

**Improving the Social, Physical, and  
Economic Capital of an  
Urban Community through Residential  
Revitalization**

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# **LRT Station Location and Configuration: Impacts and Implications for Development along the Central Corridor**

Report Prepared for the District Councils Collaborative  
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December 2007

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## Executive Summary

This study examines the potential impact of light rail station configuration on development along the proposed Central Corridor light rail transit (LRT) line in St. Paul. Within the context of the neighborhood stations (from Westgate to Rice), how might the configuration of platforms in station areas affect, positively or negatively, development in the surrounding neighborhoods?

In general terms, the question of how LRT station platform configurations impact development is one that has not been studied to any extent in practice or theory. The consensus from interviewees and the literature reviewed was that it would be nearly impossible to single out the impacts of station design/configuration on development as there are so many factors influencing the development process.

However, there are certainly ways in which light rail stations can and do impact the surrounding areas, and thus it is useful to explore what those impacts might be and how they could relate to development, particularly in the Central Corridor context.

The case studies chosen for this study come from the experience of light rail in four cities: Salt Lake City, UT, Portland, OR, Denver, CO, and Houston, TX. While all four of those locations have unique circumstances that have shaped their development and experience of light rail, collectively they demonstrate several key points in considering the impact of station configuration on development. First, planners in all of these cities agreed that a much more significant factor in shaping potential development than station platform configuration is the alignment of the LRT line relative to the street. Exclusive right-of-ways allow for less conflict with cars than median or side-running alignments, but may not have the same potential to transform the street and surrounding neighborhoods. Second, planning for development is one thing, but making it happen is another. Planning efforts are of course important, but development patterns should not be expected to change overnight (in some cases, it has taken years for significant new development to come along). Finally, the overall goals of the LRT project will ultimately guide the configuration of stations, giving shape to how the station area functions. At least one of the planners interviewed spoke of the tension between “mobility” and “access” – getting people from place to place efficiently on the one hand, and maximizing people’s ability to use those places on the other.

In all, there is no formula for designing station configurations to encourage development. Instead, it is useful to focus on the factors that contribute to a successful LRT station environment – quality, safe pedestrian access; a station connected to the surrounding community, including through effectively managing traffic flows; and a station with its own sense of “place.”

Included in this report are a review of relevant literature, case studies of light rail in other cities, a classification of proposed Central Corridor neighborhood station areas, and a question and answer section to summarize the issues studied in the report.

## **The Issue – What Difference Does a Station Make?**

Scheduled to begin service in 2014, the Central Corridor Light Rail Transit (LRT) line along University Avenue in St. Paul will have an undeniable effect not only on transportation along the corridor, but also on the community and economic development patterns in the surrounding neighborhoods. Planning for the line is currently underway, and as traditional transportation planning focuses largely on issues of traffic management and engineering capacity, it is worth examining how LRT might best serve the needs and goals of the neighborhoods surrounding it.

The central research question for this report is: how does light rail station configuration impact community and economic development in surrounding neighborhoods? By looking to existing research on the subject as well as relevant examples of light rail around the country, key insights and issues can be identified and applied to the University Avenue context.

To provide sufficient context for examining this question, though, some background is needed on light rail stations in general, the concept of transit-oriented development, and plans for the Central Corridor LRT.

### *Light Rail Stations*

Light rail stations, while seemingly standard in nature and effect, can in fact take a variety of configurations. In the Twin Cities, one need only take a short ride on the Hiawatha LRT to see that station layouts and designs differ markedly depending on the alignment at the station, the given neighborhood, and the adjacent land uses. Along Hiawatha, some stations have center platforms, a single point from which passengers board trains bound either direction. Other stations, though, use split platforms, allowing the train to stay on a straight track while passengers have to decide which direction they are heading before choosing a platform.

The Hiawatha line, however, runs primarily along an exclusive right-of-way (outside of downtown), a fact that simplifies to some extent the decision over how to configure platforms. Many LRT lines run in the street, with automobile traffic on one or both sides of the train. In such cases, the configuration of platforms can have a distinct effect on the flow of traffic through intersections, the connections between the sides of the street and other elements of life at a given station.

### *Transit-Oriented Development (TOD)*

The notion of “transit-oriented development” (TOD) has become a hot topic for many, and offers to this study, at the least, a way to think about the intersections between transportation and economic development. In the context of this research, TOD and its corollary, “development-oriented transit” (DOT), provide a useful basis for exploring the fundamental ways in which platform configuration might impact development. A more complete review of those issues follows in the “Literature Review” section.

### *Central Corridor Plans*

The Central Corridor LRT line will be a median-running train, traveling down the center of University Avenue between the planned Westgate and Rice Street stops (east of the University of Minnesota and west of downtown St. Paul). Preserving access to and

from both sides of the street is a major factor in the choice of a median alignment. Since the train will be running in the street and current automobile traffic levels are to be maintained, careful attention is being paid to coordinating the movement of cars and trains along and across University Avenue. In addition to keeping traffic moving, the issue of available right of way is also a factor. Along University, a median alignment allows Metro Transit to minimize any private property acquisition in the construction process, but minimizing the width of station platforms will be a key consideration in achieving that end as well.

## **Research Methods**

The primary methods of research for this report consisted of a thorough review of any existing studies and/or literature on this subject as well as interviews with key figures in other cities with light rail to understand the practical impacts of station configuration on community and economic development. Interviews were completed with planning staff in Salt Lake City, Portland, Denver, and Houston. Repeated attempts were also made to interview members of neighborhood organizations and business associations in those cities, but with no success.

## Summary of Relevant Literature – Keys to Success

Over the past number of years, there has been a growing interest in, and body of research around, the connections between transit and development. TOD, “transit-oriented development,” has become its own field, an idea increasingly appealing to policy makers and planners. This literature, while useful, tends to focus on how to design the areas around transit stations, and not on the stations themselves. A much more recent buzzword, “development-oriented transit,” has come into play, but there is no real literature to speak of here that looks at how best to design transit to encourage development.

In addition to the TOD literature, there are “best practices” when it comes to designing light rail stations. However, these practices are focused primarily on how to design stations so as to minimize accidents between trains and cars, as well as trains and people. Indeed, safety is and must be of the utmost importance in designing LRT stations, but looking at station design solely from the perspective of minimizing accidents does not capture the full extent of how stations can and should be configured.

As a result, the literature reviewed for this project does not answer the research question set out, but only helps frame the issue. Taking into account the elements of station areas identified as critical to TOD, as well as to keeping pedestrians safe, several issues emerge as worthy of consideration when dealing with station configuration.

The importance of quality pedestrian access to and from stations is perhaps the most critical issue that emerges from existing studies and research. To positively impact the surrounding community, stations should be designed so as to ensure that pedestrians can easily go between the stations themselves and their origins/destinations outside the station area. Studies of pedestrian travel behavior confirm that pedestrians are willing to walk considerable distances to access transit, and that the most important consideration in doing so is having quick and direct routes to the station (Schlossberg, et al 2007). Moreover, “the vitality and market success of a TOD district lie in creating a pedestrian destination. TOD thrives in a place where people can congregate, meet along the street, and feel protected from the traffic” (U.S. EPA 2006, 16).

Another critical issue to consider in designing stations is maximizing safety, both in terms of minimizing conflicts and the safety of riders using the station. Pedestrian crossings should be well-marked and designed so as to encourage safe access to and from platforms. Station areas should also be well-lit to encourage use in the evening hours.

A third issue of great importance emerging from the literature is the connection between stations and the surrounding community. For development to be “transit-oriented,” the station cannot be an island unto itself. It must be a part of the community it serves and encourage increased activity in relation to the station. In particular, the station must fit in some recognizable way with the existing street grid/walking paths, it should be clearly visible from nearby areas, and it should connect with other transit routes. In addition, the siting of parking areas in relation to the station is a major question, as it is important that parking not act as a barrier between the station and the community.

Closely tied to this issue of connection with the community is the notion of “place-making.” In transit planning circles, place-making has become an increasingly



popular idea. In short, the concept refers to the potential of transit stops to be distinctive “places,” rather than simply a boarding platform for one’s commute.

Also related to the issue of connection with the surrounding community is the potential for station configurations to impact traffic flows. Effectively managing traffic is a necessary element for promoting TOD. In the University Avenue context, managing traffic means coordinating the flows of pedestrians, cars, and trains, especially at major North-South intersections. Keeping people moving is important, but it must be done safely, and access to all of the places along University that people already go must be maintained. Station configuration certainly plays a role in affecting development potential in as much as it can significantly affect the way that the competing traffic forces move through intersections.

## Case Studies: Examples of Station Configurations

Since there is no existing literature to directly address the question of station configuration impacts on development, another approach to the question is to examine the experiences of other cities with LRT lines. To help understand the potential implications for the Central Corridor, the example lines looked at in this study were chosen based on their comparability with the University Avenue context. As the Central Corridor will run at-grade down the middle of the street in an urban neighborhood, LRT lines that operate in similar fashion and areas were sought. The most similar lines, in Salt Lake City, Denver, Portland, and Houston, all happen to be Western/Southwestern cities. LRT lines in other regions, in cities such as St. Louis, Pittsburgh and Buffalo were examined, but since those lines run primarily along exclusive right-of-ways, they were not included.

### *Salt Lake City, UT*

The University line of the Salt Lake City Trax LRT system opened in 2001, in advance of the 2002 Winter Olympic Games. It runs between downtown Salt Lake (where it shares a track with the Sandy line) and the University of Utah, and between those points it runs along the median of 400 South, a heavily-trafficked commercial corridor with three lanes of traffic in each direction.

The context of 400 South is unique, as it has a 136' right of way and 600' long blocks, leaving quite a bit of room for situating LRT tracks and stations along this portion of the corridor. In choosing preferred station configurations for the stops along 400 South, Salt Lake City and the Utah Transit Authority had to consider how to make stations work at key intersections while preserving three lanes of traffic on each side. In the end, they opted for the more straightforward set-up of center platforms, positioned strategically to avoid blocking left turns at critical intersections.

The primary motivation behind light rail in Salt Lake, and particularly the University line, was the city's hosting of the Winter Olympics in 2002, although development along the 400 South corridor was also a goal. That development has been slow in coming, however. According to one city planner, there has been some development of condos outside of station areas, but no significant projects along 400 South. A positive element of redevelopment was achieved during LRT construction, though, as sidewalks were renovated, which has created a more pedestrian-friendly atmosphere. Walking trips along the street are more common now than previously, a noteworthy change due to the LRT.

### *Portland, OR*

Portland's Yellow line runs north from downtown along Interstate Avenue, and was completed in 2004. The line was constructed using Federal funds (74% of the project budget), and meant to take advantage of existing ridership potential. Unlike 400 South in Salt Lake City, Interstate Avenue sees only moderate automobile traffic, and in fact was cut to one lane in each direction (from two) by TriMet in the process of accommodating the new LRT line. The smaller scale allows for a more pedestrian-oriented atmosphere, as do the pedestrian crossings to stations at both ends of the platforms.

A majority of the stations along Interstate Avenue feature split, far-side platforms. That configuration was chosen primarily to maintain left-hand turn lanes along the route, an important goal with the street being reduced to one lane of traffic each way.

According to one Portland planner, development has come along, if slowly, in the station areas along the Yellow Line. New and refurbished commercial uses have been steadily coming, and some new residential development has gone up as well. Mixed-use projects, however, of the sort that TOD typically seeks to take advantage, have not materialized to date.

### *Denver, CO*

Denver's Central Corridor (or "D" line) is the oldest of the systems studied here, as it was completed in 1994. It runs north from downtown through the Five Points neighborhood, an historically minority and working-class area. The line was completed without using Federal funding, built as a "demonstration project" to show the viability of rail in the region.

Along with being a demonstration project, however, the Central Corridor line through the Five Points was seen as having the potential to revitalize a low-income neighborhood. Welton Street, along which the LRT runs, is a naturally pedestrian-friendly street, with wide sidewalks, street trees, one-way traffic, and relatively narrow street crossings (quite unlike University Avenue in St. Paul). The city put together a "guidebook" of strategies for how to take advantage of the corridor's features and develop around the new LRT line, but despite the efforts, new and infill development was slow in coming. In fact, only within the last few years has much development taken place, more than 10 years after the line opened. According to one city planner, Denver learned that LRT does not necessarily bring economic development, that "TOD plans are easy, TOD implementation is hard," and that success requires committed support from local government, businesses and community members (Good 2006).

One of the most unique factors in the development of the Welton Street Corridor was the role played by neighborhood residents and businesses in shaping the ultimate decisions on the line. Community members advocated for additional stops, and the line ultimately ended up with 5 stops within a 1-mile stretch through the neighborhood, significantly more than had been planned by the transit authority.

### *Houston, TX*

The Red line in Houston's MetroRail system opened in 2004, and, like Denver, was constructed without Federal funding. Built to help the city deal with traffic congestion, the existing line connects downtown Houston with points south, including the Texas Medical Center. Outside of downtown, it runs through the urban Midtown neighborhood along a median track, divided from traffic by "buttons" (separators).

Most of the stations along Houston's Metro Rail line have center, far-side platforms. An interesting variation from the other examples, this platform configuration has trains stop on the far side of intersections, but passengers board from the center. Like split, far-side platforms, the actual platform width is less than for standard center platforms, which may have been part of their appeal.

Though development was not the primary goal of this LRT line, Houston has seen some increase in development activity along the route since opening. Interestingly,

according to one planner, most of the new development/redevelopment has been in already dense areas, which have increased their density, rather than in more open areas along the route.

*Case Studies: Lessons Learned*

- 1) Many factors impact development, and station configuration decisions are made after more fundamental ones, most notably the alignment of the LRT line itself. In comparison to the impact that the LRT alignment can have on development patterns, platform configurations are of much lesser significance, though still noteworthy.
- 2) Development around LRT doesn't happen immediately, even with extensive planning. Planning is of course necessary, but a variety of other factors have to come into play (available land, market conditions, etc.) before development is possible.
- 3) Intentions shape the design – stations are configured and designed, at least in part, to serve the ultimate ends of the LRT project. If economic development is the goal, stations are likely to reflect that through short spacing, pedestrian-friendly designs, etc. On the other hand, if the LRT is designed simply to get people from one place to another quickly, stations will be less likely to emphasize connections to the surrounding community.

## Central Corridor Station Typology

The proposed stations along University Avenue include a diverse mix of uses in the station areas. In thinking about how to develop stations that best promote/support development in the surrounding area, it is critical to recognize the relationship between the station and its adjacent land uses. Who will be using the LRT at this station? How will they be using it – to get to work, to go home, to go to the store, school, library, etc.? Understanding the walking paths and patterns at each station, and when during the day it is being used, can be of great use in designing successful stations.

There is a great deal of diversity in land uses and functions along University Avenue between the Westgate and Rice St. proposed stations. Within that stretch of the corridor, there are station areas surrounded by predominantly industrial, commercial, and residential land uses, with a great deal of variety in the combinations.

The City and County of Denver uses a well-defined station typology for TOD purposes based on the places and/or destinations within each station area. With this typology, not only the broad categories of uses are considered (retail, office, etc.), but also the reach of those uses – neighborhood-serving, regional destination, etc. For example, the “Urban Center” classification applies to areas that draw from a broader region, and generally include employment centers, retail, and some housing density. The “Urban Neighborhood” classification, on the other hand, applies to areas that have more local-serving retail, a great deal of housing (mainly lower-density), and few employment centers.

While it is not possible to foresee what uses will be in place when the Central Corridor opens, the following is a categorization of the stations based on predominant land uses in the station areas presently, which should give a sense of how the station may be used in the future.

### *Office/Industrial (Urban Center in the Denver typology)*

**Westgate** – This station area is filled with industrial and office uses (making up around 50% of the total area), with some residential near the edge of the station area and new multi-family housing being developed. Located just off Interstate 280, it is very much a regional employment draw, and will likely continue to function so. The station will have split, far-side platforms, split around the intersection of Berry Street.

**Raymond** – This station area is also predominantly industrial and office in nature. The station will feature a center platform, located southeast of the intersection.

**Fairview** – This station area is another one filled with industrial uses, although with a mix of retail and institutional uses. Because of the curve in the road near the intersection, the station will have a center platform located northwest of the actual intersection. Pedestrians will be able to access the platform from crosswalks at the intersection and then continuing to walk west.

### *Retail*

**Snelling** – This station area is heavily retail-oriented, with both small stores and larger shopping destinations nearby. Further away from the station, though, are more residential uses. Several platform configurations have been proposed for the Snelling

stop, but the most likely candidate at this point in time is a split, far-side alignment at the Snelling intersection, which will allow for left turn lanes onto Snelling, a major north-south route.

*Residential (Urban Neighborhood in the Denver typology)*

**Lexington** – This station area features predominantly residential uses, with neighborhood-serving retail along University. The station is to have split, far-side platforms, again allowing for left turns onto a busy north-south route.

**Dale** – This station area is also predominantly residential in nature, again with local-serving retail uses along University. The station platforms will be in a split, far-side configuration.

*Institutional*

**Rice** – This station area, located very near the State Capitol, has a concentration of government/institutional uses, with residential areas being secondary. Currently, plans are to have the LRT alignment run on the side of the street at this point of the route, and the station platforms will be split across from each other with the eastbound platform abutting the sidewalk on the South side of the street (and the westbound platform closest to the auto traffic).

## **Light Rail Station Configuration and Development Impacts for Station Areas along the Central Corridor: Questions and Answers**

**Q:** *How does the configuration of station platforms impact potential development in LRT station areas?*

**A:** Unfortunately, there is no clear answer to this question. There are so many factors that affect development patterns that it is very difficult to isolate the impact of light rail in general, and thus even more difficult to be certain of how the configuration of platforms might affect development. However, it is still worth examining how the platform configurations proposed along the Central Corridor differ in nature and how they will function.

**Q:** *What types of platform configurations are being considered?*

**A:** As of this writing, the three configuration patterns being considered are 1) center platforms (at Raymond, Fairview), 2) split, far-side platforms (at Westgate, Snelling, Lexington, Dale), and 3) split platforms (at Rice, which will be on the side of the street rather than in the center).

**Q:** *What are the advantages of Center Platforms, and why would Metro Transit want to use them?*

**A:** Center platforms require less infrastructure, and therefore cost less, than having multiple platforms at a single station. In addition, center platforms may be easier for new or visiting transit users, as passengers can access trains going in either direction from one platform.

**Q:** *What are the disadvantages of Center Platforms?*

**A:** Center platforms, though they require less infrastructure, require a wider right-of-way at the station location, than other platform configurations. Center platforms are 20' wide (whereas side platforms are only 12' wide), thus requiring either a wider street or fewer lanes of traffic at the station location than at other points along the route. Especially at busy intersections, reducing the lanes of traffic can cause increased congestion and reduced access (if left turns are prohibited).

**Q:** *What are the advantages of Split, Far-Side Platforms, and why would Metro Transit want to use them?*

**A:** Split, far-side platforms provide for improved traffic flow through intersections, which is especially important at stops near busy north-south cross streets. This type of platform configuration allows for dedicated left-turn lanes along University Avenue in the "shadow" of the far-side platform, while maintaining the standard two lanes of traffic each way. Especially in terms of development, providing for a variety of ways to access businesses and destinations in station areas is important, and so allowing left turns can certainly play a role in maintaining multi-modal access.

**Q:** *What are the disadvantages of Split, Far-Side Platforms?*

**A:** The most obvious disadvantage is the increase in cost and materials due to having two platforms instead of one. Additionally, having two separate platforms could also make

way-finding slightly more difficult for new transit users or visitors unfamiliar with the system, as users will have to know which direction they are going to get to the right platform. However, the difficulty in way-finding has not been generally seen as a significant problem in other cities that have such configurations.

*Q: What are the advantages of Split (Across) Platforms, and why would Metro Transit want to use them?*

**A:** In the Central Corridor context, split platforms will only be used where the LRT tracks run along the side of traffic rather than down the median of the street. As such, a major advantage of that configuration is that it allows for less potential conflict between pedestrians and vehicles since riders approaching from the same side of the street that the station is on will not have to cross any traffic.

*Q: What are the disadvantages of Split (Across) Platforms?*

**A:** Split platforms will take up a few more feet in total than would a center platform (24' vs. 20'), leaving less room in the right of way for traffic lanes or sidewalk space.

*Q: Is one type of platform configuration safest?*

**A:** There are no existing studies that directly compare the safety of center versus split or split, far-side platforms. To examine potential safety impacts, then, it is necessary to examine the elements of pedestrian safety connected with LRT station platforms.

First, pedestrian crossings must be considered. Namely, are there sufficient crossings of reasonable distance, are there crossings where people want to walk, are they well marked, and are they signalized? Every station will (presumably) have at least one crossing to the platform. Center platforms will be, obviously, equal distance to the sidewalk as they are in the middle of the street. Side platforms will be closer to one side of the street than the other, but the difference will be only slight, and signalized crossings should provide enough time to get to the platform from either side.

As to the question of where crossings are, regardless of whether the Central Corridor stations have center, split, or split, far-side platforms, preliminary indications from Metro Transit are that there will only be pedestrian crossings to stations at intersections. This is significant along University Avenue, as most of the neighborhood stations will only be about half the length of blocks. As such, riders will only have a marked crossing to one end of the platform, except at Rice Street (where one platform will be next to the sidewalk).

No matter where crossings are, though, they must be well-marked, and every station should have at least one signalized crossing to facilitate movement to and from the platform. As of this writing, no decisions have been made by Metro Transit as to final designs for markings and signals at station platforms.

Additionally, there is a consideration as to safety from crime while waiting for trains. Center platforms presumably allow for a greater concentration of riders on the platform. However, there are no studies that actually look at this issue, and so it can only be speculated as to how much of an impact the “concentration” factor might actually have. Significant factors such as lighting, visibility, “defensible spaces,” and level of activity around the station are likely much greater influences on personal safety than station configuration alone.



**Q:** *Are there other impacts on pedestrians from station configurations?*

**A:** In addition to the questions of crossings, center and split, far-side platform configuration will require differing widths of sidewalks adjacent to platforms. According to preliminary engineering designs for the Center Corridor, center platforms allow for sidewalks to be an equal 11' on both sides of the platform, whereas split, far-side platforms will require that the sidewalk nearest the station be 9' versus 11' on the opposite side.

**Q:** *How will station configuration affect the Central Corridor?*

**A:** Station configuration decisions will be most noticeable in three ways – 1) the “footprint” of platform infrastructure, 2) the resulting automobile traffic patterns, and 3) the resulting pedestrian circulation patterns. Having split, far-side platforms will mean having a larger “footprint” on the station area than center platforms in terms of infrastructure. Regarding auto traffic, split, far-side platforms will allow for left-turn lanes along University Avenue, an important consideration at intersections that have a great deal of cross-traffic and cars needing to make left turns (such as at Snelling). Pedestrians will also access the various platform configurations differently, as center platforms should have a more concentrated flow of foot traffic and split, far-side platforms may see more uneven patterns of usage depending on from and to where people are traveling.

**Q:** *Which type of platform configuration is best for encouraging development along University Avenue?*

**A:** Again, there is no standard answer or format – it is almost impossible to attribute development impacts with specific urban and transit design features, especially given the extent to which development is shaped by the context of a given site. Instead of thinking about a “best” configuration for development, it may be more useful and appropriate to think of what impacts might result from a given configuration at a specific site and how those impacts relate to community objectives.

**Q:** *How have other cities made decisions about which type of platform configuration to use?*

**A:** In general, the most important decision regarding situating light rail in a city is the alignment of the rails themselves – will the train run on an exclusive right-of-way (such as along Hiawatha), or will it run in the street (down University)? Planners interviewed from other cities tended to point to this question as primary before dealing with how to configure platforms, as platform decisions will largely be shaped by the alignment pattern. However, for those lines that run in the street, the most important factors in choosing configurations at stations have been the available space (right-of-way) and, to a lesser extent, traffic flow considerations. In particular, the available right-of-way shapes much of the platform configuration process, as transit authorities generally seek to minimize the costs and impacts associated with acquiring private property to make the LRT line possible, and thus use what is available. Salt Lake City, for example, situated their University LRT line along a very wide street (136'), making it possible to use center platforms without worrying about having enough space to fit them in.

## Appendix A: Research Resources

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- <http://www.reconnectingamerica.org/> - CTOD
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