The mission of the Niehoff Urban Studio is to foster interdisciplinary collaboration among students, faculty, and civic leaders as a way of bridging the gap between academia and practice through community-based design projects. As part of the studio process, faculty and students engage directly with community stakeholders to propose innovative and equitable solutions to urban problems through design and policy that enrich the communities and the quality of life for the residents they serve.

The studio considers topics related to current urban issues in biannual cycles. Beginning in fall 2012, the Niehoff Studio introduced "Metropolis and Mobility" which focused on transportation systems and networks within Cincinnati. This theme addresses the current preoccupation of Cincinnati area planning in this period which includes once-in-a-generation transportation infrastructure projects being planned and undertaken, such as urban streetcar, regional light rail, bus rapid transit, a bicycle network, and federal highway and bridge projects. During the 2012-13 academic year student work explored regional Bus Rapid Transit and bicycle mobility. In 2013-14 the studio work focused exclusively on a proposed bikeway and Light Rail Corridor known as “Wasson Way”.

This document highlights select research and project proposals for Wasson Way. This work was developed in response to case study research and real world challenges identified by stakeholder groups. It is designed to be a resource used to guide decision making by the community, practitioners, and government officials.
Movement in the City Fall 2013-Spring 2014

In the fall 2013 and spring 2014 semesters, seven faculty and 116 advanced students from the Civil Engineering, Urban Planning, Urban Studies, Real Estate, and Urban Geography programs worked to engage stakeholders around the planned future of the 6.5 mile Wasson Way Bikeway and Light Rail corridor in the central area of Cincinnati. Civil engineering students began work in the fall 2013 semester by researching best practices and were joined by the students of four other disciplines in the spring 2014 semester to conduct further research, reconnaissance, and design studies. In parallel, a community workshop was conducted by the UC Community Design Center in partnership with AIA Cincinnati in October that provided valuable stakeholder visioning and design concepts for the student work to carry on from (see www.uc.edu/cdc/12_12_13_WassonWay_WorkshopFinal_web.pdf)

As interdisciplinary teams and as in-parallel researchers, students conducted a survey of best practices, site specific research, urban analysis, engineering, urban design, programming, policy making, and planning for both Light Rail Transit (LRT) systems and Bikeways. LRT design for the Wasson Way corridor, already specified for that location by an earlier regional rail plan, was articulated by students with feedback from city transportation officials. The novel Bike Trail proposal was developed in close collaboration with the non-profit Wasson Way Organization, a grass-roots civic group.

The final student work was presented during an open house on April 17. Following the student exhibit, a panel discussion entitled ‘Bright Ideas for Mobility’ was held. The panel, moderated by Jake Mecklenborg of UrbanCincy, included Michael Moore - City Transportation and Engineering, Mel McVay - City Planning, Nern Ostendorf - Queen City Bike, and Eric Oberg - Rails to Trails Conservancy. Panelists reflected on the promise of student work and articulated their visions for the future of Cincinnati’s LRT and Bike network.

The following pages show a small portion of the student work containing some of the best and brightest ideas and visualizations. See www.uc.edu/cdc/niehoff_studio/programs/metro_mobility/metro_mobility.html for original student report and poster files as well as coverage of the discussion panel and a video by UrbanCincy.com.
Research Topics

In the fall semester of 2013 civil engineering students began preliminary research focusing on the topics of: Bike Trails, Rails to Trails, Rails with Trails, Light Rail Transit, Transit Oriented development, and Environmental Considerations. The research survey focused on case study examples from similar type projects throughout the United States.

**Bike Trails:**
Using The Little Miami Scenic Trail (Ohio), The Midtown Greenway (Minneapolis), and the Monon Trail (Indianapolis) as case studies, students identified important questions related to construction, design, safety, liability, and sustainability. The bike trail research identified the basic standards for trail design, construction, and sustainability.

**Rails to Trails:**
The research team identified land acquisition and financing as a critical aspect for developing a rail to trail project. The team evaluated case studies from across the United States. The research group also analyzed the recommendations from the national Rails to Trails conservancy.

**Rails With Trails:**
The Rails With Trails research group focused on the recommendations and case studies of existing Rails with Trails projects. An important aspect of bikeway planning is safely integrating both modes of movement together.

**Light Rail Transit:**
The Light Rail Transit research highlighted key considerations for the transit systems including: design, safety, economics, implementation, legal issues, environmental, and human factors. The student team compared Norfolk (Virginia), Buffalo (New York), and Charlotte (North Carolina) light rail systems.

**Transit Oriented Development (TOD):**
The TOD research team began to evaluate common goals behind transit oriented developments in the United States. These goals for developers and municipalities alike are to: increase property values, decrease dependency on individual vehicles, reduce parking requirements, and develop retail and service amenities.

**Environmental:**
The Environmental research group sought a holistic strategy to comprehensively address storm water and environmental impacts of the light Rail and trail amenities across the entire area proposed for Wasson Way. For stormwater considerations they evaluated four stormwater strategies. In addition they identified Leadership in Energy and Environmental Design or LEED as a beneficial design standard.
Site Reconnaissance

The basis of studio work was built from site reconnaissance, including a detailed analysis of Wasson Way and the transportation network that it is a part of. This included identification of challenges and opportunities within the proposed LRT and bikeway corridor which extends through eight communities and five jurisdictions from Evanston at the west to Mariemont and Columbia Twp. at the east. The corridor study zone was expanded beyond just the narrow rail/trail right-of-way, to include nearly one half mile on either side so as to address all potential areas impacted.

Interdisciplinary student teams were asked to identify and distill the strengths, weaknesses, opportunities and threats (SWOT analysis) within the formal, social and technical structures of this broad area. Through this comprehensive analysis and reconnaissance, students utilized and applied their disciplinary knowledge to evaluate the corridors in five zones shown below and described in the framework section of this report. Reconnaissance findings directed further research and case studies necessary to support the final student proposals.

Opportunity and Constraints Diagram for Wasson Way Corridor in Evanston and Norwood

Character Zones
Within the approximate 1 mile study area are four different character zones. Each area has unique strengths, weaknesses, opportunities, and threats that will affect Wasson Way’s daily operations. Each area must be designed differently in order to connect one study area to the adjacent.
Framework Concepts

Before initiating specific individual urban design, engineering, or programming proposals, interdisciplinary student teams developed urban framework proposals which covered five sections of the Wasson Way corridor as well as the corridor as a whole. See [www.uc.edu/cdc/niehoff_studio/programs/metro_mobility/metro_mobility.html](http://www.uc.edu/cdc/niehoff_studio/programs/metro_mobility/metro_mobility.html) for detailed posters.

Integrating Diverse Land-uses and Movement Options

The 6.5 mile long Wasson Way corridor contains a diverse land-use and neighborhood mix. It touches five different jurisdictions, five Cincinnati neighborhoods of contrasting demographic profiles, private and public institutional anchors, regional retail centers, office areas, manufacturing districts as well as several parks and a national scenic river. The corridor is crisscrossed with interstate and state highways, regional arterial roadways, existing freight and future passenger rail, and current bus service as well as forthcoming bus rapid transit lines. It was the objective of the student teams to tie these diverse elements, uses, and conditions together into a cohesive corridor. This corridor will provide enhanced live-work-play opportunities along an accessible bikeway with trailheads parallel to a future regional light rail line (LRT) that requires both large multi-modal hubs and smaller stops. Both trailheads and LRT stops provide opportunities as the locus for stabilizing existing surrounding conditions, stimulating the creation of new amenities, or promoting higher and better use redevelopment including a mix of uses in more dense pedestrian friendly patterns.

A Green Infrastructure Corridor

Students recognized the value of the corridor as a way of not only connecting various existing green space assets, but also as a substantial urban green infrastructure alignment in and of itself. Wasson Way could provide valuable new public spaces, landscaped buffers, preserved natural areas, and potentially a wildlife corridor. It could be exploited for stormwater management with vegetated bridges, raingardens, bioswales, detention basins, and other engineered features. And finally, plantings could provide hefty environmental benefits through carbon sequestration and mitigation of the urban heat island effect.

Evanston-Norwood Area: Institutional Anchoring and Workplace Development

Providing a multi-modal terminus at the Xavier University Campus, redeveloping an older commercial service district along Dana Ave, and making the best use of the sizeable vacated rail siding were key components of student work in this section of the corridor. Students would explore expanding the new Keystone office park to include a mix of uses around a rail stop. This proved to be an innovative way of converting a highway served commercial node into robust Transit Oriented Development. Planning work also considered the best integration of development, transit, and bikeway connectivity into the neighborhoods.
Rookwood and Madison: Opportunity in Complexity

Adjusting existing roadway infrastructure to accommodate rail and trail was a major challenge to the students in this section of the corridor. The success of the Rookwood regional commercial center stimulated concepts for high density mixed use infill development at the busy intersection of Madison and Edwards that could integrate a transit stop and capitalize on the presence of the Bike Trail. And further west the underutilized Withrow Recreation area was conceived as a heavily programmed central gathering space for the entire Wasson Way corridor.

Paxton and Hyde Park Plaza: Reconceiving a Shopping Mall

Opportunities were explored to reconceive Hyde Park Plaza as a high density mixed use transit oriented development that would complement nearby historic neighborhood business districts and provide new housing models for this highly desirable part of the city. Important traffic engineering issues were addressed including reworking the heavily traveled Paxton-Wasson-Isabella intersection and promoting more regular movement through the Plaza superblock for pedestrians, bikes, and automobiles.

Wasson Way at Redbank: Knitting Together and Connecting the Parts

Students found that segregated land-use areas, steep slopes, streams, conflicting rail and highway infrastructure in this part of the corridor could benefit from planned organization, integration, and better connectivity. Redevelopment opportunities along the existing and extended Red Bank Expressway were conceived by students, along with a multi-modal terminal connecting the Oasis rail and Wasson LRT lines. Also desired here was connectivity to other existing trails at Murray Avenue, Armleder Park, Mariemont, and the Little Miami Scenic Trail.

Wasson Way at Mariemont: Natural Areas and the Commercial Strip

In this section of the corridor planners and engineers explored how to sensitively integrate the proposed bike trail with an extraordinary natural environment in the Little Miami River, its riparian landscape, and other assets. Navigating various possible trail alignments in relation with the existing rail yard was a challenge and alternate routes were tested. And remaking the auto oriented commercial strip along Wooster Pike to advantage bikers was envisioned.
Design and Research Applications

The following section of this report illustrates student design applications which were derived from reconnaissance, stakeholder interaction and recommended urban framework plans. These proposals are concerned with applications relevant not only to the narrow bike and light rail right-of-way, but to a wide swath of the area around it that will be impacted.

Since the corridor is intended to accommodate both a bikeway and transit, the potential for new higher density building and use patterns that might result was articulated in student work as “transit oriented development” (TOD). These projects incorporate the added dimension of multi-modality as “bike oriented development” (BOD) as well. This new or re-development itself was seen as an organizing device for areas of the corridor that are particularly complex, such as around Rookwood Commons at Madison and Edwards and at the Red Bank Expressway zone.

A significant amount of student work addressed how to fully implement the technical aspects of the proposed light rail line and the bikeway. Many aspects of the LRT proposal required articulation ranging from track alignment and bus feeder systems to station location and design. Similarly, the bikeway required alignment, connections, and environmental engineering of its green borders. Both systems were enhanced through student concepts for public space linkage and natural networks for social and environmental benefits. Other design efforts explored how best to integrate the new bike and LRT lines into the existing street system through innovative modifications. Finally, a body of student research was developed that explored social, cultural, and economic impacts of future corridor development. For complete and original student work in report and poster format visit www.uc.edu/cdc/niehoff_studio/programs/metro_mobility/metro_mobility.html.

Transit Oriented Development / Bike Oriented Development

Transit and Bike oriented development opportunities were a key focus of the studio given the potential ridership present on both Trail and Rail. Current real estate trends favor redevelopment and densification of various large sites in this area of the city. The Keystone Parke Office Park at Dana and I-71 is visible evidence of that. In student studio projects, a mix of uses was proposed for each design that would accommodate a more pedestrian and less auto oriented environment where users could potentially live, work, and play in the same area. Light rail transit promotes density at these locations by reducing auto dependence and its space intensive parking demands. Bike trail connections provide an attractive recreational amenity for potential residents of these new developments and may offer commuting benefits as well. Finally, certain types of retail may benefit from attracted rail and bike riders. TOD/BOD projects included work from collaborating teams of Urban Planning, Engineering, and Real Estate Students.

Commercial Redevelopment Opportunities (Lexington)

A potential redevelopment site bordered by Dana, Montgomery, and Lexington Avenue was targeted because of a large abandoned rail siding available for reuse. This design area was expanded to include the redevelopment of existing commercial service and warehousing properties along Dana. This development, south of Wasson Way, is seen as complementary to the University Station development under construction west of Montgomery and is proposed to be mixed use, residential over commercial, with compact structured parking. Landscaped internal space is included as an amenity. Multi-family residential units are proposed north of Wasson Way with significant public green space set aside for the use of these new households, Norwood, and Evanston residents as well as for Bike Trail related events.
Infill Commercial Density (Rookwood)

Large scale infill development was the focus of a student proposal for a site bounded by Madison, Edwards, and Wasson Roads and cattycorner to the expansive Rookwood retail mall. This student project is notable because of its relative density, anticipating future demand, with a taller office block, similar to the existing Rookwood office tower, and as called for in the economic pro-forma developed by real estate student partners. Office, retail, entertainment, and structured parking uses fill buildings tightly fronting Madison and Edwards leaving an open interior configuration of space that spans across Wasson Road to a southern perimeter of townhouses. This open area provides an outdoor venue for entertainment uses and office workers and frames a light rail stop on the south side of Wasson. Most importantly the development configuration and open space design put the Bike Trail and its trail head at the desired center of activity.

Work Destinations (Dana at I-71)

Two TOD/BOD alternatives were proposed as models for workplace development and expansions of the existing Keystone Pointe Office Park at Dana and I-71. Each incorporates dense mixed use development, structured parking, and defined public spaces around proposed transit stops. The scheme above organizes the public space around an axis between the rail stop and the historic Evanston park pavilion across Dana. Proposed green space incorporates the meandering bike trail and promotes a trail spur connection south into the existing Evanston playground. The below scheme is oriented around a public plaza north of Dana to be anchored by the proposed rail stop. Both projects propose new housing at the edges of the Evanston Playfield as a means to bridge the overall development to the Evanston community.
**Transit Oriented Development / Bike Oriented Development**

**Mall Redevelopment into a mixed use TOD/BOD (Hyde Park Plaza)**

The popularity of the Hyde Park/Oakley neighborhoods and a shift to preferences for a less auto dependent lifestyle are predicted to press redevelopment of the Hyde Park Plaza site for more dense building and use patterns, like that already visible in the existing Drexel apartment complex across Paxton. The student proposal shown below, created through teamwork among Urban Planning, Engineering, and Real Estate students, attempts to surgically place new development around existing to create an integrated mix of housing, retail, manufacturing (existing Richards Industries), and green space with structured and surface parking. The design introduces a green “Mall” along an axis connecting the proposed LRT stop and Bike Trail with the Oakley recreation area, thus distributing bikers and rail commuters throughout the center of the development. Circulation improvements include a new internal public boulevard that moves area traffic through, rather than around the previous mall superblock, thereby reducing loads on Paxton. And a traffic roundabout was engineered for the intersection of Wasson, Paxton, and Isabella to promote safety, facilitate flow, and mark an entry to the development district.

**Phasing Plan for the Proposed Hyde Park Plaza TOD/BOD**

**Redbank and Wooster: Redefining the Highway zone and commercial strip**

At the east end of the corridor both Red Bank Expressway and Wooster Pike areas in Columbia Twp. represent opportunities for the Wasson Way project to have a positive impact on the built environment. The fragmented development pattern of the Redbank expressway zone can be made more cohesive with strategic infill that might also help tie together the various rail, road, and bike circulation. Of particular interest is the reconception of the Redbank expressway as an attractive landscaped boulevard which incorporates better defined bike and pedestrian pathways to link Wasson Way north to Murray Trail. At Wooster Pike, beyond Mariemont, an auto dominated commercial strip can be reorganized to create a critical mass of bike friendly entertainment uses by clustering new with existing bars and restaurants that will serve riders of the proposed riverside Wasson trail and the adjoining heavily used Little Miami Scenic Trail.
Light Rail and Bikeway Integration

Making Light Rail Transit Work (Line Design)

Planning and Engineering students worked side by side to understand and illustrate Light Rail with Bike Trail application to the corridor. Students considered all aspects of LRT alignments including the capacity of the existing Right-of-Way to accommodate both required Bike and LRT operating dimensions. In response, a team of engineers designed the LRT operations for comparison under several scenarios of single, double, or hybrid track configuration shown at right and provided a comparative rating based on seven factors. To complement the LRT and collect more dispersed riders, a bus-shuttle feeder service shown below was designed to connect nearby destinations to LRT stops.

Success Criteria

- Operating Cost
- Resiliency (Number of LRT vehicles & Affected Stations)
- Construction Cost & Volume of Earthwork
- Community Opposition (Number of Panel Rejection)
- Rider Capacity
- Safety (Number of Road Crossings per Hour)
- Maximum Rider Wait Time

Comparison of Rail Alignment Options

1. Single Track

2. Double Track

3. Turnout at Hyde Park Plaza

4. Turnouts at Hyde Park Plaza & Rookwood

5. Double Track between Hyde Park Plaza & Rookwood

Proposed Electric Feeder Vehicles

Proposed Feeder Routes
Light Rail and Bikeway Integration
Making Light Rail Transit Work (Stops and Stations)

In parallel to the LRT line design, and collaborating with the engineering students, planning students of the same team created a methodology for selecting secondary and tertiary rail stop locations shown on the table below. They also devised a typology for each based on an expected level of service. In addition, site specific architectural designs were provided for each LRT stop and station type with attention to how the bike trailhead, bus connectivity, public space, and other amenities could be integrated.
Light Rail and Bikeway Integration

Multi-Modal Opportunities (XU + Red Bank Hubs)

A multi-modal hub is anticipated at each end of the Wasson LRT line where it meets other regional rail lines (I-71 LRT, Oasis Line).

At Xavier University the hub is situated at the east edge of campus where the proposed Wasson Way LRT line meets the proposed I-71 LRT line and in proximity to the busy Montgomery Rd and Dana Avenue intersection in Evanston. The student design team was challenged to integrate the transit stop with the proposed bikeway, local bus service, and a proposed Bus Rapid Transit (BRT) line on Montgomery Road. Consequently, a full multi-modal transit center was proposed that incorporated structured parking, a bus depot, a dual line rail station, and an iconic bike storage/share/service facility. The location offered a site to provide small retail functions fronting Dana, and incorporated public spaces and promenades that served to connect the hub to the campus as well as the new University Station mixed use development to the east.

At the east end of the Wasson Way corridor another multi-modal hub was proposed near the Red Bank Expressway. Here students also saw the opportunity for a larger transit oriented development around the proposed hub and they chose to situate the LRT station at the edge of an existing private green space already framed by the historic manufacturing buildings of Mariemont. New development was formed to extend and define the space and it was further modified to incorporate a bus hub and network for pedestrian circulation for movement among a proposed mix of uses. The LRT station was designed to negotiate the challenging grade separation that exists between the existing Wasson Way rail ROW and the much lower existing Oasis rail ROW.
Corridor Infrastructure and Public Amenities

Trail Connectivity

Students were challenged to find bikeway trail connections between the proposed Wasson Way and other existing trails in the complex Ault Park and Red Bank Expressway area. Significant grade changes and other barriers prevent easy connections to the Armleder Park/Lunken Airport Trail, the Murray Trail, and the Little Miami Scenic Trail as well as to Ault Park trails. Planning Students provided alternative routing. After investigating possible stairway and ramp connections between Wasson Way and the Ault Park Valley Trail, engineering students designed a sloping trail at grade as shown.

Corridor Green Infrastructure and Environmental Considerations

Engineering students explored the capacity of Wasson Way to become an important Green Infrastructure corridor that could ameliorate negative environmental impacts such as stormwater overflows and flooding, air/water pollution, and urban heat island effects. Opportunities exist along its length to provide rain gardens, bioswales, green roofs and green walls/green bridges as shown in the student work below. Outside of the trail/rail line, consideration was given to mitigating stormwater surcharges caused by proposed development around the corridor, as might happen with full implementation of the student concept for Transit Oriented Development at the Lexington/Dana/Montgomery Road.

Map Diagram of the Many Possible On- and Off-Road Connections Between Wasson Way and Other Existing and Proposed Trails
Corridor Infrastructure and Public Amenities

Green Spaces and Places

Wasson Way has the potential to tie together and make more accessible a significant amount of green space in an urban open space network. A Planning student surveyed proximate green resources to delineate a typology of green space near or on the corridor that ranges from defined urban parks to wild and scenic areas. A planning and engineering team selected the Withrow High School recreation area as the subject of a programming and design exercise intended to create a central gathering space for Wasson Way and a recreational asset for the surrounding community. This team defined a twelve month programming menu and provided specific area designs for active recreation/team sports, walking trails, a community garden, a dog park, performance venues, and social areas.
**Multi-Modal Conflicts**

**Bikes, Trains, and Automobiles**

Roadway Design and crossing considerations for the bike trail and light rail line were the concern of a number of student teams. TOD design teams included surrounding intersection design to enhance the functionality of their proposed development. A roundabout was envisioned for the busy intersection of Paxton/Wasson/Isabella at the gateway of a future redeveloped Hyde Park Plaza to ease flow and promote safety. The complicated intersection of Edwards, Madison, and Wasson was analyzed for modifications that would reduce congestion and better accommodate an at-grade rail, bike, and pedestrian crossing. Crossing design was a technical aspect of the Lexington TOD at Dana as well, and automated gates were tested as a means of safety control. Finally, student teams throughout were obliged to explore how the bikeway and light rail line could be incorporated in the design of the street right-of-way.

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**Traffic Counts at Madison/Edwards/Wasson**

**Proposed Roundabout at Wasson/Paxton/Isabella**

**Reconfigured Right-of-Way at Dana near the XU Transit Hub**

**Rail/Trail Crossing at Montgomery Rd/Lexington TOD**
**Perception and Identity**

Urban Geography and Urban Studies students worked in parallel to studio design teams while considering a wide variety of social, cultural, and economic issues. A strong thematic area explored was the future identity of Wasson Way and how the corridor will be perceived by users and surrounding residents. An “imageability” study was undertaken to document how current residents of the area comprehend the corridor. In addition, the theory of “mental mapping” was applied to determine best ways to design the bike trail and associated spaces to be cognitively accessible and inclusive of all users. To complement this, interpretive signage, exhibits, and an art program were proposed and intended to be place-specific so as to exploit the rich cultural heritage of the corridor. A notable identity concept proposed making the corridor understood as critical infrastructure, not only for recreation and transit, but also for environmental remediation as well as utilities for energy, communications, and water.
Process, Use, and Impact

Urban Geography and Urban Studies investigations covered other areas of interest including understanding the unique tools and technology of participation in the grass-roots Wasson Way project and the roles of the various actors and agents involved. Of special concern was the question of whether the success of a fully developed Wasson Way will result in displacement and gentrification in lower income parts of the corridor. In response to this, a study of the impact of the light rail transit on surrounding property values was conducted, using Denver as a case study, which showed a potential positive correlation.

In addition, students endeavored to understand the practicalities of how the proposed bike trail would be used and enhanced through programming and policies. While tourism was ruled out as a significant impact for this bikeway, regular bikers were estimated to make a substantial economic impact on the local economy. A proposal for a “Trail Resource Center” was made to advocate for general public education about biking and provide programming that might serve to engage surrounding communities in the use and appreciation of the future Wasson Way. And finally, innovative policies and procedures were proposed to insure the ongoing community ownership, maintenance, and safety of the bikeway.
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