

# Intermodal Surface Public Transport Hubs: Harnessing Synergy for Success in America's Urban and Intercity Travel

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## OVERVIEW: INTERMODAL COORDINATION

Promoting intermodal coordination among various public transport services has been a nominal goal of federal policy at least since the passage of the groundbreaking Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. According to a report by the National Commission on Intermodal Transportation (NCIT) – a body established under that legislation – intermodal connectivity in public transport is a challenging but critical need:

In the passenger system, just as in the freight system, poor modal connectivity is a significant barrier to intermodalism. Too often, the bus station is 10 blocks from the commuter rail station, or the transit line stops at the airport, but too far away to walk to the terminals. [1]

The commission's report summarizes a number of the most salient benefits of effective intermodal coordination:

- Lowering transportation costs by allowing each mode to be used for the portion of the trip for which it is best suited;
- Increasing economic productivity and efficiency, thereby enhancing the Nation's global competitiveness;
- Reducing the burden on overstressed infrastructure components by shifting use to infrastructure with excess capacity;
- Generating higher returns from public and private infrastructure investments;
- Improving mobility for the elderly, disabled, isolated, and economically disadvantaged;
- Reducing energy consumption and contributing to improved air quality and environmental conditions.

Fortunately, the commission's report notes, "Passenger intermodalism has shown some signs of progress since passage of ISTEA."

Bus and rail transit systems more often coordinate schedules and farecards. Amtrak and intercity bus lines are recognizing the need to provide coordinated schedules and interline ticketing, and multimodal passenger stations are on the drawing boards around the country.

## CRITICAL ROLE OF INTERMODAL HUBS

Intermodal surface public transport stations represent a rapidly evolving and developing concept, designed to provide a hub for interfacing and interconnecting a variety of intercity, regional, and local public transport systems, all within a single facility. These include:

- Intercity motor coach (e.g., Greyhound, Amtrak Thruway)
- Intercity passenger rail (Amtrak)
- Regional bus and passenger rail
- Local bus, rail transit, and other local-area modes
- Access to shuttle vans and taxis (and often, park & ride facilities for personal motor vehicles)

(This research effort has focused on intermodal hubs that integrate both local/regional and intercity public transport services.)

In line with the advantages of intermodal coordination in general, discussed above, intermodal passenger hubs appear to offer important particular benefits. For example, public transportation providers can benefit from the efficiencies of shared costs and operational infrastructure, and public transportation services benefit from smoother intermodal interfaces

and travel route connection opportunities that tend to promote higher ridership. Likewise, passengers benefit from improved systemwide connectivity and the greater convenience this affords in making connections among local, regional, or intercity travel. [2] As the NCIT report points out,

Intermodal terminals encourage coordination of intercity bus service with rail passenger service. In California, for example, State transportation funds are used by Amtrak to run buses which offer coordinated service with passenger trains. [1]

Such ground-transport intermodal hubs have the particular advantage that they typically provide service into or at the edge of the core areas of central cities, and thus facilitate access via a multiplicity of local and regional transit route options.

In addition, intermodal public transport hubs tend to be strong attractors for transit-oriented development (TOD), often being transformed into destinations in their own right. [2] As a City of Austin TOD guidebook explains, TOD is becoming “an increasingly popular tool for cities across the U.S. to create more livable communities and combat urban sprawl, which has a number of negative cultural, economic, environmental, and social consequences that are felt in both urban and suburban areas.” [3] According to the guidebook, TOD is

the functional integration of land use and transit via the creation of compact, walkable, mixed-use communities within walking distance of a transit stop or station. A TOD brings together people, jobs, and services and is designed in a way that makes it efficient, safe, and convenient to travel on foot or by bicycle, transit, or car.

As the Jacobs Carter Burgess consulting firm has pointed out, “intermodal transit facilities are hubs for more than just transportation”:

Development surrounding these stations can range from restaurants and shops to serve waiting commuters to full-scale mixed-use complexes with office, retail, and residential uses. [2]

## **CONVERTING LEGACY RAILWAY STATIONS INTO INTERMODAL HUBS**

Increasingly, previously disused urban railway stations (often termed “legacy” stations because they have existed since for many decades and represent distinctive and significant architectural styles) are being renovated and converted into these kinds of intermodal public transportation hubs. The NCIT report particularly focused on the potential of refashioning legacy rail stations into effective, viably functioning intermodal facilities:

Many cities abandoned or demolished downtown passenger rail terminals during the urban renewal era of the 1960's. Yet, by the 1990's, it became clear to many cities that a central downtown multimodal transportation center would be the heart of a viable passenger intermodal system. Construction of these facilities requires cooperation among local governments, transit and commuter rail operators, public and private bus operators, and often one or more freight railroads. Ownership of such facilities is no longer necessarily a public responsibility. In fact, funding them often requires a complex mix of public and private financing and commercial development arrangements. The Union Stations in Los Angeles and Washington, D.C., and Boston's South Station, are excellent examples of successful projects. [1]

As the Jacobs Carter Burgess article similarly notes,

The resurgence of interest in intermodal centers has also given old train stations a new lease on life. Facilities such as Union Station in Denver and Union Station in Dallas languished for years as intercity rail service declined or disappeared altogether. With the advent of popular light rail systems in both cities, the once dormant stations are again bustling with passengers and helping bolster business at adjacent restaurants and shops. [2]

"It's all about location" explains Allan Zreet, senior project manager in Carter & Burgess's Facilities Division. "The train stations are typically in the right place for existing rail infrastructure, which makes them natural centers for light rail and commuter lines. Adding buses, taxis, and shuttles is likewise easy." [2]

The restoration of legacy rail stations has distinct advantages, according to the Great American Stations website. For example,

It is usually a linchpin to development and the beginning of our contribution to the revitalization of the downtown. It is also an impetus for economic growth and aesthetically and economically benefits the community and surrounding region. [4]

In addition, restoration and redevelopment of stations already in use for Amtrak service not only improves Amtrak customer service and satisfaction but also provides an efficient and pleasant facility for local bus, intercity motor coach, and other public transport passengers.

One of the most important advantages of existing legacy railway stations is that almost always they are located at the heart of their communities. Typically, as station restoration advocate Hank Dittmar has pointed out, America's railway stations were originally built at the core of the nation's cities and towns, “and hence at the core of our increasing metropolitan economy. Cities that invest in station projects are making a visible commitment to downtown revitalization...” [4]

Railway station restoration projects are particularly well positioned, argues Dittmar, to attract TOD and bolster urban economic revitalization:

In many cases, the opportunity exists to remake the train station into a mixed-use center of economic activity, while still accommodating train and bus service. In fact, the continual throughput of passengers makes train stations attractive locations for both office and retail. The new station facilities, which have included other uses, have stimulated employment and retail sales. Washington's Union Station contains an entire shopping center with 140 shops and restaurants, and it's a sought after retail location.... The South Station project in Boston renovated 134,000 square feet of office space, 15,000 square feet of retail space and accommodated about 60 new jobs.

Smaller stations have also been successful in integrating commercial uses. In Memphis, the former Illinois Central offices have become attractive loft housing. [4]

(It should be noted that while Memphis's Central Station is served by local transit, it lacks convenient connectivity to regional transit and intercity motor coach services.)

Dittmar presents additional evidence of station revitalization catalyzing community revitalization.

Meridian's Union Station project has sparked over \$10 million of reinvestment in the surrounding downtown, because the business community recognized the stake the City has made in its future. In Washington, DC, a study conducted in the mid-nineties found that 13 million square feet of privately developed office space followed the Union Station restoration.... Lafayette, Indiana's station project has prompted a \$36 million development adjacent to the station and pedestrian bridge project. [4]

All three of these rail station restoration examples cited by Dittmar also function as intermodal public transport hubs.

## EXAMPLES OF INTERMODAL PUBLIC TRANSPORT HUBS IN U.S. CITIES

Intermodal public transport hubs both in operation and under development can be found throughout the country. A number of particularly significant examples of this type of facility are discussed in the following summary.

### New York City – Port Authority Bus Terminal

“Located in the heart of New York City, the Port Authority Bus Terminal is the world's busiest bus terminal, the region's primary ground transportation facility, and the largest bus terminal in the United States” relates the Port Authority of New York and New

Jersey (owner/developer of the facility) on its website. The agency further points out:

Opened on December 15, 1950, the terminal is located one block west of Times Square, occupying the blocks between Eighth and Ninth Avenues, from 40th to 42nd Streets. It is an integral part of the revitalized Times Square and theater district areas, and a vital connection for the region's workers, travelers and visitors. Approximately 200,000 daily bus passenger trips are made through the PABT each day. [5]

Figure 1. NYC Port Authority Bus Terminal



Serving as a second intercity/regional/local hub together with the PABT is New York City's Pennsylvania Station (see below). Unfortunately, a drawback to both facilities is that, while there is excellent interface with various regional and local services, both facilities lack an intercity rail-motor coach interface. Furthermore, while PABT has excellent intercity motor coach-regional bus connections, it has no regional rail connections; likewise Pennsylvania Station offers excellent intercity rail (Amtrak) to regional passenger rail connectivity, but no regional bus connections.

### New York City – Pennsylvania Station

Commonly known as Penn Station, Pennsylvania Station, according to *Wikipedia*, is “the major intercity rail station and a major commuter rail hub in New York City.” The *Wikipedia* article notes that Penn Station “is located in the underground levels of Pennsylvania Plaza, an urban complex at 8th Avenue and 31st Street in Midtown Manhattan, and is owned by Amtrak.” [6]

Figure 2. NYC Penn Station



Reportedly serving 600,000 passengers a day (compared to 140,000 across town at Grand Central Terminal) at a rate of up to a thousand every 90 seconds, according to *Wikipedia*, Penn Station is thus “the busiest passenger transportation facility in the United States ... and by far the busiest train station in North America.”

Penn Station is at the center of the Northeast Corridor, an electrified passenger rail line extending south to Washington, D.C. and north to Boston. Intercity trains are operated by Amtrak, while commuter rail services are operated by the Long Island Rail Road and New Jersey Transit. The station is also connected to six New York City Subway lines.

As “the busiest Amtrak station in the United States” says *Wikipedia*, Penn Station saw 4.3 million Amtrak boardings (2004), “more than double the traffic at the next busiest station, Union Station in Washington, D.C.” [6] Another significant feature of Penn Station is that the huge Madison Square Garden sports and entertainment arena was constructed atop it 1968. [7]

As noted above in the discussion of New York’s Port Authority Bus Terminal, while Penn Station offers excellent intercity rail (Amtrak) to regional passenger rail connectivity, but there is no connectivity to either intercity motor coach or regional bus services – a significant drawback, particularly for an intermodal hub of such magnitude.

A massive project to rebuild and expand Penn Station, encompasses visions of a much grander station lying one block west. As an article in *Wikipedia* notes,

Across Eighth Avenue from Penn Station sits New York’s General Post Office, the James Farley Post Office. Under pressure from the late Senator Daniel Patrick Moynihan, plans were publicized in 1999 to move entrances and concourses of Penn Station under this building, which fills an entire city block. When completed, the station inside the historic James A. Farley Building, a NY State and National Landmark, would be named Moynihan Station West, in honor of the late Senator. [6]

Development of this new station site has been complicated by Amtrak’s objections to elements of the scheme. Meanwhile, a related project, known as Moynihan Station East, is in process. This envisions the demolition of Madison Square Garden and construction of Moynihan Station East, above Penn Station’s existing rails and platforms, including the construction of some 7.5 million square feet of new commercial or mixed-use development. [8]

### Philadelphia – Penn (30<sup>th</sup> St.) Station

Located at 2955 Market St., Philadelphia’s Penn Station (generally known as the 30<sup>th</sup> St. Station) in Philadelphia, Pennsylvania is served by a daily average of 29 intercity trains. It serves as an important intermodal hub for connections with Philadelphia’s regional passenger rail, subway, streetcar, and urban bus system. [9]

Philadelphia’s famous 30th Street Station was built between 1929 and 1933 by the Pennsylvania Railroad. The enormous, eight-story concrete frame building has been on the national Register of Historic Places since 1978. It is an example of some of the railroad industry’s most monumental construction and is architecturally interesting for its use, adaptation and transformation of the neo-classical style into a more modern, almost art-deco style.

The station has been the site of important TOD, as described in the following information from the Great American Stations website:

From 1988-91, the station underwent renovation overseen by SWH Management, Inc. The \$75 million project included the restoration of the main concourse, with special attention to its ceiling and massive marble columns. It also led to the refurbishment of the building’s exterior, the rehabilitation of 280,000 square feet of office space, and the conversion of a former mail handling facility into a 420-car underground parking garage. Today the station is owned by Amtrak and is managed by US Equities. In addition, in 2004 investors broke ground on the construction of the Cira Center, a 29-story office building designed by architect César Pelli. Completed the following year, the new building both stands on ground leased from Amtrak and also includes a skyway connecting it to a parking lot and the station. Designed by the same architect who built the world-famous Petronas Twin Towers in Malaysia, the striking new building marks both the evolution and continuation of the station’s unique and innovative history. [9]

## Pittsburgh – Penn Station

*Figure 3. Pittsburgh Penn Station*



Today commonly called Penn Station by locals, this facility until 1912 was known as Union Station, and previously was called Pennsylvania Station. It is an historic and architecturally significant railway station, built between 1898 and 1903, and located at Grant Street and Liberty Avenue in Pittsburgh, Pennsylvania. [10, 11]

Today it is located directly adjacent and provides important connectivity to two major transit facilities of the Port Authority of Allegheny County: the East Busway, with numerous rapid bus routes fanning out from the central business district, and the terminus of one branch of Pittsburgh's light rail transit system (the T).

## Baltimore – Penn Station

Pennsylvania Station (generally referred to as Penn Station) is the main railway station in Baltimore, Maryland, serving as a major public transport hub, interconnecting Amtrak intercity rail, MARC regional passenger rail, and the urban bus and light rail system operated by Maryland Transit Administration (MTA). It is the eighth busiest rail station in the United States by number of passengers served. [12]

The station is architecturally significant, constructed in 1911 in the Beaux-Arts style of architecture for the Pennsylvania Railroad. It is located at 1515 N. Charles Street, about a mile and a half north of downtown and the Inner Harbor.

## Washington, DC – Union Station

Washington's Union Station is the city's grand "ceremonial" railway station, created in the Beaux-Arts style, a neoclassicist style popular since the 1893 World's Columbian Exposition in Chicago. It was designed to be the entrance to Washington, D.C., when it opened in 1907. [13]

*Figure 4. Washington Union Station*



Today, Union Station is one of the busiest and best-known places in Washington, D.C., visited by 20 million people each year, according to an article in *Wikipedia*. Serving as an extremely busy intermodal hub, Union Station is served by Amtrak intercity rail passenger service, MARC and VRE (Virginia Railway Express) regional passenger rail transit systems, and the Washington transit system of MetroBus buses and MetroRail subway trains.

Union Station well illustrates how intermodal hubs can also become destinations in their own right. Along with its busy mobility functions, "Union Station boasts an upscale shopping center, food court, and multi-screen movie theater", according to Jacobs Carter Burgess. [2]

## Los Angeles – Union Station

*Figure 5. Los Angeles Union Station*



Also known as the Los Angeles Union Passenger Terminal, Union Station, built in 1939, is considered to be "the last of America's great rail stations." Located in Downtown Los Angeles, California on 800 N. Alameda St., between the Santa Ana Freeway (US 101) and Cesar E. Chavez Avenue (Formerly Macy St.), at the edge of the CBD, LAUS serves as a major intermodal hub, interconnecting Amtrak intercity rail passenger service, Amtrak Thruway motor coach services, Metrolink regional passenger rail services, local and regional bus lines, Red Line subway trains, Gold Line light rail trains, and a variety of other regional bus transit services using the adjacent El Monte busway. [14, 15]

A drawback is that LAUS does not currently include connections to Greyhound intercity motor coach services.

## **Portland – Union Station**

Originally constructed in 1896, Portland Union Station has been in continuous operation since that time. In 1987, the Portland Development Commission purchased Union Station and 31 acres of former rail yards. This led to a major rehabilitation of the station shortly thereafter. [16]

In 2003, an additional project created a central plaza at the main entryway containing an island planted with local and native plants. The access to the station was changed, a new street was built, and a Thruway motor coach boarding area was established. In addition, the city's major Greyhound motor coach station is located immediately adjacent to Union Station, on the next block, thus forming a large, sprawling intermodal hub also served by Portland's TriMet transit system (soon to include light rail connections). [16]

## **New Orleans – Union Passenger Terminal**

New Orleans Union Passenger Terminal (NOUPT) is the main train station in New Orleans, Louisiana. Opened in 1954, NOUPT is the major Southern hub for Amtrak, with three trains (Sunset Limited, City of New Orleans and Crescent) serving the city. In the 1970s, parts of two platforms were shortened to allow for Greyhound Lines to build an intercity motor coach terminal, sharing the terminal with Amtrak and creating an intermodal facility. [17]

A major drawback is that local transit connections are relatively poor. In its heyday, the station was served by streetcars which pulled in virtually to the front door. While some local bus service is accessible on nearby streets, creating better connectivity is clearly a major need to improve the functionality of NOUPT as a crucial intermodal hub for the city.

## **Dallas – Union Station**

Union Station is a major intermodal hub serving Amtrak intercity rail passengers, the Dallas Area Rapid Transit (DART) light rail system, and Trinity Railway Express (TRE) regional passenger rail services. A major advantage is that all these rail services are interconnected via convenient cross-platform access.

Originally constructed in 1916 as Dallas Union Terminal, Union Station, located in the Reunion district of downtown Dallas, Texas on Houston Street, between Wood and Young Streets, underwent significant rehabilitation in the 1990s. The light rail station re-opened on 14 June 1996 and serves as a key station on DART's Red and Blue lines as well as the TRE regional rail line (Green Line). Nearby are the George Allen Courts Building, Dealey Plaza, the Hyatt Regency at Reunion, Reunion Tower, and Reunion Arena. [18]

A drawback is the lack of good connectivity to intercity motor coach services. The Greyhound motor coach terminal, however, can be relatively easily reached by a walk of a few blocks.

## **Emeryville – Amtrak Station**

Located between Berkeley and Oakland, this full-service railway station opened in 1994 to replace Amtrak's Oakland station, condemned after the 1989 Loma Prieta earthquake. Emeryville was "the first new train station to be built in northern California in more than sixty years" according to the Great American Stations website. [19]

Functioning as an intermodal center, the Emeryville station serves several dozen daily short and long-distance trains, the Amtrak Thruway motor coach service to San Francisco, and local bus service.

The Great American Stations website notes significant TOD activity:

Strong real estate development has occurred in the area surrounding the station, spurred largely by the ideal location of Emeryville. There has been tremendous commercial and residential growth around the station, and Emeryville has become a regional center for biotechnology, software and film industries. [19]

## **Sacramento – Amtrak Station**

The historic Sacramento railway station, originally built by the Southern Pacific Railroad (SP), succeeded at least two earlier SP stations on that site, and is part of a complex that dates back to 1863 and the Central Pacific Railroad's construction of the western portion of the first transcontinental rail line. Constructed in 1926, the present station itself sits on an approximate 240-acre rail yard. Its three-story-high, tile-roofed structure is typical of the Renaissance Revival style used in many Western stations. [20]

As an intermodal hub, the Sacramento station is served by 40 daily trains and 35 buses and motor coaches. In addition, Sacramento's Regional Transit light rail transit line was recently extended into the station, permitting convenient cross-platform connectivity between intercity, regional, and local train services. [20]

Today the station is also a key component in a massive development project aimed at revitalizing Sacramento's urban core. This project, the Sacramento Railyards, "is reputed to be the largest infill development in the United States" according to the Great American Stations website. [20]

## Ft. Worth – Intermodal Transportation Center

Ft. Worth's Intermodal Transportation Center (ITC) certainly ranks on the leading edge of innovation in the development of intermodal public transportation hubs in American cities, providing a major nexus of interconnectivity for Amtrak intercity rail passengers, Trinity Railway Express (Green Line) regional passenger rail services, a major bus depot for the Fort Worth Transportation Authority (known locally as "The T"), and, most recently, the city's major Greyhound intercity motor coach station. [21, 22]

Figure 6. Ft. Worth Intermodal Transportation Center



Located at the corner of 9th and Jones Streets, the ITC is conveniently positioned on the northeast side of downtown Fort Worth. This new facility is designed to handle all modes of transportation serving the downtown area as well as the region.

The center will likely be a catalyst for future development in the southeast sector of downtown. The design features a 90' clock tower that serves as the terminus to the 9th Street axis. [22]

## Meridian – Union Station

Meridian, Mississippi has taken a significant lead in demonstrating how a small city can create an effective intermodal public transport hub, centered on the restoration of an historic railway station. As a 1999 article in the Federal Highway Administration publication *Connections* reports,

Under the leadership of Mayor John Robert Smith, who envisioned the transportation center long before most people in the community had any concept of

multi-modalism, Union Station was developed as the catalyst that would spark the re-birth of the Depot District.

Following a series of town meetings, architectural plans were developed and the Union Station tower was reconstructed to house Amtrak, Greyhound and the Meridian Transit System, with taxi service to the Meridian Regional Airport, rubber wheeled trolley loops through downtown and office space for Norfolk Southern Railroad. [23]

Figure 7. Meridian, Ms Union Station



The article summarizes a number of "Successful Results" from this project, including "Community Reinvestment" and "Reclamation", already realized just two years after completion:

...Union Station has had a profound impact on the community in numerous, tangible ways:

- The \$6.8 million project has already leveraged more than \$8 million in private investment in the Depot District, including office space, retail shops, a data processing/computer training center, apartments, two restaurants, and vital records storage buildings.
- Additional private sector projects under construction or designed include upper-story apartments on the west side of Front Street and an up-scale condominium development. The first tenants in the apartments in historic buildings are beginning to move in.
- The meeting rooms on the tower's mezzanine level are in great demand for business meetings and social events like retirement parties, class reunions, birthday parties, weddings and receptions. Union Station has become a hub of community life.
- Union Station is now a comfortable, attractive arrival and departure point for rail and bus riders, giving travelers a positive first impression of Meridian as a thriving and progressive community.

## Atlantic City – Municipal Bus Terminal

The Atlantic City Bus Terminal is a regional intermodal public transport station and a major stop for New Jersey Transit buses and Greyhound motor coaches in Atlantic City, New Jersey. Located at the 1900 block of Atlantic Avenue, approximately half the

facility's size is devoted to a Polo Ralph Lauren store in the Atlantic City Outlets The Walk. The terminal contains vending machines, restrooms, a seating area, and ticket offices for New Jersey Transit and Greyhound coach lines. Adjacent to the bus station is the Atlantic City Rail Terminal. [24]

According to Jacobs Carter Burgess, the Atlantic City terminal represents a particularly unique illustration of the synergy of intermodal integration, with the relatively new 24,000-square-foot bus terminal serving as a "bookend" to an eight-block, mixed-use urban redevelopment project, The Walk-Atlantic City, co-developed by the Cordish Company of Baltimore and the Casino Reinvestment Development Authority of Atlantic City. With a new hotel and convention center anchoring the other end, The Walk includes 325,000 square feet of retail, entertainment, and restaurant tenants. The Walk also provides a much-needed pedestrian-friendly link between the famed Boardwalk and casinos, and other portions of the city. [24]

"A transit facility as an anchor to The Walk makes sense because bus service is critical to Atlantic City's economy" notes Carter & Burgess Project Manager Jack Hollon, who headed planning, design and architectural services for both The Walk and the transit station projects. [24]

A substantial portion of the city's 37 million annual visitors come by way of New Jersey Transit and Greyhound. The new station provides a perfect gateway from which they can easily access any of Atlantic City's attractions – shopping, gaming, or entertainment.

## Denver – Union Station

After a late-19<sup>th</sup>-century fire, Union Station was rebuilt in 1914 in the Beaux Arts architectural style. According to the Great American Stations website,

In the late 1980s, the Regional Transportation District (RTD) and the Denver Union Terminal Railway Corporation (DUT), the station owners, upgraded the platforms and canopies. The RTD purchased the site in August 2001. Under a public/private agreement, the station and its surrounding 19.5 acres will be the hub of the RTD's master plan for an intermodal retail, office and residential development.

The redevelopment of Denver Union Station is part of RTD's voter-approved FasTracks program – a \$4.7 billion, 12-year transit expansion program across the RTD service area. Scheduled for completion in 2017, FasTracks will create six new commuter rail and light rail corridors, extend three existing corridors, add 21,000 new parking spaces, and expand bus service.

This station will ultimately become the connection point for Amtrak, light and commuter rail, local, regional and intercity buses and other public and private transportation modes. [25]

## Seattle – King Street Station

According to the Great American Stations website,

Seattle's King Street Station was constructed in 1906 by the Great Northern Railway. The building is constructed of granite and red brick with terra cotta and cast stone ornamentation. The distinctive clock tower is a Seattle landmark and was inspired by the Piazza de San Marco's bell tower in Venice, Italy. The station is listed on the National Register of Historic Places. [26]

The Washington State Department of Transportation (WSDOT) provides useful background on the renovation of this station and its conversion into a more effective intermodal hub:

The City of Seattle has identified King Street Station as one of three important downtown transportation hubs. The station is currently served by 12 WSDOT-sponsored Amtrak Cascades trains, Amtrak long distance trains (Coast Starlight and Empire Builder) and 16 weekday Sounder commuter trains, as well as Amtrak Thruway intercity bus services.

The station has been poorly maintained and allowed to deteriorate during a period of declining rail travel. The renovation will bring the building up to modern codes and standards, improve space and amenities for the traveling public and transportation employees, and preserve the historic character of the building. [27]

In the early 1990s, Ron Borowski, Project Manager of the Seattle Engineering Department, described the King Street Station project to the National Commission on Intermodal Transportation as a "Rainbow Coalition" of transport operators – local and regional buses; intercity motor coaches; airport shuttles; pedestrian paths; bike trails; links to the ferry terminals; and Amtrak intercity rail and regional passenger rail services. [1]

## St. Louis – Gateway Transportation Center

St. Louis's intermodal public transportation hub, officially called the St. Louis Gateway Transportation Center, currently under construction, is on track to become one of the finest examples of a multi-modal public transport hub in the nation. Located west of 14th St. and south of Clark St., this 20,000-square foot facility will become the new station for Greyhound intercity motor coaches and Amtrak intercity trains, providing easy access to Metro buses and the city's MetroLink light rail system. Via MetroLink, passengers will also have a rapid, direct connection to St. Louis's Lambert airport. [28]

## Miami – Intermodal Center

Miami’s Intermodal Center is unusual in that it is located next to the Miami International Airport, and thus provides connectivity to both surface and air passenger transport. The Miami Intermodal Center (MIC), targeted to be completed by 2011, is described as “a massive ground transportation hub” being developed by the Florida Department of Transportation. [29]

The MIC Program consists of a Rental Car Center, the Miami Central Station, major roadway improvements, the MIA Mover transit system, and a joint development component. According to the Miami Intermodal Center website,

It will provide connectivity for residents and visitors of Miami-Dade County and the South Florida region, where none existed, between the transportation systems in the Palm Beaches, Fort Lauderdale, Miami, and the Florida Keys, as well as decongest the streets in and around the busy airport. [29]

## Salt Lake City – Intermodal Hub

The Intermodal Transportation Center in Salt Lake City, Utah – now under construction – is intended to serve as a single point of access to all of the area’s major transportation systems. Costing more than \$20 million, and located at 300 South and 600 West, the new facility will house not only station facilities for Amtrak intercity rail passenger service, but also an intercity bus depot, a Utah Transit Authority bus transfer station, a light rail station, a regional passenger rail station, taxicab stands, and amenities for bikers. [30]

The facility is being created in a historically important warehouse that was rehabilitated and turned into the center for the new complex. Ultimate completion of all elements is targeted for 2020. The Intermodal Hub will be the epicenter for public transportation in Salt Lake County.

According to the Great American Stations website, “the building itself is very modern in appearance, aimed to complement Salt Lake City’s reviving urban landscape.” The website also notes that “The hub, which is scheduled to be completely finished and inhabited by 2008, also has the distinction of being Salt Lake City’s first Leadership in Energy and Environmental Design (LEED) certified construction project, setting a new standard for energy efficiency leadership in the city’s public works.” [30]

The center is located close to the city’s historic Gateway District, the home for Salt Lake City’s railroad lines, yards and depots since the late 1800s. Those sites, including the old Union Pacific Rail Depot, have now been redeveloped from brownfields into a mixed-use

complex that has reenergized that neighborhood and the city’s economy. [30]

## RURAL/EXURBAN PUBLIC TRANSPORT HUBS: AUSTIN-AREA EXAMPLES

The relevance of intermodal public transportation hubs is certainly not confined to large core cities. There has been important development of such facilities in exurbs and rural communities, many of them functioning as satellite communities vis-à-vis larger cities.

Implementation of the transit hub concept in smaller communities is illustrated in the Austin, Texas area and surrounding non-urbanized region, where the Capital Area Rural Transportation System (CARTS) has been developing intermodal public transport hubs in its nine-county transit district surrounding the Austin urban area. These include transit centers in the following communities:

### San Marcos Station

*Figure 8. San Marcos Intermodal Transit Station*



This station, in operation since 2001, interconnects both Amtrak intercity rail passenger service and Greyhound intercity motor coach services with regional and local fixed route CARTS bus services. Greyhound Lines operates 14 schedules a day through this station on the IH35 corridor.

### Round Rock

This station also on the IH35 corridor opened in 1995 and interconnects Central Texas Trailways and Greyhound intercity motor coach services with regional CARTS bus services.

### Bastrop

This station, in operation since 1991, interconnects Coach America (Kerrville) intercity motor coach services with regional and local fixed route CARTS bus services. The station also supports commuter services with a park & ride facility and weekday commuter bus service to Austin.

## Taylor

*Figure 9. Taylor, Texas Intermodal Transit Center (Rendering)*



This station, currently under development and scheduled to open in 2009, will interconnect both Amtrak intercity rail passenger service and intercity motor coach services with regional CARTS bus services.

## Georgetown

*Figure 10. Georgetown, Texas Transit Center (Rendering)*



This station, also slated for a 2009 opening, is the third CARTS intermodal facility on the IH35 corridor and will interconnect Greyhound intercity motor coach services with regional and local fixed route CARTS bus services. This station also has a park & ride facility and will offer weekday commuter bus service to Capital Metro's Tech Ridge Park & Ride facility for connections to Austin.

## CONCLUSIONS

Intermodal public transport hubs appear to hold substantial potential for creating significantly larger, more interconnected public transport transit systems that can effectively bolster urban sustainability and livability as well as contributing to solutions for traffic congestion and the worsening problems related to energy use, petroleum availability, and greenhouse gas emissions. The issue then becomes how to most effectively encourage and finance the development of such facilities.

Jacobs Carter Burgess's Allan Zreet notes that local leadership, not necessarily money, is often the biggest need. "There are any number of funding options" he argues:

...the FTA, city funds, participation from Amtrak and Greyhound, and private development. However, the project needs a champion – somebody willing to step up as facilitator to put the pieces together. While the city should be involved to handle the land-use issues, a private-sector entity or public-private partnership can also take the lead.

But the key, Zreet emphasizes, is cooperation among governments, the private sector and the community. "Sometimes people equate an intermodal center and associated development with increased traffic, crime, and air pollution problems" Zreet acknowledges. "It's important to have people see what the project will be like in 10 to 15 years after all the other land uses are implemented."

There is considerable evidence that a kind of Balkanization in modal authority and management is a prevalent challenge to the expansion of effective intermodal coordination, including the development of intermodal hubs. For example, the NCIT report observes that

The weakest links in the current transportation system are the points of transfer between modes. And, because the current system is funded and managed separately by each mode, responsibility for strengthening these links is unclear.

Citing the view of Seattle's Ron Borowski, the NCIT report points out that while public transport users accept the concept of intermodalism, the problem lies in "forging implementing agreements between service providers."

By far, one of the potentially most powerful mechanisms for encouraging the development of intermodal hubs would be strong intervention at the federal government level, in terms of both policy measures and funding incentives. An aggressive federal program to specifically promote the consolidation and clustering of centrally located public transportation terminals – particularly intercity rail and motor coach,

together with local and regional transit – could be implemented via an array of policy incentives plus special funding incentives. Such a federally coordinated program could go a long way in fostering the development of intermodal hubs, with their benefits in terms of efficiency and interconnectivity, in American cities from coast to coast.

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