The Arizona Department of Transportation (ADOT) and the Federal Highway Administration (FHWA) have initiated a project to reconstruct the traffic interchanges on Interstate 17 at Happy Valley and Pinnacle Peak roads. The purpose of the project is to improve regional traffic flow as the population grows and development continues in north Phoenix. Design began in 2017 and scheduled for completion in summer 2018. Construction is scheduled to begin in the fall of 2018 and last approximately 20 months. Construction at both interchange locations is anticipated to occur within existing ADOT right-of-way.

Pinnacle Peak Road Interchange
The scope of work includes:

- constructing a new Tight Diamond traffic interchange
- constructing a new underpass bridge that would accommodate potential future expansion of I-17
- reconstructing Pinnacle Peak Road to two through lanes in each direction with right- and left-turn lanes
- extending the existing culverts and re-grading the detention basins
- constructing retaining walls
- installing ramp meters, signals, lighting and pavement markers; and
- re-seeding areas disturbed by construction.

Happy Valley Road Traffic Interchange
The scope of work includes:

- removing the existing roundabouts and constructing a Diverging Diamond traffic interchange
- constructing a new underpass bridge that would accommodate potential future expansion of I-17
- reconstructing Happy Valley Road to three through lanes in each direction with right- and left-turn lanes
- re-grading the detention basins
- installing ramp meters, signals, lighting and pavement markers; and
- re-seeding areas disturbed by construction.

Interstate 17
The scope of work includes:

- adding one general purpose lane in both directions between Pinnacle Peak and Happy Valley roads.

Learn more and sign up to receive project updates by email at azdot.gov/I17TrafficInterchanges

Questions or comments? Call the ADOT project information line at 855.712.8530 or email Projects@azdot.gov
Since announcing the plan to reconstruct the traffic interchanges on I-17 at Happy Valley and Pinnacle Peak roads, ADOT has received questions about the project. Most questions center on the idea of building a Diverging Diamond Interchange (DDI) at Happy Valley Road. While the information below addresses the most frequently asked questions, ADOT realizes it is not an exhaustive list. For additional questions or comments, please call the ADOT Project Information Line at 855.712.8530 or email Projects@azdot.gov.

Q. Why is this project being considered now and how will it be funded?
A. Reconstruction of the traffic interchanges on I-17 at Happy Valley and Pinnacle Peak roads are identified as priority projects by the city of Phoenix and the Maricopa Association of Governments (MAG), the Council of Governments and Metropolitan Planning Organization for the Maricopa County region. Because of growth and development in the area, the existing interchanges (which were only an interim solution) are no longer functioning efficiently. Reconstruction to accommodate current and future traffic projections is necessary to improve regional and local mobility and safety. The ADOT policy on reconstruction projects is to design and construct new interchanges that will accommodate the traffic volumes projected in 20 years. For this project, it would be for 2035.

This project is included in the ADOT Five-Year Construction Program for fiscal year 2018. The primary funding source for regional freeway improvements is a half-cent sales tax approved by Maricopa County voters in 2004. This sales tax revenue is prioritized by MAG for projects in the region. The Federal Highway Administration (FHWA) also would provide funding for this project.

Q. Did ADOT consider any other options for the traffic interchange at Happy Valley Road?
A. Yes. During the pre-design phase, ADOT studied whether a Diverging Diamond Interchange (DDI), a partial cloverleaf (Parclo), a three-level diamond interchange or a conventional diamond interchange would perform best at I-17 and Happy Valley Road. In the analysis between the DDI and the other interchange options, the DDI scored higher than all the other interchange options in the following categories: number of signal phases; accommodating peak travel during the morning and evening rush hours; reduction in conflict points with other vehicles; accommodating bicycles and pedestrians; the ability for future expansion (if needed); cost; and impacts to users and local businesses during construction. An additional benefit of the DDI option is that it can handle future traffic growth beyond the 2035 projected volumes. The other interchange configurations did not have this excess capacity beyond 2035. The DDI, Parclo, three-level diamond and diamond scored the same in only one category: Park and Ride Compatibility.

Q. Are DDIs safe?
A. Safety is among the many benefits of a DDI, as they have been shown to reduce the number and severity of collisions while also reducing wrong-way movements. DDIs reduce the number of “conflict points” compared to other interchange designs and, because of reduced speed limits and the angles at which vehicles cross the intersection, the severity of collisions decreases. In a study by the FHWA, researchers compared the DDI to other interchange designs; the study found that at locations where the DDI is open, it has experienced a 50-percent reduction in overall collisions and a 60-percent reduction in fatal collisions. DDIs also have safety benefits to the cyclists and pedestrians who travel through them. The crossings are shorter and protected with signals. Read the FHWA study online at https://www.fhwa.dot.gov/publications/research/safety/07048/.

Q. Is the DDI as confusing as it looks?
A. No, according to motorists who have experience driving on the 88 DDIs that exist across the United States. It’s important to keep in mind that just about any interchange looks confusing from the air. The completed interchange will have pavement striping, curbed islands and medians, traffic signals and signing to provide a simple and efficient driving experience that is very intuitive for the driver. When driving through a DDI, the striping and signage are very similar to driving on a one-way road that happens to cross another one-way road (similar to downtown Phoenix). This type of interchange also allows left turns on the entrance ramps to turn without crossing opposing traffic or waiting for a traffic signal.

Q. What are the primary benefits of the DDI at I-17 and Happy Valley Road?
A. The DDI has been shown nationally to reduce the number and severity of crashes and, because of its geometry, can reduce the possibility of wrong-way movements.

The DDI improves traffic operations and efficiency for interchanges with particular travel patterns. Its design is particularly beneficial at I-17 and Happy Valley Road because of the traffic patterns at the interchange. The DDI interchange configuration
is specifically designed to efficiently handle heavy turning movements, which are the primary movements at the Happy Valley interchange. In fact, the traffic models predict the DDI design has excess capacity and will function well beyond its 2035 design life. Because of the shorter traffic signal cycle times, traffic will move more freely through the DDI and vehicles will not sit idle for as long when compared to other interchange designs. This reduces vehicle emissions, which is better for the environment, and reduces noise.

The DDI is less expensive to build than the other interchange types evaluated and will require fewer materials.

The DDI will safely accommodate cyclists and pedestrians with fewer conflict points with vehicles compared to other interchanges types evaluated.

Q. Why can’t ADOT keep the roundabouts at Happy Valley Road and simply add more lanes on the I-17 overpass?

A. Adding more lanes on the I-17 overpass would move more traffic between the roundabouts; however that would result in additional traffic backups at the roundabouts and further degrade their operation. In layman’s terms, the increased traffic would create a bottleneck at the roundabouts. Adding another lane to the roundabouts (increasing from two to three lanes) is not a preferred alternative because of safety — specifically, the potential for increased “side swipe” collisions as motorists attempt to change lanes within the roundabouts. Multilane roundabouts remain a topic of study, with emphasis on finding solutions to risky driver behavior; specifically, weaving between lanes. To date, the FHWA has determined that one of the biggest safety challenges of multilane roundabouts is getting motorists to select and stay in their proper lane as they navigate the roundabout.

Q. Would ADOT maintain access to the frontage roads from the DDI?

A. Yes. The DDI at Happy Valley Road would maintain access to the frontage roads with a signal-protected frontage road movement through the interchange.

Q. When is construction scheduled to begin and how long will it last?

A. Construction is scheduled to begin in fall of 2018 and last approximately 20 months.

Q. Are other states building DDIs?

A. Yes. Since their introduction in 2009, DDIs have grown in popularity because of their operational and safety benefits. As of July 12, 2017, 88 DDIs had been constructed across the U.S. in Colorado, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Mexico, New York, North Carolina, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Utah, Virginia, Wisconsin and Wyoming.

Q. Would the DDI at Happy Valley Road be the first in Arizona?

A. It’s possible. ADOT is building two DDIs on the Loop 202 South Mountain Freeway at Desert Foothills Parkway and 17th Avenue along the Pecos Road segment. The Loop 202 South Mountain Freeway is scheduled to open in 2019.

Q. When the I-17 project at Happy Valley and Pinnacle Peak roads begins, how will ADOT reduce the impacts of construction on the north Phoenix community?

A. Among the reasons ADOT is planning a DDI at Happy Valley Road is the ease of constructability. The DDI will require less time and materials to build. A majority of the new interchange can be constructed off of the existing roads, which translates into fewer impacts on the local community and drivers while construction is underway, and a shorter total construction duration.

While it is too soon to provide specific information about construction, preliminary plans call for ADOT to phase and schedule work in a way that minimizes impacts on the community and traveling public, while also completing the project efficiently and on time. In anticipation of construction, ADOT plans to gather input from residents, businesses, employers and other local stakeholders about how construction impacts could be reduced. To receive information about this outreach effort, please subscribe for project alerts on the project web page at azdot.gov/I17TrafficInterchanges.