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KITSAP COUNTY

TRANSPORTATION IMPACT FEE RATE STUDY

2021 UPDATE

FINAL REPORT

May 2021

Prepared for:

Kitsap County

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1. Introduction

This document summarizes the development of an updated Kitsap County transportation impact fee rate. It describes the existing impact fee rate, the basis for the fee, the rate methodology, the impact fee project list, and the recommended fee rate.

Definition of Impact Fees

Impact fees are a comprehensive grouping of charges based on new development. These fees are assessed to pay for capital facility improvement projects necessitated by new development growth, including but not limited to parks, schools, and streets/roads.

Transportation impact fees are collected to fund improvements that add capacity to the transportation system, accommodating the travel demand created by new development. The Revised Code of Washington (RCW) Section 82.02.050 identifies the intent of impact fees as:

- To ensure that adequate facilities are available to serve new growth and development;
- To promote orderly growth and development by establishing standards by which counties, cities, and towns may require, by ordinance, that new growth and development pay a proportionate share of the cost of new facilities needed to serve new growth and development; and
- To ensure that impact fees are imposed through established procedures and criteria so that specific developments do not pay arbitrary fees or duplicative fees for the same impact.

Statutory Basis for Impact Fees

Transportation impact fees are a financing mechanism authorized by the Growth Management Act (GMA) of Washington State (see RCW 36.70A.070 and 82.02.050). State law imposes limitations on impact fees. These limitations are intended to assure property owners that the fees collected are reasonably related to their actual impacts and will not be used for unrelated purposes.

If impact fees are imposed, the funds collected from developments can be expended only on transportation system improvements which are: (a) identified in the comprehensive plan, capital improvement program, or other policy documents (including this study) as needed for growth, and (b) reasonably related to the impacts of the new development from which fees are collected.

Specifically, condition (a) requires that impact fees are not used on improvements needed to remedy existing deficiencies. Those needs must be entirely funded from public sector resources. Condition (b) is satisfied if the local government defines a reasonable service area, identifies the public facilities within the service area that require improvement during the designated planning period, and prepares a fee schedule taking into account the type and size of the development as well as the type of public facility being funded.

To achieve the goal of simplicity, impact fee calculations are applied on an average basis for the entire transportation system, rather than project-by-project. This is a key difference between impact fees and State Environmental Policy Act (SEPA) mitigation, whereby pro-rata shares of specific project improvements are collected. However, impact fees are not a replacement for SEPA mitigation.

Pre-calculated impact fees are easier to administer than traditional SEPA development mitigation, at the point of development review. However, more complex administrative procedures are necessary to track the funds collected from each development. This is necessary to assure that the funds are expended

only on eligible transportation system improvements and to assure that impact fee revenues are used within ten years. Fees not expended within ten years must be refunded with interest to the current owner of the property.

The methodology and results described below are consistent with the requirements of the GMA. The procedures and recommendations described herein can be formally enacted by an impact fee ordinance incorporating this report by reference.

2. Traffic Forecasting

The Kitsap County travel demand model and traffic operations model are the technical basis for the transportation impact fee rate calculation. The models quantify anticipated travel demand and traffic operations, which are used to identify transportation improvement projects required to maintain transportation level of service standards given anticipated development forecasts. This section describes the development, calibration, and application of the travel demand and operations models. The 2020 travel demand model update process is summarized in the technical memorandum "2020 Travel Demand Model Update," included as **Appendix A**.

Data Collection

The travel demand and intersection operations models are based on the PM peak hour of travel, defined as the highest four consecutive 15-minute volume intervals during the PM peak period. The PM peak hour generally corresponds to the afternoon commute rush hour.

Kitsap County staff provided 4-6 PM peak period intersection turning movement counts collected between 2017 and 2019 for 206 intersections in Kitsap County. Supplemental 2017-2019 PM peak period counts were provided by WSDOT, the City of Bremerton, the City of Port Orchard, and by Transportation Solutions.

Additional 4-6 PM peak period counts were collected at 62 intersections throughout the County in late September and early October 2020. To account for the travel demand impacts of the COVID-19 pandemic, turning movement counts were also collected at eight locations where recent pre-pandemic counts were available. The 2020 counts were scaled based on the ratio of 2020 demand to 2017-2019 demand. These adjustment factors are summarized in **Table 1**. After applying the adjustment factors indicated in Table 3, 2020 counts were further adjusted to maintain conservation of flow with nearby intersections with recent pre-COVID-19 counts. This two-step adjustment approach reduced the uncertainty of the 2020 counts relative to known pre-COVID-19 volumes.

Table 1. PM Peak Hour Volume COVID-19 Adjustment Factors

Area	Locations	PM Peak Hour Volume		Ratio
		Pre-COVID-19	October 2020	
South/Central Kitsap County (incl. Silverdale)	4	6,763	5,963	1.13
North Kitsap County (incl. Kingston)	2	3,013	2,350	1.28
WSDOT Routes	2	5,753	4,540	1.27

Google Earth Pro and Bing Maps satellite and street-level photography were reviewed to verify existing roadway characteristics including roadway geometry, channelization, intersection control, turn restrictions, and posted speeds.

Traffic signal timing plans were obtained from Kitsap County and WSDOT staff for all signalized intersections in the study area.

Travel Demand Model Platform

The 2020 travel demand model update involved converting the Kitsap County model from TransCAD 5.0 software to PTV Visum 2020 software. The benefits of the Visum modeling platform are described in the "2020 Travel Demand Model Update," included as **Appendix A**, and include more detailed intersection-level delay calculations, increased forecasting accuracy, reduced model input requirements, improved scenario management capability, and improved transportation network coverage of local streets. The updated model also shares a software platform with long-range planning models used by the cities of Bainbridge Island, Bremerton, Port Orchard, and Poulsbo.

Travel Demand Model Calibration

Travel demand model calibration consists of adjusting model procedures and formulas to allow the model to best represent local travel behavior for a known condition. This can involve adjusting trip generation rates, trip distribution gravity model parameters, and other more detailed model parameters including network volume-delay functions and model procedure settings.

Travel demand model validation consists of comparing the model's traffic assignment output to actual traffic counts and possibly other available field data to establish correlation between the base-year model and base-year field data.

A well-calibrated model, when populated with land use and street network data that existed at the time traffic counts were collected, will generate traffic volumes that closely correlate with traffic counts. Calibration errors should be minimal and evenly distributed to consider a model "validated" and therefore suitable for use in planning, operations, and design studies.

The 2020 model was calibrated according to best practices identified in *National Cooperative Highway Research Program Report 765: Analytical Travel Forecasting Approaches for Project-Level Planning and Design* (TRB 2014) and *Travel Model Validation and Reasonableness Checking Manual Second Edition* (FHWA 2010).

PM peak hour intersection turning movement counts collected between 2017 and 2020 were aggregated to obtain 2,094 link volume counts. Link counts were used as reference points during the model calibration. The 2020 model traffic volumes were checked against the PM peak hour link volume counts and model input parameters were calibrated to improve the correlation between the modeled and counted traffic volumes. Validation checks were also performed by County and consultant staff based on local engineering knowledge and judgment.

The most common statistical measures of travel demand model accuracy are the coefficient of determination (R^2) and the percent root-mean square error (%RMSE) statistics. The R^2 statistic can be interpreted as a "goodness of fit" statistic and measures the strength of the linear relationship between the calculated model volumes and observed (counted) traffic volumes. Percent RMSE measures the average error between the modeled and observed traffic volumes and can be calculated using the following formula:

$$\%\text{RMSE} = 100 \text{ x } \frac{\sqrt{\frac{\sum(\text{Assignment Errors})^2}{\text{Number of Links}}}}{\text{Average Count}}$$

R and %RMSE measure the overall degree to which modeled volumes correspond to observed count data. Perfection would be 100 percent correlation of modeled volumes to counts (R^2 = 1.00, %RMSE = 0). R^2 values above 0.88 are desirable, per *Model Validation and Reasonableness Checking Manual* (FHWA 1997).

There are no national standards for R^2 or %RMSE. However, the Federal Highway Administration (FHWA) provides guidelines for model calibration. **Table 2** shows that the 2020 model calibration satisfies the FHWA recommended values. The calibrated model has an R^2 statistic of 0.96, which indicates a strong correlation between traffic counts and modeled volumes.

Table 2. Model Calibration Statistics

Calibration Statistic	FHWA Recommended Value	2019 Model Statistic
R^2	≥ 0.88	0.96
%RMSE	≤ 35%	22%
%In[1]	≥ 75%	96%

[1]%In represents the percent of assigned volumes within the NCHRP Report 765 recommended allowable error curves. The maximum value is 100 percent; the higher the value the more accurate the model.

Although the Kitsap County model was well calibrated, there were still some minor differences between the 2020 raw model volumes and the traffic counts. The minor differences were post-processed using Visum software's origin-destination matrix correction procedure. The resulting "correction matrix" was incorporated in the calibrated 2020 trip table to obtain a final post-processed origin-destination trip matrix. This trip table was then assigned to the modeled transportation network to obtain post-processed model volumes. The 2020 post-processed model volumes were used as a baseline condition from which to compare long-range traffic volume growth for capacity and LOS analyses.

Travel Demand Forecasting

Long-range (2036) traffic forecasts were calculated by entering Kitsap County housing and employment growth forecasts to the calibrated travel demand model. Land use development forecasts were based on the 2016 Capital Facilities Plan update and were reviewed by County and consultant staff prior to model input. Transportation improvement projects identified in the 2021-2026 TIP were assumed to be constructed by 2036 and were applied to the travel demand model.

New development will generate a total of 21,582 new weekday PM peak hour trips by 2036. The travel demand model assigned each new trip throughout the transportation network, generating traffic volume forecasts for most public roadways and intersections in the county.

Segment Level of Service

The current Kitsap County Level of Service (LOS) policy identifies roadway deficiencies based on PM peak hour volume-to-capacity (v/c) ratio, as shown in **Table 3**.

Table 3. County Roadway Level of Service Standards

Functional Classification	LOS Standard (Maximum v/c)	
	Urban (UGA)	Rural (Non-UGA)
Principal Arterial	D (0.89)	C (0.79)
Minor Arterial	D (0.89)	C (0.79)
Collector	D (0.89)	C (0.79)
Minor Collector	D (0.89)	C (0.79)
Residential/Local	C (0.79)	C (0.79)

The roadway segment capacity methodology used in this analysis, summarized in **Table 4**, is similar to the system currently used several other agencies in Western Washington for the purposes of systemwide capital improvement planning. The capacity policy is appropriate for systemwide capital improvement planning.

Table 4. PM Peak Hour Capacity Policy for Capital Improvement Planning

Functional Classification		Principal Arterial	Minor Arterial	Major Collector	Minor Collector
Base Service Volume (vphpl)		1,000	930	860	790
Includes median, TWLTL, or LT pockets*		+500	+465	+430	+395
Reduction for narrow shoulder	<2 feet	-100	-95	-85	-80
	2-3 feet	-50	-45	-45	-40
	>3 feet	0	0	0	0
No sidewalk		-200	-185	-170	-160
On-Street Parking		-50	-45	-45	-40

*or no left-turn demand along segment

Segment volume-to-capacity (v/c) ratio and Level of Service (LOS) was calculated for all functionally classified (collector or higher) County roadway segments. Segments which exceed the applicable maximum v/c standards identified in **Table 2** were identified as deficient, and mitigation recommendations were applied to the extent necessary to maintain the 2020 countywide lane-mile total of deficient roadway segments through 2036.

Intersection Level of Service

Intersection LOS is based on the average delay experienced by a vehicle traveling through an intersection. Delay at a signalized intersection can be caused by waiting for the signal or waiting for the queue ahead to clear the signal. Delay at roundabouts and stop-controlled intersections is caused by waiting for a gap in traffic or waiting for a queue to clear the intersection or roundabout.

Delay is defined differently for signalized and all-way stop controlled intersections than for two-way stop controlled (i.e. stop control on minor approach) intersections. For signalized and all-way stop controlled intersections, LOS thresholds are based upon average control delay for all vehicles (on all approach legs) entering the intersection. For minor-approach-only stop controlled intersections, delay is reported for the movement with the worst (highest) delay. **Table 5** identifies intersection LOS delay thresholds.

Table 5. Level of Service Thresholds

LOS	Signalized and Roundabout Delay (sec/veh)	Unsignalized Delay (sec/veh)
A	≤10	≤10
B	>10 – 20	>10 – 15
C	>20 – 35	>15 – 25
D	>35 – 55	>25 – 35
E	>55 – 80	>35 – 50
F	>80	>50

Delay for signalized and stop-controlled intersections was calculated in Synchro 10 software using Highway Capacity Manual 6 (HCM6) methodology. Signalized intersections were modeled using an ideal saturated flow rate of 1,800 vehicles per hour per lane (vphpl), which is consistent with Synchro analysis guidance identified in the August 2018 "WSDOT Synchro & SimTraffic Protocol."

Roundabout delay was calculated in Sidra Intersection 8 software using the Sidra capacity model and signalized level of service thresholds, per WSDOT October 2019 "Sidra Policy Settings."

3. Impact Fee Analysis

Methodology

The conceptual basis for the transportation impact fee is that growth (i.e. new development) should pay a proportionate share of the cost to provide future transportation capacity. This proportionate share is calculated based on the estimated cost of growth-related transportation improvement projects and on an estimate of growth's share of capacity utilization for each project. The impact fee analysis is limited to projects that provide capacity improvements needed for growth. Projects related to maintenance, such as pavement overlays and physical obsolescence, as well as improvements necessary to mitigate existing capacity deficiencies, are not eligible for impact fee funding. However, agencies have been encouraged by the Department of Commerce to consider multimodal transportation improvements and, to that end, shoulder widening, sidewalks, bike lanes and parallel trails are reasonable to include as both motorized and nonmotorized capacity enhancements.

Current Impact Fee Methodology

Kitsap County first adopted a transportation impact fee ordinance in 1992. The ordinance established an impact fee rate of approximately $51 per daily trip for each of three impact fee districts. The impact fee rate structure was updated in a 2003 study to create four impact fee districts, with a fifth district for state route projects in Kitsap County. Impact fee service areas are shown in **Figure 2**.

Kitsap County Ordinance 561-2018 established a new impact fee rate table based on the Institute of Transportation Engineers *Trip Generation Manual.* The current impact fee rate is uniform across all impact fee service areas and is adjusted for inflation.

As of March 2020, the transportation impact fee rate is approximately $700 per new PM peak hour trip, an equivalent of $694 per new single-family dwelling unit. This is the second-lowest impact fee rate in Western Washington for jurisdictions who impose transportation impact fees.

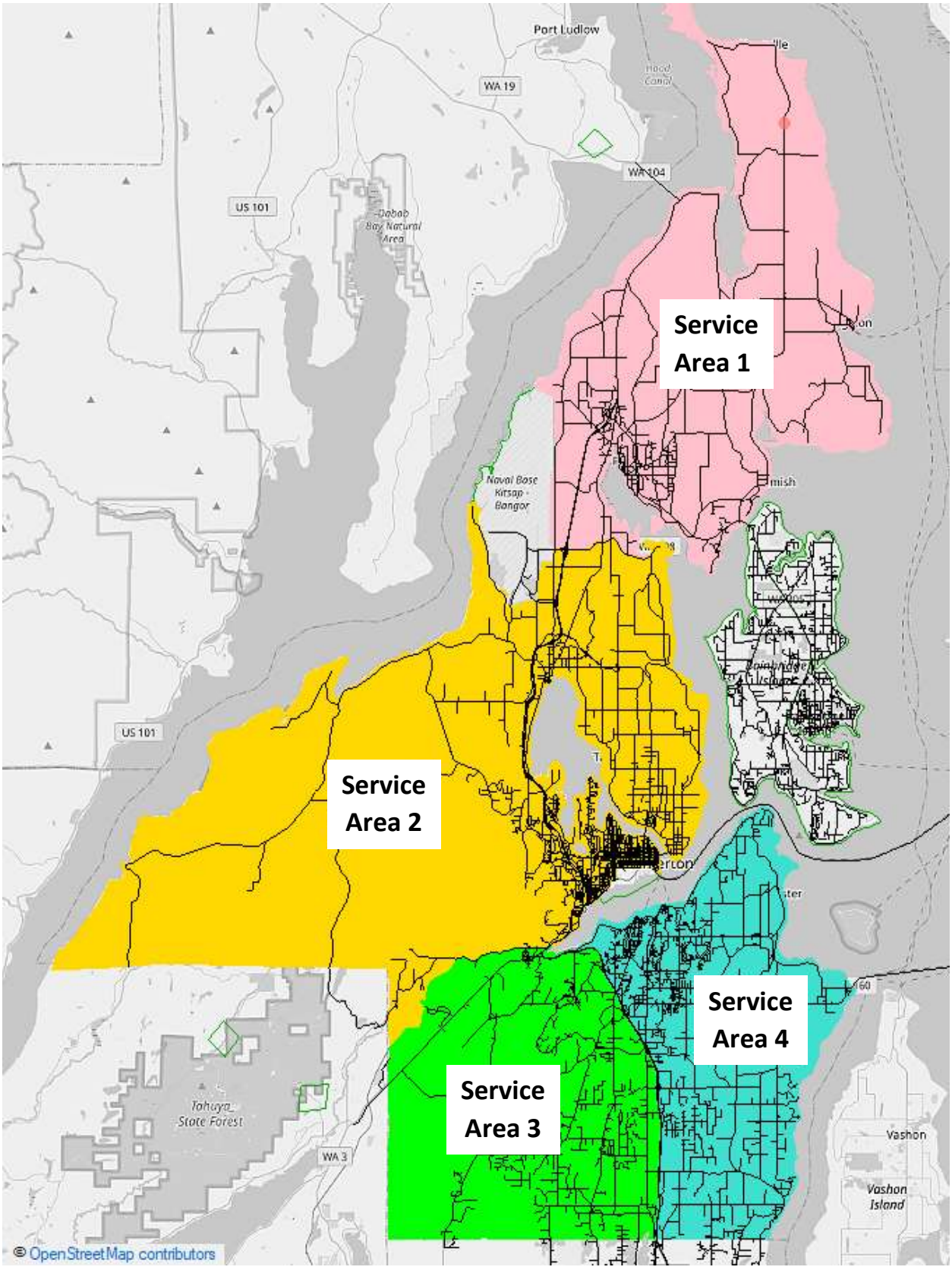

Figure 1. Transportation Impact Fee Service Areas

Projects Eligible for Impact Fees

Not all planned transportation projects and programs are eligible for impact fees. Planned improvement project are divided below into the following categories to establish a list of qualifying projects that will form the basis for the Kitsap County impact fee rate:

- Project Improvements,
- Planned Transportation Projects needed within 20 years, and
- Maintenance Projects

Project Improvements

Project improvements are transportation improvements necessary for a specific development that do not provide significant system benefits. These are typically low-volume local streets that serve driveways and parking areas. They may provide connections to other developments, but not for the purpose of significant system capacity. Other project improvements include safety improvements and new access connections to existing arterials that serve only one development. Project improvements are typically required by other development regulations or as SEPA mitigation for specific development impacts not anticipated in the Comprehensive Plan. Project improvements are not eligible for impact fees.

Planned Transportation Projects

The Kitsap County Six-Year Transportation Improvement Program 2021-2026 (TIP) identifies transportation projects which are needed to serve traffic growth for the next six years. Projects needed to support long-range growth are identified in the 2016 Kitsap County Capital Facilities Plan (CFP), Subarea Plans, and Transportation Implementation Strategy Plans (TIS).

The updated travel demand model and intersection operations model identified several roadway and intersection improvement projects (not identified in the plans cited above) which are required to maintain segment LOS standards and intersection LOS D (urban, LOS C rural) or better on County collector and arterial roadways through 2036. These projects were reviewed by County and consultant staff and included as planned transportation improvement projects for the purpose of impact fee rate calculation. A summary of all transportation improvement projects included in the transportation impact fee project list is provided in **Appendix B**.

Projects with capacity benefits are eligible for impact fee funding. Capacity-related improvements may include adding turn lanes, lane widening or separating non-motorized modes, adding signals or roundabouts for intersection capacity, or other improvements. The proportional share of these projects reasonably related to growth are eligible for impact fees.

Maintenance Projects

Maintenance programs, general studies, and non-capital activities are generally not eligible for impact fees. A component of ongoing pavement preservation could be eligible for impact fees if it is demonstrated that growth increases the magnitude of pavement reconstruction requirements. For instance, if existing conditions require a two-inch asphalt overlay, but added traffic from growth requires a three-inch asphalt overlay to achieve the same pavement life, the cost of the additional inch of asphalt could be attributed to growth. If the overlay or reconstruction provides increased lane width, intersection improvements, or shoulder widening, the cost of the expansion could be considered eligible.

Eligible Project Costs

Impact fee eligible projects and their estimated costs are identified in **Appendix B**. These costs include various elements which are necessary for the construction of transportation improvements, including design, permitting, right-of-way, construction, and construction management. Ongoing or future maintenance is not an eligible impact fee cost. TIP projects which are not capacity-related, or which are considered maintenance projects/programs are not included in the TIF project list.

Impact Fee Calculation

The impact fee was calculated based on the increase in PM peak hour vehicle trips resulting from growth, the cost of improvements related to growth, and the County's transportation financing strategy. The calculation methodology is described below.

County Funding Responsibility

Federally classified roadway projects (collectors and arterials) are generally eligible for state and federal grant funds. These funds are not predictable, typically have very restriction eligibility criteria, and vary in amount by grantor. The 2021-2026 TIP identifies a total of $15,346,000 in secure grant funding for programmed transportation improvement projects which are on the impact fee project list. This secure grant funding was removed from the impact fee rate calculation equation. The remaining transportation improvement project cost of $297,090,682 was used as the basis for the proportionate share calculation.

Proportionate Share of Project Cost

Growth's proportionate share of improvement costs was calculated as the proportion of new development trips relative to total PM peak hour trips in 2036. The growth share was calculated per improvement project based on Kitsap County travel demand model forecasts.

The proportionate growth share of project costs was calculated by dividing the 2020-2036 PM peak hour trip growth by the total 2036 PM peak hour volume on each improvement project, as shown:

$$[Proportionate\ Share\ of\ Project\ Cost] = \frac{2020\text{–}2036\ PM\ peak\ hour\ growt}{2036\ PM\ peak\ hour\ volume}$$

The proportionate share for each project on the transportation impact fee list is provided in **Appendix B**. The sum of the growth share of project cost for all impact fee projects is $92,899,391, or approximately 30 percent of total impact fee eligible project cost.

Impact Fee Rate

The countywide transportation impact fee rate was calculated by dividing the sum of the growth share of TIF project cost by the total countywide PM peak hour trip growth forecast, as shown:

$$\frac{\text{Development share of project costs}}{\text{Countywide PM trip growth}} = \frac{\$92{,}899{,}391}{21{,}582\ \text{new trips}} = \$4{,}304\ /\ \text{PM peak hour trip}$$

Based on this analysis, the countywide transportation impact fee will be $4,304 per new PM peak hour trip.

Sample Transportation Impact Fees

Table 6 summarizes the fee rates which would be paid by several typical developments If the identified impact fee rate were adopted in an impact fee ordinance. A comprehensive transportation impact fee rate schedule is included in Appendix B.

Table 6. Transportation Impact Fee Comparison for Typical Land Uses

Land Use Type	ITE LUC[1]	Trip Rate	Per Unit	2019 TIF Rate ($/unit)	2021 TIF Rate ($/unit)
Single-Family Home	210	0.99	DU	694	4,261
Low-Rise Multifamily	220	0.56	DU	392	2,410
Assisted Living	254	0.26	Per bed	182	1,199
General Office	710	1.15	1,000 ft^2	805	4,950
Shopping Center	820	2.51*	1,000 ft^2	1,757	10,803
Light Industrial	110	0.63	1,000 ft^2	441	2,712

[1]Land Use Code and trip rates per Institute of Transportation Engineers *Trip Generation Manual 10th Edition*

*Includes 34% reduction for pass-by trips, per Institute of Transportation Engineers *Trip Generation Handbook*

4. Additional Issues for Consideration

Anticipated Annual Impact Fee Revenue

The amount of revenue generated annually by impact fees are variable, subject to general economic and social conditions.

Transportation impact fee revenue for the years 2011 through 2020 are shown in **Figure 2**. Based on the last four years of development activity, Kitsap County received an average of $402,513 annually in transportation impact fees.

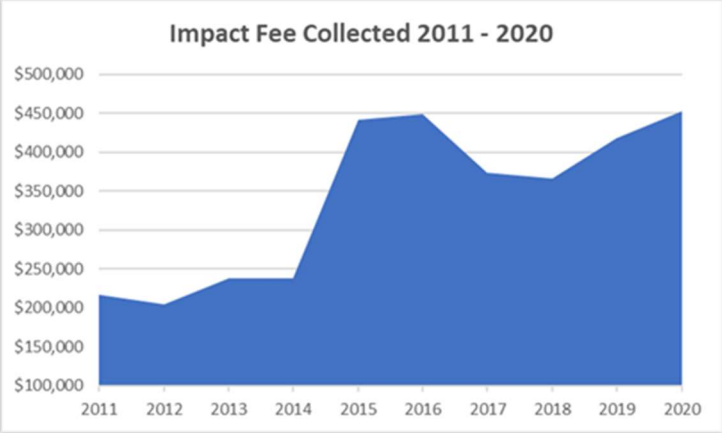

Figure 2. Historical Transportation Impact Fee Revenue

The anticipated annual revenue from the proposed transportation impact fee, based on the travel demand growth forecast of 21,582 new trips by 2036, is shown below:

$$\frac{1{,}349 \text{ trips}}{\text{year}} * \frac{\$4{,}304}{\text{PM trip}} = \$5{,}806{,}096 \text{ / year}$$

The transportation impact fee is anticipated to generate an average of $5,806,096 per year. This represents a 20-year average and may be more or less in any given year.

Anticipated Grant Revenue

Transportation improvement projects are generally eligible for state and federal grant funds. These funds are not predictable and vary in amount by grantor. Grant funding totaling $15,346,000 for impact fee eligible projects, per the 2021-2026 TIP, was subtracted from the total project cost used in the impact fee rate calculation.

Anticipated Need for Other Public Funds

The anticipated impact fee revenue does not fully fund the non-grant share of TIF project costs. The anticipated need for other public funds is summarized below:

Total TIF Project Cost	$312,436,682
Anticipated Grant & Intergovernmental Revenue	$15,346,000 (5% of total)
Growth/Development Share of Project Cost	$92,899,391 (30% of total)
Remaining Unfunded Commitment (2020-2036)	$204,191,292 (65% of total)
Average Annual Unfunded Commitment	**$12,761,956**

The County will need to identify other revenue sources to fund the remaining unfunded revenue commitment of $204,191,192 associated with the TIF projects. This represents an annual funding commitment of $12,761,956.

5. Transportation Impact Fee Rate Comparison

The City of Bellingham Public Works Department has compiled a list of transportation impact fee rates for 79 public agencies in western Washington. The full comparison chart is included in **Appendix C**. Provided below are current transportation impact fee rates for several cities located within or near Kitsap County. The updated impact fee rate of $4,304 per PM trip would be just below the western Washington average rate, but far from the lowest in western Washington.

Western WA Maximum Transportation Impact Fee:	$14,064 /PM trip	(City of Sammamish)
City of Poulsbo Transportation Impact Fee:	$5,397 /PM trip	
City of Gig Harbor Transportation Impact Fee:	$5,071 /PM trip	
City of Port Orchard Transportation Impact Fee:	$4,943 /PM trip	
Western WA Average Transportation Impact Fee:	$4,384 /PM trip	
Proposed Kitsap County Transportation Impact Fee	**$4,304 /PM trip**	
City of Bainbridge Island Transportation Impact Fee:	$1,687 /PM trip	
Existing Kitsap County Transportation Impact Fee:	**$700 /PM trip**	
Western WA Minimum Transportation Impact Fee:	$589 /PM trip	(City of Oak Harbor)
City of Bremerton Transportation Impact Fee:	No impact fee	

6. Credits and Adjustments

Impact Fee Credits

An applicant may request a credit for impact fees in the amount of the total value of system improvements, including dedications of land, improvements, and/or construction provided by the applicant. Credits should be considered on a case-by-case basis and should not exceed the impact fee payable.

Claims for credit should be made before the payment of the impact fee. Credits for the construction should be provided only if the land, improvements, and/or the facility constructed are listed as planned transportation projects in the Rate Analysis and Impact Fee Ordinance. No credit should be given for code-based frontage improvements or right or way dedications, or direct access improvements to and/or within the subject development (project improvements) unless the improvement is part of a project listed in the Rate Analysis and Impact Fee Ordinance.

Independent Fee Calculation

An applicant may submit an independent fee calculation for a proposed development activity. The documentation submitted should be prepared by a traffic engineer licensed in Washington State and should be limited to adjustments in the trip generation rates used in the fee calculation.

Construction Cost Index Adjustment

Transportation impact fees should be adjusted yearly to account for inflation. Annual adjustments may be based on the Mortenson Construction Cost Index (CCI) for Seattle, which is updated quarterly.

7. Conclusions

The recommended transportation impact fee rate is $4,304 per new PM peak hour trip.

Appendix A. 2020 Travel Demand Model Update

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Technical Memorandum

February 24, 2021

TO: Jeff Shea, PE \ Kitsap County Public Works

FROM: Andrew L. Bratlien, PE \ Transportation Solutions

SUBJECT: 2020 Travel Demand Model Update

This memorandum provides an overview of changes applied to the Kitsap County travel demand model as part of the ongoing transportation impact fee and model update effort.

This memorandum does not identify all of the details of the travel demand model development, calibration, and application, but is intended to serve as a reference document for County staff. A full model documentation report will describe travel demand and intersection LOS models in greater detail.

TRAVEL DEMAND MODEL BACKGROUND

Prior to 2012, Kitsap County maintained a travel demand model based in UFOSNET software. A 2012 model update converted the UFOSNET model into TransCAD 5.0 software and incorporated elements of the PSRC regional EMME/2-based travel demand model. In 2017, a minor model update incorporated updated land use forecasts to the existing TransCAD model.

The 2021 travel demand model update involved converting the countywide travel demand model into PTV Visum 2020 software. The Visum platform offers several key benefits relative to TransCAD:

- **Shared software platform** with local agencies which maintain Visum-based models, including Bremerton, Port Orchard, Poulsbo, and Bainbridge Island. Transportation Solutions has developed the models for each of these agencies. The use of a common modeling platform will increase the likelihood of inter-agency coordination and buy-off.
- **File management**: Visum's integrated data model allows travel demand model data to be stored in a single file. Visum's single-file structure allows land use and network changes to be analyzed quickly and shared easily. In contrast, TransCAD model data is stored in separate files which can make scenario management and file sharing difficult.
- **Data transfer**: Visum allows model data to be easily exported to Excel or CSV format where it can be processed for more detailed analysis. For example, turning movement volume forecasts may be exported to Synchro file format for intersection LOS analysis. Visum shares its data structure with Vissim simulation software, which allows travel demand model data to be used as the basis for more detailed microsimulation analyses such as corridor studies.
- **Graphical capabilities**: Visum allows select link and zone analyses ("flow bundles") to be run at any time. In contrast, TransCAD requires flow bundles to be defined before a model run. Additionally, Visum offers several graphical tools which are helpful for development, calibration, and stakeholder presentations. These tools save time and facilitate stakeholder understanding of model results.

ANALYSIS PERIOD

The previous travel demand model was calibrated using 2010 Average Daily Traffic (ADT) counts collected at 345 locations throughout Kitsap County. PM peak hour traffic volumes were estimated by applying fixed peaking factors to daily trip generation rates and 2010 ADT counts. In this way, PM peak hour traffic forecasts were calculated indirectly based on daily travel behavior patterns.

The updated travel demand model was developed specifically to analyze the weekday PM peak hour of travel, defined as the four consecutive 15-minute intervals with the highest traffic volume during the 4-6 PM period. The PM peak hour generally corresponds to the afternoon "rush hour" as commuters return home from work. Traffic counts for a total of 2,611 locations were either provided by County staff or collected by the Transportation Solutions team and were reviewed to identify the PM peak hour at each location.

PM peak hour trip generation rates for modeled land uses were obtained from the Institute of Transportation Engineers *Trip Generation Manual 10th Edition* and from other travel demand models in the region. Trip rates, trip distribution patterns, and other model parameters were subsequently calibrated until the assigned traffic volume matched the observed PM peak hour traffic counts.

The focus on the PM peak hour of travel for model development and calibration improved the model's reliability as a forecasting tool during the critical one-hour period.

ROADWAY CAPACITY

Model Capacity

The previous travel demand model calculated segment capacity using a modified Highway Capacity Manual (HCM) based calculation methodology. The methodology required significant data input requirements, including a total of 17 input attributes for each roadway segment. Input attributes included basic physical characteristics such as number of lanes and lane width as well as intersection control characteristics such as driveway, signal, roundabout, and stop control spacing. Intersection capacity and delay were not defined but were modeled implicitly as penalties to segment capacity.

The new travel demand model uses a planning-level HCM-based segment capacity methodology which maintains accuracy while reducing the time and data requirements for model maintenance. The method requires only two link attributes: free flow speed and number of lanes (including center turn lanes). In addition, the model incorporates planning-level intersection turning movement capacities which are based on intersection control type and channelization. The updated capacity methodology offers several key benefits:

- **Easy to maintain**: Roadway segments have only two input parameters which are easy to update. The previous model included 17 input parameters, many of which were difficult to measure consistently (e.g shoulder width, driveway spacing) or difficult to monitor (bus frequency, roadway parking maneuvers per hour).
- **Captures intersection delay**: Turning movement delay is modeled separately from segment delay, allowing congested intersections to be more quickly identified and improvements analyzed separately from roadway widening projects.

- **Removes capacity penalties:** The previous model applied significant capacity penalties to corridors with roundabouts and signalized intersections. The purpose of this approach was to implicitly model intersection capacity in the link-based model. The result was that urbanized corridors with signal or roundabout control could reach LOS-deficient status despite having acceptable intersection operations. The updated travel demand model explicitly models intersection capacity, allowing more realistic segment capacity estimation.

A summary of key differences between the previous travel demand model and the updated model are shown in **Table 1**.

Table 1. Comparison of Travel Demand Model Characteristics

Category	Element	Previous Model	Updated Model
General	Software	TransCAD 5.0	PTV Visum 2020
	Calibration Year	2010	2020
	Analysis Period	Daily PM (estimated)	PM peak hour
Demand Structure	Number of TAZs	421	421
	Number of connectors	1,322	2,094
Supply Network	Number of links	4,344	16,458
	Centerline miles	422	1,252
	Number of nodes	2,221	7,277
	Considers Link Capacity	Yes	Yes
	Considers Turn Capacity	No	Yes
Calibration	Count Locations	345	2,611
	Goodness-Of-Fit	$R^2 = 0.94$	$R^2 = 0.96$

Capacity Policy

The current Kitsap County Level of Service (LOS) policy identifies roadway deficiencies based on PM peak hour volume-to-capacity (v/c) ratio, as shown in **Table 2**. There is currently no intersection LOS policy.

Table 2. County Roadway Level of Service Standards

Functional Classification	LOS Standard (Maximum v/c)	
	Urban (UGA)	Rural (Non-UGA)
Principal Arterial	D (0.89)	C (0.79)
Minor Arterial	D (0.89)	C (0.79)
Collector	D (0.89)	C (0.79)
Minor Collector	D (0.89)	C (0.79)
Residential/Local	C (0.79)	C (0.79)

The Transportation Element of the 2016 Comprehensive Plan defined roadway capacity as identical to the previous travel demand model capacity values. This approach has significant constraints, as described above, which limit its effectiveness as a planning-level tool for identifying capital improvement projects. While it can be attractive to use the same roadway capacity methodology for

travel demand modeling as for capital facilities planning, transportation policy is not required to be directly linked to the capacity functions used by a travel demand model.

Transportation Solutions developed a simplified segment capacity policy which reduces the number of inputs required, removes capacity penalties for intersection improvements, and which recognizes the desirability of higher traffic volumes on segments with higher functional classification. The updated capacity methodology, summarized in **Table 3**, is similar to the system currently used by Port Orchard and is based on Highway Capacity Manual planning-level service volume thresholds. This policy is appropriate for systemwide capital improvement planning and would not be intended for project-level analysis or design.

Table 3. PM Peak Hour Capacity Policy for Capital Improvement Planning

Functional Classification		Principal Arterial	Minor Arterial	Major Collector	Minor Collector
Base Service Volume (vphpl)		1,000	930	860	790
Includes median, TWLTL, or LT pockets*		+500	+465	+430	+395
Reduction for narrow shoulder	<2 feet	-100	-95	-85	-80
	2-3 feet	-50	-45	-45	-40
	>3 feet	0	0	0	0
No sidewalk		-200	-185	-170	-160
On-Street Parking		-50	-45	-45	-40

*or no left-turn demand along segment

Appendix B. Transportation Impact Fee Project List

ID	Source	Service Area	Project	Limits	Description	Cost	Unfunded	Growth %	Growth Share
1	TIP	1	Hansville Road Pave Shoulders	Bayberry Ln to Gust Halvor Rd	Construct paved shoulders	$ 300,000.00	$ 300,000.00	5%	$ 15,223.88
5	TIP	2	Ridgetop Blvd NW	Quail Run Dr to Tower View Cir	Roadway improvements	$ 4,212,132.34	$ 1,153,132.34	12%	$ 494,506.10
6	TIP	2	Ridgetop Blvd & Sid Uhinck Dr	Intersection improvement	Realign road	$ 700,000.00	$ 700,000.00	26%	$ 180,404.69
7	TIP	4	Jackson Ave / Salmonberry Rd	Intersection improvement	New roundabout	$ 1,400,000.00	$ 479,000.00	50%	$ 703,643.12
8	TIP	2	Seabeck Highway #2	Gross Rd to Newberry Hill Rd	Pave shoulders and resurfacing	$ 5,110,000.00	$ 3,664,000.00	34%	$ 1,720,452.26
9	TIP	2	Bay Shore Dr & Washington Ave NW	Intersection improvement	Construct sidewalk curb and gutter with 2" overlay	$ 7,005,000.00	$ 7,005,000.00	34%	$ 2,393,668.34
10	TIP	2	Anderson Hill Rd & Provost Rd/Old Frontier Rd	Intersection improvement	Southbound right-turn lane	$ 515,000.00	$ 468,000.00	24%	$ 124,563.01
11	TIP	2	W. Hills STEM School – Nat'l Ave. Roadway Improvement	Loxie Eagens: CL to Arsenal; National Ave: Charleston Beach to CL	Pedestrian and intersection Improvements and overlay	$ 2,959,000.00	$ 1,110,000.00	28%	$ 825,073.91
12	TIP	2	Central Valley Rd Phase 1	Fairgrounds Rd to Foster Rd	Construct protected bike/ped facilities	$ 3,650,000.00	$ 1,605,000.00	48%	$ 1,737,645.54
13	TIP	2	Greaves Way NW & Old Frontier Rd NW	Intersection improvement	New roundabout	$ 1,597,000.00	$ 360,000.00	44%	$ 701,544.92
14	TIP	1	Hansville Rd & SR 104	Intersection improvements	Southbound right-turn lane	$ 455,000.00	$ 127,000.00	24%	$ 110,809.52
15	TIP	2	Anderson Hill Rd & Apex Airport Rd	Intersection improvements	Signal and channelization Improvements	$ 1,115,000.00	$ 1,003,000.00	33%	$ 370,328.53
16	TIP	2	Fairgrounds Road Sidewalk Improvements	Woodridge to Nels Nelson Rd	Construct sidewalk (both sides) and bike lane (eastbound)	$ 2,599,000.00	$ 2,599,000.00	35%	$ 903,341.75
17	TIP	3	Glenwood Road Improvements	Lake Helena Rd to Wildwood Rd	Resurface, pave shoulders, and realign curves	$ 2,775,000.00	$ 633,000.00	36%	$ 997,118.64
18	TIP	3	Sidney Road Shoulders	Port Orchard CL to Lider Rd	Construct paved shoulders	$ 915,000.00	$ 915,000.00	17%	$ 158,921.05
19	TIP	4	Beach Drive #2	Main St to Clam Bay Ct	Pave Shoulders and drainage improvements	$ 2,100,000.00	$ 2,100,000.00	0%	$ -
20	TIP	4	Lund Ave Improvements	City limits to Jackson	Bike lane, sidewalk, median control, new RABs at Hoover, Harris, Chase	$ 8,000,000.00	$ 8,000,000.00	11%	$ 845,839.02
21	TIP	2	Ridgetop Blvd NW Improvements	Mickelberry Rd NW to NW Myhre Rd	Widen to 4 lanes, sidewalks, and bike lanes	$ 13,700,000.00	$ 11,540,000.00	18%	$ 2,509,076.18
22	TIP	1	Kingston Ferry Congestion Mitigation Project	Kingston Ferry area	Move inbound ferry lane to NE 1st Street	$ 19,054,090.00	$ 19,054,090.00	96%	$ 18,225,651.30
23	CFP	1	Viking Way Improvements	SR 308 to Poulsbo CL	Access management, LT lanes, Shared Use Path, intesection impr. @ Sherman	$ 14,000,000.00	$ 14,000,000.00	1%	$ 209,908.74
24	CFP	2	Anderson Hill Rd Improvements	Apex Rd to Old Frontier Rd	WB climbing lane, sidewalk, bike lane or MUP, new RR bridge	$ 11,000,000.00	$ 11,000,000.00	22%	$ 2,384,678.08
25	CFP	2	Central Valley Rd Phase 2	Foster Rd to SR 303	Sidewalks & bike lane	$ 4,000,000.00	$ 4,000,000.00	19%	$ 748,309.54
27	CFP	2	Newberry Hill Rd Improvements	Provost Rd to Silverdale Way	SB/WB slip lane, add WB lane, add bike lane, sidewalks	$ 8,000,000.00	$ 8,000,000.00	22%	$ 1,754,098.36
28	CFP	2	Riddell Rd Improvements	CL to Sandra Ln	Sidewalk and bike lane, LT lanes	$ 2,000,000.00	$ 2,000,000.00	48%	$ 957,597.17
29	CFP	2	Ridgetop Blvd Phase 2b	Hospital driveway to SR 303 NB	Widening and improvements	$ 6,900,000.00	$ 6,900,000.00	14%	$ 960,759.49
31	CFP	3	Belfair Valley Rd Improvements	SR 3 to Division	Access control, bike lane & sidewalks	$ 4,340,480.00	$ 4,340,480.00	4%	$ 170,759.96
36	CFP	4	Mullenix Rd	SR 16 WB ramps to Phillips Rd	Eastbound climbing lane and shoulder	$ 8,680,980.00	$ 8,680,980.00	29%	$ 2,486,778.55
37	CFP	3	Sunnyslope Rd	SR 3 to Old Clifton Rd	Widen lanes and shoulder	$ 3,000,000.00	$ 3,000,000.00	100%	$ 3,000,000.00
38	TIS	2	Silverdale Way & Bucklin Hill Rd	Intersection improvements	Reconfiguration per Silverdale TIS	$ 2,800,000.00	$ 2,800,000.00	6%	$ 166,108.43
39		3	Bethel Burley Rd & Lider Rd	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	51%	$ 662,415.09
41		2	Eldorado Blvd/Dickey Rd & Newberry Hill Rd	Intersection improvements	New single-lane roundabout w/slip lane	$ 2,000,000.00	$ 2,000,000.00	29%	$ 577,030.81
42		2	Nels Nelson Rd & Bucklin Hill Rd	Intersection improvements	New single-lane roundabout	$ 1,500,000.00	$ 1,500,000.00	16%	$ 237,477.64
43		2	Pine Rd & McWilliams Rd	Intersection improvements	New single-lane roundabout	$ 1,500,000.00	$ 1,500,000.00	5%	$ 81,168.83
44		3	Sam Christopherson Ave & Belfair Valley Rd	Intersection improvements	New single-lane roundabout w/slip lane	$ 1,500,000.00	$ 1,500,000.00	24%	$ 365,971.11
45		3	Sidney Rd & Lider Rd	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	50%	$ 660,038.46
46		2	Tracyton Beach Rd/Hansberry St & Riddell Rd	Intersection improvements	NBL turn pocket	$ 515,000.00	$ 515,000.00	30%	$ 155,577.41
49		2	Riddell Rd & Almira Dr	Intersection improvements	New traffic signal (grade challenge)	$ 1,500,000.00	$ 1,500,000.00	66%	$ 991,275.90
50		3	Bethel Burley Rd & Mullenix Rd	Intersection improvements	New single-lane roundabout	$ 1,500,000.00	$ 1,500,000.00	12%	$ 173,986.49
51		4	Bethel Rd & Bielmeier Rd	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	54%	$ 710,423.08
52		4	Bethel Rd & Cedar Rd	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	25%	$ 325,729.73
53		2	Chico Way & Erlands Point Rd	Intersection improvements	New single-lane roundabout	$ 2,500,000.00	$ 2,500,000.00	26%	$ 658,109.21
55		2	McWilliams Rd & Old Military Rd	Intersection improvements	New single-lane roundabout	$ 1,500,000.00	$ 1,500,000.00	29%	$ 429,988.97
56		2	Chico Way & Northlake Way	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	52%	$ 680,331.49
57		2	Old Military Rd & Fairgrounds Rd	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	46%	$ 596,805.29
58		3	Sunnyslope Rd & Old Clifton Rd	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	100%	$ 1,310,000.00
59		1	Suquamish Way & Totten Rd	Intersection improvements	New single-lane roundabout	$ 1,500,000.00	$ 1,500,000.00	35%	$ 517,877.09
60		3	Sidney Rd & Berry Lake Rd	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	100%	$ 1,310,000.00
61		2	Central Valley Rd & McWilliams Rd	Intersection improvements	New single-lane roundabout	$ 1,500,000.00	$ 1,500,000.00	28%	$ 417,404.13
63		2	National Ave & Arsenal Way	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	17%	$ 219,734.19
64		3	Old Clifton Rd & Berry Lake Rd	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	100%	$ 1,310,000.00
65		2	Loxie Eagans Blvd & Arsenal Way	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	28%	$ 368,318.84
66		1	Hansville Rd & 288th St	Intersection improvements	New single-lane roundabout (tribal land)	$ 2,000,000.00	$ 2,000,000.00	17%	$ 338,325.99
67		2	Perry Ave & Sylvan Way	Intersection improvements	New single-lane roundabout	$ 1,310,000.00	$ 1,310,000.00	43%	$ 569,341.20
70		1	Hansville Rd Improvements	SR 104 to Little Boston Rd	Widen to 3 lanes; add sidewalks & shoulder	$ 15,819,000.00	$ 15,819,000.00	13%	$ 2,049,486.56
72		2	Holly Rd Improvements	Lake Tahuyeh Rd to Seabeck Hwy	Access management, shoulders, left turn lanes	$ 14,000,000.00	$ 14,000,000.00	10%	$ 1,403,760.07
73		2	Seabeck Highway Improvements	Northlake Way to Calamity Ln	Add shoulders, access control, LT lanes	$ 8,500,000.00	$ 8,500,000.00	53%	$ 4,496,683.25
79		3	Sidney Rd Improvements	Lider Rd to Wildwood Rd	Add shoulders, access management, LT lanes	$ 7,500,000.00	$ 7,500,000.00	27%	$ 2,054,208.27
80		1	Miller Bay Rd Improvements #1	W Kingston Rd to Gunderson Rd	Access management, LT lanes, shoulders or MUP	$ 10,000,000.00	$ 10,000,000.00	40%	$ 3,997,493.73
81		4	Jackson Ave Improvements	Salmonberry to Ash Ave	Bike lane, sidewalk, median control, U Turns	$ 5,000,000.00	$ 5,000,000.00	14%	$ 677,536.23
82		2	Silverdale Way Improvements #1	SR 308 to Mountain View Rd	Access control, left turn lanes, buffered sidepath or MUP	$ 3,000,000.00	$ 3,000,000.00	5%	$ 148,270.18
85		1	Hansville Road Improvements	SR 104 to Old Hansville Rd	Acccess control, LT lanes, shared use path	$ 6,000,000.00	$ 6,000,000.00	21%	$ 1,280,075.19
86		2	Silverdale Way Improvements #2	Newberry Hill to Byron	Access Control, left turn lanes, sidewalk and bike lanes	$ 6,000,000.00	$ 6,000,000.00	8%	$ 457,429.05
89	TIS	2	Bucklin Hill Gap	Mickelberry Rd NW to NW Myhre Rd	Sidewalk and bike lane and lane realignment	$ 2,600,000.00	$ 2,600,000.00	19%	$ 495,329.87
90		1	Miller Bay Rd Improvements #2	Gunderson to Early Dawn Ln	Access management, LT lanes, shoulders or multi-use path	$ 8,000,000.00	$ 8,000,000.00	45%	$ 3,616,099.07
91		2	Anderson Hill Rd Improvements #2	Olympic View to Willamette Meridian	Access management, shoulders & NM path, LT lanes	$ 2,000,000.00	$ 2,000,000.00	42%	$ 846,153.85
92		1	Augusta Ave Improvements	South to Geneva St	Access management, sidewalk, bike lane	$ 2,000,000.00	$ 2,000,000.00	50%	$ 1,006,289.31
94		2	Central Valley Rd Improvements	Brookdale to McWilliams	Access management, LT lanes, sidewalk, bike lane	$ 3,500,000.00	$ 3,500,000.00	42%	$ 1,452,614.38
95		2	Chico Way Improvements	SR 3 NB off-ramp to Eldorado Blvd	Access management, sidewalks/MUP, center curb, roundabouts (Eldorado)	$ 4,500,000.00	$ 4,500,000.00	15%	$ 670,126.35
98		2	Silverdale Way & Linder Way	Intersection improvements	New traffic signal or roundabout	$ 1,500,000.00	$ 1,500,000.00	12%	$ 175,356.75
99		1	Suquamish Way Improvements	Totten to Division	Access management, sidewalk, bike lane	$ 2,300,000.00	$ 2,300,000.00	35%	$ 800,117.92
100		1	West Kingston Blvd Improvements	Bridge to Middle school	Sidewalk and bike lane	$ 1,300,000.00	$ 1,300,000.00	45%	$ 582,657.66
101		2	Tracyton Blvd Improvements	Bucklin Hill Rd to Palmer	Sidewalk and bike lane	$ 1,100,000.00	$ 1,100,000.00	11%	$ 123,832.34
102		2	Pine Rd Improvements	Riddell to school	Sidewalk and bke lane, LT lanes	$ 2,500,000.00	$ 2,500,000.00	54%	$ 1,358,267.72
103	TIS	2	Kitsap Mall Blvd and Randall Ln	Intersection improvements	Dual eastbound LT lanes	$ 1,900,000.00	$ 1,900,000.00	3%	$ 59,450.83
104	TIS	2	Ridgetop Blvd Improvements	Silverdale Way to Blaine	4 lane, median acess control, SW, bike lane, intersection impr	$ 7,100,000.00	$ 7,100,000.00	28%	$ 2,019,062.50
105	TIS	2	Silverdale Way and Ridgetop	Intersection improvements	Add NB right turn lane	$ 1,500,000.00	$ 1,500,000.00	7%	$ 108,089.01
106	TIS	2	Ridgetop Blvd Improvements	Blaine to Mickelberry	4 lane, median acess control, SW, bikelane, intersection impr.	$ 17,200,000.00	$ 17,200,000.00	20%	$ 3,496,859.50

Appendix C. Comparison of 2019-2020 TIF Rates in Western Washington

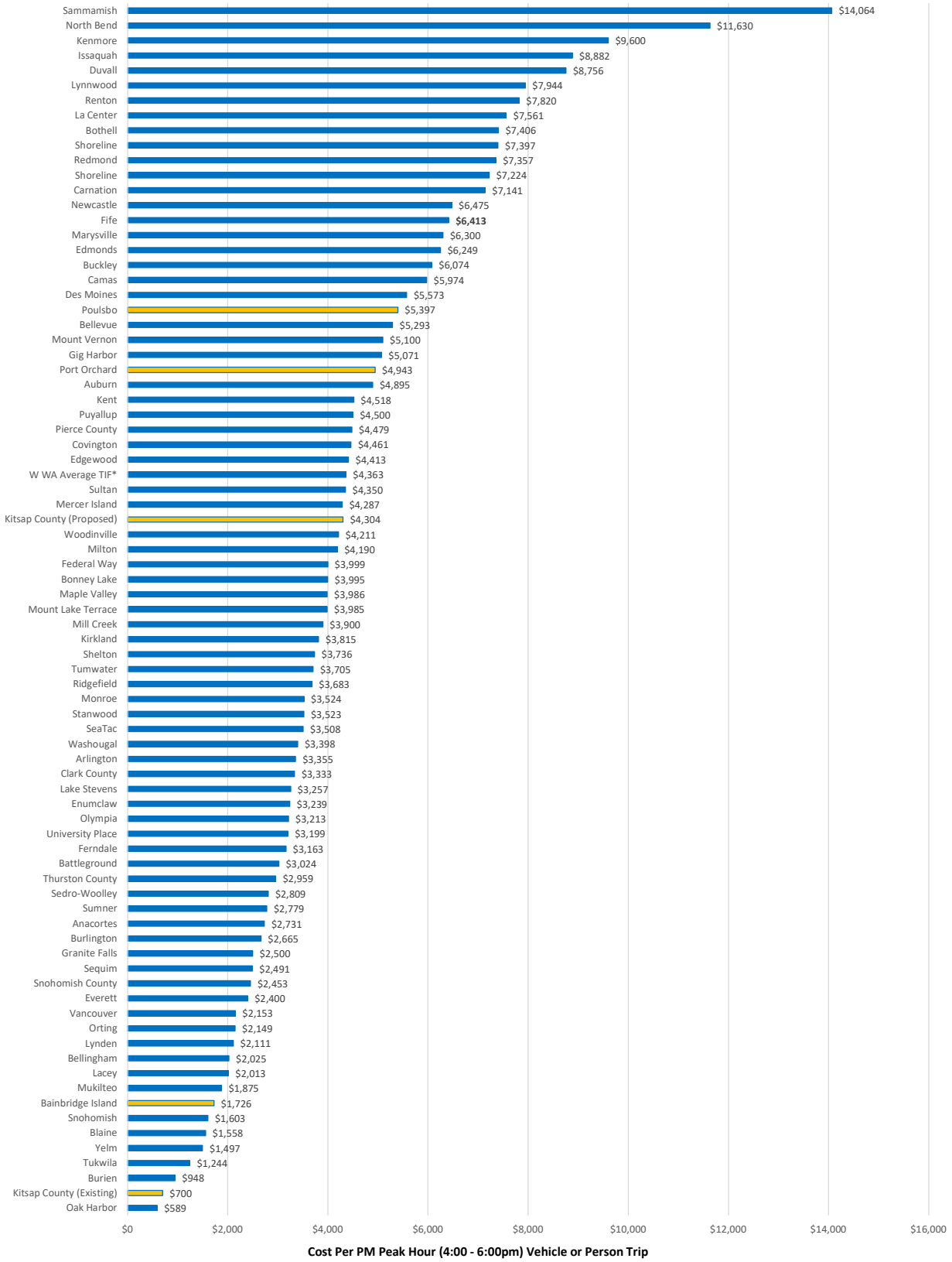
Comparison of 2020-2021 TIF Base Rates in 74 Cities and 5 Counties in Western Washington

With Kitsap County Cities Highlighted for Emphasis

[Based on information available. Average includes both Cities and Counties. See TIF rate table on next page for additional details.]

Data compiled Nov. 2019 by Chris Comeau, AICP-CTP, Transportation Planner, Bellingham Public Works ccomeau@cob.org or (360) 778-7946

***Western WA State Average TIF**



Appendix D. Transportation Impact Fee Rate Schedule

Kitsap County Traffic Impact Fee Rate Schedule – Residential (2020 Update)

ITE Code[1]	ITE Land Use Category[1]	ITE Trip Rate[2]	Rate per Unit[3]	Impact Fee per Unit
210	Single-Family Detached Housing	0.99	DU	$4,261
220	Low-Rise Multifamily Housing (1-2 floors)	0.56	DU	$2,410
221	Mid-Rise Multifamily Housing (3-10 floors)	0.44	DU	$1,894
230	Mid-Rise Residential w/ 1st Floor Commercial	0.36	DU	$1,549
240	Mobile Home Park	0.46	DU	$1,980
251	Senior Housing Detached	0.30	DU	$1,291
252	Senior Housing Attached	0.26	DU	$1,119
253	Congregate Care Facility	0.18	DU	$775
254	Assisted Living	0.26	bed	$1,119
260	Recreational Home	0.28	DU	$1,205
270	Residential PUD	0.69	DU	$2,970
-	Accessory Dwelling Unit (≤ 450 sf)	0.56	DU	$2,410
-	Accessory Dwelling Unit (> 450 sf)	0.28	DU	$1,205

[1] Institute of Transportation Engineers, Trip Generation Manual (10th Edition)

[2] Trip generation rate per development unit for PM peak hour of the adjacent street traffic (4-6 PM)

[3] DU = Dwelling Unit

Kitsap County

Transportation Solutions

INNOVATIVE | PRACTICAL | EQUITABLE

Kitsap County Traffic Impact Fee Rate Schedule – Non-Residential LUC 1-799 (2020 Update)

ITE Code[1]	ITE Land Use Category[1]	Base Trip Rate[2]	% Primary Trips	Net Trip Rate	Rate per Unit[3]	Impact Fee per Unit
PORT AND TERMINAL						
30	Intermodal Truck Terminal	1.87	*	1.870	ksf	$8,048
90	Park and Ride with Bus Service	0.43	*	0.430	space	$1,851
INDUSTRIAL						
110	General Light Industrial	0.63	*	0.630	KSF	$2,712
130	Industrial Park	0.40	*	0.400	KSF	$1,722
140	Manufacturing	0.67	*	0.670	KSF	$2,884
150	Warehousing	0.19	*	0.190	KSF	$818
151	Mini Warehouse	0.17	*	0.170	KSF	$732
170	Utilities	2.27	*	2.270	KSF	$9,770
180	Speciality Trade Contractor	1.97	*	1.970	KSF	$8,479
LODGING						
310	Hotel	0.60	*	0.600	room	$2,582
311	All Suites Hotel	0.36	*	0.360	room	$1,549
312	Business Hotel	0.32	*	0.320	room	$1,377
320	Motel	0.38	*	0.380	room	$1,636
RECREATIONAL						
411	Public Park	0.11	*	0.110	acre	$473
416	Campground/RV Park	0.27	*	0.270	site	$1,162
430	Golf Course	0.28	*	0.280	acre	$1,205
432	Golf Driving Range	1.25	*	1.250	tee	$5,380
433	Batting Cages	2.22	*	2.220	cage	$9,555
434	Rock Climbing Gym	1.64	*	1.640	KSF	$7,059
435	Multi-Purpose Recreational Facility	3.58	*	3.580	KSF	$15,408
437	Bowling Alley	1.16	*	1.160	KSF	$4,993
444	Movie Theater	14.60	*	14.600	screen	$62,838
445	Multiplex Movie Theater	13.73	*	13.730	screen	$59,094
488	Soccer Complex	16.43	*	16.430	field	$70,715
490	Tennis Courts	4.21	*	4.210	court	$18,120
491	Racquet/Tennis Club	3.82	*	3.820	court	$16,441
492	Health Fitness Club	3.45	*	3.450	KSF	$14,849
493	Athletic Club	6.29	*	6.290	KSF	$27,072
495	Recreational Community Center	2.31	*	2.310	KSF	$9,942
INSTITUTIONAL						
520	Public Elementary School	1.37	*	1.370	KSF	$5,896
522	Public Middle/Junior High School	1.19	*	1.190	KSF	$5,122
530	Public High School	0.97	*	0.970	KSF	$4,175
537	Charter Elementary School	0.14	*	0.140	student	$603
538	School District Office	2.04	*	2.040	KSF	$8,780
540	Junior / Community College	1.86	*	1.860	KSF	$8,005
560	Church	0.49	*	0.490	KSF	$2,109
565	Day Care Center	11.12	44%	4.893	KSF	$21,059
566	Cemetery	0.46	*	0.460	acre	$1,980
571	Prison	0.05	*	0.050	bed	$215
575	Fire & Rescue Station	0.48	*	0.480	KSF	$2,066
590	Library	8.16	*	8.160	KSF	$35,121
MEDICAL						
610	Hospital	0.97	*	0.970	KSF	$4,175
620	Nursing Home	0.59	*	0.590	KSF	$2,539
630	Clinic	3.28	*	3.280	KSF	$14,117
640	Animal Hospital / Veterinary Clinic	3.53	*	3.530	KSF	$15,193
650	Freestanding Emergency Room	1.52	*	1.520	KSF	$6,542
OFFICE						
710	General Office	1.15	*	1.150	KSF	$4,950
712	Single-Tenant Office (<5,000 sf)	2.45	*	2.450	KSF	$10,545
715	Single Tenant Office (>5,000 sf)	1.71	*	1.710	KSF	$7,360
720	Medical/Dental Office	3.46	*	3.460	KSF	$14,892
730	Government Office Building	1.71	*	1.710	KSF	$7,360
732	US Post Office	11.21	*	11.210	KSF	$48,248
733	Government Office Complex	2.82	*	2.820	KSF	$12,137
750	Office Park	1.07	*	1.070	KSF	$4,605
760	Research and Development Center	0.49	*	0.490	KSF	$2,109
770	Business Park	0.42	*	0.420	KSF	$1,808

[1] Institute of Transportation Engineers, Trip Generation Manual (10th Edition)

[2] Trip generation rate per development unit, for PM Peak Hour of the adjacent street traffic (4-6 pm).

[3] DU = Dwelling Unit; KSF = 1,000 square feet; VSP = Vehicle servicing position

* Pass-by and diverted trip rate data not available. Primary trip rates may be applied based on local data, development context, and engineering judgment

Kitsap County Traffic Impact Fee Rate Schedule – Non-Residential LUC 800-999 (2020 Update)

ITE Code[1]	ITE Land Use Category[1]	Base Trip Rate[2]	% Primary Trips[3]	Net Trip Rate	Rate per Unit[4]	Impact Fee per Unit
RETAIL						
810	Tractor Supply Store	1.40	66%	0.924	KSF	$3,977
811	Construction Equipment Rental Store	0.99	74%	0.733	KSF	$3,153
812	Building Materials and Lumber Store	2.06	74%	1.524	KSF	$6,561
813	Free-Standing Discount Superstore (w/ Grocery)	4.33	71%	3.074	KSF	$13,232
814	Variety Store	6.84	66%	4.514	KSF	$19,430
815	Free Standing Discount Store (w/o Grocery)	4.83	83%	4.009	KSF	$17,254
816	Hardware/Paint Store	2.68	74%	1.983	KSF	$8,536
817	Nursery (Garden Center)	6.94	74%	5.136	KSF	$22,104
818	Nursery (Wholesale)	5.18	74%	3.833	KSF	$16,498
820	Shopping Center	3.81	66%	2.515	KSF	$10,823
823	Factory Outlet Center	2.29	66%	1.511	KSF	$6,505
840	Automobile Sales (New)	2.43	100%	2.430	KSF	$10,459
841	Automobile Sales (Used)	3.75	100%	3.750	KSF	$16,140
842	Recreational Vehicle Sales	0.77	100%	0.770	KSF	$3,314
843	Automobile Parts Sales	4.91	44%	2.160	KSF	$9,298
848	Tire Store	3.98	72%	2.866	KSF	$12,334
849	Tire Superstore	2.11	72%	1.519	KSF	$6,539
850	Supermarket	9.24	64%	5.914	KSF	$25,452
851	Convenience Market	49.11	49%	24.064	KSF	$103,571
853	Convenience Market w/Gas Pumps	49.23	17%	8.369	VFP	$36,021
854	Discount Supermarket	8.38	51%	4.274	KSF	$18,394
857	Discount Club	4.18	63%	2.633	KSF	$11,334
861	Sporting Goods Superstore	2.02	66%	1.333	KSF	$5,738
862	Home Improvement Superstore	2.33	58%	1.351	KSF	$5,816
863	Electronics Superstore	4.26	60%	2.556	KSF	$11,001
866	Pet Supply Superstore	3.55	66%	2.343	KSF	$10,084
867	Office Supply Superstore	2.77	66%	1.828	KSF	$7,869
875	Department Store	1.95	66%	1.287	KSF	$5,539
876	Apparel Store	4.12	66%	2.719	KSF	$11,703
879	Arts and Crafts Store	6.21	66%	4.099	KSF	$17,640
880	Pharmacy/Drug Store w/o Drive-Thru	8.51	47%	4.000	KSF	$17,215
881	Pharmacy/Drug Store w/ Drive-Thru	10.29	38%	3.910	KSF	$16,830
882	Marijuana Dispensery	21.83	100%	21.830	KSF	$93,956
890	Furniture Store	0.52	47%	0.244	KSF	$1,052
899	Liquor Store	16.37	64%	10.477	KSF	$45,092
SERVICES						
911	Walk-in Bank	12.13	65%	7.885	KSF	$33,935
912	Drive-in Bank	20.45	65%	13.293	KSF	$57,211
918	Hair Salon	1.45	65%	0.943	KSF	$4,057
920	Copy, Print, and Express Ship Store	7.42	66%	4.897	KSF	$21,078
925	Drinking Place	11.36	100%	11.360	KSF	$48,893
930	Fast Casual Restaurant	14.13	57%	8.054	KSF	$34,665
931	Quality Restaurant	7.80	56%	4.368	KSF	$18,800
932	High Turnover (Sit-Down) Restaurant	9.77	57%	5.569	KSF	$23,969
933	Fast Food w/o Drive-Thru	28.34	57%	16.154	KSF	$69,526
934	Fast Food w/ Drive-Thru	32.67	50%	16.335	KSF	$70,306
935	Fast Food Restaurant w/ Drive-Thru w/o Indoor Seating	42.65	50%	21.325	KSF	$91,783
936	Coffee/Donut Shop w/o Drive-Thru	36.31	57%	20.697	KSF	$89,079
937	Coffee/Donut Shop w/ Drive-Thru	43.38	50%	21.690	KSF	$93,354
938	Coffee/Donut Shop w/ Drive-Thru w/o Indoor Seating (Espresso Stand)	83.33	11%	9.166	KSF	$39,452
939	Bread/Donut/Bagel Shop w/o Drive-Thru	28.00	57%	15.960	KSF	$68,692
940	Bread/Donut/Bagel Shop w/ Drive-Thru	19.02	50%	9.510	KSF	$40,931
941	Quick Lubrication Vehicle Stop	4.85	72%	3.492	VSP	$15,030
942	Automobile Care Center	3.11	72%	2.239	KSF	$9,638
943	Automobile Parts and Service Center	2.26	72%	1.627	KSF	$7,003
944	Gasoline/Service Station	14.03	58%	8.137	VFP	$35,023
945	Gas Station w/Convenience Market	13.99	12%	1.679	VFP	$7,226
947	Self-Serve Car Wash	5.54	58%	3.213	stall	$13,830
948	Automated Car Wash	77.50	58%	44.950	stall	$193,465
950	Truck Stop	22.73	58%	13.183	KSF	$56,741
960	Super Convenience Market/ Gas Station	22.96	35%	8.036	VFP	$34,587
970	Winery	7.31	100%	7.310	KSF	$31,462

[1] Institute of Transportation Engineers, Trip Generation Manual (10th Edition)

[2] Trip generation rate per development unit, for PM Peak Hour of the adjacent street traffic (4-6 pm).

[3] Average primary trip rates, per Trip Generation Handbook (3rd Edition), 2017. Additional primary rates based on similar land use and engineering judgment. Pass-by rates should be used with caution and refined using local data whenever possible. [4] DU = Dwelling Unit; KSF = 1,000 square feet; VSP = Vehicle servicing position