THE CONNECTING LINE:

Re-Imagining the Train's Identity in Montana's Historic Railroad Towns

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Abstract

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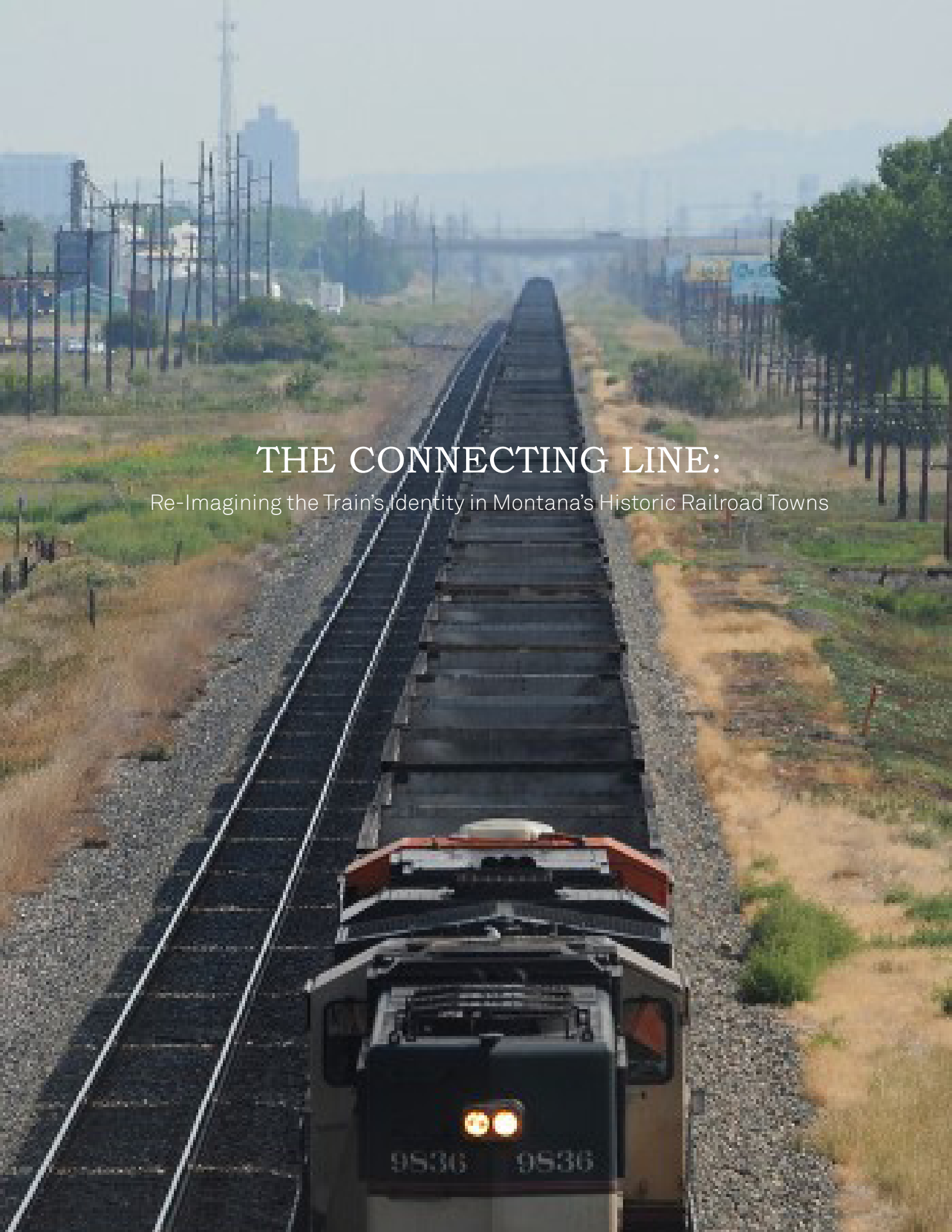
This thesis proposes that Montana towns need to establish new, healthier relationships between the railroad corridors and the communities they divide. Once the primary mode of transportation for goods and people, the railroad brought life to the developing region and served as an organizer for commerce and civic activity. Today, as these towns have grown and as alternative modes of transportation have supplanted travel by rail, Montana's train corridors have fallen out of relationship with the towns they once established. Once the hallmark of westward expansion in the late 19th century, these now industrial pieces of infrastructure act as physical barriers in the city and have become isolated utilitarian conditions devoid of human activity.

This thesis contends that these industrial train corridors should be re-imagined to function as mixed-use, multi-modal spaces that support other facets of city life and provide new levels of access to public recreation, small business development and various living and learning accommodations. The proposed integration of infrastructure and civic amenity will expand the role of the working railroad to serve more than just itself, but to also serve the city and its inhabitants to facilitate healthier and more sustainable futures for Montana's railroad towns.



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INTRODUCTION

In recognizing the historic significance of the railroad in Montana and its influence on regional access, city growth and cultural identity, this thesis explores the growing disconnect of the working train corridor within the Montana railroad town and contends that these towns need to establish new, healthier relationships between the train corridors and the communities they divide. Dating back to the industrial revolution, the American railroad system resulted in unprecedented levels of national commerce and regional connection. With the ability to transport people and goods across the country in a matter of days, as compared to months on foot or by wagon, this infrastructural innovation became the hallmark of 19th century westward expansion.

Figure 3 - Billings, Montana Aerial

Today, the industrial railroad still serves as a major economic driver in Montana's growing towns. However, as other modes of transportation have become more accessible and as these towns have continued to develop away from their historic downtown cores, these once thriving railroads have become isolated conditions in the city and have fallen out of relationship with their surroundings. With the passenger rail service no longer serving Montana's major towns, these train corridors now function as utilitarian pieces of infrastructure that are separated from physical, social and economic activity in the city.

This thesis proposes that these industrial train corridors should be re-imagined to function as mixed-use, multi-modal spaces that support other facets of city life and provide new levels of access to public recreation, local business development and various living and learning accommodations. The proposed integration of infrastructure and civic amenity will expand the role of the working railroad to serve more than just itself, but to simultaneously serve the city and its inhabitants to facilitate healthier and more sustainable futures for Montana's railroad towns.

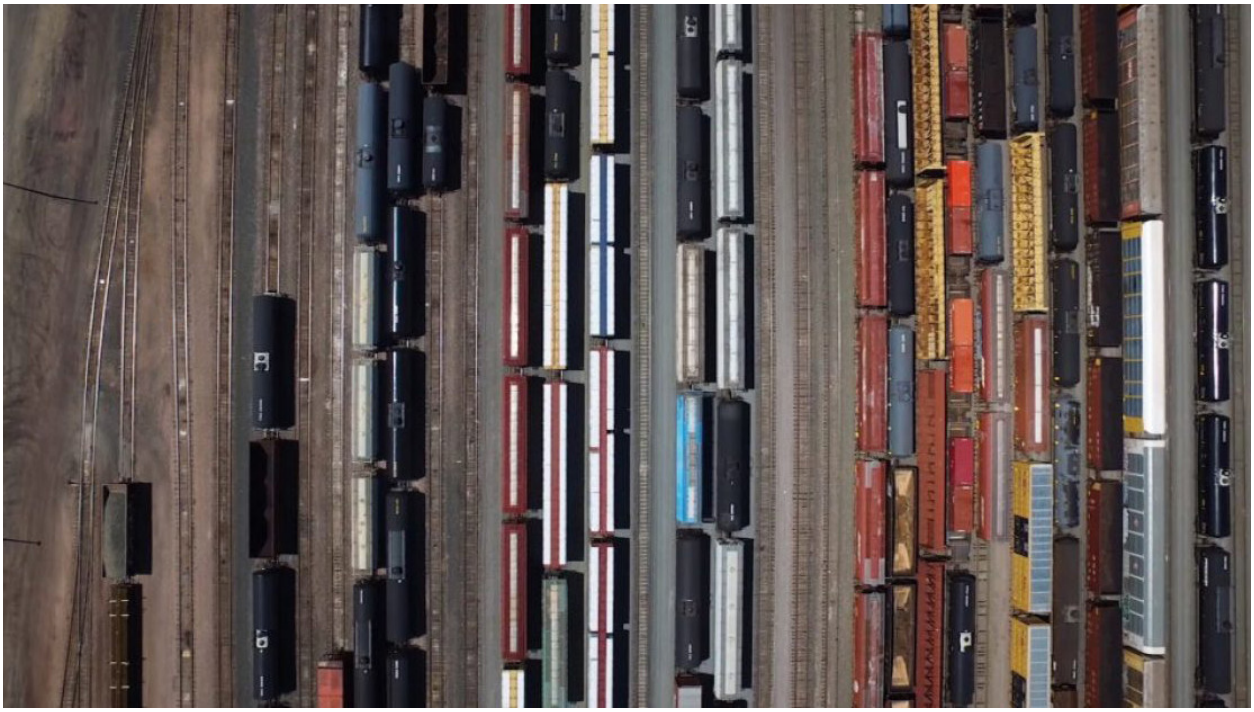


Figure 4 - Train Yard, Laurel, Montana

This exploration will take place in the city of Billings, Montana. As an industrial railroad town of 110,000 inhabitants, the disconnect between the railroad and the surrounding city is becoming more evident every year as the city continues to grow. With an estimated population growth of 40,000 people in the next 20 years[1] , and with increasing demand for freight transportation, the current condition of the train corridor in Billings presents a unique opportunity to transform the narrative of the railroad from a dividing, single-use infrastructural element into a connecting amenity that can once again serve the city as a platform for civic activity.

Within the city of Billings, the design project will analyze a two mile segment of train corridor that passes through the heart of the downtown area. Within this site, there are three different zones that are bisected by the tracks, including the north and south side residential neighborhoods, the commercial downtown core, and the industrial East Billings Urban Renewal District. In an attempt to re-imagine the working train corridor in Montana, this design project will explore ways in which to respond to the specific contexts of these different areas along the corridor, and aims to create a new connection between infrastructure and city that prioritizes access to recreation, local business

Figure 5 - Northern Pacific Railroad, North Dakota

II
THE RAILROAD IN MONTANA

THE TRANSCONTINENTAL MOVEMENT

The idea of the Northern Pacific Railroad began in 1864 when congress awarded the railroad company 60 million acres of land between St. Paul, MN and the Puget Sound region.[2] With the first transcontinental railway being completed in 1869 and connecting a large portion of the Midwest to the California coast, the northwest region of the country was still lacking an efficient means of regional access.

The completion of the Northern Pacific Railroad was not a smooth process as the lack of funding, change in company ownership and financial backers hindered the project from the very beginning. Starting in St. Paul, Minnesota and stretching west across the states of North Dakota, Montana and Idaho, the railroad terminates at its main west coast location of Seattle, Washington. Nearly twenty years after the initial idea was proposed, in September of 1883 in Gold Creek, Montana, the ceremonious final spike was delivered, thus completing the Northern Pacific connection between the northern Midwest and the West Coast.[3]

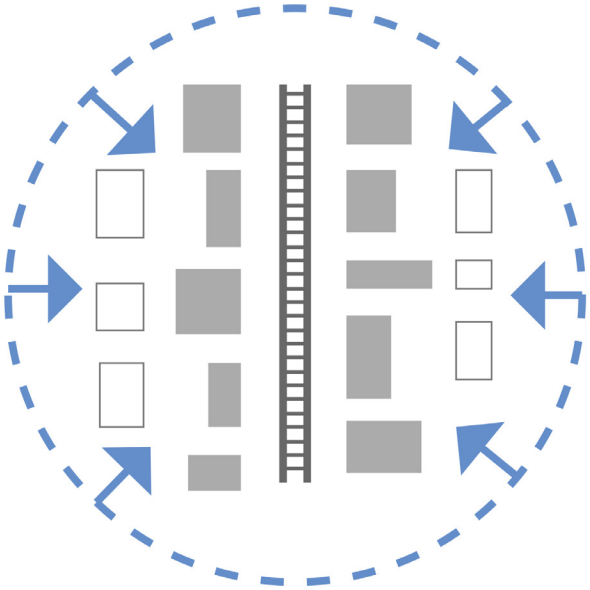


Figure 6 - Infrastructure that Gathers Diagram
Figure 7 - Historic Aerial View of Livingston, Montana

PATTERNS OF THE RAILROAD TOWN

As the Northern Pacific Railroad moved across the northern part of the country, certain stopping points were established for trains to pick up and drop off passengers, fuel and freight. From these checkpoints, there emerged a development pattern defined by and based around the presence of the railroad. The emergence of the train station as a public institution greatly influenced the way in which towns continued to grow. In most cases, the station included a variety of spaces and activities, including the main waiting hall, ticketing and baggage areas, offices and in some cases, restaurants for passengers.

Being placed on one side of the tracks, these buildings sparked the need for other passenger related amenities close by, such as hotels, bars, restaurants and eventually, houses, civic and government buildings.[4] These amenities historically existed on the same side of the tracks as the main train station, thereby experiencing a much higher level of public activity. The industrial facilities that emerged in these towns, however, were then placed on the opposite side of the tracks to maintain separation from the more active and public side of the railroad.[5] With the railroad serving as a social and economic instrument in these fledgling towns, these initial points of transfer soon evolved into established infrastructural nodes[6] , turning from small service stations into thriving towns and eventual cities that were fueled by national commerce and homesteaders looking for opportunity in the West.

Figure 8 - Missoula Train Depot, Missoula, Montana

As these towns grew, as more and more passengers arrived and settled and as the railroad became more accessible to an emerging middle class, this new infrastructure started to take on a new identity, serving as a new public realm – a place for commerce, a place of exchange, a place of demonstration and a place of public assembly.[7] With the train station solidifying its role in the downtown core of the town and with the high frequency of new passenger arrivals and departures, the immediate area surrounding the station became bustling public nodes that congregated travelers, businesses, market spaces and civic gatherings.

The railroad also brought about change in the perception of time and space. Wolfgang Schivelbusch, author of *"The Railway Journey: The Industrialization of Time and Space in the 19th Century"*, characterizes this new perception as an "annihilation of space and time" and centers this theory around the newly found convenience of passenger rail and speed at which the railroad was able to reach distant places.[8] Schivelbusch goes on to explain how travel time, prior to the railroad, had been perceived as a fixed amount of time for a particular distance traveled. With the railroad, "the same amount of time permitted one to cover the old spatial distance many times over...time shrinks and access to space grows."[9]

Figure 9 - Emergence of the Automobile

EVOLUTION OF MOBILITY

As the Post-War era began, the United States witnessed a dramatic infrastructural shift. Fueled by urban sprawl and the development of the modern-day suburb, increased access to automobiles, the implementation of roads, the interstate highway system, and the emerging possibility of commercial air travel, these events signaled that the era of mass passenger rail service was coming to an end. With these newer innovations in human mobility, towns and cities developed by the railroad were now becoming less dependent on this form of infrastructure to act as the means of civic connection.

The human desire of increased access to mobility, efficiency and independent movement is described by Schivelbusch in that "neither the general fear of the mechanical and the specific frights of accident and injury, nor the social fear of boundless economic power entirely effaced the utopian promise implicit in the establishment of speed as a new principle of public life."[10]

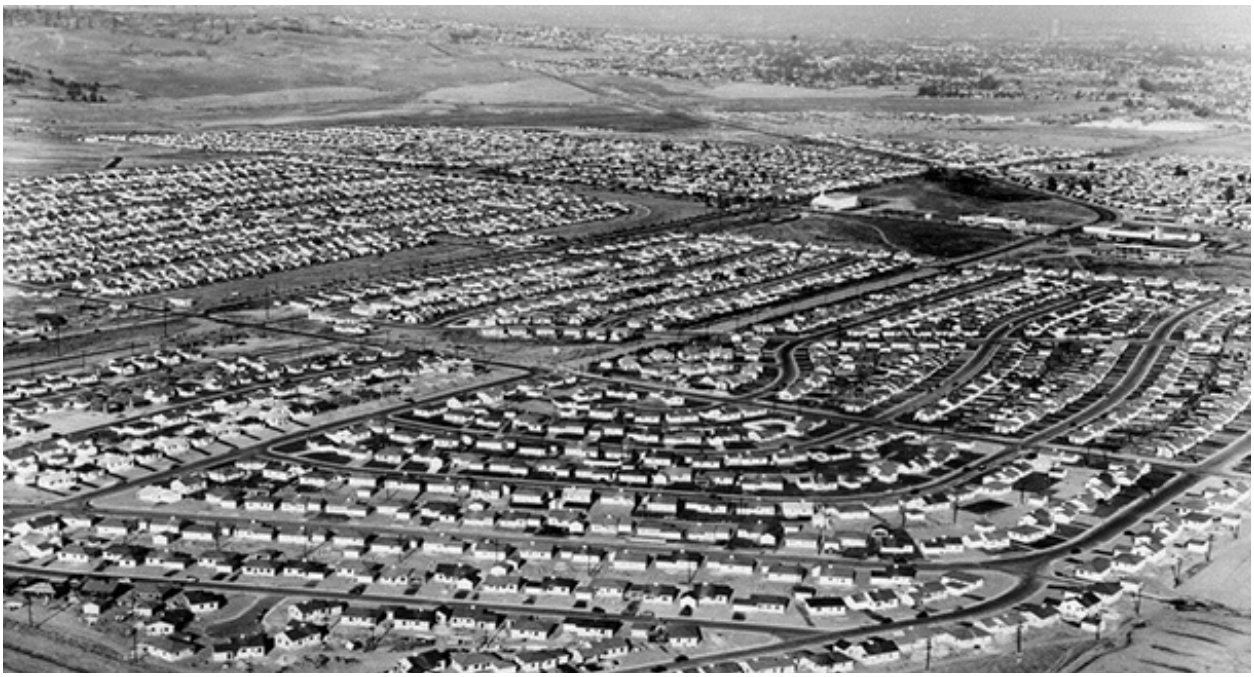
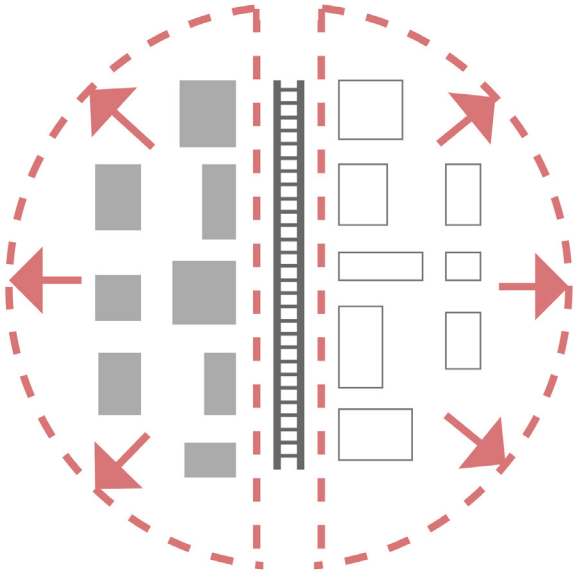
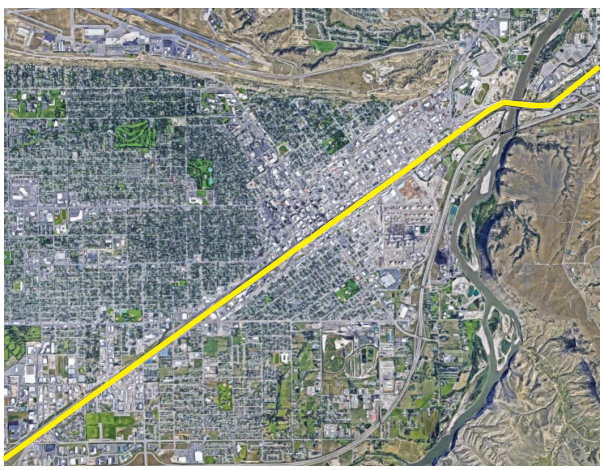


Figure 10 - Suburban Sprawl, Los Angeles
Figure 11 - Commercial Air Travel

This transition from passenger rail service to faster and more flexible modes of transportation spawned a new type of urban development, one that no longer revolved around public access to the railroad, but rather focused around the needs of car and airplane travel. With this new type of city development, the infrastructure of the train that formed and remained in the city began to take on qualities of an "edge" condition. Kevin Lynch, author of "*The Image of the City*", describes "edges" as linear elements not used or considered as paths by the observer...They are boundaries between two phases, linear breaks in continuity...Such edges may be barriers, more or less penetrable, which close one region off from another."[11]

Lynch characterizes the urban railroad as having become "a physical obstruction that segregates the different zones of a city. It defines where one area ends and another begins, highlighting the distinctions between residential neighborhoods, commercial centers, industrial zones and perhaps more importantly, the perception of access and overall desirability of place."[12]





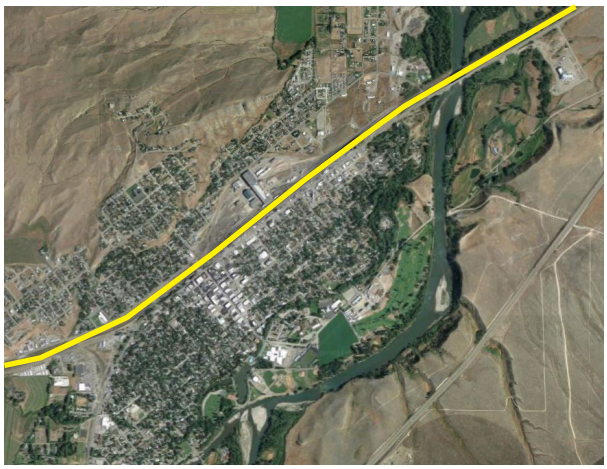


Figure 12 - Infrastructure that Divides Diagram
Figure 13 - Billings, Montana Aerial Railroad Path
Figure 14 - Livingston, Montana Aerial Railroad Path

PROBLEM

Today's Railroad Town

This thesis recognizes the spatial condition the train corridors within Montana's railroad towns to be "lost spaces". Roger Trancik, author of "*Finding Lost Space: Theories of Urban Design*", describes these conditions as "undesirable urban areas that are in need of redesign - anti-spaces, making no positive contribution to the surroundings or users."[13] Today, these once thriving railroads have become isolated conditions in the city that have fallen out of relationship with their surroundings and the people they once served. With the passenger rail service pulling out of Montana's major towns in 1979[14] , these train corridors now function as purely utilitarian pieces of infrastructure that have not adapted to interact with these evolving towns and act as barriers that inhibit physical, social and economic activity.

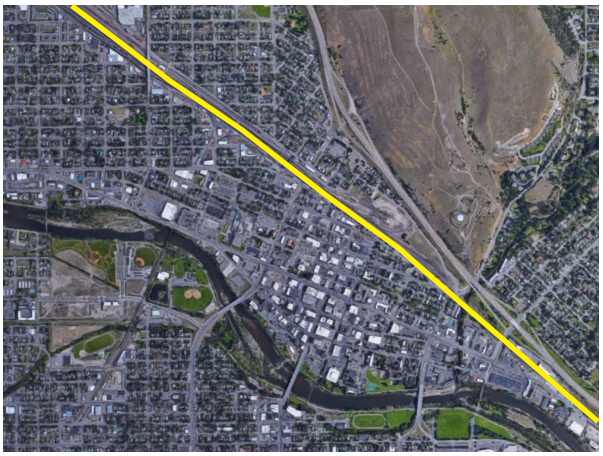


Figure 15 - Missoula, Montana Aerial Railroad Path
Figure 16 - Glendive, Montana Aerial Railroad Path

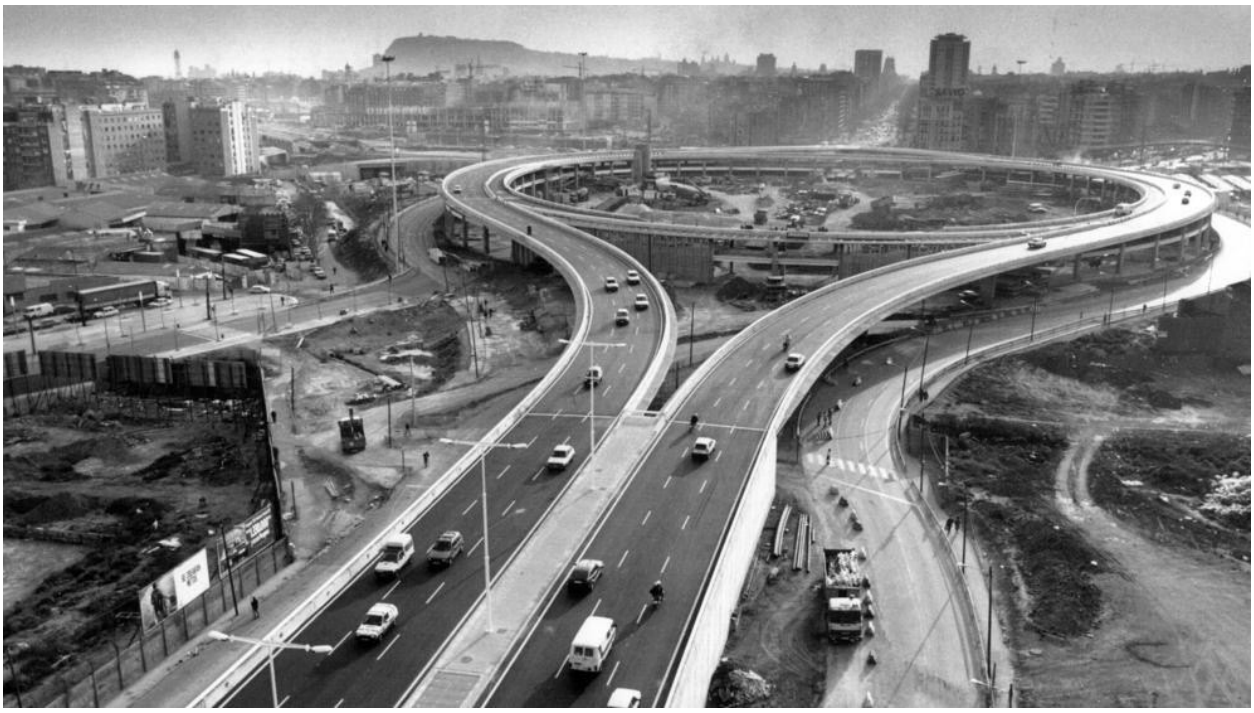


Figure 17 - Nudo-de-la-Trinitat, Barcelona, Spain (Before)
Figure 18 - Nudo-de-la-Trinitat, Barcelona, Spain (After)

III
FRAMEWORK OF DESIGN

"FUSION INTO A NEW COMPOSITE"
(Acceptance)

In an attempt to re-imagine the train's identity in Montana's railroad towns, this thesis approaches the current condition as an opportunity for "fusion into a new composite". Kelly Shannon and Marcel Smets introduce this concept in "*The Landscape of Contemporary Infrastructure*" and define it as the combining of two or more distinct elements into one entity...where the integration in this sense is not attained by trying to color the new intervention in accordance with its surroundings, but by reconfiguring the existing setting into a new composite landscape.[15] Shannon and Smets note that in this approach, infrastructure is evidently rendered visible, but does not stand on its own.

The concept of "fusion" can be utilized in several ways depending on the different contexts in which it is being applied. One type "fusion" is about recognizing and accepting the presence of existing infrastructure and working to incorporate it into a fuller, more complex urban landscape.[16] The Nudo-de-la-Trinitat in Barcelona, Spain by Enric Battle and Joan Roig exemplifies this condition of accepted existing infrastructure. This design approach accepts the presence of a current infrastructure and pairs it with an ecological landscape element, thus creating new in between spaces and establishing a new relationship between city and road. Within these newly created spaces, this design intervention incorporates new water features, public seating, sports courts, vehicle parking, pedestrian walkways and open green space, all enhancing the relationship between high speed travel and public amenity.

Figure 19 - Allegheny Riverfront Park, Pittsburgh, Pennsylvania (Before)
Figure 20 - Allegheny Riverfront Park, Pittsburgh, Pennsylvania (After)

"FUSION INTO A NEW COMPOSITE"
(Active Change)

A second strategy for "fusion" is one that consists of "active change". Shannon and Smets describe this concept as "alleviating the effect of traffic by making the road part of a new and more complex section.[17] This design concept allows for infrastructural elements, such as a road, to be moved or manipulated to accommodate new features or uses, such as green space, walkways or screens, that enhance the overall condition of the space in response to the surrounding context.

The Allegheny Riverfront Park project in Pittsburgh, PA shows how the concept of "active change" can be used to contribute to the greater whole of the urban environment. What was once a highway that followed the water's edge along the Allegheny River, has now become a hybrid urban landscape that promotes coexistence of multiple uses, including vehicle travel, pedestrian and bike access, space for art installations, and a playful interaction with the waterfront.[18] By actively changing the current condition of the road along the waterfront, the re-purposed space is no longer acting as a singular, utilitarian condition, but rather serves as a platform that engages its users, the city and the landscape.

Figure 21 - Leidsche Rijn A2 Expressway, Utrecht, Netherlands (Construction)
Figure 22 - Leidsche Rijn A2 Expressway, Utrecht, Netherlands (Vision)

“THE ARTIFICE OF HIDING”
(Concealment In Urban Areas)

This thesis looks at yet another infrastructural design approach presented in *The Landscape of Contemporary Infrastructure* in an effort to re-imagine the train’s identity in Montana railroad towns. The concept of “artifice of hiding” is broken down into two separate parts, the first in regards to urban areas and the second pertaining to the open landscape. Shannon and Smets describe this concept as “concealment through topographical manipulations and strategic section design to render infrastructure inconspicuous.”[19] This action has the potential to not only amend the visual condition of current infrastructure, but also provides valuable regained space and an expanded public realm.[20]

The Leidsche Rijn A2 Expressway near Utrecht in the Netherlands features a large scale effort to submerge highway traffic below the city to allow traffic to flow more effectively and provide more mixed-use space at ground level. This strategy of concealment in the urban environment has provided the city of Utrecht with less traffic congestion and allowed for over 600 housing units to be constructed on top of the new tunnel.[21]

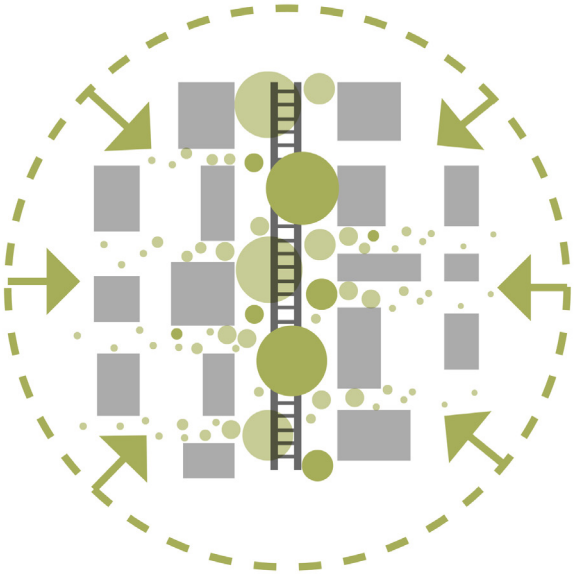


Figure 23 - Infrastructure of Coexistence
Figure 24 - Norreport Station, Copenhagen, Denmark
Figure 25 - West Side Greenway, New York, New York

PROPOSAL

This thesis proposes that these industrial train corridors should be re-imagined to function as mixed-use, multi-modal spaces that support other facets of city life and provide new levels of access to public recreation, small business development and various living and learning accommodations. The proposed integration of infrastructure and civic amenity will expand the role of the working railroad to serve more than just itself, but rather to simultaneously serve the city and its inhabitants to facilitate healthier and more sustainable futures for Montana's railroad towns.

Figure 26 - Wandle Park, Croydon, Surrey, England
Figure 27 - Pike Place Market, Seattle, Washington

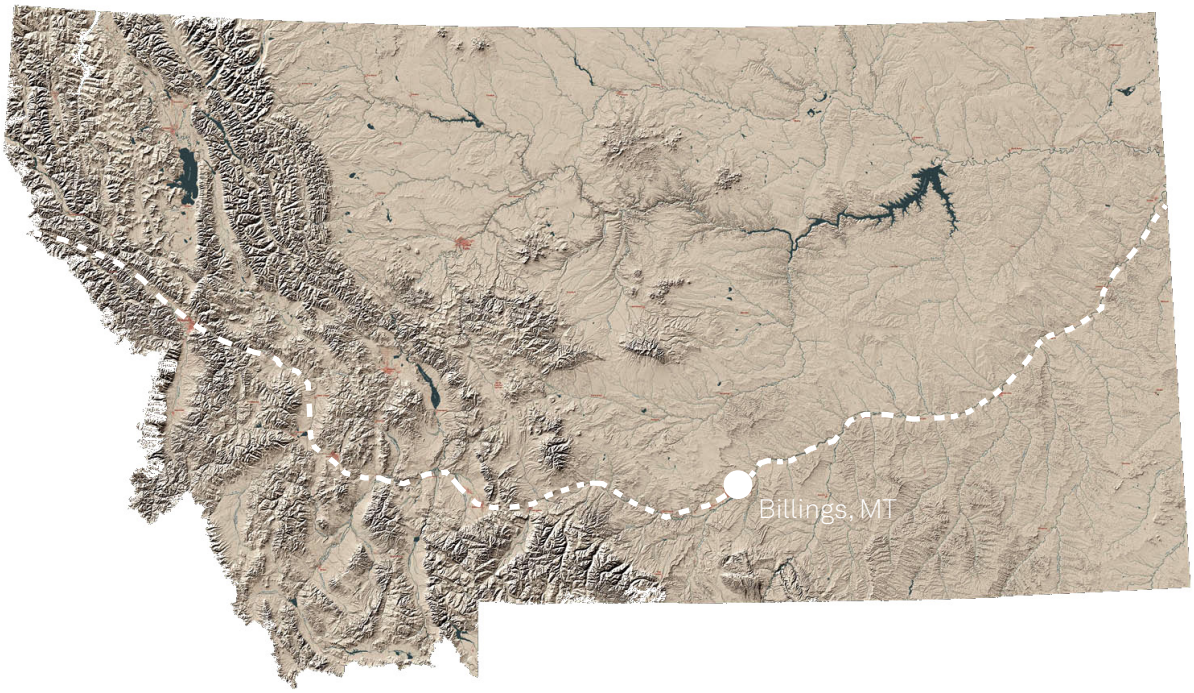


Figure 28 - Map of Montana

IV
BILLINGS, MONTANA

THE WORKING RAILROAD TOWN

This thesis contends that infrastructure and public amenity can coexist in Montana's railroad towns, thus expanding the public realm and transforming the identity of the railroad corridor into an element of civic connection. This thesis will use the city of Billings, Montana as a vehicle to explore ways in which architecture can play a role in bringing the city back to the railroad, the historic life source of the town, in an attempt to facilitate healthier and more sustainable growth for the city itself and the expanding railroad networks in Montana.

The city of Billings, settled on the north flats of the Yellowstone River in south-central Montana, acts as a regional gateway to the western United States and has long been as its slogan suggests, "Montana's Trailhead."[22] Being the largest city in the state with a population of 110,000 people as of 2019, Billings serves as an economic hub for Montana and a surrounding region that reaches out to parts of North Dakota, South Dakota and Wyoming.

Figure 29 - Downtown Billings, Montana ca. 1883
Figure 30 - Billings Old Town ca. 1893

THE MAGIC CITY

Founded in 1882, Billings is a direct byproduct of the Northern Pacific Railroad and its expansion westward. As the railroad movement continued throughout Montana, there was also a need to establish certain points along the way that would serve as train depots for freight and passengers. Between the years 1881 and 1883, the present-day towns of Glendive, Miles City, Forsythe, Billings and Livingston were all determined by the Northern Pacific Railroad's movement west.[23] Due to the locomotives of the time running on steam, the average refueling distance was between 60 and 120 miles which determined where these towns would be located.[24] With the completion of the Northern Pacific Railroad in 1883 in Gold Creek, Montana, the state finally had the infrastructure it needed to reach a new level of economic prosperity.

Within one year, the town of Billings had over two thousand new structures and it was during this time that Billings' north side began to see rapid development, including several churches, banks, the county courthouse, a library and city hall.[25] By the early 1900s, the population of Billings had reached over 10,000 people, making it one of the fastest growing cities in the United States at the time.[26] As the city began to grow to the north of the tracks, the industry that accompanied this growth was placed on the south side, downwind from the rest of the town. As industry in Billings took hold due to increased levels of commerce and regional connection, there was also an increase in the number of people moving into the city by train who were in search of work.

Figure 31 - First Airport in Billings, Montana
Figure 32 - Interstate Highway Construction near Miles City, Montana

In the years that followed, Billings grew into a thriving economic center for the region which was fueled by the railroad and the financial prosperity that came with it. However, by the 1950s this dynamic began to change due to a shifting national infrastructure. With a small airport built in 1927, the influx of residents and travelers to Billings presented an opportunity for expansion in the passenger airline industry. Northwest Airlines first brought commercialized passenger service to Billings in 1933, soon followed by Inland Airlines in 1934.[27] As Billings continued to develop, so did its airport, completing terminal expansions in 1958, 1972 and again in 1992.[28]

Beginning in 1956 and finishing in 1988, the construction of the Interstate Highway System in Montana took place. Coming across Minnesota and North Dakota, Interstate 94 merged with Interstate 90 a few miles east of present day Billings, where the latter continued west to Seattle, Washington.[29] These two highways followed the original Northern Pacific route throughout Montana and passed through many of the original railroad towns along the way. This infrastructural achievement allowed people the freedom to explore the country at their leisure in the comfort of their own automobile.

With an interstate highway running through Billings and a regional airport at the disposal of the surrounding residents, people were no longer tied to railroad travel as they once were. With increased private automobile ownership , living farther away from the city center was now a possibility. As the amenities that were traditionally located within close proximity to the train stations expanded to other parts of the city, the railroad, the pulse that was responsible for the growth and prosperity of these towns, slowly began to fade.

Figure 33 - Montana Rail Link Train Yard, Laurel, Montana
Figure 34 - Cities of Laurel and Billings Aerial

THE CURRENT CONDITION

Today, the railroad continues to serve the state of Montana as a vital economic driver. In Billings, as other industries have become more established and as markets have expanded outside Montana's borders, the dependence on freight transportation is steadily increasing. About ten miles west of Billings is the town of Laurel. This railroad town is home to the largest train yard between Seattle, Washington and Minneapolis, Minnesota and is operated by the Montana Rail Link.[30] Today, the train yard is handling 24 freight trains per day with 12 trains going east and 12 going west. Within the next year, Montana Rail Link estimates an increase in freight activity and anticipates over 30 trains passing through daily.[31]

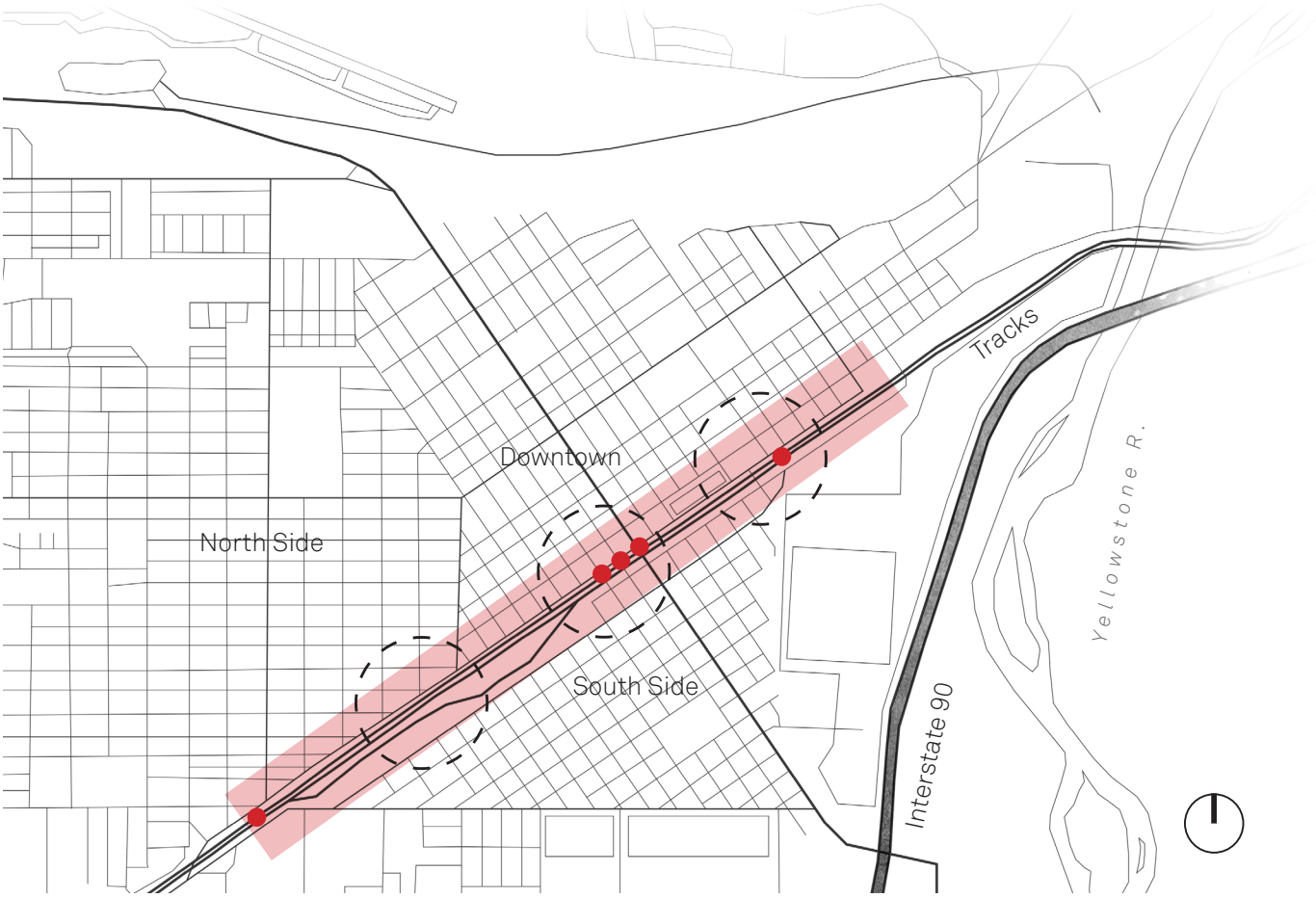
The city of Billings is expecting growth as well. With a current population of 110,000 people, the city is expected to increase by 40,000 people in the next 20 years assuming it maintains its current growth rate of 1.5 percent.[32] Although Billings finds much of its economic stability through the working industrial railroad, this growth is due in part to the emergence of other commercial industries that have expanded job markets and diversified the workforce population. The conditions of Billings and the Montana Rail Link present an opportunity to re-imagine the relationship between these two entities as one that facilitates healthier growth and coexistence for both the city and the railroad.

Figure 35 - Billings, Montana Aerial

A CITY FORMED AND DIVIDED BY INFRASTRUCTURE

Today, Billings can trace its current city layout back to the train depot's original location on the north side of the tracks. The railroad and its train depot ultimately determined how the city would be organized and was responsible for many of the urban design decisions that are still evident in Billings today. When the train first came through this area, the tracks acted as the datum that everything else would be organized around. Being placed on the north side of the tracks, the depot served as the main access point to the city. The amount of people entering Billings from this side of the tracks led to the establishment and continued development of the downtown core, which featured primary public amenities such as hotels, restaurants, shopping and eventually institutional and government buildings.[33]

The side of the tracks opposite the depot was historically allocated for industry and workforce housing. In Billings, the South Side neighborhood is a direct result of this initial city layout decision. Today, this area has become cemented in the role it was initially intended to serve and as Billings has grown, this now larger residential community is being cut off to the rest of the city by industrial facilities and infrastructure. The North Side neighborhoods have expanded out from the downtown core over the years and are expanding to the west where open farm land is being purchased for new residential developments and commercial centers.



Project Site

Existing Track Crossings

Zones of Exploration

Figure 36 - Billings Site Analysis Diagram

V
SITE ANALYSIS

THE WORKING TRAIN CORRIDOR

Within the city of Billings, the design project will analyze a two mile segment of train corridor that passes through the heart of the downtown area. Within this site, there are three different zones that are bisected by the tracks, including the north and south side residential neighborhoods at the west end of the corridor, the industrial Billings Urban Renewal District on the east end of the corridor, and the commercial downtown core which lies in the middle. Along this stretch of corridor within the city, there are currently five access points across the tracks; one underpass at each end and three street-level crossings within the downtown core.

The goal of this thesis is to create a cohesive social connection between railroad infrastructure and public activity. In re-imagining this infrastructural condition, one that is currently serving out of pure utility, this thesis draws upon the character and conditions of the site in an attempt to formulate an architectural response which promotes a new coexistence between working infrastructure and public amenity. The proposed "fusion" of infrastructure and civic space will create an expanded public realm in the city of Billings, one that celebrates the past, present and future of the railroad in Montana.

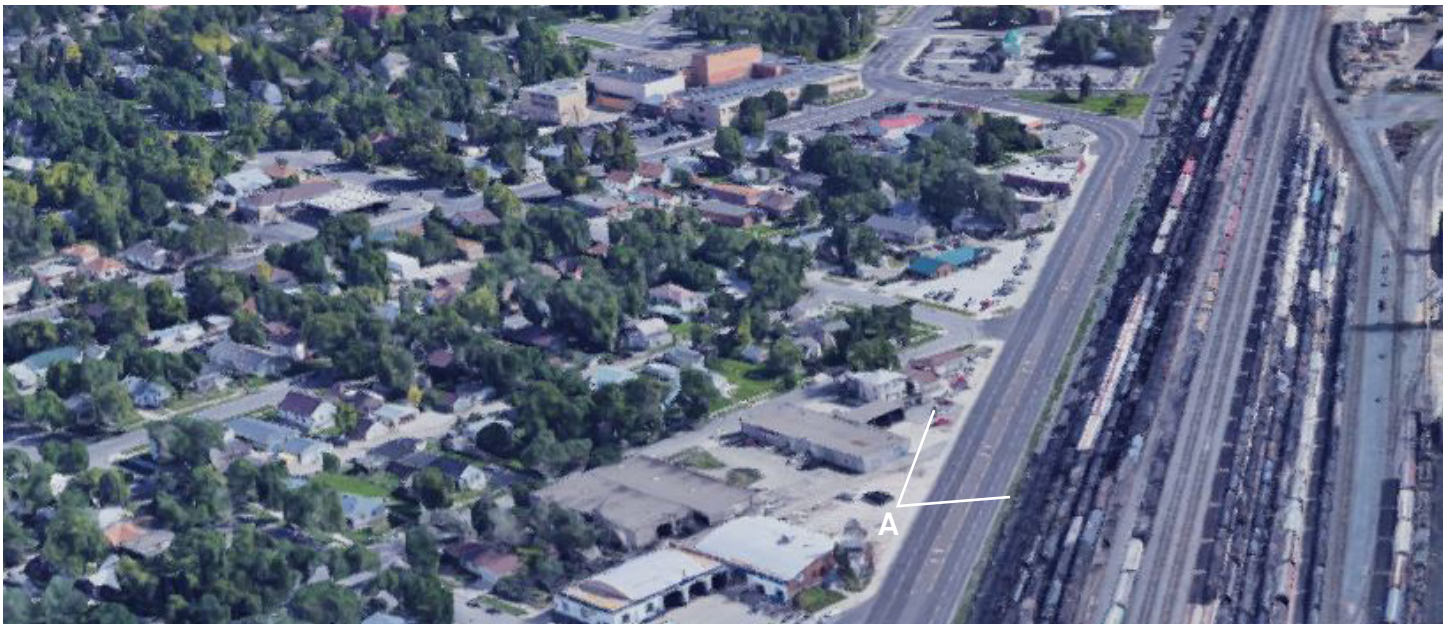
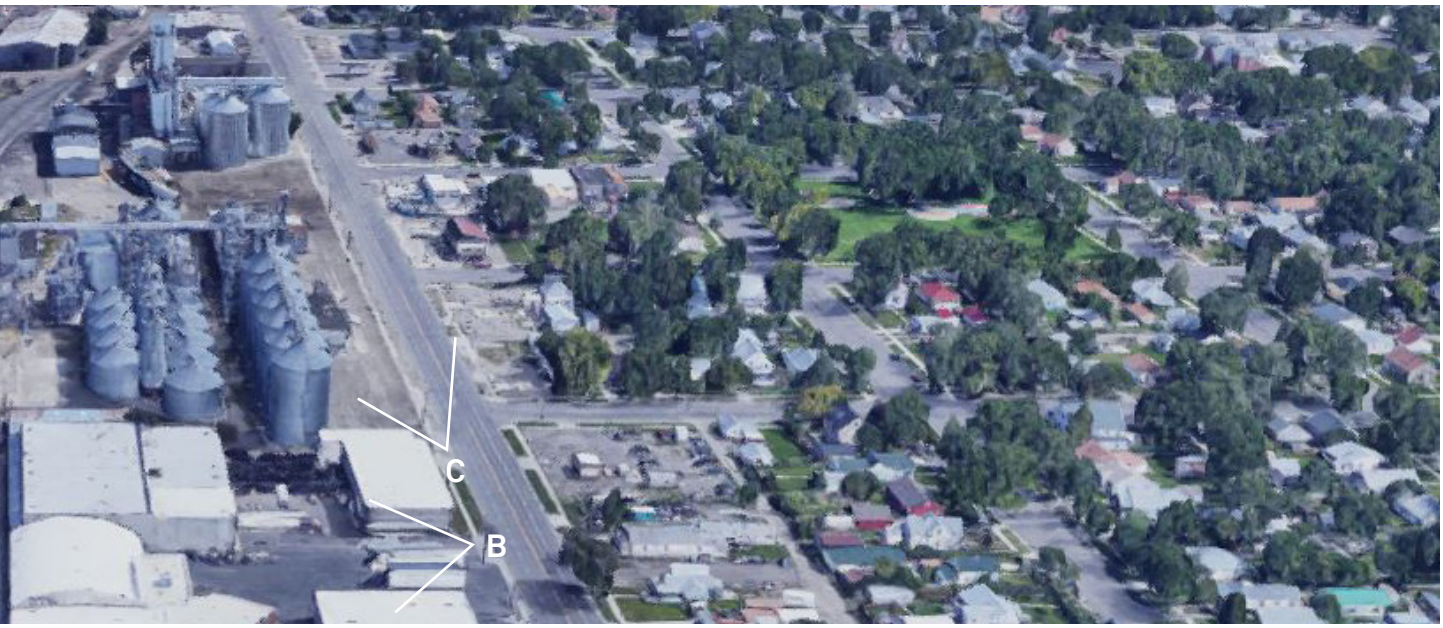


Figure 37 - North and South Side Neighborhoods Aerial
Figure 38 - North Side Neighborhood on Montana Avenue



THE WORKING TRAIN CORRIDOR

Residential Zone

The western portion of the working train corridor in Billings consists of a train yard as well as adjacent industry that is served by the trains today. As a whole, this swath of infrastructure and industrial zoning is over 700 feet across and stretches over a mile without a single point of access across the tracks. This portion of the corridor bisects the north and south side residential neighborhoods. This split, which has been established since 1882, has resulted in two residential communities with very different characteristics.

Figure 39 - South Side Industrial Lot
Figure 40 - South Side Grain Silos on 1st Avenue

With the majority of major programs being located north of the tracks in the city, the North Side neighborhood has much more access to downtown amenities, employment, retail, education and outdoor recreation. While the South Side neighborhood today consists of more than just industry workforce housing as it did when the city was founded, the presence of the tracks and adjacent industry has hindered this neighborhood in terms of growth potential, physical access, recreational opportunities, business development and overall desirability and land value.

A large portion of program on the south side of the tracks consists of industry, including an oil refinery and sugar beet plant, various correctional facilities and minimal outdoor space for recreation. This undesirable and unhealthy program in this part of the city, along with surrounding infrastructure such as the tracks to the north and Interstate 90 to the south, has greatly reduced the land value in the South Side neighborhood. This is exemplified by the housing market trends in the area, where as of September 2018, the South Side neighborhood had a median home price of $121,000, as compared to the North Side which had a median home price of $279,000.[34]

Between the North Side and South Side neighborhoods lies the industrial train yard. The yard is completely fenced off along its entire length on the north side of the tracks and is capped by adjacent industry on the south side, making this area virtually inaccessible to the two communities it divides. The industry itself consists of a mixture of auto-repair, industrial equipment supply companies and grain processing facilities. The large grain elevators and silos rise high above the surrounding neighborhoods, providing a constant reminder that this is a working railroad serving a city built on trade, industry and agriculture.

Figure 41 - East Billings Industrial Zone Aerial
Figure 42 - Historic Billings Depot on Montana Avenue

THE WORKING TRAIN CORRIDOR

Industrial Zone

The eastern zone of the corridor in Billings consists industrial facilities, old and re-purposed. Anchored by the presence of the historic Billings Train Depot built in 1909,[35] this area of town has seen significant changes recent years. On the north side of the tracks, many industrial facilities have been occupied by new restaurants, breweries and shops, an indicator of future development extending from the east side of downtown. The south side of the tracks is a different story. This area today remains primarily industrial with some light commercial mixed in. While some of these facilities are heavily used, others are under-utilized and are situated next to empty lots or scrap yards.

Figure 43 - Back of Billings Depot
Figure 44 - Billings Depot from Minnesota Avenue

Today, the depot itself serves a unique function for the city of Billings. Placed on the National Register of Historic Places in 1978, the building sat vacant for many years after Amtrak withdrew service from Billings in 1979. However, in 1995 the depot was fully renovated and currently serves the public as an event space and museum.[36]

The back of the depot is largely inaccessible to the public. The old passenger platform has been fenced off making this part of building a back-of-house space. From the south side of the tracks, the vacant lots within the boundaries of the site provide a clear line of site across the tracks to the back of the depot. Completely separated from public access on this side of the tracks, the public amenities offered by this historic building can only be accessed from the north side of the tracks on Montana Avenue.

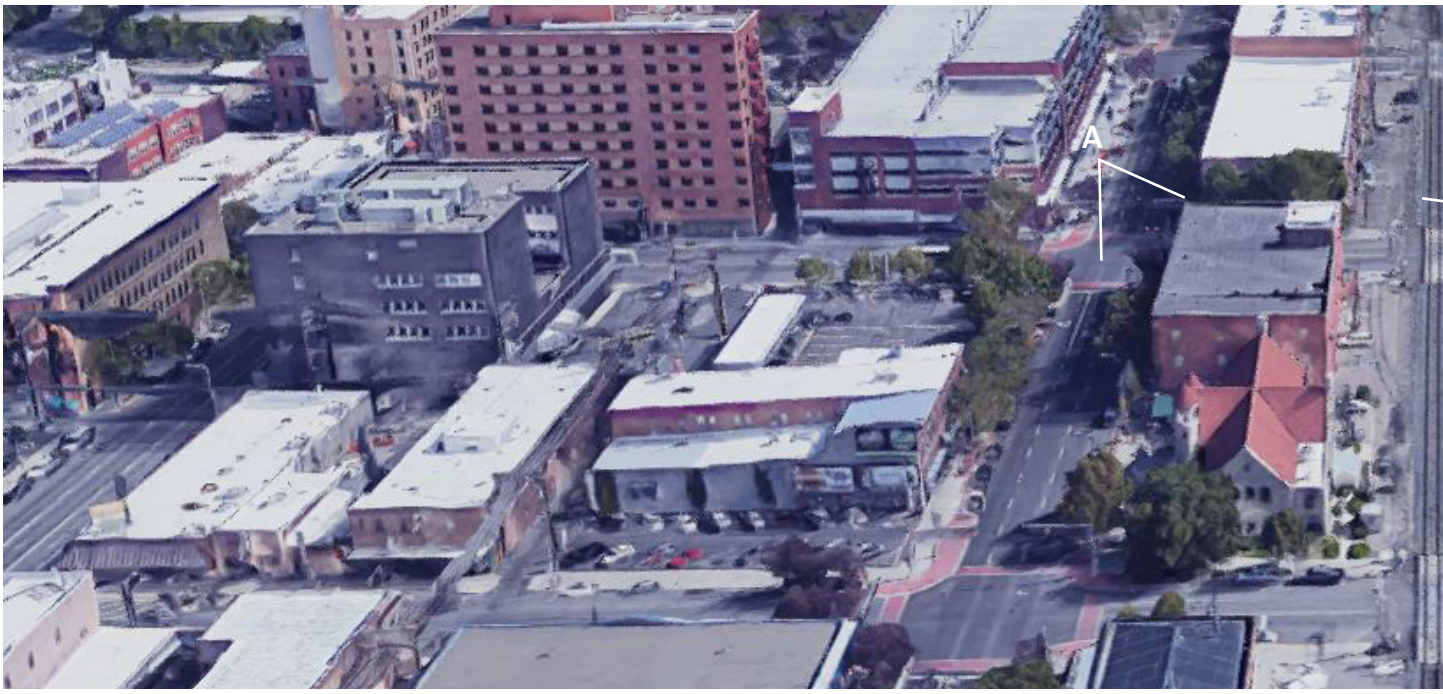


Figure 45 - Billings Downtown Train Crossings
Figure 46 - Restaurants on Montana Avenue

THE WORKING TRAIN CORRIDOR

Downtown Commercial Zone

The commercial downtown core of Billings is the most contrasted condition within the working train corridor. Emphasized by the elements of density and proximity, the difference in levels of public activation are noticeable within a one block radius. Starting with the north side downtown core, this area has seen a significant amount of development over several decades. Stemming back to its initial placement due to the location of the depot, the north side downtown area is vibrant, highly activated and boasts a variety of public amenities including restaurants, galleries, breweries, hotels and various other commercial and civic programs.

Figure 47 - Downtown Train Crossing
Figure 48 - Historic Minnesota Avenue

Within this zone, there are three street-level access points across the tracks. One of these points is 27th Street, the main thoroughfare that connects downtown Billings to Interstate 90 to the south and Logan International Airport to the north. With increasing freight train activity, these crossings are blocked several times a day, many times during peak business hours. Being a vehicle-oriented city and with an already limited number of crossing opportunities, the train activity in the downtown core is causing increased traffic as well as creating higher levels of inaccessibility within the city.

One block to the south of Montana Avenue, across the tracks, is historic Minnesota Avenue. Having been established since the railroad came through this area, this street was once a thriving part of the downtown atmosphere. However, as development and growth continued on the north of the tracks, Minnesota Avenue slowly fell quiet. Today, it sits one block in the wrong direction from the bustle and activation of the north side downtown. Severed by the tracks, many of the historic brick structures, several of which have been placed on the National Register of Historic Places, either sit under-utilized or vacant.

On the eastern portion of the street, a variety of small businesses have opened their doors, including a salon, a brunch and coffee shop, and a home decor boutique, all in the hopes of bringing the public back to this historic area in the city. While this trend is promising, the presence of the tracks in the city continues to isolate this historic area and inhibit public access and engagement. By re-imagining the current condition of the downtown corridor, this proposal will provide a platform upon which public activation of these forgotten areas can take place.

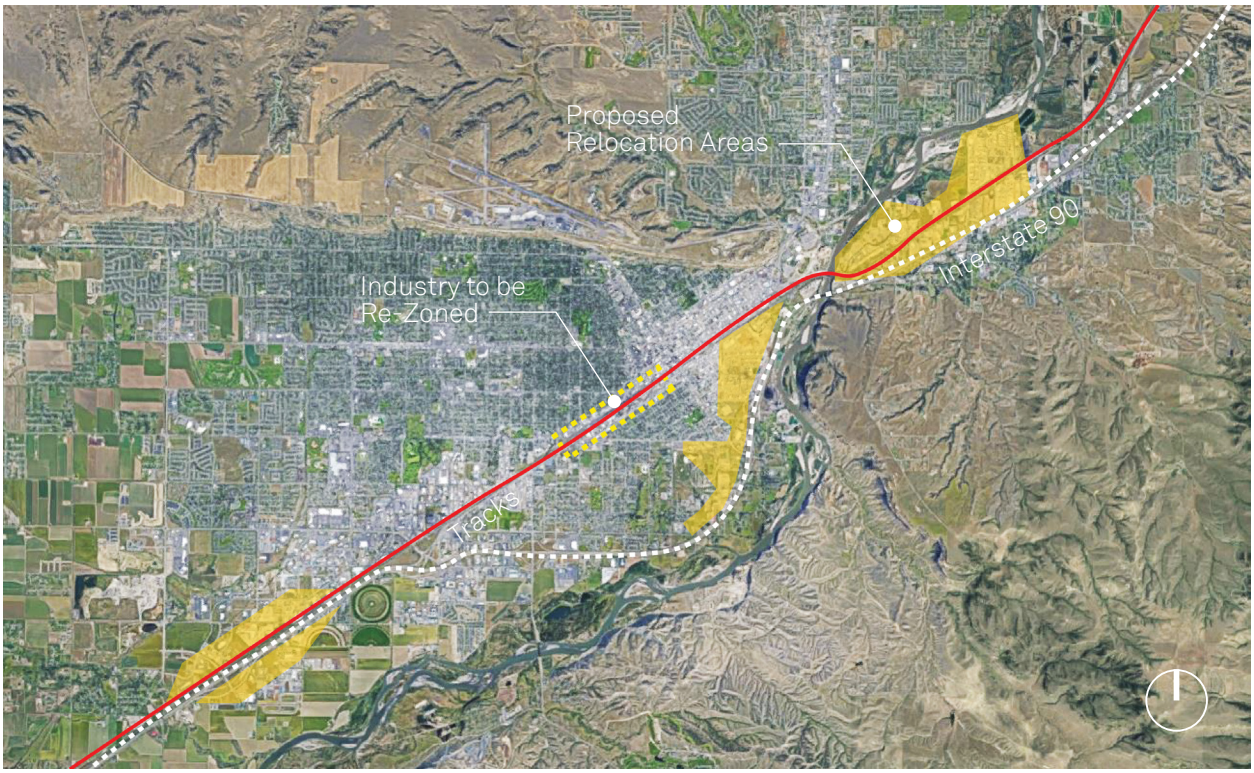


Figure 49 - Industrial Re-Zone Diagram

VI
DESIGN RESPONSE

CITY SCALE
Industrial Re-Zone

The response begins by identifying the train corridor as a framework for the design intervention. To facilitate a healthier connection between infrastructure and city and by utilizing existing qualities of the train corridor in Billings, this thesis proposes a tiered design approach that acknowledges conditions at the city, corridor and zone scales. The design response consists of a re-purposed train infrastructure and a re-appropriation of space within the corridor that, combined with new program centered around public use, can transcend the current role of the train in Montana from serving a single-use utilitarian function to acting as the connective tissue that brings the city together.

The design response for this thesis begins at the city scale. By analyzing the relationships between the industrial program and residential neighborhoods along corridor, this design proposes a re-zone, moving the industry to another area of Billings that is currently designated for industry and away from residential areas and the commercial downtown core. Moving corridor industry to these existing zones will consolidate industrial activity along Interstate 90, providing increased efficiency for the transfer of goods on and off the train, as well as provide increased access for trucking distribution.

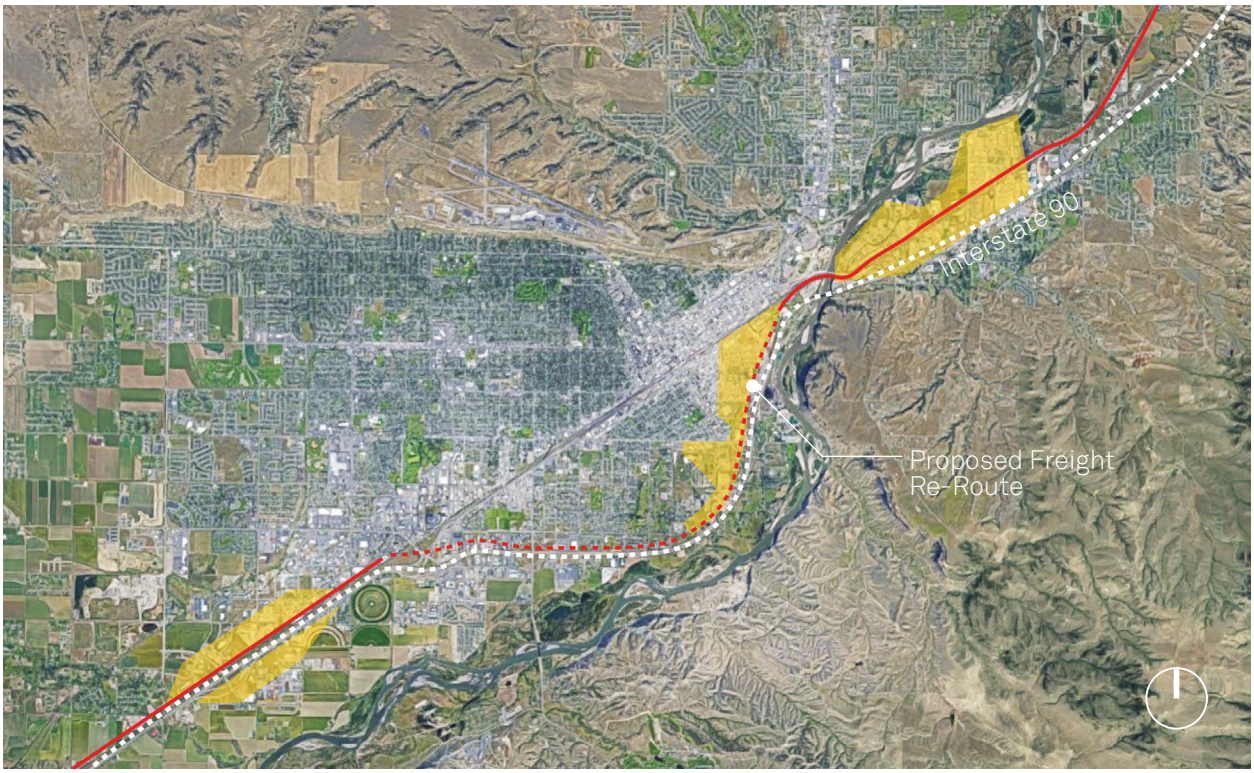


Figure 50 - Freight Train Re-Route Diagram

CITY SCALE

Re-Route Freight Train

The second phase of design at the city scale proposes that the existing freight train be re-routed to align with the newly zoned industrial operations. Today, freight train transportation is still one of the more efficient means of transporting goods from one place to another. With the average locomotive capable of carrying 2,000 pounds of material 500 miles on a single gallon of diesel fuel, the railroad still acts as a vital asset that plays a large role in the success Billings. With increases in railroad operations and freight activity, this new alignment of industry and freight transportation creates more space for growth and will allow for smoother transitions of goods coming in and out of the city.

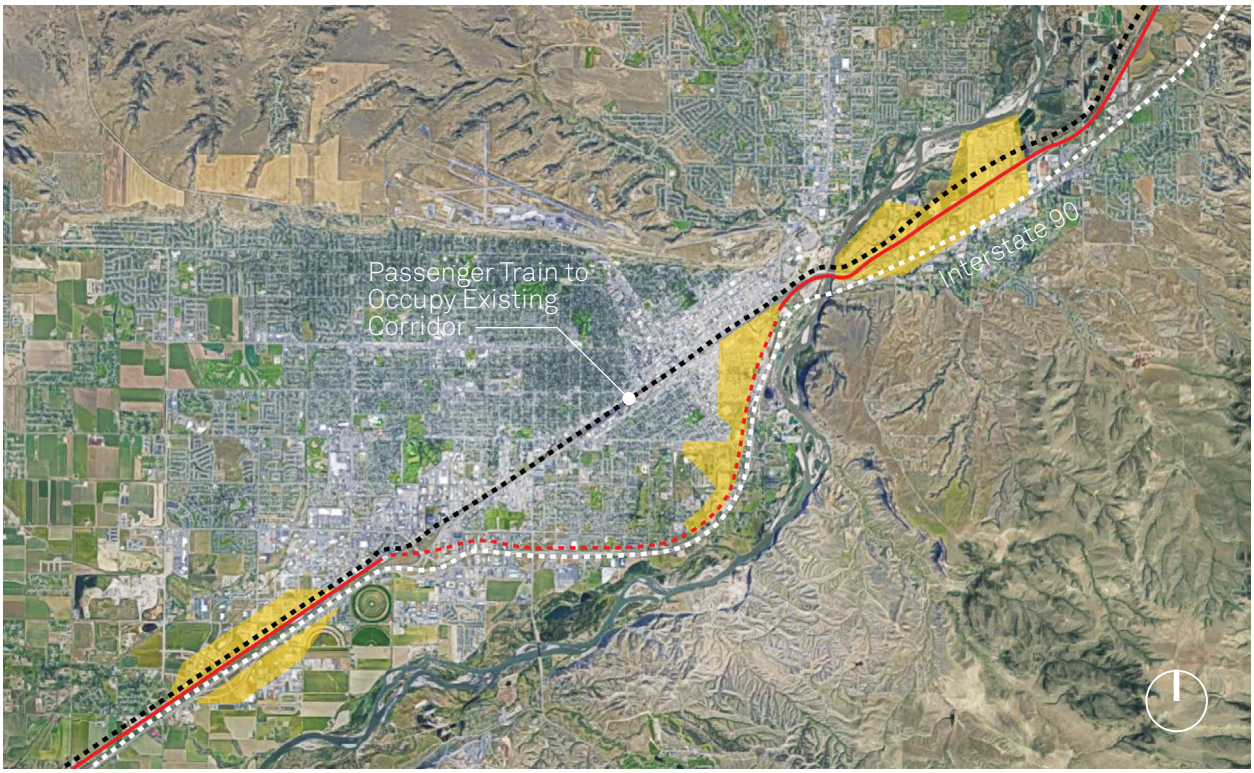


Figure 51 - Return of Passenger Rail Diagram

CITY SCALE

Return of the Passenger Rail

The third phase of city scale design proposes bringing back the passenger rail service to Billings as well as the other towns follow the tracks along Interstate 90. With Amtrak pulling out of Billings in 1979, this withdrawal from the city marked the last time the corridor served as occupiable space for the public. With this proposal, the passenger train can once again utilize the central location of the corridor within the city. Although Amtrak left this area, the need and desire for alternative transportation in Montana is evident. With Montana's major towns being located between 60-120 miles apart, the state as well as most of its cities are very vehicle dependent. In addition, the large distances between towns presents an opportunity for the passenger train to serve the commuter demographic. Montana is known for its severe winters and the region has a history of closing the interstate highways. The passenger train offers a safer and more efficient option for commuters as well as takes more vehicles off the road.

Lastly, the return of the passenger train will also serve recreational travelers, both in and out of state. The tourism industry is a large revenue source for Montana, accounting for $3.24 billion in 2018.[37] Most of this money was spent in the northwest area of the state near Glacier National Park, an area that is currently served by Amtrak. The return of the passenger train to the major towns along Interstate 90 will promote stimulation of local economies, provide increased access to Yellowstone National Park, and serve as yet another means of exploring the beautiful and vast wilderness of Montana. The second scale of design focuses on the train corridor in the city.

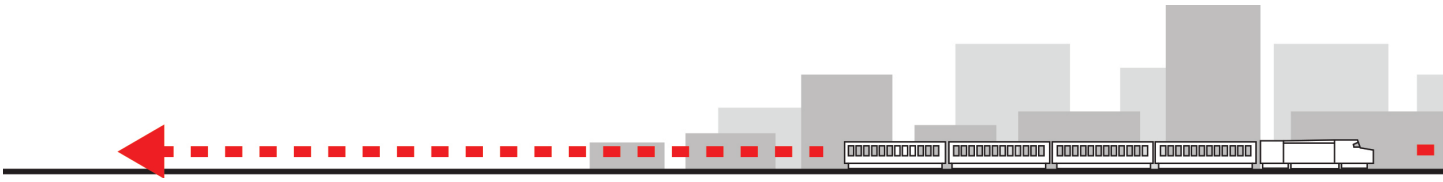
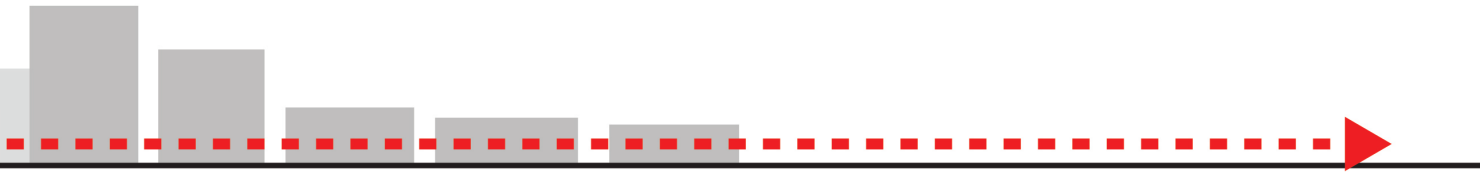


Figure 52 - Tracks in the City Diagram



CORRIDOR SCALE

Tracks in the City

The return of the passenger rail service brings the public back to this urban space, however with the current infrastructure of the corridor, this space still serves a single function. To fully re-imagine this space as a connecting civic amenity within the city of Billings, further action is needed to allow for multiple facets of city life to coexist with the infrastructure of the railroad.

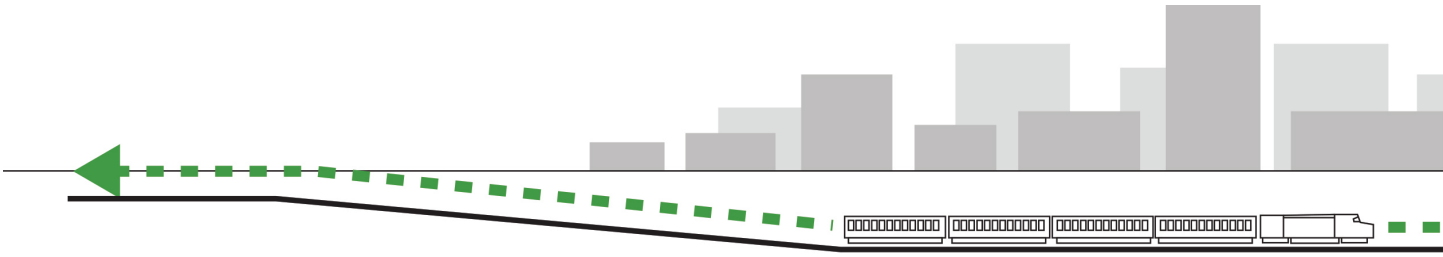
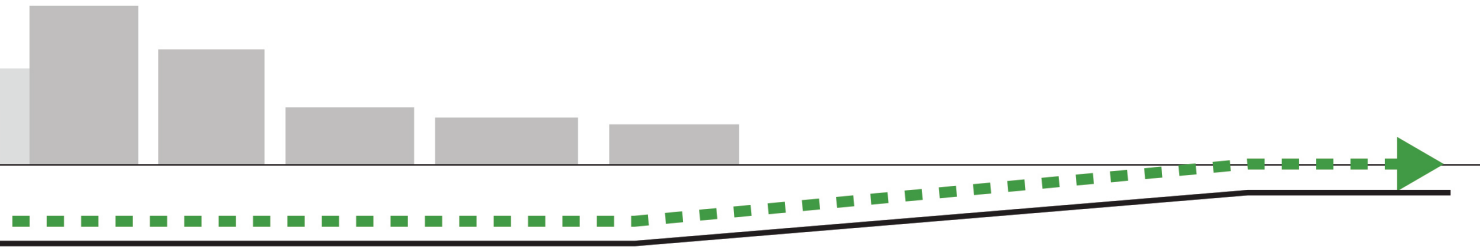


Figure 53 - Drop Tracks Below Grade Diagram



CORRIDOR SCALE

Drop Tracks Below Grade

The first design intervention at the corridor scale proposes that the tracks be dropped below grade within the city. In understanding the rigidity of railroad infrastructure, the train will begin its decent below grade as it approaches the city of Billings. Once the train reaches the central area of the city, it levels out and continues straight along the corridor until it has made its way through the heart of the city, at which point the train will begin to ramp up and return to grade level once it has exited Billings.

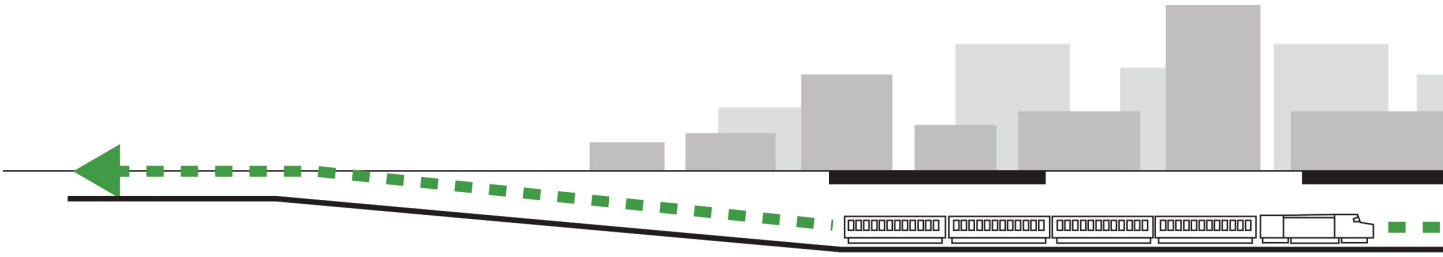
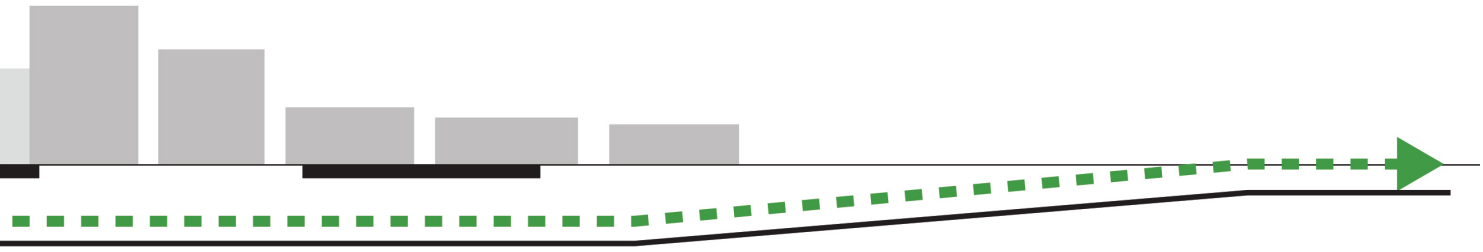


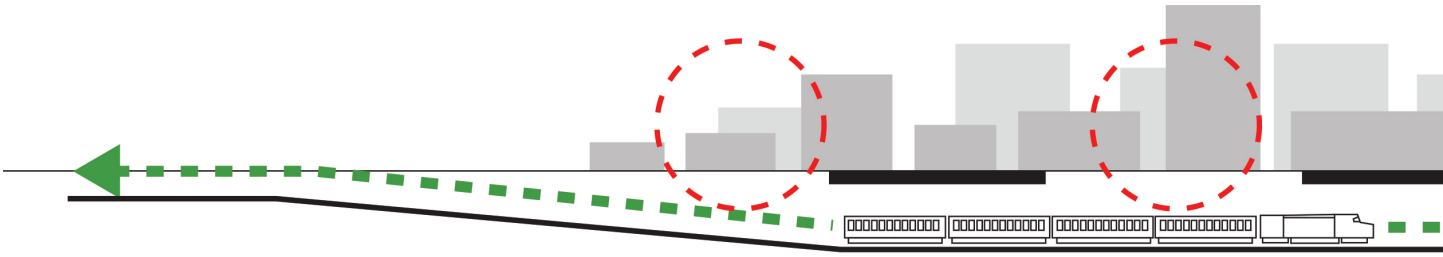
Figure 54 - Capping the Tracks Diagram



CORRIDOR SCALE

Strategically Cap

Upon dropping the train below grade within the city, this design proposes strategically capping the new corridor at various significant points in response to the various contexts through which it passes. This design response recognizes these points as being the industrial zone of the corridor where the historic Billings Depot is located, the commercial zone which features downtown core and the residential zone that consists of the north and south side communities.

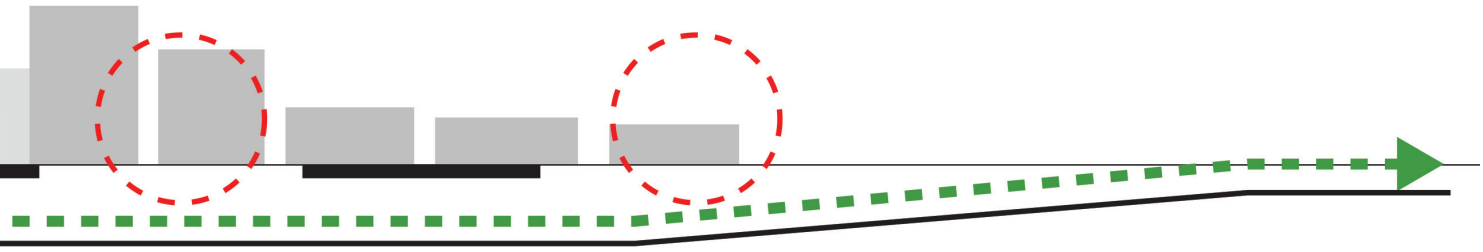


CORRIDOR SCALE

Visible Track

With the new corridor being capped in these significant places, this design recognizes the importance of the train in the city as a historical marker of regional and cultural identity. The nostalgia of the train in Montana is a powerful element that has shaped many communities and it is a sentiment that many towns, including Billings, strongly identify with. Leaving certain sections of the tracks exposed to the public promotes a new level of interaction with the trains, one that engages various demographics at different levels.

Figure 55 - Exposed Tracks Diagram



This re-imagined interaction with the railroad can appeal to the avid train enthusiast, the young child who enjoys watching the trains and listening to the sound of the horns, the commuter bicyclist who may be focused on an upcoming meeting at work, but is reminded of the presence of the train in the city nonetheless, the person driving a car across the new corridor and notices the train passing underneath at the same time, or the person out for a walk and decides to sit on a park bench and is pleasantly surprised at the emergence of the train out of a covered section of corridor. This design response proposes an experience of the railroad that can be pursued, ignored or passively enjoyed, all while celebrating the identity of railroad town in Montana.

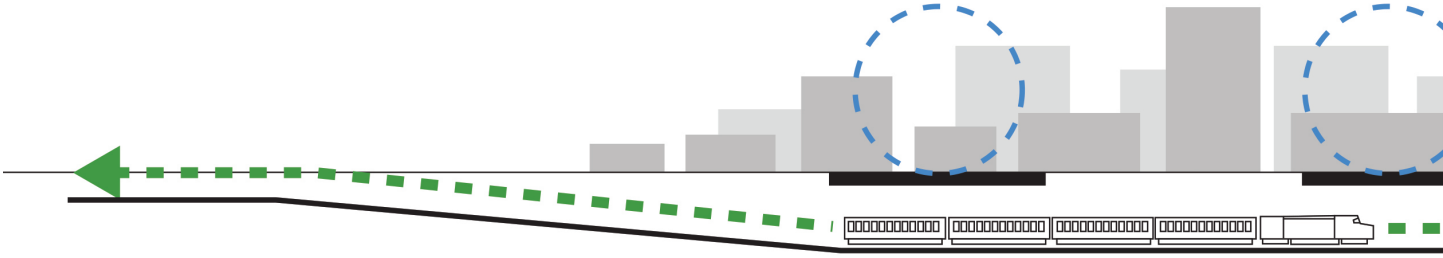
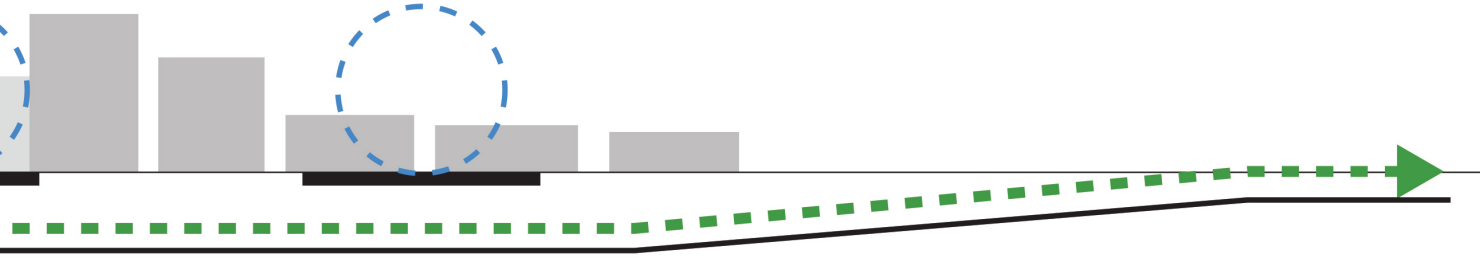


Figure 56 - Programming of Re-Gained Space Diagram



CORRIDOR SCALE

Program Re-Gained Space

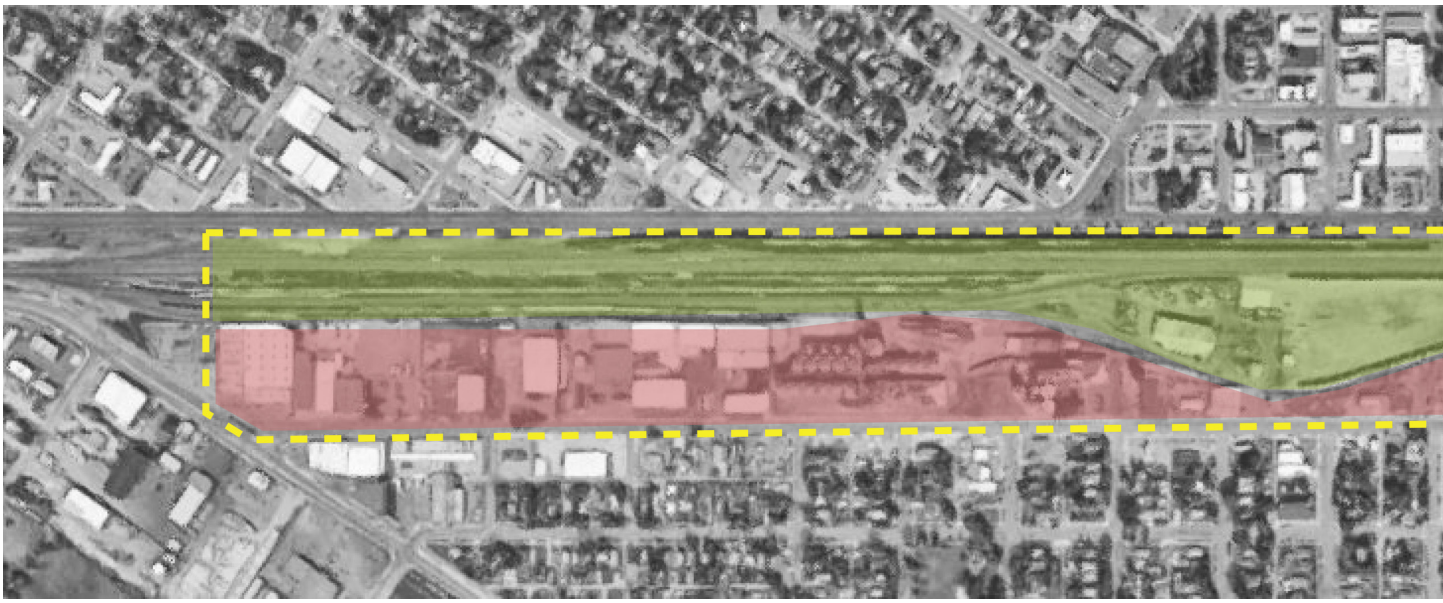
Lastly, the corridor scale design proposes programming of the re-gained space along the newly envisioned train corridor. The choice of program is in response to the existing context of Billings and incorporates programmatic and architectural design guidelines that either change the use of existing buildings to better respond to the immediate surroundings, create new uses through the implementation of new architecture, or emphasize and celebrate the current use and function of existing buildings.

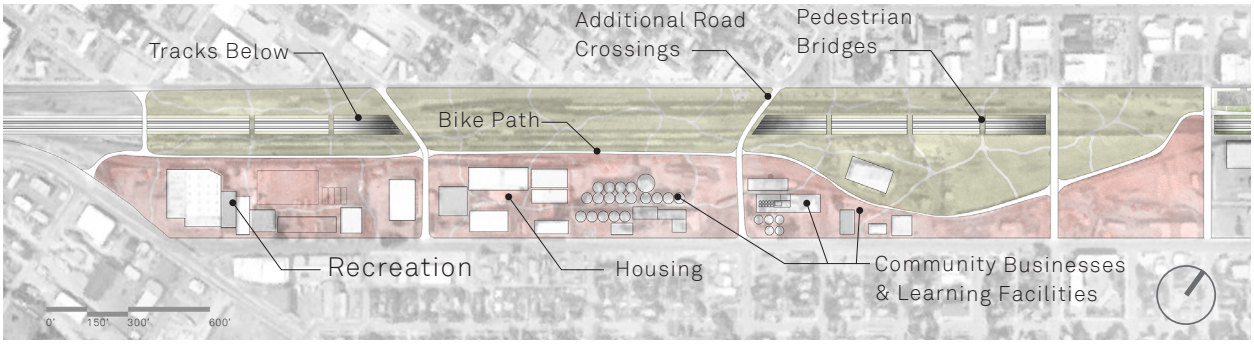
ZONE SCALE

The boundaries of the working corridor are identified by existing streets, current access points across the tracks and by changes in programmatic layout of the city. Today, the corridor is bounded by Montana Avenue to the north and Minnesota Avenue and 1st Avenue to the south. A large assemblage of overpasses and underpasses, along with a zoning transition into retail, caps the corridor on the west side. The east side of the corridor is defined by an underpass as well as the historic Billings Train Depot.

Figure 57 - Site Boundary Diagram

The design intervention draws upon the existing built condition to facilitate a connection between autonomous infrastructure and civic activity. Within the working train corridor of Billings, this thesis responds to the unique contexts throughout this two mile segment to create nodes of program that not only engage the immediate surroundings, but activate a new level of public use for the city as a whole. The design intervention is comprised of four different types of program, all emphasizing increased pubic engagement and access along the corridor. This thesis proposes a mixed-use development within the existing industrial buildings, a city park occupying the space where the rail yard used to be, a train station and public market, and a historic train museum.





Mixed-Use Development

Railway Park

Figure 58 - Residential Zone Program Diagram
Figure 59 - Residential Zone Design Proposal Diagram

ZONE SCALE

Residential Zone

Within this vast area of the corridor, this design intervention reduces its scale and subdivides the existing industrial facilities and train yard into two separate sections. This thesis proposes that the train yard be converted into a city park, utilizing its linear quality to provide multiple access points for pedestrians, bikers and vehicles, and act as a conduit of movement to the other zones along the corridor. The remaining industrial buildings which sit directly adjacent to the proposed park and the South Side neighborhood will be re-purposed to serve as a mixed-use amenity that engages both sides of the tracks in the downtown area of Billings. Within this mixed-use development, this design utilizes the existing industrial structures and proposes these buildings support community-oriented program, including a recreation center and sports fields, various housing accommodations, community businesses and public learning facilities.

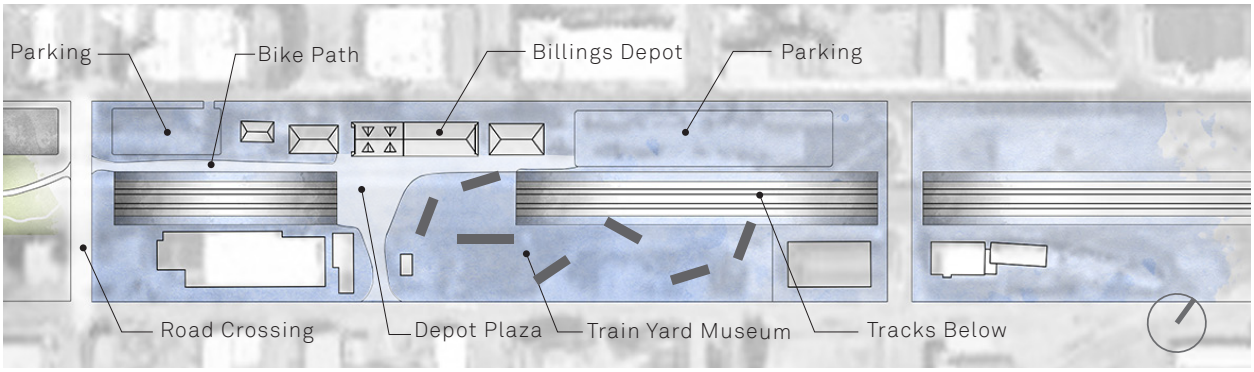
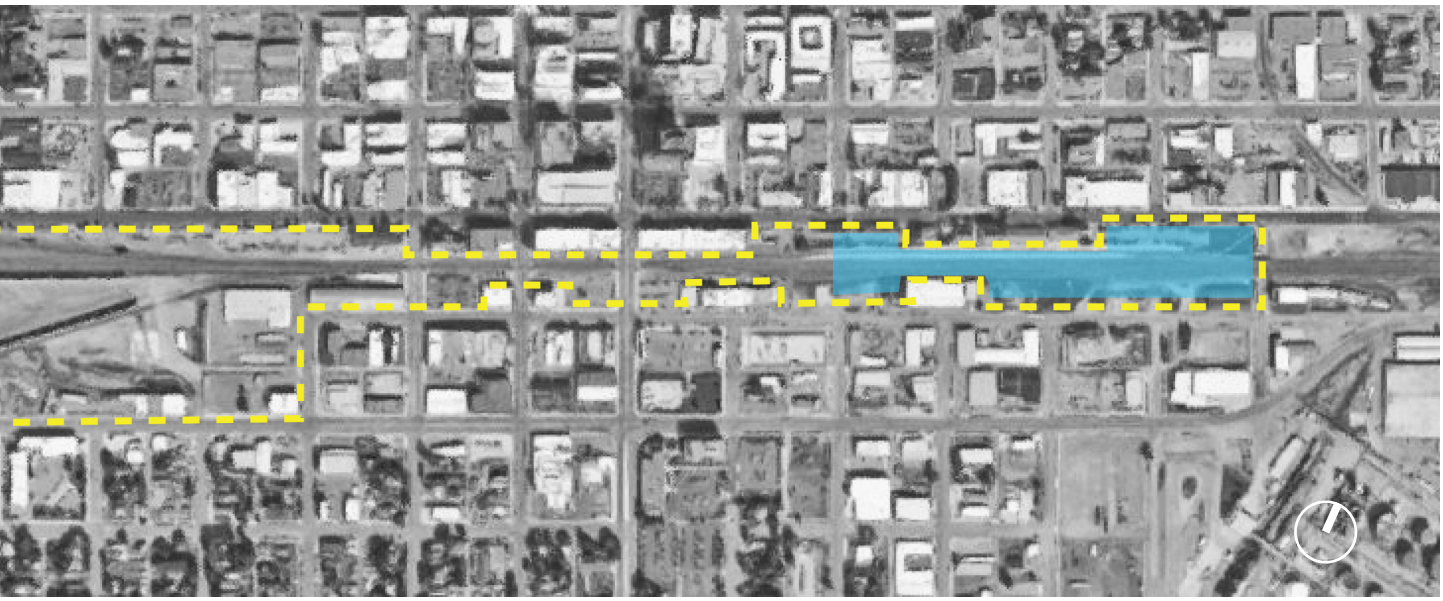


Figure 60 - Industrial Zone Program Diagram
Figure 61 - Industrial Zone Design Proposal Diagram



ZONE SCALE

Industrial Zone

The east end of the corridor features the historic Billings Train Depot and with the current function of this building serving as a public event space and Northern Pacific Railroad museum, the design intervention emphasizes this function and proposes a programmatic extension to the back side of the depot. This new program consists of a historic train museum and event plaza that promotes increased south side access to the depot. With additional visual connections to the active train tracks below, this proposal creates moments of contrast between the old and the new that celebrate the history of the railroad in Montana as well as acknowledge its role in shaping the futures of railroad towns across the state.

Figure 62 - Commercial Zone Program Diagram
Figure 63 - Commercial Zone Design Proposal Diagram

ZONE SCALE

Commercial Zone

The commercial zone of the downtown core of Billings is where this thesis focuses its design intervention. The proposal features a variety of program prioritizing public space and multi-modal access throughout a four block section of the downtown between Montana Avenue to the north and Minnesota Avenue to the south. The reclaimed space is activated by new levels of pedestrian and bicyclist activity in addition to increased vehicular access across the corridor. This string of public nodes stretches through the downtown core and acts as a seam of connectivity, creating equitable points of access from both sides of the tracks.

Acceptable Area

Figure 64 - Acceptable Intervention Area Diagram

PRIORITIES OF DESIGN

Acceptable Area

In re-imagining this section of corridor in the downtown core of Billings, this thesis recognizes the importance of establishing an acceptable intervention area. The existing buildings on the north side of the identified site are actively used today for commercial and retail purposes, while others serve more civic functions or are privately owned by the Montana Rail Link. The existing buildings on the south side half of the site are currently serving as light commercial and residential use. Although many of these buildings are under-utilized and do not experience the same amount of foot traffic as do the buildings on the north side of the site, the buildings on the eastern side of the southern half of the site have seen small business return over the past few years.

This thesis takes the position that these existing buildings are important to the downtown fabric of Billings and have the potential to serve the city to a fuller capacity if given the opportunity. The opportunity in this case, is the reintroduction of people to this area of the downtown core. For so many years, the spatial nature of the corridor was one that served the industrial freight train and nothing else. This in turn had a direct impact on the adjacent buildings, how they were used and perceived. Therefore, this design proposes to not remove any existing structures within the identified site. Within the downtown area of Billings, there is an abundance of open and in-between spaces that have the ability to affect change on their immediate surroundings. These open and in-between spaces is where the design intervention will take place.

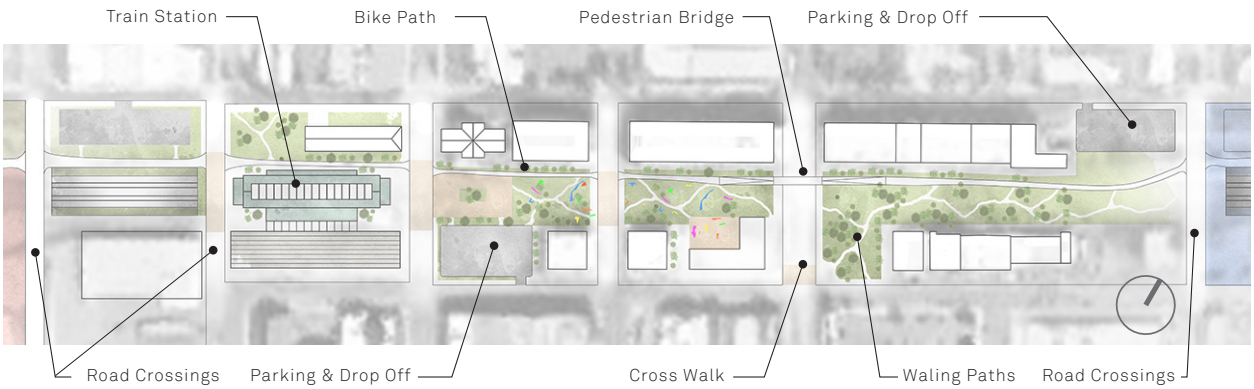


Figure 65 - Multi-Modal Access Diagram

PRIORITIES OF DESIGN

Multi-Modal Access

With the area of intervention defined as the spaces in-between the existing buildings on this site, the goal of this design is to transform the purpose of this new space into one that extends beyond its boundaries and can act as a platform for civic activity, providing the people of Billings with a place to go, a thing to do and a way to get there. Thus, this thesis approaches this site by prioritizing two primary programmatic elements. The first being increased access to multi-modal transportation. Billings, as well as most of Montana, is a car-dependent state and with such infrastructural attention being given to the automobile, this intervention brings priority back to other modes of mobility such as walking, biking, and riding the passenger train.

In this design, the proposed train station acts as the gateway to the city and features main entrances on the east and west ends of the building. With the new train station, this design recognizes the need for additional vehicular access as well as parking and drop-off areas within the site. The design proposes three new roads as well as three separate parking and drop-off zones, two of which utilize existing parking lots. In addition, the new section of corridor features new walking paths, a cross walk at the intersection of 27th Street and Minnesota Avenue, a pedestrian bridge and a bike path that follows the original route of the old freight tracks throughout the entire corridor. This connecting element stitches the nodes of new program together, emphasizing the vision for the corridor in Billings, a vision that allows people to move across, move to and move through this new space in the city.

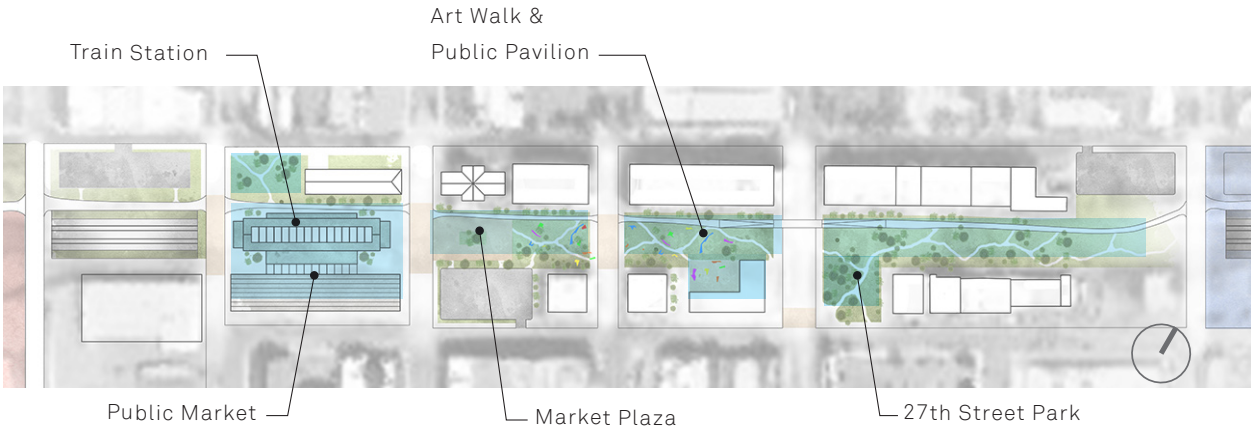


Figure 66 - Public Amenity Diagram

PRIORITIES OF DESIGN
Public Space

The third priority of this design intervention is the creation and activation of public space within the downtown core of Billings. This design priority stresses the importance of diversity among environments. This idea of diversity is explained by Kevin Lynch as "a place which affords obvious and easy access to a moderate variety of people, goods and settings, while this variety can be expanded if a person wishes to expend further energy - an explorable world, whose vast diversities can be sought out or ignored at will."[38]

The types of public space proposed in this design intervention utilize the concepts brought forth by Lynch in that these spaces incorporate more passive programs that can be explored or ignored by the public at their choosing. For some, this new corridor can serve a utilitarian function, allowing easier transportation from one point to another. For others, this space can serve as an explorable world where the proposed program acts as a primary form of leisure, a place for rejuvenation, a place of social interaction, a place to support local business, or a place to enjoy one's self and meet fellow members of the community.

With Billings being relatively spread out, this design strategy bases itself on the concentration of space and people in the downtown core. Jane Jacobs describes concentration of people in the city as a "positive good" that acts as a source of vitality that should be "enjoyed as an asset and their presence celebrated: by raising the concentrations of people where it is needful for flourishing city life...and aiming for a visibly lively public street life and for accommodating and encouraging, economically and visually, as much variety as possible."[39]

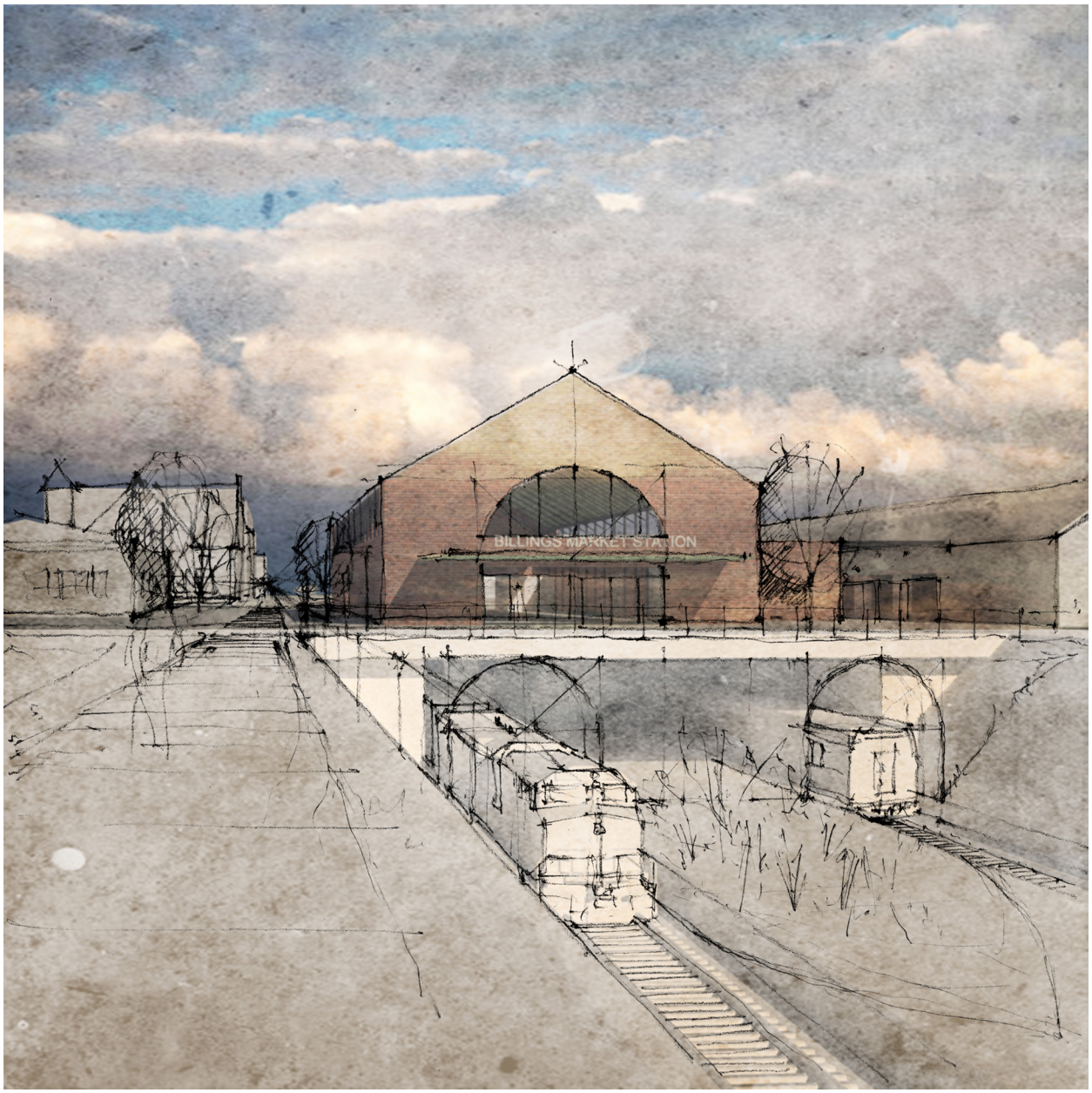


Figure 67 - Approaching Billings Market Station from the West

BILLINGS MARKET STATION

Approaching this newly envisioned stretch of the downtown from the west, the bike path that connects the entire corridor rides along an exposed section of track that showcases the trains arriving and departing from the new station. The new station design references the industrial vernacular of the region with its brick exterior and gabled metal roof. While moderately scaled, the station rises up above the surrounding buildings and features a large, arched entry on the east and west ends, providing an increased level of architectural contrast between the old industrial and the new civic.

The station is flanked on either side by the bike path (on the north side) and by the public market (on the south side) which utilizes an existing warehouse owned by the Montana Rail Link. This design balances the large scale entry points with smaller scaled spaces on the side, each having smaller entrances as well.

Figure 68 - Train Station Aerial

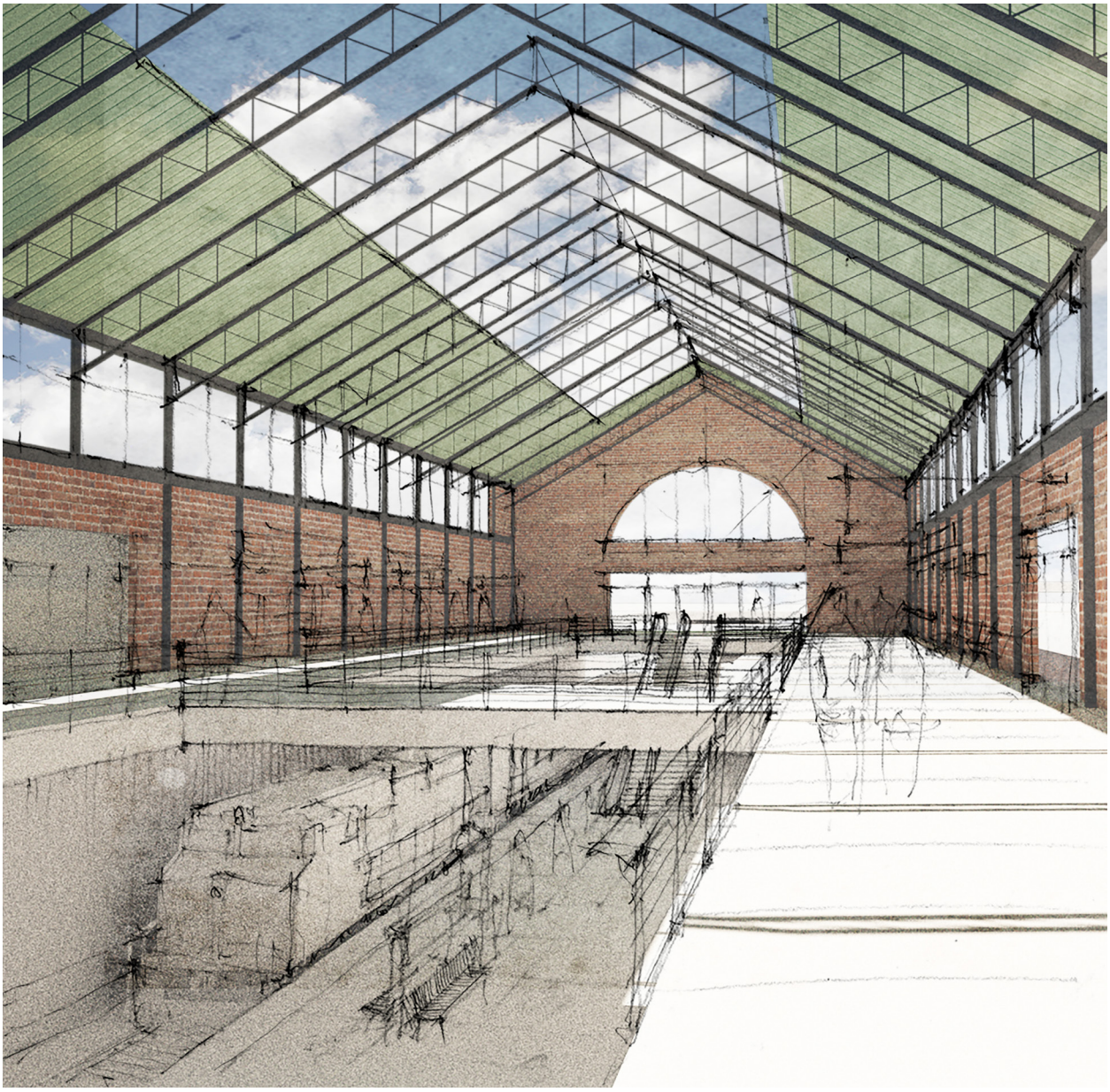


Figure 69 - Train Station Interior

THE STATION

After passing through the lowered awning at the east and west entrances, the interior space opens up to the main station hall where the steel truss structure is exposed, emphasizing a sense of openness throughout the building. With the train running through the city below grade, the clerestory windows on the north and south sides of the station, as well as the skylight above, allow light to pour into the building, filtering down to the train platform below.

The primary design element of the station is its location on the tracks. Rather than being placed on one side, like many historical train stations including the Billings Train Depot, this station straddles the tracks, promoting access from both sides. Passengers now enter the station from the north, south, east and west onto a mezzanine that encompasses the entire building. From here, people descend down to the central platform to ride the train while still maintaining a visual connection with the station hall above.

Figure 70 - Train Station Aerial

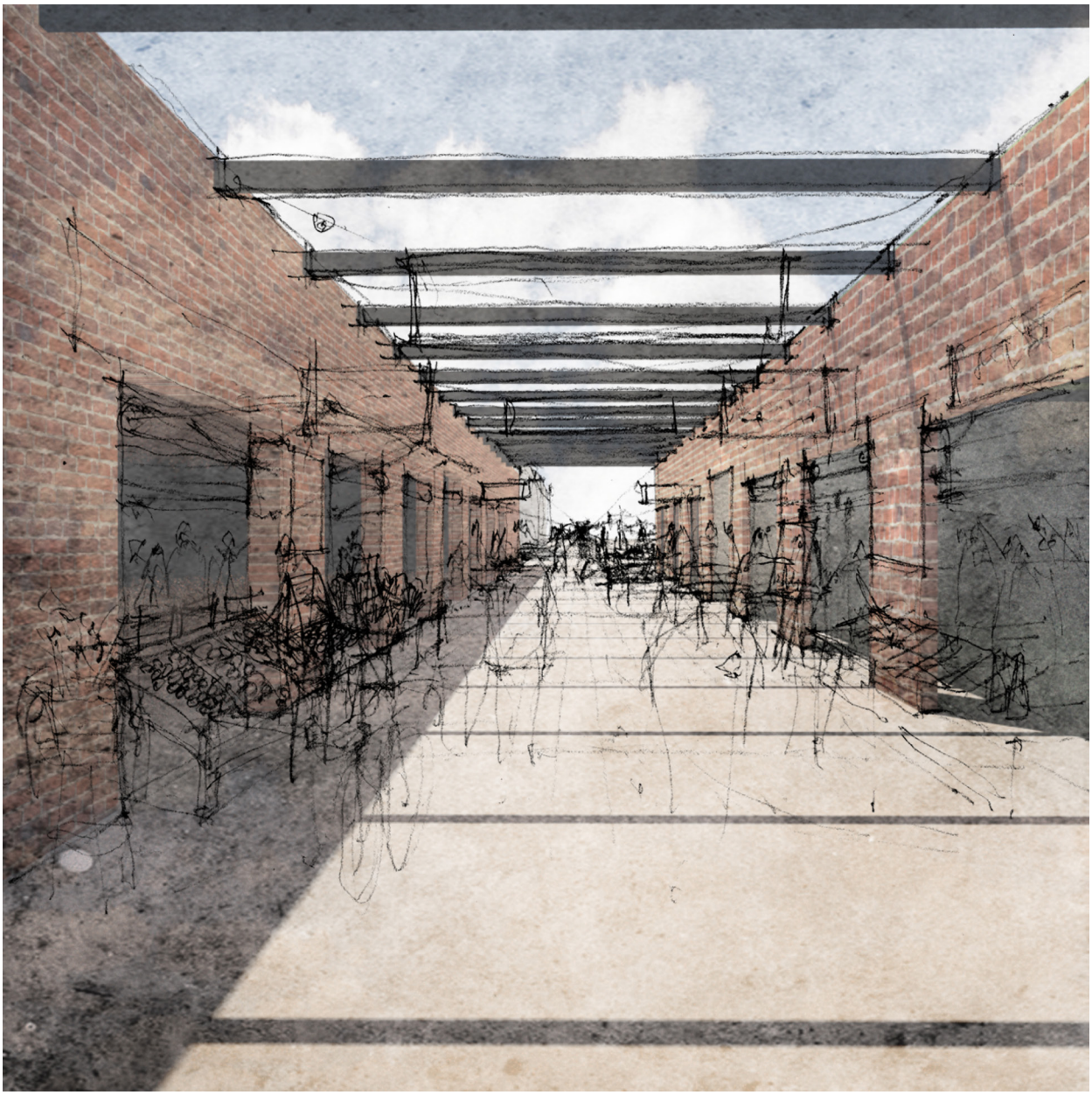


Figure 71 - Billings Public Market

THE PUBLIC MARKET

Directly to the south side of the Train Station is the new Billings Public Market. Proposed to occupy a warehouse currently owned by the Montana Rail Link, this addition of program in the downtown core is in support of local vendors and craftspeople in the area. As the city of Billings grows, the downtown has many needs that are trying to be addressed. One of these needs is that of housing. For years this issue has been difficult to address and while the south side downtown area offers optimal location, the lack of desirability has remained a problem, largely due to the presence of the train in the city. With the goal of this design being to prioritize public space within the bounds of the site, the train being below grade within the city allows this piece of program to assist in making this historic area more desirable for public activity as well as future living.

Figure 72 - Billings Public Market Aerial

Figure 73 - Billings Market Plaza

MARKET PLAZA

Across the street to the east of the station is the Billings Market Plaza. This open public space in the city serves many functions. First, it acts as an overflow space for passengers entering and leaving the station. Second, this space is an extension of the public market across the street that provides space for vendors who do not have stall space in the market hall. During the warmer months of the year, this space can host farmer's markets, craft fairs, food trucks and other outdoor events.

Third, the plaza engages the south side of the Western Heritage Center directly adjacent to the north. Once blocked in on its south side by fences and train tracks, this now open space showcases this historic building as the anchor of this programmatic intervention. Lastly, the plaza serves the general public of Billings. Its close proximity to the downtown core and the South Side neighborhood makes this space a central gathering point for a variety of people at different times throughout the day.

Figure 74 - Billings Market Plaza Aerial

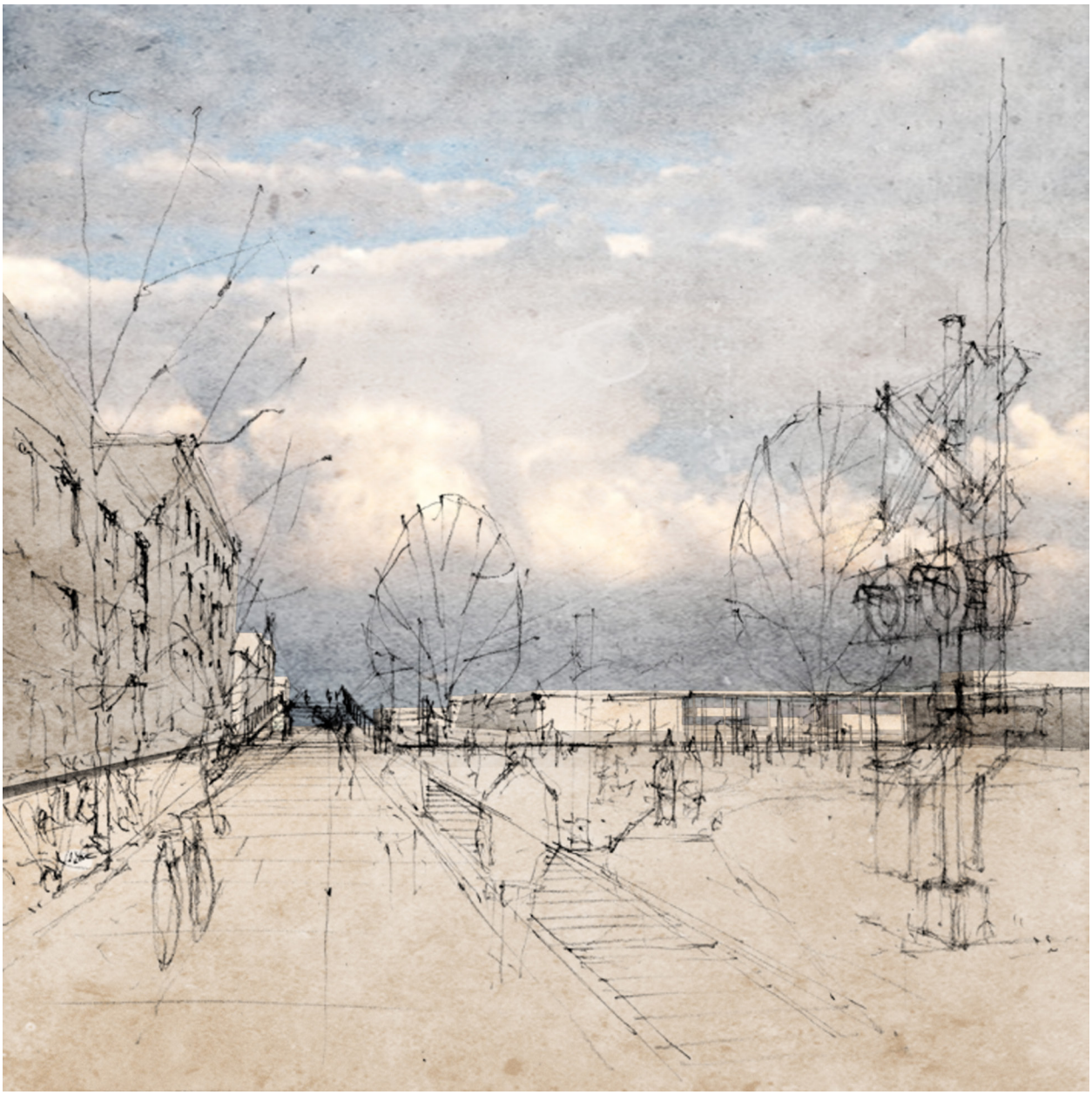


Figure 75 - The Artwalk

THE ARTWALK

Continuing east along the bike path through the downtown core, the artwalk presents the city of Billings with an opportunity to show off the work of its emerging artist community. The in between spaces along this portion of the bike path are compressed by two existing buildings on the south side of the corridor. With the continuous backside walls of the buildings to the north also framing this space, this section now becomes a tapestry for local art and cultural expression of the city.

The eastern edge of the artwalk is where the public pavilion is located. Framing the corner of the highly trafficked 27th Street and the currently quite Minnesota Avenue, this programmatic element opens inward towards the artwalk. The pavilion offers both interior and exterior event and workshop spaces for artists to practice their craft and put it on display in either more formal gallery settings, as an exterior installation piece under the pavilion canopy, or along the artwalk.

Figure 76 - The Artwalk Aerial

Figure 77 - 27th Street Park

27th STREET PARK

The final piece of program along the downtown corridor is the 27th Street Park. Directly across from the artwalk and public pavilion, the park offers green space in the downtown core, an amenity that is currently lacking in this area. Featuring walking paths, wooded areas and proximity to several small businesses that have started to occupy this section of the south side, the park offers release from the hard-scaped condition of downtown Billings.

A main feature of the park is the new pedestrian / bicyclist bridge that spans across 27th Street and connects the park to the artwalk to the west. With 27th Street serving the city as the primary thoroughfare connecting Interstate 90, downtown Billings and Logan International Airport, this street is primarily dominated by the automobile and has little pedestrian access. Therefore, the pedestrian bridge allows pedestrians, bicyclists and vehicles uninhibited movement throughout this porting of the new corridor.

Figure 78 - 27th Street Park Aerial

Figure 79 - Commercial Zone Section & Aerial Perspective


CROWNE PLAZA

VII
CONCLUSION

This thesis contends that Montana towns have an opportunity to create new and healthier relationships between the railroads and the communities they divide. The city of Billings acts as an example of what is possible for railroad towns in Montana, and by exploring a variety of design approaches in different contexts of the city, we can imagine how other towns with similar conditions can do the same. The railroad, the life source for so many Montana towns, has the opportunity to transform its role into a new people-oriented infrastructural amenity that not only celebrates its rich history, but establishes an engaging connection to its cities and serves as a public platform to create a more vibrant future for Montana's railroad towns.

This thesis works within the realm of what could be in the city of Billings, making a conscious effort to approach the condition of the railroad through the lens of envisioning what is possible. In understanding the rigid nature of railroad infrastructure, the railroad in Montana towns is often considered a permanent infrastructural fixture around which city life must conform. This exploration challenges this condition and demonstrates that infrastructure and city do not need to exist in isolation from one another. By approaching the train corridor in Billings not as a fixed condition, but as a usable asset capable of change, the re-imagining of what is possible for Montana's railroad towns can now transition into the realm of the probable.

This thesis strives to work within the broader context of Billings and uses its existing infrastructure as an asset for intervention. The design concepts of “acceptance” and “active change”, brought forth by Kelly Shannon and Marcel Smets, have played a pivotal role in re-imagining the working railroad town. By accepting the essence of what Billings is and by utilizing the existing context to aid the design process, the intervention can more effectively preserve and celebrate the character and identity of the city. Through actively changing specific components within the accepted condition, the role of the train in the city can serve to improve the continuity of city life.

This thesis presents but one iteration of what the working railroad town in Montana can aspire to be. By exploring the conditions of the railroad corridor in Billings, it is clear that there are many ways in which to re-connect communities to the train corridors that once served them. Through design decisions at the city, corridor and zone scales, this thesis utilizes the existing infrastructure established by the railroad to act as a framework for design intervention in an attempt to re-imagine the train’s identity in Montana - an identity that promotes and celebrates the coexistence of infrastructure and civic amenity.

“Today, infrastructure can no longer simply be considered as a large object in isolation from its surroundings... Landscape and infrastructure merge and movement corridors are re-worked as new vessels of collective life.”

- Marcel Smets & Kelly Shannon

Figure 80 - Re-Imagined Corridor in Billings, Montana Aerial Perspective

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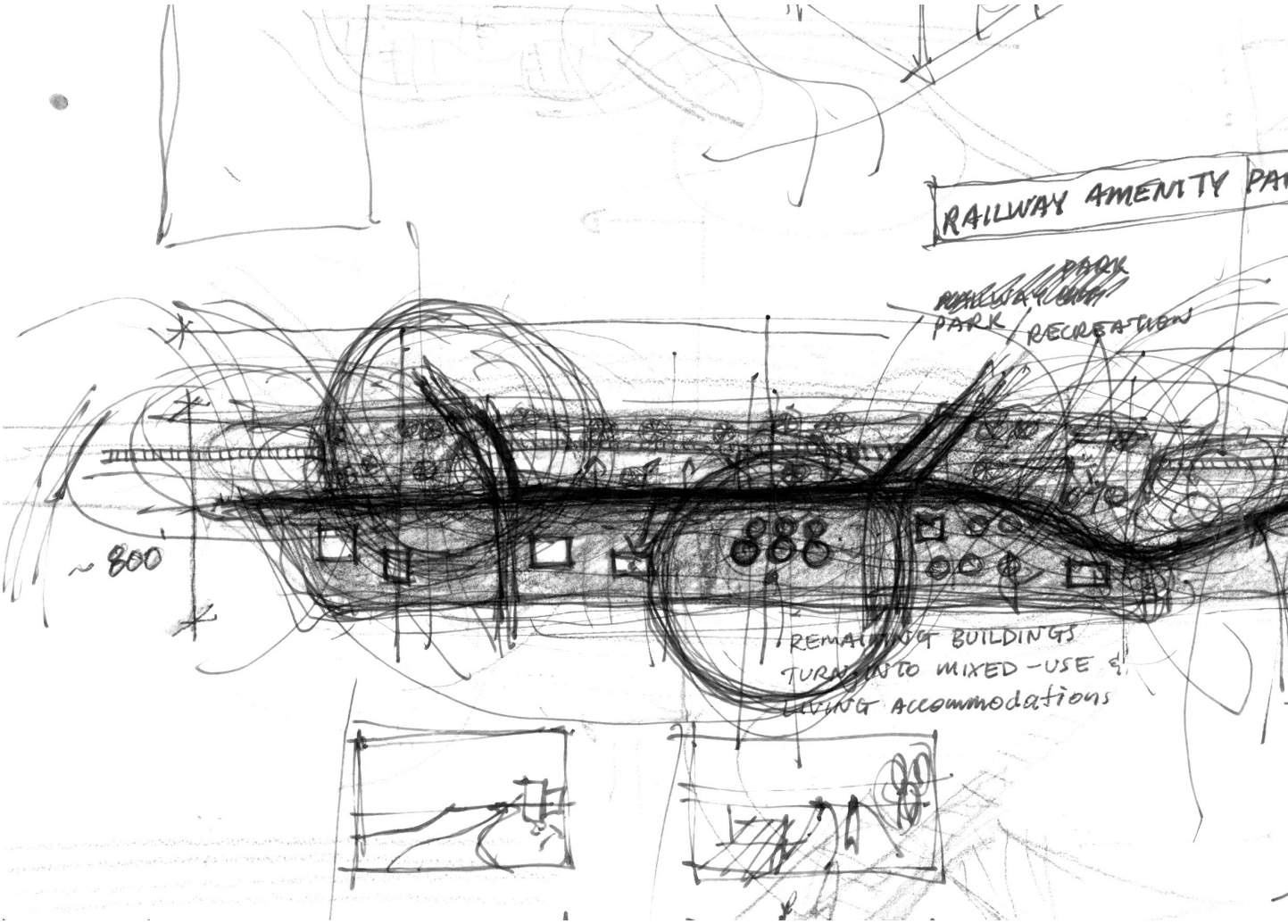
APPENDIX
Iterations



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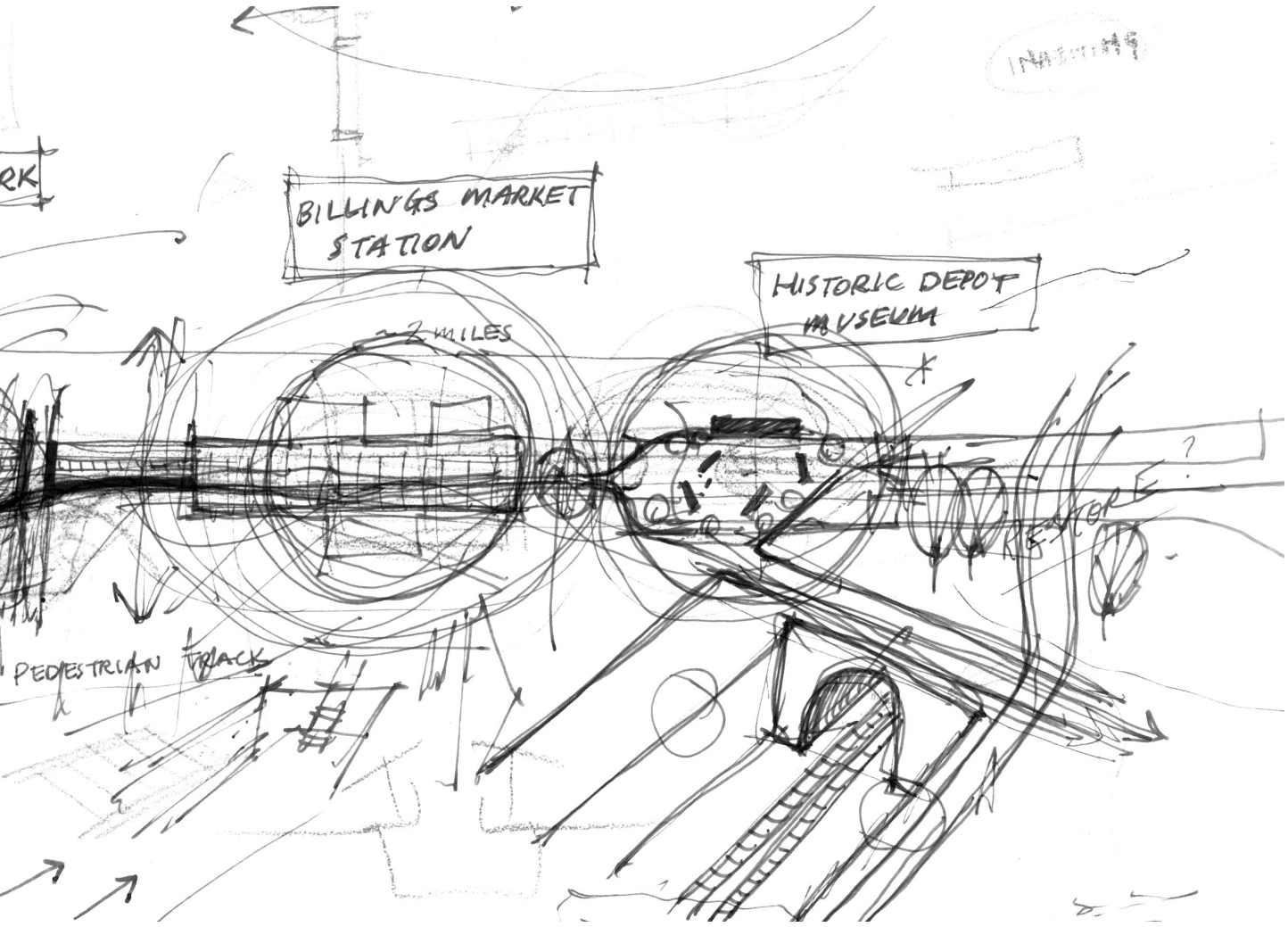
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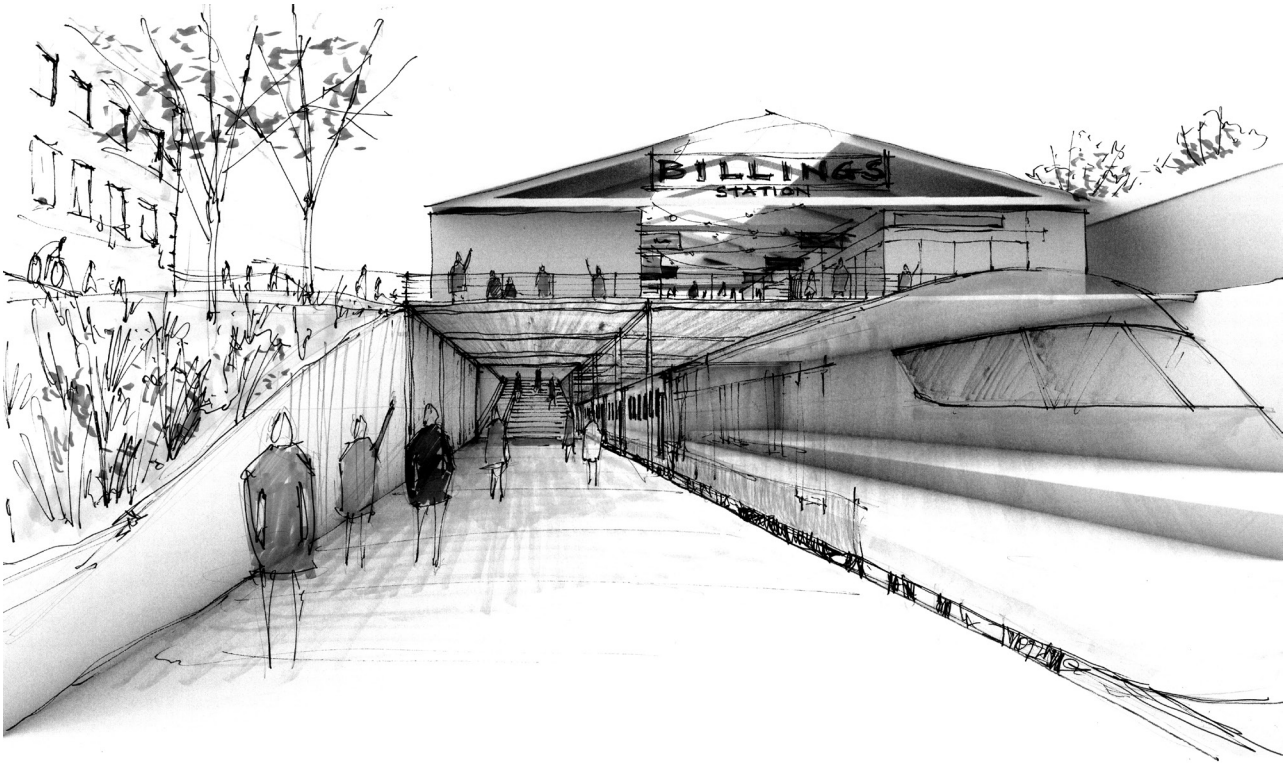

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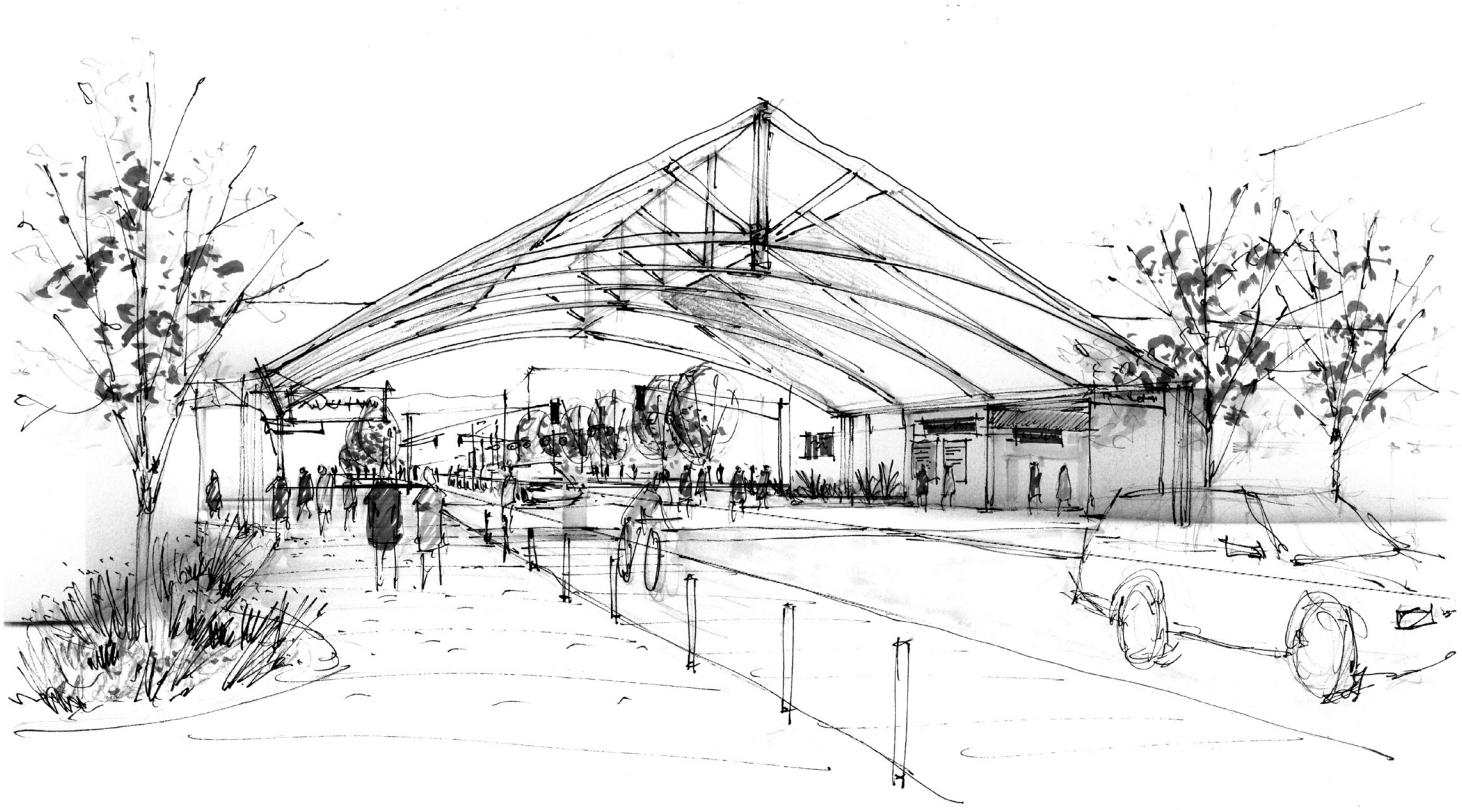

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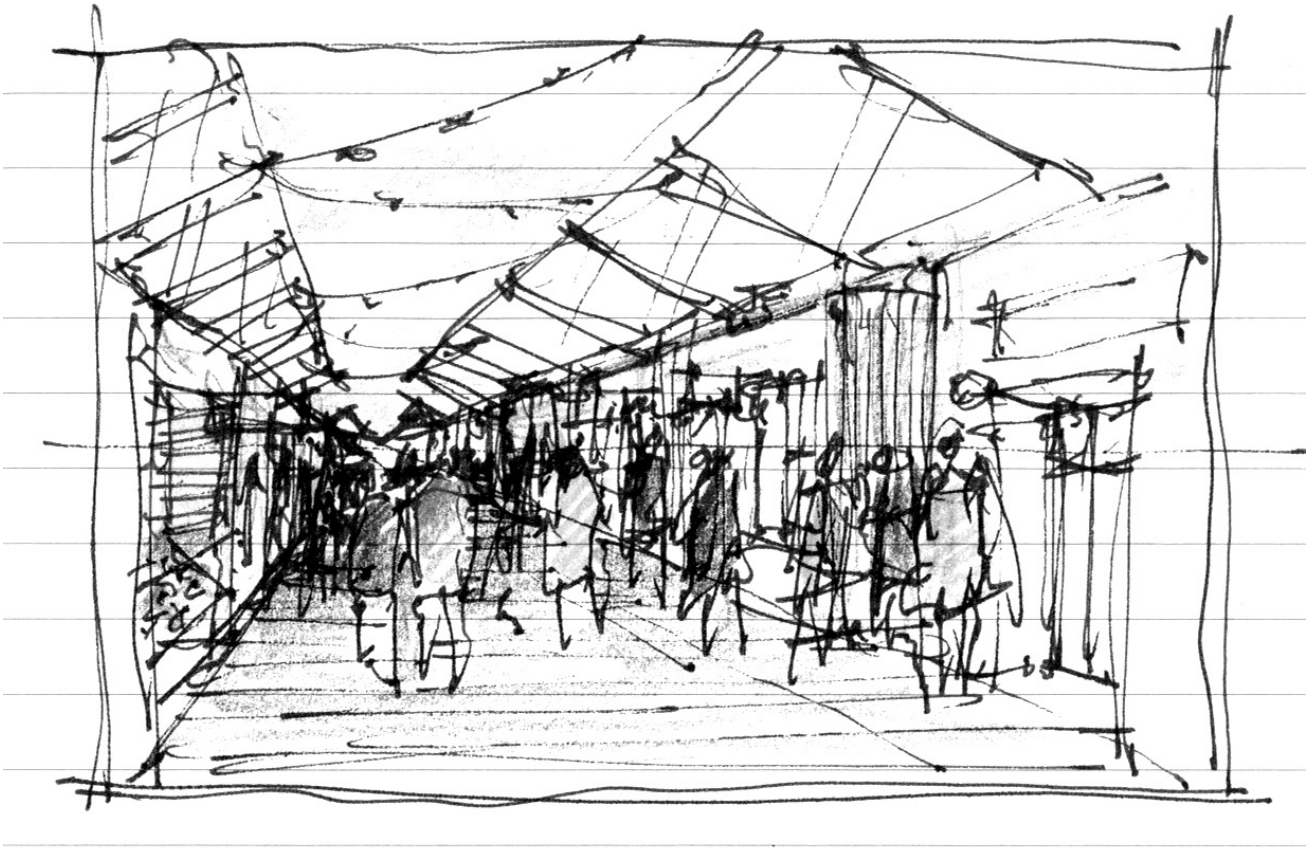
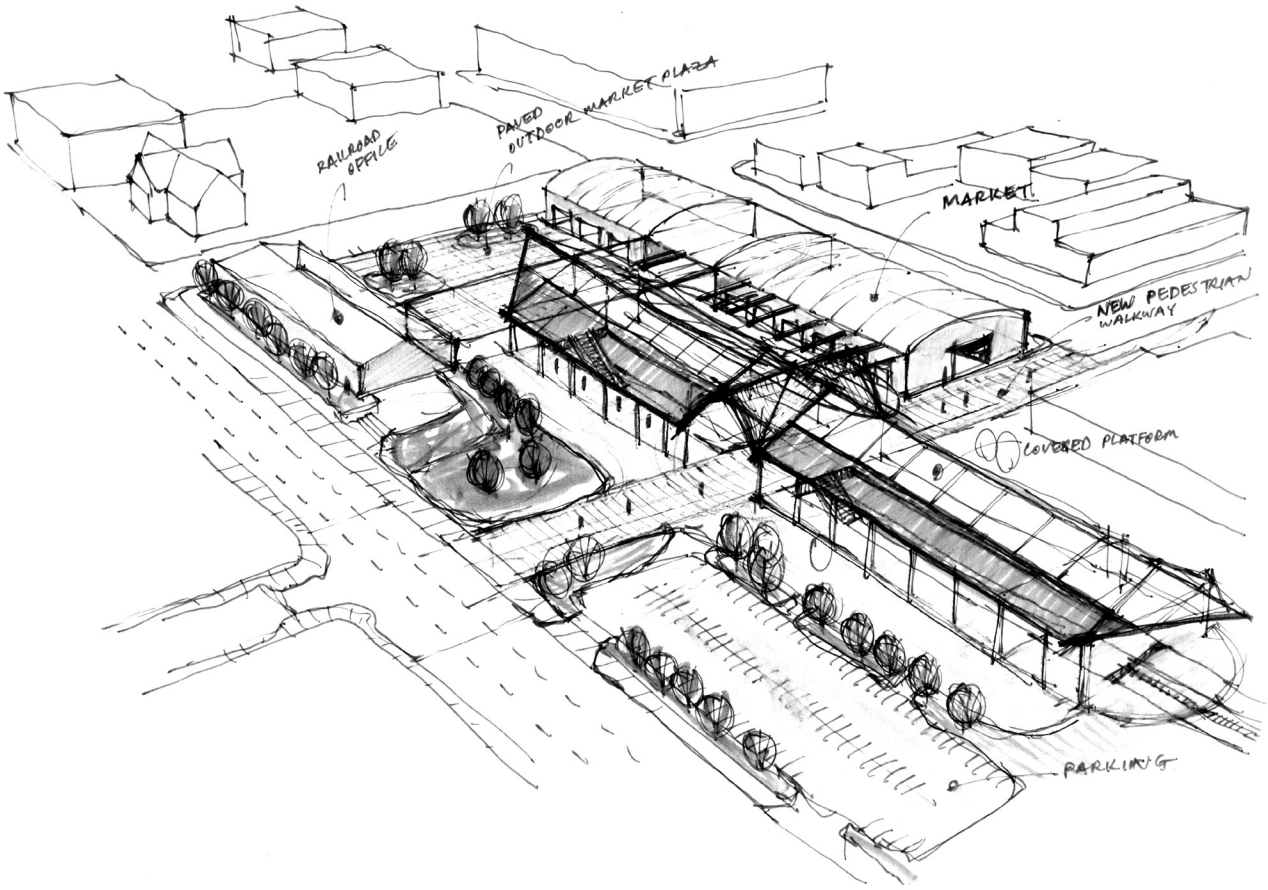


Public Market (Opt. 1)

Public Market (Opt. 2)



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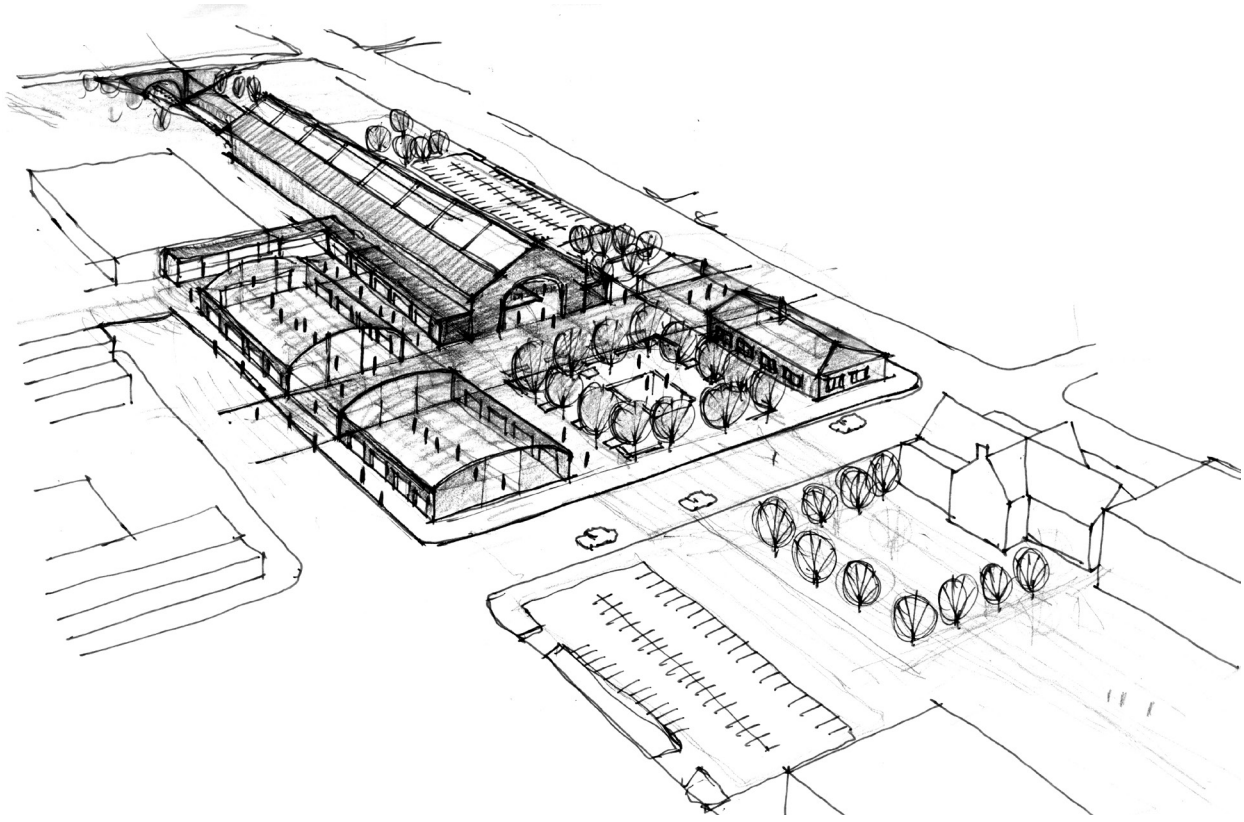

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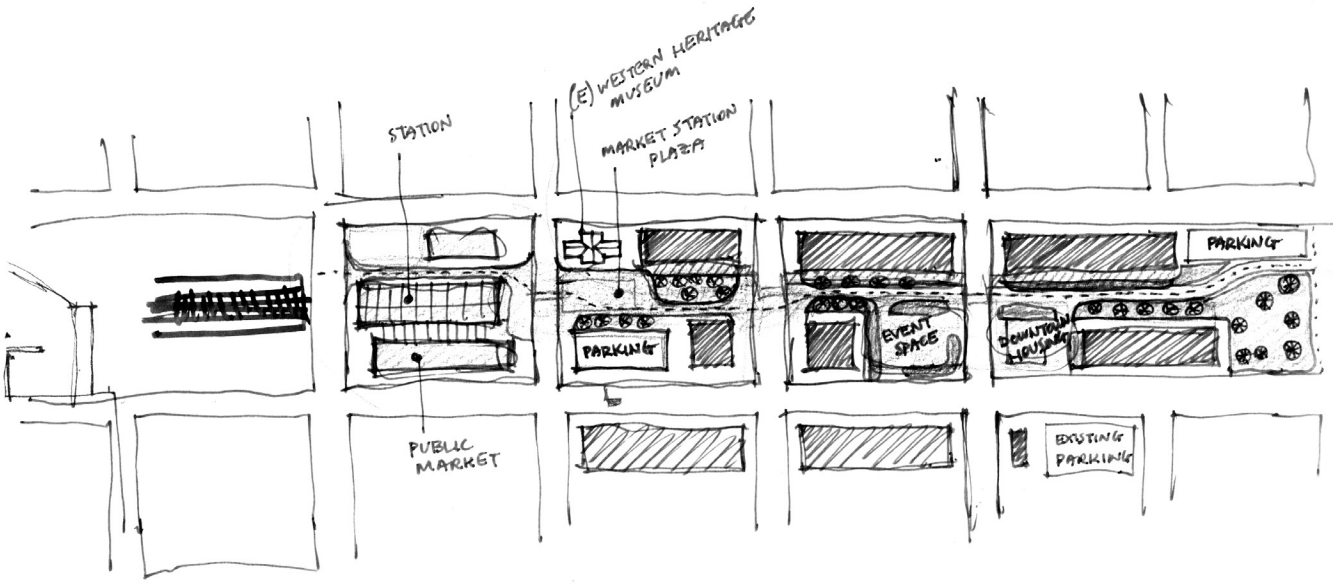

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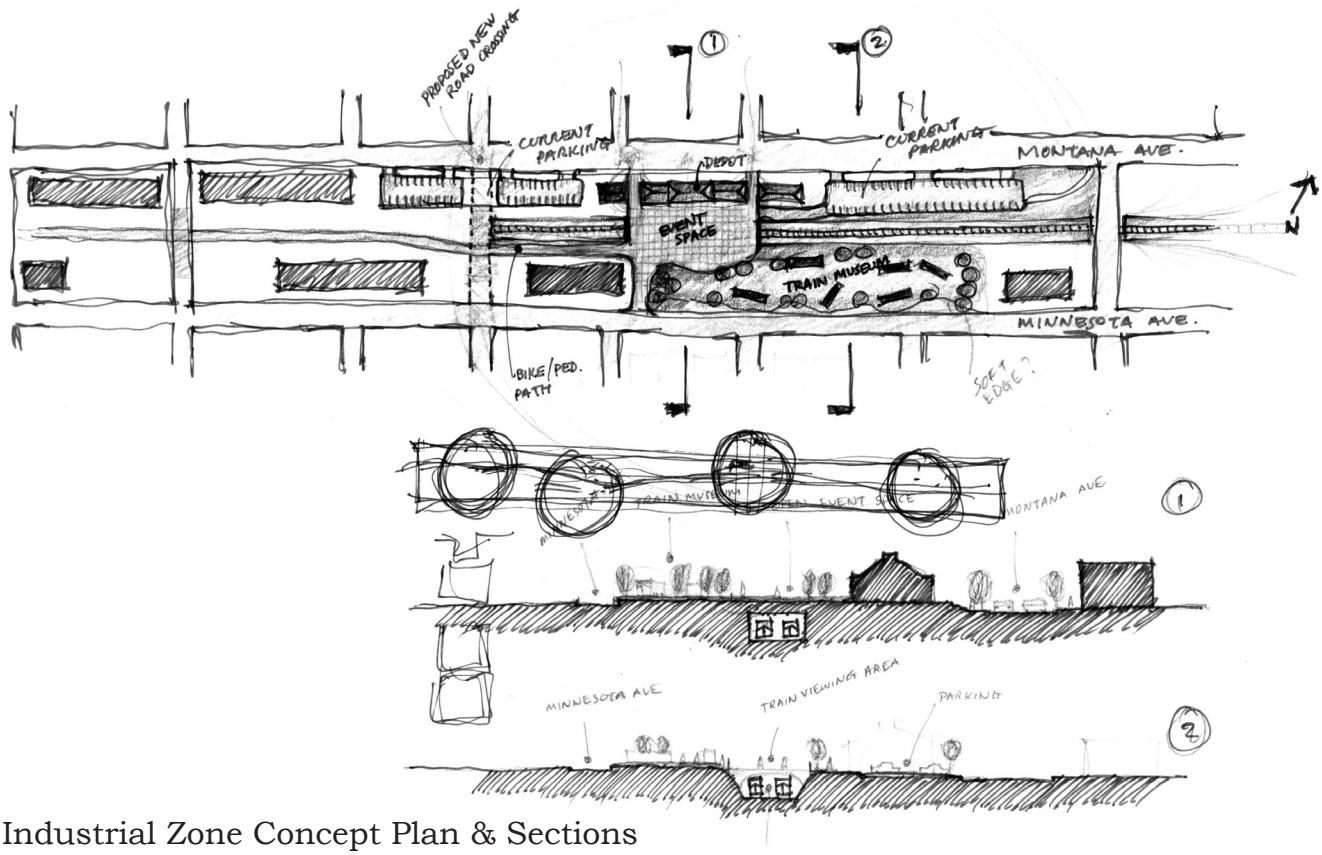

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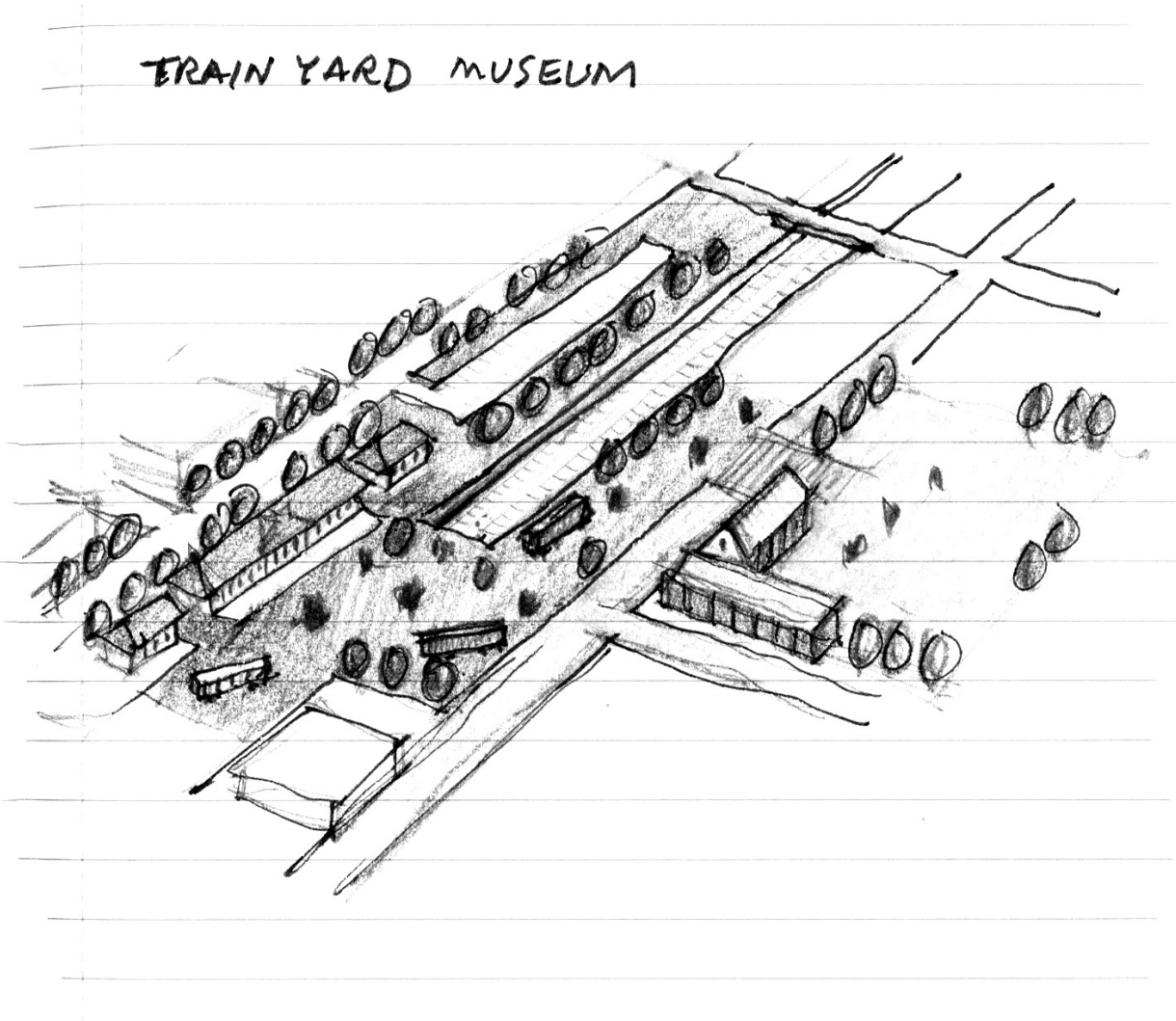
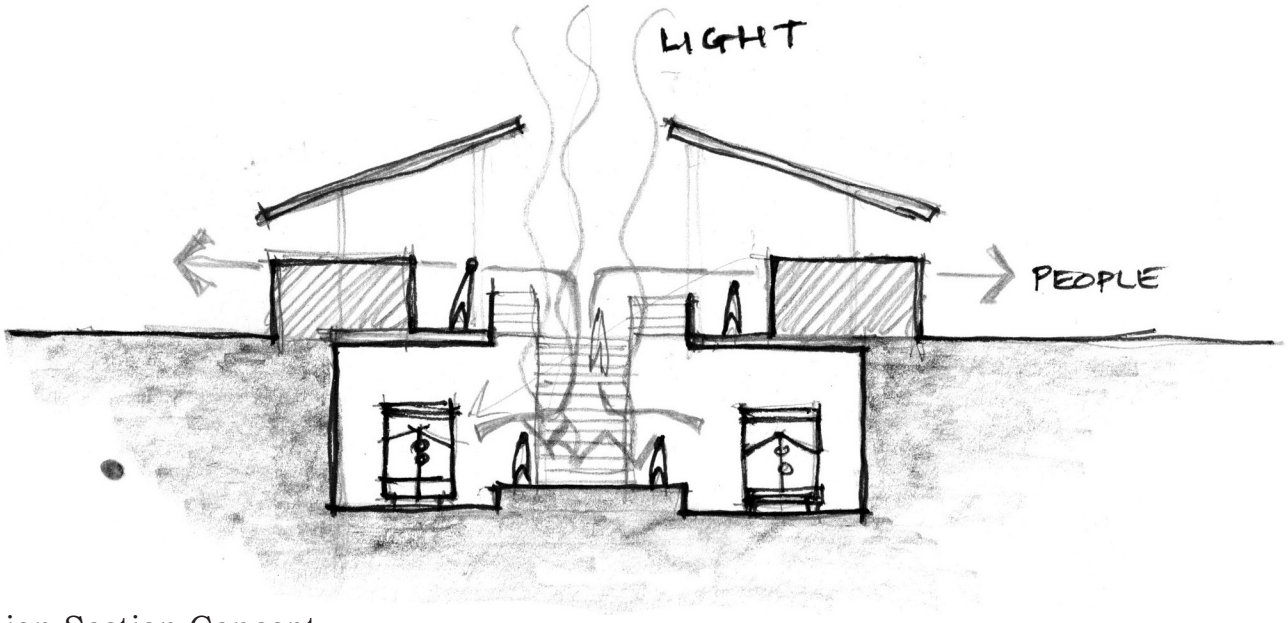
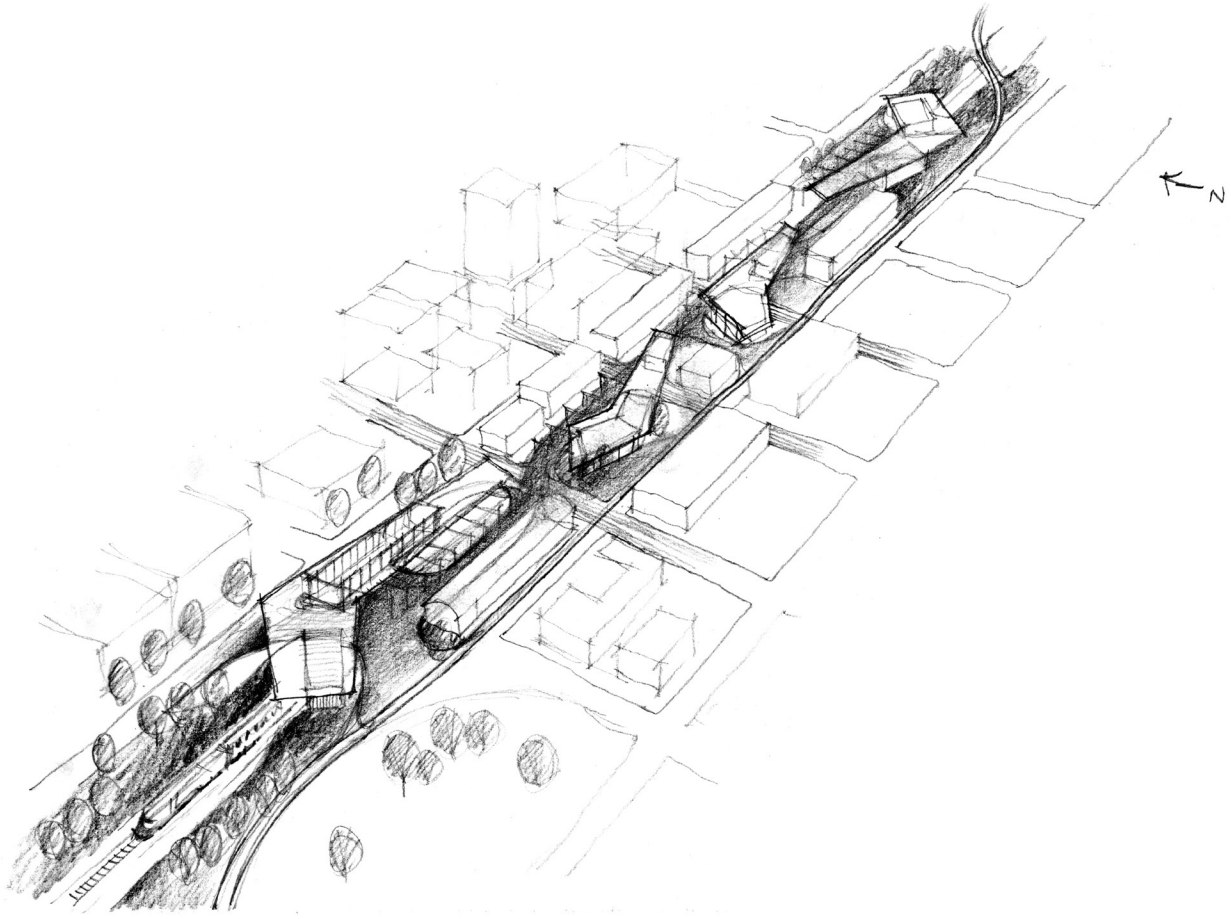


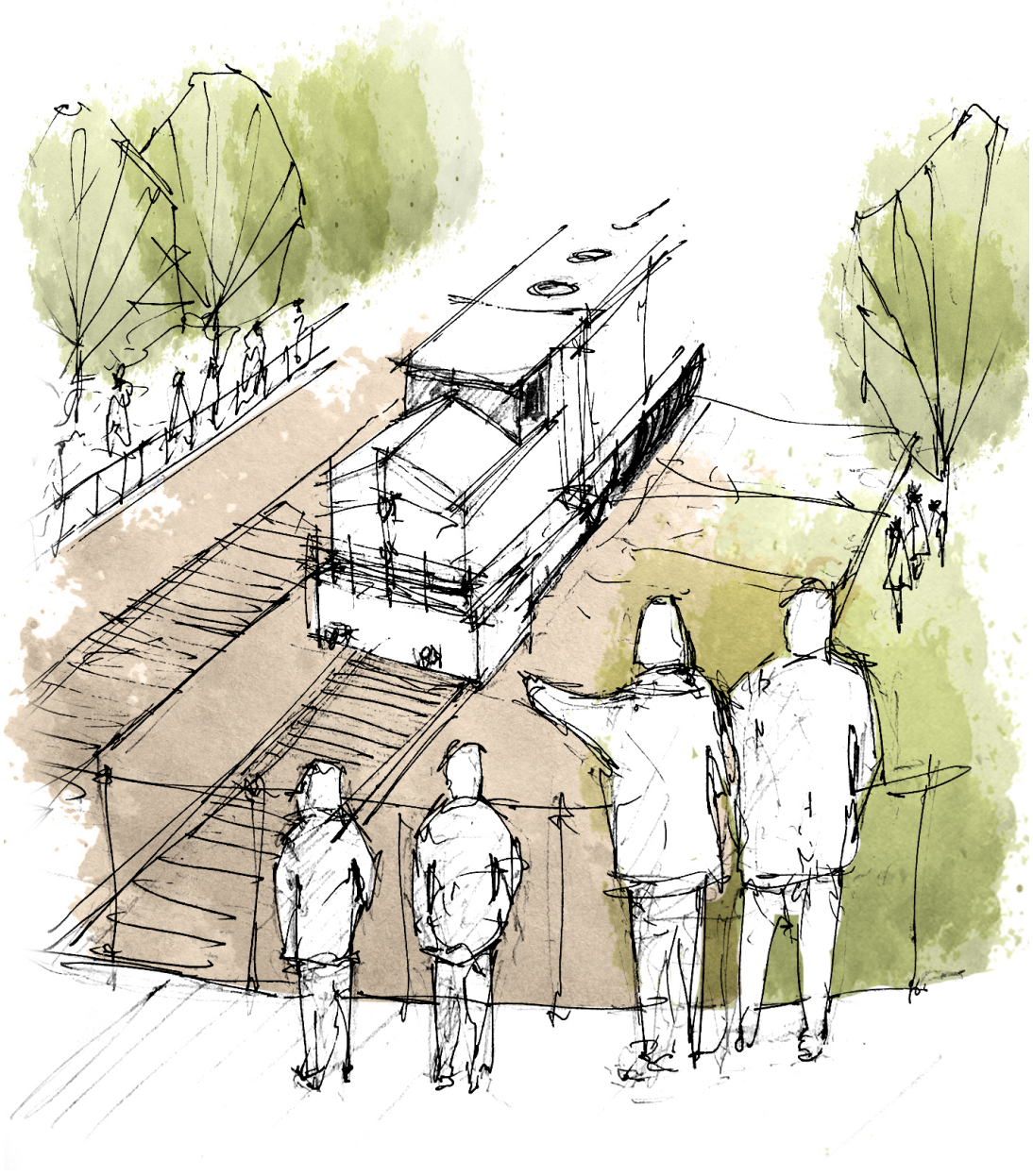
Train Yard Museum Concept



Station Section Concept



Station Concept - String of Nodes



Train in the City

Initial Visions