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Interstate 49 Connector: Urban and Sustainable Design

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Abstract. The Interstate 49 Connector project is an approximate 5.5-mile segment of limited access, highway development plan needed for continuous access between an interstate route and a Federal-Aid highway system. The project is part of a proposed North American Free Trade Agreement (NAFTA) highway that will connect Winnipeg, Manitoba, Canada to New Orleans, Louisiana, United States. At present, I-49 transitions into a four-lane highway with little control access. Connecting Interstate 10 and Highway 90 into a continuous arterial will link two economically beneficial interstate routes, and concurrently provide citizens of southern Louisiana with a safe, emergency evacuation route. In 2014, the University of Louisiana at Lafayette Community Design Workshop (CDW) was contracted to work with the Louisiana Department of Transportation and Development (LaDOTD)/Lafayette Connector Partners (LCP) Team to address the proposed I-49 Connector project in Lafayette, Louisiana. Acting as a think tank to the consultant planning firms, the CDW provided support at community group-work meetings, public meetings and used the studio for uncovering and exploring issues of Urban Design and Sustainable Design. During the past four years, the CDW has run eight graduate studios to study two primary areas designated as the Northern Entry Gateway into the city and the Core Area around the downtown and traditional neighborhoods. Each area, taken from an urban, contextual perspective and environmental perspective, has its own unique character and physical makeup.

1. Introduction

The Community Design Workshop is a research institute and part of the School of Architecture and Design at the University of Louisiana at Lafayette. Established over 20 years ago, the CDW has completed over 100 projects and worked in 15 parishes within the state of Louisiana. The CDW's focus is to aid neighborhoods, small towns and cities to visualize their potential as a community. Operating as a faculty-led graduate-level studio, the CDW has expertise in urban design, planning, architecture and sustainability.

The role of the CDW in the I-49 Connector project was to aid the public process while supporting the consultants through charrettes and public meetings. "The I-49 Connector project is an initiative rooted in community collaboration and designed to create one of the most historic, landmark transportation projects in the state of Louisiana", [1]. The CDW was tasked with exploring and incorporating numerous ideas on how best the I-49 Connector should transverse the City of Lafayette while also addressing issues of Urban Design and Sustainable Design. The resulting graduate studio's design development can be attributed to three criteria: the external influences of multiple public processes, professional and government agencies' input, and the impact of regional, historical flooding. Community working groups, technical groups and



public meetings continue to influence the project, roadway elevation and the exits through the city. In 2016, an historic flooding event fundamentally required directional changes to the original design.

2. Public, Professional and Governmental Process

2.1 Discussion and Education

Instituting a public forum was a common technique implemented for the I-49 Connector project that manifests itself in two types of discussions: charrettes and public meetings. “Context Sensitive Solutions (CSS) is a collaborative and interdisciplinary design approach to planning and design. CSS is a relatively new process that evolved in the profession for the design of large transportation facilities”, [2]. Both charrettes and public meetings were used extensively to foster discussions and help educate the public on issues regarding urbanism, architecture, and planning strategies. The meetings provided a collaborative exchange between the CDW, the planning staff, neighborhood organizations, the public, and state and federal agencies. The community brings with it a wealth of knowledge regarding their neighborhood or city. Because of this, the CDW played the role of both educator and student through the exchange provided by the respective groups Figure 1.



Figure 1. CDW presents design options to LCP collaborators.

2.2 Charrettes

Charrettes are short design exercises that focus on a wide range of design issues. Numerous I-49 Connector project charrettes took place with a representative cross-section of Lafayette’s population in attendance. Multiple groups had active roles, collaborated in the charrette process, and arrived at a consensus regarding the importance of the project to the community with respect to planning, architecture, and landscape. Each group contributed special, individual perspectives such as economic development that the project might generate, while being concerned about the possible displacement of housing and the potential relocation strategies. Additionally, there was interest in a facility that would accommodate a variety of public activities and recreation. Policies and procedures for land use, land banking, and interest in developing the space and the structures into an activated environment were discussed along with concerns for lighting and sound issues, and the overall aesthetic properties.

2.3 Public Meetings

A series of public meetings provided a forum for presenting ideas about urbanism to the community, and for listening to citizens' concerns. Public meetings encouraged the formal exchange of ideas between

businesspersons, city officials, professionals, and residents. In the absence of a CSS program, highway projects were “highly detrimental to the urban fabric; creating physical and psychological rifts that are (now) extremely difficult to bridge.”[3] Armed with information compiled from the charrettes and with research on contemporary urban design and road construction, a series of public meetings were held to inform and educate the public regarding the project’s process and progress. These public meetings enabled the CDW to emphasize and present concepts and procedures for urban design.

3. Design Outcomes

3.1 I-49 Connector Design

Utilizing the information obtained from the public process, the CDW realized that the design for the I-49 Connector was the most important urban design project for the City of Lafayette since the railroad entered the city in the 1880’s and shifted its original grid. “One Acadiana President and CEO Jason El Koubi called the connector the single most consequential investment that we can make in the future of Lafayette and the future of Acadiana. The connector will restitch the urban fabric in the core of Lafayette, bringing goods, services and jobs to the northside, and offering the opportunity to address and clean up environmental contamination along the corridor.”[4] Keeping in mind the political and economic realities of the selected alignments, several goals were identified. One goal was to develop the I-49 Connector as a linear park system. Other goals included using the design process as an opportunity to continue the neighborhood design in the African-American neighborhoods (a CDW project that had begun two years prior). In addition, the CDW realized that it must demonstrate to federal, state, and local officials and to the citizens of Lafayette that highway design could be comprehensively based on the three-dimensionality and materiality of the city.

3.2 Linear Green Space

The opinions expressed in the charrettes and public meetings reinforced the role of this project as the new gateway into the city and parish of Lafayette. “The inclusion of public space allows for the I-49 Connector to become the front door and living room for Lafayette.”[5] This approximate 5.5-mile corridor provided an excellent opportunity to connect rural landscapes with Lafayette’s northern and southern edges. Figure 2 These rural landscapes could be extended through the I-49 Connector permitting linear green spaces to transverse the city. This would allow public parks to impact the city landscape on a territorial scale, an urban scale, and a pedestrian scale.



Figure 2. Rendering for Green Space adjacent to the I-49 Connector area

I-49 is a NAFTA highway and will eventually extend from New Orleans, Louisiana, to Winnipeg, Manitoba, Canada. The City of Lafayette sits at the intersection of two major interstate highways: Interstate 49 and Interstate 10. On a city scale, parks could become a green corridor marking the transition from highway to city and making this civic space the “living room” for the City of Lafayette. The garden would integrate existing vegetation in the connector with new indigenous landscaping. The facility was designed with three distinct levels to experience the green space at different heights and speeds. The traveler passing through Lafayette on the I-49 Connector would view the green space from above, gliding through the tree canopy and seeing special vistas of the city beyond. The traveler on the boulevard would engage the garden at grade, at a reduced speed, while being afforded views of the park and events. Finally, the pedestrian separated from the automobile, would experience the green corridor separated from the automobile. “This park scheme includes areas for a farmer’s market space for food trucks, pathway infrastructure, public seating, water features, a skate park, and basketball courts.”[6] Figure 3 To break up the flat terrain and the potentially over-scaled size of the 22-foot highway, the landscape could be molded with berms, hills, and valleys. Where the interstate’s alignment intersects with particular places and notable architecture, other integration strategies would be employed. In commercial districts, walls and berms would be used to mask the interstate and to negotiate the transition between highway and architecture. In addition, public spaces were designed with landscape and fountains acting as noise buffers. Many of the walls constructed as buffers around the city would also provide a backdrop for other purposes such as advertising and public art. On-grade parking could be housed beneath the I-49 structure.



Figure 3. Park Scheme that includes pathway infrastructure, public seating and water features

3.3 Flooding Impact

In August, 2016 the Lafayette region sustained historical flooding (30 inches over a 48-hour period) which substantially altered the focus of the I-49 Connector. “A combination of an incredibly moist air mass and a slow moving storm system resulted in feet of rain for southern Louisiana. The epic rains caused devastating flooding, which led to the evacuation of tens of thousands, killed at least thirteen people, and paralyzed the region.”[7] Louisiana saw record-shattering rainfall ... as floodwaters reached as high as 50 feet in southern parts of the state. The storm....marked one of the most extreme of its kind in recorded history, the National Weather Service said, the kind forecast for that area only once every 500 years.”[8]

The original plan for the green space area of the I-49 Connector project called for a cut and cover facility with park space on top. Because this green area sustained unprecedented flooding, the cut and cover design had to be abandoned. Instead, the green space area became a working component. Its function is to act as a regional retention area for this area and the surrounding parklands. Figure 4 In addition, the green space would clean and filter water runoff from the proposed elevated roadway. The green space would also serve as a wet and dry retention area to hold substantial amounts of water for future flooding events. “Natural disaster...cause the loss of people’s lives and property, that occur in a certain natural environment and are beyond human ability to control....natural disasters mainly focus on forces of nature, but they are closely related to human socio-economic activities.”[9]



Figure 4. Northern Gateway District that becomes a regional retention area in the park space

3.4 Urbanism and Architecture

The urbanism and architecture of the I-49 Connector operate in several ways. The general rule was to clearly define the urban field of the city apart from the linear green space. The CDW proposed an urban edge of buildings that clearly delineates the city’s fabric and provides green space containment. Figure 5 This urban edge became a buffer to the neighborhoods with a commercial district between the connector and the occupants. This edge would include a 30-foot setback of green space from the service road. In the downtown area, constructed architecture has a minimum height of three stories and a maximum of four stories. This restriction allowed the architectural edge to become a visual barrier and sound deflector to the I-49 Connector.

Other needed areas of urban design included the downtown area and the north end. The downtown area focused on infilling fragmented blocks that had been in a state of decay since the mid 1960’s. In addition, major arterials used the complete street system to form linkages from the I-49 Connector to other parts of the city. The CDW employed a layered system of buildings, open spaces, or parks to establish a buffer zone between the I-49 Connector, downtown, and the traditional Lafayette neighborhoods. In the north end, a vacant mall, suburban development and object-orientated (stand-alone) buildings provided challenges for the continuity of the city’s fabric. By orientating parking to the rear of the buildings and with controlled access to service roads, the CDW could utilize the space between the buildings as green space. In this flat and object-driven landscape, a rhythm of buildings and parks would establish a continuous urban edge.



Figure 5. Urban edge provides containment of green space and buffer to neighborhoods

4. Neighborhood Redevelopment

4.1 Housing and Understanding Neighborhoods

The neighborhoods and residences that the I-49 Connector bisects were shaped by the railroad as it ran through Lafayette in the late 1800's and by the automobile as it cut through the area in the 1960's. Over time, residential neighborhoods became fragmented due to the railroad's impact, new road construction, industry, and the aging, existing residential stock. Displacement has long been a factor in this area as each transportation project resulted in individual family removal and relocation as one economic social and cultural group replaced another through cycles of exodus and migration. The I-49 Connector cuts through four distinct neighborhoods composed of a mixture of income levels from low to upper middle with a cultural mix predominately of African-American, Creole and Acadian heritage. In the paper *Understanding Minority Residents' Perceptions of Neighborhood Risks and Environmental Justice: New Modalities, Findings and Policy Implications*, the authors assert that the members of communities affected by large-scale planning projects "...experience environmental injury in ways that are deeper and more complex than this simple notion of Risk." [10] Indeed, several community groups voiced concerns over both the environmental and contextual issues related to the I-49 Connector. Each of the four residential areas in the study has a different mix requiring solutions that address the specific needs of its residents.

Previous studies conducted by the Lafayette City Council and Parish Government identified the I-49 Connector area as a location with housing problems that included, among others, substandard housing. The 2010 U.S. census statistics for metropolitan areas identified housing problems including age of housing, size of housing, and low proportion of home ownership. It was essential for the CDW to document the existing housing stock in order to assess current conditions and develop strategies to address the housing needs of the area while minimizing the impact of the facility. If properly considered, the I-49 Connector should lead to the re-development of the surrounding neighborhoods.

The CDW developed a field survey form that assessed the existing housing stock, identified its strengths and weaknesses, and determined projected needs within the proposed I-49 Connector. The survey provided information regarding the current context of each structure and its existing conditions. The survey presented a general description of the property, neighborhoods, residential conditions, residential typologies, and observations regarding the potential to relocate a structure. It also provided criteria for replacement housing. These guidelines required that replacement housing have equal and comparable uses including types of rooms and for the activities that occur within and about the house. Through varying pattern combinations, unique housing types were designed to accommodate the particular owner or occupant's needs. The survey

revealed that residences in the area represent a range of architectural typologies including the cottage, the ranch house and styles from folk Victorians, to Craftsmen bungalows. These typologies are examples of regional, vernacular adaptations of national styles that form an architectural and cultural heritage.

The field survey and charrettes served two roles: they provided the CDW with a direct understanding of the area and they provided the residents with a forum in which to express their concerns and ideas regarding the interstate connector. Primary concerns included the need to relocate, the need to find affordable housing without incurring debt, and the timetable for implementation. Ideas gathered through the fieldwork focused on economic development and cultural identity. Proposals included cultural centers, job training and opportunities, and a railroad history museum. The data from the initial housing survey provided the basis for figure and ground studies that identified vacant properties and areas that required new development. These studies then generated a model of each neighborhood allowing for a complete mapping of the project area that defined the existing conditions and provided basic strategies for development. To re-develop housing, the studies are essential to illustrate the location of vacant properties and the locations for in-fill houses. For a neighborhood to be a viable community, it must be complete. Each vacant lot is an opportunity for decay. The first component of the housing proposal was to fill the vacant lots with single- family residences and where appropriate small, multi-family housing.

4.2 Neighborhoods

A current trend in residential planning is to return to the scale, design, and characteristics of turn of the century traditional houses and neighborhoods. Much of the existing project area contains characteristics of tree-lined streets, porches, and an architectural vocabulary that is being rediscovered by the neo-traditional and new urbanism movements in design and planning. The houses typically present a well-proportioned front, one that responds to the scale of an individual, and emphasizes the vertical orientation rather than the horizontal as found in later ranch-style houses. This orientation leads itself to having the houses relate to each other, rather than standing as an isolated piece. These houses follow design patterns of area vernacular houses constructed of wood, with lap siding, raised on piers and with a variety of details that express the skill of the carpenters who constructed them. It is the consistency of this vernacular vocabulary that builds overall coherency and which ties the neighborhoods together. (Figure 6)



Figure 6. Example of in-fill to existing neighborhoods incorporating tree-lined streets and new housing types patterned from existing housing stock

4.3 *Housing Prototypes*

When in filling an existing neighborhood, primary goals were to avoid the repetition of designs by responding to the character of the existing neighborhood. To achieve this, each type is reduced to its component pieces that focus on stylistic elements of form. The component elements are identified as living patterns. Each of the vernacular stock types documented by the field surveys was examined with respect to the uses. The Shotgun, Creole Cottage, and Craftsman's Bungalow are archetypal examples of housing types common to the Acadian region and to the project area. The residential stock includes houses with porches, wood construction on piers, and composite roof profiles. "Use of the porch as a primary living space is common to 95 percent of the existing stock in the survey. Using the definition of 'equal and comparable', the porch is now considered an essential component of all replacement housing for the connector project", [11]. Also identified were unique features that make a residence a personal reflection including color, texture, and windows. These elements expand the size of the home physically and fosters a greater sense of neighborhood identity.

5. Results and discussions

The I-49 Connector project was originally proposed over twenty years ago. The CDW played a major role in the preliminary discussions. During this time frame, three major hurricanes and a major flooding event impacted the area and it became ever more evident that the interstate would be completed. Since 2016, the CDW and the LaDOTD have been working extensively to integrate this major facility into the existing fabric of the City of Lafayette while buffering it with green spaces, park lands, and urban development to shield the traditional neighborhoods.

6. Conclusion

Placing an emphasis on the value of public welfare and societal needs, the School of Architecture's curriculum is contrasted by the inclusion of theoretical and real-world design issues which form the genesis and the development of the student's experiential education. The importance of this duality becomes evident when reviewing the history of the School's Community Design Workshop and the associations formed with team partners. The collaborative research completed by these organizations represent intense investigations that manifested itself in the I-49 Connector project. This study provided a cityscape for solving the problems and needs of a growing metropolis. The rich cultural diversity of the city's people required careful, thoughtful study to comprehend the nature and direction of investigation and planning.

The public process that consisted of public discussions and the education of the community through meetings and charrettes proved to be highly successful in identifying community needs and providing viable design solutions for the regeneration of neighborhoods, while mitigating potential problems. Unforeseen flooding disasters fundamentally altered portions of the original plan but resulted in a more sustainable design. Ultimately, the CDW felt that the study accurately represented the dynamic and the spirit of the community.

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