



**City of Henderson
Department of Public Works
Traffic Services Division
Traffic Engineering**

*To provide planning, design, design review, and
Maintenance of City transportation infrastructure*

TRAFFIC IMPACT ANALYSIS GUIDELINES

Traffic Impact Analysis Scope

1. A scope request must be submitted to the City for all new projects and updates regardless of the trip generation volumes. Generally, one intersection shall be analyzed for every 100 peak hour trips. For scoping purposes, the peak hour trips shall be calculated without any pass-by adjustments. The City may require additional intersections due to the location and nature of the development. Please fax TIA or TIA Update scope requests to (702) 267-3091. Email scope requests to PWTrafDataCollection@cityofhenderson.com.
2. The scope request must include trip generation volumes, vicinity map and a reduced site plan. The site plan to include at a minimum, any existing and proposed driveways, adjacent and opposing driveways, medians, drive aisles, and building footprints. A preliminary trip distribution is optional. The City encourages early review of the distribution to minimize review time of the study and to reduce the number of reviews.

Traffic Impact Analysis

A TIA is typically required on projects generating 100 peak hour trips or more for the entire proposed development. The City of Henderson (City) may require traffic studies, regardless of the number of trips generated by the development, as the City deems necessary due to the type of development proposed and the location. Updates will be required as different phases are built, regardless of the number of trips.

1. **Trip Generation:** Trip Generation should be calculated using the Institute of Transportation Engineers (I.T.E.) Trip Generation Manual, latest edition (See www.ite.org). In addition, Section 3.4 of the ITE Trip Generation Handbook titled Recommended Procedure for Estimating Trip Generation should be used.
2. **Pass-By Trip Reductions:** The following pass-by reductions will be allowed for traffic impact analyses. Pass-By Trip Reductions shall not be applied to driveway volumes. Reductions for diverted link trips and for uses other than those shown are not permitted. Unless otherwise shown, the pass-by reductions are for the weekday PM peak period.

Land Use	ITE Code	Pass-By Reduction	Primary Diverted
Free Standing Discount Superstore	813	28%	72%
Free Standing Discount Store	815	17%	83%
Hardware/Paint Store	816	26%	74%
Shopping Center	820	34%	66%
Shopping Center Sat Mid-day	820	26%	74%
Tire Store	848	28%	72%
Supermarket	850	36%	64%
Convenience Market (Open 24 hours)	851	61%	39%
Convenience Market with Gasoline Pumps AM Peak	853	63%	37%

Convenience Market with Gasoline Pumps	853	66%	34%
Discount Supermarket	854	23%	77%
Home Improvement Superstore	862	48%	52%
Pharmacy/Drugstore without Drive-Through Window	880	53%	47%
Pharmacy Drugstore with Drive-Through Window	881	49%	51%
Furniture Store	890	53%	47%
Drive-In Bank	912	47%	53%
Quality Restaurant	931	44%	56%
High-Turnover (Sit-Down) Restaurant	932	43%	57%
Fast-Food Restaurant with Drive-Through Window AM Peak	934	49%	51%
Fast-Food Restaurant with Drive-Through Window	934	50%	50%
Gasoline Service Station AM Peak	944	58%	42%
Gasoline Service Station	944	42%	58%
Gasoline Service Station with Convenience Market AM Peak Period	945	62%	38%
Gasoline Service Station with Convenience Market	945	56%	44%

3. **Mixed Use Projects:** For mixed use projects of regional significance, internal capture rates shall be approved by the City Traffic Engineer or designee.
4. **RTC Transit Routes:** Provide a bus turnout on the far side of all 80' x 80' intersections and greater as a minimum. A combination bus turnout/right-turn lane may be required based upon review of the site plan. Other bus turnout locations will be reviewed on a case by case basis.
5. **Level-of-Service Analysis:**
 - Level-of-service calculations shall be based upon the latest edition of the Highway Capacity Manual.
 - If an intersection operates at a level-of-service below C (D or less), please provide and analyze three mitigation measures such as: signalization, channelized medians, turning lanes, increase in storage lanes, restricted turns, or additional lanes. Discuss the pros and cons of each as outlined in the RTC Policies and Procedures Manual. (See www.rtcsonv.com). If an intersection operates at level-of-service D or poorer with mitigation measures, the analysis still needs to be provided in the traffic study. Based upon the results of the analysis, the City will determine if any of the mitigation measures will be implemented. This information is needed in order to evaluate the impact on the overall roadway system in the area and adjacent neighborhoods.
6. **Warrant Analysis:** Signal warrant analysis shall be based upon the latest issue of the Manual on Uniform Traffic Control Devices (MUTCD). In general, the peak hour warrant shall not be used to warrant new traffic signals for typical commercial and residential land uses. The City may allow the use of projected volumes for warrant analysis provided the analysis shows projected 8 hour traffic signal warrants being satisfied. In addition to the Traffic Signal Warrant Analysis, provide progression analysis if a new or future signal is needed or recommended. If a new signal is proposed on a roadway being coordinated by the Freeway and Arterial System of Transportation (FAST), the proposed signal location will need to be submitted to FAST for their concurrence.
7. **Progression Analysis:** If a new signal is proposed on a roadway with existing or proposed traffic signal coordination performed by FAST, the proposed signal location and progression analysis will need to be submitted to FAST for their concurrence. Unless otherwise approved by the City, the arterial green band shall be a minimum of 40 percent of cycle length.

8. Queuing Analysis:

- Provide a queuing analysis at all project driveways in a gated community.
- A 30 second service time per vehicle with one storage lane shall be used in the analysis. A separate visitor lane and turn-around area will need to be provided per RTC Standard Drawing No. 222A.
- A left turn lane and/or right turn lane at the project entrance shall not be included as part of the storage distance.
- The available queuing distance shall be a minimum of 50 feet measured from the back of curb to the visitor call box.
- Methodology from the ITE Transportation and Land Development publication shall be used. (See www.ite.org).

9. Left/Right Turn Storage Analysis: Left-turn and right-turn storage bay analyses must be performed at all study intersections and project driveways identified in the traffic impact analysis scope. Storage at signalized intersections is to be calculated using the Poisson method with 95 percent confidence and a 3 minute wait. Right turn lane storage may be calculated as shown in the ITE *Transportation and Land Development* publication. (See www.ite.org). Storage at unsignalized intersections is to be calculated assuming a uniform arrival rate with a 2 minute wait.

10. Intersections of 80 ft and 100 ft Streets: Additional rights of way for dual left turn lanes and right turn lanes are required for all intersections of 80 ft and greater per RTC Standard Drawing 201.1. (See www.rtcnv.com). Right of way for intersection flaring may also be required at any intersection as determined by the Public Works Director or designee.

11. Driveways:

- Common driveways shall be required between developing parcels with similar uses proposed. Exceptions to this requirement must be approved by the Director of Public Works and / or the Community Development Director. (See Henderson Development Code Section 19.10.1N6f)
- No more than two driveways shall be allowed along the property frontage of any street. If the driveway spacing cannot be met, then only one drive will be allowed. Additional driveways shall require approval from the Director of Public Works. (See Henderson Development Code Section 19.10.1N6g)
- Except for the DCC zoning district, driveways into commercial, business park, office complex and warehouse developments that generate more than 500 vehicle trips per day shall be spaced 200 feet centerline to centerline for driveways accessing 80-foot-wide right of way streets and 300 feet centerline to centerline for driveways accessing 100-foot-wide and greater right-of-way streets. Driveways in the DCC zoning district shall be approved by design review. (See Henderson Development Code Section 19.10.1N6h)

12. Cost Participation Analysis / Critical Lane Analysis:

- Use 66.6% (2/3) for 2 lanes and 50% (1/2) for 3 or more lanes in calculating the critical lane for multilane facilities. Use 55.5% for dual left turn lanes or dual right turn lanes.
- Use 1200 vehicles per hour as the critical lane volume at intersections and 1,140 per hour at T intersections. The current cost of a signal is approximately \$275,000 for intersections of City roadways and \$300,000 on state roadways. The cost is subject to change by the City based upon actual bid prices.
- If left turn volumes exceed 300 vehicles per hour, dual lefts may be required. Participation for dual lefts is computed using a 300 vehicle per hour capacity. The current cost for dual-left turns is approximately \$150,000.

- For streets 100 feet wide or greater, right-turn lanes may be required for driveways that are projected to have 50 to 99 entering vehicles during the peak hour and right turn lanes will be required for all driveways that are projected to have 100 entering vehicles or more during the development's peak hour. For streets 80 feet in width, right-turn lanes will be required at driveways that are projected to have 100 entering vehicles or more during the peak hour. If right-turn volumes exceed 150 vehicles per hour at an intersection, a right turn lane may be required. Right turn lanes may also be required as determined by the Director of Public Works. Right turn lanes shall not be required for driveways in the DCC zoning district. The current cost for right turn lanes is approximately \$150,000. A capacity of 150 vehicles per hour should be used for participation calculations for intersections.
- Use existing lane configurations in the analysis and what is committed to be built by the developer. It may be acceptable to use additional lanes if a project is under construction.
- When projects are built in phases, the study will address the improvements to be constructed with each phase and the associated participation for each phase.

13. **Traffic Accident Analysis:** The intersections and mid-block locations to be analyzed shall be specified in the TIA scope. Accident data is to be supplied by the City of Henderson police. In general, an accident analysis shall include the number of accidents and an accident rate. Accident rates shall be calculated per million vehicle miles for segments and per million entering vehicles for intersections. Traffic and pedestrian accident data including a minimum period of 3 years shall be evaluated at intersections, median openings and mid-block as required in the scope. The estimated increase or decrease of accident potential is to be analyzed and mitigation measures recommended.

14. **Figures to be included in the Traffic Impact Analysis:**

- Vicinity Map.
- Site Plan Map.
- Directional Distribution.
- Existing traffic volumes.
- Peak Hour Site Only Volumes.
- Future Background Traffic Volumes.
- Future Background With Site Traffic Volumes.
- Existing Geometrics and Control.
- Recommended Geometrics and Control.
- School Walking Routes for Residential Developments.
- Site Plan or Project Boundary Superimposed on Aerial Photograph.
- Time-Space Diagrams for traffic signal progression, if applicable.

15. **Additional Items to be Included in the Traffic Impact Analysis:**

- Traffic Impact Analysis Scoping Checklist.
- Planning Commission and City Council Conditions.
- 24"x36" and 11"x17" site plans showing, at a minimum, building with square footages, drive aisles, street names (public and private), medians, right-of-way, opposing/adjacent driveways, and gated entries.
- Completed Traffic Impact Analysis Submittal Form.
- Statement of Conformance to NDOT's *Access Management System and Standards*, if applicable.
See (www.nevadadot.com/business/forms/pdfs/TrafEng_AccesMgtSysStandards.pdf).

16. **Submittal Fees:** Submittal Fees will need to be paid at the time of initial submittal. The fees are shown in the table below and were effective May 2, 2005.

Type of Submittal	Fee
Traffic Impact Analysis (acreage \leq 5)	\$500
Traffic Impact Analysis (5 < acreage < 40)	\$1,000
Traffic Impact Analysis (40 < acreage < 320)	\$2,000
Traffic Impact Analysis (320 < acreage < 2,560)	\$4,000
Traffic Impact Analysis (acreage \geq 2,560)	\$6,000
Traffic Impact Analysis (over 3 reviews, Master Traffic Impact Analysis and 2 addendums)	\$250
Traffic Impact Analysis Update (acreage < 5)	\$100
Traffic Impact Analysis Update (acreage \geq 5)	\$250

17. **Traffic Impact Analysis Update:** Traffic Impact Analysis Updates will be required as different phases of a project are built regardless of the number of trips. If the site is part of a previously approved master traffic impact analysis, the City will verify that the site is being developed consistent with the original analysis. The update will need to address cost participations and improvements that will be constructed. The requirement for an update may be waived if the master traffic impact analysis has been approved for less than two years, the site has been developed consistent with the original analysis and all cost participations have been paid.

18. **Master Streets and Highways Plan Amendments:**

- Master Streets and Highways Plan amendments shall be classified as legislative, quasi-judicial or minor adjustment.
- Legislative amendments are those changes that involve the creation, broad scale implementation or revision of public policy, including large scale map changes where a significant number of property owners are directly affected. Legislative amendments shall require a traffic impact analysis.
- Quasi-Judicial amendments are those that affect only the subject property or other properties in the immediate vicinity. Quasi judicial amendments should require a traffic impact analysis.
- Minor adjustment amendments involve only a single property and may not require a traffic impact analysis. A typical minor adjustment would be a minor adjustment to a street or highway alignment that would not affect the functionality of the roadway.
- The Director or Public Works or designee shall determine if a proposed amendment is legislative, quasi-judicial or minor adjustment.
- The traffic impact analysis for a Master Streets and Highways Plan Amendment shall address the following:
 - The traffic impact analysis area shall be generally determined by the properties adjacent to the proposed roadway to the nearest adjacent 100 foot right of way in each direction including all intersections of 80 foot right of way and greater. The traffic impact analysis area may be expanded by the Director of Public Works, Director of Community Development or designee.
 - Traffic conditions shall be evaluated for existing conditions, 5 year, 10 year and 20 year projections with and without the proposed amendment.
 - The applicant shall identify the responsible party and propose mitigation and improvements for the 5 year, 10 year and 20 year scenarios.
 - Master Streets and Highways Plan amendments that involve establishing new alignments shall demonstrate the new alignment is consistent with the following elements:
 - The new alignment maintains the intent and purpose of the proposed alignment originally shown on the plan maps.

- The new alignment will not adversely affect the carrying capacity, safety or integrity of the transportation system.
- The new alignment is necessary to preserve a significant natural feature, minimize engineering or construction constraints or would result in a significant enhancement of the development potential of affected properties.
- The new alignment will not significantly increase the cost or complexity of any off-site improvements.
- The new alignment does not have significant adverse affects on nearby property.

19. Miscellaneous:

- The Traffic Impact Analysis will need to be approved before any improvement plans are submitted for review and approval. A copy of the traffic impact analysis approval letter shall accompany the improvement plans at the time of submittal.
- Any incomplete information provided with the Traffic Impact Analysis will result in the entire submittal being rejected.
- Civil Improvement mylars will not be signed and released until the applicable traffic participation fees have been paid.