



PERMANENT (car) SHOW

an alternative vehicle infrastructure

PERMANENT (car)SHOW

an alternative vehicle infrastructure

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2009-2010 Masters Project
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Contents

- -Establishing the Argument

- - -NAIAS **P2**
- - -Cobo **P14**
- - -Alternative Vehicles **P18**

- -Site Introduction

- - -Detroit, Large Scale **P23**
- - -Woodward Ave **P27**

- -Proposal **P36**

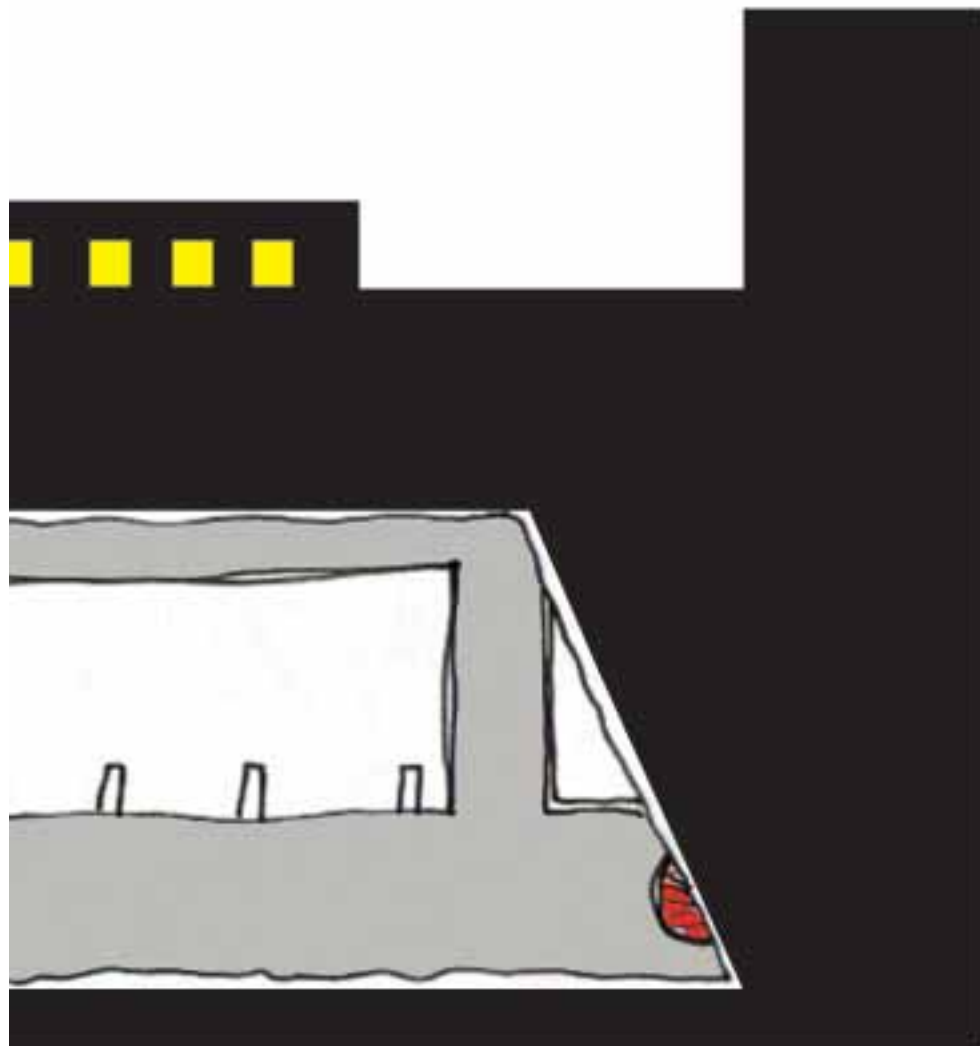
- - -Ring Introduction **P37**
- - -Ring Master Plan **P38**
- - -Street Sections **P39**
- - -Site Program **P47**

- -Buildings **P50**

- - -Charge **P52**
- - -Rent **P58**
- - -Experience **P66**
- - -School **P74**

- -Appendix

- - -Connection Studies **P87**
- - -Sections **P91**
- - -Previous Version Birdseye **P93**
- - -Alternative Vehicle Fuels **P95**
- - -Bibliography **P96**



1907

NAIAS

A photograph of a crowded auto show floor. In the background, there are large banners for 'Lexus', 'BMW', 'Hyundai', and 'Jee'. The floor is filled with people of various ages and ethnicities, some looking at cars, others talking. In the foreground, a blue silhouette of a person stands with their back to the camera, looking towards the show. The text is overlaid on a semi-transparent grey box in the center of the image.

Since its opening in 1907 the North American International Auto Show has become one of the top auto shows in the world, averaging 1 million visitors annually.

LI SHI GUANG MING
AUTO DESIGN CO., LTD.

Electric Avenue

Electric Avenue

2007

LI SHI GUANG
MING AUTO DESIGN

CGM

LI SHI GUANG MING
AUTO DESIGN CO., LTD.



In **2007** the NAIAS brought **500,000,000** dollars
to the metro Detroit economy.

2010

An aerial photograph of a large, modern indoor showroom. The floor is covered in a vibrant red carpet. Several cars are displayed on the carpet, including a white sedan, a dark sedan, and a white SUV. The showroom is surrounded by lush greenery and trees. The lighting is bright, highlighting the cars and the carpet.


In 2010 NAIAS introduced a 37,000sf showroom for electric cars dubbed “**Electric Avenue.**” Alongside Electric Avenue “**EcoXperience**” was established as a 1/2 mile indoor track to test drive new electric cars.

2010



...Alongside NAIAS 2010 Michigan Economic Development Corporation(MEDC) returned with the “**MEDC Alternative Energy Showcase**” featuring ten of the most innovative alternative component suppliers displaying the latest battery and related technology.

2010

A red sports car is the central focus, positioned in a dark environment illuminated by several bright spotlights. The car is angled towards the left. The background is mostly black, with the circular beams of light creating a dramatic effect. A person's face is partially visible in the upper right, looking towards the car.

...companies included: A123 Systems Incorporated, Dow Kokam, DTE Energy, Johnson Controls-Saft, MEDC-Oakridge Labs, Michigan Technology University, Sakti3, TARDEC and University of Michigan-College of Engineering.



2010

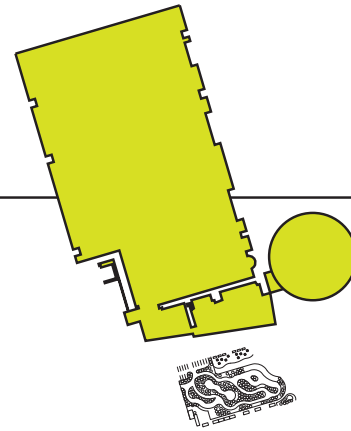
...also Lawrence Technology University, Mana International, Michigan State University, PEP stations, SPX Service Solutions and Wayne State University displayed.



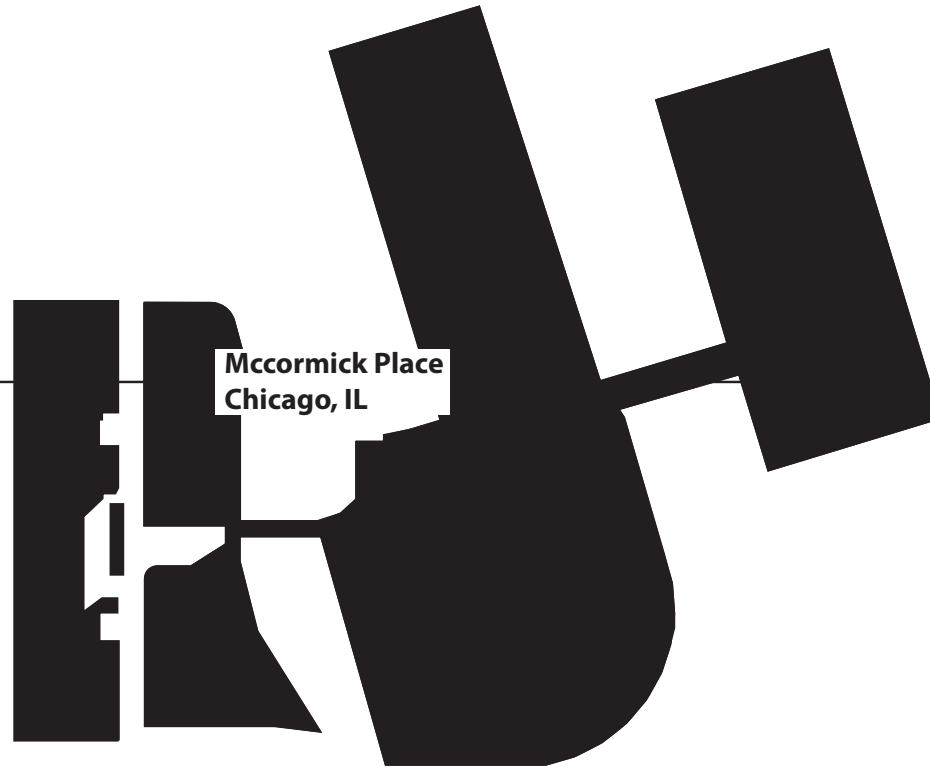
**Merchandise Mart
Chicago, IL**



**Cobo Hall
Detroit, MI**



**McCormick Place
Chicago, IL**

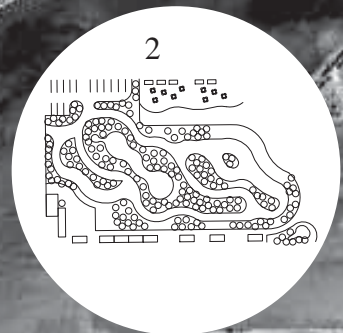


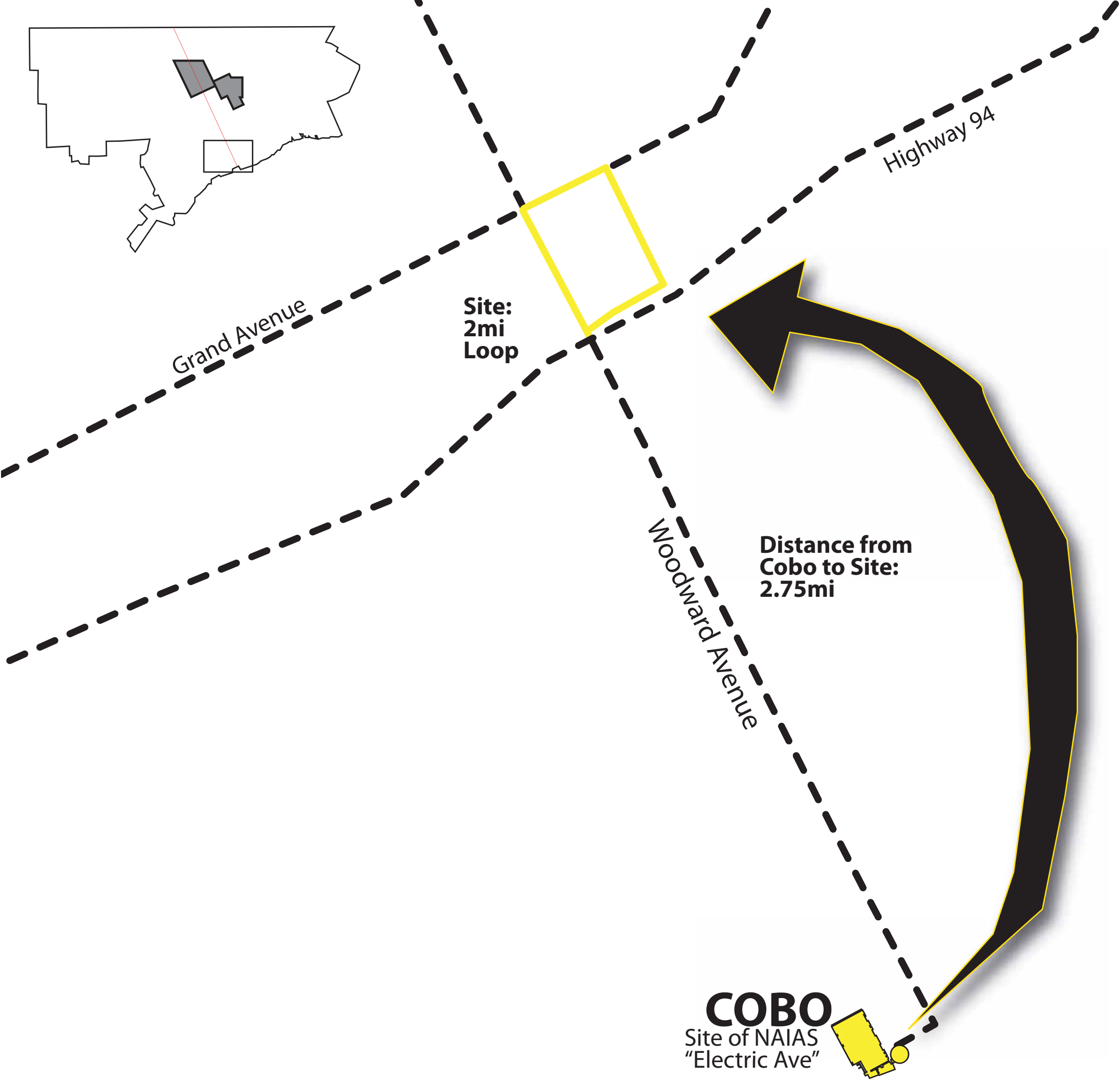
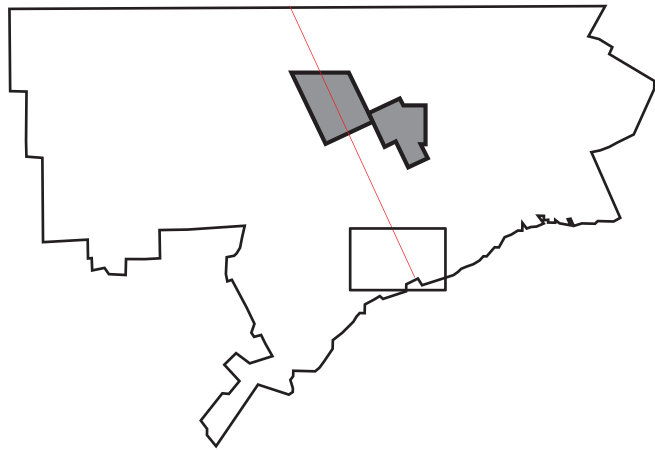
The NAIAS is currently held in Detroit's Cobo Convention Center...



- 1 "Electric Avenue"
- 2 "EcoXperience"
(2nd floor)

COBO





Grand Avenue

Site:
2mi
Loop

Highway 94

Woodward Avenue

Distance from
Cobo to Site:
2.75mi

COBO
Site of NAIAS
"Electric Ave"

ALTERNATIVE VEHICLES are defined as any device of personal mobility fueled by anything other than finite resources. Consider two categories of Alternative Vehicles as **motorized** and **non-motorized**.



MDI's AirPod One



GM/SEGWAY P.U.M.A.



TOYOTA I-real



A large array of alternative fuel source vehicles exist today. Most do not get farther than speciality trade shows and are not general public knowledge.

MOTORIZED



TAGA Stroller Bike



BULLITT Cargo Bike

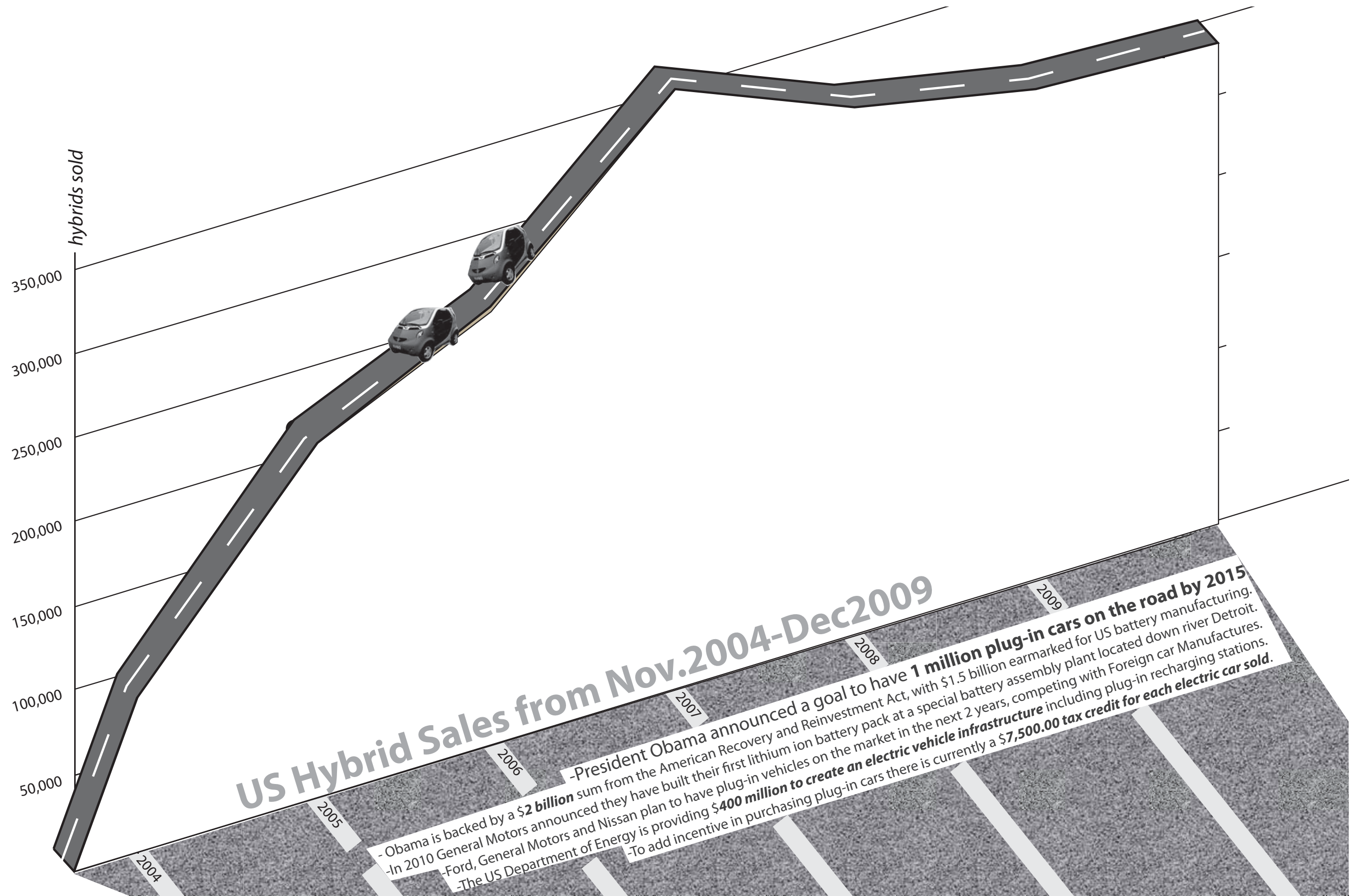


Undoubtedly the bike is the most popular non-motor vehicle on the streets today. However it is time to update the bike with cargo, safety and passenger features.

NON-MOTORIZED

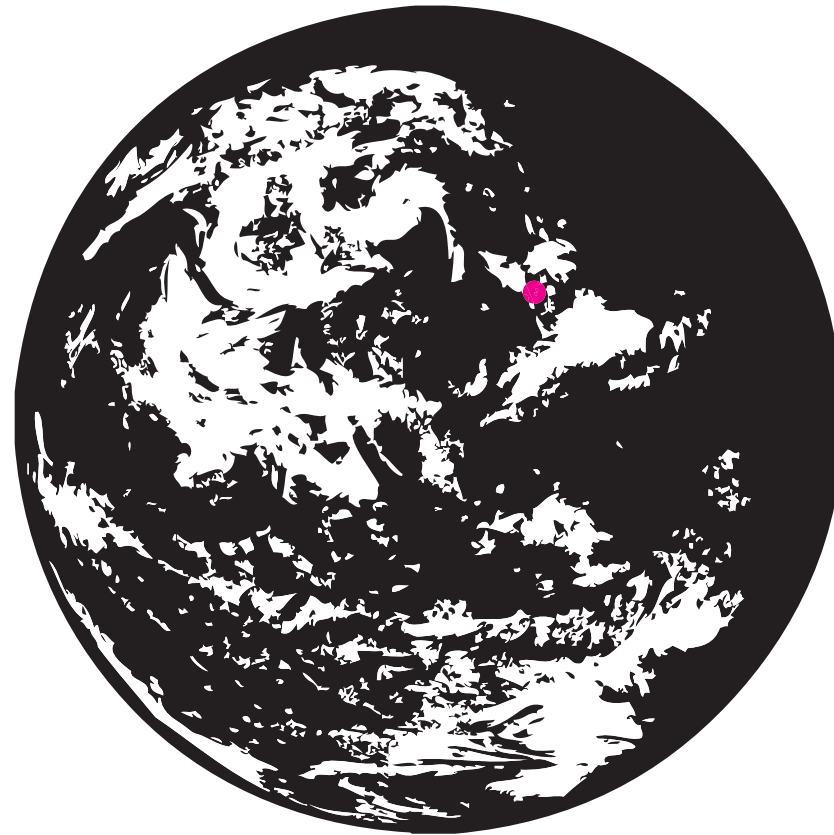
The US market alone has created a market for hybrids dependent on rising gasoline prices.

As prices of oil can only increase, so can sales of hybrid and alternative vehicles...

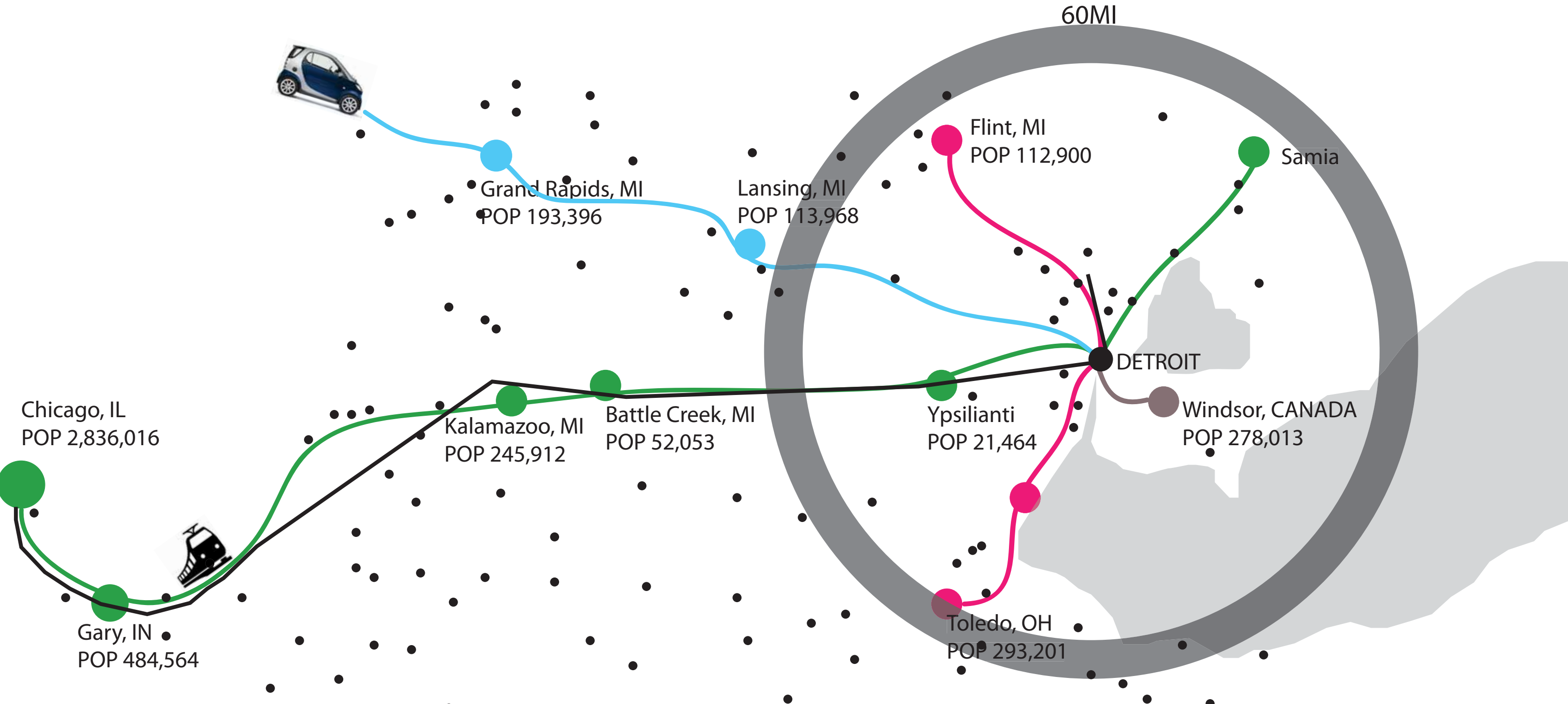


2010

Enter Detroit, MI








Site Introduction



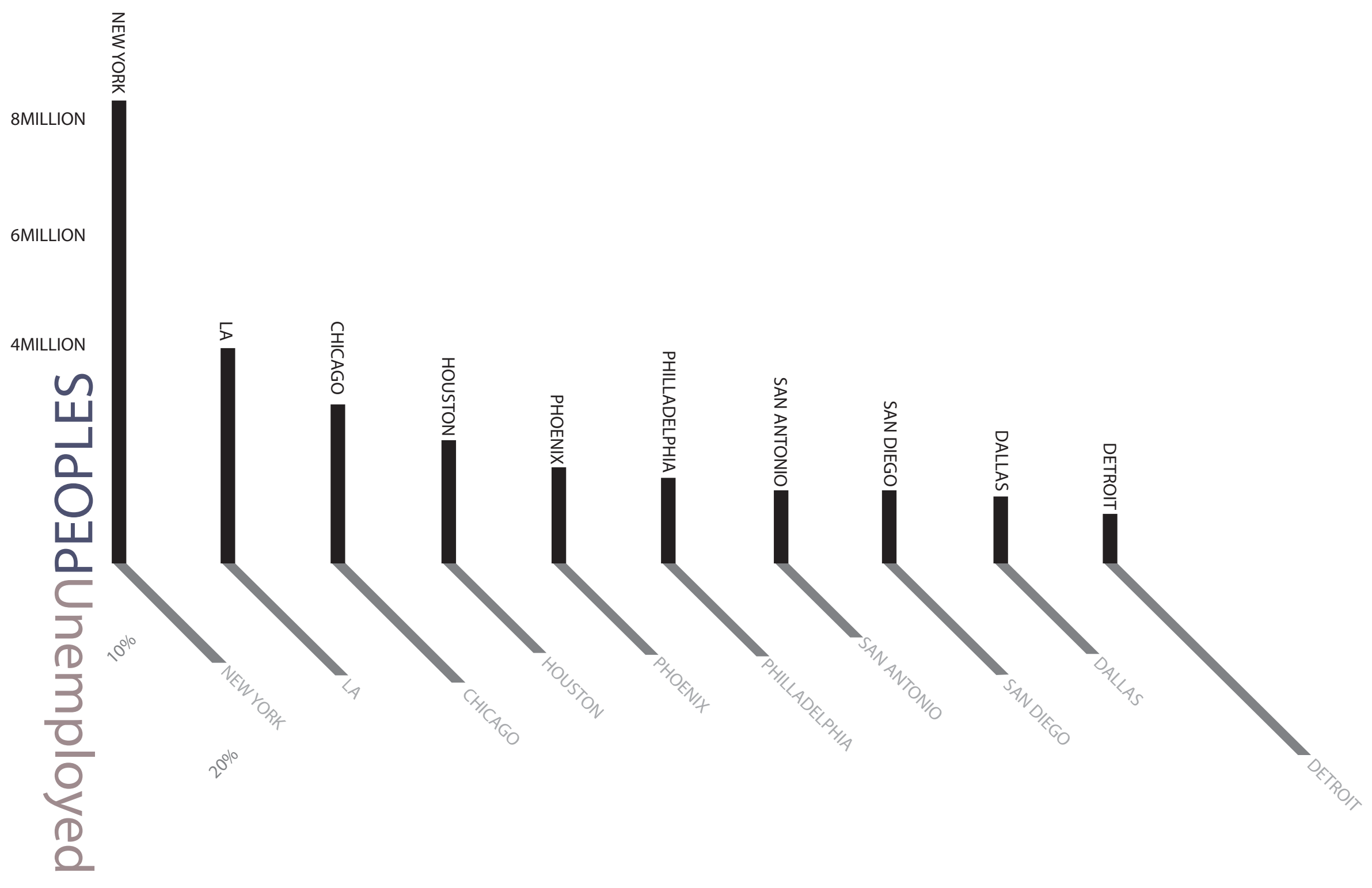
ON ANY GIVEN DAY...

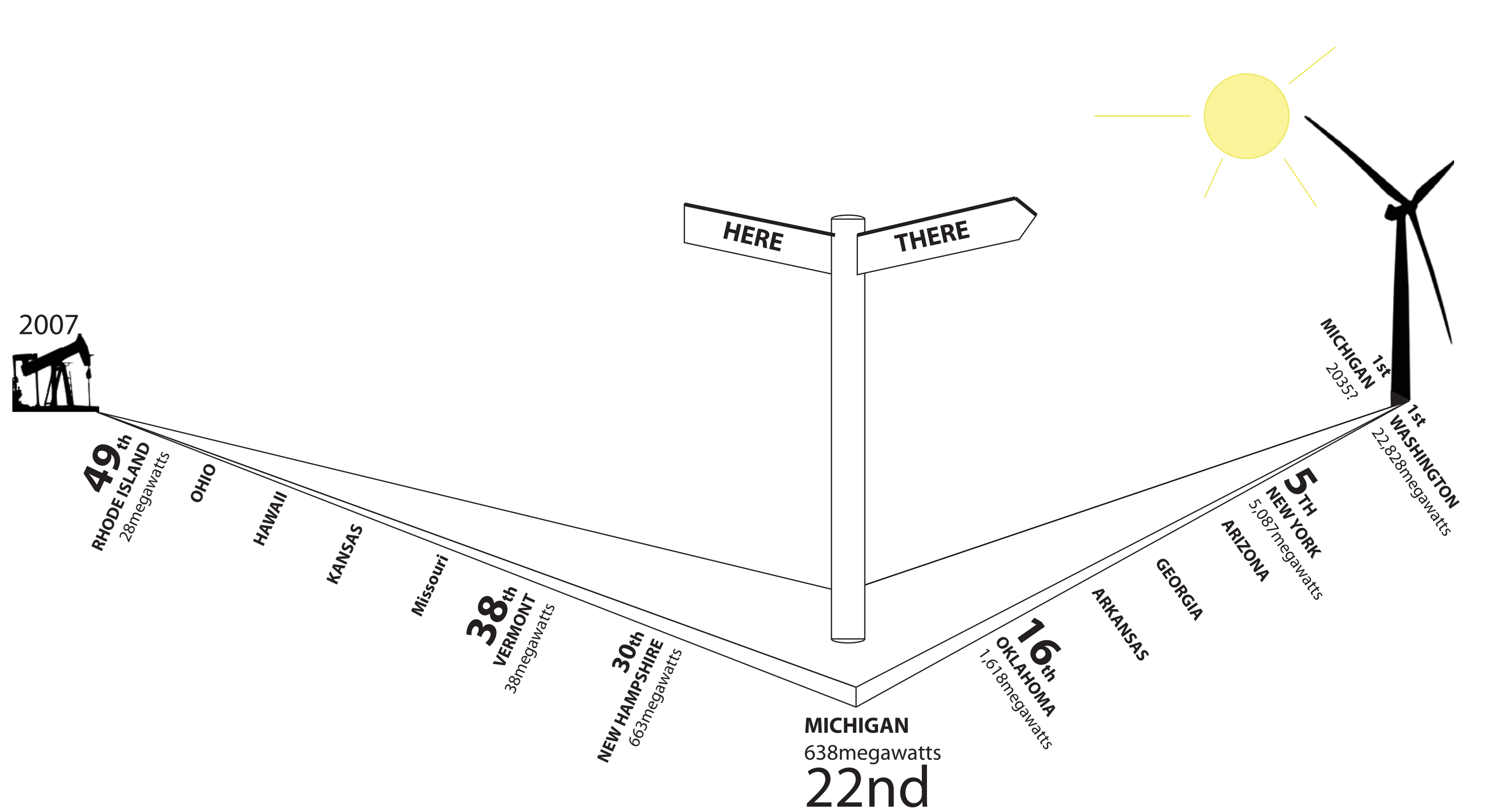
4,631,487

PEOPLE CONNECTED DIRECT ROUTE TO DETROIT, MI

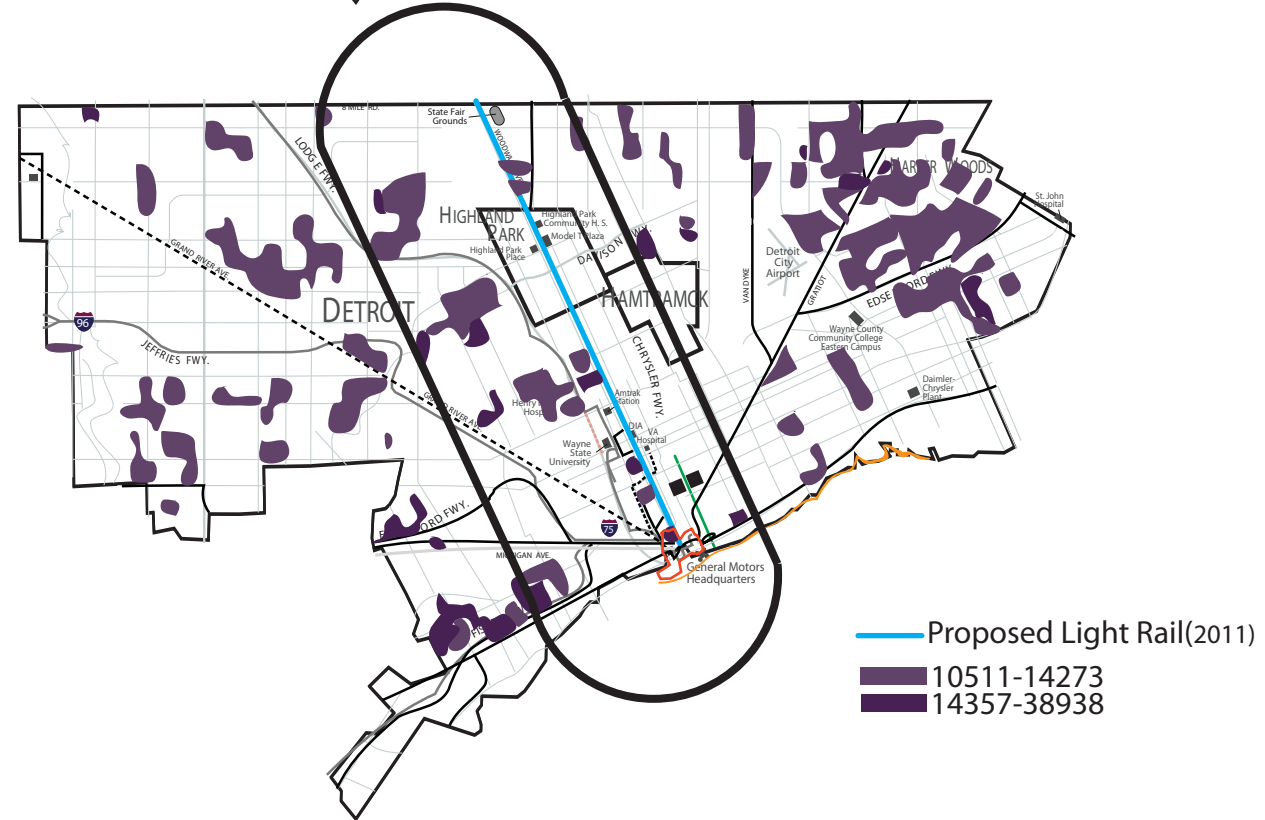
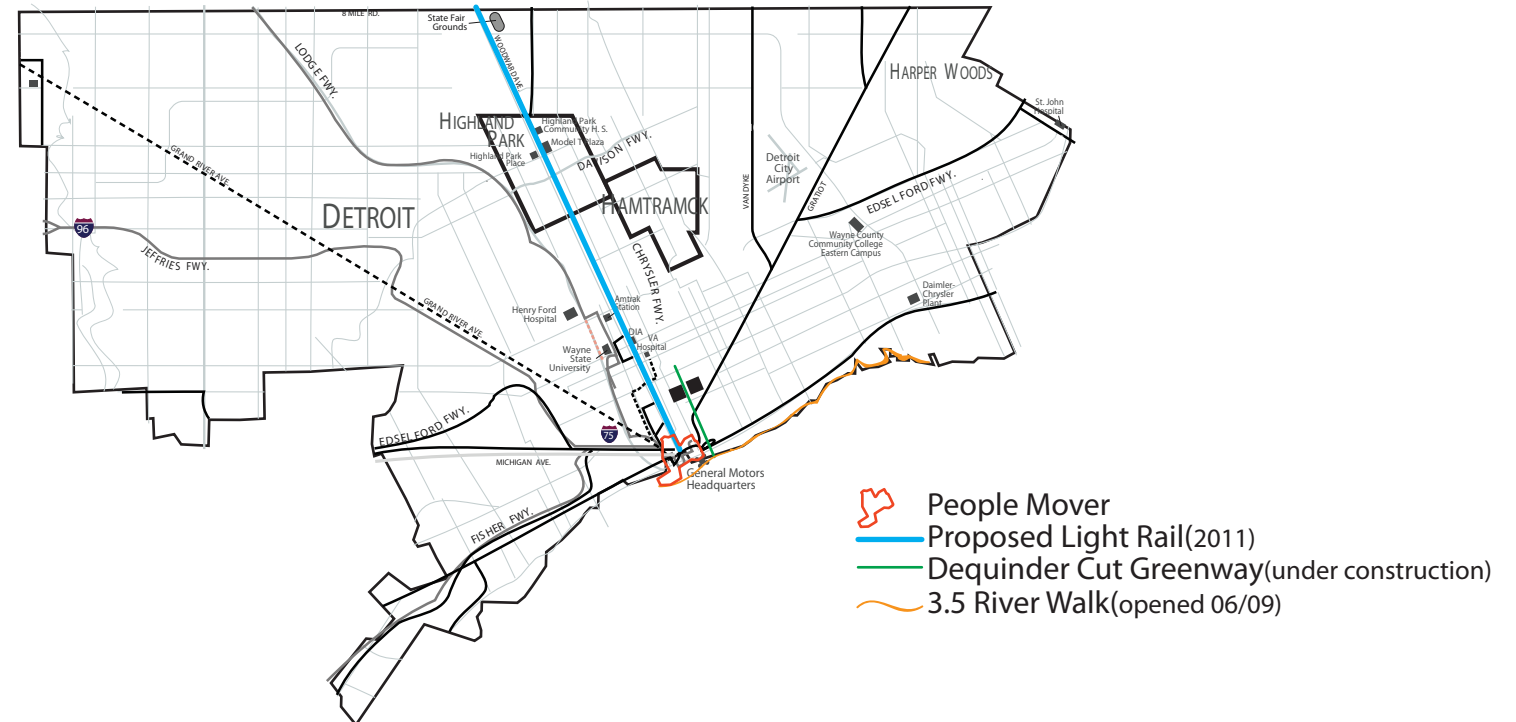
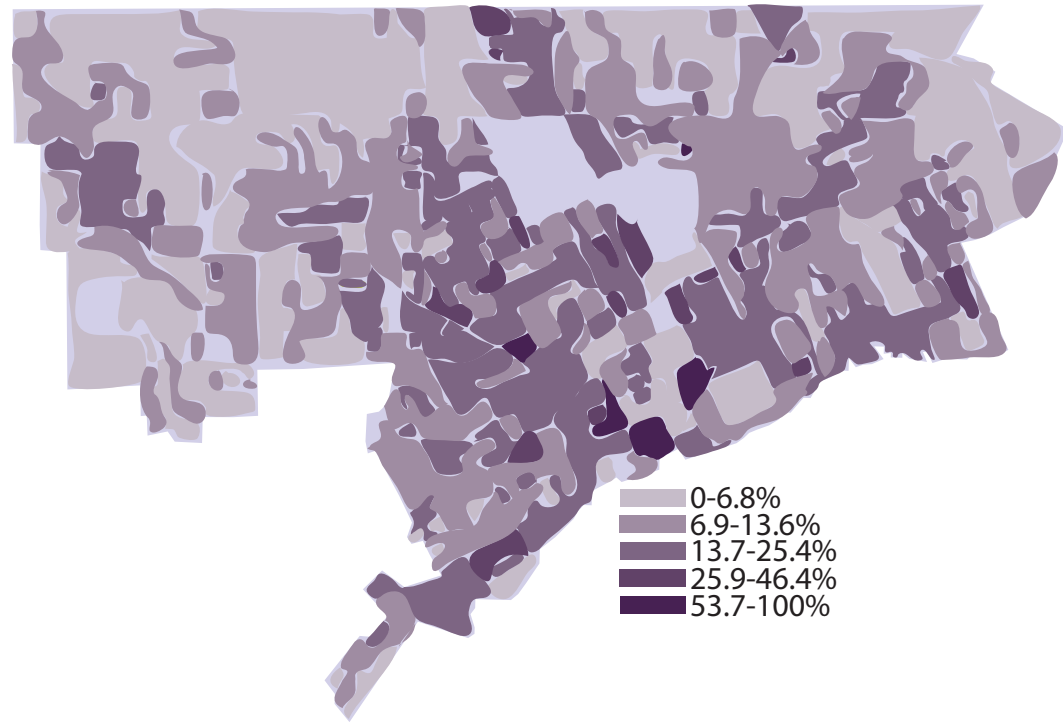
-  Amtrack Train
-  RT 94
-  RT 96
-  RT 75
-  Smaller Cities

*Population count from 2000 US census (rounded to nearest HUMAN)



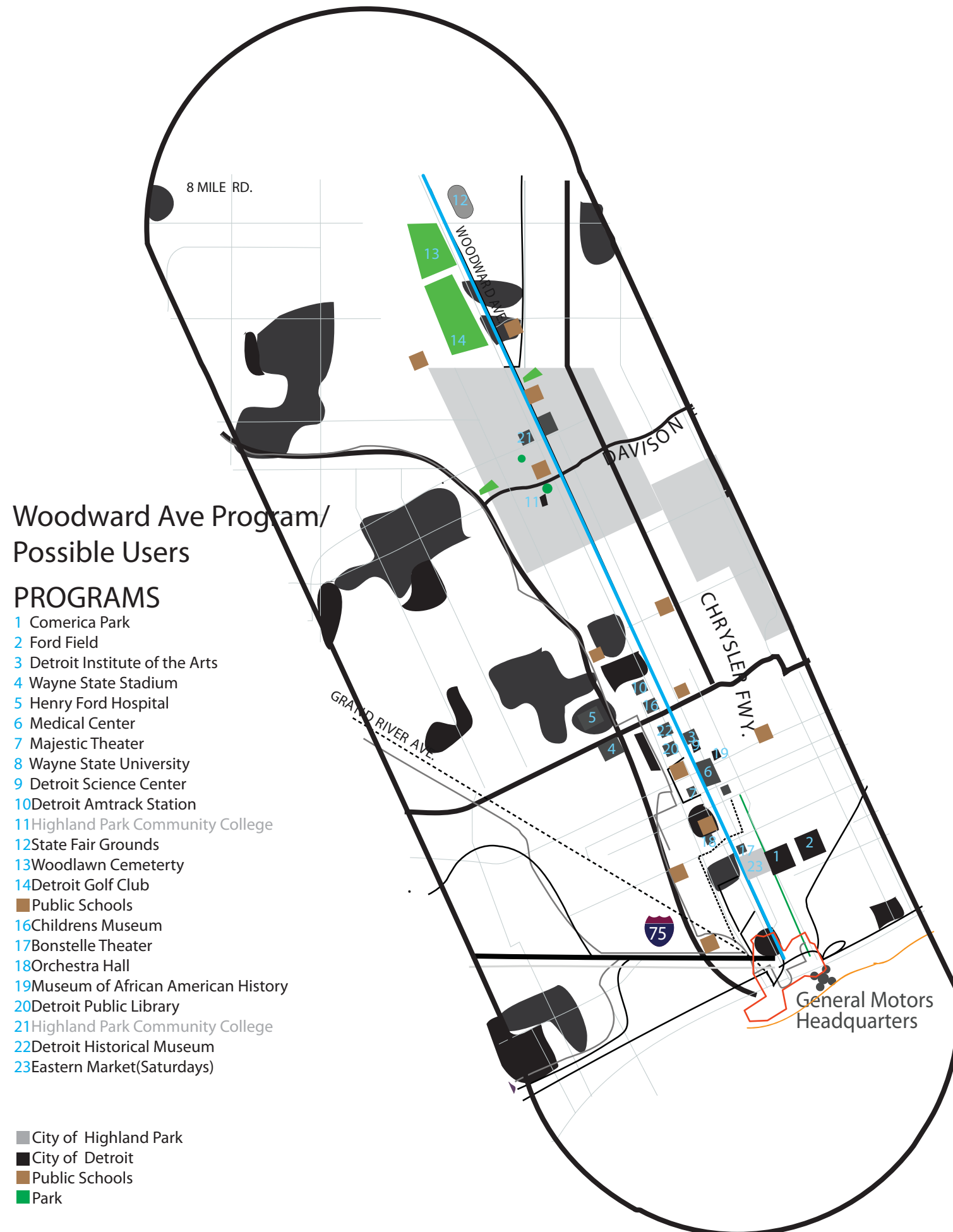


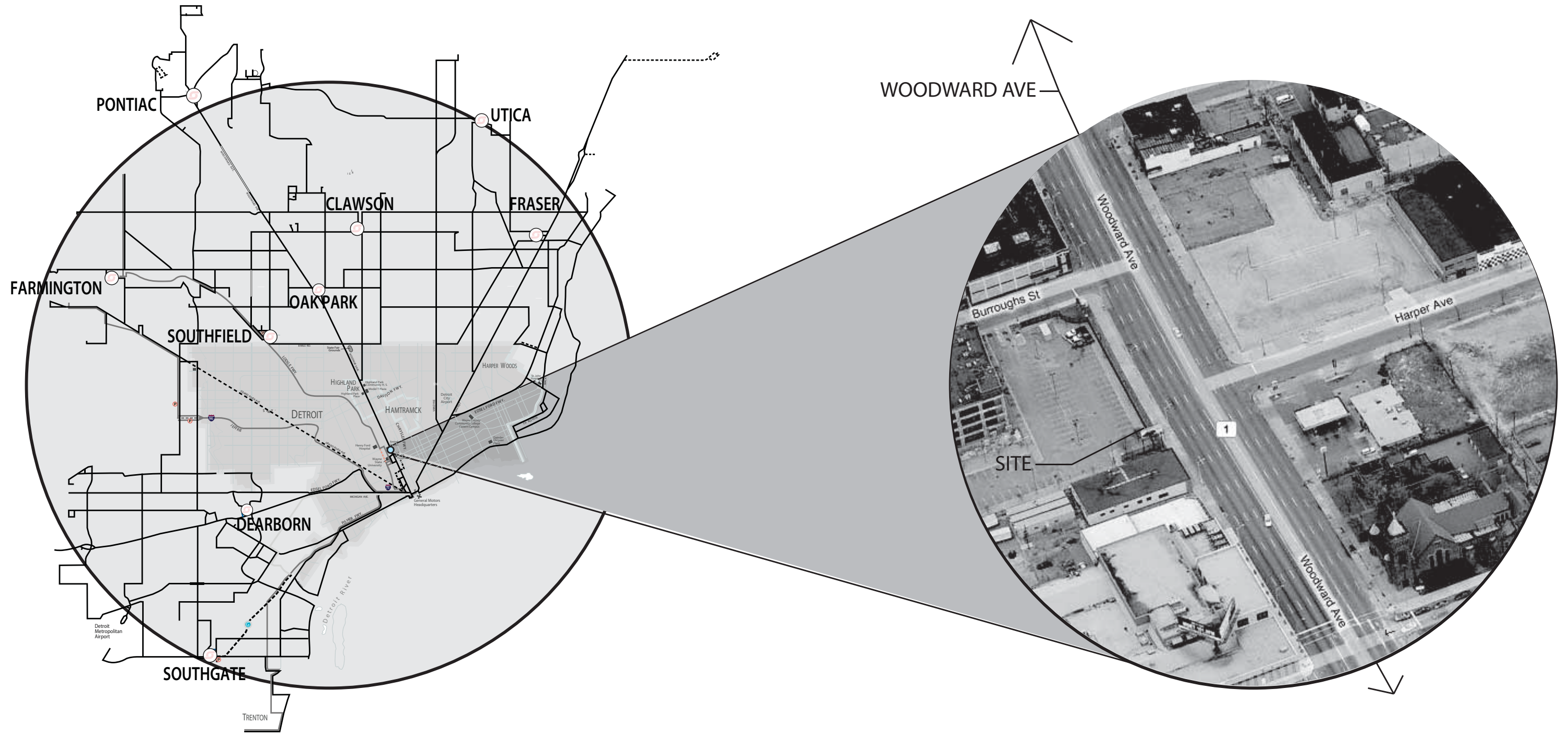
Amount of Renewable Energy Generated Statewide rankings and data courtesy of US DEPARTMENT OF ENERGY

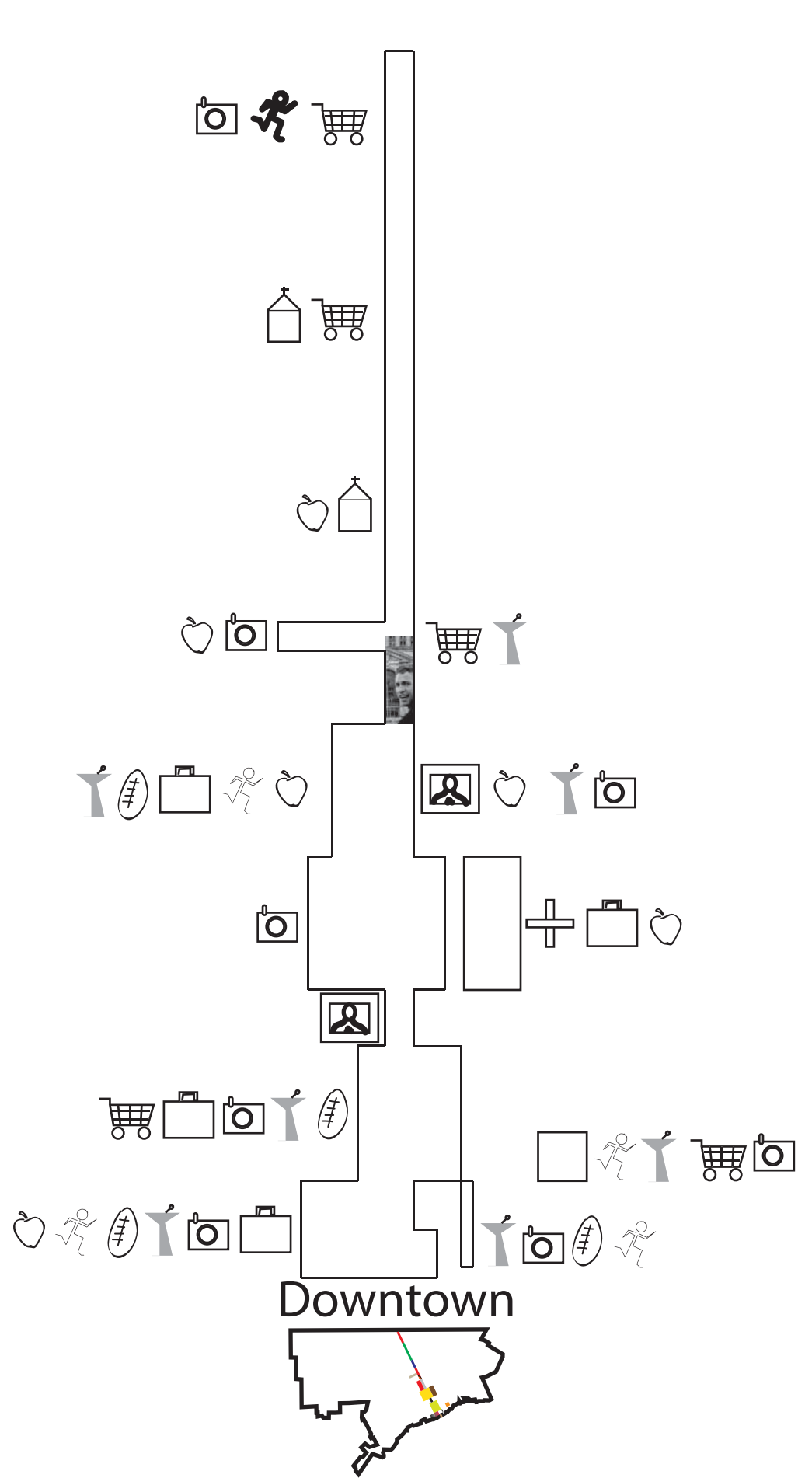
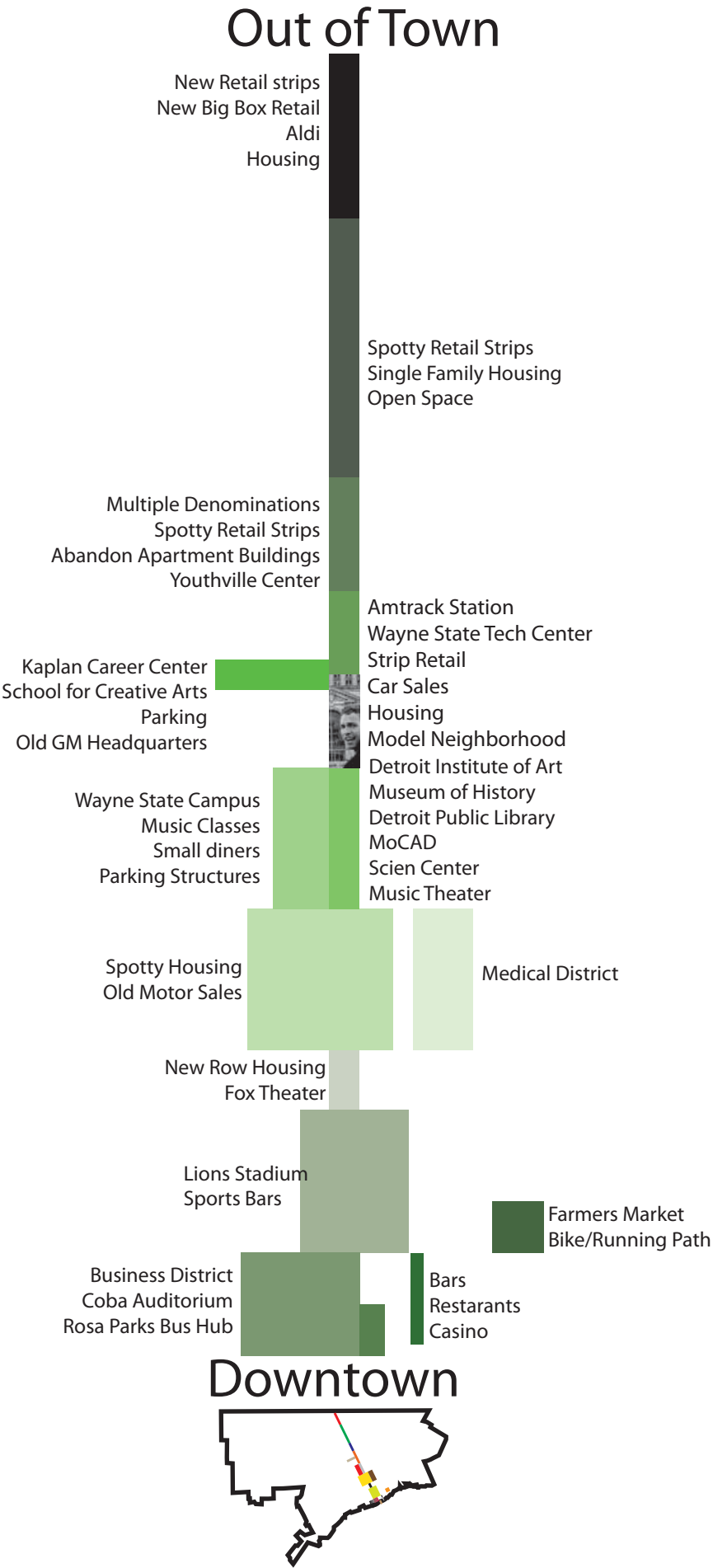
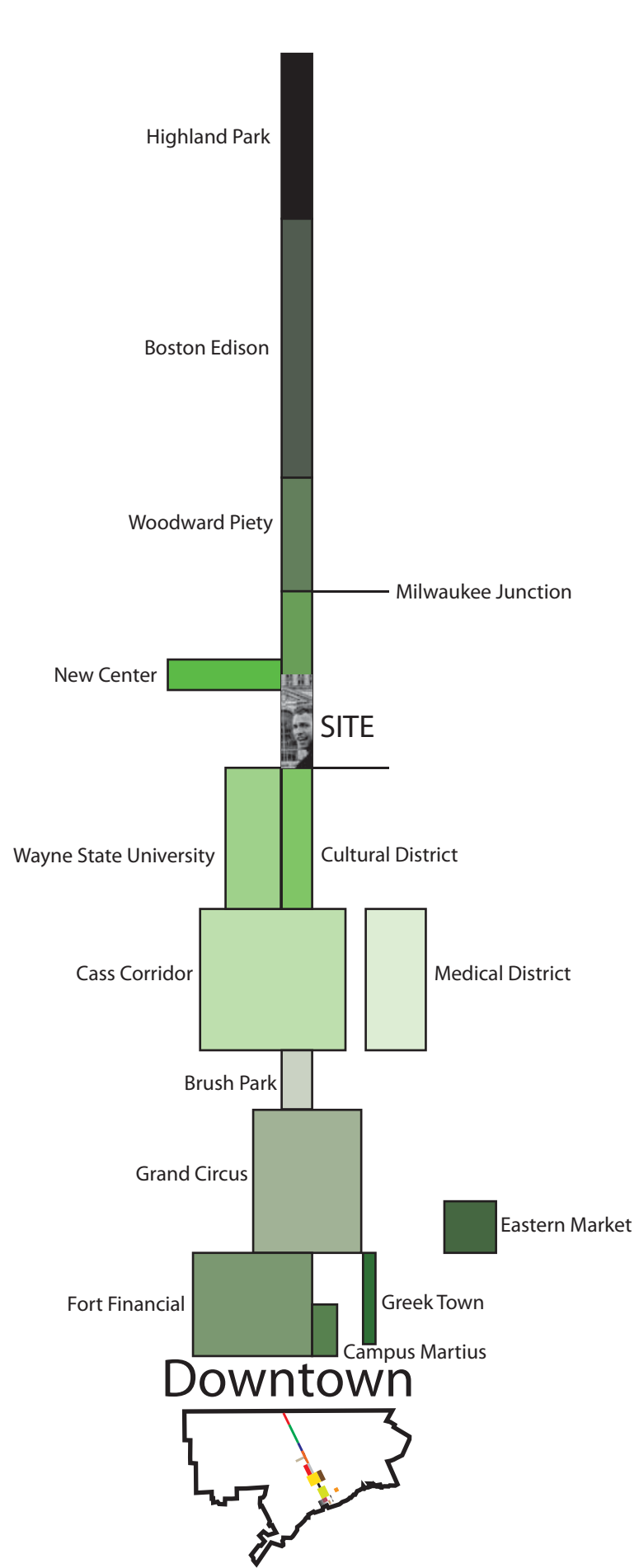


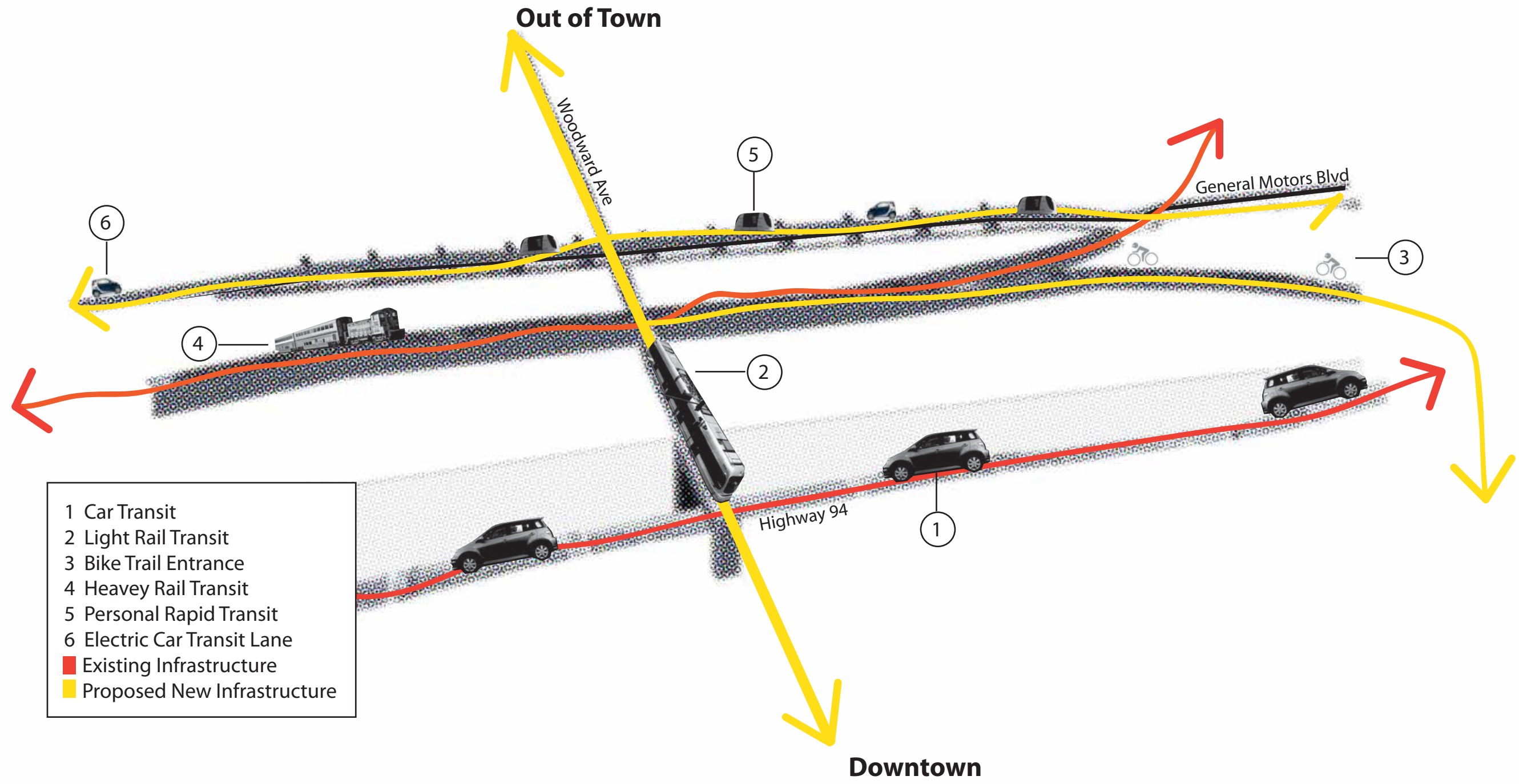
Population Density/Abandoned Buildings/Transportation/Selected Area

Main Artery of Site

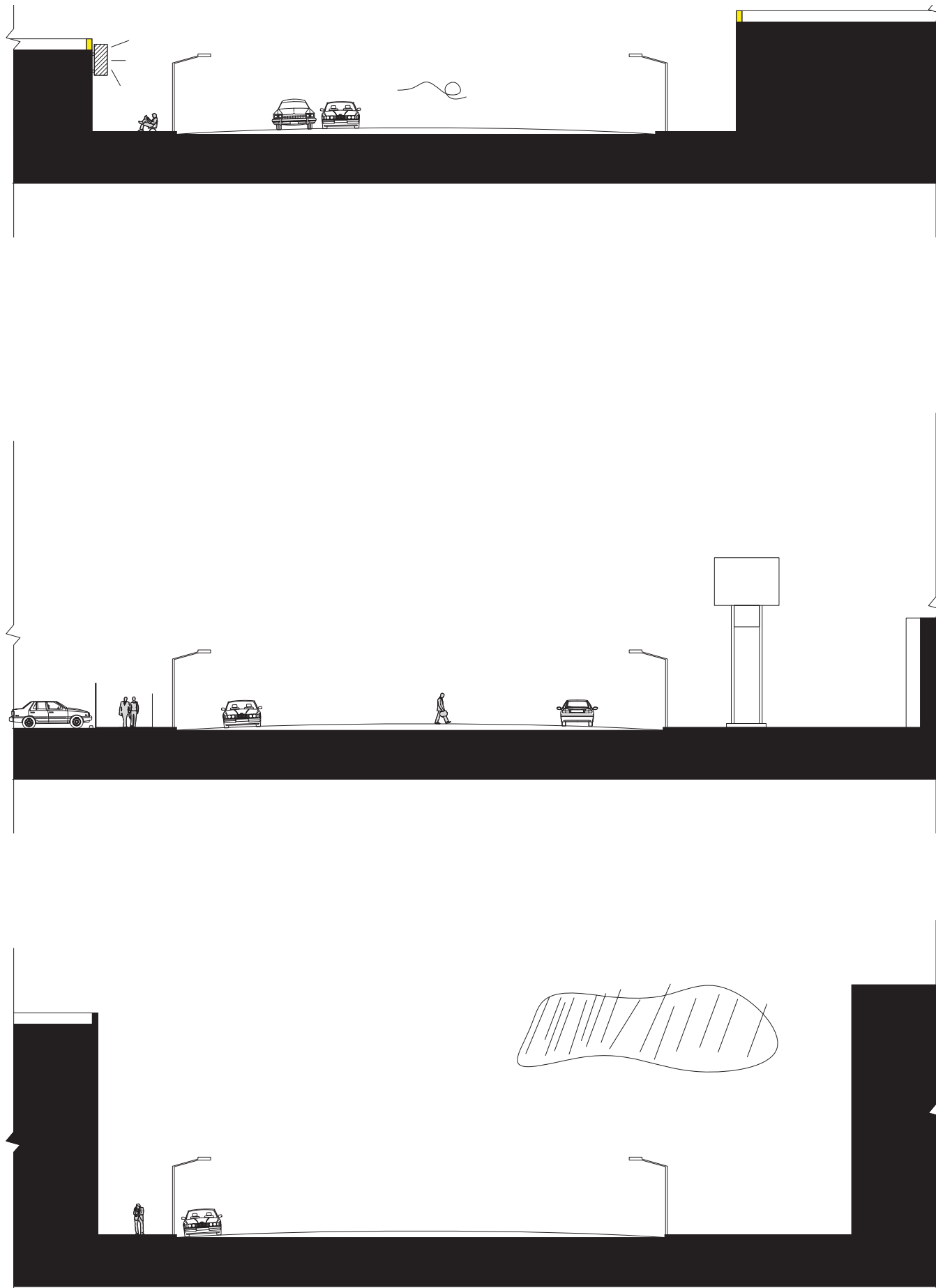








- 1 Car Transit
- 2 Light Rail Transit
- 3 Bike Trail Entrance
- 4 Heavey Rail Transit
- 5 Personal Rapid Transit
- 6 Electric Car Transit Lane
- Existing Infrastructure
- Proposed New Infrastructure





1805
Great Fire destroys all of Detroit minus two stone buildings



1806
Judge Augustus Brevort Woodward creates a new city plan with large boulevards. Initially 66' wide.



1824
Governor Lewis Cass extends Woodward to town of Pontiac to help in settler disbursement



1848-95
Woodward becomes Privatized to aid in maintenance



1865
Annual July 4th parade begins



1882
Woodward becomes so crowded between Campus Martius and Grand River, Police are posted at crosswalks to escort people across

1895
First mile of concrete highway in world is laid by Wayne County between 6 and 7 mi

1909
Henry Ford continues his assembly line in a new building along Woodward Avenue.



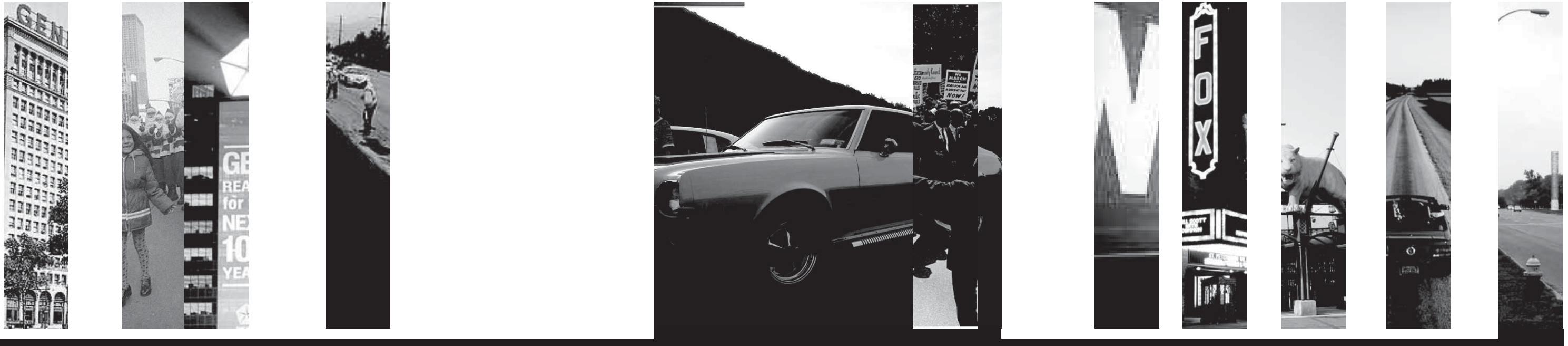
Woodward Avenue Action Association was formed in 1995 as a not-for-profit organization as a result from and economic development planning study for communities of Ferndale, Pleasant Ridge, Huntington Woods, Royal Oak, Berky and Birmingham with Oakland County. It has since then connected with Detroit, Bloomfield Township, the city of Pontiac, Highland Park and Wayned County devoting itself to the improvement of Woodward's economy and community using cultural, automotive and music history to tell a story and increase tourism. Today, close to 300 private businesses, institutions and individuals provide support through annual dues. In 1999 WA3 helped Woodward obtain a State heritage Route title under the state of Michigan. In 2002 Woodward was designated one of America's Historic Byways.



Alongside the WA3's contribution, **funding for Woodward Avenue's redevelopment is coming from a handful of other sources.** In 2006 the New Center Council received \$50,000 for the creation of a streetscape improvement plan. Between 6 and 8 mile roads along Woodward, \$20,000 has been allocated for a conceptual streetscape plan. The WA3's contribution is around 270,000 for design of signage on Woodward, several 30 foot tall street markers and the design of a new visitors center. Recently, the firm Hamilton Anderson was hired to research the users of Woodward avenue and the demographics of its visitors. Alongside their research, Hamilton Anderson was asked to come up with a design for a visitors center providing tourists a place to learn about the cultural history along the Woodward stretch.



Hamilton Anderson signage



1921 General Motors move headquarters to an Albert Kahn building on Grand avenue, two blocks off Woodward	1924 America Thanksgiving parade first marches	1925 The new Chrysler company moves into Highland Park on Woodward Avenue	1926 Woodward width is extended from 66' to 200' from Detroit to the town of Pontiac	1950's-60's "Woodward-ing" takes off as teenagers notoriously cruise Woodward and frequent drive-ins	1960 Martin Luther King Jr. lead civil rights march with 125,000 warming up for his Washington march 2 months later	1963	1995 Woodward Avenue Action Association (WA3) is created	1999 Woodward becomes a Michigan Heritage Route owing to its more than 300 historic sites	2000 Comerica Park opens on Woodward as the Detroit Tigers home	2002 Secretary of Transportation designates Woodward as a National Scenic Byway	2009-11 WA3 receives 160,000 annually for streetscaping owing to its National Scenic Byway status
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Destination Woodward: user statistics

Vehicle trips per work day: 35,000
 Work days per year: 260
 Work day vehicle trip per year: 9,100,000
 Dollars spent per vehicle per day: \$20
 Dollars spent per work day trip: **\$182,000,000**

Metro Area Population: 5,200,000
 Annual visitors: 17,000,000
 Average visitor dollars spent: \$263
 Shopping: \$76
 Dining: \$70
 Entertainment: \$25
 Miscellaneous: \$92
 Annual Visitor dollars spent per year: **\$447,100,000**
 Annual Entertainment dollars spent per year: \$42,500,00







The engineering firm Giffels-Webster has been brought in to create a plan for creating a pedestrian and cyclist friendly Detroit. The **Woodward Avenue Non-motor motorized plan** calls for a "road diet" breaking down Woodward into areas with larger sidewalks and dedicated biking lanes. The proposal also restricts the current 6 lane road into a 4 lane road with a large median for the addition of a rapid transit lane. A decrease in speed to 35 mph is also suggested.

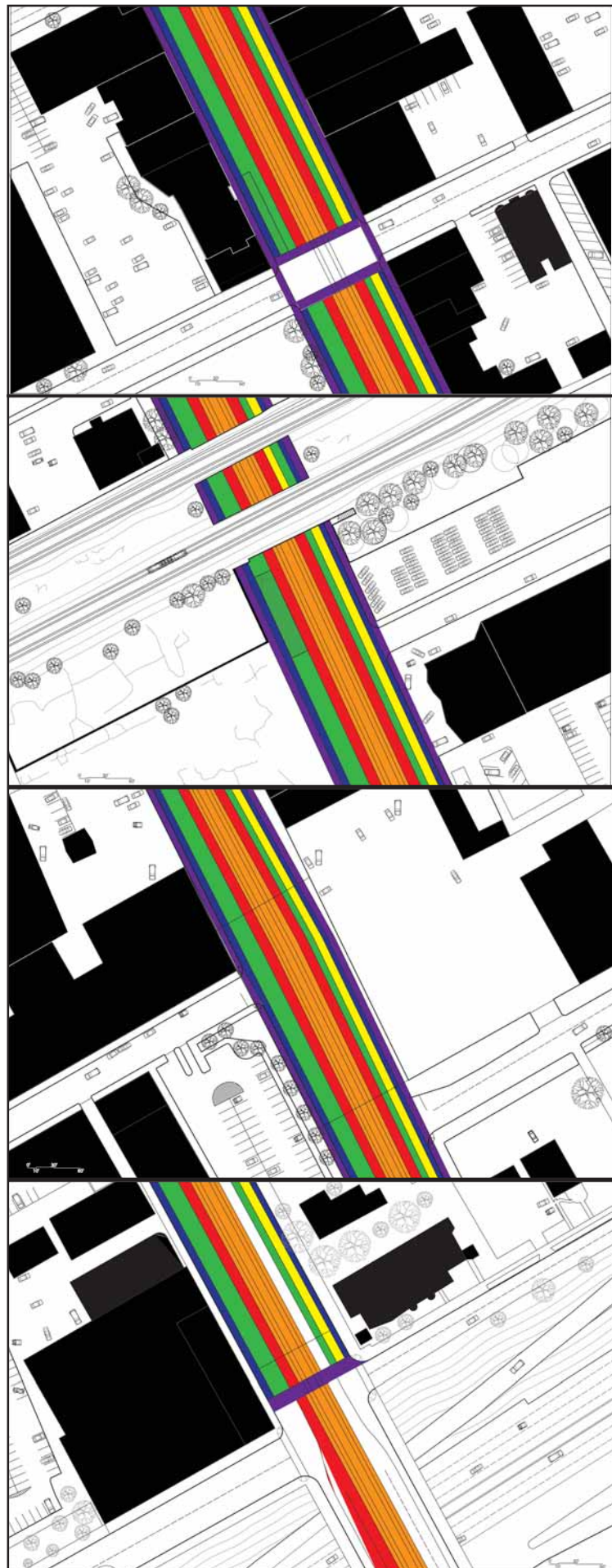
In November of 2006, Detroit Department of Transportation announced the possible development of a **rapid transit line along Woodward Avenue**. The proposed line would run from 8 mile road to downtown Detroit. In reference to Denver and Seattle's success with light rails, Detroit plans to divide Woodward Avenue into four lanes of traffic with two tracks for the lightrail. In December 2009, with President Obama's Omnibus spending bill of 1 trillion, a provision in the bill allows for \$125 million of private money to be used as matching funds for the \$425 million dollar project. This initial amount is enough to begin the tracks from Grand Boulevard to Hart Plaza. Private investors would finance the first 3.4mi stretch and then the city would eventually build the rest.



PROPOSAL

In order for the two-mile long site to be used as a launching strip for alternative vehicles, the site will be separated into **6 different strips**:

-  **Motor vehicle**
-  **Lightrail**
-  **Sidewalk**
-  **Non-motor vehicle**
-  **Green space**
-  **Water collection**



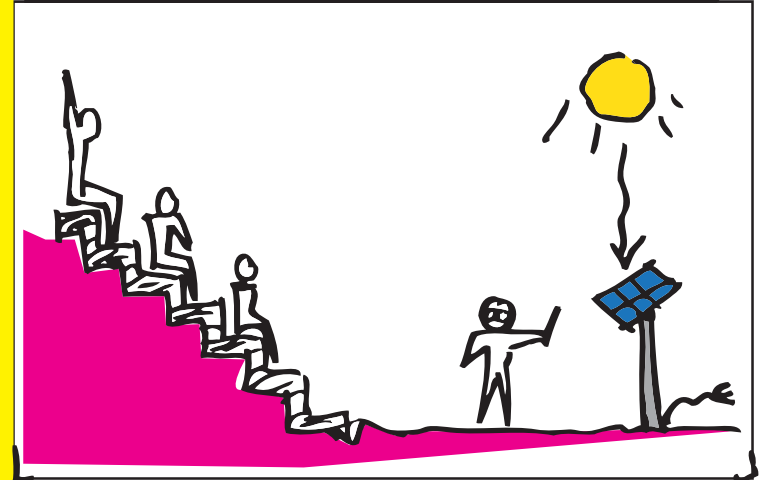
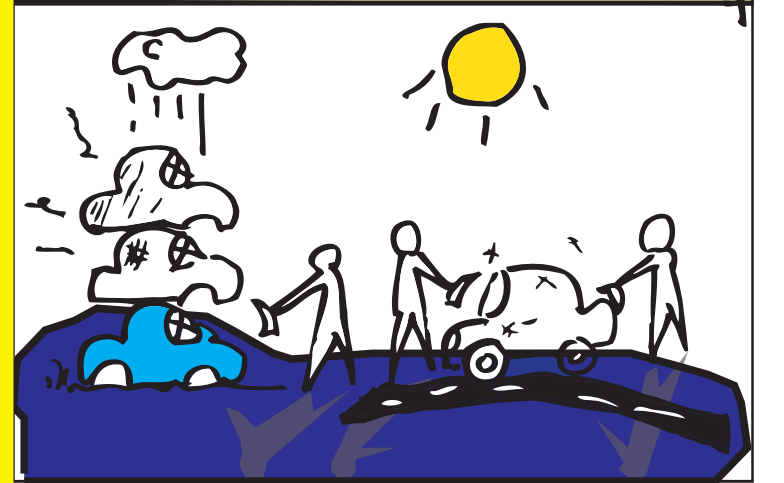
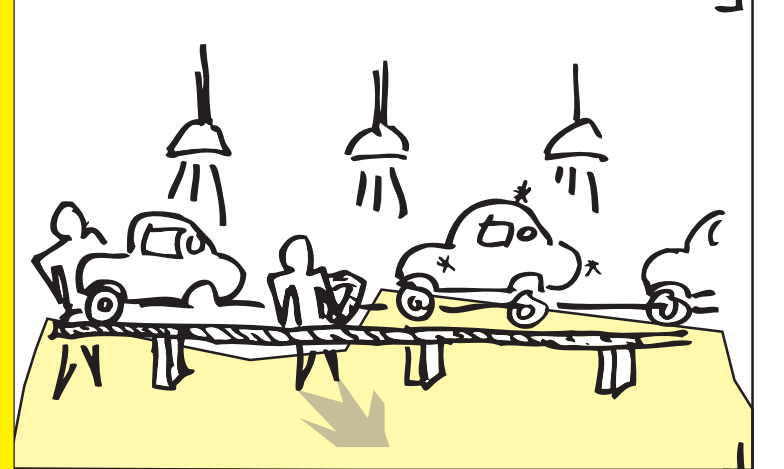
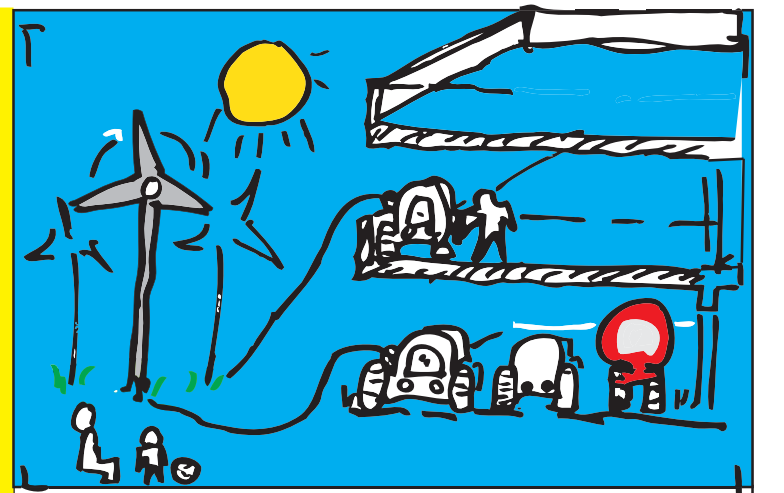
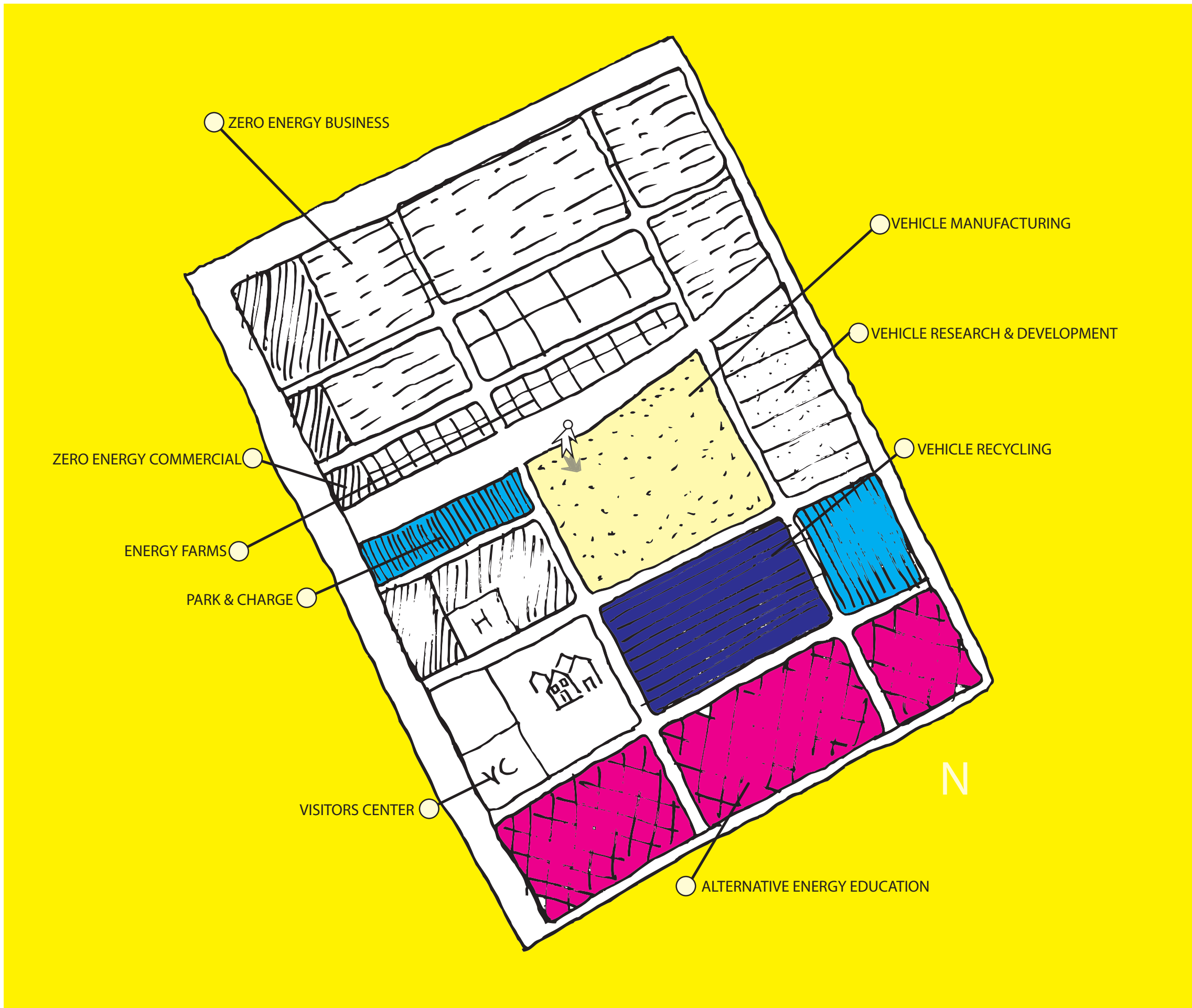
Charging

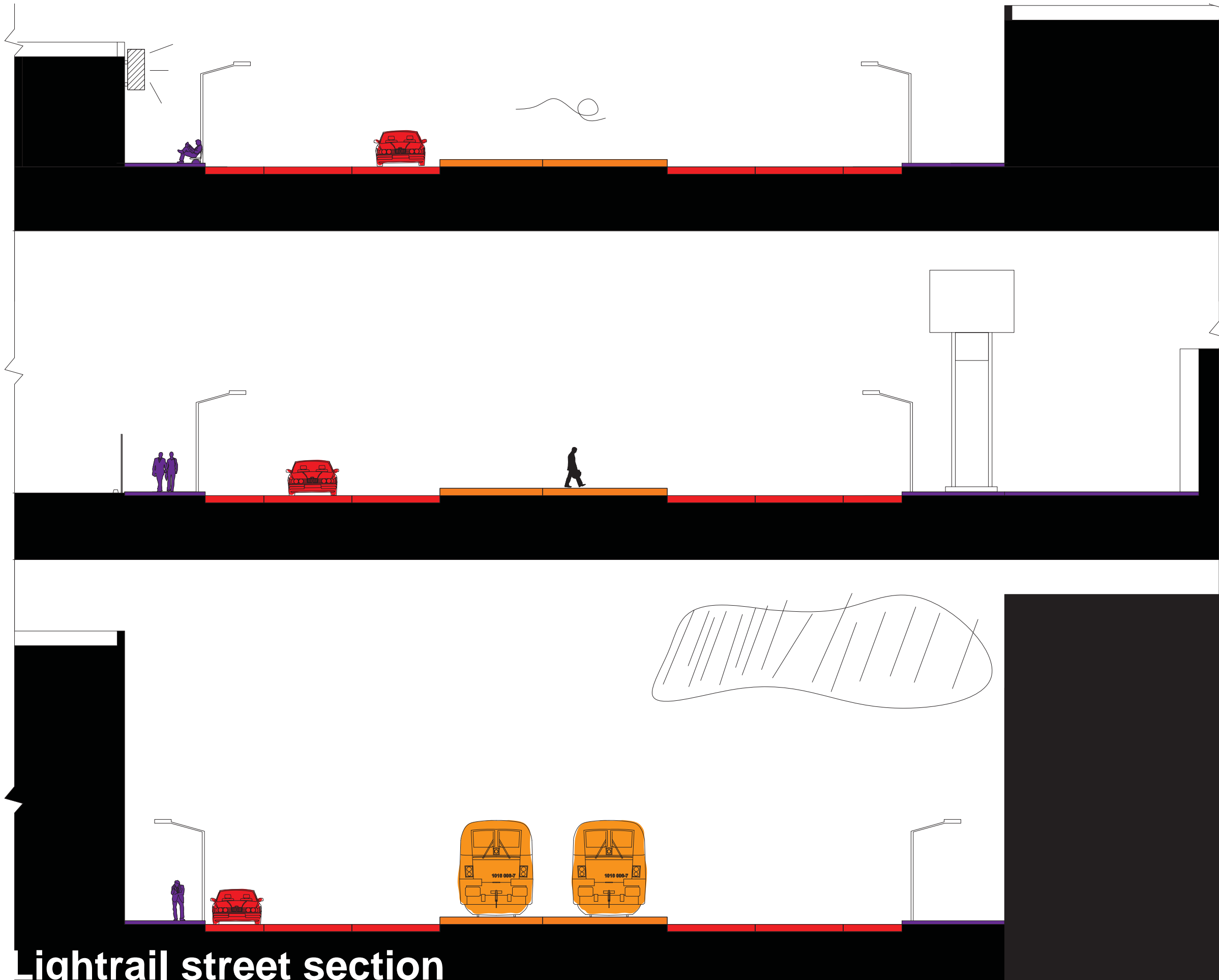
Rental

Mechanic/School

Show room/Sales

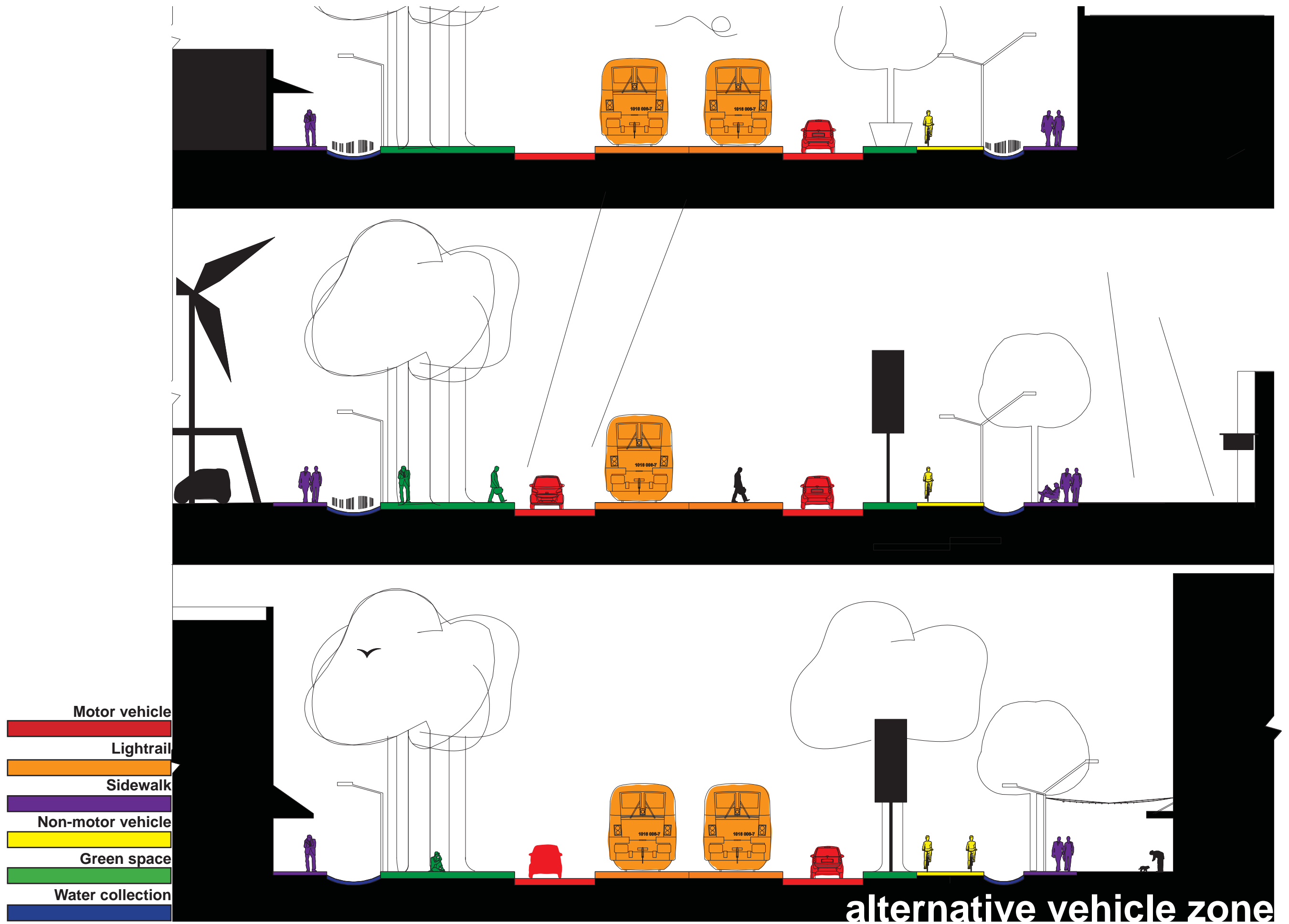






- Motor vehicle**
- Lightrail**
- Sidewalk**
- Non-motor vehicle**
- Green space**
- Water collection**

Lightrail street section



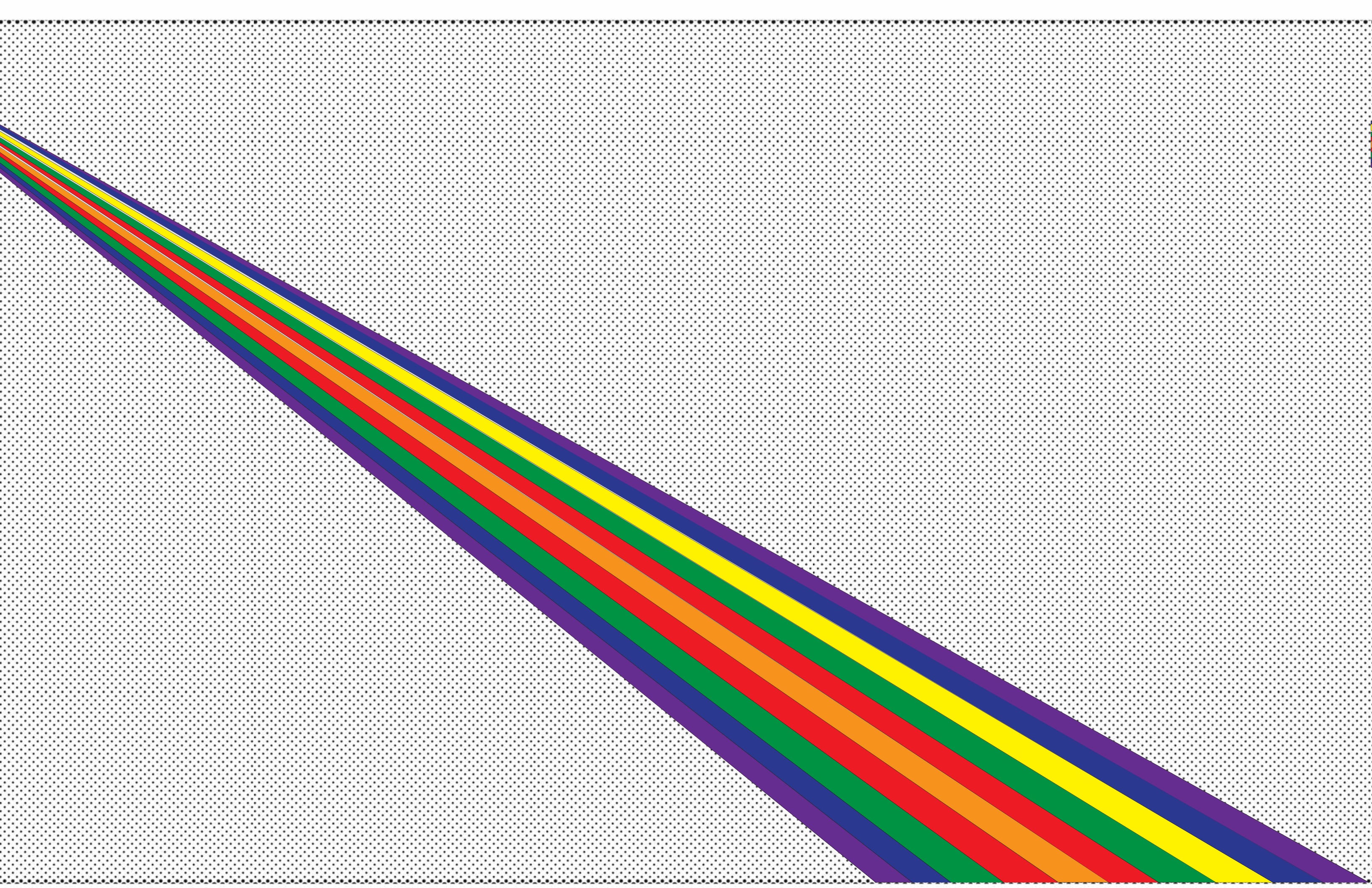
alternative vehicle zone

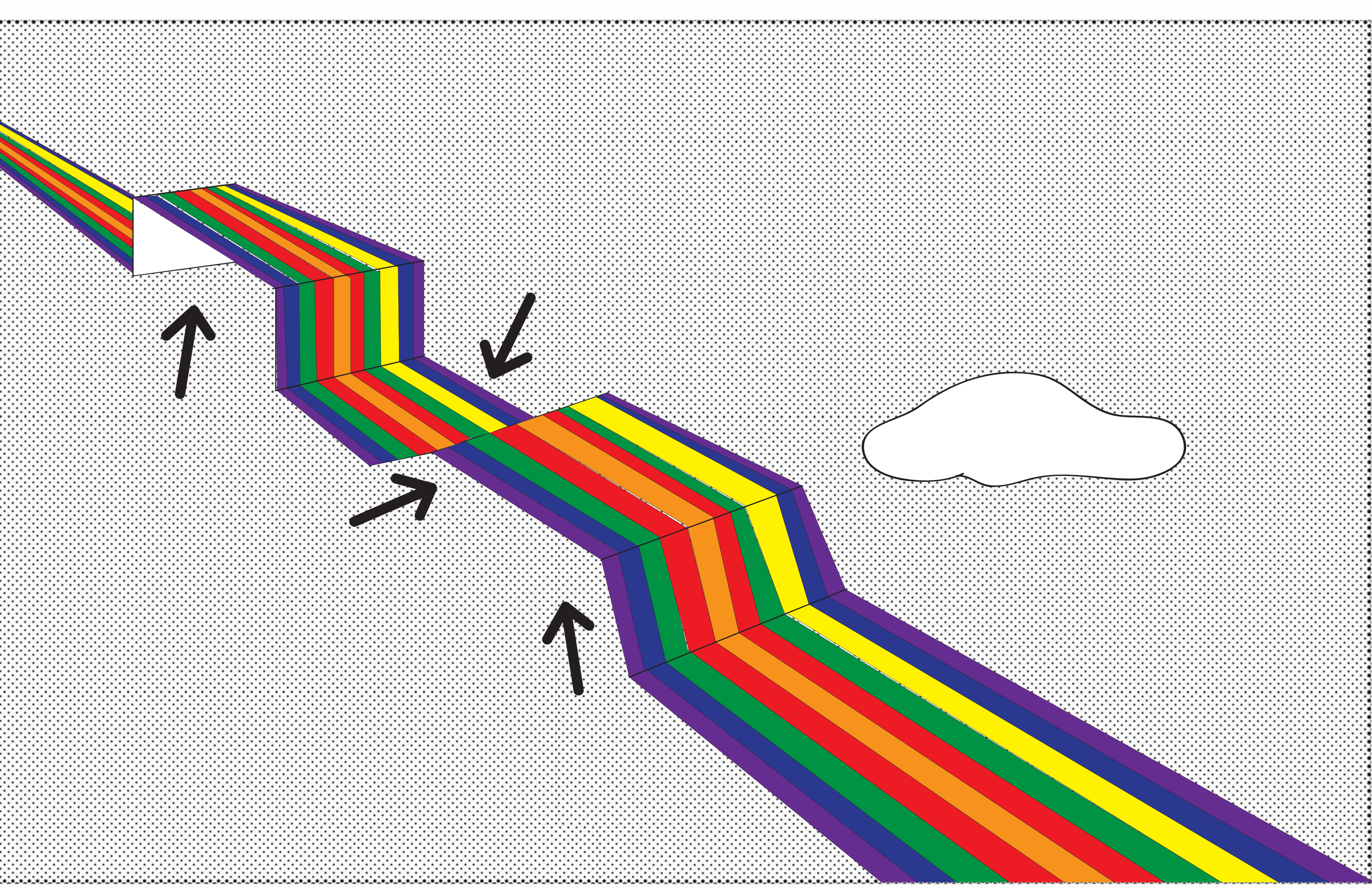


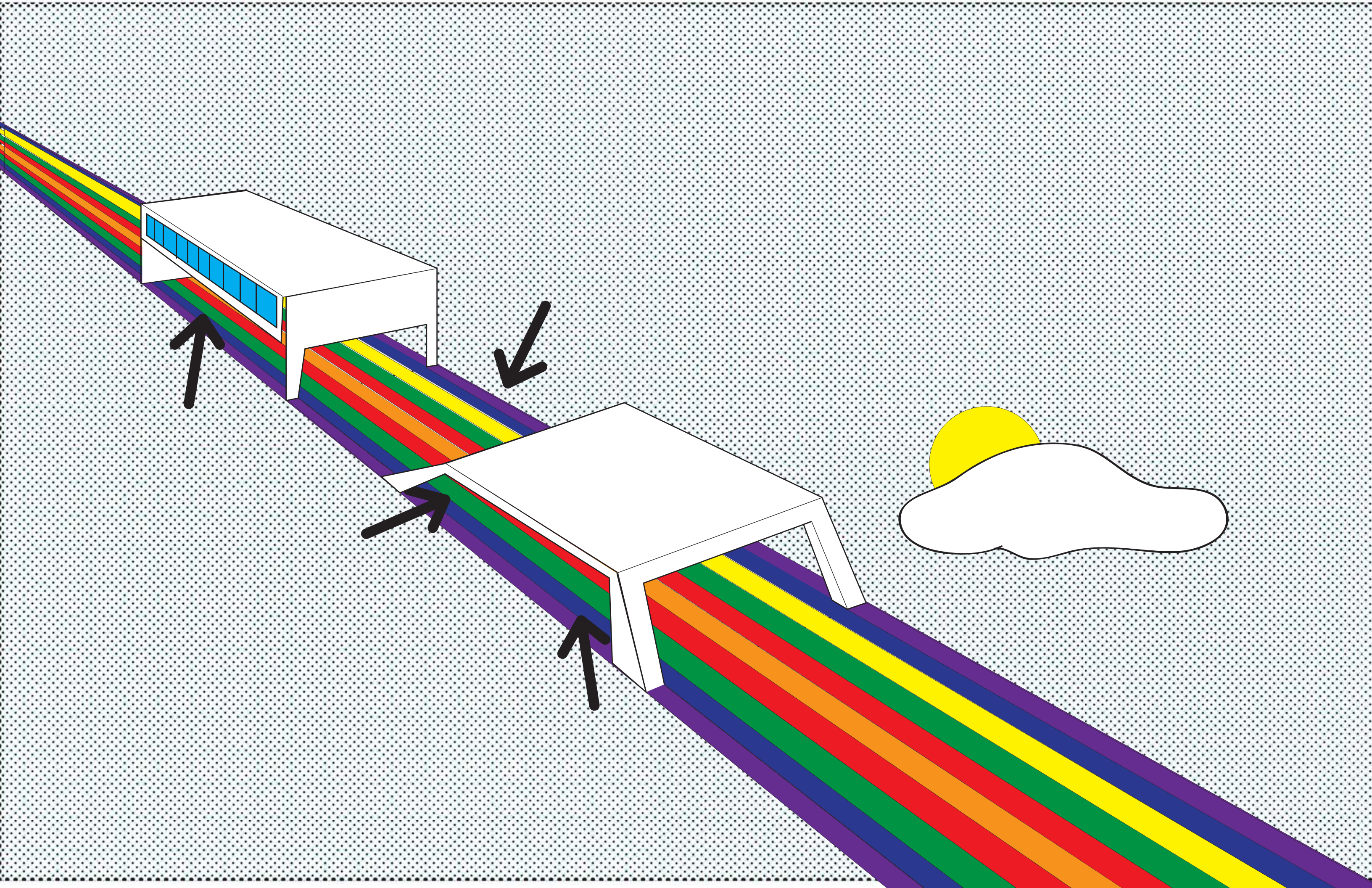
Site now



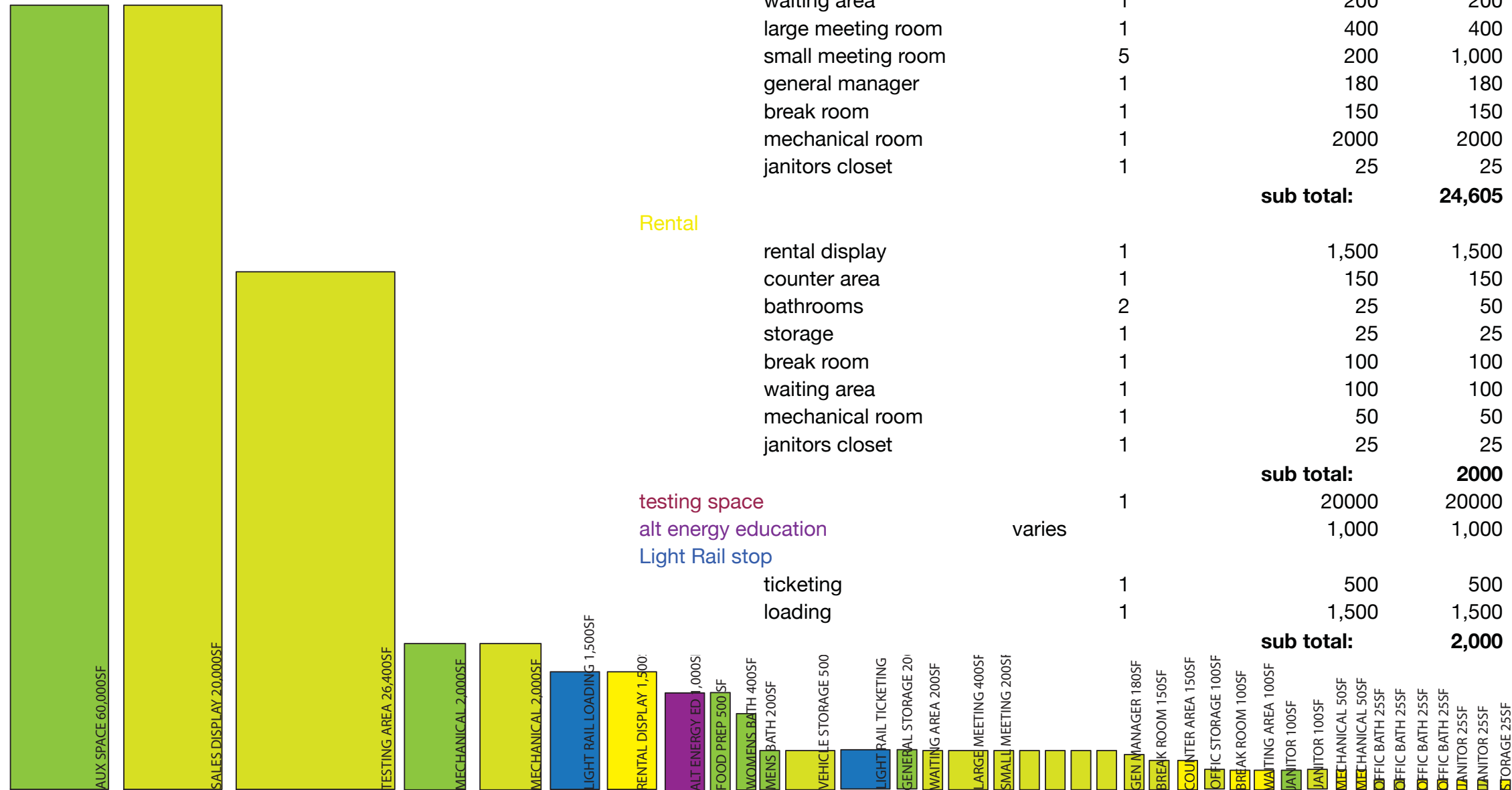
Site with strips



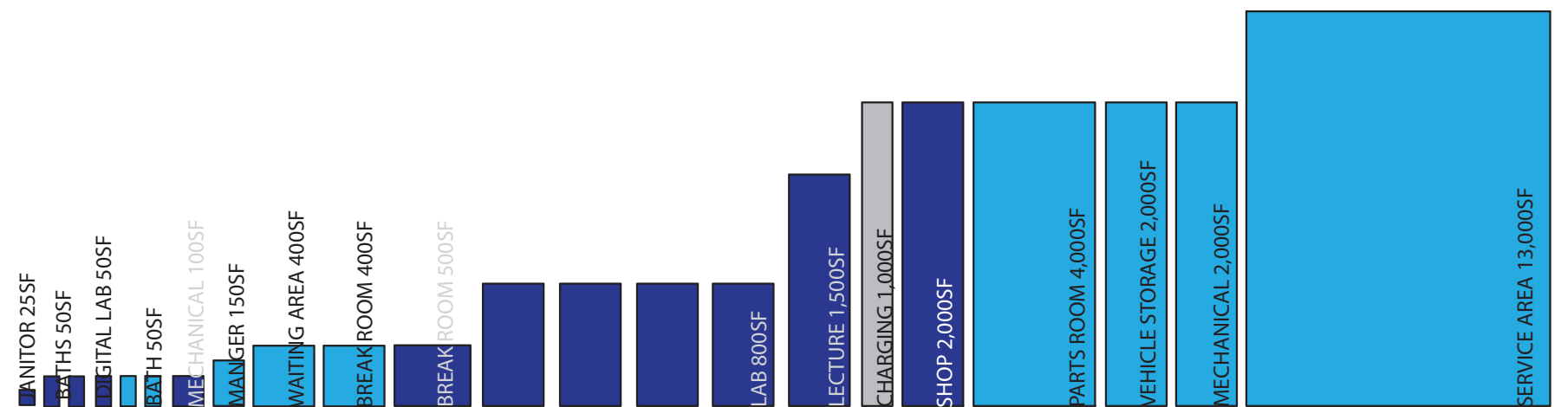


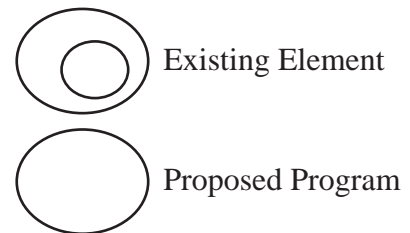
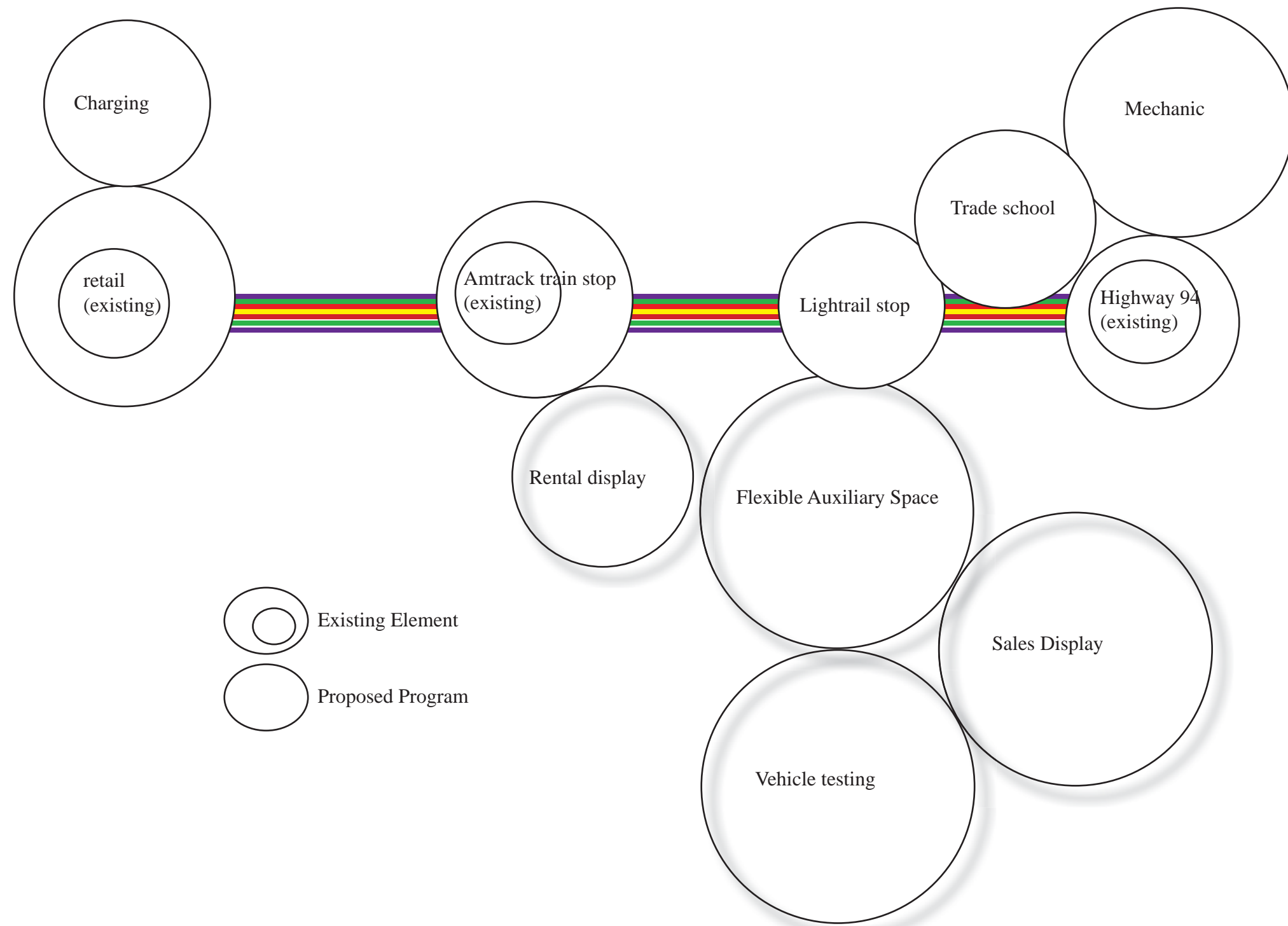


The overall site program is broken down into two functions; **Vehicle introduction** and **Vehicle Maintenance**. Vehicle introduction consists of exposure of alternative vehicles through sales, rental and testing. Vehicle maintenance combines specialty mechanics with a mechanical trade school.



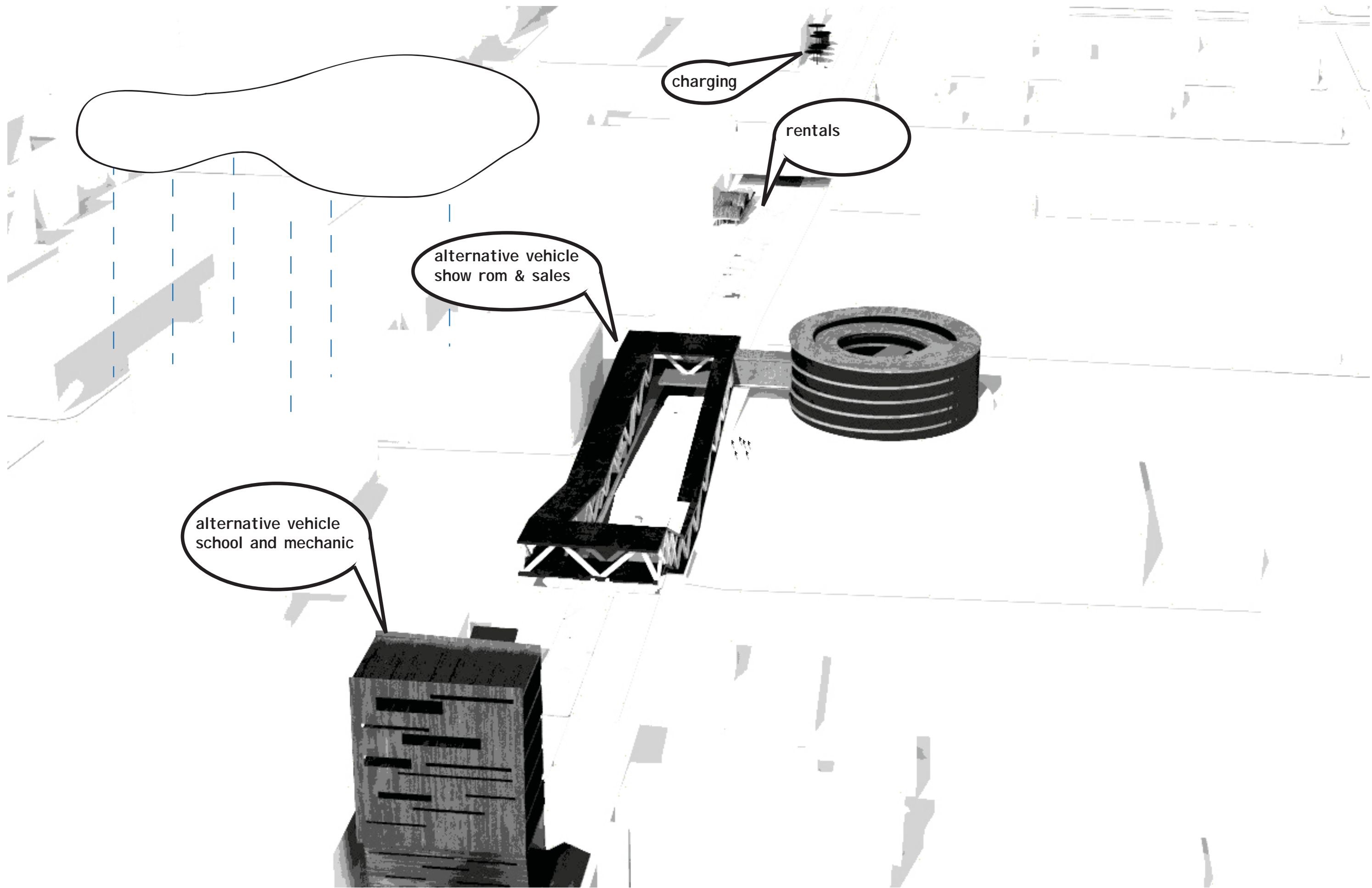
Space	Number	net SF	Total SF
mechanic shop			
bathrooms	2	50	100
mechanical room	1	2,000	2,000
service area	1	13,000	13,000
vehicle storage	1	2,000	2,000
managers office	1	150	150
break room	1	400	400
waiting area	1	400	400
parts room	1	4,000	4,000
		sub total:	22,050
mechanic trade school			
labs	4	800	3200
bathrooms			
mens	varies	50	50
womens	varies	50	50
break area	1	500	500
digital lab	1	50	50
lecture room	1	1,500	1,500
mechanical room	1	100	100
janitors closet	varies	25	25
		sub total:	5,475
refueling stations			
charging area	1	1,000	1,000





Site Program Clustering

BUILDINGS

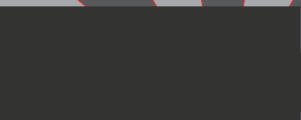


charging

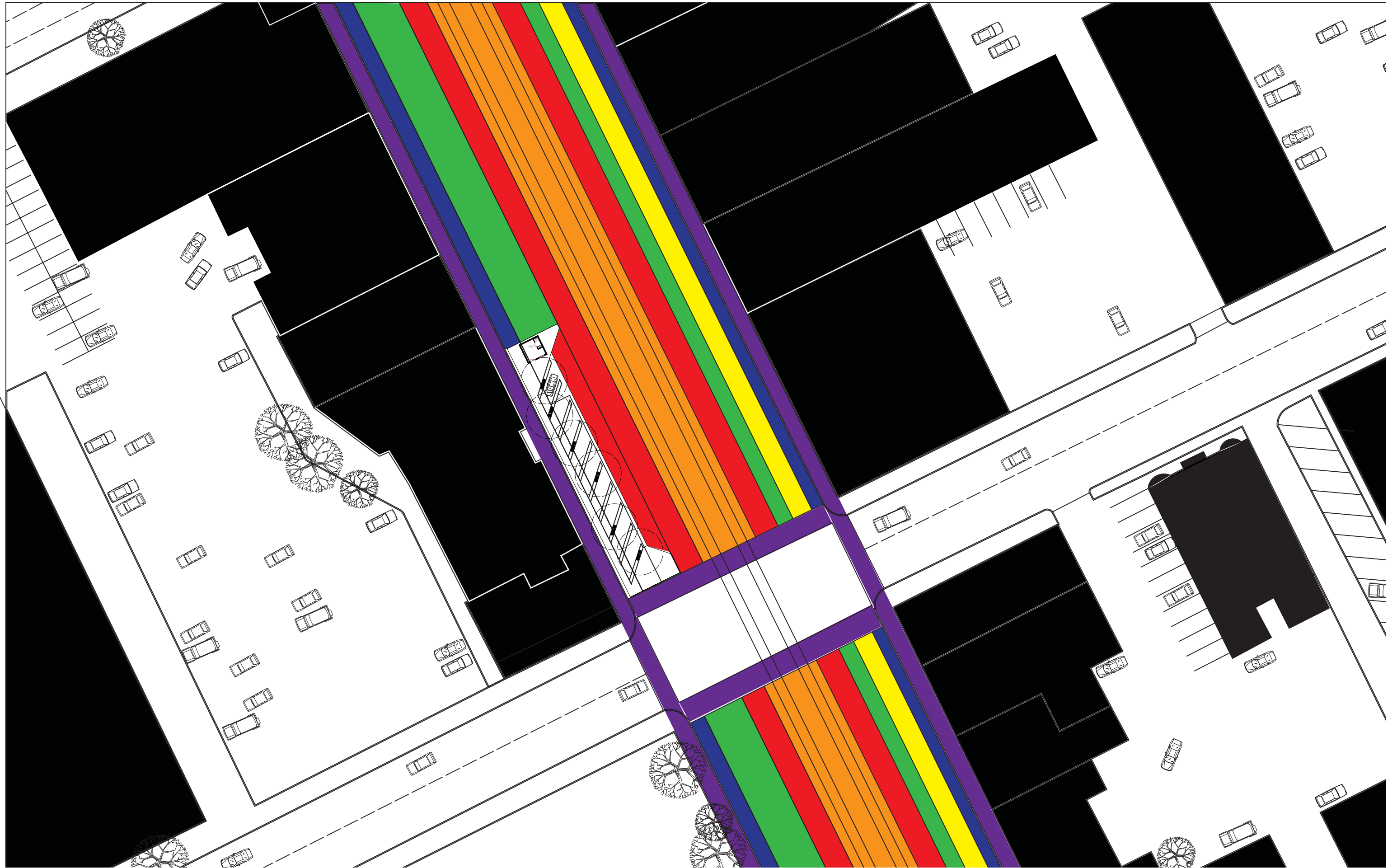
rentals

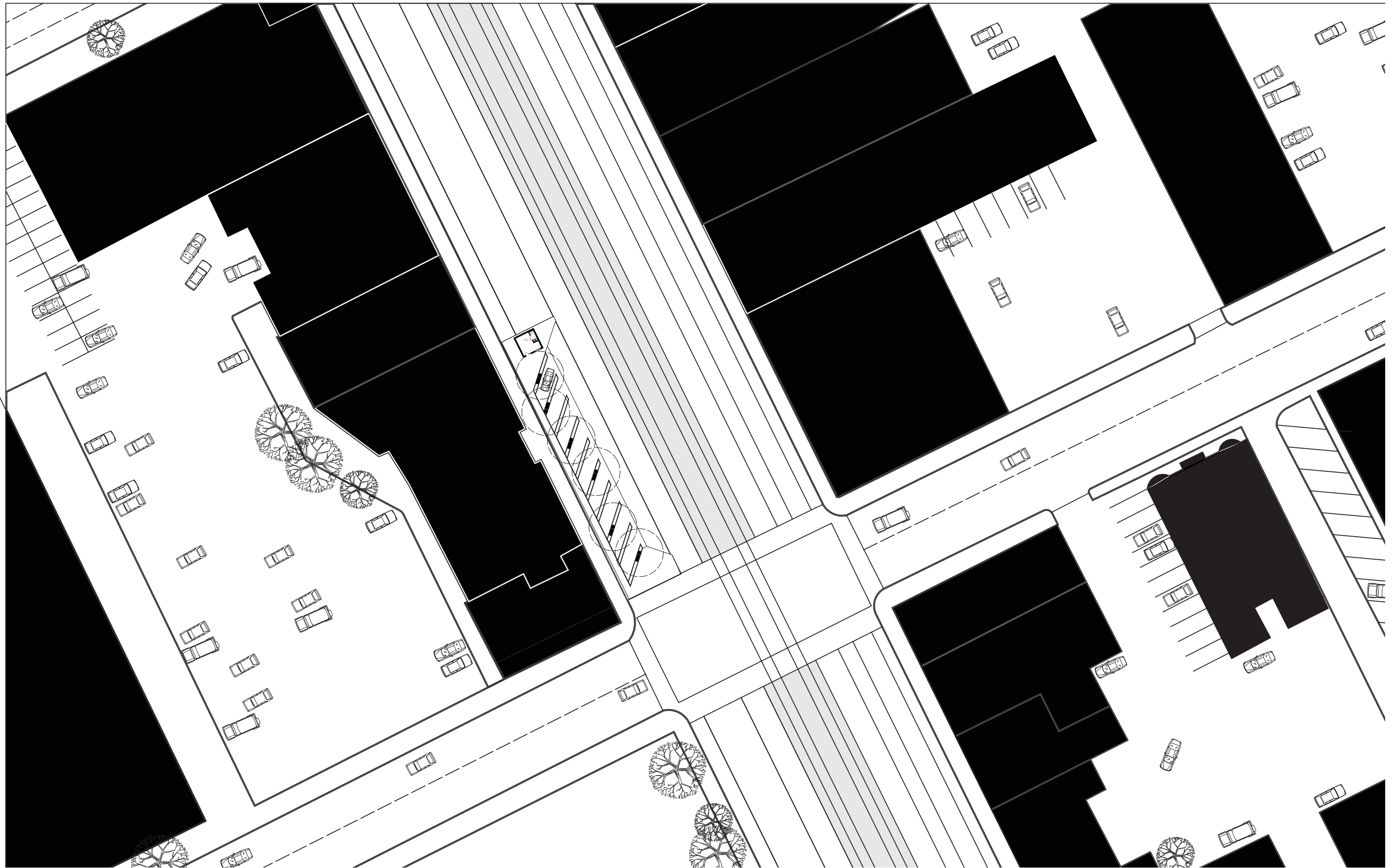
alternative vehicle
show rom & sales

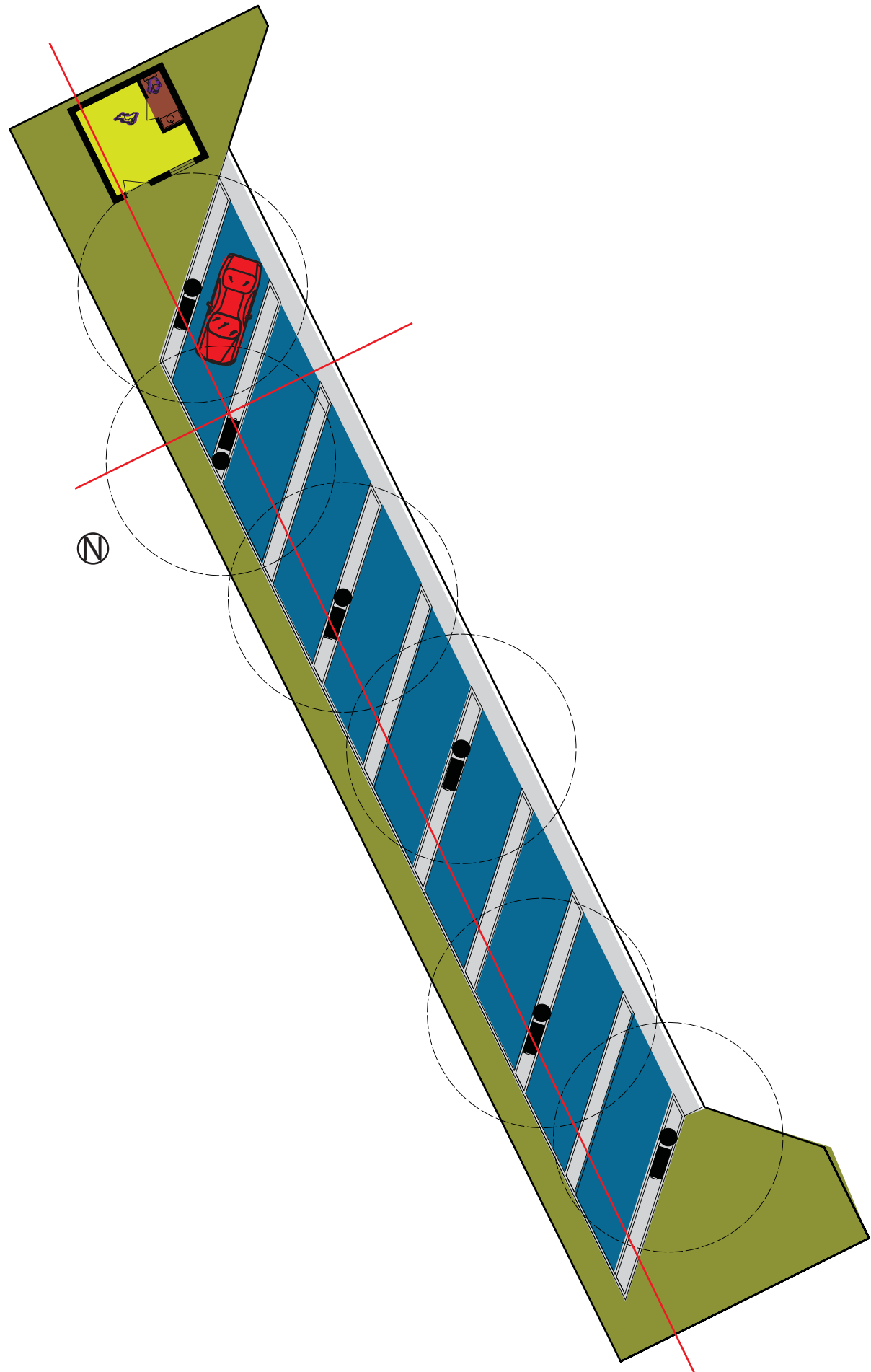
alternative vehicle
school and mechanic



CHARGE



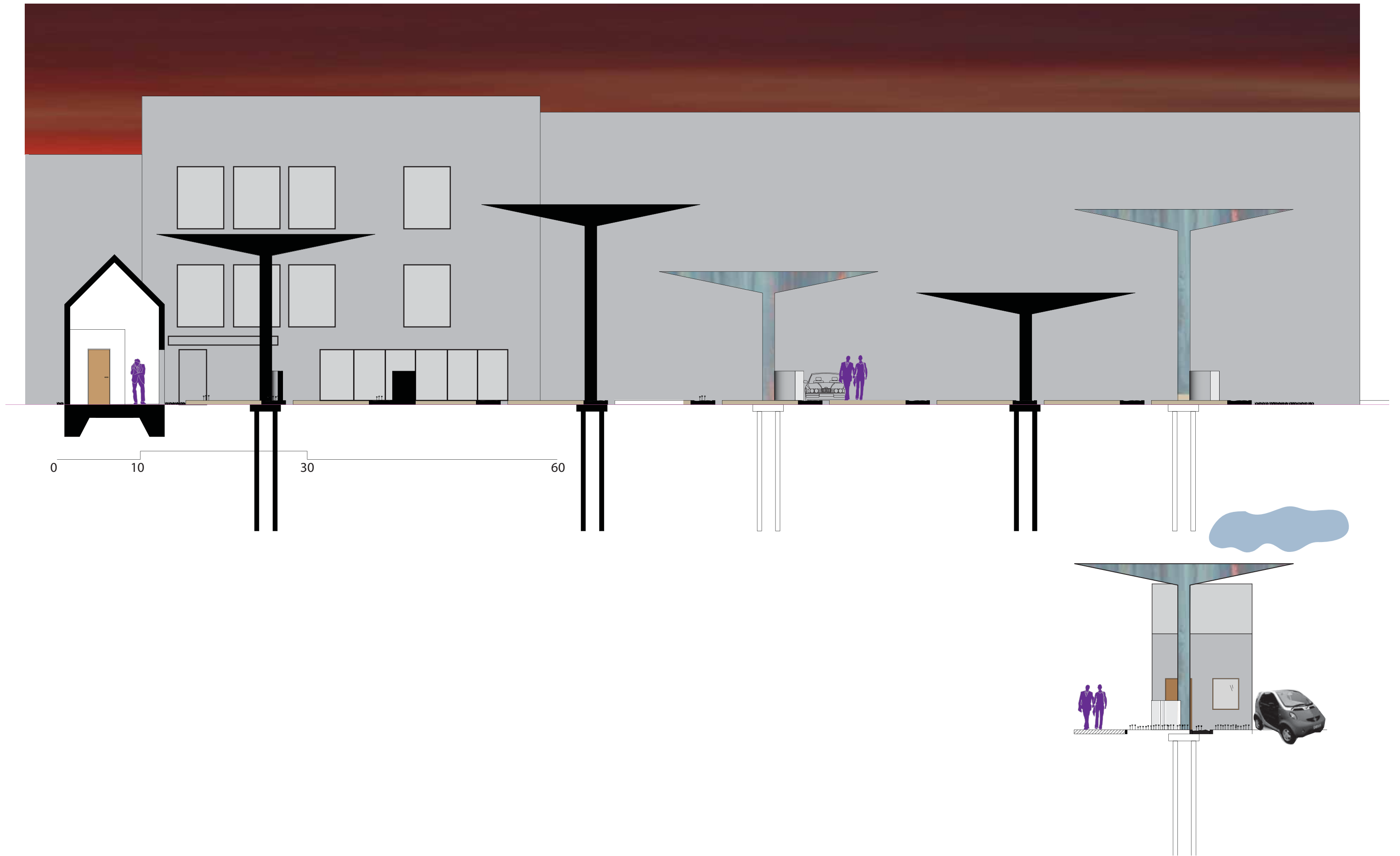


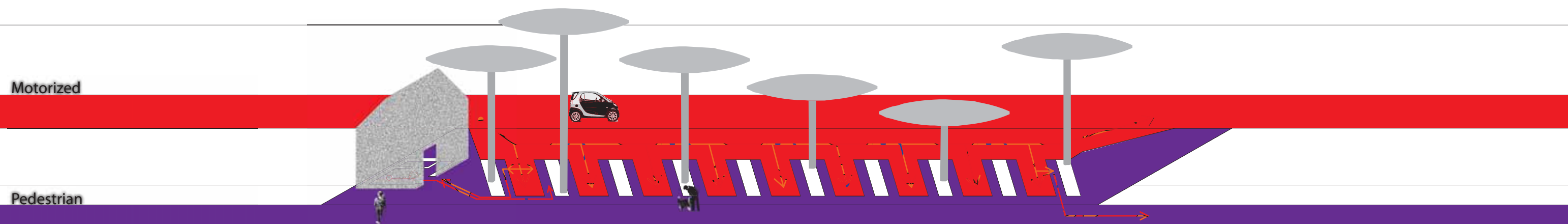
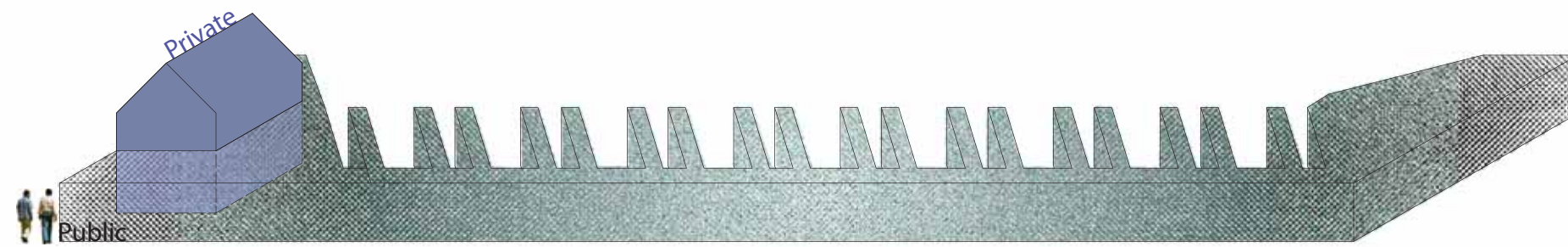
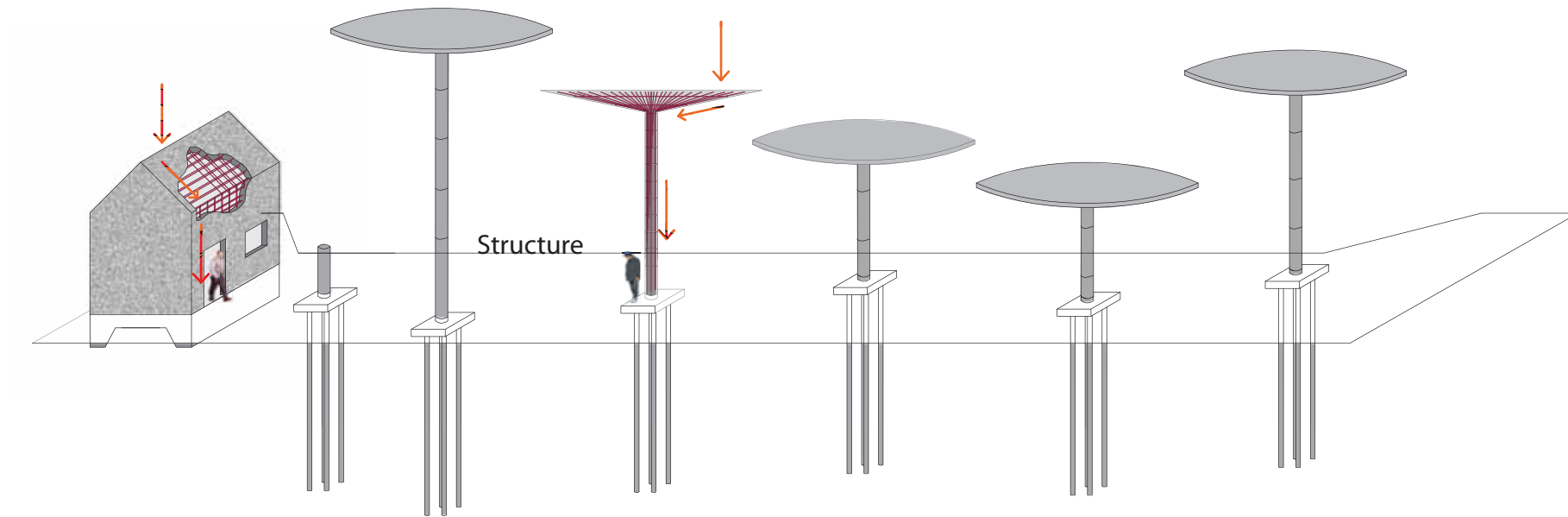


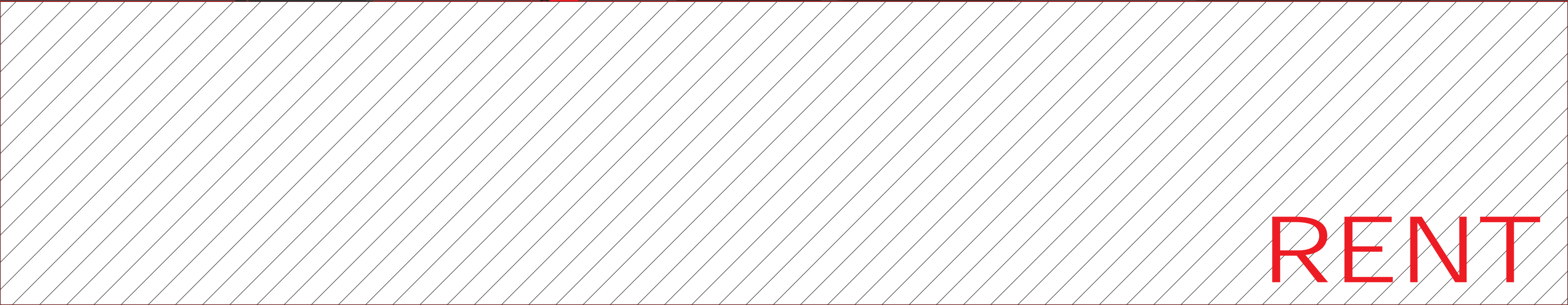
- Service Lounge
- Picnic area
- Service Stall
- Bathroom
- Shelter

Charging Station

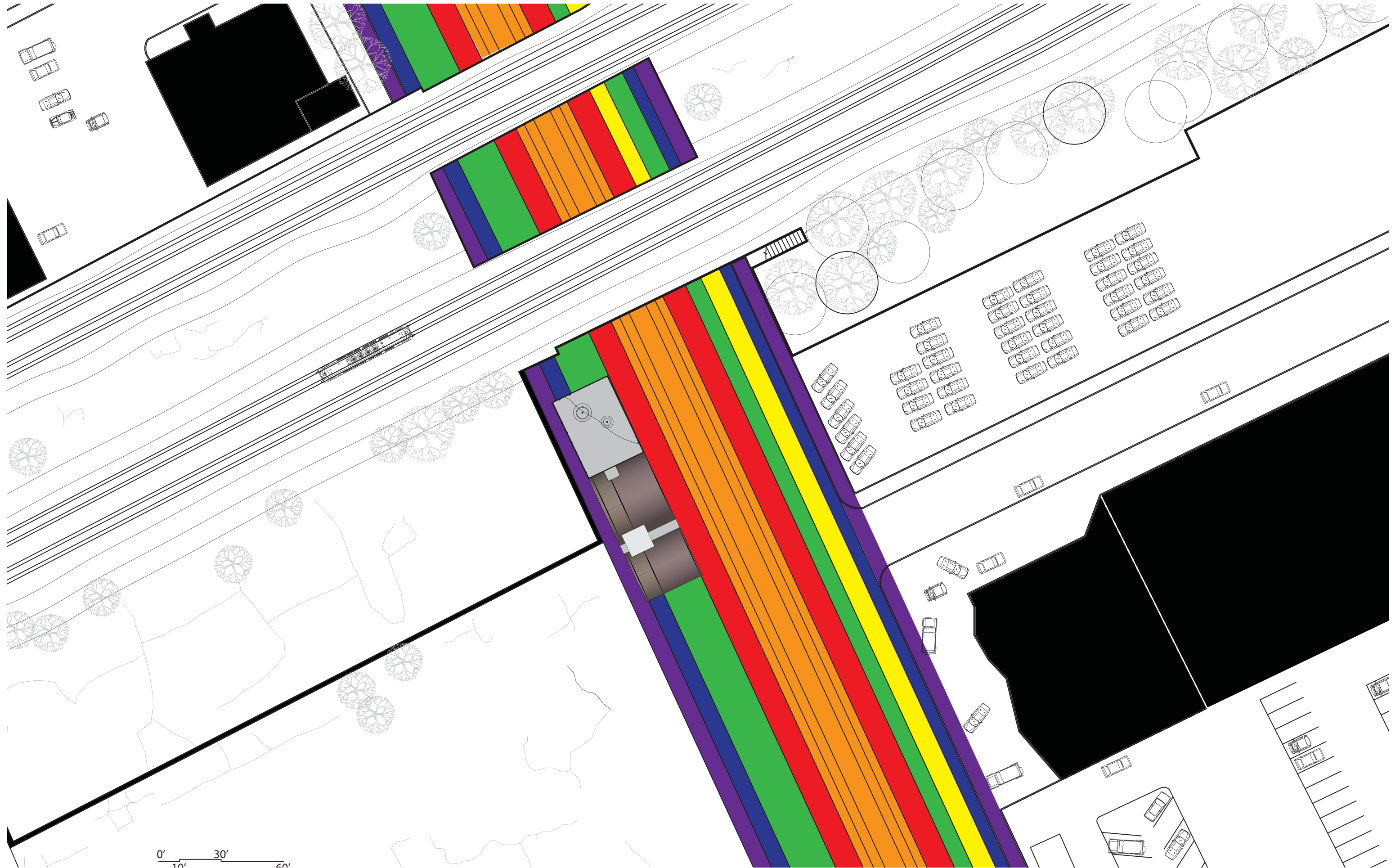
The charging station is similar to a gas station in providing vehicles with fuel as well as shelter for the driver while she services the car. This station provides electrical fuel under umbrella shaped shelthers. The most current and quickest electrical recharging device fully charges a vehicle in just under 30 minutes.

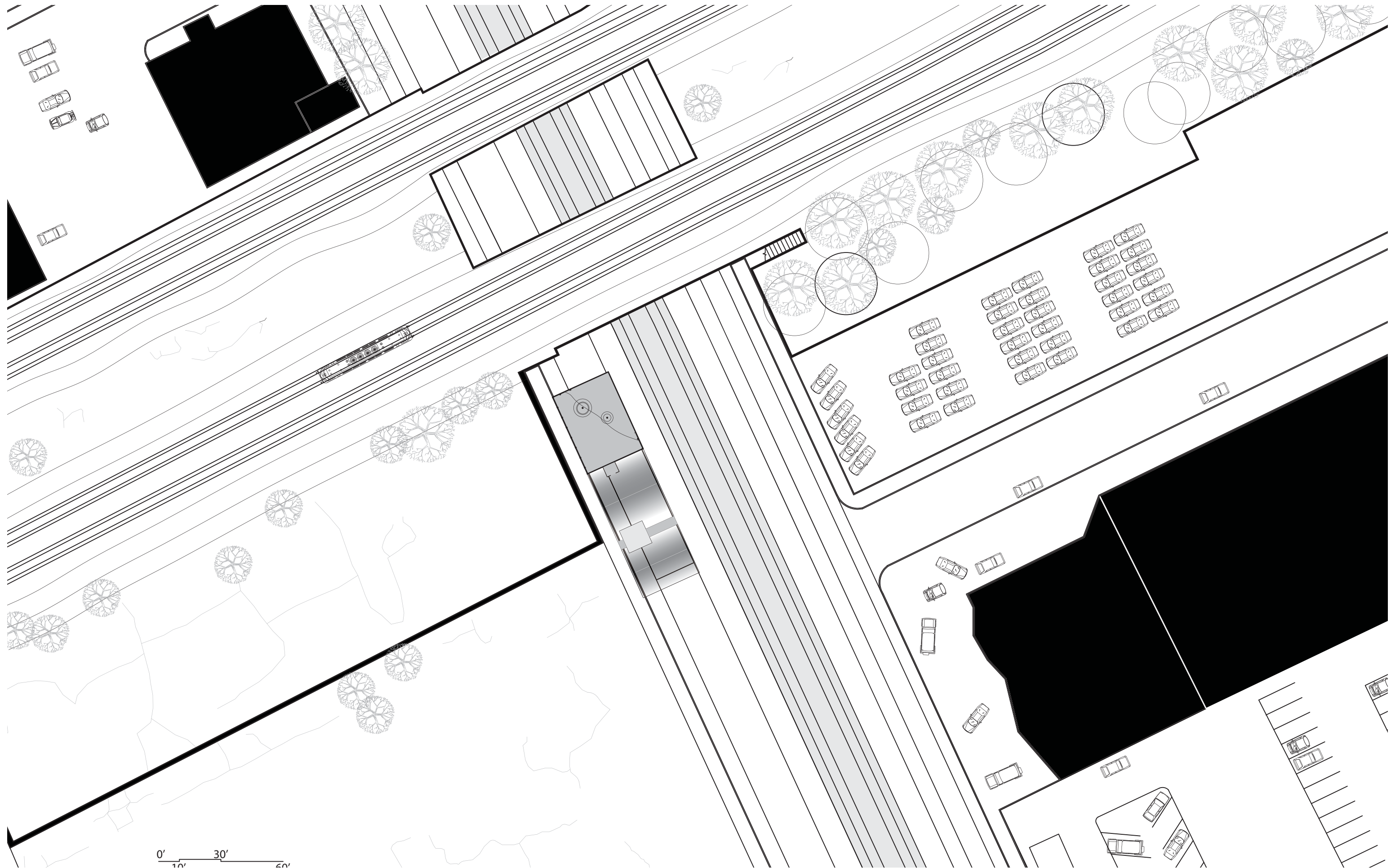




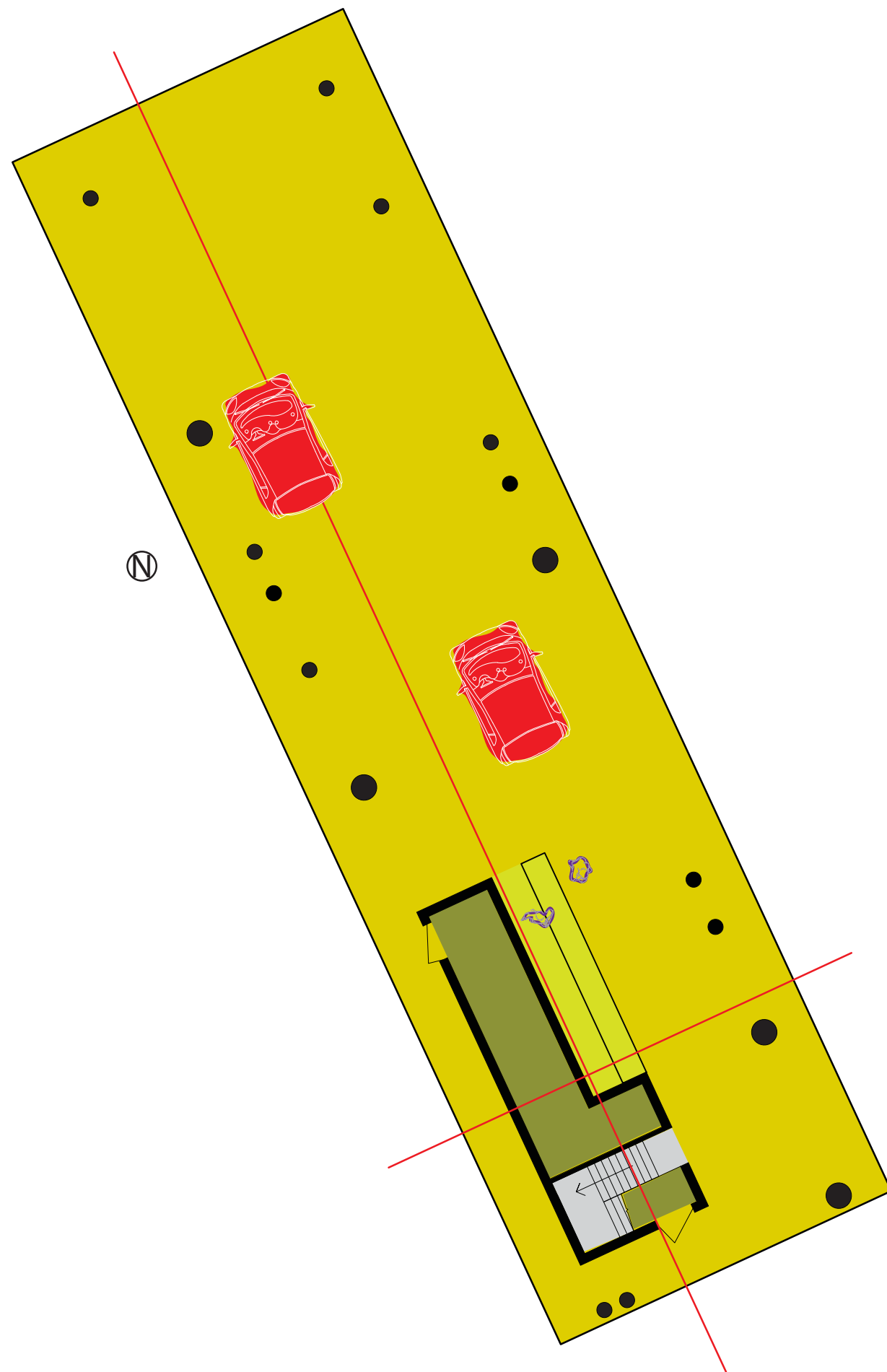


RENT





0' 10' 30' 60'

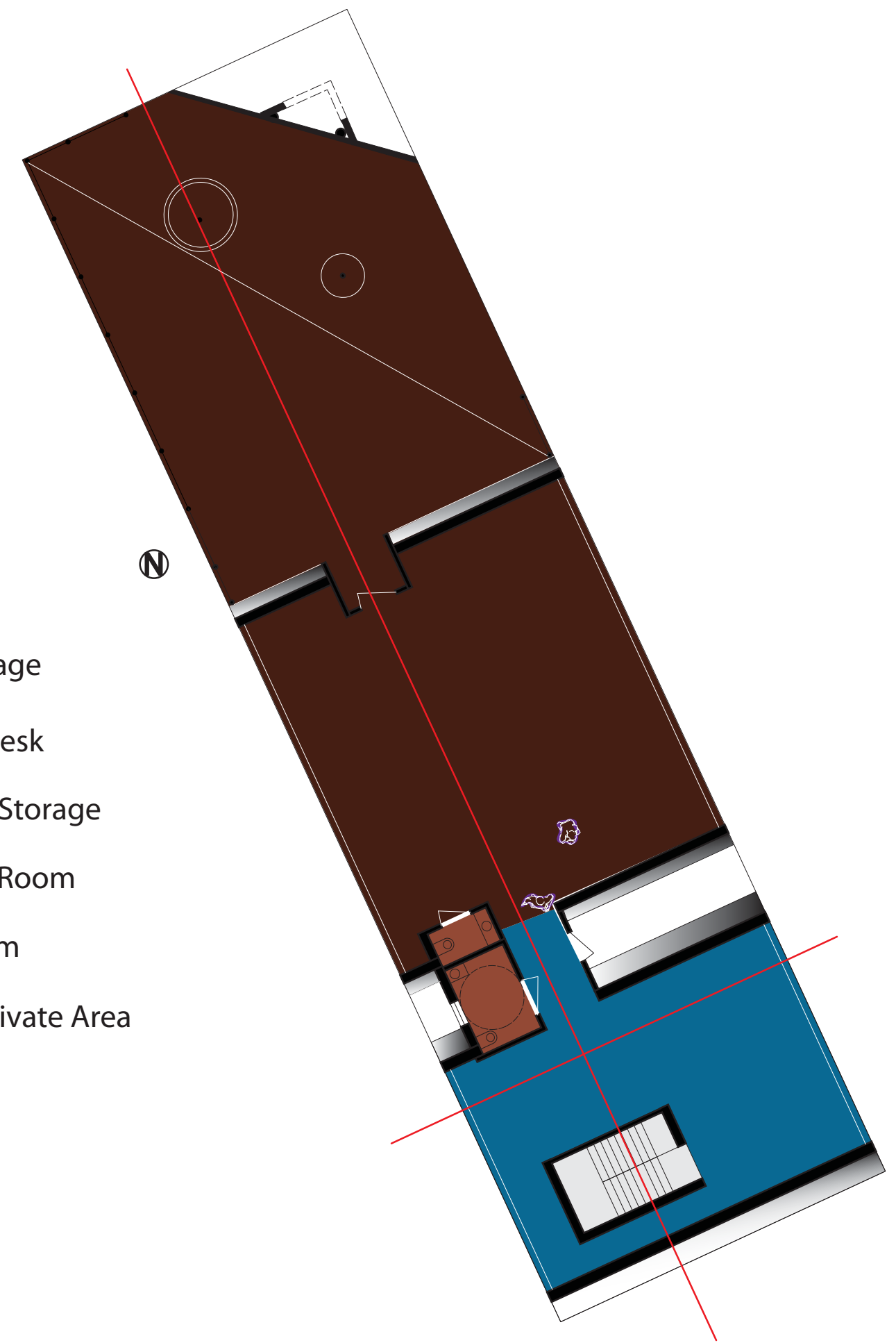


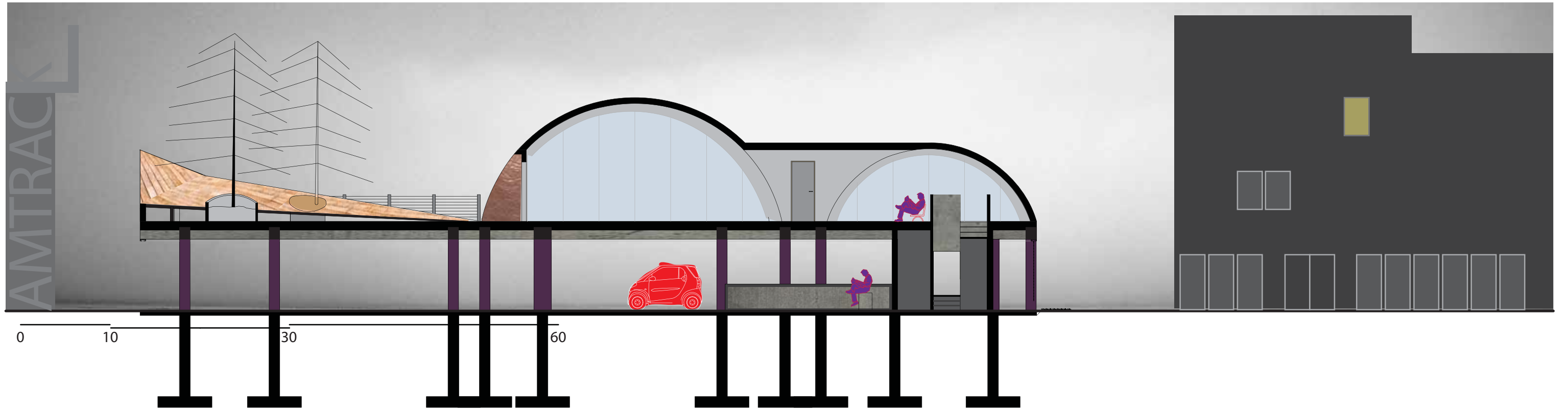
- Car Storage
- Rental Desk
- General Storage
- Waiting Room
- Bathroom
- Break/Private Area

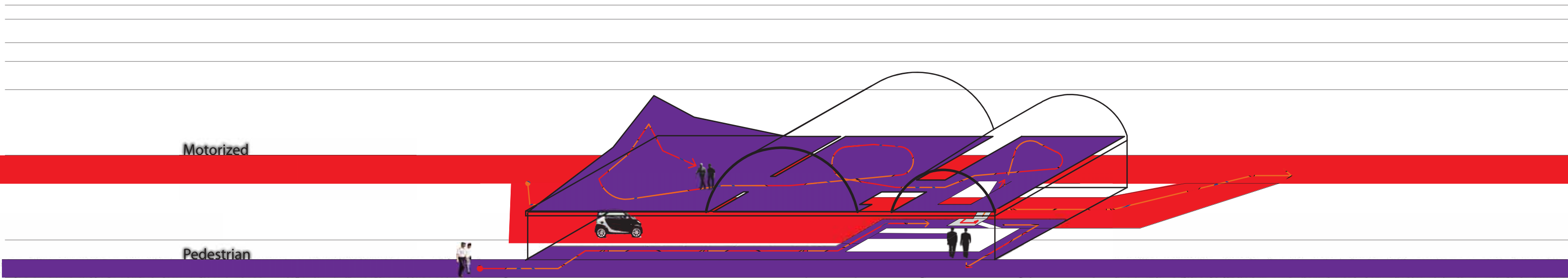
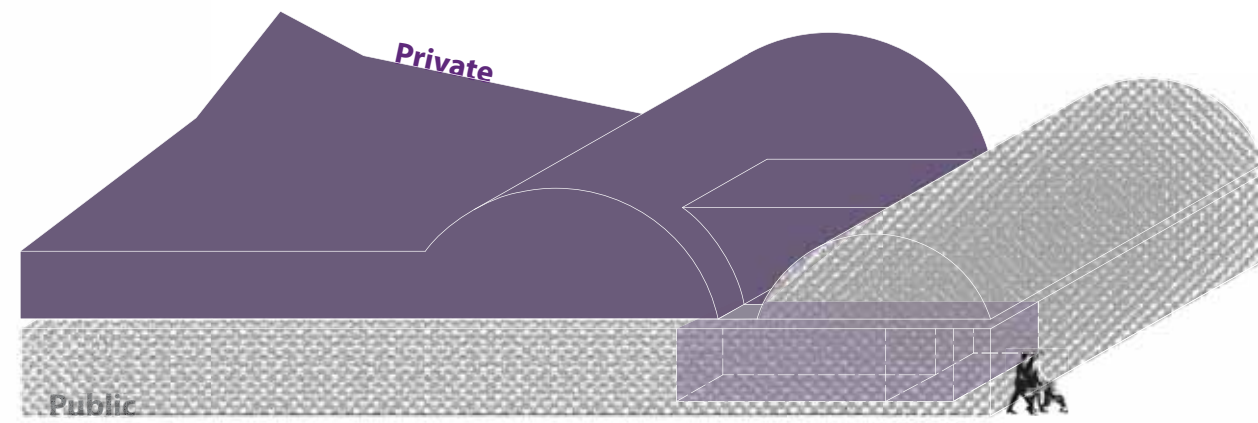
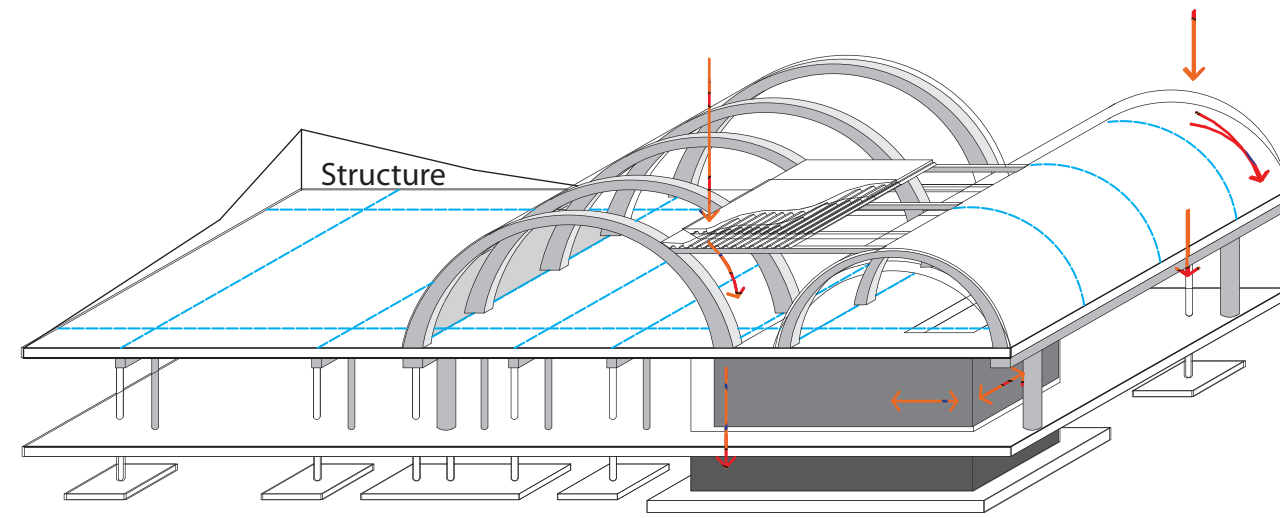
Rental Pavillion

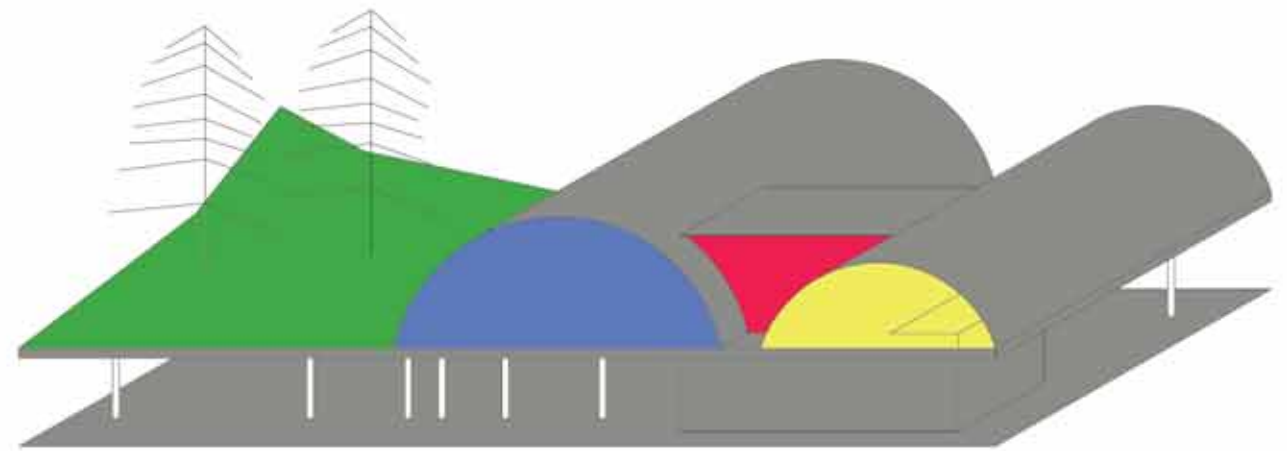
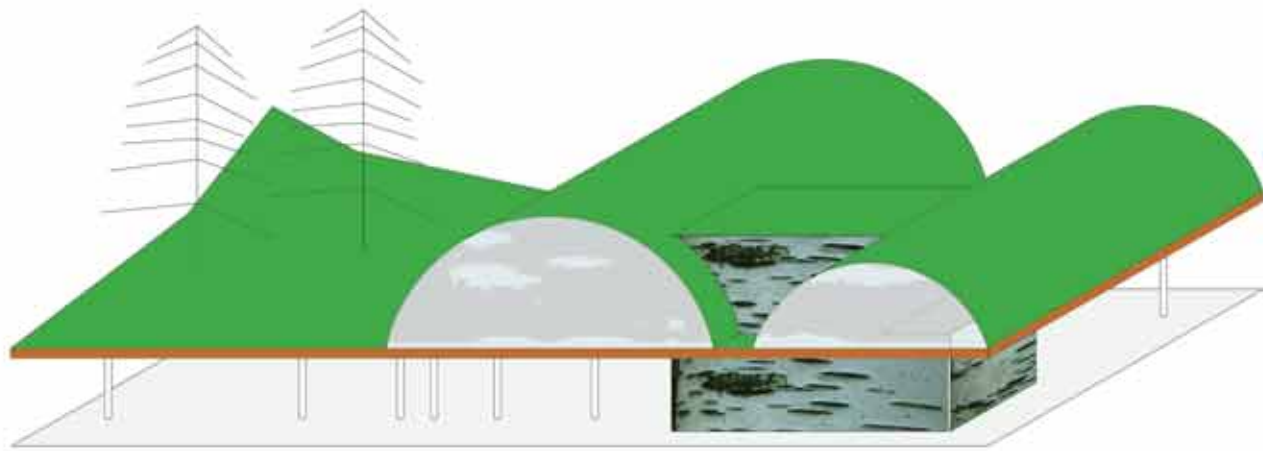
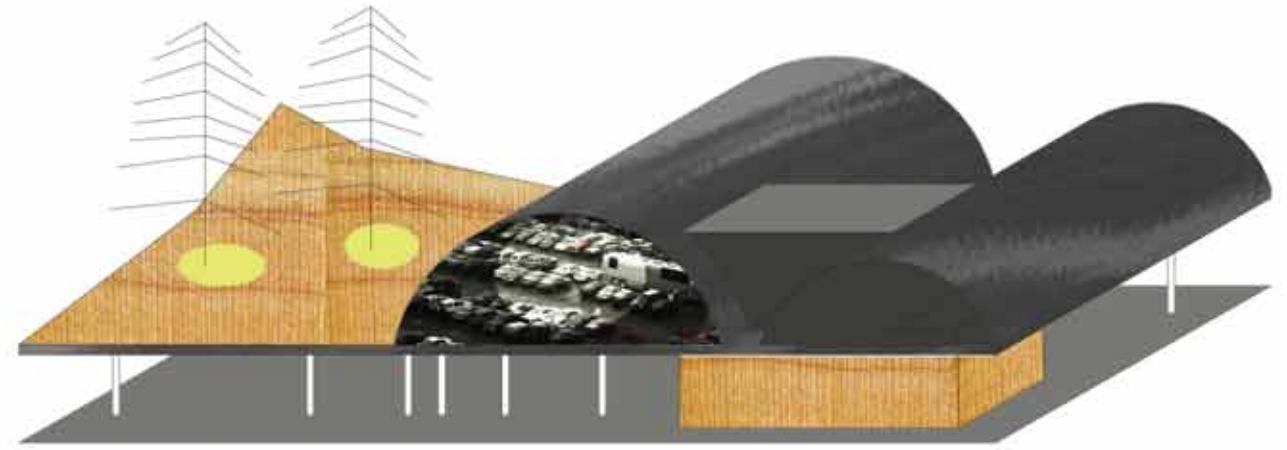
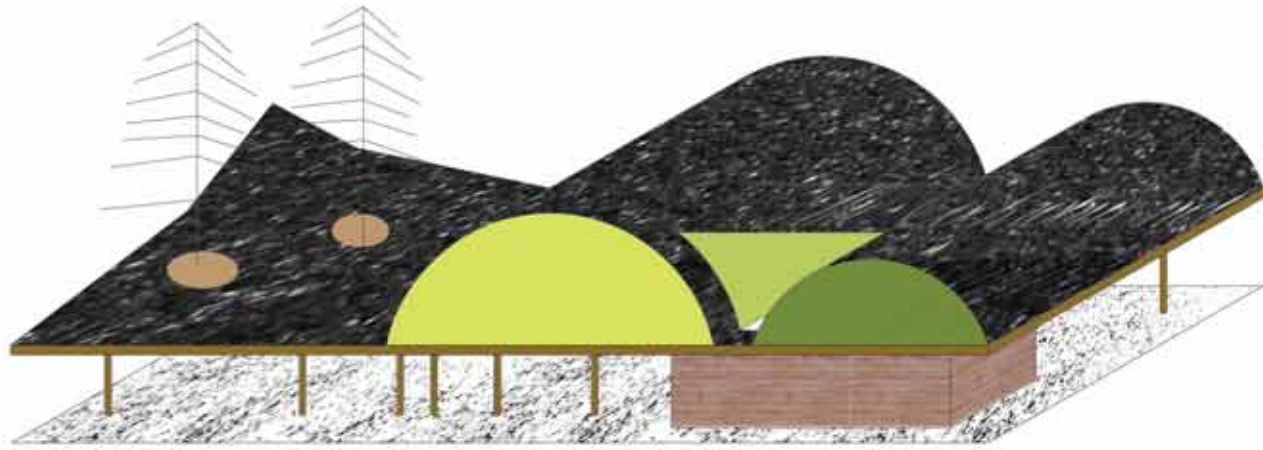
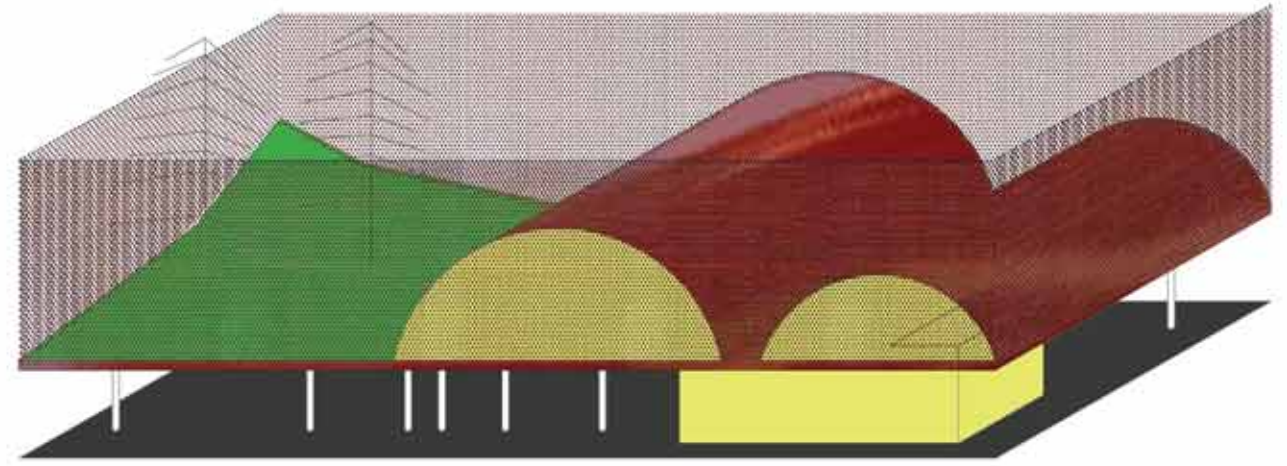
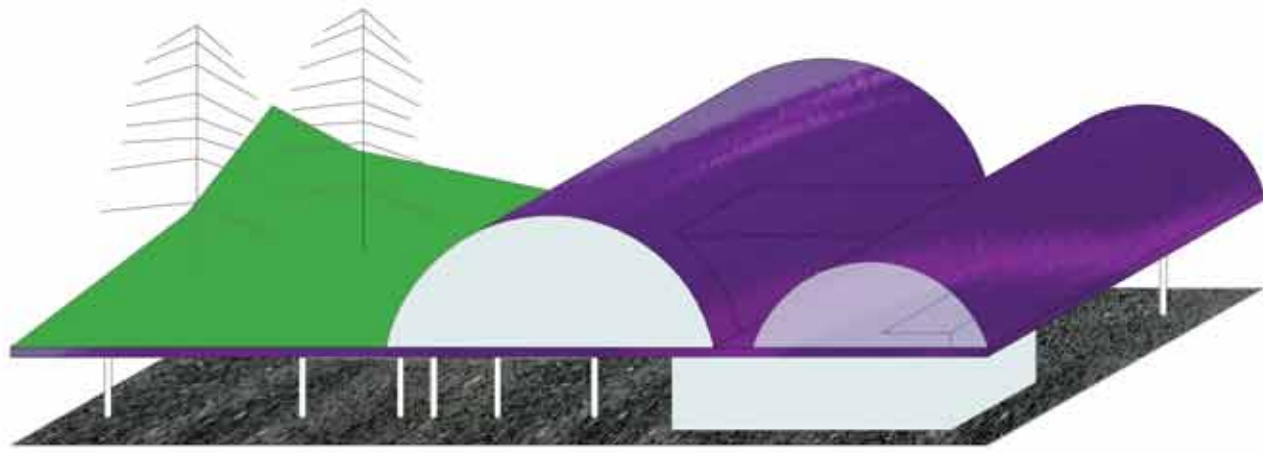
The rental pavillion allows visitors to both take an extended test drive with new vehicles introduced in the nearby car show as well as allow visitors without wheels a way of mobility in the city that promotes the use of alternative vehicles. The pavillion offers cautious new buyers an easier way in to vehicle purchasing.

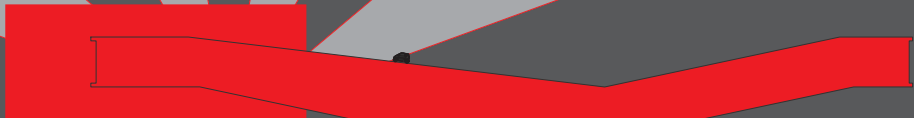
- Car Storage
- Rental Desk
- General Storage
- Waiting Room
- Bathroom
- Break/Private Area



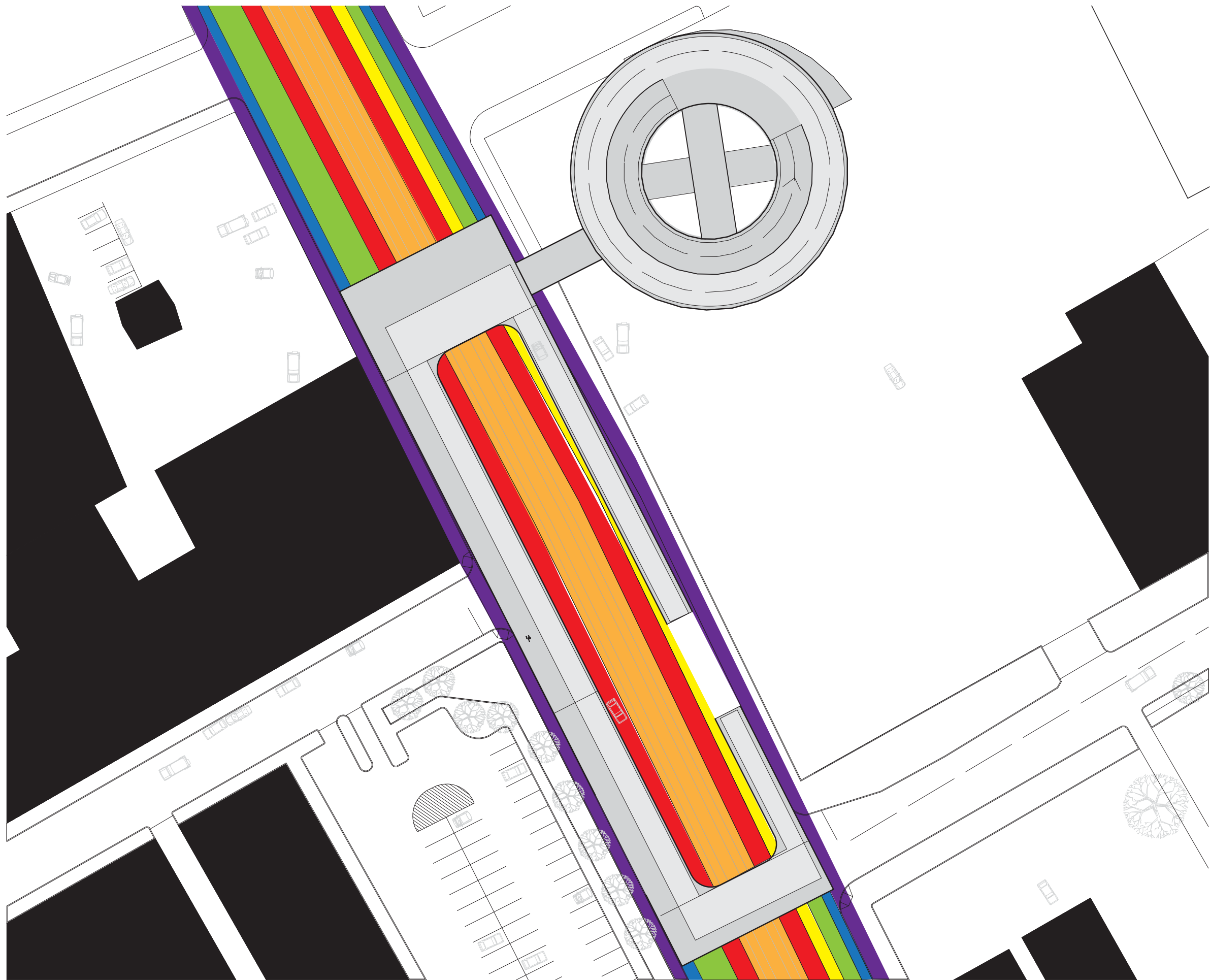


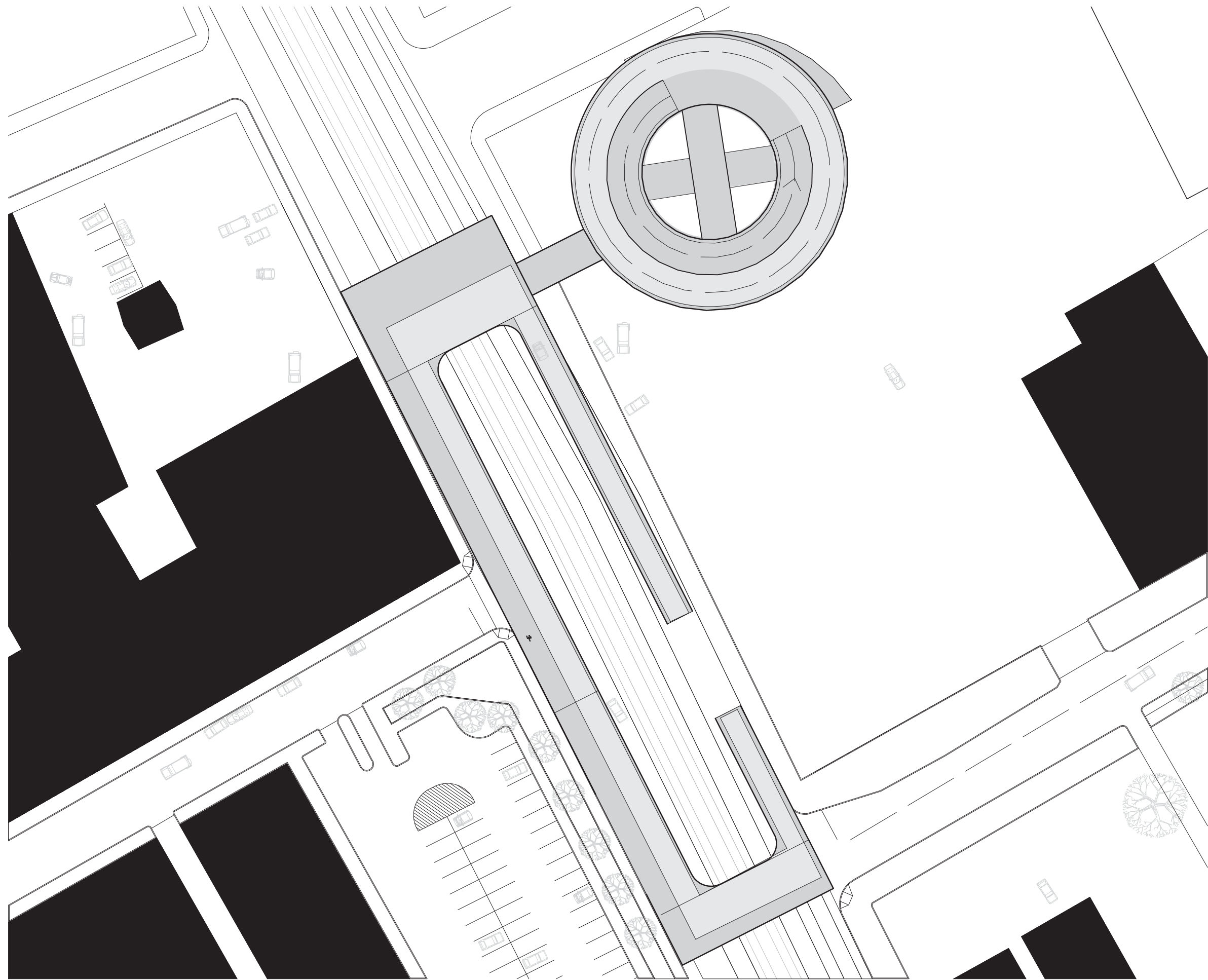




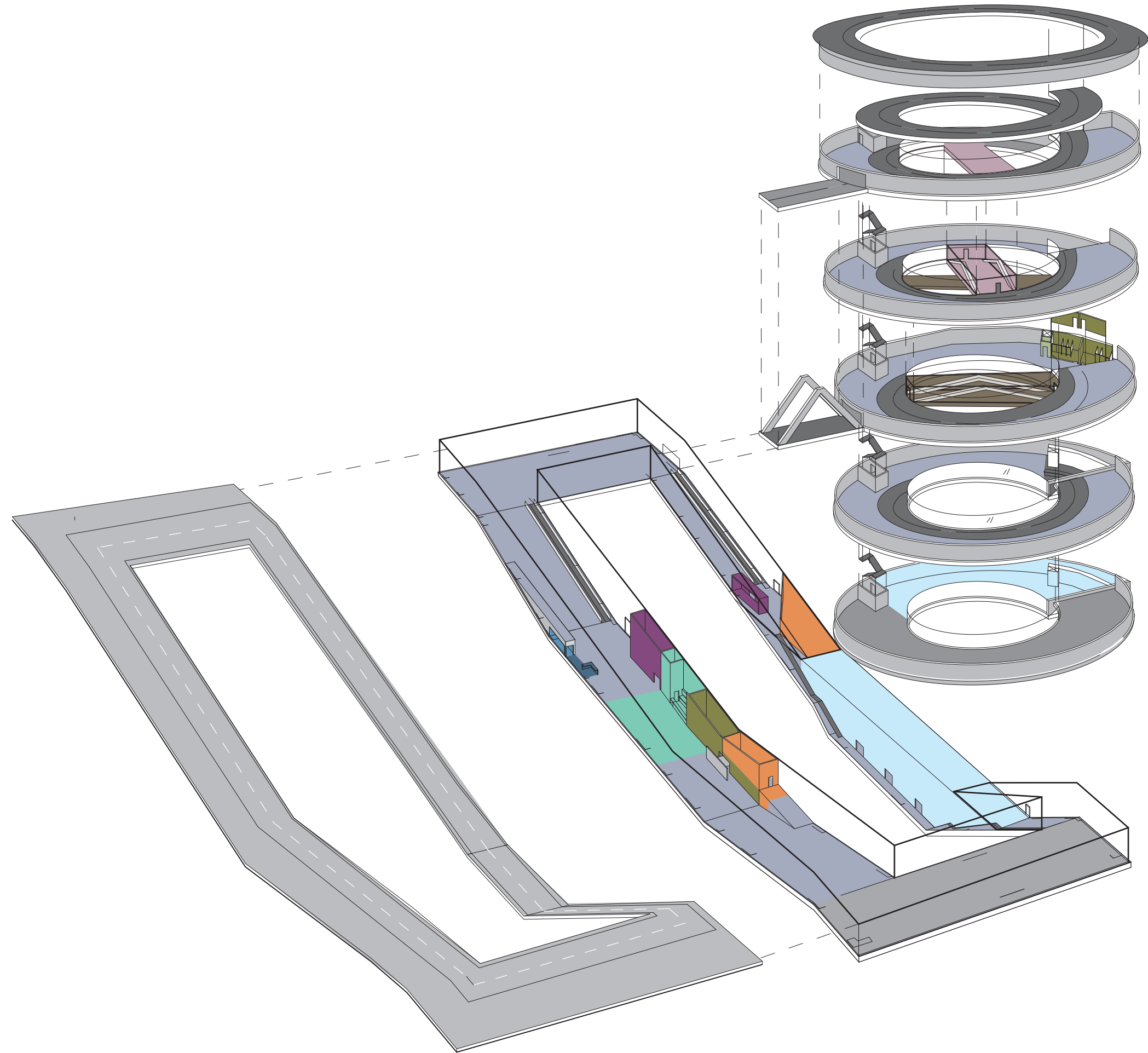


EXPERIENCE







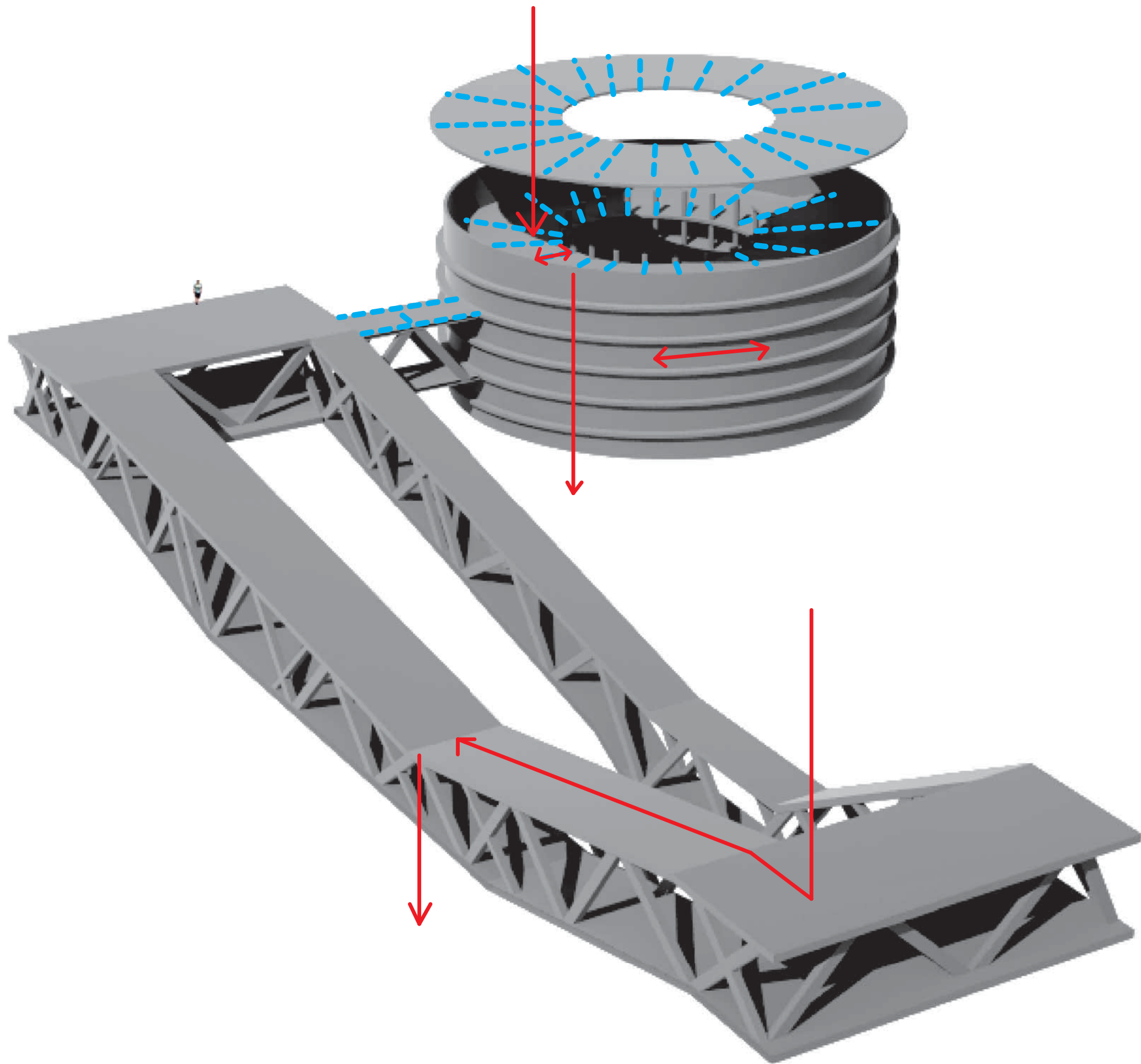


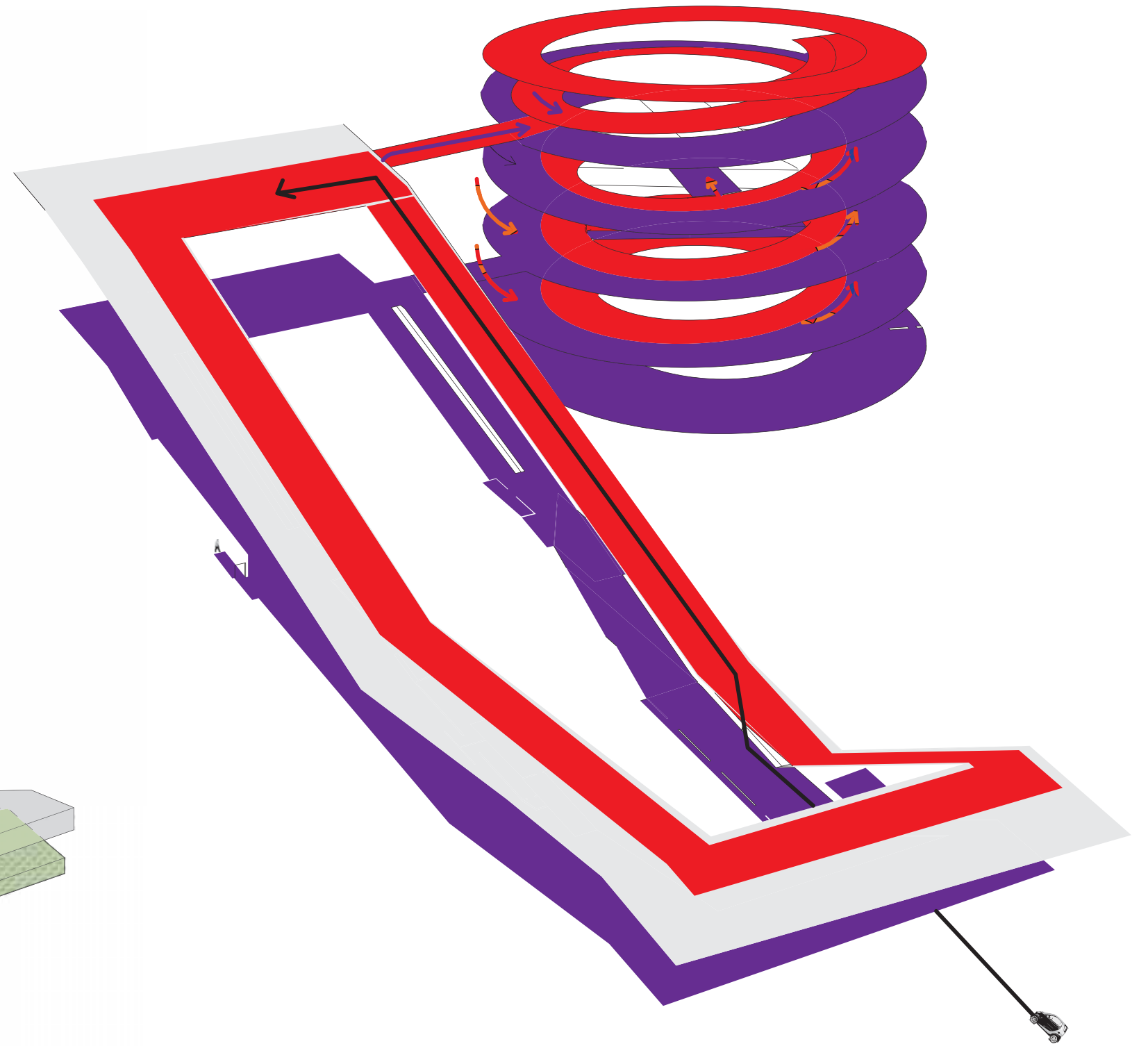
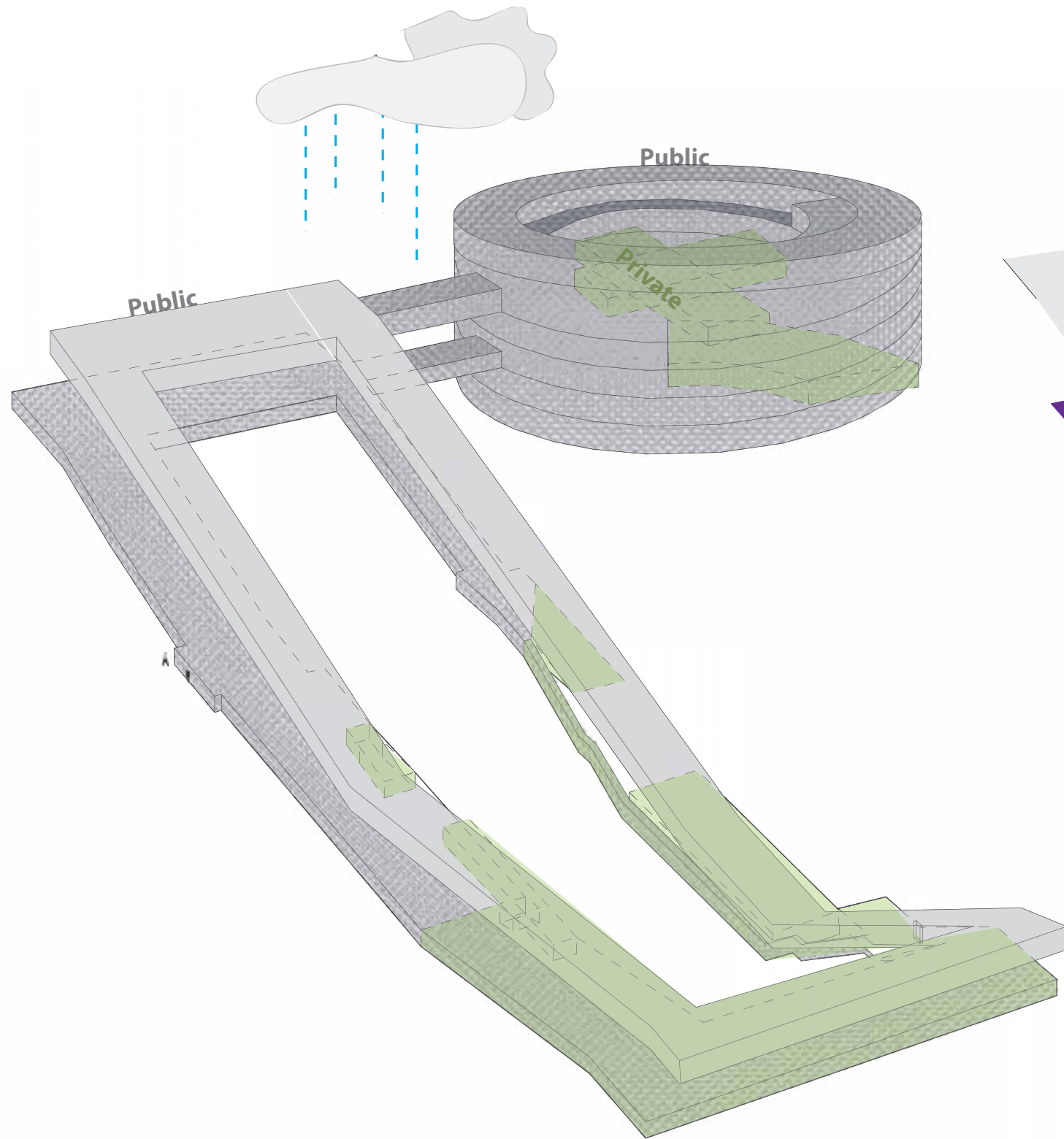
- Education Lounge
- Display
- Sales Room
- Break Room
- Janitors Closet

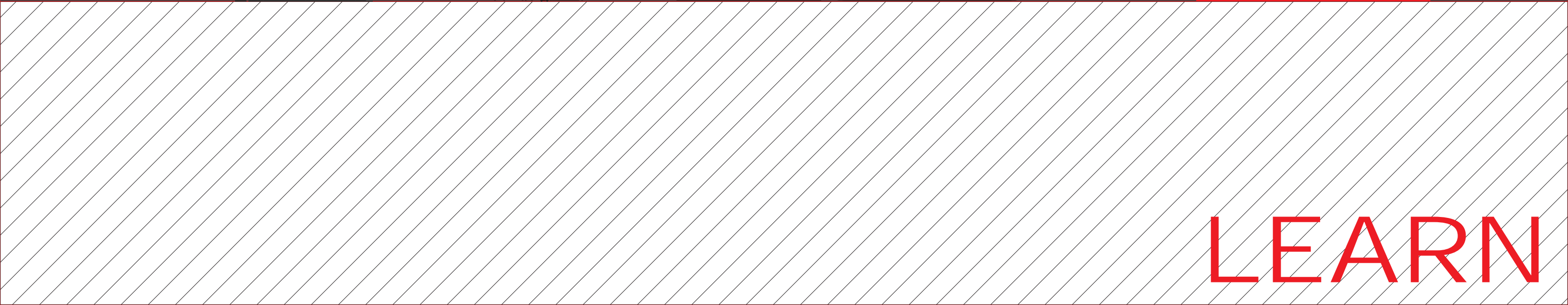
Sales

Show

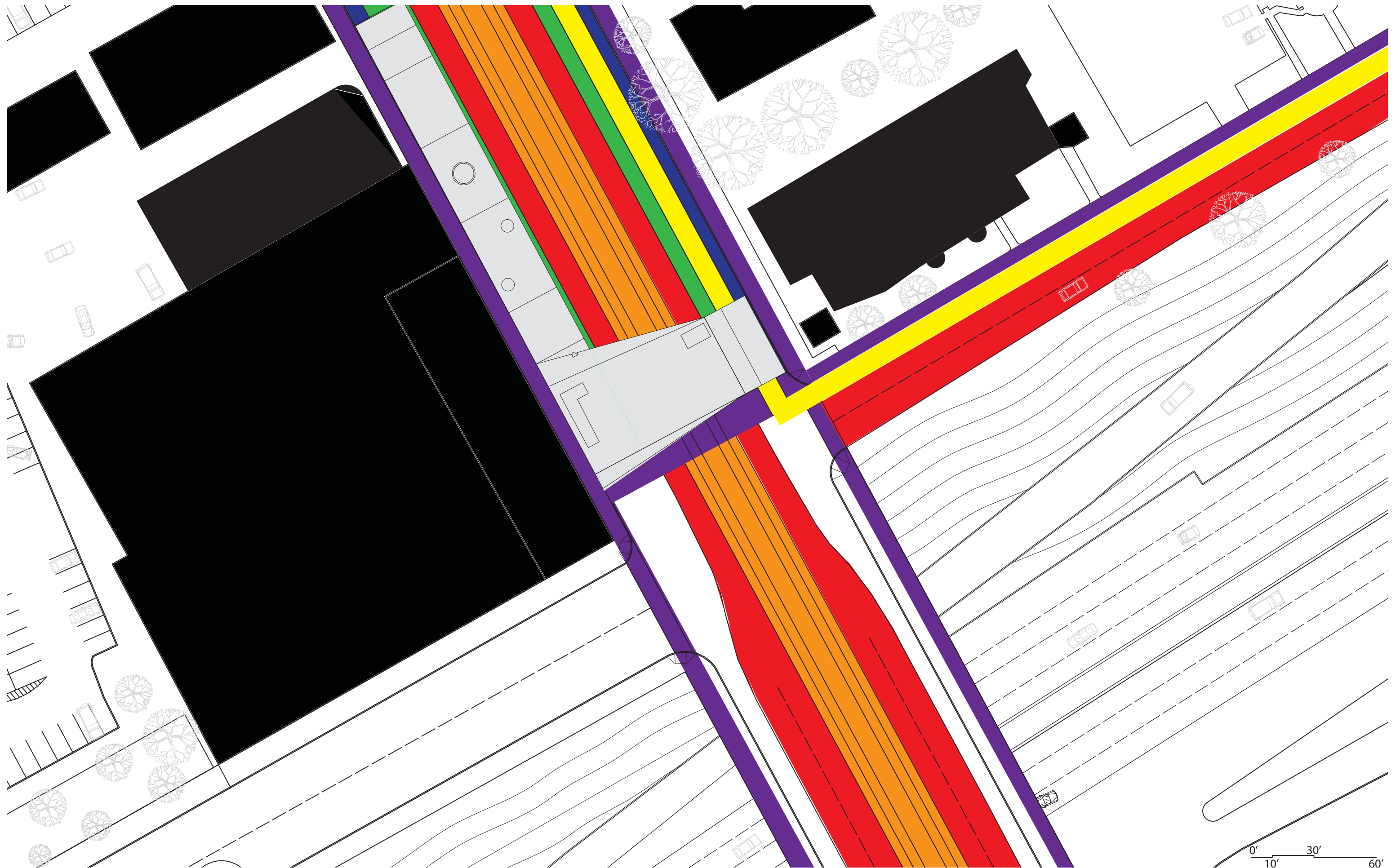
- Main Entrance
- Welcome Desk
- Light Rail Stop
- Cafe/Kitchen
- Bathroom
- General Storage
- Office Area
- Mechanical

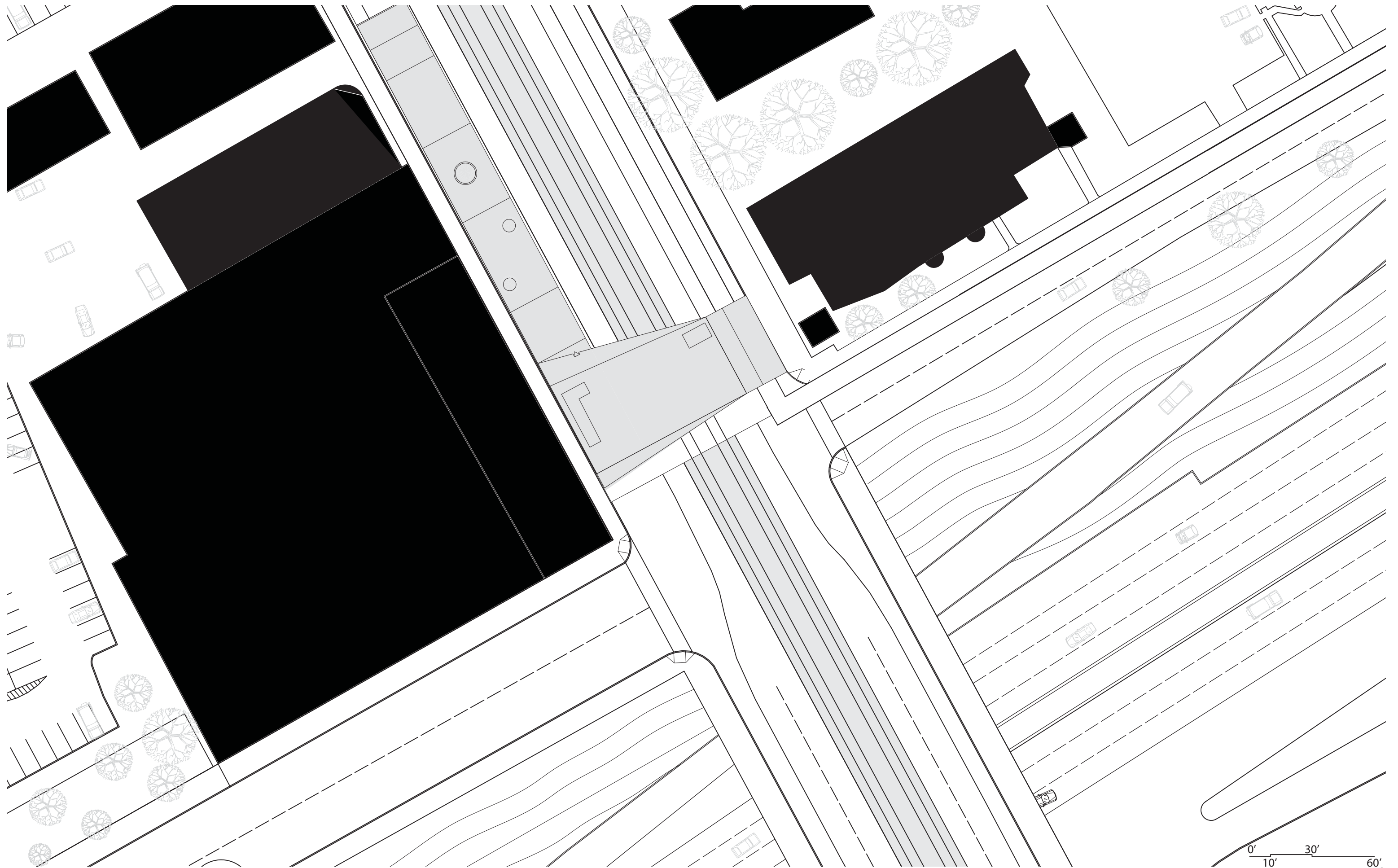




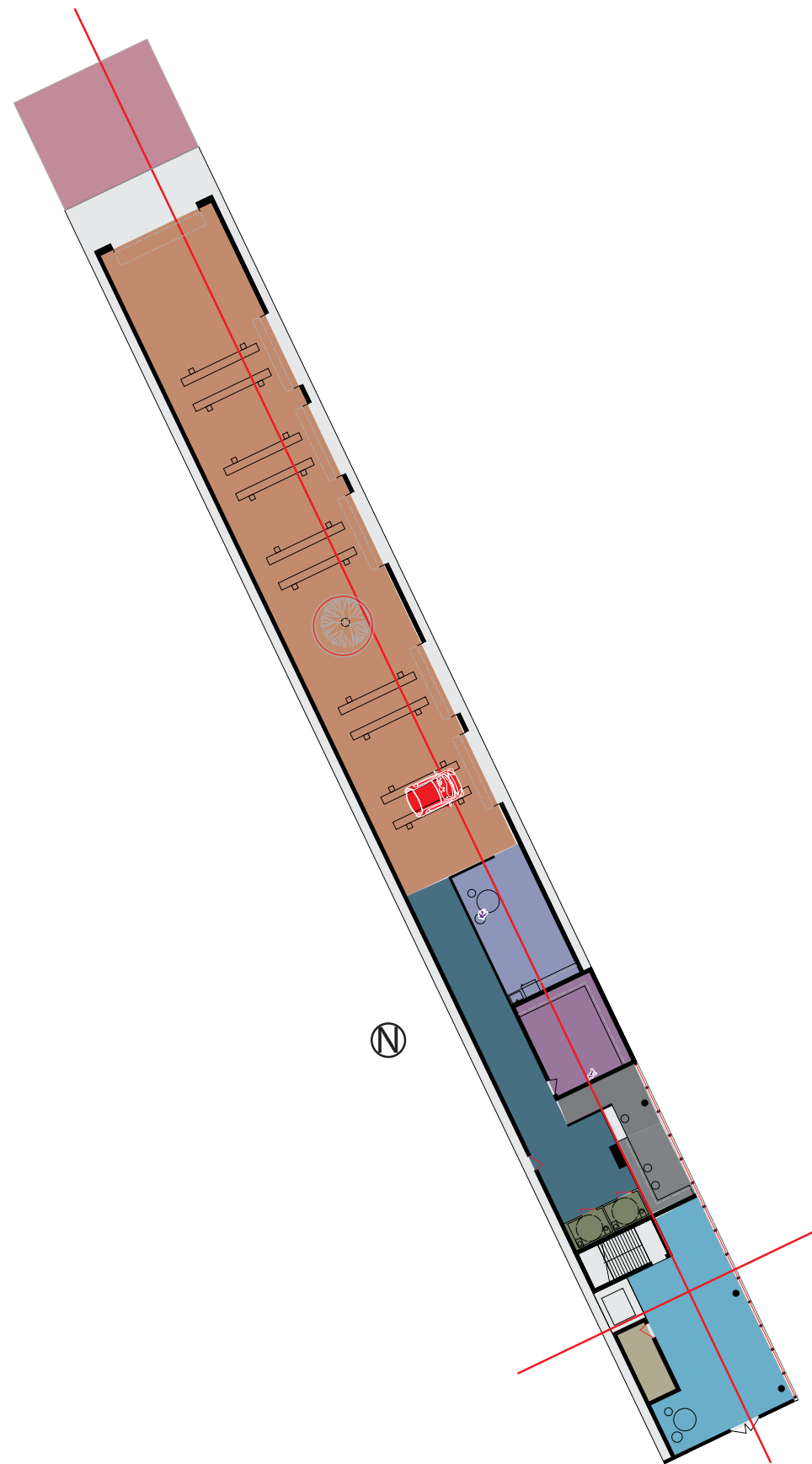


LEARN





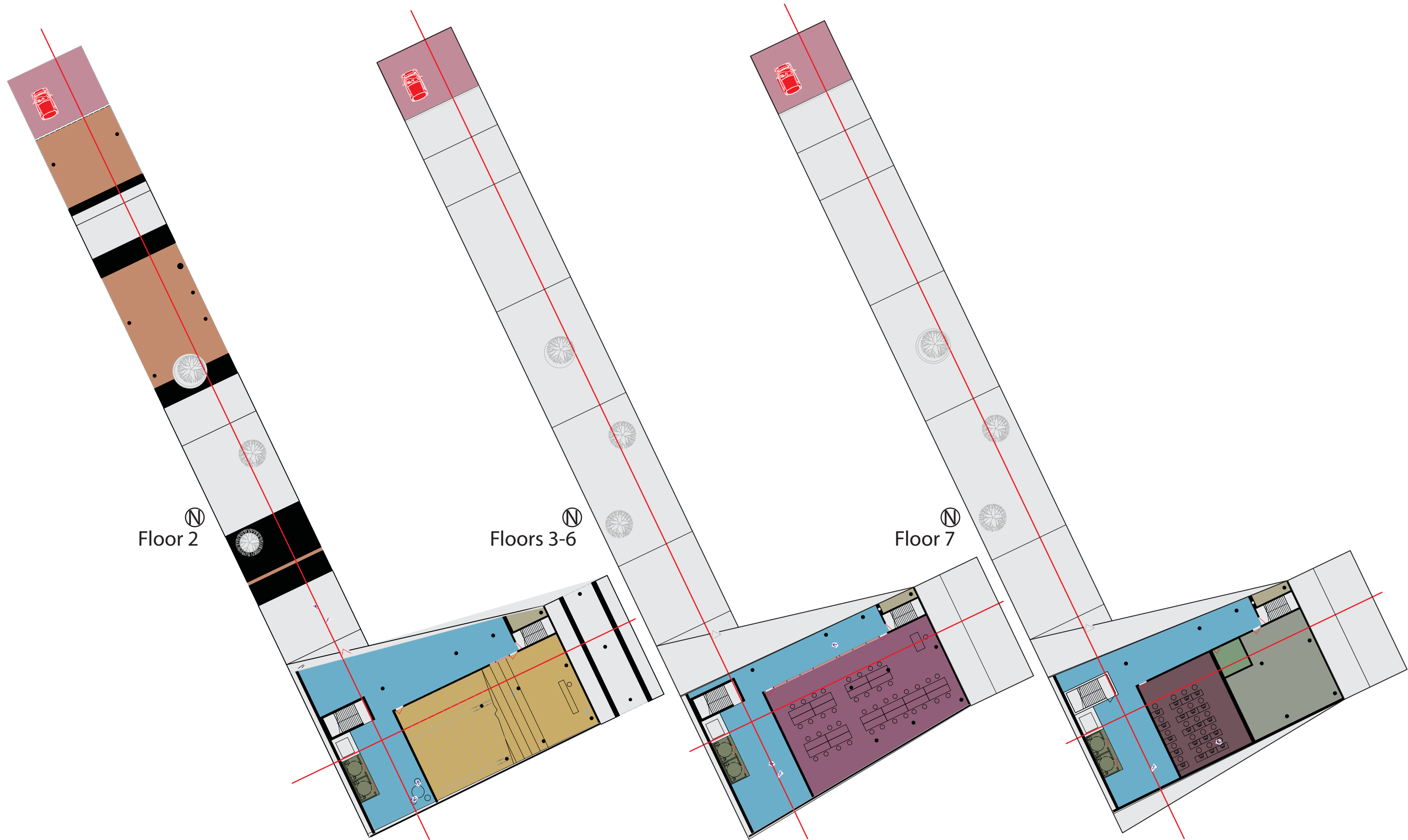
0' 10' 30' 60'
76



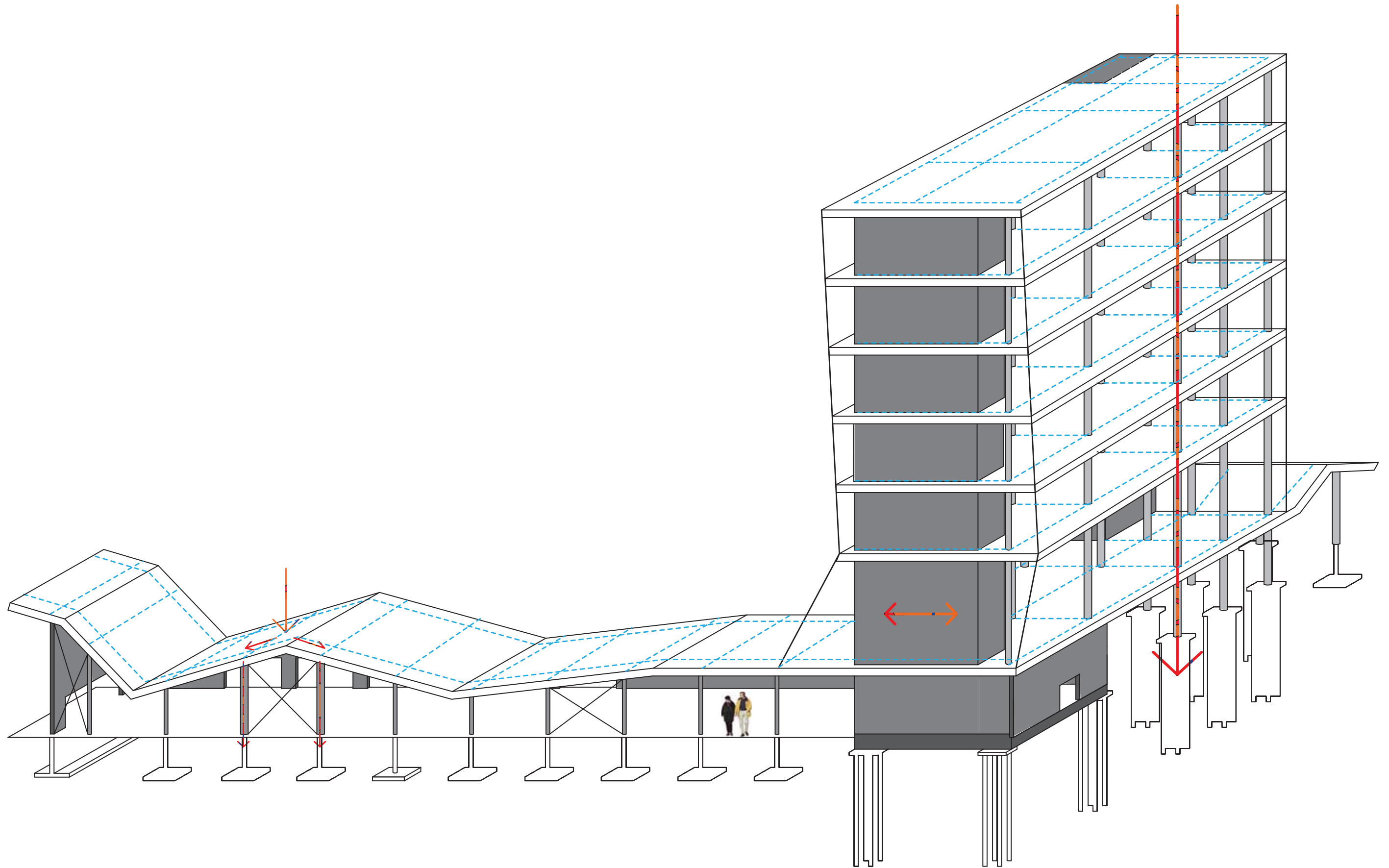
- Car Waiting Lot
- Service Area
- Parts Room
- Break Room
- Front Desk
- Waiting Room
- Manager's Office
- Bathroom
- School Lobby
- General Storage
- Main Lecture Hall
- Lab Room
- Computer Room
- Janitors Closet
- Mechanical Room

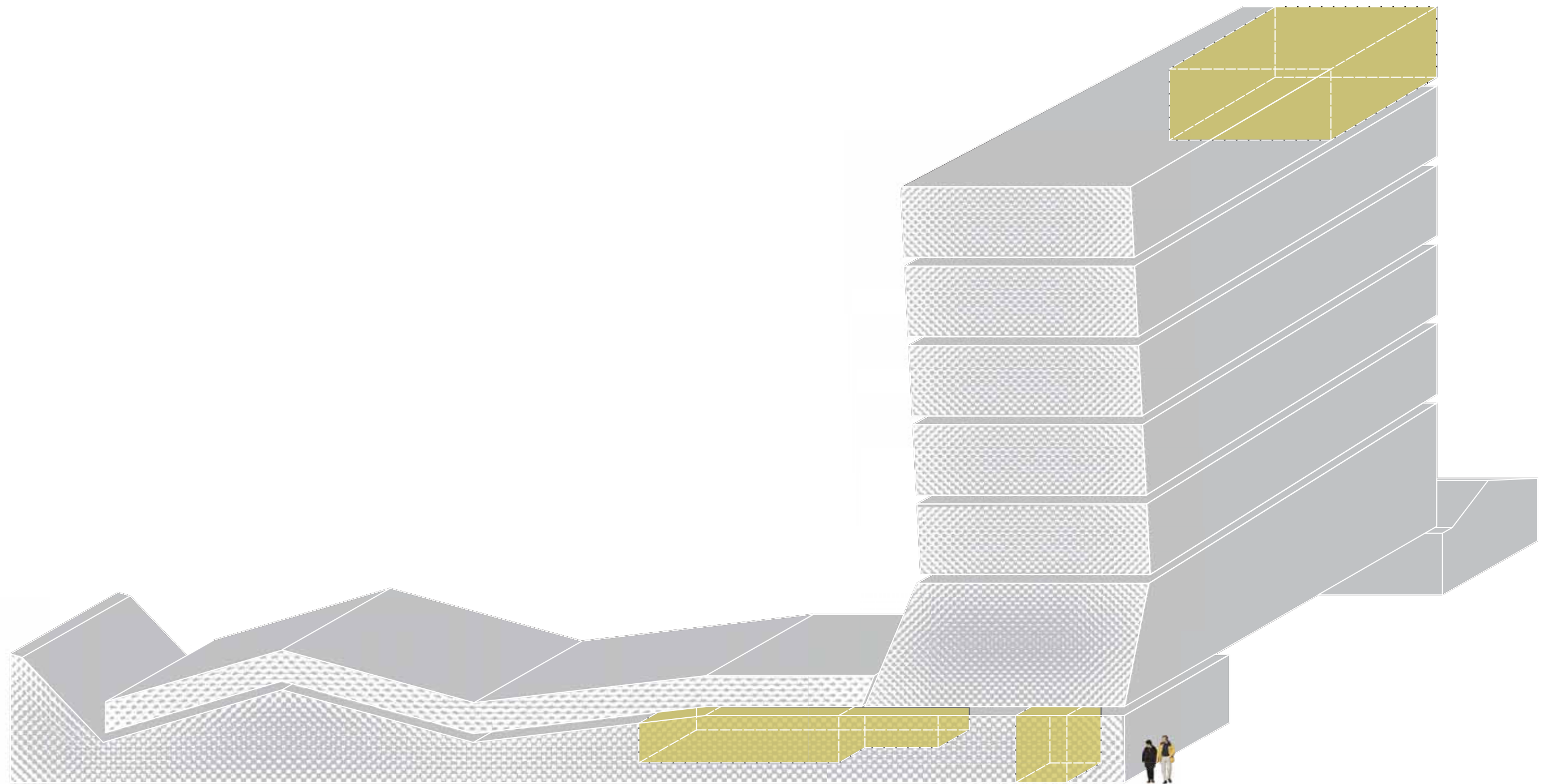
Alternative Vehicle School & Maintenance Center

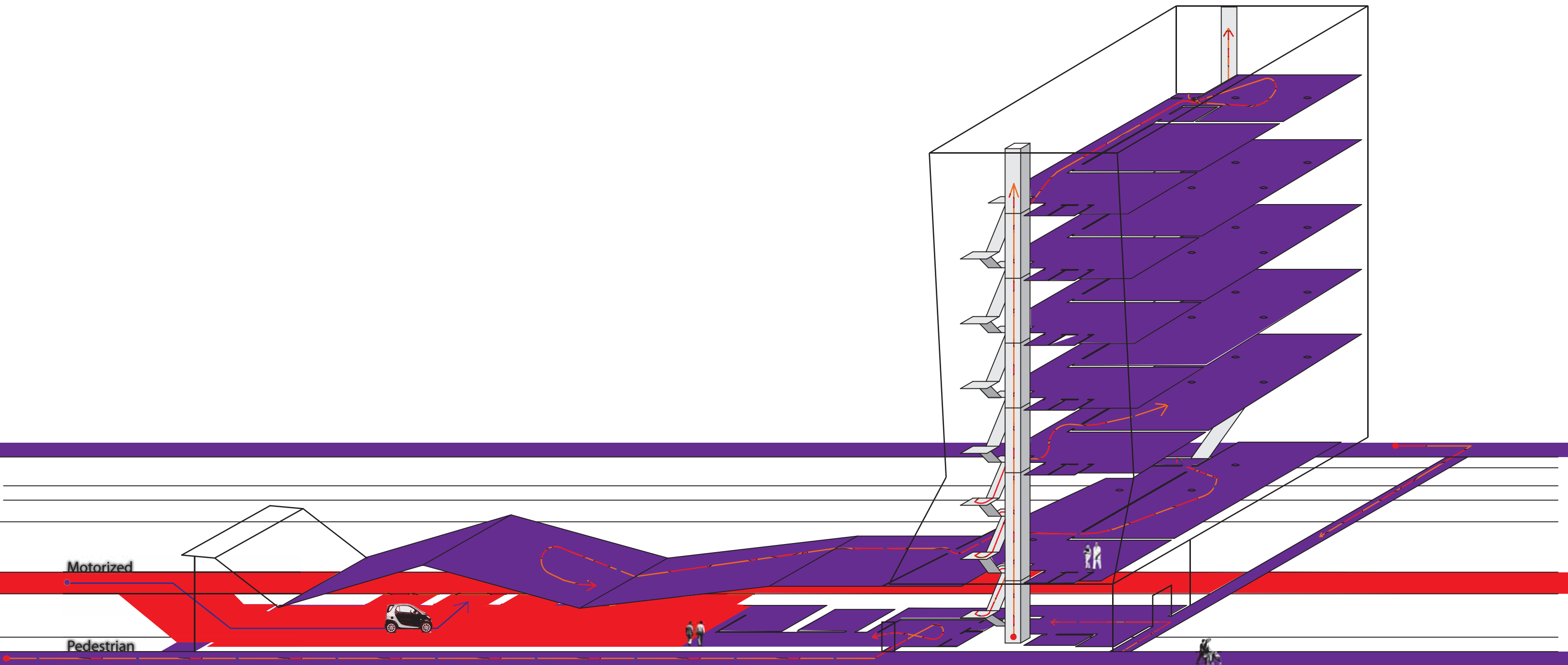
The program of this building is set up as a symbiotic relationship between the alternative vehicle mechanical shop on the ground floor and the trade school above, creating a new alternative energy work force. The mechanic shop not only can service new types of engines, but also works as a demonstration shop.





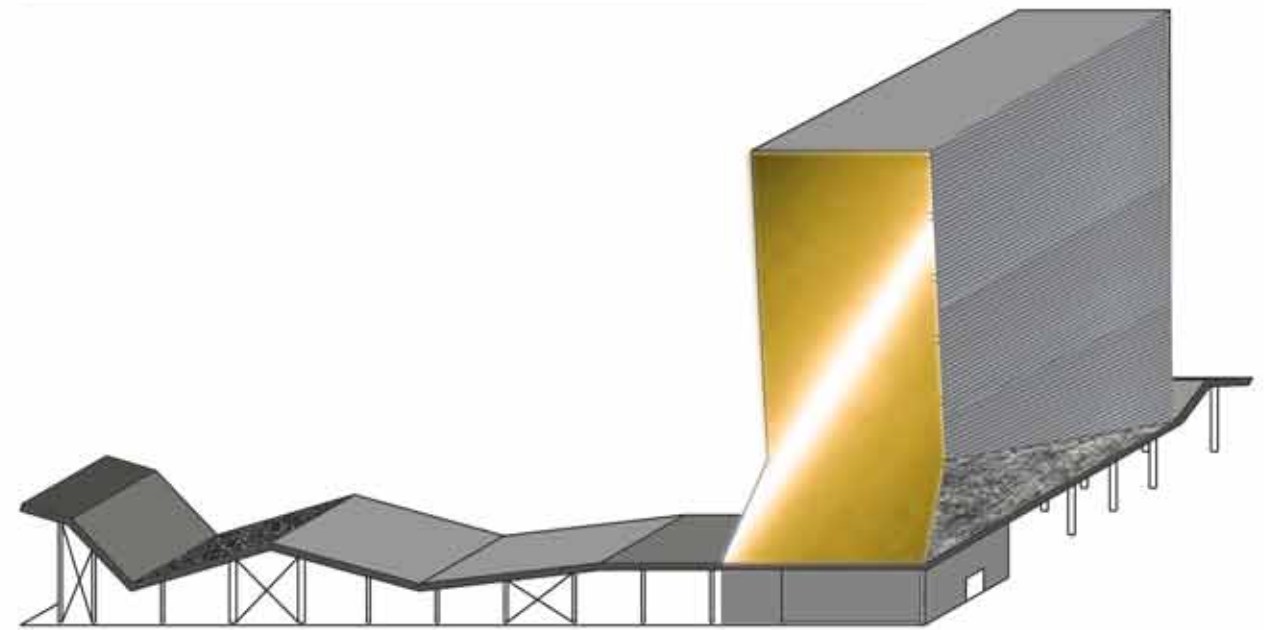
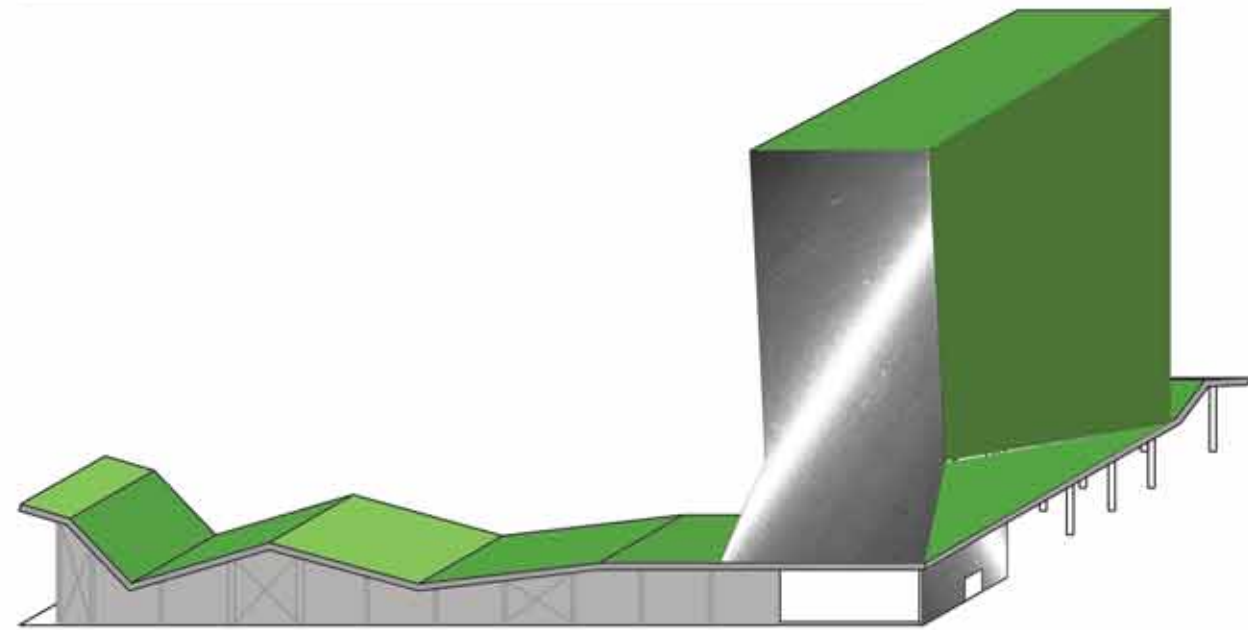
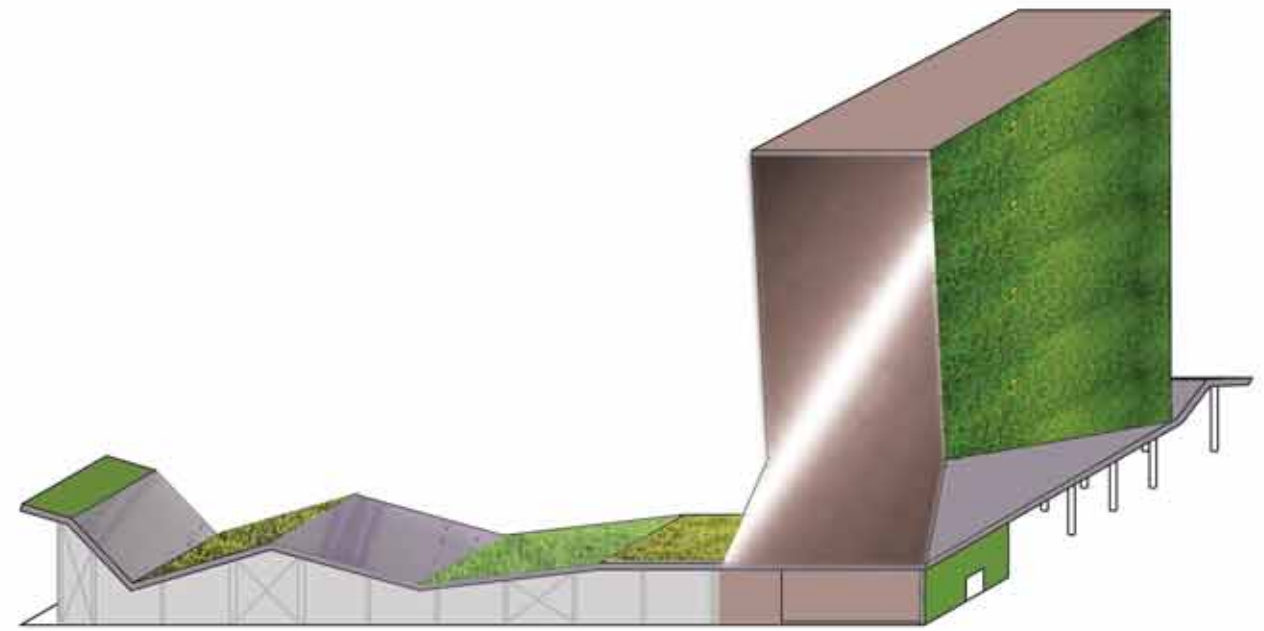
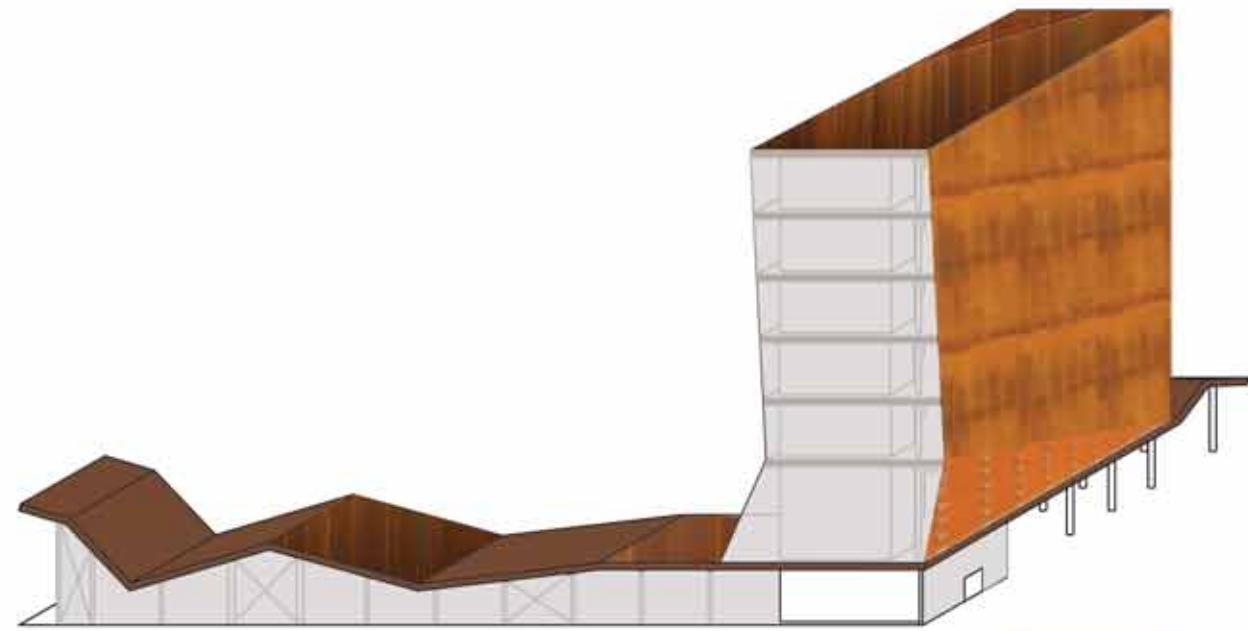
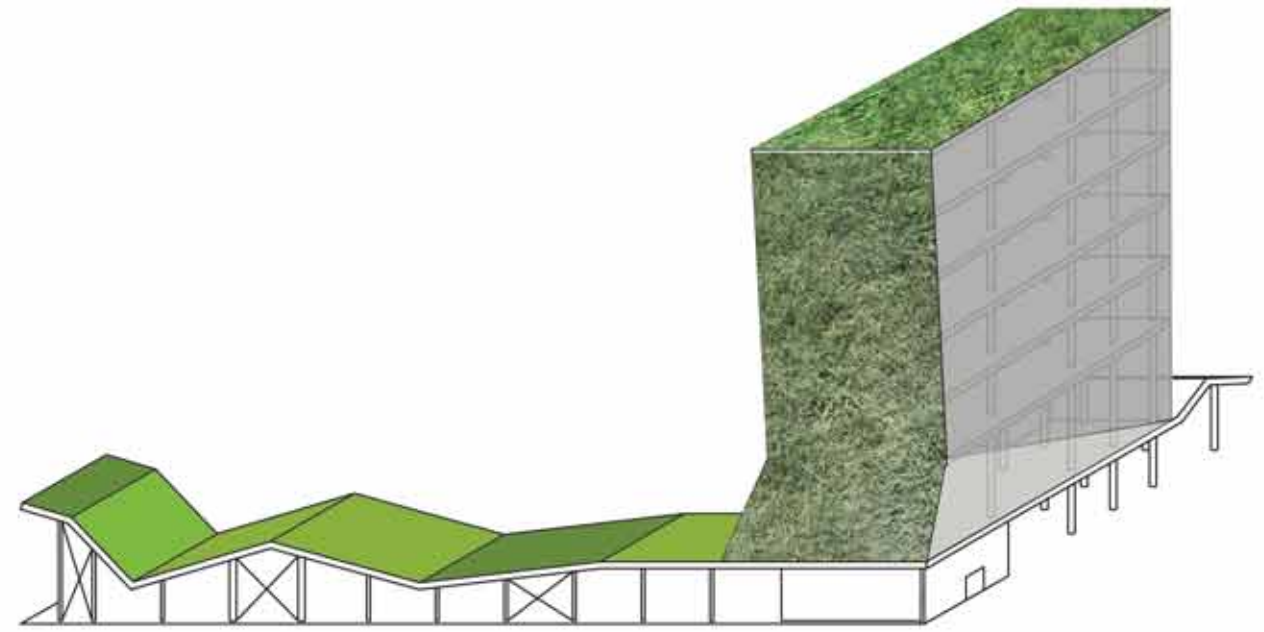
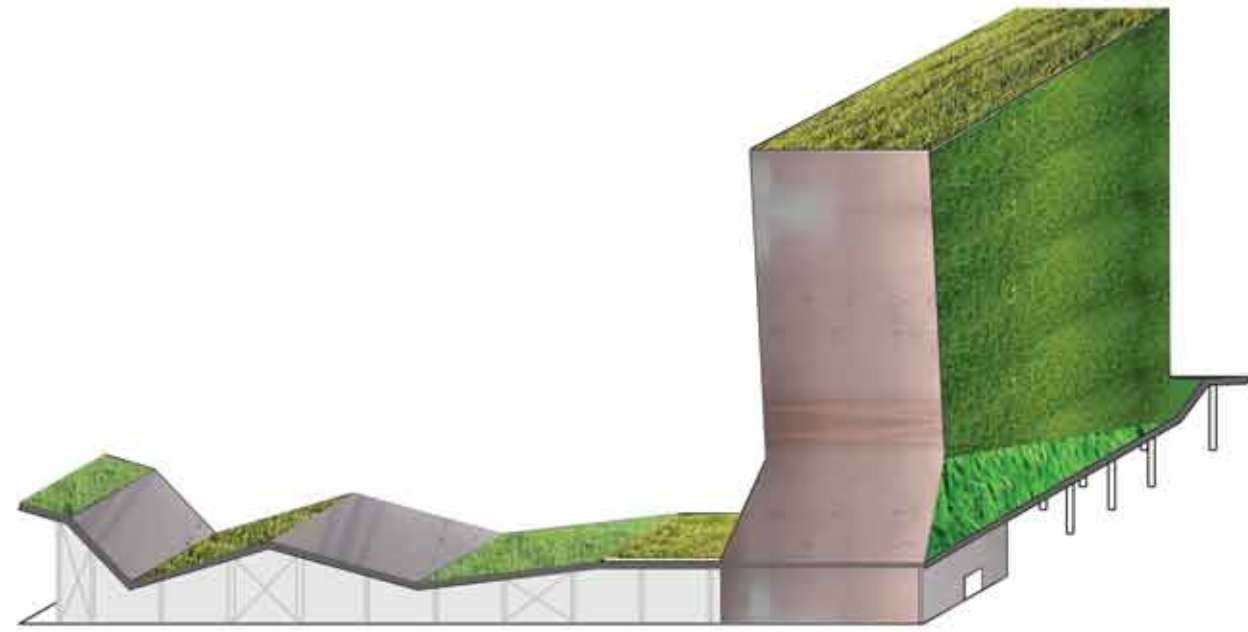






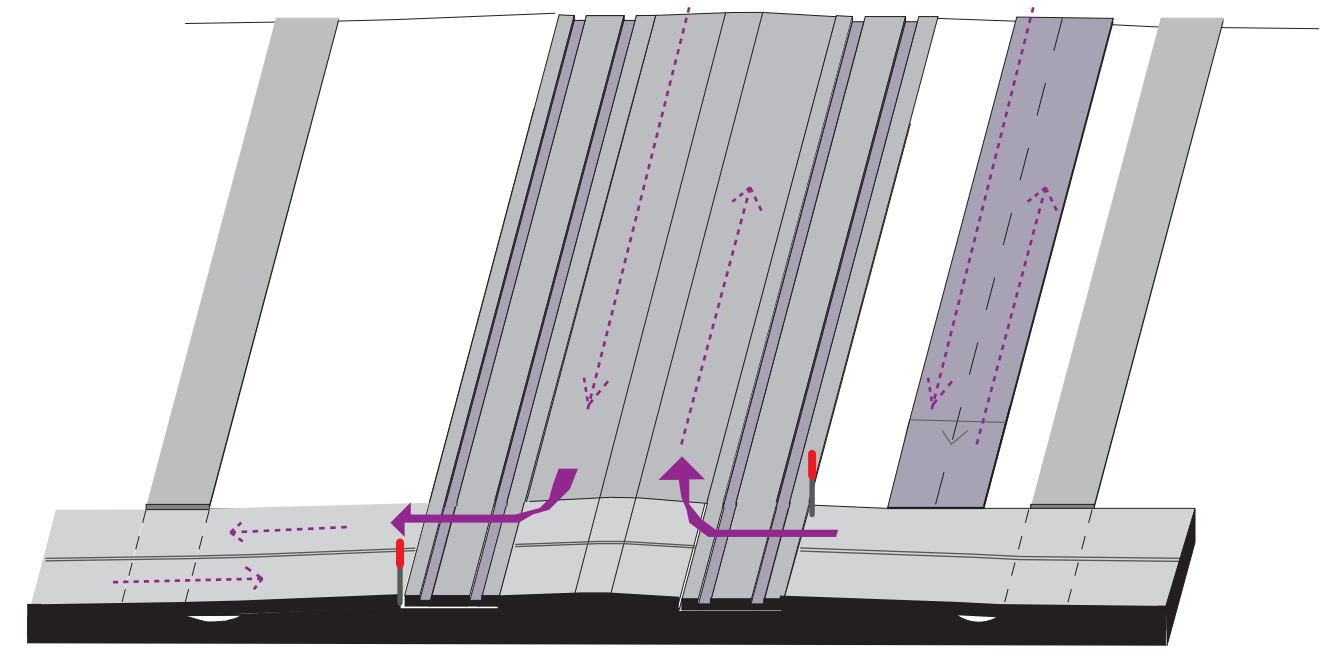
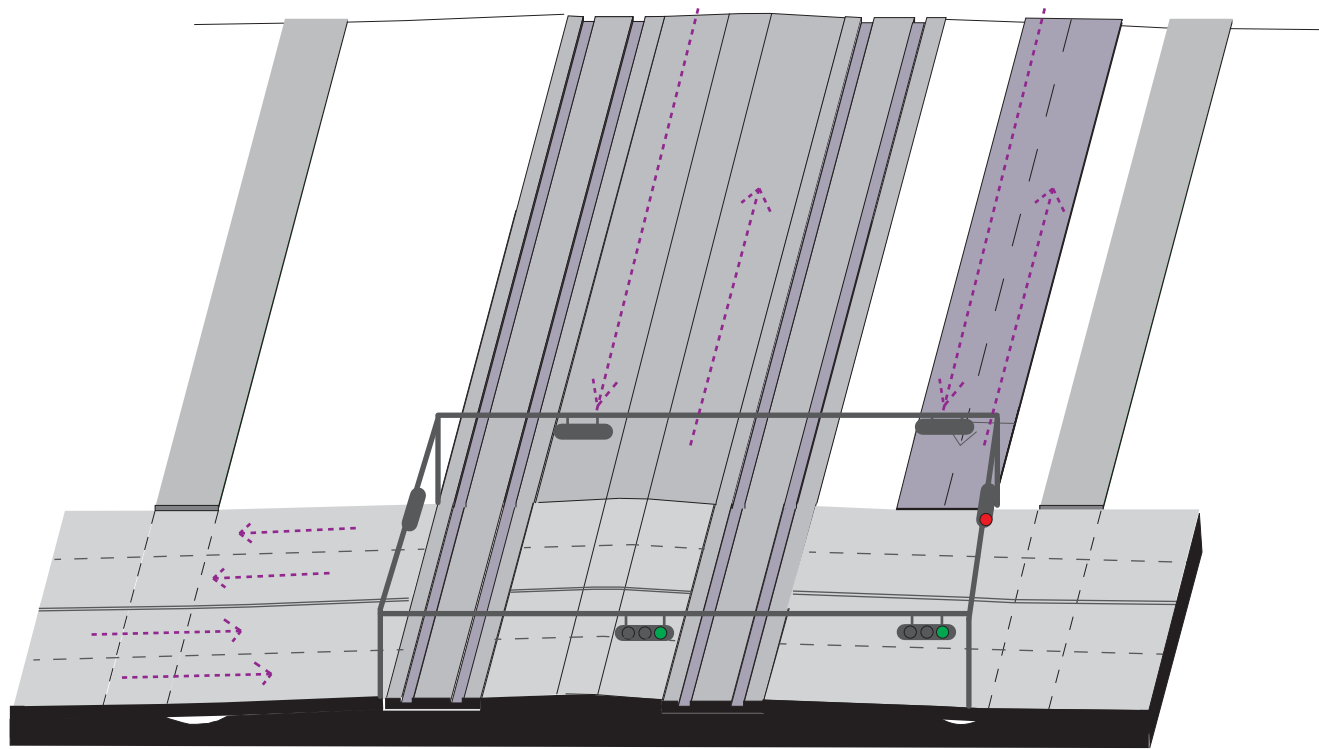
Motorized

Pedestrian

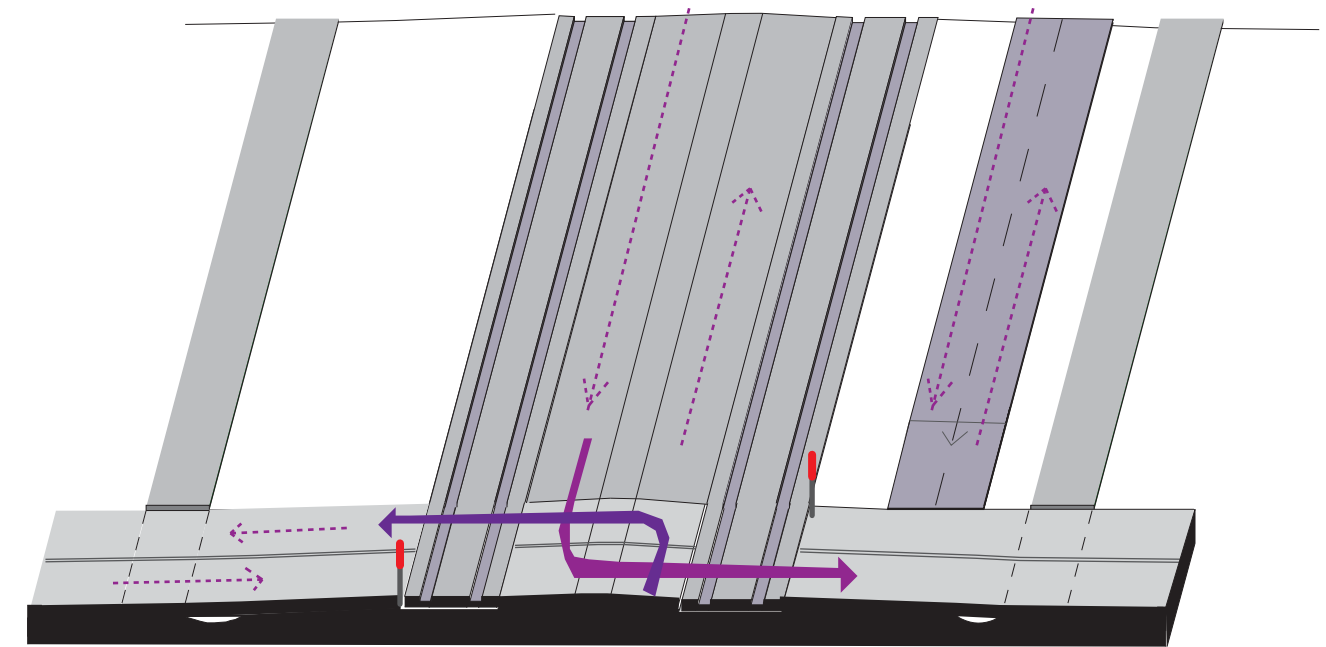
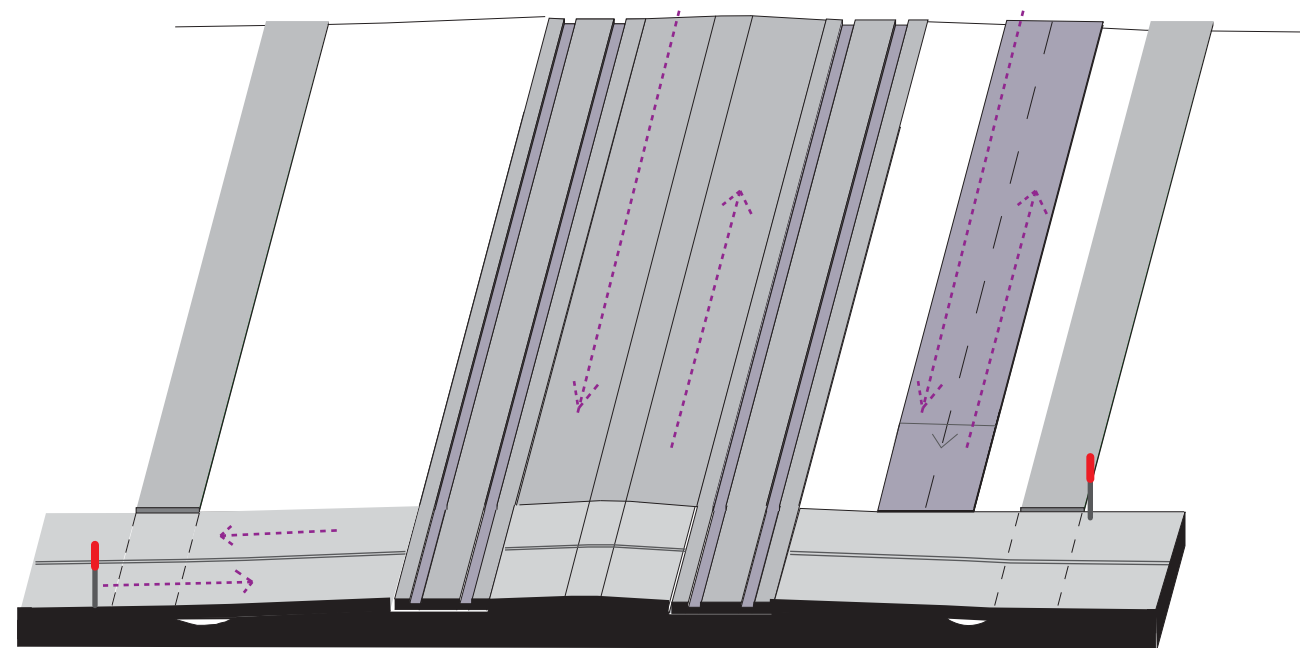




APPENDIX

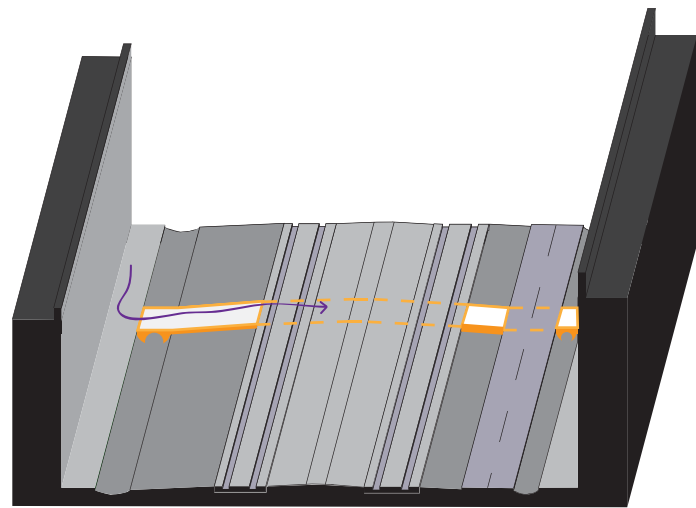


Major Crossing Streets could incorporate traffic signals to help with mass transit crossings as well as other motorized and non-motorized traffic.

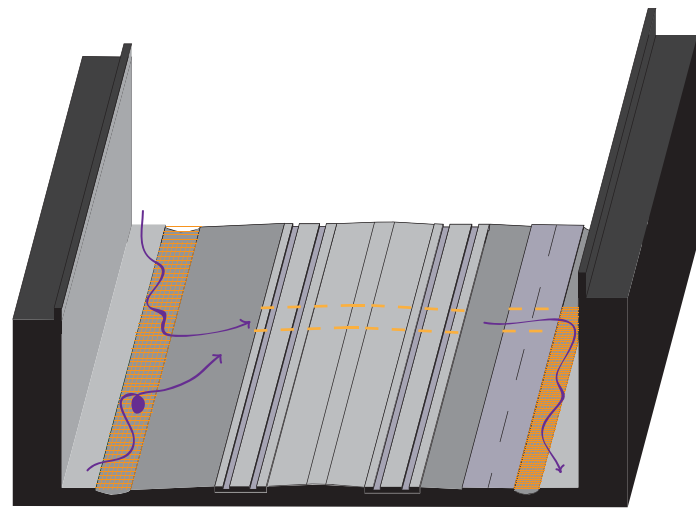


Smaller crossing streets could use simple stop signs for traditional traffic. Priority would be given to mass transit and alternative vehicles.

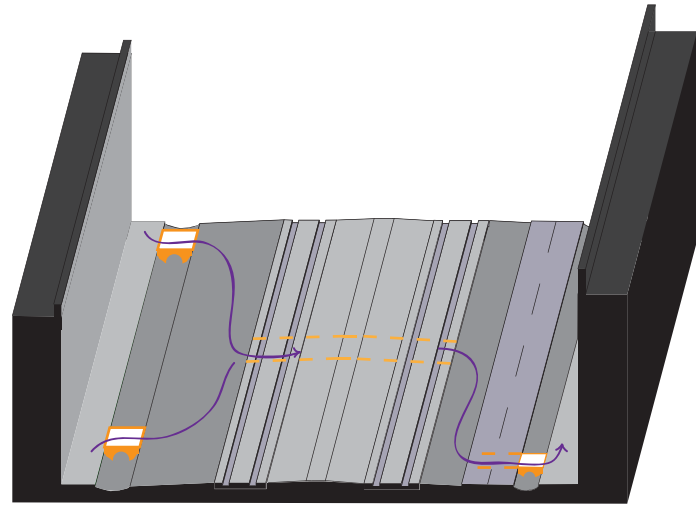
Right and Left Turns



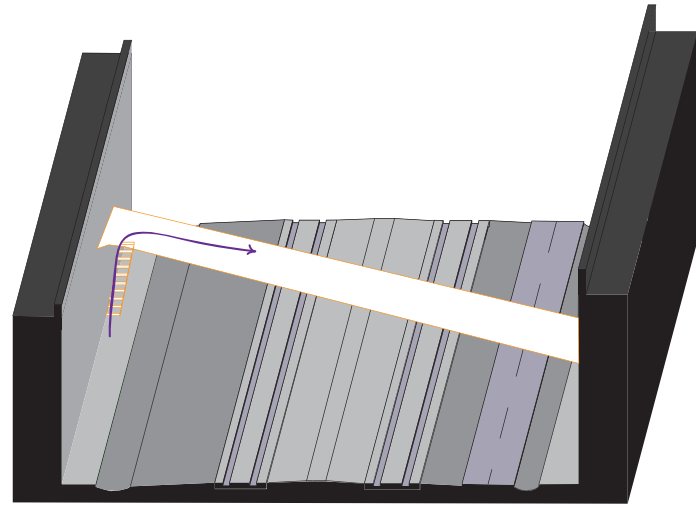
Path



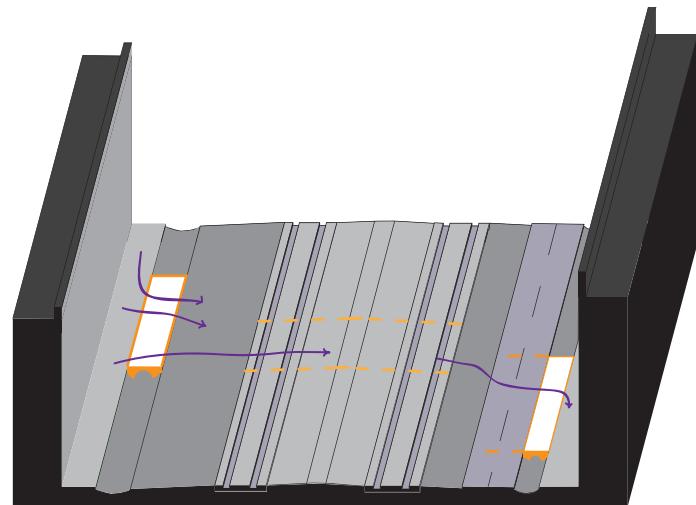
Permeable Cover



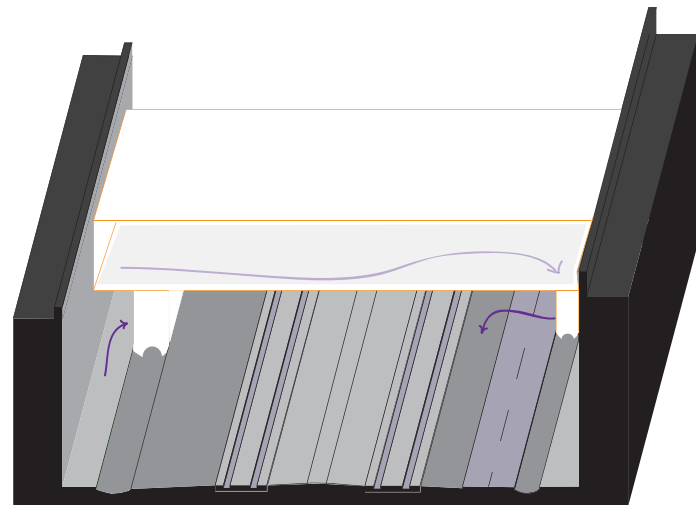
Random Bridges



Bridge

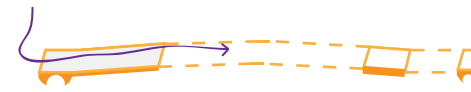


Expanded Crossing Areas

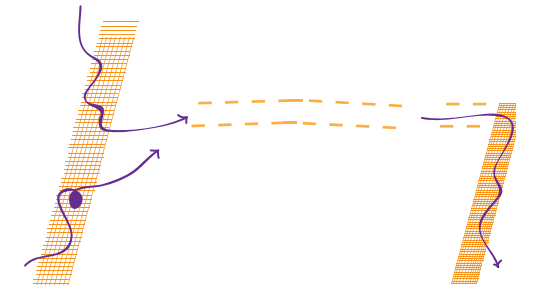


Architecture as Path

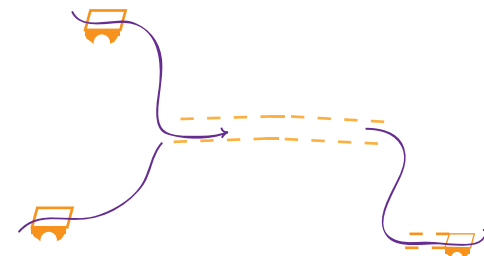
Pedestrian Traffic



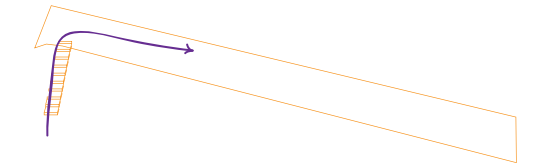
Path



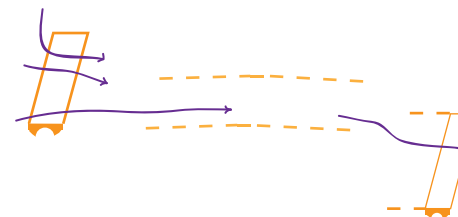
Permeable Cover



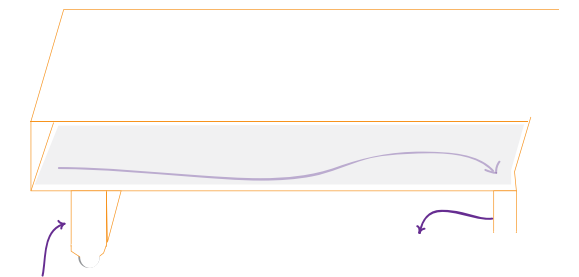
Random Bridges



Bridge

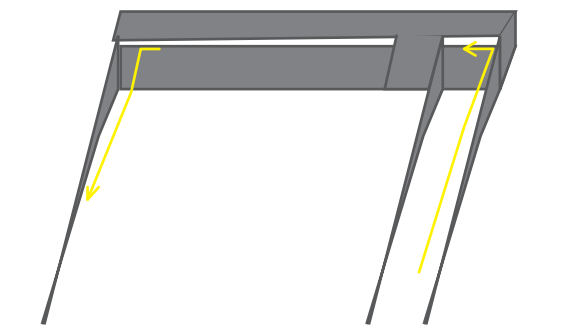
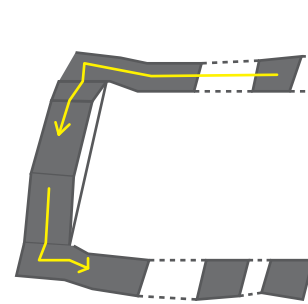
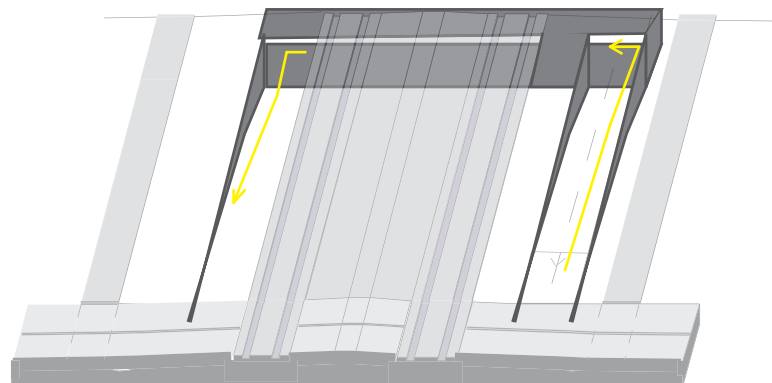
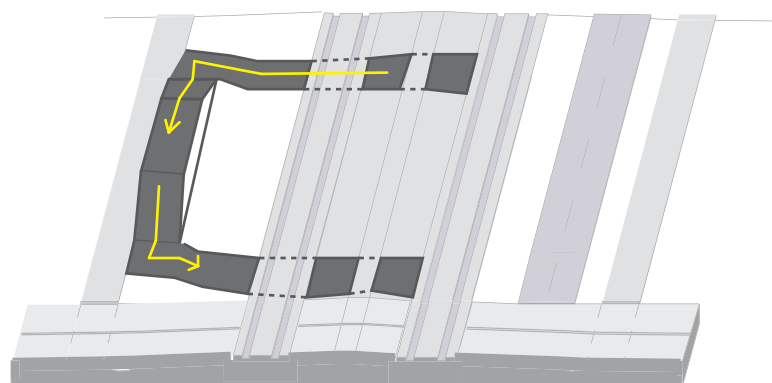
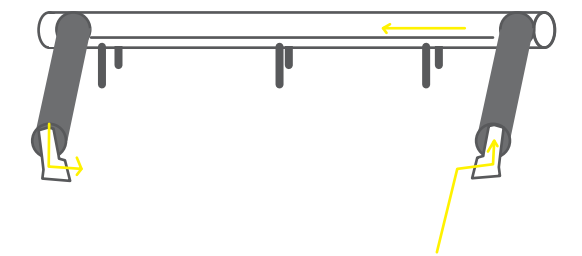
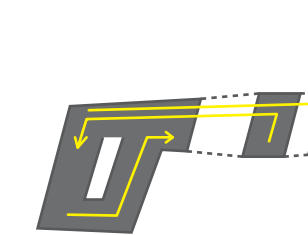
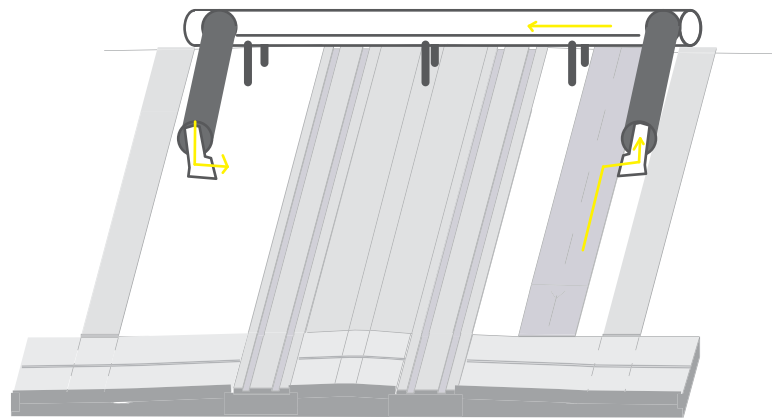
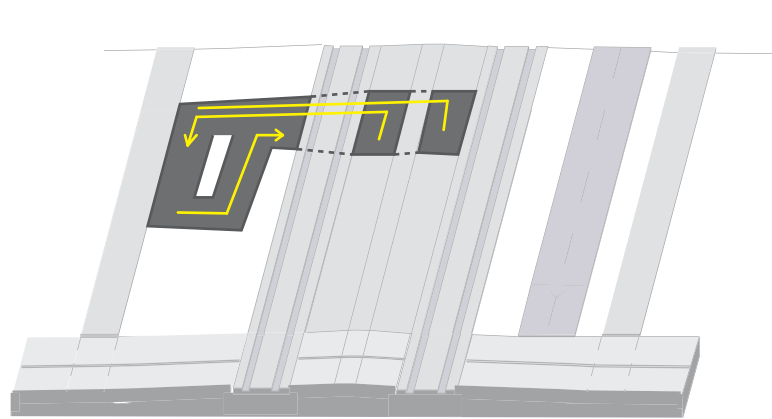
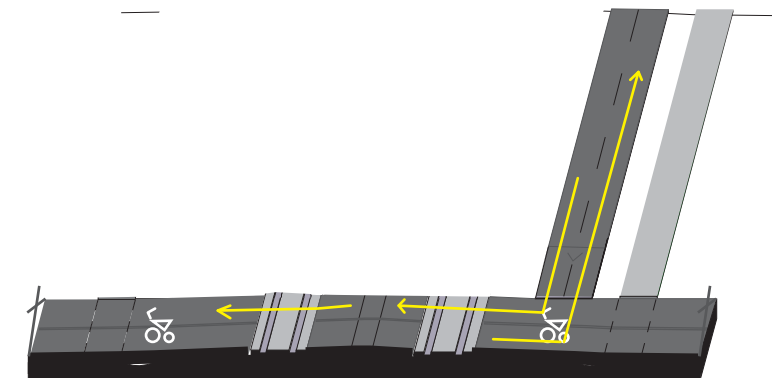
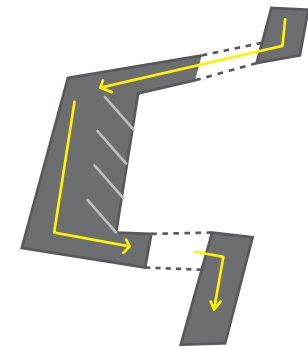
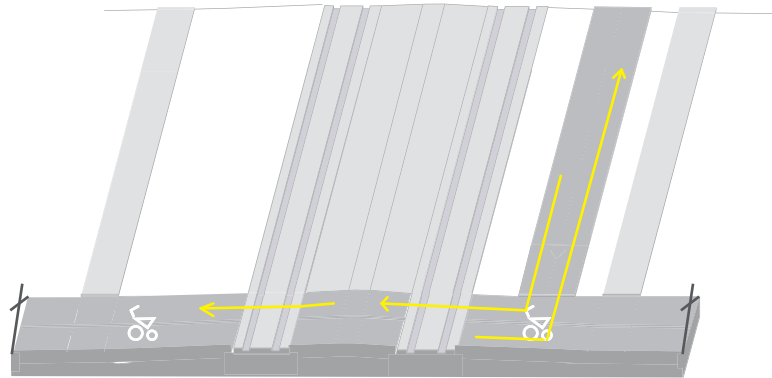
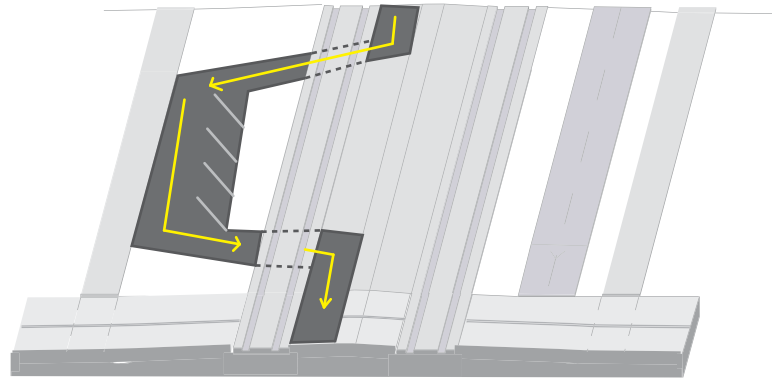
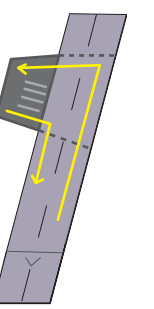
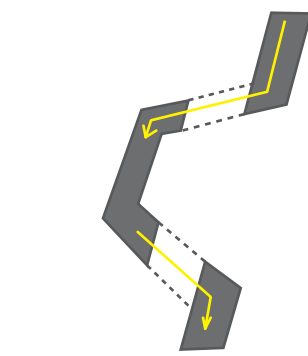
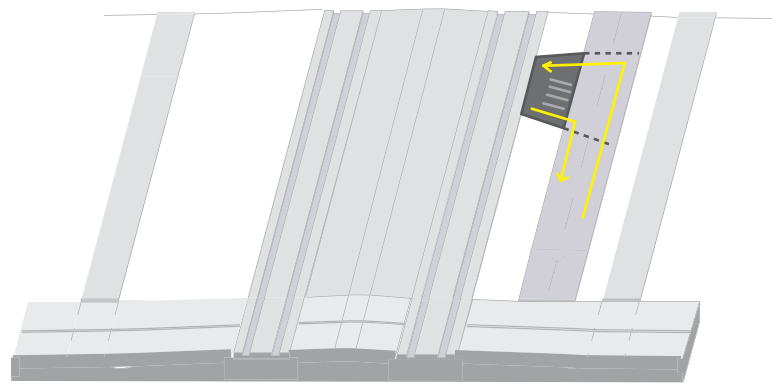
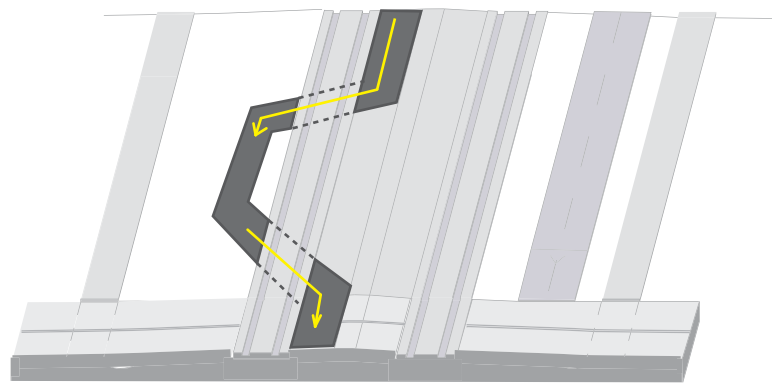


Expanded Crossing Areas



Architecture as Path

Pedestrian Traffic

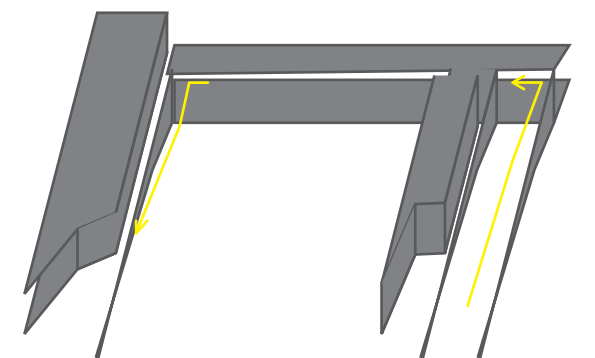
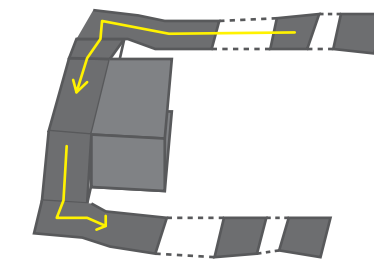
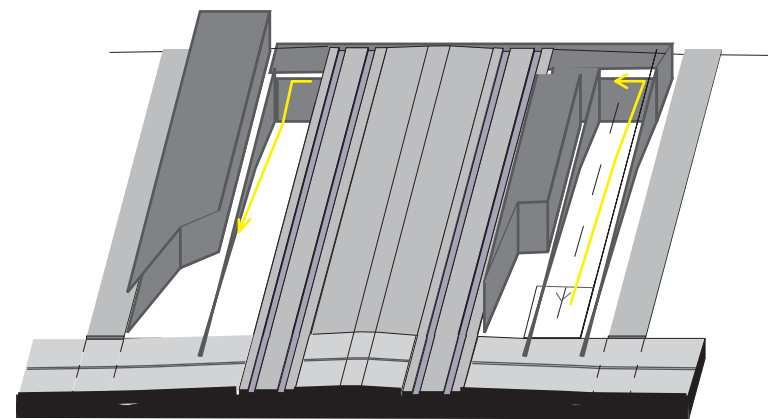
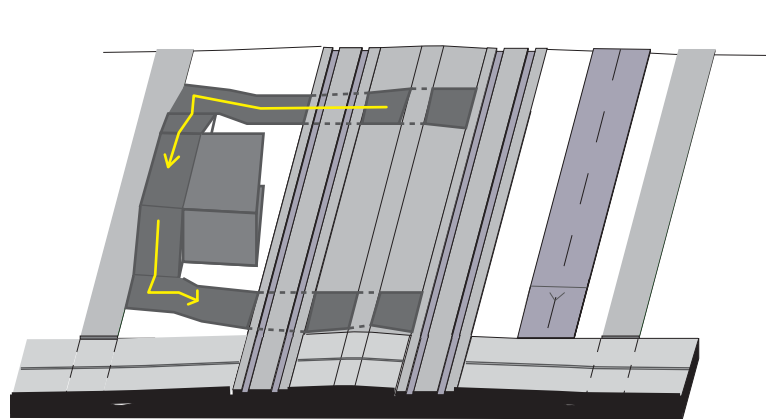
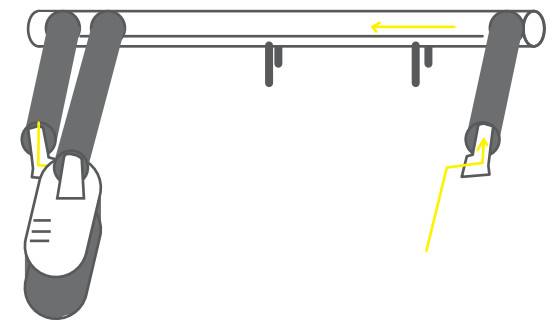
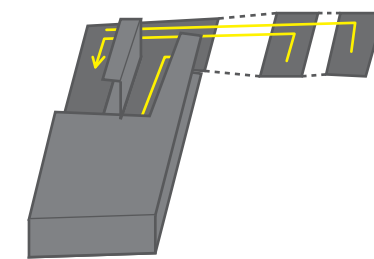
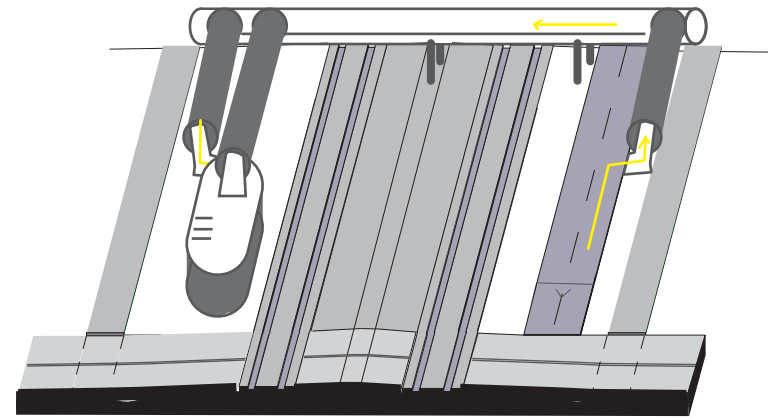
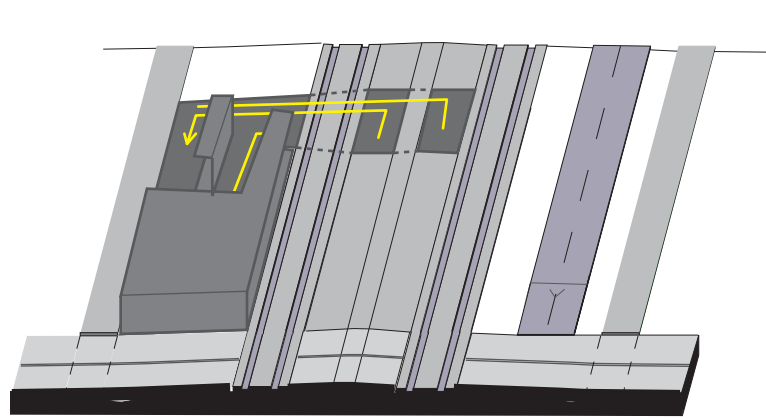
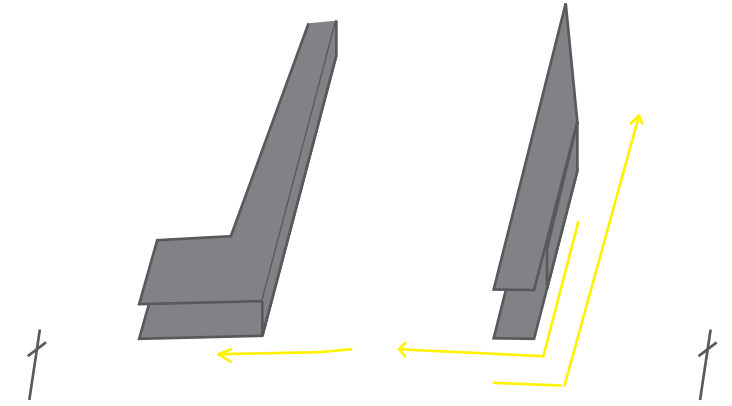
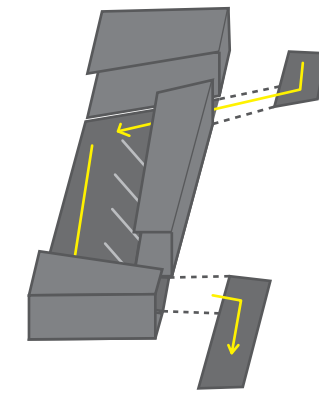
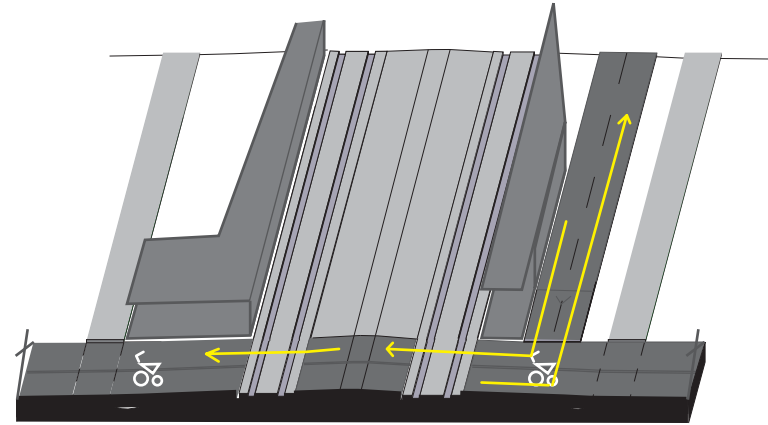
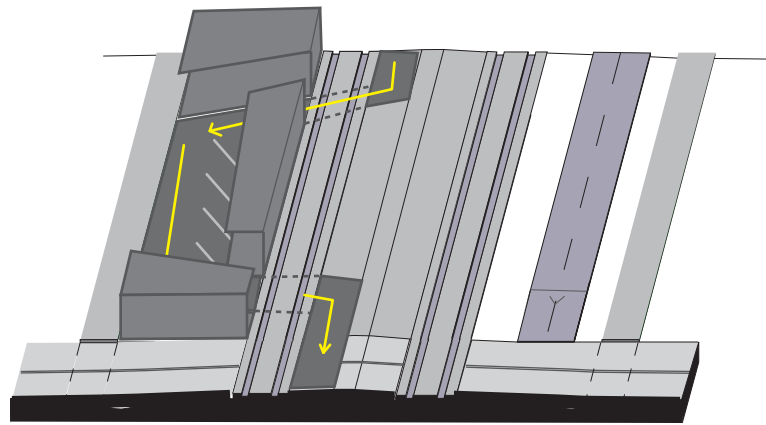
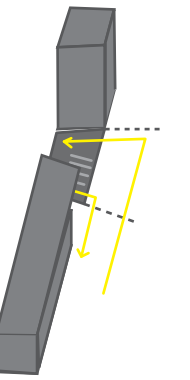
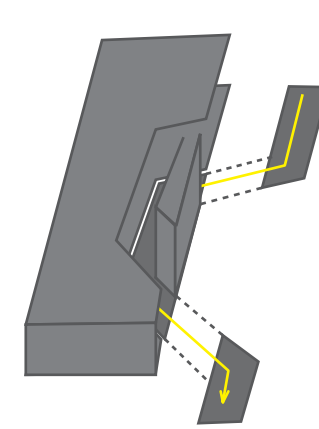
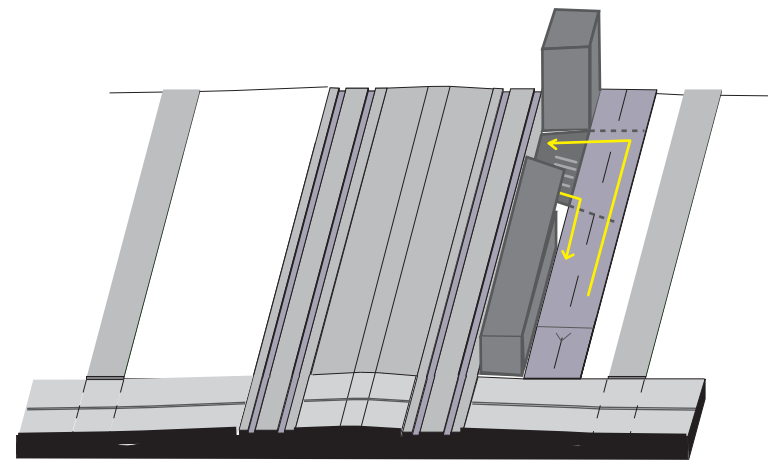
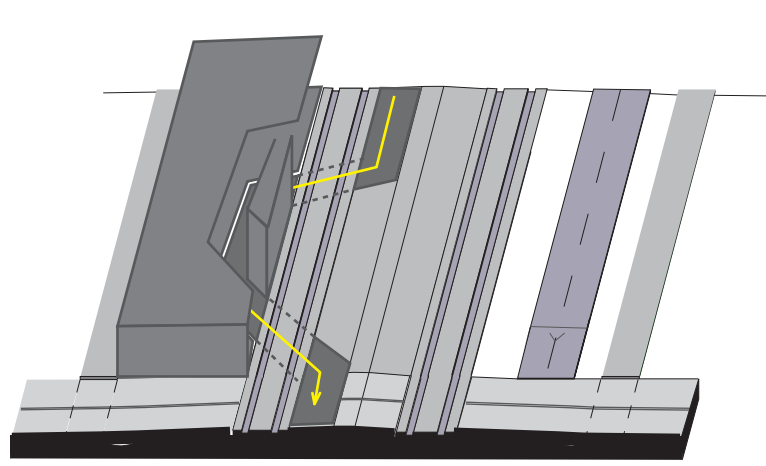


Program Access(Motorized)

Program Access(Non-Motorized)

Program Access(Motorized)

Program Access(Non-Motorized)

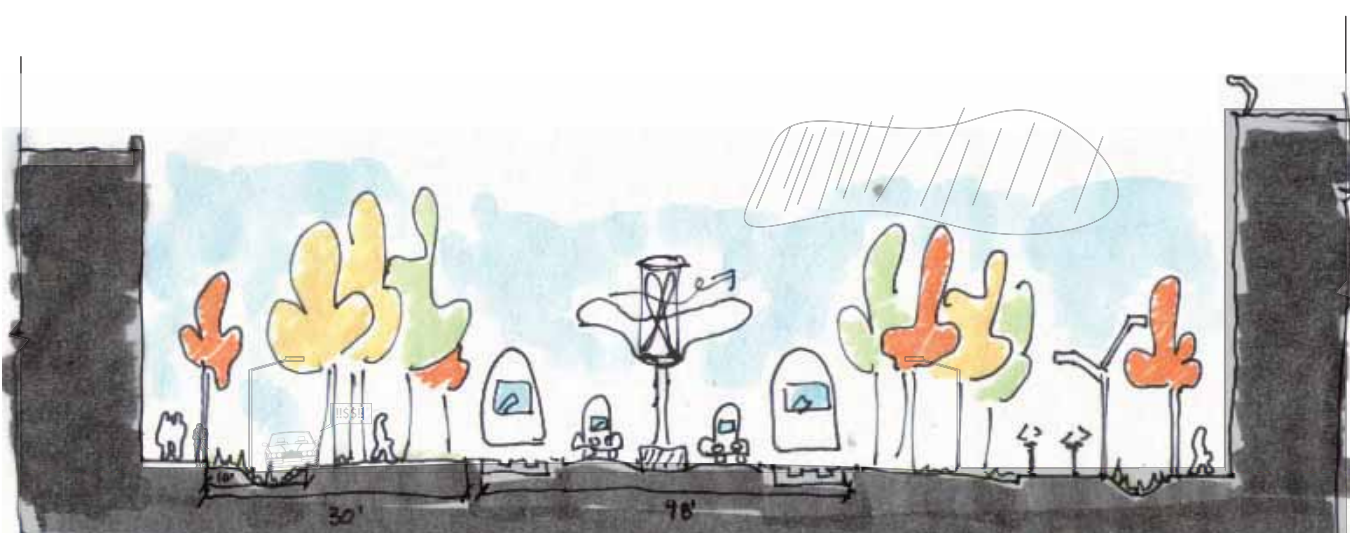
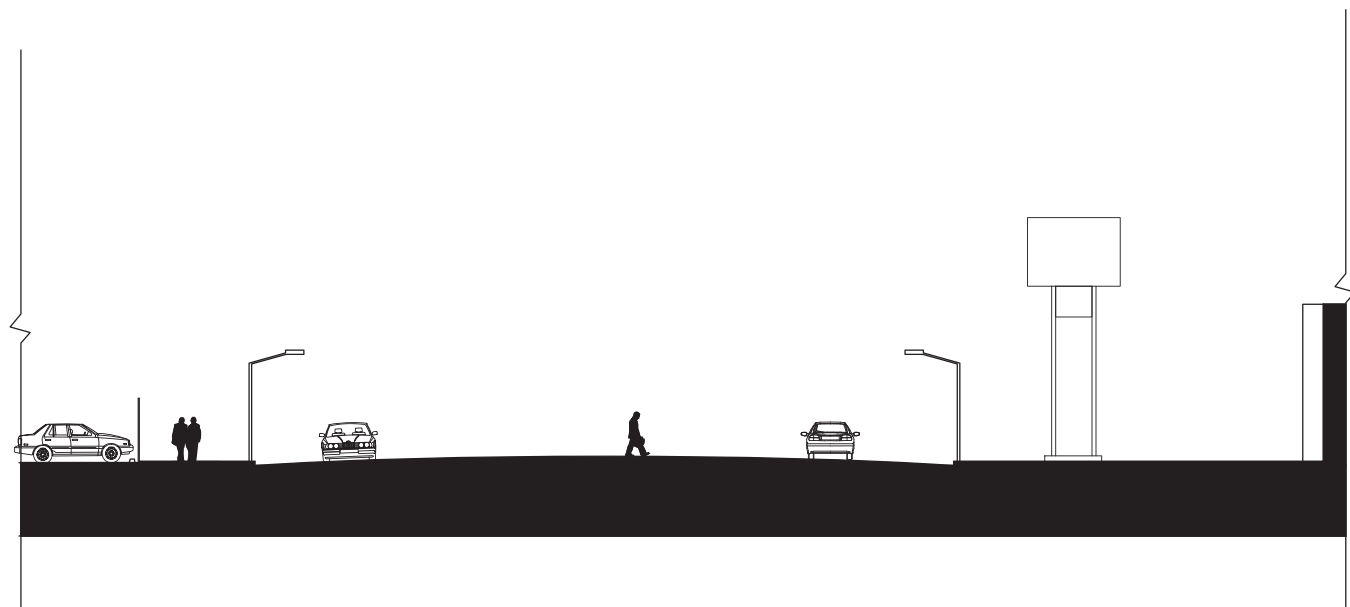
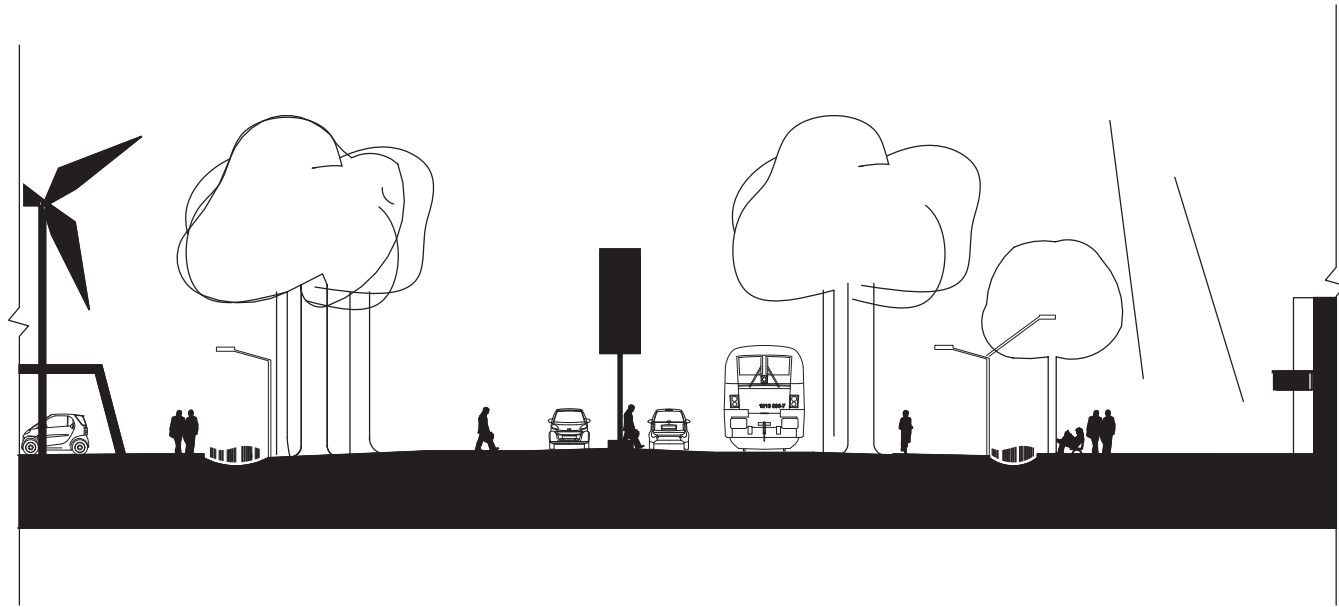
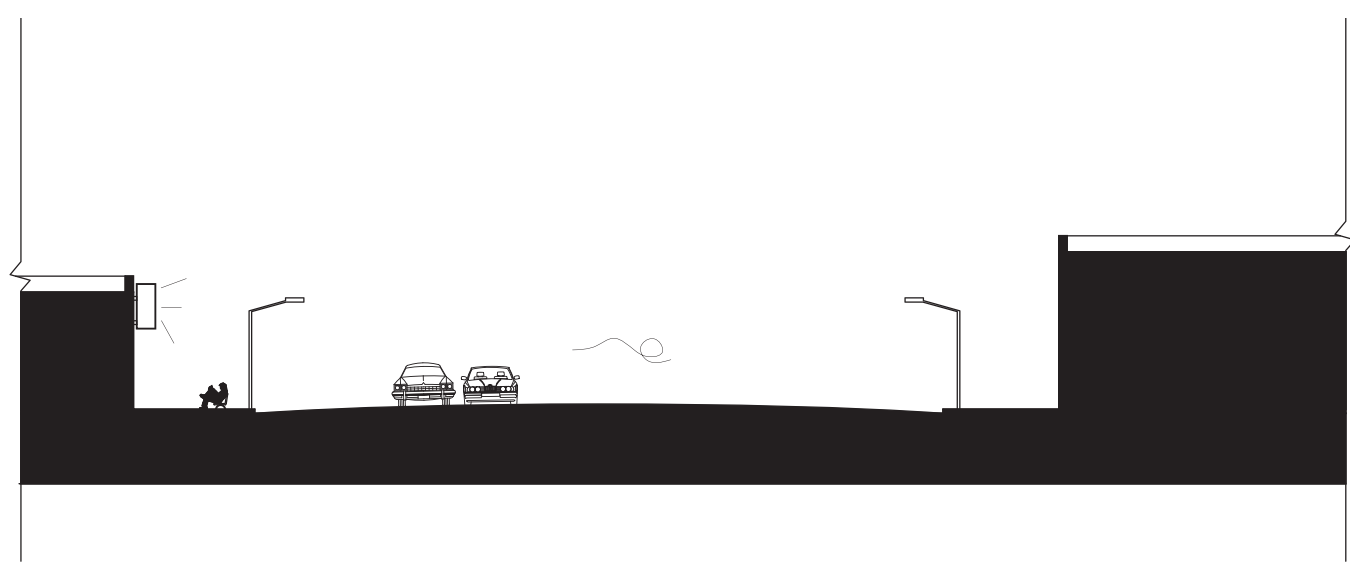
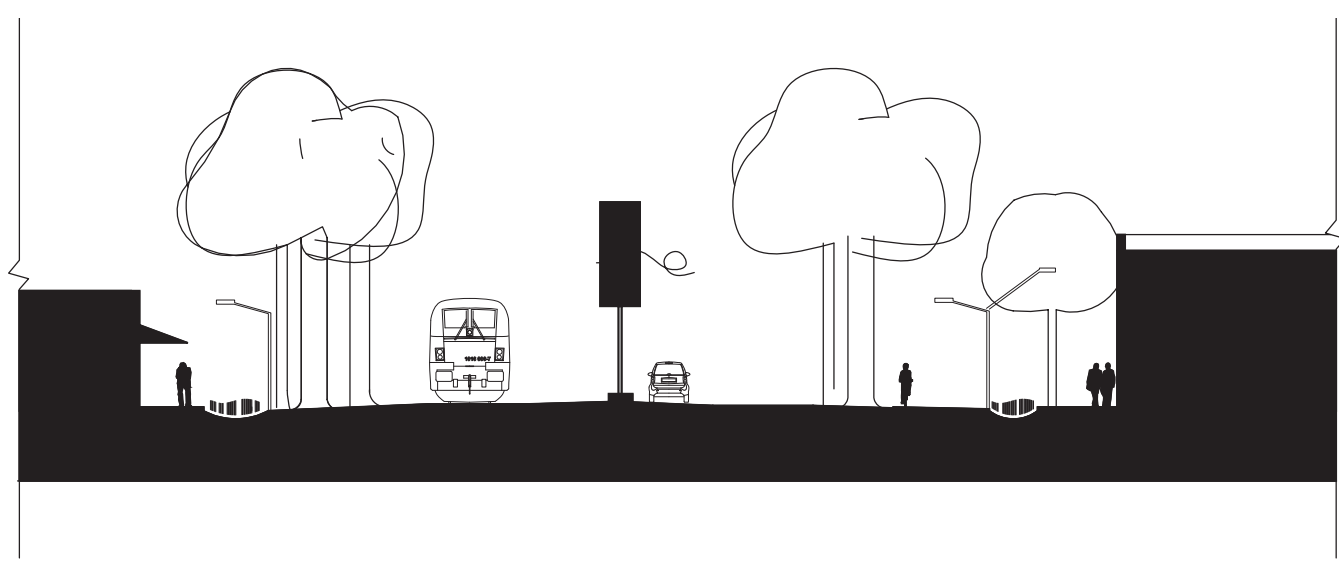


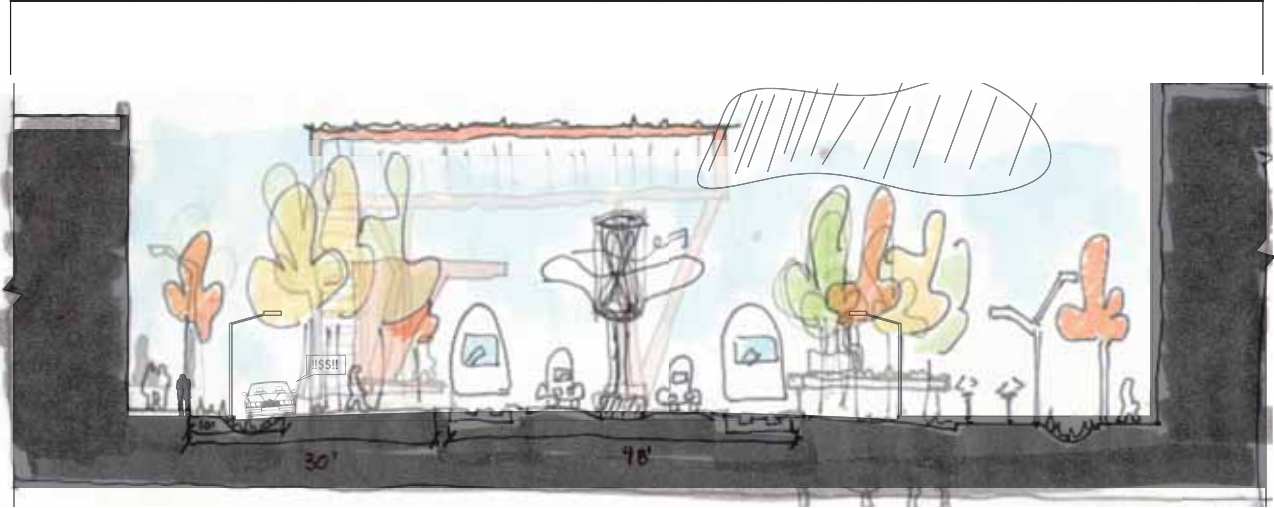
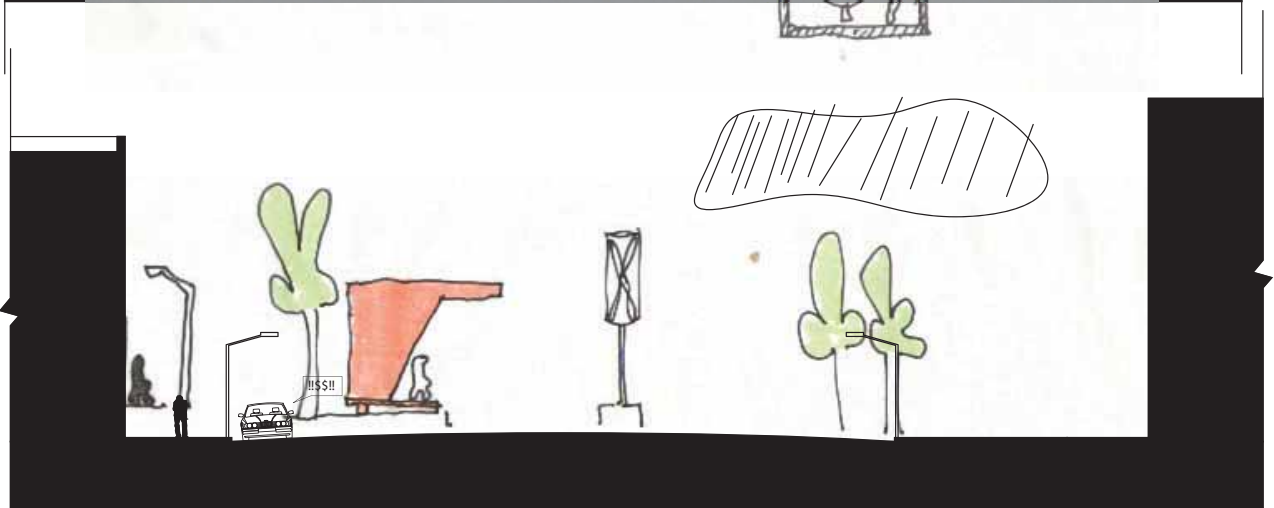
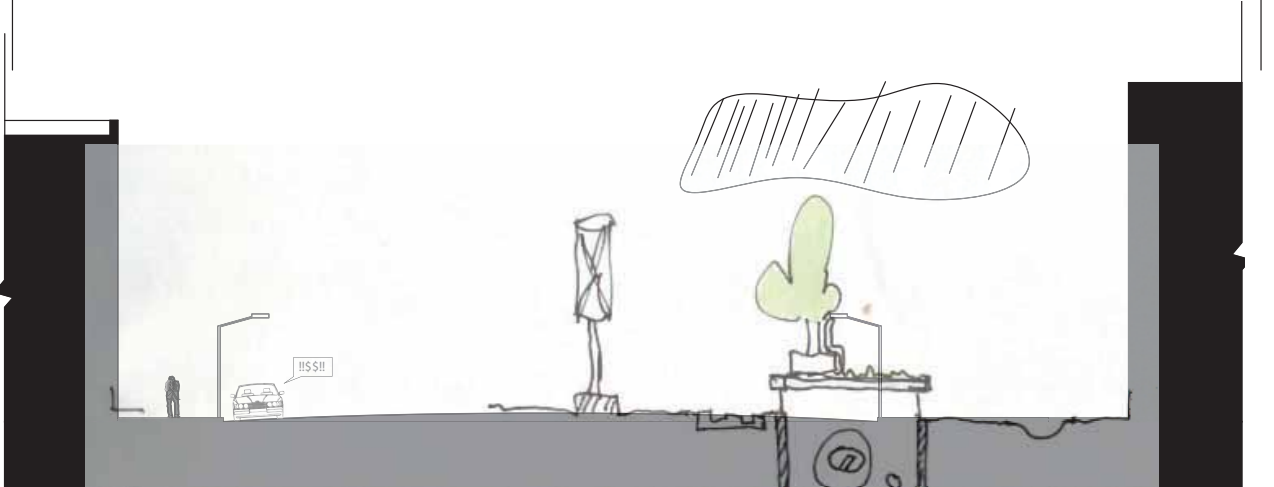
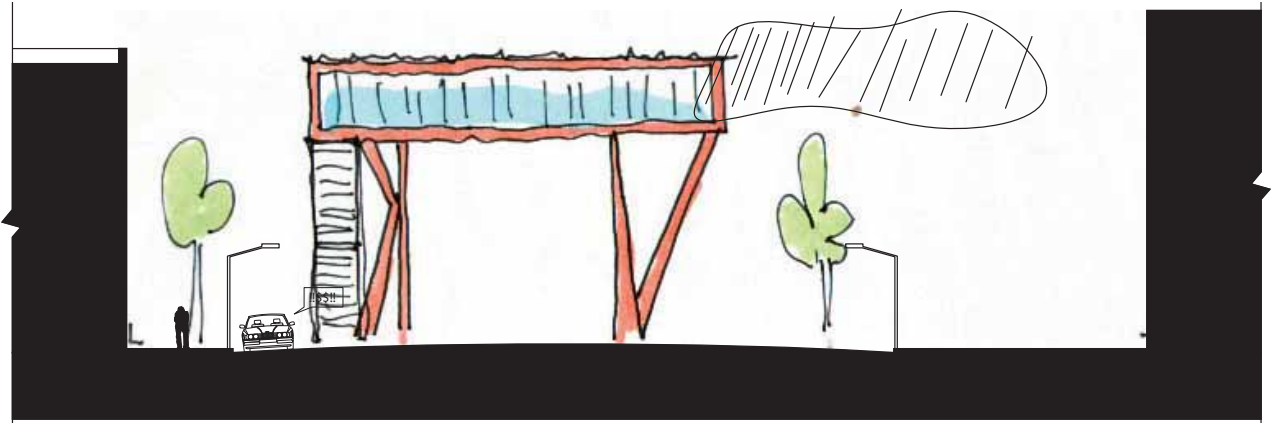
Architecture Base(Motorized based)

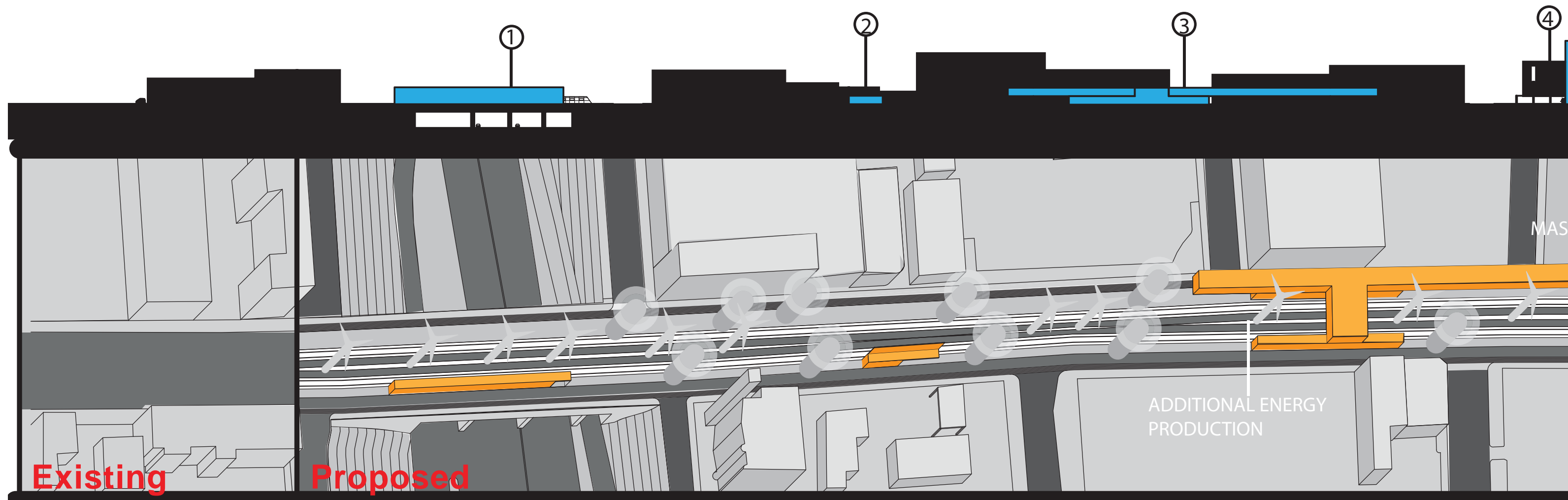
Architecture Base(Non-Motorized based)

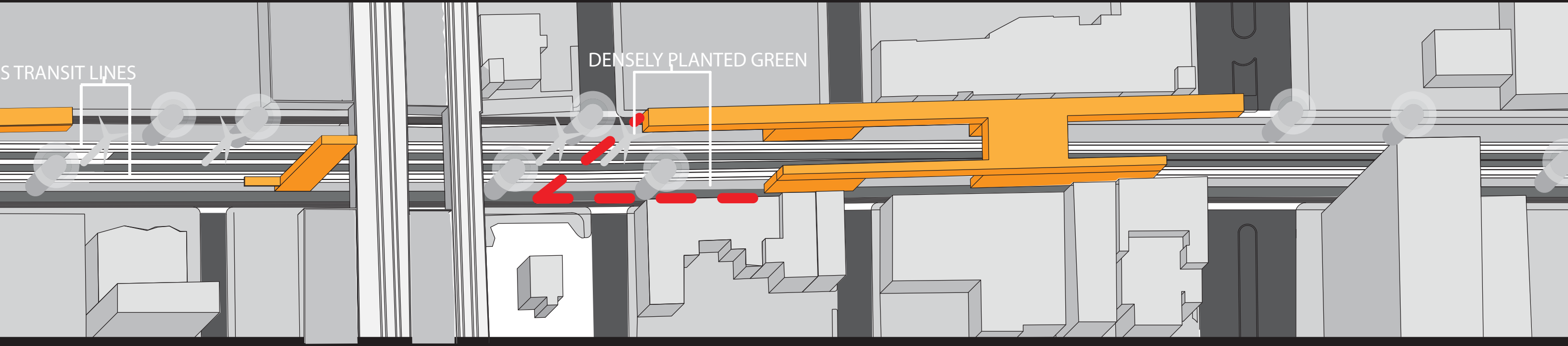
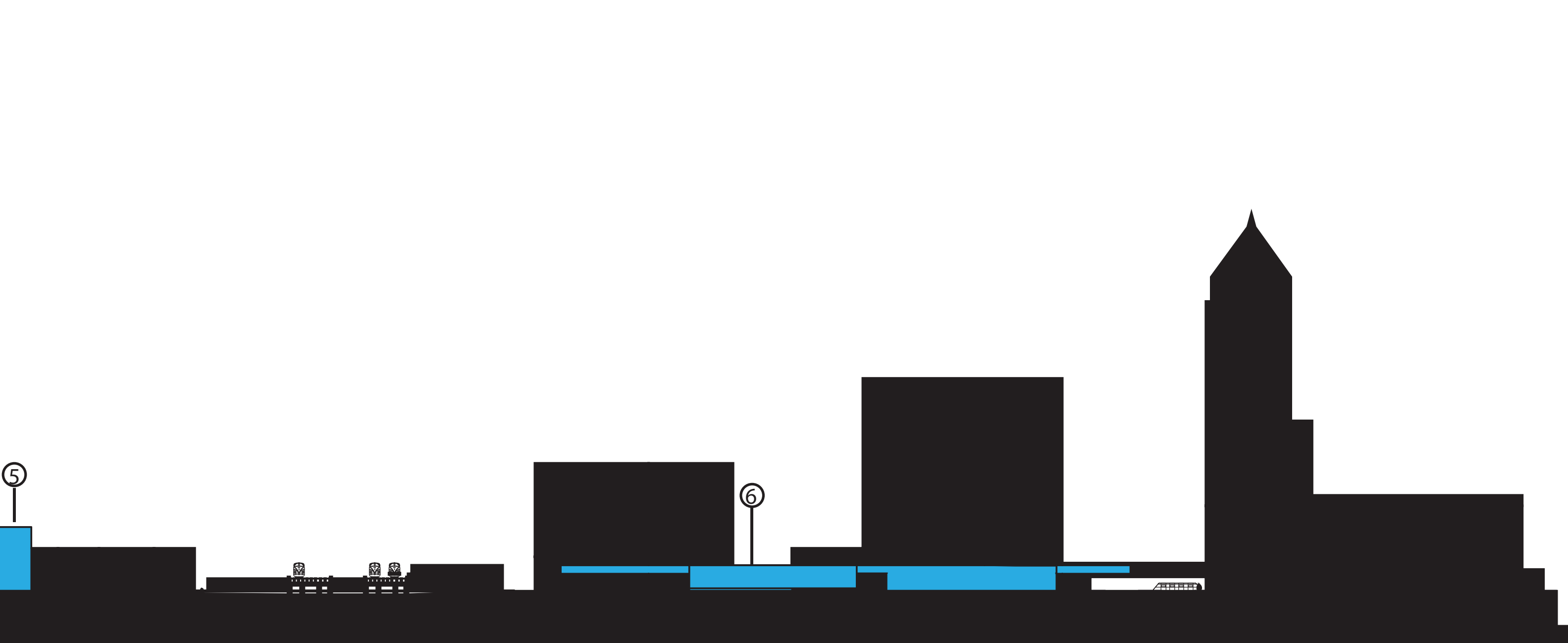
Architecture Base(Motorized based)

Architecture Base(Non-Motorized based)









Alternative Vehicle

Any vehicle that is used for carrying passengers and does not rely on the use of non-renewable fossil-fuels.

Single Fuel Sources:

Compressed Air-(p31)

Battery Electric-(p32)

Solar

Ammonia- Can be used in slightly modified spark ignited or diesel engines and has no other emissions than nitrogen and water. Has half of the density of petrol and diesel and is also used in fuel cells.

Biofuels

Bioalcohol/Ethanol- Created from sugar starch whenever yeast finds a simple sugar solution.

Biodiesel- Lower density than its fossil-fuel cousin, but produces lowest emissions of diesel engines.

Biogas- May be used in internal combustion engines after purification of raw gas. Removal of H_2O and H_2S can produce similar results to compressed natural gas.

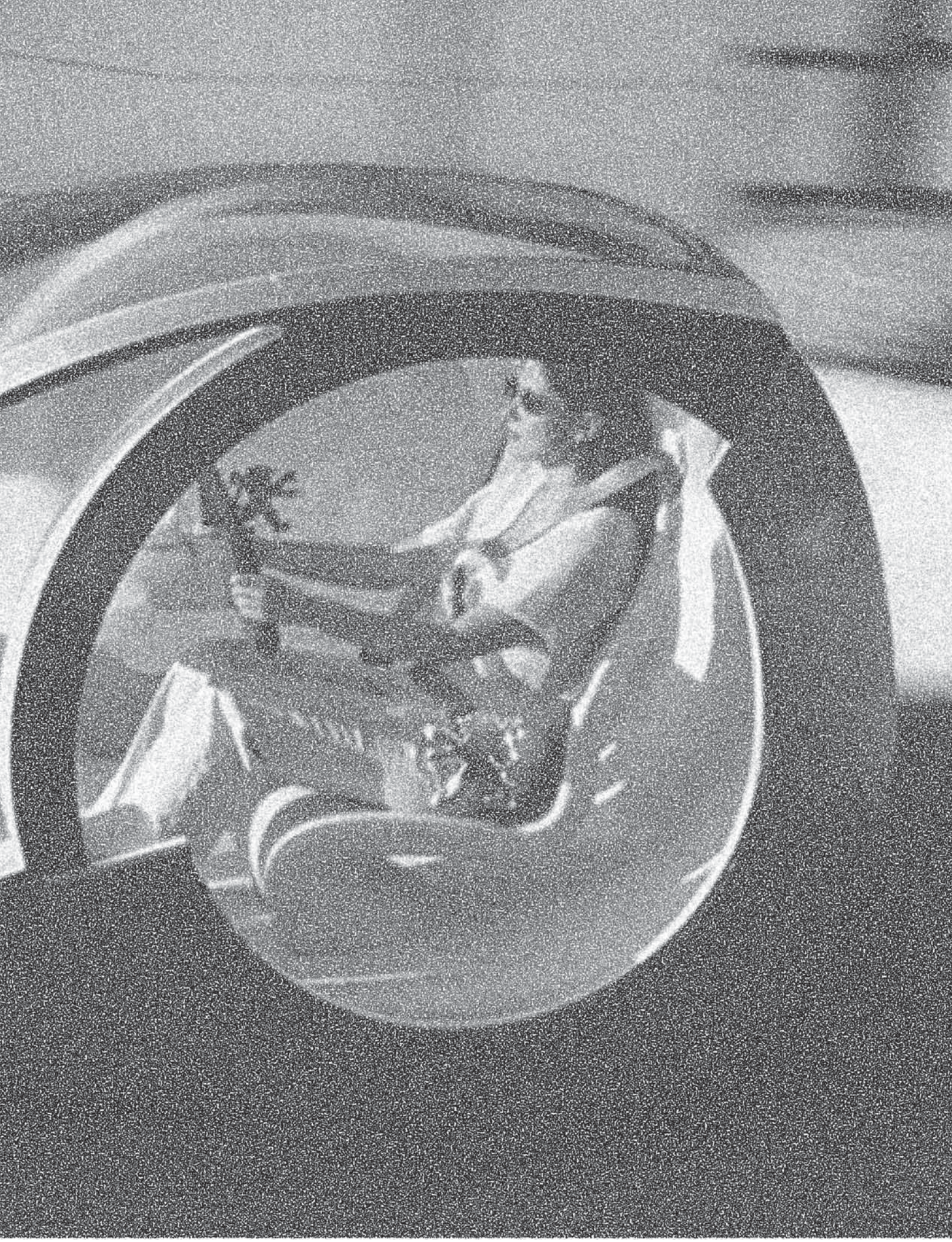
Hydrogen-(p33)

Liquid Nitrogen- LN₂ is a method of storing energy created when energy is used to liquify air then the air is evaporated to create LN₂. Once LN₂ is exposed to ambient temperatures it can create Nitrogen gas to power a piston or turbine engine.

Steam- Created from a steam engine which is heated from burning wood, coal or ethanol to heat a boiler converting water into steam. The pressure created by turning water into steam is used to push pistons via an external combustion engine.

Wood Gas- Needs a wood gasifier which burns wood and combines raw materials with controlled O_2 or steam to convert carbonaceous materials into syngas.

People-power-(p34)



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