I-70 / AIRPARK (MONAGHAN ROAD) INTERCHANGE

INTERCHANGE IMPACT FEE STUDY

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Submitted to

Arapahoe County
Public Works and Development
6924 S. Lima Street
Centennial, CO 80112

Submitted by

David Evans and Associates, Inc.
1600 Broadway, Suite 800
Denver, CO 80202

Prepared by

Felsburg Holt & Ullevig
6400 S. Fiddlers Green Circle, Suite 1500
Greenwood Village, CO 80111

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INTRODUCTION

INTERCHANGE PROJECT SUMMARY

Arapahoe County is currently conducting a project focused on approvals and design for safety and capacity improvements needed at the Interstate 70 (I-70)/Airpark interchange, including shifting the interchange approximately 600 feet to the east to match the existing Monaghan Road alignment south of I-70. The project is needed to provide improved access to developing areas south of the interchange.

By shifting the interchange to the Monaghan Road section-line, the project is compatible with both Arapahoe County's and Adams County's long-range transportation plans, which call for Monaghan Road to be a continuous 9-mile arterial roadway corridor from Jewell Avenue on the south to 56th Avenue on the north. Adjacent I-70 interchanges include the Aerotropolis (Harvest) interchange that is under construction nearly 2 miles to the west and the Watkins Road interchange 3 miles to the east. **Figure 1** shows the I-70/Airpark interchange location and the planned roadway network near the interchange.

This project design will be compatible with a future planned extension of Monaghan Road north over the Union Pacific Railroad (UPRR), but the interchange improvements to be constructed with this project will not include that extension. The timing and funding for that future project are unknown and depend on development areas north of the railroad.

Figure 2 shows the conceptual plan for the interchange improvement project that is the subject of this impact fee study. The estimated construction cost based on the recently completed preliminary design is $40 million.

FIGURE 1. FUTURE ROADWAY NETWORK

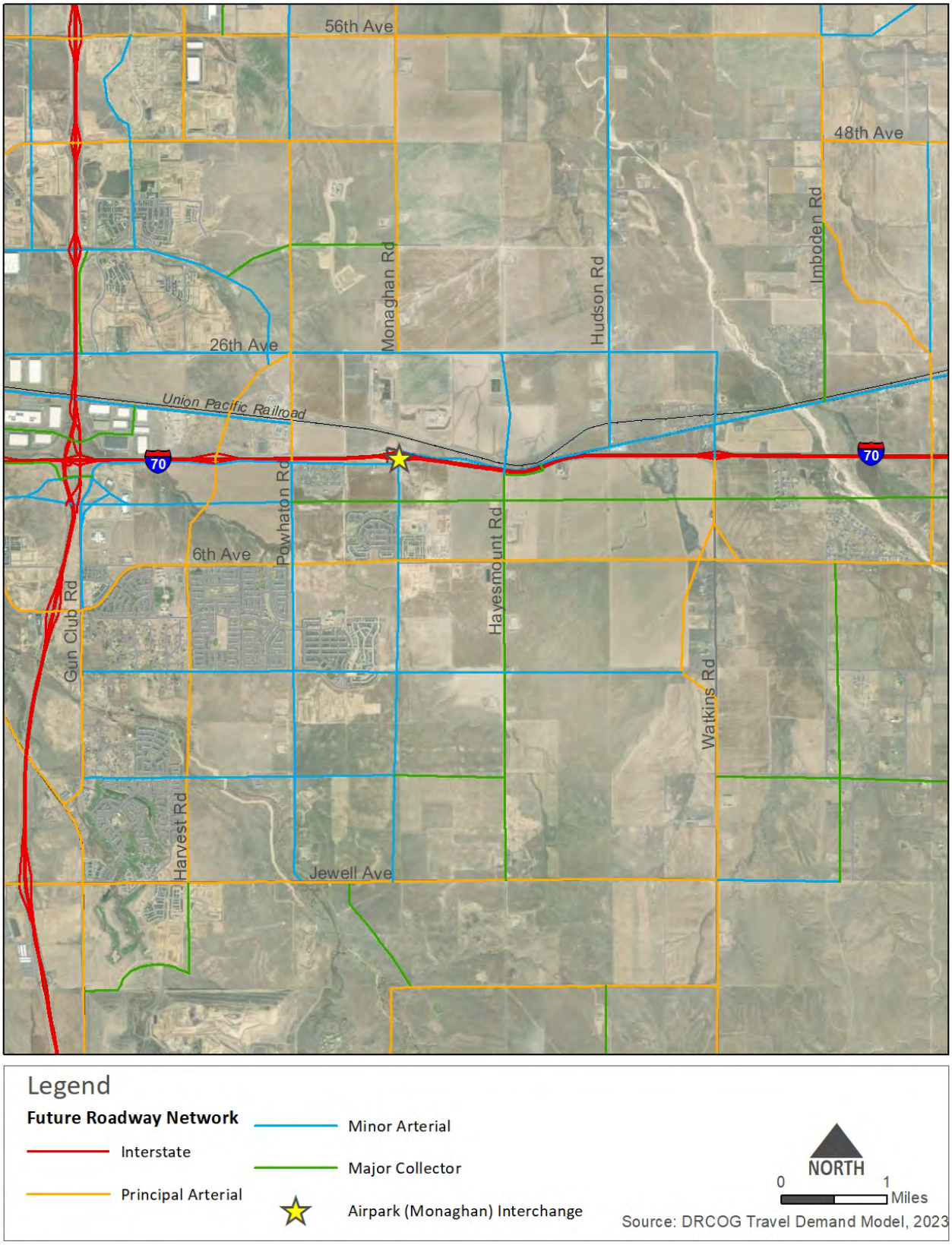


FIGURE 2. CONCEPTUAL AIRPARK (MONAGHAN) INTERCHANGE

IMPACT FEE OVERVIEW

The County has determined that impact fees are the most appropriate primary funding source for interchange improvements. Impact fees are one-time charges assessed on new development based on a standard formula rather than an individual assessment. Impact fees are commonly used to fund growth-related capital improvement projects. Arapahoe County currently collects transportation impact fees on three groups of developments, including a Rural Transportation Impact Fee, Regional Transportation Impact Fee, and Oil and Gas Impact Fee.

This report is intended to establish a nexus between impact fee area development and the interchange improvements, methodology to calculate proportionate fees, and proposed fees that may be imposed on developments that will be primary beneficiaries of the I-70/Airpark (Monaghan) interchange improvements. The impact fee would be established through Board of County Commissioners (BOCC) adoption by resolution.

The following steps are involved in calculating proposed impact fees. Each step is documented in the remainder of this report.

1. **Define Impact Fee Source/Benefit Area**: Identify the development area that will generate traffic using the interchange and will correspondingly be the primary beneficiaries of interchange improvements.
2. **Develop Forecasts**: Prepare forecasts of developments anticipated in the impact fee area.
3. **Allocate Interchange Use/Benefits**: Forecast relative interchange use rates for different parts of the impact fee area.
4. **Define Interchange Costs**: Develop estimates of cost to construct and finance interchange improvements.
5. **Calculate Cost Per Trip**: Calculate the interchange cost per trip generated that can be applied to development.
6. **Develop Fee Schedule**: Develop an impact fee schedule for different land use types based on cost per trip and trip generation estimates for new development.

INTERCHANGE BENEFIT AREA

IDENTIFICATION OF BENEFIT AREA

The project team conducted extensive analysis to determine the most appropriate interchange benefit area for imposition of impact fees.

FOCUS ON THE SOUTH

It was first determined that the impact fee should focus on development south of I-70. This determination was based on the interchange project being solely driven by increased traffic to and from the south. This project will retain only the current connection north of I-70 to CO 36 to the east. It is anticipated that future development north of I-70, in the City of Aurora and in unincorporated Adams County, will drive the need for a Monaghan Road extension across the UPRR and for I-70/Monaghan interchange improvements to accommodate that extension and additional traffic demand to and from the north.

Based on these development expectations, the County has determined that the impact fee targeting the current interchange improvement plans should be assessed only on developments to the south. Conversely, it is expected that Arapahoe County and developments to the south of I-70 would not participate in future interchange improvements or road extension serving development to and from the north.

EAST, WEST, AND SOUTH LIMITS

The project team researched development plans south of I-70 using Arapahoe County and City of Aurora sources and found active or future development as shown on **Figure 3**. The Sky Ranch development south of the interchange is the primary driver of the immediate need for interchange improvements. The ultimate plan for Sky Ranch includes 3,137 dwelling units (DUs) and 2.1 million square feet (SF) of commercial and industrial development, with more than 700 homes already built. Sky Ranch is limited by agreement with Arapahoe County in the amount of development that can be completed before I-70/Airpark (Monaghan) interchange improvements are made, with the development currently nearing that limit. For that reason, the Sky Ranch development is funding the current interchange planning and design project and seeks to create an equitable funding program for interchange construction.

Harmony, Parklands Village, and Tributary developments are also currently active. The Foxridge Farm mobile home park is an existing development. Other development areas shown on **Figure 3** are in the planning stages.

Based on traffic studies analyzing development plans and zoning, forecasted traffic using the interchange, and through multiple BOCC study sessions, the parties determined that the 6-square-mile area shown on **Figure 4** is the most appropriate benefit area for the impact fee. The proposed impact fee area is bounded by Powhaton Road on the west, Hayesmount Road on the east, I-70 on the north, and Mississippi Avenue on the south. This decision was driven by two primary reasons:

- This area will generate traffic to the interchange and most directly benefit from interchange improvements. Developments to the west will benefit more from the I-70/Aerotropolis (Harvest Road) interchange planned for construction in the short-term future. Developments to the east are expected to benefit more from the I-70/Watkins Road interchange. Development south of the proposed impact fee area would be more than 3 miles south of I-70, have many travel route options, and be less direct beneficiaries of the interchange.
- Developments to the west of the proposed I-70/Airpark (Monaghan) interchange are participating in funding of improvements focused on the I-70/Aerotropolis (Harvest Road) interchange. Developments to the east are expected to participate in future improvements to the I-70/Watkins Road interchange. While some trips from developments to the east and west may use the I-70/Airpark interchange, some trips from developments in the proposed I-70/Airpark (Monaghan) interchange impact fee area can be expected to use Aerotropolis and Watkins Road interchanges. It is reasonable to focus the I-70/Airpark (Monaghan) impact fee on the 6-square-mile area that will generate the most traffic and benefit the most from interchange improvements. The traffic analysis showed a significant decrease in traffic contributing to the interchange outside the proposed impact fee area.

FIGURE 3. EXISTING AND PLANNED DEVELOPMENTS

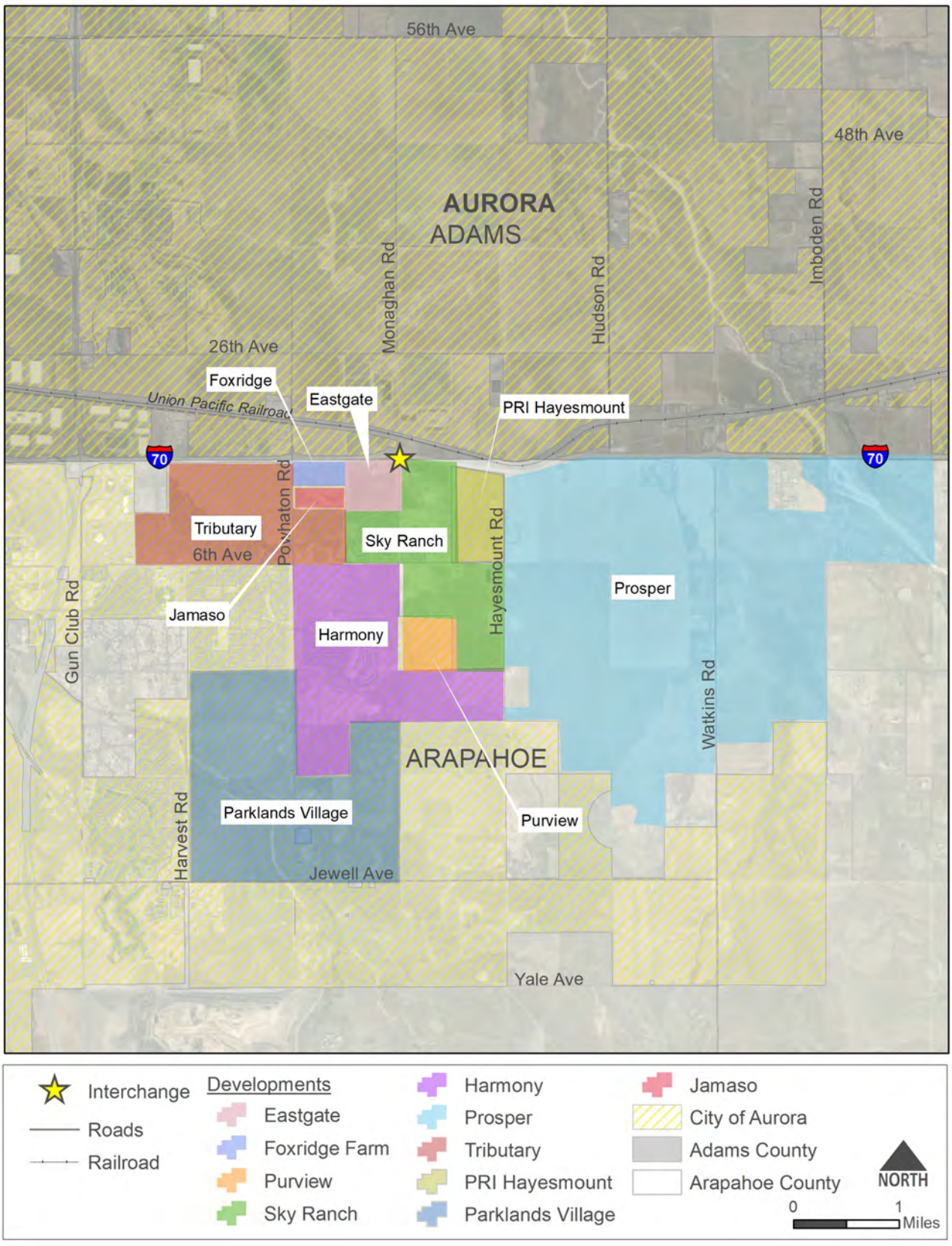
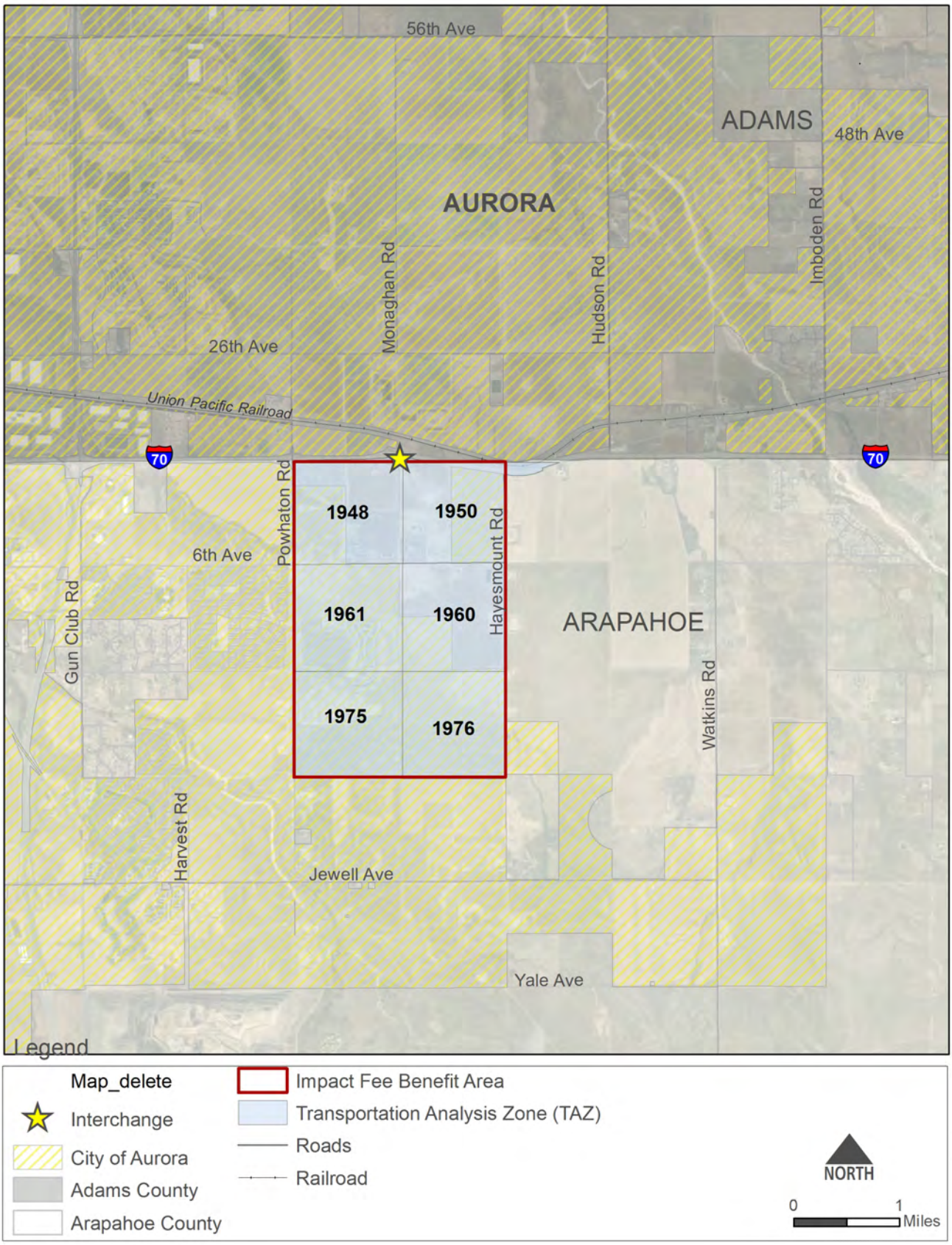


FIGURE 4. TRANSPORTATION ANALYSIS ZONE SYSTEM



DEVELOPMENT FORECASTS

The I-70/Airpark (Monaghan) Interchange project has used the Denver Regional Council of Governments (DRCOG) regional travel model to develop 2050 traffic forecasts for the interchange and surrounding roadway system. Since the DRCOG model is based on population and employment forecasts developed several years ago on a regional basis, the project team developed more refined impact fee area land use forecasts based on actual development plans and local County and Aurora land use plans. These forecasts were used as a replacement for DRCOG forecasts in the six Transportation Analysis Zones (TAZs) shown on **Figure 4**.

Table 1 shows the residential forecasts, and **Table 2** shows the commercial forecasts for individual developments and TAZs within the impact fee area. The impact fee area is projected to have more than 10,000 total DUs in 2050, including more than 3,000 each in Sky Ranch and in Harmony. Sky Ranch and neighboring Eastgate are projected to have the majority of the nearly 2.6 million SF of non-residential development, with 2.1 million and 380,000 SF, respectively.

TABLE 1. IMPACT FEE AREA 2050 RESIDENTIAL DEVELOPMENT FORECASTS

Development	Jurisdiction	TAZ	Units		
			Total	Existing	Future
Sky Ranch	Arapahoe County	Multiple	3,137	712	2,425
		1948	509	509	0
		1950	1,096	203	893
		1960	1,532	0	1,532
Eastgate	Arapahoe County		1,000	0	1,000
		1948	1,000	0	1,000
Tributary	Aurora		580	0	580
		1948	580	0	580
PRI Hayesmount	Aurora		908	0	908
		1948	664	0	908
Purview	Aurora		840	0	840
		1948	840	0	840
Harmony	Aurora	Multiple	3,522	852	2,670
		1961	1,543	852	691
		1975	1,109	0	1,109
		1976	870	0	870
Parklands Village	Aurora		760	0	760
		1975	760	0	760
Impact Fee Area Total			**10,747**	**1,564**	**9,183**

Source: Economic & Planning Systems forecasts

TABLE 2. IMPACT FEE AREA 2050 COMMERCIAL DEVELOPMENT FORECASTS

Development	Jurisdiction	TAZ	Total Sq. Ft.		
			Total	Existing	Future
Sky Ranch	Arapahoe County	Multiple	2,100,000	0	2,100,000
		1950	1,381,000	0	1,381,000
		1960	719,000	0	719,000
Eastgate	Arapahoe County		380,000	0	380,000
		1948	380,000	0	380,000
Cottonwood Creek	Aurora		13,000	0	13,000
		1959	13,000	0	13,000
Harmony	Aurora		100,000	0	100,000
		1975	100,000	0	100,000
Impact Fee Area Total			**2,593,000**	**0**	**2,593,000**

Source: Economic & Planning Systems forecasts

IMPACT FEE CALCULATION

BENEFIT ALLOCATION BY TIER

After the 6-square-mile use/benefit area was established, the project team considered whether differential fees should be assessed for different TAZs within the overall benefit area. Because it was determined that the six TAZs did, in fact, have differential use/benefit levels, the project team established two tiers, with Tier 1 TAZs having the most direct benefit and Tier 2 having substantial but lesser use/benefits. **Figure 5** shows the two tiers that were established. The tiers were established and use/benefits quantified using professional judgment based on proximity and established traffic patterns, along with travel model outputs.

The project team identified the two TAZs immediately adjacent to the interchange as part of Tier 1 due to proximity to the interchange, supported by the relatively high interchange use predicted by the travel model (see discussion of **Table 3**). TAZ 1960 was also included in Tier 1. Since a large majority of traffic from this area on the eastern edge of the metropolitan area is oriented to the west, trips to/from the area east of the interchange are more likely to use the interchange compared with trips to/from the west of Monaghan Road for whom use of the future I-70/Aerotropolis interchange may be a preferred route.

TAZs 1961 and 1975, both west of Monaghan Road, were assigned to Tier 2. Although TAZ 1976 is east of Monaghan Road, it was also assigned to Tier 2 based on its 2-plus-mile distance from the interchange.

The 2050 travel model used to estimate the distribution of trips included the future road network captured on **Figure 1**. The model was used to estimate the number of daily vehicle trips generated from each of the six impact fee area TAZs forecasted to use the interchange. As a regional macro-level tool, the travel model cannot be expected to provide precise results about trips using the interchange. Nuances such as the location of land uses within a TAZ, demographics, specific land use types and trip purposes, and traffic conditions affect travel choices, but the model cannot capture these precisely. However, the model results can provide useful information.

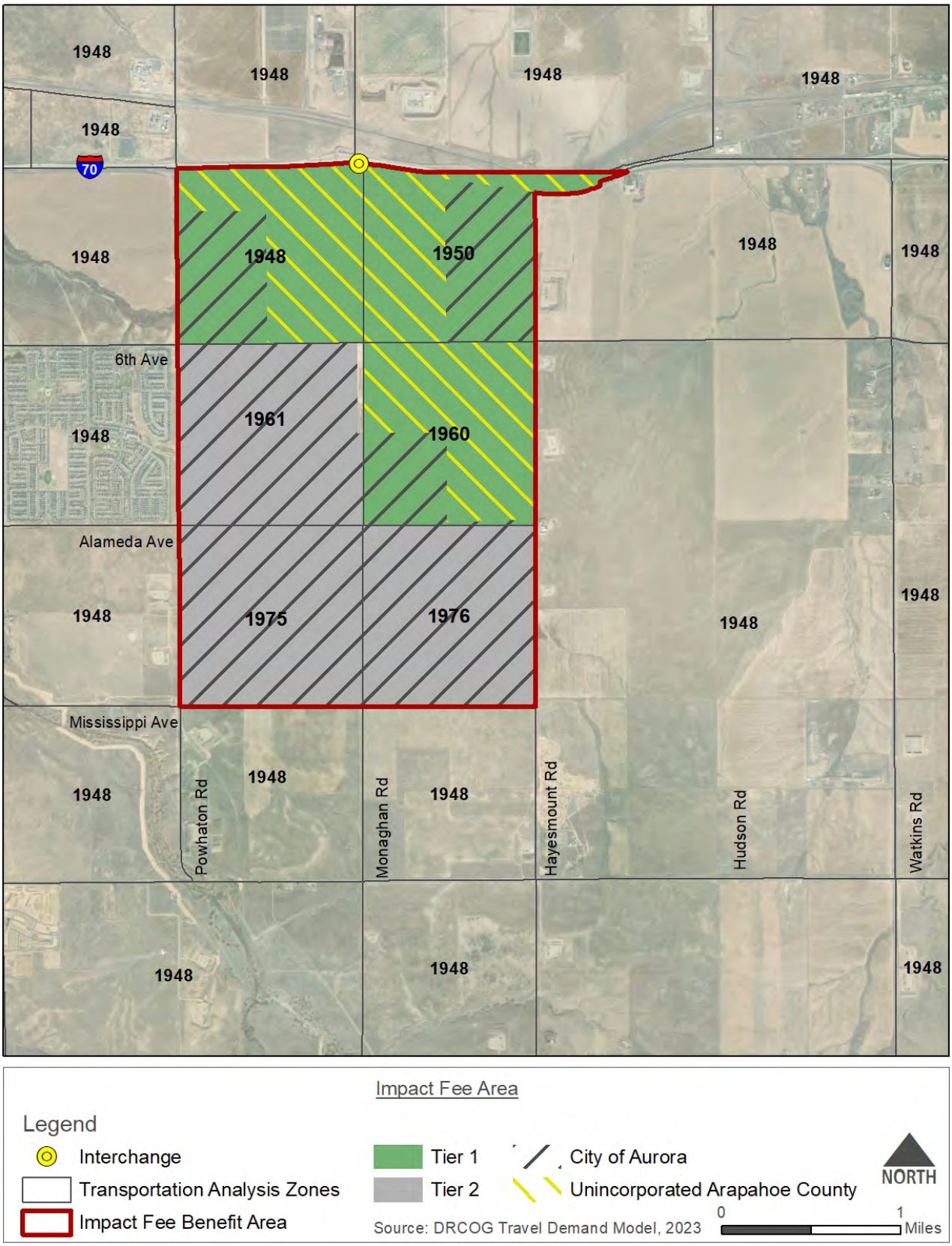
Table 3 shows the number of daily vehicle trips to and from each TAZ projected to use the interchange, specifically one of the four interchange ramps. It also shows the total number of trips forecast to be generated by each TAZ. The last column shows the forecast ramp trips as a proportion of the total trips. These model results generally support the establishment of the two tiers. Although the model did not show trips from TAZs 1961 and 1975 using the interchange, close scrutiny of the model shows that some model "nuances" as described above account for this model result and it is reasonable to include these areas in the Tier 2 fee area.

Table 3 also shows a model estimate of 94.4 percent of trips using the interchange generated from Tier 1 and 5.6 percent generated from Tier 2. These estimates, along with total trip estimates, are used in developing costs per trip and fees as described in later sections of this report.

TABLE 3. 2050 USE OF INTERCHANGE BY TAZ AND TIER

TAZ	Ramp Trips	Total Trips	Ramp % of Trips
1948	10,607	25,520	41.6%
1950	2,445	13,203	18.5%
1960	2,415	15,226	15.9%
Tier 1 Subtotal	**15,467**	**53,949**	**28.7%**
1961	0	10,113	0.0%
1975	0	14,087	0.0%
1976	918	6,235	14.7%
Tier 2 Subtotal	**918**	**30,435**	**3.0%**
Total Ramp Trips	16,385		
Tier 1 % Contribution	94.4%		
Tier 2 % Contribution	5.6%		

FIGURE 5. IMPACT FEE AREA AND TIERS



CONSTRUCTION AND FINANCING COSTS

As stated previously, the estimated interchange construction cost is $40 million based on current unit costs and the recently completed preliminary interchange design. Arapahoe County and the Sky Ranch development are working on the funding details to construct the interchange improvements. The funding option that is being pursued includes using municipal bonding for construction with an estimated cost of $28 million, using a 5 percent interest rate, for the financing costs. Thus, a total cost of $68 million was used to calculate impact fees. Impact fees will be used to help pay for these bonds, and it is anticipated that the adopted impact fee resolution will specify that the impact fee reimbursement cap would be adjusted if more favorable interest rates or faster than expected reimbursement brings actual financing costs below $28 million.

COST PER TRIP

The impact fee is calculated by developing an estimated cost per trip generated by new developments. Trip generation for new developments will be based on the rates provided in the Institute of Transportation Engineers (ITE) Trip Generation Manual for various land use types (as shown in **Table 7, Fee Schedule**). The cost per trip calculation (as shown in **Table 5**) is calculated based on the forecasted trips generated by the regional travel model.

For various technical reasons, the trip generation rates in the ITE Trip Generation Manual may be substantially higher than rates used in the regional travel model. One reason is that Trip Generation Manual rates are based on all trips in and out of development driveways, while the model rates are estimates of trips that only reach the model's major street network. Therefore, to develop an equitable fee that will be based on Trip Generation Manual rates, a "normalization factor" must be calculated and applied to costs per trip. **Table 4** calculates a normalization factor of 70 percent based on an estimate of 2050 impact fee area trips using ITE Trip Generation rates versus regional model trips.

TABLE 4. TRIP FORECAST NORMALIZATION FACTORS

TAZ	Estimated Trip Generation using ITE Trip Generation Rates									2050 Model Trips
	Total 2050 Development Forecasts				2050 Daily Trip Estimates[1]					
	DUs	Retail (1000 SF)	Office (1000 SF)	Industrial (1000 SF)	9/DU[2]	18.5/1000 Sq Ft Retail[3]	10.8/1000 Sq Ft Office)	4.87/1000 Sq Ft Industrial	Total Trips	
1948	3,593	229	51	100	32,337	4,237	551	480	37,604	25,520
1950	1,096	105	709	567	9,864	1,943	7,657	2,722	22,185	13,203
1960	1,532	10	236	378	13,788	1,943	2,549	1,814	20,094	15,226
Tier 1 Subtotal										53,949
1961	1,543	NA	NA	NA	13,887	NA	NA	NA	13,887	10,113
1975	1,869	150	NA	NA	16,821	2,775	NA	NA	19,596	14,087
1976	870	NA	NA	NA	7,830	NA	NA	NA	7,830	6,235
Tier 2 Subtotal										30,435
Subarea Total									121,196	84,384
								Normalization Factor		70%

[1] Source: ITE Trip Generation Manual, 11th Edition

[2] Blended rate assuming approximately 80% single family, 20% multi-family

[3] Blended rate assuming 95% general shopping and 5% higher trip generating uses such as fast food and convenience stores

Table 5 provides calculations of cost per tier, and **Table 6** provides calculations of cost per trip for Tier 1 and Tier 2 based on trip forecasts presented in **Table 3** and the normalization factor calculated in **Table 4**. The results are a $832.88 cost per trip for developments in Tier 1 and $87.63 cost per trip for developments in Tier 2.

TABLE 5. COST BY TIER CALCULATION

Description	Ramp Trips	Factors	Cost by Tier
Total Ramp Trips	**16,385**	**100.0%**	**$68,000,000**
Tier 1 Ramp Trips	15,467	94.4%	$64,190,174
Tier 2 Ramp Trips	918	5.6%	$3,809,826
Totals	**16,385**	**100.0%**	**$68,000,000**

TABLE 6. COST PER TRIP CALCULATION

Description	Total Trips	Cost	Cost per Trip
Total Cost	**NA**	**$68,000,000**	**NA**
Tier 1 Cost Per Trip Calculation	53,949	$64,190,174	$1,189.83
Tier 2 Cost Per Trip Calculation	30,435	$3,809,826	$125.18
Tier 1 Cost Per Trip Normalized (x 0.70)	NA	NA	**$832.88**
Tier 2 Cost Per Trip Normalized (x 0.70)	NA	NA	**$87.63**

FEE SCHEDULE

Table 7 shows the resulting fee schedule for eight common land uses in Tier 1 or Tier 2 zones. Fees are shown per DU for residential uses and per 1,000 SF for other uses. Daily trip rates are from the standard national trip generation source, the ITE Trip Generation Manual. ITE Trip Generation Manual surveys find that many retail trips are not "primary" trips but represent people stopping at a store on the way to and from primary destinations (for example, a stop at a convenience store on the way from home to work). For that reason, the trip rates for the three retail categories represent primary trips based on survey data presented in the ITE Trip Generation Manual.

TABLE 7. FEE SCHEDULE

Land Use Type (ITE Category)	Unit	Daily Trips[1]	Tier 1 Cost/Trip	Tier 2 Cost/Trip	Tier 1 Fee	Tier 2 Fee
Single Family (210)	Dwelling	9.43	$832.88	$87.63	$7,854	$826
Multi-Family (220)	Dwelling	6.74	$832.88	$87.63	$5,614	$591
Retail (820)	1000 Sq. Ft.	15.54[2]	$832.88	$87.63	$12,943	$1,362
Convenience Store w/Gas (945)	1000 Sq. Ft.	99.87[3]	$832.88	$87.63	$ 83,180	$8,752
Fast Food Restaurant (934)	1000 Sq. Ft.	140.24[4]	$832.88	$87.63	$ 116,803	$12,289
Office (710)	1000 Sq. Ft.	10.84	$832.88	$87.63	$9,028	$950
Industrial (110)	1000 Sq. Ft.	4.87	$832.88	$87.63	$4,056	$427
Mini-Warehouse (151)	1000 Sq. Ft.	1.45	$832.88	$87.63	$ 1,208	$127

[1] Source: ITE Trip Generation Manual, 11th Edition

[2] Based on average 42% primary trips from ITE Trip Generation Manual, 11th Edition

[3] Based on average 16% primary trips from ITE Trip Generation Manual, 11th Edition

[4] Based on average 30% primary trips from ITE Trip Generation Manual, 11th Edition

REVENUE ESTIMATES

Arapahoe County, or other appropriate jurisdiction, will collect the impact fee at the time of the building permit. The amount of impact fee revenue that will actually be collected depends on various factors, including development quantities, specific land use types, and distribution of Tier 1 and Tier 2 development. However, an estimate has been developed based on the 2050 land use forecasts presented previously and reasonable assumptions about the mix of land uses, including single family versus multi-family residential and types of retail development. **Table 8** shows the revenue estimates by TAZ and jurisdiction with full build of the 2050 development forecasts presented previously.

The total revenue estimate is approximately $63 million. Again, it should be emphasized that actual revenue by 2050 may be substantially lower or higher depending on the actual quantities, mix, and location of land uses. However, it is noted that this $63 million estimate is $5 million short of the total cost target of $68 million. A primary reason for this shortfall is that the fee is calculated on ***total*** 2050 forecasted land use and trip generation, but impact fees can be assessed only on ***new*** development. Existing land uses, primarily existing phases of the Sky Ranch Development and Foxridge Farm, make up roughly 5 percent to 10 percent of total 2050 traffic but they are not subject to impact fees.

Table 8 shows that approximately $45.4 million of the revenue would come from developments in unincorporated Arapahoe County and $17.5 million from developments in Aurora.

The primary sources of the estimated $45.4 million impact fee revenue from the unincorporated county would be Sky Ranch with an estimated $33.9 million and Eastgate with an estimated $11.5 million. The development sources of the estimated $17.5 million revenue from Aurora would include contributions from several developments, including PRI Hayesmount, Tributary, Purview, and Parklands Village.

TABLE 8. REVENUE ESTIMATES BY TAZ AND JURISDICTION

Tier	TAZ	Unincorporated Arapahoe County				Aurora				Unincorp. Revenue	Aurora Revenue	Total Revenue
		DUs	Retail (1000 SF)	Office (1000 SF)	Industrial (1000 SF)	DUs	Retail (1000 SF)	Office (1000 SF)	Industrial (1000 SF)			
1	1948	1,000	229	51	100	580	NA	NA	NA	$11,460,000	$4,425,000	$15,885,000
1	1950	893	105	709	567	908	NA	NA	NA	$16,874,000	$7,131,000	$24,005,000
1	1960	1,532	105	236	378	840	NA	NA	NA	$17,055,000	$2,884,000	$19,393,000
2	1961	NA	NA	NA	NA	691	NA	NA	NA	NA	$555,000	$ 555,000
2	1975	NA	NA	NA	NA	1,109	150	NA	NA	NA	$1,037,000	$1,037,000
2	1976	NA	NA	NA	NA	1,869	NA	NA	NA	NA	$1,500,000	$1,500,000
TOTAL										**$45,389,000**	**$17,532,000**	**$62,922,000**