MASTER

(S)cars
a treatment for Boston's big dig

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Graduation report
‘(S)cars - a treatment for Boston’s Big Dig’
Graduation Studio ‘Architecture of smart mobility’

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(s)cars

a treatment for boston’s big dig
This graduation report is part of the graduation process of the master Architecture, Building and Planning and the master track Architecture of the University of Technology Eindhoven.

This report finds its start in the studio ‘Architecture of Smart Mobility’ under supervision of Prof. Dr. Ir. P.J.V. v. Wesemael and Ir. F.H.J. Ziegler.

The graduation process, which lasts for one year, is separated in two parts, called M3 and M4.

Within M3 there is a collaborative research, done by all students in the studio together. The final product of this collaboration is an atlas which bears the same title as the studio.

Within M4 an individual research and design task are performed. Each student formulates his or her own research question and sets own goals for the design task. One of the final products of this assignment is the booklet ‘(S)cars – a treatment for Boston’s Big Dig’, which you are now reading.

The two products together form the complete graduation report for the studio. Each of them, however, can be read on its own.

Without the contribution of some others this booklet could not have been at this level.

First and foremost I would like to thank Debby Huiskes, my wonderful girlfriend, for all the support throughout the whole process and especially in the most stressful moments when she was always there for a pep talk, a helping hand and making sure I could spend all the necessary time on this project.

Stephan van der Wel, who became a dear friend during this master, has been of much help in this project. The discussions we had about our designs and about several themes during the process brought me many steps further. In many working marathons, even one which lasted over a week, we always were able to cheer each other up. Thanks Stephan, for this and for sharing the hundreds of liters of coffee.

I feel blessed to have had such a wonderful bunch of fellow students in this studio. Two of them I would like to mention in special. Liza van Hest and Laura van Loon, who became besides fellow students friends as well. With them I could share thoughts, times to stress and times to relax also outside the university.

The guidance of Pieter van Wesemael and Franz Ziegler certainly brought me new insights and pushed me towards a more challenging design, for which I would like to thank them.

I would also like to thank my family and friends in general for their understanding when I was too busy to catch up.
Perceiving our environment is something we do without any conscious awareness but still do it all day long. It is fascinating in how this seemingly simple activity can lead to several problems and in our case also to a collision between a world for cars and a world for human beings in the city.

Like a hammer, a car is a tool. That means that it is a product that we ‘embody’ when we use it. It becomes an extension of our body, a part of ourselves and we are not fully aware of the tool itself. The awareness stays with the environment we perceive through the tool.

In J.J. Gibson’s theory of perception, we perceive features in the world around us after the different activities they afford us. These ‘affordances’ correspond to the abilities we have with our body. Using a tool gives our body other abilities which makes us perceive other possible activities with features in our environment. A nail only appears to us hammerable when we have a hammer in our hands.

When we drive a car, we perceive the environment in another way, due to the different set of abilities and disabilities we have at our disposal. Even though it is the same world, it is perceived in a different way.

This is where it becomes a problem. With the way of designing the world around us in the past decades, there is a separation in thought. One group designs with the focus on the pedestrian as user, the other designs with the driver in focus. With both these designing processes the designer works with the abilities of its user in mind and creates designs with corresponding affordances in mind. With this, two representations of the world are created. One of affordances for cars, one of affordances for pedestrians. In some cases parts of cities are shaped with one representation strictly prioritized.

A perfect example of such an area is found in the city center of Boston. In this city the idea of an elevated highway straight through the city, the Central Artery, left some deep scars in the urban tissue. Even since it has been demolished and has been transformed into the Greenway, those scars have remained visible. One side of the Greenway is still small scale and kept its original tissue, the other has changed into a bigger scale with a wider tissue. The difference is so clear, that glued does not suit this location. The Greenway is designed as a new park, distancing from the neighboring areas and welcoming a new phase for the city.

One particular plot on the Greenway where exit ramps are situated, is not well designed and splits the Greenway and its park. In order to complete this Greenway, this plot is designed in this assignment. Suiting its central location in the city in a public park, public program is situated. In this case a museum. In order to make use of the researched theory, a car park will be added. These two will leave space for a continuation of the park.

A spacious building is created which houses both enjoyable and suitable space for both car drivers and for other users. As aimed for, the two find a way of interaction to ensure an awareness of each other’s space. A physical separation combined with a forced interaction at the same time, creates sensible tension in which a more conscious awareness of each other’s presence is experienced.
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This is a story of different collisions. Collisions of urban tissues, collisions in program, but above all one of collisions in perspectives and perceptions. Perceiving our environment is something we do without any conscious awareness but still do it all day long. It is fascinating in how this seemingly simple activity can lead to several problems and in our case also to a collision between a world for cars and a world for human beings in the city.

A perfect example of such a collision is found in the city center of Boston. In this city the idea of an elevated highway straight through the city, the Central Artery, left some deep scars in the urban tissue. How could this happen?

The aim of the graduation studio ‘Architecture of Smart Mobility’ is to analyze and understand the, in many cases, problematic relation between cars with their roads and the architecture for humans.

My personal aim is to investigate the cause of this problematic relation by approaching it from a different theoretical angle in the hope this might lead to new insights. The obtained theoretical position will be of guidance in the research in the location in Boston and the design process.

The goal of the research as a whole is to eventually find an answer to the following question.

In which way should the areas scarred by the coming and going of the elevated Central Artery be treated in order to create a well-functioning city center for Boston?

This answer will be presented in the form of a design proposal. It is good to understand that this design assignment, besides being only a design proposal, is used to illustrate a different approach in designing for Boston in particular, but could also be of use in other situations with similar circumstances.

The way this research report is composed is as a story that can be read in one go. It starts with a more abstract view on the theme of mobility and architecture. This will lead to some issues that will explain the situation of the Central Artery in Boston. From there the location will be further analyzed which will lead to a proposal for a masterplan. Part of this masterplan will be worked out into a design which will be explained.
architecture and mobility
The theme of the studio ‘architecture of smart mobility’ has been researched in the preceding collective part in the first semester. Both the cities Boston and Eindhoven were analyzed on an urban scale as well as focused on an important car route with the adjacent environment. The findings were connected to the historical development of the cities and, where possible, explained. Besides the research in the cities there has been research into several typologies, urban plans and buildings which incorporated the presence of cars in some way. [8]

The results were presented in an atlas. This atlas served as a guidance in choosing an individual research direction and research location. A small note needs to be made. The term ‘smart’ can lead to different expectations. At the University of Technology of Eindhoven it mostly refers to smart solutions for the consumption of limited sources in mobility and the aim for environmentally cleaner alternatives. This is not the type of ‘smart’ as it has been treated throughout this specific studio. The aspect that could be called smart in our studio are the ways in which the presence of mobility and, more specific, cars is dealt with in urban and architectural planning. [8]

Part of this graduation project is an individual research. My personal interest, after seeing many different ways of dealing with cars in plans for our built environment, became the question why in planning for cities and buildings problems occur in dealing with cars.

This interest lead together with the choice for a location of research to my mentioned research question.

**In which way should the areas scarred by the coming and going of the elevated Central Artery be treated in order to create a well-functioning city center for Boston?**

This question contains three different aspects which together will bring an answer. One comes forth from my interest in the source of the problem of cars in the city. In order to understand the situation I think it is key to understand this problem. The second is the story of the Central Artery in Boston, which is the problem area itself. The last aspect is how the situation should be dealt with now. This will eventually lead to a design proposal in this area.
1.2 architecture and mobility

Mobility and architecture. Two themes that in certain ways seem rather as each other’s opposites. What is more interesting than the difference between them in general, is the difference in how we make use of them.

Mobility contains in essence everything that is ‘not staying’ but ‘moving about’. If we look at it from a human’s perspective to what it can be useful for, I’d like to call this the human scale, it brings us above all freedom. The opportunity to move around, escaping one place and replacing it for another. Mobility gives us the opportunity to change surroundings.

When we try to describe the bigger scope of architecture we end up with something much like the ‘built environment’. It is together with landscaping the part of the surroundings that is designed by man. It is designed to contain and protect us. To enclose us by forming boundaries. Architecture brings us the opportunity of staying in a place.

So indeed, quite contradicting themes. Not staying and staying. But so far the terms are still quite vague as well. In this essay will be shown how and where mobility and architecture meet. In order to be able to understand more about their relation we should concretize them further.

If we look at the human scale of mobility we have to face the fact that over the past century the car has been the method of mobility that brought us the biggest sense of liberation. The numbers in which they grew are simply astonishing. Over one billion cars are being used nowadays. In the United States there are 800 vehicles per 1000 people. These numbers show some the importance in and the impact on our daily lives. From now on for the scope of this essay we will focus the mobility theme on cars only. [8]
The car, as many things, has a use, a purpose for being. It is the product of the idea of carrying people comfortably over far distances. Besides being a product it is also an object. This means that added to the value of its functionality it has a layer of status attached to it. This added value means that we, to some extent, identify ourselves with the object itself. [10]

Not only in a psychological way is the car part of our beings. From a physical angle we can appoint the car as a tool. A tool is a product that when in use we are not fully aware of the tool itself. When we use it, it becomes an extension of ourselves. We can describe it the best as ‘embodiment’. The tool becomes part of our body and we are aware of it as much as of the rest of our body. The easiest example is the hammer. When a carpenter uses it for hammering, it mediates the relationship between the carpenter and the nail. The carpenter is not consciously paying attention to the hammer, but only to the nail that he wants to hammer. The hammer is embodied and becomes an extension to the hand of the carpenter. The same goes for products we look through. A pair of glasses is not looked at, but looked through and at the world. The glasses mediate the relationship between the person and the world. [5] [10]

As mentioned the car is a tool as well. When driving it, one does not look at the car, but through the windshield at the world. When turning the steering wheel, we are aware of turning ourselves with the car in one go and not of turning the steering wheel. We even experience the shell of the car as being an extension of our own skin and are aware of its measurements without paying attention to it but through proprioceptiv perception. Due to familiarization the car becomes an integral part of our perceptive system. [5]
Before jumping to cars and perception it is crucial to understand how perception works. In dealing with perception in this case I am not interested in how the eye exactly works and how the light triggers the neuro system attached to the eye. The part of perception that will briefly be discussed here is the way people perceive things that surround them.

J.J. Gibson calls this an ‘ecological approach’ and describes with it how the environment supports cognitive activity. In his work he treats the process of the interaction between an agent, in our case a human being, and attributes in its environment. Conditions that enable the interaction include both properties of the agent and properties of the environment. The intended properties of the agent are his ‘abilities’ and the intended properties of the environment are called ‘affordances’. What Gibson explains is that there is a direct relation between the abilities and affordances. The agent with its abilities sees the attributes in the environment and perceives its affordances. In other words, when a human being perceives the world that surrounds him, he sees the possibilities in which he can use the different attributes. This tells something about both the environment and the agent. If for example a man sees a rock with the size of a hand, he perceives this rock as ‘pick-upable’ and ‘throwable’ which relate to his abilities of picking up and throwing of hand sized attributes. [5] [10]

Now what is interesting is that tools, such as the mentioned hammer, pair of glasses and car, extend our bodies and add abilities to our beings. With these added abilities we perceive the world in a slightly different way. With the hammer in his hands a carpenter considers a nail being ‘hammerable’ where it was not without the hammer. The same goes for cars. When we drive a car, we perceive the environment in another way than without driving it, due to the difference in abilities we have at our disposal. Besides the added ability of comfortably moving around over great distances, more interesting perhaps are the abilities that are taken away when driving a car. For example, one cannot step onto things, so curbs become boundaries where they weren’t without a car. Stairs are of no use for car drivers. They now only afford crashing into. Doors and openings in buildings afford pedestrians walking through them. With a car these openings become in general too small, so they lose this affordance to them. With the loss of such abilities, many things in the environment that are of use for pedestrians lose their affordances to car drivers. Besides the difference in perceiving the affordances inherent to the changed abilities there is another big difference. Due to the relative high speed in one direction and the greater chance of crashing into things, our field of view narrows down to a smaller angle. The environment we are able to perceive becomes a small segment of our usual field of view, right in front of us. The higher the speed, the narrower this focus becomes. [5] [10]
It becomes clear that users of the car as drivers perceive the world in a different way than users of the city as pedestrians. In their driving or walking state, they have totally different abilities and the built environment with all its elements affords totally different things. Even though it is the same world, it is perceived in a different way.

This is where it becomes a problem. With the current system of designing the world around us, there is mostly a separation between the two fields. One group designs with the focus on the pedestrian as user, the other designs with the driver as user in focus. With both these designing processes the designer works with the abilities of its user in mind and creates designs with corresponding affordances in mind.

The fact that these designing processes in a city are mostly separated, results therefore in designs which work well for one user group, but may work not so well for the other. One can say that actually two worlds are being designed: one for the pedestrians in the city and one for the cars. The issue now is that these worlds on paper may be designed separately, but they have to share the same available space in the cities in our real world.

According to the theory of heterotopias as Foucault describes them, one could say that the car can be seen as a special kind of space with a strong heterotopic character. When the user enters this space he has to adopt a new disciplinary system with a new set of rules and proper behavior. This idea of the car as a heterotopia supports the idea of the existence of the two worlds mentioned previously. [9]

What happens in many problem cases is that parts of cities are designed merely for either only cars or only pedestrians. This results in some unpleasant situations where the two worlds meet each other. Instead of sharing the available space and connecting the two worlds in a well working manner incorporating both the sets of abilities and affordances, borders are formed, literally splitting parts of cities. When this occurs and such a border exists, it may logically be treated as a border by people in the city. [6]
2.1 boston

A beautiful city that shows the problem of designing with one user group in mind is Boston. Before plummeting into this problem it is wise to understand more about how Boston was formed as a city and the decisions that were made as a result.

In 1630 Boston was established on the Shawmut Peninsula which lays in a natural harbor on the east coast of what is now the United States. This small piece of land was connected to the mainland by a narrow strip of land, the neck. The English settled on this piece of land because of its convenient situation in the natural harbor. From that time on it was one of the most important places of New England and it rapidly expanded.

Over the next centuries many landfilling projects took place in order to create more space to build and connect several of the other peninsula’s and islands. This included the area around the peninsula of Charlestown, across the Charles River. Boston was already connected to this area in the end of the eighteenth century by a bridge. This river crossing became an important connection for Boston to the North and the West. With the filling of land, Boston grew in size and population.

Looking at the situation nowadays, it is visible that the area around the original peninsula and its neck, the oldest part of the city, has remained the active city center. The transportation of people and goods from and to this area is therefore of great importance. With the introduction of the car in the city, it became clotted. The need for a fast way from and to the center rose. [4][8]

This is where the problem starts.

Back in 1948 the plan for ‘the highway in the skies’ by Governor Bradford was accepted. A plan focused on car traffic. At that moment the old city center of Boston was not car-friendly and solutions for this were being sought. Part of the accepted plan would reduce the risk of traffic jams in the city by creating one single flow of traffic on a new level above the streets. This part was adopted as the ‘Central Artery’.

In order to create the Central Artery more than ten thousand people had to be moved and about one thousand buildings had to be demolished. After overcoming many delays, the Central Artery finally opened in 1959. It was designed as a collector distributor road for the city, but had to serve as an interstate highway as well. From the start there were problems. By the time it got in use, it was already almost at the top of its capacity. In the 1980’s the severity of the problems got really visual. More than 200,000 cars used the Central Artery daily, resulting in traffic jams for ten hours a day. The accident rate was up to four times as high as the average on comparable interstate roads in the United States.

After a small decade, sick of the traffic jams, planners already began thinking of tearing the Central Artery back down and replacing it for a tunnel. This idea was worked out into a serious proposal in the 1970’s, but it was not implemented. Later, in the 1980’s the state of Massachusetts sought funds for a new plan. In the new plan the highway would be widened and placed under the ground. The new plans, also known as ‘the big dig’, were approved in 1987. In 2005 the new Central Artery, now also known as the Greenway, was opened. [8]
2.2 a cut in the city

It may be clear that from the start the priority in executing this plan was definitely the world for the cars and not the one for the pedestrians in the city. The mentioned problems are also car oriented. But besides this car project and the car oriented problems, it had a massive impact on the city and its people self.

As mentioned, in the 1950’s about one thousand buildings had to be demolished. Since the Central Artery was running straight through the center of Boston, a whole stretch of roughly sixty meters wide was completely cleared. The old urban fabric stopped existing. Connections were cut off. Buildings were cut off. When the elevated Central Artery was there, a new phase began in which the two sides, the North End and the rest of the city developed further in their own ways. The North End remained in general as it had been before: small scale buildings in their historic fabric.

The south side of the Central Artery grew bigger and taller and was home to many redevelopments. It turned into a booming business district with new buildings on a larger scale. Alongside the Central Artery cutoff buildings were patched, mostly with blind brick walls, and open spaces were filled up with buildings such as parking garages, with mostly blind or inactive facades towards the highway.

The whole situation appears quite sad. An old American city with pretty much its original urban tissue, torn in two by a highway on stilts, creating new borders and louche circumstances ideal for lowlife. [4] [8]
2.3 scars

The new Central Artery project, the big dig, sounds as a rather perfect solution from different perspectives. It was initiated as a solution for solving the traffic problems that occurred with the elevated highway. The dark space underneath the highway would disappear. Opportunities of new developments on top of the new tunnel would appear. The empty space could be used to reconnect the once separated city parts. [22]

There are some issues however.

The state of Massachusetts wanted to solve their traffic problem, which they indeed succeeded in. They however again only had their minds set on the car’s perspective, not so much on the people in the city. Yes, it gave them the ground for new developments, but the tunnels were placed rather close to the surface at certain points which results in restrictions of what can be built on top. At some places there would not even be enough ground for trees to grow in. Another point is the fact that along the Central Artery buildings were patched with blind walls and buildings were placed with and inactive façade towards the highway. They would either have to be redeveloped or replaced or would remain a scar in the tissue. Besides this, there is a new urban fabric which makes it at most places impossible to rebuild the original fabric. [15]

Whatever happens, scars of the elevated Central Artery will remain visible.

fig. 11: Janus, the two-faced god. This god represents the Big Dig. One face shows the good opportunities of creating new space for the city now the Elevated Central Artery has been demolished. There is however a downside. The way the Big Dig has been designed was once again with the focus on a traffic problem and scars will remain in the city.
masterplan
3.1 context analysis

One of assignments of the graduation studio is finding a location for a new design. Since the research took me to the elevated Central Artery, to the big dig and the separation in Boston’s city center, my design location will be situated somewhere in this area. To understand a bit more about the situation nowadays a short overview of the collaborative analysis of the area is shown. These are made on a larger scale and might not be precise. They however do give enough information for this moment. To make it more clear, the area of research is highlighted.

If we start by looking at the map showing the built areas, we see throughout the whole area a rather organic tissue. To the North it however is slightly smaller scaled than to the South. On this south side it is also visible that there are some more open areas whereas the North is completely packed.

Clearly, the highway is the biggest artery in the infrastructure of the city. However, it merely passes underneath the city and therefore has no direct consequences, not anymore, on the city center. The Surface Road along the Greenway is still a pretty busy road. The stream of cars follows the Greenway, from north-west to south-east and vice versa. This direction is mostly perpendicular to the historic north-south oriented tissue, which is still visible in North End.

Comparing this to the ages of the buildings in this area, we see that the southern side with the bigger scale is much newer than the historic North. The map showing the building heights, shows that many of these newer buildings are much higher.

Looking at the program of the city center, we see a very diverse area, with many different functions, but all more or less grouped in one location. This makes it very clear to distinguish different segments of the city center and see how they can possibly relate to the Greenway.

Boston has a great history considering parks. The famous Boston Common, the green Commonwealth Avenue and of course the Emerald Necklace. In the ‘head’ of Boston, the city center, there was no park until 1976 when the Christopher Columbus Park was opened. The Greenway connects to this park, only ‘kissing’ it, and then turns away from it. The fact that the Greenway lays throughout the whole center and connects to the Columbus Park which lays at the waterfront, makes it possible to walk via a system of parks to the waterfront from many places in the center. [8] [20]
3.2 location: scarred tissue

One area on top of the big dig is of particular interest to me.

Towards the northern end of the Greenway, the part bordering the neighborhood North End, there is a plot that cuts off the new park on top of the big dig. The situation is that one particular plot, where two exits of the tunnel come to the surface, is designed in such a way that the park simply cannot continue and the North End Park becomes a separate park. This feels as a shortcoming, even more because on both the North as the South side of this plot there are some inactive spots. On the North and South side of the new North End Park there are empty spots and some small, unfit buildings that are clear leftovers from the elevated Central Artery period.

Furthermore, the end, or start, of the Greenway finds its place in this North End Park, but could possibly use a more majestic mark then some metal fences at the tunnel mouth. Finally, this place is the place which shows perfectly the difference in way of development on both sides of the Central Artery.
Looking again at the city center, but now from the North End Park area, we can distinguish several different parts of the city center and the possible relations with them. Immediately is clear that there are many different but all interesting and lively parts surrounding the area.

Of course, the location itself is part of the Greenway, which runs through the city center.

On the north-west side, there is an area which is still being further developed, but houses many bars and cafés already. This is the Bulfinch Triangle. At the end of this triangle there is the North Station.

To the north there is North End, an Italian infused, small scale neighborhood, still on the original tissue. One can find many small scale restaurants and cafés here. The main program in this ‘Little Italy’ is housing.

On the east side there is Christopher Columbus Park with the Harbor right behind it. Through the park this Harbor Front is easily reached.

To the south there is, directly bordering the location, a shopping area with a historic market and old pubs in the Blackstone Block, the only historic building block in this new part of the city. Next to it, there is the Faneuil Hall and the Quincy market, with its food court and regular shops.

A little behind this commercial area, there is the Government center with its brutalist City Hall.

The last part is the financial district of Boston. The most of the high-rise buildings are found in this district.

On the following pages, some photo’s of the location are shown to get a sense of what kind of location it is from eye-level. [11] [12] [13]
fig. 30: Facing south from the location to the empty spot on the right and the closed facade of a parking garage.
fig. 31 Facing south-west over the North End Park.
fig. 32: View from the eastern plot with ramps to North End. The cut-off and patched facades are clearly visible.
fig. 33: Facing east from the same location. There is a clear view to Christopher Columbus Park. The small piece of landscaping in the front is the Armenian Heritage Park.
fig. 34: View to North End. On the western part of the location some small shops and restaurants are situated in unfit buildings.
fig. 35: Although the patched buildings are closed, in the way they are patched they have character and are a beautiful reminder of the situation in the 1950’s-1980’s.
fig. 36: A little to the south there is the Government Center with its huge, brutalist city hall by I.M. Pei. It shows beautifully the difference in scale from the North End. From the North End Park it is just visible.
fig. 37: Next to the location a new building complex will be built in the near future. It has high-rise of 180 meters.
In a way it sounds cliché. Original tissue torn apart – solution: heal the tissue by reconnecting. I can imagine places where such an approach suits best. In this particular location however it does not work that well.

The tissue of North End is still pretty much the same as it was originally. The South side of the Central Artery however changed rapidly and grew in scale and became a different city center than it was before the Central Artery. Both the tissues now have their own character and seem to work quite well on their own. If I were to heal the tissue, what kind of fabric would it be? There is no mutual tissue, not anymore.

On top of this, the way the roads and plots are arranged on top of the big dig, does not support traffic flows from North to South or vice versa well. The direction of the traffic flow is clearly East-West oriented.

What seems to me as a more fitting solution is to accept the new situation as it is. Yes, car oriented decision-making tore apart the old situation, yes, it left scars which will remain tangible in the urban tissue and yes, it is unrealistic to fix a tissue that does not exist anymore. I accept this situation. There is now a segregation in neighborhoods and a wide, long stretched park that mediates between them. This park, on top of the big dig, is inviting to renew and activate the edges along the park where it is necessary. What leaves is two issues on top of the big dig itself. There is still the missing proper ending or start of the Greenway and there is the unfortunately designed plot in between the North End Park and the rest of the Greenway.

In terms of program there is a need to find one that fits this location and the approach of reworking the edges and filling in missing parts on top of the big dig. Along the edges it is possible to look at the directly bordering blocks and see what kind of program suits next to it.

On the southern edge there is a historic street market and some shopping areas. To expand this into a commercial shopping district and link the historic market to it, seems as a legit solution for the lower floors. On top of it some housing and hotel units can be fitted.

On the northern edge there is the Italian infused North End with its many small scale restaurants and cafés. These are mainly situated along Hannover Street and Salem Street. It is suitable to complete this and place some small to middle scale restaurants, cafés and bars facing the Greenway as well. Another part along this edge has
a couple of empty spots. One will be kept open to ensure the view on a rather attractive building which housed the Police department before but is now in use by the Traffic Tunnel Administration. The other empty spot gives the opportunity to finish a residential block.

Now what is suitable for the plots on top of the big dig itself? Looking at the location in the city on the bigger scale it is very clear that we are right in the middle of the city center. This area of Boston is part of the land that was populated already in the early days of the city’s existence. Nowadays it is still a central location for several public and touristic buildings and places and a really accessible place with fast connections out of the city. For these reasons it is a clever move to place a public program which could be attractive to tourists as well.

Among the suitable possibilities there are that of a theater, a cinema and a museum. Since it is a lively area which ideally should be lively during the day as well a museum seems to be a good fit. This idea is supported by the project from a group Bostonians for bringing a new museum to the city, The Boston Museum. Their plan however was rejected in 2013. [23] [25]
fig. 40: Small scale restaurants and bars.

fig. 41: New residential housing block.

fig. 42: Residential apartment building.

fig. 43: Tourist information kiosk.

fig. 44: Market building.

fig. 45: Shopping area.

fig. 46: Public entertainment and horeca.

fig. 47: Museum and parking.

fig. 48: Hotel.
3.5 museum and car park

Within the masterplan one plot will be designed into more detail. By far the most challenging plot in this area is the plot on top of the big dig which separates the parks and which has a far from standard layout due to the tunnel exits. Besides these inconveniences, it is in the masterplan part of the greenway which forms a mediator in between the North and the South sides.

This plot has been assigned to be the new museum. Thinking back at the theme of our graduation studio and the research at the start of this report, it will be interesting to combine this museum with a car park.

fig. 49: Plot to design, with ramps in between North End Park and the rest of the Greenway.

fig. 50: Parking garage in New Haven by Paul Rudolph.
fig. 51: Guggenheim museum in New York by Frank Lloyd Wright.
4.1 vision and ambition

In order to explain my ambition for this design assignment I take a step back to the theme of architecture and mobility.

One of the conclusions is that there are different approaches in designing for a city. One approach is with the user of the car in the center, which leads to a world especially suitable for the driving people. The other is one which is designed for the people in the city, the pedestrians, the visitors, which might be less useful to drivers. In those designs cars are usually treated as not pleasant features which in the best scenario are hidden from the eye.

For this design it will be my goal to see if I can create a building which houses both enjoyable and suitable space for both car drivers and for visitors and users of the other program as well. Ideally the two would find a way of interacting to ensure an awareness of each other’s space.

This physical separation and forced interaction at the same time, in the same space, brings a sensible tension in which a more conscious awareness of each other’s presence is experienced.

This ambition forms the guide throughout the design process.
fig. 52: Citroën DS with city as background.
In history, museums were above all spaces for the conservation and collection of pieces of art or valuable objects. A center of culture and research. The last century museums transformed more into buildings of exposition and showing pieces to a broader audience. With it the museum became a social gathering space as well. New museums are designed to deal with large numbers of people and, in order to attract those people, the buildings are designed to draw attention to themselves as well. The presence of large crowds makes it interesting for other, more commercial programs to be in close proximity as well. [1] [3]

Simultaneously there is another shift. Whereas museums used to be mostly funded by governments and private investments, the institutions they are nowadays need to raise their funds more and more in another way. This is usually done by introducing additional commercial programs, such as shops, cafés and restaurants. [2]

With the more public and touristic function of museums, the buildings are also designed more on a thought of routing. Many modern museums have a representational central gathering space from which the rest of the museum is visited. The way it works is often by making people return to the central space. In this way they relate themselves in a spatial manner to where they are. The central space can be a majestic hall, but can also be a central transition space which visitors return to. When returning to this space, the visitor can realise that is finished one part and is about to continue to another part. Another welcome effect of using a central space to which one returns, is that when a group splits up, they have a better chance of meeting eachother. [3] [7]
4.3 ideas for the plot

A first glance at the plot shows us already some problems that can be of guidance in the design. One of the things that is clear is that it indeed is a missing shackle in the whole Greenway. It would be great if this connection could be made in one way or another. The main problem is that there is close to no space in between the two tunnel openings. The possible ways of continuing the park and connecting the two separate parts is to either go around the plot or go over the plot. Going around the plot means bringing the park in a highly urbanized area and adding a quirky curvature to the existing Greenway. Going over the plot means going up and down in order to overpass the two openings. This vertical movement could correspond to the already present vertical movement of the ramps.

The northern edge of the plot is a really strict boundary. A thick concrete wall is placed right at the edge which leaves not even some space for a sidewalk. There is no opportunity for an address at this side at all. On the other side there is an almost oval shape of ground floor space. This part has the opportunity of having addresses, facing a commercial shopping district at the other side of the road. This is valuable surface area. Talking about addresses, there are two sides left on the plot which face a part of the Greenway. On the East side there is only little ground left next to the tunnel openings. On the West side almost half of the edge is in use by a tunnel exit road and just in front of this side the connection to the North End Park is cut off by a second road from this same exit.

Another problem comes with thinking about the car park. Because of the tunnels it cannot be placed underground and due to the small area it is not reasonable to place the car park on the ground floor. This means automatically that it should be placed on a higher level. It however becomes clear pretty quickly that there is not enough space for turning into the plot. [16]

One intervention that brings solutions on more aspects is to widen the plot by slightly increasing the curvature in the plot’s edge. This is possible since the plot on the opposite side of the road will be redeveloped as well. By widening the plot, more of the valuable ground floor area is created. Simultaneously it creates more space for an address at the North End Park side and extra space for turning into the plot by car. Combining this intervention with cutting of one branch of the roads coming out of the ramp exit, it creates both a lower volume of traffic in the shopping district and the opportunity of having a big entrance at the North End Park itself.

fig. 54: View from Custom House Tower on the plot and adjacent North End Park.
4.4 concept

This concept contains a couple of steps.

The first step is the widening of the plot as explained to gain more commercial ground floor area, to gain a better connection to and entrance at the park, a better curvature in the surface road and the possibility for cars to turn into the plot.

Step two is capping the two tunnel openings, with about the same slope as the ramps underneath the caps. In the center of the plot, where the two created sloped caps meet, a flat surface will be created to serve as a small inner square. At this square the actual entrance to the museum can be situated.

Three will be the connection of the two parks via the created sloped caps.

The fourth step will be placing an intertwinement of museum and car park raised from the ground and connecting them to the new ramps. This intertwinement will be organized according to the previously analyzed types and routings.

The last step is adding the additional program: shops and office underneath and a restaurant with a view at the top box.

This to a large extent based on organization of program, organization of spaces and organization of routing. The very particular plot, leads to a an equally particular organization. The attempt is to create an organization in which meetings between the several flows of users are possible, while none of these flows is interrupted. Each of the sort of users, the pedestrians in the park, the drivers in the car park and the visitors of the museum, can reach their part of the building, without being interrupted in their routing but also not without being confronted by the other user’s space. On purpose nothing is hidden.

Because the organization is that distinctive, organization becomes form.
fig. 55: Concept in five steps.
The vision that leads to the approach for the masterplan, is that each side of the Greenway has its own tissue and character. Both parts have been separated in the 1950’s and since then developed in their own speed and scale.

The way the Greenway is designed is with the main direction in the same direction as the submerged highway itself. The flow of traffic is of a different scale than either side of the Greenway. The relative emptiness of the park makes it appear as a whole new zone in between the already different zones.

Since it is so different, the approach is to accept all the different zones with its own properties and designing the edges matching their side. The Greenway itself however is completely new and has its own identity already. Buildings on the Greenway should shape this identity together with the already existing and well working park. With this park a new age has started. This new age should be represented by a corresponding architecture that suits this moment.

Compared to the mostly brick architecture in Boston, a more high-tech treatment for architecture will be fitted on the Greenway. This idea of going into a new era and a matching, more high-tech is supported by the city. [14]

4.5 architectural language

fig. 56: Early sketch, showing the new direction in architectural language.
fig. 57: Sketch showing the idea of flowing spaces.
fig. 58: Sketch from a little later, showing more ideas on language on lower floors to the public space.
Car parks and museums. Usually two programs that find quite different treatments and different spaces in a city. A museum needs to be representative whereas a car park is often hidden in the city. In a way one can even argue whether these two can be seen as architectural representations of the world for the cars and the world for the public.

What both car parks and museums have in common is their dependency on a clear routing and a clear organization of spaces. In many cases one visits a car park and a museum only a couple of times. In this case there is no opportunity of getting familiar with a complex building’s organization. It is therefore that in such programs the organization is as clear as possible. Let alone a combination of the two. [7] [16]

One of the aims in this design is to create a building which suits both the car drivers and users of the museum in a way that their routings do not cross, but at the same time a visual interaction is forced.

Because one floor of the car park takes up almost the whole floor area and an airy and spacious car park is preferred, the decision is made to make the parking floor serve double as ramp. By doing this, a separate set of ramps is not needed and more freedom is created in where one rises or drops.

This makes it also possible to, in a way, interweave the museum in such a way, that at certain points the users of both car and museum are at the same level and their views cross. They visually meet each other. This tension is dramatized by switching back and forth between meeting and avoiding.

Another part of the program is the continuation of the park. At the lowest possible level, the park continues through the building. In the center a small square is created where all users meet: the pedestrians in the park pass through it, the car drivers pass by and the museum visitors find their entrance at the square.

Museums nowadays can economically survive due to the addition of commercial program. In this case some valuable shopping spaces will be rented out that connect to the new shopping district. At the highest level of the museum a space for conventions or temporary exhibitions is located next to a restaurant with a brilliant panoramic view over the Greenway, Columbus Park and harbor. To be of please to the car park users, a special viewing platform is situated at the other end of the building. Exactly on the corner from which the iconic Bunker Hill Bridge, the City Hall and the Custom House Tower can be seen.
fig. 59: Steps from separate programs to an organization in which the car park and museum are intertwined.
The overall shape of the building is formed by the typical organization of the program. The car park demands a certain width of the floors. This width is almost half of the total width of the plot itself. If the building would be all straight from top to bottom, there would either be only a small void in the core of the building, or the building would stand on the road.

The solution to this is to introduce a sort of oval shape in the floor plans. At the ground floor, the building remains straight and fits nicely in the plot. Towards higher floors, the floors jut out, creating a wider void in the center. This creates a rather complex geometry in its totality. The waving the floors in vertical direction and the gradual movement outwards in horizontal direction. The key to a balance in this has been found in, believe it or not, mathematics.

By capturing both the movements in parametric equations it became possible to finetune the total geometry while making sure the geometry remains correct and stays within boundaries (for example the maximum of 7% sloping in the car park). In this way the base for the columns and floors is generated. [16]
For b = q To q + 2: Z(a) = 29663: Next b: q = q + 3
For b = q To q + 2: Z(b) = 29679: Next b: q = q + 3
For b = q To q + 2: Z(a) = 29699: Next b: q = q + 3
For b = q To q + 2: Z(b) = 30000: Next b: q = q - 3
For b = q To q + 2: Z(a) = 30000: Next b: q = q + 3
For b = q To q + 2: Z(b) = 30000: Next b: q = q + 3

'-------------------- X AND Y POINTS --------------------'

For i = 0 To 19
    For j = 0 To 2
        X(60 * i + 3 * j + k) = j * 7200
        If Int(i / 2) = (i / 2) Then
            Y(60 * i + 3 * j + k) = (k * 9600 + 6000) + (Z(60 * i + 3 * j + k) * (-((Abs(j * 7200 - Xq1)) / Xq1) ^ 2 + 1)) / q1
        Else
            Y(60 * i + 3 * j + k) = -1 * (k * 9600 + 6000) - (Z(60 * i + 3 * j + k) * -((Abs(j * 7200 - Xq2)) / Xq2) ^ 2 + 1)) / q2
        End If
    Next k
Next j
Next i

'------------------------ INNER SPLINES ------------------------'

For b = 0 To 10
    For a = 0 To 19
        Fitpt(3 * a) = X(60 * b + 3 * a)
        Fitpt(3 * a + 1) = Y(60 * b + 3 * a)
        Fitpt(3 * a + 2) = Z(60 * b + 3 * a)
    Next a
    DX = Fitpt(3) - Fitpt(0)
    DY = Fitpt(4) - Fitpt(1)
    StartTan(0) = DX / 14400: StartTan(1) = DY / 14400: StartTan(2) = 0
    EndTan(0) = DX / 14400: EndTan(1) = DY / 14400: EndTan(2) = 0
    Set SplineEdge = ThisDrawing.ModelSpace.AddSpline(Fitpt, StartTan, EndTan)
    If Int(b / 2) = (b / 2) Then
        rotatePt1(0) = 0: rotatePt1(1) = -6000: rotatePt1(2) = 0
        rotatePt2(0) = 0: rotatePt2(1) = -6000: rotatePt2(2) = 1
        rotateAngle = dtr(-1.5)
    Else
        rotatePt1(0) = 0: rotatePt1(1) = -6000: rotatePt1(2) = 0
        rotatePt2(0) = 0: rotatePt2(1) = -6000: rotatePt2(2) = 1
        rotateAngle = dtr(1.5)
    End If
    SplineEdge.Rotate3D rotatePt1, rotatePt2, rotateAngle
Next b

'------------------------ OUTER SPLINES ------------------------'

For b = 0 To 10
    For a = 0 To 19
        Fitpt(3 * a) = X(60 * b + 3 * a)
        Fitpt(3 * a + 1) = Y(60 * b + 3 * a)
        Fitpt(3 * a + 2) = Z(60 * b + 3 * a)
    Next a
    DX = Fitpt(3) - Fitpt(0)
    DY = Fitpt(4) - Fitpt(1)
    StartTan(0) = DX / 14400: StartTan(1) = DY / 14400: StartTan(2) = 0
    EndTan(0) = DX / 14400: EndTan(1) = DY / 14400: EndTan(2) = 0
    Set SplineEdge = ThisDrawing.ModelSpace.AddSpline(Fitpt, StartTan, EndTan)
    If Int(b / 2) = (b / 2) Then
        rotatePt1(0) = 0: rotatePt1(1) = 6000: rotatePt1(2) = 0
        rotatePt2(0) = 0: rotatePt2(1) = 6000: rotatePt2(2) = 1
        rotateAngle = dtr(-1.5)
    Else
        rotatePt1(0) = 0: rotatePt1(1) = 6000: rotatePt1(2) = 0
        rotatePt2(0) = 0: rotatePt2(1) = 6000: rotatePt2(2) = 1
        rotateAngle = dtr(1.5)
    End If
    SplineEdge.Rotate3D rotatePt1, rotatePt2, rotateAngle
Next b
The final routing plan exists of four different routings together. The aim has been to create points of meeting while not interrupting each other’s route. The first routing is the one of pedestrians through the park. Their route forms the foundation for the rest of the organization.

The second routing is for the cars. They turn off the street and into the plot where they will drive up the ramp, turning towards the inner square. There they stop to get their ticket for the car park. After this they turn away from the square and drive up to a small roundabout. When necessary they can come straight back when the driver only wants to drop-off someone or pick anyone up. When making use of the car park they find an easy system that makes it only necessary to watch out for cars on one side. For the rest they can remain focused on the appearance of the museum masses and experience the diversity of space while driving towards and under them. The system is set up in a manner that they have parking on one side and the edge of the building on the other. This gives a lesser sense of enclosure compared to parking on both sides. They never face any oncoming traffic and have several possibilities of trying a part of the car park another time in the case it is busy. Cars circling straight up or down the building always have priority over traffic coming from the sides. This creates a better flow. Pedestrians that come from their car or return to it, can make use of one of the elevators on each end of the building, which end in the park.

Another routing is for museum visitors. In order to create more interaction, the several museum spaces are divided over several masses. These can be placed in the space of the car park. Since a generous amount of space is created in the middle, it is possible to place a clear, representational space for routing in the center, connecting each of the museum masses. This space is easily passed through, because visitors can use a travelator to get up and down the building. A big entrance with museum shop and ticket desk is placed in between the inner square and the lowest museum box.

The last set of users are the people who go for shopping. This program is added and is placed across the street from the shopping district. In order to connect to this district, the shops are addressed and faced directly to that side. Pedestrians find a dry, wide sidewalk whose length is both compartmented and emphasized by a strong rhythm of columns.
4.9 architectural appearance

With the new situation and a new park, Boston has welcomed a new phase. The Greenway distances itself from the neighboring areas by introducing a new program, tissue, openness and appearance. The building on top of the Greenway will be treated in the same way. A new appearance, differentiated from the buildings on the other sides of the road.

The organization is of much importance and the form follows this organization. Although it is a quite complex organization, it is exactly that which makes it a more interesting building. The interweavement of program and shapes is therefore something I want to expose and dramatize.

The building is quite a colossal one and could appear as too massive. In order to create a balance, a façade is added that expresses more elegance while dramatizing the movement and gradual alteration of space. The façade of the car park, which makes up most of the whole façade, is completely filled with vertical, thin, aluminum panels. These panels are placed 600 millimeters center to center and have a width of 300 millimeters. All panels are aligned in the same direction. The effect that is created by doing this, is that while in standing in front of it, one can easily look through the façade. While moving sideways or from another angle, the façade appears more closed. At an angle of 45 degrees, only half of the transparency is left. When looking at a really small angle at it, the façade looks as a closed veil that is wrapped around the floors.

To emphasize the shape of the floors, the panels are not completely straight, but arched. The more the panel is located to the center of the façade, the more it is arched. To make the whole look less heavy and to make the panels stand out from their darker background, they are powder coated in white.

A museum space needs a rather closed façade. To show the organization, the museum needs to stand out from the car park. To obtain this, the boxes are extended so they jut out further than the façade of the car park. This gives the whole the sense that the closed museum boxes are rigid and massive and pushed through the rest of the building. In this way the building gets a more iconic appearance.

To give the boxes their own feel, they will be cladded with white GFRC (glass fiber reinforced concrete) panels. These panels can be very thin (a couple of millimeters) and have a really smooth, almost shiny surface to them. This gives the boxes a slightly different feel to them, while fitting with the rest of the high-tech materials. The box that is lowest to the ground floor, gets a big stretch of windows to be able to showcase a couple of pieces to the park.

The continuation of the park will be shaped by windy paths and leveled landscaping. The green parts will be filled in with small bushes, tall grasses and sedum.
5.1 floor plans ground floor

fig. 67: Floor plan ground floor, Scale 1:500
1: Exit ramps
2: Front square with entrance to passage
3: Armenian Heritage Park with second entrance to passage
4: Inner square
5: Lifts to car park
6: Shops
7: Car entrance to car park
8: Museum entrance
5.1 floor plans first floor

fig. 68: Floor plan first museum floor. Scale 1:500
1: Souvenir shop
2: Ticket desk
3: Wardrobe
4: Toilets
5: Meeting point
6: Travelator and stairs to rest of museum
7: Office and storage and technical space
5.1 floor plans second floor

fig. 69: Floor plan second museum floor. Scale 1:500
1: Museum space
2: Car park
5.1 floor plans third floor

fig. 70: Floor plan third museum floor. Scale 1:500
1: Museum space
2: Car park
5.1 floor plans fourth floor

fig. 71: Floor plan fourth museum floor. Scale 1:500
1: Restaurant
2: Terrace
3: Changing exhibition or space for occasions
4: Viewing platform
5.1 floor plans roof

fig. 72: Roof plan. Scale 1:500
5.2 sections long section facing north

fig. 73: Long section facing north. Scale 1:500
5.2 sections cross section facing east
5.2 sections cross section facing east

fig. 75: Cross section facing east. Scale 1:500
5.3 elevations south

fig. 76: South elevation. Scale 1:500
5.3 elevations west and east

fig. 77: West elevation. Scale 1:500
fig. 78: East elevation, Scale 1:500
5.3 elevations north

fig. 79: North elevation. Scale 1:500
5.4 impressions sectional perspective
5.4 impressions west entrance pedestrians

fig. 81: West entrance pedestrians.
5.4 impressions museum entrance
5.4 impressions museum central routing

fig. 83: Central routing museum.
5.4 impressions birds-eye restaurant
5.4 impressions east entrance pedestrians

fig. 85: East entrance pedestrians.
5.4 impressions shops and entrance cars
5.4 impressions car sequence 1

fig. 87: Car sequence 1 - The car drives towards the box and looks into the museum.
5.4 impressions car sequence 2

fig. 88: Car sequence 2 - The car drives down and under the museum.
epilogue
6.1 discussion

Along the research and design process it became clear that due to political issues the plot will not be used as a building site in the near future. As the plot is quite out of the ordinary, it will probably cost more than any ordinary plot. Who is going to pay for any developments is not clear yet.

The view from the Boston Authorities is that the highway is property of the state of Massachusetts and therefore is responsible for the left scars on top of the Big Dig. The state on the other hand says that only the highway itself was and still is property of the state and that any space on the surface is the city's responsibility.

On top of this, the plot is of little interest for investors, due to more complex and expensive construction conditions and little ground floor space in return.

The design process therefore became less realistic and gained a sort of ideological character. The aim for the design shifted from being merely an architectural assignment to an opportunity of showcasing the approach derived from the research.

With this, it became much more an exercise of organization. The research came to the conclusion that in many cases cities and buildings are designed for either the world of the car driver, or the world of the humans on foot. In history this has led to uncomfortable situations like in Boston. With this conclusion in mind, the goal has been set to design with both the worlds treated equally, not prioritizing one of them. A building is created which houses both enjoyable and suitable space for both car drivers and for visitors and users of the other program as well. There is a forced visual interaction to ensure an awareness of each other's space. This physical separation and forced interaction at the same time, in the same space, brings a sensible tension in which a more conscious awareness of each other's presence is experienced. A well-functioning mix is the result. The goal is reached.

The answer of the research question ‘In which way should the areas scarred by the coming and going of the elevated Central Artery be treated in order to create a well-functioning city center for Boston?’ is answered within the design of the masterplan and the building. The tissue has been damaged to such an extent, that fixing is not the suitable solution. Each side of the Greenway has its own character and program and will stay this way. The Greenway is a complete new sensation in Boston's center and will be treated as such. It is a public space, used as a transition zone which is the perfect location to great public and touristic program.

What could be of interest for further research is perhaps to figure out more about the different attributes in our built environment specifically, considering what they afford people on foot and what they afford drivers. In making a comparison between the two, one could figure out which elements could contribute to both drivers and people on foot. If we would for instance use planters of the right height, they could double as crash rails. Further research could result in more of these specific recommendations for designers.
Looking back at the whole process in general I am pretty satisfied. Thinking about the available time and the amount of effort I put in the whole graduation project, I think I could not have done anything more than has been done now.

Of course, at certain points in the process you make decisions which in a later stage you realize you could have better done differently, but I believe this is all part of the design process. You have to make some mistakes in order realize that things should be done in a different manner.

From the start the scope of the studio was on a rather big scale. Bigger than many of the other graduation studios. This meant that at the begin colloquium we chose an area of research whereas other studios had their masterplan already. At the second colloquium we presented a masterplan and proposed a design location while other studios presented their design concepts. Together with the fact that most students in this studio have designs at a rather big scale, made it impossible to work many of the designs out into architectural detail. This in itself is not a problem at all. However, personally I do like to work out buildings to a further extent and to more detail.

The fictional aspect of the assignment made it possible to treat this design in a more academic way as a statement, as a case to present a new possible perspective on how to design also in other similar situations.

I saw it as a challenge to create such a big building with such a specific and complex morphology. Although I think I succeeded in this, I do doubt whether I would do it again with this amount of time to design. This kind of geometry is way more time consuming than a more simple, flat and straight geometry. Not only drawings require more time, digital models require different software than the usual architectural oriented software. Keeping track of the level and the floor to ceiling distance is quite hard. Now just imagine making a wooden model: about 400 different columns, 2000 different panels in the facade and a winding road in vertical and horizontal direction. With the right computer-controlled machines it is possible. Without it: impossible.

Although there were stressful moments, I look back at a pleasant graduation year.
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