

Site Map

Iyo Polo

Mangroves

Ibikiri Polo

passenger boat to Okrika villages & Okrika main town
Okrika Jetty

Ibidoki Polo

TOINIPIRIMA AMA

Darick Polo

Wakrike Polo

Firisika Polo

local fishing

7

1 + 2

SITE

6 views of the site from Firisika riverbank

Mangroves

2

Amatari Polo

Ibiapu Polo

5

6 views of the site from Abo Ama

6 views of the site from fishing boats entering the bay

8

8

ABO AMA

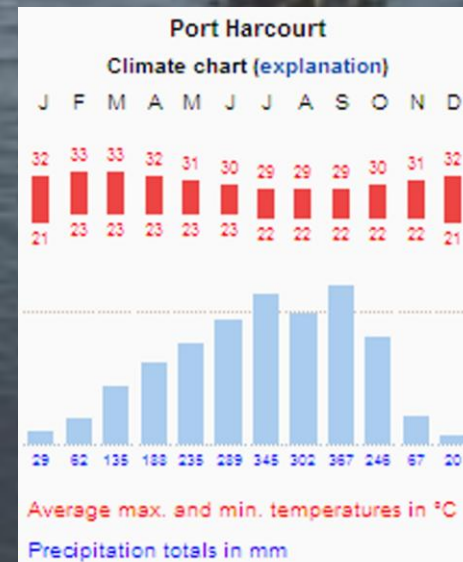
3 Boundary line between Tonipirima and Abo Ama

6 views of the site from the cemetery

N



Site analysis



Earth Conditions



Unskilled Workforce



Existing Methods of Construction





Waste Management

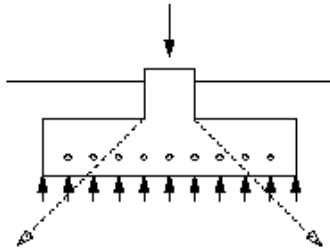


Available Materials

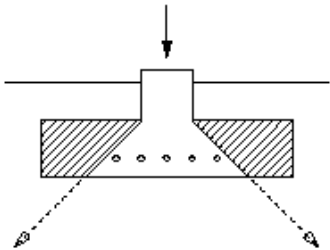


Economising on Concrete

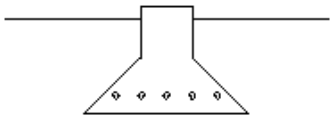
The Strip Foundation



This first image shows the generic form of a strip foundation. The two diagonal lines represent the 45 degree angle of weight distribution through the foundation.



Here we can see that all concrete above these diagonal lines is effectively free of loading, and normally is reduced for economical reasons without hindering the compressive capability of the foundation.

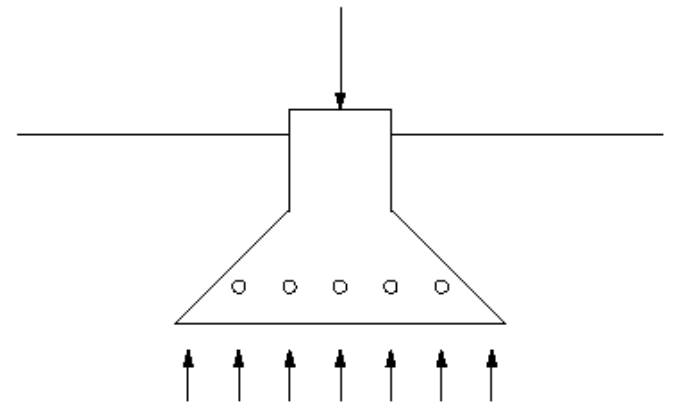


The form we are left with is that of the foundation minimised to economise on the use of concrete, while theoretically still having the same capability to carry load as the first image.

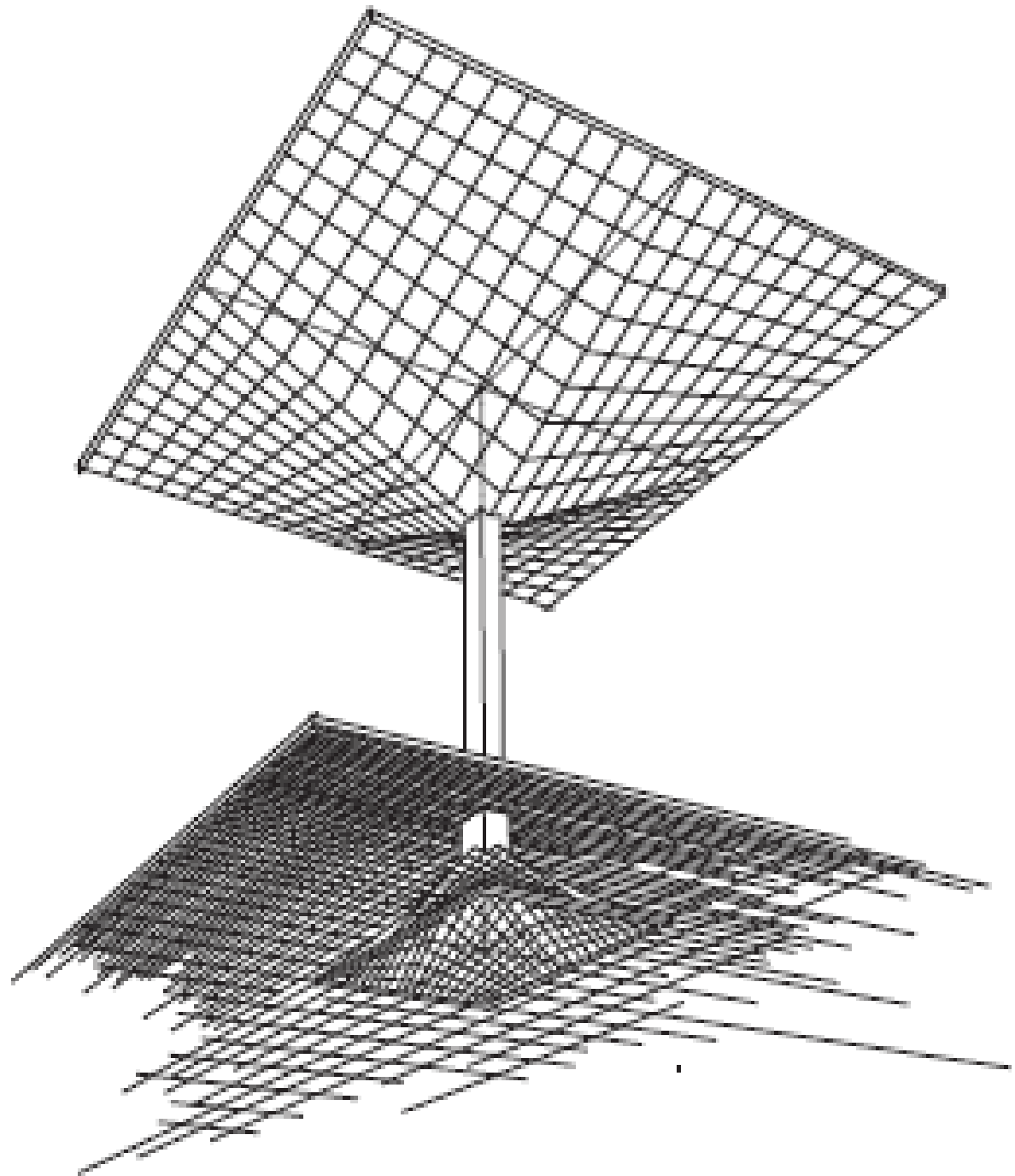
The image below shows the profile of the strip foundation system which is well suited to the site for two reasons.

1. Due to the soft boggy like nature of the ground, which has a tougher crust closer to the surface, a shallow, light weight, wide-bottomed foundation is needed to prevent the building from sinking into the soft mud.
2. This type of foundation system is easy to construct and requires no high-tech equipment or specialists, and therefore easy for the locals to use as a construction technique in the future.

Due to the fact that a strip foundation is a long continuous member steel reinforcement will be needed to prevent the concrete from cracking, while aiding to distribute loads evenly over the surface upon which it will reside.

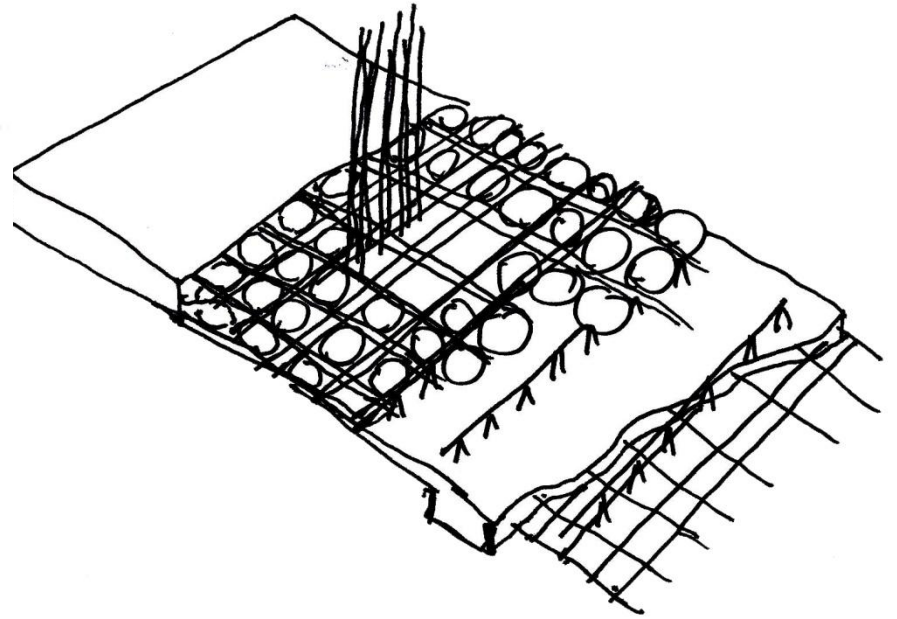
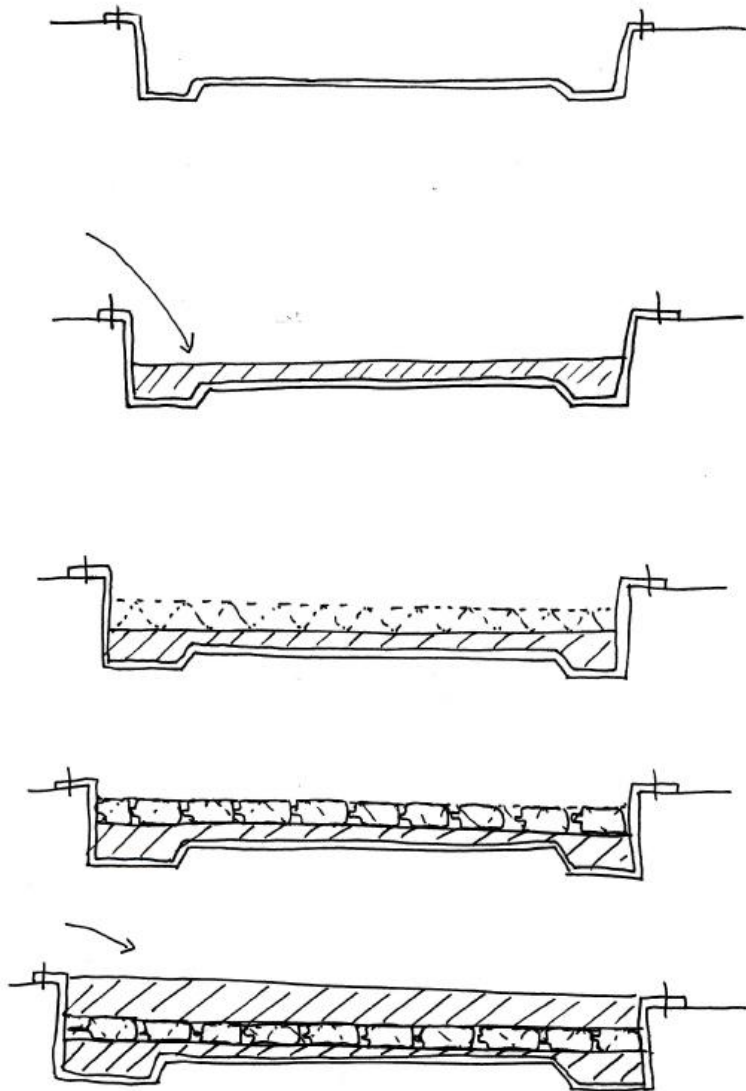


Precedents

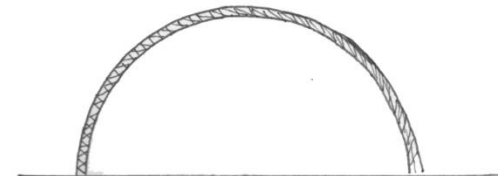
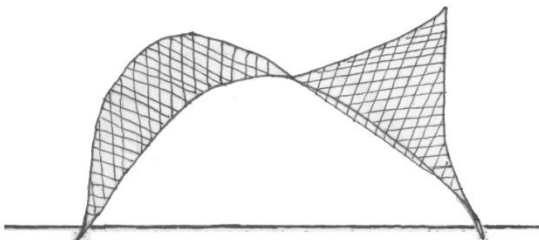
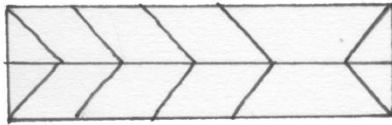
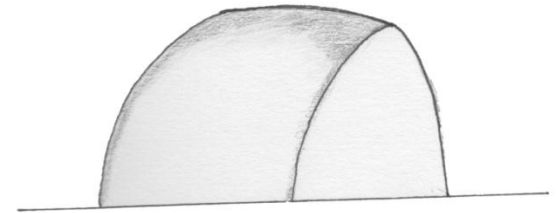
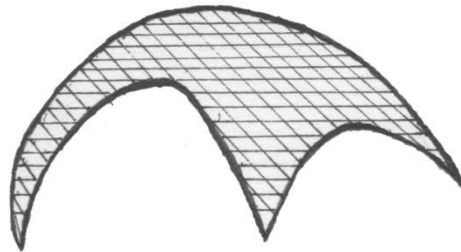
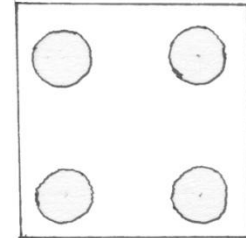
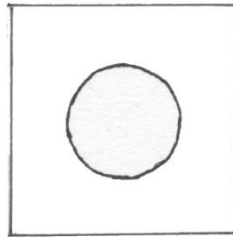
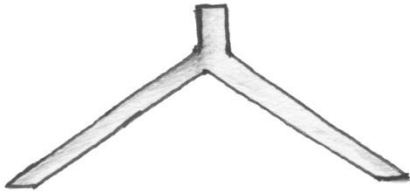




Precedents



Overall Ideas



Meeting with Article 25



Analysis Table

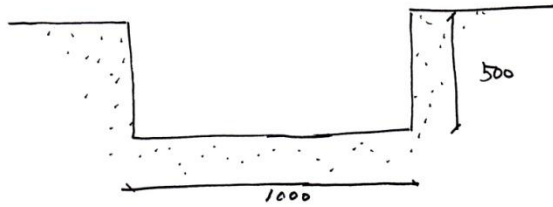
WORKSHOP 05_Port Harcourt Initial Design Analysis

1=Low 5 = High

Concept	Ease of Assembly	Materials / Cost	Environmental Criteria	Engineering Criteria	Cultural Requirements	Scoring
Option 1 : In Situ Strip	4 - Easy for pouring concrete and creating earth mound but the construction of the support systems is more labour intensive.	3 - Minimizing the amount of concrete and creating a support system which can be reused. However this support system may be an initial cost.	3 - Minimizing the amount of concrete and creating a support system which can be reused.	4 - Has the potential to be work following other precedents, however still yet to be tested by engineer calculations.	3 - No particular relation to the cultural requirements but should improve their current way of working.	17/25
Option 2 : The Canoe	4 - Easily constructed if casted in situ.	2 - Quite a large amount of concrete required unless a hollow form can be produced.	3 - Reuse of formwork will minimize materials required.	4 - Has the potential to be work following other precedents, however still yet to be tested by engineer calculations.	5 - Related to the people of the Niger Delta using the formation of the canoe	18/25
Option 3 : Waffle Form	3 - Poured in situ so easy to assemble.	3 - Minimizing use of concrete and Re-using waste products from the area to create the hollow forms.	4 - Medium use of Concrete and a method of removing waste from the area through re-use in the hollow forms.	4 - We think this could work but we need to consider methods for supporting reinforcement	5 - Waste is an issue in the Niger Delta, re-use of the waste for hollow forms will help to minimize waste issues in the area. Easy for an unskilled workforce.	19/25
Option 4 : Star Pile	1 - We don't think its feasible to construct a pile foundation in the Niger Delta because of difficulty of access and required machinery.	2 - Strong mix would be required and large piles with large amounts of concrete makes this an expensive process.	2 - No re-use of materials and large amounts of concrete.	4 - In the western world we believe this idea has potential due to the friction created by the surface area but may not work in the Niger Delta.	1 - This would not work inline with their current current process which are much simpler. Could not be undertaken without access to machinery and skilled workforce.	10/25
Option 5 : The Tent	2 - Easy to manufacture but labour intensive.	3 - Very Cheap to build with minimal concrete. Expense could be found in the mesh.	4 - Minimal use of concrete and no need for movement of large amounts of soil	3 - Not yet tested before so to be qualified by the Engineer.	2 - No particular relation to the cultural requirements and may increase labour requirements.	14/25

Step by Step

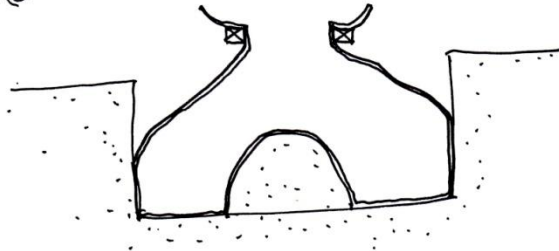
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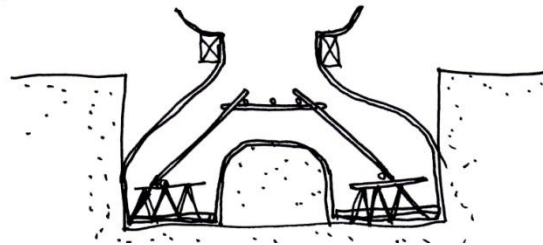
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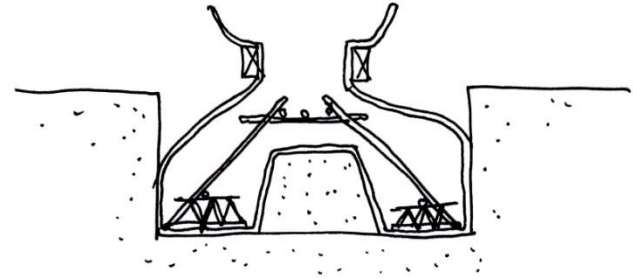
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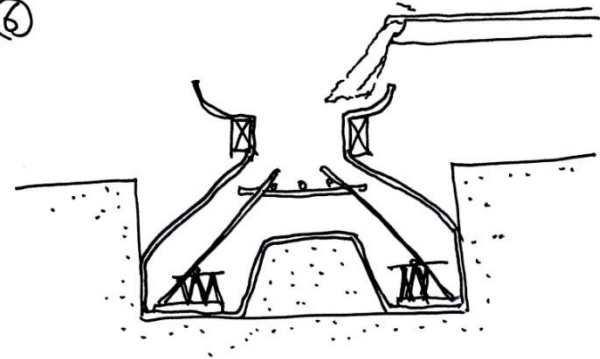
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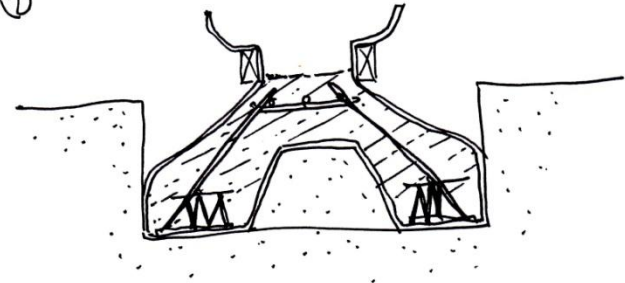
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⑥



⑦



Step by Step



Canoe Strip Foundation



L
E
V
E
L
4





SHARP/GRIT SAND

SHARP/GRIT SAND

SHARP/GRIT SAND

SHARP/GRIT SAND

SHARP/GRIT SAND

SHARP/GRIT SAND

SHARP/GRIT SAND

level 1

a

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n

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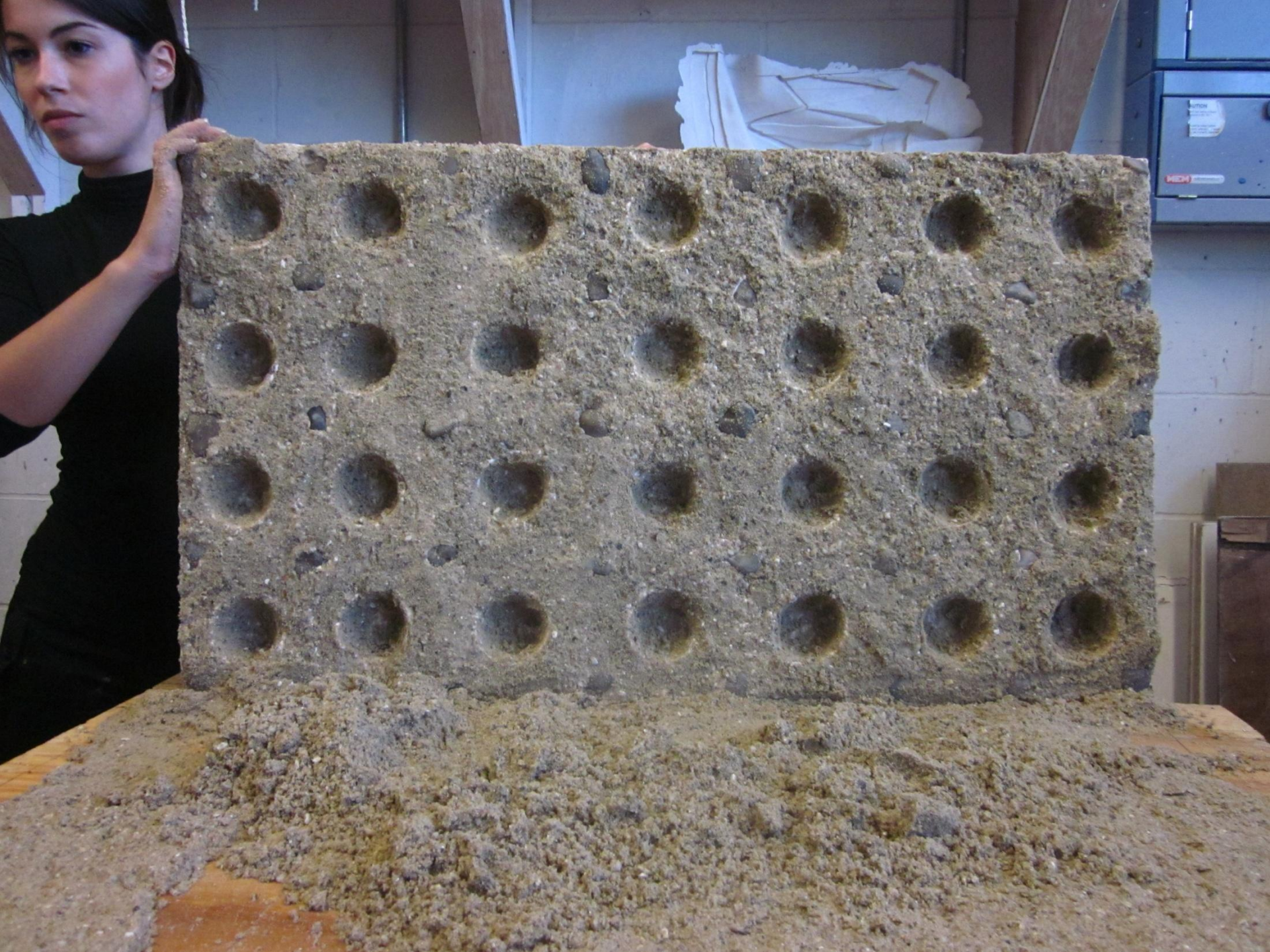
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PRICE

Hollow Raft Foundation







Canoe Strip Foundation



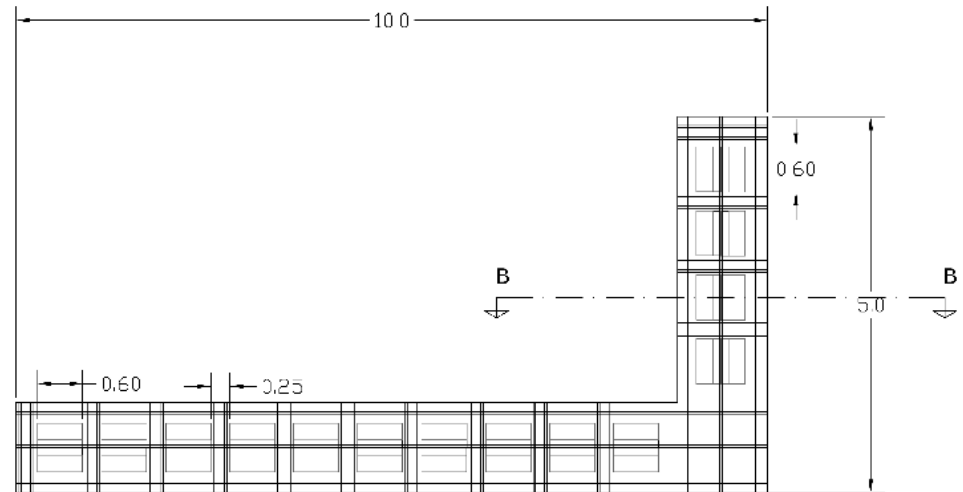
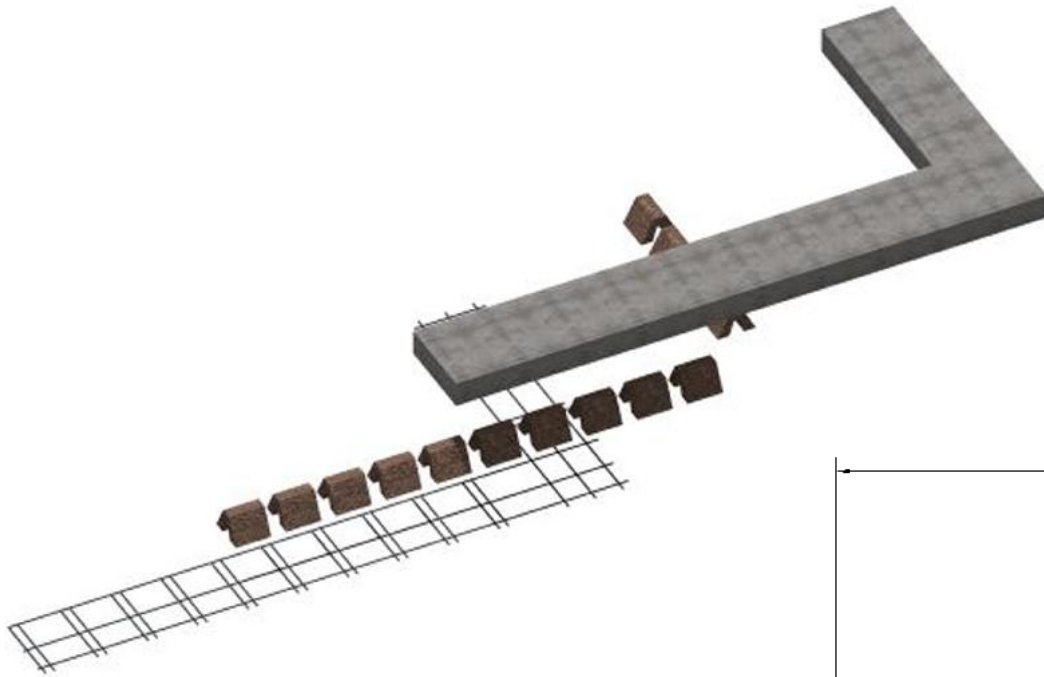




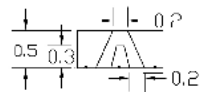




Economised Concrete

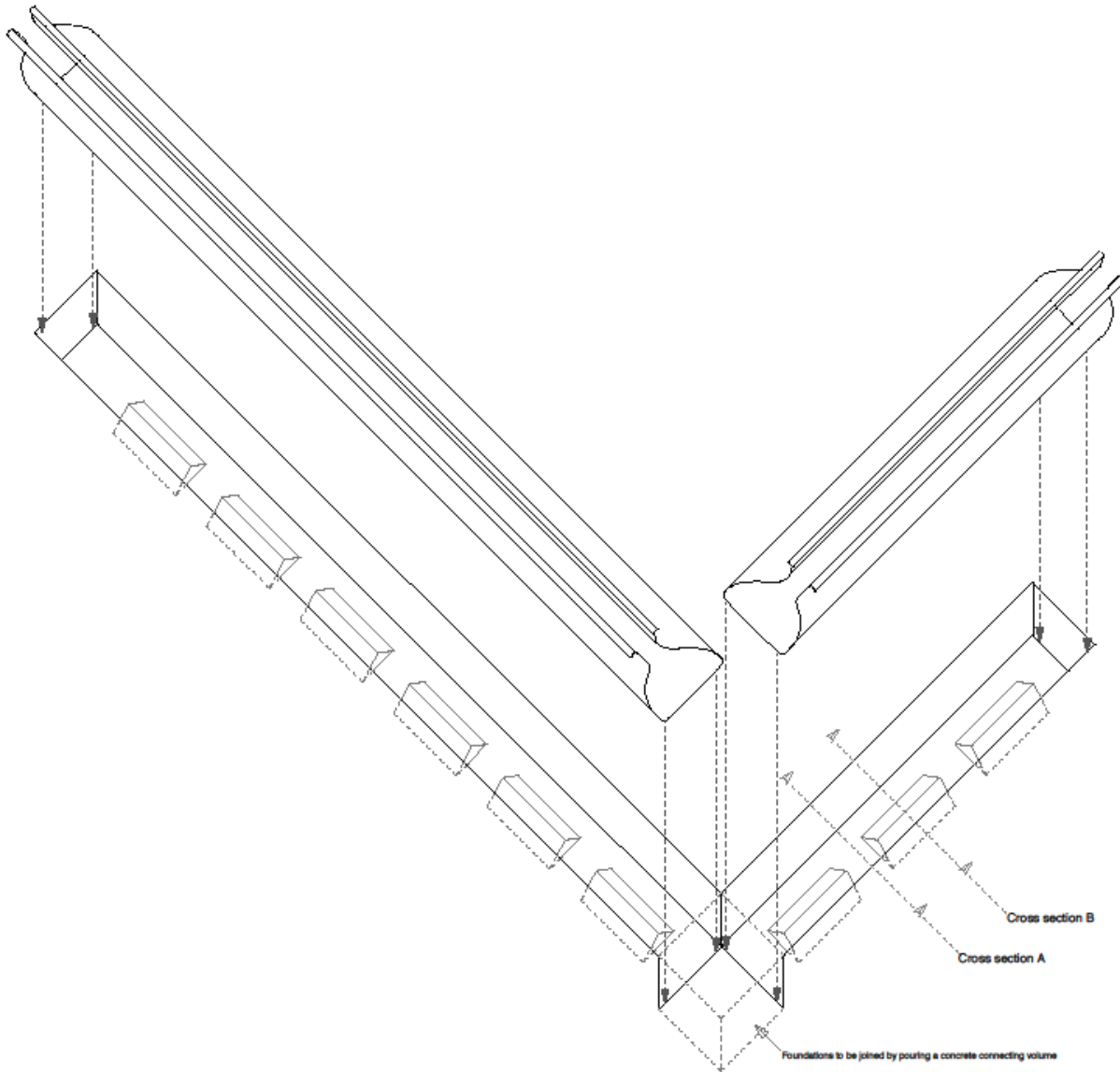


Plan



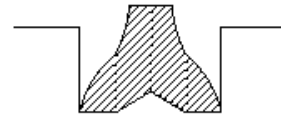
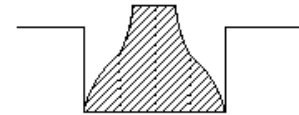
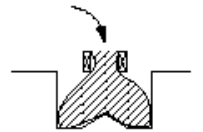
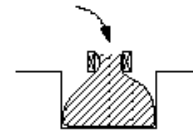
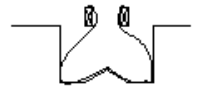
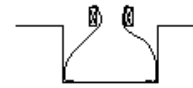
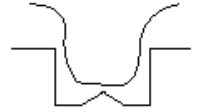
Section B-B

Foundation proposal - Exploded Axonometric & Casting Cross Sections



Cross section A

Cross section B



Hollow Raft Foundation





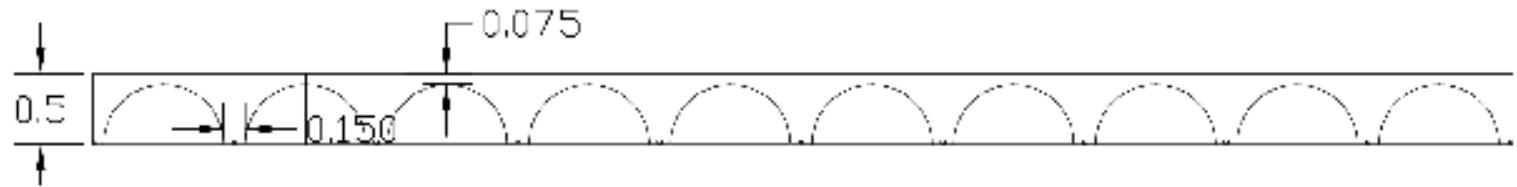
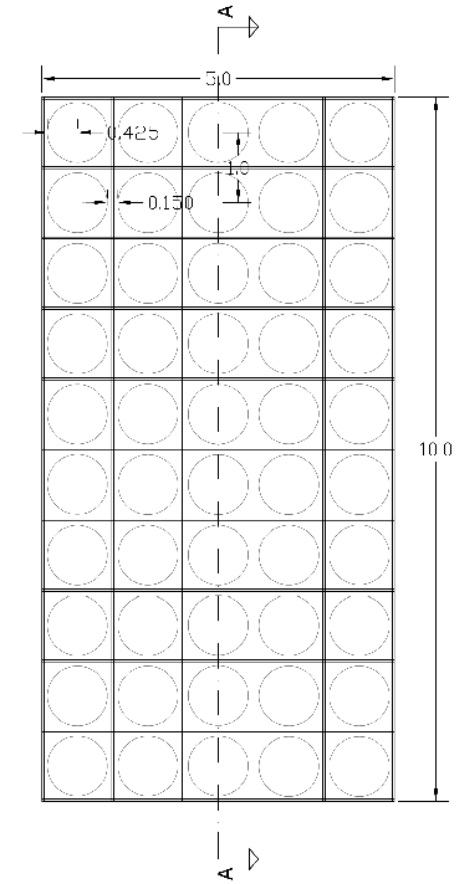
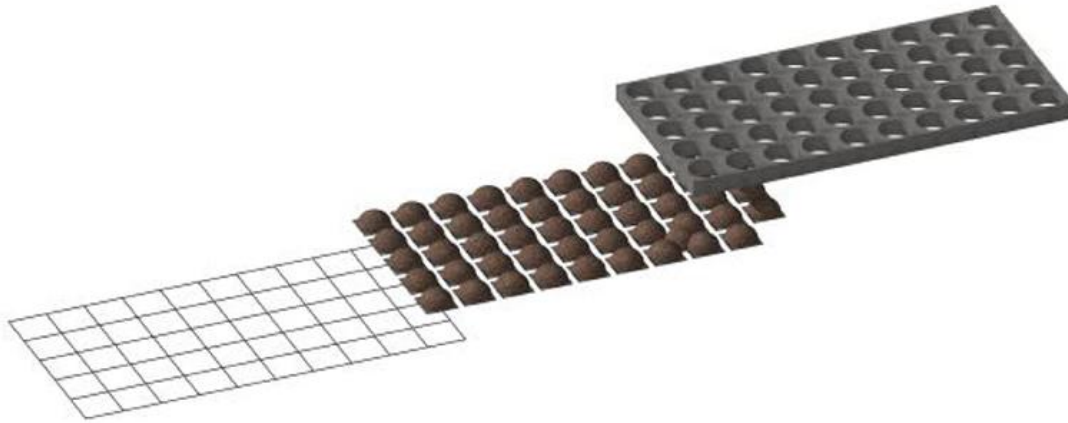








Economised Concrete





STOP