Exhibit B

# CITY OF COMMERCE CITY
# 2022 ROAD IMPACT FEE UPDATE

Commerce CITY

## Final Report

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# 1. INTRODUCTION

## 1.1 OVERVIEW

This study provides an update to the City of Commerce City (C3) Road Impact Fee. The original Road Impact Fee study was completed on June 11, 1999 and the ordinance was adopted on August 21, 2000. One of the provisions of the ordinance is that the fees should be updated every three years. In 2004, Public Works updated the road impact fee report, but City Council decided not to increase the fees at that time. Despite significant increases in population and construction cost escalations, the 2000 road impact fees are still used today. Since 2000, the City's population has nearly tripled from 21,084 people to 62,400 people in 2020. This increase in population has placed large demands on the City's roadway infrastructure, particularly in the Northern Range. The road impact fee originally only applied to the Northern Range growth area of the City and was designed to recover the net costs of expanding the City's arterial roadway system to accommodate traffic impacts of new development in this area. With the increase in capital costs over time, the current fee only generates 30 percent of the fee needed to construct capacity-expanding roadway projects.

This update includes a revised fee for the Northern Range study area and a new fee for the Core City. The basic methodology from the 2004 study was maintained in this update. The updated 2021 road impact fees for the Northern Range are compared with the 2000 fees in Table 1 below. This update incorporated 31 land use types that C3 Public Works staff anticipate could be developed within the City. Over time, many land uses have been added, removed, or modified in the *Institute of Transportation Engineers*' (*ITE*) *Trip Generation Manual (10th Edition)*, so Table 1 shows the fee changes for major land use types that are comparable with the 2000 fees. A complete updated fee schedule for the Northern Range is provided in Table 12 of this report. A list of fees for the Core City is provided in Table 13. The updated fees in the Northern Range are higher than the current fees, although the rate of increase should not be unexpected, given that it has been 21 years since the impact fee study was last updated. Overall, the school and service land uses see more increase in fee than residential, industrial and office land uses.

*Table 1: Existing and Proposed Road Impact Fees*

| ITE Land Use Code | | Unit | 2000 Impact Fee | 2021 Impact Fee | Change |
|---|---|---|---|---|---|
| Industrial | | | | | |
| 110 | General Light Industrial | 1000 Sq. Ft. | $1,146 | $3,393 | 196% |
| 150 | Warehouse | 1000 Sq. Ft. | $595 | $1,067 | 79% |
| Residential | | | | | |
| 210 | Single-Family Detached Housing | Dwelling Units | $1,181 | $4,842 | 310% |
| 220/221 | Multifamily Housing (Avg of low- and mid-rise) | Dwelling Units | $726 | $2,459 | 239% |
| Lodging | | | | | |
| 310 | Hotel | Rooms | $674 | $2,935 | 336% |
| Institutional | | | | | |
| 520 | Elementary School | 1000 Sq. Ft. | $656 | $5,032 | 667% |

| | | | | | |
|---|---|---|---|---|---|
| 560 | Church | 1000 Sq. Ft. | $770 | $2,402 | 212% |
| 565 | Day Care Center | 1000 Sq. Ft. | $3,701 | $13,076 | 253% |
| Office | | | | | |
| 710 | General Office Building | 1000 Sq. Ft. | $1,741 | $5,642 | 224% |
| 720 | Medical-Dental Office Building | 1000 Sq. Ft. | $4,279 | $16,965 | 296% |
| Retail | | | | | |
| 820 | Shopping Center | 1000 Sq. Ft. | $3,198 | $10,446 | 285% |
| Services | | | | | |
| 912 | Drive-in Bank | 1000 Sq. Ft. | $5,250 | $32,595 | 521% |
| 932 | High-Turnover (Sit-Down) Restaurant | 1000 Sq. Ft. | $3,325 | $27,296 | 721% |
| 934 | Fast-Food Restaurant with Drive-Through Window | 1000 Sq. Ft. | $4,909 | $40,067 | 716% |
| 943 | Automobile Parts and Service Center | 1000 Sq. Ft. | $1,636 | $6,328 | 287% |

Note: The complete updated fee schedule for the Northern Range is in Table 12. The complete updated fee schedule for the Core City is in Table 13.

## 1.2 DEMOGRAPHICS

C3 has experienced very rapid growth since the year 2000. Their population has grown from 21,084 in 2000 to 62,400 in 2020[1]. The Denver Regional Council of Governments (DRCOG) estimates C3 is projected to grow faster than the region, to an estimated population of 71,600 by 2035[2].

According to the current *City of Commerce City Transportation Plan* (2010), and consistent with development since the *Transportation Plan* was adopted, most of C3's development potential is in the northern part of the city. As of 2010, the Northern Range service area had residential development potential for approximately 48,400 new housing units at full buildout. Table 2 summarizes the Northern Range potential for new residential and non-residential developments by planning area, as outlined in C3's 2010 *Transportation Plan*. Table 3 summarizes the Core City potential for new residential and non-residential developments as outlined in C3's 2010 *Transportation Plan*.

*Table 2: New Residential and Non-residential Development Potential in the Northern Range[2]*

| Planning Area | Potential Residential Acreage (ac.) | Potential New Housing Units | Potential Business and Industry Acreage (ac.) |
|---|---|---|---|
| Irondale | 121 | 822 | 1,037 |
| Northern Range | 3,525 | 18,759 | 1,396 |
| E-470 Influence Area | 1,316 | 7,135 | 3,818 |
| DIA North | 4,066 | 21,698 | 7,142 |
| Service Area Total | 9,028 | 48,414 | 13,393 |

[1] U.S. Census Bureau estimate. https://data.census.gov/cedsci/profile?g=1600000US0816495
[2] *City of Commerce City Transportation Plan, 2010.*

*Table 3: New Residential and Non-residential Development Potential in the Core City*[3]

| Planning Area | Potential Residential Acreage (ac.) | Potential New Housing Units | Potential Business and Industry Acreage (ac.) |
|---|---|---|---|
| Historic City | 39 | 861 | 2,496 |

Between 2010 and 2017 approximately 2,700 single family dwelling units and 400 multifamily units were constructed. Between 2018 and 2021, the rate of residential construction has varied considerably. In 2018 and 2019, 800 and 700 single family dwelling units were constructed each year, respectively. In 2020, during the start of the COVID 19 pandemic, rates of residential construction skyrocketed to nearly 1,000 single family dwellings and over 600 multifamily units in one year. In 2021, rates of residential construction leveled off at approximately 1,100 units. Reducing the 48,400 potential new housing units identified in 2010 by approximately 7,300 dwelling units constructed between 2010 and 2021, results in a potential of 41,100 additional dwelling units that could be built in the future. Assuming an average rate of 1,200 units per year into the future, residential build out of the Northern Range could be expected to occur around 2056.

## 1.3 SERVICE AREA

### NORTHERN RANGE

The service area is the geographic area within which the impact fees are collected and spent. C3 currently applies road impact fees in the "Northern Range" growth area. Its boundaries are generally from the South Platte River to the west, Watkins Road to the east, the city limit boundary with Brighton to the north, and the Wildlife Refuge boundary and boundary with Denver to the south. As mentioned in the above section, this area experiences the greatest infrastructure needs since most of the City's growth occurs within these boundaries. Figure 1 depicts the Northern Range impact fee service area, which has changed slightly since the 2004 update. Some properties along the Platte river have been annexed into Thornton and as a result have been removed from the study area. A detailed service area map is included in Appendix A.

### CORE CITY

During this update it was noted that no fees are currently collected in the Core City. Based on discussion with City Council, the Core City was included as a new service area in this update. The Core City boundaries are generally from the South Platte River to the west, Wildlife Refuge boundary to the east, 80th Avenue to the north, and the city boundary with Denver to the south. Figure 2 shows the Core City impact fee service area. A detailed service area map is included in Appendix A.

### FUNDED ROADS

Besides the geographic area, a road impact fee system should also define the major roadway system that is to be funded with the impact fees. The City's current road impact fees are based on the cost of City-owned arterial roadways. The arterial street system forms an integrated network and is designed to move traffic long distances. While the road impact fee will only be used to fund improvements to the arterial road system, the Northern Range area is divided into three benefit districts due to the large size. A benefit district is an area where fees are collected and earmarked for expenditure. Highway 2 and Picadilly Road (shown as dashed lines in Figure 1) are used as the boundaries between benefit districts for the Northern Range area.

[3] *City of Commerce City Transportation Plan, 2010.*

The Core City is smaller in size and therefore, is not broken into multiple benefit districts. The road impact fees in the Core City are also based on the City-owned arterial roadways and the road impact fee will only be used to fund improvements to arterial roads in the Core City area.

*Figure 1: Northern Range Road Impact Fee Service Area*

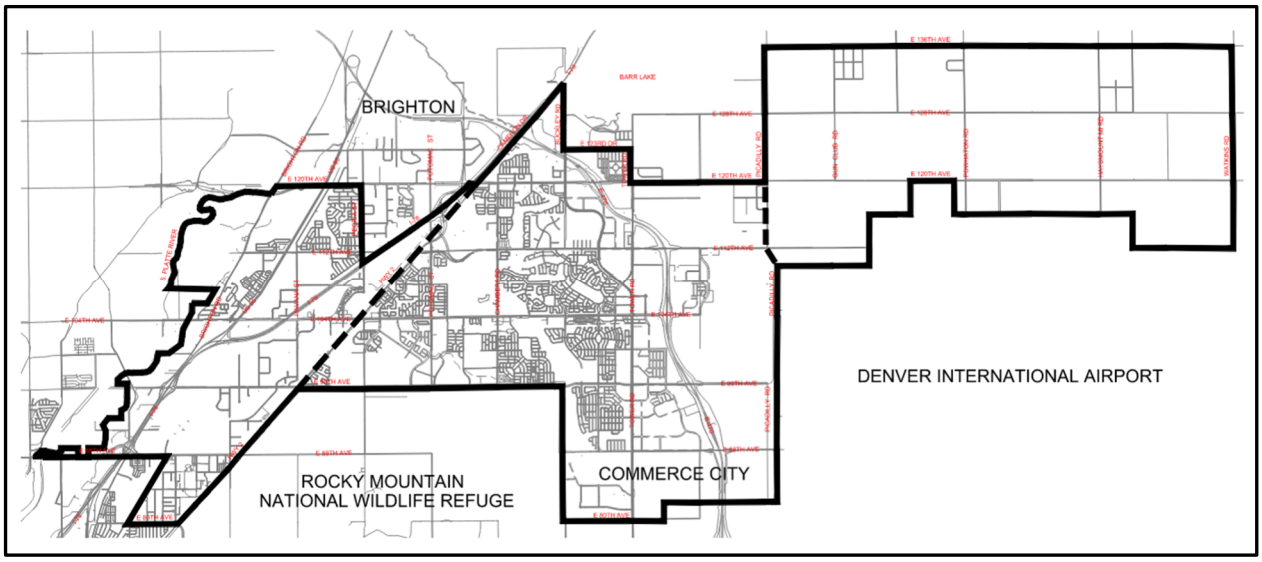
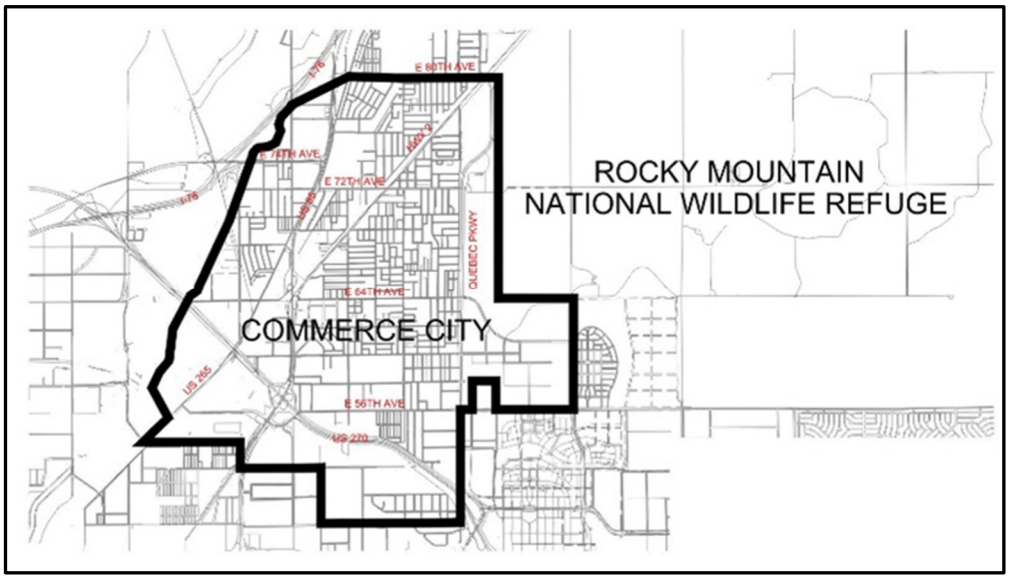



*Figure 2: Core City Road Impact Fee Service Area*



# 2. ROAD IMPACT FEE UPDATE

## 2.1 METHODOLOGY

This section presents the methodology used to develop and update C3's Northern Range service area road impact fees and to calculate new fees for the Core City. The road impact fees are calculated using the "modified consumption-based" methodology which is consistent with the 2004 study. The concept is that new development should pay for the cost of replacing the capacity that additional traffic consumes on the major roadway system. For every service unit of traffic generated by development, the road impact fee charges the net cost to construct an additional service unit of capacity. This approach assumes there are no existing infrastructure deficiencies or surplus capacity in the transportation system. New development is only paying its proportionate share for growth-related infrastructure. Revenue will be used to expand or provide additional facilities, as needed, to accommodate new development.

The process for updating the impact fee is shown in Figure 3. The process involves three main steps: (i) review the existing roadway network and collect relevant data, (ii) estimate travel demand generated or attracted by various types of development, and (iii) determine the net cost of expanding the arterial roadway system and the impact fee related to various types of development. The existing conditions review includes updating the roadway inventory in the service area to reflect the 2021 roadway network conditions, such as roadway length and number of lanes, functional classification, service volume capacity, and daily vehicle-miles of travel. The system-wide level of service standard is calculated based on the vehicle-mile of capacity (VMC) to vehicle-mile of travel (VMT) ratio.

The existing network review provides necessary inputs for both the peak hour travel demand forecast and the construction cost estimate (i.e. the Net Cost Per VMT). The travel demand calculation forecasts the vehicle-miles of travel (VMT) placed on the roadway system by specific land use types during the weekday peak hour. The *ITE Trip Generation Manual, 10th Edition* and *ITE Trip Generation Handbook, 3rd Edition* were used to update the trip generation rates and pass-by rates. The overall trip length was derived based on the trip length of arterial roads in the West Service Area of unincorporated Adams County and adjusted to reflect travel on C3's major roadway system. The cost estimate identifies roadway improvements needed to accommodate growth and identifies the total cost of constructing those projects (in 2021 dollars).

The formula for calculating road impact fees to be imposed by Commerce City are shown in Figure 4. The road impact fee is the product of Vehicle Miles of Travel (VMT) per development unit, multiplied by the net cost per VMT for capacity-expanding improvements. VMT is equal to the trip generation rate multiplied by the average trip length and trip adjustment factors. The net cost per VMT is based on the cost of roadway improvements, credits for outstanding debt associated with capacity-expanding road improvements and outside revenue sources that could fund future improvements.

*Figure 3: Road Impact Fee Update Methodology*

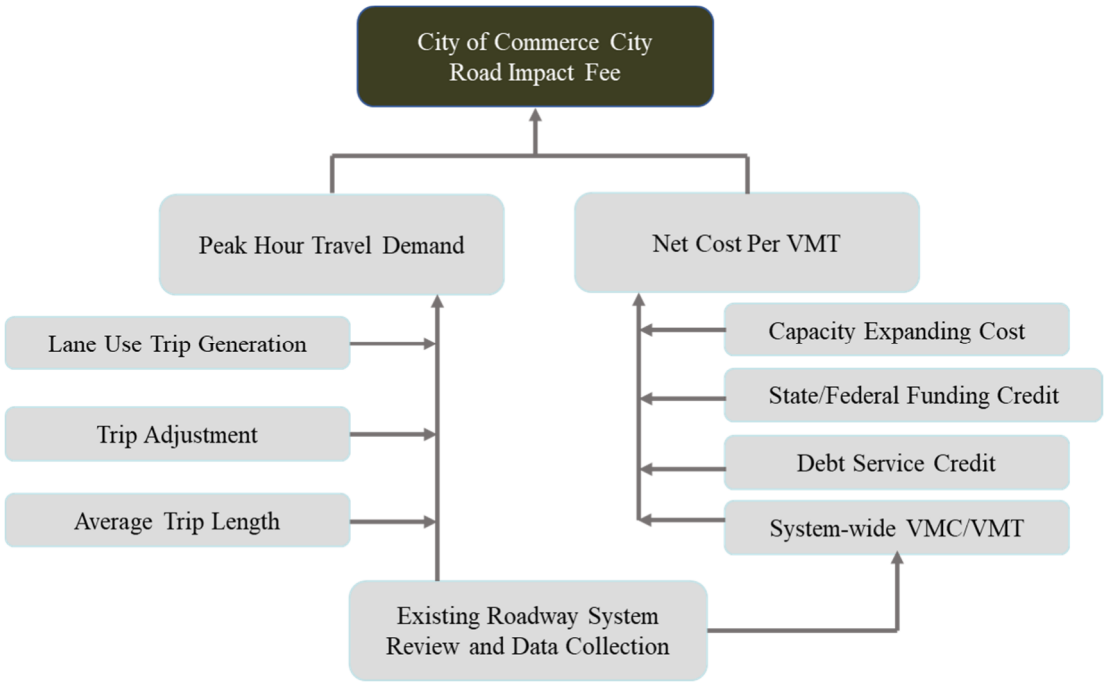



*Figure 4: Road Impact Fee Formula*

$$Road\ Impact\ Fee = Peak\ hour\ travel\ demand\ (VMT) \times Net\ Cost\ Per\ VMT$$

$$Peak\ hour\ travel\ demand\ (VMT) = Trips \times Trip\ Adjustment\ Factor \times Average\ Trip\ Length$$

$$Net\ Cost\ Per\ VMT = Cost\ Per\ VMT - Funding\ Credit\ Per\ VMT - Debt\ Credit\ Per\ VMT$$

$$Cost\ Per\ VMT = Cost\ Per\ VMC \times \frac{VMC}{VMT}$$

A service unit is a common unit of travel demand generated by different land uses. An appropriate service unit for road impact fees is vehicle-miles of travel (VMT). VMT captures the number of vehicles traveling within a specified timeframe, and the distance that those vehicles travel. It provides a measure of roadway vehicle travel usage over a geographic area, such as a city, state, or highway system. Consistent with the 2004 study, this update uses PM peak hour trip rates because evening peak hour traffic is generally the highest period of roadway use in urban areas. PM peak hour VMT is thus the service unit used for this road impact fee update.

## 2.2 EXISTING ROADWAY SYSTEM

The major roadway system in this update is defined as all City-owned arterial roads in the service area, which excludes interstates, state and federal highways, collector roads and local streets. Figures 5 and 6 show the major roadway system in the North Range and Core City service areas. Although state and federal highways are shown in Figures 5 and 6, I-76, I-270 and US 85 are excluded from the major roadway network that is to be funded with road impact fees. The E-470 toll road is also excluded from impact fee funding.

An inventory of 17 major arterials, amounting to approximately 82.6 miles of roads within C3's Northern Range, and 5 major arterials, amounting to approximately 11.8 miles of roads within the Core City are provided in Appendix B. The inventory includes information on existing roadway lengths and number of lanes, functional classification, surface type, service volume capacity, forecasted 2021 average daily traffic (ADT) volumes, vehicle miles of capacity (VMC) and daily vehicle-miles of travel (VMT).

The arterial functional classification of the major roadways was based on Figure 5.3 of C3's 2010 Transportation Plan and adjusted as appropriate based on discussions with C3 Public Works and anticipated future needs. Historic average daily traffic (ADT) volumes collected by C3 between the years of 2014 and 2019 were used as a basis to develop 2021 traffic volume estimates. Using the historical ADT data, annual growth rates were calculated for 18 locations on six major arterial roads. Figure 7 shows the annual growth rate at each of studied locations on 88$^{th}$ Avenue, 104$^{th}$ Avenue, 112$^{th}$ Avenue, 120$^{th}$ Avenue, Highway 2, and Tower Road. Except for four locations that show a negative annual growth rate, the remaining survey locations display an increasing trend of traffic volume growth, with an annual growth rate ranging from 0.9 percent to 12 percent. While traffic reduced on four of the roadways evaluated, it is believed that this traffic remained on the network and was included in some of the higher traffic growth locations. The average annual growth rate, which includes both the increases and decreases in traffic, was estimated as 3.3 percent for the arterial roads in both the Northern Range and Core City service areas and was used to grow existing 2014-2019 traffic counts to 2021 traffic forecasts.

The modified consumption-based approach adds a system-wide ratio of capacity to demand (VMC/VMT) into the impact fee calculation to ensure the new development pays for the cost to maintain the system-wide ratio of capacity to demand. The Existing VMC was quantified based on the inventory of all existing arterial roads within the service area limits, respectively, as included in Appendix B. The VMC are based on a planning level daily capacity of 8,000 vehicles per lane from the *Adams County Transportation Plan* (2012), and daily capacity of 2,000 vehicles on gravel roads, consistent with the 2004 study. The estimated capacity of each road segment was multiplied by the length of the segment in miles to determine segment VMC, and the VMC for all segments was summed to determine system wide VMC. The system wide VMT is based on a similar method, except that the ADT is multiplied by the length of the segment. About 9 percent of average daily travel in Commerce City occurs during the evening peak hour, based on a review of 2021 traffic counts collected on 104$^{th}$ Avenue during the 104$^{th}$ Avenue Signal Re-timing effort. This percentage was used to convert the daily VMC and VMT into peak hour VMC and VMT. For the arterial roads that serve as the boundary between C3 and the County or other municipalities, the assumption of whether to include improvements on all, half, or none of a particular roadway was based on guidance from C3 Public Works Department and an assumption about how much of the road would be the responsibility of C3 to construct.

*Figure 5: Northern Range Arterial Roadway Network*

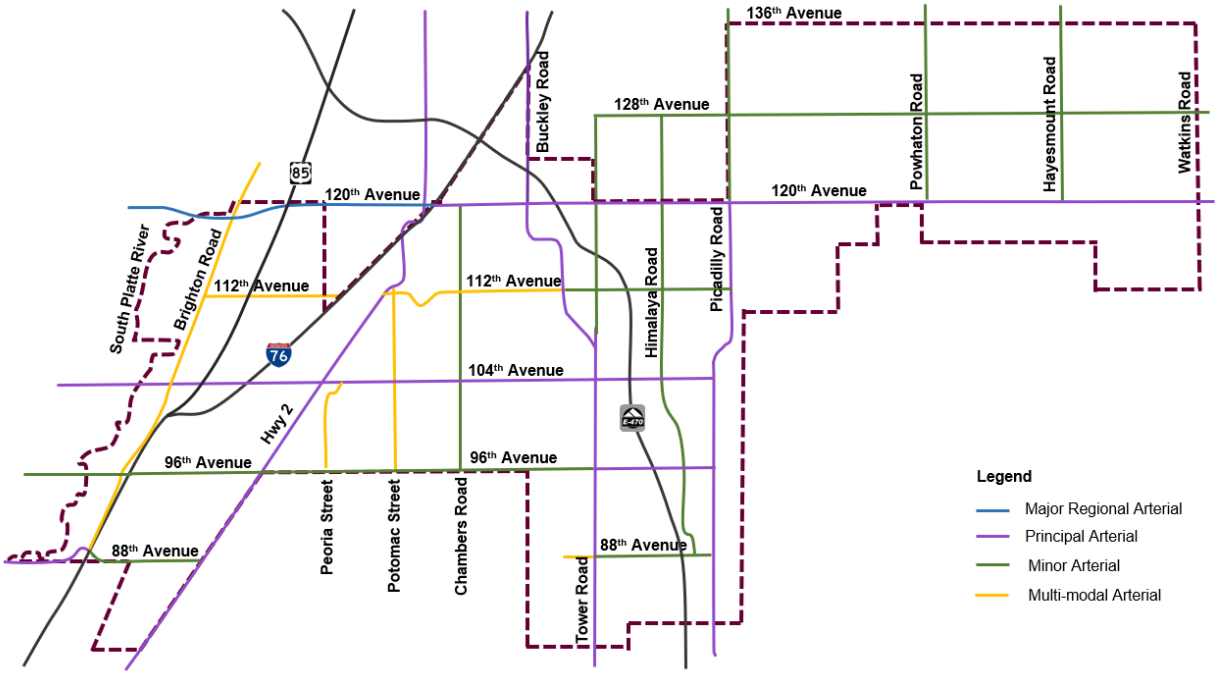



*Figure 6: Core City Arterial Roadway Network*

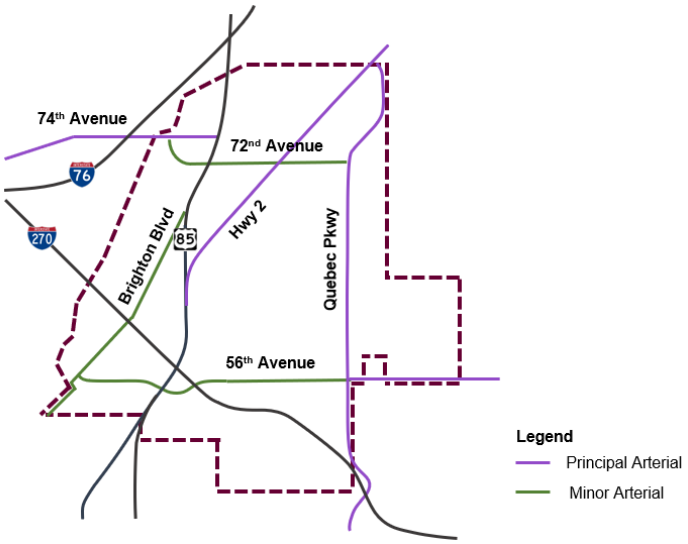
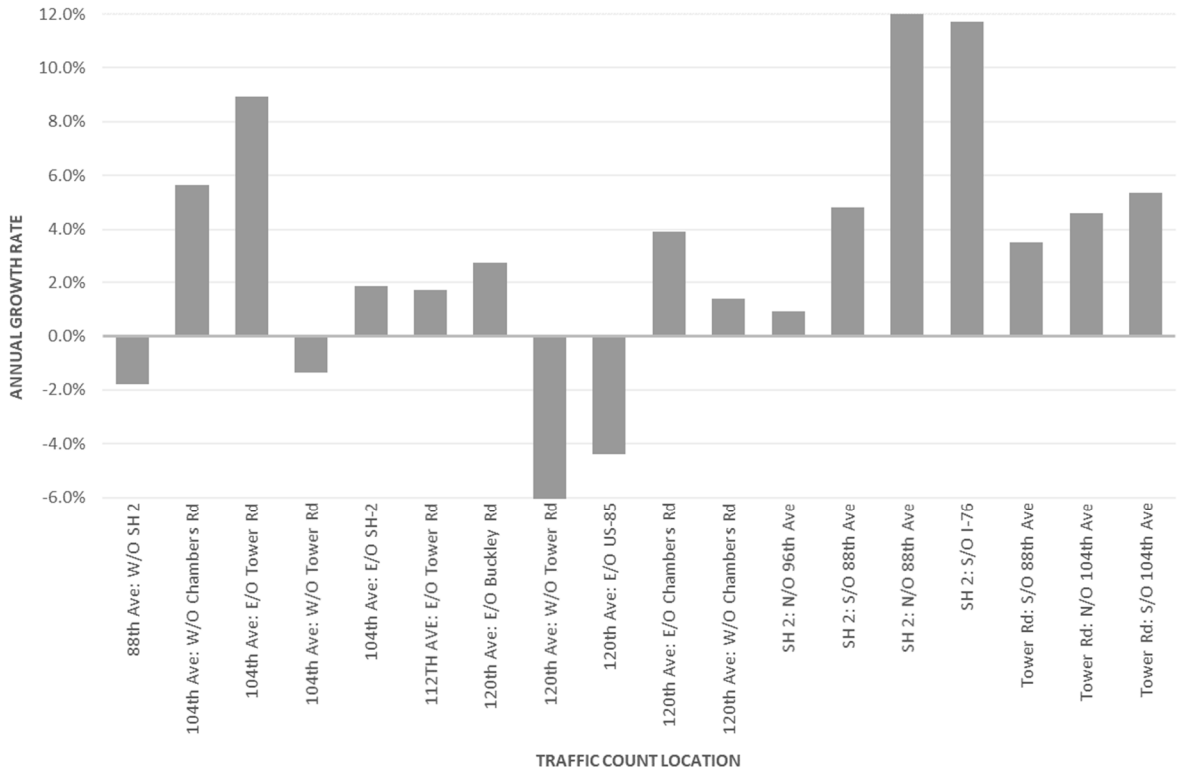


*Figure 7: Major Roadway Calculated Annual Growth Rate*




As shown in Tables 4 and 5, the existing arterial system has a VMC to VMT ratio of 1.98 and 1.51 in the Northern Range and the Core City, respectively. Since the major road system currently operates at a level of service well in excess of 1.00 capacity to demand, there are no existing deficiencies from an impact fee perspective. The modified consumption-based approach requires the new development pay for the capacity of the major road system that it directly consumes. Since travel is never evenly distributed throughout a roadway system, actual roadway systems require more than one VMC for every VMT in order to keep most road segments functioning at an acceptable level of service. Consequently, the consumption-based road impact fee model generally underestimates the full cost of growth. Assuming that the capacity/demand ratio will approach 1.00 as the City arterials build-out, a capacity to demand (VMC/VMT) ratio of 1.00 was used in the impact fee calculation.

*Table 4: Northern Range Capacity to Demand Ratio*

| | |
|---|---|
| **Daily Vehicle-Miles of Capacity (VMC)** | 1,342,300 |
| **Daily Vehicle-Miles of Travel (VMT)** | 677,209 |
| **Percent of Daily VMT Occurring in PM Peak Hour** | 9% |
| **Peak Hour Vehicle-Miles of Capacity (VMC)** | 120,807 |
| **Peak Hour Vehicle-Miles of Travel (VMT)** | 60,949 |
| **System-wide Capacity / Demand Ratio** | 1.98 |

*Table 5: Core City Capacity to Demand Ratio*

| | |
|---|---|
| **Daily Vehicle-Miles of Capacity (VMC)** | 363,200 |
| **Daily Vehicle-Miles of Travel (VMT)** | 240,701 |
| **Percent of Daily VMT Occurring in PM Peak Hour** | 9% |
| **Peak Hour Vehicle-Miles of Capacity (VMC)** | 32,688 |
| **Peak Hour Vehicle-Miles of Travel (VMT)** | 21,663 |
| **System-wide Capacity / Demand Ratio** | 1.51 |

## 2.3 TRAVEL DEMAND

The project team, working with the Public Works department, selected 31 land use types anticipated for development within the service area, for which road impact fees should apply. The recommended land use types cover the general categories of industrial, residential, lodging, recreational, institutional, medical, office, retail, and services. The travel demand associated with each land use type is the product of three factors: 1) trip generation, 2) trip adjustment, and 3) trip length. The result is the vehicle-miles of travel (VMT) placed on the major roadway system during the peak hour by a particular land use.

### TRIP GENERATION

The most recent edition of the *ITE Trip Generation Manual* (*10th Edition*) was used to determine the trip generation rate for each land use type. Trip generation represents the number of vehicle trips generated to and from a specified land use. The trip generation rates in this study generally use the number of dwelling units or 1,000 square feet of gross floor area for the purpose of impact fee calculation. The third column in Table 8 presents the average trip generation rate during the PM peak hour, by land use types.

### TRIP ADJUSTMENT

The obtained trip generation rates were adjusted to avoid double charging for any particular trip. Based on the notion that a trip has an origin and a destination at its two ends (known as trip ends), one trip might be counted at both origin and destination sites as a trip end but only uses the roadway system one time. For example, a single one-way trip from home to work counts as one trip end for the residence and one trip end for the workplace, for a total of two trip ends. To avoid over-counting, the trip rate was divided in half for the travel demand estimation.

The trip adjustment also includes a "percent new trip factor" to only count the primary trips generated or attracted by the land use but exclude the pass-by and diverted trips. The *ITE Trip Generation Handbook* (*3rd Edition*) defines the primary trip as the trip that is made for the specific purpose of visiting the development. The stop at the development is the primary reason for the trip and the trip typically goes from an origin to a destination and then returns to the origin. The examples are home-to-work-to-home, work-to-restaurant-to-work, or home-to-shopping-to-home. If an intermediate stop is made along the way, either a pass-by trip or a diverted trip is involved in this trip chain. To remove the portion of pass-by and diverted trips and reduce the possibility of over-counting, the "percent new trip factor" is introduced in the procedure. The reduction for pass-by trips is drawn from the *ITE Trip Generation Handbook*. An assumed 10% diverted link trip reduction was applied to Land Use Code 820 – Shopping Center, consistent with the

2004 study. For the land uses unavailable in the *Handbook*, assumptions are made based on available data and standard engineering practices.

## AVERAGE TRIP LENGTH

The average trip length is relatively difficult to determine since this factor is more representative of local travel characteristics. In the context of a road impact fee using a consumption-based methodology, the relevant input is the average length of a trip on the major arterial system within C3's service area limits.

In the 2004 study, the average trip length was pulled directly out of the *Adams County 1998 Road Impact Fee Study*. In the more recent, *Adams County 2019 Transportation Impact Fee Report*, an average trip length was only provided for the unincorporated areas of Adams County. *Adams County's Report* utilized an average trip length of 4.66 miles based on the capacity and utilization of 153 lane miles of arterials in the West Service Area of unincorporated Adams County. While the trip lengths in the County's arterial system provide estimates of relative travel magnitudes in proximity to C3's service area, the average trip distance still needed to be adjusted to reflect travel on C3's major roadway system. An adjustment factor was derived by dividing the total VMT that are using the County roadway system by the VMT observed on C3's major roadway system. The calculation of average trip length in the Northern Range service area is shown in Table 6. The average trip length calculation for the Core City is shown in Table 7.

*Table 6: Northern Range Average Trip Length*[4]

| | |
|---|---|
| **Adams County Unincorporated Average Trip Length (miles)** | 4.66 |
| **Arterial VMT in West Service Area of County Unincorporated Area** | 1,226,768 |
| **Commerce City Northern Range Service Area Arterial VMT** | 677,209 |
| **City Arterial VMT / County Unincorporated VMT** | 0.55 |
| **City Arterial Average Trip Length (miles)** | 2.57 |

*Table 7: Core City Average Trip Length*[5]

| | |
|---|---|
| **Adams County Unincorporated Average Trip Length (miles)** | 4.66 |
| **Arterial VMT in West Service Area of County Unincorporated Area** | 1,226,768 |
| **Commerce City Core City Service Area Arterial VMT** | 240,702 |
| **City Arterial VMT / County Unincorporated VMT** | 0.20 |
| **City Arterial Average Trip Length (miles)** | 0.91 |

NORTHERN RANGE

The total VMT on the arterial system in the West Service Area of the Adams County unincorporated area is 1,226,768 per day. Daily VMT on C3's Northern Range major roadway system was identified in Table 4 as 677,209. Dividing the Adams County VMT by C3's Northern Range daily VMT results in a local trip length adjustment factor of 0.55. As shown in Table 6, the County average trip length was multiplied by the local adjustment factor to determine average trip length in C3's Northern Range service area. The resulting local trip length is 2.57 miles per trip.

[4] *Adams County Transportation Impact Fee Report, 2019.* Commerce City Arterial VMT from Table 4.
[5] *Adams County Transportation Impact Fee Report, 2019.* Commerce City Arterial VMT from Table 5.

CORE CITY

The total VMT on the arterial system in the West Service Area of the Adams County unincorporated area is 1,226,768 per day. Daily VMT on C3's Core City major roadway system was identified in Table 5 as 240,702. Dividing the Adams County VMT by C3's Core City daily VMT results in a local trip length adjustment factor of 0.20. As shown in Table 7, the County average trip length was multiplied by the local adjustment factor to determine average trip length in C3's Core City service area. The resulting local trip length is 0.91 miles per trip.

TRAVEL DEMAND SCHEDULE

The result of combining trip generation rates, new trip factors and localized average trip lengths is a travel demand schedule that establishes the PM peak hour VMT during an average weekday on arterial roadways within C3's service area, generated by various land use types per unit of development. The recommended travel demand schedules for the Northern Range and the Core City are presented in Tables 8 and 9, respectively.

*Table 8: Northern Range Travel Demand by Land Use*

| ITE Land Use Code | | Unit | Peak Hour Trips | 1/2 Peak Hour Trips | % New Trips | Trip Length (miles) | Peak Hour VMT |
|---|---|---|---|---|---|---|---|
| **Industrial** | | | | | | | |
| 110 | General Light Industrial * | 1000 Sq. Ft. | 0.69 | 0.346 | 100% | 2.57 | 0.89 |
| 130 | Industrial Park * | 1000 Sq. Ft. | 0.44 | 0.220 | 100% | 2.57 | 0.57 |
| 150 | Warehouse * | 1000 Sq. Ft. | 0.22 | 0.109 | 100% | 2.57 | 0.28 |
| **Residential** | | | | | | | |
| 210 | Single-Family Detached Housing | Dwelling Units | 0.99 | 0.495 | 100% | 2.57 | 1.27 |
| 220 | Multifamily Housing (Low-Rise) | Dwelling Units | 0.56 | 0.280 | 100% | 2.57 | 0.72 |
| 221 | Multifamily Housing (Mid-Rise) | Dwelling Units | 0.44 | 0.220 | 100% | 2.57 | 0.57 |
| **Lodging** | | | | | | | |
| 310 | Hotel | Rooms | 0.60 | 0.300 | 100% | 2.57 | 0.77 |
| **Recreational** | | | | | | | |
| 495 | Recreational Community Center | 1000 Sq. Ft. | 2.31 | 1.155 | 100% | 2.57 | 2.97 |
| **Institutional** | | | | | | | |
| 520 | Elementary School | 1000 Sq. Ft. | 1.37 | 0.685 | 75% | 2.57 | 1.32 |
| 522 | Middle School/Junior High School | 1000 Sq. Ft. | 1.19 | 0.595 | 75% | 2.57 | 1.15 |
| 530 | High School | 1000 Sq. Ft. | 0.97 | 0.485 | 75% | 2.57 | 0.94 |
| 560 | Church | 1000 Sq. Ft. | 0.49 | 0.245 | 100% | 2.57 | 0.63 |
| 565 | Day Care Center | 1000 Sq. Ft. | 11.12 | 5.560 | 24% | 2.57 | 3.43 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 575 | Fire and Rescue Station | 1000 Sq. Ft. | 0.48 | 0.240 | 100% | 2.57 | 0.62 |
| **Medical** | | | | | | | |
| 650 | Free-Standing Emergency Room | 1000 Sq. Ft. | 1.52 | 0.760 | 100% | 2.57 | 1.96 |
| **Office** | | | | | | | |
| 710 | General Office Building | 1000 Sq. Ft. | 1.15 | 0.575 | 100% | 2.57 | 1.48 |
| 720 | Medical-Dental Office Building | 1000 Sq. Ft. | 3.46 | 1.730 | 100% | 2.57 | 4.45 |
| 770 | Business Park | 1000 Sq. Ft. | 0.42 | 0.210 | 100% | 2.57 | 0.54 |
| **Retail** | | | | | | | |
| 820 | Shopping Center | 1000 Sq. Ft. | 3.81 | 1.905 | 56% | 2.57 | 2.74 |
| 850 | Supermarket | 1000 Sq. Ft. | 9.24 | 4.620 | 64% | 2.57 | 7.61 |
| 862 | Home Improvement Superstore | 1000 Sq. Ft. | 2.33 | 1.165 | 58% | 2.57 | 1.74 |
| 881 | Pharmacy/Drugstore with Drive-Through Window | 1000 Sq. Ft. | 10.29 | 5.145 | 51% | 2.57 | 6.75 |
| 882 | Marijuana Dispensary | 1000 Sq. Ft. | 21.83 | 10.915 | 51% | 1.29 | 7.16 |
| **Services** | | | | | | | |
| 912 | Drive-in Bank | 1000 Sq. Ft. | 20.45 | 10.225 | 65% | 1.29 | 8.55 |
| 930 | Fast Casual Restaurant | 1000 Sq. Ft. | 14.13 | 7.065 | 54% | 2.57 | 9.72 |
| 932 | High-Turnover (Sit-Down) Restaurant | 1000 Sq. Ft. | 9.77 | 4.885 | 57% | 2.57 | 7.16 |
| 934 | Fast-Food Restaurant with Drive-Through Window | 1000 Sq. Ft. | 32.67 | 16.335 | 50% | 1.29 | 10.51 |
| 937 | Coffee/Donut Shop with Drive-Through Window | 1000 Sq. Ft. | 43.38 | 21.690 | 11% | 1.29 | 3.07 |
| 940 | Bread/Donut/Bagel Shop with Drive-Through Window | 1000 Sq. Ft. | 19.02 | 9.510 | 11% | 2.57 | 2.69 |
| 943 | Automobile Parts and Service Center | 1000 Sq. Ft. | 2.26 | 1.130 | 57% | 2.57 | 1.66 |
| 949 | Car Wash and Detail Center | Wash Stalls | 13.60 | 6.800 | 34% | 2.57 | 5.95 |
| 960 | Super Convenience Market/Gas Station | 1000 Sq. Ft. | 69.28 | 34.640 | 44% | 1.29 | 19.60 |

**Notes: Peak Hour Trips**: Trips generated/attracted by the development. From *ITE Trip Generation Manual 10th Edition*. **1/2 Peak Hour Trips**: peak hour trips divided by 2 to avoid overcounting of the trips from the new development onto the roadway network. **% New Trips**: percentage of primary trips. Percentage for Shopping Center (based on pass-by trip formula plus assumed 10% diverted-link trips), Supermarket, Home Improvement Store, Pharmacy, Bank, Sit-down Restaurant, Fast food Restaurant from ITE Trip Generation Handbook 3rd Edition. Other land uses assumed based on other published information. **Trip Length**: average trip length in service area. One-half average trip length assumed for trip generation rate over 10 new trips per peak hour. **Peak Hour VMT**: PM peak hour vehicle-miles traveled from each land use development. * Higher percentage of truck trips generated in the land use type of "Industrial". The trip generation is adjusted to account for the truck trips based on ITE Trip Generation Handbook. The truck trip percentage is assumed as 1/2 of the weekday average tuck percentage from ITE Trip Generation Handbook 3rd Edition Appendix I, considering less truck travel in peak hours.

*Table 9: Core City Travel Demand by Land Use*

| ITE Land Use Code | | Unit | Peak Hour Trips | 1/2 Peak Hour Trips | % New Trips | Trip Length (miles) | Peak Hour VMT |
|---|---|---|---|---|---|---|---|
| **Industrial** | | | | | | | |
| 110 | General Light Industrial * | 1000 Sq. Ft. | 0.69 | 0.346 | 100% | 0.91 | 0.32 |
| 130 | Industrial Park * | 1000 Sq. Ft. | 00.44 | 0.22 | 100% | 0.91 | 0.20 |
| 150 | Warehouse * | 1000 Sq. Ft. | 0.22 | 0.109 | 100% | 0.91 | 0.10 |
| **Residential** | | | | | | | |
| 210 | Single-Family Detached Housing | Dwelling Units | 0.99 | 0.495 | 100% | 0.91 | 0.45 |
| 220 | Multifamily Housing (Low-Rise) | Dwelling Units | 0.56 | 0.28 | 100% | 0.91 | 0.26 |
| 221 | Multifamily Housing (Mid-Rise) | Dwelling Units | 0.44 | 0.22 | 100% | 0.91 | 0.2 |
| **Lodging** | | | | | | | |
| 310 | Hotel | Rooms | 0.6 | 0.3 | 100% | 0.91 | 0.27 |
| **Recreational** | | | | | | | |
| 495 | Recreational Community Center | 1000 Sq. Ft. | 2.31 | 1.155 | 100% | 0.91 | 1.06 |
| **Institutional** | | | | | | | |
| 520 | Elementary School | 1000 Sq. Ft. | 1.37 | 0.685 | 75% | 0.91 | 0.47 |
| 522 | Middle School/Junior High School | 1000 Sq. Ft. | 1.19 | 0.595 | 75% | 0.91 | 0.41 |
| 530 | High School | 1000 Sq. Ft. | 0.97 | 0.485 | 75% | 0.91 | 0.33 |
| 560 | Church | 1000 Sq. Ft. | 0.49 | 0.245 | 100% | 0.91 | 0.22 |
| 565 | Day Care Center | 1000 Sq. Ft. | 11.12 | 5.56 | 24% | 0.91 | 1.22 |
| 575 | Fire and Rescue Station | 1000 Sq. Ft. | 0.48 | 0.24 | 100% | 0.91 | 0.22 |
| **Medical** | | | | | | | |
| 650 | Free-Standing Emergency Room | 1000 Sq. Ft. | 1.52 | 0.76 | 100% | 0.91 | 0.69 |
| **Office** | | | | | | | |
| 710 | General Office Building | 1000 Sq. Ft. | 1.15 | 0.575 | 100% | 0.91 | 0.53 |
| 720 | Medical-Dental Office Building | 1000 Sq. Ft. | 3.46 | 1.73 | 100% | 0.91 | 1.58 |
| 770 | Business Park | 1000 Sq. Ft. | 0.42 | 0.21 | 100% | 0.91 | 0.19 |
| **Retail** | | | | | | | |
| 820 | Shopping Center | 1000 Sq. Ft. | 3.81 | 1.905 | 56% | 0.91 | 0.98 |
| 850 | Supermarket | 1000 Sq. Ft. | 9.24 | 4.62 | 64% | 0.91 | 2.7 |
| 862 | Home Improvement Superstore | 1000 Sq. Ft. | 2.33 | 1.165 | 58% | 0.91 | 0.62 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 881 | Pharmacy/Drugstore with Drive-Through Window | 1000 Sq. Ft. | 10.29 | 5.145 | 51% | 0.91 | 2.4 |
| 882 | Marijuana Dispensary | 1000 Sq. Ft. | 21.83 | 10.915 | 51% | 0.46 | 2.54 |
| **Services** | | | | | | | |
| 912 | Drive-in Bank | 1000 Sq. Ft. | 20.45 | 10.225 | 65% | 0.46 | 3.04 |
| 930 | Fast Casual Restaurant | 1000 Sq. Ft. | 14.13 | 7.065 | 54% | 0.91 | 3.46 |
| 932 | High-Turnover (Sit-Down) Restaurant | 1000 Sq. Ft. | 9.77 | 4.885 | 57% | 0.91 | 2.55 |
| 934 | Fast-Food Restaurant with Drive-Through Window | 1000 Sq. Ft. | 32.67 | 16.335 | 50% | 0.46 | 3.73 |
| 937 | Coffee/Donut Shop with Drive-Through Window | 1000 Sq. Ft. | 43.38 | 21.69 | 11% | 0.46 | 1.09 |
| 940 | Bread/Donut/Bagel Shop with Drive-Through Window | 1000 Sq. Ft. | 19.02 | 9.51 | 11% | 0.91 | 0.96 |
| 943 | Automobile Parts and Service Center | 1000 Sq. Ft. | 2.26 | 1.13 | 57% | 0.91 | 0.59 |
| 949 | Car Wash and Detail Center | Wash Stalls | 13.6 | 6.8 | 34% | 0.91 | 2.11 |
| 960 | Super Convenience Market/Gas Station | 1000 Sq. Ft. | 69.28 | 34.64 | 44% | 0.46 | 6.97 |

**Notes: Peak Hour Trips**: Trips generated/attracted by the development. From *ITE Trip Generation Manual 10th Edition*. **1/2 Peak Hour Trips**: peak hour trips divided by 2 to avoid overcounting of the trips from the new development onto the roadway network. **% New Trips**: percentage of primary trips. Percentage for Shopping Center (based on pass-by trip formula plus assumed 10% diverted-link trips), Supermarket, Home Improvement Store, Pharmacy, Bank, Sit-down Restaurant, Fast food Restaurant from ITE Trip Generation Handbook 3rd Edition. Other land uses assumed based on other published information. **Trip Length**: average trip length in service area. One-half average trip length assumed for trip generation rate over 10 new trips per peak hour. **Peak Hour VMT**: PM peak hour vehicle-miles traveled from each land use development * Higher percentage of truck trips generated in the land use type of "Industrial". The trip generation is adjusted to account for the truck trips based on ITE Trip Generation Handbook. The truck trip percentage is assumed as 1/2 of the weekday average tuck percentage from ITE Trip Generation Handbook 3rd Edition Appendix I, considering less truck travel in peak hours.

## 2.4 COST PER SERVICE UNIT

Road impact fees must increase the carrying capacity of the major roadway system. The capacity improvement cost in this update only includes the capacity-expanding improvements to major arterials within C3's service area. Types of eligible improvements include construction of new roads, widening existing roads, paving gravel roads, as well as improvements of bridges and culverts as a result of roadway widening. The cost of maintenance is not included in the impact fee process.

The future lane capacity included in the fee calculation was taken from Figure 5.4 of the *City of Commerce City Transportation Plan* (2010) and refined based on discussions with Public Works staff about future roadway needs. The transportation plan identifies improvements needed for the arterial system to accommodate anticipated growth through buildout, based on city area growth forecasts. The construction cost per mile for roadway widening are based on C3's typical cross section requirements for minor, principal and multimodal arterial roadways. Major Regional classified roadways were assumed to follow the principal arterial typical cross section. The planning level costs for bridge and culvert widening and replacement were provided by Public Works staff and reviewed by the consultant for inclusion in the impact fee calculation. Appendix C provides a detailed list of future lane capacity improvements and associated cost estimates for the Northern Range and the Core City areas. The unit cost estimates for road widening, and bridge and culvert improvements are presented in Appendix D.

NORTHERN RANGE

As shown in Table 10 below, the total estimated cost for ultimate roadway improvements is approximately 634 million (in current dollars). The identified improvements add a total of 166,257 vehicles-miles of capacity during the peak hour. Dividing the total cost for ultimate roadway improvements by the capacity added yields a cost of $3,812 per VMC. As mentioned in previous sections, the average cost per VMC must be multiplied by the system-wide VMC/VMT ratio to determine the cost per VMT. The resulting cost per service unit, using a 1.0 VMC/VMT is $3,812 per VMT.

*Table 10: Northern Range Roadway Improvement Cost Per Service Unit*

| | |
|---|---|
| **Total Estimated Cost for Ultimate Roadway Improvements** | $633,819,310 |
| **New Peak Hour Vehicle-mile of Capacity (VMC)** | 166,257 |
| **Cost Per New Peak Hour VMC** | $3,812 |
| **Assumed System-wide VMC/VMT Ratio** | 1.0 |
| **Cost Per New Peak Hour Vehicle-mile of Travel (VMT)** | $3,812 |

CORE CITY

As shown in Table 11 below, the total estimated cost for ultimate roadway improvements is approximately 26 million (in current dollars). The identified improvements add a total of 4,320 vehicles-miles of capacity during the peak hour. Dividing the total cost for ultimate roadway improvements by the capacity added yields a cost of $5,934 per VMC. As mentioned in previous sections, the average cost per VMC must be multiplied by the system-wide VMC/VMT ratio to determine the cost per VMT. The resulting cost per service unit, using a 1.0 VMC/VMT is $5,934 per VMT.

*Table 11: Core City Roadway Improvement Cost Per Service Unit*

| | |
|---|---|
| **Total Estimated Cost for Ultimate Roadway Improvements** | $25,635,562 |
| **New Peak Hour Vehicle-mile of Capacity (VMC)** | 4,320 |
| **Cost Per New Peak Hour VMC** | 5,934 |
| **Assumed System-wide VMC/VMT Ratio** | 1.0 |
| **Cost Per New Peak Hour Vehicle-mile of Travel (VMT)** | 5,934 |

## 2.5 NET COST PER SERVICE UNIT

The net cost per service unit is based on the cost per service unit less credits to account for any outside revenue sources that will fund the proposed growth-related improvements and accounting for outstanding debt for road improvements. This section provides an update of the revenue credits pertaining to roadway capacity improvements. Credits or reimbursements should also be provided to those who construct eligible improvements that are included in the list of planned improvements on which the fees are based. These are referred to as “developer credits,” and are calculated on a case-by-case basis.

## STATE/FEDERAL FUNDING

While there is a possibility for state or federal funding to construct growth related improvements in the Northern Range, no state or federal funds have been identified for any of the capacity-expanding improvements included in this study. Therefore, no credit against the impact fees is warranted.

## DEBT CREDIT

The City has no outstanding debt for previous capacity-expanding arterial road improvements. Consequently, no debt service credit needs to be provided.

## NET COST PER SERVICE UNIT

Since no revenue credits are warranted, the net cost per service unit is the same as the cost per service unit. The net costs to provide major road capacity per unit of development are shown in Table 12 and 13 for Northern Range and Core City.

C3's general policy relating to road exactions is to require the developer to construct and dedicate right-of-way (ROW) for all internal streets and one-half of the required cross-section for adjacent streets. Since these fees are collected to add capacity on the arterial roadway network, developers that are required to construct portions of arterial improvements adjacent to or through their projects, need to be given credit for the value of such contributions, up to the amount of their road impact fees. No credits are required for ROW dedications, however, since ROW costs are not included in the impact fee calculations. C3 could decide to charge less than the full net cost, as long as the fees are reduced proportionately for all land use types.

# 3. UPDATED ROAD IMPACT FEE SCHEDULE

The updated road impact fees for this study are derived by multiplying the peak hour VMT for each land use by the net cost per service unit. The updated fee schedules for the Northern Range and Core City are shown in Tables 12 and 13, respectively. The road impact fees calculated in this update are compared with the 2004 fees, currently in use as this update was being completed, in Table 1 of the report. Since many land uses have been added, removed, or modified between Versions 6 and Version 10 of ITE's *Trip Generation Manual*, not all of the land use types are available for a fee comparison.

*Table 12: Northern Range Updated Road Impact Fee*

| ITE Land Use Code | | Unit | Peak Hour VMT | Net Cost/ VMT | Net Cost/ Unit |
|---|---|---|---|---|---|
| Industrial | | | | | |
| 110 | General Light Industrial | 1000 Sq. Ft. | 0.89 | $3,812 | $3,393 |
| 130 | Industrial Park | 1000 Sq. Ft. | 0.57 | $3,812 | $2,173 |
| 150 | Warehouse | 1000 Sq. Ft. | 0.28 | $3,812 | $1,067 |
| Residential | | | | | |
| 210 | Single-Family Detached Housing | Dwelling Units | 1.27 | $3,812 | $4,842 |
| 220 | Multifamily Housing (Low-Rise) | Dwelling Units | 0.72 | $3,812 | $2,745 |
| 221 | Multifamily Housing (Mid-Rise) | Dwelling Units | 0.57 | $3,812 | $2,173 |
| Lodging | | | | | |
| 310 | Hotel | Rooms | 0.77 | $3,812 | $2,935 |
| Recreational | | | | | |
| 495 | Recreational Community Center | 1000 Sq. Ft. | 2.97 | $3,812 | $11,322 |
| Institutional | | | | | |
| 520 | Elementary School | 1000 Sq. Ft. | 1.32 | $3,812 | $5,032 |
| 522 | Middle School/Junior High School | 1000 Sq. Ft. | 1.15 | $3,812 | $4,384 |
| 530 | High School | 1000 Sq. Ft | 0.94 | $3,812 | $3,584 |
| 560 | Church | 1000 Sq. Ft. | 0.63 | $3,812 | $2,402 |
| 565 | Day Care Center | 1000 Sq. Ft. | 3.43 | $3,812 | $13,076 |
| 575 | Fire and Rescue Station | 1000 Sq. Ft. | 0.62 | $3,812 | $2,364 |
| Medical | | | | | |
| 650 | Free-Standing Emergency Room | 1000 Sq. Ft. | 1.96 | $3,812 | $7,472 |
| Office | | | | | |
| 710 | General Office Building | 1000 Sq. Ft. | 1.48 | $3,812 | $5,642 |
| 720 | Medical-Dental Office Building | 1000 Sq. Ft. | 4.45 | $3,812 | $16,965 |

| | | | | | |
|---|---|---|---|---|---|
| 770 | Business Park | 1000 Sq. Ft. | 0.54 | $3,812 | $2,059 |
| Retail | | | | | |
| 820 | Shopping Center | 1000 Sq. Ft. | 2.74 | $3,812 | $10,446 |
| 850 | Supermarket | 1000 Sq. Ft. | 7.61 | $3,812 | $29,011 |
| 862 | Home Improvement Superstore | 1000 Sq. Ft. | 1.74 | $3,812 | $6,633 |
| 881 | Pharmacy/Drugstore with Drive-Through Window | 1000 Sq. Ft. | 6.75 | $3,812 | $25,733 |
| 882 | Marijuana Dispensary | 1000 Sq. Ft. | 7.16 | $3,812 | $27,296 |
| Services | | | | | |
| 912 | Drive-in Bank | 1000 Sq. Ft. | 8.55 | $3,812 | $32,595 |
| 930 | Fast Casual Restaurant | 1000 Sq. Ft. | 9.72 | $3,812 | $37,055 |
| 932 | High-Turnover (Sit-Down) Restaurant | 1000 Sq. Ft. | 7.16 | $3,812 | $27,296 |
| 934 | Fast-Food Restaurant with Drive-Through Window | 1000 Sq. Ft. | 10.51 | $3,812 | $40,067 |
| 937 | Coffee/Donut Shop with Drive-Through Window | 1000 Sq. Ft. | 3.07 | $3,812 | $11,704 |
| 940 | Bread/Donut/Bagel Shop with Drive-Through Window | 1000 Sq. Ft. | 2.69 | $3,812 | $10,255 |
| 943 | Automobile Parts and Service Center | 1000 Sq. Ft. | 1.66 | $3,812 | $6,328 |
| 949 | Car Wash and Detail Center | Wash Stalls | 5.95 | $3,812 | $22,683 |
| 960 | Super Convenience Market/Gas Station | 1000 Sq. Ft. | 19.60 | $3,812 | $74,721 |

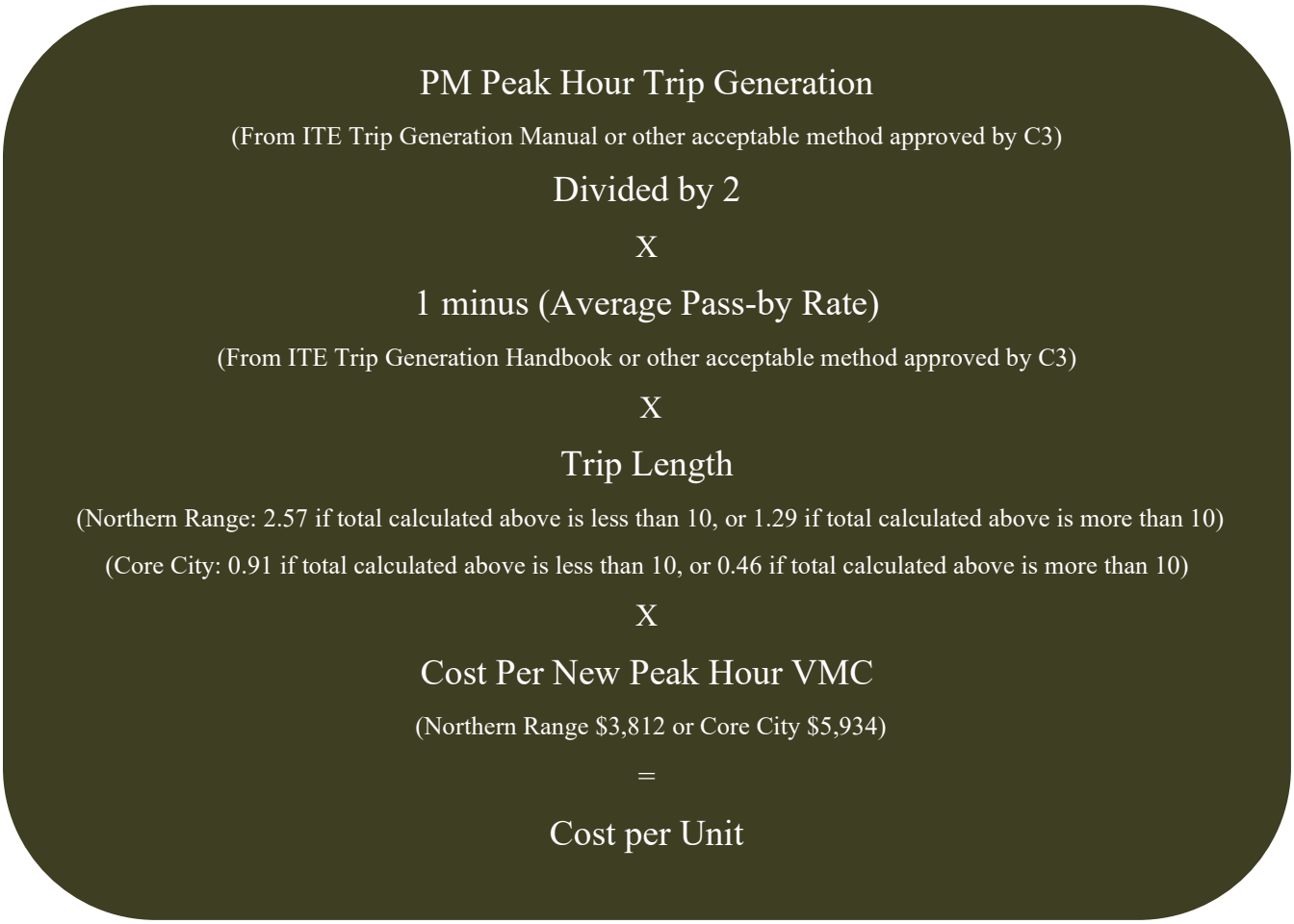
*Table 13: Core City Updated Road Impact Fee*

| ITE Land Use Code | | Unit | Peak Hour VMT | Net Cost/ VMT | Net Cost/ Unit |
|---|---|---|---|---|---|
| Industrial | | | | | |
| 110 | General Light Industrial | 1000 Sq. Ft. | 0.32 | $5,934 | $1,899 |
| 130 | Industrial Park | 1000 Sq. Ft. | 0.20 | $5,934 | $1,187 |
| 150 | Warehouse | 1000 Sq. Ft. | 0.10 | $5,934 | $593 |
| Residential | | | | | |
| 210 | Single-Family Detached Housing | Dwelling Units | 0.45 | $5,934 | $2,670 |
| 220 | Multifamily Housing (Low-Rise) | Dwelling Units | 0.26 | $5,934 | $1,543 |
| 221 | Multifamily Housing (Mid-Rise) | Dwelling Units | 0.20 | $5,934 | $1,187 |
| Lodging | | | | | |
| 310 | Hotel | Rooms | 0.27 | $5,934 | $1,602 |
| Recreational | | | | | |
| 495 | Recreational Community Center | 1000 Sq. Ft. | 1.06 | $5,934 | $6,290 |

| | | | | | |
|---|---|---|---|---|---|
| Institutional | | | | | |
| 520 | Elementary School | 1000 Sq. Ft. | 0.47 | $5,934 | $2,789 |
| 522 | Middle School/Junior High School | 1000 Sq. Ft. | 0.41 | $5,934 | $2,433 |
| 530 | High School | 1000 Sq. Ft | 0.33 | $5,934 | $1,958 |
| 560 | Church | 1000 Sq. Ft. | 0.22 | $5,934 | $1,306 |
| 565 | Day Care Center | 1000 Sq. Ft. | 1.22 | $5,934 | $7,240 |
| 575 | Fire and Rescue Station | 1000 Sq. Ft. | 0.22 | $5,934 | $1,306 |
| Medical | | | | | |
| 650 | Free-Standing Emergency Room | 1000 Sq. Ft. | 0.69 | $5,934 | $4,095 |
| Office | | | | | |
| 710 | General Office Building | 1000 Sq. Ft. | 0.53 | $5,934 | $3,145 |
| 720 | Medical-Dental Office Building | 1000 Sq. Ft. | 1.58 | $5,934 | $9,376 |
| 770 | Business Park | 1000 Sq. Ft. | 0.19 | $5,934 | $1,127 |
| Retail | | | | | |
| 820 | Shopping Center | 1000 Sq. Ft. | 0.98 | $5,934 | $5,815 |
| 850 | Supermarket | 1000 Sq. Ft. | 2.70 | $5,934 | $16,022 |
| 862 | Home Improvement Superstore | 1000 Sq. Ft. | 0.62 | $5,934 | $3,679 |
| 881 | Pharmacy/Drugstore with Drive-Through Window | 1000 Sq. Ft. | 2.40 | $5,934 | $14,242 |
| 882 | Marijuana Dispensary | 1000 Sq. Ft. | 2.54 | $5,934 | $15,073 |
| Services | | | | | |
| 912 | Drive-in Bank | 1000 Sq. Ft. | 3.04 | $5,934 | $18,040 |
| 930 | Fast Casual Restaurant | 1000 Sq. Ft. | 3.46 | $5,934 | $20,532 |
| 932 | High-Turnover (Sit-Down) Restaurant | 1000 Sq. Ft. | 2.55 | $5,934 | $15,132 |
| 934 | Fast-Food Restaurant with Drive-Through Window | 1000 Sq. Ft. | 3.73 | $5,934 | $22,134 |
| 937 | Coffee/Donut Shop with Drive-Through Window | 1000 Sq. Ft. | 1.09 | $5,934 | $6,468 |
| 940 | Bread/Donut/Bagel Shop with Drive-Through Window | 1000 Sq. Ft. | 0.96 | $5,934 | $5,697 |
| 943 | Automobile Parts and Service Center | 1000 Sq. Ft. | 0.59 | $5,934 | $3,501 |
| 949 | Car Wash and Detail Center | Wash Stalls | 2.11 | $5,934 | $12,521 |
| 960 | Super Convenience Market/Gas Station | 1000 Sq. Ft. | 6.97 | $5,934 | $41,361 |

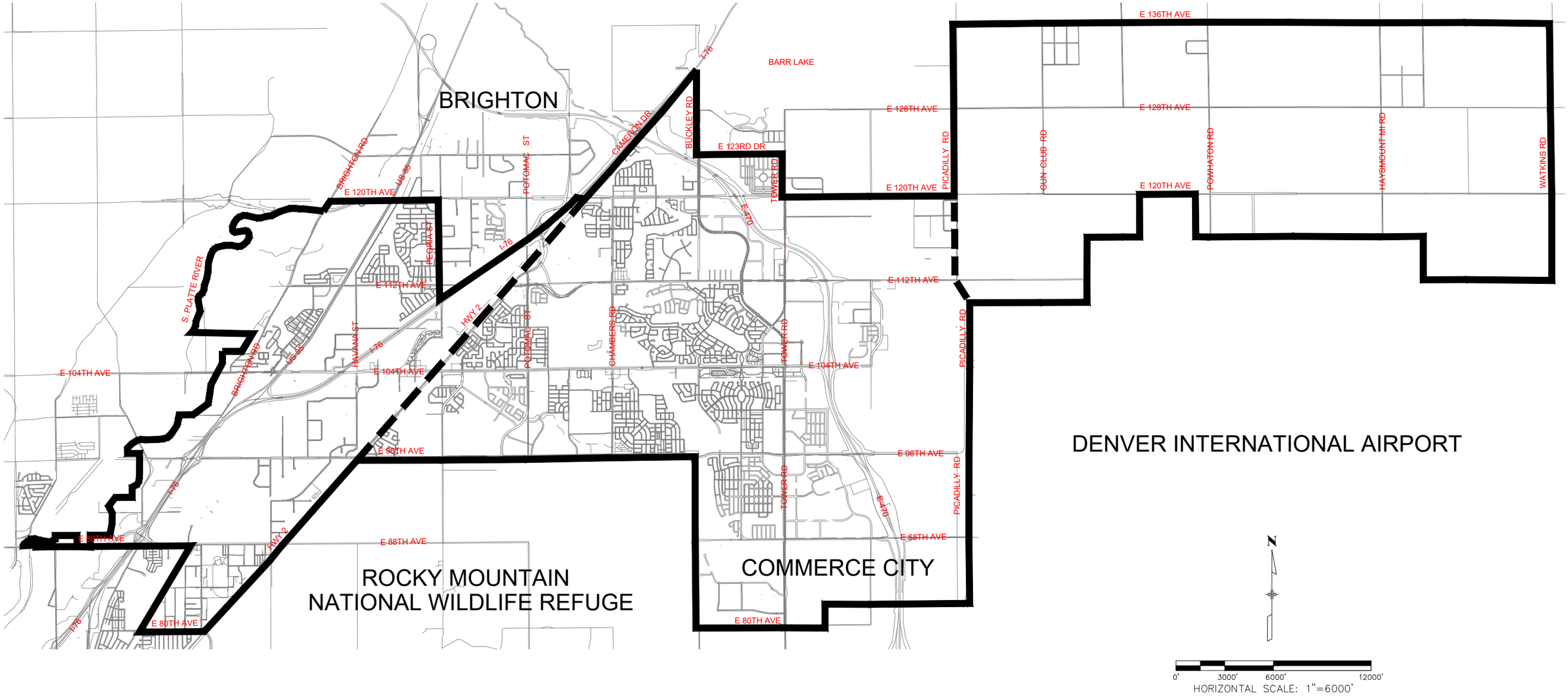
For land uses that are not included in Table 12 or Table 13, Figure 8 summarizes the overall process for calculating the impact fee. The resulting cost per unit is multiplied by the total proposed units to get the total fee. For example, if the cost per unit is $5,000 and the proposed development is for 50 homes, the road impact fee for the 50 homes is 5000 times 50, or $250,000. If the development were for a 5,000 SF retail building and the cost per unit is $12,000, the fee would be 12,000 times 5 (since the cost per unit is applied per 1,000 SF), or $60,000.

*Figure 8: Process for Calculating Impact Fees for Land Uses Not Identified in this Study*



# APPENDIX A

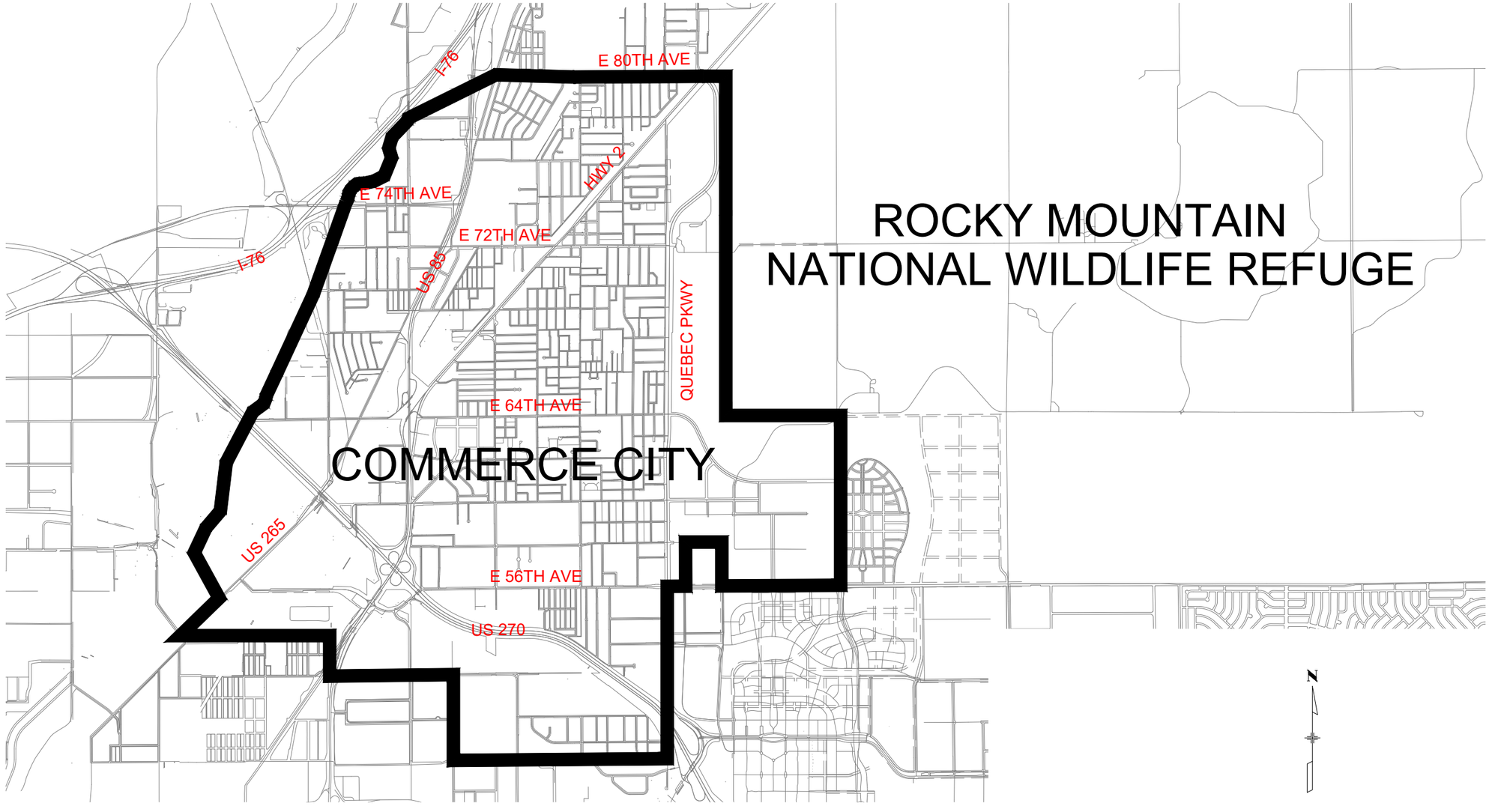
## Northern Range Service Area Map




# ROAD IMPACT FEE SERVICE AREA AND BENEFIT DISTRICTS

# APPENDIX B

# Core City Service Area Map




# ROAD IMPACT FEE SERVICE AREA AND BENEFIT DISTRICT

# APPENDIX C

# Northern Range Existing Roadway Inventory

# Northern Range Service Area 2021 Arterial System

| Roadway | From | To | Arterial Classification | Length (miles) | Surface | Existing # Lanes | Capacity | 2021 Volume | VMC | VMT |
|---|---|---|---|---|---|---|---|---|---|---|
| 88th Ave | Platte River | Wikiup Dr | Principal | 1.55 | Paved | 4 | 32,000 | 19,880 | 49,600 | 30,814 |
| 88th Ave | Wikiup Dr | SH 2 | Minor | 1.45 | Paved | 2 | 16,000 | 14,580 | 23,200 | 21,141 |
| 88th Ave | Telluride St | Tower Rd | Multi-modal | 0.45 | Paved | 2 | 16,000 | 7,470 | 7,200 | 3,362 |
| 88th Ave | Tower Rd | Picadilly Rd | Minor | 2.00 | Paved | 2 | 16,000 | 180 | 32,000 | 360 |
| 96th Ave | McKay Rd | I-76 | Minor | 0.50 | Paved | 2 | 16,000 | 15,600 | 8,000 | 7,800 |
| 96th Ave | I-76 | Heinz Way | Minor | 1.60 | Paved | 2 | 16,000 | 15,600 | 25,600 | 24,960 |
| 96th Ave | Heinz Way | SH 2 | Minor | 0.35 | Paved | 4 | 32,000 | 13,680 | 11,200 | 4,788 |
| 96th Ave | SH 2 | Eagle Creek Pkwy | Minor | 0.20 | Paved | 4 | 32,000 | 12,170 | 6,400 | 2,434 |
| 96th Ave | Eagle Creek Pkwy | Tower Rd | Minor | 4.75 | Paved | 2 | 16,000 | 10,650 | 76,000 | 50,588 |
| 96th Ave | Tower Rd | E-470 | Principal | 0.85 | Paved | 2 | 16,000 | 3,830 | 13,600 | 3,256 |
| 96th Ave | E-470 | Picadilly Rd | Principal | 1.15 | Paved | 2 | 16,000 | 1,070 | 18,400 | 1,231 |
| 104th Ave | Platte River | US 85 | Principal | 1.10 | Paved | 2 | 16,000 | 17,250 | 17,600 | 18,975 |
| 104th Ave | US 85 | SH 2 | Principal | 1.80 | Paved | 4 | 32,000 | 25,310 | 57,600 | 45,558 |
| 104th Ave | SH 2 | Chambers Rd | Principal | 2.05 | Paved | 4 | 32,000 | 21,970 | 65,600 | 45,039 |
| 104th Ave | Chambers Rd | Tower Rd | Principal | 2.00 | Paved | 4 | 32,000 | 17,730 | 64,000 | 35,460 |
| 104th Ave | Tower Rd | E-470 | Principal | 0.60 | Paved | 4 | 32,000 | 4,730 | 19,200 | 2,838 |
| 112th Ave | Brighton Rd | Havana St | Multi-modal | 0.80 | Paved | 2 | 16,000 | 7,140 | 12,800 | 5,712 |
| 112th Ave | Havana St | Lima St | Multi-modal | 0.50 | Paved | 3 | 24,000 | 7,140 | 12,000 | 3,570 |
| 112th Ave | Lima | Oakland St | Multi-modal | 0.25 | Paved | 4 | 32,000 | 4,620 | 8,000 | 1,155 |
| 112th Ave | Oakland St | Peoria St | Multi-modal | 0.25 | Paved | 2 | 16,000 | 4,620 | 4,000 | 1,155 |
| 112th Ave | SH 2 | Bison Ridge Rec Center | Multi-modal | 0.35 | Paved | 2 | 16,000 | 1,070 | 5,600 | 375 |
| 112th Ave | Bison Ridge Rec Center | Chambers Rd | Multi-modal | 0.95 | Gravel | 2 | 2,000 | 260 | 1,900 | 247 |
| 112th Ave | Chambers Rd | Parkside Dr | Multi-modal | 0.85 | Paved | 2 | 16,000 | 1,730 | 13,600 | 1,471 |
| 112th Ave | Parkside Dr | Picadilly Rd | Minor | 3.15 | Gravel | 2 | 2,000 | 340 | 6,300 | 1,071 |
| 120th Ave* | Platte River | US85 | Major Regional | 1.35 | Paved | 4 | 32,000 | 18,660 | 21,600 | 12,596 |
| 120th Ave* | US 85 | Peoria St | Major Regional | 0.55 | Paved | 2 | 16,000 | 14,620 | 4,400 | 4,021 |
| 120th Ave | I-76 | Jasper St | Principal | 0.65 | Paved | 3 | 24,000 | 14,720 | 15,600 | 9,568 |
| 120th Ave | Jasper St | Tower Rd | Principal | 1.75 | Paved | 2 | 16,000 | 14,350 | 28,000 | 25,113 |
| 120th Ave* | Tower Rd | Picadilly Rd | Principal | 2.00 | Paved | 2 | 16,000 | 630 | 16,000 | 630 |
| 120th Ave | Picadilly Rd | Watkins Rd | Principal | 6.95 | Paved | 2 | 16,000 | 1,560 | 111,200 | 10,842 |
| 128th Ave | Picadilly Rd | E/O Gun Club Rd | Minor | 1.45 | Paved | 2 | 16,000 | 270 | 23,200 | 392 |
| 128th Ave | E/O Gun Club Rd | Watkins Rd | Minor | 5.50 | Gravel | 2 | 2,000 | 270 | 11,000 | 1,485 |
| Brighton Rd | 96th Ave | 104th Ave | Multi-modal | 1.20 | Paved | 2 | 16,000 | 2,400 | 19,200 | 2,880 |
| Brighton Rd | 104th Ave | 120th Ave | Multi-modal | 2.10 | Paved | 2 | 16,000 | 3,350 | 33,600 | 7,035 |
| SH 2 | 80th Ave | 88th Ave | Principal | 1.30 | Paved | 4 | 32,000 | 16,660 | 41,600 | 21,658 |
| SH 2 | 88th Ave | 96th Ave | Principal | 1.40 | Paved | 4 | 32,000 | 24,910 | 44,800 | 34,874 |
| SH 2 | 96th Ave | I-76 | Principal | 3.55 | Paved | 4 | 32,000 | 17,110 | 113,600 | 60,741 |
| Peoria St | 96th Ave | 104th Ave | Multi-modal | 1.20 | Gravel | 2 | 2,000 | 180 | 2,400 | 216 |
| Potomac | 96th Ave | 104th Ave | Multi-modal | 1.00 | Gravel | 2 | 2,000 | 190 | 2,000 | 190 |
| Potomac | 104th Ave | 107th Ave | Multi-modal | 0.40 | Paved | 4 | 32,000 | 1,820 | 12,800 | 728 |

| Roadway | From | To | Arterial Classification | Length (miles) | Surface | Existing # Lanes | Capacity | 2021 Volume | VMC | VMT |
|---|---|---|---|---|---|---|---|---|---|---|
| Potomac | 107th Ave | SH 2 | Multi-modal | 0.75 | Paved | 2 | 16,000 | 1,820 | 12,000 | 1,365 |
| Chambers Rd | 96th Ave | 104th Ave | Minor | 1.00 | Paved | 2 | 16,000 | 10,130 | 16,000 | 10,130 |
| Chambers Rd | 104th Ave | 112th Ave | Minor | 1.00 | Paved | 2 | 16,000 | 9,420 | 16,000 | 9,420 |
| Chambers Rd | 112th Ave | 117th Ave | Minor | 0.60 | Paved | 3 | 24,000 | 12,700 | 14,400 | 7,620 |
| Chambers Rd | 117th Ave | 120th Ave | Minor | 0.35 | Paved | 4 | 32,000 | 11,230 | 11,200 | 3,931 |
| Buckley Rd | 120th Ave | Cameron Dr | Principal | 1.30 | Paved | 2 | 16,000 | 12,990 | 20,800 | 16,887 |
| Buckley Rd | Cameron Dr | I-76 | Principal | 0.20 | Paved | 4 | 32,000 | 10,980 | 6,400 | 2,196 |
| Tower Rd | 80th Ave | 88th Ave | Principal | 1.00 | Paved | 4 | 32,000 | 31,890 | 32,000 | 31,890 |
| Tower Rd | 88th Ave | 104th Ave | Principal | 2.00 | Paved | 4 | 32,000 | 25,620 | 64,000 | 51,240 |
| Tower Rd | 104th Ave | 120th Ave | Minor | 2.00 | Paved | 2 | 16,000 | 15,090 | 32,000 | 30,180 |
| Tower Rd* | 120th Ave | 124th Ave | Minor | 0.50 | Paved | 2 | 16,000 | 310 | 4,000 | 78 |
| Himalaya Rd | 96th Ave | 112th Ave | Minor | 2.05 | Gravel | 2 | 2,000 | 670 | 4,100 | 1,374 |
| Picadilly Rd | 88th Ave | 96th Ave | Principal | 1.00 | Gravel | 2 | 2,000 | 540 | 2,000 | 540 |
| Picadilly Rd | 112th Ave | 120th Ave | Principal | 1.00 | Gravel | 2 | 2,000 | 540 | 2,000 | 540 |
| Picadilly Rd* | 120th Ave | 128th Ave | Minor | 1.00 | Gravel | 2 | 2,000 | 270 | 1,000 | 135 |
| Picadilly Rd* | 128th Ave | 136th Ave | Minor | 1.00 | Paved | 2 | 16,000 | 270 | 8,000 | 135 |
| Powhaton Rd | 120th Ave | 136th Ave | Minor | 2.00 | Gravel | 2 | 2,000 | 670 | 4,000 | 1,340 |
| Hayesmount Rd | 120th Ave | 136th Ave | Minor | 2.00 | Paved | 2 | 16,000 | 940 | 32,000 | 1,880 |
| **Total** | | | | **82.60** | | | | | **1,342,300** | **677,209** |
| **Percent of Daily VMT Occurring in PM Peak Hour** | | | | | | | | | | **9%** |
| **Estimated Total PM Peak Hour VMC and VMT** | | | | | | | | | **120,807** | **60,949** |

**Notes:**

* It is assumed only 1/2 of the road will be C3's responsibility to build, the VMC and VMT divided by 2.

Arterial Classification: C3's 2010 Transportation Plan Roadway Classification with adjustments based on discussions with C3 Public Works staff.

Capacity: Arterial Road — 8000 vpd/lane (Adams County Transportation Plan 2012 planning level capacity). 2-lane Gravel Road — 2000 vpd (consistent with 2004 Study).

2021 Volume: projected Average Daily Traffic (ADT) volume based on 2014-2019 Commerce City traffic counts.

Percent of Daily VMT Occurring in PM Peak Hour derived from 2021 traffic volume data collected during 104$^{th}$ Avenue Signal Retiming effort.

VMC=Capacity * Segment Length.

VMT=Volume * Segment Length.

# APPENDIX D

# Core City Existing Roadway Inventory

## Core City Service Area 2021 Arterial System

| Roadway | From | To | Classification | Length (miles) | Surface | Lanes | Capacity | 2021 Volume | VMC | VMT |
|---|---|---|---|---|---|---|---|---|---|---|
| 56th Ave | Brighton Blvd | BNSF Crossing | Minor | 0.55 | Paved | 2 | 16,000 | 4,780 | 8,800 | 2,629 |
| 56th Ave | BNSF Crossing | Sandcreek Dr | Minor | 0.55 | Paved | 4 | 32,000 | 18,770 | 17,600 | 10,324 |
| 56th Ave | Sandcreek Dr | Eudora St | Minor | 0.10 | Paved | 2 | 16,000 | 20,940 | 1,600 | 2,094 |
| 56th Ave | Eudora St | Quebec Pkwy | Minor | 1.40 | Paved | 4 | 32,000 | 20,530 | 44,800 | 28,742 |
| 56th Ave* | Quebec Pkwy | Roslyn St | Principal | 0.10 | Paved | 4 | 32,000 | 35,040 | 1,600 | 1,752 |
| 56th Ave* | Spruce St | Central Park Blvd | Principal | 0.70 | Paved | 6 | 48,000 | 26,670 | 16,800 | 9,335 |
| 72nd Ave | Colorado Blvd | Hwy 85 | Minor | 0.65 | Paved | 2 | 16,000 | 4,300 | 10,400 | 2,795 |
| 72nd Ave | Hwy 85 | Quebec Pkwy | Minor | 1.30 | Paved | 4 | 32,000 | 17,170 | 41,600 | 22,321 |
| 74th Ave | Colorado Blvd | Hwy 85 | Principal | 0.65 | Paved | 4 | 32,000 | 33,170 | 20,800 | 21,561 |
| Dahlia St | 72nd Ave | 74th Ave | Minor | 0.25 | Paved | 2 | 16,000 | 6,350 | 4,000 | 1,588 |
| Hwy 2 | 64th Ave | 80th Ave | Principal | 2.50 | Paved | 4 | 32,000 | 14,690 | 80,000 | 36,725 |
| Quebec Pkwy | 56th Ave | 64th Ave | Principal | 1.00 | Paved | 6 | 48,000 | 32,880 | 48,000 | 32,880 |
| Quebec Pkwy | 64th Ave | Hwy 2 | Principal | 2.10 | Paved | 4 | 32,000 | 32,360 | 67,200 | 67,956 |
| **Total** | | | | **11.85** | | | | | **363,200** | **240,702** |
| **Percent of Daily VMT Occurring in PM Peak Hour** | | | | | | | | | | **9%** |
| **Estimated Total PM Peak Hour VMC and VMT** | | | | | | | | | **32,688** | **21,663** |

**Notes:**

* It is assumed only 1/2 of the road will be C3's responsibility to build, the VMC and Cost divided by 2.

Capacity: Arterial Road — 8000 vpd/lane (Adams County Transportation Plan 2012 planning level capacity). 2-lane Gravel Road — 2000 vpd (consistent with 2004 Study).

Peak Hour Capacity = Capacity * Percent of Daily VMT in PM Peak Hour.

Percent of Daily VMT Occurring in PM Peak Hour derived from 2021 traffic volume data collected during 104th Avenue Signal Retiming effort.

New Peak Hour VMC = (Future Capacity - Existing Capacity) * Segment Length.

Total Cost = Segment Length * Cost Per Mile.

# APPENDIX E

# Northern Range Roadway Improvement Cost Estimation

# Northern Range Ultimate Roadway Improvement Cost Estimate

| Roadway | From | To | Length (miles) | Existing Lanes | Future Lanes | Existing Peak Hour Capacity | Future Peak Hour Capacity | New Peak Hour VMC | Cost/Mile ($Million) | Total Cost ($Million) |
|---|---|---|---|---|---|---|---|---|---|---|
| 88th Ave | Wikiup Dr | Rosemary St | 0.55 | 2 | 4 | 1440 | 2880 | 792 | 7.840 | 4.312 |
| 88th Ave | Rosemary St | SH 2 | 0.90 | 2 | 4 | 1440 | 2880 | 1296 | 7.840 | 7.056 |
| 88th Ave | Tower Rd | Picadilly Rd | 2.00 | 2 | 4 | 1440 | 2880 | 2880 | 7.840 | 15.681 |
| 88th Ave | O' Brian Canal Bridge | | - | 0 | 4 | - | - | - | - | 2.752 |
| 96th Ave | Platte River | McKay Rd | 0.30 | 0 | 4 | 0 | 2880 | 864 | 8.932 | 2.680 |
| 96th Ave | McKay Rd | I-76 | 0.50 | 2 | 4 | 1440 | 2880 | 720 | 7.840 | 3.920 |
| 96th Ave | I-76 | Heinz Way | 1.60 | 2 | 4 | 1440 | 2880 | 2304 | 7.840 | 12.544 |
| 96th Ave | Eagle Creek Pkwy | Tower Rd | 4.75 | 2 | 4 | 1440 | 2880 | 6840 | 7.840 | 37.241 |
| 96th Ave | Tower Rd | E-470 | 0.85 | 2 | 6 | 1440 | 4320 | 2448 | 9.046 | 7.689 |
| 96th Ave | E-470 | Picadilly Rd | 1.15 | 2 | 6 | 1440 | 4320 | 3312 | 9.046 | 10.403 |
| 96th Ave | Second Creek Bridge | | - | 2 | 4 | - | - | - | - | 0.880 |
| 96th Ave | O' Brian Canal Bridge | | - | 2 | 4 | - | - | - | - | 1.440 |
| 96th Ave | First Creek Culvert | | - | - | - | - | - | - | - | 0.289 |
| 96th Ave | Grass Valley Gulch Culvert | | - | - | - | - | - | - | - | 0.313 |
| 104th Ave | Platte River | US 85 | 1.10 | 2 | 6 | 1440 | 4320 | 3168 | 9.046 | 9.951 |
| 104th Ave | US 85 | SH 2 | 1.80 | 4 | 6 | 2880 | 4320 | 2592 | 8.847 | 15.925 |
| 104th Ave | SH 2 | Chambers Rd | 2.05 | 4 | 6 | 2880 | 4320 | 2952 | 8.847 | 18.137 |
| 104th Ave | Chambers Rd | Tower Rd | 2.00 | 4 | 6 | 2880 | 4320 | 2880 | 8.847 | 17.695 |
| 104th Ave | Tower Rd | E-470 | 0.60 | 4 | 6 | 2880 | 4320 | 864 | 8.847 | 5.308 |
| 104th Ave | E-470 | Picadilly Rd | 1.50 | 0 | 6 | 0 | 4320 | 6480 | 10.345 | 15.517 |
| 104th Ave | Second Creek Bridge | | - | 4 | 6 | - | - | - | - | 0.780 |
| 104th Ave | O' Brian Canal Bridge | | - | 4 | 6 | - | - | - | - | 0.720 |
| 104th Ave | I-76 Bridge | | - | 4 | 6 | - | - | - | - | 3.000 |
| 112th Ave | Bison Ridge Rec Cen | Chambers Rd | 0.95 | 2 | 2 | 180 | 1440 | 1197 | 6.897 | 6.552 |
| 112th Ave | Parkside Dr | High Plains Pkwy | 0.60 | 2 | 2 | 180 | 1440 | 756 | 6.897 | 4.138 |
| 112th Ave | High Plains Pkwy | E-470 | 1.00 | 2 | 4 | 180 | 2880 | 2700 | 7.840 | 7.840 |
| 112th Ave | E-470 | Picadilly Rd | 1.55 | 2 | 4 | 180 | 2880 | 4185 | 7.840 | 12.152 |
| 112th Ave | Third Creek Bridge | | - | 0 | 4 | - | - | - | - | 3.440 |
| 112th Ave | Second Creek Culvert | | - | - | - | - | - | - | - | 0.500 |
| 120th Ave* | US 85 | Peoria St | 0.55 | 2 | 4 | 1440 | 2880 | 396 | 7.840 | 2.156 |
| 120th Ave | I-76 | Jasper St | 0.65 | 3 | 6 | 2160 | 4320 | 1404 | 8.947 | 5.815 |
| 120th Ave | Jasper St | Tower Rd | 1.75 | 2 | 6 | 1440 | 4320 | 5040 | 9.046 | 15.831 |
| 120th Ave* | Tower Rd | Picadilly Rd | 2.00 | 2 | 6 | 1440 | 4320 | 2880 | 9.046 | 9.046 |
| 120th Ave | Picadilly Rd | Watkins Rd | 6.95 | 2 | 6 | 1440 | 4320 | 20016 | 9.046 | 62.870 |
| 128th Ave | Picadilly Rd | E/O Gun Club Rd | 1.45 | 2 | 4 | 1440 | 2880 | 2088 | 7.840 | 11.368 |
| 128th Ave | E/O Gun Club Rd | Watkins Rd | 5.50 | 2 | 4 | 180 | 2880 | 14850 | 7.840 | 43.122 |
| Peoria St | 96th Ave | 104th Ave | 1.20 | 2 | 2 | 180 | 1440 | 1512 | 6.897 | 8.276 |
| Peoria St | First Creek Bridge | | - | 0 | 2 | - | - | - | - | 2.240 |
| Potomac | 96th Ave | 104th Ave | 1.00 | 2 | 2 | 180 | 1440 | 1260 | 6.897 | 6.897 |

| Roadway | From | To | Length (miles) | Existing Lanes | Future Lanes | Existing Peak Hour Capacity | Future Peak Hour Capacity | New Peak Hour VMC | Cost/Mile ($Million) | Total Cost ($Million) |
|---|---|---|---|---|---|---|---|---|---|---|
| Chambers Rd | 96th Ave | 104th Ave | 1.00 | 2 | 4 | 1440 | 2880 | 1440 | 7.840 | 7.840 |
| Chambers Rd | 104th Ave | 112th Ave | 1.00 | 2 | 4 | 1440 | 2880 | 1440 | 7.840 | 7.840 |
| Chambers Rd | 112th Ave | 117th Ave | 0.60 | 3 | 4 | 2160 | 2880 | 432 | 7.741 | 4.645 |
| Chambers Rd | Second Creek Bridge | | - | 0 | 4 | - | - | - | - | 1.720 |
| Buckley Rd | 120th Ave | Cameron Dr | 1.30 | 2 | 6 | 1440 | 4320 | 3744 | 9.046 | 11.760 |
| Buckley Rd | Cameron Dr | I-76 | 0.20 | 4 | 6 | 2880 | 4320 | 288 | 8.847 | 1.769 |
| Buckley Rd | O' Brian Canal Bridge | | - | 0 | 6 | - | - | - | - | 3.328 |
| High Plains Pkwy | 104th Ave | 120th Ave | 2.15 | 0 | 6 | 0 | 4320 | 9288 | 10.345 | 22.242 |
| Tower Rd | 80th Ave | 88th Ave | 1.00 | 4 | 6 | 2880 | 4320 | 1440 | 8.847 | 8.847 |
| Tower Rd | 88th Ave | 104th Ave | 2.00 | 4 | 6 | 2880 | 4320 | 2880 | 8.847 | 17.695 |
| Tower Rd | 104th Ave | High Plains Pkwy | 0.50 | 2 | 6 | 1440 | 4320 | 1440 | 9.046 | 4.523 |
| Tower Rd | High Plains Pkwy | 120th Ave | 1.50 | 2 | 4 | 1440 | 2880 | 2160 | 7.840 | 11.760 |
| Tower Rd* | 120th Ave | 124th Ave | 0.50 | 2 | 4 | 1440 | 2880 | 360 | 7.840 | 1.960 |
| Tower Rd | Third Creek Bridge | | - | 0 | 4 | - | - | - | - | 2.064 |
| Himalaya Rd | 88th Ave | 96th Ave | 1.00 | 0 | 4 | 0 | 2880 | 2880 | 8.932 | 8.932 |
| Himalaya Rd | 96th Ave | 112th Ave | 2.05 | 2 | 4 | 180 | 2880 | 5535 | 7.840 | 16.073 |
| Himalaya Rd | 112th Ave | 120th Ave | 1.00 | 0 | 4 | 0 | 2880 | 2880 | 8.932 | 8.932 |
| Himalaya Rd | Third Creek Bridge | | - | 0 | 4 | - | - | - | - | 3.440 |
| Picadilly Rd | Denver Line | 88th Ave | 0.90 | 0 | 6 | 0 | 4320 | 3888 | 10.345 | 9.310 |
| Picadilly Rd | 88th Ave | 96th Ave | 1.00 | 2 | 6 | 180 | 4320 | 4140 | 9.046 | 9.046 |
| Picadilly Rd | 96th Ave | 112th Ave | 2.05 | 0 | 6 | 0 | 4320 | 8856 | 10.345 | 21.207 |
| Picadilly Rd | 112th Ave | 120th Ave | 1.00 | 2 | 6 | 180 | 4320 | 4140 | 9.046 | 9.046 |
| Picadilly Rd* | 120th Ave | 128th Ave | 1.00 | 2 | 4 | 180 | 2880 | 1350 | 7.840 | 3.920 |
| Picadilly Rd* | 128th Ave | 136th Ave | 1.00 | 2 | 4 | 1440 | 2880 | 720 | 7.840 | 3.920 |
| Picadilly Rd | Third Creek Bridge | | - | 0 | 6 | - | - | - | - | 4.160 |
| Powhaton Rd | 120th Ave | 136th Ave | 2.00 | 2 | 4 | 180 | 2880 | 5400 | 7.840 | 15.681 |
| Hayesmount Rd | 120th Ave | 136th Ave | 2.00 | 2 | 4 | 1440 | 2880 | 2880 | 7.840 | 15.681 |
| **Total** | | | **73.55** | | | | | **166,257** | | **633.819** |

**Notes:**

* 1/2 in service area, the VMC and Cost divided by 2.

Capacity: Arterial Road — 8000 vpd/lane; 2-lane Gravel Road — 2000 vpd (same assumption as 2004 Study). Peak Hour Capacity = Capacity * Percent of Daily VMT in PM Peak Hour.

Percent of Daily VMT Occurring in PM Peak Hour from 104$^{th}$ Ave Signal Retiming 2021 ADT data.

New Peak Hour VMC = Newly Added Peak Hour Capacity * Segment Length.

Roadway Improvement Cost = Segment Length * Unit Price.

# APPENDIX F

# Core City Roadway Improvement Cost Estimation

## Core City Ultimate Roadway Improvement Cost Estimate

| Roadway | From | To | Length (miles) | Existing Lanes | Future Lanes | Existing Peak Hour Capacity | Future Peak Hour Capacity | New Peak Hour VMC | Cost/Mile ($Million) | Total Cost ($Million) |
|---|---|---|---|---|---|---|---|---|---|---|
| Quebec Pkwy | 64th Ave | Hwy 2 | 2.10 | 4 | 6 | 2880 | 4320 | 3024 | 8.847 | 18.579 |
| 72nd Ave | Colorado Blvd | Hwy 85 | 0.65 | 2 | 4 | 1440 | 2880 | 936 | 7.840 | 5.096 |
| Dahlia St | 72nd Ave | 74th Ave | 0.25 | 2 | 4 | 1440 | 2880 | 360 | 7.840 | 1.960 |
| **Total** | | | **3.00** | | | | | **4,320** | | **25.636** |

**Notes:**

Capacity: Arterial Road — 8000 vpd/lane; 2-lane Gravel Road — 2000 vpd (same assumption as 2004 Study). Peak Hour Capacity = Capacity * Percent of Daily VMT in PM Peak Hour.

Percent of Daily VMT Occurring in PM Peak Hour from 104$^{th}$ Ave Signal Retiming 2021 ADT data.

New Peak Hour VMC = Newly Added Peak Hour Capacity * Segment Length.

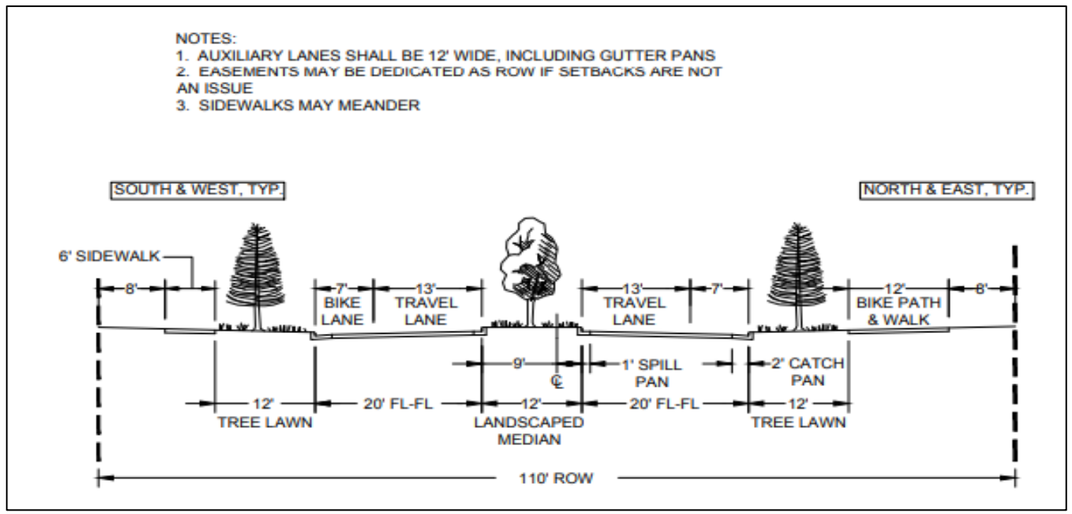
Roadway Improvement Cost = Segment Length * Unit Price.

# APPENDIX G

# Roadway Improvement Unit Price Estimation

| 2-Lane Multimodal* | TABLE 2B ITEM | UNIT COST | SECTION WIDTH | QTY PER LF | COST PER LF |
|---|---|---|---|---|---|
| CLEAR & GRUB | | $0.18 /SF | 86 FT | 86.00 SF | $15.48 |
| GRADING / COMPACTION (assume 36" avg cut/fill w/ 3:1 side-slopes) | | $25.00 /CY | 86 FT | 4.78 CY | $119.44 |
| SCARIFY & RECOMPACT (12") | | $20.00 /CY | 34 FT | 1.26 CY | $25.19 |
| ASPHALT PAVEMENT (7.5") | | $90.00 /TON | 34 FT | 1.63 TONS | $146.63 |
| AGGREGATE BASE COURSE (14") | | $55.45 /CY | 34 FT | 1.47 CY | $81.46 |
| CURB & GUTTER | | $42.00 /LF | 8 FT | 4.00 LF | $168.00 |
| CONCRETE SIDEWALK (4") ON SCARIFY & RECOMPACT (6") | | $80.00 /SY | 18 FT | 2.00 SY | $160.00 |
| MEDIAN LANDSCAPING (irrigation, planting, trees) | | $10.00 /SF | 11 FT | 11.00 SF | $110.00 |
| TREE LAWN LANDSCAPING | | $7.00 /SF | 23 FT | 23.00 SF | $161.00 |
| EROSION CONTROL / SEEDING | | $0.63 /SF | 48 FT | 48.00 SF | $30.24 |
| ROADWAY LIGHTING | | $133.00 /EA | | 1.00 EA | $133.00 |
| SIGNING / STRIPING/ INTERCONNECT | | | | | $0.00 |
| WORK ZONE TRAFFIC CONTROL | | $31.25 /EA | | 1.00 EA | $31.25 |
| TYPICAL ROADWAY DRAINAGE | | $87.00 /EA | | 1.00 EA | $87.00 |
| TYPICAL 8" WATER LINE, FITTINGS AND HYDRANTS | | | | | $0.00 |
| TYPICAL 8" SANITARY SEWER AND MANHOLES | | | | | $0.00 |
| MOBILIZATION / CONSTRUCTION SURVEY | | $37.50 /EA | | 1.00 EA | $37.50 |
| BUS STOP PADS/ SHELTER | | | | | $0.00 |
| | | | | TOTAL ROADWAY COST/LF | $1,306.19 |
| | | | | TOTAL ROADWAY COST PER MILE | $6,896,673.75 |
| | | | | **TOTAL ROADWAY COST PER MILE ROUNDED UP TO NEAREST $100K** | **$6,900,000.00** |

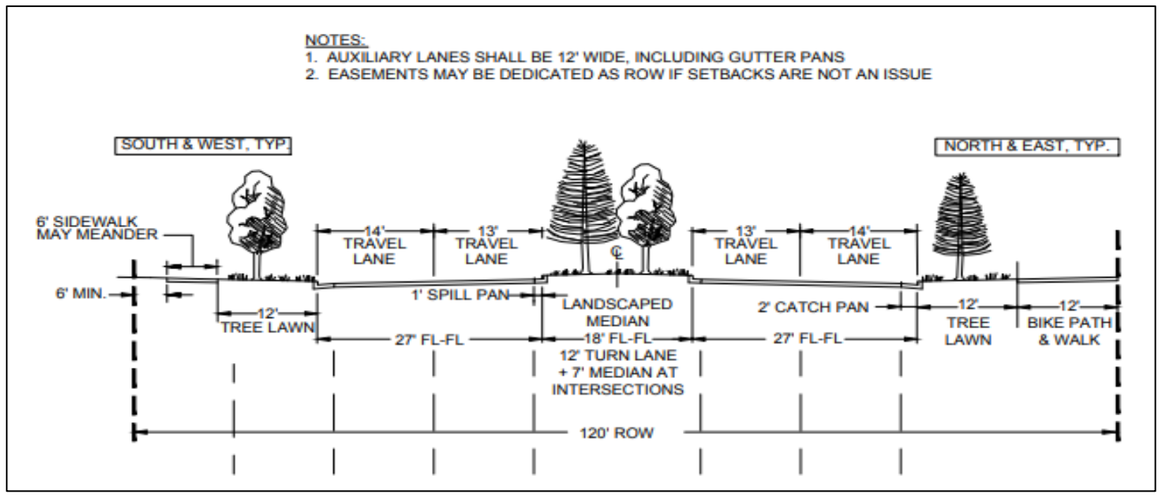
*Per C3 Typical section is 2 travel lanes and 2 bike/parking lanes with median, 49' fl to fl, 12' tree lawns and 6'/12' detached pedestrian sidewalks in a 110' ROW.




## 2 Lane Gravel Road to 2 Lane Multimodal Arterial

| 4-Lane Principal Arterial* | TABLE 2B ITEM | UNIT COST | SECTION WIDTH | QTY PER LF | COST PER LF |
|---|---|---|---|---|---|
| CLEAR & GRUB | | $0.18 /SF | 96 FT | 96.00 SF | $17.28 |
| GRADING / COMPACTION (assume 36" avg cut/fill w/ 3:1 side-slopes) | | $25.00 /CY | 96 FT | 5.33 CY | $133.33 |
| SCARIFY & RECOMPACT (12") | | $20.00 /CY | 48 FT | 1.78 CY | $35.56 |
| ASPHALT PAVEMENT (7.5") | | $90.00 /TON | 48 FT | 2.30 TONS | $207.00 |
| AGGREGATE BASE COURSE (14") | | $55.45 /CY | 48 FT | 2.07 CY | $115.01 |
| CURB & GUTTER | | $42.00 /LF | 8 FT | 4.00 LF | $168.00 |
| CONCRETE SIDEWALK (4") ON SCARIFY & RECOMPACT (6") | | $80.00 /SY | 18 FT | 2.00 SY | $160.00 |
| MEDIAN LANDSCAPING (irrigation, planting, trees) | | $10.00 /SF | 17 FT | 17.00 SF | $170.00 |
| TREE LAWN LANDSCAPING | | $7.00 /SF | 23 FT | 23.00 SF | $161.00 |
| EROSION CONTROL / SEEDING | | $0.63 /SF | 46 FT | 46.00 SF | $28.98 |
| ROADWAY LIGHTING | | $133.00 /EA | | 1.00 EA | $133.00 |
| SIGNING / STRIPING/ INTERCONNECT | | | | | $0.00 |
| WORK ZONE TRAFFIC CONTROL | | $31.25 /EA | | 1.00 EA | $31.25 |
| TYPICAL ROADWAY DRAINAGE | | $87.00 /EA | | 1.00 EA | $87.00 |
| TYPICAL 8" WATER LINE, FITTINGS AND HYDRANTS | | | | | $0.00 |
| TYPICAL 8" SANITARY SEWER AND MANHOLES | | | | | $0.00 |
| MOBILIZATION / CONSTRUCTION SURVEY | | $37.50 /EA | | 1.00 EA | $37.50 |
| BUS STOP PADS/ SHELTER | | | | | $0.00 |
| | | | | TOTAL ROADWAY COST/LF | $1,484.91 |
| | | | | TOTAL ROADWAY COST PER MILE | $7,840,305.24 |
| | | | | **TOTAL ROADWAY COST PER MILE ROUNDED UP TO NEAREST $100K** | **$7,900,000.00** |

*Per C3 Typical section is 4 lanes with median, or parking, 72' fl to fl, 12' tree lawn and 6'/12' detached pedestrian sidewalks in a 150' ROW.



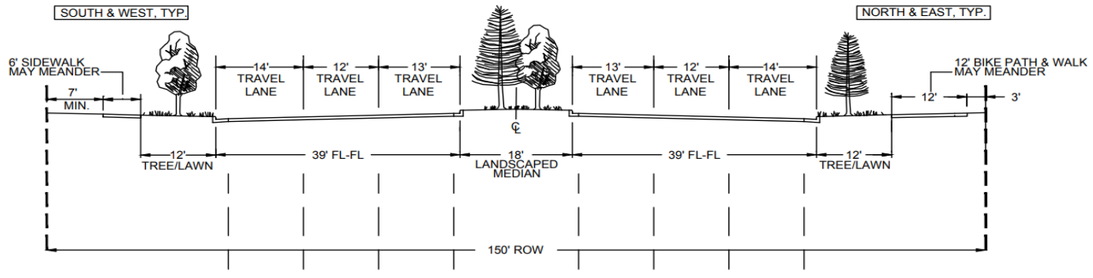

## 2 Lane Gravel Road to 4 Lane Arterial

| 6-Lane Principal Arterial* | TABLE 2A ITEM | UNIT COST | SECTION WIDTH | QTY PER LF | COST PER LF |
|---|---|---|---|---|---|
| CLEAR & GRUB | | $0.18 /SF | 126 FT | 126.00 SF | $22.68 |
| GRADING / COMPACTION (assume 36" avg cut/fill w/ 3:1 side-slopes) | | $25.00 /CY | 126 FT | 7.00 CY | $175.00 |
| SCARIFY & RECOMPACT (12") | | $20.00 /CY | 72 FT | 2.67 CY | $53.33 |
| ASPHALT PAVEMENT (7.5") | | $90.00 /TON | 72 FT | 3.45 TONS | $310.50 |
| AGGREGATE BASE COURSE (14") | | $55.45 /CY | 72 FT | 3.11 CY | $172.51 |
| CURB & GUTTER | | $42.00 /LF | 8 FT | 4.00 LF | $168.00 |
| CONCRETE SIDEWALK (4") ON SCARIFY & RECOMPACT (6") | | $80.00 /SY | 18 FT | 2.00 SY | $160.00 |
| MEDIAN LANDSCAPING (irrigation, planting, trees) | | $10.00 /SF | 17 FT | 17.00 SF | $170.00 |
| TREE LAWN LANDSCAPING | | $7.00 /SF | 23 FT | 23.00 SF | $161.00 |
| EROSION CONTROL / SEEDING | | $0.63 /SF | 50 FT | 50.00 SF | $31.50 |
| ROADWAY LIGHTING | | $133.00 /EA | | 1.00 EA | $133.00 |
| SIGNING / STRIPING/ INTERCONNECT | | | | | $0.00 |
| WORK ZONE TRAFFIC CONTROL | | $31.25 /EA | | 1.00 EA | $31.25 |
| TYPICAL ROADWAY DRAINAGE | | $87.00 /EA | | 1.00 EA | $87.00 |
| TYPICAL 8" WATER LINE, FITTINGS AND HYDRANTS | | | | | $0.00 |
| TYPICAL 8" SANITARY SEWER AND MANHOLES | | | | | $0.00 |
| MOBILIZATION / CONSTRUCTION SURVEY | | $37.50 /EA | | 1.00 EA | $37.50 |
| BUS STOP PADS/ SHELTER | | | | | $0.00 |
| | | | | TOTAL ROADWAY COST/LF | $1,713.27 |
| | | | | TOTAL ROADWAY COST PER MILE | $9,046,089.07 |
| | | | | **TOTAL ROADWAY COST PER MILE ROUNDED UP TO NEAREST $100K** | **$9,100,000.00** |

*Per C3 Typical section is 6 lanes with median, or parking, 96' fl to fl, 12' tree lawn and 6'/12' detached pedestrian sidewalks in a 150' ROW.

NOTES:

1. AUXILIARY LANES SHALL BE 12' WIDE, INCLUDING GUTTER PANS
2. EASEMENTS MAY BE DEDICATED AS RIGHT-OF-WAY IF SETBACKS ARE NOT AN ISSUE
3. SIDEWALKS MAY MEANDER
4. DUAL LEFT TURNS SHALL BE PROVIDED WHERE TRAFFIC VOLUMES DICTATE
5. SEE PRINCIPAL & REGIONAL ARTERIAL INTERSECTION DETAILS FOR TURN LANE AND ROW CONFIGURATOINS.

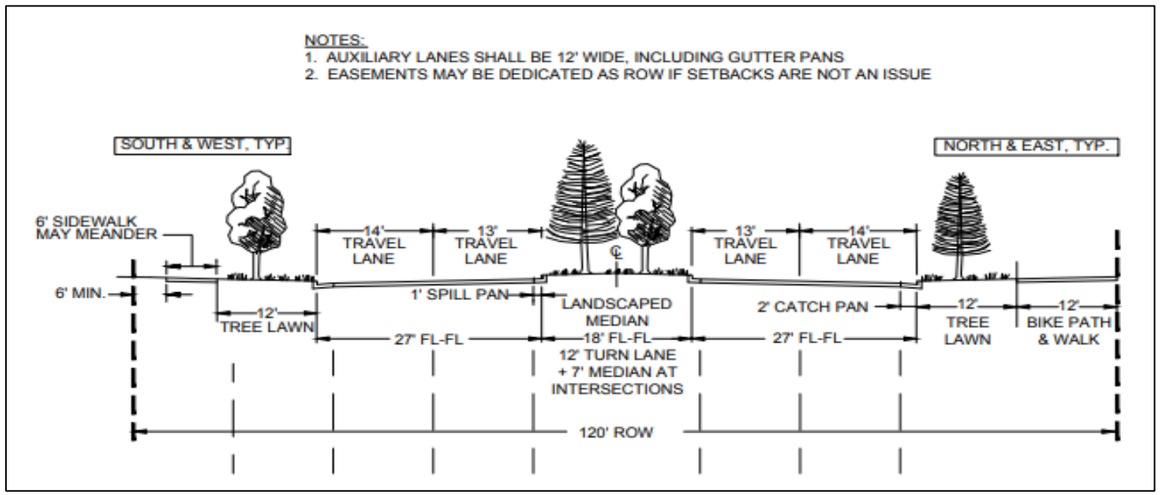



PRINCIPAL ARTERIAL
NOT TO SCALE

**2 Lane Gravel Road to 6 Lane Arterial**

| 4-Lane Principal Arterial* | TABLE 2B ITEM | UNIT COST | SECTION WIDTH | QTY PER LF | COST PER LF |
|---|---|---|---|---|---|
| CLEAR & GRUB | | $0.18 /SF | 120 FT | 120.00 SF | $21.60 |
| GRADING / COMPACTION (assume 36" avg cut/fill w/ 3:1 side-slopes) | | $25.00 /CY | 120 FT | 13.33 CY | $333.33 |
| SCARIFY & RECOMPACT (12") | | $20.00 /CY | 48 FT | 1.78 CY | $35.56 |
| ASPHALT PAVEMENT (7.5") | | $90.00 /TON | 48 FT | 2.30 TONS | $207.00 |
| AGGREGATE BASE COURSE (14") | | $55.45 /CY | 48 FT | 2.07 CY | $115.01 |
| CURB & GUTTER | | $42.00 /LF | 8 FT | 4.00 LF | $168.00 |
| CONCRETE SIDEWALK (4") ON SCARIFY & RECOMPACT (6") | | $80.00 /SY | 18 FT | 2.00 SY | $160.00 |
| MEDIAN LANDSCAPING (irrigation, planting, trees) | | $10.00 /SF | 17 FT | 17.00 SF | $170.00 |
| TREE LAWN LANDSCAPING | | $7.00 /SF | 23 FT | 23.00 SF | $161.00 |
| EROSION CONTROL / SEEDING | | $0.63 /SF | 46 FT | 50.00 SF | $31.50 |
| ROADWAY LIGHTING | | $133.00 /EA | | 1.00 EA | $133.00 |
| SIGNING / STRIPING/ INTERCONNECT | | | | | $0.00 |
| WORK ZONE TRAFFIC CONTROL | | $31.25 /EA | | 1.00 EA | $31.25 |
| TYPICAL ROADWAY DRAINAGE | | $87.00 /EA | | 1.00 EA | $87.00 |
| TYPICAL 8" WATER LINE, FITTINGS AND HYDRANTS | | | | | $0.00 |
| TYPICAL 8" SANITARY SEWER AND MANHOLES | | | | | $0.00 |
| MOBILIZATION / CONSTRUCTION SURVEY | | $37.50 /EA | | 1.00 EA | $37.50 |
| BUS STOP PADS/ SHELTER | | | | | $0.00 |
| | | | | TOTAL ROADWAY COST/LF | $1,691.75 |
| | | | | TOTAL ROADWAY COST PER MILE | $8,932,420.44 |
| | | | | **TOTAL ROADWAY COST PER MILE ROUNDED UP TO NEAREST $100K** | **$9,000,000.00** |

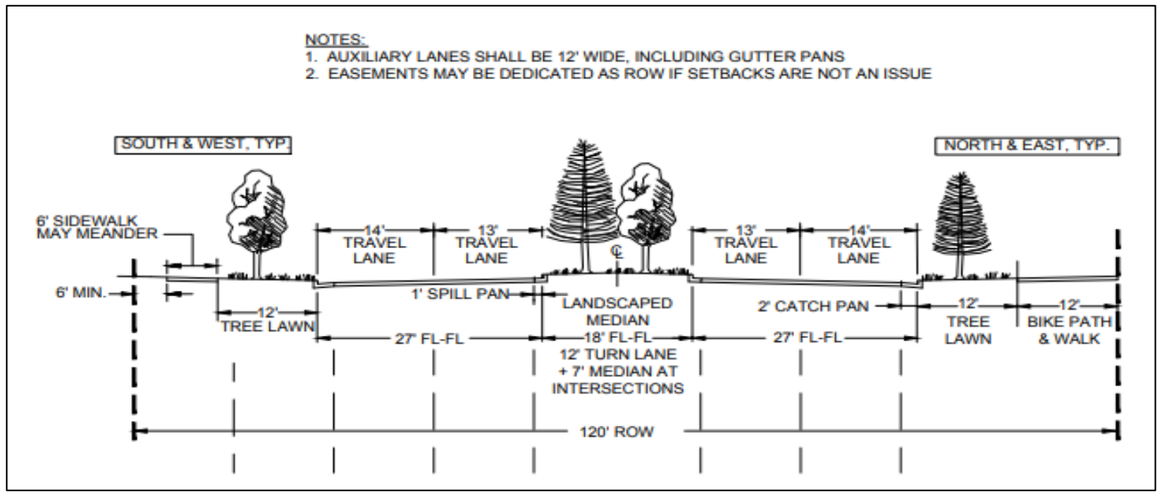
*Per C3 Typical section is 4 lanes with median, or parking, 72' fl to fl, 12' tree lawn and 6'/12' detached pedestrian sidewalks in a 150' ROW.




## 4 Lane Arterial

| 4-Lane Principal Arterial* | TABLE 2B ITEM | UNIT COST | SECTION WIDTH | QTY PER LF | COST PER LF |
|---|---|---|---|---|---|
| CLEAR & GRUB | | $0.18 /SF | 96 FT | 96.00 SF | $17.28 |
| GRADING / COMPACTION (assume 36" avg cut/fill w/ 3:1 side-slopes) | | $25.00 /CY | 96 FT | 5.33 CY | $133.33 |
| SCARIFY & RECOMPACT (12") | | $20.00 /CY | 48 FT | 1.78 CY | $35.56 |
| ASPHALT PAVEMENT (7.5") | | $90.00 /TON | 48 FT | 2.30 TONS | $207.00 |
| AGGREGATE BASE COURSE (14") | | $55.45 /CY | 48 FT | 2.07 CY | $115.01 |
| CURB & GUTTER | | $42.00 /LF | 8 FT | 4.00 LF | $168.00 |
| CONCRETE SIDEWALK (4") ON SCARIFY & RECOMPACT (6") | | $80.00 /SY | 18 FT | 2.00 SY | $160.00 |
| MEDIAN LANDSCAPING (irrigation, planting, trees) | | $10.00 /SF | 17 FT | 17.00 SF | $170.00 |
| TREE LAWN LANDSCAPING | | $7.00 /SF | 23 FT | 23.00 SF | $161.00 |
| EROSION CONTROL / SEEDING | | $0.63 /SF | 46 FT | 46.00 SF | $28.98 |
| ROADWAY LIGHTING | | $133.00 /EA | | 1.00 EA | $133.00 |
| SIGNING / STRIPING/ INTERCONNECT | | | | | $0.00 |
| WORK ZONE TRAFFIC CONTROL | | $31.25 /EA | | 1.00 EA | $31.25 |
| TYPICAL ROADWAY DRAINAGE | | $87.00 /EA | | 1.00 EA | $87.00 |
| TYPICAL 8" WATER LINE, FITTINGS AND HYDRANTS | | | | | $0.00 |
| TYPICAL 8" SANITARY SEWER AND MANHOLES | | | | | $0.00 |
| MOBILIZATION / CONSTRUCTION SURVEY | | $37.50 /EA | | 1.00 EA | $37.50 |
| BUS STOP PADS/ SHELTER | | | | | $0.00 |
| | | | | TOTAL ROADWAY COST/LF | $1,484.91 |
| | | | | TOTAL ROADWAY COST PER MILE | $7,840,305.24 |
| | | | | **TOTAL ROADWAY COST PER MILE ROUNDED UP TO NEAREST $100K** | **$7,900,000.00** |

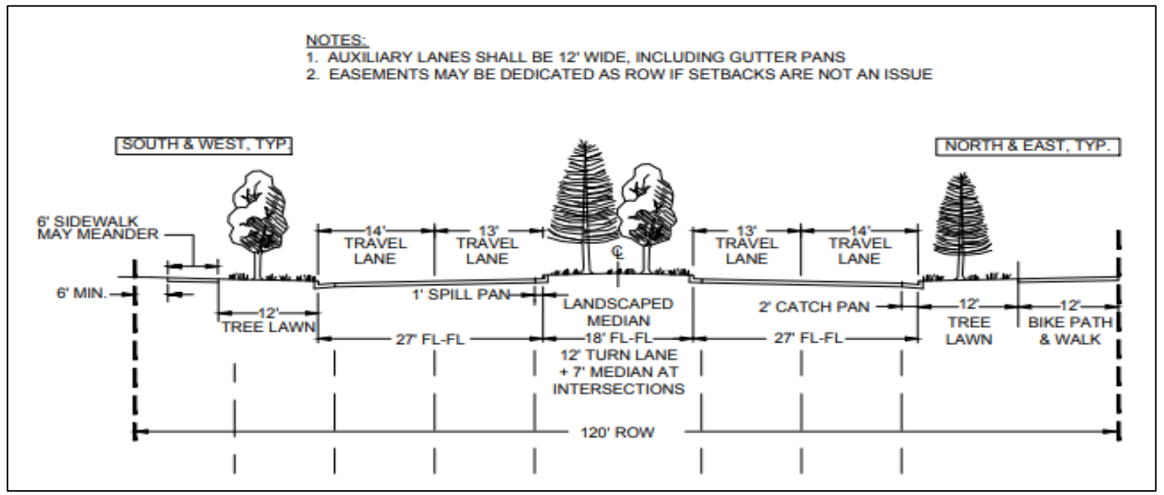
*Per C3 Typical section is 4 lanes with median, or parking, 72' fl to fl, 12' tree lawn and 6'/12' detached pedestrian sidewalks in a 150' ROW.




## 2 Lane Paved Road to 4 Lane Arterial

| 4-Lane Principal Arterial* | TABLE 2B ITEM | UNIT COST | SECTION WIDTH | QTY PER LF | COST PER LF |
|---|---|---|---|---|---|
| CLEAR & GRUB | | $0.18 /SF | 84 FT | 84.00 SF | $15.12 |
| GRADING / COMPACTION (assume 36" avg cut/fill w/ 3:1 side-slopes) | | $25.00 /CY | 84 FT | 4.67 CY | $116.67 |
| SCARIFY & RECOMPACT (12") | | $20.00 /CY | 48 FT | 1.78 CY | $35.56 |
| ASPHALT PAVEMENT (7.5") | | $90.00 /TON | 48 FT | 2.30 TONS | $207.00 |
| AGGREGATE BASE COURSE (14") | | $55.45 /CY | 48 FT | 2.07 CY | $115.01 |
| CURB & GUTTER | | $42.00 /LF | 8 FT | 4.00 LF | $168.00 |
| CONCRETE SIDEWALK (4") ON SCARIFY & RECOMPACT (6") | | $80.00 /SY | 18 FT | 2.00 SY | $160.00 |
| MEDIAN LANDSCAPING (irrigation, planting, trees) | | $10.00 /SF | 17 FT | 17.00 SF | $170.00 |
| TREE LAWN LANDSCAPING | | $7.00 /SF | 23 FT | 23.00 SF | $161.00 |
| EROSION CONTROL / SEEDING | | $0.63 /SF | 46 FT | 46.00 SF | $28.98 |
| ROADWAY LIGHTING | | $133.00 /EA | | 1.00 EA | $133.00 |
| SIGNING / STRIPING/ INTERCONNECT | | | | | $0.00 |
| WORK ZONE TRAFFIC CONTROL | | $31.25 /EA | | 1.00 EA | $31.25 |
| TYPICAL ROADWAY DRAINAGE | | $87.00 /EA | | 1.00 EA | $87.00 |
| TYPICAL 8" WATER LINE, FITTINGS AND HYDRANTS | | | | | $0.00 |
| TYPICAL 8" SANITARY SEWER AND MANHOLES | | | | | $0.00 |
| MOBILIZATION / CONSTRUCTION SURVEY | | $37.50 /EA | | 1.00 EA | $37.50 |
| BUS STOP PADS/ SHELTER | | | | | $0.00 |
| | | | | TOTAL ROADWAY COST/LF | $1,466.08 |
| | | | | TOTAL ROADWAY COST PER MILE | $7,740,900.44 |
| | | | | **TOTAL ROADWAY COST PER MILE ROUNDED UP TO NEAREST $100K** | **$7,800,000.00** |

*Per C3 Typical section is 4 lanes with median, or parking, 72' fl to fl, 12' tree lawn and 6'/12' detached pedestrian sidewalks in a 150' ROW.



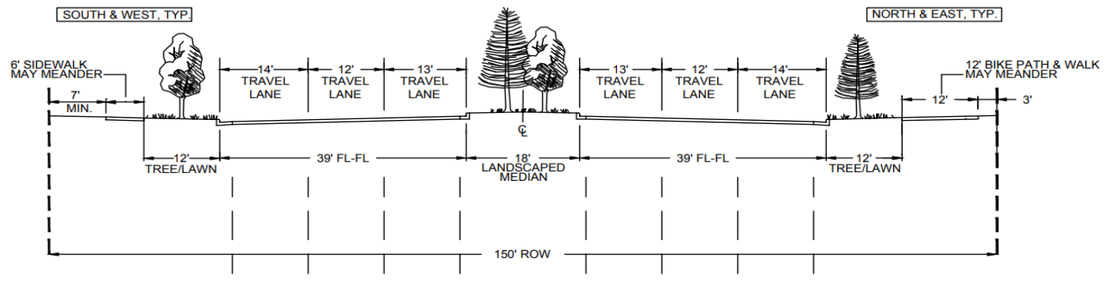

## 3 Lane to 4 Lane Arterial

| 6-Lane Principal Arterial* | TABLE 2A ITEM | UNIT COST | SECTION WIDTH | QTY PER LF | COST PER LF |
|---|---|---|---|---|---|
| CLEAR & GRUB | | $0.18 /SF | 150 FT | 150.00 SF | $27.00 |
| GRADING / COMPACTION (assume 36" avg cut/fill w/ 3:1 side-slopes) | | $25.00 /CY | 150 FT | 16.67 CY | $416.67 |
| SCARIFY & RECOMPACT (12") | | $20.00 /CY | 72 FT | 2.67 CY | $53.33 |
| ASPHALT PAVEMENT (7.5") | | $90.00 /TON | 72 FT | 3.45 TONS | $310.50 |
| AGGREGATE BASE COURSE (14") | | $55.45 /CY | 72 FT | 3.11 CY | $172.51 |
| CURB & GUTTER | | $42.00 /LF | 8 FT | 4.00 LF | $168.00 |
| CONCRETE SIDEWALK (4") ON SCARIFY & RECOMPACT (6") | | $80.00 /SY | 18 FT | 2.00 SY | $160.00 |
| MEDIAN LANDSCAPING (irrigation, planting, trees) | | $10.00 /SF | 17 FT | 17.00 SF | $170.00 |
| TREE LAWN LANDSCAPING | | $7.00 /SF | 23 FT | 23.00 SF | $161.00 |
| EROSION CONTROL / SEEDING | | $0.63 /SF | 50 FT | 50.00 SF | $31.50 |
| ROADWAY LIGHTING | | $133.00 /EA | | 1.00 EA | $133.00 |
| SIGNING / STRIPING/ INTERCONNECT | | | | | $0.00 |
| WORK ZONE TRAFFIC CONTROL | | $31.25 /EA | | 1.00 EA | $31.25 |
| TYPICAL ROADWAY DRAINAGE | | $87.00 /EA | | 1.00 EA | $87.00 |
| TYPICAL 8" WATER LINE, FITTINGS AND HYDRANTS | | | | | $0.00 |
| TYPICAL 8" SANITARY SEWER AND MANHOLES | | | | | $0.00 |
| MOBILIZATION / CONSTRUCTION SURVEY | | $37.50 /EA | | 1.00 EA | $37.50 |
| BUS STOP PADS/ SHELTER | | | | | $0.00 |
| | | | | TOTAL ROADWAY COST/LF | $1,959.26 |
| | | | | TOTAL ROADWAY COST PER MILE | $10,344,898.67 |
| | | | | **TOTAL ROADWAY COST PER MILE ROUNDED UP TO NEAREST $100K** | **$10,400,000.00** |

*Per C3 Typical section is 6 lanes with median, or parking, 96' fl to fl, 12' tree lawn and 6'/12' detached pedestrian sidewalks in a 150' ROW.

NOTES:

1. AUXILIARY LANES SHALL BE 12' WIDE, INCLUDING GUTTER PANS
2. EASEMENTS MAY BE DEDICATED AS RIGHT-OF-WAY IF SETBACKS ARE NOT AN ISSUE
3. SIDEWALKS MAY MEANDER
4. DUAL LEFT TURNS SHALL BE PROVIDED WHERE TRAFFIC VOLUMES DICTATE
5. SEE PRINCIPAL & REGIONAL ARTERIAL INTERSECTION DETAILS FOR TURN LANE AND ROW CONFIGURATOINS.




PRINCIPAL ARTERIAL
NOT TO SCALE

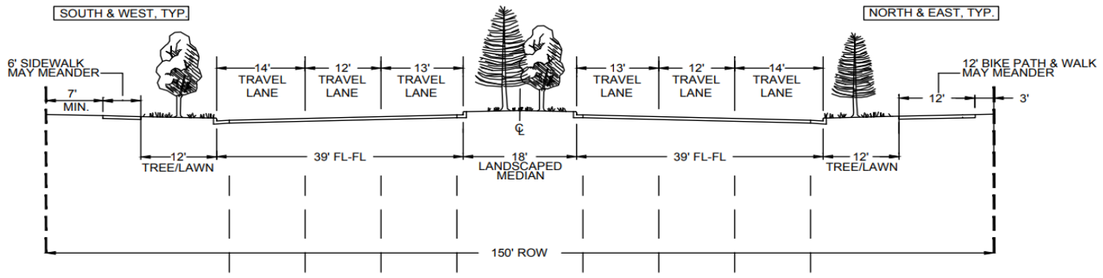
**6 Lane Arterial**

| 6-Lane Principal Arterial* | TABLE 2A ITEM | UNIT COST | SECTION WIDTH | QTY PER LF | COST PER LF |
|---|---|---|---|---|---|
| CLEAR & GRUB | | $0.18 /SF | 126 FT | 126.00 SF | $22.68 |
| GRADING / COMPACTION (assume 36" avg cut/fill w/ 3:1 side-slopes) | | $25.00 /CY | 126 FT | 7.00 CY | $175.00 |
| SCARIFY & RECOMPACT (12") | | $20.00 /CY | 72 FT | 2.67 CY | $53.33 |
| ASPHALT PAVEMENT (7.5") | | $90.00 /TON | 72 FT | 3.45 TONS | $310.50 |
| AGGREGATE BASE COURSE (14") | | $55.45 /CY | 72 FT | 3.11 CY | $172.51 |
| CURB & GUTTER | | $42.00 /LF | 8 FT | 4.00 LF | $168.00 |
| CONCRETE SIDEWALK (4") ON SCARIFY & RECOMPACT (6") | | $80.00 /SY | 18 FT | 2.00 SY | $160.00 |
| MEDIAN LANDSCAPING (irrigation, planting, trees) | | $10.00 /SF | 17 FT | 17.00 SF | $170.00 |
| TREE LAWN LANDSCAPING | | $7.00 /SF | 23 FT | 23.00 SF | $161.00 |
| EROSION CONTROL / SEEDING | | $0.63 /SF | 50 FT | 50.00 SF | $31.50 |
| ROADWAY LIGHTING | | $133.00 /EA | | 1.00 EA | $133.00 |
| SIGNING / STRIPING/ INTERCONNECT | | | | | $0.00 |
| WORK ZONE TRAFFIC CONTROL | | $31.25 /EA | | 1.00 EA | $31.25 |
| TYPICAL ROADWAY DRAINAGE | | $87.00 /EA | | 1.00 EA | $87.00 |
| TYPICAL 8" WATER LINE, FITTINGS AND HYDRANTS | | | | | $0.00 |
| TYPICAL 8" SANITARY SEWER AND MANHOLES | | | | | $0.00 |
| MOBILIZATION / CONSTRUCTION SURVEY | | $37.50 /EA | | 1.00 EA | $37.50 |
| BUS STOP PADS/ SHELTER | | | | | $0.00 |
| | | | | TOTAL ROADWAY COST/LF | $1,713.27 |
| | | | | | |
| | | | | TOTAL ROADWAY COST PER MILE | $9,046,089.07 |
| | | | | | |
| | | | | **TOTAL ROADWAY COST PER MILE ROUNDED UP TO NEAREST $100K** | **$9,100,000.00** |

*Per C3 Typical section is 6 lanes with median, or parking, 96' fl to fl, 12' tree lawn and 6'/12' detached pedestrian sidewalks in a 150' ROW.

NOTES:

1. AUXILIARY LANES SHALL BE 12' WIDE, INCLUDING GUTTER PANS
2. EASEMENTS MAY BE DEDICATED AS RIGHT-OF-WAY IF SETBACKS ARE NOT AN ISSUE
3. SIDEWALKS MAY MEANDER
4. DUAL LEFT TURNS SHALL BE PROVIDED WHERE TRAFFIC VOLUMES DICTATE
5. SEE PRINCIPAL & REGIONAL ARTERIAL INTERSECTION DETAILS FOR TURN LANE AND ROW CONFIGURATOINS.




PRINCIPAL ARTERIAL
NOT TO SCALE

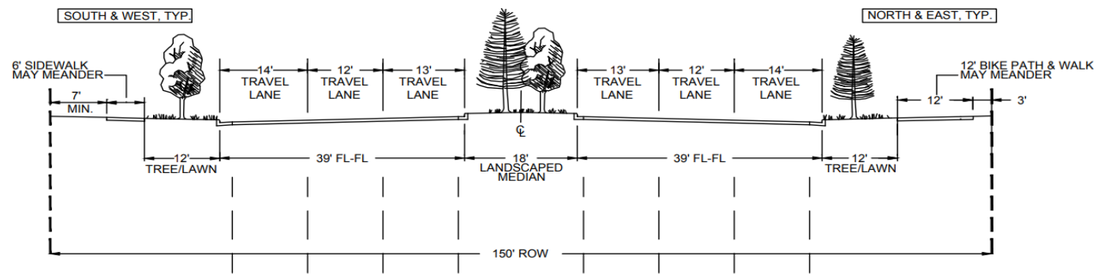
**2 Lane Paved Road to 6 Lane Arterial**

| 6-Lane Principal Arterial* | TABLE 2A ITEM | UNIT COST | SECTION WIDTH | QTY PER LF | COST PER LF |
|---|---|---|---|---|---|
| CLEAR & GRUB | | $0.18 /SF | 114 FT | 114.00 SF | $20.52 |
| GRADING / COMPACTION (assume 36" avg cut/fill w/ 3:1 side-slopes) | | $25.00 /CY | 114 FT | 6.33 CY | $158.33 |
| SCARIFY & RECOMPACT (12") | | $20.00 /CY | 72 FT | 2.67 CY | $53.33 |
| ASPHALT PAVEMENT (7.5") | | $90.00 /TON | 72 FT | 3.45 TONS | $310.50 |
| AGGREGATE BASE COURSE (14") | | $55.45 /CY | 72 FT | 3.11 CY | $172.51 |
| CURB & GUTTER | | $42.00 /LF | 8 FT | 4.00 LF | $168.00 |
| CONCRETE SIDEWALK (4") ON SCARIFY & RECOMPACT (6") | | $80.00 /SY | 18 FT | 2.00 SY | $160.00 |
| MEDIAN LANDSCAPING (irrigation, planting, trees) | | $10.00 /SF | 17 FT | 17.00 SF | $170.00 |
| TREE LAWN LANDSCAPING | | $7.00 /SF | 23 FT | 23.00 SF | $161.00 |
| EROSION CONTROL / SEEDING | | $0.63 /SF | 50 FT | 50.00 SF | $31.50 |
| ROADWAY LIGHTING | | $133.00 /EA | | 1.00 EA | $133.00 |
| SIGNING / STRIPING/ INTERCONNECT | | | | | $0.00 |
| WORK ZONE TRAFFIC CONTROL | | $31.25 /EA | | 1.00 EA | $31.25 |
| TYPICAL ROADWAY DRAINAGE | | $87.00 /EA | | 1.00 EA | $87.00 |
| TYPICAL 8" WATER LINE, FITTINGS AND HYDRANTS | | | | | $0.00 |
| TYPICAL 8" SANITARY SEWER AND MANHOLES | | | | | $0.00 |
| MOBILIZATION / CONSTRUCTION SURVEY | | $37.50 /EA | | 1.00 EA | $37.50 |
| BUS STOP PADS/ SHELTER | | | | | $0.00 |
| | | | | TOTAL ROADWAY COST/LF | $1,694.45 |
| | | | | TOTAL ROADWAY COST PER MILE | $8,946,684.27 |
| | | | | **TOTAL ROADWAY COST PER MILE ROUNDED UP TO NEAREST $100K** | **$9,000,000.00** |

*Per C3 Typical section is 6 lanes with median, or parking, 96' fl to fl, 12' tree lawn and 6'/12' detached pedestrian sidewalks in a 150' ROW.

NOTES:

1. AUXILIARY LANES SHALL BE 12' WIDE, INCLUDING GUTTER PANS
2. EASEMENTS MAY BE DEDICATED AS RIGHT-OF-WAY IF SETBACKS ARE NOT AN ISSUE
3. SIDEWALKS MAY MEANDER
4. DUAL LEFT TURNS SHALL BE PROVIDED WHERE TRAFFIC VOLUMES DICTATE
5. SEE PRINCIPAL & REGIONAL ARTERIAL INTERSECTION DETAILS FOR TURN LANE AND ROW CONFIGURATOINS.




PRINCIPAL ARTERIAL
NOT TO SCALE

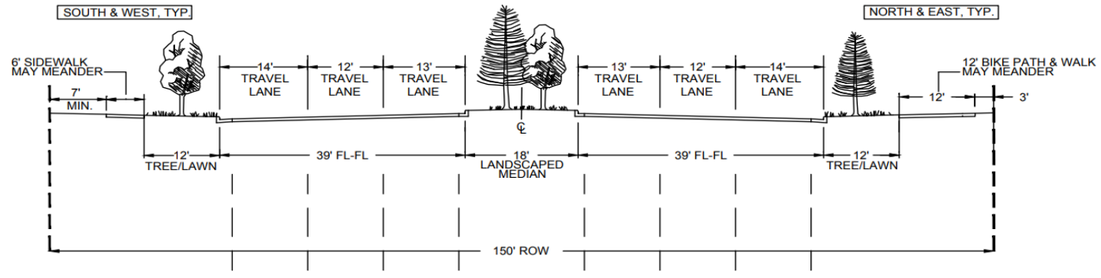
**3 Lane to 6 Lane Arterial**

| 6-Lane Principal Arterial* | TABLE 2A ITEM | UNIT COST | SECTION WIDTH | QTY PER LF | COST PER LF |
|---|---|---|---|---|---|
| CLEAR & GRUB | | $0.18 /SF | 102 FT | 102.00 SF | $18.36 |
| GRADING / COMPACTION (assume 36" avg cut/fill w/ 3:1 side-slopes) | | $25.00 /CY | 102 FT | 5.67 CY | $141.67 |
| SCARIFY & RECOMPACT (12") | | $20.00 /CY | 72 FT | 2.67 CY | $53.33 |
| ASPHALT PAVEMENT (7.5") | | $90.00 /TON | 72 FT | 3.45 TONS | $310.50 |
| AGGREGATE BASE COURSE (14") | | $55.45 /CY | 72 FT | 3.11 CY | $172.51 |
| CURB & GUTTER | | $42.00 /LF | 8 FT | 4.00 LF | $168.00 |
| CONCRETE SIDEWALK (4") ON SCARIFY & RECOMPACT (6") | | $80.00 /SY | 18 FT | 2.00 SY | $160.00 |
| MEDIAN LANDSCAPING (irrigation, planting, trees) | | $10.00 /SF | 17 FT | 17.00 SF | $170.00 |
| TREE LAWN LANDSCAPING | | $7.00 /SF | 23 FT | 23.00 SF | $161.00 |
| EROSION CONTROL / SEEDING | | $0.63 /SF | 50 FT | 50.00 SF | $31.50 |
| ROADWAY LIGHTING | | $133.00 /EA | | 1.00 EA | $133.00 |
| SIGNING / STRIPING/ INTERCONNECT | | | | | $0.00 |
| WORK ZONE TRAFFIC CONTROL | | $31.25 /EA | | 1.00 EA | $31.25 |
| TYPICAL ROADWAY DRAINAGE | | $87.00 /EA | | 1.00 EA | $87.00 |
| TYPICAL 8" WATER LINE, FITTINGS AND HYDRANTS | | | | | $0.00 |
| TYPICAL 8" SANITARY SEWER AND MANHOLES | | | | | $0.00 |
| MOBILIZATION / CONSTRUCTION SURVEY | | $37.50 /EA | | 1.00 EA | $37.50 |
| BUS STOP PADS/ SHELTER | | | | | $0.00 |
| | | | | TOTAL ROADWAY COST/LF | $1,675.62 |
| | | | | TOTAL ROADWAY COST PER MILE | $8,847,279.47 |
| | | | | **TOTAL ROADWAY COST PER MILE ROUNDED UP TO NEAREST $100K** | **$8,900,000.00** |

*Per C3 Typical section is 6 lanes with median, or parking, 96' fl to fl, 12' tree lawn and 6'/12' detached pedestrian sidewalks in a 150' ROW.

NOTES:

1. AUXILIARY LANES SHALL BE 12' WIDE, INCLUDING GUTTER PANS
2. EASEMENTS MAY BE DEDICATED AS RIGHT-OF-WAY IF SETBACKS ARE NOT AN ISSUE
3. SIDEWALKS MAY MEANDER
4. DUAL LEFT TURNS SHALL BE PROVIDED WHERE TRAFFIC VOLUMES DICTATE
5. SEE PRINCIPAL & REGIONAL ARTERIAL INTERSECTION DETAILS FOR TURN LANE AND ROW CONFIGURATOINS.




PRINCIPAL ARTERIAL
NOT TO SCALE

**4 Lane to 6 Lane Arterial**

## BRIDGE COSTS PLANNING LEVEL ESTIMATION

| Bridge | Roadway | Crossing | Classification | Lanes | Length | Width | Area | Unit Cost | Cost | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| ADA14N-122.0096 | Buckley Rd/High Plains Pkwy | O'Brian Canal | Principal Arterial | 6 | 80 | 104 | 8,320 | $400.00 | $3,328,000 | *Complete replacement* |
| COMC-10-0.8-01 | Tower Rd | Third Creek | Minor Arterial | 4 | 60 | 86 | 5,160 | $400.00 | $2,064,000 | *Complete replacement* |
| | Himalaya Rd | Third Creek | Minor Arterial | 4 | 100 | 86 | 8,600 | $400.00 | $3,440,000 | *New bridge* |
| | E 112th Ave | Third Creek | Minor Arterial | 4 | 100 | 86 | 8,600 | $400.00 | $3,440,000 | *Complete replacement* |
| | Picadilly Rd | Third Creek | Principal Arterial | 6 | 100 | 104 | 10,400 | $400.00 | $4,160,000 | *New bridge* |
| COMC-24-0.1-01 | E 96th Ave | Second Creek | Minor Arterial | Add 2 | 110 | 40 | 4,400 | $200.00 | $880,000 | *Adding EB bridge* |
| COMC-21-0.3-01 | Chambers Rd | Second Creek | Minor Arterial | 4 | 50 | 86 | 4,300 | $400.00 | $1,720,000 | *Complete replacement* |
| COMC-09-0.4-01A/B | E 104th Ave | Second Creek | Principal Arterial | Add 2 | 130 | 30 | 3,900 | $200.00 | $780,000 | *Adding lanes to inside of existing bridge* |
| | E 104th Ave | O'Brian Canal | Principal Arterial | Add 2 | 120 | 30 | 3,600 | $200.00 | $720,000 | *Adding lanes to inside of existing bridge (CDOT bridge )* |
| | E 104th Ave | I-76 | Principal Arterial | Add 2 | 400 | 30 | 12,000 | $250.00 | $3,000,000 | *Adding lanes to inside of existing bridge (CDOT bridge )* |
| | Peoria St | First Creek | Multimodal Arterial | 2 | 80 | 70 | 5,600 | $400.00 | $2,240,000 | *New bridge* |
| COMC-2-1.5-01 | E 96th Ave | O'Brian Canal | Minor Arterial | Add 2 | 90 | 40 | 3,600 | $400.00 | $1,440,000 | *Assumes existing bridge remains as WB lanes* |
| ADA088-008.0047 | E 88th Ave | O'Brian Canal | Minor Arterial | 4 | 80 | 86 | 6,880 | $400.00 | $2,752,000 | *Complete replacement* |

| CULVERT COSTS PLANNING LEVEL ESTIMATION | | | | | | |
|---|---|---|---|---|---|---|
| **Stream** | **Crossing** | **Length** | **Size** | **Unit Cost** | **Cost** | **Comments** |
| First Creek | 96th Ave | 165 | 6'x10' | $1,750.00 | $288,750 | |
| Second Creek | O'Brian Canal/E 112th | 250 | 6'X12' | $2,000.00 | $500,000 | |
| Grass Valley Gulch | 96th Ave | 250 | 4'x8' | $1,250.00 | $312,500 | |