Multimodal Transit Station

by

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A Terminal Project
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Statement of Intent

As the price of gasoline continues to rise, traffic congestion threatens to gridlock our city streets, available parking becomes increasingly scarce, and the general public becomes more vocal about these problems, many varied groups of concerned citizens and professionals are proposing a different approach to solving our transportation needs.

One approach would be to attack the individual factors comprising each problem. For instance, the price of gasoline is chiefly determined by taxes, supply, and demand. One could then argue we should try to reduce the taxes on gasoline. That would lower the price and then everyone would be happy. However, much of the gasoline tax pays for road construction and maintenance, so this solution is not feasible. No tax money, no roads. The frustrations caused by traffic congestion and parking availability could be solved by constructing more and bigger streets, roads, and freeways, and building more parking facilities, all at the cost of billions of tax dollars. That certainly is a viable solution, one which is employed throughout many cities and towns in the United States. However, one could counter this suggestion by pointing out the high cost of road construction and maintenance, and the real estate resources consumed by our already bloated system of roads. Most importantly, these ideas do not address the larger scale problem: the United States has an obsession with the automobile, probably because it is the most convenient form of transportation widely available.

In many cities, automobile ownership provides opportunities unavailable to those who do not own an automobile. Some people are consequently trapped by the unavailability of transportation. Conversely, automobile owners are trapped through traffic congestion and the need to find parking. Both groups are enslaved by the automobile; one with, and one without. This slavery can be broken through the provision of attractive, readily accessible, affordable, and timely public transportation. This will give all citizens the freedom to move and travel as they wish without the need to be chained to an automobile. For these reasons, I propose to develop a mass transit rail system in the Midwest to allow every resident the freedom move about the entire region.

The final product of this project will be a train station/transportation hub in Lincoln. Providing a common location for all forms of mass transit to converge together for hassle-free transfer between systems, this transportation hub will allow easy access to all modes of traffic: pedestrian, bicycling, automobiles, buses, street trams, and trains. Alternative means of transport (non-automobile) will be encouraged.

This project, while specifically addressing the criticisms surrounding mass transit in the United States through design strategies, will allow for a broader look at how architecture can respond to the need for mass transportation.

In addition, I will explore the feasibility and possible implementation of different sustainable models as they relate to transportation, both personal and public. I will also research possible ways to reduce energy consumption in commuter transportation and suggest alternative energy-efficient models for public transportation.

This system, when tied-in with a larger network of systems, not only increases transportation availability, but can be considered sustainable economically as well as architecturally. Through greater transport availability, individual cities need not duplicate services, such as a convention center, provided in closely neighboring cities. This allows each city to develop a unique character.

My experience traveling throughout Europe with the London Program exposed me to many modes of mass transit I had never before experienced. It was refreshing to live without my own automobile as I relied completely on mass transit across nine countries and through 21 cities. This three-and-a-half month experience provided me with sufficient basic knowledge and personal experience to propose such a system for Lincoln.
Site Description

Due to the urban nature of public transportation, the transportation hub shall be sited within reasonable proximity to the downtown of Lincoln. Possible sites include the Haymarket district and more specifically, the current Lincoln train station. It shall strive to make use of sites possessing no built structure or properties recommended for re-development. The central location of this transportation hub will provide easy access to pedestrians, bicyclists, automobiles, buses, street trams, and trains.
Methodology/Approach

This thesis project is a response to the need for more efficient mass transit in Lincoln and the Midwest region. Preliminary research will inform the design of the mass transit system and help determine where the main station/hub will be located. A series of plans, from a macro to micro level, shall detail how this system ties in with neighboring modes of transportation and how the system functions within itself. In addition, a review of Lincoln’s Master Plan and existing railroad rights-of-way will also guide the system development and site selection. A review of the current modes of public transportation will determine how or if it should change to accentuate the new mass transit system. Exhaustive research and review of existing precedents similar to Lincoln will help determine not only the choice of system but also the most viable and applicable options for this situation. Possible means of implementing alternative energy sources in every aspect of the system will be explored throughout the research and design process.

Bibliography


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Premise

It is more efficient in terms of land usage, energy policy, and available resources to invest in public rail transit infrastructure.

Facts:

Increased highway construction through a city destroys pedestrian activity.

Building highways to combat congestion costs the government billions of dollars every year. Maintenance is billions more. Our highway infrastructure is failing faster than our capacity to restore it.

Expanding highway capacity slows traffic and increases congestion.

The true cost of automobile use is not realized by drivers. The suburban commuter pays only 25% of the costs of travel to the city center.

The Federal government hands out 1.2 trillion dollars to subsidize highways and parking. 90% of highway money comes from the Federal government. The majority of money used for rail transit comes from local sources.

The gas tax only covers 60% of the cost; the rest is absorbed in general taxes such as property and sales.

A study completed by engineer Stanley Hart for Pasadena, California showed that for each dollar contributed by the motorist, the city spends $8.

60% of oil, 50% of rubber, 67% of iron, 20% of all electronics and aluminum, carpeting go to the car. This is a vast amount of resources consumed by a single entity which is not used for very long. The average person sells or trades their car in 4.5 years and at 41,000 miles.

Money spent on public transportation is twice as effective at increasing productivity as money spent on highways.

Auto-centric suburban sprawl development costs 2.5 times as much as dense urban development.

Auto-centric development leads to higher air pollution, higher energy consumption, higher water use, increased soil erosion, and accelerated depletion of farmland.

It is impossible to achieve an efficient and dense urban core with highways.
Problem:
Lincoln lacks an efficient transportation system. According to the Joslyn Castle Institute’s Flatwater Metroplex Report, the current Lincoln population of 250k persons is projected to grow to 527k persons by 2050. If there are not measures taken soon to prepare for this growth, Lincoln runs the danger of becoming a sea of highways.

Transit systems need to be proactive rather than reactive. Appropriate infrastructure needs to be established prior to the expected population surge to facilitate the orderly and efficient movement of people and products.

Solution:
Multimodal Transit Hub melds available means of transit into one interlocking system. In addition to pedestrian, bicycling, automobile, and bus, this Hub will introduce a local monorail system and incorporate both a downtown streetcar and high-speed cross-country rail system.

Problem:
Public transit has a negative public image. The majority of riders are the “have-nots” from our society; 38% of mass transit riders have annual incomes less than or equal to the poverty level. In larger cities, minorities and women are disproportionately represented among mass transit riders, 60% are women and 48% are African-Americans and Hispanics.

“My fourteen-year old son sees the bus go by and he calls it the ‘loser cruiser’…”
- planner Anton Nelessen in Asphalt Nation

Solution:
Provide high quality, convenient, and attractive mass transit options. Rather than merely serving as a waypoint in a journey, new transit facilities must not only facilitate the efficient movement of persons throughout the city, but also serve as a destination in themselves.

Problem:
Lincoln lacks a singular public space. Historically, central train stations have functioned as the grand entrance to the city, frequently serving as an iconic element and, through the provision of public spaces, a cultural center. Lincoln currently has two icons: the state capital and Memorial Stadium, and by association, the University of Nebraska campus. Neither of these can function as a public space; Centennial Mall was intended to serve this purpose, but this has never been realized.

Solution:
Extensive plaza shall connect arena, convention center/hotel, and transit hub to provide a large public spatial identity.
Why Monorail over Light Rail?

**Cost Factors:**

- **Total length of the system:** 36 miles
- **Topography:** relatively flat
- **Location (construction access, impeding traffic) use of existing rail right-of-way (RRoW):** use of existing RRoW - minimal
- **Utilities relocation:** use of existing RRoW - minimal
- **Land acquisition:** use of existing RRoW
- **Passenger requirements (size and number of vehicles):** 700 passengers per 4 car train
- **Speed (max speed desired, distance between stations):** 55 mph top speed, acceleration 3 mph/second
- **Number of Stations:** 22
- **Special Structures (tunnels, bridges, overpass, urban structures etc):** none
- **Geotechnical conditions:** none
- **Environmental Mitigation (restoration, wildlife protection, sound constraints):** minimal

**Aesthetically pleasing:**

Elevated monorail guideway provides more opportunities to hide or blend stations and guideway into the city.

As basic structural elements, pylons can serve multiple structural uses.

Monorails are quieter – rubber tires on concrete vs. steel wheels on steel rails.

**Cost effective & Profitable:**

Seattle Monorail - built 1962, private corporation pays city of Seattle 75,000 dollars per year to operate, only transit system nationwide to turn a yearly profit.

Monorails are able to be fully automated - decreases overhead required for drivers.
Popular with people/taxpayers:
- Narrow guideway permits sunlight to penetrate through to the street and surrounding areas
- Car exhaust is not blocked by elevated track system, allowing dangerous gases to escape
- Narrow guide way is visually less constraining
- Aesthetically pleasing

Seattle Center Monorail

Construction – minimal disruption:
- Guideways manufactured off-site allows greater precision and control, able to be quickly installed later
- Columns - dig a hole, insert rebar, put up forms, pour concrete
- Concrete requires little maintenance

Seattle Center Monorail

Safety
- No chance of vehicle/pedestrian/train collision with elevated guide way
- Monorails are virtually impossible to derail.

Seattle Center Monorail

Okinawa Monorail
The Switch Myth

Many opponents of monorail suggest that the difficulty in switching rails renders monorails not feasible as a viable transportation system. However, this myth is easily dispelled by examining the methods of switching tracks. It really is much simpler than monorail opponents would have you think.

Segmented Switch

most common switch in Japan, allows a straight guideway beam to change from a straight position to a curved position.

Rotary Switch

most common for people-mover steel beam systems, rotating section of track replaces a straight section with a curved section.

Beam Replacement Switch

straight guideway beam pivots to a side while curved section moves into place, cycles in 12 seconds.
The Dr. Martin Luther King Jr. Transportation Center in downtown Sioux City combines parking with local and Greyhound bus facilities.

Spatial allowances:
- Retail: 7100
- Restrooms: 460
- Waiting: 700
- Lobby: 3500
- Ancillary: 1635
- Offices: 1115
- Driver’s Lounge: 230
- Restrooms: 150
- Custodial: 140
The St. Louis Multimodal Transportation Center reclaims previously wasted space under Highway 40 as it incorporates local bus, Metrolink light rail, and Amtrak services into one facility.

Spatial allowances:
- Restrooms - 1600
- Luggage storage - 2300
- Waiting/reception - 4290
- Platform (Bus) - 7200
  - Indoor - 4900
  - Outdoor – 2300
- Platform (LRT/Amtrak)
  - Outdoor – 37000
- Ancillary - 3750
- Offices - 800
- Conference - 400
- Restroom - 65
- Break room - 185
- Baggage Storage - 2300
Spatial allowances:
- Retail - 20,000
- Locker & Luggage Storage – 5000
- Reception & Waiting – 7000
- Monorail – 3000
- Grocery – 10,000
- Dining – 20,000
- Ancillary - 4300
- Restrooms – 3400
- Coffee & Snacks - 2000
- High Speed Rail – 14,000

Total – 88,700 sf
Amtrak is the national passenger rail service provider. Launched in 1971, Amtrak took over passenger rail service from several different freight companies. Amtrak currently provides service to over 500 destinations in 46 states and set a new ridership record in 2007, transporting over 25 million passengers. Most passenger traffic occurs on the Northeast Corridor Service (Boston - Washington, D.C.) with almost 9.5 million passengers.

Amtrak currently operates 33 routes across the nation. The busiest stations in passenger volume (over 1 million passengers embarking or disembarking) are New York, Washington D.C., Philadelphia, Chicago, and Los Angeles. However, New York’s Penn Station departures and arrivals are more than double any other station.

This map illustrates the national Amtrak system. Service to the Midwest is not as plentiful as on both coasts because of the lower population density, but a daily westbound train traveling from Chicago to Denver passes through Lincoln around 1 am and the eastbound train stops around 5 am.

Ideally, a high-speed cross-country passenger rail transit system will soon replace Amtrak. High-speed rail is different from Amtrak in a number of ways. Generally, high-speed trains are considered to travel over 124 mph except where local speed restrictions require a lower speed. High-speed lines require dedicated tracks that are specially manufactured, constructed, and welded together and have high turn radii. Almost every high-speed train currently in use is powered by overhead electricity.
The Midwest Regional Rail System Executive Report prepared for the Departments of Transportation from the states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, and Wisconsin, the Nebraska Department of Roads, and the Ohio Rail Development Commission was released in September of 2004.

Major plan elements of the Midwest Regional Rail System include:
- using 3,000 existing rail rights-of-way to provide transportation between rural, small urban, and major metropolitan areas
- operating a “hub and spoke” system providing passenger rail service to the Midwest from and through Chicago
- introducing modern train equipment that operates at speeds up to 110 mph
- providing multimodal connections to increase system access
- improving reliability and on-time performance

This map illustrates how the new transit facilities in Lincoln can connect into a larger Midwest Regional System.
West Haymarket Redevelopment

The adjoined map shows how a local rail transit system could be implemented in Lincoln.

Utilizing information from the 2030 Lincoln/Lancaster Comprehensive Plan and the Lincoln Downtown Master Plan from September of 2005, this map combines all current modes of transportation such as automobile, bus, hike/bike, airplane, and Amtrak. It also implements the projected growth plans of Lincoln in order anticipate transit needs and to pre-emptively provide excellent transit infrastructure. It is important to be aware of growth patterns and plan ahead to provide good transit; planning for implementation of good public transportation should be at the forefront of any growth plans, not at the end.

There are plans to build a beltway around the east side of Lincoln to provide a direct connection from Interstate 80 to Highway 77. It is expected that Lincoln will grow to the south and east into the space created by the new beltway.

Current bus routes are identified by red lines. The bus system operates on a spoke system with the hub at 11th and N Streets. The public transportation system in Lincoln, as it currently exists, is not as effective as it could be. The biggest complaints regarding StarTran service are relative to the frequency and the hours of operation. If Lincoln grows as planned, this system will need to be re-designed. With the implementation of a more far-reaching transit solution, I suggest the bus routes operate on a grid system instead of hub and spoke. This should facilitate easier connections within the larger monorail loop.

Locations of high pedestrian activity identified in the 2030 Comprehensive Plan are identified with blue triangles and circles; triangles for existing pedestrian activity centers and circles for planned or expected zones of pedestrian activity.

Current hike/bike trails are shown as green lines.

Possible routing for the monorail loop was determined by first locating all the railroad right-of-way in the city and examining how it related to the perceived need for transit availability. The monorail loop as currently designed exists entirely on rail right-of-way with the exception of the cross-town connections on 27th Street and O Street and the eastern portion which runs east of 84th Street.

There are 22 suggested stations shown as small red dots. Each commuter stop on the monorail loop was placed at or near points of high pedestrian activity. The Multimodal Transportation Hub is located in downtown Lincoln.

In addition, the West Haymarket Blight Area is identified by a purple area west of downtown Lincoln. This area was declared blighted by the Lincoln Planning Commission in August of 2007. It is currently 403 acres of flood plain with railroad tracks. In order to begin using tax financing to pay for redevelopment, state law requires the area be declared blighted by the local governing body.
West Haymarket Redevelopment_Downtown Master Plan

The 2015 Vision is a group of numerous Lincoln business and civic leaders united and dedicated to revitalizing Lincoln for the next generation. As part of their vision, they have identified 10 pillars to Lincoln’s Future. Three of those pillars have direct implications for this project; the West Haymarket Arena, Convention Center+Hotel, and the Retail Corridor along P and Q Streets.

To begin exploring ideas, an architecture firm in Omaha prepared four scenarios. Through critical analysis, it was determined none of these proposals represented what this author considered to be the ideal scenario. Each element of the proposals, Arena, Convention Center/Hotel, vehicular circulation, parking, and Amtrak station was re-configured to reflect the best solution. The following is the critique of those proposals while the adjoining page shows the final idealized solution.

![Map of Site Concepts with notes]

- **Site Concept “A”**
  - Angling plaza toward Haymarket park is too one-dimensional.

- **Site Concept “B”**
  - Arena far removed from the urban context.
  - Suggest widening plaza to parallel with Q Street and re-positioning the Amtrak Station further to the north to provide visual and functional terminus for the plaza.

- **Site Concept “C”**
  - Appreciate public plaza at terminus of Q Street.
  - Dislike Arena adjacent to Lincoln Station.

- **Site Concept “D”**
  - Appreciate Convention Center+Hotel located adjacent to Lincoln Station; this will provide a healthy hum of activity for such an historic building.
easy pedestrian access to Haymarket Park

new station location provides opportunity for plaza terminus and regular public space activity

Convention Center+Hotel connected to Lincoln Station will bring activity to the former train station
Site Study

These three sites were chosen from the other 19 options because of their proximity to both the cross-country passenger rail and the monorail loop. Also considered were traffic density patterns to determine where the most vehicular traffic was occurring.

The heaviest traffic volume in 2006 occurred on O Street between 40th and 48th Streets with over 40,000 vehicles daily. 27th Street between Holdrege and Vine, Cornhusker Highway between 27th and 33rd Streets, and O Street between 27th and 33rd Streets each had over 35,000 vehicles daily.

The Site Matrix Study helped rank each site based on several factors. The site with the lowest score, West Haymarket, was chosen to begin design.

<table>
<thead>
<tr>
<th>West Haymarket</th>
<th>27th Street State Fair Drive</th>
<th>Bob Devaney Sports Center</th>
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<tbody>
<tr>
<td>existing Right of Way proximity</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>road accessibility</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>parking availability</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Hike &amp; Bike trail access</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Demolition necessity</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Land acquisition</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>growth potential</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>proximity to residential</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>commercial/retail access</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>employment center access</td>
<td>13</td>
<td>20</td>
</tr>
</tbody>
</table>
Mostly surrounded by industrial or commercial applications, the primary causes for generating such a low score stem from the potential for high cost of acquiring the land, low potential for growth, and low proximity to residential. Inconvenient vehicular access also factored in the decision. An average score on most of the other criteria, coupled with last place in three categories, placed this site at the bottom of the list.
2nd Place: Antelope Valley Roadway & Bob Devaney Sports Center

Increased access from residential neighborhoods and excellent vehicular access helped this site score higher. However, weaknesses in available parking, commercial/retail access, and employment center access contributed to a mediocre score. Closer proximity to the University of Nebraska-Lincoln campus as well as a direct connection with a large sports venue were attractive specifics.
1st Place: West Haymarket

The West Haymarket Redevelopment Project has excellent exposure to employment, commercial/retail, and parking. The only portion of the study in which it lacked was road accessibility and proximity to residential.
West Haymarket Site

The re-configured West Haymarket Redevelopment site provides for the best multimodal solution among the three sites closely examined. Similar to the local city map depicting the route, stations, and influences on both routes and stations, this map overlays several pieces of information to provide the most comprehensive understanding of the transportation options available in downtown Lincoln.

Current rail right-of-way and Amtrak service is identified by the dark blue line running generally from the northeast corner to the southwest corner of this map. Ideally, cross-country service on this corridor would be provided by the Midwest Passenger Rail System, a proposed high-speed regional passenger rail system to serve the states of Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin, but passenger rail service is currently provided by Amtrak.

The proposed Monorail loop is depicted by the light blue line generally running from the northeast corner to the southwest corner of this map with a cross-town connection running down Q Street and O Street (that portion not shown on this map) and one line running out to the airport. The monorail loop and airport spurs shown here exist on current rail right-of-way. Switching for the monorail tracks occurs where the monorail lines converge north of the station.

As part of the Downtown Master Plan, this map includes a streetcar loop running up and down P and Q Streets.

As with the local city transportation map, this map also implements the current bus routes, shown as red lines. Each hike/bike trail is shown as a green line and the West Haymarket Blight Area is outlined with black dashed lines.
Conceptual Design [1.0]

Building informing the movement of people on their progression to the trains.

Shifting planes allow users to progress from the plaza to their choice of transportation, either local monorail or cross-country high-speed passenger rail.

One plane alludes to vertical movement to reach elevated monorail platforms and the other plane alludes to the downward motion required to reach the cross-country platforms.

There was extensive conversation about how big to make this station. This initial concept was timid and non-aggressive in the building placement and relationship to the plaza. This conceptual solution was an unmitigated disaster because the circulation of the building was inefficient, insufficient, and confusing.
Multi-level conceptual design with multiple stairs and elevators. This layout is very confusing and has poor circulation.

To illustrate the confusing vertical circulation, each elevator is marked with a red indicator and each ramp or stair is marked with a blue indicator.
Conceptual Design [2.0]

Building informing the people of the motion of the trains

Instead of shifting horizontal planes, this concept attempted to use shifting vertical planes among the building elements to suggest the movement of the trains behind the station. It solved the biggest problem with Concept 01 - confusing circulation, and asserted its presence on the plaza with a connecting concourse over the access road. However, it did not give adequate reference to any north bound travel because the primary visual movement was to the south.
Concept 2 was more successful than Concept 1 because it more adequately solved the circulation issue; depending on the path taken, circulation through the building can be entirely straight with only two points of vertical circulation to allow for a concourse over the road.

- **Ground floor**: Retail frontage on main circulation paths non-existent

- **2nd floor**: Simplified circulation is easier to navigate and understand

- **3rd floor**: Building form infers movement entirely to the south, ignoring the other half of transit traffic traveling north
Transit is about moving from point A to point B as quickly as possible. This station prepares the user for their rapid increase in velocity when utilizing the transit system. As one moves into and through the space, the progression through the lower level, up the stairs, and across the connector to the platforms, the building prepares one (through increasing frequency of elements and sense-experiences) for the acceleration and motion of the trains. This is achieved through an understanding of our ability to perceive motion. Just as with a blurred picture, when the movement of the camera or subject infuses more information into the same amount of exposure time, when we are physically in motion or observing something moving, this increased amount of information brings decreased ability to process or understand it as coherently as with motionless subjects.

There is an exponential relationship inherent to the physics of motion. A constant rate of acceleration leads to a linear indication of velocity increase, and the distance traveled is represented as an exponential curve. This Multimodal Hub displays this exponential relationship of motion through the individual building elements. Building element lengths of 512', 256', 128', 64', 32', 16', 8', 4', and 2' reinforce the exponential effect as the user progresses through the space to reach the train platforms. This countdown serves as the psychological on-ramp, preparing the transit rider for their eventual departure at transit speed.
End of First Semester Critical Self-Analysis

As it now stands, Lincoln does not need such a grand public transit solution. However, should Lincoln continue to grow as projected by the Joslyn Castle Institute, from the current population of 250k to 527k, I think measures will need to be taken to facilitate the continued movement of people through the city. Many assume this should or will take the form of automobile or highway-based transportation. I suggest this mind-set is not forward thinking.

My intent with this Design Thesis is to suggest that it should be possible and feasible for someone to effectively live, work, and play in a city the size of Lincoln without owning a car.

The public transportation system in Lincoln, as it currently exists, is not effective. The biggest complaints regarding StarTran service are relative to the frequency and the hours of operation. If Lincoln grows as planned, this system will fail. To provide for this, planning for implementation of good public transportation should be at the forefront of any growth plans, not at the end.

In preparing for this project, I read two books as inspiration and sources. The primary source, Asphalt Nation – How the Automobile Took Over America and How We Can Take It Back by Jane Holtz-Kay provided the fodder for the “Facts” section of my presentation, detailing the inefficiencies associated with highway based transportation and development and the benefits of public transportation. Railed transit and the permanence associated with the investment in rails provide more growth incentives than does public transit provided through busing. In addition, the incessant complaining about vehicular congestion only decreases the credibility of busing as a viable means of alternative transit because the buses are stuck in the same traffic as the cars and experience the same problems with congestion. Only transit with dedicated lanes and traffic control systems that give the transit vehicle precedence over other traffic will ever be able to overcome congestion issues.

Bus routes can change overnight, but it would take a lot of economic forces to stop a railed transit vehicle from continuing service. Businesses are keen to locate along railed transit routes because, as a corridor for people, it will provide the business with a lot of valuable exposure. Similarly, housing in the vicinity of railed transit increases in value compared to housing associated with bus transit or no public transit because there is the expectation that the rails are going to stay.

The second book read in preparation for this project was Suburban Nation – The Rise of Sprawl and the Decline of the American Dream, by Andres Duany, Elizabeth Plater-Zyberk, and Jeff Speck. This book argued for the density of the urban core of cities and dissected the inefficiencies of the suburb model for city growth. There is an inherent problem with trying to utilize both highway and mass transit systems for transportation purposes because highways subtract from space that could otherwise be contributing to the critical mass that defines a city center. Without critical mass, it is not feasible to implement mass transit because it usually ends up subsidized by the local city government. However, if more emphasis were placed on mass transit as a better option, more federal funding would go to developing transit rather than roads. I think there is an increasing awareness of the costs associated with highway based transportation planning because the perceived cost to the driver is increasing. I detail some of the other costs not directly realized by the driver in my “Facts” section.

It all comes down to which transportation solution the government emphasizes. That is how large infrastructure projects such as this happen – with government assistance. If there were no government assistance, there would be much fewer roads than currently exist.

For the above reasons, I suggest that rail transit is a good and viable means of transit that should be explored in earnest. I think it is important to note that for my purposes, Lincoln merely serves as the laboratory of exploration to start the conversation. I think it’s ok to walk a little bit (and good for you too!) and mass transit is simply a better model for development.

Because of the red tape associated with any large public project, the planning for large projects needs to begin several years before planners anticipate the actual need will arise. Avoiding the conversation regarding the validity of the convention center/hotel and arena proposals, I chose to use the DLR proposals to set the stage for what the West Haymarket might actually look like when the need for more efficient transportation arises. I re-configured the basic elements of the Vision 2015 groups’ pillars concerning the West Haymarket; Arena, Convention Center/Hotel, and vehicular circulation and parking to illustrate what I think would be the best solution given those required pieces. If the West Haymarket Development area becomes a focal point for the city (and the state to some extent) for culture, sports, and entertainment, why not also provide good mass transit to service the area?
The most basic issue concerning this design was circulation. Since this is a project concerned with transportation, it only makes sense that clear and concise circulation patterns be provided to facilitate the efficient and orderly movement of people. There was an extensive conversation to determine how big to make this station. My first idea, presented at the second critique, was timid and non-aggressive, demurely sitting directly adjacent to the tracks and barely encroaching on the sovereignty of the plaza. Even though this idea was an exploration into how the building can inform the movement of people on their progression to the trains, this solution was an unmitigated disaster because the circulation of the building was inefficient, insufficient, and confusing.

My second approach worked to solve the circulation issue. Circulation should be straightforward and easily understood. I changed the platform layout from two side platforms to one center platform to simplify the vertical circulation requirements. Then the issue of how people ascend through this station to cross over the street and then either ascend or descend to their respective trains became the next issue. There were two solutions generated, one with a grand/monumental stair that effectively took over the plaza, and the other was the quick and efficient circulation approach. However, both circulation solutions notwithstanding, there was no retail or dining storefront relative to the traffic flow of people.

This led to the third approach which incorporated the clear circulation paths of the second iteration and moved to provide ample exposure to the retail or dining elements intended to occupy the other spaces in the building. This also incorporated the idea of suggesting motion through the experience of moving through the approach and building on the way to the platforms. This is accomplished through three means: a building layout determined by the exponential relationship of distance traveled to the velocity and constant acceleration. Starting from the waiting platform, the building elements exponentially increase by the value of 2 to the xth power. These elements are 2, 4, 8, 16, 32, 64, 128, 256, and 512 feet. The purpose is to use the successive building elements to lend to the understanding of the compression of space in time. Associated with this countdown of the building elements on the journey to the waiting platform is a changing relationship to the outside environment through increasing translucency of the fenestration. As one physically increases their velocity, the ability to understand their immediate environment decreases because there is not enough time to process that information. Instead one is only able to process information physically distant relative to their speed. The fenestration is a means to that experience of decreased comprehension due to velocity. Thirdly, each separate building element is to read as a piece of the progression from slow (512 feet) to fast (2 feet).

During my first critique and regarding the size of the transit system, Bob Kuzelka, President of ProRail Nebraska, graduate of this college, and current Director of the Environmental Studies program on East campus criticized my loop system design as too small and told me to be heavy-handed when laying out the system. In my second critique, Tom Laging’s closing comments were to base the size of the building on Event Days and to make it feel more Roman. So I went a lot bigger and instead of fronting on the plaza or engaging it timidly, I invaded it.

I realize there are still design issues that need to be addressed. The relationship of the station to the neighbors is not resolved, the experience of actually approaching the station needs articulation; the waiting platforms have not been addressed other than meeting spatial requirements, the interior needs resolution and more detail, etc. I think the idea of designing a building to make the user feel like they are moving faster than they really are is intriguing and needs further exploration to implement additional layers of design development relative to the motion concept.
Research Analysis
Conceptual Design
Design Development
Final Documentation
Bibliography & Appendix
Acknowledgements
These two pages show two iterations during the progression of the design from Schematic to Design Documentation.

This left page highlights the last significant design decision to enclose the plaza on three sides and allow the station to reach around the periphery. No development of the plaza at this point.

The right page shows further development of the plaza and an initial attempt to route the trolley around the plaza. The trolley loop as well as the public green space was soundly criticized as creating a new “no man’s land” in the center of the plaza. Provision for parking under the convention center was implemented after continual comments about the lack of adjacent parking.
Research Analysis
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Design Development
Final Documentation
Bibliography & Appendix
Acknowledgements
view of train platforms
N-S section through platforms

W-E section through lobby & plaza
Monorail Platform
8523 sf
Research Analysis
Conceptual Design
Design Development
Final Documentation
Bibliography & Appendix
Acknowledgements
Bibliography:


Light Rail Now. http://www.lightrailnow.org


ProRail Nebraska. http://www.trainweb.org/prorailnebraska/


Mark:

First, I enjoyed the chance to attend your final thesis presentation as well as having had the opportunity to observe the evolution of the project. I felt that it did evolve into a good final design proposal. I am sorry that the other guest critics didn’t spend more time on your actual design solution rather than the background which you had developed for it. But, as I recall from almost 50 years ago as a architecture student, I guess you can’t expect miracles.

Second, I hope that you can attend the ProRail Nebraska meeting on 17 MAY at Mahoney Park to present your final design proposal to our membership. I know that they would enjoy seeing it and would offer you some interesting comments. If that is a date that works for you, please let me know and whether morning or afternoon would be best for you.

Bob Kuzelka

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Mark Oquist

Thank you for being such a gracious critic this past year. I have enjoyed this project immensely and your enthusiasm was a great encouragement.

I delayed replying to your mail until now because I wanted to clarify what my post-graduation plans looked like... I am planning on starting my first day of work in Kansas City on Monday, May 19th. I didn’t know until yesterday what date my new employers were expecting me to start. I don’t have my moving plans necessarily nailed down yet, but I anticipate that I may already be moved to Kansas City before the 17th.

I’m sorry; it may not work out for me to present in person to the Pro Rail Nebraska membership. Every additional presentation opportunity is always good and I had been hoping to receive some more feedback on my project :-)

I will keep you informed of my plans as graduation approaches. At the very least I could provide you with a PowerPoint presentation if you would like to be able to still show my project to the Pro Rail members. And once again, thank you for your helpful criticism and direction as well as your excitement about railed transit. And it was definitely a bonus that your undergrad background was Architecture!

Mark Oquist
Acknowledgements
I would like to thank my thesis mentor, Nate Krug, for his all of his encouragement and direction throughout the course of this project. His enthusiasm for transit alternatives was greatly appreciated.

Thank you to Bob Kuzelka and Dan Lutz from ProRail Nebraska and Professors Bill Borner and Tom Laging for their time to attend all my reviews and offer constructive criticism that pushed me to think differently about my project.

Thank you to my friends outside the College for their support and encouragement when I needed it and their understanding when I was too busy with schoolwork.

Thank you to my friends inside the College of Architecture for their criticism that pushed me to think creatively and for the camaraderie that made the long nights fun and helped six years pass quickly.

Lastly, thank you to my family for their constant encouragement throughout these six years and their patience when I needed to be focused on schoolwork.
Thanks.