







TABLE OF CONTENTS

SIGNATURE	2	THESIS SCHEDULE	26
LICENSE	4	STUDIO EXPERIENCE	27
ABSTRACT	8	PROGRAM	29
PROBLEM STATEMENT	10	RESEARCH	31
STATEMENT OF INTENT	13	CASE STUDIES	44
PROPOSAL	17	HISTORICAL	58
NARRATIVE	18	GOALS	64
USER/CLIENT	20	PROGRAMMATIC	105
MAJOR PROGRAM	21	REFERENCES	111
SITE INFORMATION	22	PERSONAL	113
PROJECT EMPHASIS	24		
A PLAN FOR PROCEEDING	25		

**S t a t e m e n t  
o f  
I n t e n t**



**ABSTRACT**

This project, Parametric Animation, aims to test the potential of parametric structures as an architectural design tool. Although this tool is not new in the architectural design community, the variety of it's applications are limited and the unfamiliar depths of its potential invite new investigations. These new investigations in architectural design will be most instrumental and welcome in developing countries where, as the productivity of particular objects grows rapidly, so too does the necessity for large scale and efficient design. Parametric structuring as design has the potential to accomplish the architectural requirements of the rapid production of objects, it is simply the most logical solution. Yet it also has the power to create a stagnation of the society that

manifest these objects. A building must not only create a relationship between itself and objects but also the specific society within which it is situated. Above all it must maintain the relationship between a society and their specific object. So far parametric structuring has only accomplished the limited scope of necessity, yet it must understand that the relationships between buildings, necessity, objects and societies are not separate and rather intertwined. The animation which parametric structuring gives to necessity it can also give to objects and the societies who created them. The most simple description of this project is a transit station located in Caxias do Sul, Brazil with a square footage of forty thousand.

**KEYWORDS**

**PARAMETRIC**

**DESIGN SOFTWARE**

**DIGITAL**

**TRAIN STATION**

**BRAZIL**

# **PROBLEM STATEMENT**

## PROBLEM STATEMENT

HOW CAN A BUILDING'S RELATIONSHIP TO ITS SOCIETY BE INFLUENCED BY A PARAMETRIC STRUCTURE ?



**T TYPOLOGY**

This project will manifest it self in a Transit station that will meet the needs of the transportation of objects and people. The building must animate not only objects and people but also a specific society and the relationships between these two things.

**C CLAIM**

A parametric structure will influence a building’s relationship to its society by revealing both the animation inherent in the society’s particular inanimate objects and these object’s function in a building.

In this claim the actor is the parametric structure (in the hand of the designer). There are no other actors that play a part, all other parties are passive. The action is one of animation, or to bring the appearance of movement. This action can be specifically described as a parametric structure creating movement through the iteration and deformation of something that does not move on its own. This action is done rigorously and efficiently and is automated so that a body of outcomes are created. This body will then imply animation. The object that is acted on is any particular object in a society that is inanimate. It is not to be confused that action of the parametric structure is taken on the building, rather when the parametric structure acts on an object, a building’s function is determined. The animation that results determines the buildings previously undetermined function. Again the manner of the action involves rigor, efficiency, automation, and animation.

**P PREMISES**

A society innately builds relationships with objects because objects are the only comprehensible substances that any predictable relationships can be build from and if a relationship can not be predicated there is no use in acting on it.

Animation must be present for any relationship to be develop or tested, because a relationship’s development depends on time and movement and animation is the embodiment of these two things then animation must be present if a relationship is desired.

A parametric structure is void with out an initial input and manifest nothing unless one is present, similarly an object remains inanimate without a structure to move it. If the object is given to the parametric structure as an input the object will gain animation in the form of the parametric structures’s manifestation.

**T THEORETICAL PREMISE**

Societies contain particular objects, an object is the only substance that a predictable relationship can be developed with, a relationship must develop over time and movement, a parametric structure will give time and movement to an object and because of this a parametric structure will influence a building’s relationship to its society by animating that society’s object.

**J JUSTIFICATION**

An investigation of how parametric structuring as a design tool can develop a relationship between buildings, societies and objects, will lead to buildings that perform better holistically over a longer lifespan because they not only meet to a necessity but also develop society.

# **P r o p o s a l**





As the 20th century has unfolded a drastic shift in mentality has changed and influences our relationship with the world around us. This shift can be traced all the back to the classical thinkers and philosophers who started asking questions about their world. These questions threw society into so much doubt and skepticism that they abstracted themselves from the world and replaced it with pure thought and reason. This can specifically be seen in the work of Descarte. This philosopher came to the conclusion that because everything could be questioned none of it was real. He denied the world completely and concluded only that because he thought he himself must exist. In this society raised the intellect, the mind, reason above the world it self. It disposed of myth and wonder and replaced it with the pure efficiency of the mind. Perhaps this change was beneficial to society for it brought about a scientific revolution that brought about the spectacular and productive technology of the 20th century. Society has never been more clear headed, productive and efficient in history and this has lead to a broadening of the world it self. Traveling across the world is as simple as getting on a plan, and we can even interact with places from our homes as we surf the web. But the efficiency of this new era has limited

our relationships to almost entirely digital ones and has limited our ability to interact in any other way. This limited interaction with our surrounding is incredibly detrimental to society for it abandons the world. We can not deny the importance of the world around us, as it appears outside the digital realm. This importance can most easily be explained through architecture we are deeply dependent on its presence to keep us safe. It is the structural fabric we build upon the earth that allows us to be situated, to move through it, to interact with it, and to discover it. By its own nature architecture can not forget the world, it must abide by it and be with in it and part of it at the same time, and we must create it and exist through it. It is apparent that our current mentality about the world, a digital mentality, is insufficient to meet the needs of the production of architecture. Yes we can build buildings faster and cheaper because of the advancements in building technology. We can also design quicker and keep up with the architectural demands of society because of digital programs. The introduction of parametric structures has revolutionized the ability for one idea to be propagated into infinity, but even with this advancements architecture is struggling. Our building have short

life spans, the materials they are made of are superficial, their programs and typologies are limited and superficial and ultimately they have no ability to create interactions between both people and environments. As much as we can interact with these two things digitally this relationship can never translate into architecture. The digital and the physical have little overlap between the. But on top of these challenges we have created to hardest challenge for our selves. We have become so reliant on the digital and its efficiency and practicality that we can not propose to abandon it. The pace of the world has become so fast and productive that it will leave anything behind if it does not find a way to keep up with it. We can not abandon the digital but we must find a way to reconnect with the world in a physical way. Again the importance of architecture in the problem is apparent because architecture is one of the few productions that still remains situated in the world. In particular architecture must first take on projects that address the issues society is dealing with. A transit station become the prime typology because its goal is to connect people to the world, the bring them from one place to another. It however is dangerous for it can do this so efficiently that it ends up disconnecting people as the speed through time

and space. A transit station is also a worthy problem because it forces us to place something on the earth in places we might not desire to place. Many developing areas that are trying to keep up with the hyper productive world are in need of transportation systems and structures. In all this we can see both why we must connect again with reality as well as maintain our use of digital methods of production. It can only be through the embracing of both these things and the struggle to overlap them that we can keep our ability to design and build meaningful and productive architecture alive



## USER/CLIENT

Any transportation system is build for primarily two types of people. Its goal is the efficient movement of inanimate objects, whether they be people or products. The two types of people are divided into a group that wants to move products, and a group that wants to move themselves. This can be simplified into buyers and suppliers.

### Buyers

A buyer in terms of a transportation system is a person who makes a purchase for them selves. They desire to move from one point to another and in some way would like to improve this act of animation. This improvement can come in many forms, for example a buyer may desire speed and efficiency, another might desire luxury, while others might desire excitement and adventure.

### Supplier

A Supplier possesses a product which they most animate in some form so they can make a profit. In terms of a transportation system, a supplier relies on the system to spread their product and make it more available. Unlike the buyer the supplier has a very predictable set of needs. These include efficiency, simplicity, economy, and security.

## MAJOR PROGRAM

### TERMINAL

The major architectural structure that supports the coming and going of the passengers and their various needs before and after boarding a transport.

### PLATFORM

The connection between the transport and the terminal, the space were passengers wait and board their transport.

### YARD

A space were the transports themselves are coordinated and stored when they are not in use.

### CONNECTION

Although ambiguous, a transportation system must provide a connection between it self and the rest of the world that makes it easier for the passengers to transfer between the rest of the world and their transport. This element is apparent in both the parking ramps of transportation terminals, and the huge drive ways where passengers are dropped off and picked up.

### STORAGE

Concerning the transportation of products rather than people, there must be space to contain them when they are in limbo between transport and owner.

### LOADING

A separate space for loading products onto transports.





### PROJECT EMPHASIS

This project's emphasis is to test the potential of parametric structures and of the digital altogether as far as they can influence a building's relationship to its society. Although this topic could be investigated in many ways, this project will be filtered though the design of a transportation system and be particularly mind full of the necessity attached to transportation systems, the intrusion they have within an environment, and the abstraction they create between their travelers and the world they travel through. Ultimately this project must design a transportation system with parametric structures and the digital that has a relationship to its society.

### A PLAN FOR PROCEEDING

#### RESEARCH DIRECTION

Research will be conducted in accordance with the Theoretical premise, in particular concern for parametric structures and the relationship between societies and objects. Research will also investigate transit stations, the site and an analyst of it, and all the programmatic elements as well as the historical context of all these things. More particular research will be conducted in terms of the history of digital interactions and concern the events and ideologies that lead up to the contemporary reliance on the digital.

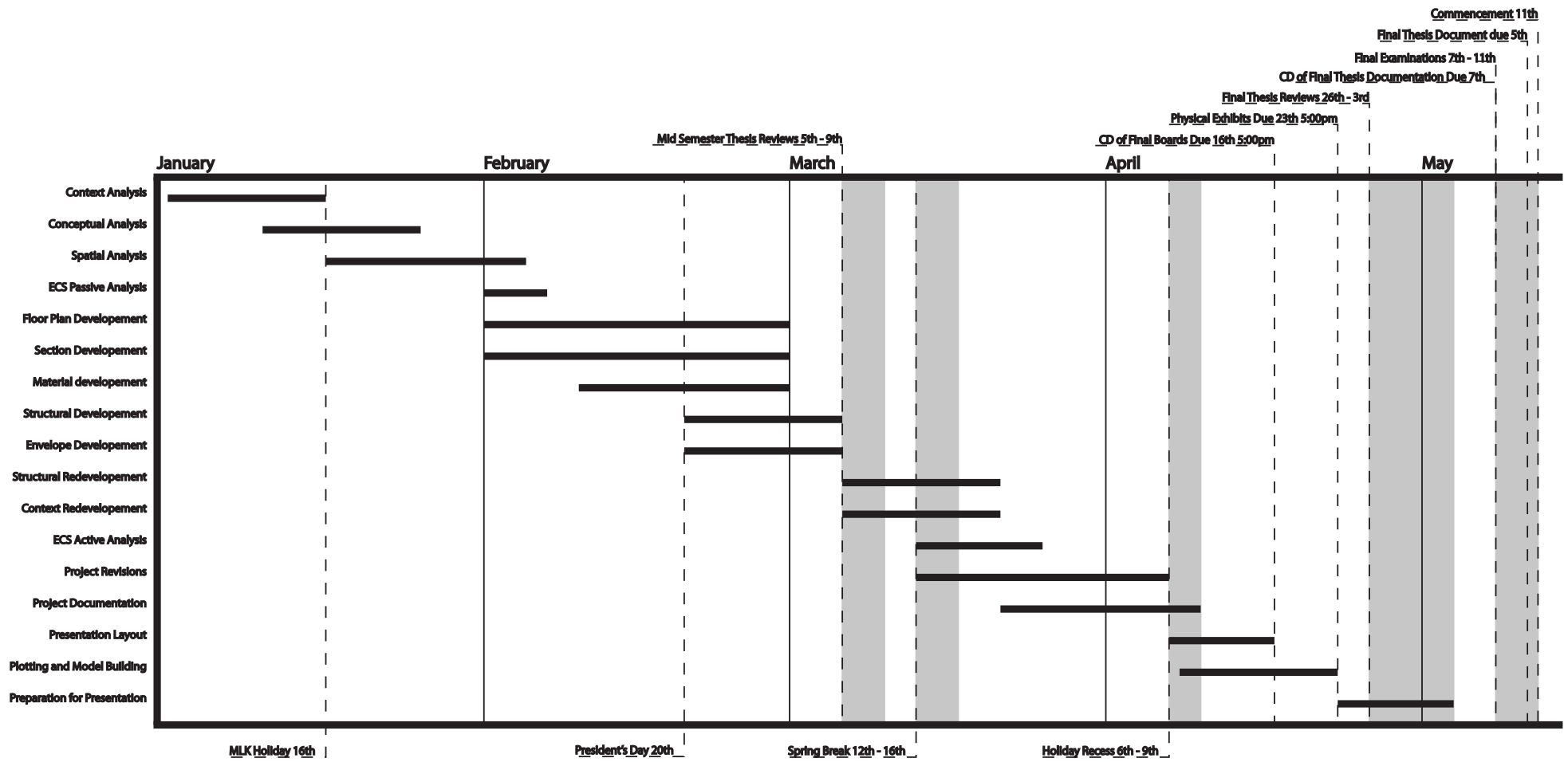
#### DESIGN METHODOLOGY

Although the emphasis of this project is on parametric structures and the digital these will not be the only methods of design implemented. Physical manifestations that poetically help understand the design will be paramount. Parametric structures and the digital must be investigated in parallel with these physical manifestations, the method does not aim to become fragmented but rather unified. Ultimately the simultaneous weaving of the physical and the digital as a design method will become the paradigm for any work on this project.

#### DOCUMENTATION OF DESIGN

The primary means of documentation will occur through photography of the physical manifestations. There will also be use of video documentation in the form of time lapse or stop motion. This documentation will occur as part of the design process, rather than as a completion of it. The documentation will become apart of the design and it will be used throughout the process. This documentation will also become part of a digital collection.

## THESIS SCHEDULE



## PREVIOUS STUDIO EXPERIENCE

Second Year  
Fall - 2008 - Stephen Wischer  
Tea house  
Boat house

Spring - 2009 - Mike Christenson  
Dance studio  
Material iterations

Third Year  
Fall - 2009 - Paul Gleye  
Center for Future Excellence  
Center for social and intellectual Excellence

Spring - 2010 - Ron Ramsay  
Shaker Barn  
Chicago Brazil Consulate

Fourth Year  
Fall - 2010 - Frank Kratky  
High Rise

Spring - 2011 - Malini Srivastava  
Design Build

Fifth year  
Fall 2011 - Malini Srivastava  
Design Build

**P r o g r a m**  
**D o c u m e n t**

**R e s e a r c h  
a n d  
G o a l s**

## INTRODUCTION

Through out history the practice of architecture and architecture itself as build manifestation has been intimately connected with epistemology. The marriage between these three things is easily identified because they all are concerned with truth and reality. For the philosopher who studies or thinks about epistemology, their concern is to find a valid grounding to base their claims upon. The legitimacy of what is called truth has been a highly debated topic over man’s existence and the conclusions about it have existed in a constant ebb and flow. For the Architect they are also concerned with finding a valid grounding for their buildings, yet this extends beyond just simply the stability of a building’s foundations. The practice of architecture differs from the practice of construction because the architect is concerned with both the physical quality of their design and the effect they have on the occupants pleasure and wellbeing. The later of these concerns is more closely aligned with the concerns of the philosopher. Yet it is important to note that through out history almost all of the original insights into epistemological questions have come from the philosophers. These

insights propagate through out societies and in the constant ebb and flow of truth and reality the architect becomes pray to the whims of philosophers. When reality and truth change so does the world view and along with it the demands of society changes as well. How a building relates to its society is dependent on the current state of epistemological truth in the world and because an current state is comprised of the narrative that leads up to the present a re-telling of the history of epistemology is crucial.

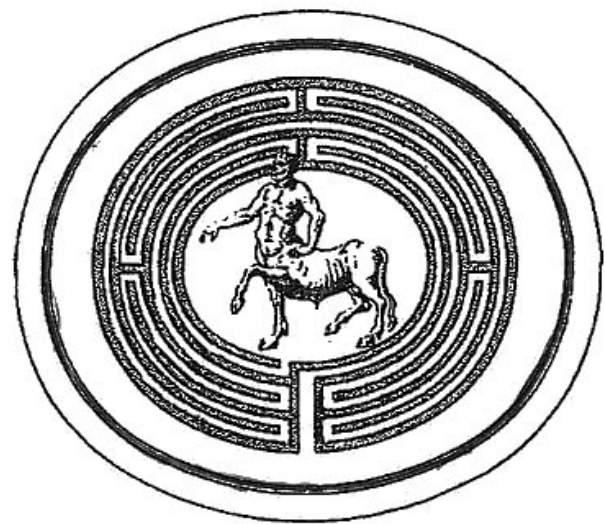


image of daedalus's labyrinth from Alberto Perez. Gomez essay [1]

## MYTHOLOGY

In ancient history the first forms of epistemology came through mythology. A contemporary Architectural Historian and Professor Alberto Pérez-Gómez, writing about the poems of Homer and the Myth of Daedalus, explains how both of these reveal the ancient perceptions about truth and reality. Gómez says...

**“In Homer, techne, particularly metal smithing, carpentry and weaving, is the know-how of the demiourgoi , and is not differentiated from the act of magic which, like Prometheus, taps the power of the gods. Controlling, often dangerously, the order of the world, the demiurge creates wondrous object of magical effects. Technical action depends on the same kind of intelligence as metis (magic), a propitiatory power or cleverness in overcoming disorder.” [1]**

This world view, as Gómez describes it, not only saw mythology and the Gods as a reality, but it also saw a direct connection between the human world and the world of the Gods. Reality

contained magic and through it humans believed they were able to connect with the gods. The perception of a divine realm and a human realm during this time came from the general perception of disorder in the human realm, yet Gómez explains how the Gods and magic were the perceived order of the world and that man was able to produce beautiful things by taping into this perceived order. [1]

For example Daedalus, an artist and inventor of ancient times, was the creator of *agalмата* or statues of the Gods. These statutes were said to have open eyes and movable limbs both being the result of *techne* and called *daidala*, described in Homeric text as...

**“The principle value of daidala is that of enabling inanimate matter to become magically alive, of reproducing life rather than representing it” [1]**

Beyond other inventions attributed to Daedalus, including the saw, the axe, glue, and the plumb-line [1], Gómez also describes Daedalus’ most monumental achievement, the Labyrinth. While living in Crete and working for king Minos of Knossos, Daedalus constructed a wooden cow for

the queen who had fallen in love with a bull. Daedalus’s skill was so great that the magic and wonder of the wooden cow was so life like that the queen was able to seduce the bull. Yet this resulted in the birth of the Minotaur which, because of Daedalus’s magic and skill as a *demiurge*, represented the ability for man to change the order of the world.

Daedalus was then asked to design a structure to hide the Minotaur monster and once again Daedalus used his skills as a demiurge to design a labyrinth. Gómez describes the labyrinth which Daedalus builds as...

**“a metaphor of human existence: ever changing, full of surprise, uncertainty, conveying the impressing of disorder, a gap between the only two certain points that it possesses, birth (entrance) and death (its center).” [1]**

But when Daedalus as an architect reveals the labyrinth it is not seen as disorder but as order. In the labyrinth Gómez is describing the epistemological thoughts during ancient times. Truth and meaning were the same as magic and divinity and both hinged on the relationship between disorder and order.





## CLASSICAL

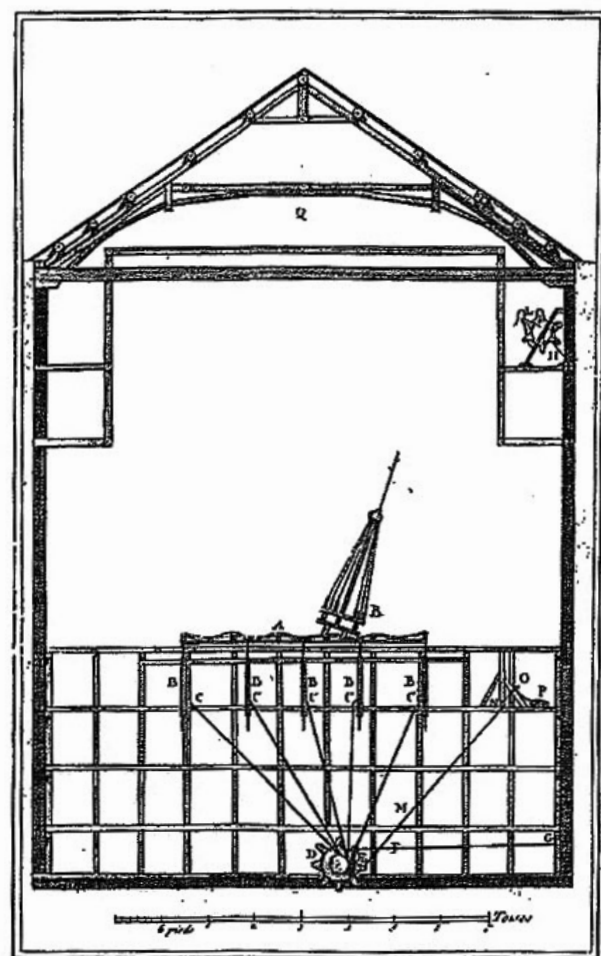
Although the time distinction between Daedalus and the classical time period is very small and even overlaps there is a large difference between the epistemological ideas. Classical philosophy took place primarily with the Greeks. Socrates is the most famous greek philosopher and his love for wisdom set a new stage for critical and philosophical thought. Although the classical thinkers did not abandon the Gods and mythology, the epistemological implications of this new philosophy marks the start of an ebb and flow of epistemological truth that would come to define contemporary time.

Plato's Timaeus, a detailed description of the universe, human nature, and politics describes a distinction between two things, being and becoming. He describes being as the unchanging forms or as the objects of thought and becoming as our sensations and opinions. [2] Plato arrived at this dichotomy because he, like people before him saw the world as unordered. Yet through myth and magic he could also understand that an order existed. Plato was trying to answer the question why is the world ordered?

Plato's question is one concerned entirely with epistemology, but this is a very different kind than that of the mythological times where there was no separation between the world and the Gods. The difference between Plato's dichotomy or separation of being and becoming, birth and death, order and disorder, contrast sharply with the metaphor of the labyrinth where all these things are revealed as one. The presence of a dichotomy is perhaps the biggest shift between the mythological world and the contemporary world.

In Timaeus however, Plato does not separate being and becoming completely. He identifies a third element that he calls *Chora* and he describes it as the receptacle of being and becoming. It is the space where things exist and the existence of human dialogue. [2] Gómez also talks about the *Chora* as being similar to the labyrinth.

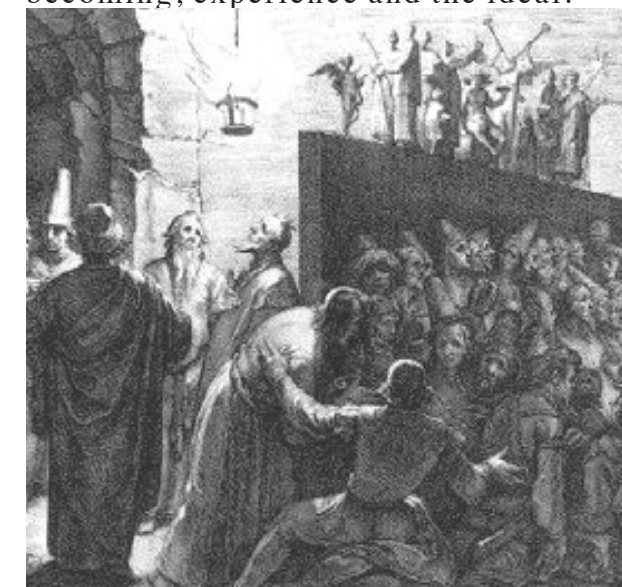
**“The Chora was a place for the dromenon (ritual) in archaic times, a place where only individual participants would produce the magical effects desired, that is, order and spiritual security in the world.” [1]**



Theatrical machinery from Alberto Pérez-Gómez's essay [1]

But in Plato's later writing, specifically The Republic, his dichotomy between being and becoming, or the objects of sensation and the objects of thought becomes more distinct and the importance of *Chora* starts to fade. The Republic is a long description of the perfect city state and within it Plato gives his readers an allegory to help them understand his epistemological understanding. This allegory is important because Plato uses the inherent epistemological ideas to define the rules of his utopian city state. In his Allegory men are bound in a cave so they can only look at the back wall. On this wall are projected shadows and these projected shadows are all that the imprisoned men know. Then one man is freed and escaping the cave finds that outside are the real forms. He realizes he was only seeing shadows of these perfect forms and it is these forms that Plato's understanding of knowledge revolves around [3]. Plato intends that the cave in his allegory represents our world and that what we see and experience are simply shadows of the perfect forms. These forms exist in a separate world and we must free ourselves from the cave so we may dwell in the world of the forms. [3]

An important detail of Plato's allegory is that it is not the sunlight that is casting shadows of the real forms but rather a fire that is casting shadows of vessels of the forms rather than the real forms themselves. Only the real forms interact with the sun. In this allegory the shadows on the wall are what Plato referred to as becoming or experience, while the world outside the cave is the being or the rational. It is important to note that Plato is suggesting that our sensations and experiences are only shadows of shadows of the true forms. Plato's writing in Timaeus no longer contains a *Chora* that connects being and becoming, experience and the ideal.



Dramatization of Plato's allegory of the cave [4]

When Plato does talk about a possible connection between being and becoming it is a distorted and painful description that contrast his earlier writings about *Chora*.

**“if the prisoners are released and disabused of their error. At first, when any of them is liberated and compelled suddenly to stand up and turn his neck round and walk and look towards the light, he will suffer sharp pains; the glare will distress him, and he will be unable to see the realities of which in his former state he had seen the shadows; and then conceive some one saying to him, that what he saw before was an illusion, but that now, when he is approaching nearer to being and his eye is turned towards more real existence, he has a clearer vision, -what will be his reply? And you may further imagine that his instructor is pointing to the objects as they pass and requiring him to name them, -will he not be perplexed? Will he not fancy that the shadows which he formerly saw are truer than the objects which are now shown to him?” [3]**





**“whatever I had admitted until now as most true I received either from the senses of through the senses. However, I have noticed that the senses are sometimes deceptive” [10]**

For example, Descartes observes that whether he is sleeping or awake he is still experiencing or sensing the same things, regardless of whether or not these things really exist. From this Descartes is able to call into doubt all sensible things or, in other words, the size, shape, quantity and place of things, including anything that is extended from man’s body. Because of this Descarte



*Drawing of Descarte writing on his mediations [11]*

can no longer claim that he has arms, legs, a body, or even valid sensation nor, everything that he held as true. Anything that come to him from his senses. [10]

In the second meditation, Descartes asks whether or not he exist himself. He has already proved that the existence of everything else is skeptical so the next legitimate thing to be skeptical of is himself. He rigorously puts himself to the test and tries to think of how his own existence can be skeptical. But in this Descartes finds the thing which he cannot call into double and he states it clearly as...

**“after everything has been most carefully weighed, it must finally be established that this pronouncement ‘I am, I exist’ is necessarily true every time I utter it or conceive it in my mind” [10]**

This observation was also described by Descarte with the phrase *cogito ergo sum*, or I think therefore I am [10] and it is one of the most rational phases ever conceived. Descartes work not only stated that the mind and reason were the only paths to truth, but it also denied the existence of anything other

then the mind. This extreme skepticism become the dominant epistemological view of the world and resulted in both a Cartesian ordering of perception as well as a complete quantification of reality. For example the work of Galileo, Newton, and later Einstein is a result of Descartes rationalism.

## PHENOMENOLOGY

At the same time as Descartes was working on his rational epistemology other philosophers were working against rationalism. Although not a phenomenologist, Kant made some very large contributions to the survival of empirical epistemology. Kant divided the world into *noumenon* and *phenomenon*. The *noumenon* are things with in themselves and Kant believed that we could not experience these things as they are alone. The phenomenon are our experiences of these things. [12]

In this way Kant is suggesting a reversal of the world. Instead of our minds orbiting reality it is reality that orbits our minds. Because we have no connection to the noumenon, and the only thing left is the phenomenon, or our own projections of experience onto noumenon, concepts that were previously metaphysical like space and time or cause and effect are now epistemological because they are structures of our experience and create phenomenon. Here the importance Kant places on experience and interactions with the world is reminiscent of the *Chora* and mimesis from the mythological times.

Another important philosopher that pioneered phenomenology was Merleau Ponty. In reaction against rationalism Ponty places the body and objects and our perception or experiences at the center of epistemological understanding. Ponty states that...

**“Our Perception ends in objects, and the object once constituted, appears as the reason for all the experiences of it which we have had or could have.” [13]**

Ponty’s philosophy aims to place our bodies and their sensation as the highest epistemological truth for he states that all we know comes to us through our bodies. Yet this is not an empirical philosophy because Ponty, like Kant, demonstrates a reversal of the world that changes the way we think about the world. The problem faced by empiricist was the connection between objects and our perceptions of them. This perceived dichotomy between objects and ourselves returns to Plato’s concept of being and becoming. However Ponty collapses the divide between objects and ourselves by calling attention to the fact that we are objects ourselves. Ponty says...

**“for if I can, with my left hand, feel my right hand as it touches an object, the right hand as an object is not the right hand as it touches...” [13]**

Ponty is calling attention to the phenomenon that in one instant our bodies can both be a perceivers of objects and be perceived. Although Ponty has collapsed the division between ourselves and objects, he opens the realm of perception and flesh. Also because our bodies can not perceive themselves our understandings are reliant on the interactions that occur. Ponty is suggesting that the only way we can gain epistemological knowledge is through our surroundings and our own projection onto them. [13]

Ponty’s work suggest an epistemology similar to that of the mythological times when there was no dichotomy in the world and ordering was through magical objects and creations. Ponty’s contemporary is Alberto Pérez-Gómez whose work not only exist in the ancient past but is also some of the most current and original epistemological thoughts about the world.



## INTRODUCTION

The theoretical research was under taken in order to establish a valid understanding of the theoretical premises outlines in the statement of intent. These premises were established as the beginning of this project and the accompanying theoretical research was intended to be a consistent and continuous investigation that was both influenced by and influenced the architectural work. In this way its priority is set along side the architectural work and its continuation and augmentation is a necessity.

Concerning the nature and scope of the theoretical research, this was derived from the nature of the beginning premises which focuses on the relationship between a society and its objects. These premises also focus on how architectural practice is influenced by this relationship. Because of this the research is philosophical and epistemological in nature. In other words it is concerned with how humans can know the world they live in, a world full of objects.

The findings of this research will address the relevance of the philosophical and epistemological ideas as it relates to the practice of

architecture.

## CONCLUSIONS

The study of epistemology, or the nature of knowledge, is perhaps one of the most problematic branches of philosophy. It's problematic nature is due to the fact that studying the nature of knowledge is wrapped up within the world itself and because of this the study must address the question, does our knowledge correlate with the world? In other words, epistemology hinges on verifying the consistency between knowledge and the world. If this connection is not verified and the consistency is left ambiguous, skepticism arises and although the implications of skepticism, from a solely philosophical point of view, lead only to frustration and arguments among philosophical thinkers, when skepticism becomes the world view and reaches outside of pure philosophical thought, our ability to manifest and take action with intention is stripped from us. Just as epistemology hinges on verifying the consistency between knowledge and the world, the world hinges on epistemology and its ability to overcome skepticism. For if we can not be sure that our knowledge about the world is consistent with that world, how can we manifest or

act with confidence and assurance?

The questioning of skepticism must be overcome and it has been said before by many great thinkers through out time. Responses have been proposed but they all reduce down to an indexing of epistemological history and a final determining of our current epistemological state. For example the index of epistemology, in its formation, can be expressed as an ebb and flow between rationalism, pure reason as the source of knowledge, and empiricism, experience as the source of knowledge. But where does this indexing leave us, has it given us any insight into the skeptical question. Perhaps this indexing can determine what implications the skeptical question has had on philosophy itself. But what about the world, what about manifestation and action, how has this indexing given any insight into these necessary topics. It has not and it will not until we extend philosophical thought beyond itself and test the consequences it has on action and manifestation.

The practice of architecture, defined not as the buildings of structures that exist as architecture, but rather the planning, thinking, and preparing for the construction of such structures, is the concern here. It is an activity solely

concentrated on manifestation and action in the world and unlike science, whose aims is to understand the world, it aims to use our understanding to create the world. On the other hand, like art the practice of architecture must also achieve an idea. Simply put, buildings must stand up on the world and function in them and because of this the practice of architecture can become a test for the epistemological question. A new indexing of the history of epistemology is necessary, an indexing that not only takes into account the philosophical ideas but also test them against the practice of architecture. In this way the question of skepticism can be overcome.

Epistemology has been an ebb and flow between rationalism and empiricism since the work of philosophers like Plato and Aristotle. These thinker were trying to understand where true knowledge existed. This problem also concerns architects because it is not clear how an architect should understand his design for a building. Does his knowledge exist in already built architecture, in other architects, in drawings or in models? Plato's allegory of the cave posits an answer to this epistemological question. In terms of the practice of architecture this allegory is very useful because it



reminds the architect that their work is only representations of buildings not the building itself. For example an architect does not work by placing one brick on top of another until he has built a wall, rather he draws his plan for the wall he wishes to make, yet as Plato's allegory of the cave shows, these drawings can be described as shadows of a more real world. Plato intended the cave to represent the world we experience. For architects this world would be buildings and therefore these buildings, in Plato's terms, are shadows of more perfect forms that exist in their own world. In this way the practice of architecture is compounded, because it is a design or planning practice it must represent its intentions through drawings. Does this mean that drawings are then shadows of shadows? Plato already speaks very poorly about the world of the shadows, would he speak even more poorly about the practice of architecture?

There is another concerning component to Plato's allegory which arises when the practice of architecture is used as its testing ground. Plato never gives his main character, the man freed from the shackles of the cave, any intention. He is somehow freed and without reason ventures into the world outside the cave where he is

enlightened. The only intention Plato gives his character is the desire to return to the cave to free his fellow prisoners. Assuming the architect is freed from the shackles of the cave and abandons both the shadows of the world (buildings) and the shadows of shadows that is his work (drawings), then after seeing the world of the forms and returning to the remaining prisoners what tools does he have to enlighten them. He has already abandoned and denied everything he once possess. He can give no evidence to the prisoners about the world of the forms. In this lies the problem with Plato's allegory of the Cave and his world of the forms. It leaves the architect with no tools with that he can use.

Concerning Plato's contemporary Aristotle, who believed the forms existed within the objects themselves and that they were understood through experience, his approach is empirical. Through the practice of architecture this approach obliges the architect their tools. Specifically the architect can now communicate about the similarities and differences between things in order to obtain and use knowledge. Returning again to the allegory of Plato's cave there seems now to be no need for the architect to leave the world of the cave

to grasp the knowledge they need. Yet Plato's cave and the shadows of the world can not be ignored. More so the fact that the practice of architecture uses shadows of shadows, their drawings, to achieve their goal definitely can not be ignored. Although Aristotle's claim that the perfect forms are held within the objects allows the architect to now grasp these forms through empirical study and talk about them in their similarities and differences, he still can not be sure that his drawings possess the forms as well. An architect must plan and act in a manner that is representational of his true intentions and because of this there is still a gap between the architect's manifestations and the world. This gap must be analyzed and verified so that the architect can not only gain knowledge about the world and talk about it with others, but also manifest his knowledge and put it to use.

Moving ahead, Augustine's claims about language inform us that communication is really miscommunication. This, as Augustine says, is because there is no firm connection between the world and language. Again, what is left to the architect that allows him to do his job. If communication has no epistemological value how can the architect plan for

action. If he wishes to manifest his intentions in the world then his job will involve others and this involves communication.

Next to Augustine, Hume states that our ideas are never as clear as our impressions and because of this our connection to the world can not be verified. It is at this point that skepticism has now denied the architect all his tools. He can no longer talk about knowledge or communicate with others, he can not use his own mind as a source of knowledge or as a connection to the world, and he is completely skeptical about the validity of his practice.

Hume, did not however test his own ideas in the practice of architecture, his description never left the realm of philosophy and because of this he missed an important insight. The practice of architecture involves the world, impressions and ideas. Yet Hume's understanding of impressions was limited to experiences given to us by the world. In the architect's practice he is forced to create his own impressions of the architecture he is designing. For example to understand an idea about a design he is working with the architect will produce a drawing. This drawing then becomes an impression itself but, importantly, it was not given to the

architect by the world rather it was a manifested in the world. The connection or validity of these impressions are clear because their source is known. Although Hume's claims about impressions and ideas create a greater degree of skepticism he identified the importance of impressions. Ultimately, when his claims are tested in the practice of architecture, a new realm is opened, the realm of self generated impression.

With these self created impressions in mind, another insight can be gained by returning to Plato's allegory of the cave. The architect inhabiting Plato's cave, after returning from the world of the forms, has no tools that he can communicate with or manifest. But this is not the case for he has the power to create impressions himself. What's to deny the architect the ability and power to cast shadows himself for the prisoners so he may communicate with them.

Yet there still exist another problem, the validity of his self created impressions. For after returning from the world of perfect forms he will still not be able to create perfect impressions of these forms. Kant's work provides another insight that collapses this gap. Kant divides the world into the nuomenon and the phenomenon and

when this is tested in the practice of architecture an intimate alignment occurs. Architects structure their practice through their own knowledge and impressions. All these things are self generated and are also present in the world. The architect's ability to create impressions that guide him is no different then his ability to frame phenomenon with the structures of his mind. Kant's reordering of the world gives the architect back his tools and his ability to rely on them. This is because if the reality of the world is the structure of our minds then any manifestation that can be experiences is just as real as the original reality.

Finally the work of Merleau Ponty and Alberto Pérez-Gómez, in terms of both the practice of architecture and architecture itself, collapses any divide. The practice of architecture can and should be an experience of objects for it is through objects that we understand all we can about the world and ourselves. There is no difference between the two and because of this the importance of *Chora* in mythology during the ancient times becomes both the method of architectural practice and the result of architectural manifestation.

**LIEGE-GULIEMINS  
CALATRAVA - TGVT**

This train station is one of the major cross roads of the Belgian railway network. It is located in the city of Liege specifically at a junction between the major urban landscape and the major residential banks to the south of the site.

This train station is mainly defined by its large shell structure which covers the platforms. The building was built not only to accommodate the changing and growing train network but also to provide new public space. It is situated between the city and the major residential area and because of this most of the occupants of Liege travel through the train station during their daily routines.

The major programmatic elements include nine tracks passing through the station, bus connections, a large commercial space both below the platforms and at the front of the structure, a parking ramp as well as offices and services facilities. The station serves approximately 16000 passengers each day.

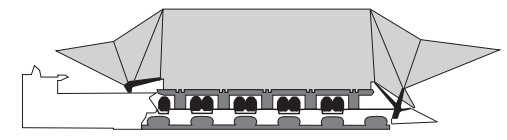
EAST ELEVATION



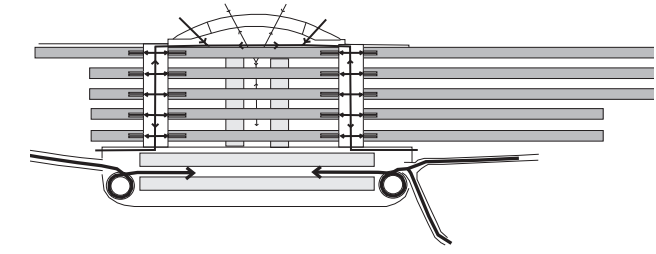
EAST SECTION



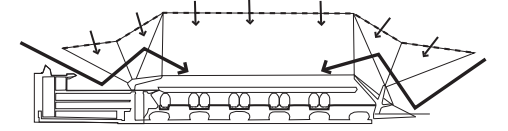
HIERARCHY



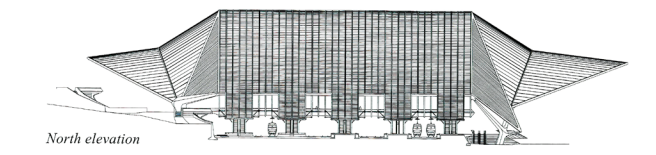
CIRCULATION



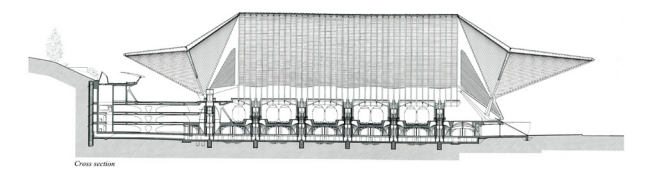
NATURAL LIGHT



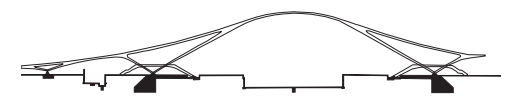
NORTH ELEVATION



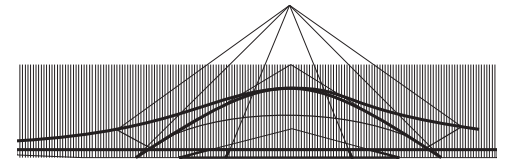
NORTH SECTION



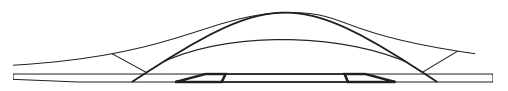
STRUCTURE



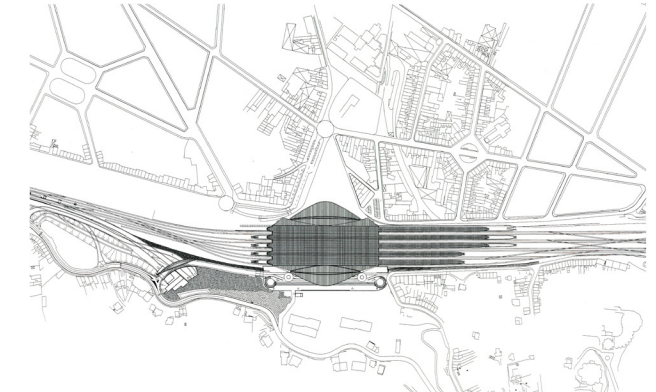
GEOMETRY



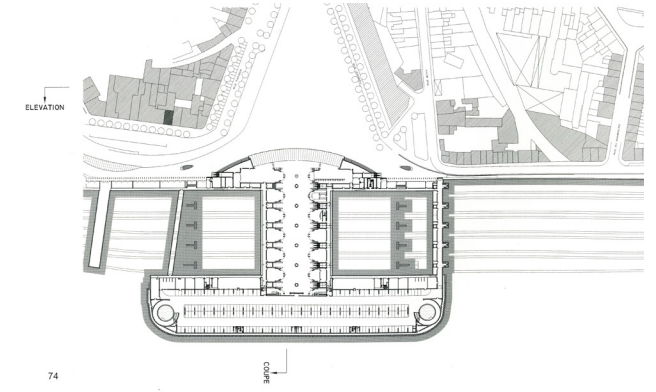
MASSING



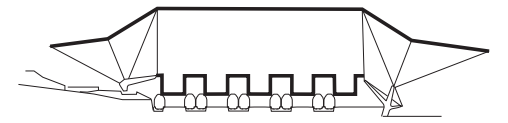
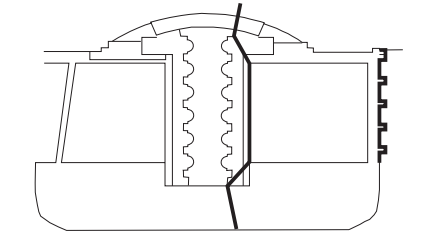
SITE PLAN



FLOOR PLAN



PLAN TO SECTION



All Drawing on page from GA Document 111. [14]





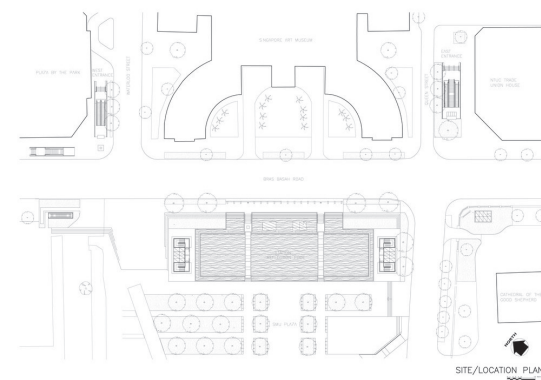
## SINGAPORE WOHA - BRAS BASAH MRT

This train station connects to the circle line in the historic district of Singapore. This makes it a local, closed train station instead of a connection to other cities or places. The circle line is an underground train line making this station the deepest connection in the line.

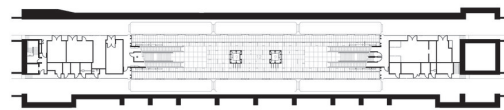
There are two problems this station needed to solve. First, being so far underground, it needed to let light into the structure to improve the quality of travel for commuters. Second, being in a historic district it had to have a minimal effect on the above ground landscape. Both these problems were solved by constructing a large pool with a glass bottom as the only above ground part of the building. This both minimized its impact on the historic district and let a large amount of light into the platforms on the lowest level.

The station's programmatic elements include two rail tracks and two platforms, paid and unpaid concourses as well as a transfer concourse, office and services facilities, small retail space, and connections to multiple parts of the surrounding city. The station serves approximately 55000 passengers.

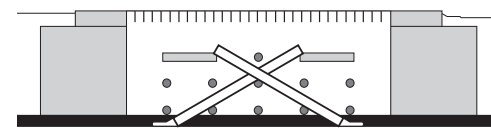
SITE PLAN



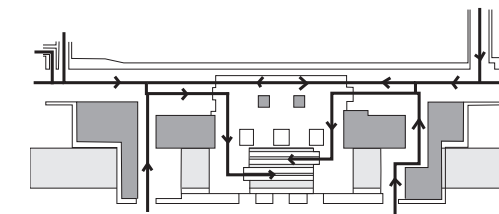
CONCOURSE LEVEL



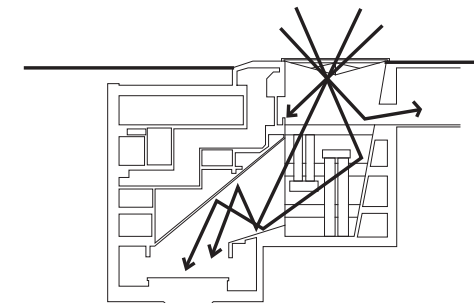
HIERARCHY



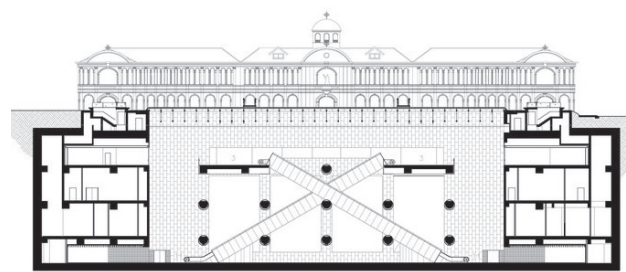
CIRCULATION



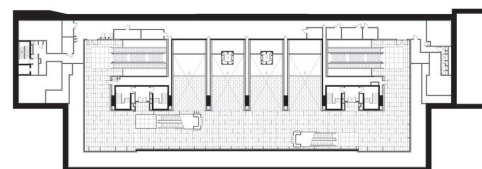
NATURAL LIGHT



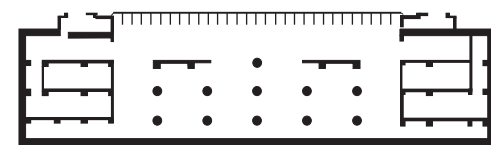
LONGITUDINAL SECTION



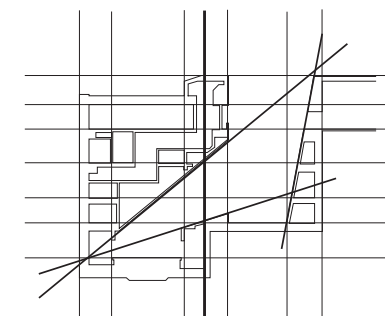
TRANSFER LEVEL



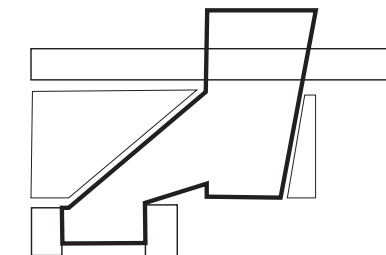
STRUCTURE



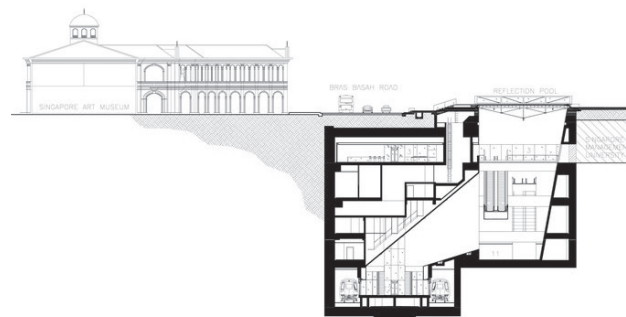
GEOMETRY



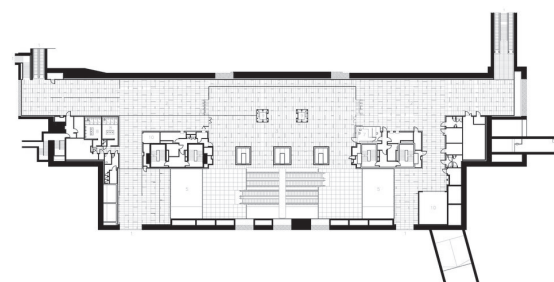
MASSING



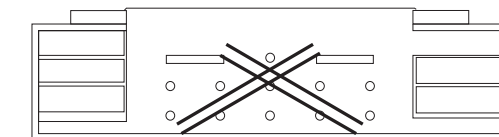
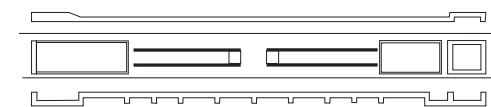
CROSS SECTION



ENTRY LEVEL



PLAN TO SECTION



All Drawing on page from openbuildings.com [15]

1. OFFICE  
2. CONCOURSE  
3. TRANSFER LEVEL  
4. CONCOURSE  
5. CONCOURSE LEVEL PLANE











COMMON CHARACTERISTICS  
AND THE  
THEORETICAL PREMISE

All three of these stations have a couple of common characteristics. They all separated the platforms and tracks from the rest of the programmatic functions, they make use of natural light, and they provide for multiple transit lines and options. In terms of the theoretical premises, these commonalities result in a question. There are two specific claims made in the premises the refer to objects and animations, yet can trains be considered and object and can movement of trains be considered animations? Assuming they can only creates question; is separating the platforms and train tracks from the rest of the programmatic elements an effective way of maintaining a connection between a society and its objects. More specifically, in terms of splitting spaces into paid and unpaid concourses, doesn't this create more divides and separation between a society and its objects. Does this simple characteristic of separating the platform need to change a station's design?

UNCOMMON CHARACTERISTICS  
AND THE  
THEORETICAL PREMISE

Still asking the same question about the division between objects and other programmatic functions. The Amsterdam station shows an interesting difference. Although there is still a physical divide, the presence of the train as it travels and moves is maintained. Instead of being hidden in a shell or deep underground, the building seems to be designed around the path of the train as it moves through a city. Whether people are in or outside of the building they still experience the train in the same way. The Calatrava train station does have a strong connection between people and objects and it accomplishes this by placing the station in the middle of a natural path between residential life and city life. Also by not defining spaces as paid and unpaid the entire station becomes more public and accessible. This openness seems to promote not only a connection between people and objects but also allows animation to occur unobstructed.

CONCEPTUAL IDEAS  
AND THE  
THEORETICAL PREMISE

Conceptually all three of these stations have a very important, but simple thing in common and that is that when people are traveling they desire efficiency and a pleasant environment. Although not explicitly expressed in the theoretical premise this desire is there inherently. The desire for pleasant spaces is associated with the quality of their connection and relationships with objects and the desire for efficiency is associated with animation. For example one of the reason why the Amsterdam station is successful is because it conceptually wanted to raise the train as an iconic object. This physically manifested in the train platform actually being raised into the air and incased in glass. This simple yet powerful solution has a great association with the premises. On another side the Basah train station, although its requirements limited its solutions, gives little importance to the object of the train and rather uses a visual effect, the glass bottomed pound, to achieve a pleasant space. This is combined with a network of stairs and movement and this does not align with the premises.

SITE AND ENVIRONMENT  
AND THE  
THEORETICAL PREMISE

Concerning the Basah train station, its site actually comes in conflict with the theoretical premises. How can any relationships between objects be created through animation when neither the objects nor the animation can change the physical character of the environment. Of course it should not go unmentioned that the Basah station with its pound is a very beautiful and well designed structure, but in terms of the importance of objects and animation these restrictions and solutions fall short. To better explain this Calatrava's station is placed right in an existing pathway and is left open to the public rather then gated off. In this way it becomes a part of a society because it is a space that facilities animation. This result would not of been possible unless the existing connection between residential and city life were not identified and acted upon.

SPATIAL AND FUNCTIONAL  
RELATIONSHIPS AND  
TECHNICAL SOLUTIONS

Finally concerning the various solutions outside of their relation to the theoretical premises each of these train stations must consider the issue of moving large amount of people and massive trains through the same environment. This task is very demanding and puts a lot of stress on the freedom the architect has in designing space. For example the simple aspect of elevating a train and platform above everything else, like in the Amsterdam station, must of taken a considerable amount of planning and money to achieve. Calatrava's desire to create a public open space changes the dynamics of an efficient train station. His shell which opened up the space, although impressive and inspiring, took a large financial investment. Finally the programmatic needs of the Singapore train station put a lot of stress on the architect to move people through space efficiently leaving little room for the quality of that space. All of these things are consistent in train station design and can not be overlooked.



**“arrays of lines are manipulated by means of mutual attraction (cling) forces while simultaneously responding to quasi-gravitational forces. The system is able to dynamically resolve any initial geometry together with any configuration of forces by producing resultant configurations that display both the rich differentiation and the lawful coherency that we would expect in complex natural systems” [17]**

In this detailed description it is evident that the computer is being used heavily as a design tool. Yet the introduction of terms like gravitational forces, natural or even hair suggest that the physical has not yet been abandoned. But each of these terms is bracketed with others terms that can not be ignored. Terms like quasi-gavitational, natural systems, and maya hair dynamic system blatantly take away the physical and replace it with the computer. But MRGD goes beyond these rigid descriptions and includes in the introduction to their publications phrases like....



Series of deformed grids subject to the hair dynamic forces [17]

**“The way these various system feed into each other follows the paradigm of autopoeisis rather than the paradigm of mechanical translation.” [17]**

The introduction of autopoeisis into the description gives hope to the idea of something physical within this group’s work and research.

Although the legitimacy or value of MRGD’s research and work can not be entirely identified an apparent different direction of thought is can be seen in it. This deviant direction is not only a consequence or an accidental occurrence of their work but is also a pursuit of the group. The following quote sums this conscious/critical/perceptive and ambiguous/confusing nature presented in this publication.

**“The difference is perhaps best exemplified by the difference between kicking a ball and kicking a dog.” [17]**

MRGD is also very knowledgeable of the history and roots of digital architecture and this makes them both a perfect starting point for moving backwards through the history of this

topic and gives them legitimacy. Instead of denying history the group embraces it and seeks to learn and understand from it. Later in their publication, *Morphē*, the group references an article published in 1969 by Gordon Pask. Claiming that this article, titled the *Architectural Relevance of Cybernetics*, appeared in a landmark issue of *Architectural Design*, MRGD gives its impressions of Pask’s thoughts about the use of digital computation in architecture, saying...

**“he argued that architecture had no theory to cope with the pressing contemporary complexities of the time and only through a cybernetic understanding of systemic processes could the architect evolve his practice.” [17]**

MRGD’s understanding of the history and attitude within which digital design presented itself is monument in their ability progress the use of computers in design. Like MRGD more investigation and research must be put into Gordon Pask’s Journal Article.

Again, published 1969 in a September issue of *Architectural Design*, this was the first time that any architectural magazine had appeared with an article concerning computation

of design issues. Pask starts his discussion by calling attention to current computer or cybernetic applications with in the architectural field. He references an outdated application called PERT programming which was used in construction scheduling. It is through details like these that we are able to better understand a framing of the introduction of computers and their use in architectural design. Pask describes these origins as “valuable but quite trivial” [19] and even with this, acknowledges that they will have a large influence upon architecture. Pask believes that the problem, as he saw it at this time, was that

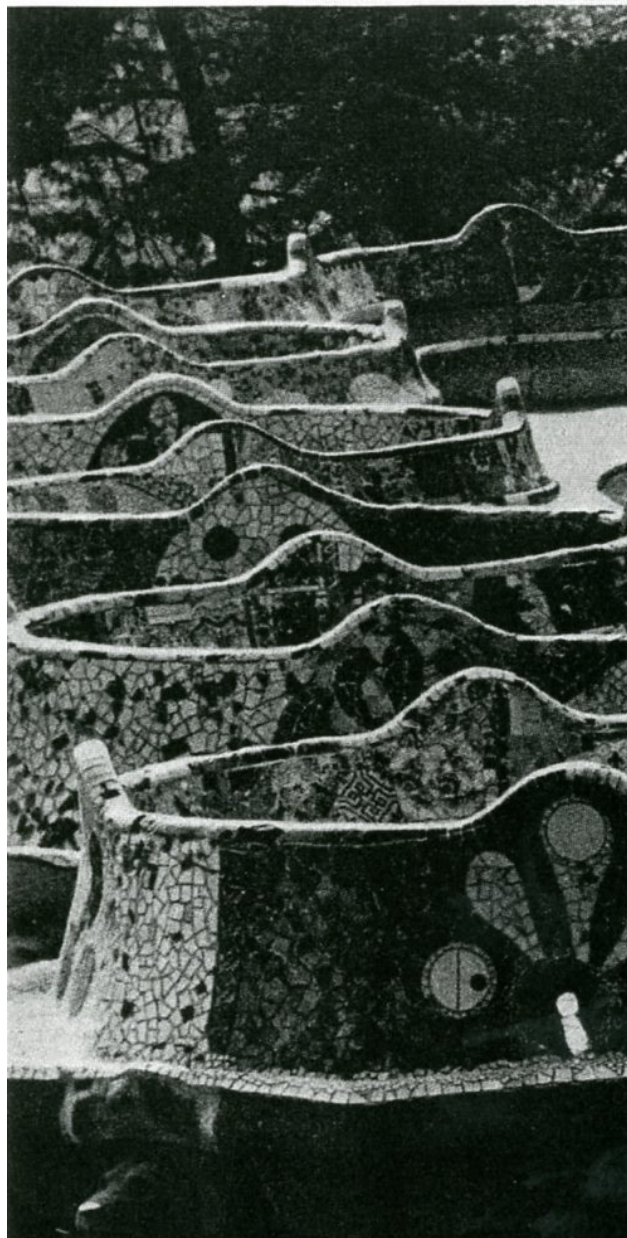
**“neither of them demonstrated more than a superficial bond between cybernetics and architecture. If we leave the matter at this level, then architects dive into a cybernetics bag of tricks and draw out those which seem to be appropriate.” [19]**

Pask’s speculations or fears about the relevance of computers in design can not be over looked and they gain strength from the clarity with his understanding of his own time and the pressures acting on architecture.

Specifically Pask talks about the emergence of Pure architecture or as he describes it architecture which emerges as observations of the history of construction and style as they related to different time periods. [19] He talks about the metalanguage of architecture that was used to describe these formalist observations. He advocates the architect as a system designer and challenges the current practices in terms of their ability to design a system as opposed to apply a metalanguage of forms. Yet above all of this, in terms of Pask’s contemporary time, he has the following to say...



Images of Gaudi’s parque Guell, included in Pask article and referred to as “one of the most cybernetic structures in existence” [19]



Images of Gaudi's parque Guell [19]

**“In the course of the Victorian era new techniques were developed too rapidly to be assimilated into pure architecture and new problems were posed and could no longer be solved by applying the rules of pure architecture, for example, make a ‘railway station’ or make a ‘great exhibition’. The solution to such (in those days) outlandish problems clearly depends upon seeing the required building as part of the ecosystem of a human society.” [19]**

Within this context Pask, although admitting that solutions to these new problems were eventually determined and constructed, draws attention to the fact that these solutions were developed with no architectural theory associated with them. Where the pure architecture had a metalanguage which restricted and discouraged innovation, the new architecture did not contain these limits. But just because it did not contain these limits doesn't give it a suspended quality. Pask identifies what he calls sub-theories that opposed to general theory dealt with isolated qualities. These sub-theories were, unlike the dogmas of pure architecture theory,

systems and addressed specific functions of buildings. To this Pask says that...

**“the functions, after all, are performed for human beings or human societies. It follows that a building cannot be viewed simply in isolation. It is only meaningful as a human environment [...] on the one hand serving them and on the other hand controlling their behavior.” [19]**

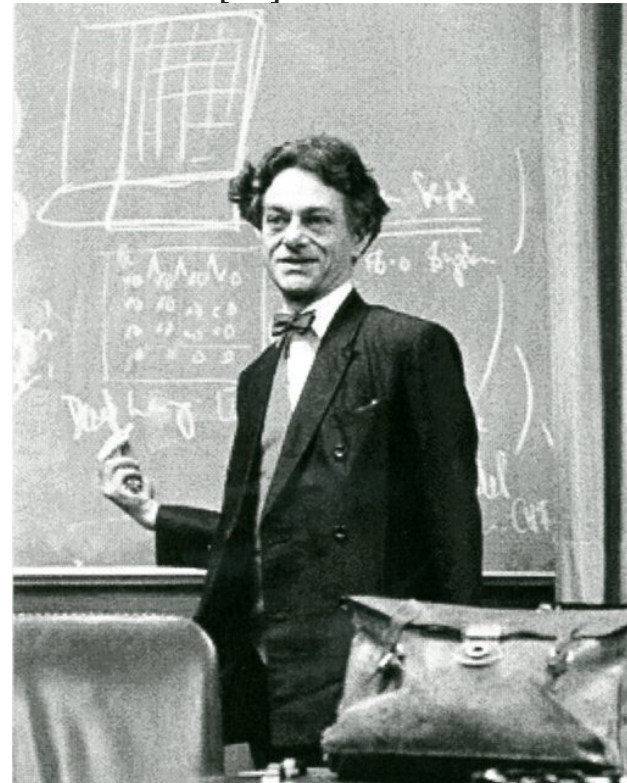


Image of Gordon Pask included in Usman Haque's article [20]

This observation that, while divorced from any metalanguage or pure architecture and while being approached as a system of functions, the new architecture was tied to the realm of humans. It was both controlled and in control of them. This liberation that Pask is describing, a liberation from the dogma of pure architecture, was perhaps not given to architects by cybernetic computation and has little to do with computers in any way, but the ability to come to this realization while computation was being practiced is very powerful and hopefully one of the potentials of a design process that involves both the computer and the physical world.

Return again to the more present times, another group of researches, under the title of Haque share a similar interest in Gordon Pask as did MRGD. This research group professes its interested in interactive architecture systems. They share the understanding that architecture is no longer static and they desire to explore new territory that is dynamic, responsive, and conversant. [21] Although similar to MRGD, this research group has a different approach where design manifests in animated fashion. To do this the group utilizes computer software, yet there is also

a strong sense of the physical in their work as well. Regardless of these differences both groups still understand the importance of looking all the way back to the work of Pask.

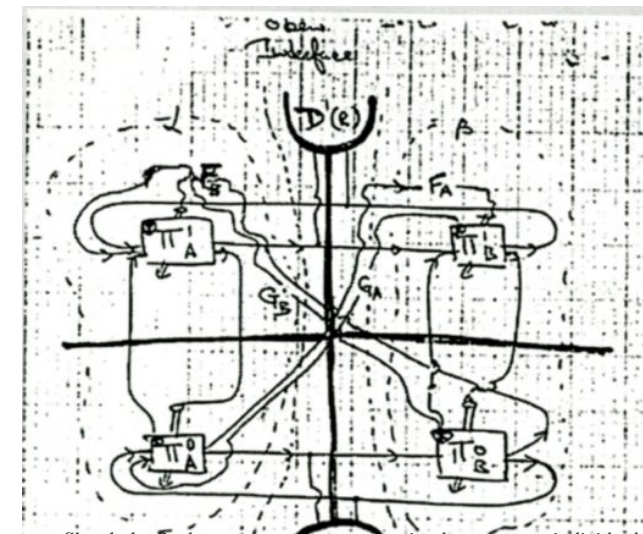
Usman Haque the director of the group, in an article published in 4social: interactive design environments titled The Architectural Relevance of Gordon Pask, says the following...

**“Now at the beginning of the 21st century, Pask's conversation theory seems particularly important because it suggest how, in the growing field of ubiquitous computing, humans, devices and their shared environments might coexist in a mutually constructive relationship.” [20]**

Usman goes on further to say that environments can be thought of as conversations or relationships but only if they are shared environments. These environments Usman seems to assume are full of complexity and he claims that Pask's experiments and ideas suggested a frame work for creating interactive artifacts, specifically cybernetic and digital ones. Yet what Usman focuses

on above everything else in Pask's work is that it does not become prescriptive, restrictive or autocratic [20]. In the end Usman sees the relevance of Pask's work in the unique interactions that are possible rather than the...

**“so-called intelligent environments, which presumes that we all see all things in the same way and which denies the creative-productive role of the participant in interactions with such environments.” [20]**



Sketch by Pask to annotate a conversation between two individuals giving rise to an environment. [20]



## ACADEMIC

As architecture schools and the academic environment progress they are forced to change and adapt to the current times. The environment of today is defined by two major things, first the epistemological ideologies as well as the current use of digital and parametric design tools in the field of architecture. This thesis aims to address these two issues by not only investigating both of these issues intimately but also proposing a design process that incorporates the inherent conflict between the epistemological ideals and the use of digital technology.

Also, because the academic environment exist prior to the professional environment where projects are actually build and paid for, this thesis project will concentrate more on the introduction of new ideas and concepts. This does not mean that the project will avoid the constructible nature or the real life conflicts that exist, but rather suggest solutions to these issues as opposed to detailing these solutions fully.

## PROFESSIONAL

Continuing this though of the relationship between the academic and the professional a goal of this thesis is to be founded on real and existing typologies in the world. For example a train station is not a new or an forgotten building typology and it has a strong relevance to the professional environment. By engaging this typology and staying true to the real world conflicts involved the ideas presented in this thesis will relate to professional projects. Of course in a similar line of thought the profession of architecture is currently becoming more reliant on digital and parametric tools to keep up with the demands on designed structures. This is perhaps the most important professional goal of this thesis. By engaging professional tools and suggesting new ways they can be used this knowledge can then be carried into the professional realm and used to improve it.

## PERSONAL

Personally this thesis is the culmination of many things I have been investigating through out my academic career and life. The Theoretical research and foundation is not an isolated investigation produced only for this thesis but rather involves my on going study in philosophy and architectural theory.

However my intention is not to allow this work to become isolated in the philosophical and theoretical realm of research. This project must be grounded in real manifestations that interact with the world and become tactile and experiential. Because of this my personal commitments to the project will be both concentrated on the ideology and the physical act of making and production. This goal will be very difficult to maintain because of the difficulties and differences involved when research and making are combined.

Beyond this thesis project and into my career as an architect I desire that my work always straddle both the theoretical and the production of real buildings. As I have been involved in many projects that were actually build

it has come to my attention how much of the theoretical and ideological is lost in the translation to build projects. Keeping this concern at the forefront of my thinking through out the project is one of my most substantial and personal goals.

To be specific about these goals it is necessary that I make clear what exactly it is I am addressing and how they relate. The current epistemological ideas in the world are confused between rationalism and empiricism, however it is evident to me that rationalism has caused a major change in the way all things are done. This change has increased the productivity of the world and resulted in the necessity for people and projects to rely on digital and efficient technics to solve their problems. Yet these digital technics lack the nature present in experiential interaction to connect us to the only things we can develop real relationships with, objects. My goal is not to fight against the growing necessity for efficient digital techniques, but rather use them to discover both experiential interactions and relationships. This will allow us to reconnect with the objects that surround us.



**A n a l y s i s**  
**S i t e**



## BRAZIL

During the summer before the start of my thesis year I took the opportunity to travel to Brazil for a two week school trip. Although interested in the country in general I also intended to locate my thesis project in Brazil. The country as a whole has some very powerful qualities. Firstly, it is huge and the types of environments is crosses are very different each having their own character and people. Similar to this it has a large population and its cities are full of countless numbers of inhabitants. With all of this land and people the country, which is currently a developing country, has a lot of resources and is starting to become a highly productive and powerful nation. It is developing quickly and quickly becoming on of the focuses for business in the world.

One of the most productive and advanced regions of Brazil is the southern most state Rio Grande do Sul. This is where my site is located, in a large city called Caxias do Sul, but it is important that I discovered this while traveling in brazil rather then picking it before hand. I traveled through a large part of Brazil including its biggest cities like Rio, Sao Paulo, and Brasilia, but ultimately I choose Caxias do Sul.

After the school trip was done I remained in Caxias do Sul for two more weeks simply existing there and exploring the city and it surroundings. This exploration with in the city limits was mainly done by using the existing bus system. This method of travel seemed to be the only possible public transportation for the city because its landscape is made up of many hills which can be gentle at times and intense at others. Traveling by bus turned into a continuous feeling of changing direction and angle as well as making turns and navigations that seemed impossible. This first interaction with the city made me skeptical that a transit center incorporating a train would be possible for the city.

Yet, as I explored the city more I discovered the remnants of an old railroad that passed through the city. Theses remnants still existed as well as a large amount of the path the rail took through the city. Yet new uses had been established for this winding cut through the city. For example one area where a large section of the rails remained had been turned into the club district. The interaction between the clubs and the rails in front of them as path and threshold was very powerful.

Ultimately the place I ended up most in the city was the large town square. This was because most of the buses passed through the town square and most of the connections between different lines occurred there as well. The town square occupied an entire block of the urban environment and it of course was surrounded on all four sides by roads and buildings. A large park occupied the entire block and there was always activity here, not only in the form of people passing through on their daily agendas but also it acted as a host to social activities and gatherings. I got the sense that it was one of the most important areas in the city and I gathered that the park and square acted at time as a farmers market and place of commerce for the smaller satellite cities that surrounded Caxias do Sul.

I was surprised however that two things didn't exist in the square. The remnants of the train tracks were not present and I wondered whether or not they had been removed during redevelopment or if they never passed through the town square in the first place. Also, although there was a place where all the buses stopped to pick up and unload their passengers which was marked by a structure that covered them from rain or sun, there was no other

developments to support the bus hub. The road that these buses traveled on was very busy and I remember seeing lines of buses sometimes six to eight long lined up as cars and people were delayed and held up waiting for the constant stream of buses to move along. Although it made sense to me that the buses should all connect and travel through the town square it didn't seem to accommodate the process.

This road was also right in front of the most impressive feature of the square, a large and old cathedral that sat on top of a hill raising it about twenty feet above the rest of the square's ground level. The cathedral and the elevation change created a perfect spot to stand and view the entire square. It was one of the most impressive urban environments I had been in. Sadly the massive amount of transit pressure put on the space was very distracting.

Eventually I ventured outside of the limits of the city and started to understand more about the rural landscape and towns. The landscape was also full of rolling hills with varying degrees of steepness, it seemed to be untouched by the urban developments present in the city. Most of the towns looked like they had not changed much for a long time and there was

large amounts of farm land. Talking with residents of the city I understood that although they lived in the town to work most of them enjoyed the country as an escape from the city. The land was beautiful and there were plenty of social activities that occurred in the surrounding small towns.

One of the most dominant features of this environment was the amount of wineries. The area surrounding Caxias do Sul in one of the most fertile wine areas in Brazil and I actually had the chance to visit the oldest wineries in Brazil were the first grapes were planted and harvested for wine. This activity and history was a large part of Caxias do Sul's culture and they even hold a large festival every two years in celebration of the wine.

In conclusion the time I spent in the city and its surroundings showed me that it was a productive region where people celebrated this productivity. It had an established gathering place and center at the town square, but its transit system was under pressure and needed development. This development was not only needed at the town square but also reaching out to the wineries and the beautiful country side that the inhabitants were so connected to.



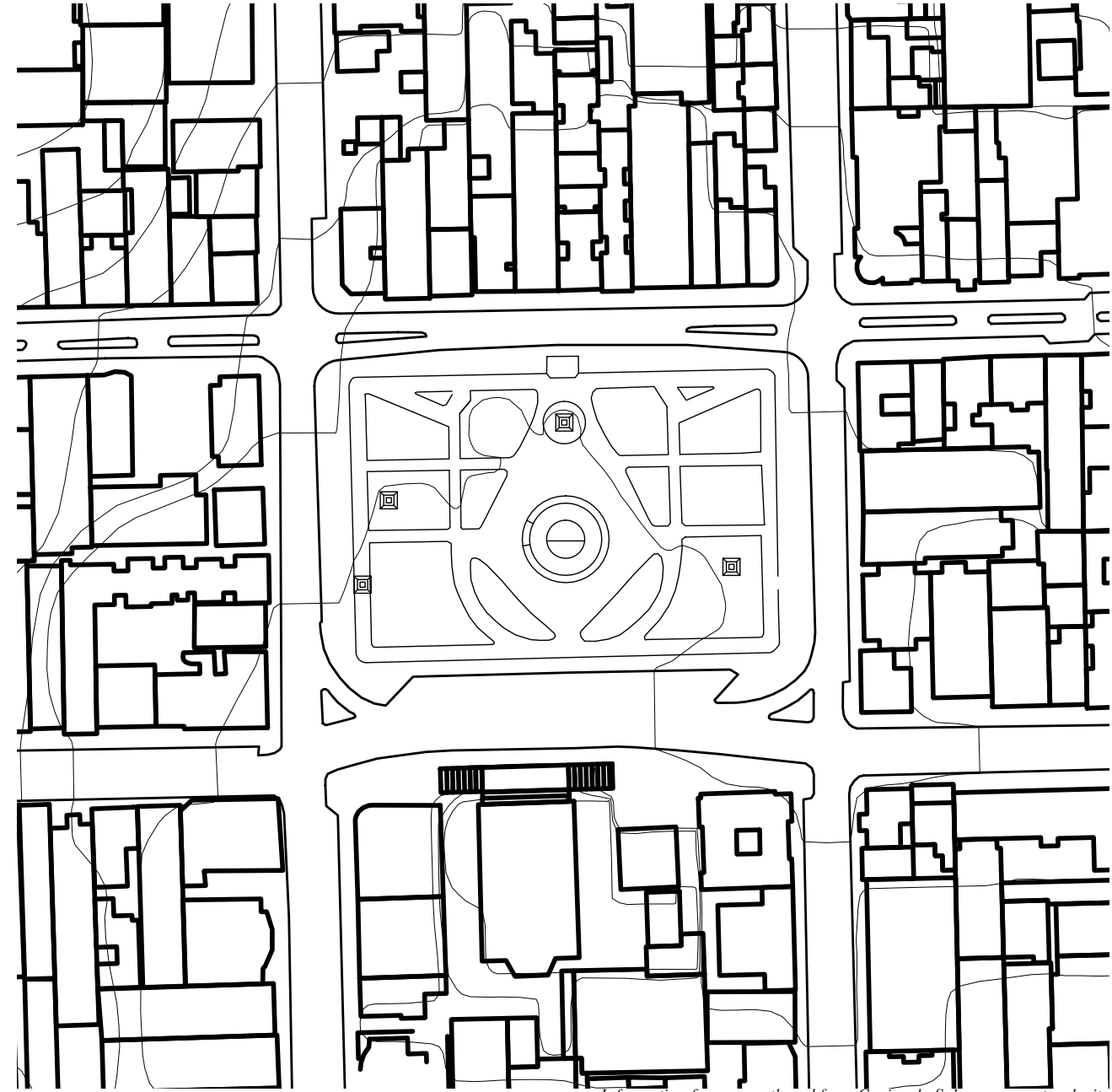




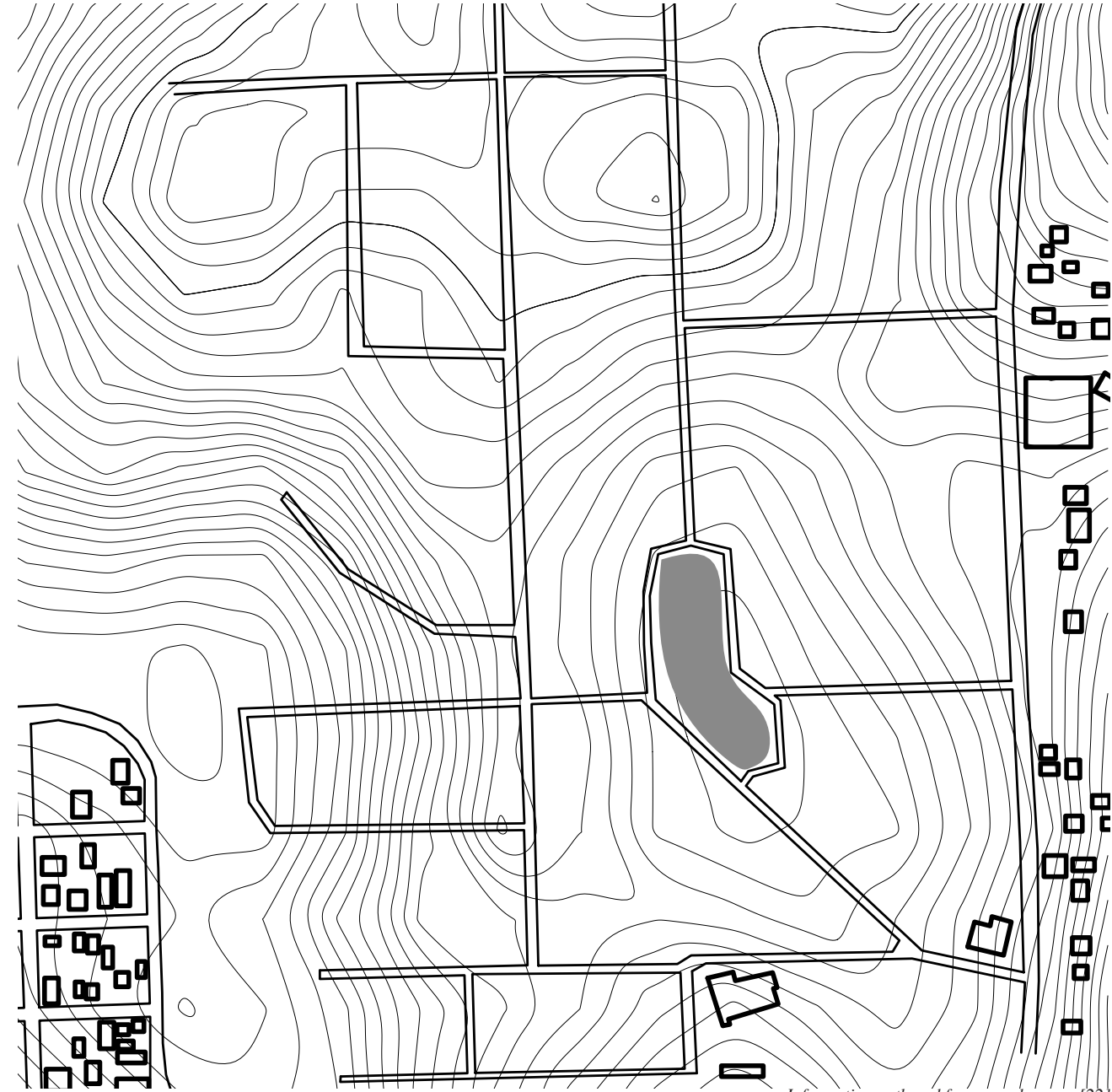




**CAXIAS DO SUL**  
Piazza Dante Allighieri



*Information for map gathered from Caxias do Sul government web site [23]*



*Information gathered from google maps [22]*

**FLORES DA CUNHA**  
Vinicola Luiz Argenta

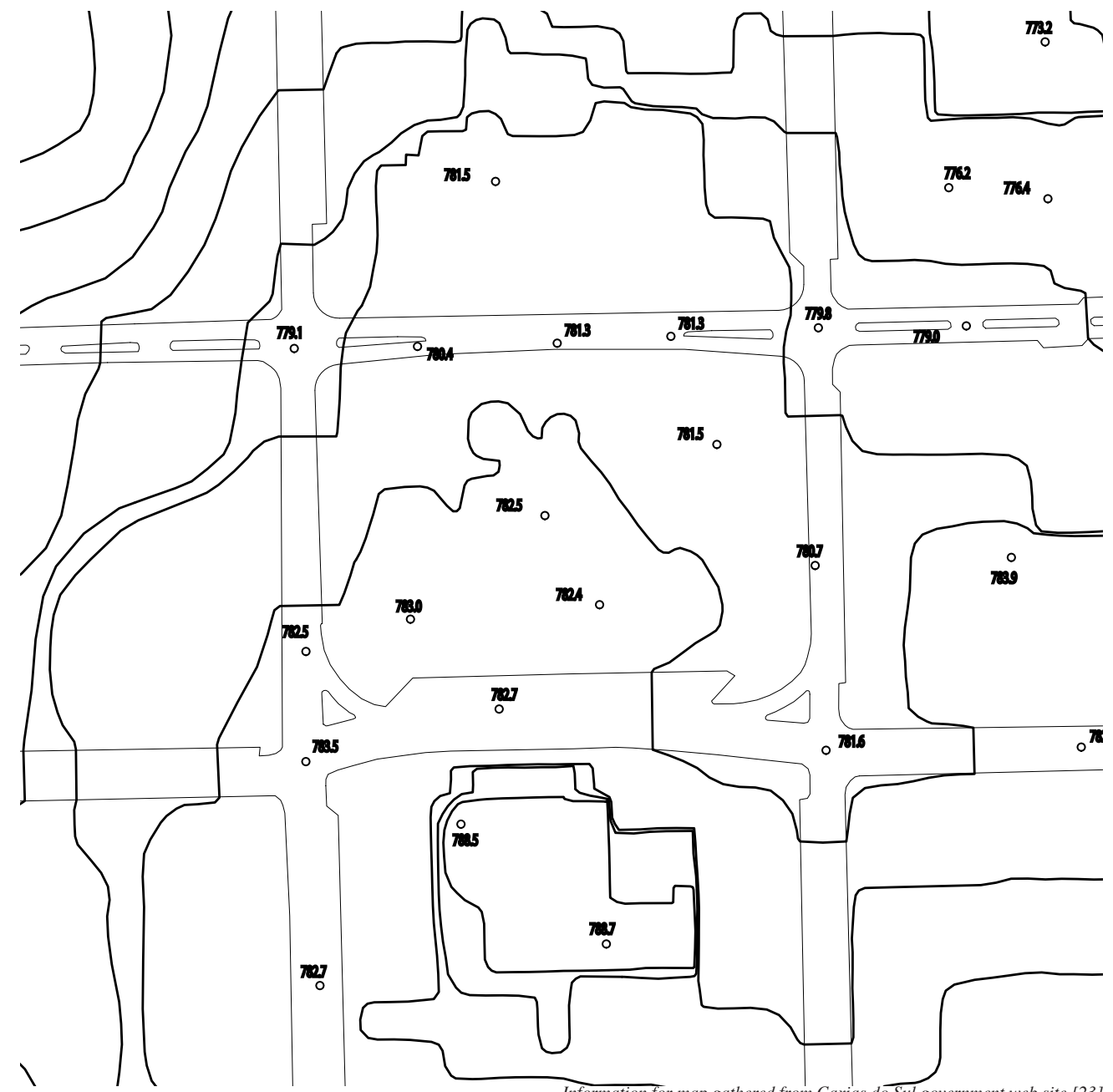






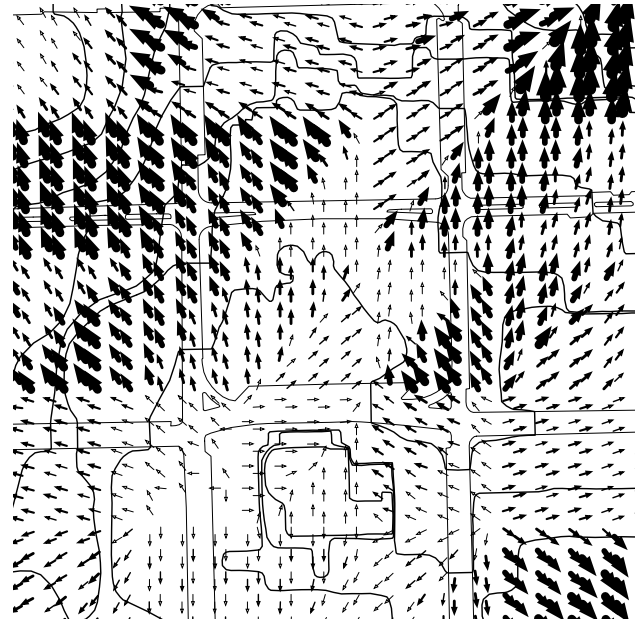


CAXIAS DO SUL



Information for map gathered from Caxias do Sul government web site [23]

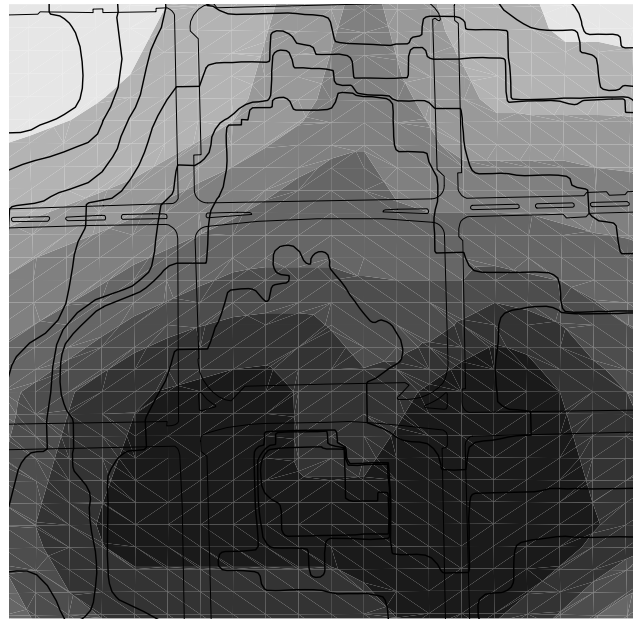
SLOPE ANALYSIS



- 0.0% - 3.0%
- 3.0% - 4.0%
- 4.0% - 4.6%
- 4.6% - 5.5%
- 5.5% - 6.8%
- 6.8% - 8.0%
- 8.0% - 9.6%
- 9.6% - 15.0%

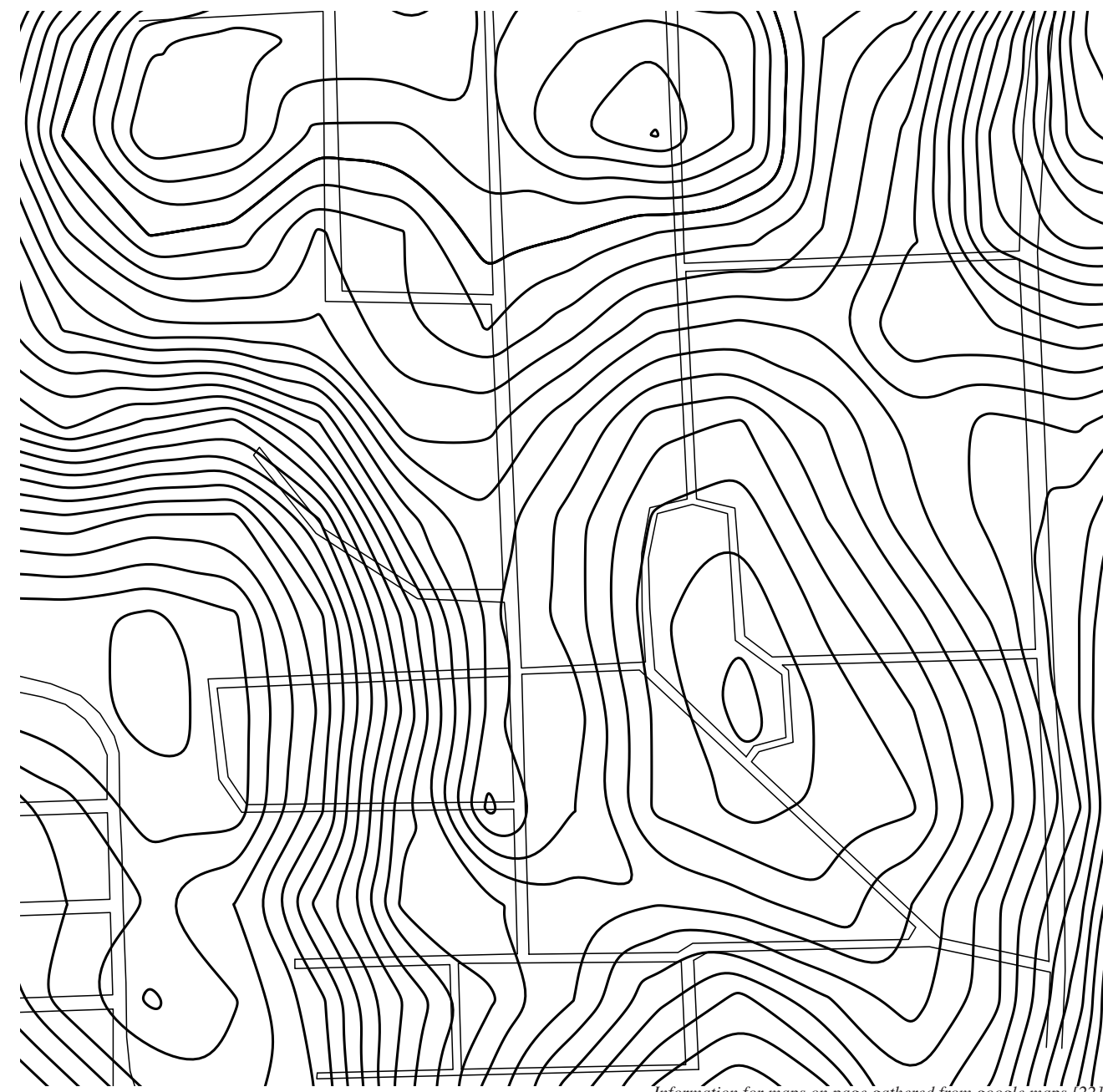
Information for maps on page gathered from google maps [22]

ELEVATION ANALYSIS



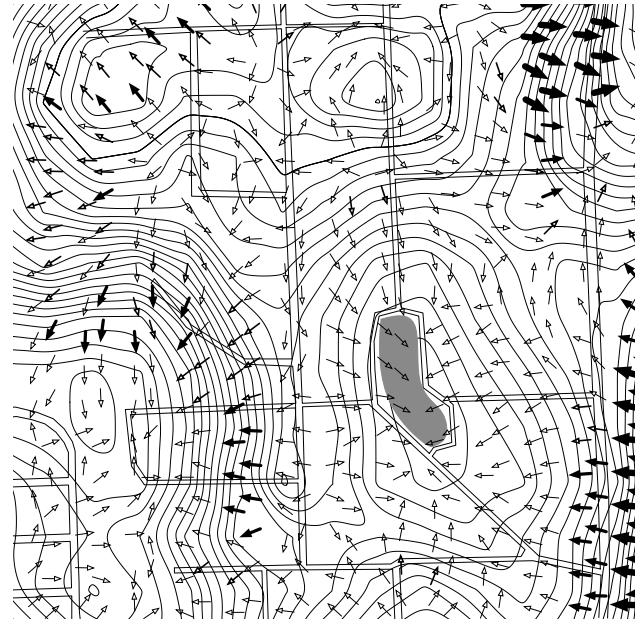
- 2522 FT - 2547 FT
- 2547 FT - 2560 FT
- 2560 FT - 2568 FT
- 2568 FT - 2574 FT
- 2574 FT - 2581 FT
- 2581 FT - 2585 FT
- 2585 FT - 2591 FT
- 2591 FT - 2600 FT

FLORES DA CUNHA



Information for maps on page gathered from google maps [22]

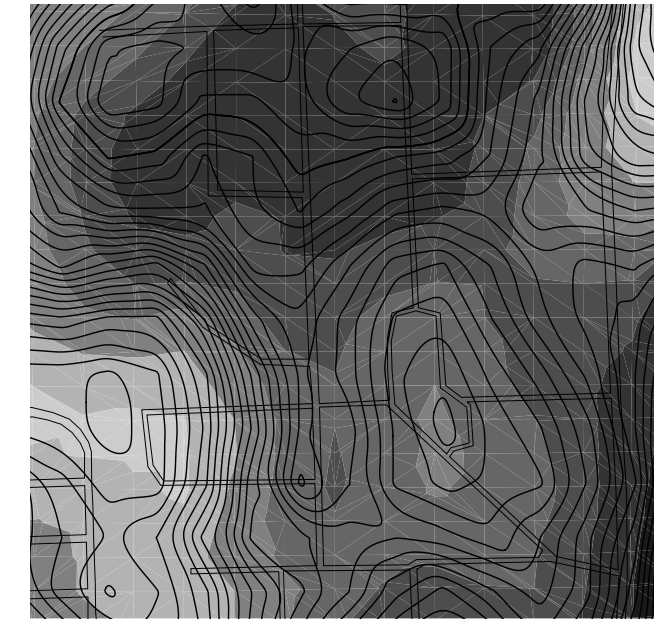
SLOPE ANALYSIS



- 0.0% - 3.0%
- 3.0% - 4.0%
- 4.0% - 4.6%
- 4.6% - 5.5%
- 5.5% - 6.8%
- 6.8% - 8.0%
- 8.0% - 9.6%
- 9.6% - 15.0%

Information for maps on page gathered from google maps [22]

ELEVATION ANALYSIS



- 2522 FT - 2547 FT
- 2547 FT - 2560 FT
- 2560 FT - 2568 FT
- 2568 FT - 2574 FT
- 2574 FT - 2581 FT
- 2581 FT - 2585 FT
- 2585 FT - 2591 FT
- 2591 FT - 2600 FT

SOIL CLASSIFICATION

- Acrisols
- Alisols
- Plinthosols (AC)
- Acid soil with clay-enriched lower horizon and low saturation of bases.



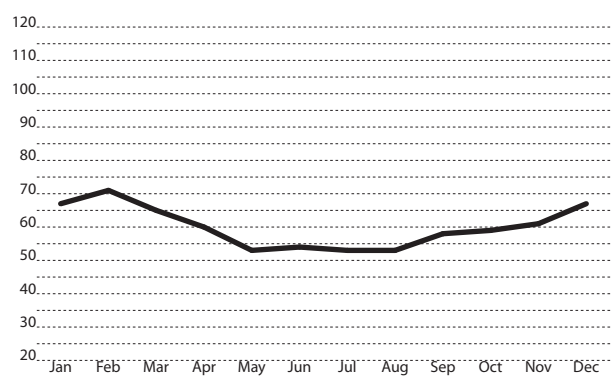




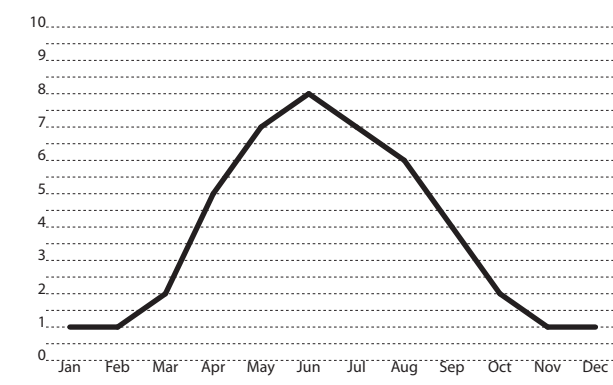




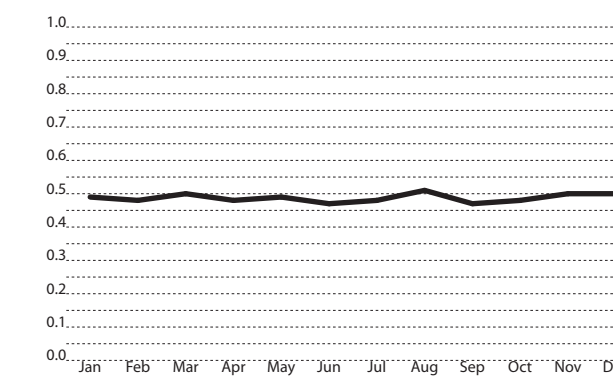
TEMPERATURE AVERAGES  
DEGREES FAHRENHEIT [25]



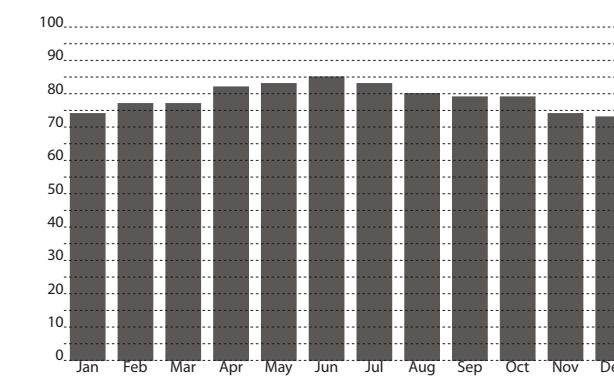
FOGGY DAYS PER MONTH  
[24]



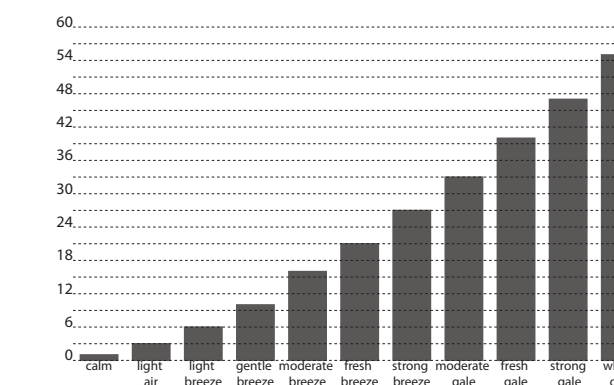
CLOUDINESS  
0=CLOUDY 1=SUNNY [26]



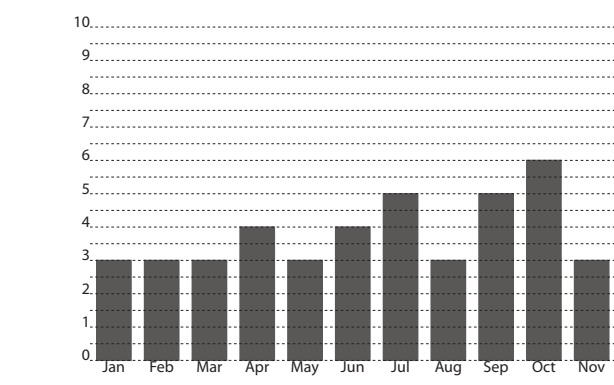
RELATIVE HUMIDITY  
PERCENTAGE [24]



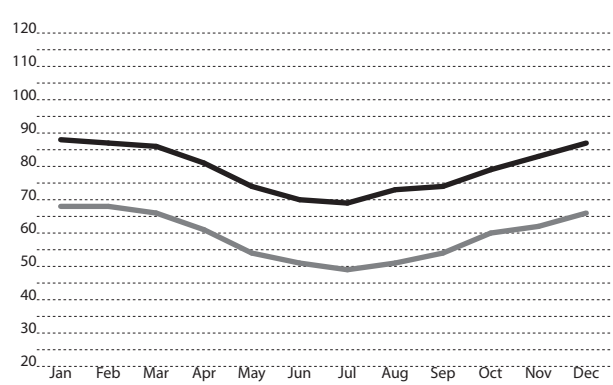
KNOTS KEY  
[27]



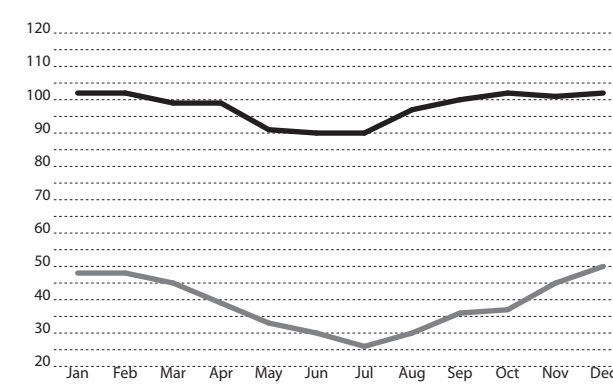
RAIN FALL PER MONTH  
[24]



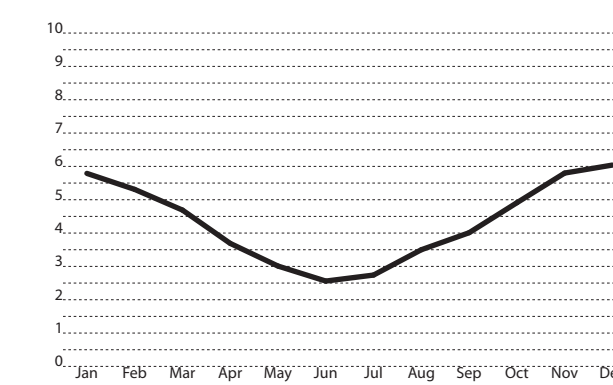
TEMPERATURE DAY & NIGHT  
DEGREES FAHRENHEIT [24]



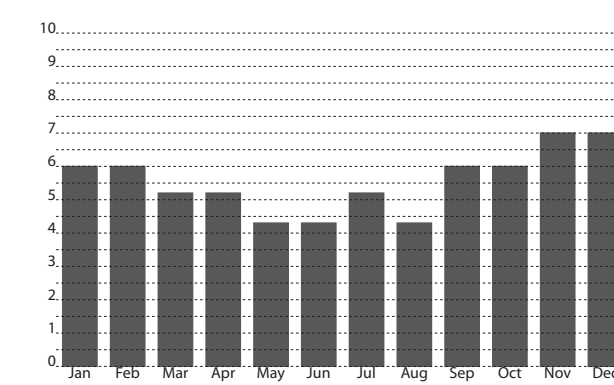
TEMPERATURE EXTREMES  
DEGREES FAHRENHEIT [24]



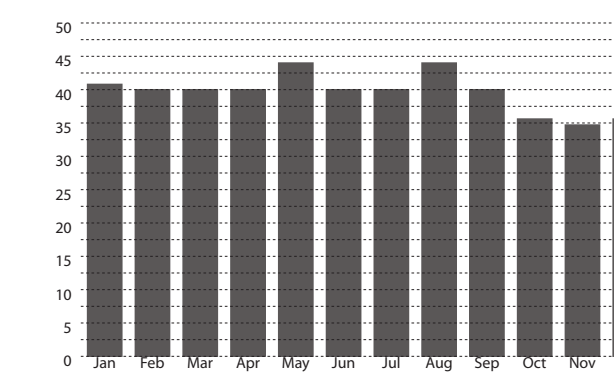
SHADING  
KWH/M2/DAY [26]



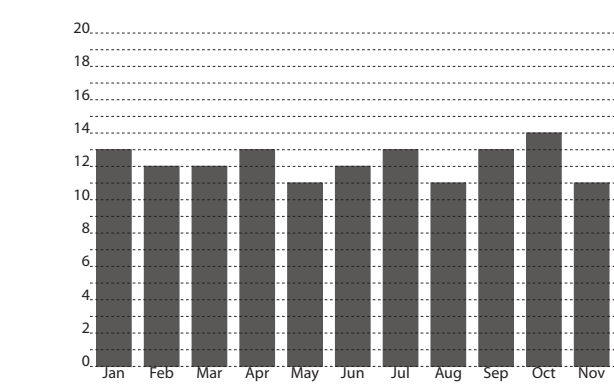
AVERAGE WIND SPEED  
KNOTS [24]



HIGHEST WIND SPEED  
[24]

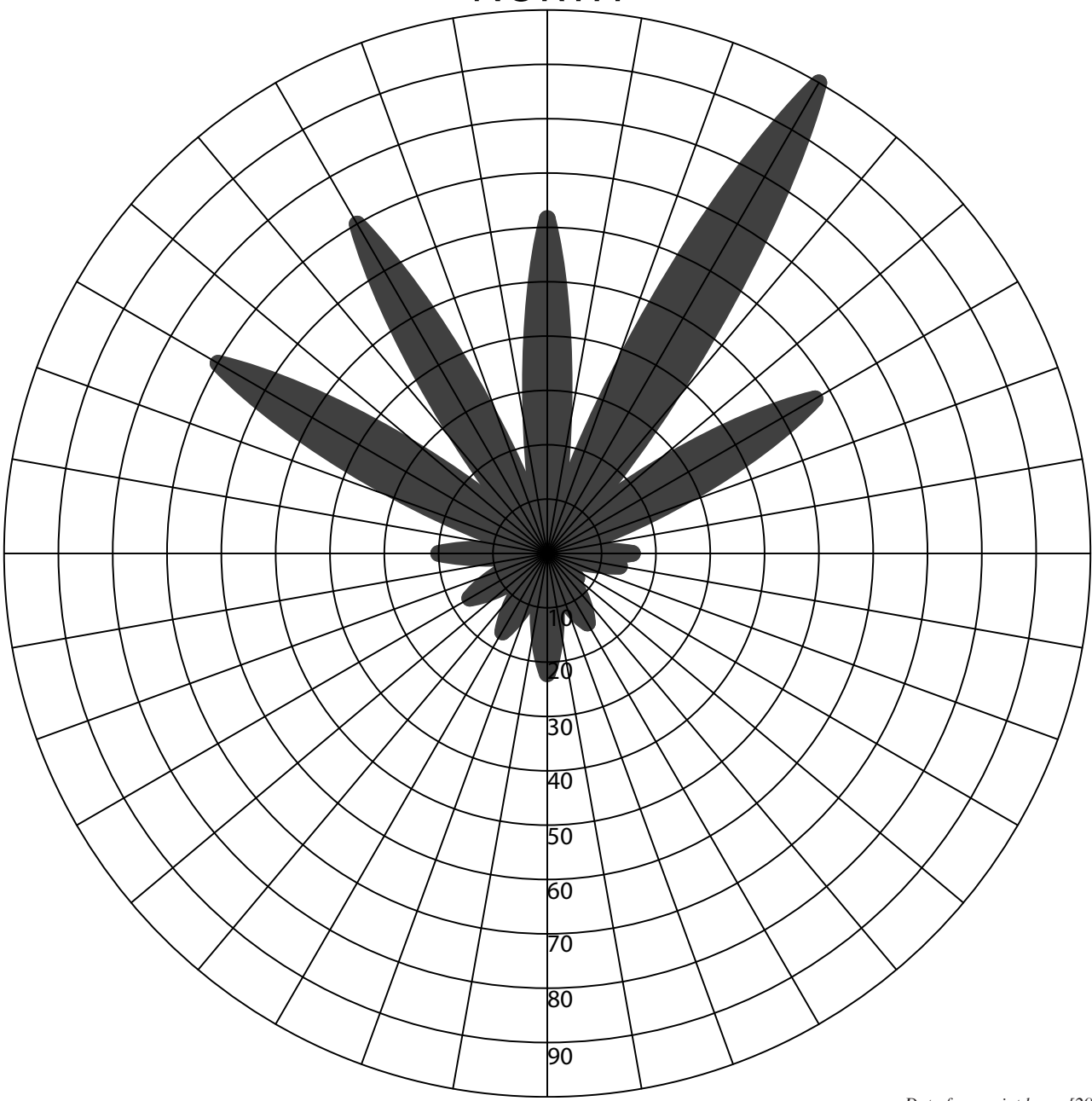


NUMBER OF WET DAYS PER  
MONTH [24]



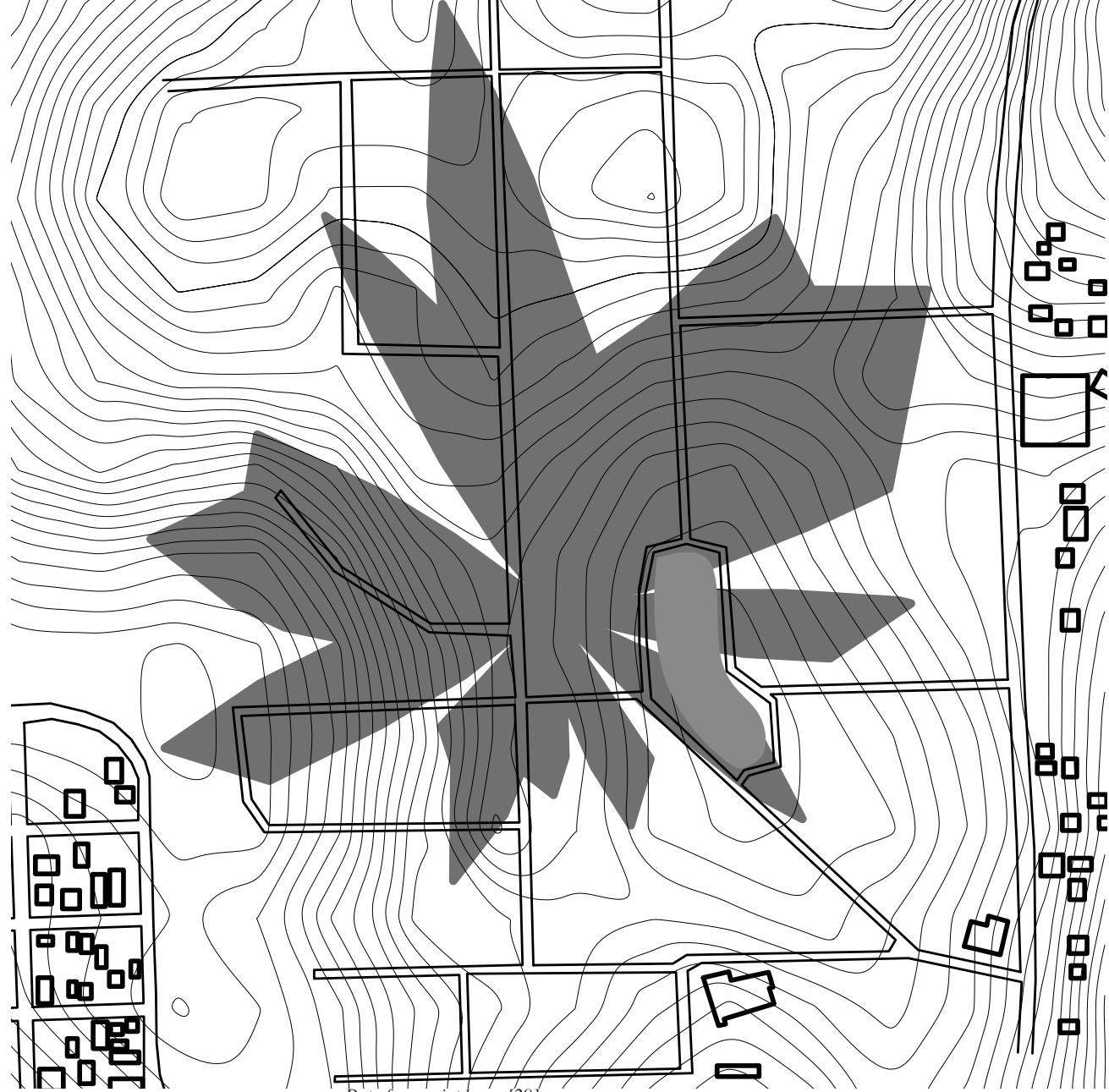


### WIND DIRECTIONS



Data from aviador.es [29]

### WIND INTENSITY & FREQUENCY

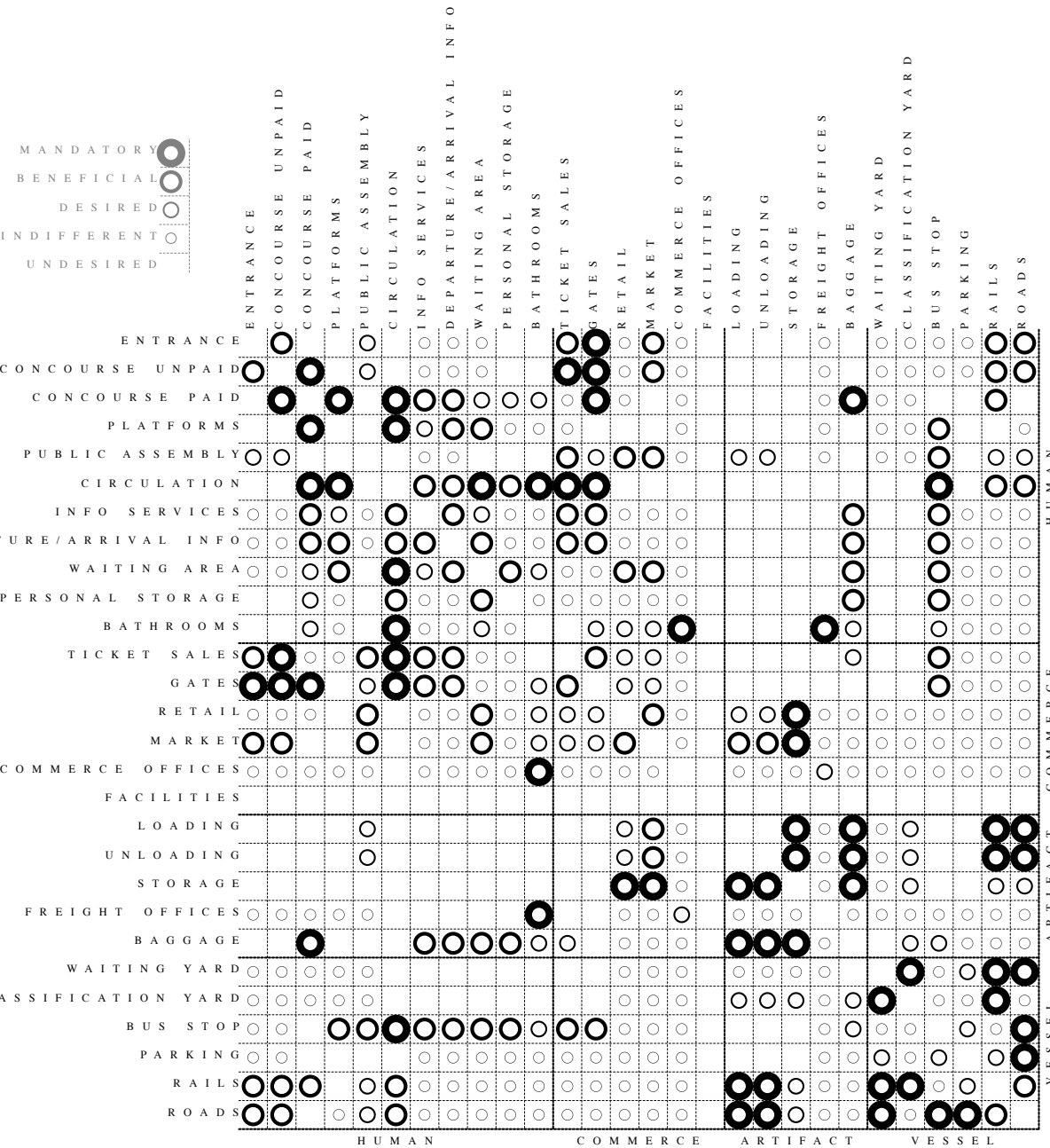


Data from aviador.es [29]

**P r o g r a m m a t i c  
R e q u i r e m e n t s**



animation



### VESSEL

RAILS	---	SF
ROADS	---	SF
MARSHALLING YARD	20000	SF
PARKING	9000	SF
BUS STOP	2000	SF
WAITING YARD	10000	SF
<b>TOTAL</b>	<b>41000</b>	<b>SF</b>

### ARTIFACT

LOADING	1500	SF
UNLOADING	1500	SF
STORAGE	2000	SF
BAGGAGE	700	SF
FREIGHT OFFICES	100	SF
<b>TOTAL</b>	<b>58000</b>	<b>SF</b>

### HUMAN

CONCOURSE PAID	5000	SF
CONCOURSE UNPAID	1000	SF
PLATFORM	20000	SF
CIRCULATION	800	SF
INFO SERVICES	100	SF
TRAIN INFORMATION	50	SF
BATHROOMS	1000	SF
WAITING AREAS	800	SF
ENTRANCE	1500	SF
PERSONAL STORAGE	100	SF
PUBLIC ASSEMBLY	8000	SF
<b>TOTAL</b>	<b>37550</b>	<b>SF</b>

### COMMERCE

TICKET SALES	200	SF
GATES	50	SF
RETAIL	10000	SF
TRAIN OFFICES	400	SF
MARKET	20000	SF
FACILITIES	2000	SF
<b>TOTAL</b>	<b>32650</b>	<b>SF</b>
<b>GRAND TOTAL</b>	<b>117000</b>	<b>SF</b>



















[1] Pérez-Gómez, Alberto . “The Myth of Daedalus.” AA Files 10 (1985): 49-52. Print.

[2] Cooper, John M., and D. S. Hutchinson. Complete works. Indianapolis, Ind.: H a c k e t t Pub., 1997. Print.

[3] Barnes, Jonathan. The complete works of Aristotle: the revised Oxford t r a n s l a t i o n . Princeton, N.J.: Princeton University Press, 1984. Print.

[4] “Hyperborean Vibrations: Allegory of the Cave - Plato.” Hyperborean Vibrations. N.p., 13 Jan. 2011. Web. 8 Dec. 2011. <<http://hyperboreanvibrations.blogspot.com/2011/01/allegory-of-cave-plato.html>>.

[5] Else, Gerald Frank. Aristotle: Poetics. Ann Arbor: University of Michigan Press, 1967. Print.

[6] Greek Theatre Clipart. (n.d.).Educational Technology Clearinghouse. Retrieved December 8, 2011, from <http://etc.usf.edu/clipart/14200/14221/>

[7] Philosophisches & Literarisches SehLoft: On theft: St. Augustine, Twain. (n.d.). Philosophisches & Literarisches SehLoft. Retrieved December 8, 2011, from <http://enriquegdelag.blogspot.com/2009/09/on-fruit-theft-augustine-twain.html>

[8] Pusey, E. B., Dods, M., & Shaw, J. J. (19551952). The confessions. Chicago: Encyclopaedia Britannica.

[9]Hume, D., Bigge, L. A., & Nidditch, P. H. (1978). A treatise of human nature(2d ed.). Oxford: Clarendon Press ; .

[10] Descartes, R. (199). Meditations on first philosophy. Raleigh, N.C.: Alex Catalogue.

[11] Rene Descartes and the Legacy of Mind/ Body Dualism. (n.d.). Serendip Home | Serendip’s Exchange. Retrieved December 9, 2011, from <http://serendip.brynmawr.edu/Mind/Descartes>

[12] Kant, I., & Abbott, T. K. (1898). Kant’s Critique of practical reason and other works on the theory of ethics (5th ed.). London: Longmans, Green.

[13] Ponty, M. (1962). Phenomenology of perception. New York: Humanities Press.

[14] Futagawa, Y. (2010). GA document 111. Tokyo: GA International ADA Edita. .

[15]Bras Basah Mass Rapid Transit Station | OpenBuildings. (2011, October 1 5 ) . OpenBuildings | Archiving the World’s Built Environment. Retrieved December 9, 2011, from <http://openbuildings.com/buildings/bras-basah-mass-rapid-transit-station-profile-4658>

[16] Binney, M. (1995). Architecture of rail: the way ahead. London: Academy Editions ; .

[17] Altinisik, Melike, and Samer Chamoun. Morphê: MRGD. Wien: Springer, 2008. Print.

[18] “MRGD.” MRGD. N.p., n.d. Web. 4 Nov. 2011. <<http://studio.mrgd.co.uk/>>.

[19] Pask, Gordon. “The Architectural Relevance of Cybernetics.”Architectural Design September (1969): 494-496. Print.

[20] Bullivant, Lucy, and Usman Haque. “The Architectural Relevance of Gordon Pask.” 4dsocial: interactive design environments. London: Wiley-Academy ; , 2007. 54-61. Print.

[21] “haque :: design + research.” haque :: design + research. N.p., n.d. Web. 4 Nov. 2011. <<http://www.haque.co.uk/>>.

[22] Google Maps. (n.d.). Google. Retrieved October 12, 2011, from <http://www.google.com/maps>

[23] Prefeitura de Caxias do Sul. (n.d.).Prefeitura de Caxias do Sul. Retrieved October 1, 2011, from <http://www.caxias.rs.gov.br/planejamento/texto.php?codigo=11>

[24] Climate History for Caxias Do Sul | Local | Brazil. (n.d.). Weather Forecasts and Related Weather Information | MyWeather2.com. Retrieved November 1, 2011, from <http://www.myweather2.com/City-Town/Brazil/Caxias-Do-Sul/climate-profile.aspx?month=1>

[25] Weather in CAXIAS DO SUL January 2010, Brazil, map | 2011-1977 Daily Weather Climate Data Statistics. (n.d.). Geographic Data - maps | United Kingdom, Canada, Australia, New Zealand, Germany, United States. Retrieved November 1, 2011, from <http://geodata.us/weather/show.php?usaf=839420&uban=99999&m=1&c=Brazil&y=2010>

[26] Caxias do Sul, Brazil - Sunrise, sunset, dawn and dusk times for the whole year - Gaisma. (n.d.). Sunrise, sunset, dawn and dusk times around the World - Gaisma. Retrieved November 1, 2011, from <http://www.gaisma.com/en/location/caxias-do-sul.html>

[27] Wind Speed Converter. (n.d.).CSGNetwork.com Free Information - Calculators, Converters, Apps and Source Code. Retrieved November 1, 2011, from <http://www.csgnetwork.com/windspeedco>

[28] UO SRML: Polar coordinate sun path chart program. (n.d.). UO Solar Radiation Monitoring Laboratory. Retrieved November 1, 2011, from <http://solardat.uoregon.edu/PolarSunChartProgram.html>

[29] SBCX Average Wind Statistics (CAXIAS DO SUL in BRAZIL) | Meteo-Mobile. (n.d.). Aviation Weather for pilots | Meteo-Mobile. Retrieved November 1, 2011, from <http://www.aviador.es/Weather/Wind/SBCX-3>

[30] architecture online - arcspace is an architecture and design magazine that features today’s most creative projects as well as the most influential of the past.. (n.d.). architecture online - arcspace is an architecture and design magazine that features today’s most creative projects as well as the most influential of the past.. Retrieved December 8, 2011, from <http://www.arcspace.com>



