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Recapturing Urban Space: An Inhabited Bridge in Nashville, Tennessee

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I am submitting herewith a thesis written by Benjamin Smith Culbertson entitled "Recapturing Urban Space: An Inhabited Bridge in Nashville, Tennessee." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Architecture, with a major in Architecture.

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Recapturing Urban Space:
An Inhabited Bridge in Nashville, Tennessee

A Thesis Presented for the
Master of Architecture
Degree
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Benjamin Smith Culbertson
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Abstract

Density. A word used in the description of many large cities. It is how so many people can fit into a relatively compact area and still operate efficiently. Density, used as a tool to craft cities can generate spectacular moments. Several centuries ago, one of these moments was the inhabited bridge. It provided the continuity of the urban fabric by linking areas that were separated by rivers and other natural boundaries. They were nodes in the city that housed commerce, social activity, and residences. However, as cities grew to be more globally connected hubs, the needs of the pedestrian fell way to the needs of the bigger, faster transportation. With this shift in the socioeconomic status quo, the inhabited bridge was unable to meet the new demands of the city and thus fell out of favor within developing cities.

In recent years, we have seen a shift in population distribution; people are moving back to the city. They are seeking jobs, residences, and better lifestyles. We will soon be faced with an issue of providing enough amenities for this influx of new residents. How will cities adapt and change to suit the needs of this increase in population? One answer: density. The need for densification of the city will always lead to new innovations and solutions. I believe one solution to this impending issue can begin with a new take on the inhabited/urbanized bridge.

For this study, I intend to take the old typology, the inhabited bridge, as a base and begin to explore/expand the concept to see how it might provide solutions in the context of today. The case study will include a design proposition in downtown Nashville, TN, which has an estimated population increase of one million by the year 2035 (Nashville MPO). The intent of this study is not to completely solve the issue of city densification and connection of urban fabric. Rather, it is to explore the opportunities unique to this typology and hopefully stimulate conversation around the topic of crafting density within a city.

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Chapter 1
Site Selection and Conceptual Rationalization

In times when the inhabited bridge was prevalent, the main mode of transportation was one's own feet. Obviously, that is not the case today. We chose to drive our car to get from point A to point B in the shortest amount of time. Cars give us this luxury and therefore we are able to consider large distances as such small feats and why our bridges are built to accommodate this. So the question became, where can this bridge be located where the level of foot traffic is comparable to those in the past (when inhabited bridges were still in favor)? The solution was to provide a new bridge that was utilized by sports fans. Every Sunday, thousands of Nashvillians make a pilgrimage to the stadium to watch their Titans play and become a part of an experience unlike any other. There are few other times when someone can gather together with 70,000 other people to be a part of an experience. So, this pilgrimage is exactly what can support the needs of an urbanized bridge. Currently, fans cross over the river via two available bridges: Shelby Street Bridge and the Woodland Street Bridge. Shelby Street Bridge is an old railroad bridge that was converted to a pedestrian bridge in 2003. The Woodland Street Bridge is a vehicular bridge on which game day; shuts down two of its four lanes to allow for pedestrian traffic.

This new inhabited bridge would provide the alternative to closing lanes on the Woodland Street Bridge and simultaneously, would provide amenities to users; thus generate income for the bridge's investors. This need for an alternate pedestrian path was even recognized by Hargreaves Associates, the landscape architecture firm commissioned to redesign Nashville's waterfront. A rendering of the firm's solution, shown on the following page, depicts a structure that hangs from the side of the Woodland Street Bridge.

Figure 1. Proposed Woodland Street Pedestrian Bridge (Hargreaves Associates).

On a football Sunday, the city breathes new life. Fans explore downtown, take in the sites, and most importantly; walk the city. The bridge them becomes the literal connection of landmarks within the city. The first is Union Street; which houses some of Nashville's great restaurants. Second is Public Square Park. And last, is LP Field, where the Tennessee Titans Play. This concept can be seen below.

Figure 2. View of selected site and axial connection (Nashville, Tennessee).

Chapter 2
Site Analysis

The chosen site is in the heart of downtown Nashville, Tennessee. Nashville is located in southeast United States. The Cumberland River, which runs along downtown, is a prominent feature in the city. It currently supports a highly active industrial economy, but there are plans to revitalize the river as a more public friendly amenity.

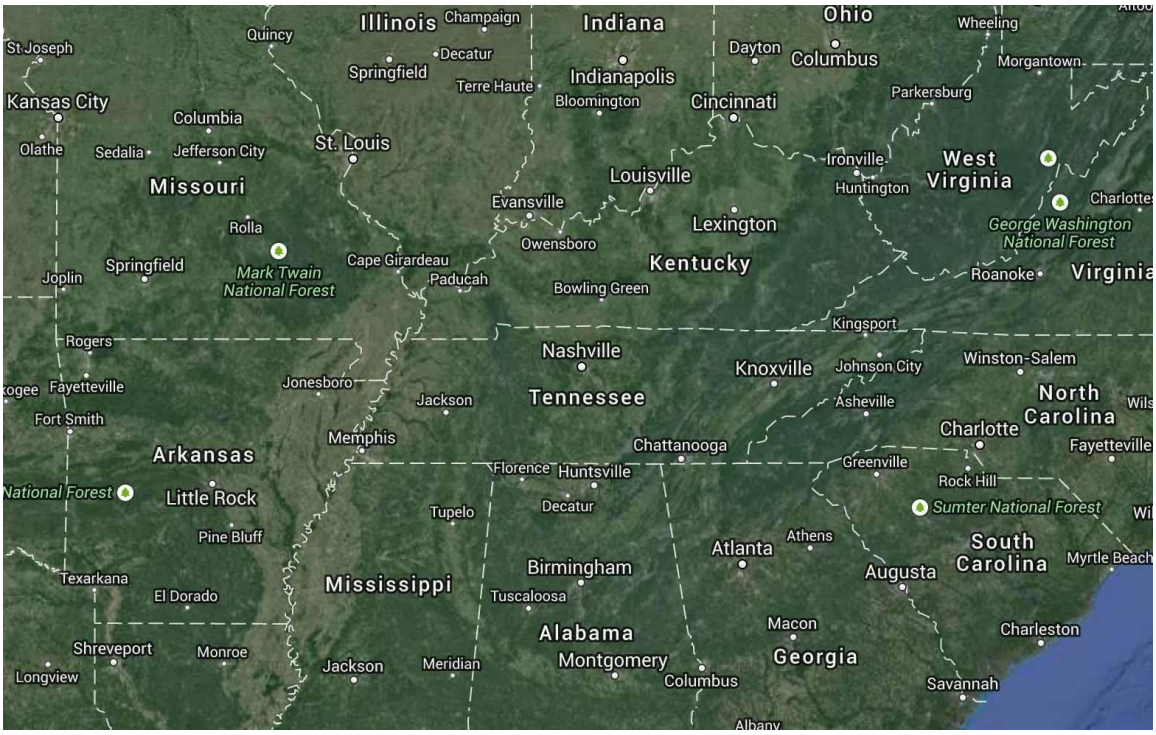


Figure 3. Aerial view of southeast United States (Nashville, Tennessee).

Figure 4. Aerial view of Nashville, Tennessee (Nashville, Tennessee).

Figure 5. Aerial view of downtown Nashville (Nashville, Tennessee).

Existing Bridges

The site is located within close proximity of three types of bridge programs. These programed uses include: Shared Roadway Bridges (vehicular and pedestrian), a Pedestrian Bridges, and a CSX Train Bridge. The nearest of these bridges to the site is the Woodland Street Bridge which is directly to its north. However, It must also be noted that this bridge is hardly accommodating to pedestrians. The first bridge to the south is the Shelby Street Bridge. This bridge was converted to a pedestrian bridge, opened in 2003 (Nashville MPO).

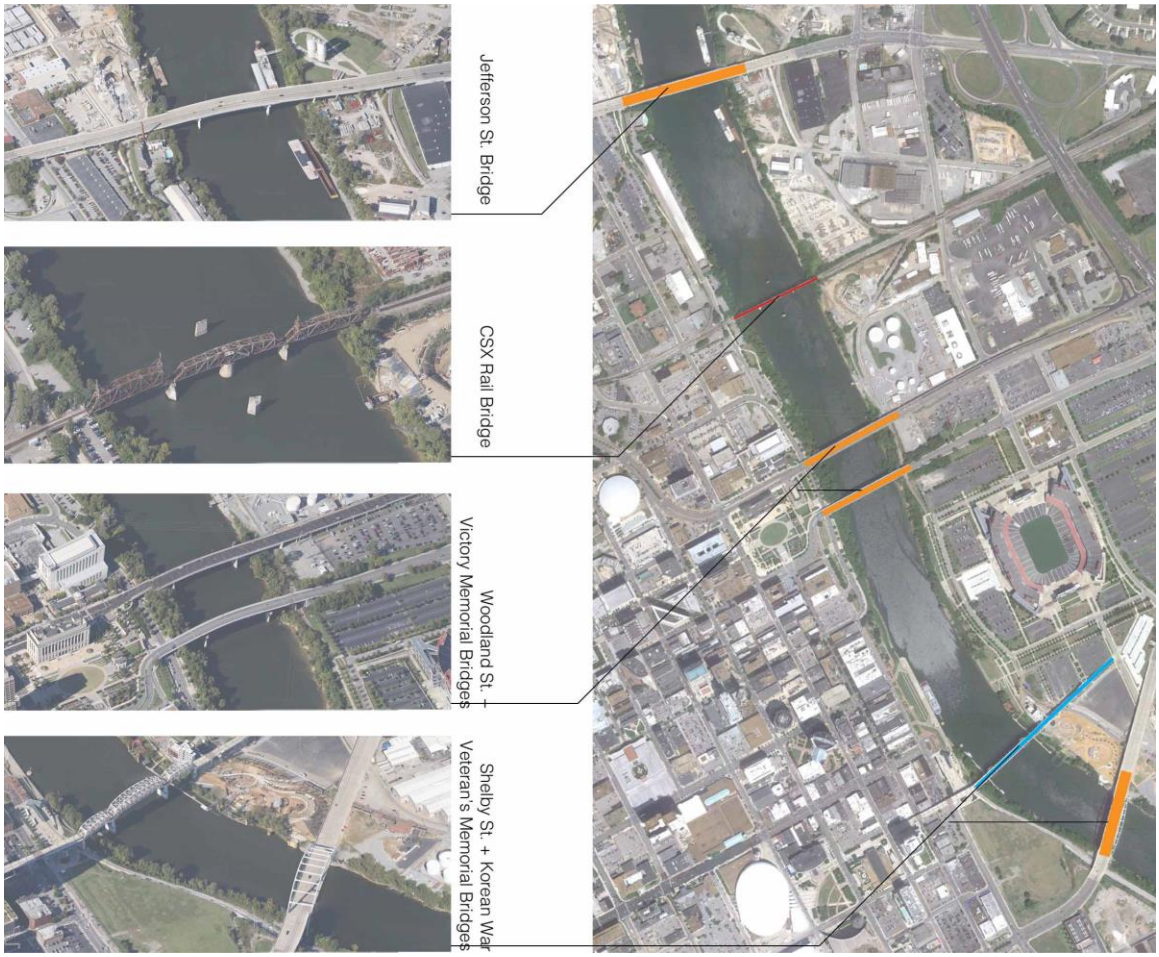


Figure 6. Downtown Nashville's bridges (Nashville, Tennessee).

Flood Plain

In the next diagram, the red line indicates the 500-year flood-plain while blue indicates the 100-year flood-plain. Two dams control the portion of the Cumberland River that flows through Nashville. The river flows south to north. Upstream is Old Hickory Dam and downstream dam is Cheatham Dam. The J. Percy Priest Dam was built in 1973 to reduce water volumes associated with 100 / 500 year. floods.

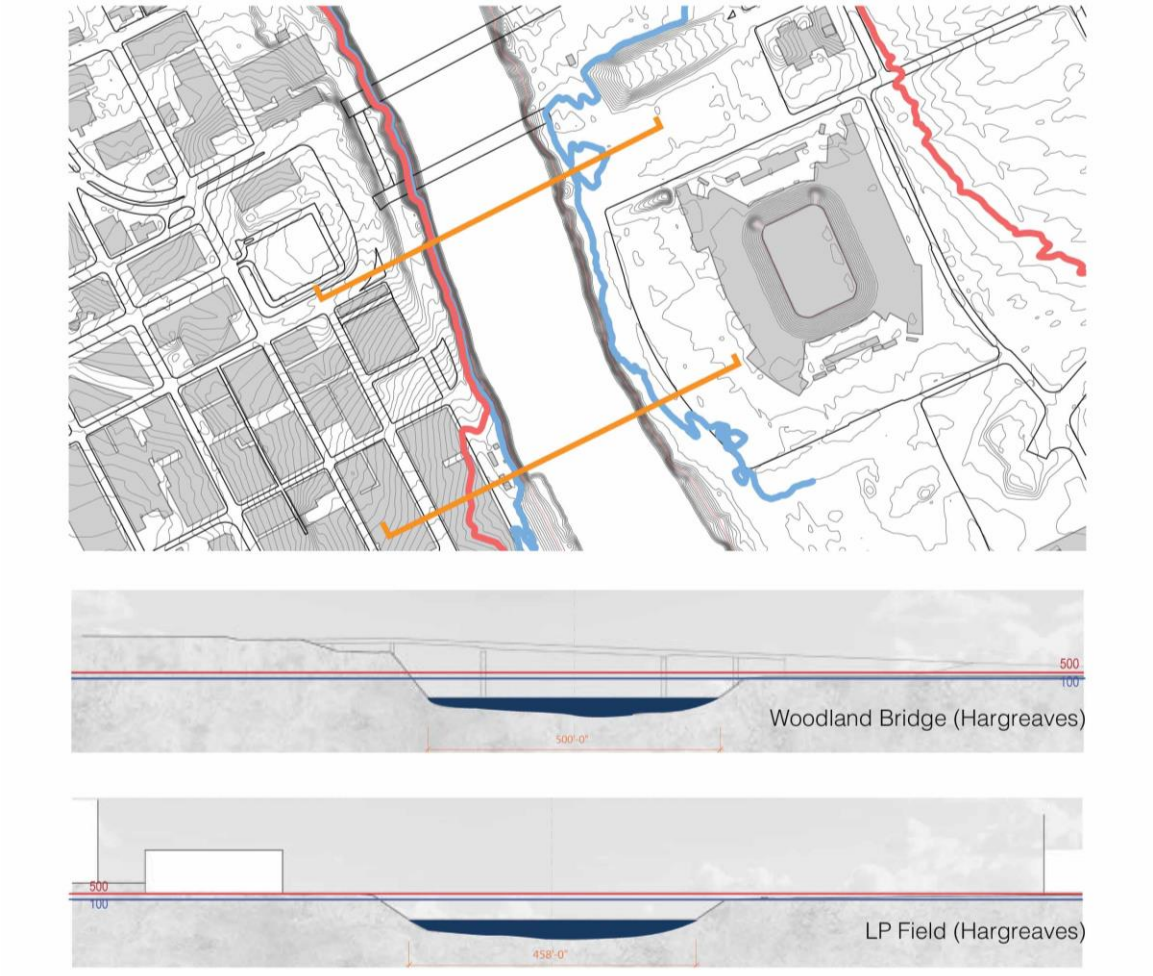


Figure 7. Downtown sections (Hargreaves Associates).

Soil Types

The proposed project site will be situated such that foundations will have to account for two different soil types. On the west bank, there is Bigby-Cannon Limestone and on the east bank the soil is comprised of alluvial deposits. Special care will have to go into the structure on the stadium-side, as it is very soft ground.

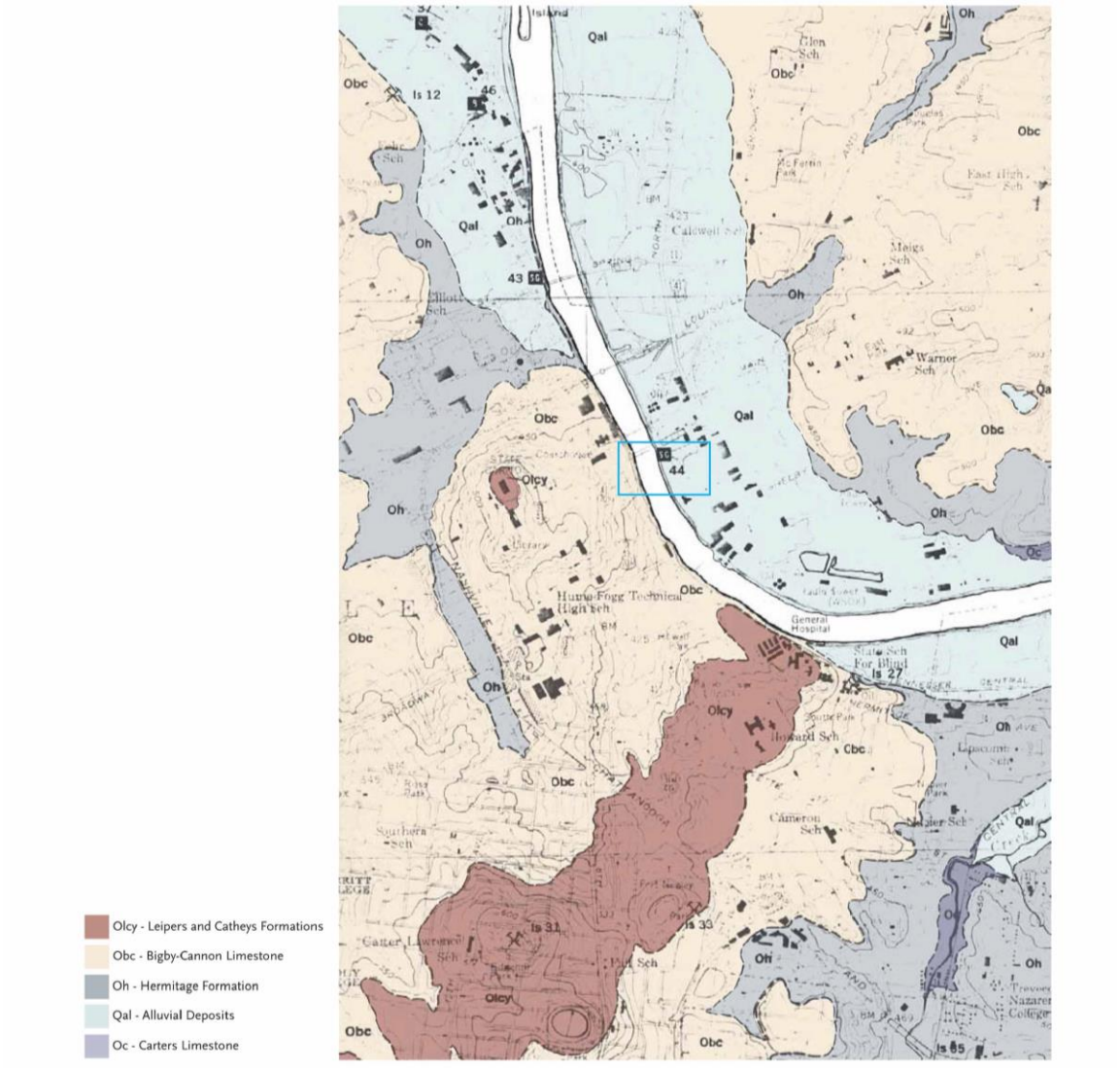


Figure 8. Soil types (Hargreaves Associates).

Height Clearances

These site sections give a slightly more detailed rendering of the slope on the banks of the river. The river can fluctuate several feet depending on the allowance of the two dams: Old Hickory and Cheatham. **Normal pool height** is **385 feet** above sea level. The clearance required above gauge height (385 feet) is 57 feet. This means that the **clearance height** for the bridge must be **442 feet** above sea level. At this location, clearance for river traffic should not be an issue. As we can see in the top section, the Woodland Street Bridge has met the minimum clearance requirements with ease.

Figure 9. Reference sections showing existing site conditions.

Other Diagrams

The following diagrams, give a sense of the context in which the bridge is placed. From these diagrams, proximity, location, and other aspects of the site become apparent.

The next diagram shows us land uses around the site. The proposed bridge comes into contact with: public landscape, the waterfront parks; streets, on both banks of the river; and parking, a large component to the east bank landing.

Parking is vitally important to the project. It determines travel distances of the users. Available parking is very close to the bridge. LP Field parking is available on the east bank and the Public Square Park underground garage is available on the west bank. Both of these parking locations allow for a total walking distance of under a quarter of a mile. In addition, for those wishing to avoid walking, a flat bed golf cart valet service could be implemented to transport residents wishing to avoid walking. This is quite prevalent in Nashville, as almost every restaurant of considerable size and reputation has valet parking. So this feature is not unusual to have available.

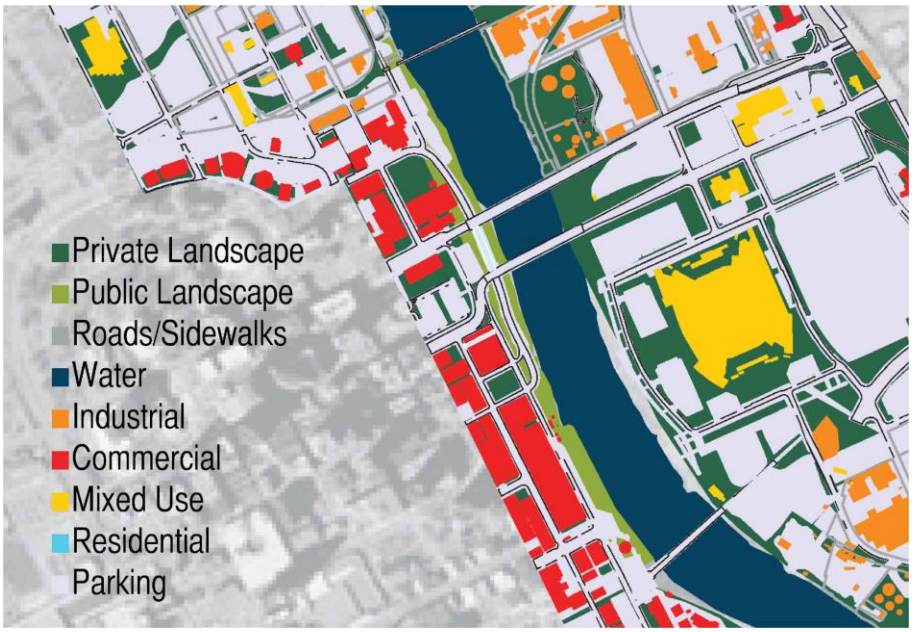


Figure 10. Land-use diagram (Hargreaves Associates).

The figure below depicts the hubs of leisure programs around the site. It also justifies the level of importance of the earlier stated nodes within the city. These nodes

are Union Street, the Public Square Park, and LP Field. The diagram shows several points of leisure activity surrounding these locations, further validating their importance to the city. The activities associated with LP Field include Titans games, concerts, and future outdoor park events (generated by the installation of the new waterfront park). The bridge will provide a connection to these nodes and thus reinforce this axis within the city.

The dark-green signifies park space while the light green lines denote completed trails. In addition to the current amenities, the Hargreaves Associates revitalization of the riverfront will create a unique design feature on the river. This means that the proposed project will have the opportunity to integrate and hopefully strengthen the design qualities from the riverfront renovation.

Figure 11. Leisure features diagram (Hargreaves Associates).

The following diagram from Hargreaves Associates shows us river usage; both current water traffic channels as well as the rivers edge uses. The light blue is a 300-foot

width reserved for commercial traffic. The locks within the dams regulate 120 barges per day of through traffic. Ingram Barge, a locally based company has 18 barges a day (Hargreaves Associates). We also see orange bars, which indicate barge-fleeting areas. Lastly, we see there is an oil industrial site on the other side of Woodland and Jefferson Street Bridges.

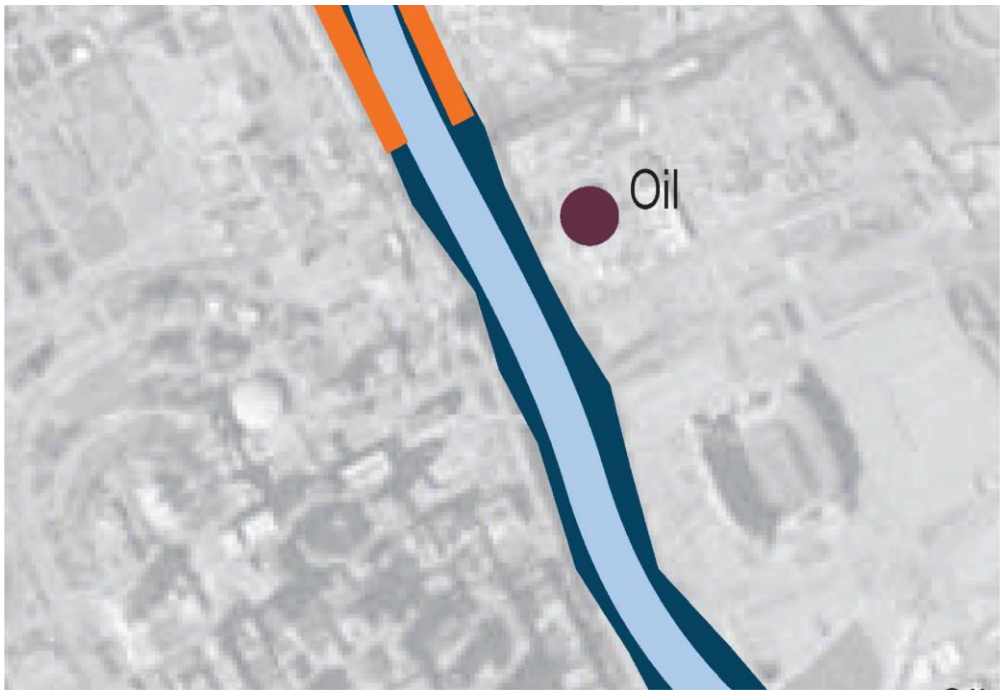


Figure 12. Industrial water-use diagram (Hargreaves Associates).

In the diagram on the next page, we see the ownership of the land within the chosen site. It is clear that the majority of the site is owned by the local government and would thus provide ease of land acquisition related logistics. The only other ownership is the private commercial lot in which the low-rise building sits.

Figure 13. Land ownership diagram (Hargreaves Associates).

Football games are a very important aspect of the site. And along with that comes tailgating. The diagram on the next page shows groups of 4 - 20 tailgaters. Although this diagram only represents one day (December 17, 2006), we begin to see the possible trends in clusters of sites that tailgaters prefer. It is evident in this diagram that the connection chosen for the proposed project should not inhibit tailgating activities to a large extent. In any case, this project may even increase amenities and further accommodate tailgaters.

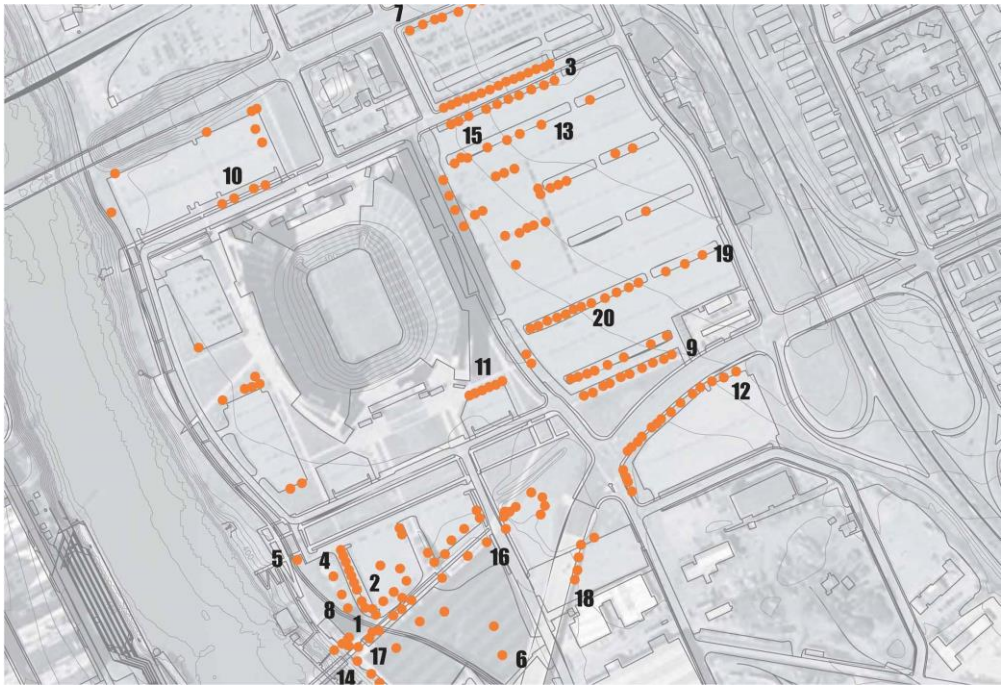


Figure 14. Tailgating groups diagram (Hargreaves Associates).

Historical Context

Nashville has a rich history dating back several hundreds of years. Similar to many other American cities, Nashville was settled by Native Americans. The majority of these Native-American sites fell along the low-lying riverbanks, now the Sulfur Dell and industrial areas. After Richard Henderson purchased the west bank in 1775, a few years later Fort Nashborough was built (Hargreaves Associates). This was a two-acre complex and today, a quarter-size replica remains only 500 feet from the west bank side of the proposed project site.

Around the height of the industrial revolution, mills covered the east bank. This location may have been a result of cheap, flat land for ease of rail transportation, and proximity to the river for boat transportation. Nashville's City Wharf quickly became a hub for shipping. Arthur Dyer also created an international business on the east bank of

the Cumberland known as the Nashville Bridge Company, which predated the Shelby Street Bridge. Although this company went through several business restructurings, it quickly became one of Nashville's largest businesses. In addition to bridge building, the company had diversified its production to manufacture inland barges as well as ships for WWII (Tennessee Department of Transportation). NABRICO, for short, established a multi-acre site and had business in structural work, bridges, and barges. It even fabricated a 310-foot tower to assemble and serve the Saturn Space Ship ("Nashville Bridge Company"). After WWII, the company began to focus its business efforts primarily on fabricating inland barges. By the 1960s it had become the world's largest builder of inland barges (*The Tennessee Encyclopedia of History and Culture*). In the mid-1990's, several years after NABRICO relocated downriver, the city of Nashville bought the old industrial site to construct its NFL stadium. So, it is fitting that on this site, a lost bridge typology makes its resurgence.

Figure 15. NABRICO campus (Nashville Bridge Company).

Figure 16. Barge deployment (Nashville Bridge Company).

Figure 17. NABRICO office tower (Nashville Bridge Company).

Chapter 3
Conceptual Precedents

London, England

Old London Bridge may be the best representative for the inhabited bridge. Originally built sometime in the twelfth century, it was regenerated after disasters such as floods, fires, and frost. Its final demolition came in 1823, 700 years later. Until 1739 it was the only connection of London to Southeast England (Murray). In addition to this, it was the longest inhabited bridge to ever be built in Europe (935 feet). Having such a long span, it hosted a wide variety of functions, such as commercial and domestic uses. Because this urban development was restricted in width, it stretched out its various programs, which generated microcosms of space within itself.

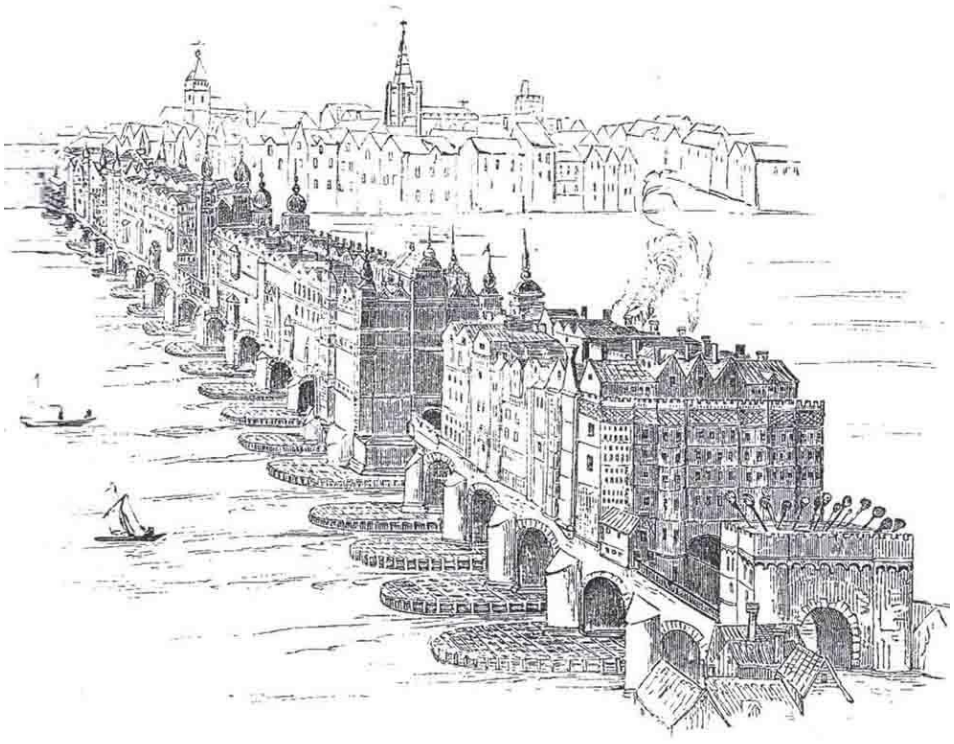


Figure 18. Old London Bridge circa 1616 (Murray).

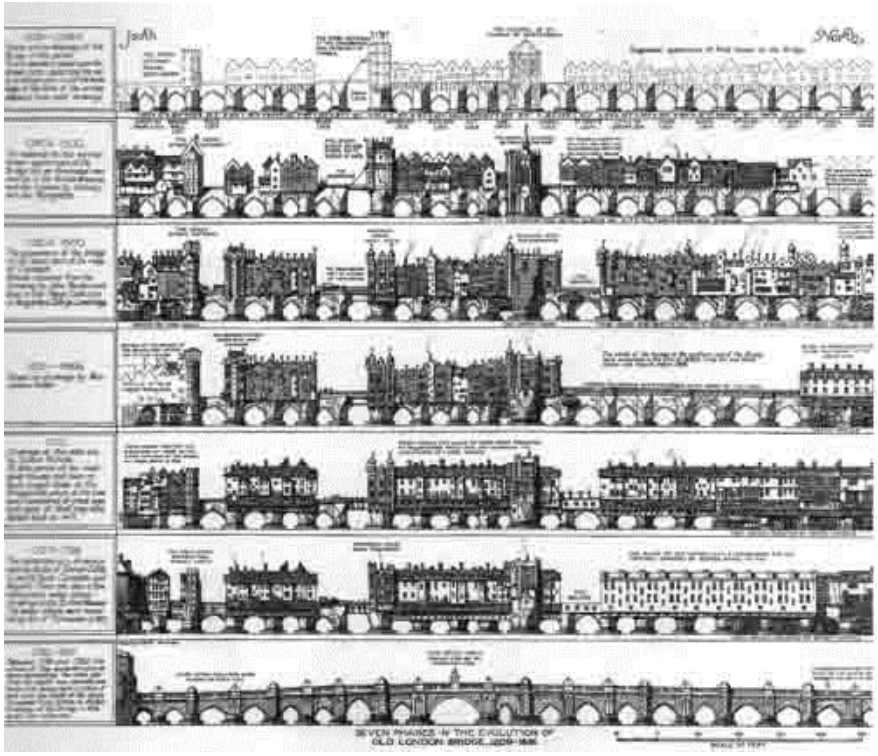


Figure 19. London Bridge evolution (Murray).

Paris, France

Paris contained the best examples of inhabited bridges in France. The Ile de la Cite provided a unique opportunity to connect four bridges to one island. For several centuries, all four bridges to the island contained extensively built-up livable spaces. Most of the bridges contained structures that rose to four or five stories tall. Paris, having one of the highest densities of population at that time, gave the Parisians a difficult and yet grand opportunity for the development of their inhabited bridges. The planning of these bridges had to be efficient and fit well into an urban design. Successfully, they produced well-considered spaces, but they also created a strong urban fabric for which the bridges could weave into. They designed the urban space to create elaborate and scenic environments within this section of the city. It was for this reason the Parisians were able to enjoy large-scale festivals that included processions through the bridges.

Figure 20. Map of Ile de la Cite, Paris (Murray).

Figure 21. Pont au Change, Paris (Murray).

Venice, Italy

Italy also contained an assortment of inhabited bridges. One of the strongest designs of this typology is the Ponte Rialto in Venice, one of the few remaining inhabited bridges today. This bridge achieves excellence of design in several aspects. One of these is the pure quality of commercialization. This is a truly vital aspect to the design of an inhabited bridge. For the bridge to continue to be a success not only socially, but also financially, it must generate income. The Ponte Rialto gives the public three paths of circulation. This configuration allows the bridge to have four facades resting upon the structure instead of the typical two with a single main way of passage. Secondly, the bridge achieves a prominent architectural presence within its context. Unlike the Parisian bridges which sought sophistication of design for the inward-facing architecture, the Venetian bridge is a wholly design element. The architecture of the bridge displays its beauty and allows users to experience the beauty of the city around it. It also leaves a small gap at the apex of the arch for the public to enjoy the privileged view of the city from the center of the Grand Canal. All in all, it considers the elements within commerce, architecture, and urban design.

Figure 22. Ponte Rialto, Venice (Murray).

Peabody Bridge Competition in Bankside, London

Allies and Morrison take a different approach to the inhabited bridge in their entry in the Peabody Bridge Competition in London, England. They decided to maintain open space on the river's axis. Two piers house the building component of the design. They stand as islands breaking the structural span of the bridge that also reduces the apparent length of the bridge for the pedestrian.

Figure 23. Allies & Morrison's entry for the Peabody Bridge Competition (Murray).

Richard Horden created a streamlined design, which is light in structure and in its impact on the views from the river. The glazing contributes to the sense of lightness.

There is a 650-foot gallery arcade, which provides a covered walkway with various framed views of London's landmarks. The design also includes a conservatory that creates more views up and down the river as well as relieves the length of the arcade. He also has chosen to make an effort for a low energy bridge, which includes glass-laminated PV panels. A study was done to determine viability of water turbines, but maintenance costs of such a component were not cost-effective. The design also includes shops, galleries, cafes, restaurants, and terraces. The structure is a 'primary beam' configuration located at the deepest part of the cross-section (Murray).

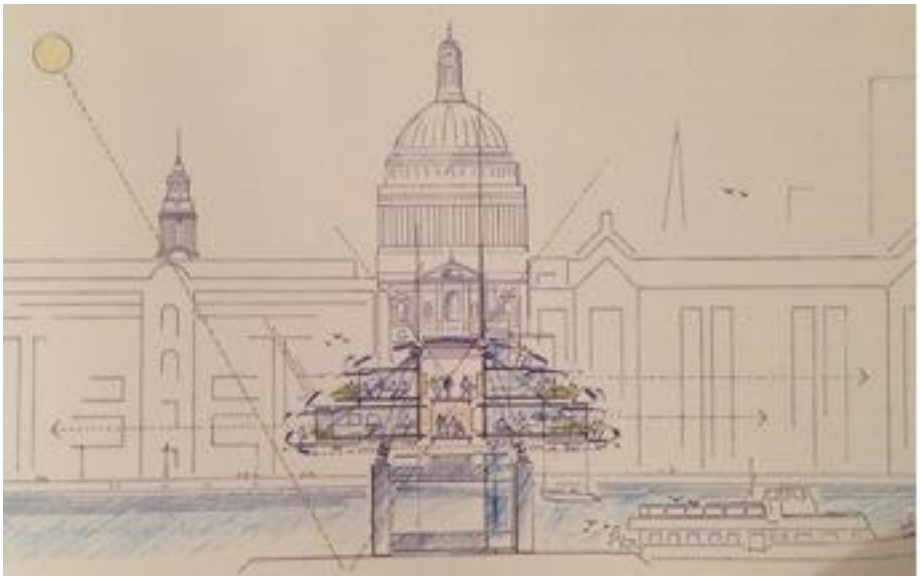


Figure 24. Richard Horden's entry for Peabody Bridge Competition (Murray).

Thames Water Habitable Bridge Competition in London, England

Zaha Hadid's design is arranged as a series of cantilevered volumes that are connected at the center by an open walkway. Public program exists on the lower levels while private accommodation is separated above. The design also has flexible spaces that can be used for residences, offices, studios, or workshops. Structurally each volume

forms one truss and within those, the spaces are connected. Similar to the Ponte Rialto, this design also has a very open center span, which allows dramatic views of the river.

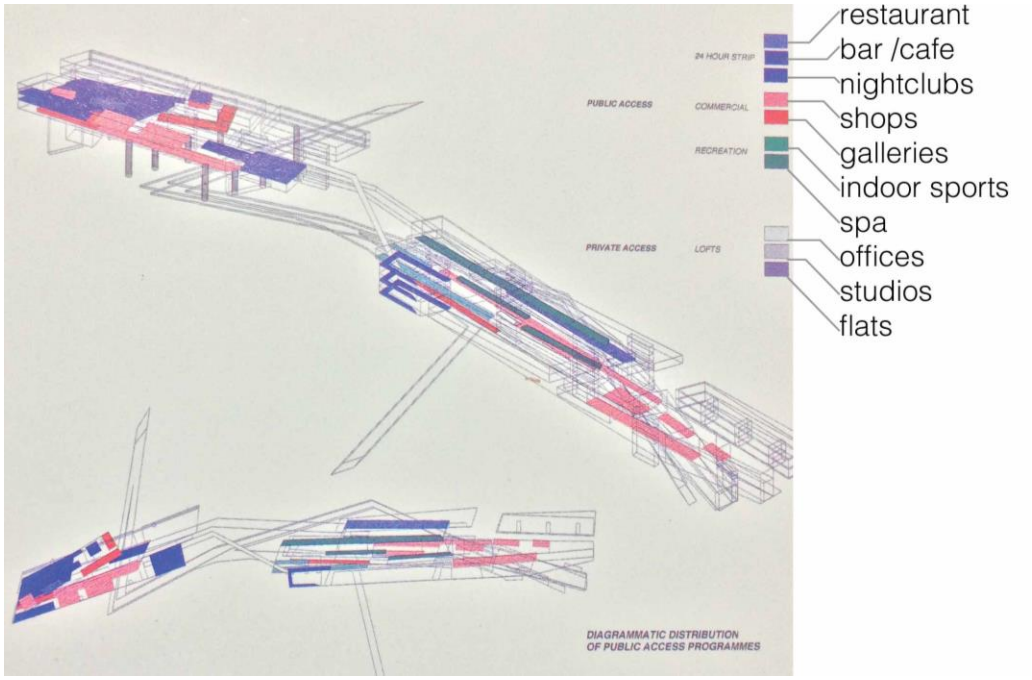


Figure 25. Program Diagram for Zaha Hadid's entry (Murray).

Ian Ritchie's bridge has two main walkways that are on the edge of the bridge and are partially covered. Also, three crosswalks lead to opposite edges of the bridge that frame key views of London. Covering the top of the bridge is a three-dimensional landscape that protects pedestrians from winds. The interior is two levels that are gridded by three 30-foot wide bays on which structural trusses run. The passive spaces can accept a variety of programs while the active spaces contain a pool, bowling alley, and gym.

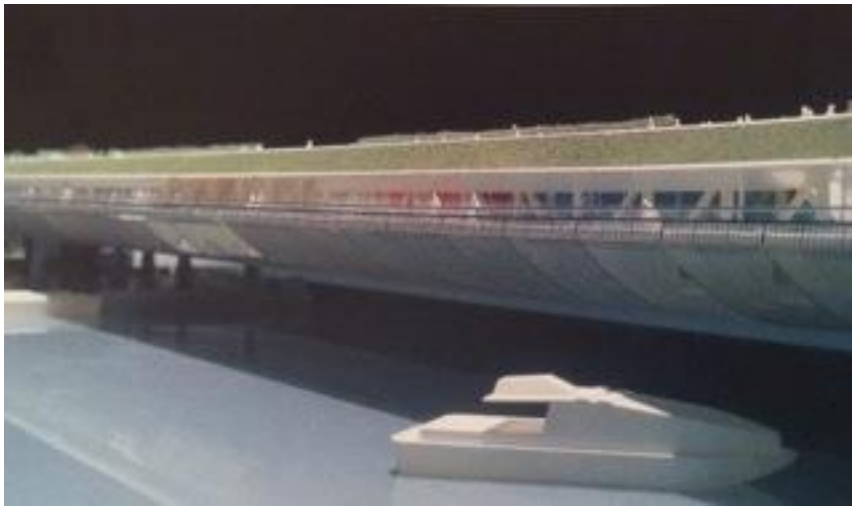


Figure 26. Ian Richie's entry for Thames Bridge Competition (Murray).

Illinois Tollway Oasis

The Illinois tollway oasis is part of a larger typology of buildings over roadways. In past cases, it housed one restaurant and that was the extent of the program. However, the current buildings contain more of a small mall-like program. Standard Oil of Indiana built the original oases in 1959 on leased land from the Tollway Authority (Illinois Tollway Oasis History). These unique rest stops have in the past struggled to generate income and therefore ownership has changed multiple times. The relationship of a private owner on State Road property has set an intriguing precedent however. In addition, the designs have gone through a similar response to the architecture of inhabited bridges. Inhabited bridges of the past closed off views down the river and this was one of the many reasons the bridge typology diminished to exist. The early tollway oases also realized this shortcoming in their designs and responded by creating large glazed openings and moved shops inward to allow for less obstructed views.

Figure 27. Early version of Tollway Oases (Illinois Tollway History).

Figure 28. New design in response to obstructed views of older versions of the Tollway Oases (Illinois Tollway History).

Chapter 4

Early Conceptual Massing

Site and Massing

The following images and diagrams display the early conceptual massing of the project.

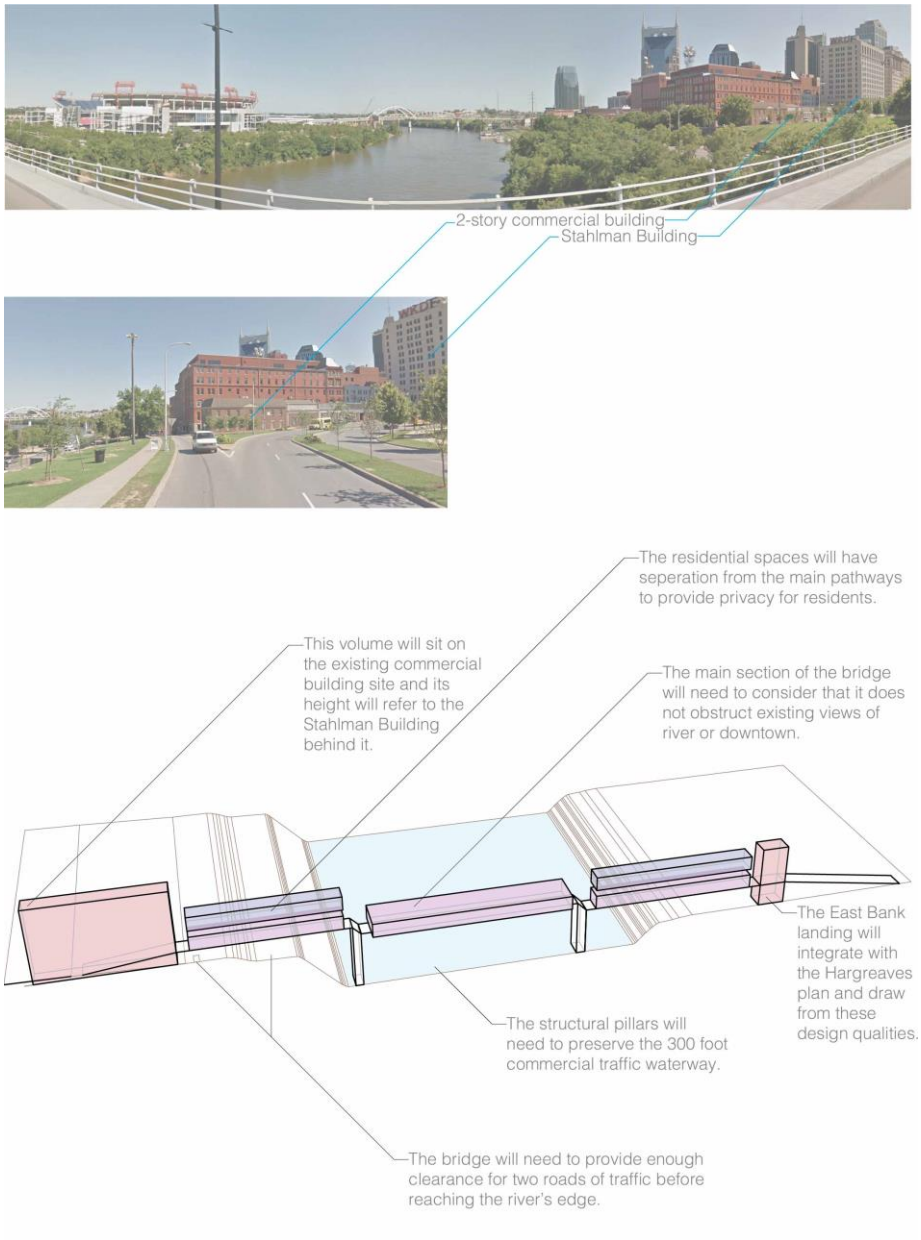


Figure 29. Conceptual massing (Nashville, Tennessee).

Chapter 5
Bridge Program

The primary function of a bridge is to connect two points across a divide. Inhabited bridges provide exactly what the name depicts: built environments for people to inhabit in addition to crossing some sort of divide. These functions on the bridge varied widely. Examples include residences, shops, light industry, military functions, and religion. If we were to momentarily disregard the need for connecting two points, the dominant function of old inhabited bridges was mainly commercial. The size and type of shops evolved as the traffic of the bridge grew. This is apparent in the case of the Ponte Vecchio, in Florence. As the economics changed, butcher shops were pushed out while more profitable businesses, like jewelers, moved in. In a way, our modern shopping malls have a root in inhabited bridges. In 1515, the buildings on Pont Notre-Dame in Paris were rebuilt in order to provide a more continuous order of shops with large display windows, an important innovation to catch the eye of the customer. Diversification of the bridges' program came when tradesmen built residences above their shops for convenience and to safeguard their goods (Murray).

The criteria for the Thames Water Habitable Bridge Competition are used as a point of basis for the program of this project. The design brief includes that the bridge should be a destination in it's own right; should be of mixed-use program, i.e. residential, commercial and cultural; should be pedestrian only; should maintain a firm foothold in reality in terms of its usage of structure and materials; and the bridge should have the potential to be self-funding. The financial feasibility study of the international management consultants, KPMG, reported that program could include: office, residential, retail and recreational/educational, favoring a mix of retail, restaurant, and residential (Lipton and Cadman).

It is important to note that the Thames Water Habitable Bridge Competition is one of a slightly different scale. So for the design of this Nashville bridge, some things

remained constant while others did not fit within the scope and context of this project. For example, there is no doubt that residential units will be in high demand for the bridge. They will capture the most intriguing views of downtown as well as the revitalized waterfront by Hargreaves Associates. These condos occupy the middle portion of the bridge so that they capture the best of these unobstructed views. The diagram below shows the bridge's location in proximity to existing luxury condominium high-rises. These buildings have the most similar amenities and views; however, they will not even likely come close to the quality of views captured by the residences on the bridge.

Figure 30. Locations of luxury high-rises.

The second program type the bridge contains is light retail. Because the bridge leads from downtown to an area that is typically only occupied during game day, this inconsistent flow of foot-traffic will not likely support full-fledged commercial businesses. The proposed design offers kiosk-like space for which small businesses can

operate out of during game day. These small businesses will monetize the travel to the stadium. This is an attempt to provide a return to investors of the bridge and therefore be a more financially feasible project. In addition, the public level provides park-like amenities that would incentivize people to take leisurely strolls on the bridge on days it is not being utilized for Titans games or concerts. The public level of the bridge is shown in the image below.

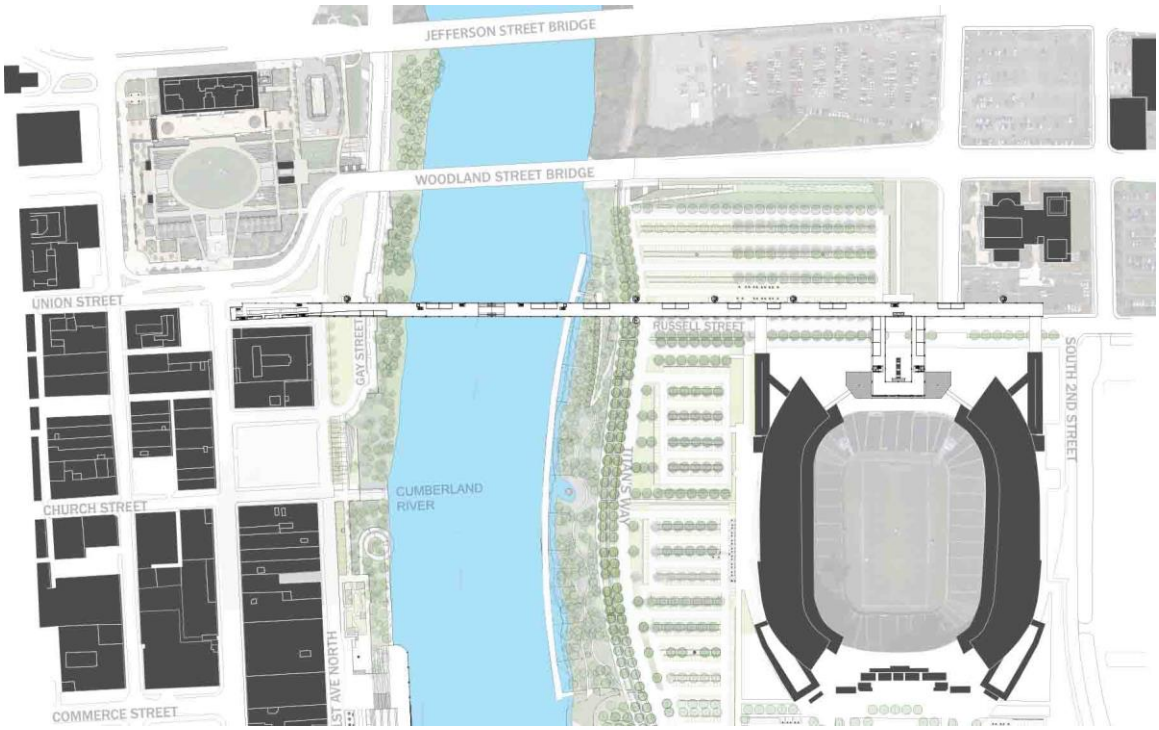


Figure 31. Public level plan of the bridge.

Along with these spaces, the bridge will be host to several other public and semi public programs. An example of this is: in the middle portion of the span, the bridge contains two double height exhibition spaces. These spaces could be rented out for weddings, as art galleries, and any other large group gatherings. They will be of the highest demand, as they provide some of the most dramatic views on the bridge.

The last two major programs of the project deal with the anchors of the bridge. This would be the block downtown and the area fronting LP Field. The downtown-side building houses the ramp up to the bridge level, small market below, and office spaces above. The east connection of the bridge will culminate in a full functioning hotel, which will provide amenities to fans in the stadium as well.

Chapter 6
Design Approach

Design Intentions

Cities all over the world are growing. Populations are not just increasing, but people are seeking out cities to find new life-styles. With space limited in downtown Nashville and a river bisecting a major portion of the city, pressure will be put upon the city outward from the river. However, with society attempting to make more sustainable cities and urban spaces that are more pedestrian friendly, the city will need to densify to make this possible. One solution to the lack of available space is to utilize free space over the river. Inhabited bridges provided many cities in Europe with special urban design qualities and spaces within the city. However, the success of this proposed bridge would hinge upon the creation of a place, *genius loci*. The financial and the physical are vital parts to the project, but they are not what will create a great urban experience. From this creation of place, the project will create a strong sense of community, which will create strong businesses, which will create a strong city.

Design for Varying Levels of Use

As mentioned earlier, the bridge will deal with varying levels of users. The majority of occupants will utilize the bridge during game days. They will use the bridge to cross the river while also visiting the small shops and park-like amenities. On the other days, the bridge will cater to residents, hotel guests, guests of small gatherings, and people wishing to take leisurely strolls. The layout of the bridge is designed so that these activities have ample space to operate, while also not obstructing the adjacent programs.

LP Field Hotel

At the point where the bridge meets the threshold of the edge of LP Field, the program changes. Permanent residents, living in the condos on the bridge, will most likely want to be situated so that they can take full advantage of the river views and

downtown. Once the bridge reaches the LP Field area, the guests of the hotel will have views that best take advantage of the stadium. The hotel will provide temporary residences to football enthusiasts that want to be emerged in game day activity. The rooms will feature great views of the stadium and the activity surrounding it. Some rooms will also feature views of downtown.

The hotel component will feature several amenities to guests as well as the general public attending the Titan's game. In addition to the rooms available, the design will provide a new entryway to the stadium. Today's stadiums are about encompassing the whole experience of the game. They provide amenities that go beyond just a seat or snack bars. Today's fans want to be free to get out of their seats and enjoy the game in a variety of ways. This component of the project will provide additional spaces for which the fan can get up, move around, all while still being in contact with the game. The design also offers views directly on the field from two restaurants, hotel rooms, and exhibition spaces.

With this new concept of sports experience, comes a new type of stadium. Baseball stadiums seem to be on the forefront of this exploration. The atmosphere of the game is no longer completely contained within the stadium. Some baseball stadium designs now look to integrate the city skyline in the backdrop of the outfield. This brings the context of the city into the stadium, which is quite nice. In a similar manner, LP Field has this quality of inviting the surrounding context into the stadium. Unlike most football stadiums that are enclosed completely by the bowl of seating, LP Field has breaks in the bowl of seating on the north-south axis. This allows for fans to catch glimpses of the surrounding context. This quality is then improved upon by providing a covered plaza. The fan can catch these glimpses while also occupying this space cut out from the bowl. This component of the project can be seen in the following section and render.

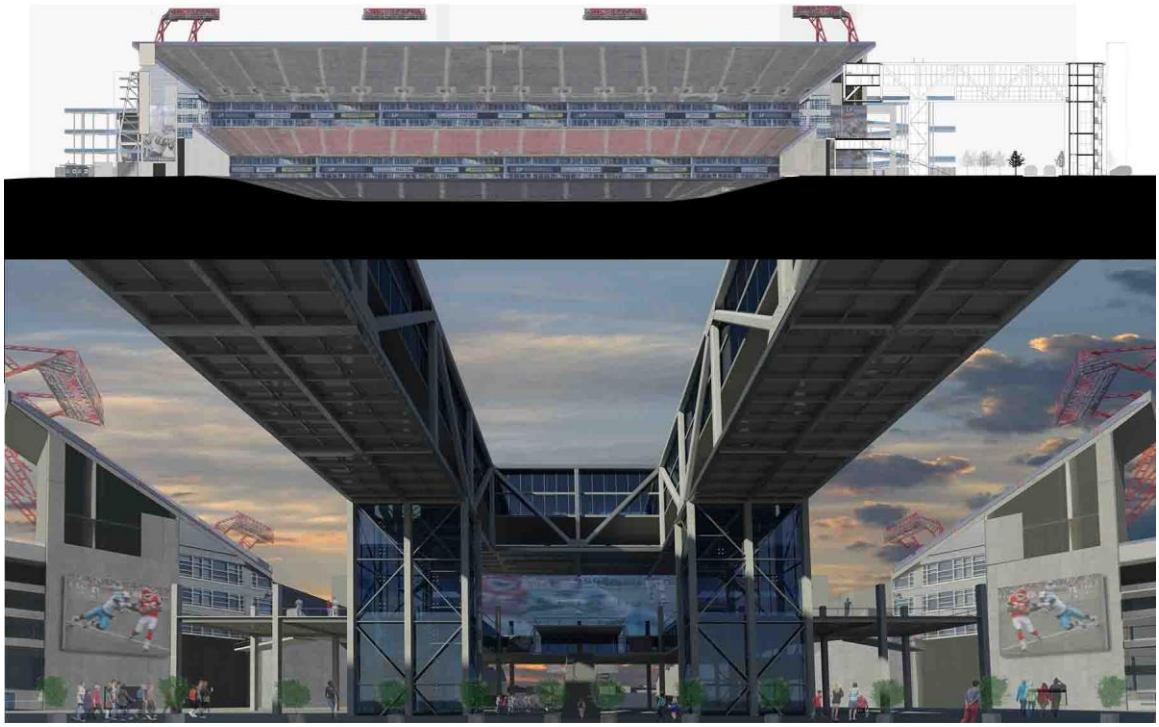


Figure 32. Hotel, stadium entrance, and covered plaza in section and perspective.

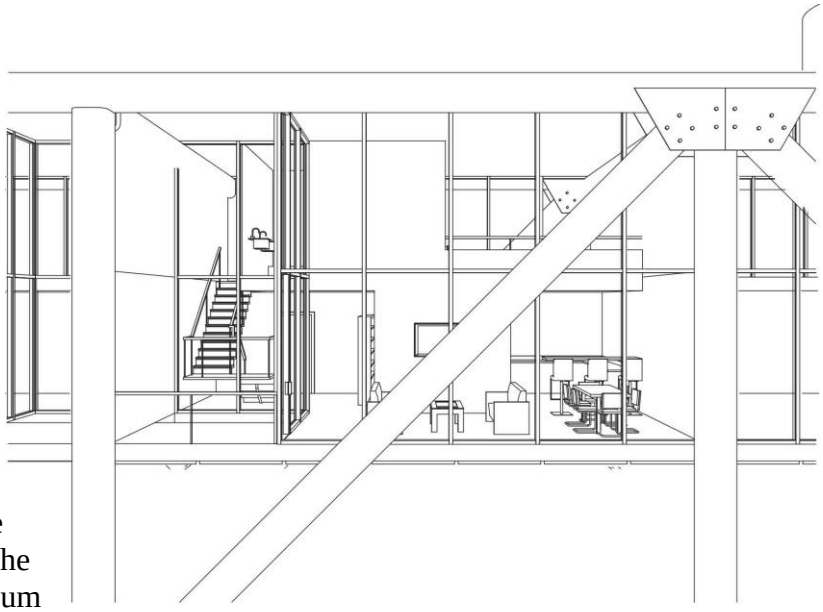
The Ramp Building

The building marking the start of the bridge in the downtown area will house several things. The first, and probably most important, is the ramp up to the bridge. In order to clear 2nd Avenue traffic, the bridge needs to be elevated at least 14 feet. The ramp will do this as well as celebrate the entrance to the bridge to the surrounding area through a transparent facade. In addition to the ramp, the building will provide several levels of office space above the large atrium ramp space. These additional levels will add to the volume and scale of the building, which allows it to relate to the existing height contexts of downtown. Lastly, the site slopes down approximately 15 feet towards the river. These divergent movements of downward sloping grade and upward sloping ramp generate usable space below for additional program to exist. This may be a small retail space that could be used as a convenience store.

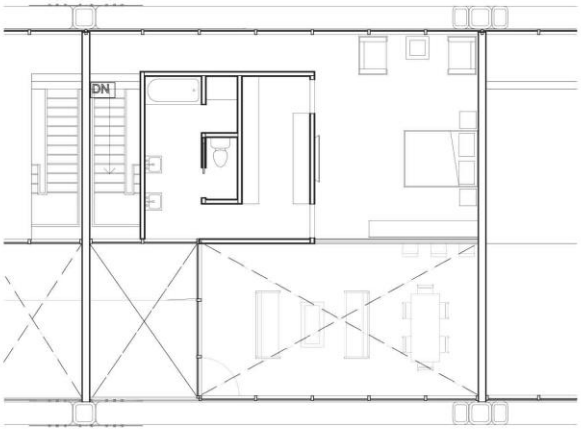
Main Bridge Span and Containing Programs

The main component of the bridge is the span over the river. This space is by far the most important, and rightly the most elegant. This 35-foot square metal box truss, creates a thin, floating, line over the Cumberland River. Within this structure, are three different program types.

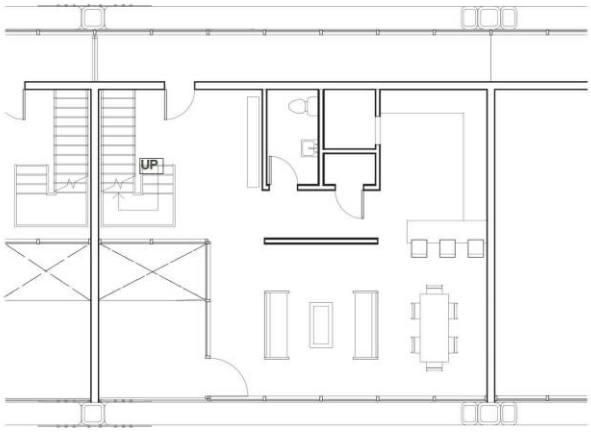
The first is the condominiums. These are two stories (a level of living area and a mezzanine sleeping level). As mentioned before, the condos overlook the best views of the river and downtown. The living level takes this into consideration and provides the resident with a double height space to observe these views. The condos are also provided with a small outdoor patio, which has a portion cut out so that light may enter into the public level of the bridge. The condos are designed on a five-foot grid and provide a large separation element that splits the entrance and kitchen spaces apart from the living and dining spaces. This element also extends to the sleeping loft level and opens up to allow views onto the river as well. This element also provides a surface to mount an entertainment system. The couches are arranged in such a way so that residents may watch television or take in views of the river. This design may be seen on the next page.



Perspective View into the Condominium



Plan of Sleeping Loft



Plan of Living Level

Figure 33. Condominium module.

The Second are the two double height exhibition/gallery spaces as mentioned previously. The Third is the public level containing light retail and park like amenities. These are the more public and semi-public components of the bridge. As mentioned earlier, the public level will house several small kiosks as well as some park-like amenities. The exhibition spaces sit in the middle of the bridge and provide the most provocative views of the river and of the bridge itself. These exhibition spaces sit above the public level and on the same level as the condominiums. These amenities are depicted in the following render.

Like the Ponte Rialto, in Venice, the bridge has an open feature at the center of the span. This place, within the bridge, is simply the structure. There are no buildings overhead or enclosing partitions. This open, park-like area will feature a stepped seating amphitheater of sorts, inspired by the High Line in New York. There are seats facing down the river that allow some one to view a show of barges running up and down the river with the city skyline as a back drop. This is intended to be the most magically point on the bridge, inviting people to partake in the beauty of the bridge's structure as well as the dramatic views of the river and downtown.

Figure 34. Middle of the bridge. Depicts off-day activity and exhibition spaces.

Structure and Circulation

The structure of a bridge is the most important portion of the design. It can also be the most elegant. This design utilizes a simple, but eloquent box truss type structure. The choice was made to have this type of structure for a few different reasons. One of them was to relate back to the historical significance of the site. The Nashville Bridge Building Company was on this site before LP Field and has a rich history of bridge and barge building. So it was out of respect for this that this structure was considered. In addition to this justification, the bridge was to be of a smaller scale. The design attempts to become an eloquent thin line of structure that spans a distance of over 2,000 feet. These are some of the deciding factors for the structure choice for the bridge.

The circulation was a tricky component to the bridge. Fire safety is a very important aspect to buildings today and it must be incorporated into this design. For this reason, the project includes fire stairs contained within silo-like structures at each bridge support. Fire safety is also supported by the puling back of buildings in the center of the bridge to reduce traveling distance over the river, where fire stairs cannot be provided. The silo-like structures relate to several instances in the site. The first is relating to the formal qualities of the NABRICO site, in which there are circular platforms where cranes would operate. In addition to this, the cylindrical design, the structure is made of metal to relate back to this very same historical context. The metal also gives differentiation to the elements of the bridge and separates them from the concrete bridge foundations. All of these components can be seen in the following exploded axon.

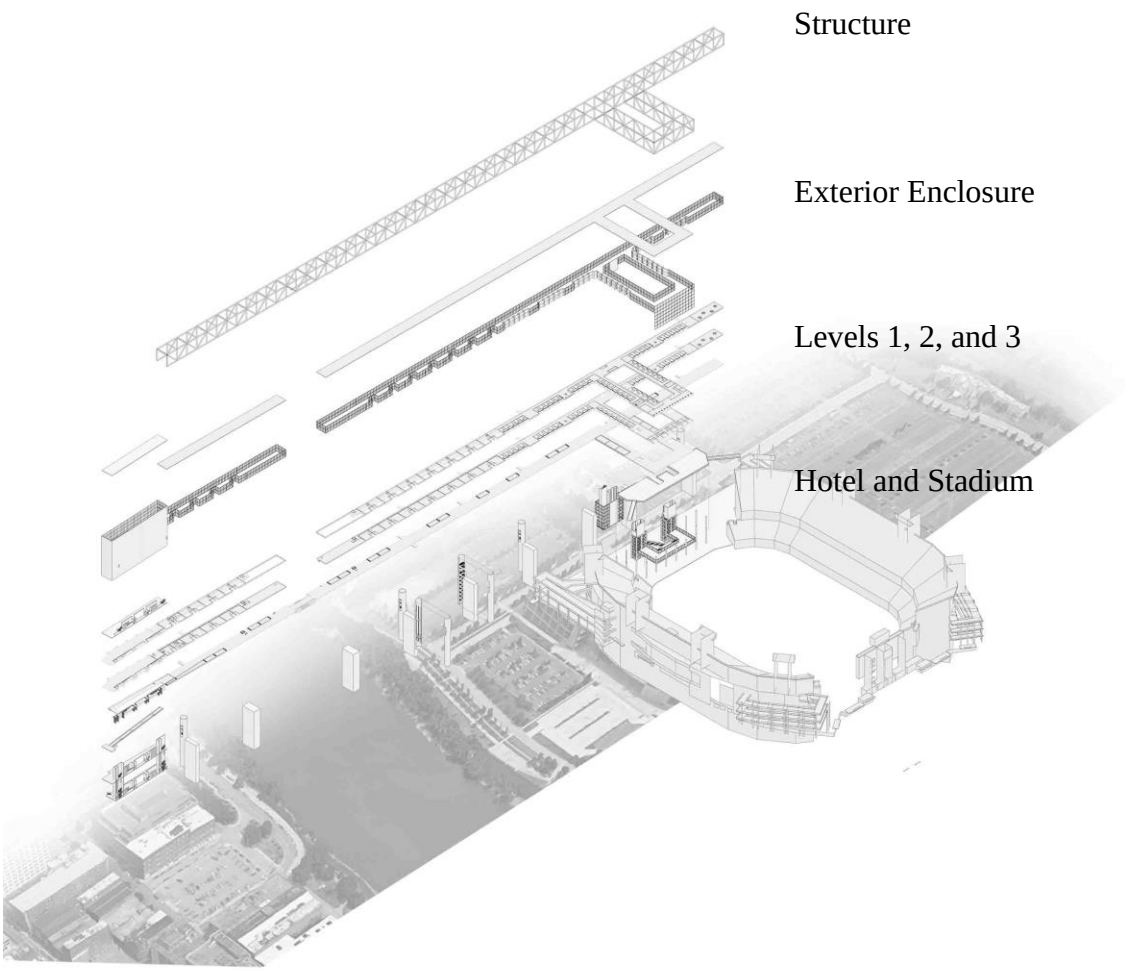


Figure 35. Exploded Axonometric.

Chapter 7
Hypothetical Clients

Tennessee is home to 19,550 bridges on public roads. These bridges can be categorized into two groups: On-System and Off-System. In the former, the bridges are on Interstate Highways and are maintained by the state. In the latter, bridges are operated by local governments and are on roads which these entities maintain (Nashville MPO).

The proposed bridge will contain connections to local roads such as Union Street and Russell Street in downtown Nashville; however, it will only cater to non-vehicular transportation. Following these considerations, the bridge funding would not entirely fall under the aforementioned categories, but a strong case could be made for local government maintenance. Typical funding from this source would most likely involve issuing municipal bonds, privately sourced funding, or be a mix of local government and private investors.

In a competition for an inhabited bridge in London, an international management consulting firm, KPMG, did a study to determine the commercial feasibility of such a bridge. In short, they found that the project "…should certainly be viable." The report included office, residential, retail, and recreational/educational programs. They also shared that the project would be the most successful with a majority share of retail, restaurant, and residential (Murray).

Similar to the proposal in London, this site in Nashville consists of prime real estate site due to its coveted views of the river and downtown, as well as its proximity to several amenities. In this case, there is simple justification for higher prices. To attract investors, they would need to be convinced of the value of the bridge in terms of generating income for a return on investment. To achieve this, prices cannot simply be calculated through proximities to amenities and potential views, but also by the quality of

the space. This energy will generate an atmosphere unlike any other in Nashville, and in the country for that matter. It is in this quality that the bridge would either fail or succeed.

In conclusion, this project could be funded through a number of ways. This project's feasibility, being unprecedented in modern times, cannot be completely understood through analyses and projections. Therefore, it is imperative that instead of leading a campaign for funds through typical financial analyses, the project must be based in the quality and sense of place that it creates. For it is from this quality that activity will be generated and thus create a strong sense of value in the eyes of the residents and therefore investors.

Chapter 8
Conclusions and Recommendations

In the end, this bridge is just as much about studying a solution via urbanization as it is about capturing the beauty of the river and downtown. The location provides an optimal location to experience the levels of traffic on the bridge as if it would be utilized on a regular basis hundreds of years ago. This bridge also provides an extension of the urban fabric, which provides a point of urban revitalization/stimulation on the other side of the river. The Cumberland River creates a major disconnect within the city. It seems as though the scale of downtown has been reluctant to expand across the river, most likely for the reason that it is not easily accessible. Pedestrian bridges provide this access, but they feel like a long way to walk. If you provide people with interesting, urban spaces for which to travel in, this distance becomes more inviting. This project attempts to begin these conversations.

If I were to continue this project, I would further study ways in which I could consolidate the formal aspects of the bridge and the stadium. The strongest existing connection is the steel structure of the bridge as well as the structure of the stadium. The stadium has truss-like structures that support the lights as well as the exposed structure for the seating. In historical context, the site has a rich heritage of structures and bridges, which reinforces this connection. However, I believe this connection and the integration of the two elements could be investigated further.

All things considered, I am delighted to have been given the opportunity to work on a project that was so unique. I am also very thankful to all that were involved in counseling me in the design. I would not be able to have reached the level of complexity and shear amount of design required for this particular project had it not been for these people. I wish to thank them for all the help and the time they invested in me.

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Vita

Benjamin Culbertson was born in Louisville, Kentucky. He attended The University of Kentucky's College of Design from 2008 to 2012. He received a Bachelor of Arts in Architecture and went on to pursue his Master of Architecture at The University of Tennessee's College of Architecture and Design. There, he was intrigued by urban design in Nashville and decided to pursue this study of an inhabited bridge in downtown Nashville. He is expected to graduate in May 2014.