

# **THE RESHAPING OF LAND USE AND URBAN FORM IN DENVER THROUGH TRANSIT-ORIENTED DEVELOPMENT**

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## Executive Summary

This project funded by the National Center for Intermodal Transportation at the University of Denver examines the current state of transit-oriented development (TOD) in Denver, Colorado. It begins with a review of the return of rail transit to the city and an evaluation of how Denver defines TOD. It then examines the status of TOD in the city as presented by the Regional Transit District (RTD). These data are then used as a starting point for a detailed analysis focused on how TOD is reshaping the land use and urban form throughout the entire Denver region. This analysis begins with an in depth review of how TOD development differs at the five individual station types as identified by RTD in their *TOD Strategic Plan*. It then continues with an examination of the planning efforts oriented to TOD ongoing throughout the region, and a comparison of these efforts to planning efforts ongoing in non-TOD areas. This is followed by a review of TOD oriented rezoning activities within the region, both at individual stations as well as within a recodification of the entire zoning bylaw currently ongoing within the city. Analyses of station-area population densities and mixed use development follows. The analysis concludes with an examination of mobility performance measure changes since the reintroduction of rail transit into the region. These measures were found in the 2009 *Urban Mobility Report* from the Texas Transportation Institute.

Upon concluding the project, a number of issues became clear about TOD in Denver with the most obvious that the nearer to the downtown one is, the more impact TOD has had. It was also found that urban neighborhood, urban center, and major urban center stations all seem to be following their description within the RTD TOD typology. Development at urban neighborhood stations is mostly residential, at urban center stations more retail, office and government, and at major urban center stations more focused on larger mixed-use projects. The individual transit corridors are seen to be attracting different types of development depending upon their location, and overall office development regionally now seems now to have a more transit oriented focus.

Though TOD has become an integral piece of the Denver planning process, it is really too early to evaluate the fruits of these efforts. From station area plans to the entire rezoning of the City and County of Denver, TOD or TOD concepts are now part of the equation. Mobility performance measures of the Denver region have also improved since the opening of Denver's second transit line in 2000. This improvement cannot be specifically attributed to the reintroduction of rail transit into the region, but is an interesting coincidence to be investigated.

## Acknowledgements

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## Introduction

Denver, Colorado is presently in the middle of developing a 157-mile regional rapid transit system after reintroducing rail transit into metropolitan area in 1994 with the opening of the 5.3 mile Metro Area Connection (MAC) light rail line. As such, transit-oriented development, or TOD has become a considerable concern throughout the Denver region. This is especially true as the program called “FasTracks”, that was successfully voted upon by the region to develop the rail transit system, was labeled a regional land use and transit development program, not just a transit program.

With the FasTracks emphasis on regional land use development, TOD has become a major focus within the entire Denver region. The City and County of Denver, the Denver Regional Council of Governments (DRCOG), and the Denver Regional Transportation District (RTD) now all have TOD programs with full-time TOD staff. The Metro Denver Economic Development Corporation has a TOD focus, and TOD plans are being created at all different scales from individual station areas to the entire region. The City and County of Denver has even developed its own TOD typology that separates its rapid transit stations into seven individual TOD station types, recognizing the important differences between different places and destinations within the region.

The goal of this report is to examine the impact on land use and urban form that TOD is having throughout the Denver region. It begins with a brief review of the reintroduction of rapid transit into the Denver region and a more thorough discussion of the Fastracks program and its current status. It then defines the overall concept of TOD in general and in Denver specifically, and reviews the state of TOD throughout the Denver region as presented by RTD and the City and County of Denver. This is then followed by a more detailed analysis of the impact of TOD in Denver, at the station, corridor and regional scales. The report concludes by examining how the concept of TOD is being incorporated and into the land use and urban form of the Denver Metropolitan region.

## The Return of Rail Transit to Denver

In 1954, the last electric streetcar ran in Denver ending an era in which at one time streetcars accessed virtually the entire city. In 1973, planning for the reintroduction of rail service began with a proposal for a 93-mile personal rapid transit (PRT) system to run on six radial routes with five circumferential connectors. In 1976, this proposal was changed to an 80-mile advanced rapid transit (ART) system running only on the six radial routes. This was then changed to a 73- mile similar system in 1980. None of the above was ever implemented, and eventually, 25 years after the original PRT proposal, a 5.3-mile light rail line, called the Metro Area Connection (MAC) was opened. Several of the earlier proposals had been submitted to the federal government for financial assistance and all were denied. The MAC line was built without federal assistance as a demonstration line for future federal funding.

The MAC line opened in 1994 with higher than predicted ridership, and by 1995 federal funds were received to help build a 8.7-mile southwest corridor extension to the MAC line. The southwest corridor extension, which opened in 2000, is located in an operating freight rail corridor, and along Colorado Highway 85. It offers access to several outlying Park-and-Ride lots and the municipalities of Englewood and Littleton. Being located in an existing rail corridor, land acquisition costs were reasonable. Ridership thus far has been above predicted, and additional parking has been added at several of the park-and-ride lots.

At the same time that the southwest corridor line was being built, planning for a southeast corridor rail line was in progress. This corridor parallels Interstate 25 and is the primary route south out of Denver. Interstate 25 has typically been very congested and the original plan was to build only a new light rail extension next to the interstate to help alleviate traffic. There was strong interest in improving Interstate 25 also however, and in the end, the rail extension got linked together with highway widening improvements and the entire project was called TREX. The TREX project was completed in 2006. It was comprised of seventeen miles of highway expansion and improvements, nineteen miles of new light rail line, a new drainage system, and improved pedestrian and bicycle access. Also during the construction of the TREX project, the 1.8-mile Central Platte Valley spur light rail line opened providing access to numerous sports and entertainment venues in the valley (including Invesco Field, the Pepsi Center, Six Flags Amusement Park, and Coors Field), along with the Auraria campuses (University of Colorado at Denver, Metropolitan State College, and Community College of Denver).

During the time that the Southwest corridor line was being built, Denver again began to undertake the development of a long-range plan for a regional rapid transit system. In 1997, a plan entitled "Guide the Ride" which proposed a sales tax increase to fund the development of regional rapid transit system was defeated in a public vote by 51 to 49 percent. In 2004, another plan was proposed, this time entitled "FasTracks". In this plan, not only was the plan focused on rail transit, but also on overall regional land use. This time, the vote to increase sales tax passed, and since 2004 the FasTracks program has been moving forward.

The initial FasTracks proposal is "a multi-billion dollar comprehensive transit expansion plan to build 122 miles of new commuter rail and light rail, 18 miles of bus rapid transit, 21,000 new parking spaces at light rail and bus stations, and enhance bus service for easy, convenient bus/rail connections across the eight-county district ([http://www.rtd-fastracks.com/main\\_26](http://www.rtd-fastracks.com/main_26))". It involves the construction of transit service in six new corridors and the development of the Denver Union Station into a multimodal transit hub all within a very short twelve year time period (see Figure 1).



**Figure 1: FasTracks Program**

At this time, each of the proposed new corridors are in different stages of development. The US 36 Corridor Bus Rapid Transit (phase I) is in the final stages of its environmental review with design scheduled to begin in early 2010. Construction of new bridges on the West Corridor is presently ongoing with a projected opening date for the entire light rail line scheduled for 2013. All of the other lines are in various stages of the permitting process, with the Federal Transit Administration having approved the Environmental Impact Assessment for the Gold Line and East Corridor Line in November 2009.

At this time, the FasTracks program is having budgetary problems due to increasing costs and decreasing revenues. Specifically, according to a July 5, 2009 article in the Denver Post:

RTD officials blame soaring materials costs and the worst recession in a generation for FasTracks' \$2.3 billion cost increase and \$4.6 billion revenue shortfall. But budget overruns, delays, missteps in buying land and optimistic revenue forecasts also played roles.

In 2004, voters agreed to pay a 0.4 percent sales tax increase to fund FasTracks. Now, RTD is saying that it needs another 0.4 percent increase in the sales tax to pay for the projected budget shortfall. In addition, it is pursuing significant private-public partnerships to help fund portions of the project. At this time, it is unclear as to the exact future of the FasTracks program and whether it will be able to be completed in its original twelve year system-oriented rapid framework, or whether it will have to be completed in a piecemeal context over a much longer period of time.



## Defining Transit-Oriented Development or TOD in Denver

Although there are many different definitions of transit-oriented development, they nearly all have a number of similar components. To begin with, they focus on the area within a half mile of a transit station, or what is considered a walkable distance to a transit station. Increased density is usually mentioned, along with mixed land uses, and improved accommodations for pedestrians. The location of the station should support new land use development, while the development should increase transit ridership. Parking is usually limited, and the potential for intermodality increased. Livability around the stations is most often a central focus, with the reduction of regional congestion, and an improved regional environment, both secondary goals.

The California Department of Transportation has a good basic definition that captures the essence of most TOD:

Moderate to higher-density development, located within an easy walk of a major transit stop, generally with a mix of residential, employment and shopping opportunities designed for pedestrians without excluding the auto. TOD can be new construction or redevelopment of one or more buildings whose design and orientation facilitate transit use (<http://transitorienteddevelopment.dot.ca.gov/>).

In the City and County of Denver, 2006 *Transit-Oriented Development Strategic Plan*, TOD is defined as follows:

TOD is more than simply development near transit, successful TOD creates beautiful, vital, and walkable neighborhoods; provides housing, shopping and transportation choices; generates lasting value for citizens and public and private stakeholders; and provides access to the region's jobs, government centers, healthcare facilities and cultural and recreational destinations.

Following that general definition, the report states that TOD should achieve these five main goals in order to succeed (Denver Community Planning and Development 8/2/06:10):

- Location efficiency
- Rich mix of choices
- Value capture
- Place-making
- Portal to the region

Location efficiency is the conscious placement of homes, jobs, civic uses, shopping, entertainment, parks and other amenities close to transit stations to promote walking, biking and transit use.

Rich mix of choices is about expanding housing, transportation and shopping choices.

Value Capture needs to be a key objective of all parties involved with TOD.

Place-making was one of the greatest limitations to the first generation of TOD projects in cities with older transit systems such as Washington, DC, San Francisco and Chicago

Transit stations are a “portal” or entry point to the regional transit network, and part of a metropolitan economy composed of employment, residential, cultural, recreational and shopping amenities.

From this definition and these goals, it can be seen that TOD in Denver is being viewed from a very strong land use development perspective. This perspective emanates from the original goal of FastTracks being a regional land use plan as well as a transit development plan. This definition, and these goals, are all very long-range, however.

## **TOD in Denver Today**

There are three major public bodies involved with TOD today in Denver. They are the Denver Regional Transportation District (RTD), the City and County of Denver, and the Denver Regional Council of Governments (DRCOG).

The Denver RTD has a full-time TOD director, and states its TOD mission as follows ([http://www.rtd-fastracks.com/main\\_45](http://www.rtd-fastracks.com/main_45)):

RTD's TOD mission is to help facilitate TOD opportunities that increase ridership or enhance transit investments throughout the District through station design and close coordination with local jurisdictions and developers.

The City and County of Denver is very involved with TOD planning. They completed an overall TOD Strategic Plan in 2006, and are in the process of developing station-area plans for most of the stations within the city limits. Many of these plans are already adopted, some are in process, and others are about to begin. They also have developed a TOD Station Typology noting that “one size does not fit all (<http://www.denvergov.org/TOD/StationTypology/tabid/395260/Default.aspx>)”. Figure 2 below explains this typology, and figure 3 exhibits the typological designation of most of the individual stations within Denver.

TOD Typology	Desired Land Use Mix	Desired Housing Types	Commercial Employment Types	Proposed Scale	Transit System Function
<p><b>Downtown</b></p> 	Office, residential, retail, entertainment, and civic uses	Multi-family and loft	Prime office and shopping location	5 stories and above	<b>Intermodal facility/transit hub.</b> Major regional destination with high quality feeder bus/streetcar connections
<p><b>Major Urban Center</b></p> 	Office, retail, residential and entertainment	Multi-family and townhome	Employment emphasis, with more than 250,000 sf office and 50,000 sf retail	5 stories and above	<b>Sub-Regional destination.</b> Some Park-n-ride. Linked with district circulator transit and express feeder bus
<p><b>Urban Center</b></p> 	Residential, retail and office	Multi-family and townhome	Limited office. Less than 250,000 sf office. More than 50,000 sf retail	3 stories and above	<b>Sub-Regional destination.</b> Some Park-n-ride. Linked with district circulator transit and express feeder bus
<p><b>Urban Neighborhood</b></p> 	Residential, neighborhood retail	Multi-family, townhome and small lot single family	Local-serving retail. No more than 50,000 sf	2-7 stories	<b>Neighborhood walk-up station.</b> Very small park-and-ride, if any. Local and express bus connections
<p><b>Commuter Town Center</b></p> 	Office, retail, residential	Multi-family, townhome, small lot single-family	Local and commuter-serving. No more than 25,000 sf	2-7 stories	<b>Capture station for in-bound commuters.</b> Large park-n-ride

<p><b>Main Street</b></p> 	<p>Residential, neighborhood retail</p>	<p>Multi-family</p>	<p>Main street retail infill</p>	<p>2-7 stories</p>	<p><b>Bus or streetcar corridors.</b> District circulator or feeder transit service. Walk-up stops. No transit parking</p>
<p><b>Campus/ Special Events Station</b></p> 	<p>University Campus, Sports Facilities</p>	<p>Limited multi-family</p>	<p>Limited office/retail</p>	<p>varies</p>	<p><b>Large Commuter destination.</b> Large park-n-ride</p>

Figure 2: Denver's TOD Typology

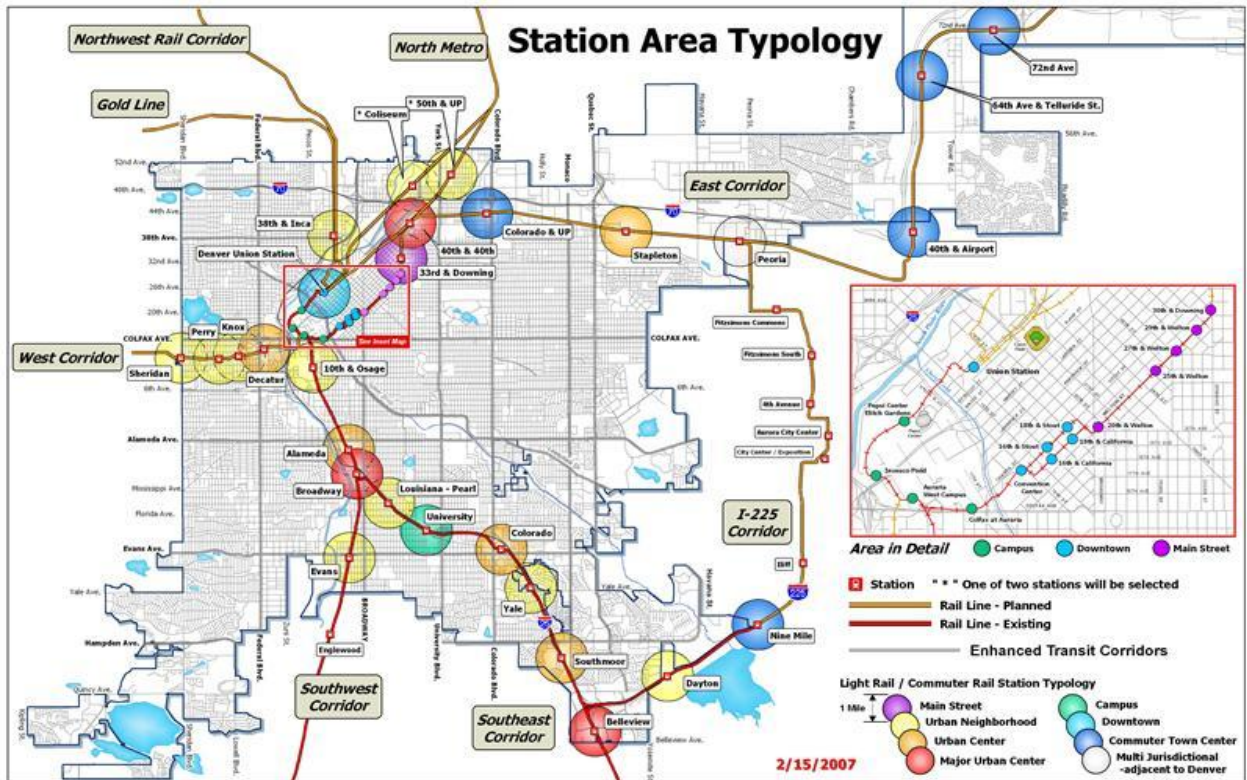


Figure 3: Station Area Typology

DRCOG sees itself “as a resource for planners, developers, policy-makers and citizens who are interested in the implementation of Transit-Oriented Development (<http://www.drcog.org/index.cfm?page=TransitOrientedDevelopment>)”. They make easily available corridor and station-area maps and demographic data, including a database of real estate development activity within one-half mile of existing and future transit stations. They are also currently conducting a study entitled “Who is TOD in Metro Denver” that strives “to benchmark how people in metro Denver are responding to TOD policy and investment decisions reshaping the regional landscape, particularly land uses around rail-transit stations (<http://www.drcog.org/index.cfm?page=WholsTOD90>)”. The study is surveying people in business, employees and residents.

RTD has been publishing a yearly TOD Status Report since 2005. In this report, RTD summarizes TOD through the examination of development activity, and planning and zoning activity. In addition, TOD activity within individual corridors and at individual stations (existing and planned) is reviewed. Figure 4 below summarizes the development activity listed in the 2008 Status Report. The figures listed generally represent all development within one half mile of stations. Timeframes vary. For the existing corridors they begin when final plans for the line were approved. For the planned corridors and extensions, they begin at the time of voter approval of the FasTracks referendum.

	Res Units	Hotel Rooms	Office (ft <sup>2</sup> )	Retail (ft <sup>2</sup> )	Gov (ft <sup>2</sup> )	Cultural (ft <sup>2</sup> )	Convention Sports	Medical- Related
<b>Existing Corridors</b>								
Built/under construction	11,621	4,586	4,500,000	2,100,000	1,600,000	143,000	2,400,000	
Proposed	8,094	2,445	1,400,000	1,500,000				
<b>Planned Corridors and Extensions</b>								
Built/under construction	2,523	140	560,000	2,700,000	316,000	57,000	2,000,000	4,600,000
Proposed	2,765	768	783,394	550,431				1,450,000
<b>Total</b>								
Built/under construction	14,144	4,726	5,060,000	4,800,000	1,916,000	200,000	4,400,000	4,600,000
Proposed	10,859	3,213	2,183,394	2,050,431	0	0	0	1,450,000
<b>Comments</b>								
19 new (2008) proposed projects (74% on existing corridors)								
3 hotels, 7 residential, 2 office, 2 retail, 5 mixed-use								
95% built/under construction projects are on Central, Central Platte Valley, & Southeast corridors								

**Figure 4: TOD Development Activity**

Figure 5 below lists station-area planning and rezoning activity at many of the existing and proposed stations. Those listed are all station areas that have adopted station-area plans or are in the process of creating them. It is also mentioned in the report that RTD is conducting corridor level planning as well as station-area planning (P.1.12). Specifically, it mentions that RTD has completed planning workshops in four corridors, and is in the process of holding planning workshops in two others. For the corridor-level workshops, coordination among the communities that the corridor runs through is sought, along with coordination with ongoing environmental evaluations.

Station	Corridor	Jurisdiction	Plan Status	Zoning Status	Other Planning Tools
10/Osage	Central/CPV	Denver	In process*		Public housing study
Alameda	Central/CPV	Denver	In process*		B'way Mktplace GDP
Auraria West	Central/CPV	Denver	In process*		Auraria Master Plan
I-25/Broadway	Central/CPV	Denver	None	Adopted 2005	Urban renewal, Cherokee GDP, Lionstone GDP
Union Station	Central/CPV	Denver	Adopted 2004	Adopted 2004	
Welton/Downing Stns	Central/CPV	Denver	Begin 2008		
40/Airport	East	Aurora	In process*	Expected 2009	
Peoria/Smith	East	Aurora	In process*	Expected 2009	
38th/Blake	East	Denver	In process*		Subarea plan
Stapleton	East	Denver	In process*		
Federal	Gold	Adams County	Adopted 2008		
Pecos	Gold	Adams County	Adopted 2008		
Kipling	Gold	Arvada	Adopted 2008		Ridge Home redev
Olde Town Arvada	Gold	Arvada	Adopted 2008		Subarea plan
Sheridan	Gold	Arvada	Adopted 2008		
41st/Inca	Gold	Denver	In process*		
Ward Rd	Gold	Wheat Ridge	Adopted 2006		
Abilene	I-225	Aurora	In process*	Expected 2009	
13th Ave	I-225	Aurora	In process*	Expected 2009	
Colfax	I-225	Aurora	In process*	Expected 2009	
Iliff	I-225	Aurora	In process*	Expected 2009	
Florida	I-225	Aurora	Begin 2009		
Commerce City	NorthMetro	Commerce City	Begin 2009		
Coliseum/NWSS	NorthMetro	Denver	Begin 2009		
124th Ave	NorthMetro	Thornton	In process*	Subarea Plan	
Dry Creek	Southeast	Arapahoe County	None	Adopted 2004	
NineMile	Southeast	Aurora	In process*		
Bellevue	Southeast	Denver	None	Adopted 2003	
Colorado Blvd	Southeast	Denver	In process*		Lincoln GDP, Subarea plan
Louisiana/Pearl	Southeast	Denver	Adopted 2007		
Southmoor	Southeast	Denver	Eliminated		
University	Southeast	Denver	None	Adopted 2007	
Arapahoe	Southeast	Greenwood Village	Adopted 2005		
Orchard	Southeast	Greenwood Village	None	Adopted 2005	
Evans	Southwest	Denver	In process*		
Mineral	Southwest	Littleton	None	Adopted 2007	ULI study
30/Pearl	NWRail	Boulder	Adopted 2007		BTV Concept Plan
Louisville	NWRail	Louisville	Adopted 2003	In process	Urban renewal
South Westminister	NWRail	Westminster	Begin 2009		
Decatur	West	Denver	In process*		
Sheridan	West	Denver	In process*		
Federal Center	West	Lakewood	Adopted 2006	Adopted 2007	GSA master plan, RTD JD
Oak	West	Lakewood	Adopted 2006	Adopted 2007	
Sheridan	West	Lakewood	Adopted 2006	Adopted 2007	
Wadsworth	West	Lakewood	Adopted 2006	Adopted 2007	Urban renewal, EDAW study, ULI study

\*Expected to be adopted in 2009

**Figure 5: TOD-Related Planning and Rezoning Activity**

In the 2008 Status Report, it is mentioned that the database of real estate development around stations is not particularly sensitive to the downturn in the economy, and does not reflect the delay or elimination of some projects. However, this is followed by the statement that “the prospects for TOD are good and it should fare favorably when the real estate market recovers (p. 2.2)”. In addition, it is stated that “the market slow down also presents a window of opportunity to complete TOD plans, zoning and implementation tools in advance of the next market cycle (ibid.)”.



The development overview section of the 2008 TOD Status Report ends with a review of regional TOD trends. This review begins by again mentioning the slowing of growth within the Denver region overall and the expectation of more projects being delayed. Figure 6, Exhibit 2.1, a chart of new units of residential TOD by delivery year projects a significant increase in 2008 through 2010. However in the text, it is mentioned that for 2008 there was actually a decrease, and that trend is probably more likely for the future, than the one in the chart. In the text, it is also mentioned that “most new residential projects are being planned as rental (62%) versus sale (38%), and that “there is some indication that residential values around stations are trending higher than comparable housing elsewhere (p. 2.3)”.

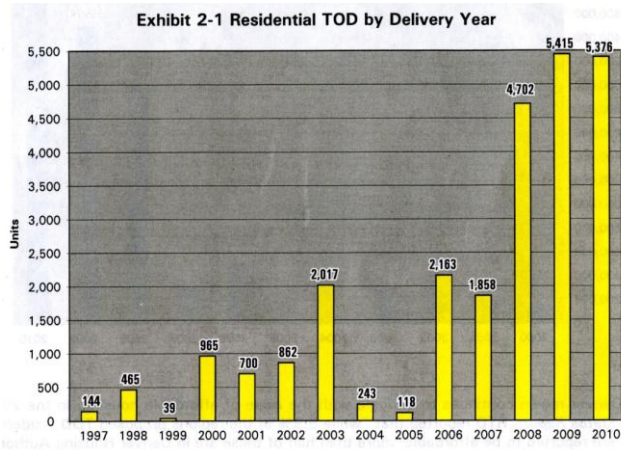


Figure 6: Exhibit 2-1 Residential TOD by Delivery Year

Upon examination of new office development, Figure 7, Exhibit 2.3 in the 2008 Status Report projects significant growth in 2008 through 2010. The text states that “the office market around stations is still fairly strong”, however “RTD does expect these numbers to drop as more projects are delayed or put off because of tighter lending requirements and a lack of new tenants” (p. 2-3).

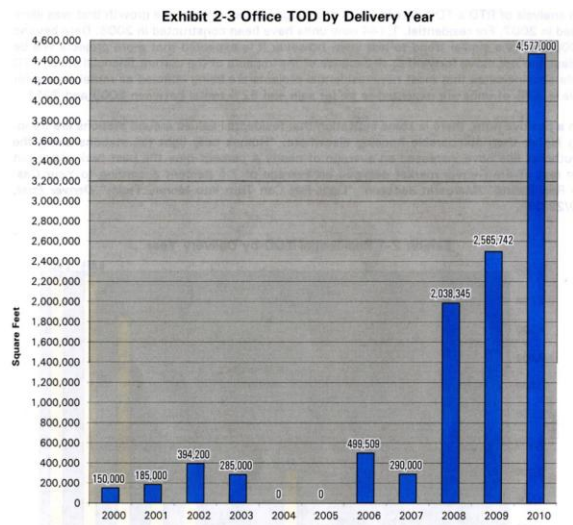


Figure 7: Exhibit 2-3 Office TOD by Delivery Year

## Assessing the Impact of TOD on the Denver Region

In order to assess the impact of TOD in Denver today, it is examined from six different perspectives in this section of the paper. The first three perspectives review the development, planning and rezoning activities presented in the *2008 TOD Status Report*. The next perspective is an examination of regional changes in mobility performance since the reintroduction of rail transit into Denver. The last two perspectives focus on the two classic standards of TOD found in all TOD definitions, density and mixed-use.

### Development Review

A geographic review of the development data from the *2008 TOD Status Report* and provided by DRCOG was conducted. Patterns of development by corridor were examined from information found in the RTD Status Report, and patterns of development by station type were examined from the DRCOG data.

Figure 8, Corridor Development was created from data found in the *RTD 2008 Status Report*. In the table, it is seen that the Central Corridor/Central Platte Valley Spur has incurred the majority of the overall development within the system. Over 50 percent of the residential units and 90 percent of the hotel rooms have been built in the station areas within this corridor. In addition, over 51 percent of the office development, 75 percent of the cultural development, 94 percent of the government development, and 100 percent of the convention/sports development have all occurred in this area.

Retail development is the one area where there is a more even distribution of development throughout the system, though the majority is still in the Central corridor. The Southwest corridor has experienced the second most retail development. It has been centered at the Englewood station as part of the public-private TOD project built there, and at the central Littleton station through several infill projects. Considering the southwest corridor has been operating since 2000, besides this retail development, it has not attracted much other transit-oriented development. With its location in a freight rail corridor with limited access and available land, this is not surprising.

The southeast corridor, though just operating since 2006, appears to be attracting significant residential and office development, as well as a reasonable amount of retail development. With its location along I-25, and access to the Denver Tech Center, there are certainly many more TOD opportunities here than in a freight rail corridor such as the southwest.

Though the West and the Gold corridors have yet to open, it can be seen that development near their stations is occurring. Though moderate, both have experienced new residential, retail and office development. The moving of St. Anthony Central Hospital to the Federal Center accounts for the large amount of medical development within the West corridor. According to the *2008 Status Report*, both the West and the Gold corridors are considered ripe for TOD development upon their opening.



Corridor	Residential		Hotel		Retail		Office		Gov		Cultural		Medical		Convention	
	Units	%	Rooms	%	Dev (ft <sup>2</sup> )	%	Dev (ft <sup>2</sup> )	%	Dev (ft <sup>2</sup> )	%	Dev (ft <sup>2</sup> )	%	Dev (ft <sup>2</sup> )	%	Sports (ft <sup>2</sup> )	%
Central/Platte Valey Spur	6,544	53%	4,127	90%	915,000	32%	2,500,000	51%	1,500,000	94%	103,000	75%			2,900,000	100%
Southwest	479	4%			687,804	24%	160,000	3%	100,000	6%	34,000	25%				
Southeast	4,598	37%	459	10%	537,877	19%	1,900,000	39%					40,000	4%		
West	230	2%			437,186	15%	250,000	5%					900,000	96%		
Gold	550	4%			283,324	10%	55,372	1%								
Total	12,401		4,586		2,861,191		4,865,372		1,600,000		137,000		940,000		2,900,000	

Figure 8: Corridor Development

In addition to examining the development data by corridor, it was also examined by TOD station type, as defined by the City and County of Denver. In order to do this, primarily the development data provided by DRCOG were used, though the short descriptions of individual stations from the *2008 TOD Status Report* were also reviewed. Figures 9 and 10 exhibit a summary of the DRCOG data. As TOD station types are only assigned for stations within the boundaries of Denver, it is only those stations that this analysis includes.

Station Type	SF Units	Aprtmnts	%	Condos	%	Twnhms	%	Affrdbl	%	Senior	%	Student	%	Hotel Rms	%
Campus	0	2,203	17%	111	2%	5	2%	0	0%	0	0%	316	37%	175	2%
Downtown	0	2,572	20%	2,679	39%	54	19%	56	5%	264	67%	125	15%	6,856	90%
Main St.	0	1,881	15%	1,812	26%	171	60%	933	76%	0	0%	0	0%	0	0%
Major Urban Center	0	3,612	28%	1,459	21%	44	15%	60	5%	0	0%	0	0%	350	5%
Urban Center	0	291	2%	347	5%	0	0%	0	0%	0	0%	0	0%	210	3%
Urban Neighborhood	0	2,224	17%	497	7%	13	5%	183	15%	132	33%	410	48%	0	0%
Total	0	12,783		6,905		287		1,232		396		851		7,591	

Figure 9: Residential Development by Station Type

Station Type	Retail (ft <sup>2</sup> )	%	Office (ft <sup>2</sup> )	%	Gov (ft <sup>2</sup> )	%	Cultural (ft <sup>2</sup> )	%	Convention (ft <sup>2</sup> )	%	Education (ft <sup>2</sup> )	%
Campus	400,117	14%	841,194	7%	0	0%	0	0%	0	0%	197,000	100%
Downtown	1,110,335	40%	7,402,175	62%	1,716,850	89%	63,000	61%	2,451,300	100%	0	0%
Main St.	200,600	7%	0	0%	0	0%	40,000	39%	0	0%	0	0%
Major Urban Center	812,883	29%	3,365,700	28%	0	0%	0	0%	0	0%	0	0%
Urban Center	169,244	6%	300,000	3%	216,322	11%	0	0%	0	0%	0	0%
Urban Neighborhood	112,000	4%	45,000	0%	0	0%	0	0%	0	0%	0	0%
Total	2,805,179		11,954,069		1,933,172		103,000		2,451,300		197,000	

Figure 10: Non-Residential Development by Station Type

In reviewing residential development by station type as shown in Figure 9, several interesting trends can be seen. First, apartments and condos are the only type of housing that have been developed at all station types. Major Urban Centers have experienced the most apartment development, but generally all station types have experienced some apartment development with Urban Centers significantly less than the others. Downtown stations have experienced the most condo development, followed by Main Street stations and Major Urban Center stations. As the characteristics of Urban Centers are less residentially oriented, it is not surprising to find less apartment and condo development at these stations. With the recent gentrification efforts in the Lodo and Five Points areas, it is also not surprising to find the most condo development at the Downtown and Main Street stations which are located in these areas.

Townhome and affordable housing development has occurred primarily at Main Street stations, with senior housing being built at Downtown and Urban Neighborhood stations, and student housing at Campus, Downtown and Urban Neighborhood stations. As the Main Street stations are all located in the Five Points area, a low-income area that is gentrifying, it is not surprising to find the majority of the new affordable and townhome development located here. The total amount of development for both senior and student housing is not large, and the Station areas where they are found all reflect individual projects. For example, the 410 units of student housing found in the Urban Neighborhood station type is the redevelopment of an old hotel at the Inca Street station on the Gold line for Regency College.

The final interesting trend found in Figure 9 is that 90 percent of the new hotel development has occurred at the Downtown stations. This is a result of the current push for tourism in the downtown area along with the opening of the Convention Center. The remaining ten percent of hotel development is proposed or expected projects that are as of yet not under construction.

In reviewing non-residential development by station type as shown in Figure 10, some other interesting trends can be seen. Foremost of these trends is that a majority of the non-residential development is occurring at Downtown stations. Specifically, 100 percent of the convention development, 89 percent of the government development, 62 percent of the office development, 61 percent of the cultural development, and 40 percent of the retail development is found at the six Downtown stations. Major Urban Center stations have received the second most non-residential development, but only in the retail and office categories. Urban Center stations have also experienced some retail and office development, as well as some government development, while all of the education-oriented development has occurred at the Campus stations. Overall, all station types have experienced some retail development, with all but the Main Street stations also experiencing some office development.

When examining both the corridor development data and the station type development data, the dominant trend found is that most of the development activity is occurring in station areas close to the Downtown. This is seen especially when it comes to residential development, of which a majority is found at the Downtown and Main Street stations. However, it is also apparent with non-residential development at the Downtown stations. When specifically examining office development, 90 percent is at the Downtown and Major Urban Center stations, and the only Major Urban Station that at this time is reporting much activity is Broadway, at the end of the Central Corridor line and still close to Downtown.

Following the above analysis, an attempt was made to compare TOD development to overall development throughout the Denver region. Specifically, the questions asked were:

1. What percentage of the total new development throughout the Denver region is TOD?
2. What percentage of the total new development in individual land use categories throughout the Denver region is TOD?

After a significant investigation, it was learned that at this time there are no data available on total new development throughout the Denver region. In fact, upon conversations with several people involved with TOD, it was found that there are no figures of total new development anywhere in the region (Gideon Berger, RTD, Tom Boone, DRCOG, Denver Zoning Office). It was mentioned by Mr. Gideon Berger in the Denver Community Development and Planning Office, that there have been numerous requests for these data, and from his perspective, the only way to obtain it would be to go through individual building permit data which would be a very labor intensive effort

A database of development projects considered “entitled” was found at DRCOG. This database lists individually all new development projects in the region that are in, or are through the permitting process, but have as of yet not been built as of Fall 2009. Figure 11 below compares the figures in this database to those listed in the 2008 RTD Status Report:

Land Use Type	DRCOG "Entitled"	RTD 2008 Status Report "Proposed"
Residential Units	10,773	10,859
Office Development (ft <sup>2</sup> )	989,847	>2.1 million
Retail Development (ft <sup>2</sup> )	~ 5 million	~ 2 million
Hotel Development	400,632 ft <sup>2</sup>	3,213 units
Mixed-Use Development (ft <sup>2</sup> )	~2.8 million	NA

**Figure 11: DRCOG Entitled vs. RTD Proposed Development**

In general upon review of Figure 11, it can be assumed that many of those projects listed as proposed in the RTD Status Report are quite long range, and not as of yet actually anywhere near the permitting stage. It can also be seen that while the figures for proposed office development are more than twice that for entitled office development, when examining retail development, the exact opposite situation is found. Setting the exact numbers aside, this would seem to point out that a larger percentage of regional office development is TOD, while regional retail development is not as TOD-focused. Upon a direct examination of the hotels listed in the entitled database, three projects are listed all near the Denver International Airport, which certainly could be TOD once the airport line is constructed. Finally, as mixed-use development is such an integral piece of TOD, it seems that in future TOD Status Reports, square footage of these types of projects would be valuable to include.

## Planning Review

A review of TOD planning throughout the Denver region as well as station area planning was conducted. The regional planning effort most related to TOD in Denver is the previously mentioned *TOD Strategic Plan* completed in 2006 by the City and County of Denver. In this plan, the city's planning and implementation efforts related to transit system and station area development are prioritized. In addition, TOD is defined, a TOD typology is created, and general station-area planning issues are discussed.

In addition to the Strategic Plan, there are nine other regional plans in Denver that in some way relate to TOD. Most of these do not specifically mention the concept of TOD, but involve the planning of other facets of the region that TOD needs to take into consideration. Below are listed these nine plans:

1. 2000 Denver Comprehensive Plan – key subjects: land use, mobility, legacies, and housing
2. 2002 Blueprint Denver – is an integrated land use and transportation plan designed as an implementation tool for the 2000 Denver Comprehensive Plan
3. 2002 Bicycle Master Plan – is a response to the 2000 Denver Comprehensive Plan striving to develop a framework for an interconnected regional bicycle system
4. 2004 Pedestrian Master Plan – is a framework for the implementation of new city policies emphasizing pedestrian mobility in planning
5. 2002 Parks and Recreation Game Plan – is a master plan for the regional parks, open space, and recreation system
6. 2006 Strategic Transportation Plan – is an implementation tool for the 2000 Comprehensive Plan and 2002 Blueprint Denver
7. 2005 Storm Drainage Plan – evaluates the adequacy of existing systems assuming future land use changes identified in 2002 Blueprint Denver
8. 2006 Sanitary Sewer Plan - evaluates the adequacy of existing systems assuming future land use changes identified in 2002 Blueprint Denver
9. 2005 Greenprint Denver – is the cities environmental action plan to ensure a positive legacy for sustainability

As TOD efforts in Denver progress, the goal should be to coordinate them with the above mentioned plans. There is mention of this type of coordination in the *TOD Strategic Plan*, where it states that these plans should “recognize TOD and support TOD principles (p. 24)”. Mention of coordinating with or “building upon (Alameda Station Area Plan p. 52)” the above plans is also found in the individual station-area plans. This recognition of interwoven planning efforts is to be commended, but it is interesting to note that the local “Area Plan provides specific recommendations for the planning area that, in case of conflict, supersede general recommendations from existing plans (ibid.).

In a simple effort to compare the type of planning being conducted at station areas to similar areas without transit stations, three station-areas and three non-station areas of similar characteristics were examined. For the station areas, two had adopted full area plans, and the third had a full area plan in process. For the non-station areas, no similar planning efforts were found. Instead, public works efforts oriented to improving infrastructure were found as were localized marketing efforts, and efforts to coordinate local businesses.

In a thorough review of the *Louisiana-Pearl Station Area Plan* prepared by the City and County of Denver, Community Planning and Development Department and adopted 2007, a similar statement about building on a solid foundation of existing documents and guiding principles was found (p. 5). In total, the plan contains an introduction, existing conditions section, a plan vision, a framework plan, and an implementation strategy. In the plan vision, the Louisiana-Pearl station is described as:

A “walk-up” light rail transit station with easy pedestrian access and designated passenger drop-off and pick-up areas. It is embedded in a stable neighborhood that offers primarily single family housing. Consistent with the principles of the Urban Neighborhood TOD Typology, near the platform there is a vibrant mix of additional housing options, shopping, dining, employment and public gathering areas (p. 25).

In the framework plan of the document, there are four focuses; land use concept areas, urban design, mobility and parking. In the section on land use concept areas, four of the five TOD goals found in the *TOD Strategic Plan*, i.e., location efficiency, a rich mix of choices, value capture, and a portal to the region are discussed. In the urban design section, the final goal, place-making is stated as one of the main urban design issues and opportunities.

In the implementation strategy of the document, short-term strategies (1 year) address rezoning, improved station accessibility and pedestrian environment, station and parking management and monitoring, and continued public participation. Longer term strategies (2 – 5 years), continue to refine zoning, look to establish finance mechanisms to fund streetscape improvements, explore the formation of a parking management district, and look to promote alternative transportation modes.

## Rezoning Review

A review of rezoning activities as presented in the 2008 *TOD Status Report* was conducted. In this review, eighteen of the forty-five listed stations have rezoning efforts either expected, in process, or already adopted (See Figure 5). The earliest adopted rezoning was 2003, with six new station-oriented rezonings expected to be adopted in 2009. Four of the eighteen are in the City and County of Denver. It would be interesting to learn about the total number of rezoning in Denver since 2003, and their geographic distribution.

The City and County of Denver is currently involved in a total rezoning effort. This effort began in 2005 and is expected to be completed in 2009. The first discussion of zoning reform was mentioned in the 1989 *Comprehensive Plan*. This idea was reiterated in the 2000 *Comprehensive Plan*, and then repeated again in 2002 in *Blueprint Denver*. It was this document that provided the vision and initial strategy for the overall rezoning effort. Specifically, *Blueprint Denver* stated that “Denver needs a new zoning code that will support a growing economy, a sustainable environment, a diverse mix of housing, strong neighborhoods, and a high quality of life”. The new revised code uses both a traditional form-based approach and a context-based approach. The context-based approach is organized around six different “contexts”, or “existing and desirable characteristics of Denver’s diverse neighborhoods” <http://www.newcodedenver.org/> .

The idea of context neighborhoods established in the revised zoning code bears some resemblance to the establishment of station typologies by the City and County of Denver in the 2006 *Strategic Plan*. Both describe the general character of the areas, desired land use mix, and something about building heights. The context neighborhoods have much more detail about building form and design standards than the station typologies, and only three of the six actually mention a relationship to public transportation in their description. Overall, four of the six context neighborhoods are similar to specific TOD station types. These are the Downtown context, the Urban Center context, the Special context, and the General Urban context, which is called Major Urban Center TOD type. Those context neighborhoods that do not have corresponding TOD areas are the Suburban Neighborhood context and the Urban Edge neighborhood context. Both of these are for neighborhoods of predominantly single family housing with commercial uses accommodated by shopping centers, shopettes, or main streets. There is a Main Street TOD neighborhood in the Denver TOD typology, but its desired housing type is multi-family, not single family.

Though some of the neighborhood context descriptions mention transit, for example in the Urban Center Neighborhood Context it states that a “high priority to pedestrian and transit activity” should be given and “a high level of access to the multi-modal transit system” should be provided it is difficult to find how this is being done in the details of the new ordinance.

## **Mobility Performance Measure Review**

A review of performance measures was conducted in order to see if any notable changes in mobility throughout the Denver region might be exhibited since the reintroduction of rail transit. The measures came from the 2009 *Urban Mobility Report* from the Texas Transportation Institute (<http://mobility.tamu.edu/ums/report/>).

From the report, it is seen (Figure 12) that from 1986 to 1990 Denver’s mobility was worsening, but similarly to most other U.S. cities. However, from 1991 to 1995 Denver’s mobility takes a turn for the worst. Its peak traveler delay grows by 64 percent, cost per traveler by 69 percent, and regional delay by 84 percent, and it falls from 27<sup>th</sup> to 15<sup>th</sup> worst on a regional time travel index of 90 U.S. cities. This downward trend continues from 1996 to 2000, but in 2001, the situation rapidly changes. There is a much slower growth in total regional delay, and minimal growth in peak travel time and system delay. Denver even moves from 9<sup>th</sup> to 13<sup>th</sup> on the time travel index.

This trend of improved mobility from 2001 to 2005 is very interesting as it coincides directly with the opening of the southwest corridor light rail line. The line parallels Colorado 285 (Santa Fe Avenue), a highly congested corridor. Though not possible to directly link the two events from this brief analysis, it is an interesting coincidence. Future projects that look at this relationship while also taking into consideration other factors would be very interesting. With the opening of the southeast line and others soon to follow, looking at mobility from a corridor perspective could also prove worth pursuing.

Years	86 - 90	91 - 95	96 - 00	01 - 05
Congested Travel (% of peak VMT)	34 - 37	41 - 54	57 - 67	67 - 67
5 year change	3	13	10	0
5 yr % change	9%	32%	18%	0%
Congested System (% of lane-miles)	36 - 33	37 - 46	46 - 52	52 - 54
5 year change	-3	9	6	2
5 yr % change	-8%	24%	13%	4%
Congested Time (number of rush-hours)	4.2 - 5.0	5.2 - 6.4	6.8 - 7.4	7.4 - 7.4
5 year change	0.8	1.2	1.6	0
5 yr % change	19%	23%	24%	0%
Total Regional Delay (1000s of person-hours)	12,073 - 14, 870	17,482 - 32,449	36,845 - 51,654	54,574 - 64,997
5 year change	2,797	14,967	14,809	10,423
5 yr % change	23%	84%	40%	19%
Worst Metro Area Ranking	20 - 22	22 - 21	19 - 16	17 - 16
Delay/Peak Traveler (person-hours)	19 - 21	22 - 37	40 - 47	46 - 50
5 year change	2	15	7	4
5 yr % change	11%	68%	18%	9%
Worst Metro Area Ranking	28 - 35	29 - 13	11 - 8	10 - 11
Time Travel Index	1.11 - 1.13	1.15 - 1.22	1.25 - 1.30	1.32 - 1.33
5 year change	.02	.07	.05	.01
5 yr % change	2%	6%	4%	1%
Worst Metro Area Ranking	22 - 29	27 - 15	14 - 9	9 - 13
Congestion Cost/Peak Traveler (\$)	191 - 260	306 - 517	578 - 747	750 - 909
5 year change	69	211	169	159
5 yr % change	36%	69%	29%	21%
Worst Metro Area Ranking	27 - 36	29 - 14	11 - 10	12 - 13

Figure 12: Mobility Performance Measures

## Population Density Review

A number of different issues related to station-area population density were examined for a selected number of FasTracks stations as part of this project. Station-area population numbers were obtained for 26 stations from DRCOG. These numbers were divided by .785 square miles (the area of a circular ½ mile station area) to determine station area population densities. Figure 13 below exhibits these densities along with the corridor for each station.

Station	Corridor	Pop	Station Area	Pop Density	
30th & Downing	Central	8,400	0.785	10,701	10,021 - 3 Downtown stations Average
25th & Welton	Central	8,300	0.785	10,573	
Union	Central	6,900	0.785	8,790	
10th & Osage	Central	3,857	0.785	4,913	
Alameda	Central	1,814	0.785	2,311	
Auraria West	Central	760	0.785	968	
				6,376	Central Cor. Average
LA/Pearl	SE	4,600	0.785	5,860	
Colorado	SE	4,300	0.785	5,478	
University	SE	4,285	0.785	5,459	
Southmore	SE	2,500	0.785	3,185	
County Line	SE	1	0.785	1	
				3,996	SE Cor. Average
				4,995	SE Cor. Average, no County Line
Littleton	SW	2,800	0.785	3,567	
Evans	SW	2,600	0.785	3,312	
Englewood	SW	2,300	0.785	2,930	
Mineral	SW	2,100	0.785	2,675	
C470/Lucent Blvd	SW	1,100	0.785	1,401	
Oxford	SW	1,000	0.785	1,274	
				2,527	SW Cor. Average
Sheridan	West	6,103	0.785	7,775	
Decatur	West	4,592	0.785	5,850	
				6,812	West Cor. Average
40th & 40th	East	2,549	0.785	3,247	
Olde Towne	Gold	3,700	0.785	4,713	
North Metro	Gold	1,200	0.785	1,529	

Figure 13: Station Area Population Density

Before discussing this figure, consider that:

According to census estimates, the City and County of Denver contains approximately 566,974 people (2006) and 239,235 households (2000). The population density is 3,698/sq mi (1,428/km<sup>2</sup>) including the airport. There are 268,540 housing units (2005) at an **average density of 1,751/sq mi** (676/km<sup>2</sup>). However, the average density throughout most Denver neighborhoods tends to be higher. Without the 80249 zip code (47.3 sq mi, 8,407 residents) near the airport, the **average density increases to around 5,470/sq m** (<http://en.wikipedia.org/wiki/Denver>).

Upon examination of the table, a number of different trends regarding station-area population density are found. First, when examining density by corridor, it is seen that the average for the Central corridor stations is above the average found throughout most Denver neighborhoods, with the Downtown stations having significantly higher densities, and the Campus station of Auraria West having one of the lowest densities of any station examined. These trends are not surprising considering the development activity at the Downtown stations previously reviewed, and the fact that according to the RTD Status Report, the Auraria Campus is not allowed to build housing.

In examining the population densities found at the stations in other corridors, it is seen that the average of the two West corridor stations is the highest of all corridors, and the average of the Southwest corridor stations is the lowest. Even at the Englewood station in the Southwest corridor, a station that was one of Denver's first true TOD projects, population density is just above half that typically found in Denver neighborhoods. It is the existing high population density of some of the stations in the West corridor that have lead many people to believe that this corridor has significant opportunity for TOD.



At Southeast corridor stations within the city of Denver, population densities are very similar to the average density for Denver neighborhoods. This is understandable as the neighborhoods near the Louisiana/Pearl Street, Colorado, and University stations are all very typical Denver neighborhoods. Beyond the Denver city limits, data were only available for the Southmore and County Line stations. As can be seen, at Southmore the population density is near the higher end for non-Denver stations, while nearly no one lives near the County line station at this time

## Mixed-Use Development Review

In an attempt to evaluate mixed-use development at rail stations in Denver, several different analyses were conducted. To begin, the DRCOG project development database was sorted with all projects designated in the Use field as “Mixed” separated out. This dataset was then sorted by corridor and station type and examined. Figure 14 below lists the results. Generally, the results mimic those found with the development data in general with significantly more of the mixed-use development found in the Central corridor and at Downtown stations. Similar to the analysis of the other development data, the Southeast corridor has the second most mixed-use developments with the Southwest corridor fairly far down the list. Also similar to the analysis of the other development data, when examining station types, Main Street stations have experienced the second most, with Major Urban Centers third.

Corridor	# Mixed-Use Projects	Station Type	# Mixed-Use Projects
Central	41	Downtown	25
Southeast	17	Main St.	11
US 36	13	Major Urban Center	7
I 225	6	Urban Neighborhood	5
Southwest	5	Campus	3
West	5	Urban Center	2
East	3		
Gold	1		
N. Metro	1		

Figure 14: Mixed Use Projects

In the comparison of station areas to similar non-station areas, an examination of the breakdown of land use was conducted. Figure 15 below shows the comparison between the land use at the 10<sup>th</sup> and Osage Station area and the Knox Street non-station area. Knox Street is on the under-construction West corridor and is classified as an Urban Neighborhood similar to 10<sup>th</sup> and Osage.

From the figure, it is easy to see that there is a more even distribution of land uses at 10<sup>th</sup> and Osage than Knox Street, especially if the 32 percent industrial and 26 percent vacant land, which is predominantly clustered on the west side of the tracks is removed. In regards to residential land use, 10<sup>th</sup> and Osage exhibits a fairly even amount of both single and multi-family housing, while Knox Street is much more centered on single-family housing. To really complete this analysis, it would be good to examine the change in land use since the opening of the station at 10<sup>th</sup> and Osage to help determine if the land use mix has changed.

Retail market data were also available for these two areas. When compared, it was found that there is 79 percent more retail square footage at 10<sup>th</sup> and Osage, and the floor-area ratio (FAR) is more than three times greater (0.7 – 0.22) at 10<sup>th</sup> and Osage. Again, it would be interesting to examine development at 10<sup>th</sup> and Osage since the opening of the rail line to see if these figures have changed.

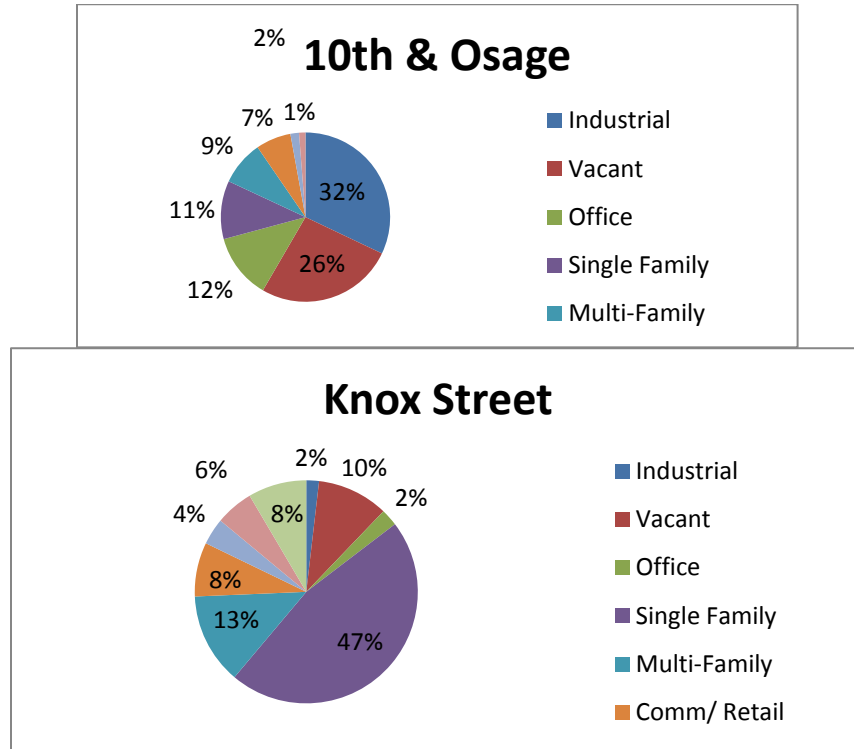


Figure 15: Station- Area to Non-Station Area Land Use Comparison

## Summary

Upon concluding the assessment of TOD in Denver from the six different perspectives reviewed above, the most obvious conclusion is the nearer to the downtown the more impact of TOD. At the six Downtown stations along the Central corridor, 90 percent of the TOD hotel rooms, 89 percent of the TOD government development, 62 percent of the TOD office development, 61 percent of the TOD cultural development, 40 percent of the TOD retail development, and 42 percent of all TOD residential development is found. More new mixed-use development can be found in this area, and the population density at Union Station is the third highest of all stations. The tremendous change to the area around Union Station is considered one of the most dramatic transformations that has occurred in Denver over the past decade.

Moving slightly away from the downtown north along the Central corridor into the Five Points neighborhood and to “Main Street” stations, TOD development is also occurring, especially in regards to housing. In the Five Points neighborhood, 76 percent of the TOD affordable housing, 60 percent of the TOD townhomes, 26 percent of the TOD condos and fifteen percent of the TOD apartments are found. In addition, the two stations with highest population density, nearly twice the Denver neighborhood average, are also in this area. Five Points is the only neighborhood besides the downtown to add a TOD cultural facility, and over 200,000 square feet of TOD retail have been built here. It also has the second most new mixed-use development projects of all station types.

Moving south away from the downtown along the Central corridor, and connecting with the Southwest and Southeast corridors, before crossing out of Denver, there are predominantly Urban Center and Urban Neighborhood stations. Here, the Urban Neighborhood stations are experiencing a moderate amount of residential development of all types, and the Urban Center stations are experiencing a moderate amount of non-residential development, specifically retail, office, and government projects. Population density at both of these station types is very close to the Denver neighborhood average, and there are only a few mixed-use projects found here.

The two Major Urban Center stations of Broadway and Belleview both are experiencing a fairly large amount of TOD development. Definitely, there is more development than at the Urban Center and Urban Neighborhood stations, and with a more even land use mix than at the Main Street stations. Over twenty percent of the TOD apartment and condo projects are found here. Twenty-nine percent of the TOD retail development and 28 percent of the TOD office development are also located here. At the Broadway station, there are long-range plans for several large mixed-use projects, though the developer of one just pulled out, with replacement being sought. There were no population density data available for these stations, though with the mixed-use nature of them, in general it would seem that they would not be areas of significantly high population density.

When examining the impact of TOD on the different rail corridors in Denver, the Central corridor, being the one primarily downtown, has been the most impacted. The Southeast corridor is next, followed by the Southwest. Moderate TOD impacts can also be seen along the under construction West corridor, and slightly in the proposed Gold corridor. While the Central corridor is experiencing all types of TOD development except medical, the Southeast corridor is predominantly experiencing residential and office TOD development. In the Southwest corridor, retail is the predominant type of TOD development found, along with a little office and a little residential.

The West corridor, though still under construction, is experiencing over 400,000 square feet of retail TOD, and a quarter of a million square feet of office TOD development, and this is only for the three stations found in the DRCOG database. A large medical complex is also in the process of moving near one of the West corridor stations. Station area population densities in the West corridor are the second highest to that found in the Central corridor. Overall, when the West corridor rail line opens in 2013, it appears that TOD will be well on its way.

Though the effort to examine the relationship between TOD development to overall Denver regional development was limited at this point, in the comparison of the RTD “proposed” projects to the DRCOG “entitled” projects, there seemed to be some evidence that much of the future office development in the Denver region may be TOD-focused. On the other hand, the evidence does not seem to point to a similar focus in regards to retail. In regards to residential development, the entitled projects database did not include single family houses, making comparisons very difficult. In the DRCOG entitled database, there is a category listed as mixed-use, though no similar category is available from RTD. As mixed-use is a founding principle of TOD, it seems that RTD might want to begin to track these types of projects.

One of the more interesting regional trends found in the analysis was the significant decrease in the worsening of mobility performance measures in the Denver region from 2000 to 2005. Mobility performance in Denver was consistently going down in the ten years prior to this period. In 1988, Denver ranked 23<sup>rd</sup> in regards to total regional delay, and by 2000, they had moved up to 16<sup>th</sup>. However, by 2005 their ranking had not changed, remaining at 16. A similar pattern is found when examining the travel time index. In 1988, Denver was ranked 31<sup>st</sup>, and by 2000, they had moved up to 9<sup>th</sup>. However, by 2005, the ranking was now 13<sup>th</sup>. Similar numbers are also found in regards to congestion cost per peak traveler. In addition, a significant reduction is also found in the rate of change for all of the actual numerical mobility measurements from 2000 to 2005. It certainly cannot be assumed that all of the improvement (or lessening of rate of worsening) in regional mobility is related to the development of new rail transit. However, it is an interesting coincidence that the beginning of this reversal coincides directly with the opening of the Southwest corridor light rail line.

One of the most interesting facets of TOD in the Denver region today is the planning efforts that are ongoing. From the regional perspective of the TOD Strategic Plan and the nine other related regional plans, to all of the local station area plans in process or adopted, to the complete rezoning effort occurring in the City and County of Denver, there is a tremendous amount of thought and analysis being done on the future of the region, as well as the involvement of TOD. Significant pieces of the Central

Platte Valley Master Plan which includes the Union Station area have been implemented. Overall downtown, an enhanced focus on accessibility, pedestrians, livability and intermodality can now be found, all pieces of the TOD definition. With station area plans now in place at a number of stations yet to be built, there is a much greater focus on how the station will “fit” into the region, rather than just putting it there.

These local station area planning efforts are very different from what is being done anywhere else throughout the region. Similar areas without a transit station may bind together to work on individual infrastructure projects or marketing strategies, but none have been found that are doing an entire area planning effort similar to those being done at the station areas. The outcomes of these types of planning efforts are beginning to be seen at various locations throughout Denver. Conscious efforts to think about pedestrian access, livability, and the best or most appropriate use of the land are now fairly common. Public-private partnerships to help insure these plans are more likely to be carried out are also more frequently being sought and obtained.

Being such an exciting but crucial time for TOD in the Denver region, following are a number of suggestions that come from this project to help keep TOD moving as positively forward in the region as possible:

- Continue to monitor TOD development activities adding mixed-use as a category to the TOD development activity being tracked
- Develop a database of development activity throughout the entire Denver region in order to determine the overall percentage of development activity in Denver that is TOD
- Extend the TOD station typology now being used within the City and County of Denver to the stations outside the city boundaries
- Begin to evaluate TOD activity from a typological basis along with a corridor and station level basis
- Develop a methodology to help insure coordination of all of the planning work currently being done throughout the region
- Examine TOD more carefully at the station-area scale in relation to RTD’s five main goals of location efficiency, rich mix of choices, value-capture, place-making, and portal to the region
- Further examine changes in regional mobility measures, possibly from a corridor scale to determine if trends found in the regional data can be substantiated

## References

### Print References

Cervero, Robert, Landis, John, *Twenty Years of The BART System: Land Use and Development Impacts*.  
Transportation Research Part A, Volume 31, #4

City and County of Denver Community Planning and Development, *Alameda Station Area Plan*.  
February 3, 2009.

City and County of Denver Community Planning and Development, *2002 Bicycle Master Plan*.

City and County of Denver Community Planning and Development, *2002 Blueprint Denver*.

City and County of Denver Community Planning and Development, *2000 Comprehensive Plan*.

City and County of Denver Community Planning and Development, *2007 Greenprint Denver*.

City and County of Denver Community Planning and Development, *Louisiana- Pearl Station Area Plan*.  
February 3, 2007.

City and County of Denver Community Planning and Development, *Lincoln Park Neighborhood  
Assessment*. June 2006.

City and County of Denver Community Planning and Development, *2004 Pedestrian Master Plan*.

City and County of Denver Community Planning and Development, *2002 Recreation Game Plan*.

City and County of Denver Community Planning and Development, *2006 Strategic Transportation Plan*.

City and County of Denver Community Planning and Development, *Transit Oriented Development  
Strategic Plan* August 2, 2006.

Denver Post, *RTD not to blame for Cost Overruns*. July 5, 2009.

Livable Communities Support Center, *Creating Livable Communities Through Transit, An Analysis of the  
Potential Benefits of TOD on the Denver Metro Region*. October 2004

PB Placemaking, *West Corridor Development Oriented Transit Analysis*. for RTD February 2006

RTD FasTracks, *Transit Oriented Development 2005 Status Report*.

### Print References (cont.)

RTD FasTracks, *Transit Oriented Development 2006 Status Report*.

RTD FasTracks, *Transit Oriented Development 2007 Status Report*.

RTD FasTracks, *Transit Oriented Development 2008 Status Report*.

Ratner, Keith, *Relating U.S. Rail Transit with Urban Form*. Dissertation, University of Denver 2001.

Wilson, Beth, *One Giant Step for Public Transit*. Rail, 15<sup>th</sup> edition.

### Digital References

California Department of Transportation, TOD Program: <http://transitorienteddevelopment.dot.ca.gov/>

City and County of Denver, The New Zoning Code: <http://www.newcodedenver.org/>

City and County of Denver, Transit-Oriented Development Program:  
<http://www.denvergov.org/Default.aspx?alias=www.denvergov.org/tod>

City and County of Denver TOD Station typology:  
<http://www.denvergov.org/TOD/StationTypology/tabid/395260/Default.aspx>

Denver Regional Council of Governments, TOD Program:  
<http://www.drcog.org/index.cfm?page=TransitOrientedDevelopment>

Denver Regional Council of Governments, “Who is TOD in Metro Denver?” study:  
<http://www.drcog.org/index.cfm?page=WholsTOD90>

FastTracks Program: [http://www.rtd-fastracks.com/main\\_26](http://www.rtd-fastracks.com/main_26)

Regional Transit District TOD Program: [http://www.rtd-fastracks.com/main\\_45](http://www.rtd-fastracks.com/main_45)

Texas Transportation Institute , *2009 Urban Mobility Report*: <http://mobility.tamu.edu/ums/report/>