

San José Annual Traffic Signal Investment Program

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Abstract

The City of San Jose, California is the 10th largest city in the United States with a population of 973,672. It has 2,310 miles of paved roadway network with 5,200,000 square feet of roadway markings, 64,000 traffic signs, 175 miles of traffic signal and communication cables and over 950 signal-controlled intersections. The City consistently looks for innovative and cost effective ways to provide its community with safe, secure, and efficient surface transportation systems that support San Jose's livability and economic vitality.

Every summer, the City's Department of Transportation leads an Annual Safety Review Summit to perform comprehensive review of intersection safety audits. The summit brings together a multidisciplinary team consisting of engineers, technicians, public safety personnel, geographical information systems specialists, and maintenance staff to review intersection safety data. The function of the team is to determine the most effective safety improvement solutions and to recommend a prioritized list of potential capital improvement projects to be considered for funding by the City Council.

This paper will highlight the City's Annual Safety Review Summit and the process utilized for selecting and prioritizing the most cost effective transportation safety improvement projects, and how they are implemented within the principles of context sensitive solutions.

Introduction

The City of San José in California is the 10th largest city in the United States with a population of 974,000. It is also the third largest city in the State of California. It has a roadway network consisting of 2,310 miles of paved roadway, 5.2 million square feet of roadway markings, 64,000 traffic signs, 175 miles of traffic signal and communication cables and over 950 signal controlled intersections. San José consistently looks for innovative, cost effective, and environmentally sustainable solutions to provide its community with safe, secure, and efficient surface transportation systems that enhance the City's livability and support economic vitality.

The City of San José has been a progressive leader in managing traffic flow conditions locally and regionally, being one of the first agencies in the Northern California to implement advanced traffic management system in 1988, and being one of the first northern California cities to embark on regional ITS deployment. Likewise, having a system that determines appropriate level of investment for a traffic safety program is crucial for a city like San José.

Since 2000, an average of 26 signals has been added to the City's traffic signal system. As the City continues to grow, the demand for new traffic signals also grows, resulting in a backlog of warranted traffic signals that far exceed available budget. San José shares a common dilemma that is faced by many public agencies; the local level of funding and resource levels are not consistent with population and development growth. To address the growing demand for traffic signals, San José programs traffic signal installation or improvement projects only after a thorough technical analysis and policy considerations have been made. This paper describes this process and factors used in the process.

In San José, the decisions to invest in traffic signal controlled intersections or modifications are guided by adopted policies, and influenced by the many perspectives that range from planning, operation, design, and implementation. Any decision must support the City's core service mission to provide safe and efficient traffic flow. The following is used to guide the decision process:

- State of California, Department of Transportation (Caltrans) - Traffic Signal Warrants
- City Council Policy
- Annual Safety Audits
- Maintenance Records
- Private Development Conditions

Caltrans Traffic Signal Warrants

The Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) requires studies and site evaluations and characteristics of a potential location to determine if a location warrants a signal installation. As most cities in California, San José follows the guides and regulations of the MUTCD. Caltrans adopted MUTCD in 2004 for all official traffic control devices in California. Under Section 4C¹, Traffic Control Signal Need Studies specifies the determination criteria and lists the eight warrants. These eight warrants are:

- Warrant 1 – Eight-Hour Vehicular Volume
- Warrant 2 – Four-Hour Vehicular Volume
- Warrant 3 – Peak Hour
- Warrant 4 – Pedestrian Volume
- Warrant 5 – School Crossing
- Warrant 6 – Coordinated Signal System
- Warrant 7 – Crash Experience
- Warrant 8 – Roadway Network

City Council Policy

Since 1972, San José has had an adopted City Council Policy prescribing the requirements qualifying an intersection for signalization. The purpose of the policy is to provide objective criteria for prioritization of traffic signal installations. With this objective in mind, the policy also establishes the requirement that a potential signalized intersection must meet at least one Caltrans traffic signal warrant. Avoiding the need to revise the Council Policy each time Caltrans approves a change in its traffic signal warrants, the policy requires the City to adhere to current Caltrans warrants, ie, MUTCD.

The traffic signal warrant process identifies the list of qualifying intersections for traffic signal installations. The list can get lengthy, given the size of San José. Budgetary limitations necessitate the need for a ranking system that objectively prioritizes future investments. San José's City Council established a policy that helps to rank the warranted signals, assigning points for the following categories:

- Crash History
- Pedestrian Volumes (with emphasis on school locations)
- Traffic Volumes
- Speed
- Other Traffic-Related Factors

The system was designed to consider more factors than just traffic volumes. In other words, traffic volumes are not weighed more heavily than any of the other factors. An example of factors impacting the other traffic-related category includes locations within the Council approved neighborhood plans.

With the point system tool, staff is able to objectively assign points for each factor and when the points are totaled, provide a single numerical assignment to each location. Therefore, this allows all warranted intersections to be prioritized based on a ranking system. The City of San José has two prioritized ranking lists: 1) warranted for new installation and 2) left turn warranted for modification. Currently, there are over 200 warranted locations and 30 left turn warranted locations. Since resources are not available to perform a proactive program, studies are performed only upon request.

Annual Safety Review (ASR) Audit

San José performs an annual safety review audit of high crash intersections. It is a process during which many of the engineering teams from design, operations and maintenance programs

throughout the department collectively review the selected intersections and discuss recommendations that may enhance traffic safety.

The following describes planning items relative to this process:

An initial listing of 30 to 40 intersections for potential consideration is developed. The list is sorted by the total number crashes, and by categories such as red light running violations, stop sign violations, and pedestrians or bicyclists related crashes. Three-year crash history is used. For example, the 2007 review was based on crashes occurring between 2004 and 2006.

Locations that have been reviewed within the last 3 or 4 years are not studied.

This list is distributed to all engineers, technicians, and program managers. The senior level managers will review the candidate locations as appropriate with their teams for input. For example, some intersections may have recently undergone significant physical or operational modifications; or will be modified in the near term as part of a City or development project. Accordingly, it may not be necessary to review a specific intersection in detail as part of this annual safety audit.

Senior Engineers meet to finalize the list of locations to be included for study. Reasons for removing any initially proposed intersections, or maintaining any that were recommended for removal is documented in the project file. ASR locations are assigned to participating staff. A "Summit" date is scheduled where staff presents analysis and safety improvement recommendations. These recommendations are then implemented as budget allows.

Maintenance Records

Of the 950 signalized locations in the City, 900 are operated and maintained by the City. Those that are located at the boundary of the city limits, an operations and maintenance agreement exists to define agency responsibilities and cost sharing.

The City maintains its own signal system and keeps a maintenance log that is used to determine if rehabilitation is needed. A portion of the traffic signal improvement program funds are dedicated to rehabilitation work that reduces operational and maintenance impacts. This strategy has become increasingly important to the maintenance program. In this case, those locations are logged for traffic signal upgrade consideration. It has been noticed that in some instances, the locations identified in the left turn signal warrant list overlaps with the maintenance list. When this happens, it raises a red flag to the operation and design staff. The question is asked as to why maintenance is needed to address those locations so frequently. In most instances, the common answer has to do with poles being hit by vehicles. When these intersections are

programmed for modification, the information will alert the designer to take special consideration in pole placement, in order to minimize similar occurrences in the future.

Conditions of Development

Many opportunities for private land development are available in San José. Each new private development project in the City is required to comply with applicable regulations and to provide the necessary public infrastructure. As necessitated by the size and use of the development project, a traffic impact study is prepared. The outcome of the study could either require the project to install a new warranted traffic signal or modify an existing one.

Funding

There are different funding opportunities available for implementing traffic signals in the City of San José. The primary source of funding is through the Traffic Capital Improvement Program. The annual investment for traffic signals in the City is \$2 million. This would fund new installations and upgrades to existing locations. This allocation funds all phases of the project, including project development, project design and construction.

Other funding sources available to fund signal installations and improvements include funds collected from private development project contribution from development nexus, cost sharing with other agencies and redevelopment agency funds that go to support the building Strong Neighborhood Initiative (SNI). The City also uses major land development projects to fund warranted signal locations. In the past three years, over 30 traffic signal projects were constructed as a result of conditions of private project development.

The City also welcomes opportunities to partner with other agencies to fund warranted traffic signal projects. The City embraces these opportunities to leverage its limited fiscal resources. Such an opportunity came up in routine collaborations with San José State University. In this particular situation, the University approached the City asking for the installation of traffic signal at one of the main entrances to the campus. This location has been warranted for some time, but not high enough on the list to be funded. With the expansion of the campus and upcoming changes in internal circulation, the University saw this as an appropriate time to initiate a joint project with the City. The University was able to secure some funding and through the partnership with the City, this traffic signal project is well underway.

The Strong Neighborhood Initiative (SNI) was approved in 2000 by the Redevelopment Agency and supported by the San José City Council. One of the purposes of the initiative is to work collaboratively with the community to deliver City Services and Neighborhood Priorities. One such priority is improving the safety of the local community. As determined by the committee

of each of the SNI areas, installation of traffic signals has been one of the top ten items for many of the SNI prioritization plans. Redevelopment agency funds are available to support this investment. Once again through partnership opportunities, the City is able to bring these warranted signals on board.

Conclusion

The decline in available fiscal resource over the years means investments must be made judiciously. Every effort is made to leverage funds where possible. Grant funds and inter-agency partnerships can positively impact investment priority. Conversely, major civil improvements due to geometric constraints or the lack of right-of-way can delay investment of proposed improvements. Community and Council input is always welcomed and considered in the process. By following the process in place when programming traffic signal projects, the City of San José has been able to systematically select locations that are defensible with the community and the City Council.

Reference

1 *Manual on Uniform Traffic Control Devices, 2003 Edition*. Washington, DC: Federal Highway Administration (FHWA), 2003.

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