Station Area Planning for High-Speed and Intercity Passenger Rail





U.S. Department of Transportation Federal Railroad Administration Office of Railroad Policy and Development "Station areas are unique places where high-speed and intercity passenger rail can connect seamlessly with intermodal options like public transit. The infill development around the station can boost economic growth and community vitality."

FRA Administrator Joseph Szabo

Overview



How can the high-speed rail service and station transform the city and the station area?

What problems can it solve? What opportunities does it present?



Photo composite banner: On the west side of Union Station is Bikestation DC offering secure bike parking; along the station front are taxis, kiss-n-ride, tourist buses, and bike parking. City buses are on the adjacent street. Access to METRO is inside the grand portico as shown above.

This station area planning document is a reference tool for State transportation departments and local and regional jurisdictions working in partnership with transportation agencies implementing high-speed and intercity passenger rail (HSIPR) projects. The Federal Railroad Administration (FRA) encourages dialogue with Federal, State, regional, and local partners on ways to better integrate passenger transport and land use. FRA has included topics, concepts, and ideas to assist local jurisdictions and others accomplish successful station area planning and achieve an optimal integration of the station in its context — to ensure ridership growth and capture livability, sustainability, and economic benefits.

Rail stations will differ depending on their location — downtown, airport transfer, suburban, and small town. While every station area is unique and should reflect local context, culture and climate, some common principles apply to the creation of forms and public spaces regardless of location. This document offers three such principles along with recommended strategies for the creation of places that invite people to stay and enjoy, and that enhance the economy and sustainability of the region.



This document is organized around the following station area planning principles:

- 1. LOCATION: Optimize the station location.
- 2. TRANSPORTATION: Maximize station connections with other transportation modes.
- **3. DEVELOPMENT:**
 - Shape it through urban design;
 - Focus infill development around the station.

These principles and related strategies draw upon transit-oriented development (TOD) concepts. Through compact development and enhanced transit, walkways and bikeways, TOD can increase access, or the ease of connection between places at the scale of the station area. This in turn enables the transport network to increase access for passengers at the scale of the city. Better access to a number of focus areas attracts development and can help to stem sprawl.

For Federal Transit Administration publications on TOD, see the webpage, http://fta.dot.gov/publications/about_FTA_11008.html.

"Under the leadership of U.S. Transportation Secretary Ray LaHood, the Federal Railroad Administration is working to fulfill President Obama's vision of providing 80 percent of Americans access to convenient high-speed rail service in 25 years.

An integrated high-speed and intercity passenger rail network will help alleviate air and roadway congestion, while increasing energy efficiency and reducing carbon emissions. High-speed rail will provide travelers with more transportation mobility choices, and promote economic devlopment."

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Aspects of the Effort

For a station area plan to become real and endure, the plan must be supported by financing and implementation plans, and be written into the zoning code. These aspects are described briefly below. The station area plan itself is covered in detail.

Station Area Plan

The development of the station area plan begins with developing a vision, setting goals and objectives, followed by the three primary work areas — station location; transportation connectivity; urban design and infill development. A vision defines a desired future state and is a long-term view. A vision of a high-speed and intercity passenger rail station, as a living, breathing part of the community can prompt the transformation of physical patterns of travel and development, and spur social and economic improvements. A vision can be emblematic of the direction a community wishes to move. It can generate a sense of purpose, creative thinking, energy, and passion. It can represent change.

Local jurisdictions and transportation agencies are encouraged to define a vision for their station and station area, and set goals and objectives for near- and long-term that are compatible with future growth in passenger transport ridership over a 20-year period.

Goals and objectives can address job creation and economic stimulation; accommodation of population growth; provision of services and facilities; livability; environmental sustainability; and preservation of open space such as agricultural, habitat, and scenic lands.¹

When the vision, goals and objectives are set, the work of station area planning then focuses on station location, transportation connectivity, and development urban design and infill — the topics covered in this booklet.

Supporting Plans

Supporting plans include streamlined development review procedures, economic viability analyses, financing plans, and implementation plans -- all critical for the station area plan to gain traction. Streamlining development review can mean waivers on review categories, accelerated processing, and even funding. Economic analyses can include review of markets for jobs, products, and development considering resources such as labor, real estate, and



Best Practice

An example of streamlined development review is California's law SB375. The law provides California Environmental Quality Act (CEQA) incentives for development projects that are consistent with an adopted sustainable communities strategy. http://www.cacities.org



Top: Walking in the Dupont Circle Metro station area, Washington D.C.

Above: Accessing Washington Union Station on foot.

Left: Pennsylvania Station, New York

funding, and enablers and constraints from laws, regulations, and policies. The financing and implementation plans should specifically identify projects, square footage by type of use, costs, and funding sources, for the near-term (5-7 years) and long-term (10-20 years).

Incorporation into Local Zoning

(with environmental review if required)

When a jurisdiction incorporates a station area plan into land use plans and zoning codes, developers have a clear framework in which to build. Local jurisdictions should achieve consistency among the station area plan, the zoning code, State rail plan, regional and local transportation and land use plans, etc.

A "specific plan" is an overlay approach to incorporating a station area plan into existing planning and zoning. Consider this definition of a specific plan: It "maps out the future of a particular neighborhood or district. More than a land-use map, it is an illustrative masterplan that delineates building types as well as use. It can actually plat streets and lots. . .It also suggests phasing of development and may include three-dimensional drawings and scale models of critical areas."²

- ¹ "Goals are broad; objectives are narrow. Goals are general intentions; objectives are precise. Goals are intangible; objectives are tangible. Goals are abstract; objectives are concrete. Goals can't be validated as is; objectives can be validated." http: //edweb.sdsu.edu/courses/edtec540/objectives/difference.html
- ² Kelbaugh, D. 1997. Common Place Toward Neighborhood and Regional Design.

1. LOCATION: Optimize the Station Location

The State department of transportation or high-speed and intercity passenger rail authority will select the general location of the station. The local jurisdiction will assist in the selection of the specific location to maximize the social and economic benefits. In this endeavor, the local jurisdiction should consider the following:

Major passenger transport stations work best in existing regional centers. By virtue of their employment and residential densities, recognizable built environment, walkability, and connections to local transportation systems, existing regional centers provide a justifiable foundation for high-speed rail passenger stations. When centers are linked to one another, they create robust regional and mega-regional networks. Car-free access at one or both ends of a trip maximizes the convenience of train travel.

Once in the regional center, close proximity to destinations can make a big difference in initial ridership and in the continued growth of ridership over time. People will walk from public transport to jobs and major venues when the walk is interesting and not too long. Stations in the "heart" of a place benefit from "location, location, location." Stations located in historically important centers where generations have worked and played can set the stage for revitalization through other infill development. Reinvesting in existing centers makes efficient use of limited societal resources — land and funding for infrastructure.

Sometimes, a regional center is identifiable but it is undeveloped; or the development that does exist is sparse and lacks coherent form. In these cases, local jurisdictions have more flexibility to locate the station and reconfigure and transform existing patterns.³ However, any context has its constraints. Good solutions are a product of a vision, seizing opportunities, and working with constraints.

Optimizing the station location is consistent with the goals of Executive Order 13514, "Federal Leadership in Environmental, Energy and Economic Performance" and the supporting *Recommendations on Sustainable Siting for Federal Facilities*, developed by U.S. DOT, EPA, HUD, GSA, DOD, DHS.⁴ Is the station located to maximize access between regional or city centers to create a regional network?

Is the project serving and at the same time capitalizing on viable existing development?

Is the station located in the "heart" of the activity center, in the 24-hour active zone, in the most walkable area, where it would be most convenient and safe for the traveler to arrive?



UNION STATION



Above: Drawing of Scollay Square from The Image of the City. Kevin Lynch. MIT Press. 1960. Drawing of buildings as figure and streets/squares as ground. Figure-ground drawings can help designers understand the urban fabric as a composition of positive and negative spaces represented by dark and light.

Left: Aerial photos of the high speed and intercity rail stations in Strasbourg, France (above) and Washington D.C. (below). Note the similar scale of the stations, and the relative density and proximity of development to the stations. Note the difference in track orientation to the stations, parallel versus perpendicular.

Below left: Union Station, Washington D.C. A simple GIS map showing population density by census tract. Union Station is in the densest area, and provides connection to intercity passenger rail, commuter rail, and Metro. Explore and refine the station location through maps, geographic information systems (GIS) drawings, narratives, and numbers:

Region and City:

Document population and employment counts. Develop census and transportation maps and other drawings to illustrate how the passenger rail project will serve and capitalize on population and development concentrations in the region, and will strengthen existing passenger transport networks.

□ Identify industries, businesses, activity centers, and other contributors to the regional economy. Businesses may include offices, hotels, and hospitals — often the largest tax contributors in the area. Activity centers may include universities, colleges, sports and entertainment venues, retail centers, museums, and parks.⁵

Heart of the city/community:

Describe and diagram the spatial and visual relationships between the "heart" of the selected community and the station. Pay particular attention to the location of the station entrances. Engage landowners, stakeholders, and community leaders, and gain support for the station location.

Station area:

□ Define the station area in terms of one-quarter and one-half mile radii of the station on maps and large-scaled figure-ground diagrams. Identify existing important landmarks, public spaces, and other salient features that contribute to the experience of the places within the station area, either positively or negatively. For the station area, document existing residential and employment counts; describe the major activity centers. Also describe the rationale for the selected boundaries of the station area.

³ It is recognized that in exceptional circumstances a station can not be located in a city center. In these cases, achieving frequent and convenient public transportation connections between the station and the city center is critical. Development efforts should be focused in the public transit hubs that provide connecting service to the high-speed rail station.

⁴ http://www.dot.gov/livability/docs/recommendations_sustainable_siting.pdf
 ⁵ Refer to *The Atlas of Rural and Small-Town America*, a new spatial interpretation of county-level economic and social conditions. http://www.ers.usda.gov/Data/ruralatlas

2. TRANSPORTATION: Maximize Station Connections with Other Transportation Modes

Establish, reroute, and add public transit lines directly to the highspeed and intercity passenger rail station. To minimize transfer time, locate public transit connections in or next to the station, and coordinate arrival and departure schedules. A passenger who travels 300 miles in 2+ hours will not want to spend 20 minutes transferring to local transit. Establish dense networks of sidewalks and bikeways, maximizing connectivity. Explore connectivity through maps such as geographic information systems (GIS). Consider that convenience (access, time, and cost) and reliability affect the decision to drive, fly, or take the train.

Region and City:

□ At the regional and city scales, develop overlay maps and diagrams of existing and potential connections among intercity rail, regional commuter rail, public transit, and bikeways. In particular, evaluate the access provided by public transit to major activity centers in the city. Reroute and add transit service as required to achieve an established target percentage of all rail passengers accessing the station by transit. To facilitate seamless transfers, coordinate schedules and investigate opportunities for through-ticketing and joint-ticketing of transportation services within a region.

In the Station area:

□ For the one-quarter mile and one-half mile radii around the station, develop overlay maps and diagrams to illustrate streets; pedestrian and bike networks; transit stations; taxi and kiss-n-ride areas; and parking spaces. Categorize public ways as boulevards, avenues, and streets, and develop design criteria for each including the width allocated to pedestrians, bicyclists, public transit, automobiles and trucks, and the separations between them through curbs, medians, curb parking, trees, etc. For many stations, auto-access via highways and streets will be important. Is the station physically connected to other passenger transport such as intercity rail, commuter rail, heavy rail transit, light rail, streetcars, trams, buses, etc., so that transfers are convenient?

In the station area, do streets include continuous sidewalks of adequate width for pedestrians?

Do interconnected bikeways form a network throughout the city?

Best Practices

Eliminate required parking minimums. Implement:

Transit pass programs for employees in lieu of building additional parking;

Parking cash-out for employees;

Market pricing of curb parking and offstreet parking.



Biicycling Route Map, Kyle Gradingei





Top: Amsterdam, Netherlands. Shown in background, Central Rail Station is connected with trams, bike- and walkways for easy access to the city.

Above: Portland, OR. Bicycle Route and Parking Map.

Left: Falls Church, VA. Accessing Metro at West Falls Church Station.

Right, two photos: Greensboro, NC. The historic Greensboro Southern Railway Depot was renovated and expanded to serve Amtrak, Greensboro Transit, Piedmont Authority for Regional Transit (PART), as well as intercity buses.

□ Describe all passenger transport services in the station area in terms of frequency, vehicle and train size, and ridership. Document existing and proposed percentages of rail station patrons by type of access - transit, walk, bike, taxi, kiss-n-ride, and park-n-ride.

□ To facilitate transfers between passenger rail and public transit, evaluate the distances and elevation changes required to transfer, the ease of access to ticketing, and availability of directional signage.

Apply Universal Design principles to public areas including parking areas to accommodate the disabled, seniors, children, delivery workers, and individals with parcels and luggage.⁶

□ Abundant parking works against the goals of enhanced sustainability and urban revitalization. Parking lots and garages fronting on the street have a deadening effect on streetlife. Their opportunity costs are high when one considers other revenue producing uses that are possible. Count the existing parking spaces in the station area — most downtowns already have an oversupply of parking. Apply pricing to existing parking to reflect market demand. Reduce parking demand through shared-use (alternate users night and day). Offer transit passes to commuters. Implement car- and ridesharing programs. Implement cash-out of employer-paid parking.

Reducing parking demand through such policies can create substantial benefits for all parties. Passes and parking cash-out resemble wage increases that help to recruit and retain workers. Fewer vehicle trips reduce traffic congestion, air pollution, and energy consumption. 7

- ⁶ http://www.access-board.gov/telecomm/ud_princ.htm
- 7 Shoup, Donald C. 2005. The High Cost of Free Parking. Chicago: American Planning Association. See page 251 for the chapter Reduce Demand Rather than Increase Supply covering employer-paid transit passes, parking cash-out, and car sharing.





3a. DEVELOPMENT: Shape It Through Urban Design

Coherent development, in which the whole is greater than a sum of the parts, requires strong organizing patterns. Establishing a clear hierarchy of public spaces connected by spatial and visual linkages can give new vibrancy, usefulness, and cohesion to station areas. Designing public spaces for use by crowds, small groups, and individuals, can be thought of as designing stage sets for urban theater.

Streetscapes and outdoor plazas should reflect the local building character and forms, framing views for the public's enjoyment and featuring landmarks and historical markers in the design of new outdoor rooms. It is likely that the new urban design framework will require the space in public rights-of-way to be reallocated to promote transit and non-motorized travel.

Region and City:

□ Consider the existing development patterns in the region and city in terms of sustainability and memorability. Let the urban design in the station area (the shape and form-making activity) spur a reconception of the regional design — based on a rural-to-urban progression of development form and density; clarity of form and hierarchy; preservation of resources; and sustainable compact development patterns. Refer to the rural-to-urban transect below.

Station area:

□ Through maps, drawings, and figure-ground diagrams establish an urban design framework for the station area. Develop spaces that invite people to linger, celebrate local traditions and the arts. Take an inventory of historic and noteworthy buildings and cultural and natural resources, and incorporate them into the framework. *Is there a perceptible station area district? What are the markers?*

In the station area, are the streetscapes designed to invite walking, biking, and use of public transit? Is there a mix of land uses?

Through its urban and architectural design presence, does the station serve as a landmark in the station area and within the city?

Best Practice

Reallocate the space in the streets and other public spaces as required to give priority to pedestrians, bikes, and transit; then taxis and service vehicles; and finally private automobiles.





□ For the one-quarter and one-half mile radii of the station, establish height and massing for focal points and featured spaces as well as for large swaths of uniform development or background buildings. Devise a hierarchy of spaces in which the rail station holds an important position. Set heightto-width ratios for outdoor public spaces,

streetscapes, and buildings. Establish a street grid and insert new streets to reduce block dimensions when blocks are uncomfortably long for walking. Set development densities by type of uses and location.

□ Further define the areas within 300 and 600 feet of the station through paving, lighting, landscape, and signage, including signage to direct people to the station. Adjust the development character, setbacks, and lighting so that a young or senior person will feel comfortable and safe even late at night.

□ Establish a "people policy" in the city. Count the people before and after changes are made. "For decades the human dimension has been an overlooked and haphazardly addressed urban planning topic. . .the traditional function of city space as a meeting place . . . has been reduced, threatened or phased out." ⁸

□ Incorporate a program for Arts and Design Excellence in the station area plan based on early arts collaboration and a percentage of project costs. Use Design Excellence concepts and engage a design review panel for the station area planning and station design.⁹

Station:

□ Design the station so that it functions as a city gateway, reflects the "dignity, enterprise, vigor, and stability" of the city.¹⁰ If the rail guideway and station are elevated, take care to ensure these large forms do not generate secondary spaces that are dark, isolated, unoccupied, unsafe. Consider building occupied space beneath elevated structures.

- 9 GSA: gsa.gov/portal/content/104455; State Dept: state.gov/r/pa/prs/ps/2011/ 04/161567.htm.
- ¹⁰ The "Guiding Principles for Federal Architecture" www.gsa.gov/portal/content/ 1010811.

Street life in Kansas City, photo by Kyle Gradinge

Top: "The Boston that everyone knows" from Image of the City. Kevin Lynch. MIT Press. 1960. Having citizens draw a memorable places diagram can help establish the urban design framework.

Middle above: Kansas City, MO. Pleasant walkable streetscape.

Above: Tokyo, Japan Development located under elevated guideway puts an otherwise negative space to use for activities that employ workers, yield revenues, and make the area safe and interesting.

Left: Rural-to-urban transect, Duany Plater-Zyberk & Company.

Memorable places diagram, Boston. Image of the City, Kevin Lynch

⁸ Gehl, Jan. 2010. Cities for People. Pg. ix.

3b. DEVELOPMENT: Focus Infill development Around the Station

Region and City:

From a regional perspective, consider the growth potential of large private and public institutions, facilities, and industries and the extent to which associated jobs can be concentrated in the station area. Capitalize on the attributes of high-speed service and the station:

- distances seem to shrink when undertaken at 150 to 220 mph; - for distances of 150 to 600 miles, travelers have been shown to
- prefer, for example, a two-hour train ride over a 40-minute flight;
- the urban scale of a passenger rail station;
- the absence of emissions, particulates, and noise found around airports and highways.

The station can be surrounded by businesses and residences seeking convenient access to intercity travel. Consider value capture opportunities such as business improvement districts that could provide revenue to the rail agency.

Station Area:

□ For the station area, map existing and proposed development. Document the quantity and types of development needed to strengthen the city's economic, social, and physical environment and build ridership for the passenger rail train. Balance jobs in the station area with residential, retail, and restaurants. For each sub-area, describe specific projects with square footages and time frames based on a near-term (5 to 10 year) and long-term (10 to 20 year) schedule. Categorize near-term projects by stage: existing, approved but not built, and under construction. Tie quantities of development square footage to forecasts of population and number of households and jobs in specific future years, e.g. 5, 10, and 20 years out.

□ Engage landowners, stakeholders, community leaders, etc., and gain support for the proposed development projects.

□ Recycle the community's "lovable buildings." When energy usage is calculated, it can be "better to keep an historic building than to demolish it and build a LEED building in its place." *originalgreen.org*

Within the station area, what kinds and how many infill projects are proposed to be completed within 5 and 10 years of revenue operations of the high-speed and intercity passenger rail project?

Focus development in the valuable one-quarter mile radius of the station.

Initiatives that can help to realize value-capture and other station area goals:

Consider partnerships for services and funding through districts for business improvement, parking, and tax increment financing. Consider what local regulatory changes if any would be required to return the tax and fee revenues to the station area for capital improvements such as widening of sidewalks and building bikeways, transit areas, landscape improvements, signage, etc.

Calculate the difference in cost (both initial and ongoing) for infrastructure and services in compact, transit-oriented development versus sprawled development. Identify uses for the potential savings.

Consider existing parking before adding more. Consider that 3,000 spaces at 300 s.f. each in a one-quarter mile radius of the station constitutes 16 percent of the total area; 10,000 spaces take over half of this precious real estate.

Implement a reduced-interest-on-mortgage program for residential units in the station area.

Implement master environmental impact reviews in TOD areas.

Implement a land assembly assistance program for developers, including provision of infrastructure in the station area.

Reduce or waive fees for developers in the TOD station area.



Top: Arlington County, VA A map from 2004 of proposed infill projects in Clarendon, a Metro station in the Rosslyn-Ballston Metrorail Corridor.

Top right: Meridian, MS Meridian's Union Station in the Meridian Downtown Historic District serves Amtrak, Greyhound, Meridian Transit, and taxis, while providing office space for Norfolk Southern Railway, community groups, and the economic development agency.

Right: Los Angeles CA The Hollywood and Highland Metro Station Area contains a complete blend of historic structures and infill development.

Below right: Oakland, CA Oakland Uptown Project also combines old and new.









SUMMARY CHECKLIST

1. LOCATION: Optimize Station Location

- □ Region and City: Document and map population, employment, and transportation systems. Identify industries, activity centers, and other contributors to the regional economy.
- □ Heart of the city/community: Describe and document the spatial and visual relationships between the "heart" of the selected community and the station.
- □ Station area: Define the station area. Identify landmarks and other features that contribute to the experience of the places within the station area. Document dwelling units and jobs, and activity centers.

2. TRANSPORTATION: Maximize Station Connections with Other Transportation Modes

- □ Region and City: Diagram and map existing and potential connectivity among intercity rail, regional commuter rail, and public transit networks. Also overlay bike networks.
- □ Station area:
 - □ Map street networks; pedestrian and bike networks; public transit stops and stations; taxi and kiss-n-ride areas; and parking spaces. Categorize streets and develop design criteria for each type including the width allocated to peds, bikes, transit, autos and trucks, and the separation given to the various uses through curbs, medians, curb parking, trees, etc.
 - □ Document existing and proposed percentages of rail station patrons by type of access transit, walk, bike, taxi, kiss-n-ride, and park-n-ride.
 - Evaluate distances and elevation changes required to transfer; also ticketing and signage.
 Apply Universal Design principles to accommodate all people.
 - □ Reduce parking demand through such policies as cash-out of employer-paid parking, transit pass and ride-share programs.

3a. DEVELOPMENT: Shape It Through Urban Design

- □ Region and City: Consider if the region could be more sustainable if a clear urban-to-rural stepping down of development were put into place.
- □ In the Station area:
 - $\hfill\square$ Establish a new urban design framework in the station area.
 - Establish height and massing for features as well as for background buildings. Establish a street grid.
 Set development densities by type of use and location.
 - □ Further define the areas within 300 to 600 feet of the station through paving, lighting, landscape, and signage. Establish a "people policy" in the city. Incorporate a program for Arts and Design Excellence.
 - □ Design the station so that it functions as a city gateway.

3b. DEVELOPMENT: Focus Infill Development Around the Station

- □ Region and City: Consider growth potential and businesses that would benefit from rail station access. .
- □ In the Station area:
 - □ For each sub-area, describe specific projects with square footages and time frames based on a near-term (5 to 10 year) and long-term (10 to 20 year) schedule to meet the economic development needs of the community. Categorize near-term projects as existing, approved but not built, and under construction. Engage landowners, stakeholders, community leaders, etc. and gain support for the proposed development projects.

Fullerton Station, CA, photo by Great American Stations.co

CONCLUSION

Modern and efficient passenger transport networks can meet 21st century lifestyle expectations for quick access, convenience, and a small carbon footprint. As the United States improves its rail infrastructure, the associated advancement in high-speed and intercity passenger rail service represents an unparalleled opportunity to make cities with stations more enjoyable and more economically vibrant. To foster enthusiasm for this vital planning effort, advance the state of practice, and to help to maximize the riderhip and livability benefits of the rail service to the community, FRA has prepared this document as a reference tool.

Supporting plans, briefly described above, are not secondary in any way, because without the economic study, finance plan, and implementation plan, there is no commitment on the part of the governing boards or the public to implement the plan. Similarly, for the plan to endure, the station area plan needs to be adopted into local zoning and made consistent with other plans.

This document is the first in a series of references that FRA expects to publish.

To comment or for more information, write to <u>hsipr@dot.gov</u> --Subject: Stations.



Fullerton Station, Fullerton, CA. This historic station serves intercity passenger rail through Amtrak, commuter rail through Metrolink, and it is a major bus depot for Orange County Transportation Authority.



U.S. Department of Transportation Federal Railroad Administration Office of Railroad Policy and Development