



Agenda City Council Policy Session

Tuesday, March 2, 2021

2:30 PM

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Register via telephone at 602-262-6001 **at least 1 hour prior to the start of this meeting**, noting the item number. Then, use the Call-in phone number and Meeting ID listed above at the time of the meeting to call-in and speak.

CALL TO ORDER**COUNCIL INFORMATION AND FOLLOW-UP REQUESTS**

This item is scheduled to give City Council members an opportunity to publicly request information or follow up on issues of interest to the community. If the information is available, staff will immediately provide it to the City Council member. No decisions will be made or action taken.

CONSENT ACTION

This item is scheduled to allow the City Council to act on the Mayor's recommendations on the Consent Agenda. There was no Consent Agenda for this meeting.

CALL FOR AN EXECUTIVE SESSION

A vote may be held to call an Executive Session for a future date.

REPORTS AND BUDGET UPDATES BY THE CITY MANAGER

This item is scheduled to allow the City Manager to provide brief informational reports on topics of interest to the City Council. The City Council may discuss these reports but no action will be taken.

DISCUSSION AND POSSIBLE ACTION (ITEM 1)**1 Comprehensive Roadway Safety Overview**

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This report provides City Council with an update on the Street Transportation and Police departments' efforts related to comprehensive roadway safety. Additionally, staff requests City Council approval of the allocation of \$3 million in Street Transportation Department Transportation 2050 funds; \$3 million in General Funds over five years; and five additional positions funded by Arizona Highway User Revenue Funds to address comprehensive roadway safety, manage the development of a Roadway Safety Action Plan, and implement high-priority Roadway Safety Projects.

THIS ITEM IS FOR DISCUSSION AND POSSIBLE ACTION.

Responsible Department

This item is submitted by Deputy City Manager Mario Paniagua and the Street Transportation Department.

ADJOURN

For further information or for reasonable accommodations, please call the Management Intern, City Manager's Office, at 602-262-4449 or Relay 7-1-1 as early as possible to coordinate needed arrangements.

Si necesita traducción en español, por favor llame a la oficina del gerente de la Ciudad de Phoenix, 602-262-4449 tres días antes de la fecha de la junta.



Comprehensive Roadway Safety Overview

This report provides City Council with an update on the Street Transportation and Police departments' efforts related to comprehensive roadway safety. Additionally, staff requests City Council approval of the allocation of \$3 million in Street Transportation Department Transportation 2050 funds; \$3 million in General Funds over five years; and five additional positions funded by Arizona Highway User Revenue Funds to address comprehensive roadway safety, manage the development of a Roadway Safety Action Plan, and implement high-priority Roadway Safety Projects.

THIS ITEM IS FOR DISCUSSION AND POSSIBLE ACTION.

Summary

Data from the National Highway Traffic Safety Administration consistently ranks Phoenix in the top three cities in the nation for overall traffic fatalities. In 2019, the most recent year for complete data, the City of Phoenix experienced 179 traffic-related deaths. Of this total, 73 were pedestrians (41 percent), 7 were cyclists (4 percent), and 99 were motorists (55 percent). Overall, Phoenix collision data for all transportation modes shows that traffic safety is an increasing and critical issue in Phoenix that has life-changing and life-ending consequences.

The Street Transportation Department (Streets) strives to provide an accessible city with safe mobility options for everyone regardless of their mode of transportation. Streets works with citywide data related to collisions in order to make sound decisions about roadway safety. These efforts are best described by the “Four E’s” approach to traffic safety, recognizing the strategic interaction between Evaluation, Engineering, Enforcement and Education. Streets recognizes that investments in Evaluation and Engineering programs can yield significant dividends and greatly improve roadway safety. However, roadway user behaviors that frequently disregard traffic laws impact overall roadway safety; therefore, Enforcement and Education are also key components to addressing overall traffic safety.

This update and overview of roadway safety practices in the City of Phoenix touches on current and planned practices and projects within each of these four areas of focus, as well as areas where more resources would be needed in order to take additional

measures to address traffic safety concerns and implement solutions.

Current Practices and Projects

Evaluation

Streets staff regularly reviews and monitors data related to collisions on City streets, as well as reports and analyses related to traffic-related safety issues. This allows Streets staff to identify and prioritize roadway safety improvement projects.

Over the past five years (2015-19), evaluation of Phoenix collision data points to the following trends:

- Traffic collisions increased 13 percent between 2015 and 2019 resulting in a total of 150,702 traffic collisions, or almost 83 collisions per day;
- Phoenix experienced 926 traffic-related fatalities over the past five years, which amounts to one traffic-related fatality every other day;
- Driver violations of "Failure to Yield to Traffic" and "Speeding" are the top driver behaviors that result in collisions, including fatal collisions. These two violations are factors in more than half of Phoenix collisions;
- Phoenix had 4,019 serious injury collisions, which amounts to more than two traffic-related incapacitating injuries per day;
- Pedestrian fatalities accounted for 41 percent of all traffic fatalities in 2019 - it is also important to note that between 2015 and 2019, other traffic-related deaths have remained steady, accounting for more than half of all fatal collisions in Phoenix; and
- In the past five years, Phoenix has also seen an eight percent increase in hit-and-run collisions. Hit-and-run collisions account for 13 percent of all reported collisions.

CRASH RISK INTERSECTION ANALYSIS

As part of its regional evaluation, the Maricopa Association of Governments (MAG) publishes the Annual Network Screening list of Top 100 intersections in the region ranked by crash risk using a rolling data set of the previous five years. The most current MAG intersection list (**Attachment A**) identifies 73 Phoenix intersections in the Top 100, with 8 Phoenix intersections in the Top 10. A filtered view of MAG's intersection list, depicting those that are partially or fully within our municipal boundaries and by Council district is included as **Attachment B**.

PEDESTRIAN SAFETY

In response to increasing trends in pedestrian fatalities and with the support of the Mayor and Council, the City Manager's Office created the Office of Pedestrian Safety (OPS) in 2018 within Streets. The formation of the OPS also included the initiation of an interdepartmental Pedestrian Safety Task Force, which includes Phoenix Police

Department representatives. The OPS has advanced data analysis processes and developed a culture of safety-focused project prioritization for Phoenix streets.

Pedestrian safety is only one component of a comprehensive safety program. The tools implemented through this program do not and cannot address all problems. Programs and projects that focus on vehicular traffic safety and driver education are equally critical to reducing and eliminating serious injuries and fatal crashes of all types, including pedestrian safety.

It should be noted that safety countermeasures are not 100 percent effective, as they all have some level of reliance on roadway users for compliance. An expanded safety program attempts to implement proven countermeasures to improve safety for all roadway users.

ROAD SAFETY ASSESSMENTS

Road Safety Assessments (RSAs) are a formalized practice of evaluating roadway safety consisting of an in-person field review by a team of experts and developing recommendations based on the scope and cost of potential improvements. RSAs are an essential step in securing safety-focused funding sources at both the federal and regional levels. From 2015 to 2019, the City of Phoenix participated in 21 RSAs at critical locations (**Attachment C**). Of these, 14 of the RSAs included intersections listed in the most current MAG Annual Network Screening list of Top 100 intersections ranked by crash risk. These RSAs were coordinated and funded through either MAG or the Arizona Department of Transportation (ADOT).

A significant limitation of the RSA process is that many high safety benefit recommendations carry substantial costs and must be addressed within Streets' Capital Improvement Program (CIP). To leverage local funding, Streets monitors federal and regional grant programs that are available for implementation of projects related to completed RSAs.

- The Highway Safety Improvement Program (HSIP) is a federal funding source for safety specific projects and managed through ADOT. Since 2016, the City has been successful in receiving funding eligibility for eight projects totaling \$16.6 million in grant funding. However, this type of funding has a long implementation process requiring federal clearances. So far, only one of the eight projects have been constructed.
- MAG has recently created a Road Safety Program (RSP) funding opportunity for safety-specific projects. The goal of the RSP program is to have safety projects built quicker, within a two-year time frame. Staff applied for funding for high safety need projects listed in MAG's Annual Network Screening list of Top 100 intersections.

Streets has been successful the last two years in obtaining \$3 million in funding for eight projects. The funded projects include full signal rebuilds and streetlighting, and all are currently in the design phase.

Engineering

PEDESTRIAN SAFETY

The OPS findings drive targeted improvements that are responsive to primary factors and trends observed in the data analysis. These analyses give special consideration to un-signalized crossing corridors with a high number of serious and fatal injury pedestrian collisions. These segments are ranked by injury severity and total injuries in order to prioritize funding and construction of infrastructure in the areas of most need. Streets staff also analyzes single-sided lighting corridor segments with large numbers of nighttime pedestrian collisions in order to improve the lighting along these corridors.

An effective pedestrian safety countermeasure is the High Intensity Activated Crosswalk, or HAWK, signal. This is a pedestrian-focused traffic control system that requires vehicular traffic to stop and dedicates time for pedestrians to cross at corresponding crosswalk locations. Research has demonstrated that HAWK signals provide significant safety benefits.

The City has 67 HAWK signals in operation and aims to expand these installations by 10 to 15 per year. A significant portion of the OPS funding is allocated to safety-focused prioritization and installation of HAWK signals in pedestrian safety hotspot areas.

TRAFFIC SIGNALS

Streets operates 1,158 traffic signals throughout the City. There is community and development demand for additional traffic signal installations, along with needs to modernize significant portions of our existing traffic signal infrastructure. Streets conducts an annual review of traffic signal and pedestrian traffic control needs using field-recorded traffic count data. This analysis determines subsequent funding priorities for the installation of new traffic signals and safety-related modifications to existing signals. Safety data analysis is a key component of project prioritization for these projects. The demand for signal-related infrastructure projects significantly exceeds Streets' annual programmed funding for such projects.

Additional regular engineering processes that implement safety-related improvements include:

- Access control - New commercial developments are evaluated for safety. As warranted, Streets staff recommend or stipulate street access restrictions for directional movements into and out of the development;

- Median offset improvements - Streets has identified opportunities to improve median design at intersections and driveways to promote visibility of opposing traffic and foster safer turning movements. These improvements are currently implemented as a component of larger street improvement projects but could be expanded as stand-alone projects or in greater numbers through a broader safety program; and
- Lane narrowing and installation of bicycle lanes - In coordination with paving and pavement maintenance projects, the repainting of pavement markings can be reconfigured to narrow travel lanes, incorporate new bike lanes, and/or buffered bike lanes in order to reduce traffic speeds and promote multimodal use of public streets.

Enforcement

In April 2020, the Phoenix Police Department's Traffic Bureau underwent a significant change by expanding the Traffic Unit within two patrol precincts. The Mountain View Precinct was the first patrol precinct to be assigned a Traffic Unit squad. The squad made a significant impact in the precinct during a pilot phase and quickly moved into a permanent assignment. In September 2020, a second Traffic Unit squad was assigned to the Maryvale-Estrella Mountain Precinct. In these precincts, the Traffic Unit has provided one sergeant and nine officers without additional sworn positions to the Police Department. Through November 2020, these two squads have responded to 1,135 of the 2,177 (52.14 percent) collisions during their operational hours.

Education

Streets' educational programs are primarily oriented towards school safety, specifically pedestrian and bicycle safety for children. Streets has dedicated staff that coordinate school safety and educational programs. Several of these programs are supported by grants from the Governor's Office of Highway Safety. Streets is also engaged with television and social media platforms, including public service announcements, to inform the public about traffic safety and understanding new technologies on City streets.

As an additional measure, speed feedback signs are deployed throughout the City to inform and reinforce speed limits and driver behavior. These sign systems consist of permanent devices, mostly located near schools, as well as portable trailers that can be located in areas of resident concerns.

Planned and Potential Future Practices and Projects

Evaluation

Current collision evaluation practices involve substantial delay in receiving data,

processing it, and then creating a plan of action in response. Streets is in the process of developing additional analytical tools in order to more quickly process and review Phoenix collision data.

Streets staff is also evaluating the utilization of the process known as Systemic Safety Planning, which involves the evaluation of safety data, and using data analysis to drive safety improvement project prioritization and selection. The general concept of System Safety Planning is that proposed safety improvements have a crash reduction benefit, derived from research, that is multiplied by the cost to install that countermeasure. This cost is compared to the benefit, which is the monetary value of reduced societal impacts from injuries and fatalities. The Federal Highway Administration (FHWA) has developed a cost estimation formula for different injury types, where a fatal collision has an estimated societal cost of \$4,008,900, while collisions that result in no injury have an average societal cost of \$7,400. If implemented, annual safety improvement project budgeting could be allocated substantially based on Systemic Safety Planning.

To more quickly address roadway safety issues and major collision events, many cities have implemented rapid-response teams consisting of multidisciplinary staff. Consisting of police, engineering, and community engagement staff, and following a structure similar to an RSA, the rapid-response team can implement near-term solutions and begin longer-term planning efforts at a much faster pace. Phoenix currently engages in interdepartmental safety reviews, but participation in these reviews is typically not the primary function for the staff involved.

Engineering

Streets has a series of completed RSAs, and the findings and recommendations of these RSAs provide potential projects for implementation with identified safety benefits. These projects have not been completed primarily due to the cost associated with the longer-term RSA recommendations. While rebuilding a traffic signal to improve safety typically costs between \$300,000 and \$500,000, the relocation of major electrical utilities to remove visibility or mobility obstructions can exceed \$1 million per intersection. In addition, a common major safety factor at Phoenix intersections in MAG's Top 100 list is poor access management (number and location of driveways) adjacent to intersections. Existing state law makes it both difficult and costly to modify existing access control for private properties.

The most recent MAG Top 100 list identifies Indian School Road intersections at 75th and 67th Avenues as the top two locations for crash risk in the MAG region. The City participated in a 2015 RSA to review the Indian School Road corridor, from 77th to 49th Avenues, including both intersections. The RSA identified at least \$8.75 million in long-term recommendations that have yet to be implemented, which include:

- Roadway Study and Geometric Improvements: \$4 million;
- Roadway Paving: \$1.3 million;
- Modernization of Corridor Traffic Signals: \$2.45 million;
- Miscellaneous Improvements: \$1,012,150;
- Access Management and Medians: Cost to be determined; and
- Relocation of Power Utilities: Cost to be determined.

There has been significant advancement in traffic signal technology in recent years. These technologies vary from systems that adapt traffic control to changing traffic conditions to advanced data collection capabilities. Streets staff are able to receive and transmit data throughout the entire street network using fiber optic and wireless communications technology. However, the improved technologies provide a significant increase in data collection, which requires additional staffing resources to adequately process and analyze the data to fully leverage its potential safety benefits. Processing this level of data has not been done historically by Streets staff, but there is significant potential to the safety-related uses of this information. Specifically, these potential programs can improve:

- Incident response and management to reduce congestion and secondary collisions;
- Adaptive signal timing that can improve and manage traffic flow more efficiently; and
- Identification of intersections with frequent red-light running violations.

Enforcement

The Phoenix Police Department's Traffic Bureau has been using a model to provide 100+ motorcycle officers over the next few years to assist in the education and enforcement of traffic laws in Phoenix. This strategy was developed to provide one Traffic Unit (one sergeant and nine officers) to each patrol precinct, with the exception of the Central City Precinct, which has Downtown Operations Unit motorcycle officers to handle the precinct's traffic needs.

Based on data, the next phase of the expansion would be to establish a similar Traffic Unit in the Cactus Park Precinct. The final three Traffic Units would be assigned to the Desert Horizon, South Mountain and Black Mountain precincts. As the Police Department has been utilizing existing, and not new, sworn officers for these expansions, current staffing challenges make any additional Traffic Unit expansion unlikely in the near future.

Education

To expand its education efforts, Streets could increase the use of driver feedback systems; although, these devices have been found to provide diminishing traffic safety

returns as drivers become accustomed to the devices.

Additional efforts could also be made to expand our social and traditional media presence and ensure that content is timely and relevant to observed safety concerns. This could be coordinated with traffic safety training focused on the adult population, in addition to the work Streets already does for school-aged children. Streets has found that partnerships with Police and community stakeholders are key to effective education efforts.

Resources

To take a more focused approach to comprehensive roadway safety on our City streets, it would first take additional investment in roadway safety improvement projects that address Phoenix's most critical traffic safety intersections and corridors.

Streets currently operates a limited number of programs that specifically address safety-related improvements. These current programs are funded at \$4,685,000 and include:

- Justified Traffic Signals: \$1.55 million;
- Office of Pedestrian Safety: \$2 million;
- Left-turn Arrow Installations: \$434,000;
- Miscellaneous Traffic Operations Improvements: \$489,000;
- Streetlighting Enhancement Program: \$50,000; and
- Speed Feedback Signs: \$162,000.

In addition to funding constraints, a comprehensive roadway safety approach would also require additional staffing to effectively implement safety-focused programs. The majority of Streets Traffic Services staff are focused on ongoing operations and maintenance of our existing roadway network, primarily our traffic signals, streetlighting, signage, striping, and traffic mitigation programs. Although staff do work on and analyze traffic safety data and trends, it is not the focus of their primary daily duties.

As a comparison, the OPS has been focused on pedestrian safety since it was formed in 2018 and has five dedicated staff members who work to analyze data in near real time, develop pedestrian safety improvement projects, and coordinate with community stakeholders on pedestrian safety issues.

Proposed Next Steps

Roadway Safety Action Plan

Streets proposes to initiate and lead the development of a Roadway Safety Action Plan

(RSAP) in partnership with the Phoenix Police Department. The RSAP would provide a roadmap of priorities for implementing enhanced roadway safety programs modeled on the Four E's: Evaluation, Engineering, Enforcement, and Education.

The primary purpose of the RSAP would be to reduce injuries and fatalities on Phoenix streets. Key to the RSAP effort would be coordination and engagement with community and business stakeholders, other City departments, and elected officials. The RSAP would include key performance metrics, goal setting, and would evaluate progress over an initial five-year period. With a City that is spread across 520 square miles, a successful RSAP for Phoenix would need to have the flexibility and adaptability to address the individual traffic safety issues for roadways across the City.

Streets anticipates that the initial phases of the RSAP could provide recommendations related to ongoing funding and staffing needs to properly support and implement the RSAP and address comprehensive roadway safety issues. The expected timeline to develop and implement the RSAP is approximately 12 to 18 months.

Roadway Safety Projects

As a short-term strategy, Streets proposes to implement high-priority safety improvements based on data analysis, including the list of the MAG Top 100 intersections, which have been reviewed by completed RSAs. This plan would require additional funding to review the prior RSAs conducted at these intersections, perform a cost-benefit analysis and preliminary engineering, and implement projects to complete the identified high-value improvements.

With additional funding, Streets recommends focusing on the three locations (75th Avenue and Indian School Road, 16th Street and Camelback Road, and 19th Avenue and Roeser Road) to implement near-term safety improvements. All three locations have recently completed RSAs and are listed in MAG's most current Annual Network Screening list of Top 100 intersections. Streets further recommends maintaining a portion of unprogrammed funds to allocate towards safety improvements for other Phoenix intersections on MAG's intersection list that may not have undergone a recent RSA.

To accomplish these potential next steps, Streets proposes an initial investment of \$6 million to initiate the RSAP and to implement high-priority Roadway Safety Projects. In addition, Streets recommends five additional positions to manage the development of the RSAP and to implement high-priority Roadway Safety Projects.

At the Feb. 2, 2021 Transportation, Infrastructure, and Innovation Subcommittee, members requested staff examine opportunities to fund equipment replacement for the

Phoenix Police Department Traffic Unit. In response, the Budget and Research Department has worked with Police and Public Works Fleet Management to ensure that the backlog of aging motorcycles used by the Traffic Unit will be replaced over the next three fiscal years.

Recommendation

The Street Transportation Department requests City Council approval of the following initial actions to develop a Roadway Safety Action Plan, to implement roadway safety project recommendations from three completed Roadway Safety Assessments and other intersections requiring safety improvements:

1. allocation of \$3 million in Streets T2050 revenues;
2. allocation of \$3 million in General Fund resources over five years; and
3. creation of five full-time City staff positions, which will be funded using Arizona Highway User Revenue.

Concurrence/Previous Council Action

The Citizens Transportation Commission recommended this item for Council approval on Jan. 28, 2021, by a vote of 15-0.

The Transportation, Infrastructure and Innovation Subcommittee recommended this item for Council approval on Feb. 2, 2021, by a vote of 4-0.

Responsible Department

This item is submitted by Deputy City Manager Mario Paniagua and the Street Transportation Department.

ATTACHMENT A

MAG Top 100 Intersections Ranked by Crash Risk Using 2015-2019 Crash Data (MAG Region)

Rank	Agency(ies)	Signal Owned & Maintained By	Location	Crashes	CF Score	CS Score	CT Score	Final Score
1	Phoenix	Phoenix	75TH AVE & INDIAN SCHOOL RD	251	1.059	1.355	1.289	1.264
2	Phoenix	Phoenix	67TH AVE & INDIAN SCHOOL RD	273	1.152	1.321	1.181	1.244
3	Phoenix	Phoenix	67TH AVE & MCDOWELL RD	246	1.038	1.304	1.267	1.228
4	Phoenix	Phoenix	99TH AVE & LOWER BUCKEYE RD	316	1.333	1.226	0.909	1.174
5	Glendale	Glendale	51ST AVE & CAMELBACK RD	222	0.937	1.172	1.143	1.106
6	Phoenix/Glendale	Phoenix	51ST AVE & MCDOWELL RD	201	0.848	1.088	1.230	1.063
7	Tempe	Tempe	RURAL RD & UNIVERSITY DR	241	1.017	1.139	0.956	1.063
8	Phoenix/Glendale	Phoenix/Glendale	43RD AVE & BETHANY HOME RD	194	0.819	1.078	1.158	1.033
9	Phoenix	Phoenix	75TH AVE & MCDOWELL RD	215	0.907	1.074	0.970	1.007
10	Phoenix	Phoenix	27TH AVE & CAMELBACK RD	203	0.857	1.074	0.974	0.995
11	Glendale	Glendale	51ST AVE & NORTHERN AVE	210	0.886	1.034	0.970	0.981
12	Mesa	Mesa	SOUTHERN AVE & STAPLEY DR	208	0.878	1.101	0.795	0.969
13	Phoenix	Phoenix	7TH AVE & INDIAN SCHOOL RD	191	0.806	0.973	1.103	0.964
14	Phoenix	Phoenix	75TH AVE & THOMAS RD	192	0.810	1.010	1.008	0.960
15	Phoenix	Phoenix	35TH AVE & BETHANY HOME RD	194	0.819	0.990	1.038	0.959
16	Phoenix/Glendale	Phoenix	43RD AVE & PEORIA AVE	196	0.827	1.061	0.885	0.958
17	Phoenix	Phoenix	35TH AVE & GLENDALE AVE	188	0.793	0.993	1.047	0.957
18	Phoenix	Phoenix	24TH ST & BASELINE RD	204	0.861	1.000	0.918	0.945
19	Phoenix	Phoenix	51ST AVE & INDIAN SCHOOL RD	193	0.814	0.959	1.031	0.941
20	Glendale/Phoenix	Glendale	75TH AVE & CAMELBACK RD	201	0.848	0.986	0.896	0.929
21	Phoenix/Glendale	Phoenix	43RD AVE & NORTHERN AVE	186	0.785	0.949	0.969	0.913
22	Tempe	Tempe	RURAL RD & SOUTHERN AVE	198	0.835	0.980	0.846	0.910
23	Phoenix	Phoenix	43RD AVE & MCDOWELL RD	184	0.776	0.973	0.903	0.906
24	Phoenix	Phoenix	83RD AVE & INDIAN SCHOOL RD	170	0.717	0.946	1.004	0.903
25	Glendale	Glendale	59TH AVE & BETHANY HOME RD	190	0.802	0.943	0.895	0.895
26	Glendale	Glendale	59TH AVE & NORTHERN AVE	184	0.776	0.939	0.851	0.877
27	Phoenix/Glendale	Phoenix	43RD AVE & GLENDALE AVE	190	0.802	0.943	0.818	0.876
28	Phoenix	Phoenix	35TH AVE & BELL RD	150	0.633	0.892	1.079	0.874
29	Phoenix	Phoenix	43RD AVE & THOMAS RD	187	0.789	0.889	0.917	0.871
30	Chandler	Chandler	ARIZONA AVE & WARNER RD	185	0.781	0.956	0.753	0.861
31	Avondale/Goodyear	Avondale	DYSART RD & VAN BUREN ST	184	0.776	0.939	0.763	0.855
32	Phoenix	Phoenix	51ST AVE & THOMAS RD	171	0.722	0.922	0.835	0.850
33	Phoenix	Phoenix	35TH AVE & CAMELBACK RD	177	0.747	0.899	0.825	0.842
34	Glendale	Glendale	67TH AVE & GLENDALE AVE	164	0.692	0.831	0.986	0.835
35	Glendale	Glendale	59TH AVE & THUNDERBIRD RD	199	0.840	0.926	0.638	0.832
36	Phoenix	Phoenix	I 017 & THUNDERBIRD RD	189	0.797	0.929	0.635	0.823
37	Tempe/Phoenix	Tempe	48TH ST & SOUTHERN AVE	168	0.709	0.878	0.810	0.819
38	Peoria	Peoria	83RD AVE & THUNDERBIRD RD	176	0.743	0.895	0.742	0.819
39	Phoenix	Phoenix	32ND ST & THOMAS RD	176	0.743	0.834	0.857	0.817
40	Glendale/Peoria	Glendale	83RD AVE & BELL RD	214	0.903	0.861	0.629	0.814
41	Phoenix	Phoenix	35TH AVE & PEORIA AVE	158	0.667	0.804	0.971	0.811
42	Phoenix	Phoenix	I 017 & PEORIA AVE	194	0.819	0.838	0.701	0.799
43	Phoenix	Phoenix	19TH AVE & UNION HILLS DR	139	0.586	0.774	1.051	0.796
44	Avondale/MCDOT/Tolleson	Avondale	99TH AVE & MCDOWELL RD	200	0.844	0.834	0.664	0.794
45	Phoenix	Phoenix	67TH AVE & THOMAS RD	152	0.641	0.868	0.778	0.789
46	Glendale	Glendale	59TH AVE & BELL RD	174	0.734	0.831	0.756	0.788
47	Avondale/Goodyear	Avondale	DYSART RD & MCDOWELL RD	187	0.789	0.868	0.620	0.786
48	Phoenix	Phoenix	44TH ST & THOMAS RD	166	0.700	0.770	0.904	0.786
49	Tempe	Tempe	APACHE BLVD & RURAL RD	173	0.730	0.804	0.799	0.784
50	Tempe	Tempe	BROADWAY RD & RURAL RD	175	0.738	0.878	0.640	0.784
51	Tempe	Tempe	BASELINE RD & I 010	188	0.793	0.861	0.597	0.778
52	Phoenix	Phoenix	19TH AVE & SOUTHERN AVE	150	0.633	0.780	0.907	0.775
53	Phoenix	Phoenix	7TH ST & UNION HILLS DR	145	0.612	0.845	0.774	0.769
54	Glendale/Phoenix	Glendale	59TH AVE & CAMELBACK RD	173	0.730	0.831	0.655	0.762
55	Phoenix	Phoenix	43RD AVE & INDIAN SCHOOL RD	176	0.743	0.794	0.705	0.759

Top 100 Intersections Ranked by Crash Risk Using 2015-2019 Crash Data (MAG Region)

Rank	Agency(ies)	Signal Owned & Maintained By	Location	Crashes	CF Score	CS Score	CT Score	Final Score
56	Phoenix	Phoenix	7TH ST & CAMELBACK RD	158	0.667	0.801	0.759	0.757
57	Phoenix	Phoenix	59TH AVE & THOMAS RD	164	0.692	0.838	0.658	0.756
58	Phoenix	Phoenix	27TH AVE & BETHANY HOME RD	157	0.662	0.797	0.763	0.755
59	Chandler	Chandler	DOBSON RD & RAY RD	161	0.679	0.868	0.575	0.748
60	Phoenix	Phoenix	48TH ST & BASELINE RD	170	0.717	0.814	0.639	0.746
61	Phoenix	Phoenix	35TH AVE & MCDOWELL RD	154	0.650	0.787	0.742	0.742
62	Phoenix	Phoenix	7TH ST & INDIAN SCHOOL RD	164	0.692	0.787	0.691	0.739
63	Phoenix	Phoenix	19TH AVE & GREENWAY RD	147	0.620	0.824	0.687	0.739
64	Phoenix	Phoenix	35TH AVE & DUNLAP AVE	161	0.679	0.750	0.772	0.738
65	Phoenix	Phoenix	51ST AVE & BASELINE RD	146	0.616	0.780	0.765	0.735
66	Surprise	Surprise	BELL RD & LITCHFIELD RD	180	0.759	0.780	0.619	0.735
67	Phoenix	Phoenix	7TH ST & MCDOWELL RD	155	0.654	0.747	0.763	0.728
68	Scottsdale	Scottsdale	HAYDEN RD & THOMAS RD	168	0.709	0.834	0.518	0.724
69	Tempe	Tempe	BASELINE RD & KYRENE RD	176	0.743	0.770	0.609	0.723
70	Phoenix	Phoenix	19TH AVE & BELL RD	144	0.608	0.757	0.767	0.722
71	Phoenix	Phoenix	44TH ST & MCDOWELL RD	163	0.688	0.743	0.704	0.719
72	Gilbert/Mesa	Gilbert	BASELINE RD & VAL VISTA DR	167	0.705	0.764	0.640	0.718
73	Phoenix	Phoenix	35TH AVE & UNION HILLS DR	138	0.582	0.780	0.721	0.716
74	Tempe	Tempe	BROADWAY RD & PRICE RD	166	0.700	0.777	0.608	0.716
75	Glendale/Phoenix	Glendale	67TH AVE & CAMELBACK RD	148	0.624	0.760	0.697	0.710
76	Mesa	Mesa	DOBSON RD & SOUTHERN AVE	157	0.662	0.801	0.552	0.704
77	Phoenix	Phoenix	35TH AVE & THOMAS RD	143	0.603	0.689	0.830	0.703
78	Phoenix	Phoenix	35TH AVE & NORTHERN AVE	143	0.603	0.767	0.668	0.701
79	Phoenix	Phoenix	19TH AVE & NORTHERN AVE	134	0.565	0.662	0.906	0.699
80	Phoenix	Phoenix	19TH AVE & DUNLAP AVE	118	0.498	0.642	1.010	0.698
81	Phoenix	Phoenix	16TH ST & THOMAS RD	142	0.599	0.713	0.766	0.698
82	Phoenix	Phoenix	16TH ST & CAMELBACK RD	161	0.679	0.764	0.584	0.698
83	Phoenix	Phoenix	19TH AVE & CAMELBACK RD	130	0.549	0.659	0.903	0.692
84	Phoenix	Phoenix	27TH AVE & INDIAN SCHOOL RD	132	0.557	0.679	0.854	0.692
85	Phoenix	Phoenix	35TH AVE & SOUTHERN AVE	126	0.532	0.693	0.848	0.691
86	Phoenix/Glendale	Phoenix	51ST AVE & THUNDERBIRD RD	142	0.599	0.784	0.574	0.685
87	Phoenix	Phoenix	52ND ST & MCDOWELL RD	134	0.565	0.679	0.813	0.684
88	Phoenix	Phoenix	27TH AVE & NORTHERN AVE	137	0.578	0.706	0.740	0.683
89	Phoenix	Phoenix	28TH DR & PEORIA AVE	135	0.570	0.689	0.781	0.682
90	Phoenix	Phoenix	59TH AVE & INDIAN SCHOOL RD	142	0.599	0.753	0.622	0.682
91	Phoenix	Phoenix	44TH ST & CAMELBACK RD	134	0.565	0.669	0.817	0.680
92	Phoenix	Phoenix	40TH ST & BROADWAY RD	145	0.612	0.740	0.615	0.677
93	Glendale/Phoenix	Glendale	83RD AVE & CAMELBACK RD	154	0.650	0.703	0.651	0.677
94	Phoenix	Phoenix	24TH ST & THOMAS RD	151	0.637	0.736	0.586	0.674
95	Phoenix	Phoenix	59TH AVE & MCDOWELL RD	147	0.620	0.743	0.589	0.674
96	Phoenix	Phoenix	16TH ST & INDIAN SCHOOL RD	126	0.532	0.672	0.816	0.673
97	Phoenix	Phoenix	7TH ST & BROADWAY RD	131	0.553	0.736	0.654	0.670
98	Glendale	Glendale	67TH AVE & BELL RD	145	0.612	0.699	0.665	0.669
99	Phoenix	Phoenix	7TH ST & GREENWAY PKWY	136	0.574	0.709	0.662	0.664
100	Phoenix	Phoenix	7TH ST & BETHANY HOME RD	151	0.637	0.723	0.557	0.660

NOTE: Since 2016, MAG has applied a more refined process using geolocation to accurately identify intersection crashes, thereby consolidating crash numbers at a few locations that may have been previously reported as separate intersections in different jurisdictions. This eliminates an error in data for crashes reported at intersections with shared jurisdiction/ownership or crashes at one intersection being recorded under two jurisdictions, based on the reporting officer's agency.

Definitions:

Rank - Numerical representation of the locations place sorted highest to lowest of all locations Final Score.

Agency/ies - Local agency where intersection is located. Multiple agencies are shown where the agency boundary runs through the intersection.

Signal Owned & Maintained By - Agency that owns and maintains the signal

Crashes - Total number of reported crashes at the location during the five-year analysis period (also referred to as Crash Frequency).

CF Score - Crash Frequency Score: the ratio of the crash frequency at the intersection to the highest intersection crash frequency for the region.

CS Score - Crash Severity Score: the ratio of the crash severity value for the intersection to the maximum crash severity value for the region.

CT Score - Crash Type Score: the ratio between CT Cost at a particular intersection to maximum of CT Cost at all intersections in the region.

(For a description of CS and CT scores see MAG Network Screening Methodology for Intersections)

Final Score - Weighted Intersection Safety Score (ISS) = 25% Crash Frequency Score + 50% Crash Severity Score + 25% Crash Type Score.

A detailed description of the Intersection Safety Score is provided in the document "MAG Network Screening Methodology for Intersections", available at the following link:

<http://azmag.gov/LinkClick.aspx?fileticket=L0IMsuxQNYU%3d&tabid=527&portalid=0&mid=3809>

Attachment B

2020 MAG 100 Phoenix with Council District

Rank	Agency(ies)	Signal Owned & Maintained By	Location	District(s)
1	Phoenix	Phoenix	75TH AVE & INDIAN SCHOOL RD	5
2	Phoenix	Phoenix	67TH AVE & INDIAN SCHOOL RD	5, 7
3	Phoenix	Phoenix	67TH AVE & MCDOWELL RD	7
4	Phoenix	Phoenix	99TH AVE & LOWER BUCKEYE RD	7
6	Phoenix/Glendale	Phoenix	51ST AVE & MCDOWELL RD	4
8	Phoenix/Glendale	Phoenix/Glendale	43RD AVE & BETHANY HOME RD	5
9	Phoenix	Phoenix	75TH AVE & MCDOWELL RD	7
10	Phoenix	Phoenix	27TH AVE & CAMELBACK RD	4, 5
13	Phoenix	Phoenix	7TH AVE & INDIAN SCHOOL RD	4
14	Phoenix	Phoenix	75TH AVE & THOMAS RD	5, 7
15	Phoenix	Phoenix	35TH AVE & BETHANY HOME RD	5
16	Phoenix/Glendale	Phoenix	43RD AVE & PEORIA AVE	1
17	Phoenix	Phoenix	35TH AVE & GLENDALE AVE	5
18	Phoenix	Phoenix	24TH ST & BASELINE RD	8
19	Phoenix	Phoenix	51ST AVE & INDIAN SCHOOL RD	4, 5
20	Glendale/Phoenix	Glendale	75TH AVE & CAMELBACK RD	5
21	Phoenix/Glendale	Phoenix	43RD AVE & NORTHERN AVE	1, 5
23	Phoenix	Phoenix	43RD AVE & MCDOWELL RD	4
24	Phoenix	Phoenix	83RD AVE & INDIAN SCHOOL RD	5
27	Phoenix/Glendale	Phoenix	43RD AVE & GLENDALE AVE	5
28	Phoenix	Phoenix	35TH AVE & BELL RD	1
29	Phoenix	Phoenix	43RD AVE & THOMAS RD	4
32	Phoenix	Phoenix	51ST AVE & THOMAS RD	4
33	Phoenix	Phoenix	35TH AVE & CAMELBACK RD	4, 5
36	Phoenix	Phoenix	1017 & THUNDERBIRD RD	1, 3
37	Tempe/Phoenix	Tempe	48TH ST & SOUTHERN AVE	6, 8
39	Phoenix	Phoenix	32ND ST & THOMAS RD	8
41	Phoenix	Phoenix	35TH AVE & PEORIA AVE	1
42	Phoenix	Phoenix	1017 & PEORIA AVE	1, 3
43	Phoenix	Phoenix	19TH AVE & UNION HILLS DR	1, 3
45	Phoenix	Phoenix	67TH AVE & THOMAS RD	7
48	Phoenix	Phoenix	44TH ST & THOMAS RD	6, 8
52	Phoenix	Phoenix	19TH AVE & SOUTHERN AVE	7, 8
53	Phoenix	Phoenix	7TH ST & UNION HILLS DR	2, 3
54	Glendale/Phoenix	Glendale	59TH AVE & CAMELBACK RD	5
55	Phoenix	Phoenix	43RD AVE & INDIAN SCHOOL RD	4, 5
56	Phoenix	Phoenix	7TH ST & CAMELBACK RD	4, 6
57	Phoenix	Phoenix	59TH AVE & THOMAS RD	4, 7
58	Phoenix	Phoenix	27TH AVE & BETHANY HOME RD	5
60	Phoenix	Phoenix	48TH ST & BASELINE RD	6, 8
61	Phoenix	Phoenix	35TH AVE & MCDOWELL RD	4
62	Phoenix	Phoenix	7TH ST & INDIAN SCHOOL RD	4
63	Phoenix	Phoenix	19TH AVE & GREENWAY RD	3
64	Phoenix	Phoenix	35TH AVE & DUNLAP AVE	1
65	Phoenix	Phoenix	51ST AVE & BASELINE RD	7, 8
67	Phoenix	Phoenix	7TH ST & MCDOWELL RD	4, 8
70	Phoenix	Phoenix	19TH AVE & BELL RD	1, 3
71	Phoenix	Phoenix	44TH ST & MCDOWELL RD	8
73	Phoenix	Phoenix	35TH AVE & UNION HILLS DR	1
75	Glendale/Phoenix	Glendale	67TH AVE & CAMELBACK RD	5
77	Phoenix	Phoenix	35TH AVE & THOMAS RD	4
78	Phoenix	Phoenix	35TH AVE & NORTHERN AVE	1, 5
79	Phoenix	Phoenix	19TH AVE & NORTHERN AVE	5
80	Phoenix	Phoenix	19TH AVE & DUNLAP AVE	3, 5
81	Phoenix	Phoenix	16TH ST & THOMAS RD	4
82	Phoenix	Phoenix	16TH ST & CAMELBACK RD	4, 6
83	Phoenix	Phoenix	19TH AVE & CAMELBACK RD	4
84	Phoenix	Phoenix	27TH AVE & INDIAN SCHOOL RD	4
85	Phoenix	Phoenix	35TH AVE & SOUTHERN AVE	7, 8
86	Phoenix/Glendale	Phoenix	51ST AVE & THUNDERBIRD RD	1
87	Phoenix	Phoenix	52ND ST & MCDOWELL RD	6
88	Phoenix	Phoenix	27TH AVE & NORTHERN AVE	5
89	Phoenix	Phoenix	28TH DR & PEORIA AVE	1
90	Phoenix	Phoenix	59TH AVE & INDIAN SCHOOL RD	5
91	Phoenix	Phoenix	44TH ST & CAMELBACK RD	6
92	Phoenix	Phoenix	40TH ST & BROADWAY RD	8
93	Glendale/Phoenix	Glendale	83RD AVE & CAMELBACK RD	5
94	Phoenix	Phoenix	24TH ST & THOMAS RD	4, 8
95	Phoenix	Phoenix	59TH AVE & MCDOWELL RD	4, 7
96	Phoenix	Phoenix	16TH ST & INDIAN SCHOOL RD	4
97	Phoenix	Phoenix	7TH ST & BROADWAY RD	7, 8
99	Phoenix	Phoenix	7TH ST & GREENWAY PKWY	3
100	Phoenix	Phoenix	7TH ST & BETHANY HOME RD	6

Attachment C

Road Safety Assessments Conducted within City of Phoenix by Location (2015-2019)

Year	Street	Range	2020 MAG 100	District(s)
2015	Indian School Road	77th Avenue - 49th Avenue	YES	4, 5
2015	Camelback Road	19th Avenue - 17th Avenue	YES	4
2016	7th Street	Hatcher Road - Northern Avenue	NO	3, 4
2018	32nd Street	McDowell Road - Thomas Road	YES	8
2019	35th Avenue	Peoria Avenue - Cactus Road	YES	1
2019	Camelback Road	27th Avenue - Interstate 17	YES	4, 5

Year	Intersection	2020 MAG 100	District(s)
2015	Washington Street & Interstate 10	NO	8
2016	67th Avenue & McDowell Road	YES	7
2016	48th Street & Southern Avenue	YES	6, 8
2017	35th Avenue & Camelback Road	YES	4, 5
2017	Central Avenue & Thomas Road	NO	4
2017	19th Avenue & Southern Avenue	YES	7, 8
2017	59th Avenue & Thomas Road	YES	4, 7
2018	35th Avenue & Bell Road	YES	1
2018	19th Avenue & Indian School Road	NO	4
2018	43rd Avenue & Peoria Avenue	YES	1
2018	67th Avenue & Thomas Road	YES	7
2018	7th Street & Jefferson Street	NO	8
2018	Central Avenue & Catalina Drive	NO	4
2018	44th Street & Washington Street	NO	8
2019	16th Street & Camelback Road	YES	4, 6