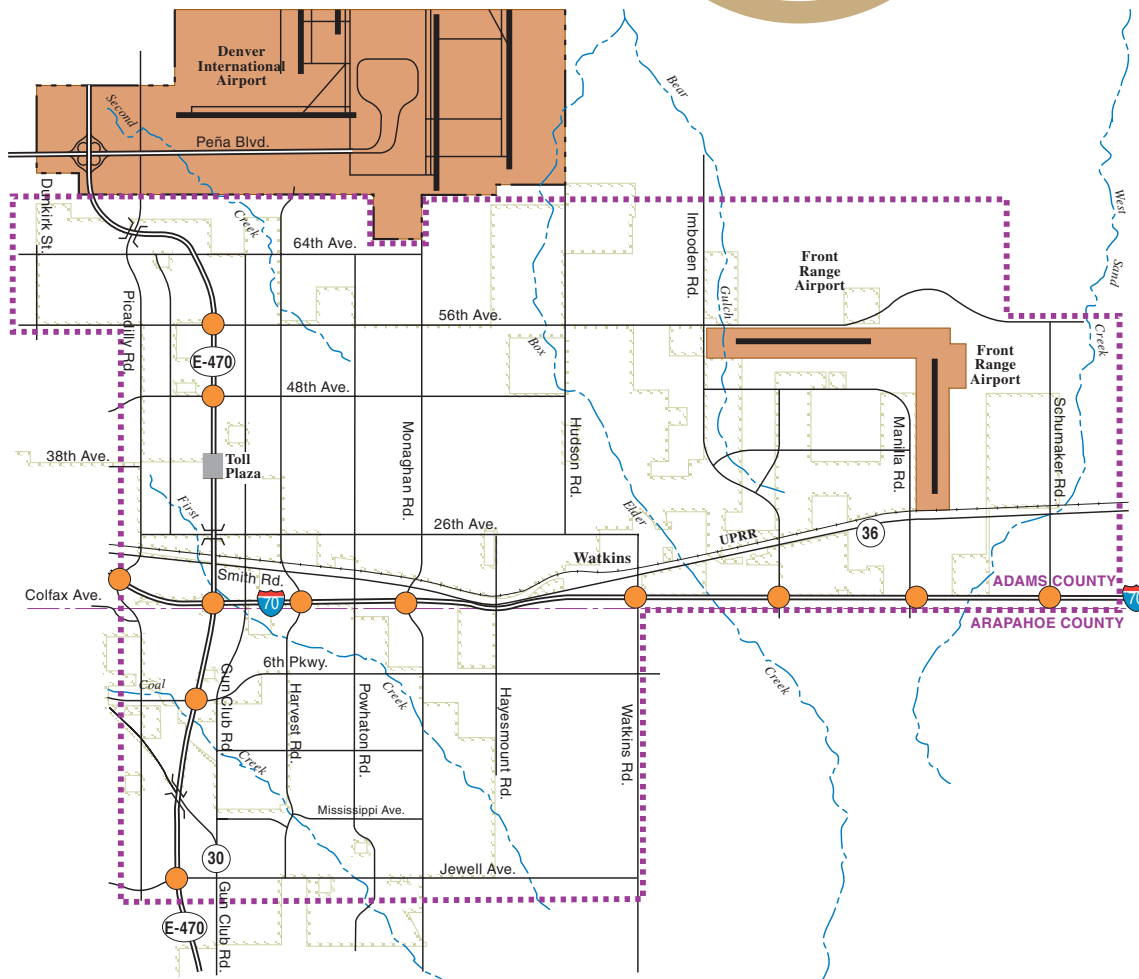


Aurora Northeast Area Transportation Study 2007 UPDATE



FELSBURG
HOLT &
ULLEVIG

engineering paths to transportation solutions

Aurora Northeast Area Transportation Study

ADOPTION DRAFT

AURORA NORTHEAST AREA TRANSPORTATION STUDY

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Northeast Area Transportation Study

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Northeast Area Transportation Study

I. INTRODUCTION

A. *Study Purpose*

The Aurora Northeast Area Transportation Study (NEATS) 2007 Update is intended to support Aurora's Comprehensive Plan relative to transportation planning and provide more insight to the planning and construction of future facilities. The study covers an area north of Jewell Avenue and east of Picadilly Road, and it serves as an update to the original NEATS document prepared in December 1999 by Felsburg Holt & Ullevig. This study was conducted in close coordination with the 2007 update for the Aurora Southeast Transportation Study (SEATS).

The following are addressed in this document:

- ▶ **Existing and Future Land Use Projections.** Since 1999, development potential throughout the study area has changed. Data from the Denver Regional Council of Governments (DRCOG) and estimates of future land use developed by City staff have been considered here for the 2030 time-frame.
- ▶ **Travel Demand Levels for the 2030 Time-Frame.** Long-term forecasts have been developed using the DRCOG regional travel demand model. This model is a version of DRCOG's model with embellishments to better represent certain elements within the NEATS and SEATS sub-area. A single common model was used in preparation of both the NEATS and SEATS effort.
- ▶ **Develop a Multi-Modal Transportation System to Address Roadways, Transit Service, and Trails.** The plan identifies corridors, alignments and interconnections to serve multi-modal needs over the long term.
- ▶ **Define the Physical Arterial Roadway Network to Adequately Serve Year 2030 Travel Demands.** This roadway network identifies the appropriate laneage and classifications for the major roads within the NEATS area. As appropriate, priority road improvements are identified.

B. *Plan Application/Use*

When adopted by the City of Aurora, the transportation system plan becomes an integral part of the City's Comprehensive Plan. The transportation plan will be used to:

- ▶ Serve as the basis for the City to request amendments to the Denver Regional Council of Governments (DRCOG) Regional Transportation Plan.
- ▶ Support requests for project prioritization and funding through the DRCOG Transportation Improvement Program (TIP).
- ▶ Define general public right-of-way needs prior to development. Actual roadway alignments will be subject to City approval in conjunction with site specific development projects through the City's Framework Development Plan process.



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- ▶ Support required cross-section dimensions for street, bikeway, sidewalk, and landscape elements.

Over time, the City will likely need to continue updating various elements of the transportation system plan. This may occur as major land use changes take place or as the result of changing travel behavior. In any event, plan updates should not be required more frequently than every five years.

C. Report Organization

This report depicts a summary of the recommended transportation plan and the steps that led to it. Subsequent sections of the report include:

- ▶ **Existing Conditions** – This section sets the foundation relative to identifying constraints, where development has occurred to-date, and major transportation facilities that are already in place.
- ▶ **Future Conditions** – This section presents the future travel demand estimates and land use information that led to the travel estimates.
- ▶ **Recommended 2030 Transportation System Plan** – This section depicts the NEATS plan with respect to roadways, interchanges, grade-separated crossings, transits elements, trail corridors, and associated grade-separated crossings.



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II. EXISTING CONDITIONS

A. *Location*

The study area encompasses the northeast part of Aurora including nearly 100 square miles of land. **Figure 1** shows the study area which is bounded by 72nd Avenue on the north, Schumaker Road on the east, Jewell Avenue on the south, and Picadilly Road (and Dunkirk Street for the northern reaches) on the west.

B. *Constraints*

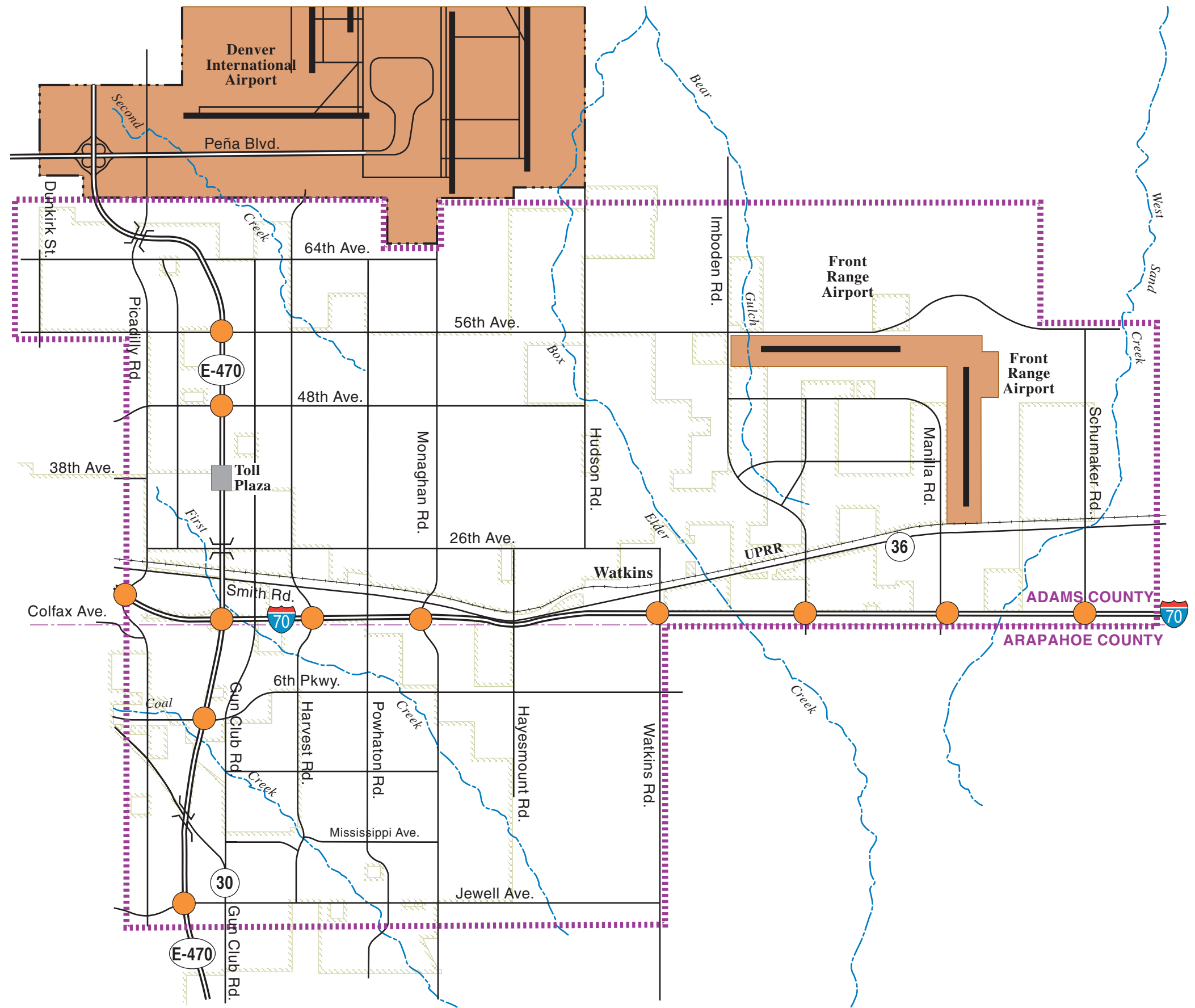
In general, the study area consists of relatively flat plains with moderate topography. However, the development of an interconnected transportation network is significantly affected by several natural and man-made features. Most prominent of the natural barriers are the numerous drainageways crossing the study area primarily in a south to north direction. The major drainages, also shown in Figure 1, generally occur at intervals ranging from approximately 1 to 3 miles. While acting as a constraint to roadway network development, these drainageways serve as excellent locations for trail system development and related amenities.

While regional freeway continuity exists via I-70 and E-470, regional arterial continuity and connectivity is limited. In an east-west direction, only the 56th Avenue corridor has any appreciable continuity between DIA and Front Range Airport. South of the Front Range Airport, 26th Avenue, Sixth Avenue, and Jewell Avenue (4 miles south of I-70) provide some east-west regional continuity within the study area.

In the 12 miles between E-470 and Schumaker Road, there is only one north-south arterial corridor with total continuity through the study area. This corridor is generally located “between” DIA and Front Range Airport along the Imboden Road and the Watkins Road corridors.

The significance of these limited “through” corridors can be an issue in a built-up area when other parallel facilities are not available to serve traffic demands. Facilities with continuity, where no parallel facilities exist, can experience a heavy concentration of traffic and potential congestion.

The Union Pacific Railroad (UPRR) has a track immediately adjacent to Smith Road and generally paralleling, and located between, the 26th Avenue and I-70 corridors. This facility has historically carried approximately 10 trains per day. In addition, the long-range forecast for this rail facility is uncertain. Therefore, the construction of roadways across the UPRR corridor could require significant costs for grade separations if rail activity increases. If rail activity decreases, or is relocated, then simple at-grade crossings with the appropriate signal and gate protection might be the most that would be required. From discussions with Union Pacific, it is anticipated that the level of activity for this rail line will likely increase in the future.



LEGEND

- = Study Area Boundary
- = Interchange
- = Aurora City Limits



North

Figure 1
NEATS Study Area



Northeast Area Transportation Study

While freeways and other access-controlled facilities can increase mobility, freeways can also constrain continuity of perpendicular corridors. Their nature requires grade-separations at all locations where arterial and collector streets either interchange or cross. Thus, I-70 and E-470 also represent significant constraints to the development of an integrated and continuous arterial and collector roadway system.

C. Developed Areas

A substantial amount of development has taken place within the NEATS study area since the last NEATS report in 1999. Specifically the following has taken place:

1. **Murphy Creek.** A golf course and residential uses have occurred within this development located east of Gun Club along both sides of Jewell Avenue.
2. **Cross Creek.** Homes have been built east of Gun Club Road at Sixth Parkway. This development has also included the extension of Sixth Parkway to the east.
3. **Traditions and Adonea.** These residential developments are located next to each other southeast of Sixth Parkway and Harvest Road. Both continue to develop.

Other areas within the NEATS study area are anticipated to develop in the near term (see Future Conditions for more information).

D. Transportation Facilities

The major roadway facilities currently in the study area are described as follows:

- ▶ **I-70** – This is the major east-west freeway that passes through the Denver Metropolitan area. Through the NEATS study area, I-70 contains four through lanes with an interchange at E-470 (which also incorporates a connection to Gun Club Road and Colfax Avenue. Other interchanges are located further east at Aurora Airpark (approximately Monaghan Road), Watkins Road, and Manila Road.
- ▶ **E-470 Tollway** – This is the beltway facility around the eastern half of the Denver Metropolitan area. Within the NEATS Study Area, E-470 aligns north-south in close proximity to Gun Club Road. The beltway is a toll facility with four through lanes and interchanges at 64th Avenue, 56th Avenue, I-70 (which also incorporated a connection to Gun Club Road and Colfax Avenue), Sixth Parkway, and Jewell Avenue. A future interchange is planned at 48th Avenue. SH 30 and 26th Avenue currently cross-over E-470.
- ▶ **56th Avenue** – This is a two-lane arterial road running east-west and serving as a southern employee access to DIA.



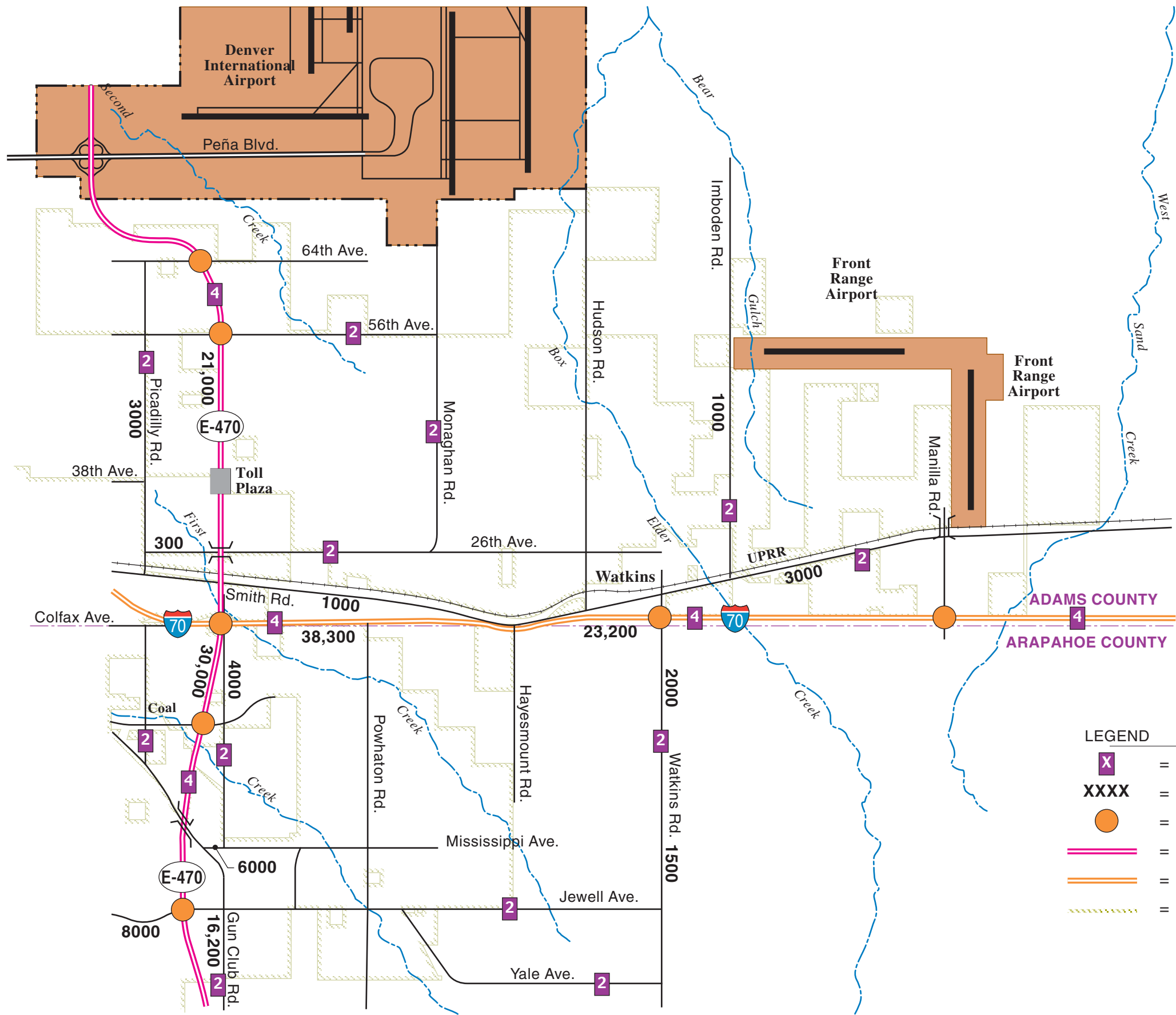
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- ▶ **Gun Club Road** – As Sixth Avenue extends east from Airport Boulevard, it turns south and becomes Gun Club Road at approximately Mississippi Avenue. Currently, this is a two-lane roadway, but ultimately planned to be a four to six lane facility. There is also a three-mile stretch of Gun Club Road north of Mississippi Avenue to Colfax Avenue.
- ▶ **Jewell Avenue** – This facility provides a significant level of continuity to the west extending to Tower Road and becoming Iliff Avenue through Aurora and eventually Evans Avenue through Denver. Within NEATS, Jewell Avenue is unimproved east of Murphy Creek, and it extends as an unimproved roadway to Watkins Road.
- ▶ **Watkins Road** – This roadway provides two paved lanes for traffic south from the Watkins area as far south as Quincy Avenue (within the SEATS study area). With the connection via US 36 near the Town of Watkins, Watkins Road and Imboden Road provide the greatest level of north-south continuity within the NEATS study area.

Figure 2 shows the existing conditions for NEATS roadways. Currently, most roadways within the study area are two-lane roads other than I-70 and E-470 which are both four-lane facilities. **Figure 2** also shows daily traffic volumes for roadways where the data are readily available. I-70 and E-470 carry 30,000 to 40,000 vehicles per day and are by far the heaviest traveled roadways in the study area. Gun Club Road, also SH 30, serves over 16,000 vehicles per day near Jewell Avenue, and Jewell Avenue itself carries around 8,000 vehicles per day. All other roadways in the study area carry far less traffic based on available data.

Transit service is scarce within the NEATS study area. The Regional Transportation District (RTD) currently provides the Gateway Call-n-Ride which runs as far east as Picadilly Road. The RTD service area extends as far east as Box Elder Creek (approximately Hudson Road). However, south of I-70, the RTD district boundary is approximately located in the vicinity of Picadilly Road. Much of the NEATS study area south of I-70 lies outside the current RTD district.

There are no known existing trails within the NEATS study area.



LEGEND

- X** = Number of Through Lanes
- XXXX** = Average Daily Traffic
- = Interchange
- = Tollway
- = Freeway
- - -** = Aurora City Limits

Figure 2
Existing NEATS Roadway Conditions



Northeast Area Transportation Study

III. FUTURE CONDITIONS

A. *Land Use*

One of the key input considerations for the travel demand model includes the magnitude and nature of households and employment by Transportation Analysis Zone (TAZ). Several sources were considered in developing the 2030 land use data to develop travel demand forecasts including:

- ▶ Development proposals and known development planning efforts
- ▶ Forecasted land use data developed by DRCOG for the regional travel demand model
- ▶ Forecasted land use data developed by City staff

All three sources were considered on a TAZ by TAZ basis in developing the NEATS model land use. Most of the data used in this analysis were the DRCOG forecasts with several exceptions including:

- ▶ Transport Area (south of Front Range Airport) – DRCOG employment numbers were reallocated between TAZ's in this area, but totals for the area were in-line with anticipated development levels. At build out (which is anticipated to be post 2030). Transport could generate as much as 140,000 vehicle-trips per day when built out.
- ▶ Various changes to land use were made to areas within the SEATS study area to reflect actual approved development and master plans such as Sorrel Ranch, Pomeroy, High Plains and Southshore.

The Appendix shows the most recent City-approved master development plan areas. The larger master plan areas within the NEATS study area include:

- ▶ Eastern Hills – 15,000 homes
- ▶ Green Valley Ranch East – 9960 homes
- ▶ Murphy Creek – 3840 homes
- ▶ High Pointe at DIA – 1610 acres of mixed use including 2490 homes
- ▶ Horizon City Center – 503 acres of mixed use including 3730 homes

Other developments are also in the process of being approved. Of note is Transport near the Front Range Airport which is planning for 5400 acres of business-related uses. Current plans suggest approximately 7.8 million square feet of office space, 1.6 million square feet of retail space, and 4,500 acres dedicated to various industrial uses. Clearly, the level of development anticipated for the NEATS study area is significant.



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The TAZ map and the associated land use numbers used in this analysis are presented in the Appendix.

B. Roadway Network

A base roadway network was coded into the model, and this is also shown in the Appendix. Embellishments beyond DRCOG's regional 2030 model include:

- ▶ The addition of a north-south four-lane arterial one-half mile east of Picadilly Road between 26th and 64th Avenues.
- ▶ Establishing Gun Club Road as a four-lane facility (north of Jewell) and extending the roadway north to 64th Avenue.
- ▶ Establishing Powhatan Road as a north-south six-lane arterial road from Jewell Avenue up to 64th Avenue.
- ▶ Establishing Colfax Avenue as a four-lane minor arterial between Picadilly Road and Powhatan Road.
- ▶ Establishing four-lane east-west collectors extending from Picadilly Road to Powhatan Road (grade-separated with E-470) between:
 - 64th and 56th Avenues,
 - 56th and 48th Avenues,
 - 48th and 38th Avenues, and
 - 38th and 26th Avenues.
- ▶ Adding an additional through lane in each direction along 56th Avenue from E-470 to Monaghan Road to establish a six-lane arterial facility extending throughout the study area.
- ▶ Extending Alameda Avenue and Mississippi Avenue east of Gun Club Road to Monaghan Road as four-lane minor arterials.

I-70 is represented in the model as a four-lane freeway and the E-470 Tollway is represented as a six-lane freeway with tolls that influence driver decisions on when and where to use the tollway. Major arterial roads represented in the model include Picadilly Road with six lanes, Sixth Parkway with six lanes, 56th Avenue with six lanes, Powhatan Road with six lanes, and Monaghan Road with six lanes.



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C. Travel Demands

Applying the model with the modifications indicated in the previous sections have produced a set of 2030 daily traffic projections that are presented in **Figure 3**. The model used in support of the *I-70/E-470 Interchange Feasibility Study*, with embellishments previously described was used in support of this effort. City planning staff administered the application of the model.

Many of the NEATS study area arterial roadways are projected to carry a significant level of traffic. Roadway segments that are anticipated to see a strong concentration of traffic in 2030 include:

- ▶ **Picadilly Road at I-70.** Ultimately, Picadilly Road will interchange with I-70, displacing the current Colfax Avenue interchange with I-70. As the first interchange west of I-70/E-470 complex and given the relatively dense development planned nearby (southwest of I-70/E-470), this roadway will serve a significant amount of traffic.
- ▶ **Harvest Road at I-70.** With an interchange at this location (first one east of the I-70/E-470 complex), Harvest Road will be an attraction for access to the freeway system. 75,000 vehicles per day are projected onto Harvest Road south of I-70.
- ▶ **Monaghan Road at I-70.** Like Harvest Road, Monaghan Road has the potential to attract a significant amount of traffic due to its potential interchange with I-70. South of I-70, 46,000 vehicles per day are projected.

Beyond these high concentration areas, most of the arterial roads are projected to experience traffic levels in-line with urban environments. Between 20,000 vehicles per day and 50,000 vehicles per day are anticipated along most of the arterial network. Beyond the 2030 time frame, traffic volumes have the potential to increase further as the NEATS area reaches build out.

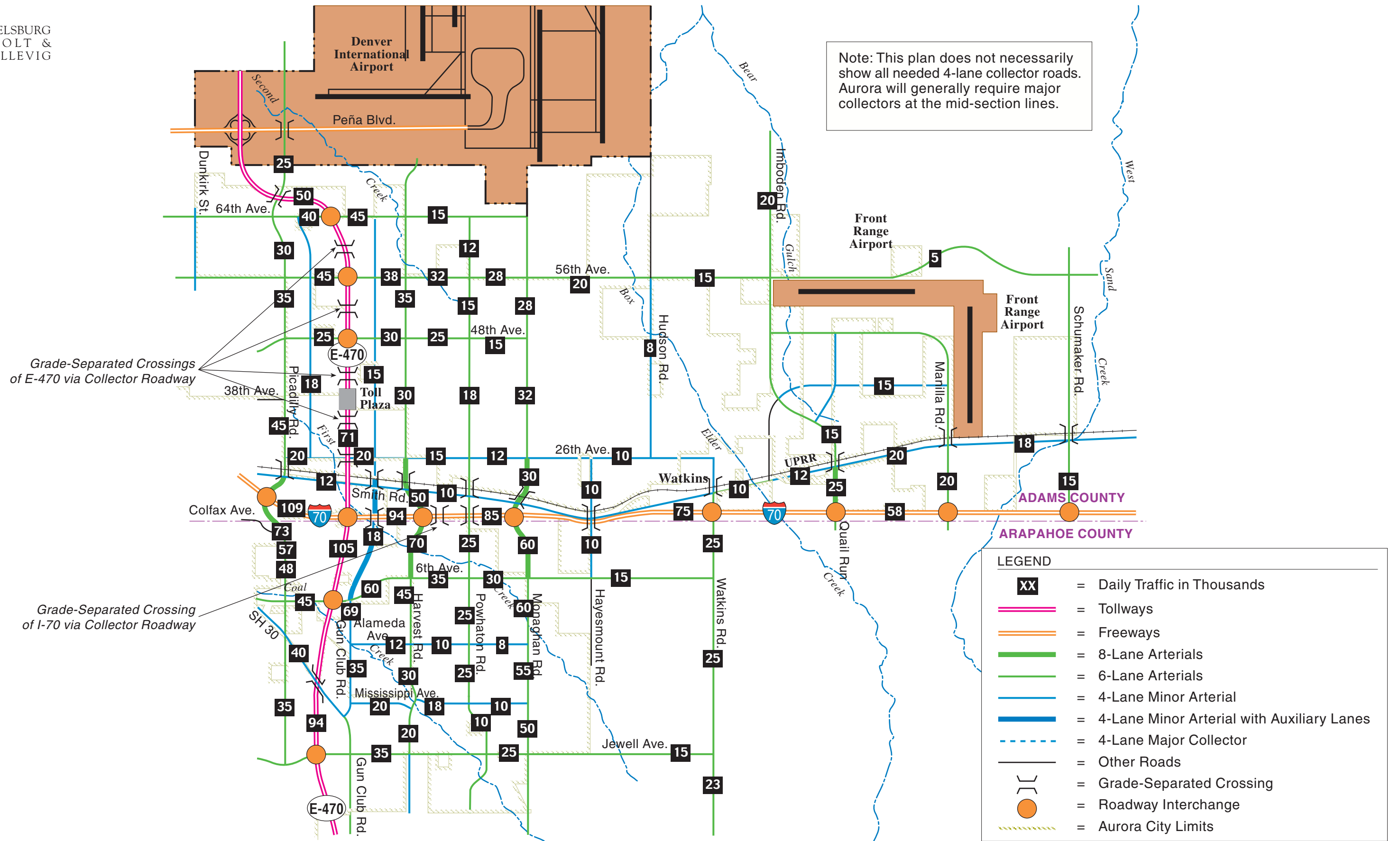


Figure 3
NEATS 2030 Daily Traffic Projections



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IV. RECOMMENDED 2030 TRANSPORTATION SYSTEM PLAN

This section of the report documents the recommended plan for the Aurora Northeast Area Transportation Study. Three primary elements are addressed including roadways, transit service, and trails. The plan is based on travel demand estimated for the year 2030, but many of the plan's components are intended to also accommodate possible conditions beyond the year 2030. As such, there are roadways shown on the plan that may seem to be over-designed in light of the 2030 traffic projections, but the intent is to preserve the option for higher-design capacity for the post-2030 timeframe.

A. *Roadway Network*

The NEATS Roadway Network Plan is shown in **Figure 4**. Several classifications of roadways have been identified ranging from 4-lane collector roads to 8-lane arterials. It is not the intent of this plan to necessarily show all collector roads needed to serve the NEATS area. Current City development standards require collector roads at approximately the half-section lines, so only collectors that are thought to have a role in serving some regional travel needs are shown. All other collector roads would be planned as part of development master plans. Cross-sections for the arterial roads should comply with the latest version of City roadway design standards.

Several interchanges are shown that do not exist today. One along E-470 includes 48th Avenue which is recognized in the E-470 Public Highway Authority future plans. Along I-70, the new interchanges include Picadilly Road, Harvest Road, Monaghan Road (which would replace the existing interchange near the Aurora Airpark area), and Quail Run Road (with a tie to Imboden Road to the north). With I-70 being under the control of CDOT and the Federal Highway Administration, all four of these interchanges will be subject to State and Federal approval procedures including:

- ▶ CDOT's 1601 Policy Directive
- ▶ NEPA Clearance
- ▶ Interstate Access Request

As development patterns generate increases in traffic within the area, the City should constantly monitor development patterns within the NEATS area. Areas of development that should trigger initiation of the interchange approval process include:

- ▶ **I-70/Picadilly Interchange** – A 503-acre mixed-use development, Horizon City Center, should be the impetus for this interchange. The proposed development would be located in the southeast quadrant of I-70/Picadilly.
- ▶ **I-70/Harvest Interchange** – Significant development southeast of I-70/E-470 will accelerate the need for this interchange based on the potential for excessive traffic loadings onto Sixth Parkway at E-470.



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- ▶ **I-70/Monaghan Interchange** – Significant development south of I-70 will accelerate the need for this interchange based on the potential for excessive traffic loadings onto Sixth Parkway at E-470.
- ▶ **I-70/Quail Run Interchange** – The need for this interchange will be driven by the level of growth that takes place with the Transport development project at Front Range Airport.

Planning for the I-70/E-470 interchange has recently taken place via CDOT's 1601 Policy Directive and the NEPA process as represented by the I-70/E-470 Interchange Environmental Assessment (November 2006). The resulting preferred alternative from this process is characterized by the following:

- ▶ E-470 Mainline crossing over I-70 west of Gun Club Road.
- ▶ Direct ramp connections between all four directions of I-70 and E-470.
- ▶ The relocation of Gun Club Road to the east and Colfax Avenue to the south, with both being continuous through the interchange complex.
- ▶ Recognition of future interchanges at I-70/Picadilly Road and I-70/Harvest Road.

Figure 5 shows the preferred alternative for the I-70/E-470 interchange.

Roadway facilities within the NEATS study area are planned to predominantly be six-lane arterials on the section lines. Near the I-70 interchanges, Picadilly Road, Harvest Road, Monaghan Road, and Quail Run Road are proposed to be eight-lane sections given the high forecasted traffic volumes. Quail Run Road is shown to be an eight-lane arterial at I-70 not because of the 2030 traffic loading, but because it is recognized that Transport will not likely be built out by 2030; post-2030 traffic loadings will likely require the eight-lane section.

Figure 4 also shows where grade-separated crossings will be needed. These include all facilities that will cross I-70 and E-470. Also recognized in the plan is the need to grade-separate the heavier traveled roads with the Union Pacific Railroad. Current railroad/roadway guidelines strongly encourage this, especially for new roadway construction. Potentially, an at-grade crossing may be acceptable if it can be clearly demonstrated as to why a grade-separation is impractical. However, this may be a challenge to demonstrate given the traffic increases and the potential greater rail activity in the future. The NEATS plan is showing 11 grade-separated crossings of the railroad line; these improvements represent significant costs, especially in light of the fact that they are located immediately adjacent to a cross-street (Smith Road/US 36). The additional challenge that this poses is the cross-street also needs to be raised or realigned to allow its continued intersection with the north-south roadway. This impacts the roadway/rail crossing's construction cost and the ability of adjacent property to obtain access.

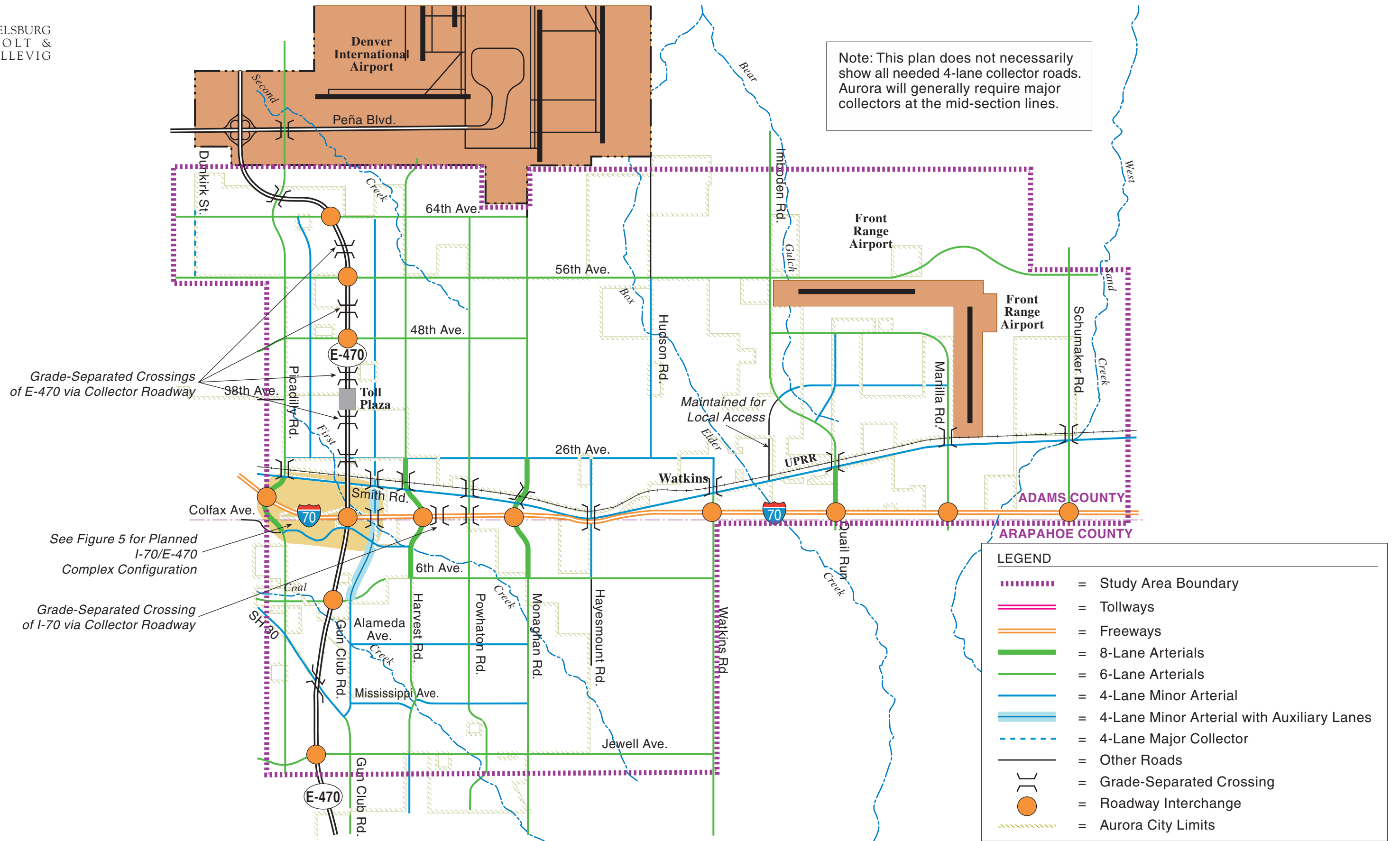


Figure 4
NEATS Roadway Network

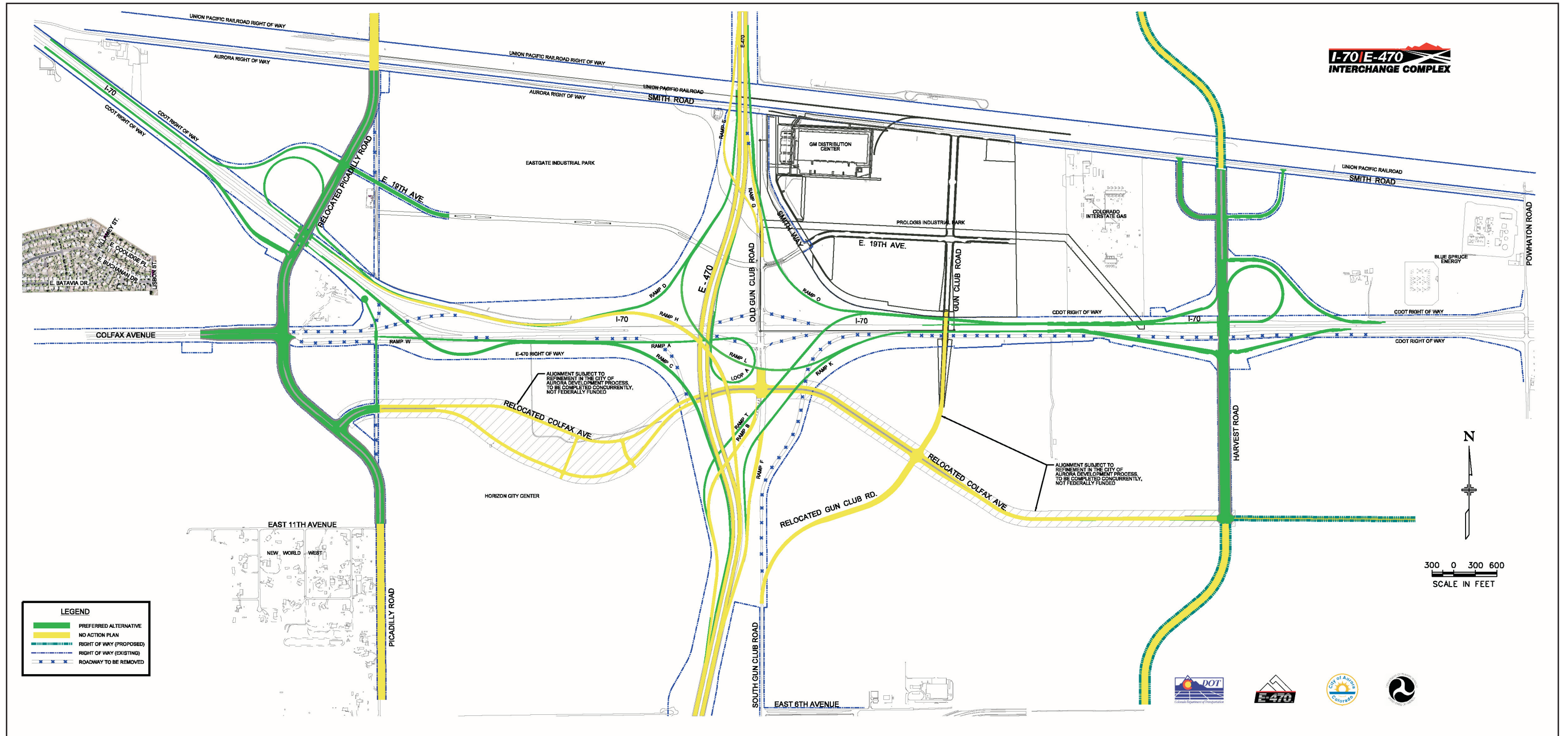


Figure 5

I-70/E-470 Interchange Preferred Alternative



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City street cross-section standards are shown in the City's Roadway Design and Construction Specifications. The City has also recently adopted a set of Urban Street Standards for urban centers and Transit-Oriented Development (TOD) areas. These are not specifically shown in this report, so the reader is referred to the above document. General characteristics of study area cross-sections include:

- ▶ **Six-Lane Arterial** – Three through lanes in each direction, a center median area capable of accommodating two lanes (possibly dual left turn lanes), and 10-foot detached sidewalks along both sides of the roadway. The landscape width between the curb and sidewalk is of adequate width that it could accommodate an additional lane (possibly a right turn lane). An eight-lane arterial would be identical with an additional 24 feet of pavement and right-of-way.
- ▶ **Four-Lane Arterial** – Two through lanes in each direction, a center median area capable of accommodating one lane (possibly a left turn lane), bike lanes along both sides of the street, and 8-foot detached sidewalks along both sides of the roadway. The landscape width between the curb and sidewalk is of adequate width that it could accommodate an additional lane (possibly a right turn lane).
- ▶ **Four-Lane Collector** - Two through lanes in each direction, bike lanes along both sides of the street, and 5-foot detached sidewalks along both sides of the roadway.
- ▶ **Two-Lane Collector** - One through lane in each direction, bike lanes along both sides of the street, parking lanes along both sides of the street, and 5-foot detached sidewalks along both sides of the roadway.
- ▶ **Local** – There are several versions of Local Streets, but they generally include one moving lane in each direction, parking lanes along both sides of the street, and 5-foot detached sidewalks along both sides of the roadway.

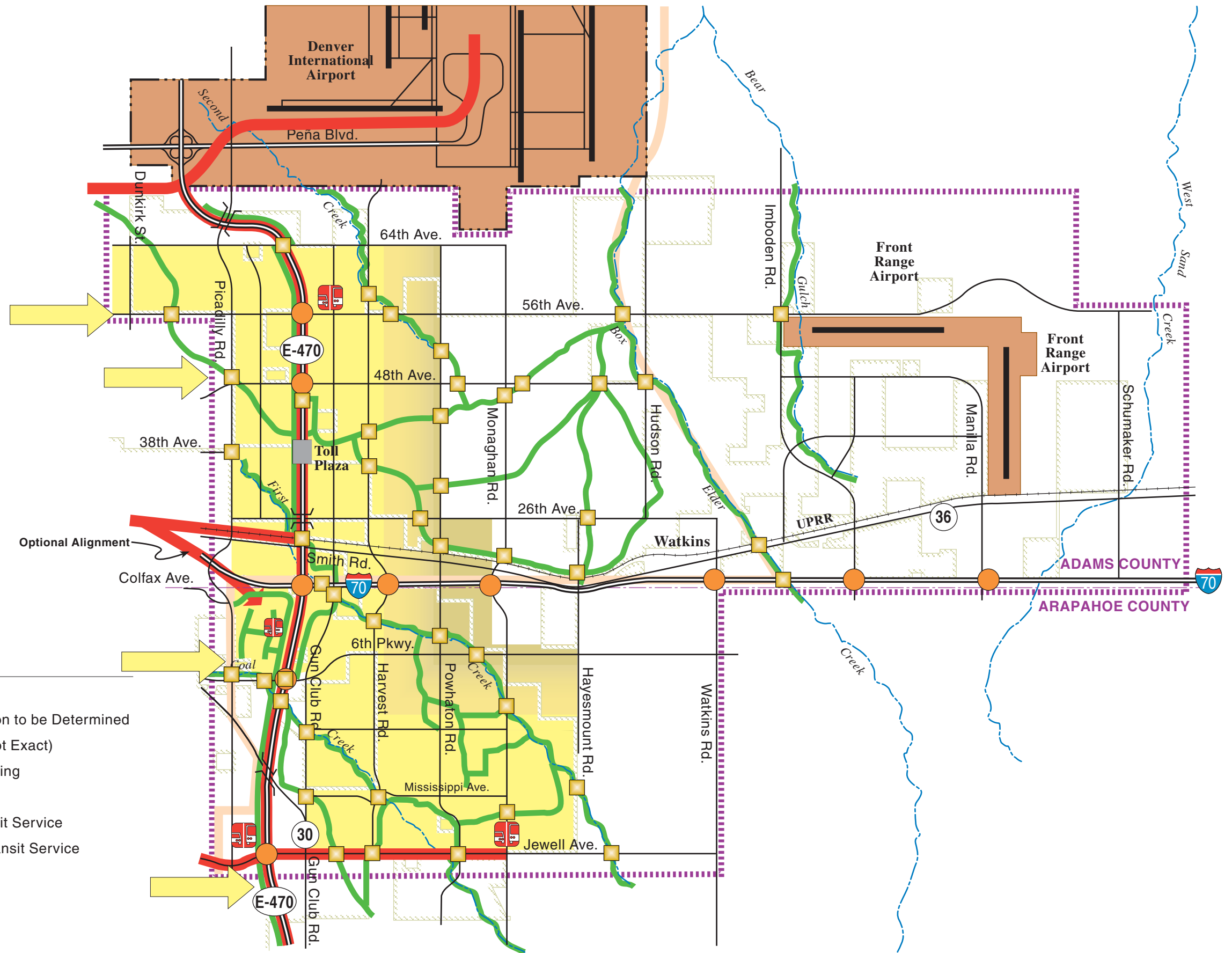
B. Transit and Trails

Transit Service

Both the Transit and Trails elements are shown in **Figure 6**. The transit component defines areas where new transit service should be considered as well as the potential for major transit corridors. Basic bus service provided by RTD should be expanded east as development occurs and conditions warrant. Two levels of expansion have been developed, one which entails regular fixed route service extended from current routes today. This fixed-rate “shading” also covers those areas where development levels might be substantial enough to warrant such service. The other level reflects development being on the fringes of the urbanized area and would entail a less-frequent service such as call-n-ride fixed route peak period service. Potentially, service could also be tied to possible express routes or Sky Ride routes that could utilize E-470. The feasibility of expanding transit service to newly developed areas will need to be determined by RTD on a continuous basis as development occurs.

LEGEND

- = Future Rapid Transit
- = Park-n-Ride; Precise Location to be Determined
- = Trail Corridor (Alignments not Exact)
- = Grade Separated Trail Crossing
- = Current RTD Service Area
- = Fixed Route Suburban Transit Service
- = Limited/Non-Fixed Route Transit Service (Call-n-Ride)
- = Roadway Interchange
- = Study Area Boundary
- = Aurora City Limits



North

Figure 6

NEATS Trails & Transit Components



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RTD service to the NEATS Study area south of I-70 will require an expansion of the RTD service area boundary. Currently, a significant amount of Aurora land areas, including a dozen approved Framework Development Plans, is outside the Regional Transportation District (RTD) boundary. By current state statute, these land areas must go through a petition and election process in order to be annexed into RTD. In addition, only registered electors who reside within the geographic boundaries of the land areas are considered to be “eligible electors” for such an election. Property owners are not eligible to sign the petition or to vote.

The Aurora City Council has supported on-going coordination with developers and property owners to explore the potential of annexing their lands into RTD. Currently, the 2007 State Legislature has approved a bill that amends the state statute regarding the RTD annexation process. House Bill 07-1186 will allow property owners to submit annexation petitions to the RTD Board for joining the RTD and obtaining necessary transit services. This will significantly simplify the process for bringing areas into the RTD service area. This bill was recently signed by the governor.

Park-n-Ride facilities are shown on the plan at strategic cross-street locations including E-470/56th Avenue, E-470/I-70 (which is already planned to be part of the Horizon City Center development), E-470/Jewell, and possibly at Jewell/Monaghan. Exact locations will need to be further assessed by RTD.

Longer-term transit service (post 2030) could potentially include rapid transit. The median within E-470 has been identified for a future rapid transit facility, exact nature unknown at this time. Jewell Avenue and the Smith Road corridor have also been identified for possible rapid transit service extending into the NEATS area from the west. RTD is currently in the early stages of identifying a “Fastracks Two” program for consideration that includes these elements. At this time, the City should ensure that these corridors are preserved for the potential of rapid transit service in the future.

Trails

Planning for the trails element was coordinated with the Parks and Open Space Department’s preliminary concept for long-term development of a trail system within the study area. Trail facilities are planned along E-470 and along major drainageways. Other facilities are also planned that connect those planned along drainageways. On-street bike lanes and sidewalks are currently incorporated in the City’s roadway standards as presented in the previous section. Collector and local roads planned as part of the development will further supplement the trails shown in **Figure 6** via their sidewalk and bike lane components. Updates to the transportation system plan may be warranted as long-range planning for trails in the city continues and the Parks and Open Space Department refines its vision. Readers should consult with the department for the latest plans.

The trails component also shows locations where grade-separated crossings should be provided. These were generally determined through assessing the nature of the trail (regional or local) and of the roadway it crosses. With many of the trails following drainage-ways, another



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consideration in making a determination for a crossing is the nature of the drainageway's crossing of the road. Since the drainage will always cross below the street, a final assessment can be made at the time of design to determine if the marginal cost to also accommodate a trail grade-separation is prudent for a particular location.

C. Plan Improvement Costs

The NEATS Transportation Plan lays out the transportation requirements needed to serve future demands based on forecasted 2030 land uses and beyond. The more significant element of this plan includes the roadway system. Approximated gross unit costs were used and applied to the improvements as a means to develop conceptual-level cost estimates to see the roadway component come to fruition. The following gross unit costs have been used:

- ▶ New/widened Arterial Roadways - \$1.5 million per lane-mile.
- ▶ New/widened Freeway - \$3.5 million per lane mile.
- ▶ New Interchange - \$15 million each.
- ▶ New Rail Road Grade-separated crossing (and Smith Road elevation) - \$7 million each.

Freeway and arterial lane-miles were extracted from the travel demand model for 2005 and for the 2030 time-frames. From this and from the plan shown on Figure 4, the following gross quantities have been estimated:

- ▶ 21 new freeway lane-miles (all E-470, see text)
- ▶ 520 new arterial lane-miles.
- ▶ 8 interchanges (includes I-70/Watkins Road assuming that this would need to be re-built to accommodate increased demands).
- ▶ 10 Grade-separated railroad crossings

From these estimates, the roadway element of the NEATS plan is estimated to cost approximately \$1.0 billion in 2006 dollars. The I-70/E-470 interchange complex alone is estimated to cost \$150 million (but this does include new interchanges at Picadilly and at Harvest) resulting in a total estimated cost of approximately \$1.1 billion. Some of these costs would be invested along E-470 (one interchange and all 21 lane-miles of freeway) which would likely be funded by the E-470 Public Highway Authority. However, there would still be \$1.0 billion that would need to be funded by other entities. This estimate range does not account for additional collector and local roadways that will also need to be constructed as part of individual developments. East-west collector roads extending between Picadilly Road and Powhatan Road, with accompanying grade-separated crossing of E-470, would add an additional \$60 to \$70 million to the total NEATS costs.



Northeast Area Transportation Study

D. Priorities and Funding

The NEATS Plan elements identified in **Figures 4 and 6** are intended to provide a “target” in terms of the direction the City should take in serving long-term travel demands extended out to the year 2030 and beyond. Seeing the plan come to fruition will take time and a variety of funding sources. Priorities will be governed largely by the pattern of development that takes place within the NEATS study area. The development community should take on a portion of the improvements as development occurs, but the City should also look to acquire funding through the DRCOG Transportation Improvement Program (TIP) process for improvement projects that have a strong potential to qualify for federal funding.

One of the critical “categories” of improvements will be the addition of interchanges and overpasses of I-70 and E-470 as development occurs. The need for I-70 interchanges will be driven largely by growth in the NEATS area, particularly adjacent to I-70. In considering an interchange for Harvest Road and Monaghan Road, the ability to construct the same road(s) across the Union Pacific Railroad should be a factor toward weighing the need for the interchange. If a grade-separated crossing of the railroad becomes problematic and the interchange is not critical, then it may not be a priority. Given that there is significant development planned around the I-70/E-470 interchange, provision for an additional freeway access and roadway continuity across the freeways needs to be a priority. Toward this end, establishing continuity along Harvest Road and constructing an interchange with I-70 will be a priority. Additionally, the construction of the Sixth Avenue Parkway across Coal Creek takes on more significance as the areas around I-70 and E-470 develop.

As the Transport area continues to grow, providing for functional access to I-70 will become critical. Provision for a new interchange at Quail Run Road and its alignment into Imboden Road north of I-70 needs to be a priority development within the Transport area.

Development plans are also occurring further north near 56th Avenue and 48th Avenue east of E-470. As the development of this area continues, the widening of 56th Avenue becomes more critical and the establishment of 48th Avenue and its interchange with E-470 becomes key depending on the exact nature of development growth. These too will likely be priorities if this area develops quickly.

As part of assessing needs, traffic impact studies for individual developments should assess a broader study area than typically analyzed in the past. Typically, these types of studies assess roadways and intersections immediately adjacent to a development. In the interest of gaining understanding of a development’s traffic impact to a particular interchange or grade-separated crossing, a traffic study’s analysis area should be expanded at the discretion of City staff. For those developments that are taking place in areas where adequate roadway infrastructure is still lacking, the City may want to adopt a policy requiring “off-site” improvements up-front to ensure adequate transportation facilities are in place.



Northeast Area Transportation Study

As development proceeds, reimbursement for off-site improvements could be offered to the initial developer. The added role of a traffic study for the more remote development proposals would be to identify these up-front off-site improvement needs and begin to set the stage for a phased sub-area transportation plan and identify appropriate funding and phasing. Improvements like interchanges and grade-separated crossings need to be among the off-site improvements considered as part of this process.

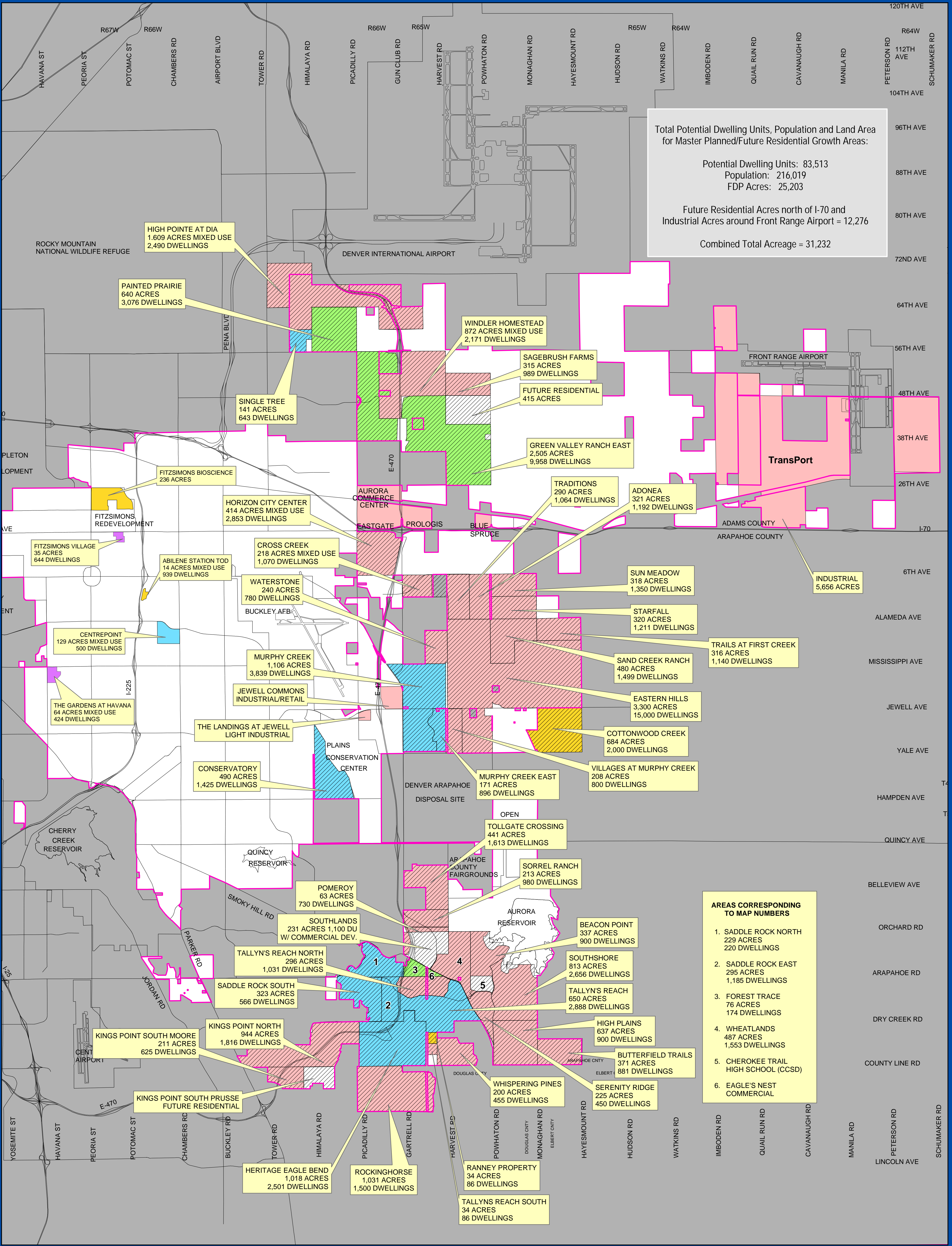
In addition, the City has commissioned the Development Cost Study which will focus in part on identifying development related infrastructure needs and associated funding alternatives. This too could be a part of the solution relative to identifying funding sources for needed transportation projects.



Northeast Area Transportation Study

APPENDIX

**APPROVAL STATUS OF MASTER PLANNED AREAS & FUTURE RESIDENTIAL
GROWTH AREAS, APRIL 2007
TRANSPORTATION ANALYSIS ZONE MAP
2030 LAND USE DATA
2030 MODEL ROADWAY NETWORK
2030 LANE-MILES
GUN CLUB ROAD PLAN & PROFILE
HARVEST ROAD PLAN & PROFILE
IMBODEN ROAD PLAN & PROFILE
PICADILLY ROAD PLAN & PROFILE**



Total Potential Dwelling Units, Population and Land Area for Master Planned/Future Residential Growth Areas:

Potential Dwelling Units: 83,513
Population: 216,019
FDP Acres: 25,203

Future Residential Acres north of I-70 and Industrial Acres around Front Range Airport = 12,276

Combined Total Acreage = 31,232

- AREAS CORRESPONDING TO MAP NUMBERS**
1. SADDLE ROCK NORTH
229 ACRES
220 DWELLINGS
 2. SADDLE ROCK EAST
295 ACRES
1,185 DWELLINGS
 3. FOREST TRACE
76 ACRES
174 DWELLINGS
 4. WHEATLANDS
487 ACRES
1,553 DWELLINGS
 5. CHEROKEE TRAIL HIGH SCHOOL (CCSD)
 6. EAGLE'S NEST COMMERCIAL

Legend

- AURORA
- OUTSIDE CITY LIMIT
- FDP APPROVED 22,248 ACRES
- FDP IN PROCESS 2,955 ACRES
- GDP APPROVED 4,552 ACRES
- APPLICATIONS ANTICIPATED 968 ACRES
- GDP IN PROCESS 99 ACRES
- FUTURE RESIDENTIAL GROWTH AREAS*

* Future Residential Growth Areas reflect a combination of "applications approved", "applications in process" and/or "anticipated" residential development. Actual residential build-out numbers may vary from those shown and would likely decrease.

Approval Status of Master Planned Areas and Future Residential Growth Areas

April 2007

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Transportation Analysis Zone Map

2030 Land Use Data
NEATS/SEATS UPDATE
Land Use Comparison

TAZ	ID	DRCOG LU		2000-2030 Growth*		Comments	NEATS/SEATS Modelling Effort	
		EMP	HH	EMP	HH		EMP	HH
979	30501	300	417				300	417
980	30502	82	197				82	197
981	30505	101	108				101	108
982	30506	1604	4875			Bennett - County capacity	1604	4875
985	30509	416	603				416	603
987	30511	1690	2	4614.4	0	Front Range Airport	1690	2
988	30512	2657	0	1271	0	Front Range Airport	2657	0
989	30513	2315	124	1022.4	13.4	Front Range Airport	2315	124
1218	31303	577	0	518.8	168.2	Too Close to DIA for HH's?	577	0
1220	31305	478	0				478	0
1221	31306	31	0	19.7	0		31	0
1222	31307	708	0	144.7	0		708	0
1223	31308	1565	88	951.3	308.5	High Pointe at DIA	1565	300
1224	31309	792	548	993.5	318.9		792	548
1229	31314	2052	741	1469.9	492	Windler Homestead	2052	741
1231	31316	831	760	908.1	392.8	Windler Homestead	831	760
1232	31317	3297	1248	251.6	72.1	Sagebrush	3297	1248
1233	31318	77	26	5.7	1.5		77	26
1234	31319	279	3				279	3
1235	31320	40	544				40	544
1236	31321	19	59	1.4	3.4		19	59
1237	31322	361	2868	26.6	165.7		361	2868
1238	31323	52	1427	723	1328.5	Green Valley Ranch East	700	1427
1243	31328	58	765	78.1	485.6		58	765
1244	31329	322	2631	24.3	152.2	Green Valley Ranch East	322	2631
1245	31330	74	48	2.7	2.8		74	48
1246	31331	7	0	0	0		7	0
1249	31334	152	547	49.7	145.3		152	547
1250	31335	151	0	44.7	0		151	0
1251	31336	2738	143	3069.1	13		2738	143
1260	31345	1380	225	766.6	0	Prologis	1380	225
1261	31346	189	3	5.2	0	Blue Spruce	189	3
1721	41304	276	0				276	0
1722	41305	6673	0				6673	0
1726	41309	1040	0				1040	0
1727	41310	0	1				0	1
1728	41311	53	1				53	1
1730	41313	0	0				0	0
1817	50409	1150	482				1150	482
1818	50410	2244	1388	1675.5	941.9		2244	1388
1819	50411	116	1749	13.3	463.5		116	1749
1820	50412	85	1219	1.8	194.1	Sky Ranch	85	1219
1821	50413	0	2	0	0.2	Sky Ranch	0	2
1822	50414	0	302	0	75.1	Sky Ranch	0	302
1823	50415	2	23	0	5.8		2	23
1824	50416	35	55				35	55
1825	50417	393	2467			Big TAZ; Centroids.	393	2467
1826	50422	31	73				31	73
1827	50423	32	189	3.9	16.7		32	189
1828	50424	29	524	19.5	84.1		29	524
1829	50425	83	1772	69.2	297.6	Starfall	83	1772
1830	50426	74	1679	66.8	288.1	Traditions and Adonea	74	1649
1831	50427	1480	740	938.3	418.3	Cross Creek	1480	740
1832	50428	71	221	30.9	80.1		71	221
1833	50429	662	238	296.5	179.9		662	238
1839	50435	19	1	7.6	0		19	1
1840	50436	8	31				8	31
1841	50437	9	66	0.1	20.3		9	66
1842	50438	77	1736	79.6	1465.3		77	1736
1843	50439	79	1790	82.2	1511.6	Eastern Hills, Sand Creek Ranch	79	1790
1844	50440	398	3278	81.4	1497.6	Eastern Hills, Trails at 1st Cr.	398	3278
1845	50441	380	3130	77.7	1429.2	Eastern Hills	380	3130
1846	50442	74	1679	77	1416.7	Eastern Hills	74	1679
1847	50443	95	1870	80.2	1477.8	Eastern Hills	95	1870
1848	50444	87	1191	63.3	417	Murphy Creek	87	1191
1849	50445	1	1075	0.6	130.5	Murphy Creek	1	1075
1850	50446	486	597	216.8	286.5	Murphy Creek	486	597
1851	50447	1141	620	497.6	432.9	Jewell Commons	1141	620
1855	50451	670	157	484.6	123.9		670	157
1856	50452	32	1262	24.6	953.8		32	1262
1857	50453	151	3033	106.5	2315.6		151	3033
1858	50454	79	279				79	279
1859	50455	103	1566			State Land Board	103	1566
1860	50456	76	123				76	123
1861	50457	123	333			State Land Board	2378	12800
1862	50459	987	291				987	291
1864	50460	55	146				55	146
1865	50461	60	0	0.1	0		60	0
1866	50462	14	192				14	1150
1867	50463	14	216				14	216
1868	50464	99	1531			Aurora Reservoir	99	1531
1869	50465	56	148			North of Aurora Reservoir	56	148
1870	50466	0	2				0	2
1871	50467	5	0				5	0
1872	50468	81	225			State Land?	81	225
1873	50469	154	1520	478.2	2051.1	Beacon Point, Southshore	154	1520
1874	50470	30	148	11.9	72.1		30	148
1875	50471	146	860	457.7	907.8	Sorrel Ranch, Pomeroy	458	1700
1876	50472	76	262	208.7	256.2	Sorrel Ranch, Pomeroy	208	262
1878	50473	381	1004	3419.7	1502.4	Wheatlands	381	1200
1879	50474	13	137	1403.4	1295.2	Southshore	95	1295
1880	50476	133	212	411.7	279.1	Southshore	412	280
1881	50477	39	250	126.6	344.6	Southshore	127	345
1882	50478	56	153			State Land?	56	153
1883	50479	51	767	144.7	990.8	Southshore, High Plains	51	991
1884	50480	64	466	156.2	523.6	High Plains	64	466
1885	50481	0	2	0.5	1.6	Butterfield Trails	0	1443
1901	50516	21	462	12.6	172.2	Plains Conservation	21	462
1903	50518	2309	670	789.9	410.7		2309	670
2185	51421	112	987	125	981.1	Tallyns Reach North	112	987
2186	51422	208	1403	346.9	752	Tallyns Reach	208	1403
2187	51423	50	1352	116.6	855.7	Tallyns Reach	50	1352
2188	51424	51	315	128.7	154.3		51	315
2198	51434	9	55	0.5	40.3		9	55
2199	51435	39	910	38.6	109.1	Whisper Pines and Eagle Bend	39	910
2209		23	1110			Copperleaf	23	1110
2210		355	1729			Copperleaf	355	1729
2356		170	964	90	861	From Douglas Co	170	964
2357		278	1084	44	1397	From Douglas Co	278	1397
2358		289	419	52	1005	From Douglas Co	289	1005
2359		260	687	90	471	From Douglas Co	260	687

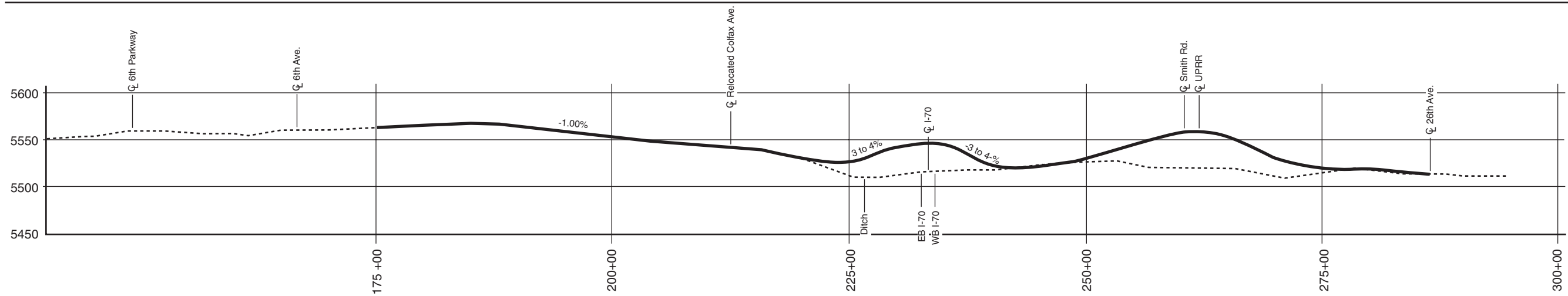
3/15/2006

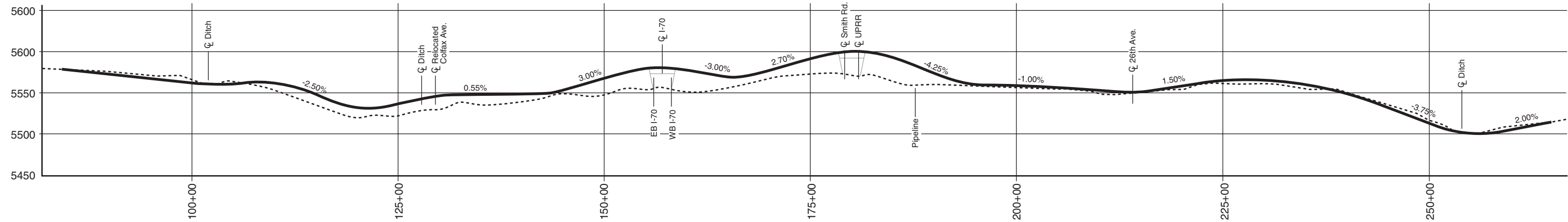
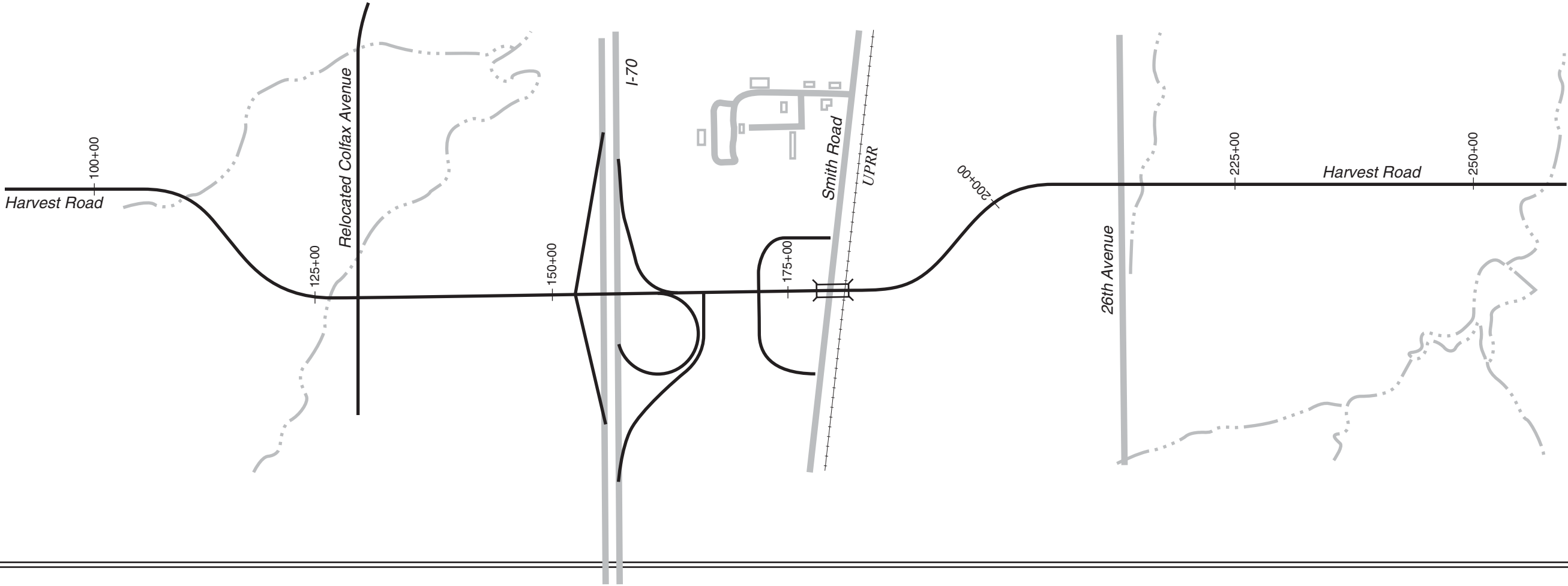
* From City's land use estimation efforts, unless otherwise indicated.

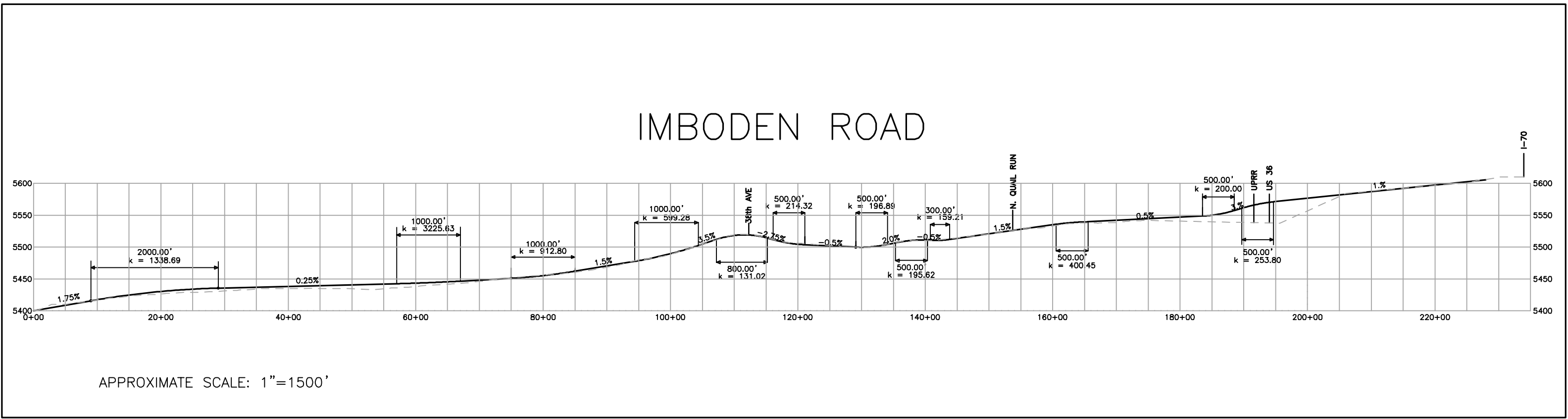
NEATS and SEATS Raw Model Network Lane-Miles

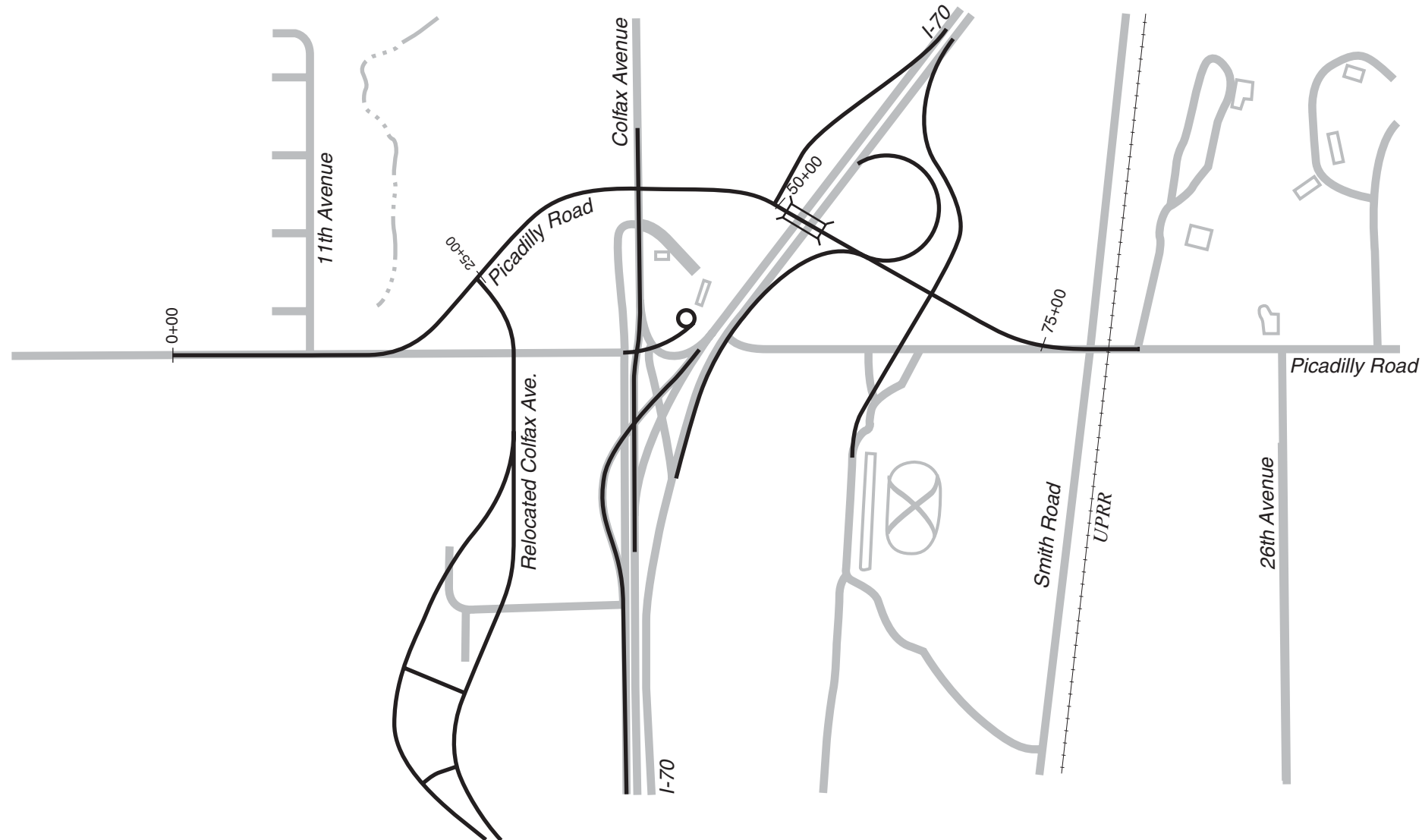
	NEATS		SEATS	
	2005	2030	2005	2030
Facility Type	Lane-Miles	Lane-Miles	Lane-Miles	Lane-Miles
Highway	99.66	120.3	43.44	64.83
Major Regional Arterial	4.18	0	15.72	15.72
Principal Arterial	0	479.86	5.62	228.04
Minor Arterial	67.52	111.7	40.84	35.58
Collector	108.44	83.6	82.58	74.02
Ramp	5.3	13.33	1.89	1.91
Centroid Connector	112.64	119.76	90.7	88.22

6/21/2007

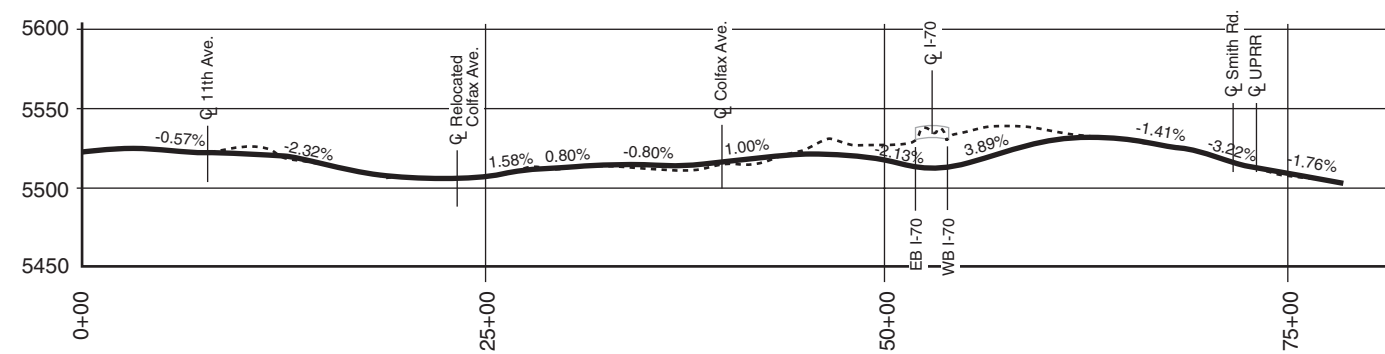








Picadilly Road Profile





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