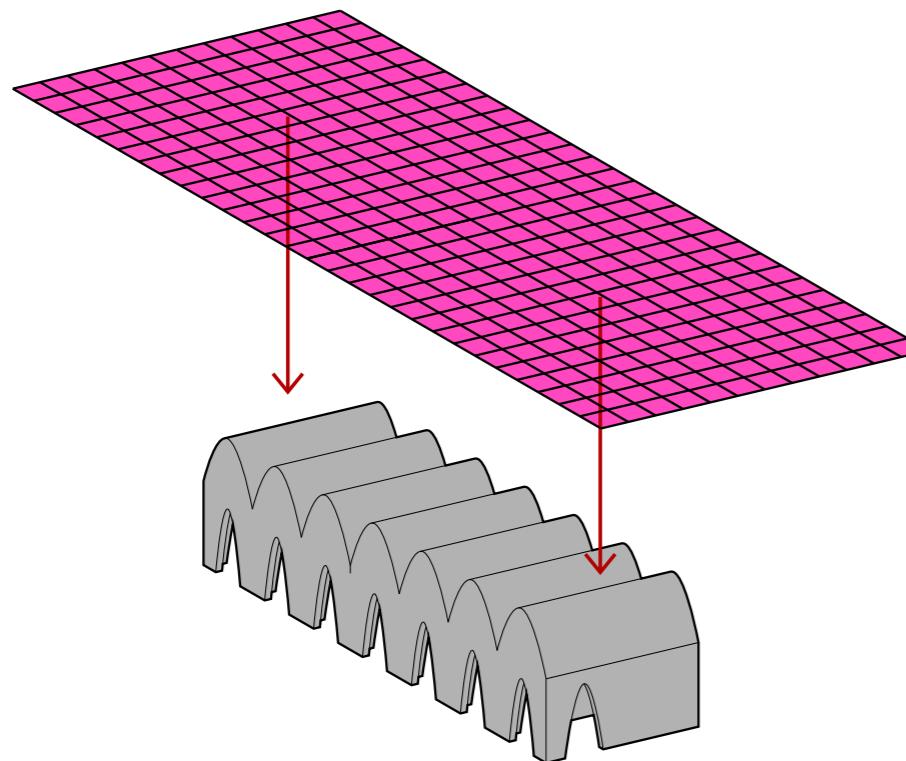




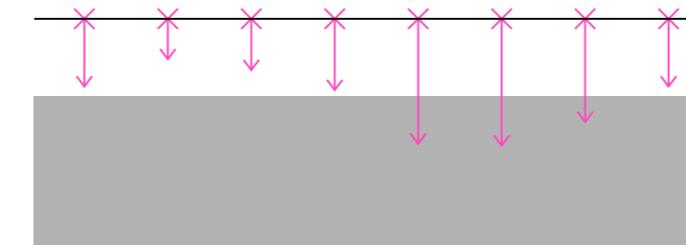
Roof Draping Process



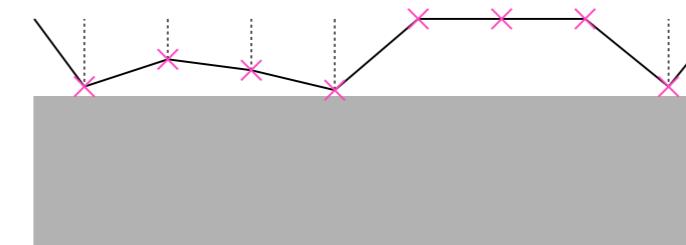
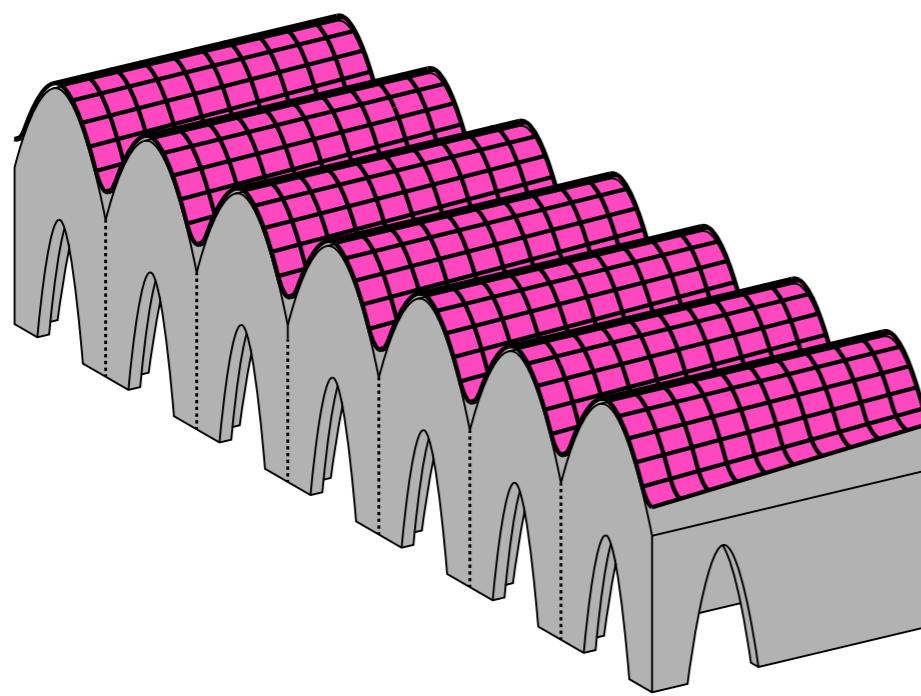
Roof Draping Process



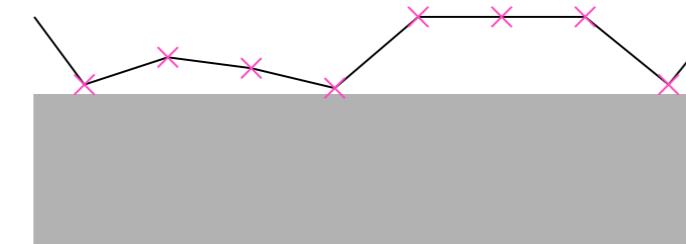
Collision Detection



Vectors from each Vertex

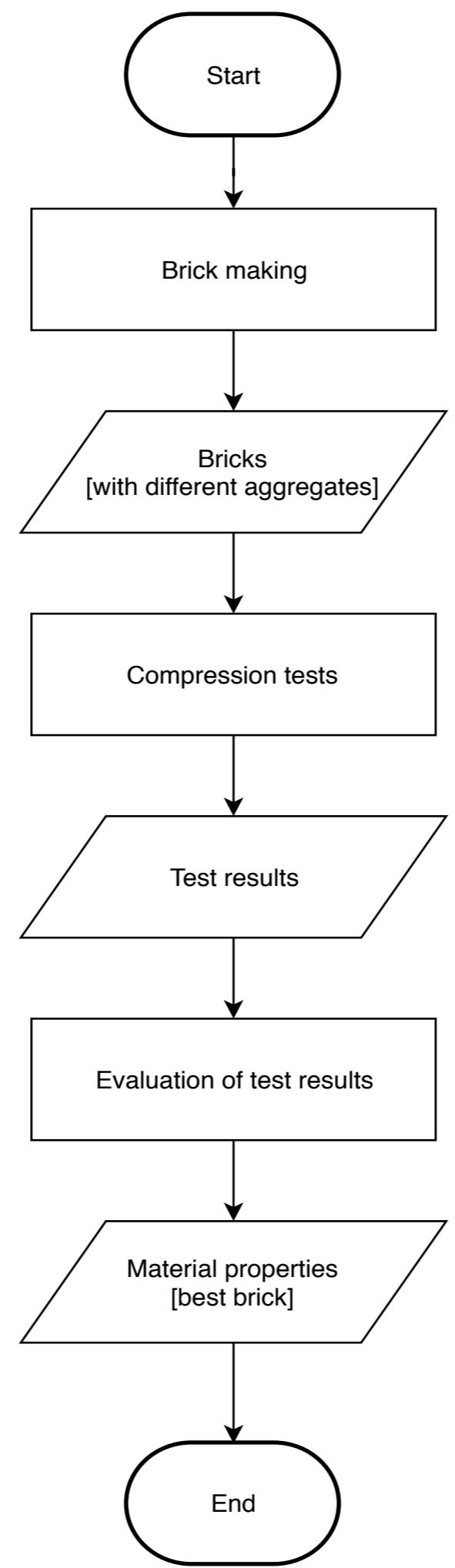


Moving only Vertices that will not collide with Solid Mesh



End of Iteration

structuring



Test results

<i>Mixture</i>		<i>strength [N/mm²]</i>	<i>factor of 2</i>	<i>at 5% strain [N/mm²]</i>
<i>Control group</i>	1 Small	0.622	0.311	0.321
	1 Big	1.125	0.5625	0.203
	1 Handmade	1.498	0.749	0.337
<i>Natural straw</i>	2 Small	0.972	0.486	0.441
	2 Big	1.234	0.617	0.202
<i>Wood chips</i>	3 Small	0.759	0.3795	0.217
	3 Big	1.995	0.9975	0.118
<i>Extra sand</i>	4 Small	0.522	0.261	0.416
<i>Extra water</i>	5 Small	0.600	0.3	0.297
<i>Paper shreds</i>	6 Big	1.028	0.514	0.773
<i>Paper shreds</i>	7 Small	0.844	0.422	0.312

Material properties used

Used brick: Brick with paper shreds as reinforcement

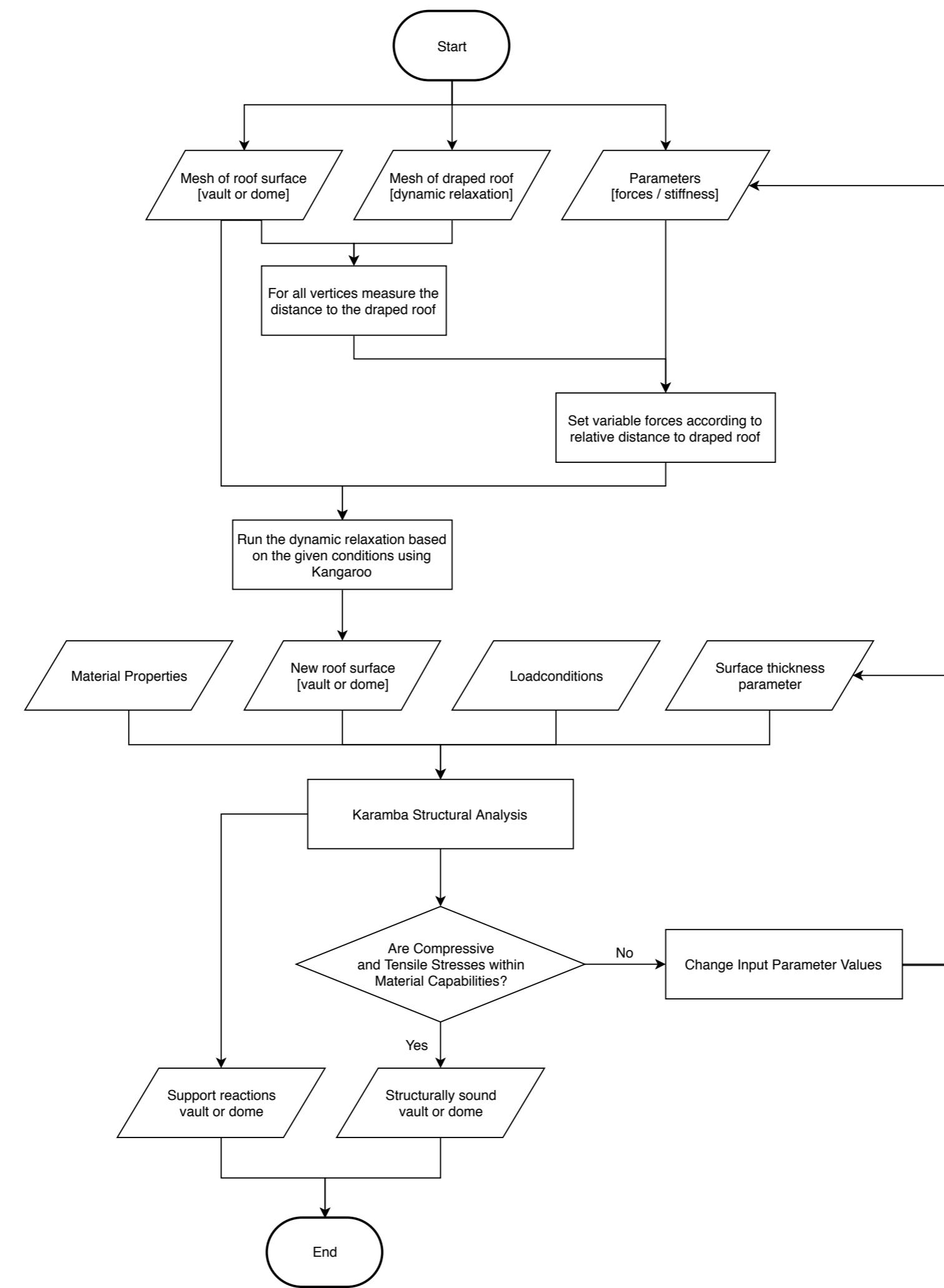
Compressive strength: 0.514 MPa

Tensile strength: 0.1 MPa

Young's modulus: 150 MPa

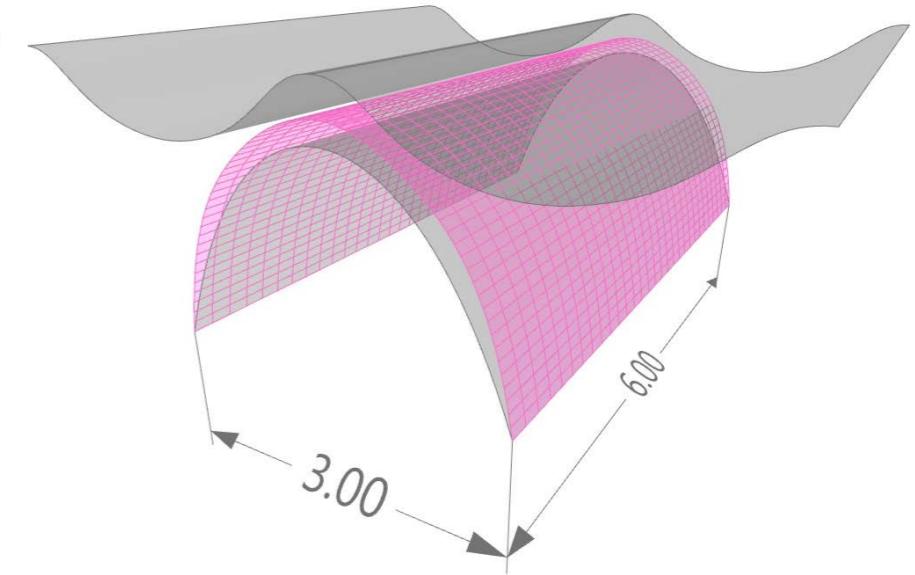
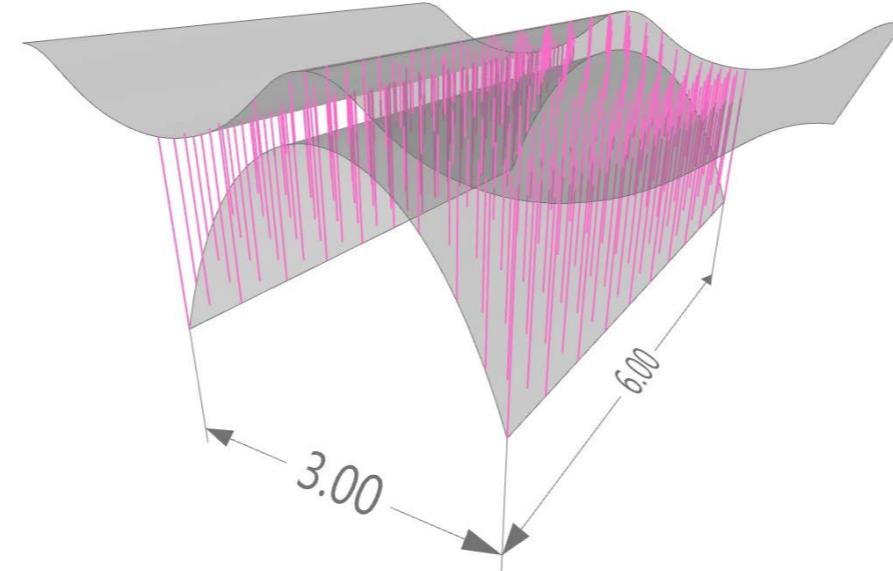
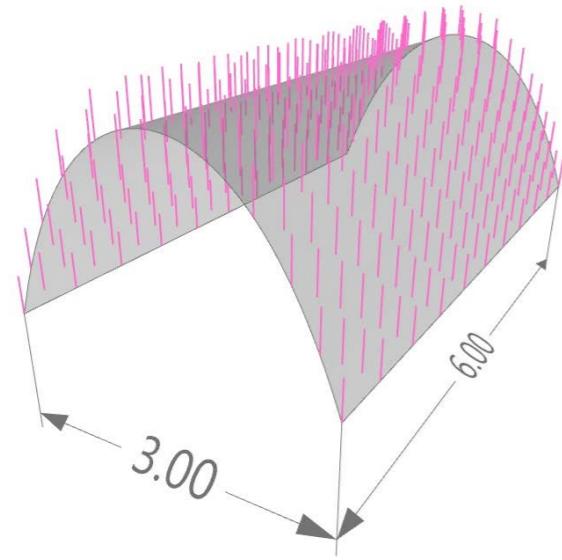
Density: 1450 kg/m³

Form - finding for Vault Module

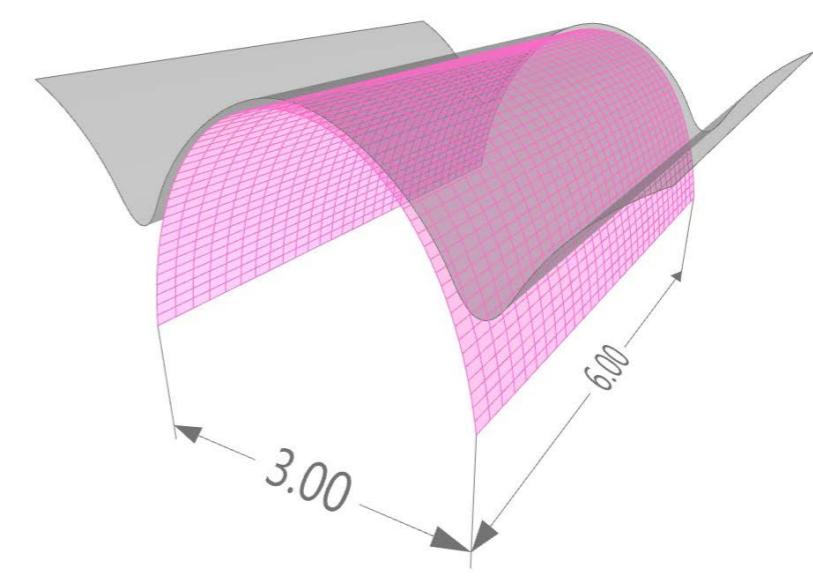
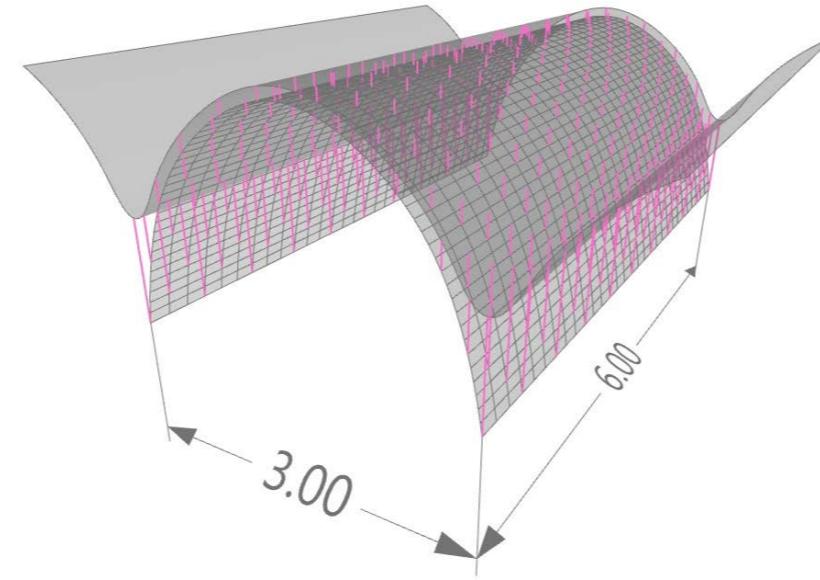
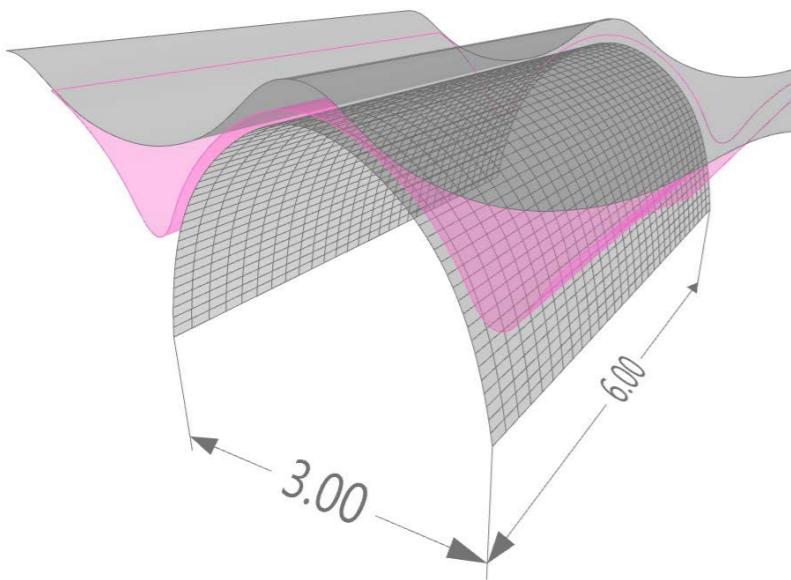


Form - finding for Vault Module

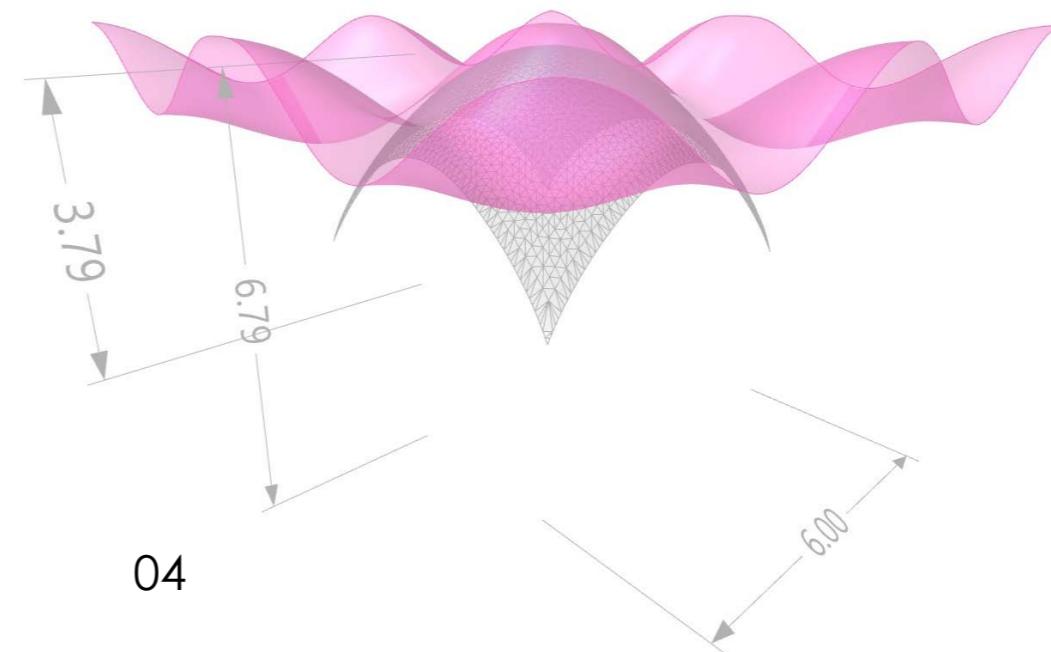
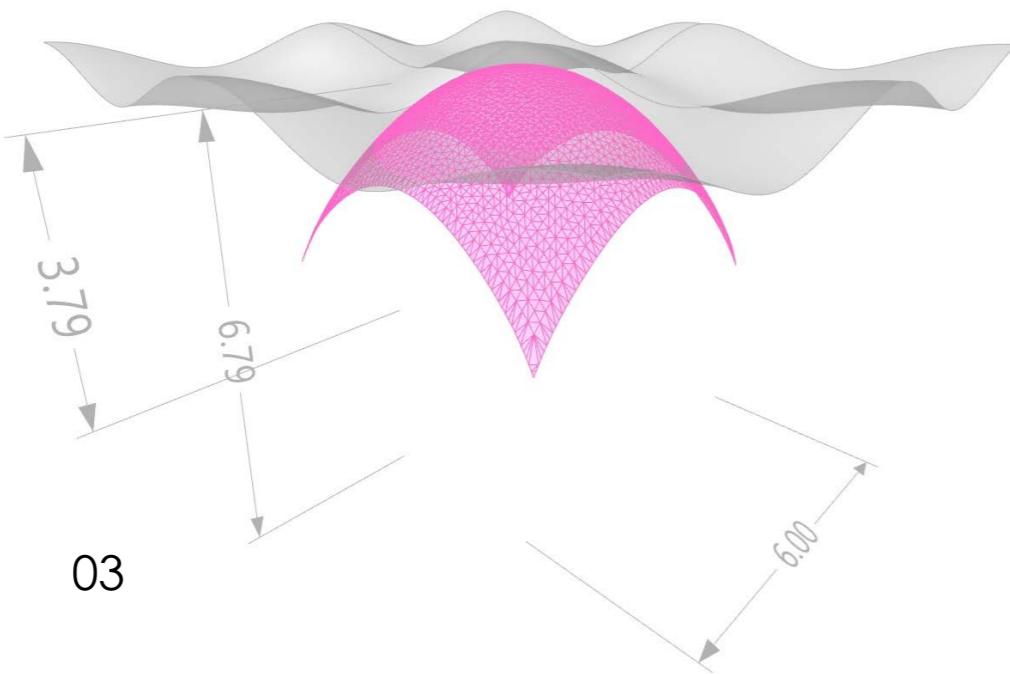
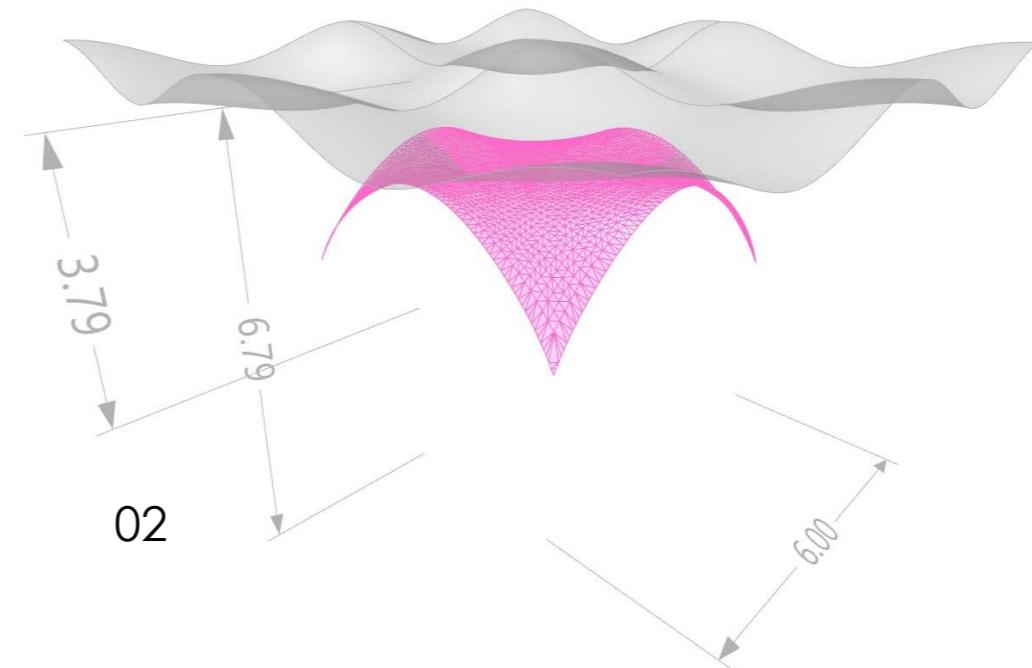
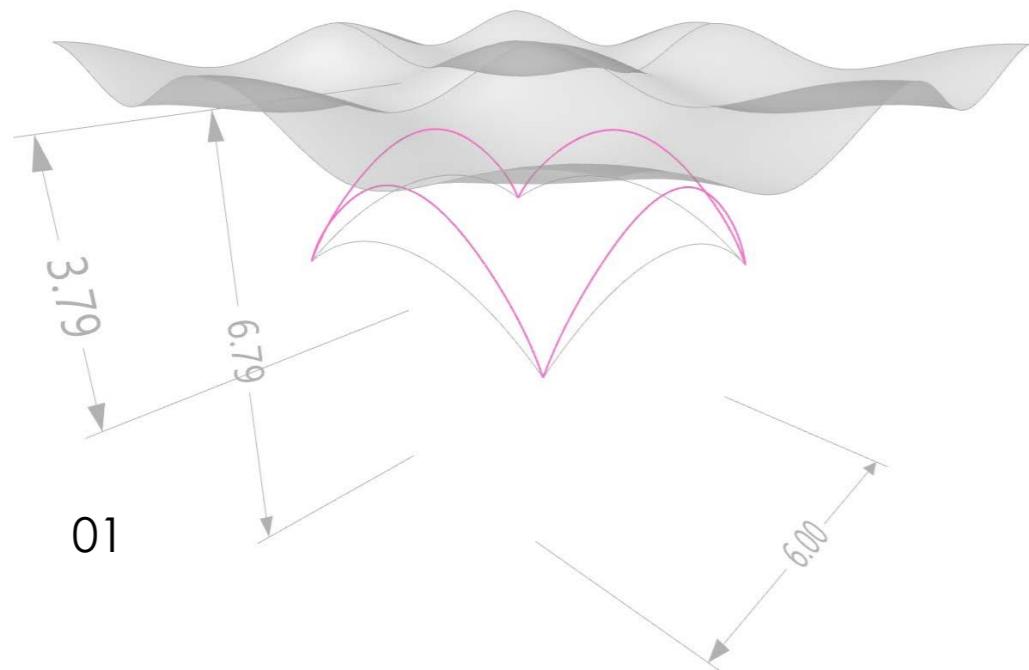
First iteration of form-finding
for vault module



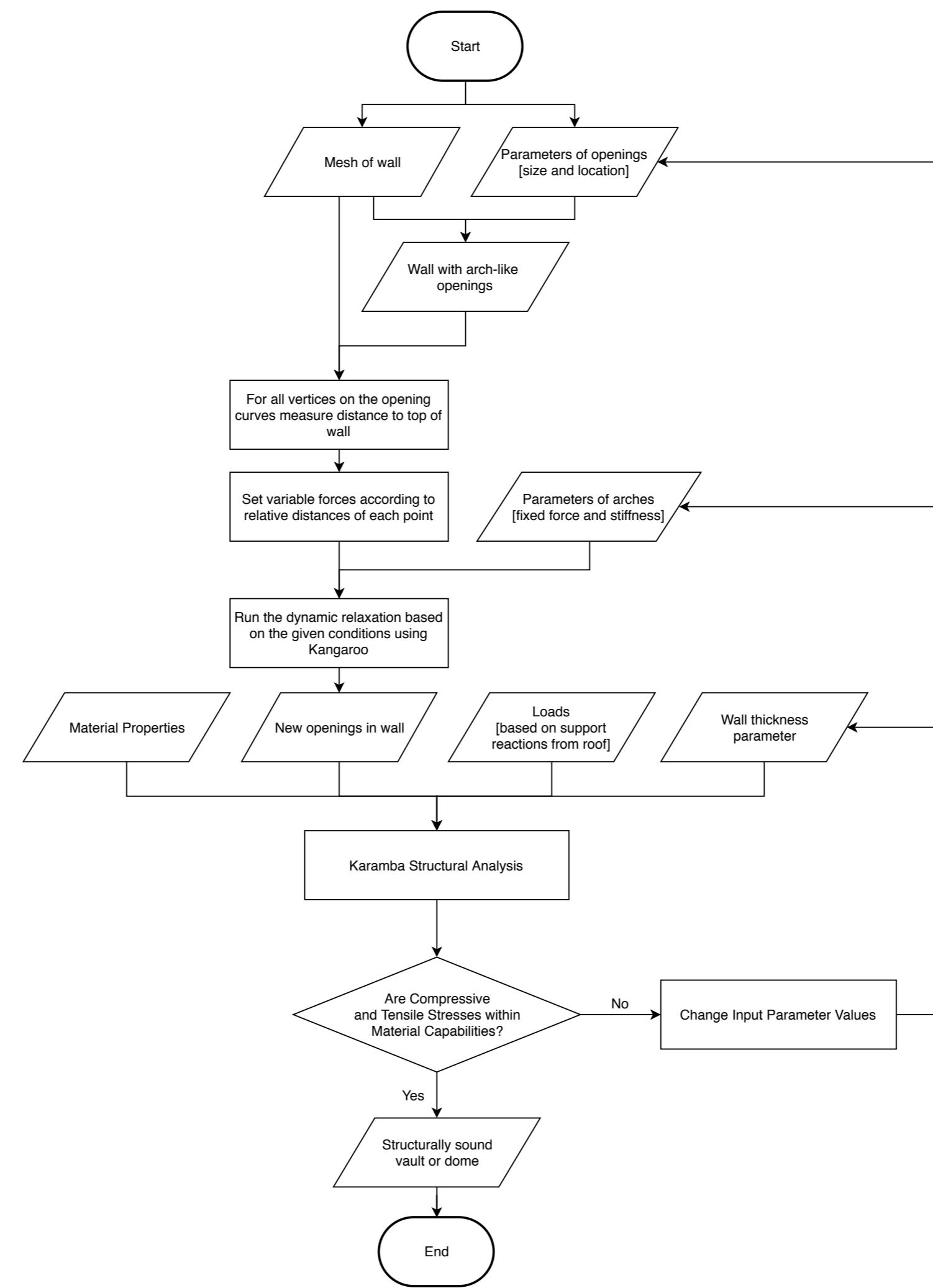
Second iteration of form-finding
for vault module



Form - finding for Dome Module

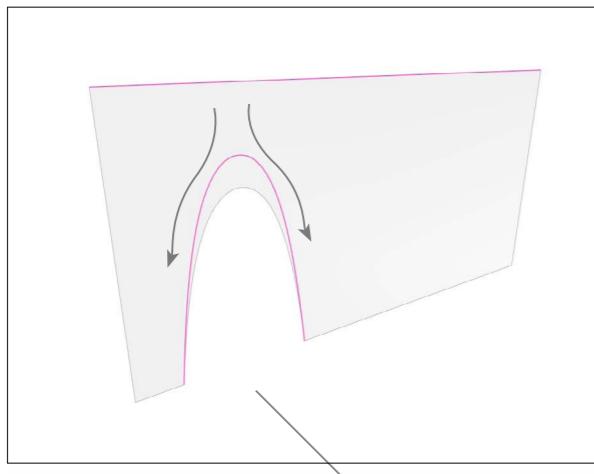


Form - finding for the Wall

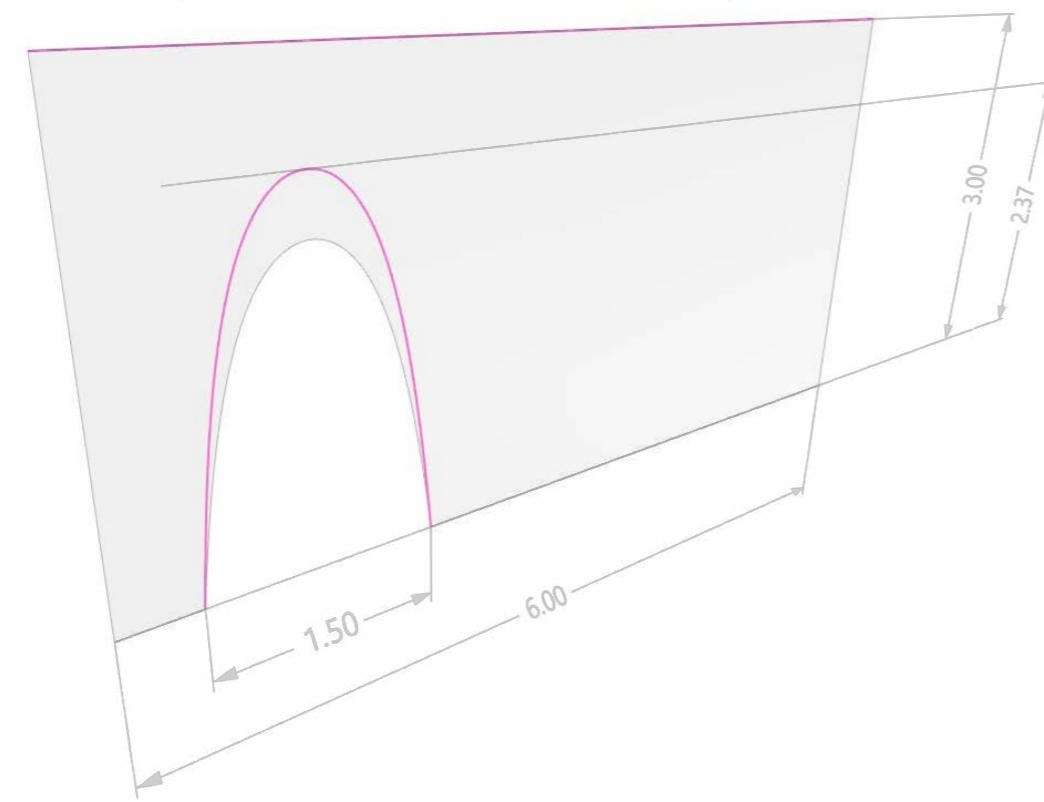
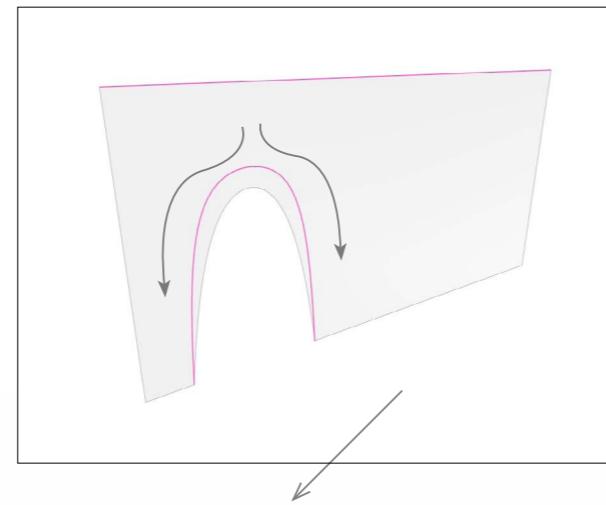


Form - finding for the Wall

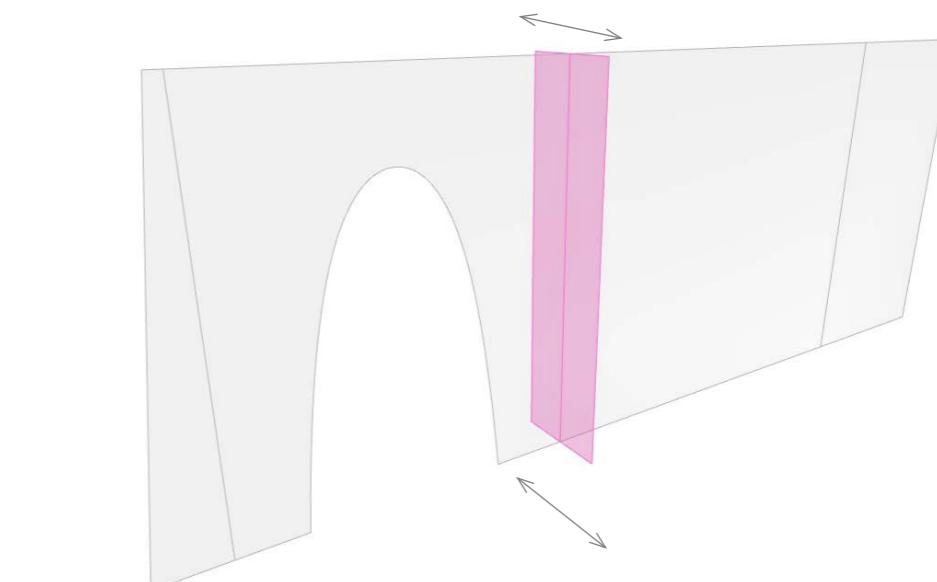
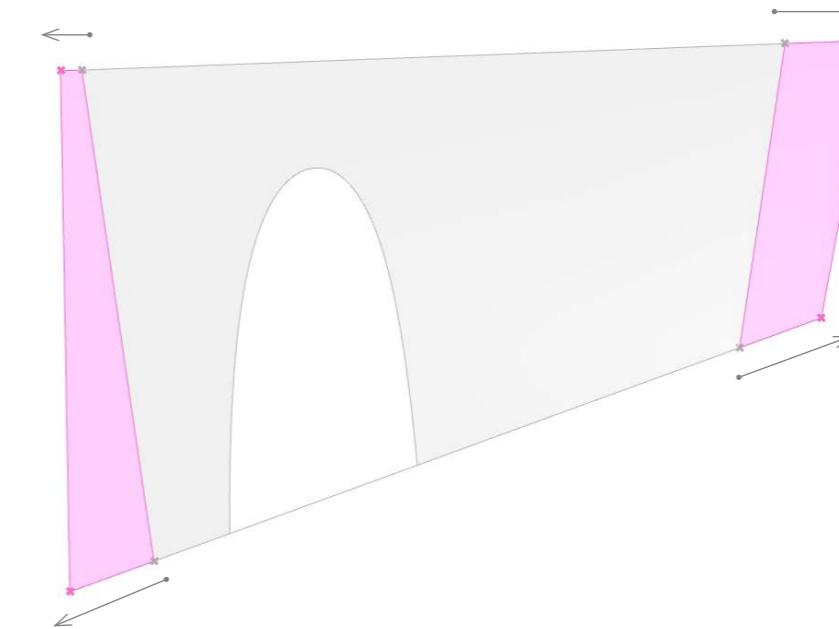
Equal forces curve



Variable forces curve

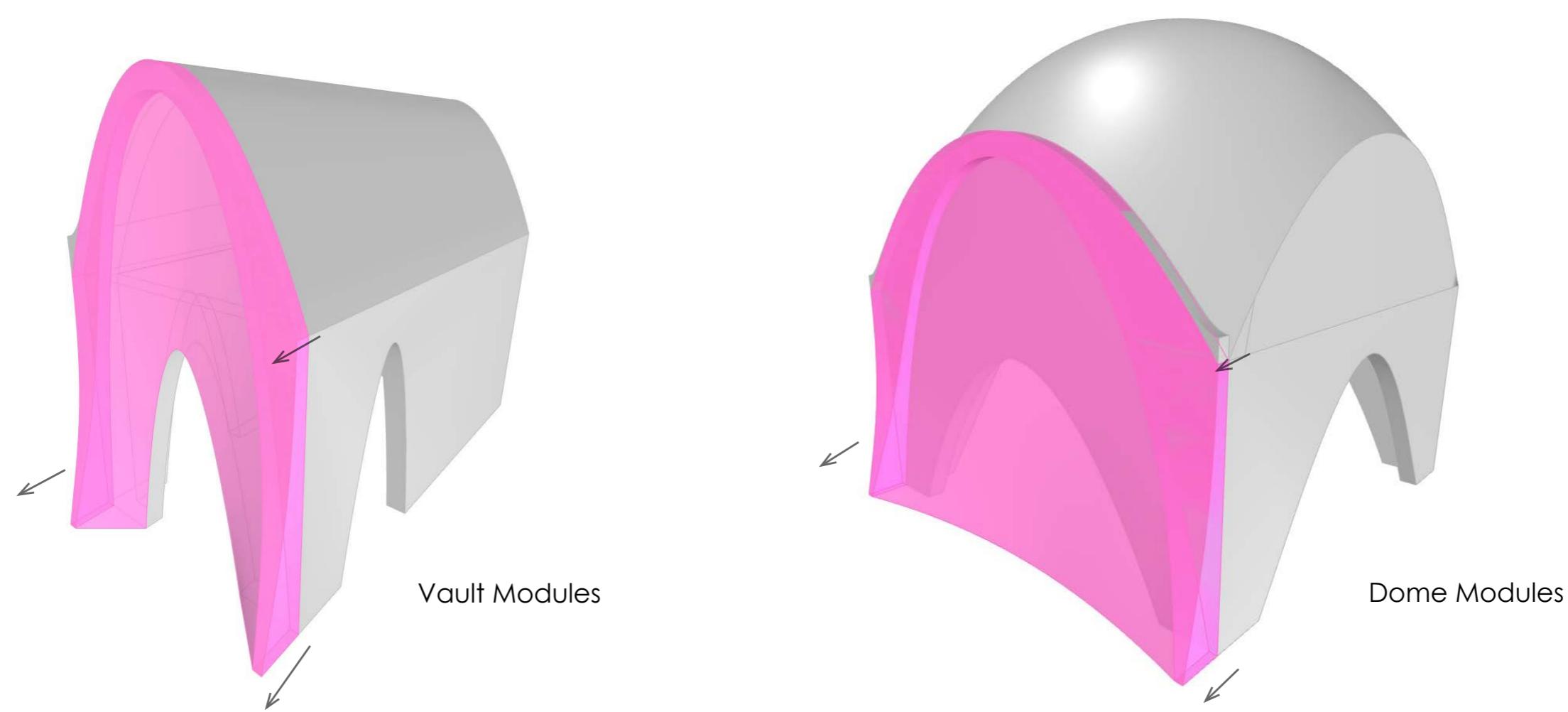


Parametrized opening position, size, shape



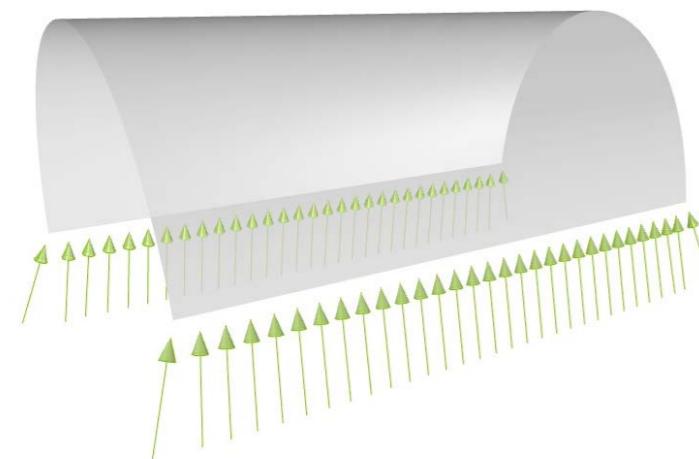
Parametrized buttresses parallel and perpendicular to wall

Shaping Buttresses

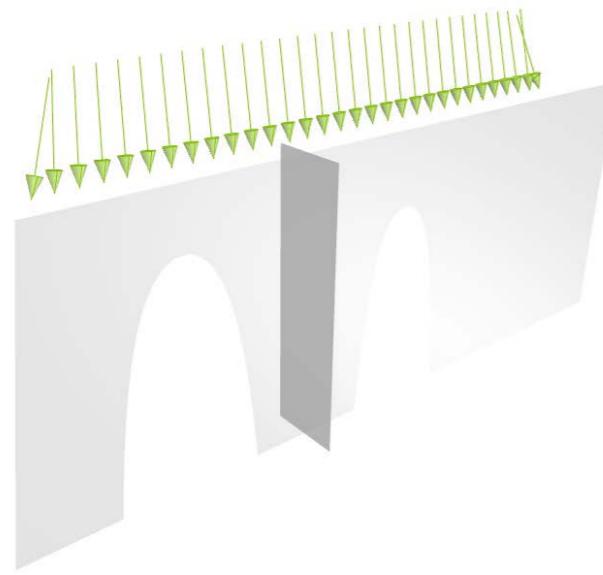


Structural Analysis

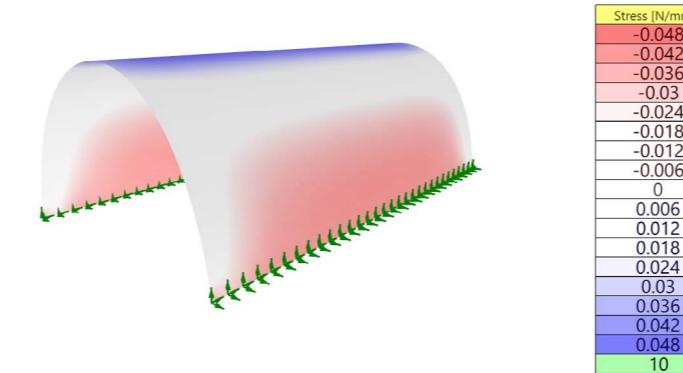
Vault Modules



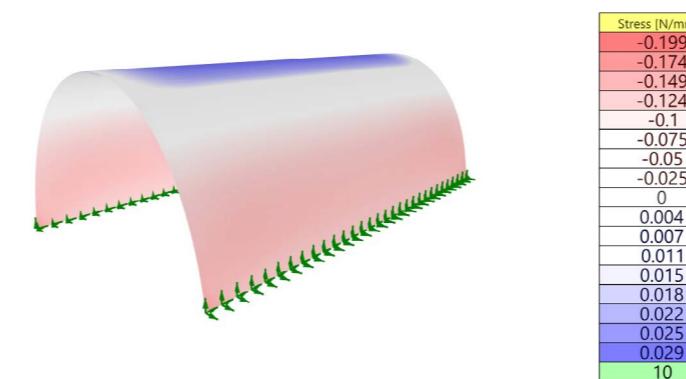
Schematization of vault model with support reactions



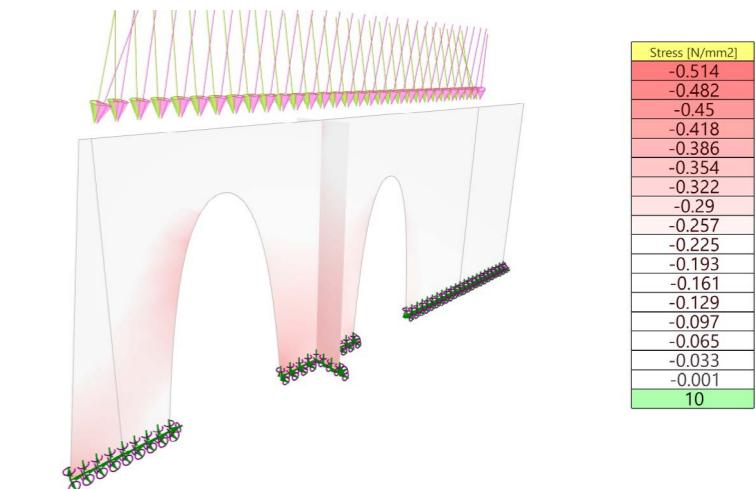
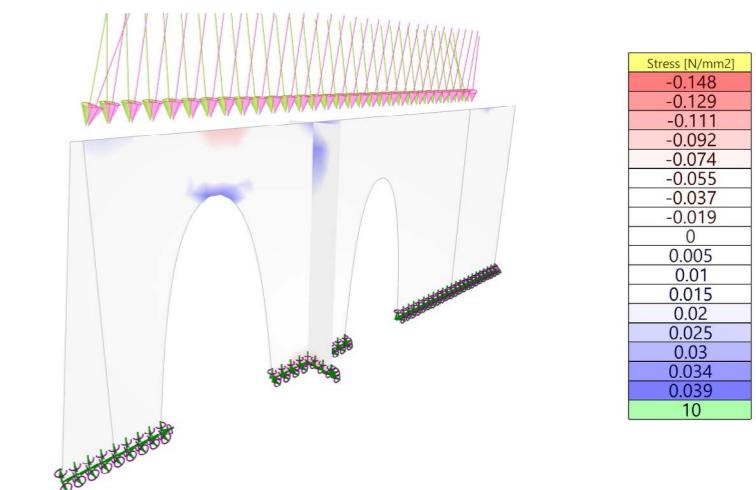
Schematization of wall with buttresses and loads,
corresponding to the support reactions of the vault



Results of structural analysis: Principal stress 1

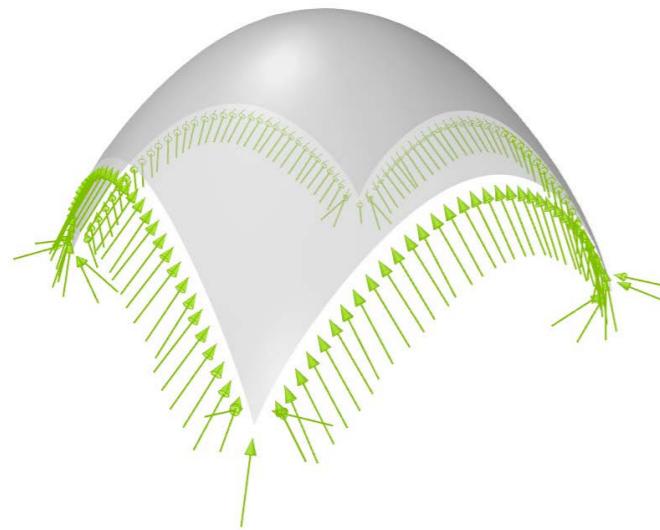


Results of structural analysis: Principal stress 2

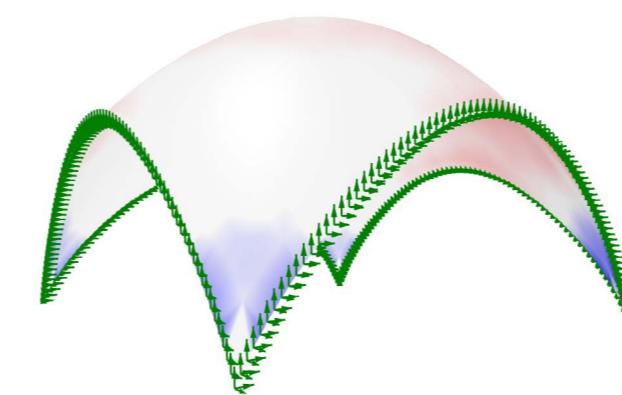


Structural Analysis

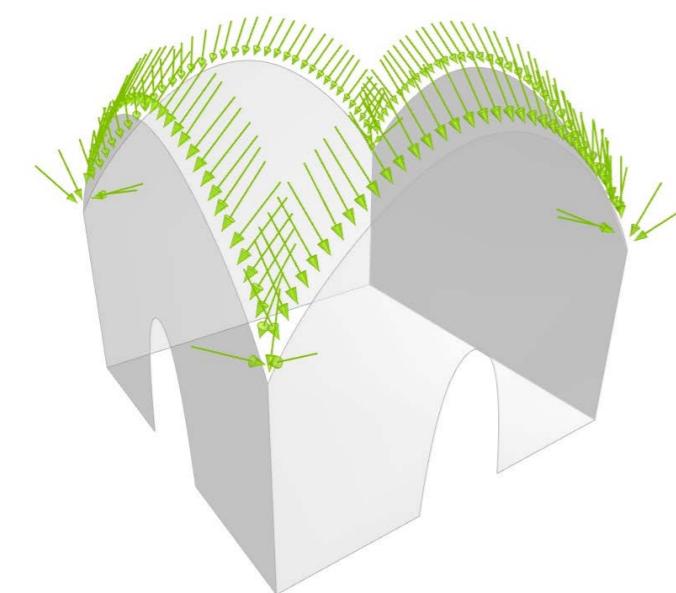
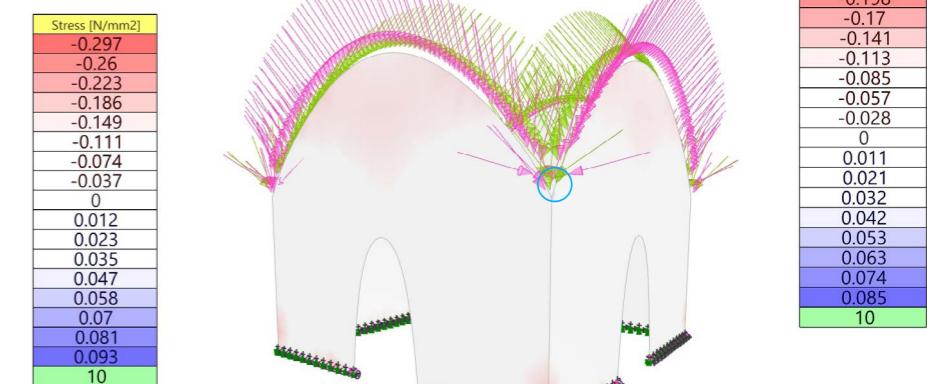
Dome Modules



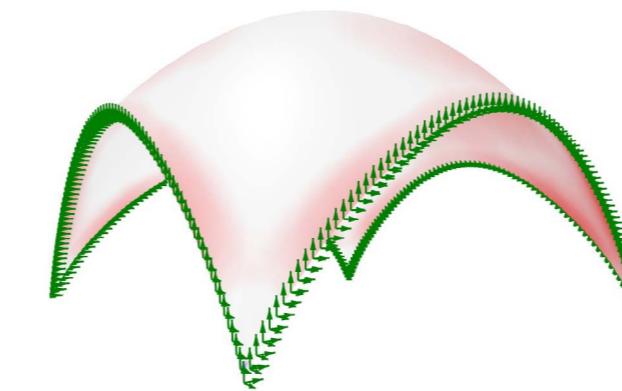
Schematization of dome model with support reactions



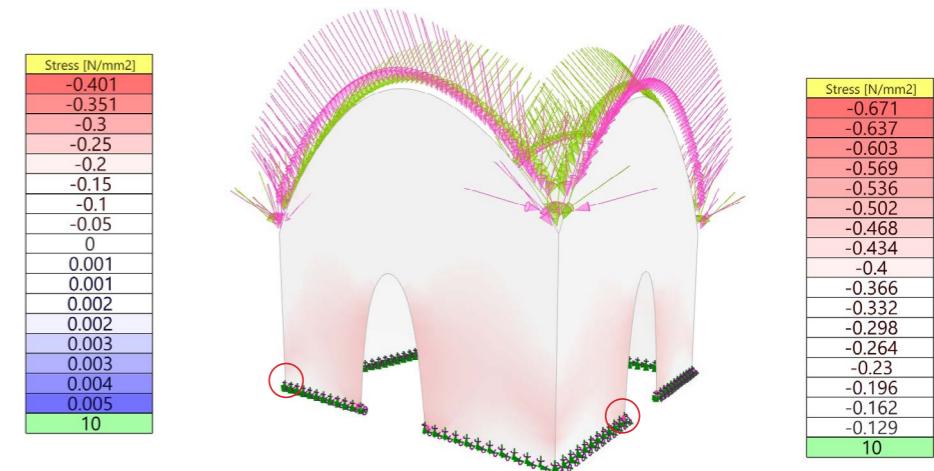
Results of structural analysis: Principal stress 1



Schematization of wall with loads corresponding to the support reactions of the vault

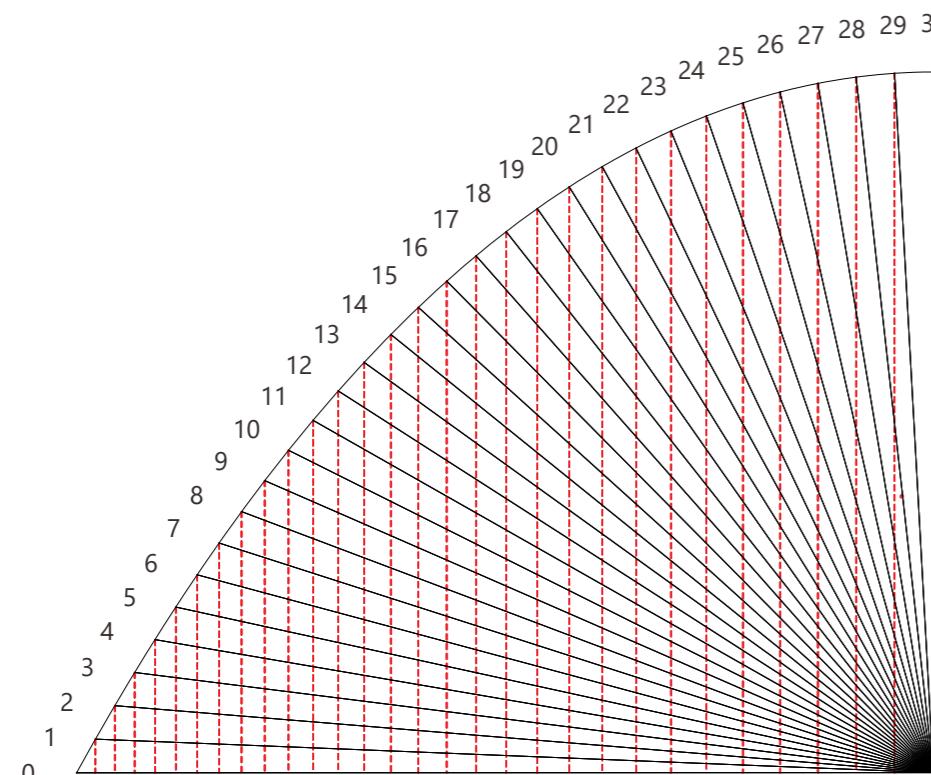


Results of structural analysis: Principal stress 2

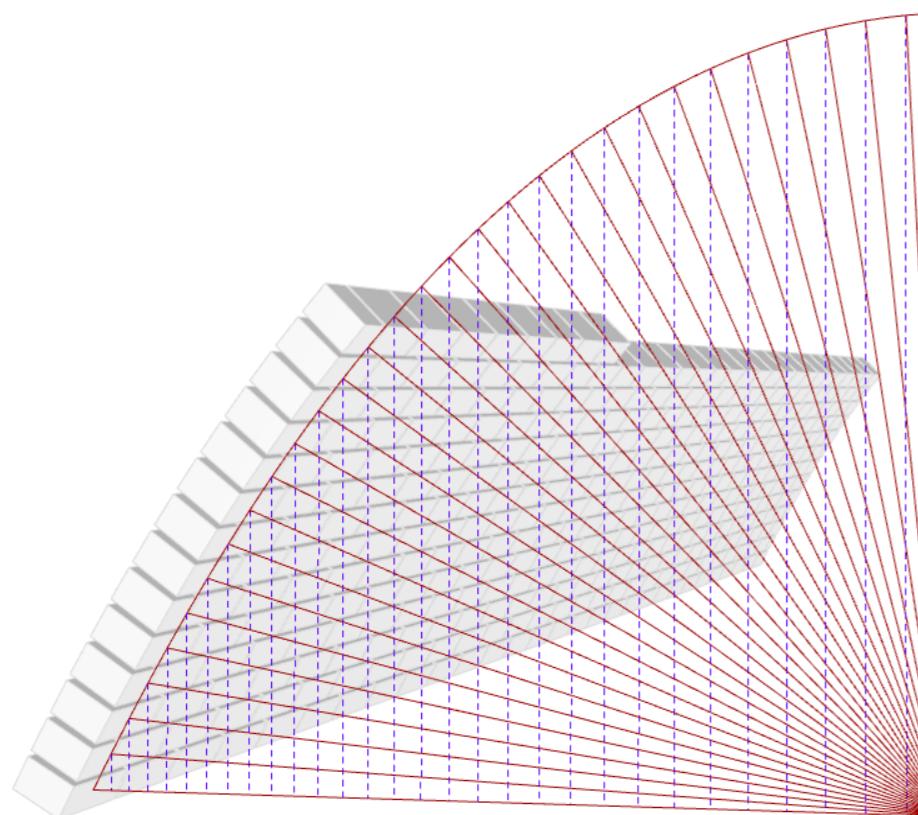


Construction Process

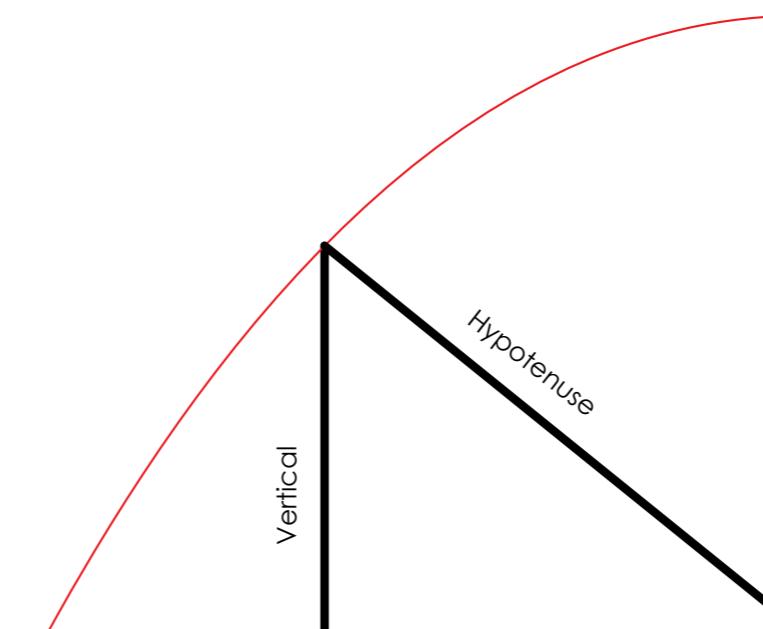
Vault and Dome



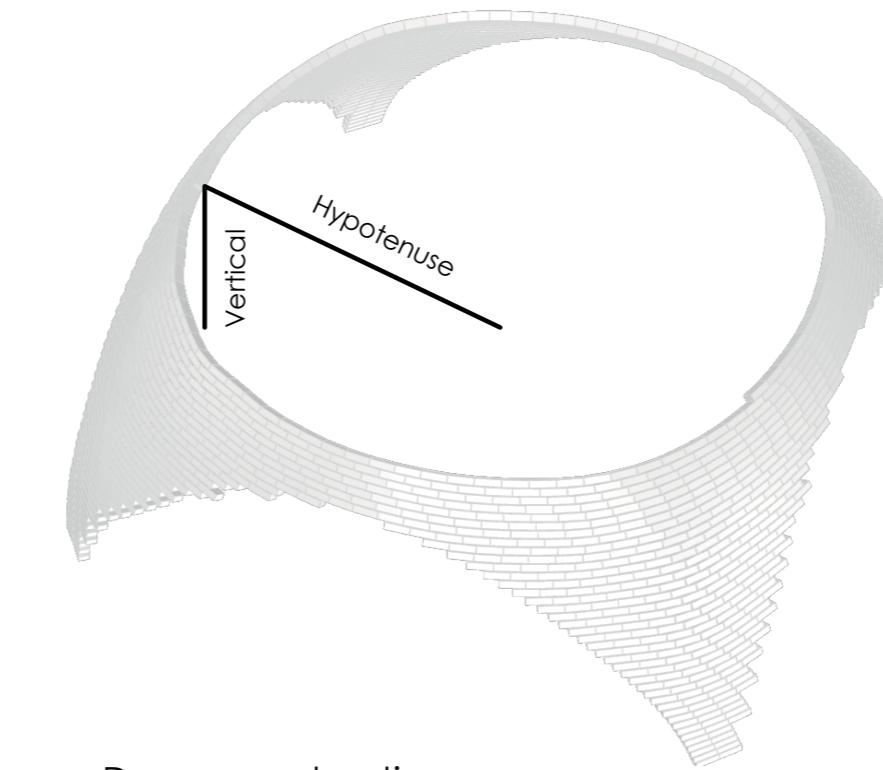
Brick layer coordinates



Vault construction



Coordinate system

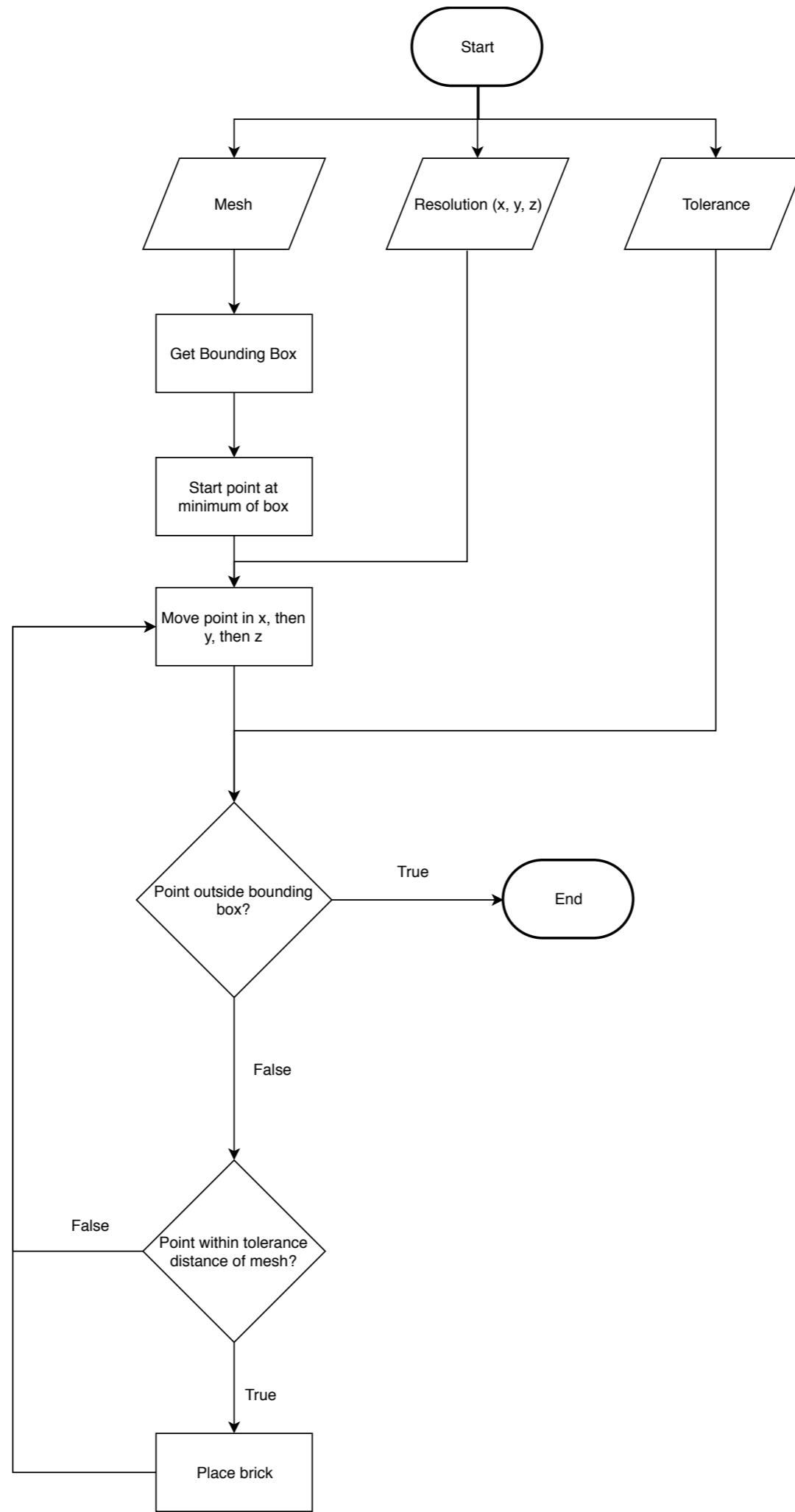


Dome construction

Number	Hypotenuse [m]	Vertical [m]
0	1.395	0
1	1.366	0.055
2	1.338	0.109
3	1.311	0.163
4	1.286	0.217
5	1.263	0.27
6	1.241	0.322
7	1.222	0.374
8	1.204	0.425
9	1.188	0.475
10	1.174	0.525
11	1.162	0.574
12	1.151	0.621
13	1.143	0.668
14	1.136	0.714
15	1.13	0.758
16	1.126	0.801
17	1.124	0.842
18	1.123	0.881
19	1.122	0.919
20	1.123	0.954
21	1.125	0.987
22	1.127	1.017
23	1.129	1.045
24	1.131	1.069
25	1.134	1.091
26	1.136	1.108
27	1.138	1.123
28	1.14	1.133
29	1.141	1.139
30	1.141	1.141

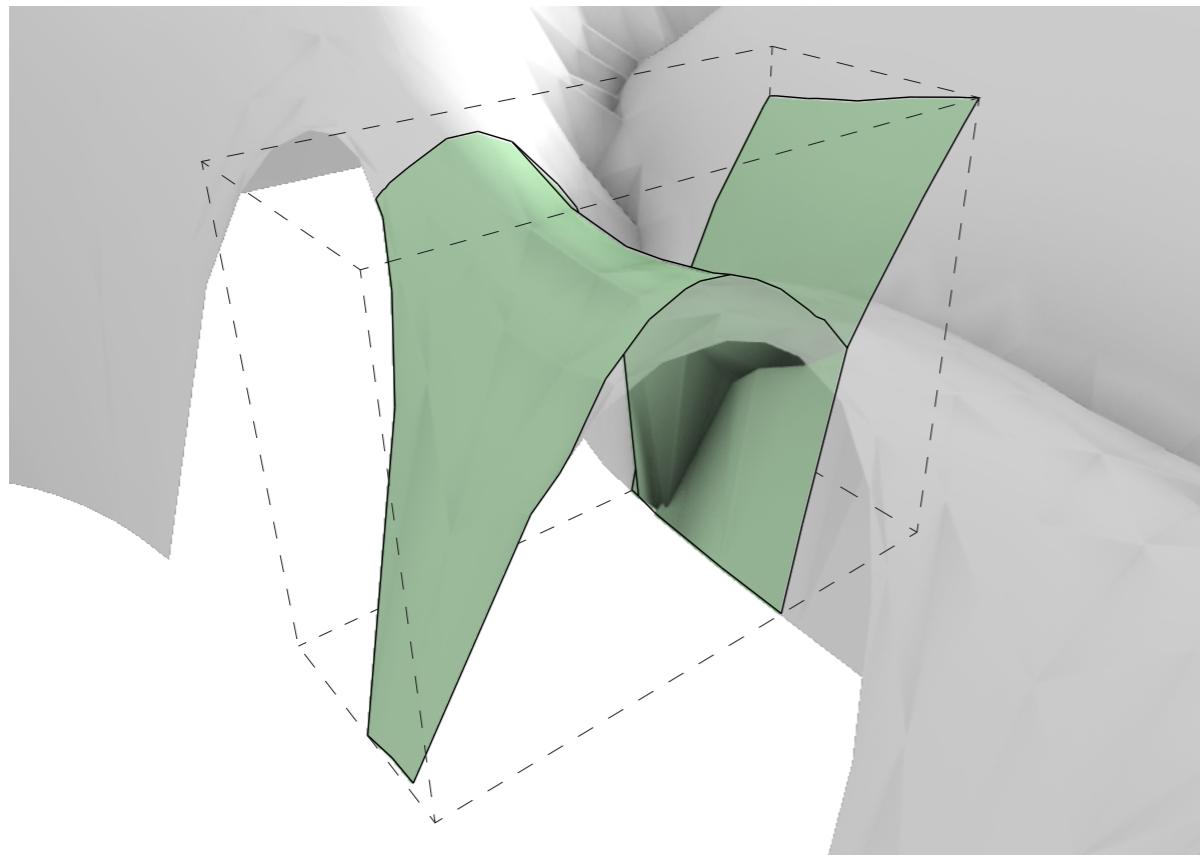
Construction Process

Voxelisation

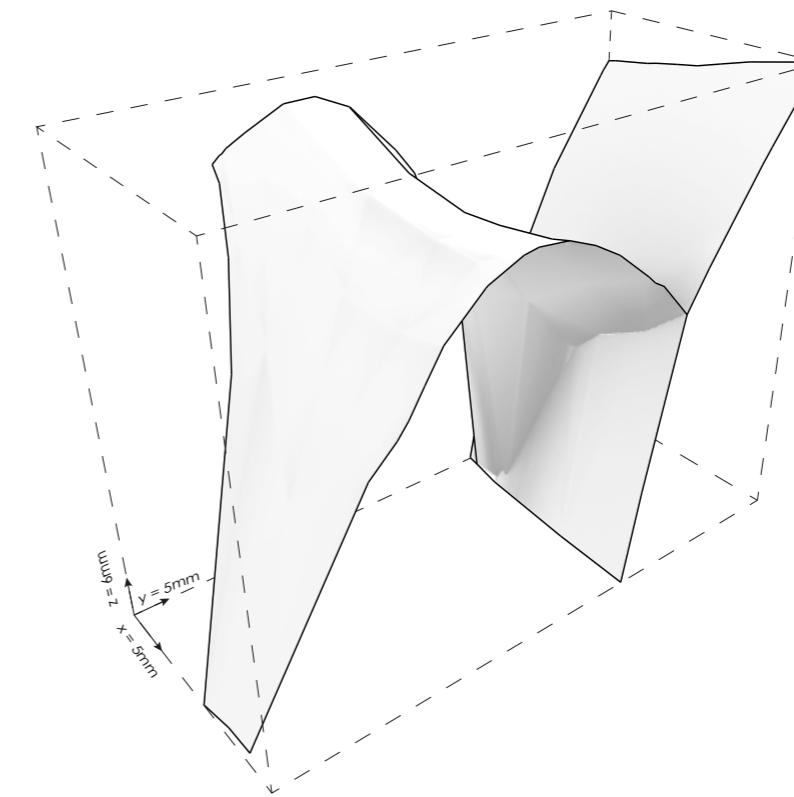


Construction Process

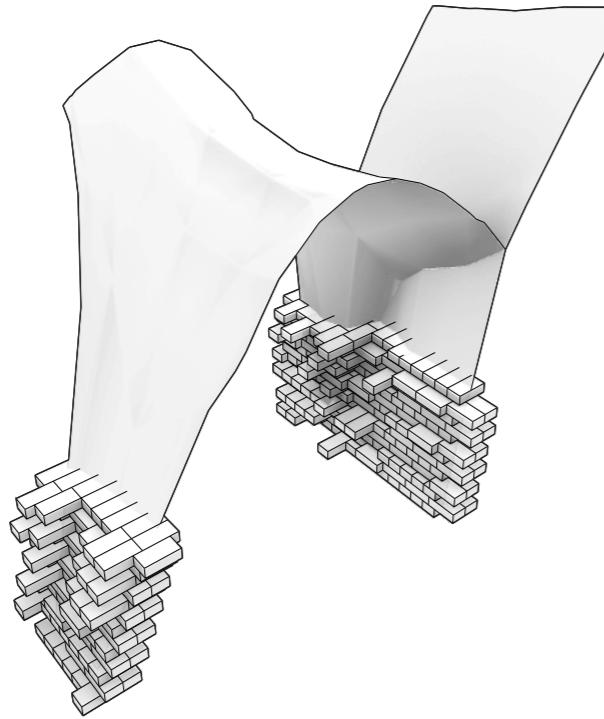
Voxelisation



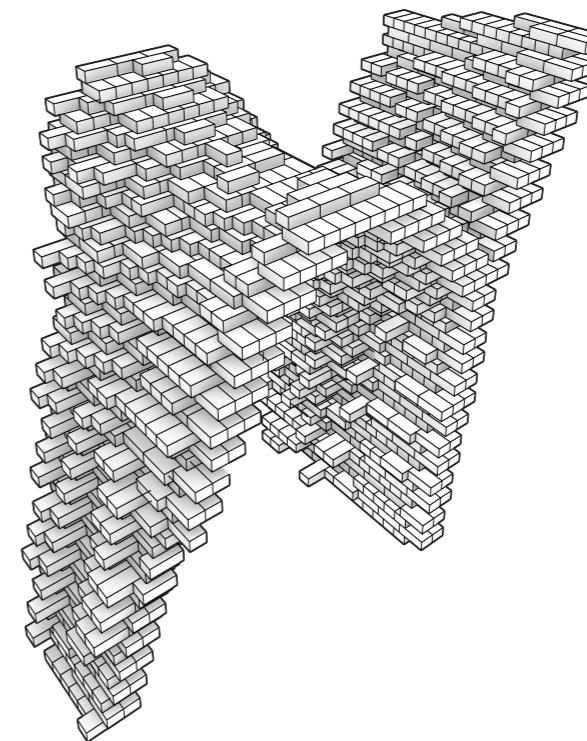
01. Input mesh



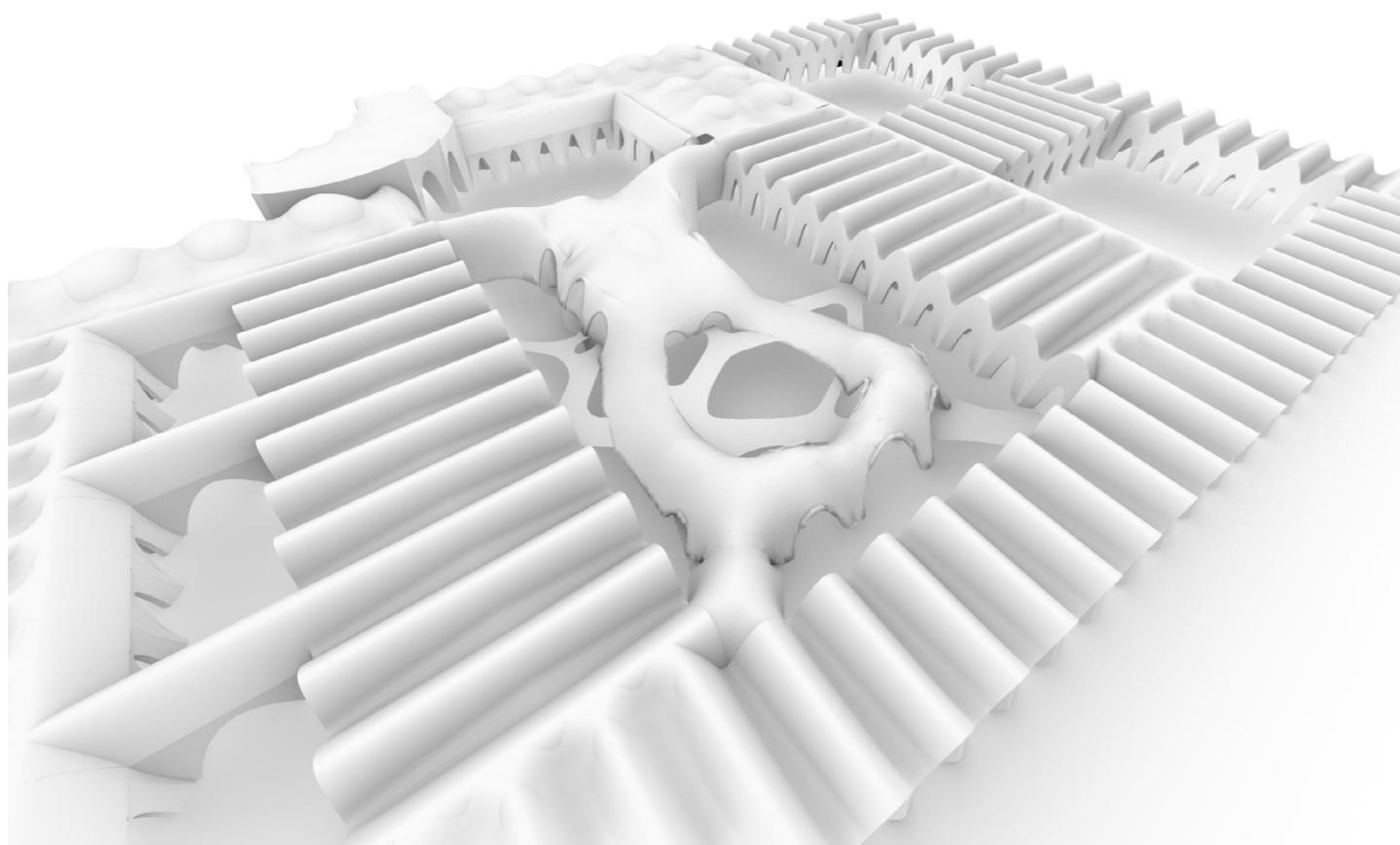
02. Move points in x, y, z



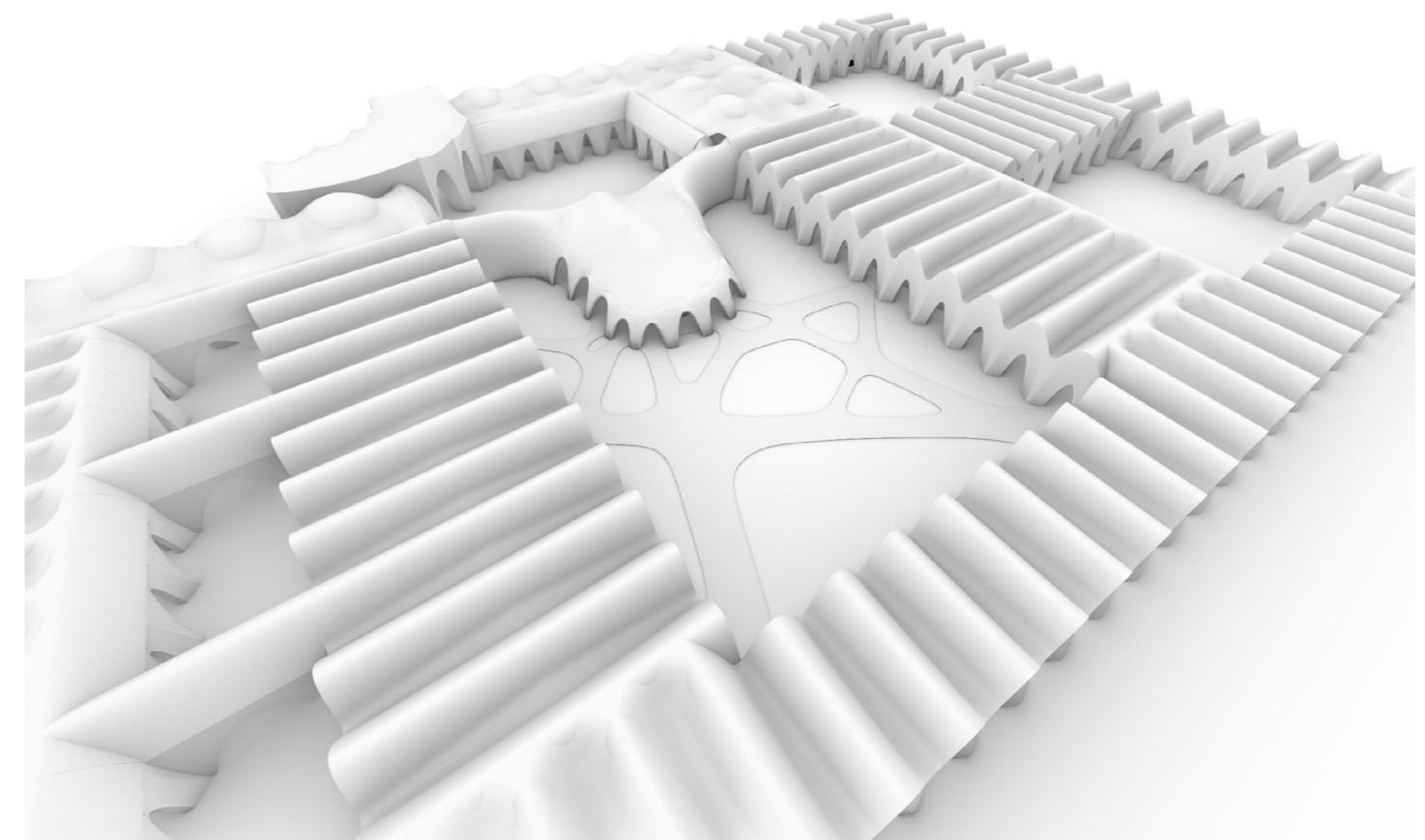
03. Place bricks on mesh



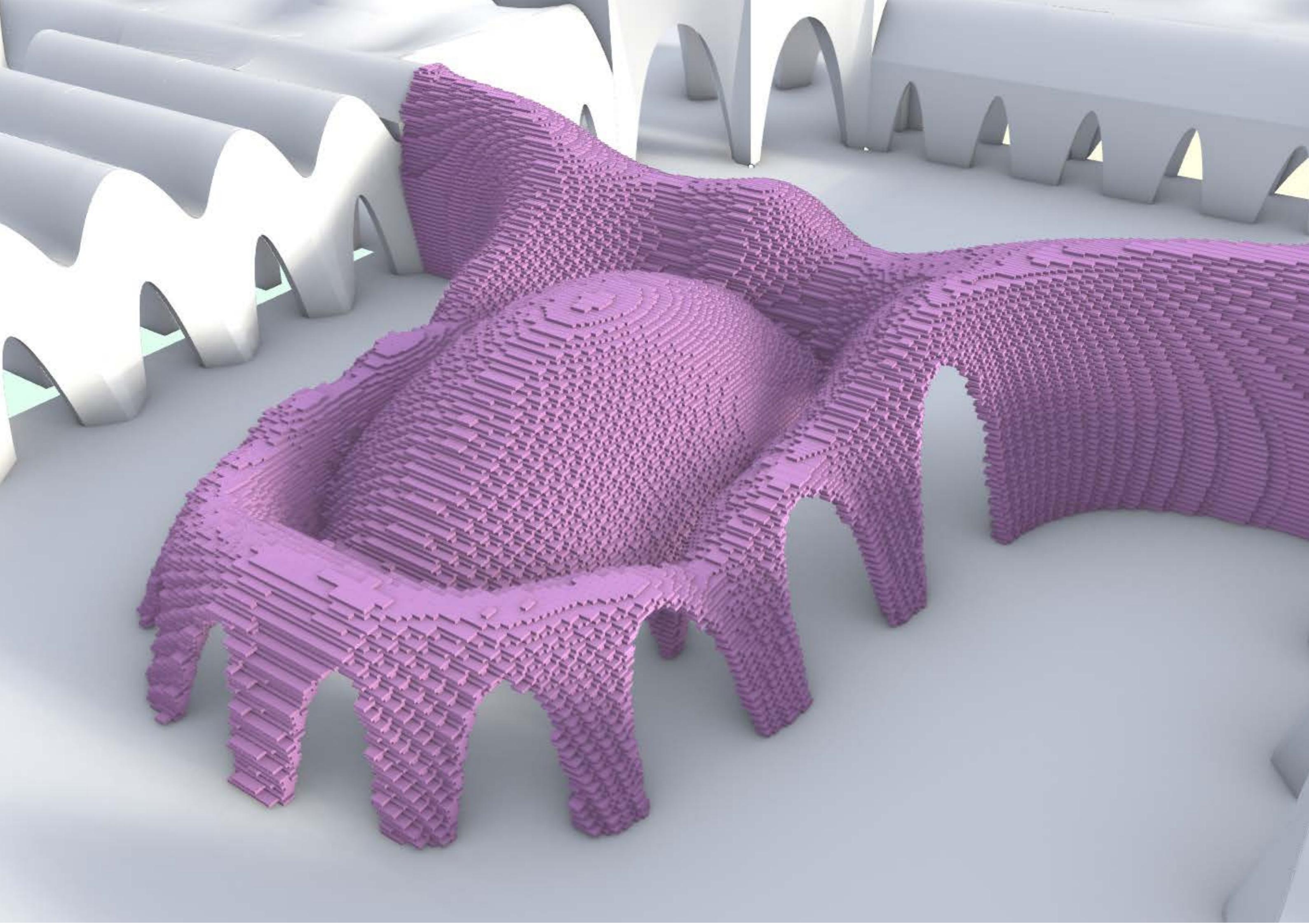
04. Voxelised mesh



01



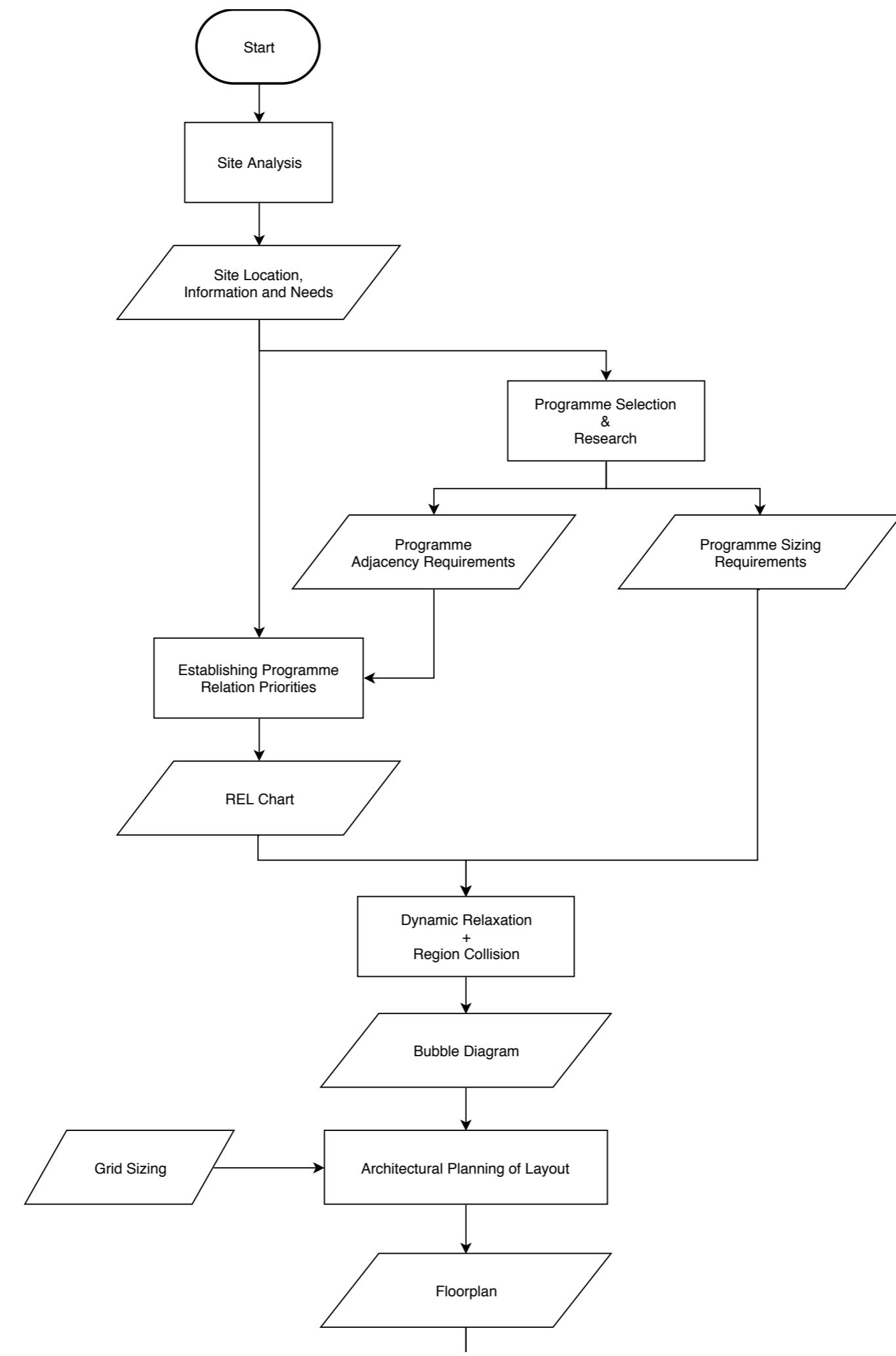
02



Thank you !



Configuration



Geometric Forming

