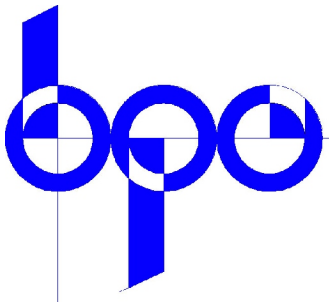
Traffic Impact Study Guidelines

Produced by
Bannock Planning Organization
for
The City of Pocatello, City of Chubbuck and Bannock County



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1.0 Introduction

The functionality of the existing roadway systems are influenced by many factors including: current use; land use bordering the facility; type and amount of access to the facility; and traffic control used along the facility. New developments or redevelopments can often change the existing conditions of a roadway requiring agencies and local property owners to make improvements to regain reasonable levels of service.

To assist the cities of Pocatello and Chubbuck and Bannock County, Bannock Planning Organization (BPO) develop Traffic Impact Study (TIS) Developer Guidelines. The primary purpose of these guidelines are (a) to assist in the short and long range planning of site access, off-site improvements, and street systems; (b) assist developers and property owners in making critical land use site planning decisions regarding traffic.[1]

The requirements for TIS's are not new and the procedures for conducting them are as varied as the communities that require them. This Guideline will clarify the TIS requirements and expectations for the Pocatello/Chubbuck Urbanized Area. The Guideline will also address the requirements of the Idaho Transportation Department.[2]

2.0 Requirements

There are many reasons to conduct a TIS including: number of trips generated; crash history of nearby intersections; assessing how different development patterns of a parcel affects internal and external trips; and protecting sensitive roadway. Normally, a TIS is considered in conjunction with an application for approval of site plan, subdivision or building permit.

2.1 Triggers

Traffic Impact Studies are required when a proposed development or redevelopment will generate 100 or more new peak hour trips or the total added volume is equal to 1,000 vehicles per day. Developments located on State Highways have an additional requirement for developments which generate between 25 to 99 trips in the peak hour or 250 to 999 trips per day. Determining the number of trips will be discussed in the traffic data section of these guidelines.

2.2 Initial Meeting

After the need for a Traffic Impact Study has been determined a meeting with the Local Jurisdiction's land use staff and BPO should take place. The purpose of this meeting will be to review the contents of these guidelines, expectations, and expected time lines. The meeting will also establish the point of contact for the developer and city.

2.3 Preparer qualification

The Traffic Impact Study must be prepared by a professional engineer registered in the State of Idaho. The developer is responsible for hiring the engineer to perform the TIS.

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1 *A Proposed Recommended Practice Traffic Access and Impact Studies for Site Development* Institute of Transportation Engineers 1988.

2 *Requirements for Transportation Impact Studies Supplement to Board Policy B-12-06* Idaho Transportation Department

3.0 Step by Step Guide

This step by step guide is not intended to be an exhaustive "how to" but rather a systematic approach to developing a TIS. The steps refer the reader to other sections in this guideline for specific requirements or guidance along the TIS development process.

3.1 Step 1 Determine if a Traffic Impact Study is Required

Early in the development process when the amount and size of buildings are established, check of the number of trips generated using Table 3 for quick guide for trips generated. No further study is required if the trips generated by this Table is less than 80 for the peak hour or 800 for the day. Since this is a quick check using grouped land uses, the number represents 80 percent of the trigger amount.

3.2 Step 2 Site Plan and Study Area

Prepare a preliminary site plan showing the planned developments, internal circulation, and connection to the public road system. Contact the agency where the development is proposed to be located in for specific requirements for this plat. In addition to the site plan the study area should be identified. (See Study Approach for guidance). The study area needs to be approved by the city.

3.3 Step 3 Existing Traffic Conditions

Daily and hourly traffic counts are needed for the study. Daily counts can be up to two years old. The older counts will be adjusted by 2% per year up to 4%. Some traffic counts can be obtained by contacting BPO or on the web site at Http://www.bannockplanning.org.

All turning counts require collection of new data. The counts should be collected over two hours during the peak hour of concern. The counts should be grouped into 15 minute intervals. Vehicle classification, pedestrian movement, and bicycle activity is also needed or required.

Existing data will be presented in graphic form indicating all intersections and roadway sections within the study area.

3.4 Step 4 Trip Generation

Trip Generation uses the size of building and the intended use of each generator identiified in Step 1. For each use or facility determine the number of trips by using the latest version of the Institute of Transportation Engineers Trip Generation manual. Use the table for each code which determines the average vehicle trip ends versus 1000 square feet of gross floor space and is the peak hour of the generator for weekday.

Numbers required from this table are:

- Land use Code
- Average Rate
- Directional distribution

Approximate Triggers for a TIS

Homes

100 Dwelling Units

Retail

15,000 Square Feet

Office

35,000 Square Feet

Industrial

70,000 Square Feet

Lodging

120 Rooms

Medical

46,000 Square Feet

3.5 Step 5 Direction Distribution

This is the process of determining where site-generated traffic will come from and go to within the larger street network. Many factors affect this distribution from the size of the development to the location within the community. No specific methodology to determine directional distribution is required but all rates must be approved by city or county and BPO.

3.6 Step 6 Trip Assignment

Trip distribution takes the trips generated, site layout, access to existing streets, and direction distribution to distribute trips to each site's access points and intersection or intersections within the impact area. The internal circulation will influence distribution, therefore the internal network must be established prior to this step.

3.7 Step 7 Analysis

The analysis requires the use of various highway capacity software programs. The answers required are Level of Service and delay for each intersection movement or access point. This data is to be compared to standards in Table 1.

4.0 Study Approach

4.1 Scope of Traffic Impact Study

The analysis of the impact of a proposed development should include but not be limited to:

- Any point which accesses a public roadway.
- Internal circulation of the site and between different development areas for larger developments.
- A distance determined by the government jurisdiction along the primary route.

4.2 Horizon Year

The TIS should be developed for the opening year of the planned development. Opening year is the year construction begins. If the development is staged with multiple developments within the single development the TIS should include the opening year of the first development and all significant phases including project completion. The dates of the significant phases and completion should be reviewed at the initial meeting and approved by City or County. If change in the scope or intensenty of a development is proposed or occurs before the horizon year a new TIS will be required if the proposed change would naturally trigger a TIS.

4.3 Time Periods

The time of day to evaluate the traffic impact is when the most traffic from the development is expected. This period is based on the type of development. Three time periods need to be identified in the TIS document including:

- Weekday AM Peak, generally 6:30 to 8:30 am, of the street the development is accessing.
- Weekday PM Peak, generally 4:00 to 6:00 pm, of the street the development is accessing.
- Weekend Peak.

The peak with the highest trip generation is the time period of evaluation. (See Traffic Data section for more details on trip generation). In some cases two time periods might be required by the city or county. This is usually limited to retail developments along principle arterials with a high weekend peak.

5.0 Standards (see Section VII)

5.1 Level of Service Standards

Traffic Impact Studies evaluate the potential impact of a specific development on the existing system. Acceptable level of service standards for each intersection evaluated shall be in accordance with Table 1. To summarize, Table 1 indicates that:

- When the LOS without development is LOS A, B, and C, the minimum acceptable projected LOS shall be LOS C for all movement within a specific intersection.
- When the LOS without development is LOS D, E, or F the minimum acceptable projected LOS shall be equal to the LOS without development.

Table 1: Minimum Acceptable Level of Service

		Projected LOS Without Development					
		A	B	C	D	E	F
Projected LOS With Development	A	N/A					
	B	B	N/A				
	C	C	C	N/A			
	D	C	C	C	N/A		
	E	C	C	C	D	N/A	
	F	C	C	C	D	E	N/A

NOTE: Level of service numbers are for all movements within a specific intersection.

5.1 Signal Warrants

All unsignalized intersections evaluated during the TIS with LOS D shall be evaluated to determine if a signal is warranted at this location. The warrant analysis shall be done using procedures outlined in the latest version of the Manual of on Uniform Traffic Control Devices.

5.2 Queuing Analysis

There is no required or standard queuing analysis for vehicle storage and turn lane. The method selected must be listed in the report including all data used.

6.0 Traffic Data

This section establishes the sources of data and how the different rates are determined.

6.1 Current Traffic Data

Traffic data for the study area should include the 24 hour Average Annual Daily Traffic (AADT) for all facilities and the 2 hour turning counts for the peak hour in Section 4.3 of these guidelines.

6.1.1 Daily Counts

All 24 hour counts must be less than two years old from the data the Traffic Impact Study is conducted. Counts not in the current year must be grown to current year by using a two percent per year growth rate. If no current daily traffic count exist, developer must conduct one in accordance with accepted traffic counting methods.

All new counts must be 48 hour counts taken Tuesday, Wednesday, or Thursday and adjusted by the month the count was taken. Seasonal adjustment factors are available from Bannock Planning Organization.

6.1.2 Turning Counts

Unless current year data exists, new turning counts for each intersection identified in the study area shall be collected. The counts should be at a minimum of two hours and cover the peak hour established in Section 4.3. Remember that vehicle classification is required for all turning counts.

6.2 Future Year Traffic Data

In phased developments the TIS requires analysis of years beyond the current year. Convert traffic current data to future traffic data by multiplying the travel demand model determined growth rate for the link of interest, provided by the Bannock Planning Organization and approved by city or county, to the current data.

6.3 Pass-by Trips

Land-use activities such as retail, office, grocery stores tend to attract trips to that land-use specifically. However, some of the trips generated by the development already exist on adjacent roadways. [3, 4]

Table 2: Pass-by Rates

Land Use	Pass-By Percentages
Shopping Center Larger than 400,000 GLA	20
Shopping Center 100,000 to 400,000 GLA	25
Shopping Centers Smaller than 100,000 GLA	35
Convenience Market	40
Warehouse stores	20
Fast Food Restaurant	40
Sit Down Restaurant	40
Service Station	45
Supermarket	20
Not Listed	15

GLA= Gross Leasable Area

6.4 Internal Trips

Multi-Use developments can have a tendency to share trips. A person might go to a grocery store in a specific development and then to the gas station in the same development. This shared trip count is double counted if the trip generation rates are not modified.[5] Internal trips can account for 3% to 23% of the trips generated. [6]

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3 *Transportation and Land Development* Verggil G. Stover and Frank J. Koepke, Institute of Transportation Engineers 1988, page 46

4 *Trip Generation Handbook An ITE Recommended Practice* Kevin G. Hooper, Institute of Transportation Engineers October 1988. page 72

5 *Transportation and Land Development* Verggil G. Stover and Frank J. Koepke, Institute of Transportation Engineers 1988. page 47

6 *Trip Generation Handbook An ITE Recommended Practice* Kevin G. Hooper, Institute of Transportation Engineers October

Developers can use 3% for non-retail and 6% for retail developments. Any other percentage must be justified by showing the proximity to primary destination, walkways or internal roads that facilitate movement between uses. Any rate other than 3 or 6 must be approved by the city or county.

6.5 Trip Generation

All calculations shall use the latest edition of the Institute of Transportation Engineer's Trip Generation Manual. The manual lists the number of trips that will be generated by various land uses. For each land use identified on the site plan the following shall be identified in the report:

- Land use type;
- ITE Land Use Code;
- square feet of proposed development; and
- directional distribution
- appropriate rate for the time period determined in Section 4.3.

For each land use identified there are many different tables which give the trip generation rate for various scenarios. For the analysis use the table which corresponds to the a.m. or p.m. peak hour of the generation and housing units or 1,000 square feet of gross floor area.

6.5.1 Approximate Triggers

To assist developers and staff in early determination of the need for a TIS, Table 3 identifies approximate trigger values for various land uses. These values in Table 3 are for multiple land uses and are only for early analysis.

Table 3: Approximate TIS Trigger Values

Land Use Type	Land Use Code	Trigger Value
Residential	210, 220, 230, 270	100 Dwelling Units
Retail	814, 815, 820	15,000 square feet
Office	710, 714, 715, 750, 770	35,000 square feet
Industrial	110, 120, 130, 140	70,000 square feet
Lodging	310, 312, 320	120 rooms
Medical	610	46,000 square feet

6.6 Trip Distribution/ Assignment

Trip distribution determines the direction or directions of approach for the development. This distribution percentage is used to assign trips from and to the development. The direction of approach can be determined by many factors including location, size of development, type of development, existing street conditions, and available data.[7]

Although there are mechanical methods available to estimate where trips will come from, it is still important for the analysis to incorporate professional judgment. Trip generation rate shall be approved by Bannock Planning Organization and City or County prior to their use in the analysis. The assumptions and methods used may vary depending upon site specific conditions. Things to consider are:

- Size of the proposed development
- Type of developed

1998. page 78

7 *Transportation and Land Development* Verggil G. Stover and Frank J. Koepke, Institute of Transportation Engineers 1988. page 49

- Existing street conditions and access
- Location of development in relation to population

The analysis conducted should be easily for a reviewer to follow. The use of flow charts and diagrams that allow reviewers to track analysis is preferred.

7.0 Analysis

7.1 Method to Determining Level of Service

McTrans High Capacity Software or other highway capacity software based on Transportation Research Board Highway Capacity Manual can be used with approval of city or county. Synchro will be used for intersections currently modeled in the Idaho Transportation Department's or BPO's Synchro model.

7.2 Signalized Intersections

Intersections which are signalized or will be signalized as a result of the development will use the following defaults in the HSC software:

- Analysis Type = Operations
- Peak Hour Factor (PHF) = 0.90
- Right-Turn of Red Reductions = Actual count.
- Cycle Length = 60 to 120 seconds (if signal is within coordinated system actual timing must be used)
- Saturation Flow = Collector's 1,700, Minor Arterial's 1,750, Arterial's 1,800.
- Arrival Type = 3
- Lane Width = 12 feet. Any width smaller than 12 must be approved by city or county.
- Percent Heavy Vehicles = Determined during turning counts. Heavy vehicle is any vehicle with three axles or more.

7.3 Unsignalized

Intersections which are unsignalized will use HSC software to determine the LOS for that intersection.

7.4 Results

In the event the HSC results are below the acceptable LOS identified in Table 1, modifications are allowed to determine what would be necessary to meet the acceptable LOS. In the report all analysis should be included for review. The results should identify all system difficenceies and proposed solutions to them.

7.5 Mitigation Measures

Mitigation requirements are jurisdiction specific. The City or County point of contact will provide you with jurisdiction specific requirements. At a minimum, for each significant impact (drop in level of service) identified in the results section, the report must discuss feasible measures to avoid or reduce the impact to the system. To be considered adequate, measures should be specific and feasible. The report should also identify who is responsible for each measure. Any existing facility which does not meet criteria prior to the TIS should be identified. Developments that cause a facility to operate at unacceptable LOS, measures should be identified for which the developer would be 100 percent responsible. If a development causes a significant impact at a facility which is directly accessed, the developer should be responsible for a equitable share. The development's equitalbe share is defined as its percentage of the facility's total traffic.

If a development causes a facility not directly accessed but with in the study area to have significant impact or operate below the acceptable LOS then the proposed development should pay a fair share of the mitigation measures identified.

8.0 Report Format

The following outline is a guide in preparing the Traffic Impact Study. Most studies can be documented using this outline; however, additional sections may be warranted or needed based on that development. Likewise, some sections in this outline might be excluded if not appropriate. Idaho Transportation Department's TIS format is included in Appendix B.

8.1 Executive Summary

The executive summary should include the site location, study area, principal findings and conclusions.

8.2 Proposed Development (Site and Nearby)

This section should include the location of the project and site within the community. The existing and proposed land use for the site and contiguous sites should also be noted. Any currently approved developments adjacent to the site should also be identified. Key points include:

- Site location
- Land use and intensity
- Site Plan
- Proposed development including any phasing and the timing for each phase
- Reference to other traffic impact studies.

8.3 Analysis of Existing Conditions

This section includes the existing conditions of the study area. This section should concentrate on establishing the status of the study area without the proposed development. If appropriate, already approved developments should be included in the existing conditions. Key points include:

- Physical characteristics
    - Roadway
    - Traffic Control devices
    - Transit service
    - Bicycle and pedestrian facilities
    - Geometrics
- Traffic Volumes which should include the daily and peak hour (two hours for each peak period)
- Level of Service
- Safety related deficiencies
- Data sources

8.4 Projected Traffic

This section describes the proposed developments, traffic generation and assignments. For phase development future non-site forecasts will also be included in this section. Key points include:

- Trip generation
- Pass-by trips
- Internal trips
- Trip distribution
- Traffic assignment
- Non-site traffic projections
- Total traffic

8.5 Traffic Analysis

This section is for the comparison of the existing conditions to developed conditions. The section should include any improvements used to accommodate site traffic. In certain areas this area may also include planned

improvements to accommodate non-site traffic. Key points include:

- Site ingress/egress
- Level of service analysis
    - With project
    - Without project
    - Improvement
    - Traffic Safety
    - Traffic Control needs

8.6 Internal Project Site Circulation

This section is required for developments that are larger and include multiple buildings or are phased over several years. The intent is to determine that the internal transportation system functions well. Key points include:

- Conflict points
    - Sight distance
    - Building access delivery points
    - Drive-through lanes
    - Vehicle/vehicle, Vehicle/ Pedestrian
- Design features
    - Widths of internal roadways and turning radious
    - Parking dimensions
- Other Features
    - Fire lanes
    - Delivery truck circulation

8.7 Conclusions and Recommendations

This section should include LOS with and without development, mitigation to accommodate site generated traffic. Discussion of results including identification and analysis of alternative. This section needs to identify any issues discovered and solutions to those issues.

8.8 Appendices

The appendices should include all data relating to the project. This could include but not be limited to:

- Traffic Counts,
- Internal circulation patterns,
- Phasing for the development,
- Highway Capacity Modeling, and
- Alternative analysis

Appendix A Report Outline

I. Introduction and Summary
- a. Purpose of Report and Study Objectives
- b. Executive Summary
  - i. Site location and study area (site plan and map)
  - ii. Development description
  - iii. Principle findings
  - iv. Conclusions and recommendations

II. Proposed Development (Site and Nearby)
- a. Description of On-Site Development
  - i. Land use and density
  - ii. Location
  - iii. Site plan
  - iv. Zoning
  - v. Project phasing and timing

III. Area Conditions
- a. Study Area
  - i. Area of influence
  - ii. Area of significant traffic impact
- b. Study Area Land Use
  - i. Existing Land Uses
  - ii. Existing zoning
  - iii. Anticipated future development
- c. Site Accessibility
  - i. Area roadway system
    1. Existing
    2. future
  - ii. Traffic volumes and conditions
  - iii. Public transportation service

IV. Projected Traffic
- a. Site Traffic (Opening Year and any significant phases)
  - i. Trip generation (include reference and tables)
  - ii. Trip distribution (Approved distribution) (figure)
  - iii. Trip assignment (figure)
- b. Existing Traffic
  - i. Non-site Traffic for anticipated development in study area
    1. Method of projections
  - ii. Through traffic
  - iii. Estimated volumes
- c. Total Traffic

V. Traffic Analysis
- a. Site access
- b. Level of Service
- c. Traffic Safety
- d. Traffic Signals
- e. Site circulation and parking