



## CITY OF WENATCHEE

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### DEPARTMENT OF PUBLIC WORKS PRE-APPROVED PLANS POLICY

#### Policy R-10: TRAFFIC IMPACT ANALYSIS REPORT GUIDELINES

Wenatchee City Code (WCC) Chapter 13.32.090, Traffic Impact Analysis - Applicability, outlines when a Traffic Impact Analysis (TIA) shall be submitted. The code language outlines that the Public Works Director or City Engineer may require a TIA for any development proposal that meets the following:

1. Generates 75 peak hourly trips or 750 daily trips;
2. Affects existing traffic problems in the local area of the project such as an area with a high accident ratio, confusing intersection, or other problems identified by the City Engineer; or,
3. Potentially impacts adjacent areas.

Due to the increase in traffic within the City of Wenatchee, the Public Works Department, under the authority granted by number 2 above, has developed this policy to further define which projects are required to submit a TIA when the following thresholds are triggered:

1. Projects adding twenty or more peak hour trips **to an intersection of arterial streets** (arterial streets are mapped in the Wenatchee Comprehensive Plan) within a one-mile radius of the project site as shown by the trip generation and distribution letter; or,
2. Projects impacting local access intersections, alleys, or driveways located within an area with a current traffic problem as identified by the City or previous traffic study, such as a high-accident location, poor roadway alignment or capacity deficiency (contact the City Engineer to determine if any local access intersections adjacent the project trigger these thresholds).

### TIA Report Minimum Elements

The TIA report shall include the following, at a minimum:

1. **Title page** - The TIA shall include a title page with the following elements:
  - a. Name of project;
  - b. City project number/permit number;
  - a. Applicant's name and address;
  - b. Engineer's name, address and phone number;
  - c. Date of study preparation; and,
  - d. The engineering seal signed and dated by the professional engineer licensed in the State of Washington who prepared the report.

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## 2. Introduction and Summary

- a. Purpose of report and study objectives.
- b. Executive summary.
  - i. Site location and study area
  - ii. Development description
  - iii. Principal findings
  - iv. Conclusions
  - v. Recommendations and proposed mitigation measures

## 3. Proposed Development - The TIA shall include the following information for the proposed development:

- a. Project description, including land use and intensity;
- b. Location and vicinity map;
- c. Site plan with building size (square feet);
- d. Proposed zoning;
- e. Access points, site circulation, queuing lengths, and parking locations;
- f. An assessment of potential impacts on multimodal facilities
  - i. Compliance with City of Wenatchee Complete Streets Policy (2016)
  - ii. Planned facilities precluded by project improvements
- g. Project phasing and timing.

## 4. Summary of existing conditions - The TIA shall provide a summary of existing conditions for the study area that includes the following:

- a. Transportation network description, including functional classification, bike/pedestrian facilities and transit routes;
- b. Existing traffic volumes;
- c. Collision history – past 3 years;
- d. Posted speed limits (and if known the 85th percentile speed determined from a speed study);
- e. Length of existing turn pockets at signalized intersections;
- f. Traffic impacts analysis, including the following:
  - i. LOS
  - ii. Safety

## 5. Projected Traffic - The TIA shall provide a summary of project traffic for each horizon year, both relating to the proposed development and background traffic. The exact horizon years required for analysis will be decided at the discretion of the City, but examples of what may be required include the opening year of the development, build-out year of development (if different than opening year) and 6-year horizon year. Phased developments may require interim analysis years. This summary shall include the following:

- a. Site traffic for each horizon year (if different):
  - i. Trip generation
  - ii. Trip distribution
  - iii. Mode choice-including estimated bike and pedestrian trips
  - iv. Trip assignment

- b. Background traffic for each horizon year on study facilities, based on:
  - i. Recent or planned development activity within 1 mile of the development:
    - i. Traffic from newly constructed projects;
    - ii. Projects for which traffic impacts have been tentatively reserved;
    - iii. Projects for which a Concurrency Certificate has been awarded;
  - ii. Non-project, general background traffic increases estimated by background growth rate

**6. Analysis Scenarios** - The TIA shall include the following analysis scenarios:

- a. Existing conditions;
- b. Opening year without project;
  - i. LOS
- c. Opening year with project;
  - i. LOS
  - ii. Multimodal/Complete Streets analysis
  - iii. Mitigations (if necessary)
- d. 6-year analysis without project;
  - i. LOS
- e. 6-year analysis with project;
  - i. LOS
  - ii. Mitigations (if necessary)
- f. Major developments with regional impacts may be required to use longer horizon years, as determined by City staff.

**7. Other Analyses** - Other analyses may be required as requested by the City, including but not limited to:

- a. Queue lengths at driveways and drive-through windows;
- b. Percentage of heavy vehicles on analysis roadways
- c. Existing Zoning
- d. Locations of the following:
  - i. On-street parking,
  - ii. Bus stops,
  - iii. Private and public schools in the area,
  - iv. Hospitals, police and fire stations in the area;
- e. Noise;
- f. Air quality (typically required when physical improvements are proposed and requires electronic submittal of Synchro files);
- g. Intersection control warrant analysis (signal, 4-way stop, yield);
- h. Auxiliary lane warrant analysis;
- i. Parking study (including vehicles and/or bicycles);
- j. Site access; and,
- k. Pedestrian access study.

8. **Findings** - The following shall be addressed in the findings section:
  - a. Traffic impacts;
  - b. Compliance with level of service standards and complete streets policy;
  - c. Summary of proposed project modifications; and,
  - d. Summary of offsite mitigation and financing plan.
  
9. **Appendices** - The following information shall be included in appendices:
  - a. Definitions;
  - b. Trip generation sources and calculations;
  - c. Volume and turning movement count sheets;
  - d. Synchro report printouts (electronic submittal may be required);
  - e. Warrant analysis calculations; and,
  - f. References.

The following is the complete Transportation Impact Analysis provided to the City of Wenatchee in November 2020 by Fehr & Peers.

**City of Wenatchee**  
Transportation Impact Analysis Guidelines

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## Definitions

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**Capacity:** On a roadway, the maximum number of vehicles which can be accommodated by the existing roadway during one hour given defined LOS standards and volume thresholds.

**Existing Traffic:** Current traffic in accordance with traffic counts collected in the last two years on the current road network.

**Gap (critical gap):** The median time headway (in seconds) between vehicles in a major traffic stream which will permit side-street vehicles at STOP or YIELD controlled approach to cross through or merge with major traffic stream under prevailing traffic and roadway conditions.

**Level of Service (LOS):** A qualitative measure describing operational conditions within a traffic stream: generally described in terms of such factors as speed and travel time, delay, freedom to maneuver, traffic interruptions, comfort and convenience, and safety.

**Mitigation:** Reduction of traffic impacts on intersections and/or roadways to an acceptable level of service through the modification of the site plan, roadway construction improvements or improvements in the existing traffic control devices.

**Mode Choice:** Estimation of the number of trips made by each possible mode of travel, such as driving, taking transit, walking, etc. to make a trip.

**Peak Hour:** The one-hour period of greatest utilization of a transportation facility; weekdays normally have two peaks, one in the morning and one in the evening. It represents the most critical period of operation and the highest typical capacity requirements.

**Peak Hour of Generator:** The one-hour period of highest volume for traffic entering and exiting a site. This can differ from the peak hour of the adjacent roadway network.

**Study Area:** The area of analysis within which impacts shall be calculated for a given development. This study area shall include any intersections of arterial streets within a one-mile radius of the site that would experience an increase of at least 20 vehicle trips during a peak hour.

**Traffic Impact:** The effect of site traffic on the operations and safety of the road network.

**Transportation Impact Analysis:** A transportation engineering study, which determines the potential traffic and other impacts of a proposed development. A complete transportation impact analysis will include an estimation of future traffic with and without the proposed generator, analysis of traffic impacts and recommended roadway improvements and other improvements which may be necessary to accommodate the expected transportation needs.

**Trip:** A one-way movement by a person or a vehicle having an origin and a destination.

**Trip Assignment:** Determination of site and non-site traffic that will use each access point and route.

**Trip Distribution:** Allocation of the site generated trips to all possible routes to and from the site.

**Trip Generation:** The process of estimating the number of trips originating from or destined for the uses on a land parcel.

**Two-Stage Gap Acceptance Methodology:** With streets that have a wide median or two-way left-turn lane (TWLTL), the median can provide enough space for drivers turning left from a side street controlled by an unsignalized (STOP or YIELD controlled) intersection to independently cross the two major streams of traffic one at a time as they enter the major thoroughfare. The two-stage gap acceptance methodology is an alternative methodology for calculating LOS provided by the Highway Capacity Manual (HCM) to account for this potential two-stage gap acceptance that could occur.

**Volume-to-Capacity Ration (V/C):** A performance measure computed using the ratio of an actual roadway volume to the theoretical capacity of a roadway link based on the prevailing level of service standard and volume threshold.

## Introduction

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This document describes the methodology and requirements for trip generation letters and transportation impact analyses (TIA) in the City of Wenatchee. All developments (except those exempt as set forth in the City of Wenatchee Municipal Code, Title 13.32.080) are subject to transportation concurrency review. This review is conducted to ensure that adequate transportation facilities are provided in conjunction with new growth. Transportation concurrency is measured using the concept of level of service (LOS) and the acceptable LOS thresholds are defined in the Wenatchee Comprehensive Plan.

- LOS “E” for signalized intersections along principal arterials of regional significance and in the Wenatchee Central Business District
- Volume-to-capacity (V/C) ratio < 1.0 for all other arterials, transit routes, and highways
- LOS “D” for signalized intersections on locally classified arterials and collectors

These guidelines are intended to provide transparency and clear direction for when and how transportation impact analyses should be completed for developments in Wenatchee.



## Transportation Impact Analysis

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This section outlines the requirements for determining whether a TIA is required, and if so, the contents of the TIA. The intent of the TIA is to understand if a development proposal would have impacts on the transportation system and to identify improvements necessary to ensure the City's street network can continue to serve travelers to the safety and mobility standards expressed in Wenatchee's Comprehensive Plan.

## Applicability

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A TIA is required for the following situations:

- 1) Projects adding twenty or more peak hour trips to an intersection of arterial streets (arterial streets are mapped in the Wenatchee Comprehensive Plan) within a one-mile radius of the project site as shown by the trip generation and distribution letter; or,
- 2) Projects impacting local access intersections, alleys, or driveways located within an area with a current traffic problem as identified by the City or previous traffic study, such as a high-accident location, poor roadway alignment or capacity deficiency.

Applicants should discuss their proposed project with Wenatchee Staff after reviewing these guidelines to determine whether a TIA is required.

## Trip Generation and Distribution Letter

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To understand the level of transportation analysis required, a development must first determine their expected trip generation and distribution. Trip generation refers to the number of vehicle trips expected to be created by a development project during the PM peak hour, unless otherwise specified by the City. Trip generation calculations should be based on the most recent edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual for the land use code that most closely matches the proposed development. Applicants should seek City staff approval of their proposed trip generation rates to ensure agreement on proper utilization of ITE rates and calculations. If more than twenty peak hour trips are expected from a development, further analysis will be required to determine the likely distribution of these trips to City intersections to determine which intersections must be studied as part of the TIA. Study intersections shall include any intersections of arterial streets within a one-mile radius<sup>1</sup> of the site that would experience an increase of at least 20 vehicle trips during a peak hour. The applicant should provide the methodology and assumptions<sup>2</sup> developed when determining the trip

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<sup>1</sup> Larger developments may need to study intersections outside of this one-mile radius, as determined by City staff

<sup>2</sup> Larger developments may require coordination with the Chelan Douglas Transportation Council for a travel demand model-based analysis of likely trip distribution.

distribution of their project. Once trip generation and distribution calculations are complete, these should be compiled into a Trip Generation and Distribution letter for review by the City.

The trip generation and distribution letter shall include the following information for the proposed development:

1. Project description, including land use and intensity
2. Location and vicinity map
3. Site plan with building size (square feet)
4. Access points onto the transportation network;
5. An estimate of trip generation for the typical weekday, AM peak-hour, and PM peak-hour conditions. Any adjustments for transit use, pass-by trips, diverted trips, or any other reductions shall be clearly stated
6. A distribution pattern for traffic on the adjacent street network, shown in a graphical format and with accompanying information on the methodology and assumptions

## **TIA Scope**

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The Trip Generation and Distribution Letter will help to inform the scope of the TIA. The scope of the TIA shall be developed by a professional engineer licensed in the State of Washington. The City and other impacted jurisdictions/agencies shall approve the scope of the TIA early in the process to avoid the need for additional analysis later in the process. The scope of the TIA shall conform to the following:

1. The study area shall include any intersections of arterial streets within a one-mile radius of the site that would experience an increase of at least 20 vehicle trips during a peak hour. Some intersections may be excluded at the discretion of the City if they have been analyzed within the past year and were shown to operate at LOS C or better. All site access points onto the City's roadway network shall be analyzed. Additional intersections, including local-street intersections and arterial intersections outside of the one-mile radius, may also be required at the discretion of the City.
2. If a development increases traffic by more than 20 vehicles at any signalized intersections within the CBD, LOS analysis may consider either isolated intersection performance or a more aggregated corridor approach to confirm that LOS E operations are achieved during the peak hour. The use of the more aggregated corridor LOS approach shall require approval by city staff. The following intersections may allow for the more aggregated corridor approach:
  - Chelan Avenue and:
    - 5th Street
    - 2nd Street
    - 1st Street
    - Palouse Street
    - Orondo Street
    - Yakima Street
    - Kittitas Street

- Mission Street and:
    - 5th Street
    - 2nd Street
    - 1st Street
    - Palouse Street
    - Orondo Street
    - Yakima Street
    - Kittitas Street
3. A weekday PM peak hour LOS analysis shall be conducted for all study area intersections (and corridors if applicable). An LOS analysis of the weekday AM peak hour, Saturday afternoon, or other time period may be required at the discretion of the City. Such exceptions may include projects with school, church, fruit packing plants, or other land uses where the peak hour of the development differs from the typical weekday PM peak hour.
  4. Analysis shall be completed for the opening year of the development, build out year (if different than opening year) and a 6-year horizon. If a development is phased or built out over time, additional interim analysis periods may be required.
  5. At a minimum, the applicant should summarize collision history and any trends within the study area for a minimum of three years. Crash data can be obtained via a public records request to the Washington State Department of Transportation. As identified by City staff in the scope review phase, a more detailed safety analysis may be required. The more detailed analysis could include intersection queuing, turn lane warrants and LOS (in the case of an approach with excessive delays), sight distance, and pedestrian/bicycle conflicts may need to be reviewed to identify potential safety issues.
  6. An assessment of potential impacts on multimodal facilities to ensure that project improvements are consistent with the City of Wenatchee Complete Streets Policy (2016) and do not preclude any future planned multimodal facilities.
  7. A calculation of the expected bike and pedestrian trips generated by a development (see **Table 2** under TIA Methodology).
  8. Additional analysis may be required by other reviewing agencies.

Intersection and corridor (if applicable) LOS shall meet or exceed the thresholds set forth in the City of Wenatchee Comprehensive Plan. In the event that the LOS standard is not met, the project applicant shall work with the City to identify appropriate mitigation measures, which could include modifications such as changes to the intersection designs or control types, constructing/funding improvements to city-owned intersections, or changing the scale of the development.

Safety issues shall be mitigated to the satisfaction of the City.

## TIA Methodology

The analysis shall be completed using the following methodology:

1. Background traffic growth rate – A default background growth rate of 2% annually can be used. If a higher or lower annual growth rate is used, assumptions and the rate shall be reviewed and approved by City staff.
2. The LOS shall be determined in accordance with the methods reported in the latest edition of the Highway Capacity Manual (HCM) or as further defined by City staff. The LOS delay thresholds defined in the HCM are shown in **Table 1**.

**Table 1. Level of Service Definitions**

Level of Service	Description	Signalized Intersection Delay (seconds/vehicle)	Unsignalized Intersection Delay (seconds/vehicle)
A	Free-flowing Conditions	≤ 10	0-10
B	Stable Flow (slight delays)	>10-20	>10-15
C	Stable Flow (acceptable delays)	>20-35	>15-25
D	Approaching Unstable Flow (tolerable delay)	>35-55	>25-35
E	Unstable Flow (intolerable delay)	>55-80	>35-50
F	Forced Flow (congested and queues fail to clear)	>80	>50

Source: Highway Capacity Manual (HCM) 6<sup>th</sup> Edition

3. Aggregated Corridor LOS (if applicable) shall be determined by calculating the volume-weighted average intersection LOS of each corridor. The same control delay thresholds defined for individual intersections shall be used to assign corridor LOS (e.g., corridor average control delay of 38 seconds would correspond to LOS D). Based on City input, WSDOT ramp terminal intersections may be evaluated separately as individual intersections.
4. Use of two-stage gap acceptance methodology for left turns at unsignalized intersections is subject to City approval.
5. Other analysis tools may be utilized with City approval if HCM methodology cannot accurately model an intersection.
6. Intersection and turn pocket queuing analysis shall be performed with Synchro software, unless the City identifies an alternative method (traffic simulation software, etc.).

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7. Trip generation data shall be based on the latest edition of the ITE Trip Generation Manual. Trip generation data from studies of similar facilities may be substituted as approved by the City.
8. Turning movement counts shall be collected less than one year prior to submitting a traffic study, unless an exemption is granted by the City. Counts shall be taken during the PM peak hours (typically 4-6PM) on a Tuesday, Wednesday, or Thursday representing a typical travel day, unless otherwise requested by the City. Such exceptions may include projects with school, church, fruit packing plant, or other land uses where the peak hour of generator differs from the typical weekday PM peak hour. Counts shall not be taken during a week which contains a holiday or during a week of a significant weather event. Projects near schools may be required to collect turning movement counts during the school year. The City may request, at its discretion, that the project collect new traffic counts at any intersection to maintain a relatively current database for TIA review.
9. Expected bicycle and pedestrian trip generation shall be calculated using the Pedestrian and Bicycle Trip Ends by Land Use table or alternative method approved by City staff.

**Table 2. Pedestrian and Bicycle Trips Ends by Land Use Category**

ITE Code	Land Use	Units	Peak-Hour Vehicle Trip Ends	Person Trip Ends	% New Trips	New Person Trip Ends	New Bike/Ped Person Trip Ends
110	General Light Industrial	KSF	0.63	0.86	100%	0.86	0.03
140	Manufacturing	KSF	0.67	0.91	100%	0.91	0.03
151	Mini-Warehouse	KSF	0.17	0.23	100%	0.23	0.01
210	SF Detached	DU	0.99	1.35	100%	1.35	0.04
220	Multifamily Housing (Low-Rise)	DU	0.56	0.76	100%	0.76	0.02
240	Mobile Home Park	Occupied DU	0.59	0.80	100%	0.80	0.02
252	Senior Adult Housing - Attached	DU	0.26	0.35	100%	0.35	0.01
253	Congregate Care Facility	DU	0.18	0.24	100%	0.24	0.01
254	Assisted Living	Bed	0.26	0.35	100%	0.35	0.01
310	Hotel	Room	0.6	0.82	75%	0.61	0.02
320	Motel	Room	0.38	0.52	75%	0.39	0.01
430	Golf Course	Acres	0.28	0.38	100%	0.38	0.01
445	Multiplex Movie Theater	KSF	4.91	6.68	75%	5.01	0.15
492	Health Club	KSF	3.45	4.69	75%	3.52	0.11

ITE Code	Land Use	Units	Peak-Hour Vehicle Trip Ends	Person Trip Ends	% New Trips	New Person Trip Ends	New Bike/Ped Person Trip Ends
495	Recreational Community Center	KSF	2.31	3.14	100%	3.14	0.09
520	Elementary School	KSF	1.37	1.86	75%	1.40	0.04
522	Middle School	KSF	1.19	1.62	75%	1.21	0.04
530	High School	KSF	0.97	1.32	75%	0.99	0.03
560	Church	KSF	0.49	0.67	75%	0.50	0.01
565	Day Care	KSF	11.12	15.12	100%	15.12	0.45
590	Library	KSF	8.16	11.10	100%	11.10	0.33
610	Hospital	KSF	0.97	1.32	100%	1.32	0.04
620	Nursing Home	Bed	0.22	0.30	75%	0.22	0.01
710	General Office	KSF	1.15	1.56	100%	1.56	0.05
720	Medical-Dental Office	KSF	3.46	4.71	75%	3.53	0.11
730	Government Office Building	KSF	1.71	2.33	100%	2.33	0.07
760	Research & Development Center	KSF	0.49	0.67	100%	0.67	0.02
812	Building Materials & Lumber	KSF	2.06	2.80	75%	2.10	0.06
814	Variety Store	KSF	6.84	9.30	66%	6.14	0.18
820	Shopping Center	KSF	3.81	5.18	66%	3.42	0.10
850	Supermarket	KSF	9.24	12.56	64%	8.04	0.24
851	Convenience Market (24 Hour)	KSF	49.11	66.78	49%	32.72	0.98
890	Furniture Store	KSF	0.52	0.71	47%	0.33	0.01
911	Walk-In Bank	KSF	12.13	16.49	71%	11.71	0.35
912	Drive-In Bank	KSF	20.45	27.81	65%	18.08	0.54
931	Quality Restaurant	KSF	7.8	10.61	56%	5.94	0.18
932	High Turnover Sit-Down Restaurant	KSF	9.77	13.29	57%	7.57	0.23
933	Fast Food w/o Drive-Thru	KSF	28.34	38.54	50%	19.27	0.58
934	Fast Food With Drive-Thru	KSF	32.67	44.43	50%	22.21	0.67

ITE Code	Land Use	Units	Peak-Hour Vehicle Trip Ends	Person Trip Ends	% New Trips	New Person Trip Ends	New Bike/Ped Person Trip Ends
936	Coffee/Donut Shop w/o Drive-Thru	KSF	36.31	49.38	51%	25.18	0.76
937	Coffee/Donut Shop w/Drive-Thru Window	KSF	43.38	58.99	51%	30.08	0.90
943	Automobile Parts and Service Center	KSF	2.26	3.07	57%	1.75	0.05
945	Gas/Service Station with Convenience Market	Pump	13.99	19.02	44%	8.37	0.25
947	Self-Service Car Wash	Stalls	5.54	7.53	44%	3.31	0.10
948	Automated Car Wash	KSF	14.2	19.31	44%	8.50	0.25

Source: Institute of Transportation Engineers, *Trip Generation*, Tenth Edition.

Person Trip Rate: 1.3 is an assumed Average Vehicle Occupancy, and 95.6% is the rate of mode share for vehicles. These were obtained from the CDTC Travel Model.

Bicycle and pedestrian trip rate: 3% is the bicycle and pedestrian mode share. This was obtained from the CDTC Travel Model

Land Use Units:

- KSF = 1,000 gross square feet building area
- DU = number of dwelling units
- Room = number of rooms for rent
- Fueling Positions = maximum number of vehicles that can be served simultaneously.
- Student = number of full-time equivalent students enrolled
- Stalls = number of wash stalls