# Transportation Impact Fee Study

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# INTRODUCTION

Prior to passage of the Montana Impact Fee Act, the City of Missoula adopted several impact fees for growth-related infrastructure. This report provides the supporting documentation for an additional transportation impact fee that has been developed according to the requirements of the new state law, as discussed below. The label "transportation" is used because Missoula intends to incorporate multi-modal features into future road improvements. For example, improvements to arterial and collector streets will be designed to include appropriate pavement width for bike lanes, bus pull-outs with shelters, sidewalks, street trees and lighting, as needed to enhance Missoula's walkability.

## Highlights of the Montana Impact Fee Act

Transportation impact fees for the City of Missoula comply with all requirements in the new state enabling legislation. Public facilities for "hard services" (i.e. water, wastewater, stormwater, transportation) and public safety (i.e. police, emergency medical rescue, fire protection) only require a simple majority approval by elected officials. Other public facilities may be funded by impact fees with a two-thirds majority approval of the governing body. The cost of bus, bike and pedestrian improvements within the right-of-way of a road will be included in the cost of the road improvements. Multi-modal facilities not within the right-of-way of roads are not addressed in this study.

Montana requires a capital improvements plan (CIP) for growth-related projects. To be funded by impact fees, improvements must have a useful life of at least ten years. The CIP must be updated at least every two years. Therefore, impact fee calculations should be in current dollars (not inflated over time), with the costs updated as part of the regular budgetary process. In Montana, "new development may not be held to a higher level of service than existing users" although higher standards are acceptable if there is a funding plan to correct the deficiency.

The Montana Act also addresses adoption, collection and expenditure of the fees. The main procedural requirement is the involvement of an Impact Fee Advisory Committee that must include at least one representative of the development community and one certified public accountant. To help cover impact fee expenses, Montana allows an administrative surcharge not to exceed five percent of the total impact fee.

# FUNDING STRATEGY

For local governments, the first step in evaluating funding options for transportation improvements is to determine the basic rules of the game established by the state constitution and statutes. Some states have more conservative legal parameters that basically restrict local government to specifically authorized actions. In contrast, "home-rule" states grant localities all powers that are not precluded or preempted by the state constitution or statutes[1].

The second step in evaluating funding options for transportation improvements is to consider the rational nexus and proportionality tests established by case law. To clarify the question of who pays for what, it is useful to distinguish between project-level improvements and system improvements (i.e., infrastructure that benefits multiple development projects and typically located off-site). The need for project-level improvements may be addressed through development exactions that remain roughly proportional to the specific project. Project-level improvements are typically specified in a development agreement and should be distinguished from the need for system improvements, determined by legislatively adopted standards. Because system improvements are larger and more costly, they typically require funding from multiple development projects and/or broad-based revenues.

Considering the functional classification[2] of street improvements can provide guidance to local government decision makers when wrestling with nexus and proportionality tests. In general, local streets are regarded as project-level improvements and arterials are typically considered system improvements. Local governments may determine collector streets to be either project or system improvements. To help with this determination, common characteristics for different functional classifications of roads are summarized in Figure 1.

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[1] Ewing, Reid. 1993. *Transportation Utility Fees*. Transportation Research Record 1395.

[2] In brief, the concept of functional classification recognizes the different design characteristics and purposes of at least three types of streets. Local streets are the smallest and least expensive improvements, designed to accommodate slow-moving traffic and providing access to adjacent properties. At the other end of the spectrum, arterial streets are the largest and most expensive improvements, designed to handle fast-moving traffic making longer distance trips, thus requiring restricted access to adjacent properties. Collector streets are generally the "mid-range" improvements that fall between local and arterial streets.

## Local Streets

Local streets are the smallest and least expensive improvements, designed to accommodate slow-moving traffic and providing access to adjacent properties. Most local governments require local street construction by the private sector. Capital costs for project-level improvements are typically passed along to homebuyers and renters that occupy new development.

## Collectors

Collector streets are generally the "mid-range" improvements that fall between local and arterial streets. If a local government defines collector streets to be "system improvements" they are eligible for impact fee funding. Given the more restricted service areas of collector streets, nexus considerations may lead to the establishment of benefit districts to track collection and expenditure of fees. The use of benefit districts ensures sufficient benefit by construction of collector roads in general proximity to new development paying the impact fees. To avoid the complexity and fiscal limitations of benefit districts and to reduce the magnitude of road impact fees, local governments may determine that collector streets are project level improvements. A caveat to this approach is the proportionality limitation for project-level improvements. The following alternatives are viable funding options for transportation improvements that cannot be fairly and reasonably exacted from one particular development project.

### *Pioneering or Front-Ending Agreements*

To open up a new area for development, property owners often establish legal mechanisms whereby the infrastructure "pioneer" may recoup capital costs from subsequent developers in the benefit area. Pioneering or front-ending agreements are sometimes negotiated between individual property owners, but usually these agreements require the involvement of local government.

### *Special Improvement Districts*

Special districts used to provide infrastructure have different names, such as Community Development District, Community Facilities District, or Montana's Special Improvement District. The specific requirements and types of special districts vary by state. In general, special districts range from non-profit corporations to quasi-governmental entities with broad powers. Key differences between the types of special districts include their ability to levy property taxes and the composition of the governing board. The basic governance options are election of a board of directors by property owners, appointment of a board by local elected officials, or the local elected officials function as the board of directors.

### *Special Assessment*

Special assessments may be levied only on properties that realize some direct benefit from a capital improvement. One advantage of a special assessment is that vacant land is required to pay for transportation improvements. Therefore, revenue is generated even before new development occurs.

### *Impact Fees*

Impact fees may be used to fund system improvements that benefit several development projects or even new development throughout an entire jurisdiction. If impact fees are focused on arterial streets, collection and expenditure zones may not be necessary. However, benefit districts should be considered in jurisdictions that cover a large geographic area and have “traffic sheds” that restrict travel patterns.

## Arterials

Arterial streets are the largest and most expensive improvements, designed to handle fast-moving traffic making longer distance trips, thus requiring restricted access to adjacent properties. Because arterials function as trunk lines, moving vehicles into, out of and across urban areas, they frequently have jurisdiction-wide funding sources. Also, the major expenditures for arterial road construction usually require funding from several revenue sources, as discussed below. Impact fees have a more direct connection between the revenue source and the demand for infrastructure from new development. Gas taxes and general revenues, such as sales and property taxes, are broad-based funds with no direct linkage to the demand for growth-related infrastructure.[3]

### *Impact Fees*

Impact fees may be used to fund system improvements that benefit several development projects or even new development throughout an entire jurisdiction. If impact fees are focused on arterial streets, collection and expenditure zones may not be necessary.

### *Gas Tax*

Most states return a portion of gas tax revenue to local governments. However, these funds tend to be used for street reconstruction and maintenance, unless earmarked for infrastructure expansion by the state. Some states, like Montana, permit an additional local option gas tax, with voter approval.

### *Optional Sales Tax and Other General Revenues*

The major general revenue sources for most local governments are sales and/or property taxes. Some states (e.g. Georgia) have authorized local option sales taxes for specific purposes, like capital improvement projects.

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[3] Tischler, Paul, Dwayne Guthrie and Nadejda Mishkovsky. 1999. *Introduction to Infrastructure Financing*. IQ Service Report, Vol. 31, No. 3. Washington, DC: International City/City Management Association.

## Recommendations for the City of Missoula

Specific funding recommendations for road improvements are summarized in Figure 1. Roads that handle regional travel, such as interstates, major state highways and principal arterials, require intergovernmental funding from federal and state revenue. Given the viability of Reserve Street for regional commercial development, additional improvements to key intersections in this corridor could be funded with Special Improvement District bonds. If congestion levels begin to prohibit customer access, the businesses along Reserve Street might be willing to approve the funding of specific improvement projects.

TischlerBise recommends transportation impact fees for the City of Missoula to provide funding for additional lane miles and intersection improvements, with improvements funded by impact fees limited to arterial and collector roads designated in the City's Capital Improvements Plan.

***Figure 1 – Funding Strategy by Functional Classification***

| Functional Classification | Example | Travel Lanes | Speed (mph) | Access Spacing | Funding Strategy |
|---|---|---|---|---|---|
| **Interstate & Major State Highway** | I-90 | 4+ | 55+ | Limited (2+ miles) | Federal & MDT (gas tax) |
| **Principal Arterial** | Reserve Street | 4-6 | 35 to 55 | ½ to 1 mile | MPO (gas tax), Impact Fees and/or Reserve Street SID |
| **Minor Arterial** | Mullan Road | 2-4 | 35 to 45 | ¼ to ½ mile | Impact Fees |
| **Collector** | Mary Jane | 2-3 | 35 | Urban Blocks | Impact Fees |
| **Local** | | 2 | 25 | Unlimited | Private Sector |

## CITYWIDE TRANSPORTATION IMPACT FEE

The City of Missoula will use an incremental expansion cost methodology for transportation impact fees. This methodology follows the same basic steps as a plan-based fee, but the fees are calibrated to existing transportation infrastructure rather than future improvements. A conceptual impact fee formula is illustrated below (see Figure 2). At the top is a general formula and at the bottom is a restatement of the formula using road impact fee terms. The first step (see the left part of the equation) is to determine an appropriate demand indicator, for a particular type of infrastructure. The demand indicator measures the number of demand units for each unit of development. For example, an appropriate indicator of the demand for roads is vehicle miles of travel. A vehicle mile of travel is defined as one vehicle trip, one mile in length. Thus VMT measurement requires data on both the number and length of vehicle trips.

The second step in the conceptual impact fee formula is shown in the middle section of the equation. Infrastructure units per demand unit are typically called Level-Of-Service (LOS) or infrastructure standards. In keeping with the road impact fee example, a useful infrastructure standard is lane miles per 10,000 VMT. A lane mile is a rectangular area of pavement one lane wide and one mile long.

The third step in the conceptual impact fee formula, as illustrated in the right side of the equation, is the cost of various infrastructure units. To complete the road impact fee example, this part of the formula establishes the cost per lane mile for road improvements.

***Figure 2 – Conceptual Impact Fee Steps***

| | | | | |
|---|---|---|---|---|
| Demand Units per Development Unit | X | Infrastructure Units per Demand Unit | X | Dollars per Infrastructure Unit |

| | | | | |
|---|---|---|---|---|
| Vehicle Miles of Travel (VMT) per Development Unit | X | Lane Miles and Improved Intersections per 10,000 VMT | X | Dollars per Lane Mile |

## Trip Generation

Citywide road impact fees are based on average weekday vehicle trip ends. Trip generation rates are from the reference book Trip Generation published by the Institute of Transportation Engineers (ITE, 2003). A vehicle trip end represents a vehicle either entering or exiting a development (as if a traffic counter were placed across a driveway). To calculate road impact fees, trip generation rates are adjusted to avoid double counting each trip at both the origin and destination points. Therefore, the basic trip adjustment factor is 50%. As discussed further below, the impact fee methodology includes additional adjustments to make the fees proportionate the infrastructure demand for particular types of development.

### *Adjustment for Pass-By Trips*

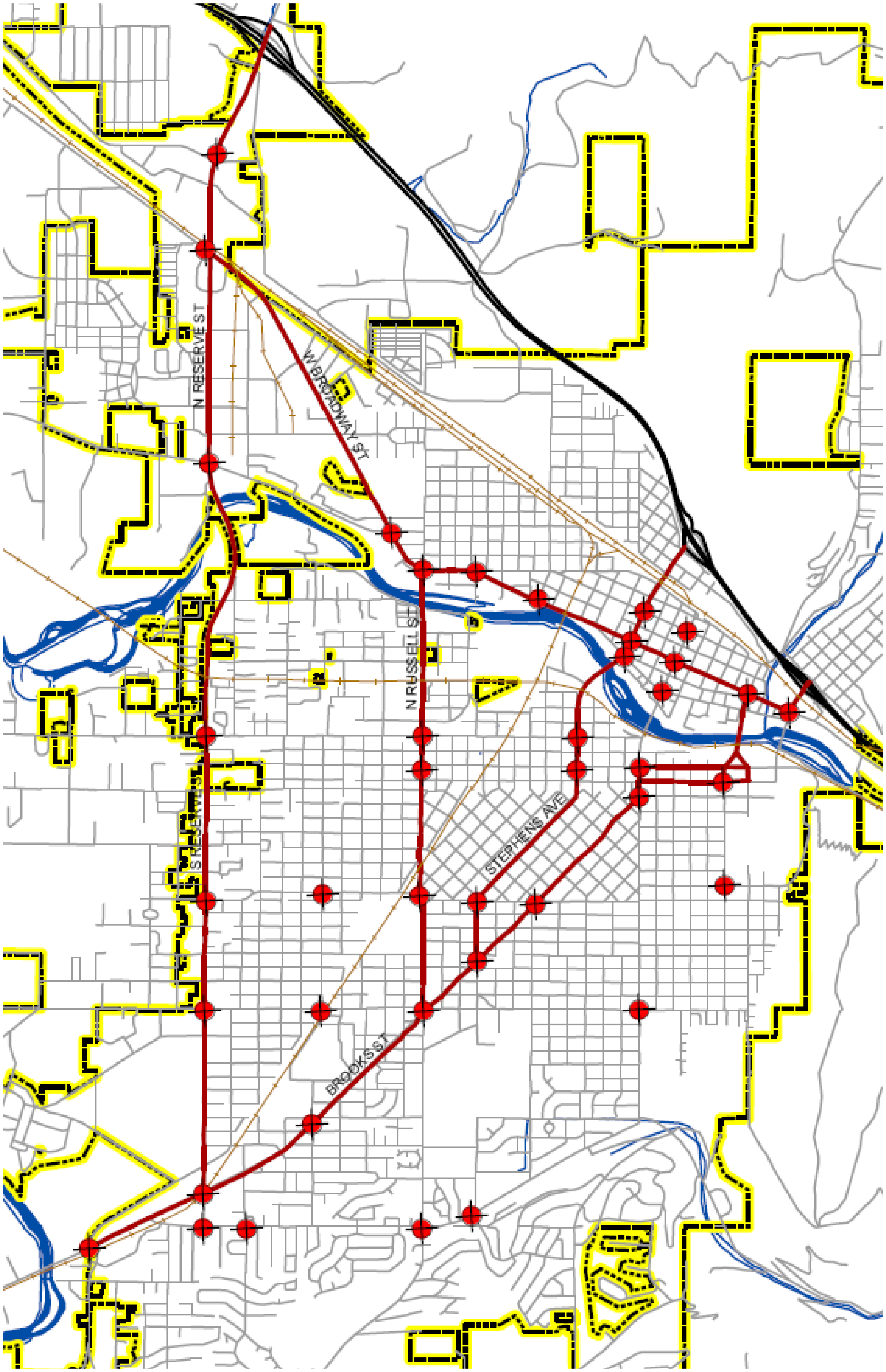
Data contained in Trip Generation Handbook (ITE, 2004) indicate an inverse relationship between commercial building size and pass-by trips. Therefore, appropriate trip adjustment factors have been calculated according to commercial building size (see Appendix B). For commercial developments, the trip adjustment factor is less than 50% because retail development and some services (like banks and day care centers) attract vehicles as they pass by on arterial and collector roads. For example, when someone stops at a convenience store on the way home from work, the convenience store is not the primary destination. For a small commercial building of 10,000 square feet of floor area, the ITE data indicates that on average 52% of the vehicles that enter are passing by on their way to some other primary destination. The remaining 48% of attraction trips have the commercial building as their primary destination. Because attraction trips are half of all trips, the trip adjustment factor is 48% multiplied by 50%, or approximately 24% of the trip ends.

## Current Infrastructure Standards for Transportation

Infrastructure standards for transportation are based on existing lane miles of principal arterial roads and the number of improved intersections within the City of Missoula. The map in Figure 3 indicates the inventory of infrastructure (principal arterial lane miles and improved intersections) used to establish the current level of service. The City of Missoula has categorically excluded interstate highways, minor arterials, collector streets and local streets from the infrastructure inventory used to determine the existing level of service. With 60.5 lane-miles of principal arterial roads and approximately 423,000 vehicle miles of travel to development located within Missoula, the existing level of service is 1.43 lane miles per 10,000 VMT. Documentation on estimated VMT is provided in Figures 4 and 5.

In addition to lane-miles, the existing infrastructure standard for transportation also includes improved intersections. To be considered a system improvement, an improved intersection must be located at the intersection of two arterials, an arterial with a collector, or at the intersection of two collectors. Traffic signals at the entrance of a major retail development are project-level improvements, thus excluded from the impact fee analysis. With 41 improved intersections (turn lanes and traffic signals or roundabouts) and approximately 423,000 vehicle miles of travel to development located within Missoula, the existing level of service is 0.97 improved intersections per 10,000 VMT.

*Figure 3 – Map of Existing Arterial Roads and Improved Intersections*



## Vehicle Miles of Travel

Vehicle Miles of Travel (VMT) is the product of the number of vehicle trips multiplied by the average trip length. The estimated number of vehicle trips to development within Missoula is documented in Figures 4 and 5.

### *Average Trip Length on Principal Arterial Roads*

Determining average trip length for the purpose of impact fees requires consideration of the functional classification of roads and the community's criteria for system improvements. A typical vehicle trip, such as a person leaving their home and traveling to work, generally begins on a local street that connects to a collector street, which connects to an arterial road and eventually to a state or interstate highway. This progression of travel up and down the functional classification chain limits the average trip length question to the following, "What is the average vehicle trip length on principal arterial roads within the City of Missoula?"

With 60.5 lane miles of principal arterial roads and a lane capacity standard of 7,000 vehicles per lane (discussed below), the arterial network has approximately 423,500 vehicle miles of capacity (i.e., 7,000 vehicles per lane traveling the entire 60.5 miles). To derive the average utilization (i.e., average trip length expressed in miles) of the principal arterial network, we divide vehicle miles of travel by the vehicle trips associated with development in the City of Missoula in FY06-07. As explained further below, existing development in Missoula currently attracts an estimated 247,798 vehicle trips on an average weekday. Dividing 423,500 vehicle miles of capacity by 247,798 average weekday vehicle trips yields an unweighted average trip length of approximately 1.71 miles. However, the calibration of average trip length includes the same adjustment factors used in the impact fee calculations (i.e., commercial pass-by adjustment and average trip length adjustment by type of land use as discussed below). Using a series of spreadsheet iterations, the weighted-average trip length is 1.81 miles, as shown in Figure 4.

### *Trip Length Weighting Factor by Type of Land Use*

The road impact fee methodology includes a percentage adjustment, or weighting factor, to account for trip length variation by type of land use. As documented in Table 6 of the 2001 National Household Travel Survey (published 12/04 by the Federal Highway Administration), vehicle trips from residential development are approximately 122% of the average trip length. The residential trip length adjustment factor includes data on home-based work trips, social and recreational purposes. Conversely, shopping trips associated with commercial development are roughly 68% of the average trip length while other nonresidential development typically accounts for trips that are 75% of the average trip length.

### *Lane Capacity*

Table 4 in the Missoula Urban Transportation Plan Update (URS, 2004) indicates that arterial lane capacity generally ranges from 6,000 to 9,000 vehicles per lane per day. The transportation impact fees are based on a lane capacity standard of 7,000 vehicles per lane.

## Vehicle Trips to Development in Missoula

The relationship between the amount of development within the City of Missoula and the projected demand for infrastructure is documented in the following two tables. Figure 4 summarizes the input variables used to determine the need for road improvements. The pass-by trip adjustment factors are documented in Appendix B. Nonresidential prototypes NR2, NR3, NR4 and NR5 have an assumed building size of 100,000 square feet of floor area. In the table below HU means housing units, KSF means square feet of nonresidential development, in thousands, ITE stands for the Institute of Transportation Engineers and VTE is a vehicle-trip end.

***Figure 4 – Travel Demand Model Inputs***

| | *ITE Code* | *Dev Type* | *Weekday VTE* | *Dev Unit* | *Trip Adj* | *Trip Length Wt Factor* |
|---|---|---|---|---|---|---|
| R1 | 210 | SFD | 9.57 | HU | 50% | 122% |
| R3 | 230 | Other Res | 5.86 | HU | 50% | 122% |
| NR1 | 110 | Goods Prod | 6.97 | KSF | 50% | 75% |
| NR2 | 820 | Retail | 67.91 | KSF | 33% | 68% |
| NR3 | 770 | OtherComSe | 12.76 | KSF | 33% | 75% |
| NR4 | 520 | Edu | 14.49 | KSF | 33% | 75% |
| NR5 | 710 | Gov | 13.34 | KSF | 50% | 75% |
| Avg Trip Length (miles) | 1.81 | | | | | |
| Capacity Per Lane | 7,000 | | | | | |
| Cost per Lane-Mile | $1,641,000 | | | | | |

Projected development in Missoula over the next five years, and the corresponding need for additional lane miles, is documented in Figure 5. The demographic data shown at the top of the table is discussed further in Appendix A. Trip generation rates and trip adjustment factors convert projected development into average weekday vehicle trips, shown with grey shading. For example, the estimated 15,500 detached housing units currently in Missoula attract 74,168 trips on an average weekday, which is about 30% of the total vehicle trips (i.e., 247,798 in FY06-07). To keep pace with the travel demand from new development, roads will need to increase by approximately 5.2 lane miles over the next five years. In addition, the City of Missoula will need to improve four intersections over the next five years.

*Figure 5 – Projected Citywide Travel Demand*

| Year-> | Base | 1 | 2 | 3 | 4 | 5 | 5-Year | Avg Anl |
|---|---|---|---|---|---|---|---|---|
| **DEMAND DATA** | FY06-07 | 2008 | 2009 | 2010 | 2011 | 2012 | Increase | Increase |
| SFD HU | 15,500 | 15,769 | 16,037 | 16,306 | 16,574 | 16,842 | 1,342 | 268 |
| OTHER HU | 13,204 | 13,433 | 13,661 | 13,890 | 14,118 | 14,347 | 1,143 | 229 |
| GOODS PRO KSF | 4,020 | 4,090 | 4,160 | 4,230 | 4,300 | 4,370 | 350 | |
| RETAIL KSF | 3,190 | 3,240 | 3,300 | 3,350 | 3,410 | 3,460 | 270 | |
| OTHER COM SERV KSF | 8,240 | 8,380 | 8,520 | 8,670 | 8,810 | 8,950 | 710 | |
| EDU KSF | 1,480 | 1,510 | 1,530 | 1,560 | 1,590 | 1,610 | 130 | |
| GOV KSF | 1,150 | 1,170 | 1,190 | 1,210 | 1,230 | 1,250 | 100 | |
| *SFD TRIPS* | 74,168 | 75,453 | 76,738 | 78,022 | 79,306 | 80,590 | | |
| *OTHER RES TRIPS* | 38,687 | 39,358 | 40,027 | 40,697 | 41,367 | 42,037 | | |
| *GOODS TRIPS* | 14,010 | 14,254 | 14,498 | 14,742 | 14,986 | 15,229 | | |
| *RETAIL TRIPS* | 71,489 | 72,609 | 73,954 | 75,075 | 76,419 | 77,540 | | |
| *COM SERV TRIPS* | 34,697 | 35,287 | 35,876 | 36,508 | 37,097 | 37,687 | | |
| *EDU TRIPS* | 7,077 | 7,220 | 7,316 | 7,459 | 7,603 | 7,699 | | |
| *GOV TRIPS* | 7,671 | 7,804 | 7,937 | 8,071 | 8,204 | 8,338 | | |
| *TOTAL VEHICLE TRIPS* | 247,798 | 251,985 | 256,346 | 260,573 | 264,982 | 269,119 | | |
| VMT | 423,335 | 430,540 | 437,952 | 445,210 | 452,687 | 459,824 | | |
| LANE MILES | 60.5 | 61.5 | 62.6 | 63.6 | 64.7 | 65.7 | 5.2 | |
| Annual Improvements | | $1,641,000 | $1,805,100 | $1,641,000 | $1,805,100 | $1,641,000 | | $1,706,640 |
| Improved Intersections | 41 | 42 | 42 | 43 | 44 | 45 | 4.0 | |

## Cost of Growth-Related Transportation Improvements

To determine a current cost factor for transportation improvements, WGM Group worked with City engineers to identify specific capacity expansion projects in the Mullan Road area. Because the Wye-Mullan area (generally located north of the Clarke Fork River and west of Reserve Street) was the subject of extensive planning work in recent years, general design standards and growth-related improvements were already identified. As shown in Figure 6, the growth-related cost of widening streets and improving intersections is expected to be approximately $1,641,000 per lane mile. The growth share of the cost for widening the three sections of Mullan Road was determined by recent traffic counts and the future capacity of each road segment after improvements are completed.

*Figure 6 – Mullan Road Area Cost Analysis*

| | *Location* | *From* | *To* | *Miles* | *Lane-Mi Increase* | *Growth Cost* | *Total Cost* |
|---|---|---|---|---|---|---|---|
| 1 | Mullan Rd (57% growth) | Reserve | Mary Jane | 0.7 | 2.1 | $3,328,800 | $5,840,000 |
| 2 | Mullan & Mary Jane Intersection | | | | | $200,000 | $200,000 |
| 3 | Mullan Rd (36% growth) | Mary Jane | Cote | 2.6 | 2.6 | $3,358,800 | $9,330,000 |
| 4 | Mullan & George Elmer Intersection | | | | | $440,000 | $440,000 |
| 5 | Broadway & Mary Jane Intersection | | | | | $200,000 | $200,000 |
| 6 | Mullan Rd (49% growth) | Cote | Phantom | 0.5 | 0.5 | $803,600 | $1,640,000 |
| 7 | Broadway & George Elmer Intersection | | | | | $200,000 | $200,000 |
| | | | | TOTAL | 5.2 | $8,531,200 | $17,850,000 |
| | | | | Cost per Lane Mile => | | $1,641,000 | $3,433,000 |

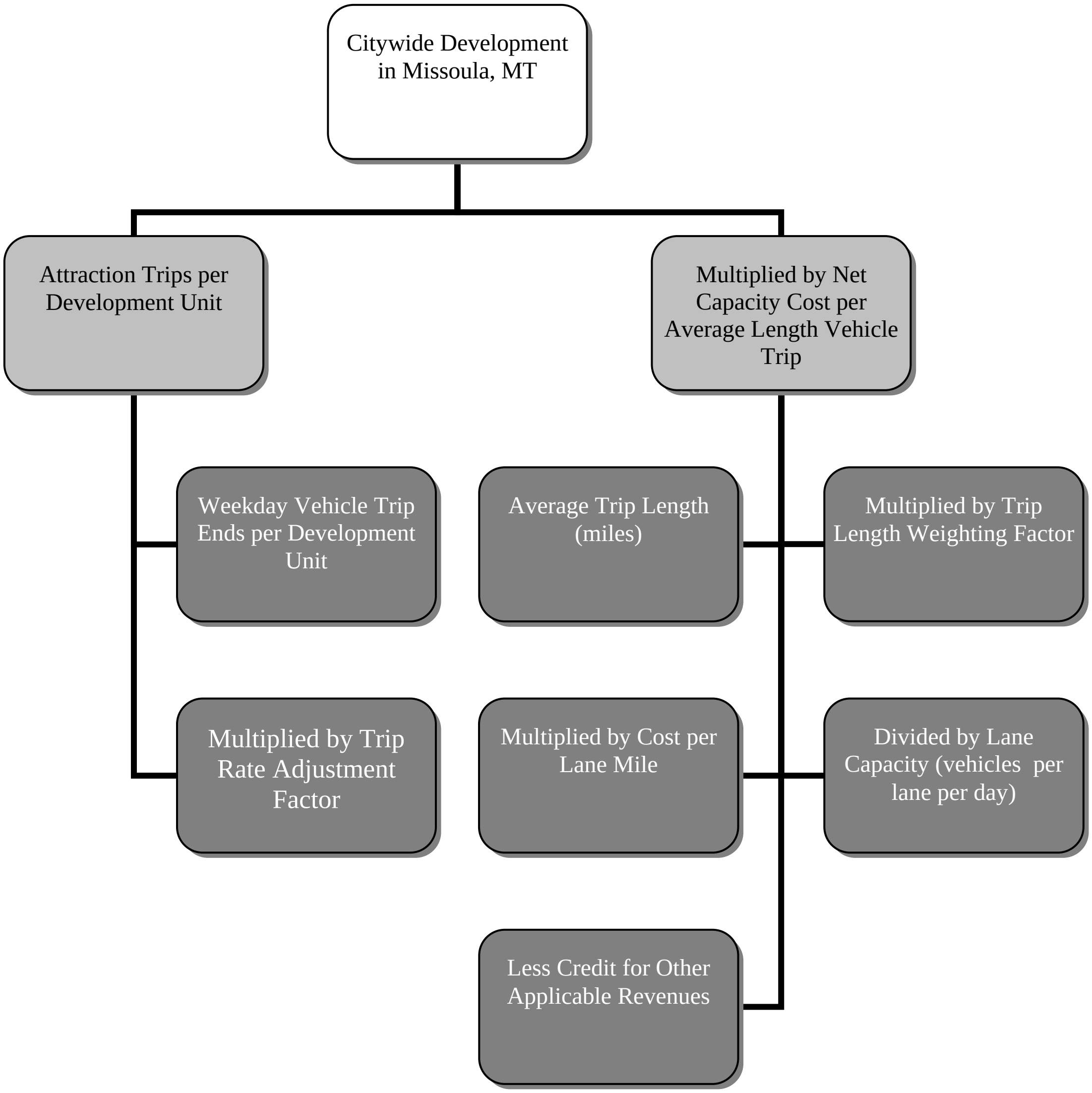
## Credit for Other Revenues

A credit for future revenue generated by new development is only necessary if there is potential double payment for system improvements. Since road impact fees will be used exclusively for growth-related capacity improvements, there is no need for a credit. General Fund and gas tax revenue will be used for maintenance of existing facilities, correcting existing deficiencies and for making capacity improvements on collector roads.

## Road Impact Fee Formula and Input Variables

As shown in Figure 7, citywide road impact fees are derived from average attraction trips per development unit (i.e. weekday trip ends multiplied by the trip rate adjustment factor) and the net capacity cost per average length vehicle trip. The net capacity cost per average length vehicle trip is a function of the average trip length, trip length weighting factor, capital cost per lane mile and lane capacity, less applicable credits.

***Figure 7 – Road Impact Fee Formula***



Input variables for the citywide road impact fee are shown in Figure 8. The trip generation rate and trip adjustment factor by type of development are multiplied by the net capital cost for an average length vehicle trip to yield the road impact fee. The net capital cost for an average length vehicle trip is obtained by subtracting the revenue credit per trip from the average trip length multiplied by the trip length weighting factor (by type of land use) multiplied by the cost per lane mile divided by the lane capacity. For example, the road impact fee for a detached housing unit is 9.57 x 0.50 x [(1.22 x 1.81 x 1641000 / 7000) – 0], or $2,477 per housing unit.

***Figure 8 – Road Impact Fee Input Variables***

| Missoula, Montana<br>ITE Code | | Weekday Vehicle Trip Ends | Trip Rate Adjustment Factors | Trip Length Weighting Factors |
|---|---|---|---|---|
| ***Weekday Vehicle Trip Ends*** | | | | |
| *Residential (per Household)* | | | | |
| 210 | Single Family Detached | 9.57 | 50% | 122% |
| 230 | All Other Housing Types | 5.86 | 50% | 122% |
| *Nonresidential (per 1,000 Sq Ft of floor area)* | | | | |
| 820 | Commercial/Shop Ctr 100,000 SF or less | 67.91 | 33% | 68% |
| 820 | Com / Shop Ctr 100,001-200,000 SF | 53.28 | 36% | 68% |
| 820 | Com / Shop Ctr 200,001 SF or more | 41.80 | 39% | 68% |
| 770 | Business Park | 12.76 | 33% | 75% |
| 720 | Medical-Dental Office Bldg | 36.13 | 50% | 75% |
| 710 | Office 25,000 SF or less | 18.35 | 50% | 75% |
| 710 | Office 25,001-50,000 SF | 15.65 | 50% | 75% |
| 710 | Office 50,001 SF or more | 13.34 | 50% | 75% |
| 610 | Hospital | 17.57 | 50% | 75% |
| 151 | Mini-Warehouse | 2.50 | 50% | 75% |
| 150 | Warehousing | 4.96 | 50% | 75% |
| 140 | Manufacturing | 3.82 | 50% | 75% |
| 110 | Light Industrial | 6.97 | 50% | 75% |
| 520 | Elementary School | 14.49 | 33% | 75% |
| *Nonresidential (per unique demand indicator)* | | | | |
| 620 | Nursing Home (per bed) | 2.37 | 50% | 75% |
| 565 | Day Care (per student) | 4.48 | 24% | 75% |
| 530 | Secondary School (per student) | 1.71 | 36% | 75% |
| 520 | Elementary School (per student) | 1.29 | 33% | 75% |
| 320 | Lodging (per room) | 5.63 | 50% | 75% |
| ***Infrastructure Standards*** | | | | |
| | Average Miles per Vehicle Trip | 1.81 | | |
| | Cost per Lane Mile | $1,641,000 | | |
| | Lane Capacity (vehicles per day) | 7,000 | | |
| | Revenue Credit Per Trip | $0 | | |

## Maximum Supportable Road Impact Fees

The input variables discussed above yield the maximum supportable impact fees shown in Figure 9. Fees for most types of nonresidential development are listed per square feet of floor area. Some of the nonresidential development types have unique demand indicators. For example, the impact fee for lodging is based on the number of rooms in the hotel/motel.

***Figure 9 – Impact Fees for Citywide Transportation Improvements***

| Maximum Supportable Road Impact Fee | |
|---|---|
| *Residential (per housing unit)* | |
| Single Family Detached | $2,477 |
| All Other Housing Types | $1,516 |
| *Nonresidential (per 1,000 Sq Ft of floor area)* | |
| 820 Commercial/Shop Ctr 100,000 SF or less | $6,466 |
| 820 Com / Shop Ctr 100,001-200,000 SF | $5,534 |
| 820 Com / Shop Ctr 200,001 SF or more | $4,703 |
| 770 Business Park | $1,340 |
| 720 Medical-Dental Office Bldg | $5,748 |
| 710 Office 25,000 SF or less | $2,919 |
| 710 Office 25,001-50,000 SF | $2,490 |
| 710 Office 50,001 SF or more | $2,122 |
| 610 Hospital | $2,795 |
| 151 Mini-Warehouse | $397 |
| 150 Warehousing | $789 |
| 140 Manufacturing | $607 |
| 110 Light Industrial | $1,109 |
| 520 Elementary School | $1,521 |
| *Nonresidential (per unique demand indicator)* | |
| 620 Nursing Home (per bed) | $377 |
| 565 Day Care (per student) | $342 |
| 530 Secondary School (per student) | $195 |
| 520 Elementary School (per student) | $135 |
| 320 Lodging (per room) | $895 |

## Projected Cash Flow for Citywide Improvements

As shown in Figure 10, transportation impact fee revenue averages approximately $1.7 million per year, if implemented at the maximum supportable level. Growth-related transportation improvements are estimated to cost $8.5 million over the next five years, which roughly matches the projected impact fee revenue. Over the next five years, Missoula will improve four intersections and expand the arterial or collector road network by approximately 5.2 lane miles. A five-year list of specific system improvements to be constructed with impact fee revenue will be added to the City's Capital Improvements Plan (CIP) and updated every 1-2 years as part of the ongoing budgetary process.

According to state law, Missoula may also impose an administrative surcharge, not to exceed five percent of the total impact fee for growth-related infrastructure. If the City adds a five percent surcharge to the citywide transportation fee, it should yield approximately $86,000 per year for expenses directly related to preparing and implementing the fees.

The cash flow summary provides an indication of the impact fee revenue and expenditures necessary to meet the demand for additional arterial lane miles. To the extent the rate of development either accelerates or slows down, there will be a corresponding change in the impact fee revenue and capital costs. See Appendix A for discussion of the development projections that drive the cash flow analysis.

***Figure 10 – Cash Flow Summary for Transportation System Improvements***

| City of Missoula | | 1 | 2 | 3 | 4 | 5 | Cumulative | Average |
|---|---|---|---|---|---|---|---|---|
| *(Current $ in thousands)* | | 2008 | 2009 | 2010 | 2011 | 2012 | Total | Annual |
| ***REVENUES*** | | | | | | | | |
| 9 Citywide Transp - SFD | | $665 | $665 | $665 | $665 | $665 | $3,324 | $665 |
| 10 Citywide Transp - Other Res | | $347 | $347 | $347 | $347 | $347 | $1,733 | $347 |
| 11 Citywide Transp - Goods Pro | | $78 | $78 | $78 | $78 | $78 | $388 | $78 |
| 12 Citywide Transp - Retail | | $323 | $388 | $323 | $388 | $323 | $1,746 | $349 |
| 13 Citywide Transp - ComServ | | $188 | $188 | $201 | $188 | $188 | $951 | $190 |
| 14 Citywide Transp - Edu | | $46 | $30 | $46 | $46 | $30 | $198 | $40 |
| 15 Citywide Transp - Gov | | $42 | $42 | $42 | $42 | $42 | $212 | $42 |
| ***Citywide Impact Fee Subtotal*** | | $1,689 | $1,737 | $1,701 | $1,753 | $1,673 | $8,553 | $1,711 |
| Adminstrative Surcharge | 5% | $84 | $87 | $85 | $88 | $84 | $428 | $86 |
| ***CAPITAL COSTS*** | | | | | | | | |
| ***Citywide Transportation Improvements*** | | $1,641 | $1,805 | $1,641 | $1,805 | $1,641 | $8,533 | $1,707 |
| ***NET CAPITAL FACILITIES CASH FLOW - Citywide Transportation*** | | | | | | | | |
| Annual Surplus (or Deficit) | Init Bal | $48 | ($68) | $60 | ($52) | $32 | $20 | $4 |
| Cumulative Surplus (or Deficit) | $0 | $48 | ($20) | $40 | ($12) | $20 | | |

Montana enabling legislation allows the City of Missoula to include an administrative surcharge, not to exceed five percent of the total impact fee. The road impact fee schedule, with five percent for administration is shown in Figure 11.

***Figure 11 – Fee Schedule with Five Percent Administrative Surcharge***

| ITE Code | *Roads* | *Adm 5%* | TOTAL |
|---|---|---|---|
| Residential Categories (per housing unit) | | | |
| Single Family Detached | $2,477 | $123 | $2,600 |
| All Other Housing Types | $1,516 | $75 | $1,591 |
| *Nonresidential (per 1,000 Sq Ft of floor area)* | | | |
| 820 Commercial/Shop Ctr 100,000 SF or less | $6,466 | $323 | $6,789 |
| 820 Com / Shop Ctr 100,001-200,000 SF | $5,534 | $276 | $5,810 |
| 820 Com / Shop Ctr 200,001 SF or more | $4,703 | $235 | $4,938 |
| 770 Business Park | $1,340 | $67 | $1,407 |
| 720 Medical-Dental Office Bldg | $5,748 | $287 | $6,035 |
| 710 Office 25,000 SF or less | $2,919 | $145 | $3,064 |
| 710 Office 25,001-50,000 SF | $2,490 | $124 | $2,614 |
| 710 Office 50,001 SF or more | $2,122 | $106 | $2,228 |
| 610 Hospital | $2,795 | $139 | $2,934 |
| 151 Mini-Warehouse | $397 | $19 | $416 |
| 150 Warehousing | $789 | $39 | $828 |
| 140 Manufacturing | $607 | $30 | $637 |
| 110 Light Industrial | $1,109 | $55 | $1,164 |
| 520 Elementary School | $1,521 | $76 | $1,597 |
| *Nonresidential (per unique demand indicator)* | | | |
| 620 Nursing Home (per bed) | $377 | $18 | $395 |
| 565 Day Care (per student) | $423 | $21 | $444 |
| 530 Secondary School (per student) | $242 | $12 | $254 |
| 520 Elementary School (per student) | $167 | $8 | $175 |
| 320 Lodging (per room) | $1,109 | $55 | $1,164 |

# Implementation and Administration

The City of Missoula will comply with the procedural requirements in the Montana Impact Fee Act for advertisement and approval of the transportation impact fees. Also, the City will follow the accounting requirements for collection and expenditure of the fees.

Development impact fees must be periodically evaluated and updated to reflect recent data and cost factors. One approach is to adjust for inflation using the Engineering News Record (ENR) Construction Cost Index published by the McGraw-Hill Companies. This index could be periodically applied to the adopted impact fee schedule. If cost estimates or demand indicators change significantly, the City should redo the fee calculations.

## Credits and Reimbursements

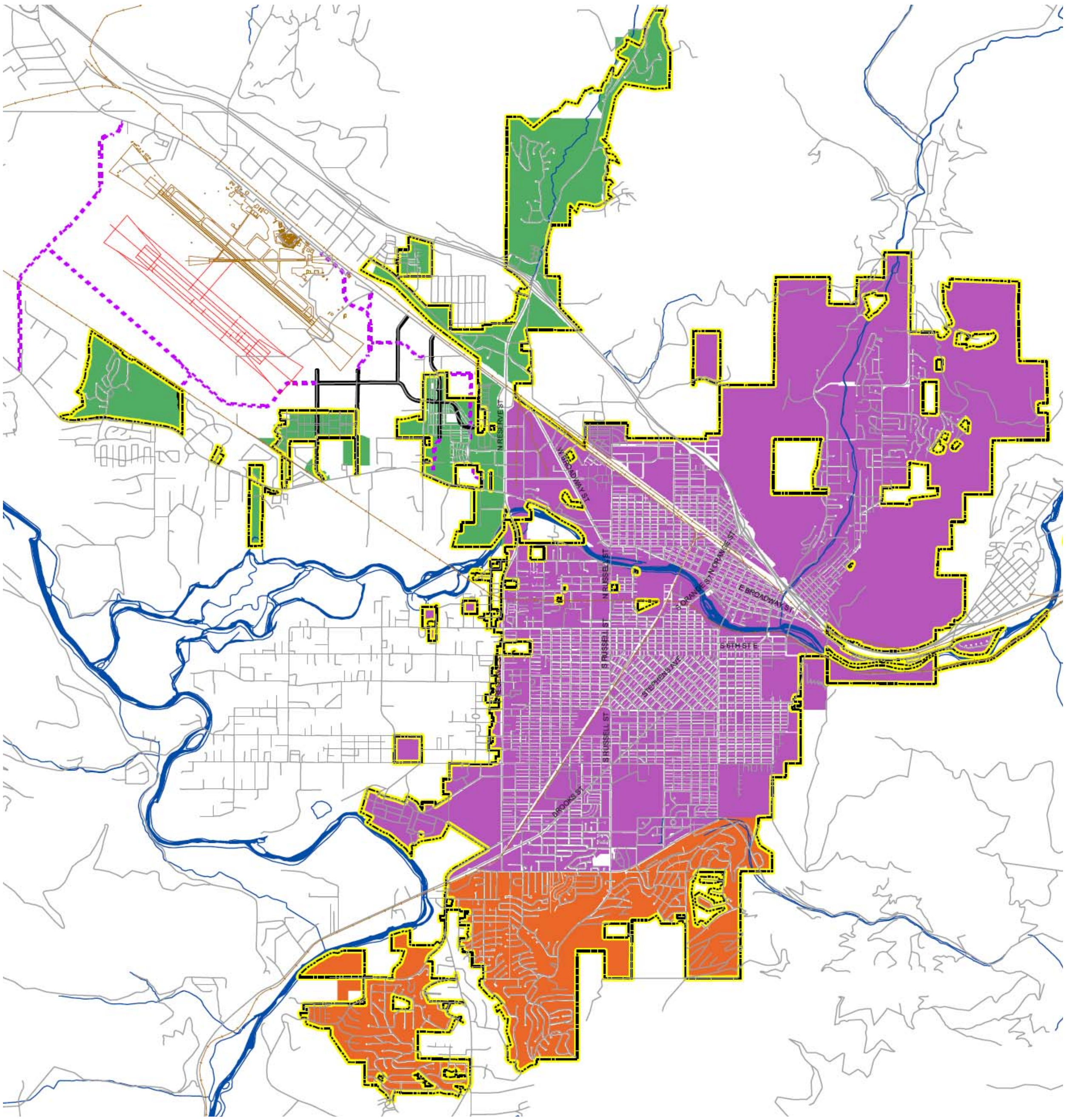
A general requirement that is common to impact fee methodologies is the evaluation of credits. A revenue credit may be necessary to avoid potential double payment situations arising from one-time impact fee plus the payment of other revenues that may also fund growth-related capital improvements. The determination of credits is dependent upon the impact fee methodology used in the cost analysis. The Missoula transportation impact fees are derived from the incremental expansion cost method. This method documents current factors and is best suited for public facilities that will be expanded incrementally in the future. Because new development will provide front-end funding of infrastructure, there is a potential for double payment of capital costs due to future principal payments on existing debt for public facilities. The City of Missoula does not have any outstanding debt for transportation capacity projects and impact revenue will cover the growth-related cost of future improvements. Therefore, a credit for other revenue sources is not applicable.

Specific policies and procedures related to site-specific credits or developer reimbursements will be addressed in the ordinance that establishes the road impact fees. Project improvements normally required as part of the development approval process are not eligible for credits against impact fees. If a developer constructs a system improvement included in the fee calculations, it will be necessary to either reimburse the developer or provide a credit against the fees in the area benefiting from the system improvement. The latter option is more difficult to administer because it creates unique fees for specific geographic areas. Based on TischlerBise’s experience, it is better for the City to establish a reimbursement agreement with the developer that constructs a system improvement. The reimbursement agreement should be limited to a payback period of no more than ten years and the City should not pay interest on the outstanding balance. The developer must provide sufficient documentation of the actual cost incurred for the system improvement. The City should only agree to pay the lesser of the actual construction cost or the estimated cost used in the impact fee analysis. If the City pays more than the cost used in the fee analysis, there will be insufficient fee revenue. Reimbursement agreements should only obligate the City to reimburse developers annually according to actual fee collections from the benefiting area. Site specific credits or developer reimbursements for one type of system improvement does not negate payment of impact fee for other system improvements.

## Benefit District

Figure 12 indicates the approximate boundaries of the service areas, or benefit districts, in which transportation impact fees will be collected and spent. Improvements to a major road at the boundary of two districts may be funded with impact fee revenue collected in either, or both, of the adjoining districts.

***Figure 12 – Transportation Impact Fee Benefit Districts***



## Nonresidential Development Categories

The nonresidential development categories listed in the impact fee schedules will cover a majority of the new construction anticipated within the study area. Nonresidential development categories are based on land use classifications from the book Trip Generation (ITE, 2003). For unique developments, the City may allow documentation of reasonable demand indicators to facilitate an impact fee determination, consistent with the methodologies and factors documented in this report.

Even though churches are a common type of development, they do not have a specific impact fee category due to a lack of sufficient data. The Institute of Transportation Engineers does not publish trip rates per church employee and the weekday trip generation rate per 1,000 square feet of floor area is not based on enough studies to be statistically valid. For churches and any other atypical development, staff must establish a consistent administrative process to reasonably treat similar developments in a similar way. When presented with a development type that does not match one of the development categories in the published fee schedule, staff should first look in the ITE manual to see if there is land use category with valid trip rates that match the proposed development. The second option is to determine the published category that is most like the proposed development. Churches without daycare or schools are basically an office area (used throughout the week) with a large auditorium and class space (used periodically during the week). Some jurisdictions make a policy decision to impose impact fees on churches based on the fee schedule for warehouses or mini-warehouses. The rationale for this policy is the finding that churches are large buildings that generate little weekday traffic and only have a few full time employees. A third option is to impose impact fees on churches by breaking down the building floor area into its primary use. For example, a church with 25,000 square feet of floor area may have 2,000 square feet of office space used by employees throughout the week. At a minimum, impact fees could be imposed on the office floor area, based on the published rate per square foot for a small office. An additional impact fee amount could be imposed for the remainder of the building based on the rate for a warehouse or mini-warehouse. The key consideration for these administrative decisions is to be reasonable and consistent. If an applicant thinks the administrative decision is not reasonable, it is appealed to the elected officials for their consideration.

# APPENDIX A – DEMOGRAPHIC DATA

In this Appendix, TischlerBise documents the demographic data and development projections used in the road impact fee study.

## Demographic Data by Type of Housing

Figure A1 provides population and housing characteristics in Missoula according to the 2000 census. The road impact fee study assumed a constant housing mix and household size over time.

***Figure A1 – Persons per Housing Unit***

City of Missoula, Montana

| *Units in Structure* | ***Renter & Owner*** Persons | Hsehlds | PPH | *Housing Units* | *Persons Per Housing Unit* | *Vacancy Rate* |
|---|---|---|---|---|---|---|
| 1-Detached | 33,383 | 13,137 | 2.54 | 13,534 | 2.47 | 2.9% |
| Mobile Homes | 3,624 | 1,578 | 2.30 | 1,615 | 2.24 | 2.3% |
| 1-Attached (Townhouse) | 1,645 | 876 | 1.88 | 976 | 1.69 | 10.2% |
| Two (Duplex) | 3,617 | 1,698 | 2.13 | 1,739 | 2.08 | 2.4% |
| 3 or 4 | 4,669 | 2,531 | 1.84 | 2,699 | 1.73 | 6.2% |
| 5 to 9 | 2,413 | 1,321 | 1.83 | 1,379 | 1.75 | 4.2% |
| 10 to 19 | 1,629 | 943 | 1.73 | 1,052 | 1.55 | 10.4% |
| 20 to 49 | 952 | 708 | 1.34 | 756 | 1.26 | 6.3% |
| 50 or more | 1,765 | 1,223 | 1.44 | 1,317 | 1.34 | 7.1% |
| Other (Boat, RV, etc.) | 0 | 0 | | 28 | 0.00 | 100.0% |
| Total SF3 Sample Data | 53,697 | 24,015 | 2.24 | 25,095 | | 4.3% |
| SF1 100-Percent Data | 53,767 | 24,141 | **2.23** | 25,225 | 2.13 | 4.3% |
| ***House Type Demographics*** | Persons | Hsehlds | PPH | *Housing Units* | *Persons Per Housing Unit* | Hsg Mix |
| Single Family Detached | 33,383 | 13,137 | 2.54 | 13,534 | 2.47 | **54%** |
| All Other Housing Types | 20,314 | 10,878 | 1.87 | 11,561 | 1.76 | **46%** |
| Group Quarters | 3,286 | | | | | |
| Sample Difference | 70 | 126 | | 130 | | |
| TOTAL | 57,053 | 24,141 | | 25,225 | | |

*Source: U.S. Census Bureau, 2000 data.*

## Recent Residential Construction

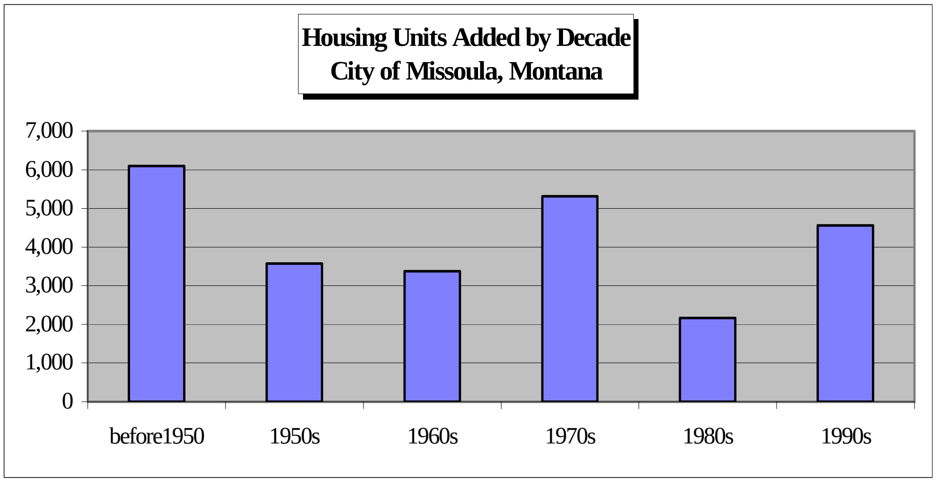
According to the US Census Bureau's 2005 population estimate, Missoula had 62,923 residents on 7/1/05. Converting the estimated population increase into housing units indicates an annual average increase of 497 housing units per year in the City of Missoula. This rate of housing construction was assumed to continue through 2025.

***Figure A2 – City of Missoula Housing Units and Population in 2005***

| | City of Missoula |
|---|---|
| Estimated Year-Round Population in 2005* | 62,923 |
| Total Housing Units in 2000 | 25,225 |
| *New Housing Units 2000-2004* | 2,485 |
| Total Units in 2005* | 27,710 |

** US Census Bureau Population Estimate*
*** Population estimate (less 3,786 persons in GQ) divided by 2.23 person per household and multiplied by 1.045 to account for vacant units.*

During calendar years 2000 through 2004, the City of Missoula added an average of 497 housing units per year.

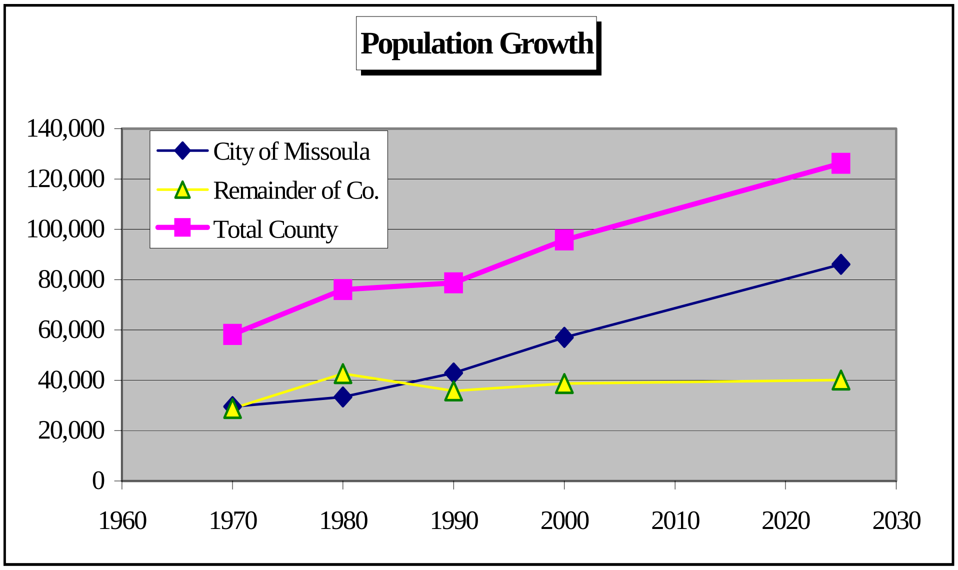



When the projected housing increase is converted to population and compared to the countywide population projection used in the 2004 Transportation Plan, Missoula's share of the total county population would increase from approximately 60% in 2000 to 68% in 2025 (see Figure A3).

***Figure A3 – City of Missoula Population Share***

| | *1970* | *1980* | *1990* | *2000* | *2025* |
|---|---|---|---|---|---|
| Total County | 58,263 | 76,016 | 78,687 | 95,802 | 126,200 |
| City of Missoula | 29,497 | 33,351 | 42,918 | 57,053 | 86,100 |
| Remainder of Co. | 28,766 | 42,665 | 35,769 | 38,749 | 40,100 |
| City Share | 50.6% | 43.9% | 54.5% | 59.6% | 68.2% |

Source: *Missoula 2004 Urban Transportation Plan Update.*




## Nonresidential Demand Indicators

In addition to data on residential development, the calculation of impact fees requires data on nonresidential development. TischlerBise uses the term “jobs” to refer to employment by place of work. Figure A4 provides employee and building area ratios derived using national data published by the Institute of Transportation Engineers (ITE) and the Urban Land Institute (ULI). In the impact fee study, vehicle trips and the number of employees per demand unit (i.e., thousand square feet of floor area, beds, students or rooms) will be used to differentiate fees by type of nonresidential development. In the table below, gray shading indicates the five nonresidential development prototypes used by TischlerBise to calculate vehicle trips and potential impact fee revenue. The first prototype, for goods-producing jobs, is Light Industrial. The second prototype, for retail/eating/drinking jobs, is a shopping center with 100,000 square feet of floor area. The third prototype, for other commercial services, is a business park. The fourth prototype, for education, is an elementary school. The fifth prototype, for government jobs, is a 100,000 square feet office building.

## *Figure A4 – Employee and Building Area Ratios*

| *ITE Code* | *Land Use / Size* | *Demand Unit* | *Wkdy Trip Ends Per Dmd Unit** | *Wkdy Trip Ends Per Employee** | *Emp Per Dmd Unit*** | *Sq Ft Per Emp* |
|---|---|---|---|---|---|---|
| ***Commercial / Shopping Center*** | | | | | | |
| 821 | 25K gross leasable area | 1,000 Sq Ft | 110.32 | na | 3.33 | 300 |
| 820 | 50K gross leasable area | 1,000 Sq Ft | 86.56 | na | 2.86 | 350 |
| **820** | **100K gross leasable area** | **1,000 Sq Ft** | **67.91** | **na** | **2.50** | **400** |
| 820 | 200K gross leasable area | 1,000 Sq Ft | 53.28 | na | 2.22 | 450 |
| 820 | 400K gross leasable area | 1,000 Sq Ft | 41.80 | na | 2.00 | 500 |
| ***General Office*** | | | | | | |
| 710 | 10K gross floor area | 1,000 Sq Ft | 22.66 | 5.06 | 4.48 | 223 |
| 710 | 25K gross floor area | 1,000 Sq Ft | 18.35 | 4.43 | 4.15 | 241 |
| 710 | 50K gross floor area | 1,000 Sq Ft | 15.65 | 4.00 | 3.91 | 256 |
| **710** | **100K gross floor area** | **1,000 Sq Ft** | **13.34** | **3.61** | **3.69** | **271** |
| 710 | 200K gross floor area | 1,000 Sq Ft | 11.37 | 3.26 | 3.49 | 287 |
| ***Industrial*** | | | | | | |
| **770** | **Business Park***** | **1,000 Sq Ft** | **12.76** | **4.04** | **3.16** | **317** |
| 151 | Mini-Warehouse | 1,000 Sq Ft | 2.50 | 56.28 | 0.04 | 22,512 |
| 150 | Warehousing | 1,000 Sq Ft | 4.96 | 3.89 | 1.28 | 784 |
| 140 | Manufacturing | 1,000 Sq Ft | 3.82 | 2.13 | 1.79 | 558 |
| **110** | **Light Industrial** | **1,000 Sq Ft** | **6.97** | **3.02** | **2.31** | **433** |
| ***Other Nonresidential*** | | | | | | |
| 720 | Medical-Dental Office | 1,000 Sq Ft | 36.13 | 8.91 | 4.05 | 247 |
| 620 | Nursing Home | bed | 2.37 | 6.55 | 0.36 | na |
| 610 | Hospital | 1,000 Sq Ft | 17.57 | 5.20 | 3.38 | 296 |
| 565 | Day Care | student | 4.48 | 28.13 | 0.16 | na |
| 530 | Secondary School | student | 1.71 | 19.74 | 0.09 | na |
| 520 | Elementary School | student | 1.29 | 15.71 | 0.08 | na |
| **520** | **Elementary School** | **1,000 Sq Ft** | **14.49** | **15.71** | **0.92** | **1,084** |
| 320 | Lodging | room | 5.63 | 12.81 | 0.44 | na |

* Source: Trip Generation, Institute of Transportation Engineers (2003).
** Employees per demand unit calculated from trip rates, except for Shopping Center data, which are derived from Development Handbook and Dollars and Cents of Shopping Centers, published by the Urban Land Institute.
*** According to ITE, a Business Park is a group of flex-type buildings served by a common roadway system. The tenant space includes a variety of uses with an average mix of 20-30% office/commercial and 70-80% industrial/warehousing.

## Jobs and Floor Area by Type of Nonresidential Development

Figure A5 provides a breakdown of jobs within the City of Missoula by type of nonresidential development. Using the square feet per employee multipliers from the table above, TischlerBise estimates that Missoula had approximately 15.9 million square feet of nonresidential floor area in 2000. Estimated education and government jobs are from the City of Missoula Comprehensive Annual Financial Report (CAFR).

***Figure A5 – Jobs and Floor Area Estimates***

| City of Missoula, Montana | *Jobs in 2000** | | *Square Feet Per Employee* | *2000 Est Floor Area* |
|---|---|---|---|---|
| ***Goods Producing*** | | | | |
| Wholesale/Transp/Warehse | 3,250 | | | |
| Construction | 2,365 | | | |
| Manufacturing | 1,765 | | | |
| Ag/Forestry | 770 | | | |
| Subtotal | 8,150 | 19.0% | 433 | 3,529,000 |
| ***Retail and Other Services*** | | | | |
| Retail Trade | 7,010 | 16.3% | 400 | 2,804,000 |
| Other Services | 22,854 | 53.2% | 317 | 7,245,000 |
| ***Public Sector*** | | | | |
| Education (K-12 only)** | 1,183 | 2.8% | 1,084 | 1,282,000 |
| Government*** | 3,733 | 8.7% | 271 | 1,012,000 |
| GRAND TOTAL | 42,930 | 100.0% | 370 | 15,872,000 |

** Place of work data from Census Transportation Planning Package (CTPP 2000)*

*** 2005 jobs for Missoula County Public Schools, as reported in City CAFR.*

**** Includes 2005 jobs at the University of Montana, as reported in City CAFR.*

## Development Projections

Key demographic data for the impact fee study are shown in Figure A6. Cumulative data are shown in the top section and annual increases at the bottom of the table. In the cash flow analysis, it is assumed that impact fees will be imposed on public sector development.

### *Figure A6 – Detailed Demographic Data*

| City of Missoula, MT | *2000* | *2007* | ***2010*** | ***2015*** | ***2020*** | ***2025*** | | |
|---|---|---|---|---|---|---|---|---|
| ***Cumulative*** | | *FY06-07* | *3* | *8* | *13* | *18* | | |
| Pop in Hsehlds (rounded) | 53,767 | 61,258 | 64,440 | 69,744 | 75,047 | 80,350 | | |
| Pop in Group Quarters* | 3,286 | 3,986 | 4,286 | 4,786 | 5,286 | 5,786 | | |
| Year-Round Population | 57,053 | 65,244 | 68,726 | 74,530 | 80,333 | 86,136 | | |
| Jobs | 42,930 | 48,851 | 51,389 | 55,618 | 59,847 | 64,077 | | |
| Housing Units | 25,225 | 28,704 | 30,195 | 32,680 | 35,165 | 37,650 | | |
| Jobs to Housing Ratio | 1.70 | 1.70 | 1.70 | 1.70 | 1.70 | 1.70 | | |
| Residential Vacancy Rate | 4.3% | 4.3% | 4.3% | 4.3% | 4.3% | 4.3% | | |
| Households | 24,141 | 27,470 | 28,897 | 31,275 | 33,653 | 36,031 | | |
| Persons Per Household | 2.23 | 2.23 | 2.23 | 2.23 | 2.23 | 2.23 | | |
| Nonres Sq Ft (x 1,000) | | | | | | | *SqFt/job* | *Prototype* |
| Goods Producing | 3,530 | 4,020 | 4,230 | 4,580 | 4,920 | 5,270 | 433 | Light Ind |
| Retail | 2,800 | 3,190 | 3,350 | 3,630 | 3,900 | 4,180 | 400 | Shop Ctr |
| Other Services | 7,240 | 8,240 | 8,670 | 9,380 | 10,090 | 10,810 | 317 | Business Pk |
| K-12 Education | 1,300 | 1,480 | 1,560 | 1,690 | 1,820 | 1,940 | 1,084 | Elem Sch |
| Government | 1,010 | 1,150 | 1,210 | 1,310 | 1,410 | 1,510 | 271 | Office |
| Total | 15,880 | 18,080 | 19,020 | 20,590 | 22,140 | 23,710 | | |
| Avg Sq Ft Per Job | | 370 | 370 | 370 | 370 | 370 | | |

| | | | | | *2000 to 2025* | *Wye-Mullan 25-Yr Incr* | |
|---|---|---|---|---|---|---|---|
| ***Annual Increase*** | *07-08* | *10-11* | *15-16* | *20-21* | *City Increase* | *Increase* | *Pct* |
| Year-Round Population | 1,161 | 1,161 | 1,161 | 1,161 | 29,083 | 7,045 | 24% |
| Jobs | 846 | 846 | 846 | 846 | 21,147 | **5,565** | **26%** |
| Housing Units | 497 | 497 | 497 | 497 | 12,425 | **3,010** | **24%** |
| Goods Producing KSF** | 70 | 70 | 70 | 70 | 1,740 | 458 | 26% |
| Retail KSF** | 50 | 60 | 50 | 60 | 1,380 | 363 | 26% |
| Other Services KSF** | 140 | 140 | 140 | 150 | 3,570 | 939 | 26% |
| K-12 Education KSF** | 30 | 30 | 20 | 20 | 640 | 168 | 26% |
| Government KSF** | 20 | 20 | 20 | 20 | 500 | 132 | 26% |
| | | | | | | 2,061 | TotalKSF |

* The 2000 group quarters population is assumed to increase by 100 people per year.

** KSF = square feet of floor area in thousands.

Based on the 2004 Transportation Plan Growth Management Scenario, the Wye-Mullan area is expected to capture approximately 26% of the City's job growth and 24% of the housing unit increase from 2000 to 2025. TischlerBise used these capture ratios to yield the Wye-Mullan area demographic data shown at the bottom of Figure A7. The base year (FY06-07) data for the study area is an estimate of existing development located within the Mullan Road impact fee benefit district.

***Figure A7 – Demographic Data for the Mullan Road Area***

| | | Year => | 1 | 2 | 3 | 8 | 13 | 18 |
|---|---|---|---|---|---|---|---|---|
| | | 2007 | 2008 | 2009 | 2010 | 2015 | 2020 | 2025 |
| ***DEMAND PROJECTIONS (cumulative)*** | | City of Missoula | | | | | | |
| P | POPULATION | 65,244 | 66,405 | 67,566 | 68,726 | 74,530 | 80,333 | 86,136 |
| H | HOUSEHOLDS | 27,470 | 27,946 | 28,421 | 28,897 | 31,275 | 33,653 | 36,031 |
| J | JOBS | 48,851 | 49,697 | 50,543 | 51,389 | 55,618 | 59,847 | 64,077 |
| PJ | POPULATION & JOBS | 114,095 | 116,102 | 118,109 | 120,115 | 130,148 | 140,180 | 150,213 |
| TVT | Total Avg Wkdy Veh Trips | 247,798 | 251,985 | 256,346 | 260,573 | 282,116 | 303,400 | 324,938 |
| RT | ***Residential Units:*** | 28,704 | 29,201 | 29,698 | 30,195 | 32,680 | 35,165 | 37,650 |
| R1 | Single Family Detached | 15,500 | 15,769 | 16,037 | 16,306 | 17,647 | 18,989 | 20,331 |
| R2 | All Other Hse Types | 13,204 | 13,433 | 13,661 | 13,890 | 15,033 | 16,176 | 17,319 |
| RVT | Res Avg Wkdy Veh Trips | 112,856 | 114,811 | 116,765 | 118,719 | 128,489 | 138,260 | 148,030 |
| NRT | ***NonRes Floor Area:*** | 18,080 | 18,390 | 18,700 | 19,020 | 20,590 | 22,140 | 23,710 |
| NR1 | Goods Producing | 4,020 | 4,090 | 4,160 | 4,230 | 4,580 | 4,920 | 5,270 |
| NR2 | Retail | 3,190 | 3,240 | 3,300 | 3,350 | 3,630 | 3,900 | 4,180 |
| NR3 | Other Services | 8,240 | 8,380 | 8,520 | 8,670 | 9,380 | 10,090 | 10,810 |
| NR4 | Education | 1,480 | 1,510 | 1,530 | 1,560 | 1,690 | 1,820 | 1,940 |
| NR5 | Government | 1,150 | 1,170 | 1,190 | 1,210 | 1,310 | 1,410 | 1,510 |
| NRVT | NR Avg Wkdy Veh Trips | 134,943 | 137,174 | 139,581 | 141,854 | 153,627 | 165,141 | 176,908 |
| ***Wye-Mullan Benefit District*** | | | | | | | | |
| DB1 | 24% W-M SFD HU | 2,000 | 2,064 | 2,129 | 2,193 | 2,515 | 2,837 | 3,159 |
| DB2 | 24% W-M Other HU | 200 | 255 | 310 | 365 | 639 | 913 | 1,188 |
| DB3 | 26% W-M Goods Pro KSF | 100 | 118 | 136 | 155 | 246 | 334 | 425 |
| DB4 | 26% W-M Retail KSF | 10 | 23 | 39 | 52 | 124 | 195 | 267 |
| DB5 | 26% W-M Other Serv KSF | 100 | 136 | 173 | 212 | 396 | 581 | 768 |
| DB6 | 26% W-M Edu KSF | 100 | 108 | 113 | 121 | 155 | 188 | 220 |
| DB7 | 26% W-M Gov KSF | 10 | 15 | 20 | 26 | 52 | 78 | 104 |
| DB8 | W-M Res Veh Trips | 10,156 | 10,625 | 11,094 | 11,563 | 13,908 | 16,253 | 18,598 |
| DB9 | W-M Nonres Veh Trips | 1,539 | 2,119 | 2,744 | 3,335 | 6,396 | 9,390 | 12,449 |
| DB10 | W-M Total Veh Trips | 11,695 | 12,744 | 13,839 | 14,899 | 20,304 | 25,643 | 31,047 |

# APPENDIX B – PASS-BY TRIP ADJUSTMENT FACTORS

**Abstract**

For commercial developments, trip generation rates are only one of the steps needed to determine traffic impacts. Because commercial developments attract vehicles passing by on adjacent streets, pass-by trip percentages reduce trip generation rates to more accurately assess travel demand. This Appendix documents a methodology for deriving pass-by trip percentages based on the floor area of a commercial development. A fitted curve equation is provided using data from traffic studies published in the second edition of Trip Generation Handbook (ITE, 2004). The recommended methodology is suitable for impact fees, which are derived using average characteristics of the transportation system.

**Purpose**

Transportation impact fees typically rely on trip generation rates published by the Institute of Transportation Engineers (ITE). For shopping centers, trip generation rates are derived from a formula using floor area as the independent variable. The fitted curve is a logarithmic equation that yields declining vehicle trip rates per thousand square feet as shopping center size increases. However, trip generation alone does not provide a complete evaluation of traffic impacts due to pass-by and diverted trips to commercial developments. Because diverted trips still increase vehicle miles of travel, transportation impact fees apply pass-by trip adjustments or derive the "percentage of new trips" associated with new development (Oliver, 1991; Tindale, 1991). This article provides a methodology for deriving pass-by trip percentages from the floor area of commercial development. The analysis of pass-by trip percentages from traffic studies reported in Trip Generation Handbook (ITE, 2004) indicates a similar relationship to the trip generation formula for shopping centers. This Appendix specifies the decline in pass-by trip percentages as commercial floor area increases.

**Literature Review**

The literature review in this section is discussed in chronological order beginning with the 1991 version of Trip Generation. In Table VII-1, pass-by trip percentages were reported for 67 shopping centers ranging in size from 44,000 to 1,200,000 square feet. These data indicate a decline in pass-by trip percentages as shopping center size increases. During 1991 and 1992, ITE also published four journal articles on the topic of pass-by trips and how these adjustments could be applied in the calculation of impact fees.

In March of 1991, Moussavi and Gorman examined how pass-by trip percentages were influenced by building size and the average daily traffic on adjacent streets. Their findings regarding the relationship between average daily trips on adjacent streets and pass-by percentages are not relevant to general impact fee formulas that estimate average travel characteristics for an entire service area. Although limited to an analysis of only 12 sites, their regression analysis did confirm that floor area is a strong predictor of pass-by trips for discount stores, but not grocery stores. Because traditional grocery stores and the more modern day version known as "discount supermarkets" tend to attract more primary trips than other comparably sized stores, this study excludes these development types.

In April of 1991, William Oliver discussed how to determine average trip length from survey data and then use the results in transportation impact fees. A key concept from this article is the idea that impact fees should only assess for the percentage of new trips attributable to new development, after accounting for internal trip capture, diverted and pass-by trips. The methodologies described by Oliver are useful for individual impact fee assessments of large-scale development, but they do not address more universal adjustments for pass-by trips, which is the focus of this research.

In May of 1991, Steven Tindale provided a detailed discussion of various technical issues related to transportation impact fees, including trip capture. The article is similar to Oliver's in advocating original data collection to establish trip rates, lengths and percentage of new trips. However, due to time and budget constraints, most jurisdictions derive impact fees using input variables readily available from regional, state or national sources such as Trip Generation.

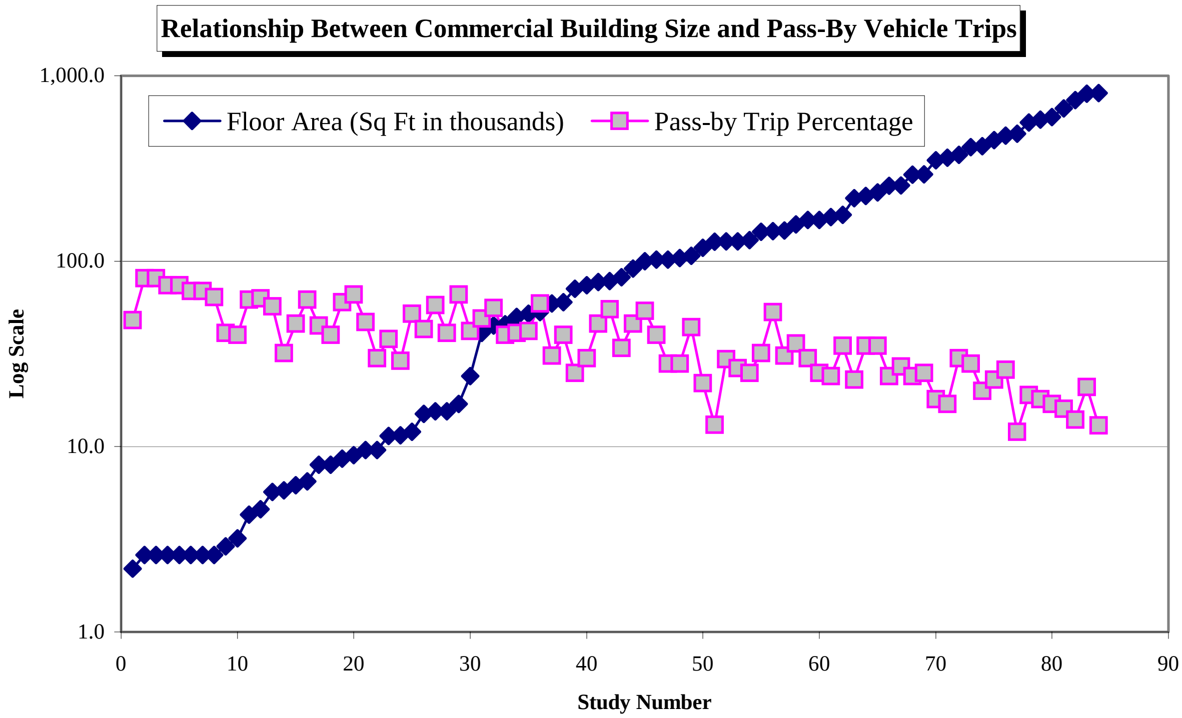
In May of 1992, Moussavi and Gorman provide a follow-up "refinement" to their 1991 article. One of the suggested refinements incorporated into the research presented below, was to use logarithmic, rather than linear regression.

The second edition of Trip Generation Handbook (ITE, 2004), provides a data plot of average pass-by trip percentage based on gross leasable floor area of a shopping center. The fitted curve equation shown in Figure 5.5 indicates a fitted logarithmic curve with an R-squared value of 0.37. The analysis presented below improves the "goodness" of fit, yielding an R-squared value of approximately 0.64.

**Analysis**

The general relationship between commercial building size and pass-by vehicle trips is illustrated in Figure B1. When commercial floor area, measured in thousands of square feet, is plotted on a log scale and rank-ordered, it is clear that increasing commercial building size decreases the pass-by trip percentage. In other words, small retail establishments, like a convenience store have higher pass-by trip percentages than large regional shopping malls.

FIGURE B1




To improve the correlation between commercial building size and pass-by trip percentage, this study used the following criteria. First, the number of interviews reported by a traffic study had to have at least 96 interviews, which ensures a maximum error of 10% in the mean at a 95% level of confidence (see Appendix B in Meyer and Miller, 2001). Second, the traffic study had to report a specific floor area of at least 1,000 square feet, rather than a floor area range. Third, traffic surveys included in the database are not older than 1989. The studies prior to 1989 include very large shopping centers of approximately one million square feet, which are rarely constructed in the current real estate market. Fourth, for consistency this analysis only includes PM-peak hour data.

Figure B2 provides a summary of the pass-by trip database, indicating types of development, the number of studies for each type, average floor area (in thousands of square feet) and average pass-by trip percentage. Shopping centers account for almost half of the studies and had the largest floor area, averaging 280,000 square feet. In total, the 84 studies analyzed had an average floor area of 159,000 square feet and an average of 39% pass-by trips.

FIGURE B2

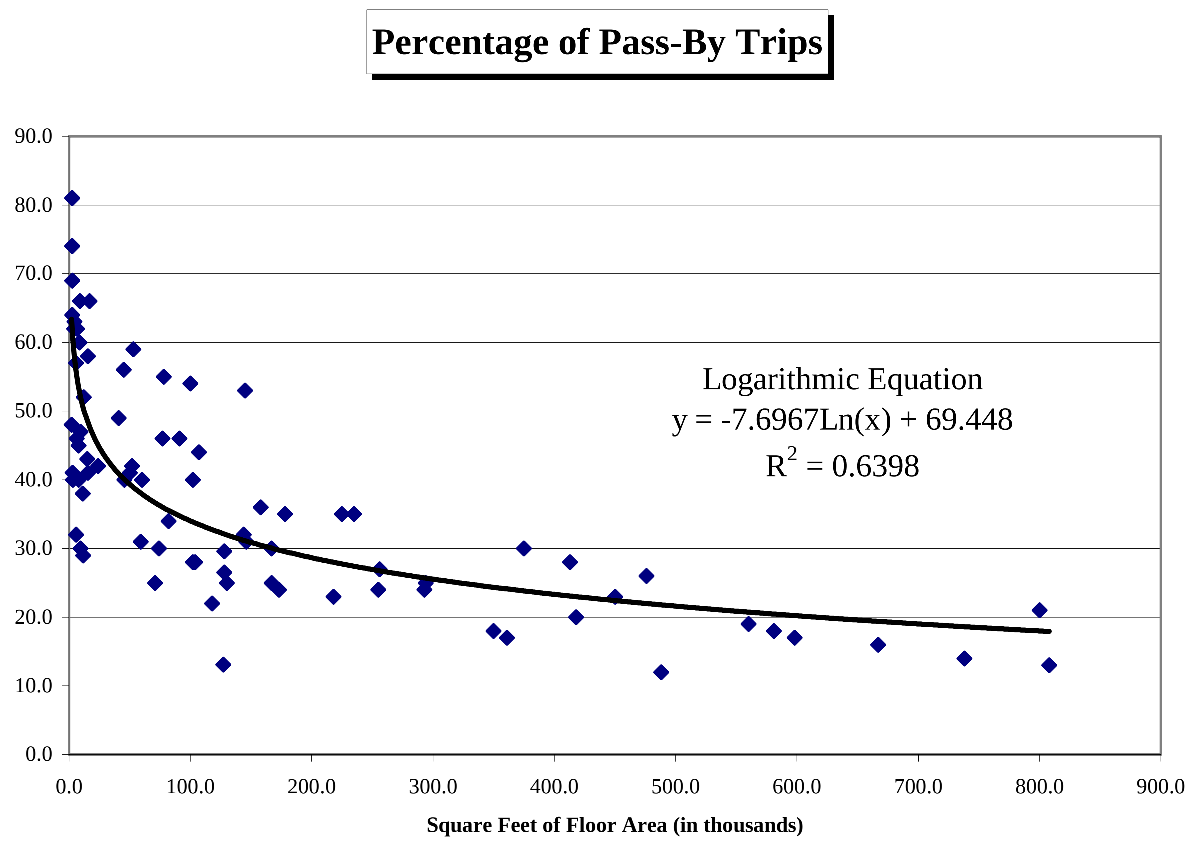
**Summary of Pass-By Trips Database**

| *ITE Code* | *Description* | *# of Studies* | *AvgSqFt (thousands)* | *AvgPass-By Trip Pct* |
|---|---|---|---|---|
| 813 | Free-Standing Discount Superstore | 8 | 151 | 28 |
| 815 | Free-Standing Discount Store | 3 | 128 | 23 |
| 820 | Shopping Center | 40 | 280 | 31 |
| 843 | Automobile Parts Sales | 1 | 15 | 43 |
| 851 | Convenience Market | 4 | 3 | 72 |
| 853 | Convenience Market w Gas Pumps | 4 | 3 | 68 |
| 862 | Home Improvement Superstore | 3 | 99 | 48 |
| 863 | Electronics Superstore | 1 | 46 | 40 |
| 880 | Pharmacy/Drugstore w/o Window | 3 | 10 | 47 |
| 881 | Pharmacy/Drugstore w Drive-Through | 3 | 14 | 49 |
| 890 | Furniture Store | 2 | 33 | 46 |
| 931 | Quality Restaurant | 2 | 7 | 54 |
| 932 | High-Turnover Restaurant | 7 | 8 | 44 |
| 934 | Fast-Food with Drive-Through | 3 | 3 | 48 |
| | TOTAL | 84 | 159 | 39 |

Studies in the database meet the following criteria: 1) PM-peak data; 2) Traffic survey in 1989 or afterwards; 3) Floor area at least 1,000 square feet; 4) Sample size of at least 96 interviews, which ensures a maximum error of 10% in the mean at a 95% level of confidence.

Figure B3 indicates a scatter plot of floor area versus percentage of pass-by trips. The best trend-line correlation between pass-by trips and floor area is a logarithmic curve with the equation ((-7.6967*LN(KSF)) + 69.448). The R-squared value for this curve is 0.6398, indicating the floor area accounts for approximately 64% of the variation in pass-by trip percentage.

FIGURE B3



The fitted curve equation allows a specific pass-by trip estimate for any size commercial building. To illustrate the change in trip generation rates and pass-by trips by size of commercial development, Figure B4 provides data for seven building-size thresholds ranging from 10,000 to 800,000 square feet of floor area.

FIGURE B4

**Trip Rates and Adjustment Factors by Size Threshold**

| Floor Area in thousands (KSF) | ***Shopping Centers*** (ITE 820 Weekday*) | | ***Shopping Centers*** (ITE 820 PM-Peak Hour*) | | Commercial Pass-by Trips** | Commercial Trip Adj Factor*** |
|---|---|---|---|---|---|---|
| | Trip Ends | Rate/KSF | Trip Ends | Rate/KSF | | |
| 10 | 1,520 | 152.03 | 137 | 13.70 | 52% | 24% |
| 25 | 2,758 | 110.32 | 251 | 10.03 | 45% | 28% |
| 50 | 4,328 | 86.56 | 396 | 7.92 | 39% | 31% |
| 100 | 6,791 | 67.91 | 626 | 6.26 | 34% | 33% |
| 200 | 10,656 | 53.28 | 989 | 4.95 | 29% | 36% |
| 400 | 16,722 | 41.80 | 1,563 | 3.91 | 23% | 39% |
| 800 | 26,239 | 32.80 | 2,470 | 3.09 | 18% | 41% |

* Trip Generation, ITE, 2003.
** Based on data published by ITE in Trip Generation Handbook (2004), the best trendline correlation between pass-by trips and floor area is a logarithmic curve with the equation ((-7.6967*LN(KSF)) + 69.448).
*** To convert trip ends to vehicle trips, the standard adjustment factor is 50%. Due to pass-by trips, commercial trip adjustment factors are lower, as derived from the following formula (0.50*(1-passby pct)).

To avoid double counting the same vehicle trip at both the origin and destination points, transportation impact fees typically convert trip ends to trips using a standard adjustment factor of 50%. For commercial development, trip adjustment factors are less than 50% because retail development and some services (like banks) attract vehicles as they pass by on arterial and collector roads. As shown above, for a small-size commercial development with 10,000 square feet of floor area, an average of 52% of the vehicles that enter are passing by on their way to some other primary destination. The remaining 48% of attraction trips have the commercial development as their primary destination. Because attraction trips are half of all trips, the commercial trip adjustment factor is 48% multiplied by 50%, or approximately 24% of the trip ends.

**Conclusions**

The methodology presented above significantly improves the "goodness" of fit between the independent variable of commercial floor area and the dependent variable of pass-by trip percentage. Commercial trip adjustment factors may be derived for any size commercial building using the recommended logarithmic regression, thus avoiding the use of a simple average pass-by trip percentage for an individual ITE land use code. The recommended methodology also avoids the small sample-size problem that currently exists for most of the ITE land use codes that only provide pass-by data for a limited number of traffic studies. The recommended use of pass-by trip adjustment factors by size of commercial development will improve transportation impact fees that are intended to proportionately allocate the cost of growth-related infrastructure to new development.

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