

Calgary Transit Service Delivery Goals

Trends and Challenges

2016 March

Background

The Calgary Municipal Development and Calgary Transportation Plans (MDP & CTP), approved in 2009, establish the framework for Calgary to grow as a sustainable city. These plans establish integrated land use and mobility strategies and policies which focus on moving towards more intensive land use supported by an increased emphasis on sustainable modes of travel – walking, cycling and transit service. The plans include provisions for “a future land use framework that will support transit”, and “providing complete communities”. Safe, accessible, reliable and convenient transit service is identified as a key element required to achieve the goal of a more compact, and affordable urban form. Affordability references both the cost of travel for individual citizens and the municipal costs to support urban growth.

In 2013, the RouteAhead, was approved by City Council creating a comprehensive, long term plan that provides a strategy for Calgary Transit to achieve the goals of the MDP and CTP. A key strategy is to make transit service more attractive which includes providing frequent transit services over longer periods of time that are accessible to the majority of Calgarians. Essentially, ensuring that transit service is available to take people where they want to go when they wish to travel.

Base Service and Primary Transit Network

Transit service delivery objectives include providing both ‘Base’ and ‘Primary Transit Network’ (PTN) levels of service. Base transit service is intended to provide mostly local service to enable access to PTN stops such as CTrain stations, community schools, shopping, recreation and local employment. By definition, Base service is a range of transit services (feeder, mainline and cross-town routes) providing comprehensive coverage - within 400 metres of 95% of residents and jobs - operating at least every 30 minutes. No span of service has been given for Base service but for the purpose of this report it is assumed that services should operate 15 hours per day, 7 days per week (to match the PTN). This level of service is required to meet the majority of travel needs and not just those travelling during weekday peak periods. However, it is recognized that a sufficient intensity of population, jobs and ridership will be required to support base services which should carry an average of at least 15 to 25 passengers per operating hour for community shuttle and regular bus services, respectively.

The PTN is intended to extend the current backbone of CTrain services with additional radial and cross-town services that will serve longer trips by offering frequency, direct routes operating during extended time periods and enabling “seamless connections” with the base services. The PTN will require the highest standards of service, operating speed, connectivity and amenities in order to provide an attractive travel alternative to the private automobile. The PTN will develop as a coordinated network of routes (both bus and LRT) that operate with a high frequency – i.e., every 10 minutes or better, 15 hours per day, 7 days per week. Less frequent service would continue to operate outside of the core time periods. The high frequency and direct, limited stop nature of these routes will be designed to offer good connections to Base service routes and serve higher density urban corridors and activity centres.

Achievement of the MDP and CTP goals will require a considerable and continuous investment in transit services and facilities. The RouteAhead identifies the need for a sustained increase in operating funding not only so that basic transit services keep pace with city growth but also to improve the quality of service –coverage, frequency, span, reliability, safety and ease of use which are the intended outcomes of delivering both Base and PTN standard service levels.

Delivering on the Service Vision

Hours of Service Per Capita

Hours of service is a common measure in the transit industry to quantify the amount of service provided in a city. Service 'hours' defines the amount of time that transit vehicles are on the road or rails throughout a span of service – i.e. day, month, or year. In 2009, when the CTP was approved, Calgary Transit provided 2.58 million hours of service which translated into 2.42 hours of service per capita. The CTP established a future target of 3.7 hours of service per capita to achieve the quality of transit service delivered in a city like Toronto which was identified as a model for providing attractive transit service. It is acknowledged that to achieve this level of transit service will require a significant growth in service hours to keep pace with population growth and improve the quality of service. The RouteAhead elaborated further by estimating that the average annual investment in transit service should be about 125,000 hours per year to keep pace with anticipated city growth and to increase the quality of service towards achieving the long term goals for Base and PTN services. The cost of this annual service increase was valued at approximately \$14.3 million annually (2012 dollars).

Currently (2015), Calgary Transit operates 2.28 hours of service per capita. Table 1 below shows that from 2009 to 2015, Calgary's population grew faster than the supply of transit service, particularly since 2011. The result is a decrease in the number of hours of service per capita - from 2.42 to 2.28.

Table 1

Service Hours Per Capita

Year	Service per Capita	Hours Transit Hours	Service Calgary Population
2009	2.42	2,576,264	1,065,455
2010	2.38	2,554,766	1,071,515
2011	2.47	2,694,766	1,090,936
2012	2.39	2,673,141	1,120,200
2013	2.38	2,740,669	1,149,552
2014	2.34	2,796,469	1,195,194
2015	2.28	2,806,469	1,230,915

The four year Action Plan 2015 to 2018 has an average service growth of about 43,000 hours of new service per year which is about 34% of the amount of service growth needed stay on pace to achieve the long term CTP and RouteAhead goals.

Base Service and Primary Transit Network Goals

Subsequent to the CTP and RouteAhead, questions have been raised regarding the validity of using hours per capita as the sole measure for determining progress towards delivering a higher quality of transit service. It is suggested that a better way to track progress on achieving transit service goals is to measure the delivery of both 'Base' and PTN services to Calgarians. In other words, how well are citizens being served?

As described previously, Base service and the PTN define both the quality and quantity of transit service in terms of the coverage (accessibility), frequency (how often transit vehicles arrive at a stop or station) and the time 'span' of service (when does service start and finish each day). A key Base service measure is making transit service accessible (i.e. within 400

metres walking distance) to ensure accessibility for the majority of Calgarians where they live and work. The PTN is intended to provide a network of higher quality services with wider spacing serving high density development. The PTN will feature buses and LRT operating over an extended time span on segregated rights of way, with transit priority measures and enhanced passenger amenities. The PTN will also offer service coverage but its main attribute will be the extent to which this network is provided throughout the city.

Progress on Achieving Base Service and Primary Transit Goals

On the following pages, Figures 1, and 2 together with Table 2 shows:

- The extent of the city where a Base level of transit service (or better) is currently provided. (Figure 1).
- The percent completion of the PTN (Figure 2).

As shown on Figure 1, in 2015 Base service is provided to about 60.4% of Calgary residences and 62.7% of jobs (business addresses). Areas that do not receive a Base level of service contain about 229,000 residents (18% of city population) and 158,000 jobs (18% of Calgary's total employment) primarily in the developed communities in the northwest, west, southwest and southeast areas where base service levels are not provided. Areas with no transit service tend to be located in the newer areas in the north, northeast, southeast, particularly developing employment areas plus pockets scattered throughout the developed area of city. Some of these pockets are isolated and have sparse developments that are not feasible to serve.

2015 Transit Service Coverage

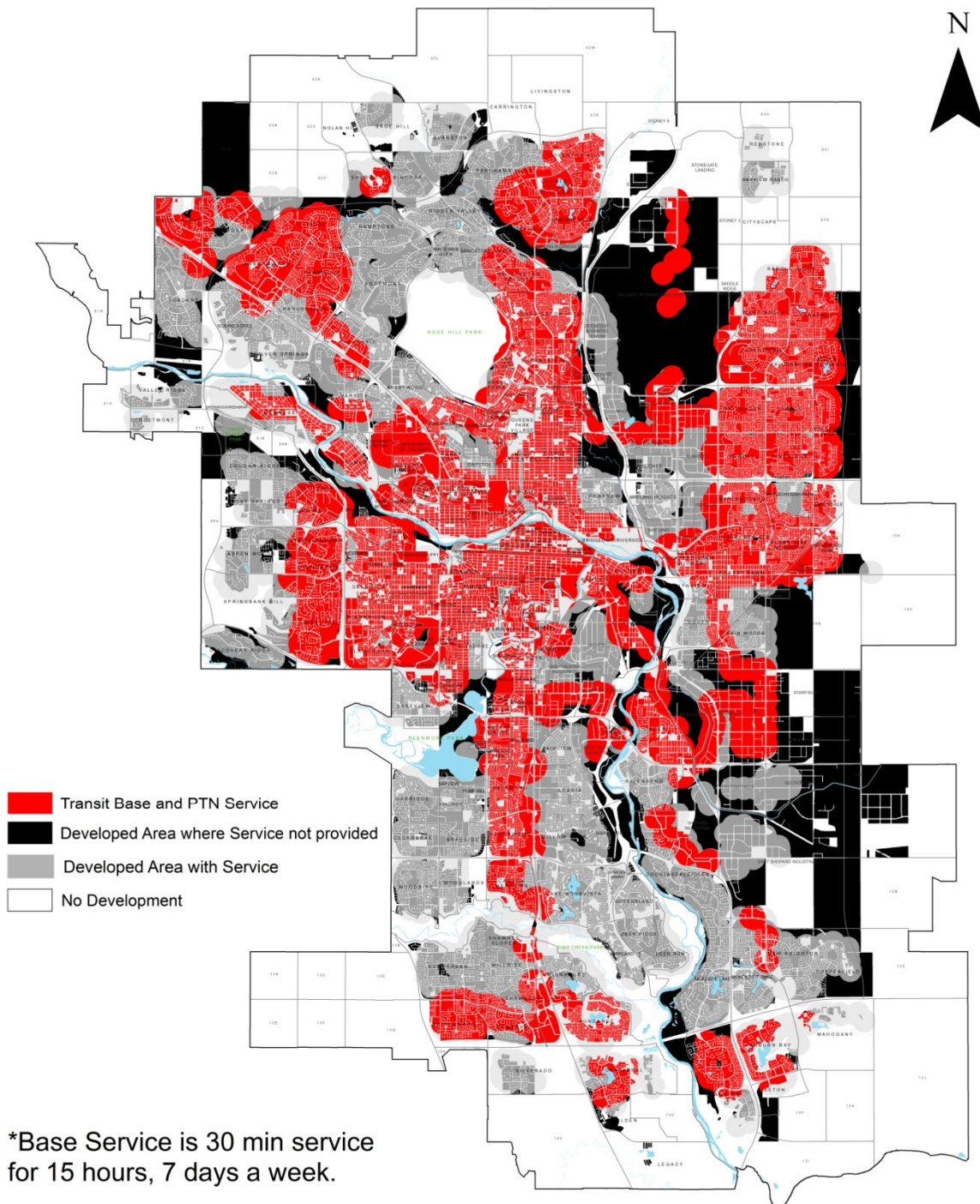


Figure 1

Primary Transit Network

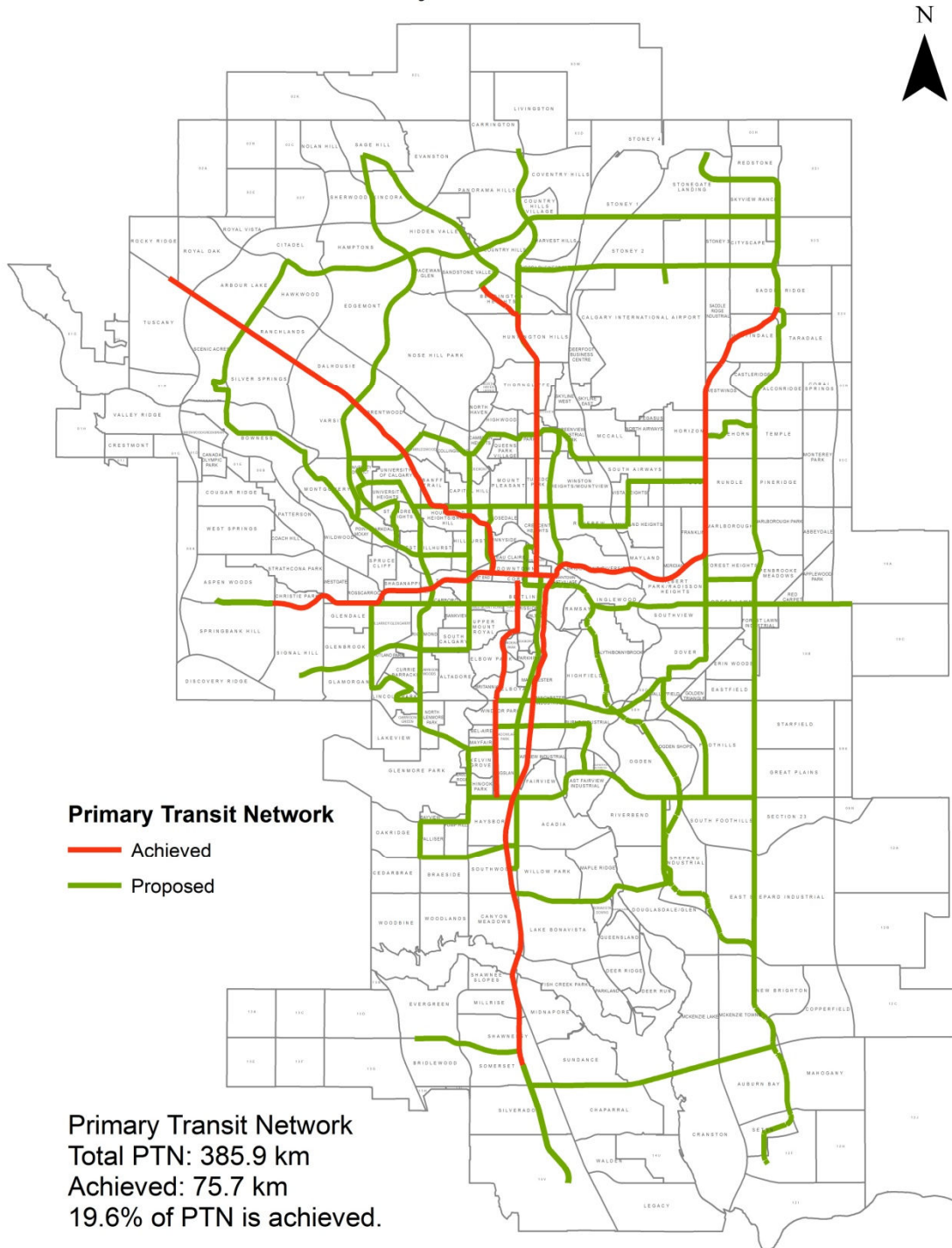


Figure 2

Table 2
Base & PTN Service Provision to Residential Areas

Year	AM Peak	Midday	PM Peak	Evening	Saturday	Sunday	Total
2011	95.2%	87.6%	95.0%	92.0%	73.5%	52.3%	58.0%
2012	94.9%	78.5%	94.7%	89.7%	70.9%	48.5%	54.0%
2013	95.4%	81.6%	95.4%	91.7%	75.9%	55.6%	57.7%
2014	95.4%	86.3%	95.3%	92.9%	75.8%	56.6%	60.4%
2015	95.0%	81.1%	95.0%	91.2%	75.4%	55.3%	60.4%
Change 2011 to 2015	-0.2%	-6.5%	0.0%	-0.8%	1.9%	3.0%	2.4%

Base & PTN Service to Employment Areas

Year	AM Peak	Midday	PM Peak	Evening	Saturday	Sunday	Total
2015	87.8%	89.6%	88.0%	82.1%	71.5%	55.6%	62.7%

Unlike the data in Table 1 that shows a trend of declining service hours per capita the information in Table 2 indicates that progress is being made towards achieving Base service goals. Base service for residential areas has expanded by 2.4%. In fact, the Base service standard is being met consistently during weekday morning and evening peak periods. However, Base service coverage declines significantly during off-peak times; i.e., evenings, Saturdays and Sundays. In the past four years there have been modest declines in Base service coverage during the mid day evening periods with most of the growth occurring on weekends.

The data used to determine Base service coverage in employment areas does not enable a similar timeline comparison since it is based on City of Calgary business license information which does not permit historical comparison. This data can be used annually to track coverage going forward.

During the past five years the PTN has expanded by 5%, mainly due to CTrain expansion plus additional service added to Route 3 (south). The PTN now totals nearly 76 kilometers and is nearly 20 percent complete. PTN expansion also contributes towards achieving Base service coverage.

Base Service Increase vs. Hours per Capita Decrease

As noted above, since 2011, the number of hours per capita has dropped from 2.47 to 2.28. During this period, despite service increases averaging 28,000 hours per year, population increased by 13 percent while transit service increased by only 4 percent. Yet, during this same period, Base service coverage has actually increased by 2.4%. At first glance, this would seem counter intuitive. However, since PTN service also contributes to providing Base service this is not surprising. In the past five years Calgary has invested strategically to expand the CTrain system with extensions of the Blue Line Northeast, Red Line Northwest, and implementation of the Blue Line West. In addition, service hours have been added to most major bus routes to

address demand. Route 3, which serves both North Central and South Calgary now provides a PTN level of service.

Since 2011, the length of the PTN has increased by 5 percent. CTrain extensions do not typically require large increases in service hours. A longer LRT line allows many feeder bus routes to be shortened with the savings in service hours reinvested in improving bus network frequency, coverage and span of service. Overall, CTrain expansion can greatly improve transit service with only a modest increase in total service hours.

The information provided above highlights the value of measuring the quality of transit in terms of progress towards meeting Base Service and PTN goals which reflect service coverage, frequency and span of service rather than simply measuring total service in comparison to population.

Future Transit Service Requirements to Meet Goals

Currently, Calgary Transit operates approximately 2.6 million hours of bus services. It is estimated that approximately 980,000 hours of additional service would be required to deliver a base level of transit service for 95% of residents in developed and developing areas that currently do not have this level of transit service. It is suggested that some developed areas may not justify having a Base level of service and these should be evaluated for potential removal from the calculation.

The PTN, seen as a longer term, but equally important objective, will require a further investment of about 1 million operating hours. Large segments of the PTN will be delivered in the near future using the Green Line, dedicated busways or transitways which are currently being designed for construction. As has already been demonstrated, implementation of the PTN will enable expansion of Base service coverage.

The Challenge to Serve New and Developing Areas

In the preceding information it is noted that since 2011 Calgary's population is growing at almost double the rate of the increase in transit service hours. During this period, increased service has primarily been invested in PTN expansion (CTrain plus supporting bus routes and Route 3), increased service to address overloads on existing major routes and service needed address bus route delays that impact service reliability. Only a very modest investment has been made to introduce transit service in new communities and employment areas.

Table 3 and Figure 3 illustrate a significant challenge emerging in the new and developing communities where many new residents are now living and new employment areas are being created. In these new areas, about 2,000 residents and 14,000 jobs do not receive any transit service. On the horizon, within the next few years many new areas with approved Area Structure Plans are expected to begin developing with new residents and jobs being attracted. These new areas will expand the developed area of the city by about 17% or about 12,000 hectares.

Figure 3
Future Transit Service Needs

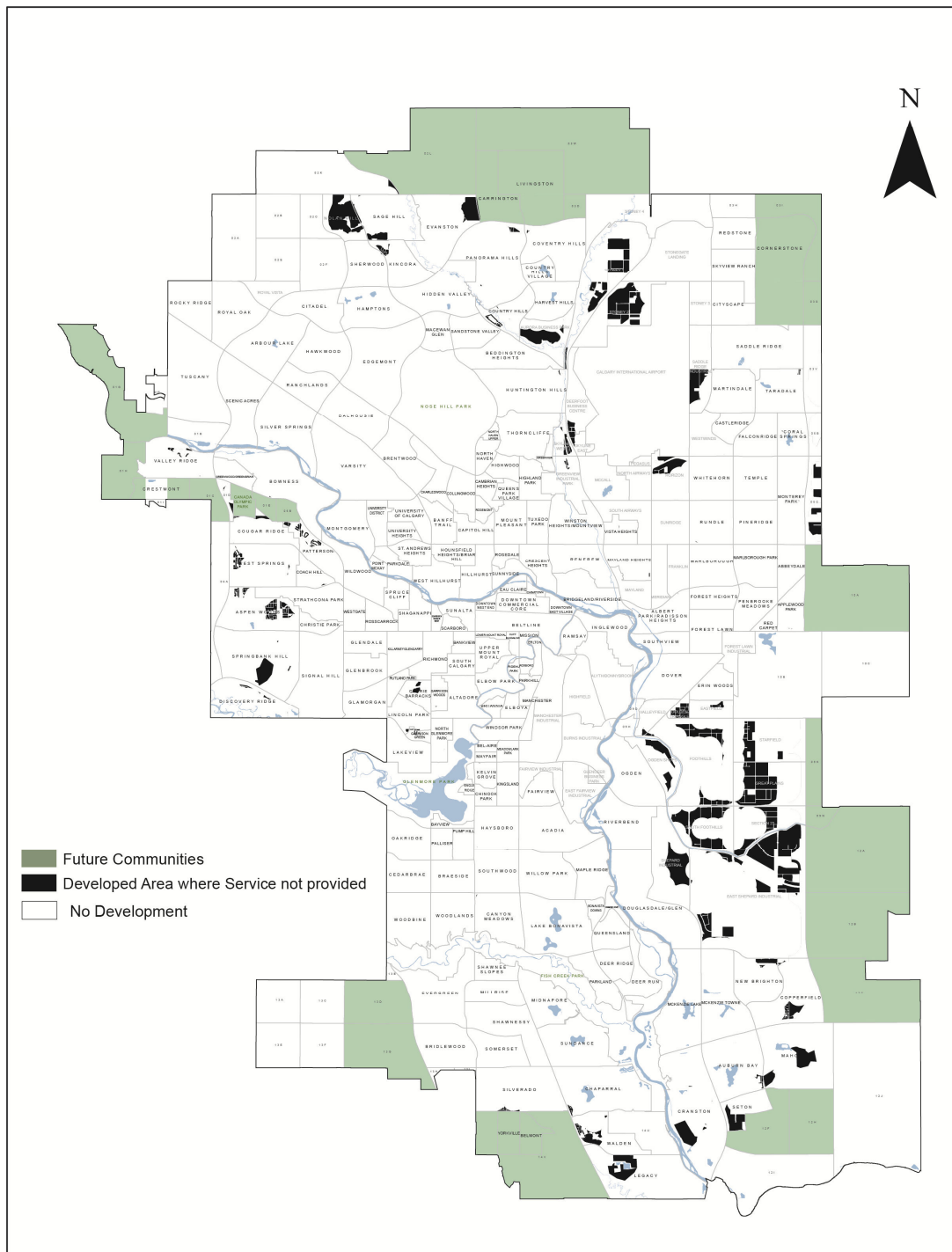


Table 3

Transit Service Status in New Areas

Base Service Status	Population	Jobs
Developing – Not fully served	147,000	127,000
Developing – No transit service	2,000	14,000
Future Development Areas - Plans approved Population and Jobs expected by 2019 >	19,000	5,400

Service For New Communities and Employment Areas

A new residential community can usually sustain transit service once it reaches about 300 to 400 occupied homes. The viability of new service also depends on the speed at which development is occurring, availability of a continuous road network, the density of the development and the ability to extend service on an existing route versus the need for a new independent route. New service typically begins with weekday peak period service followed over time, as ridership and growth occurs, by off peak services – i.e. mid-day, evenings and weekend. An early introduction of transit service is critical to developing transit travel habits of the new residents.

Transit service to employment areas is also crucial to enable employers to attract and retain staff. The ability of new employment areas to support transit service is typically lower than residential growth and the span of service often needs to be longer to serve multiple shift times, including weekends. However, Transit service to these areas is vital to support Calgary's economic growth outside of traditional, more concentrated employment areas in the downtown and other higher density locations.

Since the adoption of the MDP and CTP, land developers are planning and building more compact, higher density residential communities and employment areas. Due to the cooperative efforts of developers and City staff, these new areas are typically well planned with higher density, transit supportive land uses, roadways, pedestrian and cycling facilities that are in alignment with Calgary's sustainability goals. Planning documents that outline the requirements for these new areas have a significant focus on the quality of transit services required. However, there is currently a lack of adequate transit service in several new growth areas and for 2016 to 2018 there are only a small number of transit service hours available in approved budgets to address this situation. Residents and employers in these areas are becoming increasingly concerned with the uncertainty with the timing of new service or service upgrades. As well, the lack of transit service in these areas may result in traffic congestion developing on roadways that were designed assuming that transit service will carry a portion of peak period trips.

Providing Service to New Communities

Calgary Transit has historically provided service to new communities and business areas well after their initial development phase. There are several reasons behind this trend. A new, developing community or employment area in its initial phases is less able to generate sufficient ridership to support the required 50% funding share. To introduce transit service at an early stage requires a heavier reliance on municipal tax support. In many new areas, the road network is not completed sufficiently to allow efficient operation of buses. Calgary Transit participates in the planning of new areas at the approval stage to identify future routes and

service requirements in accordance with the land use. However, in most cases Calgary Transit is not advised of development plans with enough notice to include new service hour in its four year budgeting request.

Recently, some developers have inquired about the potential for them to fund the early introduction of transit service. In other areas, the option of having developers fund transit service in lieu of funding roadway improvements is being considered. In 2011 introductory service in Skyview Ranch was funded by the developer for the first year. This was extremely successful with ridership developing quickly on Route 445. However, in order for Calgary Transit to consider entering into similar developer funding agreements the length of the agreement would need to reflect the availability of budgeted funds to assume the cost of operating the service. For some new communities, currently well underway, this could be up to 10 years due to the number of communities waiting for service that should be funded before any new communities can be considered. While it could provide a welcome short term measure to accelerate the introduction of service, developer funding should not allow newer communities to “jump the queue” over those currently waiting for service where the developer is no longer building.

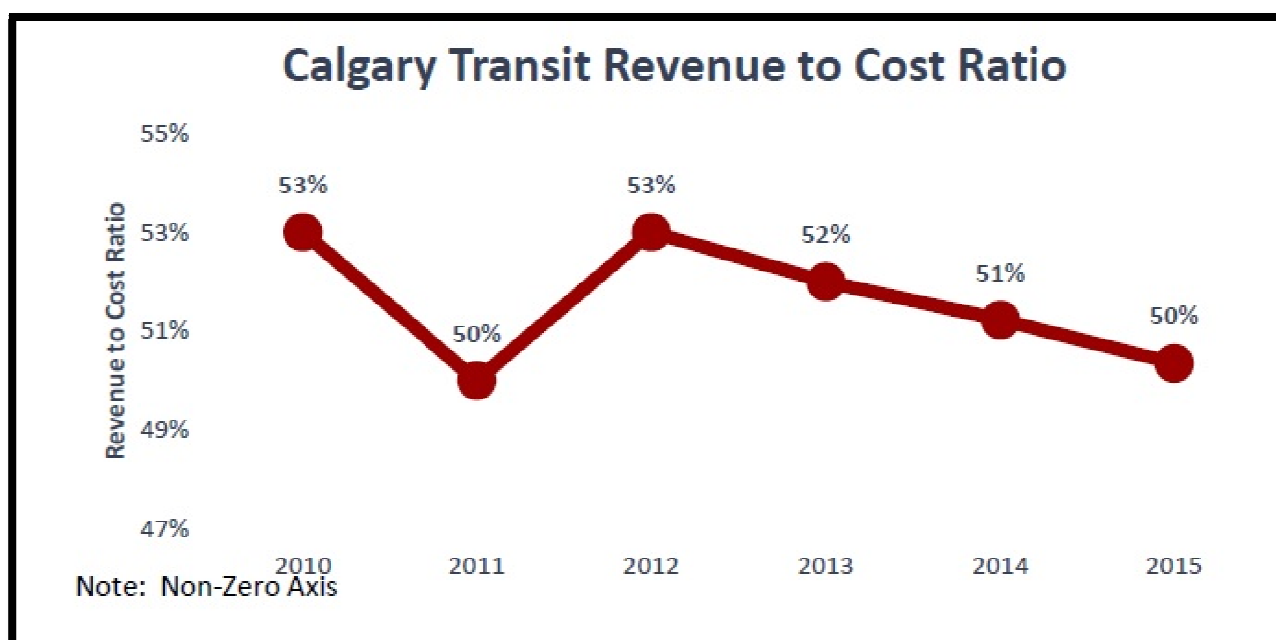
Another consideration regarding developer funded service is the nature of service they may be willing to fund. If one developer in a new area agrees to fund new service but the neighbouring developer is not willing to participate it can be difficult to design a service that only serves the community being funded. It is important that any new services follow the routings that were planned as part of the area plans. This ensures that all destinations – CTrain stations, schools, recreation centres, shopping, etc. are served effectively and efficiently and that these routes can continue to operate consistently in the future as the area develops. It is not desirable to provide isolated services based on which developer is willing to fund the service.

Transit Service Funding Challenges and Opportunities

The preceding discussion has identified three areas where continued transit service improvement is needed: 1) achievement of Base service goals for current developed areas; 2) providing new transit service to communities and employment areas that are currently developing or will begin development very soon; 3) expanding PTN service, particularly the Green Line and new transitways currently being designed.

Funding of transit service in Calgary relies on a combination of municipal taxes, transit fares and other revenue mainly from advertising. Council direction calls for Calgary Transit to achieve a Revenue / Cost (R/C) ratio of between 50 and 55 percent. Figure 4 below shows a declining R/C ratio since 2012 as the cost to provide service is increasing at a much faster rate than revenues. Cost increases are mainly attributed to increasing prices for labour, parts, technology, and (until recently) fuel. Also, customer trips have become longer as Calgary continues to expand geographically. Since 2012, the operating cost to provide a single customer trip has increased by 13 percent while the average fare paid by customers has risen by only 9 percent. This gap is increasing despite an average increase in the price of Adult and Youth fares of 12 and 20 percent respectively. During this time, the number of customers using low income fares (low income monthly pass, seniors annual pass) increased from 12 to 14 percent of total customers.

Figure 4



In 2014, a Revised Calgary Transit Fare Strategy and Structure was approved that established clear direction on how fares for various transit customer groups should be set. However, fares for 2015 were approved with no changes in fares paid by low income customers. As well, a sliding scale structure, with additional discounts for low income user fees, including transit fares, was approved conditional on obtaining cost sharing support from the provincial and federal governments. Calgary Transit supports the initiatives to provide economic assistance to low income Calgarians. However, increased use of low income fares is negatively impacting Calgary Transit revenues and the ability to deliver service that meets customer expectations. Additional support from municipal taxes will be required in order for Calgary Transit to deliver approved service levels within its R/C ratio based budget.

In recent years, when the City's operating budget is established during the four year Action Plan process, Calgary Transit submits a request for service funding based on Corporate budget guidelines and the need for additional service hours to address:

- Overloads on routes with high ridership,
- Service reliability (e.g. service delays due to traffic congestion)
- Requirements dictated by transit capital investments (e.g. LRT extensions)
- City expansion (e.g. new communities & employment areas)
- Need to increase the reach of the PTN

Table 4 provides a summary of annual population, operating hours, and ridership since 2005. Due to a variety of factors mainly related to Calgary's highly variable economy, the annual increase in service hours has not been consistent. Service growth has ranged from a reduction in service hours (2012) to a 7 percent growth (2008). Similarly, annual ridership has experienced years of significant growth inter-mixed with modest increases in some years. Meanwhile, Calgary's population grown in a more steady pattern averaging between 2 to 4 percent per year with most of this growth occurring in new communities on Calgary's perimeter where the developed area is expanding at a pace of about 5 square kilometres per year.

Table 4

Transit Service Hours, Ridership & Population

Year	Total Hours	Growth Hours	Percent Growth Hours	Ridership	Percent Growth Riders	Population	Percent Growth Population
2005	2,036,262			81,120,898		956,078	
2006	2,135,326	99,064	5%	86,908,139	7%	991,759	4%
2007	2,264,001	128,675	6%	89,879,577	3%	1,019,942	3%
2008	2,426,266	162,265	7%	94,892,298	6%	1,042,892	2%
2009	2,576,264	149,998	6%	93,597,000	-1%	1,065,455	2%
2010	2,554,766	-21,498	-1%	94,193,800	1%	1,071,515	1%
2011	2,694,766	140,000	5%	96,175,200	2%	1,090,936	2%
2012	2,673,141	-21,625	-1%	101,912,100	6%	1,120,200	3%
2013	2,740,669	67,528	3%	107,492,700	5%	1,149,552	3%
2014	2,796,469	55,800	2%	110,274,500	3%	1,195,194	4%
2015	2,806,469	10,000	0%	109,974,600	0%	1,230,915	3%
Forecast / Action Plan Budget							
2016	2,846,469	40,000	1%	116,000,000	5%	1,245,194	1%
2017	2,911,469	65,000	2%	118,600,000	2%	1,270,194	2%
2018	2,966,469	55,000	2%	120,500,000	2%	1,295,194	2%

Currently, the allocation of funding for new transit service (operating hours) is mainly influenced by demand created by service short comings (i.e., lack of service in a developed area, overloads, service reliability issues) rather than anticipating and keeping pace with city growth and to achieve RouteAhead service goals for improving service quality.

It is suggested that a long term strategy is required to new service requirements over a ten year period based on achieving the established service goals related to:

- Approved growth – plans for new area development
- Alignment with the 10 year capital plan (vehicles and infrastructure)
- Projected ridership levels on major routes
- Base and PTN service goals

Conclusions

To achieve the goals outlined in the MDP, CTP and RouteAhead plans provide transit service goals to support a more sustainable city. Significant and sustained capital and operating investments are required improve the quantity and quality of transit service. Work is currently underway to design and secure capital funding for a major expansion of new LRT and bus capital infrastructure. Goals for improved transit service goals also require improving the access and coverage of Base services and extension of the PTN.

The need for a sustained investment to deliver increased service hours in response to established goals has been identified and must be sustained in order to improve the coverage, frequency and span of transit services. It makes sense to track those attributes in conjunction with the more general goal of achieving 3.7 hours of service per capita over the next 30 years. Measuring the recent progress on expanding Base service levels and the extent of the PTN has

found that increased service hours and extension of CTrain lines during the past five years has resulted in a measureable improvement in the delivery of a Base level of service, particularly during peak hours.

However, continued rapid city growth is resulting in significant areas that have less than ideal service including some new residential and employment areas that have no service. On the horizon are additional areas with approved development plans that will soon need transit service.

Calgary Transit's ability to provide and expand service is impacted by rising costs that are not being offset by increasing revenues from both fares and municipal taxes. Low income fares subsidies are valued at approximately \$20 million annually. The recently approved Fare Structure and Funding policies that establish fare discounting principles should be followed to maintain the targeted revenue / cost ratio. If the value of these fare subsidies could be offset by a dedicated fund, new service growth could be accelerated and fares for other customers could be further stabilized. Other means of funding new services, including offers from land developers to fund introductory service in new communities should be explored and accepted where feasible.

To ensure that service goals for improved transit service are achievable, a ten year strategic plan should be established that identifies service standards and the transit operating hours required to meet the obligations inherent with new community development, new transit infrastructure and responding to ridership growth.

Next Steps:

1. Adopt 'Base' service coverage and PTN length as two additional measures for tracking the progress towards achieving MDP, CTP and RouteAhead goals
2. Review the definition of Base service to determine if there are areas or circumstances where it is not an appropriate goal.
3. Seek an alternate means of funding fare discounts for low income Calgarians so that the Calgary Transit operating budget can be more fully utilized to deliver service.
4. Develop a ten year transit service plan, with annual reviews, that identifies future service levels based on RouteAhead goals for service improvement, capital investment, and city growth.