

**SWUTC Grant – Summer 2012:  
Developing a Curriculum for Freight Planning**

Title of Project:

**Designing Freight Compatible Communities: A New Planning Paradigm**

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Grant Period: June – August 2012

Project Abstract:

Incompatibility between land uses and transportation projects is a growing challenge in planning for a sustainable and equitable American urban form. In many areas, heavily trafficked freight routes lie adjacent to land uses, including dense urban, quiet exurban, and rural communities, that are often noise, light, and vibration sensitive. There has been a historic lack of communication between planners, transportation planners and the freight industry. This has led to flawed policies including poor planning choices that have shifted the balance between industrial and residential development. Auto-oriented development patterns of the last century have magnified the conflicts and impacts between residential and freight development. However, there are positive examples of beneficial transportation investment projects such as those that have created higher paying jobs for disadvantaged populations. During the grant period, from June 1<sup>st</sup>, 2012 to August 31<sup>st</sup>, 2012, this study was undertaken to aid in the development of a new course focused on these and other issues in freight planning for the department of Community and Regional Planning at the University of Texas at Austin.

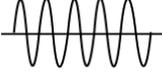
## Project Introduction:

The freight industry is a crucial element of the national economy, producing revenue and jobs across the nation while carrying an average of 42 tons of freight worth \$39,000 per person in the United States (2007 Commodity Flow Survey Data). Yet historically, there has been little interaction between the trucking, rail, air and port industries and transportation and urban planners. In many instances the freight component has not been effectively considered in the development of city and regional comprehensive plans. In addition, freight considerations have not been integrated into zoning and building codes. This has led to design and development choices, as demonstrated in the adjacent photo, that exacerbate the conflicts between freight and more sensitive land uses. A recent NCFRP Report (*NCFRP 16: Preserving and Protecting Freight Infrastructure and Routes*) pinpointed some of the conflicts that can arise near freight activity, listed in Figure 2.

Building a connection between freight and planning can also be tied to the rise of the megaregional planning perspective, which identifies and investigates networks of metropolitan areas with shared economic, environmental and social features. The development of the megaregion planning concept requires not only regional integration of planning organizations and modes, but also the simultaneous development of multiple land uses, including integration of residential and industrial demands generated by freight corridors and associated economic development.



**Figure 1: Example of development conflicting with freight railroad in Houston, Texas**

	<b>Noise Sensitive Uses</b>	Dwelling units (residential, motels, etc.); educational uses (childcare, schools, colleges, etc.); libraries; hospitals and other residential health care providers; playgrounds.
	<b>Light Sensitive Uses</b>	Dwelling units (residential, motels, etc.); and hospitals and other residential health care providers.
	<b>Vibration Sensitive Uses</b>	Dwelling units; educational uses; vibration sensitive industries (such as precision high-tech industry); all buildings not constructed to withstand the fatigue caused by rail vibrations.
	<b>Pollution/Air Quality Sensitive Uses</b>	Dwelling units (residential, motels, etc.); medical (hospitals and other residential health care providers); educational (childcare, schools, colleges, etc.); park and recreational facilities.
	<b>Uses Requiring Potentially Incompatible At-grade Crossings</b>	Dwelling units; educational uses; libraries; hospitals and other residential health care providers; commercial uses; emergency services; park and recreational facilities.
	<b>Uses Associated with the Potential for Dangerous Trespass</b>	Dwelling units; education uses (especially childcare facilities and schools); libraries; playgrounds; commercial uses.
	<b>Time Sensitive Uses</b>	Night-time sensitive uses*; dwelling units, hospitals and residential care facilities.
	<b>Traffic and Congestion Sensitive Uses</b>	Dwelling units; emergency service provider uses; residential health care facilities.
	<b>Height Sensitive Uses</b>	Residential and commercial uses that may impact approach and landing flight paths.

\* Nighttime sensitive uses are those types of uses that may cause disruption in the sleep pattern of an individual. The Day night average noise level that was developed by the Department of Housing and Urban Development recognize the heightened community annoyance caused by late-night or early-morning operations of certain industries and transportation uses. Where nighttime sensitive uses is utilized, it specifically refers to freight activities that may create noise that impacts residential land uses.

Figure 2: Conflicts with freight activity (NCRFP 16)

### Project Objectives:

A review of transportation planning courses from across the country points to the lack of curricula that educate students on the conflicts and barriers between freight and other land uses. The SWUTC Grant sponsored the research and development of a new six-hour course, a practicum, in the Community and Regional Planning Masters' Program. This practicum would be one of the first of its kind. Ultimately, this course would endeavor to bridge the current gap between the planning profession and the freight transportation industry.

This grant supported the exploration of critical issues involved in planning for and with freight activity in the United States with the goal of integrating freight into the planning curriculum at the University of Texas at Austin. The project included the development of a prospective course outline, literature review (collection of existing studies, journal articles, news articles, websites, organizations, etc.) and field research. A research trip that included site visits in Chicago, Illinois and Omaha, Nebraska offered an opportunity to not only gain a perspective of the freight rail industry but also a greater understanding of the management and operations of freight rail and intermodal terminal facilities. To better understand innovative ways in which low-income older urban communities can benefit from freight rail infrastructure, a visit was also made to the Center for Neighborhood Technology, a non-profit organization headquartered in Chicago, Illinois, under the direction of Mr. Scott Bernstein.

The product of this research includes a tentative schedule and syllabus for a practicum course in the department of Community and Regional Planning in the School of Architecture at the University of Texas at Austin. The syllabus outlines a sequence of five topic areas to be addressed during the course of the practicum. It also includes a review of literature and background readings to be used to introduce students to the history and current operation of freight railroad systems in the United States. The literature will also provide students with a primer on existing land use conflicts within various freight modes, as well as examples of associated planning and design strategies. The course format will include lecture, seminar and studio based work, following the sequence of topic areas outlined later in this document. The field research undertaken during the grant period investigated potential industry partners for the studio project portion of the course.

#### Project Tasks:

1. A review of the history and current operations of the US freight transportation network with a particular focus on freight railroads.
2. A literature review of land use conflicts between land uses and transportation projects and existing strategies for dealing with incompatibility and conflicts.
3. Develop a curriculum for a 6-hour practicum course integrating this understanding of freight into land use planning.

4. Identify potential clients to collaborate on real-world projects for the studio segment of the course, allowing students to draft design and policy solutions for conflicting land uses between freight and other land uses.

#### Course Description:

Students will learn the basics of freight planning and investigate ways to integrate freight considerations into land use planning with an emphasis on railroads. The instructors, Dr. Talia M. McCray and Ms. Lisa Loftus-Otway, envision a course that is lecture and studio based. A new course of this nature would educate the next generation of planners on the best design practices for developing livable and sustainable communities around freight facilities or corridors. Students, from across the University, will gain knowledge through a series of readings, discussions, interviews, and a research/design project at the local scale. Dr. Talia McCray and Ms. Lisa Loftus-Otway will provide instruction, supplemented by other faculty and researchers from the University of Texas and guest speakers from the freight industry including Class 1 Railroad representatives and industry associations such as the Association for American Railroads.

Building upon Dr. Talia McCray's experience with transportation, equity and environmental justice and Ms. Lisa Loftus-Otway's years of work on freight transportation, the course is specifically designed to provide the students with an opportunity to re-envision residential development to create freight compatible communities. Throughout the course, students will be collaborating with industry guest speakers and given opportunities to design solutions for real world projects. This project launched an investigation into both the industry perspective of Class I Railroads as well as opportunities for collaboration with these industry leaders on projects for the studio segment of the practicum class. Students will be able to approach the issue from a local design standpoint as well as looking at the role of freight on a megaregional scale. Burlington Northern and Norfolk Southern, two of the Class 1 Railroads, each have dedicated teams to investigate and develop business strategies around the megaregion concept. This perspective lends itself to this course's investigation into flawed policies and lack of communication among regional partners.

## **Field Research Itinerary and Reflections**

*Chicago, Illinois, June 24 -26, 2012*

- Norfolk Southern Railroad [www.nscorp.com](http://www.nscorp.com)  
Contact: Herbert Smith, Manager, Community & Legislative Relations

47<sup>th</sup> Street Intermodal Terminal

63<sup>rd</sup> Street Intermodal Terminal

- CREATE Project Partners and Bus Tour <http://www.createprogram.org/>  
Contact: Laura Wilkison, Project Manager for CREATE
- Center for Neighborhood Technology [www.cnt.org](http://www.cnt.org)  
Contacts: Scott Bernstein, President and Co-Founder

*Omaha, Nebraska, June 27 -29, 2012*

- Union Pacific Railroad [www.up.com](http://www.up.com)  
Contact: Joe Arbona, General Director - Policy & Partnerships

UP Center – Corporate Headquarters

Union Pacific Railroad Museum <http://www.uprrmuseum.org/>

Harriman Dispatch Center

Council Bluffs Yard (in Council Bluffs, Iowa)

## ***Chicago, Illinois***

Chicago is one of the largest freight hubs in the United States, along with Memphis, Tennessee and Kansas City, Kansas. In Chicago, all six Class 1 Railroads intersect where a remarkable volume of freight travels through the city every day creating congestion that reverberates across the country. Meanwhile, the freight industry employs thousands of Americans in locally based jobs; provide sustainable goods movement nation-wide; and drive local and national economic growth. Freight railroads have played a big role in the history of the United States and they are positioned to play an equally important role going forward.



**Figure 3: Class 1 Railroad Routes Nationwide**

## **Chicago Region Environmental and Transportation Efficiency (CREATE) Project**

CREATE is a unique partnership established to invest billions of dollars to make improvements to the Chicago region's passenger and freight rail network. As one of the nation's largest freight hubs, Chicago is a major congestion bottleneck where

transcontinental freight routes intersect commuter and intercity passenger rail. The CREATE program was announced in 2003 as a result of a Surface Transportation Board Task Force convened to address the regions rail capacity concerns. The project aim is to increase efficiency of the system and improve quality of life for local residents. Improvement projects include upgrades, viaduct improvements, new overpasses and underpasses to eliminate grade crossings, and safety enhancements. The partners include US DOT, the State of Illinois, the City of Chicago, Metra, Amtrak and six of the seven Class 1 railroads. (CREATE, 2010).

- Create Project bus tour (Details in tour packet) sites visited:  
79th/Greenwood viaduct improvements  
130th & Torrence Grade Separation (GS15a)  
UP Third Mainline-Proviso Yard (B2)  
25th Ave proposed Grade Separation (GS6)  
Signal improvement (B4/B5)



Figure 4: Assisted Living residence adjacent to Chicago rail yard.

## Norfolk Southern Railroad

The Norfolk Southern Railway (NS) is a Class I railroad headquartered in Norfolk, Virginia that operates approximately 20,000 route miles that serve 22 states and employs over 30,000 people (2011). The Norfolk Southern Corporation is a holding company formed in 1982 that merged several historic railroads including the Southern Railway, Norfolk and Western Railway and Conrail. NS Railway has an extensive intermodal network and serves every major container port in the Eastern United States. The



Figure 5: NS Intermodal Freight Yard, Chicago Illinois.

entirety of the Norfolk Southern route map can be seen in the image at right.

In 2011, coal, coke and iron ore comprised 31% of Norfolk Southern Railroad's derived 31% of its operating revenue from coal, coke and iron ore and nearly 20% from intermodal transportation (containers seen everyday on trucks and trains carrying common consumer goods). Other sources include agricultural, fertilizer, consumer, chemical, metals, construction, automotive and paper products. (Norfolk Southern Corporate Profile, [www.nscorp.com](http://www.nscorp.com)).

As a consequence of economic growth and the expectations of just-in-time supply chain management by consumers, Norfolk Southern is currently undertaking a rail-yard expansion that abuts a

deteriorating neighborhood in suburban

Chicago. The site exemplified the challenges that come with freight planning in an urbanized country. Growth in intermodal freight shipping has increased freight activity at this yard, leading to increased noise and congestion. NS has painstakingly acquired several blocks of adjacent residential land in order to absorb this increased volume. This expansion may serve to reduce some conflicts, like congestion, but at the same time raises issues of equity and sustainability.



Figure 6: Norfolk Southern routes.

- Site Visits and Meetings

- Herbert Smith, Manager, Community & Legislative Relations
- 47<sup>th</sup> Street Intermodal Terminal  
[http://www.nscorp.com/nscintermodal/Intermodal/System\\_Info/Terminals/chicago\\_47.html](http://www.nscorp.com/nscintermodal/Intermodal/System_Info/Terminals/chicago_47.html)
- 63<sup>rd</sup> Street Intermodal Terminal  
[http://www.nscorp.com/nscintermodal/Intermodal/System\\_Info/Terminals/chicago\\_63.html](http://www.nscorp.com/nscintermodal/Intermodal/System_Info/Terminals/chicago_63.html)

## Center for Neighborhood Technology (CNT)

The Center for Neighborhood Technology (CNT) is an innovative "think-and-do tank" that promotes sustainable urban development. The organization was co-founded by Scott Bernstein, a recognized expert in metropolitan planning whose work includes urban economics, climate change strategy, and energy efficiency. CNT has been a leader in the Chicago community since 1978, preparing research, building coalitions and launching non-profit organizations to support community development and innovation. Their projects and research span the areas of climate, energy, water, transportation and community development (Center for Neighborhood Technology, n.d.).

CNT has developed a concept termed cargo-oriented development (COD) to complement the popular planning idea of transit-oriented development (TOD). Both of these development strategies aim to build upon existing infrastructure and assets, particularly in central cities.

More than \$8 million of the Chicago economy is generated by the freight industry, with expectations that freight volumes will continue to increase. In addition to the macro-scale advantages of freight industry, the Center for Neighborhood Technology proposes a more community-based strategy to develop synergistic employment opportunities around these freight assets. Cargo-oriented development (COD) is a twist on smart growth that can support local economic growth, job creation and compact development by

leveraging the undervalued transportation assets often found in older, inner-ring suburbs. These struggling post-industrial neighborhoods can offer access to multiple modes of transportation, walkable neighborhood design and an existing local workforce. (Stabelin and Chandler, 2007). CNT's Smart Growth in Older Communities (YEAR) project discusses



Figure 6: Chicago's urban fabric along the train line near CNT offices (Photo courtesy of Maarit Moran).

CNT's Pilot project to initiate this type of development in two Chicago communities (Full report can be accessed at <http://www.cnt.org/repository/SS-Case-Study.pdf>).

With freight activity deeply embedded in Chicago's infrastructure, this type of research may instruct planning decisions in the region but more importantly it highlights the need for further inquiry into the intersection of planning and freight.

- Meetings
  - Jacky Grimshaw, Vice President of Policy
  - David Chandler, Principal Business Analyst

## ***Omaha, Nebraska***

### **Union Pacific Railroad**

Union Pacific Railroad was one of the two original companies directed under the Pacific Railroad Act of 1862 to construct a transcontinental railroad. In 2012 Union Pacific celebrates its 150<sup>th</sup> anniversary as a company. Union Pacific (UP) is one of the nation's largest railroads - serving 23 states with over 31,000 miles of track and employing 44,800 people. UP is an important link in the national and global supply chain, providing freight transportation and management that serves 25,000 customers across the continent.

If railroad companies are commonly seen as antiquated, UP demonstrates the modernity and forward-thinking reality of the industry. The corporate headquarters is housed in a LEED-certified building near the revitalized downtown warehouse district in Omaha. The state-of-the-art dispatch center tracks thousands of train cars simultaneously with the ability to direct action in the field in seconds. UP is open to new technologies and more sustainable practices that will help their business thrive.



**Figure 8: Interior Atrium at Union Pacific's LEED-certified headquarters.**

- Meetings and Site Visits
  - Joe Arbona, General Director - Policy & Partnerships
  - Tour of UP Center (Corporate Headquarters @ 1400 Douglas Street) with Dave Holt, General Director - Real Estate
  - Tour of UP Museum in Council Bluffs with Beth Lindquist, Manager of Museum Operations
  - Tour of Council Bluffs Yard with Tami Johnsen, Director of Terminal Operations
  - Meeting with Bob Turner, SVP of Corporate Relations
  - Tour of Harriman Dispatching Center
  - Meeting with Barry Michaels, VP Premium Operations (Intermodal, Auto)
  - NCFRP 16 Presentation with Lisa Loftus-Otway
  - Discussion with UP Staff: Brian G. Maher, AVP Industrial Development; Mark A. Bristol, AVP Network Planning, Pat R. McGill, Law - Real Estate; Patrick A. Halsted, Director of Industrial & Public Projects; Dale Bray; Director of Public Safety; Tony K. Love, AVP - Real Estate

## **Reflections on Visits:**

Our field research advanced the proposal that freight planning should be integrated into the planning paradigm to create healthier and more sustainable communities. Observations made during our site visits as well as the insight provided by railroad executives and staff and planning professionals at CNT showed us the significant challenges that exist for the future of freight and land use planning as well as the exciting opportunities that might lead to positive benefits for society.

The history of the railroad and freight industry is deeply intertwined with the United States' physical, cultural and economic development. Freight railroads including Norfolk Southern and Union Pacific represent an invaluable asset to the US economy as they benefit the country on both a local and national level. Railroads employ thousands of workers that help to support local economies and maintain tens of thousands of miles of track and the surrounding lands. The efficiency and energy use of rail relative to other freight modes that must be considered in planning for sustainability in the face of a changing climate. Railroads are an important contributor to our national economy and this role is likely to expand in the future as consumption grows.

However, there are still unresolved conflicts that will need to be addressed. Historically, there has been little collaboration between the profit-driven corporations of freight and the locally focused realm of planning. The railroad industry must operate in a competitive market constrained by national security concerns, movement of hazardous cargo, just-in-time manufacturing and markets and development and upkeep of its capital-intensive infrastructure. Local planning, zoning and development agencies have often overlooked the health, safety and quality of life concerns associated with land use near freight railroads and facilities. However, both parties share interest in increasing the efficiency of the nation's transportation network, supporting economic growth and advancing the health and safety of our communities.

Our investigations uncovered examples of efforts to bridge freight transportation and urban planning. The CREATE projects demonstrate a growing recognition of the overlap between freight industry logistics and local community needs. The infrastructure improvement undertaken in the CREATE program show a concerted effort to balance these

needs and improve conditions for all sides. The Center for Neighborhood Technology takes this understanding a step further. Their research into cargo-oriented development is an effort to harness some of the economic strength in the freight industry and build upon it to build stronger communities in urban neighborhoods.

Long-range comprehensive planning may be utilized to preempt conflicts and capitalize on the strengths of the freight industry in the United States. The governmental and non-profit organizations (CREATE and CNT) described several projects underway to improve links between local community needs and economic development. CREATE is focused on correcting land use conflicts between railroads and surrounding communities and finding ways to prevent similar land use conflicts in the future. The strong support for CREATE by numerous stakeholders suggests the opportunity for further cooperation between different interest groups.

## **Tentative Course Outline:**

### **I. Freight Introduction**

1. Overview of Freight
2. Railroad Industry Perspective
3. Regionalism (“megaregion”) and Supply Chains
4. Economics and Economic Development

### **II. Issues and Conflicts**

5. Issues
6. Conflicting Land Uses
7. Social Equity and Environmental Justice

### **III. Planning and Zoning**

### **IV. Case Studies**

8. Case Studies including:
  - a. Encroachment Issues
  - b. Good and Bad Planning
  - c. Community Engagement

### **V. Solutions: Tools and Products**

9. Zoning Tools
10. Construction and Design Standards
11. Regional Planning
12. Education and Outreach

## Works Cited

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