Final Design Concept Report

STATE ROUTE 202L (SANTAN FREEWAY)
VAL VISTA DRIVE TO I-10
GENERAL-PURPOSE LANES

ADOT CONTRACT NO. 2017-025
PROJECT NO. 202L MA 044 F0124 01L
FEDERAL AID ID NO. 202-C(208)T

Prepared for:

Arizona Department of Transportation

Prepared by:

AZTEC
TYPSA Group
4561 E. McDowell Road
Phoenix, AZ 85008-4505

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Table of Contents

EXCUTIVE SUMMARY IV
1.0 INTRODUCTION 1
1.1 FORWARD 1
1.2 NEED FOR THE PROJECT 1
1.3 CHARACTERISTICS OF THE CORRIDOR 3
1.3.1 Roadway Characteristics 3
1.3.2 Transit Facilities and Routes 6
1.3.3 Land Use and Ownership 6
1.3.4 Right-of-Way 6
1.3.5 Utilities 7
1.3.6 Drainage Considerations 7
1.3.7 Structures 8
1.3.7.1 Bridge Structures – Overpasses, Underpasses and Ramps 8
1.3.7.2 Retaining Walls 10
1.3.7.3 Sound Barrier Walls 10
1.3.7.4 Box Culverts 10
1.3.8 Signing and Lighting 10
1.3.9 Freeway Management System 12
1.3.10 Speed Monitoring System 13
1.3.11 Geotechnical Conditions 13
1.3.12 Existing Pavement Structural Sections 13
1.3.13 Previous Projects 14
1.4 DESCRIPTION OF THE PROJECT 14
2.0 TRAFFIC AND CRASH DATA 15
2.1 REVIEW OF CRASH DATA 15
2.2 EXISTING TRAFFIC VOLUMES 22
2.3 FUTURE TRAFFIC FORECASTING METHODOLOGY 22
2.4 OPERATIONAL ANALYSIS METHODOLOGY 31
2.4.1 SR 202L Mainline HCM Analysis 31
2.4.2 SR 202L Mainline Vissim Analysis 34
2.5 SERVICE INTERCHANGE INTERSECTION ANALYSIS 34
2.5.1 Signalized Intersections 34
2.5.2 Signalized Intersection Analysis Results 43
2.6 EVALUATION OF RAMP METER QUEUE LENGTHS 43
2.6.1 Analysis Methodology 43
2.6.2 Analysis Results 45
3.0 MAJOR DESIGN FEATURES OF THE RECOMMENDED ALTERNATIVE 46
3.1 DESIGN CONTROLS 46
3.2 ROADWAY CONFIGURATION 47
3.3 HORIZONTAL AND VERTICAL ALIGNMENTS 49
3.4 ACCESS CONTROL 49
3.5 RIGHT-OF-WAY 49
3.6 BRIDGE STRUCTURES 49
3.6.1 Introduction 49
3.6.2 Considerations for the Modification of Existing Bridge Structures 50
3.6.3 Design and Constructability Requirements 51
3.6.4 Evaluation of Bridge Modification Alternatives 51
3.6.4.1 Lindsay Road TI OP (Structure Nos. 2789 & 2790, MP 43.70) 52
3.6.4.2 Consolidated Canal Bridge (Structure No. 2683, MP 46.3) 53
3.6.4.3 Arizona Ave Ramp C RR OP (Structure No. 2676, MP 47.38) 54
3.6.4.4 Arizona Ave Ramp D RR OP (Structure No. 2677, MP 47.38) 55
3.6.4.5 UPRR OP EB (Structure No. 2678, MP 47.38) 56
3.6.4.6 UPRR OP WB (Structure No. 2679, MP 47.38) 57
3.6.4.7 Arizona Avenue TI OP (Structure No. 2693, MP 47.63) 58
3.6.4.8 Ramp S-E/56th St OP (Structure No. 2589, MP 54.74) 59
3.6.4.9 56th Street OP EB (Structure No. 2590, MP 54.74) 61
3.6.5 Mainline Underpasses 62
3.6.6 System Interchange Ramp Bridges 62
3.7 RETAINING WALLS, SOUND BARRIER WALLS, AND BOX CULVERTS 62
3.7.1 Retaining Walls 62
3.7.2 Sound Barrier Walls 65
3.7.3 Box Culverts 66
3.8 DRAINAGE 67
3.8.1 Off-Site Drainage Systems 67
3.8.2 On-Site Drainage Systems 67
3.8.3 Floodplains 69
3.9 EARTHWORK 69
3.10 TRAFFIC DESIGN 69

3.10.1 Begin and End Conditions on SR 202L 69
3.10.2 Existing Sign Structures 69
3.10.3 Lighting 70
3.10.4 Freeway Management Systems 71
3.10.5 Photo Enforcement Systems 73
3.11 CONSTRUCTION PHASING AND TRAFFIC CONTROL 73
3.12 UTILITY AND RAILROAD COORDINATION 73
3.12.1 Utility Coordination 73
3.12.2 Railroad Coordination 75
3.13 GEOTECHNICAL AND PAVEMENT DESIGN 75
3.13.1 Bridge Structures 75
3.13.2 Retaining and Sound Barrier Walls 76
3.13.3 Recommended Pavement Structural Sections 76
3.14 LANDSCAPE, IRRIGATION, AND AESTHETICS 76
3.14.1 Landscape 76
3.14.2 Irrigation 76
3.14.3 Aesthetics 77
3.14.4 Slope Stabilization, Erosion, Sediment, and Stormwater Quality Control 77
3.14.5 Noxious and Invasive Species Control Plan (NISCP) 77
3.15 AIRPORT COORDINATION 77
3.16 DIRECT HOV (DHOV) ALTERNATIVE ACCESS 77
3.17 AMERICANS WITH DIABILITIES ACT (ADA) 78
4.0 ITEMIZED ESTIMATE OF PROBABLE COSTS 79
4.1 PROJECT COST ESTIMATES 79
4.2 ESTIMATE OF FUTURE MAINTENANCE COSTS 79
5.0 IMPLEMENTATION PLAN 95
5.1 PROJECT IMPLEMENTATION 95
5.2 PROGRAM CONSIDERATIONS 95
6.0 AASHTO CONTROLLING DESIGN CRITERIA 96
6.1 AASHTO NON-CONFORMING GEOMETRIC DESIGN ELEMENTS 96
6.2 AASHTO DESIGN EXCEPTIONS 97
7.0 SOCIAL, ECONOMIC AND ENVIRONMENTAL CONSIDERATIONS 98
7.1 LAND USE 98
7.2 PRIME AND UNIQUE FARMLAND 98
7.3 WATER QUALITY 98
7.4 AIR QUALITY 98
7.5 NOISE 98
7.6 HAZARDOUS MATERIALS 99
7.7 BIOLOGICAL RESOURCES 99
7.8 CULTURAL RESOURCES 99
7.9 SOCIOECONOMIC 99
7.10 SECTION 4(F) PROPERTIES 99
7.11 PUBLIC INVOLVEMENT 100
7.12 AGENCY COORDINATION 100
7.13 NEPA CLEARANCE 100
7.14 ENVIRONMENTAL COMMITMENTS 100

List of Figures

FIGURE 1. PROJECT LOCATION MAP 1
FIGURE 2. PROJECT VICINITY MAP 2
FIGURE 3. YEARLY CRASH SUMMARY 17
FIGURE 4. CRASH HEAT MAP 21
FIGURE 5. 2018 TRAFFIC VOLUMES AND LANE CONFIGURATION 23
FIGURE 6. 2040 TRAFFIC VOLUMES AND LANE CONFIGURATION 27
FIGURE 7. 2040 A.M. PEAK HOUR LEVEL OF SERVICE 35
FIGURE 8. 2040 P.M. PEAK HOUR LEVEL OF SERVICE 39
FIGURE 9. 2040 GILBERT ROAD AND VAL VISTA DRIVE INTERSECTION PEAK HOUR TRAFFIC VOLUMES 44
FIGURE 10. SECTION 4(F) MAP 102

List of Tables

TABLE 1. EXISTING UTILITY CROSSINGS 7
TABLE 2. EXISTING BRIDGE SUMMARY 8
TABLE 3. EXISTING SR 202L LOAD CENTER CABINET LOCATIONS 11
TABLE 4. EXISTING MAINLINE CONDUIT CROSSINGS 11
TABLE 5. EXISTING RAMPS WITH RAMP METERS 12
TABLE 6. EXISTING DMS INSTALLATIONS 12
TABLE 7. PAVEMENT SECTIONS 13
TABLE 8. PREVIOUS PROJECTS 14
TABLE 9. MAINLINE CRASH SUMMARY 15
TABLE 10. MAINLINE CRASH SUMMARY, KABCO SCALE 16
TABLE 11. MAINLINE TRAFFIC FACTORS 22
TABLE 12. LEVEL OF SERVICE THRESHOLDS FOR FREEWAYS 31
TABLE 13. WESTBOUND SR 202L LOS ANALYSIS RESULTS (AM PEAK HOUR, NO BUILD) 32
TABLE 14. EASTBOUND SR 202L LOS ANALYSIS RESULTS (PM PEAK HOUR, NO BUILD) 32
TABLE 15. WESTBOUND SR 202L LOS ANALYSIS RESULTS (AM PEAK HOUR, RECOMMENDED ALTERNATIVE) 33
TABLE 16. EASTBOUND SR 202L LOS ANALYSIS RESULTS (PM PEAK HOUR, RECOMMENDED ALTERNATIVE) 33
TABLE 17. LEVEL OF SERVICE CRITERIA – SIGNALIZED INTERSECTIONS 34
TABLE 18. SIGNALIZED INTERSECTIONS ANALYSIS RESULTS 43
TABLE 19. EASTBOUND ENTRANCE RAMP METER STORAGE LENGTH CALCULATIONS 45
TABLE 20. WESTBOUND ENTRANCE RAMP METER STORAGE LENGTH CALCULATIONS 45
TABLE 21. DESIGN CONTROLS FOR SR 202L MAINLINE 46
TABLE 22. DESIGN CONTROLS FOR NON-HOV SYSTEM (DIRECTIONAL) RAMPS 46
TABLE 23. DESIGN CONTROLS FOR SERVICE (NON-DIRECTIONAL) RAMPS 47
TABLE 24. BRIDGE STRUCTURE MODIFICATION CONCEPTS FOR THE RECOMMENDED ALTERNATIVE 52
TABLE 25. NEW RETAINING WALL SUMMARY 63
TABLE 26. EXISTING RETAINING WALL SUMMARY 64
TABLE 27. EXISTING SOUND BARRIER WALL SUMMARY 65
TABLE 28. NEW SOUND BARRIER WALL SUMMARY 66
TABLE 29. EXISTING REINFORCED CONCRETE BOX CULVERT SUMMARY 66
TABLE 30. OFFSITE DRAINAGE CHANNEL SUMMARY 67
TABLE 31. STORM DRAIN TRUNKLINE RECOMMENDATIONS FOR WIDENING 68
TABLE 32. PUMP STATION SUMMARY 69
TABLE 33. EXISTING SIGN STRUCTURE MODIFICATIONS 70
TABLE 34. PRELIMINARY RECOMMENDED PAVEMENT SECTIONS 76
TABLE 35. OVERALL (VAL VISTA DRIVE TO I-10) ESTIMATE OF PROBABLE COST 80
TABLE 36. PROJECT 1 (SR 101L TO VAL VISTA DRIVE) ESTIMATE OF PROBABLE COST 85
TABLE 37. PROJECT 2 (I-10 TO SR 101L) ESTIMATE OF PROBABLE COST 90

List of Appendices

APPENDIX A – AASHTO CONTROLLING DESIGN CRITERIA REPORT
APPENDIX B – DESIGN EXCEPTION REQUEST
APPENDIX C – ADA COMPLIANCE AND FEASABILITY REPORT
APPENDIX D – SUMMARY OF COMMENTS
APPENDIX E – RECOMMENDED ALTERNATIVE TYPICAL SECTION AND 15% PLANS

EXCUTIVE SUMMARY

This Final Design Concept Report (FDCR) describes the development, evaluation and recommendation to construct General-Purpose Lanes (GPLs) on the State Route 202L (SR 202L) Santan Freeway corridor from Interstate 10 (I-10) (Milepost (MP) 57.0) to Val Vista Drive (MP 42.0). This project is located in the Arizona Department of Transportation's (ADOT's) Central District within Maricopa County in south-central Arizona.

The Maricopa Association of Governments (MAG), Regional Public Transportation Authority (RPTA) and ADOT have worked together for many years to develop a comprehensive plan for the Regional Freeway System included in the Regional Transportation Plan (RTP), which was adopted by the MAG Regional Council in November 2003. This plan includes the development of GPLs for the Regional Freeway System. The previous high-occupancy vehicle (HOV) and transit system studies provided the foundation for the development of the freeway and transit components of the multi-modal RTP.

The voters of Maricopa County passed Proposition 400 in November 2004, authorizing the continuation of the existing half-cent sales tax for the next 20 years to be used for implementing the MAG RTP. A portion of revenues collected from this half-cent sales tax extension are deposited into the Regional Area Road Fund (RARF) to fund the RTP Freeway Program (RTPFP) projects.

Maricopa County has been one of the fastest growing regions in the United States. Projections predict the population of Maricopa County will increase by nearly 30 percent between 2020 and 2040. This growth is contributing to increasing traffic congestion along the SR 202L corridor, particularly during the morning and evening peak travel periods. Traffic volume projections indicate the congestion will worsen in the future. Additional GPLs would increase the freeway capacity and help alleviate increased traffic congestion.

The purpose of this report is to develop, evaluate and recommend a concept to provide additional GPLs on 15 miles of the SR 202L (Santan Freeway), from I-10 to Val Vista Drive. The Recommended Alternative include the following improvements:

- Add one GPL in each direction from West of I-10 to the SR 202L/SR101L TI
- Add two GPLs in each direction from the SR 202L/SR101L TI to Gilbert Road
- Add one GPL in each direction from Gilbert Road to Val Vista Drive
- Widen exit ramps from one to two lanes

Alternatives were evaluated, and the Recommended Alternative is as presented in Appendix E. The Recommended Alternative is based on an evaluation of the geometric design criteria, benefits to traffic operations, environmental considerations, construction costs, conformance with adopted regional transportation plans, and public agency input.

The acquisition of new right-of-way (ROW) is not anticipated for the Recommended Alternative. Temporary Construction Easements (TCE's) are not expected at proposed sound barrier wall locations, as all portions of these walls are at least 40 feet inside the existing right-of-way.

The total estimated cost of the segment of the Recommended Alternative is approximately $204.8 million, which includes $18.8 million for final design and $186.0 million for construction. Future funding considerations have caused the project stakeholders to request funding for two projects in the future. The first project (Project 1) would consist of two additional GPLs in each direction from just east of SR 101L (MP 50.0) to Gilbert Road (MP 44.0), and one additional GPL in each direction from Gilbert Road (MP44.0) to Val Vista Drive (MP 42.0). The second project (Project 2) would construct one additional GPL in each direction from I-10 (MP 57.0) to just east of SR 101L (MP 50.0). The current MAG Freeway Lifecycle Program includes both design and construction funding for Project 1. That project's design funds are slated for Fiscal Year 2024 (FY24) in the amount of $15.04 million. Construction funding is identified in FY26 in the amount of $148.82 million. Design and construction funding for Project 2 are deferred beyond FY26. ADOT and MAG are working together for future funding opportunities to include Project 2. Detailed cost estimates for Projects 1 and 2, as well as the overall corridor improvement cost, are included in Section 4.0 of this report.

The Lindsay Road Traffic Interchange (TI) is within the milepost limits of the project. As of September 2019, Lindsay Road was under final design (ADOT Project No. 202L MA 043 H8873 01L, Federal Project No. 202-C(207)T, Gilbert CIP Project No. ST158) regarding new freeway access. That project is designing a TI with SR 202L near MP 43.0.

Continuing coordination for this SR 202L project has been conducted and will be required with the following public agencies: ADOT, MAG, Federal Highway Administration (FHWA), Maricopa County Department of Transportation (MCDOT), Gila River Indian Community (GRIC), Flood Control District of Maricopa County (MCFCD), the City of Phoenix, the City of Chandler, and the Town of Gilbert.

Coordination will also be required with several utility companies, including Salt River Project (SRP), Arizona Public Service (APS), and Roosevelt Water Conservation District (RWCD). Coordination will also be necessary with the Union Pacific Railroad (UPRR).

The City of Chandler 2020-2029 Capital Improvement Program (CIP) indicates an improvement project on Alma School Road between Pecos Road and Germann Road. The project is indicated at $2.572 million for the years 2019-2021.

Additional reports prepared as part of the study include an AASHTO Controlling Design Criteria Report, Final Traffic Report, ADA Report, Final Drainage Concept Report, Air Quality Analysis Technical Report, Noise Analysis Technical Report, Hazardous Materials Inventory, Biology Evaluation and Categorical Exclusion.

Mitigation measures are discussed in Section 7 of the DCR.

1.0 INTRODUCTION

1.1 FORWARD

This Final Design Concept Report (FDCR) describes the development, evaluation and recommendation to construct General-Purpose Lanes (GPLs) on the State Route 202L (SR 202L) Santan Freeway corridor from Interstate 10 (I-10) (Milepost (MP) 57.0) to Val Vista Drive (MP 42.0). This project is located in the Arizona Department of Transportation's (ADOT's) Central District within Maricopa County in south-central Arizona, within the cities of Phoenix, Chandler, and the town of Gilbert. Project location and vicinity maps are provided with Figures 1 and 2.

The purpose of this report is to evaluate the safety and operational characteristics of the existing SR 202L freeway, and to evaluate alternatives to provide additional GPLs as identified in the Regional Transportation Plan Freeway Program (RTPFP). A Categorical Exclusion document and related technical reports have been prepared in concert with this FDCR.

1.2 NEED FOR THE PROJECT

State Route 202 Loop (SR 202L) (Santan Freeway) is a major element of the Maricopa Association of Governments (MAG) adopted RTPFP. This segment of SR 202L accommodates traffic from the Maricopa Freeway (I-10) the Price Freeway (SR 101L), and the recently completed South Mountain Freeway (SMF, which is also the portion of SR 202L west of I-10). SR 202L is the main freeway serving both the City of Chandler and the Town of Gilbert.

Maricopa County has been one of the fastest growing regions in the United States. Projections predict the population of Maricopa County will increase by nearly 30 percent between 2020 and 2040. This growth is contributing to increasing traffic congestion along the SR 202L corridor, particularly during the morning and evening peak travel periods. Traffic volume projections indicate the congestion will worsen in the future. Additional GPLs would increase the freeway capacity and help alleviate increased traffic congestion.

This project would add one or two GPLs throughout the SR 202L corridor from I-10 to Val Vista Drive. Construction of GPLs on the SR 202L corridor would continue the implementation of the overall system planned throughout the Regional Freeway System.

ADOT, MAG and the Regional Public Transportation Authority (Valley Metro/RPTA) have worked together for many years to develop a comprehensive plan for the Regional Freeway System which is included in the Regional Transportation Plan (RTP) that was adopted by the MAG Regional Council in November 2003.

The voters of Maricopa County passed Proposition 400 in November 2004, which authorized the continuation of the existing half-cent sales tax for the next 20 years to be used for implementing the MAG RTP. A portion of the revenues collected from the half-cent sales tax extension are deposited into the Regional Area Road Fund (RARF) to fund the RTPFP.

The SR 202L widening project is included in the RTPFP. As of June 2020, funding is currently identified for a project (Project 1) between SR 101L and Val Vista Drive (MP 50.0 to MP 42.0). Design funds are slated for Fiscal Year 2024 (FY24) in the amount of $15.04 million. Construction funding is identified in FY26 in the amount of $148.82 million. ADOT and MAG are working together for future funding opportunities to include the segment from I-10 to SR 101L (Project 2).

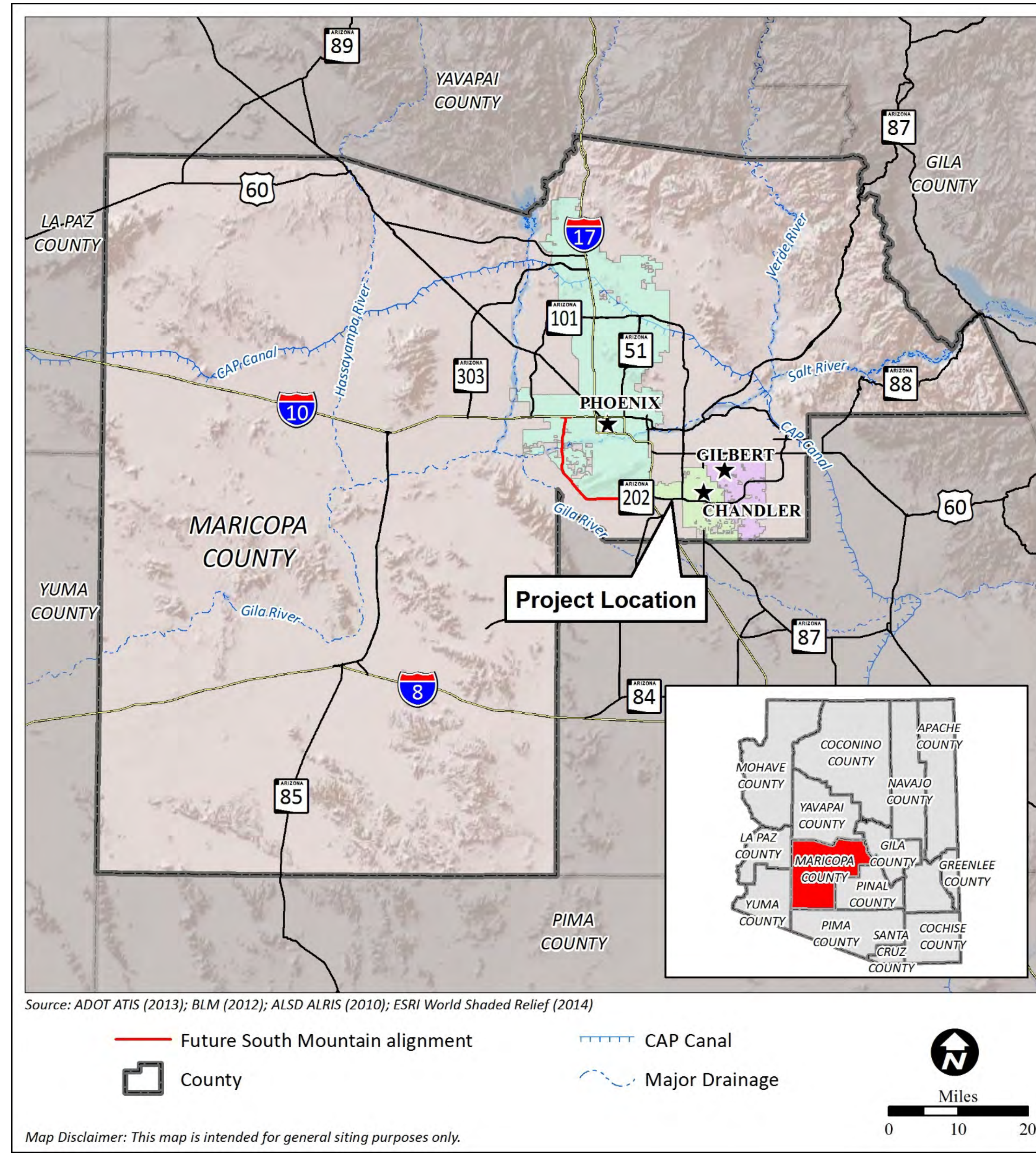


Figure 1. Project Location Map

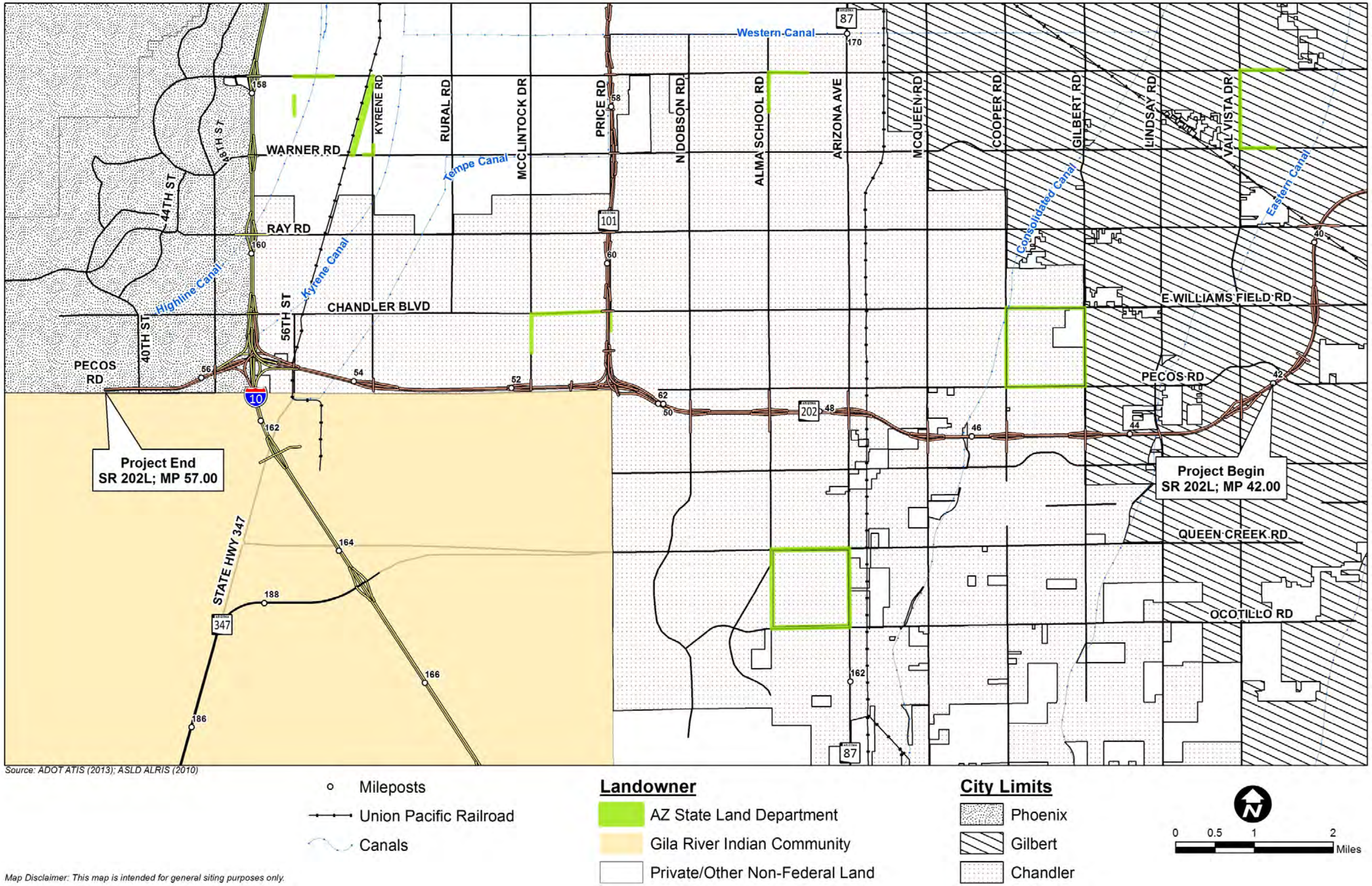


Figure 2. Project Vicinity Map

1.3 CHARACTERISTICS OF THE CORRIDOR

1.3.1 Roadway Characteristics

SR 202L is classified as a limited-access Urban Principal Freeway/Expressway with a posted speed limit of 65 mph.

The eastbound (EB) and westbound (WB) roadway sections of SR 202L generally contain three 12' wide GPLs throughout the study corridor. Between I-10 and Gilbert Road, there is one high-occupancy vehicle (HOV) lane in each direction of travel. The outside shoulders are typically 10' wide throughout the study area (12' when adjacent to concrete barrier). The median shoulders are usually 10' wide with exceptions at freeway overpasses (9.4' wide), median sign structures (9' wide), and freeway underpasses (7.4' wide). Between Gilbert Road and Val Vista Drive, the median shoulders are 8' wide and paved with asphalt concrete, with a 4' wide graded AB area adjacent to the shoulder.

The median varies along the corridor. West of the I-10/SR 202L TI, SR 202L has a variable width open median. The EB direction of SR 202L utilizes temporary concrete barrier adjacent to the inside shoulder and the WB direction of SR 202L has a cable barrier adjacent to the inside shoulder. Through the I-10/SR 202L TI, the median of SR 202L varies in width and is protected by 32" concrete half barriers leading up to the I-10/SR 202L HOV direct connector. Between I-10 and SR 101L, and from Dobson Road to Gilbert Road, a 42" median concrete barrier separates the EB and WB directions of travel. From SR 101L to Dobson Road, SR 202L has an open median that varies in width and is protected by 32" concrete half barriers leading up to the SR 101L/SR 202L HOV direct connector; past this point to Dobson, the inside EB shoulder has a half barrier and the inside WB shoulder has cable barrier next to it. East of Gilbert Road, SR 202L has an open median with cable barrier adjacent to the WB inside shoulder.

East of the SR 101L interchange, auxiliary lanes are typically provided between successive interchange entrance and exit ramps.

SR 202L intersects I-10 and SR 101L with directional freeway-to-freeway system ramps. Additional freeway lanes are provided on SR 202L to better facilitate traffic operations for vehicles approaching and departing these interchanges.

The SR 202L mainline varies between a depressed and elevated freeway throughout the study corridor. The freeway is generally bordered with sound barrier walls, retaining walls, earthen berms, or a combination of berms and walls along residential developments. As it crosses under I-10, SR 202L is a depressed freeway. West of Kyrene Road, SR 202L elevates as it leaves I-10. Continuing east, the mainline freeway crosses under Kyrene Road, and remains a depressed freeway from Kyrene Road to Arizona Avenue. It becomes an elevated freeway crossing over Arizona Avenue, is depressed again under McQueen Road, and then climbs to a briefly elevated section over the Consolidated Canal. SR 202L then becomes an at grade/depressed freeway between Cooper Road and Gilbert Road, elevates over Lindsay Road, and is a depressed freeway at Val Vista.

Eastbound SR 202L Mainline
Opened in December 2019, the SR 202L South Mountain Freeway (SMF) provides three travel lanes and a HOV lane west of I-10. As it approaches I-10, the outside travel lane drops, resulting in two travel lanes and an HOV under I-10. The I-10/SR 202L HOV direct connector is a left parallel entrance. This additional HOV lane remains parallel to the mainline HOV lane for approximately three quarters of a mile, completing an AASHTO merge to one HOV lane under the Kyrene Road underpass.

Two GPLs continue under I-10 approaching the Ramp I-10/SR 202L 'N-E/S-E' gore. This system interchange ramp combines two lanes from Ramp 'S-E' and one lane from Ramp 'N-E' at a gore approximately 950 feet west of the SR 202L gore. The combined ramps transition from three lanes to two lanes across 56th St, and a parallel entrance at the gore with SR 202L adds one GPL and one auxiliary lane to SR 202L.

Three GPLs and an auxiliary lane approach Kyrene Road. The Kyrene Road exit ramp (2 lanes) is configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane is configured as an optional exit, with the outside lane having a choice of exiting at Kyrene Road or continuing the SR 202L through movement.

The Kyrene Road entrance ramp (1 lane) is unmetered. It transitions from 2 lanes to one lane, and is configured as a parallel entrance that becomes a fourth GPL.

Four GPLs approach McClintock Drive. Starting approximately 800 feet in advance of the McClintock Drive/Chandler Village Drive exit, an outside, fifth lane opens using a standard ADOT lane addition. The McClintock Drive/Chandler Village Drive exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the outside lane.

Four GPLs approach SR 101L. Starting approximately 2,600 feet in advance of the NB SR 101L exit, the outside GPL becomes an auxiliary lane. The NB SR 101L exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the auxiliary lane.

Three GPLs approach the Price Road entrance ramp. The Price Road exit ramp (1 lane) is configured as an optional exit, with the outside lane having a choice of exiting at Price Road or continuing the SR 202L through movement. Three GPLs continue under SR 101L.

The Price Road entrance ramp (1 lane) is unmetered. It transitions from 2 lanes to one lane, and is configured as a parallel entrance that transitions to an acceleration lane. Approximately 900 feet past the Price Road entrance ramp, the acceleration lane is dropped with an AASHTO merge.

Approximately 2,300 feet east of SR 101L, the SR 101L/SR 202L HOV direct connector is a left parallel entrance adjacent to the HOV lane. The entering HOV lane completes an AASHTO merge to one HOV lane approximately 1,300 feet from the SR 101L/SR 202L HOV gore.

Three GPLs approach the SR 101L/SR 202L Ramp 'S-E' entrance gore. The ramp (two lanes) is configured as a parallel entrance at the gore with SR 202L, and adds two lanes to EB SR 202L. Approximately 1,400 feet past the lane addition, the outermost of these the ramp lanes is dropped with an AASHTO merge.

Three GPLs and the inner ramp lane approach the Dobson Road entrance ramp. The Dobson Road entrance ramp (1 lane) is metered. It transitions from 2 lanes to one lane, and is configured as a parallel entrance that transitions to an auxiliary lane. The Alma School Road exit ramp (2 lanes) is configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane is configured as an optional exit, with the outside lane having a choice of exiting at Alma School Road or continuing the SR 202L through movement.

Approximately 1,300 feet past the Alma School Road exit, the outermost lane (the inner ramp lane) is dropped with an AASHTO merge. There are three GPLs approaching the Alma School Road entrance ramp. The Alma School Road entrance ramp (1 lane) is metered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an auxiliary lane. The Arizona Avenue exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the auxiliary lane.

Three GPLs approach the Arizona Avenue entrance ramp. The Arizona Avenue entrance ramp (1 lane) is unmetered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an auxiliary lane. The McQueen Road exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the auxiliary lane.

Three GPLs approach the McQueen Road entrance ramp. The McQueen Road entrance ramp (1 lane) is unmetered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an auxiliary lane. The Cooper Road exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the auxiliary lane.

Three GPLs approach the Cooper Road entrance ramp. The Cooper Road entrance ramp (1 lane) is unmetered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an auxiliary lane. The Gilbert Road exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the auxiliary lane.

Three GPLs approach the Gilbert Road entrance ramp. The Gilbert Road entrance ramp (1 lane) is unmetered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an acceleration lane. Approximately 800 feet past the Gilbert Road entrance ramp, the acceleration lane is dropped with an AASHTO merge.

As of September 2019, Lindsay Road was under final design (ADOT Project No. 202L MA 043 H8873 01L, Federal Project No. 202-C(207)T, Gilbert CIP Project No. ST158) regarding new freeway access with a traffic interchange with SR 202L. Three GPLs will approach the Lindsay Road exit ramp, which will be configured as a parallel type exit ramp (1 lane) with an optional exit. Three GPLs will approach the Lindsay Road entrance ramp, which will be designed as a parallel entrance that transitions to an acceleration lane, which in turn will be dropped with an AASHTO merge.

Starting approximately 800 feet in advance of the Val Vista Drive exit, an outside auxiliary lane opens using a standard ADOT lane addition. The Val Vista Drive exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the lane. Three GPLs continue under the Val Vista Drive structure.

Westbound SR 202L Mainline

Three GPLs approach the Val Vista Drive entrance ramp. The Val Vista Drive entrance ramp (1 lane) is unmetered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that merges with the outside GPL via an AASHTO lane drop.

As of September 2019, Lindsay Road was under final design (ADOT Project No. 202L MA 043 H8873 01L, Federal Project No. 202-C(207)T, Gilbert CIP Project No. ST158) regarding new freeway access with a traffic interchange with SR 202L. Three GPLs will approach the Lindsay Road exit ramp, which will be configured as a parallel type exit ramp (1 lane) with an optional exit. Three GPLs will approach the Lindsay Road entrance ramp, which will be designed as a parallel entrance that transitions to an acceleration lane, which in turn will be dropped with an AASHTO merge.

Starting approximately 1,000 feet in advance of the Gilbert Road Drive exit, an outside auxiliary lane opens using a standard ADOT lane addition. The Gilbert Road exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the lane.

Three GPLs approach the Gilbert Road entrance ramp. The Gilbert Road entrance ramp (1 lane) is metered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an auxiliary lane. The Cooper Road exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the auxiliary lane.

Three GPLs approach the Cooper Road entrance ramp. The Cooper Road entrance ramp (1 lane) is unmetered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an auxiliary lane. The McQueen Road exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the auxiliary lane.

Three GPLs approach the McQueen Road entrance ramp. The McQueen Road entrance ramp (1 lane) is metered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an auxiliary lane. The Arizona Avenue Road exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the auxiliary lane.

Three GPLs approach the Arizona Avenue entrance ramp. The Arizona Avenue entrance ramp (1 lane) is metered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an auxiliary lane. The Alma School Road exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the auxiliary lane.

Three GPLs approach the Alma School Road entrance ramp. The Alma School Road entrance ramp (1 lane) is metered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that becomes a fourth GPL. The Dobson Road exit ramp (1 lane) is configured as an optional exit, with the outside lane having a choice of exiting at Dobson Road or continuing the SR 202L through movement. Immediately west of the Dobson Road exit ramp gore, the fourth, outside GPL becomes an auxiliary lane.

Three GPLs and an auxiliary lane approach 101L. The NB 101L exit ramp (2 lanes) is configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane is configured as an optional exit, with the outside lane having a choice of exiting to NB 101L or continuing the SR 202L through movement.

Three GPLs approach the Price Road exit ramp. The Price Road exit ramp (1 lane) is configured as an optional exit, with the outside lane having a choice of exiting at Price Road or continuing the SR 202L through movement.

Approximately 2,200 feet east of SR 101L, the SR 101L/SR 202L HOV direct connector is a left parallel exit adjacent to the HOV lane. The HOV exit (1 lane) is configured as a parallel, optional exit at the 101L/SR 202L HOV gore.

Three GPLs approach the Price Road entrance ramp. The Price Road entrance ramp (1 lane) is unmetered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an acceleration lane. Approximately 1,000 feet past the Price Road entrance ramp, the acceleration lane is dropped with an AASHTO merge.

Three GPLs approach the SR 101L/SR 202L Ramp ‘S-W’ entrance gore. The ramp (1 lane) is configured as a parallel entrance at the gore with SR 202L, and adds a GPL to WB SR 202L.

Four GPLs approach the McClintock Drive entrance ramp. The McClintock Drive entrance ramp (1 lane) is unmetered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an acceleration lane. Approximately 800 feet past the McClintock Drive entrance ramp, the acceleration lane is dropped with an AASHTO merge.

Four GPLs approach Kyrene Road. Starting approximately 2,800 feet in advance of the Kyrene Road exit, the outside GPL becomes an auxiliary lane. The Kyrene Road exit ramp (1 lane) is configured as a parallel exit with a mandatory exit from the auxiliary lane.

Three GPLs approach the Kyrene Road entrance ramp. The Kyrene Road entrance ramp (1 lane) is unmetered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that transitions to an auxiliary lane. The I-10 exit ramp (2 lanes) is configured as a taper-type exit, with the outside GPL having a choice of exiting to I-10 or continuing the SR 202L through movement. Approximately 220 feet past where the gore stripes meet, the outside GPL begins an AASHTO lane merge, wherein the number of general purposes lanes is reduced from three to two prior to crossing under I-10.

Approximately 2,000 feet east of I-10, the I-10/SR 202L HOV direct connector is a left exit adjacent to the HOV lane. The HOV exit (1 lane) is configured as a parallel exit at the I-10/SR 202L HOV gore.

Approximately 500 feet past the I-10 HOV exit, the HOV lane begins a left merge into the inside GPL.

Two GPLs and no HOV lanes proceed under I-10, and this is the same cross section approaching the gore with I-10/SR 202L Ramp ‘S-W’.

Frontage Roads

Eastbound and Westbound Frontage Roads are provided along each side of SR 202L between McClintock Drive and Chandler Village Drive. They have two 12’ lanes in each travel direction.

Service Interchanges and Grade Separations

Full service interchanges with a tight diamond configuration are provided at Kyrene Road, Price Road, Alma School Road, Arizona Avenue, McQueen Road, Cooper Road, and Gilbert Road. A full service diamond interchange that is wider than the others on the corridor is provided at Val Vista Drive.

A half-diamond interchange allowing for partial freeway access and frontage road access exists at McClintock Drive, with ramps to and from SR 202L located only on the west side of McClintock Drive. A half-diamond interchange providing partial freeway access exists at Dobson Road; ramps to and from SR 202L are located only on the east side of Dobson Road.

A grade separation currently provides local street connectivity and frontage road connections at Chandler Village Drive.

A grade separation currently provides local street connectivity at Lindsay Road. As of September 2019, the Lindsay Road study was approved (ADOT Project No. 202L MA 043 H8873 01L, Federal Project No. 202-C(207)T, Gilbert CIP Project No. ST158) and final design is underway regarding new freeway access with a traffic interchange with SR 202L. The project will construct a tight diamond interchange at Lindsay Road, with ramps laid out as parallel-type. The project will also include construction of short sections of the SR 202L outside, fourth GPL where the ramps will cross the new lane in the interim condition. The ramps will be striped across this excess pavement, which will provide for construction of the outside GPL without the need to reconstruct the Lindsay Road TI gores.

Cross Streets

56th Street is two lane arterial street with no direct access to SR 202L. It transitions to a four lane arterial street both north and south of SR 202L.

Kyrene Road is a four lane arterial street. At the SR 202L underpass the intersection is signalized. North of SR 202L, the Kyrene Road section includes two lanes in the northbound (NB) and southbound (SB) direction of travel. At SR 202L, Kyrene Road has two lanes in the NB direction of travel, one lane in the SB direction of travel, one left turn lane for the NB to WB traffic movement, and two left turn lanes for the SB to EB traffic movement. One right turn lane is provided for the NB to EB traffic movement and one right turn lane is provided for the SB to WB traffic movement. South of SR 202L, Kyrene road has two lanes in the both the northbound (NB) and southbound (SB) direction of travel. About one quarter mile to the south, Kyrene road transitions to one lane in each travel direction, and ends at a cul-de-sac approximately one half mile south of the SR 202L TI.

McClintock Drive is a four lane arterial street and ends at the south Frontage Road along SR 202L. Access to SR 202L is only on the west side of McClintock Drive. At the SR 202L underpass the intersection is signalized. At SR 202L, the McClintock Drive section includes two lanes in the NB direction of travel, no through lanes in the SB direction of travel, one left turn lane for the NB to WB traffic movement, and two left turn lanes for the SB to EB traffic movement onto the frontage road. Two right turn lanes are provided for SB to WB traffic movement.

Chandler Village Drive is a four lane arterial street with access to SR 202L via frontage roads. It ends at the Eastbound Frontage Road along SR 202L. At the SR 202L underpass the intersection is not signalized. The Chandler Village Drive section includes two lanes in the NB direction of travel; both lanes of EB traffic on the Frontage Road are forced to turn NB onto Chandler Village Drive. There is one left turn lane provided for the NB to WB traffic movement. At SR 202L, the two SB lanes of Chandler Village Drive transition to two right turn lanes, as SB traffic is forced to turn onto the Westbound Frontage Road. Southbound Chandler Village Drive access to the bridge over SR 202L is blocked by temporary, water-filled barrier.

Price Road is a six lane arterial street. At the SR 202L underpass the intersection is signalized. At SR 202L, the Price Road section includes three lanes in the NB direction of travel, three lanes in the SB direction of travel, two left turn lanes for the NB to WB traffic movement, and two left turn lanes for the SB to EB traffic movement. One free-right turn lane is provided for the NB to EB traffic movement and one free-right turn lane is provided for the SB to WB traffic movement.

Dobson Road is a six lane arterial street. At the SR 202L underpass the intersection is signalized. Access to SR 202L is only on the east side of Dobson Road. At SR 202L, the Dobson Road section includes three lanes in the NB direction of travel, three lanes in the SB direction of travel, and one left turn lane for the SB to EB traffic movement. One right turn lane is provided for NB to EB traffic movement.

Alma School Road is a four lane arterial street, and transitions to six lanes in the vicinity of SR 202L. At the SR 202L underpass the intersection is signalized. At SR 202L, the Alma School Road section includes three lanes in the NB direction of travel, three lanes in the SB direction of travel, two left turn lanes for the NB to WB traffic movement, and two left turn lanes for the SB to EB traffic movement. One right turn lane is provided for the NB to EB traffic movement and one right turn lane is provided for the SB to WB traffic movement.

Arizona Avenue is a six lane arterial street. At the SR 202L overpass the intersection is signalized. At SR 202L, the Arizona Avenue section includes three lanes in the NB direction of travel, three lanes in the SB direction of travel, two left turn lanes for the NB to WB traffic movement, and one left turn lane for the SB to EB traffic movement. One right turn lane is provided for the NB to EB traffic movement and one right turn lane is provided for the SB to WB traffic movement.

McQueen Road is a six lane arterial street. At the SR 202L underpass the intersection is signalized. At SR 202L, the McQueen Road section includes three lanes in the NB direction of travel, three lanes in the SB direction of travel, two left turn lanes for the NB to WB traffic movement, and one left turn lane for the SB to

EB traffic movement. One right turn lane is provided for the NB to EB traffic movement and one right turn lane is provided for the SB to WB traffic movement.

Cooper Road is a six lane arterial street. At the SR 202L underpass the intersection is signalized. At SR 202L, the Cooper Road section includes three lanes in the NB direction of travel, three lanes in the SB direction of travel, two left turn lanes for the NB to WB traffic movement, and one left turn lane for the SB to EB traffic movement. One right turn lane is provided for the NB to EB traffic movement and one right turn lane is provided for the SB to WB traffic movement.

Gilbert Road is a six lane arterial street. At the SR 202L underpass the intersection is signalized. At SR 202L, the Gilbert Road section includes three lanes in the NB direction of travel, three lanes in the SB direction of travel, two left turn lanes for the NB to WB traffic movement, and one left turn lane for the SB to EB traffic movement. One right turn lane is provided for the NB to EB traffic movement and one right turn lane is provided for the SB to WB traffic movement.

Lindsay Road is a three lane arterial street (two lanes NB and one lane SB) with no direct access to SR 202L. It transitions to a two lane arterial street both north and south of SR 202L. As of September 2019, Lindsay Road is in the final design stage (ADOT Project No. 202L MA 043 H8873 01L, Federal Project No. 202-C(207)T, Gilbert CIP Project No. ST158) regarding new freeway access with a traffic interchange with SR 202L.

Val Vista Drive is a six lane arterial street. At the SR 202L underpass the intersection is signalized. At SR 202L, the Val Vista Drive section includes three lanes in the NB direction of travel, three lanes in the SB direction of travel, two left turn lanes for the NB to WB traffic movement, and two left turn lanes for the SB to EB traffic movement. One right turn lane is provided for the NB to EB traffic movement and one right turn lane is provided for the SB to WB traffic movement.

1.3.2 Transit Facilities and Routes

There is one existing Park-and-Ride lot within the study area: the Chandler Park-and-Ride located on the southwest corner of Germann Road and Hamilton Street. Another Park and Ride at 40th Street and Pecos Road is within half a mile of the corridor at its western end.

Valley Metro currently operates one Express Bus Route which interfaces with the SR 202L Freeway Corridor. Chandler/Downtown Express. Route 542 operates on the SR 202L Freeway and I-10 between the Chandler Park-and-Ride and downtown Phoenix.

Valley Metro plans to implement the following future Transit/Express bus routes in conjunction with the Regional Transportation Plan Transit Program. A description of future planned express bus routes are provided below:

Arizona Avenue Arterial Bus Rapid Transit (BRT): This route along Arizona Avenue would provide BRT service between the Chandler Park-and-Ride and Sycamore & Main Street Light Rail Transit (LRT) Station.

Santan Express: This route would extend along the SR 202L Freeway to provide express bus service between the Phoenix-Mesa Gateway Airport/ASU East Campus and the State Capitol complex.

All of the BRT/Express bus routes would utilize the HOV lanes on the SR 202L.

1.3.3 Land Use and Ownership

Adjacent land uses along SR 202L includes residential, commercial, industrial, and unimproved uses along with public parks. The Bureau of Reclamation lands at the Tempe, Consolidated, and Eastern Canals are administered by the Salt River Project. South of SR 202L between Kyrene Road and SR 101L, the land is owned by the Gila River Indian Community. With the exception of the Lone Butte Casino and the businesses adjacent thereto, it is generally vacant and undeveloped. South of SR 202L between Kyrene Road and I-10, there are numerous commercial and industrial developments.

The majority of land use in the project vicinity is residential, with some scattered commercial and agricultural development. North of SR 202L land use is primarily residential. There are residences south of SR 202L between Dobson Road and Arizona Avenue, nearly all of which are single-family homes. Elsewhere south of SR 202L, the land use is a mix of commercial, light industrial, and agricultural. Lone Butte Casino is adjacent to and south of SR 202L immediately east of Kyrene Road. Chandler Fashion Center and its surrounding commerce is located north of SR 202L between Chandler Village Drive and SR 101L. Several large office developments exist south of SR 202L near Price Road.

Two hospitals are adjacent to the corridor: Chandler Regional Medical Center is slightly more than one half mile north of SR 202L on Dobson Road, and Mercy Gilbert Medical Center is immediately south of SR 202L east of Val Vista Drive.

There are two airports along the corridor: Stellar Airpark is located immediately north of SR 202L east of McClintock Drive, and Chandler Municipal Airport is about one-half mile south of SR 202L between Cooper Road

Two rail lines cross the SR 202L corridor. Both are owned by Union Pacific Railroad (UPRR). One runs north-south immediately adjacent to and east of 56th Street; the other runs north-south and is located approximately 1400 feet east of Arizona Avenue.

Schools
There are several schools located within one mile of the SR 202L study area. The westernmost of these is Horizon Charter School, located at the corner of 50th Street and Frye Road. There are three schools located north of SR 202L between Alma School Road and Cooper Road: Denver Elementary School, Winn School and Willis Junior High, all within the City of Chandler. Gilbert Elementary School is located south of SR 202L near Val Vista Drive in Gilbert. Camp Verde High school is west of Val Vista Drive and located between Germann Road and SR 202L.

Parks
Pecos Park is located in Ahwatukee south of SR 202L and immediately West of 48th Street. Hamilton Park is located north of SR 202L on Delaware Street between Arizona Avenue and McQueen Road in Chandler. Zanjero Park is located immediately south of SR 101L on the east side of Lindsay Road in Gilbert.

The Paseo Canal Shared Use Path runs along the Consolidated Canal.

1.3.4 Right-of-Way

The existing ADOT right-of-way (ROW) width varies throughout the corridor from approximately 325 to 500 feet. At traffic interchanges, the ROW width increases several hundred feet.

New ROW is not expected.

Temporary Construction Easements (TCE's) are not expected at proposed sound barrier wall locations, as all portions of these walls are at least 40 feet inside the existing right-of-way.

1.3.5 Utilities

Existing major utilities within the study area were identified based on information obtained from ADOT as-built drawings as well as facility plans and quarter-section maps obtained from the local jurisdictions and utility companies. These utilities are shown in Table 1.

All existing cross-road bridges (underpasses) contain conduits for use by future utilities. These conduits are not impacted by this project.

Table 1. Existing Utility Crossings

Cross St	Utility Description
I-10/SR 202L System TI HOV Directional Ramps	SRP 12kV 12-duct underground electric conduits at I-10 Mainline STA 8497+55
I-10 to 56th St	SRP 12kV underground electric conduits; Chandler 12" DIP waterline in 30" sleeve; APS 230kV overhead power lines with SRP 12kV underbuilt; SRP 500kV overhead power lines
56th St to Gila Drain	UPRR under-crossing; EPNG two 10" gas lines; Chandler 24" and 48" water and sewer sleeves; Chandler 24" sanitary sewer; SRP Gila Drain 10' x 7' RCBC; SRP 12kV underground electric conduits
Gila Drain to Kyrene Rd	SWG 4" waterline; Chandler 8" waterline
Kyrene Rd to McClintock Dr	Chandler 24" DIP sewer force main in 36" sleeve, two 48" sleeves for future pipelines; SWG 2" gas line; SRP four 12kV underground ductbanks
McClintock Dr to Country Club Dr	SRP 69kV overhead power line; SRP 12kV underground electric ductbank
Country Club Dr to SR 202L/SR101L System TI	SRP 12kV underground electric ductbank
SR 202L/SR101L System TI HOV Directional Ramps	SRP 12kV underground conduits; Chandler 30" sanitary sewer in 48" sleeve, 36" waterline in 54" sleeve; SWG 4" gas line; ADOT three 7' x 6' RCB East Channel; Air Products 12" nitrogen line; four 4" Qwest/Chandler communication conduits; Chandler 30" waterline; Chandler 12" sewer force main; Chandler sleeved 66" sanitary sewer; 30" reclaimed waterline; SRP 69kV and 12 kV overhead power lines; KMEP 6" petroleum pipeline; SRP 12kV underground electric conduits; EPNG 16" gas line
SR 101L to Dobson Rd	SRP 72" irrigation pipeline; SRP 69kV and 12 kV overhead power lines; Qwest underground telephone line; Chandler 24" reclaimed waterline, 24" and 16" waterlines
Dobson Rd to Alma School Rd	SWG 6" gas line; SRP 12kV/Cox CATV/Century Link telephone joint trench; Chandler 12" DIP waterline in 24" sleeve; SRP 12kV underground electric conduits; Chandler 2" reclaimed waterline in 6" sleeve; Chandler 16" DIP waterline in 36" sleeve
Alma School Rd to Arizona Ave	SWG 16" gas line; SRP 12kV/Cox CATV joint trench; SRP two 12kV underground electric conduits; Chandler 16" DIP waterline in 36" sleeve; 2" reclaimed waterline in 6" sleeve; 2" PVC communication conduit in 6" sleeve; SRP 36" irrigation line
Arizona Ave to McQueen Rd	SRP 24" irrigation pipeline; SRP 12kV/Cox CATV joint trench; UPRR under- crossing; SRP 230kV and 69kV overhead power lines; Chandler 16" DIP waterline in 30" sleeve; SRP 12kV/Cox CATV/Qwest joint trench; SRP 12kV underground electric conduits; SRP 12kV/Cox CATV joint trench; SWG 6" gas line
McQueen Rd to Cooper Rd	Chandler 18" sewer force main in 30" sleeve, two 36" DIP waterlines in 48" sleeves, 24" reclaimed waterline in 36" sleeve, 30" sanitary sewer in 48" sleeve; SRP three 12kV underground power conduits; SRP Consolidated Canal; SWG 6" gas line
Cooper Rd to Gilbert Rd	Chandler 16" DIP waterline in 30" sleeve; 36" DIP waterline in 48" sleeve; SRP two 12kV underground electric conduits; Chandler 12" DIP waterline in 24" sleeve, 12" reclaimed waterline in 24" sleeve, 12" DIP waterline in 24" sleeve; Gilbert 12" DIP waterline in 24" sleeve
Gilbert Rd to Lindsay Rd	SRP 12kV/Cox CATV/Qwest telephone joint trench; Gilbert 15" sanitary sewer in 30" sleeve; SRP two 12kV underground electric conduits; SRP 48" irrigation pipeline; Eastern Canal
Lindsay Rd to Val Vista Dr	SRP 12kV/Cox CATV/Qwest telephone joint trench; SRP 69kV overhead power line; SRP three 12kV underground electric conduits; Spectrum and RWCD 54" irrigation pipeline; SWG 12" gas line; SRP 12kV/Cox CATV joint trench
Val Vista Dr to Pecos Rd	SRP 12kV underground electric conduits; SRP 12kV/Cox CATV joint trench; KMEP 6" petroleum pipeline

1.3.6 Drainage Considerations

Off-site Drainage System
Off-site freeway drainage consists of lateral culverts, longitudinal interceptor channels and box culverts, retention basins, and freeway stormwater pump stations. The existing offsite systems convey freeway stormwater runoff along with offsite rural and urban drainage areas. Depending upon the location along the SR 202L Santan corridor, these channels empty into the 202L West Channel retention basin at Kyrene Road - SR202L and into the Gila Drain, which ultimately outfalls to the Gila River. Summaries of impacts to offsite drainage structures are discussed in Section 3.8.1.

On-Site Drainage System
On-site freeway drainage is collected and conveyed through a system of catch basins, lateral pipes and trunk lines discharging into the freeway offsite drainage systems. Final drainage reports prepared for the original freeway projects and HOV widening were reviewed and make no mention of the existing drainage systems accommodating widening for future GPLs. The drainage reports included the following:

- *Gilbert Road to Frye Road, Final Drainage Report, ADOT March 2004*
- *Arizona Avenue to Gilbert Road, Final Drainage Report, ADOT October 2002*
- *Dobson Road to Arizona Avenue, Final Drainage Report, ADOT August 2002*
- *Price Freeway SR101L/Santan Freeway SR 202L. Final Drainage Report, ADOT June 2001*
- *Kyrene Road to McClintock Drive, Final Drainage Report, ADOT December 2001*
- *56th Street to Kyrene Road, Final Drainage Report, ADOT June 2000*

- *I-10/SR 202L System Traffic Interchange Pecos Road Connector, Phase 1, Final Drainage Report, ADOT March 2000*
- *I-10/SR 202L System TI, Phase 2, Final Drainage Report, ADOT February 2001*
- *I-10/SR 202L System Traffic Interchange, Phase 2, Final Drainage Report, ADOT July 2000*
- *SR 202L Drainage Report, I-10 TI to Gilbert Road Design-Build Project, ADOT September 2011*

In tangent sections with a “normal crown” pavement cross-section, runoff flows away from the HOV lanes to curb inlets on the outside edge of the roadways. The existing open median areas collect runoff in ADOT C-15.80 median catch basins.

The existing SR 202L between SR 101L and Dobson Road has median curbs and gutters with catch basins where the low side of the roadway in superelevated areas is adjacent to the median. Existing bridge areas have concrete barriers approaching and departing the bridges.

Pavement runoff in superelevated areas is currently collected in median catch basins. In several segments of SR 202L, the existing C-15.80 median catch basins have been offset to allow for modification to C-15.92 catch basins.

1.3.7 Structures

1.3.7.1 Bridge Structures – Overpasses, Underpasses and Ramps

The existing bridge structures within this segment of the SR 202L were built between the years of 2003 and 2012. The ADOT Bridge Inspection Reports indicate that all existing structures over freeway through-traffic have more than 16’-6” vertical clearance. It is recommended that the vertical clearances shown herein and in the bridge inspection reports be field verified by survey during final design.

A summary of the existing bridges within the study area is provided in Table 2. The information shown is based on the Arizona State Highway System Bridge Record and as-built drawings.

Table 2. Existing Bridge Summary

Structure Name	Str. No.	Route & Milepost	Original Construction Project No.	Year Built	Superstructure and Foundation Type(s)	Minimum Vertical Clearance (ft)	Bridge Length (ft)
Val Vista Dr TI UP NB	2792	SR 202L / 42.5	202-C(009)B	2006	2-Span CiP PT Concrete Box Girder; Stub Abuts on Drilled Shafts, Integral Pier on Spread Footing	17.00	312
Val Vista Dr TI UP SB	2793	SR 202L / 42.5	202-C(009)B	2006	“	17.33	312
Lindsay Rd OP EB	2789	SR 202L / 43.7	202-C(009)B	2006	2-Span CiP PT Concrete Box Girder; Full-Height Abuts on Spread Footing, Integral Pier on Spread Footing	17.59	338
Lindsay Rd OP WB	2790	SR 202L / 43.7	202-C(009)B	2006	“	17.64	338
Gilbert Rd NB TI UP	2670	SR 202L / 44.59	202-C(001)B	2004	2-Span CiP PT Concrete Box Girder; Stub Abuts on Drilled Shafts, Integral Pier on Mat Cap founded on Drilled Shafts	17.19	262
Gilbert Rd SB TI UP	2671	SR 202L / 44.59	202-C(001)B	2004	“	17.42	262
Cooper Rd (NB) TI UP	2674	SR 202L / 45.5	202-C(001)B	2005	2-Span CiP PT Concrete Box Girder; Stub Abuts on Drilled Shafts, Integral Pier on Mat Cap founded on Drilled Shafts	17.25	262
Cooper Rd (SB) TI UP	2675	SR 202L / 45.5	202-C(001)B	2005	“	17.25	262
Consolidated Canal Br EB	2683	SR 202L / 46.3	202-C(001)B	2005	1-Span CiP PT Concrete Box Girder; Abut Caps on Columns founded on Drilled Shafts	N/A	132
Consolidated Canal Br WB	2684	SR 202L / 46.3	202-C(001)B	2005	“	N/A	132
McQueen Rd TI UP NB	2672	SR 202L / 46.6	202C (001)B	2005	2-Span CiP PT Concrete Box Girder; Stub Abuts on Drilled Shafts, Integral Pier on Mat Cap founded on Drilled Shafts	17.29	260
McQueen Rd TI UP SB	2673	SR 202L / 46.6	202-C(001)B	2005	“	17.89	260
Arizona Ave Ramp C RR OP	2676	SR 202L / 47.38	202-C(001)B	2005	1-Span PC PS AASHTO Type IV Girders; Abut Caps on Columns founded on Drilled Shafts	24.34	108
Arizona Ave Ramp D RR OP	2677	SR 202L / 47.38	202-C(001)B	2005	“	23.66	100
UPRR OP EB	2678	SR 202L / 47.38	202-C(001)B	2005	“	24.23	105
UPRR OP WB	2679	SR 202L / 47.38	202-C(001)B	2005	“	24.20	105

Table 2. Existing Bridge Summary

Structure Name	Str. No.	Route & Milepost	Original Construction Project No.	Year Built	Superstructure and Foundation Type(s)	Minimum Vertical Clearance (ft)	Bridge Length (ft)
Arizona Ave TI OP	2693	SR 202L / 47.63	202-C-002	2004	2-Span CiP PT Concrete Box Girder; Full-Height Abuts on Spread Ftg, Integral Pier on Spread Ftg	20.17	157
Alma School Rd TI UP	2692	SR 202L / 48.64	202-C-(002)	2004	“	17.39	210
Dobson Rd TI UP	2689	SR 202L / 49.64	202-C-(002)	2004	“	17.20	231
Price Rd TI UP	2613	SR 202L / 50.65	202-C-(4)B	2003	2-Span CiP PT Concrete Box Girder; Full-Height Abuts on Spread Ftg, Integral Pier on Drilled Shaft	17.35	264
Chandler Village Dr UP	2614	SR 202L / 51.22	202-C-(4)B	2004	2-Span CiP PT Concrete Box Girder; Stub Abut on Drilled Shaft & Full-Height Abut on Mat Cap founded on Drilled Shafts, Integral Pier on Drilled Shaft	17.03	309
McClintock Dr TI UP	2331	SR 202L / 51.73	202-C-507	2003	2-Span CiP PT Concrete Box Girder; Stub Abuts on Spread Footing, Integral Pier on Spread Footing	17.08	279
Kyrene Rd TI UP	2330	SR 202L / 53.75	202-C-507	2003	“	17.44	272
Ramp S-E/56th St OP	2589	SR 202L / 54.74	202-C-507	2003	2-Span CiP PT Concrete Box Girder; Stub Abuts on Drilled Shafts, Integral Pier on Spread Footing	22.42	247
56th St OP EB	2590	SR 202L / 54.74	202-C-507	2003	“	23.28	251
56th St OP WB	2591	SR 202L / 54.78	202-C-507	2003	“	22.10	251
56th St W-N Ramp OP	2592	SR 202L / 54.78	202-C-507	2003	“	23.07	259
RCB	7078	SR 202L / 55.01	600-6-(1)	2008	6-12’x8’x238’ RCBC	N/A	43
10/SR 202L HOV Ramp #2	2993	SR 202L / 55.23	202-C(202)N	2011	2-Span CiP PT Concrete Box Girder; Full-Height Abuts on Spread Ftg, Integral Pier on Spread Ftg	20.70	411
Ramp SE/SW	2615	101L / 60.73	202-C(4)B	2003	2-Span CiP PT Concrete Box Girder; Stub & Full-Height Abuts on Mat Cap founded on Drilled Shafts, Integral Pier on Mat Cap founded on Drilled Shafts	16.93	366
Ramp EN 2	2617	101L / 60.8	202-C(4)B	2004	3-Span CiP PT Concrete Box Girder; Stub Abuts on Drilled Shafts, Integral Piers on Spread Footing	17.33	308
Ramp WN	2618	101L / 60.83	202-C(4)B	2004	3-Span CiP PT Concrete Box Girder; Stub Abut on Drilled Shaft & Full-Height Abut on Mat Cap founded on Drilled Shafts, Integral Piers on Drilled Shaft	17.49	480
Ramp SE 2	2620	101L / 60.89	202-C(4)B	2004	10-Span CiP PT Concrete Box Girder; Stub Abuts on Drilled Shaft, Integral Piers on Drilled Shaft	18.37	1542
Ramp EN 1	2616	101L / 60.98	202-C(4)B	2004	4-Span CiP PT Concrete Box Girder; Stub Abut on Drilled Shaft & Full-Height Abut on Mat Cap founded on Drilled Shafts, Integral Piers on Drilled Shaft	17.14	639

Table 2. Existing Bridge Summary

Structure Name	Str. No.	Route & Milepost	Original Construction Project No.	Year Built	Superstructure and Foundation Type(s)	Minimum Vertical Clearance (ft)	Bridge Length (ft)
Frye Rd UP	2329	101L / 61.08	STP-600-1(7)	1995	2-Span CiP PT Concrete Box Girder; Full-Height Abuts on Spread Footing, Integral Pier on Spread Footing	16.78	362
Ramp S-W over Ramp D	2719	I-10 / 161.09	600-7-(1)B	2003	3-Span CiP PT Concrete Box Girder; Mid-Height Abuts on Mat Cap founded on Drilled Shafts, Integral Piers on Spread Footing	19.39	361
Ramp S-E	2715	I-10 / 161.16	600-7-(1)B	2003	9-Span CiP PT Concrete Box Girder; Mid-Height & Stub Abuts on Drilled Shafts, Integral Piers on Spread Footing	18.17	1486
Ramp W-N over Ramp C	2720	I-10 / 161.16	600-7-(1)B	2003	3-Span CiP PT Concrete Box Girder; Mid-Height Abuts on Mat Cap founded on Drilled Shafts, Integral Piers on Mat Cap founded on Drilled Shafts	32.50	396
Ramp E-N	2713	I-10 / 161.2	600-6-(1)	2002	12-Span CiP PT Concrete Box Girder; Mid-Height Abuts on Drilled Shafts, Integral Piers on Spread Footing	24.53	2251
10/202L HOV Ramp #1	2992	I-10 / 161.2	202C(202)N	2012	5-Span PC PS AASHTO Type IV & VI Girders; Full-Height Abuts Spread Footings, Piers founded on Drilled Shafts	17.08	560
Ramp W-S	2714	I-10 / 161.27	600-7-(1)B	2003	9-Span CiP PT Concrete Box Girder; Stub & Mid-Height Abuts on Drilled Shafts, Integral Piers on Spread Footing	21.40	1191
Ramp N-W	2718	I-10 / 161.32	600-7-(1)B	2003	8-Span CiP PT Concrete Box Girder; Stub Abuts on Drilled Shafts, Integral Piers on Spread Footing or Drilled Shaft	16.96	942
I-10 WB OP	2717	I-10 / 161.34	600-7-(1)B	2003	2-Span CiP PT Concrete Box Girder; Stub Abuts on Drilled Shafts, Integral Pier on Spread Footing	18.48	283
I-10 EB OP	2716	I-10 / 161.37	600-7-(1)B	2003	“	20.67	292

1.3.7.2 Retaining Walls

The as-built plans indicate that the majority of the existing retaining walls were built as cast-in-place concrete walls with spread footings. There were also a few soil nail walls and Mechanically Stabilized Earth (MSE) walls built along the corridor. Existing wall types and locations are listed in Table 26.

1.3.7.3 Sound Barrier Walls

Existing sound barrier wall locations are presented in Table 27. The as-built plans indicate that the sound barrier walls consist predominantly of concrete sound barrier walls (non-standard and ADOT standard) although some masonry walls exist along the corridor as well as non-standard concrete extensions of roadway barriers. There are also a few combination retaining/sound barrier walls noted in the Table.

1.3.7.4 Box Culverts

Existing (reinforced concrete) box culvert locations are presented in Table 29. As-built stationing data is shown, unless noted otherwise.

1.3.8 Signing and Lighting

The existing freeway guide signs are mounted on crossroad bridge structures or are supported with cantilever sign supports or tubular sign bridges. Based on a review of the as-built plans, none of the existing sign bridges were designed to accommodate a future outside widening; however, with the addition of outside barrier, some of these signs can remain.

The existing SR 202L freeway mainline lighting consists of a variety of lighting equipment throughout the corridor. The I-10 and SR 101L freeway to freeway interchanges are illuminated with 100' to 150' high mast light poles with rings of four to twelve 400-watt high pressure sodium (HPS) luminaires. Between 56th Street and Kyrene Road, Type U light poles are mounted on the SR 202L median barrier at a maximum spacing of 412 feet. Each pole has two 400-watt high mast HPS luminaires with Type 2 distribution patterns at a 69' mounting height. East of Kyrene Road, the median mounted Type U poles change to a 50' luminaire mounting height with a typical light pole spacing of 330'. Beginning at station 2137+50 the distribution pattern of the high mast luminaires changes from a Type 2 distribution pattern to a Type 5 distribution pattern. West of McClintock Drive, adjacent to Stellar Airpark, there are three nonstandard median mounted light poles with two cobrahead style 250-watt HPS luminaires on each pole at a 30' mounting height. These two poles have reduced heights because they are within the approach/departure path of Stellar Airpark. There are FAA approved red obstruction lights mounted on the tops of these poles.

Between the SR 101L interchange and Gilbert Road the median mounted Type U poles continue with 50' luminaire mounting heights at a maximum pole spacing of 340'. The distribution patterns on the 400-watt HPS high mast luminaires in this section are either Type 2 or Type 5. There is no median barrier east of Gilbert Road, therefore the mainline is illuminated from the outside with 40' and 50' Type T poles and 400-watt HPS offset style luminaires with Type 3 distribution pattern between Gilbert Road and Val Vista Drive.

The service interchange ramps from Kyrene Road to Arizona Avenue are illuminated with Type G (30') light poles with 20' luminaire mast arms and 250-watt HPS cobrahead style luminaires with Type 2 distribution patterns. The light poles along McClintock Ramps A and B are a combination of Type E (16') poles and shorter nonstandard light poles to remain below the flight path of Stellar Airpark. The cobrahead luminaires on these two ramps are 150 watt HPS with Type 2 distribution. The service interchange ramps between Arizona Avenue and Gilbert Road are illuminated with Type H (40') light poles with 20' luminaire mast arms and 250-watt HPS cobrahead style luminaires with Type 2 distribution patterns. The lighting equipment along the ramps between Gilbert Road and Val Vista Drive consists of Type S (30') poles with pole top mounted offset style 250-watt HPS luminaires with Type 2 distribution.

Underdeck lighting is installed at each of the freeway underpasses and overpasses to illuminate the roadway under the bridge structures.

The SR 202L freeway and ramp lighting is energized with 480-volt lighting systems. An ADOT standard Type IV load center cabinet is located at each service interchange. Additional cabinets to assist in providing power to the freeway to freeway interchanges are located at 56th Street and Chandler Village Drive. A list of the load center cabinet locations, addresses and the limits of the lighting fixtures associated with each cabinet are listed in Table 3.

Table 3. Existing SR 202L Load Center Cabinet Locations

Load Center Location	Load Center Address	West Limit	East Limit
Southwest Quadrant of SR 202L and 56th St	596 S. 56th St	2026+00	2047+75
Southwest Quadrant of SR 202L and Kyrene Rd	976 S. Kyrene Rd	2051+50	2134+08
Northeast Quadrant of SR 202L and McClintock Dr	995 S. McClintock Dr	2137+40	2203+90
Southwest Quadrant of SR 202L and Chandler Village Dr	998 S. Chandler Village Dr	2207+22	2242+00
Southwest Quadrant of SR 202L and Price Rd	998 S. Price Rd	2242+00	2276+00
Southeast Quadrant of SR 202L and Dobson Rd	1999 W. Santan Fwy	2279+20	2320+94
Northeast Quadrant of SR 202L and Alma School Rd	998 W. Santan Fwy	2324+35	2374+06
Northeast Quadrant of SR 202L and Arizona Ave	2 E. Santan Fwy	2377+36	2432+37
Southwest Quadrant of SR 202L and McQueen Rd	1754 S. McQueen Rd	2435+20	2483+83
Southwest Quadrant of SR 202L and Cooper Rd	1606 S. Cooper Rd	2486+83	2539+56
Southwest Quadrant of SR 202L and Gilbert Rd	1606 S. Gilbert Rd	2542+72	2576+00
Northeast Quadrant of SR 202L and Lindsay Dr	3650 S. Lindsay Rd	2577+79	2649+00
Southeast Quadrant of SR 202L and Val Vista Dr	3479 S. Val Vista Dr	2649+00	2700+00

Table 4 provides a summary of the existing SR 202L mainline conduit crossing locations located within the study area.

Table 4. Existing Mainline Conduit Crossings

Direction of Travel	Station	Description
Westbound	2009+52	2 inch
Eastbound	2034+40	3 inch
Eastbound	2081+47	3 inch
Eastbound	2084+85	3 inch
Westbound	2175+43	1 inch
Westbound	2186+85	2 inch
Westbound	2191+08	3 inch
Eastbound	2214+00	3 inch
Eastbound	2220+18	3 inch

Table 4. Existing Mainline Conduit Crossings

Direction of Travel	Station	Description
Eastbound	2297+84	3 inch
Eastbound	2306+93	3 inch
Westbound	2346+28	3 inch
Westbound	2361+79	3 inch
Westbound	2396+90	3 inch
Westbound	2407+72	3 inch
Westbound	2421+55	3 inch
Eastbound	2460+23	3 inch
Eastbound	2462+90	3 inch
Eastbound	2513+37	3 inch
Eastbound	2515+95	3 inch
Eastbound	2565+58	3 inch

1.3.9 Freeway Management System

ADOT installed Freeway Management System (FMS) equipment and communications along SR 202L between I-10 and Val Vista Drive in two separate FMS deployment projects between 2014 and 2016. The FMS design followed the FMS design standards that were in place at the time of the designs.

The existing FMS includes an integrated system of Dynamic Message Signs (DMS), closed-circuit television (CCTV) cameras, mainline detector stations, ramp meters, conduit, pull boxes, fiber optic communications, power conductors, detector lead-in cables and other conductors. The FMS equipment is connected to the ADOT Traffic Operations Center over fiber optic cable installed in one of the 3-3" conduits located along the EB and WB roadways. Some of the FMS equipment will have to be relocated within the limits of the freeway to accommodate future widening for the recommended alternative.

Mainline loop detector stations are installed in each direction at approximate one-mile spacings. Most, if not all of the loop detectors will be abandoned in place, and replaced by new detectors which will be placed at the same approximate one mile spacing in each direction of travel along SR 202L. Loop detectors will be replaced in existing lanes and added to the additional GPLs.

Ramps which met ramp meter warrants at the time of the original FMS design have two lane ramp meters as shown below in Table 5. All other ramps have loop detector and conduit infrastructure that would allow installation of ramp meters when warranted. The final designer will need to evaluate all ramps for whether they meet ramp meter warrant criteria and add ramp meters where warranted.

Table 5. Existing Ramps with Ramp Meters

Direction	Ramp	Disposition
EB SR 202L	Dobson Road	Existing 2 lane ramp meter
EB SR 202L	Alma School Road	Existing 2 lane ramp meter
WB SR 202L	Alma School Road	Existing 2 lane ramp meter
WB SR 202L	Arizona Avenue	Existing 2 lane ramp meter
WB SR 202L	McQueen Road	Existing 2 lane ramp meter
WB SR 202L	Gilbert Road	Existing 2 lane ramp meter

CCTV cameras are generally installed at approximate one-mile spacings at the traffic interchanges. CCTV generally have been installed far enough away from the mainline that they are not expected to be impacted by the recommended alternative. Additional CCTV may be required to provide DMS message verification, depending on the final location of DMS structures.

Both FMS projects along the corridor provided fiber optic communication links to pump houses. These are not expected to be impacted by new GPL construction and will be maintained.

Conduit and pull box infrastructure is installed along the freeway mainline. Between I-10 and Dobson Road, conduit is generally closer to the mainline freeway, putting this conduit at risk with the recommended alternative. Conduit along SR 202L WB between McClintock Drive and Kyrene Road is particularly vulnerable with the conduit placement relative to the existing roadway section between these ramps. Other areas within this segment are expected to have minor conflicts with the trunk conduit system that will likely require minor relocation.

Between Dobson Road and Val Vista Drive, the trunk conduit is generally located outside of the ramps and at the bottom of the fill slopes and is expected to not be affected significantly by the recommended alternative. There are several locations where the conduit transitions in close to the pavement such as at the UPRR bridge and the Consolidated Canal, and this conduit will have to be evaluated to protect in place or to relocate as required.

Conduit will be significantly impacted within the Lindsay Road TI construction limits, but those conflicts are anticipated to be resolved in the design of the Lindsay Road traffic interchange by the Town of Gilbert.

DMS Structure Locations

DMS structure locations are summarized in Table 6. DMS sign structures are overhead monotube sign structures that span one direction of the freeway, with the DMS centered over the travel lanes. The last column includes a description of the existing DMS sign structure foundation relative to existing barrier or edge of travelled way. The final designer will need to coordinate with ADOT TSM&O staff to determine if existing DMS structures are acceptable to remain in place assuming that foundations can be properly protected. If shoulder foundations cannot be protected, new sign structures conforming to the most recent sign support requirements (butterfly structures) would be the preferred replacement structure type.

Table 6. Existing DMS Installations

Direction	Station	Disposition
EB SR 202L	2041+00	DMS is on 100' structure. Foundation is 5' behind barrier.
EB SR 202L	2141+00	DMS is on 106' structure. Foundation is 35' from edge of travelled way. No barrier.
WB SR 202L	2155+00	DMS is on 87' structure. Foundation is behind barrier and only 16' from edge of travelled way. Foundation is also in front of a retaining wall. This area is very tight to accommodate any further widening.
WB SR 202L	2323+50	DMS is on 103' structure. Foundation is 32' from edge of travelled way.
EB SR 202L	2327+35	DMS is on 118' structure. Foundation is 35' from edge of travelled way.
WB SR 202L	2488+50	DMS is on 90' structure. Foundation is 5' behind barrier.
EB SR 202L	2491+43	DMS is on 100' structure. Foundation is 15' behind barrier.
WB SR 202L	2666+73	DMS is on 96' structure. Foundation is 36' from edge of travelled way.

Vehicle wrong way signing will need to be evaluated at each ramp. Currently ADOT is requiring thermal cameras to be added at each leg of the traffic interchange to provide wrong way vehicle detection and traffic signal stop bar detection. The final designer shall confirm if ADOT has added any additional equipment requirements for wrong way detection during the final design.

The FMS system must remain operational during the construction of this project. All FMS equipment should be evaluated during final design to determine potential construction conflicts. ADOT TSM&O shall be involved in reviews and provide guidance for design of the FMS within this corridor.

The FMS communication system includes three 3” conduits located along the shoulders of the EB and WB roadways. The conduit system is concrete encased where it is located along the existing roadways and is typically within the bridge structure at the overpasses.

1.3.10 Speed Monitoring System

At the present time, there are no speed monitoring systems within the study area.

1.3.11 Geotechnical Conditions

The subsurface conditions for this segment of SR 202L were determined based on review of As-Built drawings and existing geotechnical reports for various project completed within the study limits. Existing bridge boring information was taken from the As-built drawings for each of the completed existing bridges. Pavement subgrade information was taken primarily from the most recent HOV Lanes geotechnical investigation (RAMM, TRACS No. H7457 01C, 2010).

The project site is located in the Basin and Range Geologic Province of the southwestern United States. The Basin and Range Province is characterized by a modern landscape consisting of broad alluvial valleys interspersed with and bounded by uplifted and fault-block mountain ranges, often with well-developed pediments and alluvial fans. Generally, the mountain ranges and valleys trend in a north-south to northwest-southeast direction. The modern landscape was formed by late Tertiary (Miocene-Pliocene) extensional tectonism and high-angle normal faulting followed by subsequent erosion of the uplifted mountains and depositions of the sediments in the newly-formed basins.

The predominant soil types in the project area are younger Holocene alluvial deposits (USGS Mineral Resource On-Line Spatial Data). The alluvial soils along the majority of the project alignment are known to be at least several hundred feet thick. These alluvial soils are typically finer grained, lenticular deposits including low plasticity silts, medium to high plasticity clays and sands with varying amounts of silt and clay as well as gravels. Some of the near-surface clay soils are not well-suited for pavement subgrade support, as discussed in Section 3.13. Typically, the soils are soft to firm in the upper 10 to 15 feet, becoming typically firmer with depth. Hard layers were encountered below depths of about 30 feet within some of the deeper borings advanced along the project alignment. Generally, the harder layers are weakly to moderately cemented with calcium carbonate (lime). At the I-10/SR 202L TI, silty to sandy gravel with variable amounts of cobbles were encountered below the surficial fine grained layers at depths of about 65 feet to 95 feet. These coarser grained soils were not typically encountered east of 56th Street.

Groundwater is not expected to impact the project as depths to water are typically more than 80 feet in the project vicinity. Data recorded from 12 wells in the project vicinity ranged from 80 to 173 feet (ADWR Groundwater Site Inventory). Based on the well information, the depths to groundwater appear to increase from west to east.

Significant groundwater withdrawal over the past several years has resulted in the lowering of the groundwater table in several Phoenix metropolitan and surrounding areas. Large-scale drops in groundwater which occurred within the alluvial basins has resulted in collapse of the soils (ground subsidence) and the development of earth fissures, typically forming near alluvial and underlying bedrock high boundaries. Based on cursory review it does not appear that earth fissures have been identified within 10 miles of the project alignment (ADWR Hazards Map). It further appears that ground subsidence has been minimal (less than 1 cm) over the past several years (ADWR InSAR Maps, 2017). Neither ground subsidence nor earth fissuring are anticipated to impact this project.

1.3.12 Existing Pavement Structural Sections

As-built plans for SR 202L Santan Freeway were reviewed to determine the existing mainline and shoulder pavement sections which would be impacted by the freeway widening. The typical mainline pavement section for at-grade and elevated sections of roadway consists of 1” of Asphalt Rubber-Asphalt Concrete Friction Course (AR-ACFC) over 13” Portland Cement Concrete Pavement (PCCP) over 4” Aggregate Base (AB). In depressed areas, the typical mainline pavement section consists of 1” of Asphalt Rubber-Asphalt Concrete Friction Course (AR-ACFC) over 13” Portland Cement Concrete Pavement (PCCP) over 4” Asphalt Concrete Base (ACB). Because the collection of water within AB could cause weakening of the subgrade, AC base is typically substituted for AB in areas where the pavement section is either at or below adjacent site grades.

The existing pavement sections by project segment are summarized in Table 7.

Table 7. Pavement Sections

Project Segment & Number	Item	AR-ACFC (in)	PCCP (in)	AB or ACB(1) (in)	Total Thickness (in)
I-10, SR 202L System TI, Ph I H5087 01C	SR 202L Mainline & Outside Shoulders	1	13	4	18
	I-10, SR 202L Service Ramps	1	11	4	16
I-10, SR 202L System TI, Ph II H5088 01C	SR 202L Mainline & Outside Shoulders	1	13	4	18
	I-10, SR 202L Service Ramps	1	11	4	16
SR 202L, 56th Street to McClintock Dr. H5151 01C	SR 202L Mainline & Outside Shoulders	1	13	4	18
	Kyrene & McClintock Ramps	1	10	4	15
SR 101/SR 202L TI H5150 01C	202L EB & WB Mainline	1	13	4	18
	Price Road Ramps	1	10	4	15
SR 202L Dobson Road TI H5666 01C	SR 202L Mainline & Outside Shoulders	1	13	4	18
	Ramps	1	10	4	15
SR 202L, Arizona Ave to Gilbert Road H5381 01C	SR 202L Mainline & Outside Shoulders(2)	1	13	4	18
	AZ Ave., McQueen Rd., Cooper Rd., Gilbert Rd. Ramps	1	10	4	15
SR 202L, Gilbert Road to Frye Road H5912 01C	SR 202L Mainline 7 Outside Shoulders	1	13	4	18
	Gilbert Road and Val Vista Dr Ramps	1	10	4	15

(1) 4” ACB typically used in-lieu of AB for depressed sections of mainline and ramps.

1.3.13 Previous Projects

The ADOT Milepost Strip Map shows the following projects which were previously constructed as identified in Table 8.

Table 8. Previous Projects

Project Number and/or TRACS Number	Begin Milepost	As-Built Date	Description
STP-202-C(009)B 202 MA 041 H5912 01C	41.3	2006	Construct Roadway; Gilbert Rd to Frye Rd
STP-202-C(001)B 202 MA 044 H5381 01C	44.7	2006	Construct Roadway; Arizona Ave to Gilbert Rd
NH-EB-STP-202-C(202)N 202 MA 044 H7457 01C	44.57	2012	HOV Lanes; Gilbert Rd to I-10
STP-202-C(002)B 202 MA 047 H5666 01C	47.4	2006	Construct Roadway; Dobson Rod to Arizona Ave
ACSTP-202-C-(4)B 202 MA 050 H5150 01C	50.0	2006	Construct Roadway; Price (101L) - Santan (202L) Freeway TI
RAM-202-C-507 202 202L MA 053 H5151 01C	53.0	2004	Construct Roadway; 56th St to McClintock Dr
ACSTP-600-6-(1)B 202 MA 055 H5087 01C	53.0	2003	Construct Roadway; 40th St – Junction I-10 (Pecos Connector)
ACSTP-600-7-(1)B 202 MA 054 H5088 01C	53.3	2006	Construct Roadway; I-10, SR 202L System TI, Phase II

In December 2019, the SMF project (ADOT Project No. 202L MA 054 H8827 01C, Federal Project No. 200-D(200)S was opened to traffic. As of September 2019, the Lindsay Road TI project (ADOT Project No. 202L MA 043 H8873 01L, Federal Project No. 202-C(207)T) was in design. Neither of these projects shows on the ADOT Strip Maps.

1.4 DESCRIPTION OF THE PROJECT

The widening of this segment of SR 202L will begin at the east end of the SR 202L South Mountain Freeway (SMF) project immediately west of I-10 and proceed east approximately 15.0 miles to Val Vista Drive.

The project work consists of the following:

- Under I-10, the roadway typical section would be widened 12' or less in each direction in order to accommodate varying median conditions. Some portions of the median would be open, dirt areas bounded by half barriers along the inside of each direction of SR 202L. Other areas of the median would be a median barrier, with no dirt area in the median. At this location, the project would provide an eight lane (3 GPL + 1 HOV in each direction) freeway, which would tie into a similar section at the east end of the SMF project.

- From the I-10/SR 202L TI east to the SR 202L/SR 101L TI, the proposed roadway typical section would be widened by one lane in each direction in order to accommodate a barrier-divided, ten lane (4 GPL + 1 HOV in each direction) freeway.

- Between the east end of the SR 202L/SR 101L TI and Gilbert Road, the roadway typical section would be widened by two lanes in each direction to accommodate a barrier-divided, twelve lane (5 GPL + 1 HOV in each direction) freeway section. Between SR 101L and Alma School Road, The EB roadway has 6 lanes and an HOV lane.

- Between Gilbert Road and Val Vista Drive, the roadway typical section would be widened by one lane in each direction in order to accommodate an open median, eight lane (4 GPL) freeway. A future HOV lane in each direction of travel is anticipated for this area. As of June 2020, design funding of $7.5 million and construction funding of $75.1 million are deferred beyond the funding horizon. Addition of HOV lanes in this area would result in a barrier-divided, ten lane (4 GPL + 1 HOV in each direction) freeway section.

- At all locations along the SR 202L corridor, there would be 12-foot wide travel lanes, 10-foot wide outside shoulders (12-foot wide at barriers), and 10-foot wide inside (median) shoulders. The proposed entrance and exit ramps would be a parallel-type configuration, coupled with auxiliary lanes between TIs typically one mile apart. The widening would be paved with Portland cement concrete pavement (PCCP) and the entire freeway width overlaid with asphalt rubber friction course. Typical sections and plans can be viewed in Appendix E.

- All service exit ramps that are not two lanes will be widened to two lanes. The outermost lane of SR 202L, usually (but not always) an auxiliary lane, would have an obligatory exit; the next lane to the inside would have an optional exit, with the choice of exiting or continuing the SR 202L through movement. Due to the structures surrounding the EB Price Road exit (Price Road Ramp B), it will remain as a single lane exit. Traffic analysis of this ramp's volumes indicate it will function satisfactorily through 2040 as a single lane exit ramp.

- The freeway mainline would follow the existing profile of SR 202L, the majority of which is in cut with intersecting roads crossing over the freeway. Also matching the existing SR 202L profile, the widening would occur over 56th Street, Arizona Avenue, Lindsay Road, and all existing waterways and railroads; widened bridges would be required at these locations. The widening of SR 202L will necessitate the replacement of the Arizona Avenue Ramp D bridge over UPRR.

The drainage system would accommodate the wider freeway but operate using most of the existing drainage features. Runoff would be accommodated using catch basins on the low side, usually the outside, of the freeway. Through lateral pipes, trunklines, and pump stations, these flows would be delivered to concrete channels and retention basins paralleling the freeway. Depending upon the location along the SR 202L corridor, these channels empty into the 202L West Channel retention basin at Kyrene Road - SR 202L and into the Gila Drain, which ultimately outfalls to the Gila River.

Because funding is limited, the project owners and stakeholders are seeking to construct the work described herein as two smaller projects: one from SR 101L to Val Vista Drive, and the other from I-10 to SR 101L. As of June 2020, design and construction funding for the project from SR 101L to Val Vista Drive is anticipated in FY24 and FY26, respectively. No funding is yet identified for the second project from I-10 to SR 101L.

2.0 TRAFFIC AND CRASH DATA

2.1 REVIEW OF CRASH DATA

The ADOT Traffic Studies Section provided crash data for the segment of the SR 202L corridor between Val Vista Road and the I-10/SR 202L TI. Between January 1, 2013, to December 31, 2017, there were a total of 2,275 crashes reported within the study area. Figure 3 illustrates a breakdown of the crash data by mainline weaving segments throughout the corridor.

The following is a summary of some key characteristics of the crash data:

- Of the 2,275 crashes reported, 1,596 resulted in property damage only (70.2%), 673 resulted in injuries (29.6%) and 6 resulted in a fatality (0.3%).
- Eighty-three percent (83%) of the crashes involved more than one motor vehicle while 17% of the crashes involved a single vehicle.
- Of the 1,878 crashes with another motor vehicle, 79% (1,479 crashes) were rear-end crashes and 15% (284 crashes) were sideswipe crashes.
- Seventy-seven percent (77%) of the crashes occurred during daylight hours, 4% occurred at dusk or dawn and the remaining 19% occurred during hours of darkness.
- There were three head-on crashes, two resulting in property damage only and one resulting in injury. In the injury accident, the driver was driving the wrong way in the WB lanes.

Table 9 presents the complete yearly crash summary by freeway segment during the study period. Table 10 presents crash data according to the KABCO scale.

Table 9. Mainline Crash Summary

Freeway Segment	No. of Crashes (January 2013 - December 2017)	Crash Rate (2013 - 2018) (Crash/Million Vehicle Miles)
Westbound SR 202L		
Interstate 10 Interchange	37	0.29
Interstate 10 to Kyrene Rd.	25	0.45
Kyrene Rd. Interchange	22	0.27
Kyrene Rd. to McClintock Dr.	69	0.48
McClintock Dr. Interchange	20	0.23
West L101 Ramps to West Price Rd. Ramps	10	0.13
West Price Rd. Ramps to East Price Rd. Ramps	5	0.08
East Price Rd. Ramps to East L101 Ramps	38	0.57
Dobson Rd. Interchange	70	0.71
Dobson Rd. to Alma School Rd.	44	0.75
Alma School Rd. Interchange	65	0.66
Alma School Rd. to Arizona Ave.	54	0.96
Arizona Ave. Interchange	61	0.66
Arizona Ave. to McQueen Rd.	68	1.13
McQueen Rd. Interchange	134	1.59
McQueen Rd. to Cooper Rd.	85	1.50
Cooper Rd. Interchange	101	1.12
Cooper Rd. to Gilbert Rd.	63	1.33
Gilbert Rd. Interchange	61	0.78
Gilbert Rd. to Val Vista Dr.	127	0.75
Val Vista Dr. Interchange	42	0.48
Eastbound SR 202L		
Val Vista Dr. Interchange	32	0.36
Gilbert Rd. to Val Vista Dr.	227	1.33
Gilbert Rd. Interchange	89	1.13
Cooper Rd. to Gilbert Rd.	77	1.63
Cooper Rd. Interchange	90	1.00
McQueen Rd. to Cooper Rd.	31	0.55
McQueen Rd. Interchange	29	0.35
Arizona Ave. to McQueen Rd.	26	0.43
Arizona Ave. Interchange	48	0.45
Alma School Rd. to Arizona Ave.	48	0.86
Alma School Rd. Interchange	90	0.91
Dobson Rd. to Alma School Rd.	73	1.24
Dobson Rd. Interchange	81	0.82
East Price Rd. Ramps to East L101 Ramps	19	0.29
West Price Rd. Ramps to East Price Rd. Ramps	7	0.11
West L101 Ramps to West Price Rd. Ramps	14	0.18
McClintock Dr. Interchange	22	0.25
Kyrene Rd. to McClintock Dr.	31	0.22
Kyrene Rd. Interchange	11	0.14
Interstate 10 to Kyrene Rd.	14	0.25
Interstate 10 Interchange	15	0.12

Table 10. Mainline Crash Summary, KABCO Scale

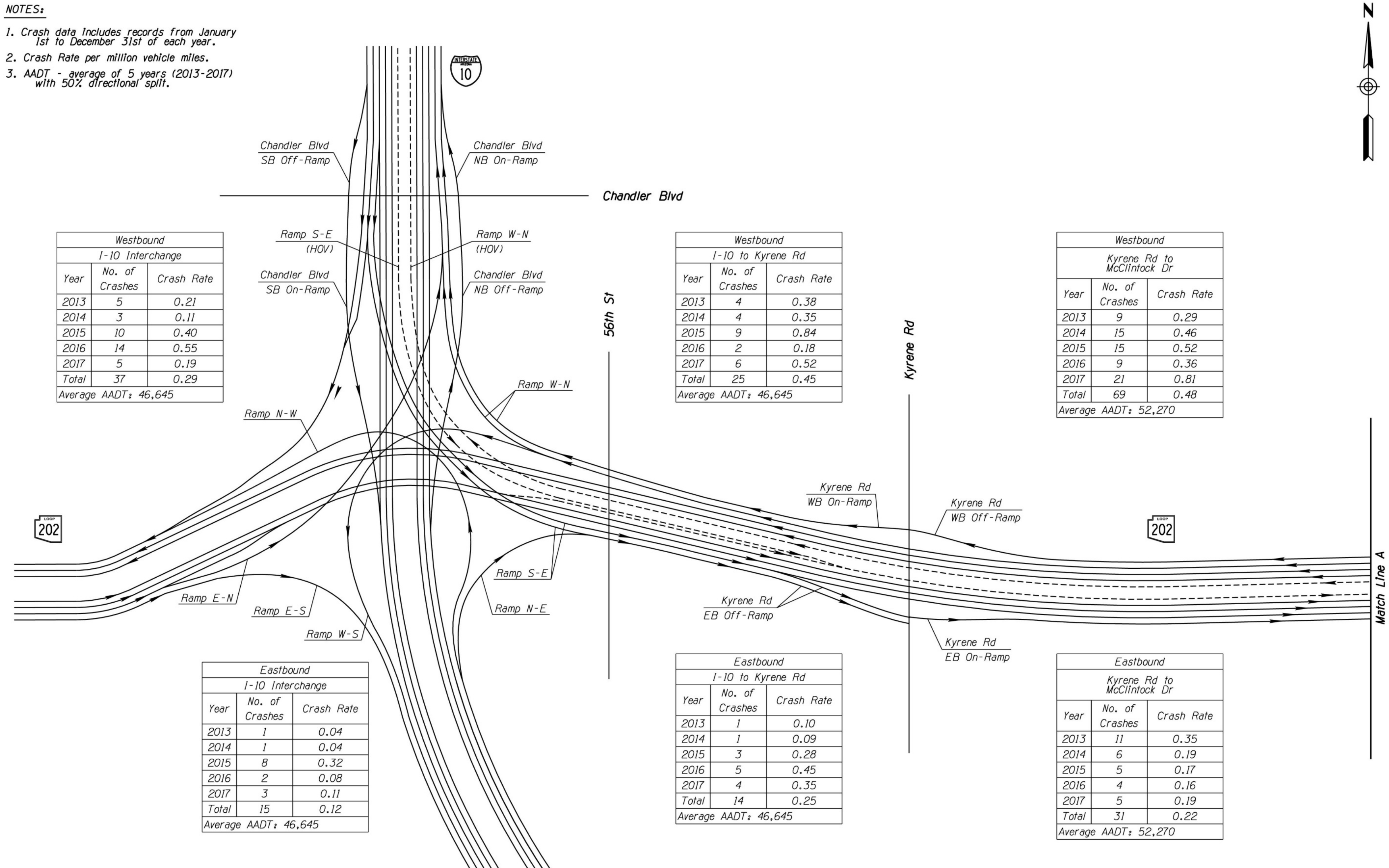
Crash Summary: All Years			State (2012-2016)
Crash Type	**Total**	**%**	**%**
Fatal Injury	6	0.3%	0.7%
Incapacitating Injury	38	1.7%	31.3%
Non-Incapacitating Injury	268	11.8%	
Possible Injury	367	16.1%	
No Injury	1596	70.2%	68.0%
Multi-Vehicle	1,878	82.5%	
Single-Vehicle	397	17.5%	
Total	**2,275**	100%	

According to the *Regional Freeway Bottleneck Study,* MAG 2006, the average crash rate on the Regional Freeway System was 0.78 accidents per million vehicle miles in 2000. This study also documented the 75th percentile as 1.41 crashes per million vehicle miles. Five of the 24 calculated segment rates are less than the average crash rate, and all but two are less than the 75th percentile crash rate.

A heat map of crash density throughout the corridor is presented in Figure 4. In general, the study corridor has the highest crash density between the SR-101L interchange and Val Vista Drive. This is the section of the study corridor that is also the most congested. Rear end crashes, in particular, tend to be more prevalent along segments with more congestion due to the stop-and-go nature of traffic. The addition of more capacity by adding GPLs will reduce congestion and therefore rear end collisions. The final traffic design should also consider the recommendations in ADOT's Roadway Departure Safety Improvement Plan (RDSIP).

NOTES:

1. Crash data includes records from January 1st to December 31st of each year.
2. Crash Rate per million vehicle miles.
3. AADT - average of 5 years (2013-2017) with 50% directional split.



Westbound		
I-10 Interchange		
Year	No. of Crashes	Crash Rate
2013	5	0.21
2014	3	0.11
2015	10	0.40
2016	14	0.55
2017	5	0.19
Total	37	0.29
Average AADT: 46,645		

Westbound		
I-10 to Kyrene Rd		
Year	No. of Crashes	Crash Rate
2013	4	0.38
2014	4	0.35
2015	9	0.84
2016	2	0.18
2017	6	0.52
Total	25	0.45
Average AADT: 46,645		

Westbound		
Kyrene Rd to McClintock Dr		
Year	No. of Crashes	Crash Rate
2013	9	0.29
2014	15	0.46
2015	15	0.52
2016	9	0.36
2017	21	0.81
Total	69	0.48
Average AADT: 52,270		

Eastbound		
I-10 Interchange		
Year	No. of Crashes	Crash Rate
2013	1	0.04
2014	1	0.04
2015	8	0.32
2016	2	0.08
2017	3	0.11
Total	15	0.12
Average AADT: 46,645		

Eastbound		
I-10 to Kyrene Rd		
Year	No. of Crashes	Crash Rate
2013	1	0.10
2014	1	0.09
2015	3	0.28
2016	5	0.45
2017	4	0.35
Total	14	0.25
Average AADT: 46,645		

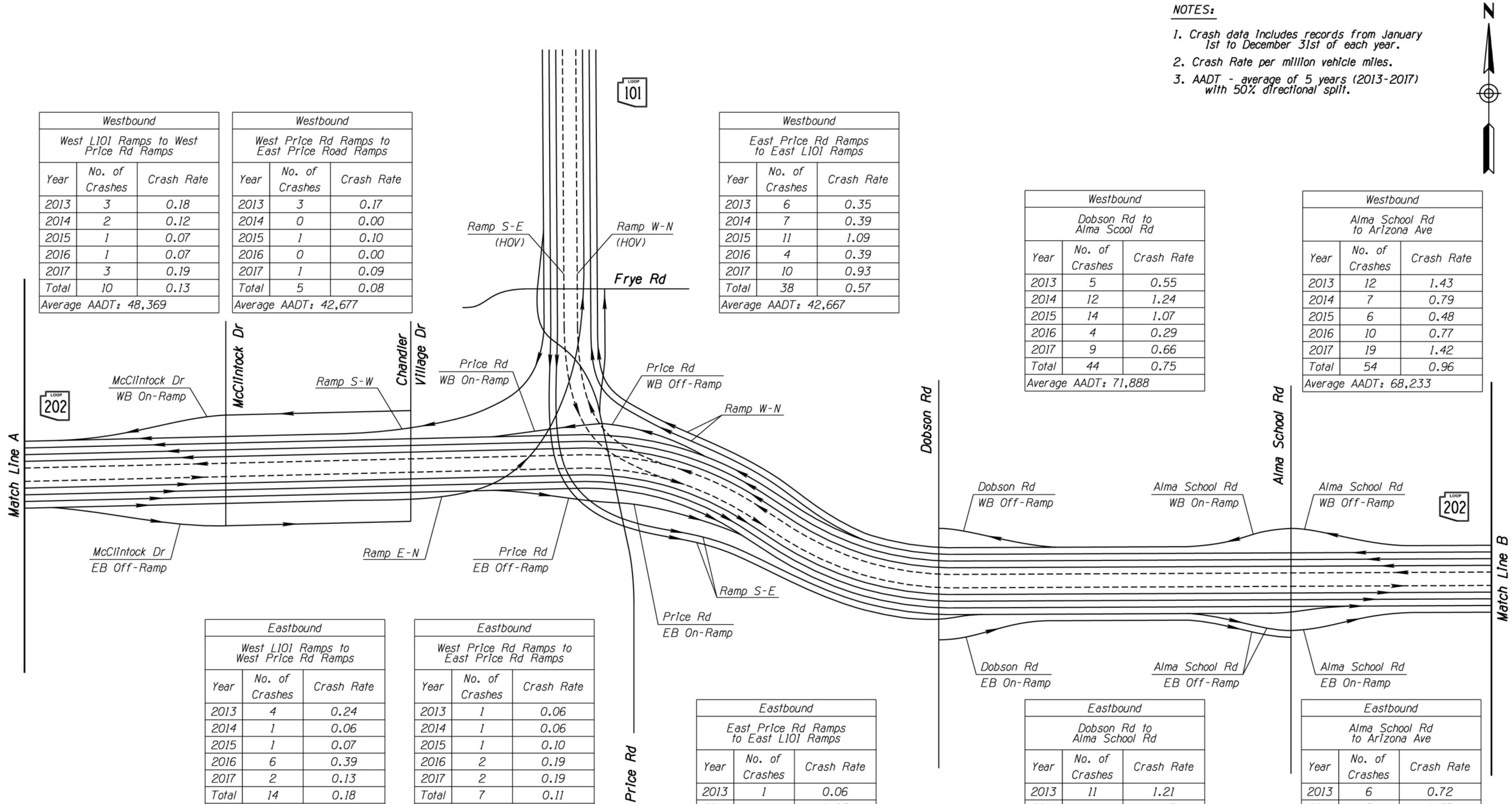
Eastbound		
Kyrene Rd to McClintock Dr		
Year	No. of Crashes	Crash Rate
2013	11	0.35
2014	6	0.19
2015	5	0.17
2016	4	0.16
2017	5	0.19
Total	31	0.22
Average AADT: 52,270		

2013-2017
YEARLY CRASH SUMMARY
SHEET 1 OF 4

Figure 3. Yearly Crash Summary

NOTES:

1. Crash data includes records from January 1st to December 31st of each year.
2. Crash Rate per million vehicle miles.
3. AADT - average of 5 years (2013-2017) with 50% directional split.



Westbound – West L101 Ramps to West Price Rd Ramps

Year	No. of Crashes	Crash Rate
2013	3	0.18
2014	2	0.12
2015	1	0.07
2016	1	0.07
2017	3	0.19
Total	10	0.13
Average AADT: 48,369		

Westbound – West Price Rd Ramps to East Price Road Ramps

Year	No. of Crashes	Crash Rate
2013	3	0.17
2014	0	0.00
2015	1	0.10
2016	0	0.00
2017	1	0.09
Total	5	0.08
Average AADT: 42,677		

Westbound – East Price Rd Ramps to East L101 Ramps

Year	No. of Crashes	Crash Rate
2013	6	0.35
2014	7	0.39
2015	11	1.09
2016	4	0.39
2017	10	0.93
Total	38	0.57
Average AADT: 42,667		

Westbound – Dobson Rd to Alma Scool Rd

Year	No. of Crashes	Crash Rate
2013	5	0.55
2014	12	1.24
2015	14	1.07
2016	4	0.29
2017	9	0.66
Total	44	0.75
Average AADT: 71,888		

Westbound – Alma School Rd to Arizona Ave

Year	No. of Crashes	Crash Rate
2013	12	1.43
2014	7	0.79
2015	6	0.48
2016	10	0.77
2017	19	1.42
Total	54	0.96
Average AADT: 68,233		

Eastbound – West L101 Ramps to West Price Rd Ramps

Year	No. of Crashes	Crash Rate
2013	4	0.24
2014	1	0.06
2015	1	0.07
2016	6	0.39
2017	2	0.13
Total	14	0.18
Average AADT: 48,369		

Eastbound – West Price Rd Ramps to East Price Rd Ramps

Year	No. of Crashes	Crash Rate
2013	1	0.06
2014	1	0.06
2015	1	0.10
2016	2	0.19
2017	2	0.19
Total	7	0.11
Average AADT: 42,677		

Eastbound – East Price Rd Ramps to East L101 Ramps

Year	No. of Crashes	Crash Rate
2013	1	0.06
2014	4	0.23
2015	6	0.60
2016	3	0.29
2017	5	0.46
Total	19	0.29
Average AADT: 42,667		

Eastbound – Dobson Rd to Alma School Rd

Year	No. of Crashes	Crash Rate
2013	11	1.21
2014	14	1.45
2015	14	1.07
2016	12	0.88
2017	22	1.62
Total	73	1.24
Average AADT: 71,888		

Eastbound – Alma School Rd to Arizona Ave

Year	No. of Crashes	Crash Rate
2013	6	0.72
2014	5	0.57
2015	14	1.12
2016	10	0.77
2017	13	0.97
Total	48	0.86
Average AADT: 68,233		

2013-2017
YEARLY CRASH SUMMARY
SHEET 2 OF 4

Figure 3. Yearly Crash Summary

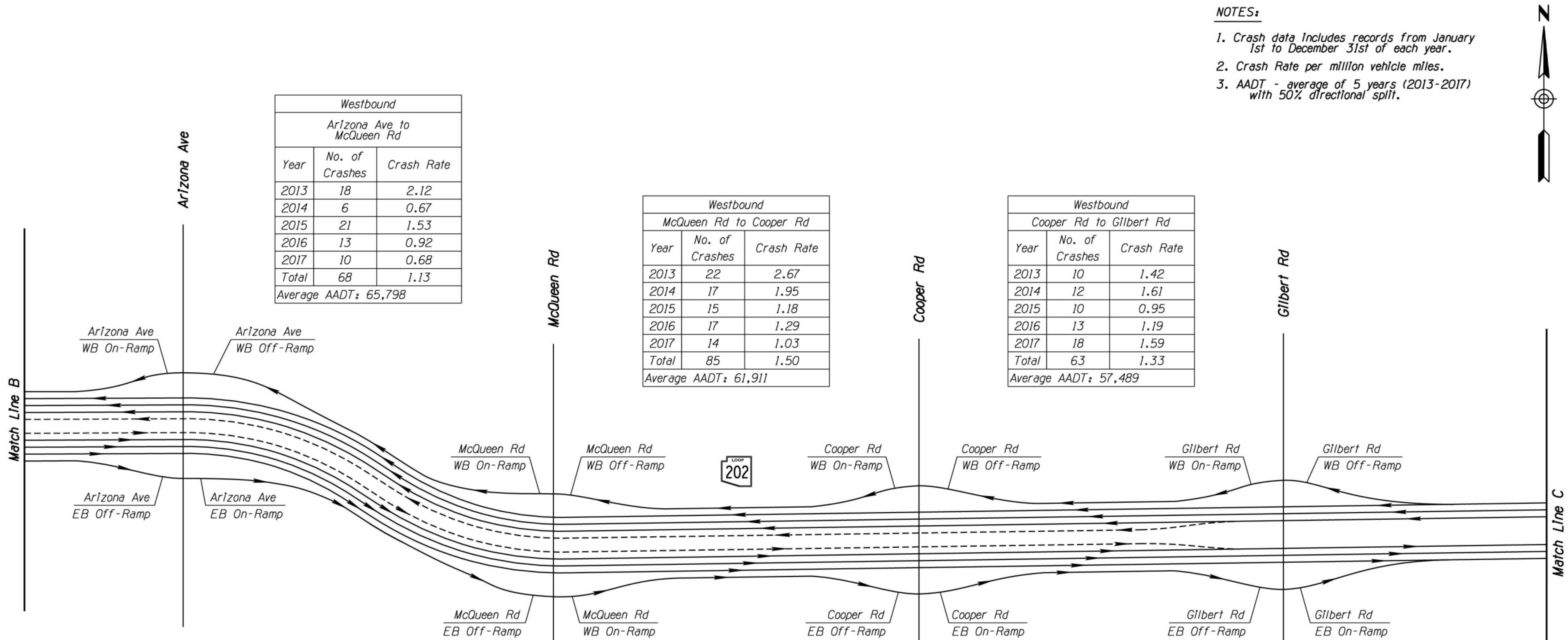
NOTES:

1. Crash data includes records from January 1st to December 31st of each year.
2. Crash Rate per million vehicle miles.
3. AADT - average of 5 years (2013-2017) with 50% directional split.

Westbound		
Arizona Ave to McQueen Rd		
Year	No. of Crashes	Crash Rate
2013	18	2.12
2014	6	0.67
2015	21	1.53
2016	13	0.92
2017	10	0.68
Total	68	1.13
Average AADT: 65,798		

Westbound		
McQueen Rd to Cooper Rd		
Year	No. of Crashes	Crash Rate
2013	22	2.67
2014	17	1.95
2015	15	1.18
2016	17	1.29
2017	14	1.03
Total	85	1.50
Average AADT: 61,911		

Westbound		
Cooper Rd to Gilbert Rd		
Year	No. of Crashes	Crash Rate
2013	10	1.42
2014	12	1.61
2015	10	0.95
2016	13	1.19
2017	18	1.59
Total	63	1.33
Average AADT: 57,489		



Eastbound		
Arizona Ave to McQueen Rd		
Year	No. of Crashes	Crash Rate
2013	6	0.71
2014	2	0.22
2015	5	0.36
2016	6	0.42
2017	7	0.48
Total	26	0.43
Average AADT: 65,798		

Eastbound		
McQueen Rd to Cooper Rd		
Year	No. of Crashes	Crash Rate
2013	6	0.73
2014	10	1.15
2015	5	0.39
2016	4	0.30
2017	6	0.44
Total	31	0.55
Average AADT: 61,911		

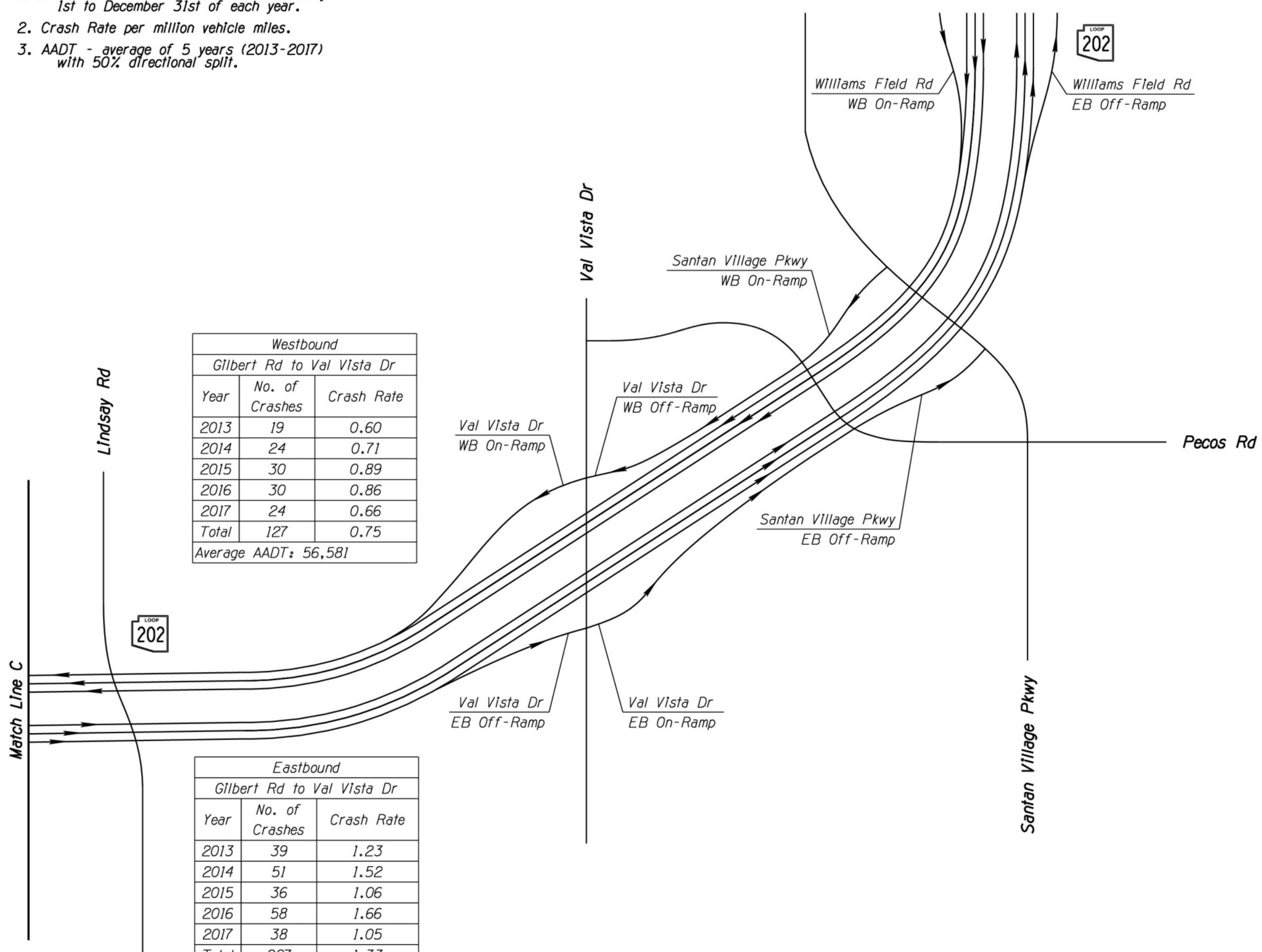
Eastbound		
Cooper Rd to Gilbert Rd		
Year	No. of Crashes	Crash Rate
2013	16	2.28
2014	16	2.15
2015	11	1.04
2016	20	1.84
2017	14	1.24
Total	77	1.63
Average AADT: 57,489		

2013-2017
YEARLY CRASH SUMMARY
SHEET 3 OF 4

Figure 3. Yearly Crash Summary

NOTES:

1. Crash data includes records from January 1st to December 31st of each year.
2. Crash Rate per million vehicle miles.
3. AADT - average of 5 years (2013-2017) with 50% directional split.



Westbound		
Gilbert Rd to Val Vista Dr		
Year	No. of Crashes	Crash Rate
2013	19	0.60
2014	24	0.71
2015	30	0.89
2016	30	0.86
2017	24	0.66
Total	127	0.75
Average AADT: 56,581		

Eastbound		
Gilbert Rd to Val Vista Dr		
Year	No. of Crashes	Crash Rate
2013	39	1.23
2014	51	1.52
2015	36	1.06
2016	58	1.66
2017	38	1.05
Total	227	1.33
Average AADT: 56,581		

2013-2017
YEARLY CRASH SUMMARY
SHEET 4 OF 4

Figure 3. Yearly Crash Summary

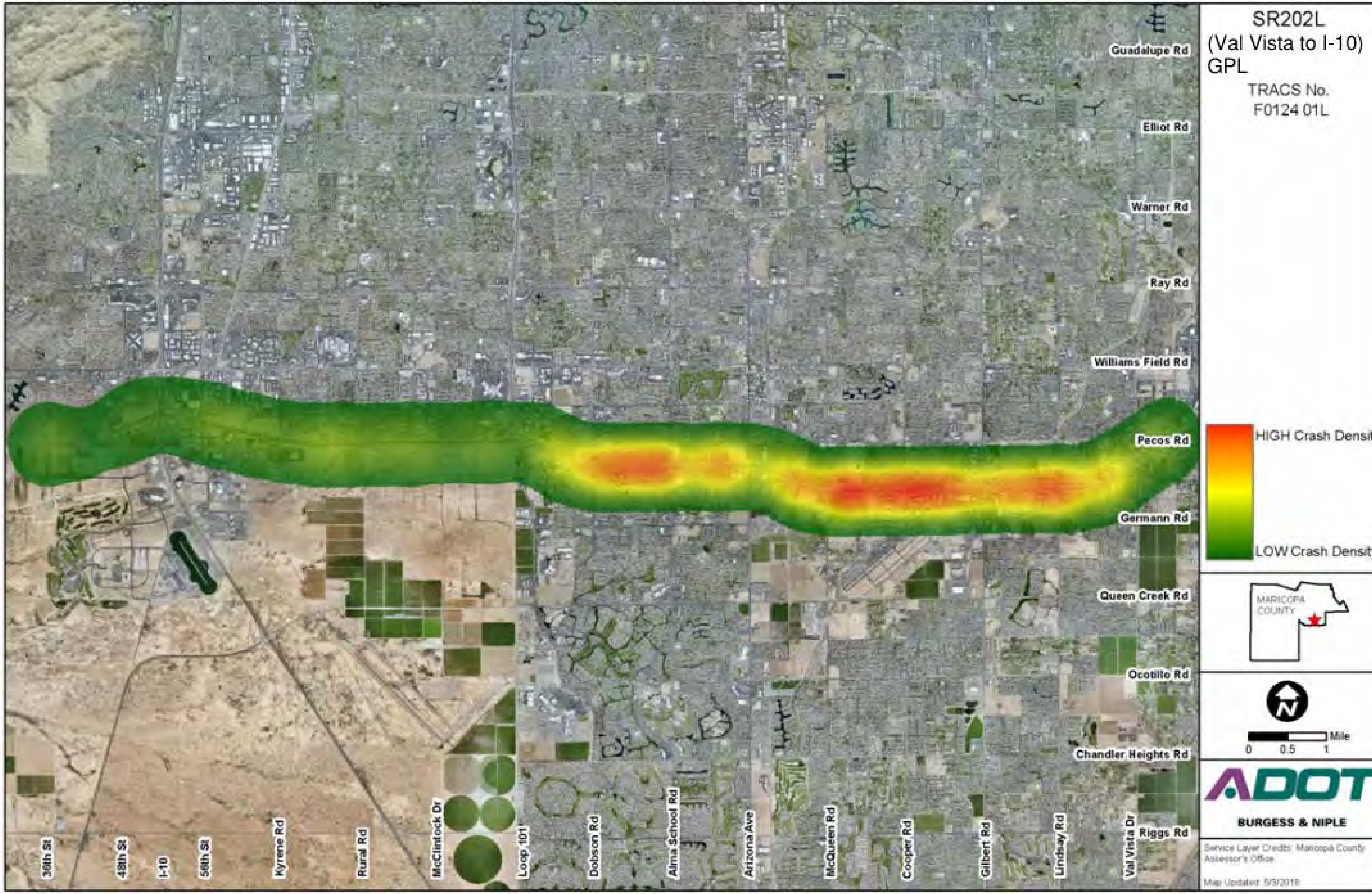


Figure 4. Crash Heat Map

2.2 EXISTING TRAFFIC VOLUMES

This circumferential freeway corridor links the communities of Chandler, Gilbert, Mesa, Tempe, GRIC, and Phoenix and serves as a high demand commuter route from the residential areas to the commercial business centers. Completion of the SR 202L will also provide an additional link to the west valley from the east valley.

In order to capture existing traffic conditions on SR 202L historical traffic count data was obtained from ADOT's Multimodal Planning Transportation Data Management System. Weekday data was taken from the mainline continuous loop detector station between McClintock Drive and Kyrene Road (Location ID 101422) for the month of January 2018. Twenty-four-hour segments traffic counts were also collected at all connecting HOV ramps at system interchanges within the study area.

Weekday Turning Movement Counts (TMCs) were completed at each of the service interchanges between Kyrene Boulevard and Val Vista Drive. The TMCs included AM Peak (5:00 AM-10:00 AM), Midday Peak (11:00 AM – 1:00 PM) and PM Peak (2:30 PM – 7:30 PM) period traffic counts. The TMC data was collected in January of 2018 for the service interchanges between Kyrene Road and Gilbert Road while Val Vista Drive was counted in November 2018.

A seasonal factor of 0.95 was applied to all collected traffic data in order to account for seasonal fluctuations in traffic patterns.

The peak period traffic counts were used in order to calculate the Average Daily Traffic (ADT) volumes at all service interchange ramps. The 24-hour mainline traffic data showed that approximately 73.5% of mainline traffic was counted during the same 12-hour period that the TMCs were completed at the service interchange ramps. Using this factor, daily traffic volumes were calculated for all the service interchange ramps. ADT volumes were then calculated for all mainline SR 202L segments in the study corridor using the counted 24-hour data between McClintock Road/Kyrene Road and calculated ADT's at the ramps. The existing segment ADT and peak hour volumes are shown in Figure 5.

ADT volumes on mainline SR 202L averaged 128,000 vehicles per day (vpd) at the west end of the project between Kyrene Road and McClintock Drive and 135,000 vpd at the east end of the project between Gilbert Road and Val Vista Drive. The highest daily volume of 190,000 vpd is experienced between Dobson Road and Alma School Road due to the large number of vehicles traveling to and from SR 101L. The largest volume of daily vehicles on service ramps were observed at the Westbound On Ramp and Eastbound off Ramp of Val Vista Drive with 22,300 vpd and 20,500 vpd, respectively.

Table 11 shows a breakdown of the traffic K value and directional split between EB/WB traffic during the AM and PM peak hours. As shown in Table 11, the busiest peak hour of the day included 7%-9% of the total daily traffic for the majority of the study corridor segments. Between 56th Street and McClintock Drive, traffic was split approximately 50/50 between EB and WB traffic. Between SR 101L and Val Vista Drive traffic was split approximately 60% towards the peak direction of travel. The K values and directional split data collected was found to be in line with historical traffic data published in ADOT's State Route AADT Report – 2017. The 2017 AADT Report also showed that mainline SR 202L has a documented 7% truck percentage (T Factor) throughout the entire project corridor.

Table 11. Mainline Traffic Factors

Freeway Segment	A.M. Peak Hour			P.M. Peak Hour		
	K Value	Directional Split		K Value	Directional Split	
		WB	EB		WB	EB
Under Interstate 10 to 56th Street	9%	34%	66%	11%	67%	33%
56th Street to Kyrene Road	7%	45%	55%	8%	51%	49%
Kyrene Road to McClintock Drive	7%	51%	49%	8%	45%	55%
McClintock Drive to State Route 101L	7%	53%	47%	8%	44%	56%
State Route 101L to Dobson Road	9%	57%	43%	8%	41%	59%
Dobson Road to Alma School Road	9%	61%	39%	8%	39%	61%
Alma School Road to Arizona Avenue	9%	60%	40%	8%	41%	59%
Arizona Avenue to McQueen Road	9%	59%	41%	8%	40%	60%
McQueen Road to Cooper Road	8%	58%	42%	8%	42%	58%
Cooper Road to Gilbert Road	8%	58%	42%	8%	42%	58%
Gilbert Road to Val Vista Drive	9%	60%	40%	8%	39%	61%

Source: 2018 Traffic Counts

2.3 FUTURE TRAFFIC FORECASTING METHODOLOGY

Traffic demand projections provided by MAG through their Travel Demand Model (TDM) for 2040 were used to develop future weekday and peak hour traffic volumes. Figure 6 show the projected traffic volumes and lane configuration for the Recommended Alternative.

A TDM is often referred to as a "regional" model because the roadway network it represents typically spans multiple jurisdictions. TDMs are extensively calibrated and rooted in survey-informed population, employment, and socioeconomic data, all of which influence trip generation and mode choice. The MAG model has a land use component that includes socioeconomic information in the region disaggregated by traffic analysis zones (TAZ). Each TAZ in the region includes information about housing, population and employment. Land use estimates for the future are generally derived from census data and regional estimates associated with improvements. to develop the future year land use data, MAG utilizes the land use elements of adopted general/comprehensive plans for cities and towns in the region. Future year MAG models also include all the programmed and funded roadway improvements in the region. Therefore, model traffic projections take into account planned improvements, new developments, and land use changes expected by a specified horizon year.

The specific model used for this study is the four-step model, which is validated to 24-hour count data and also verified for model speed estimates. Typical corridor studies use factors to convert AM and PM peak period TDM estimates to determine AM and PM peak hour volume estimates. The volumes are derived directly from the MAG model assignments and have several limitations, including imprecise turning movement volume estimates at major intersections. to improve MAG model estimates and to develop design hour traffic volumes, the model estimates for the future year must therefore be post-processed. The model calibration methodology is further outlined in *State Route 202L (Santan Freeway) Val Vista Drive to I-10 Final Traffic Report*.

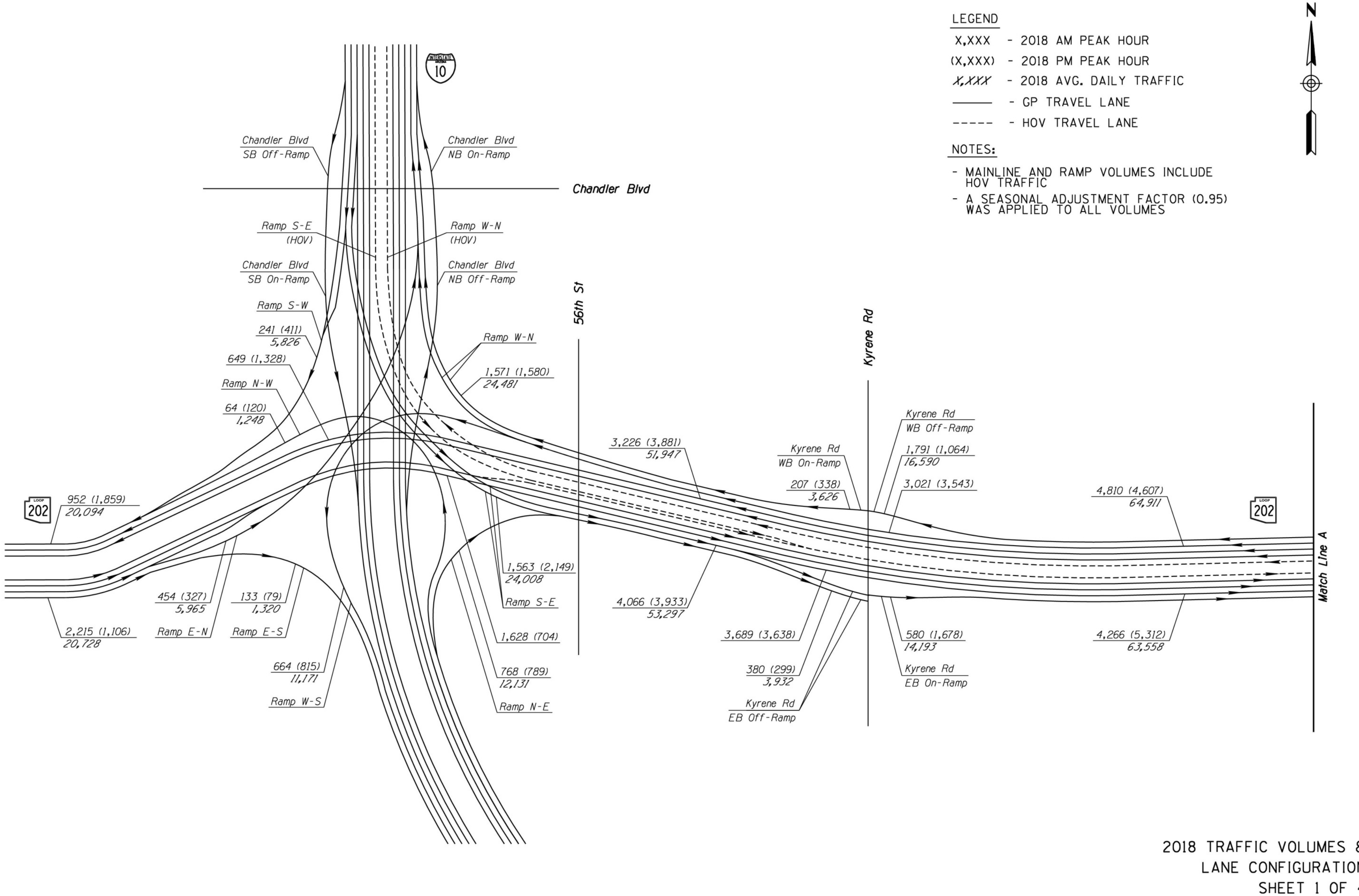


Figure 5. 2018 Traffic Volumes and Lane Configuration

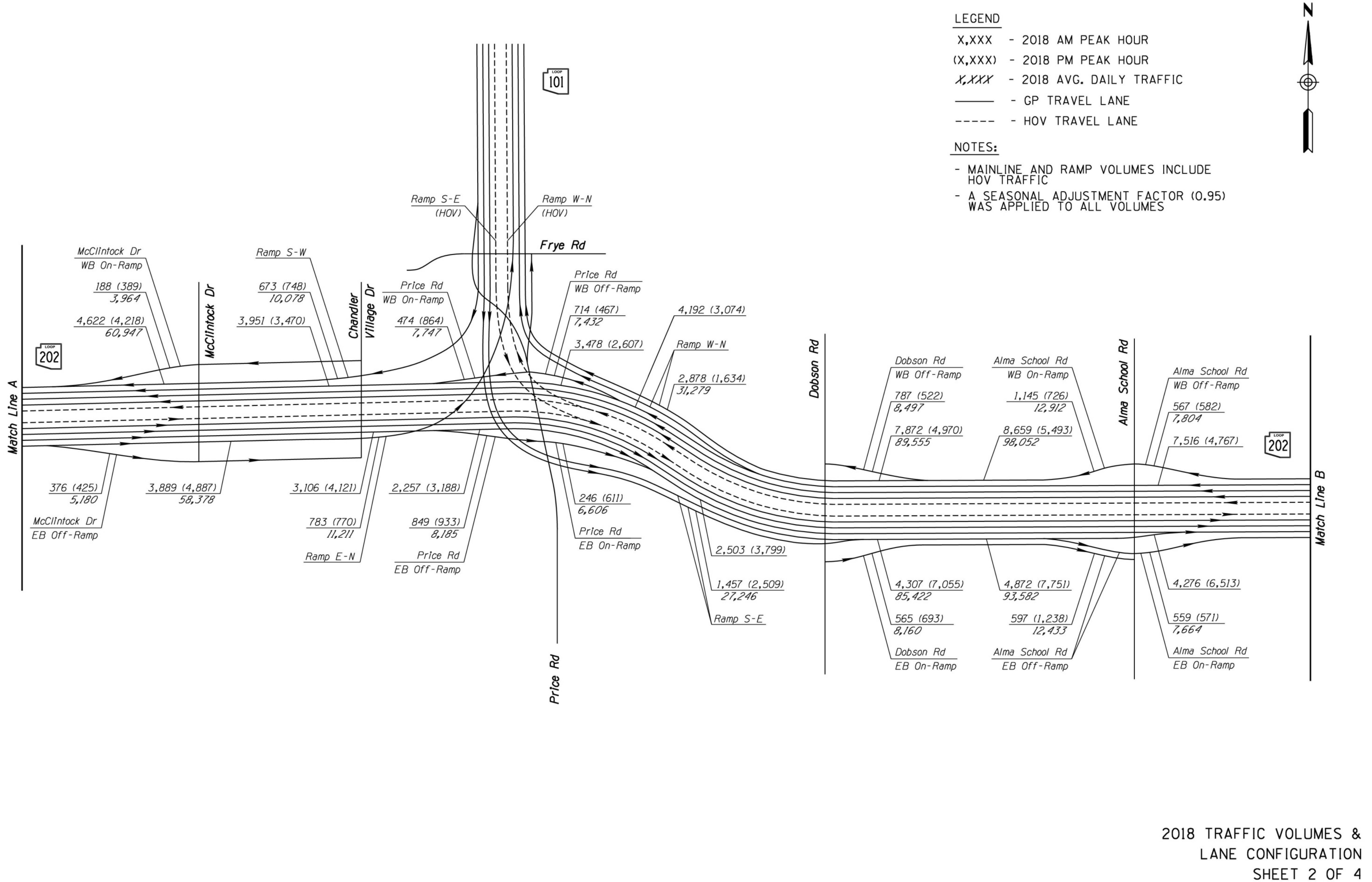


Figure 5. 2018 Traffic Volumes and Lane Configuration

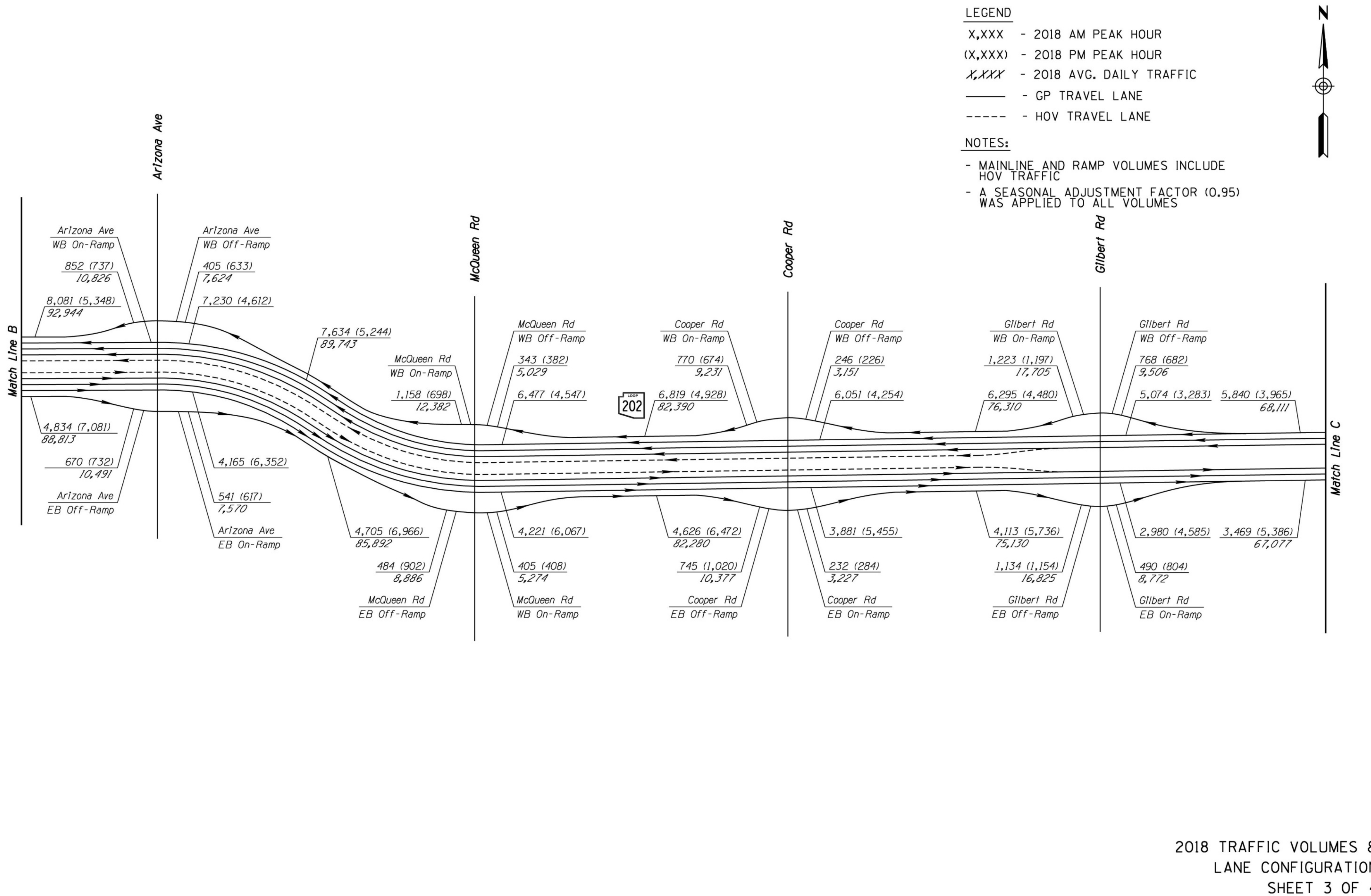


Figure 5. 2018 Traffic Volumes and Lane Configuration

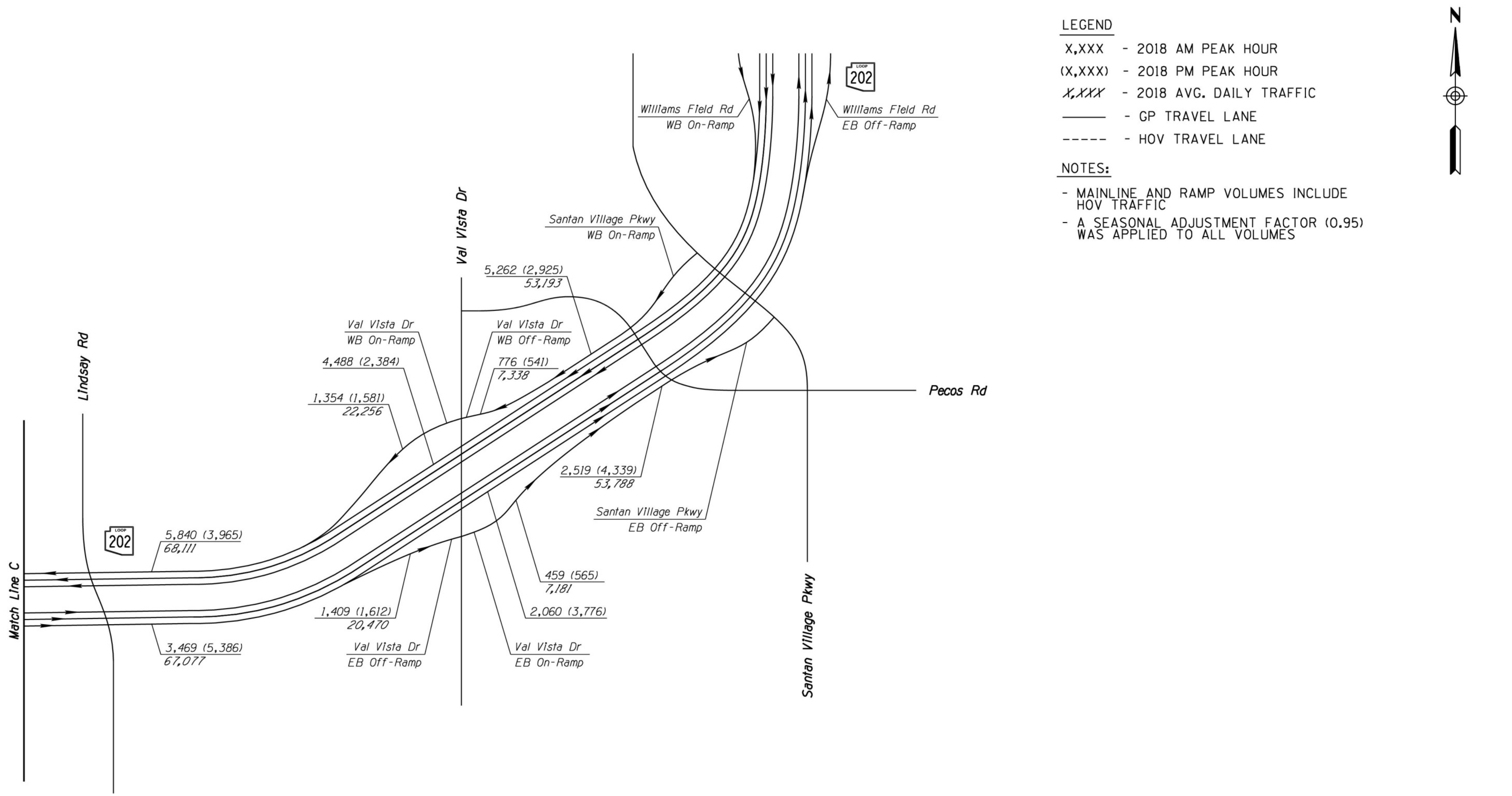


Figure 5. 2018 Traffic Volumes and Lane Configuration

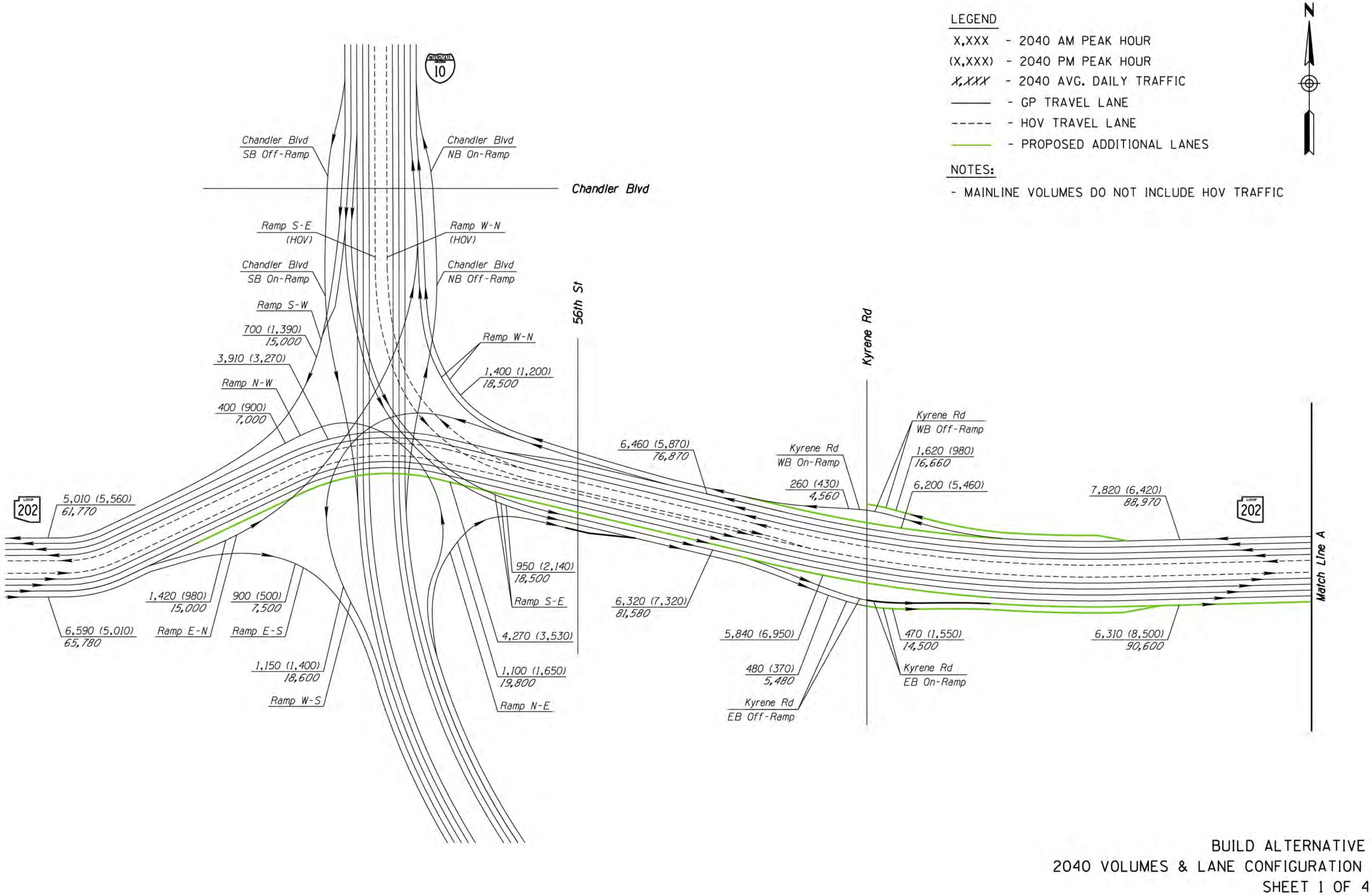
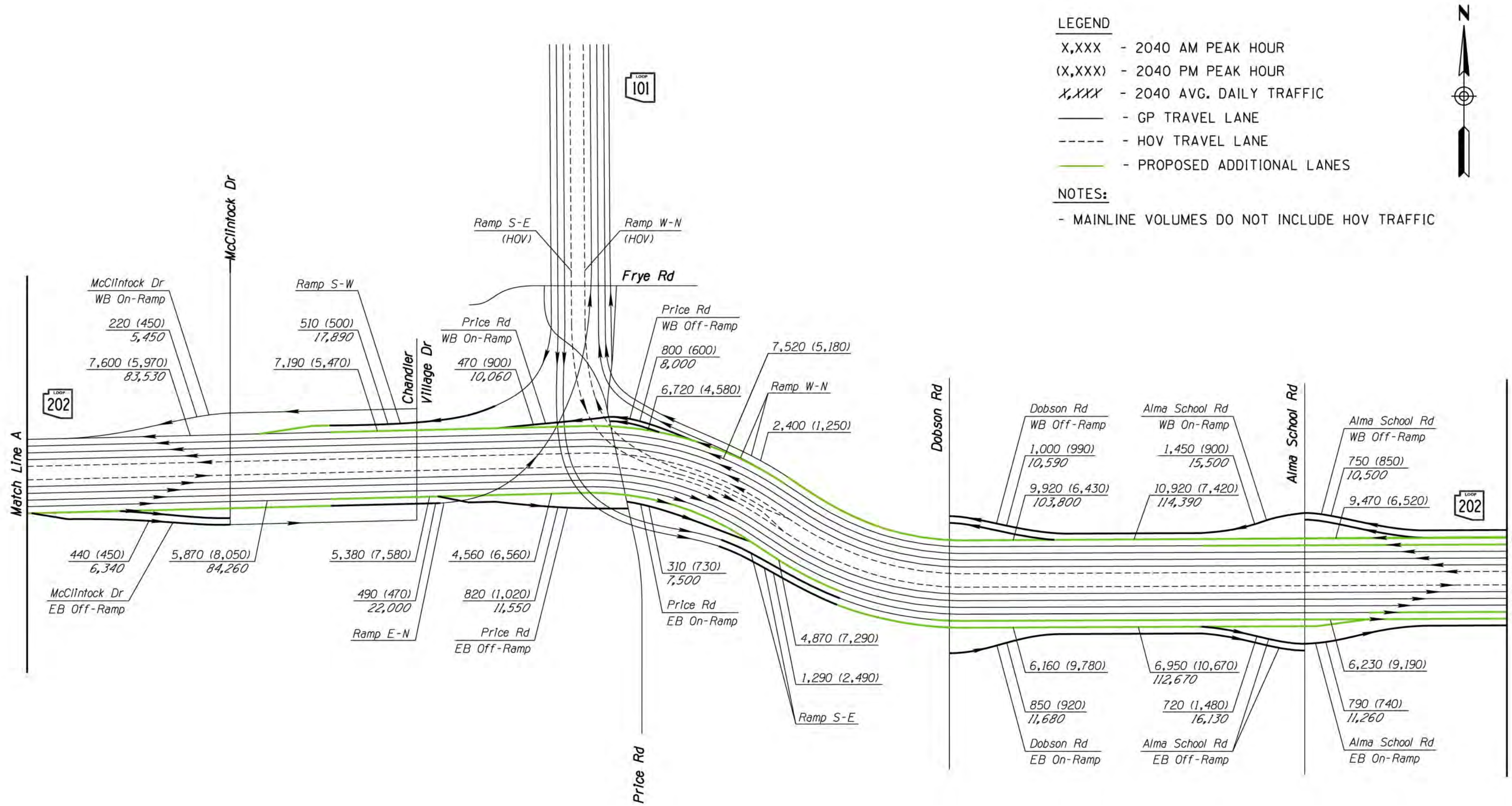


Figure 6. 2040 Traffic Volumes and Lane Configuration



BUILD ALTERNATIVE
2040 VOLUMES & LANE CONFIGURATION
SHEET 2 OF 4

Figure 6. 2040 Traffic Volumes and Lane Configuration

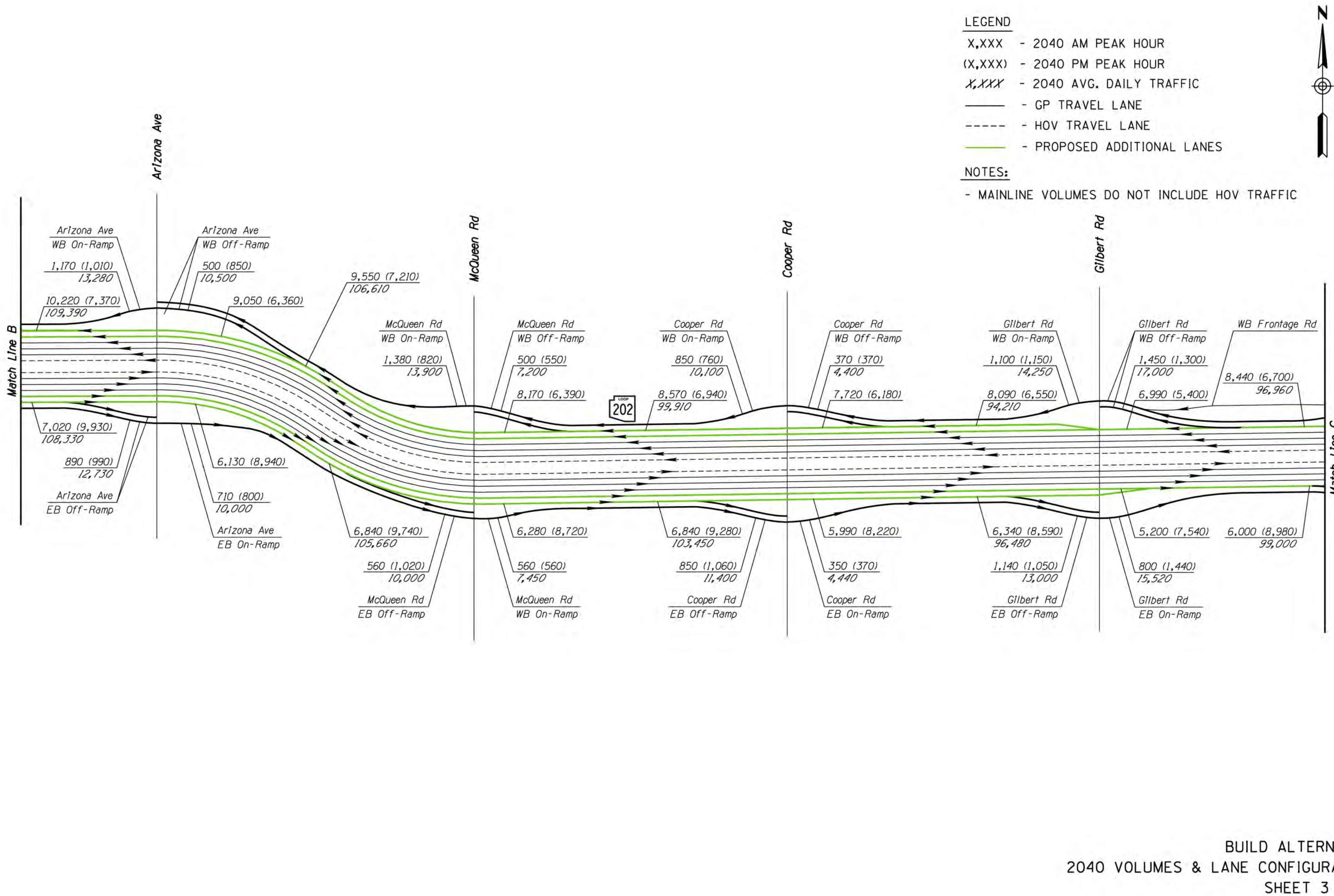


Figure 6. 2040 Traffic Volumes and Lane Configuration

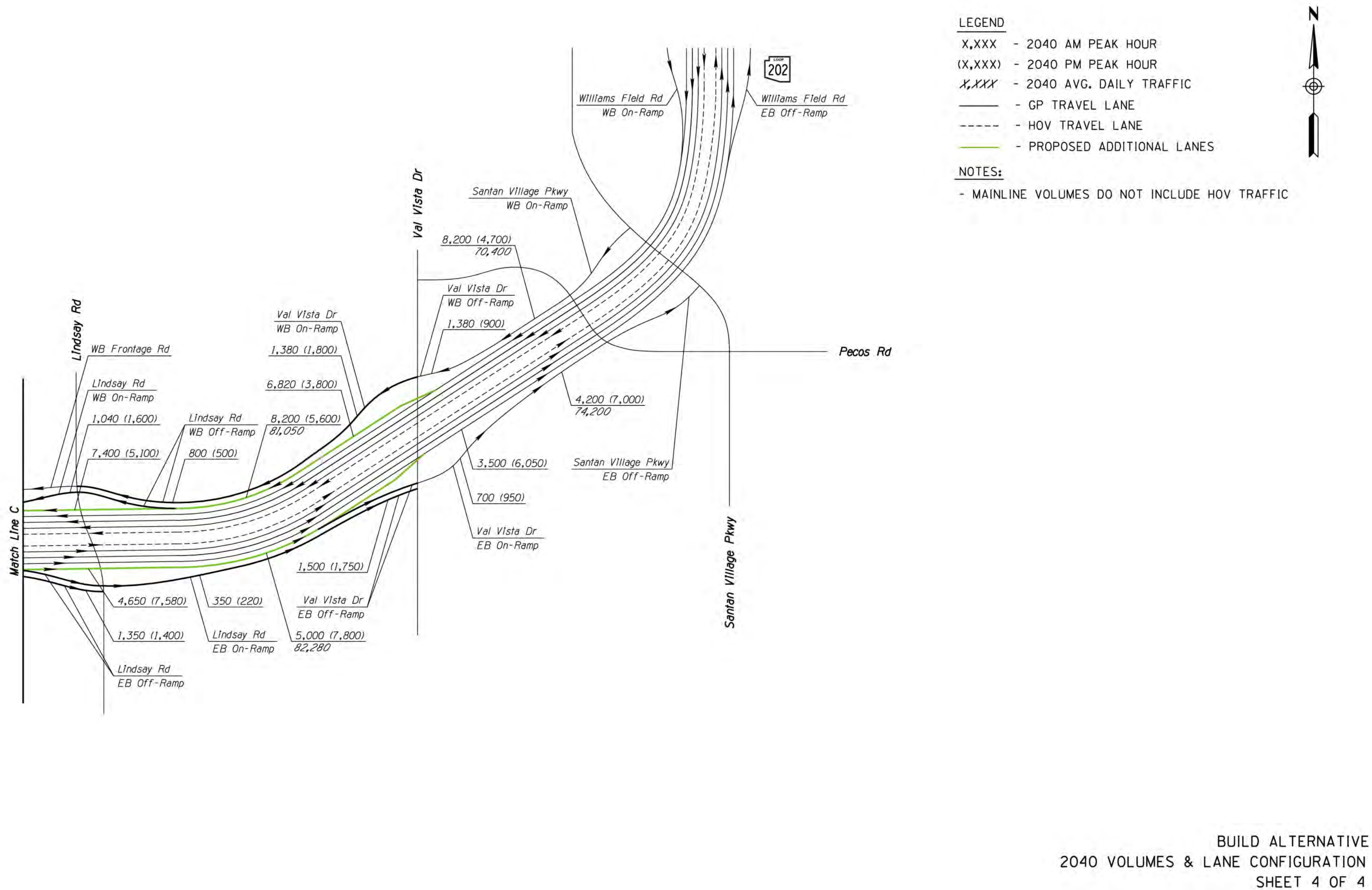


Figure 6. 2040 Traffic Volumes and Lane Configuration

2.4 OPERATIONAL ANALYSIS METHODOLOGY

2.4.1 SR 202L Mainline HCM Analysis

The study corridor was first analyzed on a macro level for existing and future study years. The analysis was based on analysis procedures outlined in the Highway Capacity Manual (HCM 2016). HCM methodology was used to conduct the traffic operations analysis and to summarize the expected Level of Service (LOS). LOS for freeway mainline operations is based on the expected density of traffic by lane. LOS is ranked from LOS A, which signifies little or no congestion, to LOS F, which signifies congestion and jam conditions when a facility is over capacity. Each LOS represents a range of operating conditions as defined in the HCM, see Table 12.

Table 12. Level of Service Thresholds for Freeways

Level-of-Service	Density Range (pc/mi/lane)
A	0-11
B	>11-18
C	>18-26
D	>26-35
E	>35-45
F	>45
Source: *Highway Capacity Manual (2010)* pg. 23-3	

In order to first identify different capacity needs for different parts of the corridor, the project corridor was broken out into segments and the LOS was calculated, without improvements, in five-year increments, to determine when LOS thresholds would cross from acceptable (LOS A-D) to non-acceptable (LOS E-F). The HCM analysis was performed for each peak direction of travel. Westbound analysis corresponds to AM peak hour volumes while Eastbound analysis corresponds to PM peak hour volumes.

Analysis excluded the HOV lane and the HOV lane traffic due to the fact that HCM methodology does not account for managed lanes. Approximately 10 percent of the segment traffic is expected to use the HOV lane. The analysis also assumes 7 percent trucks during the a.m. and p.m. peak hour condition.

As shown in Tables 13 and 14 the results of the LOS analysis show that in 2018 the following segments operate at below LOS D thresholds:

- AM Peak Hour
  - Westbound SR 202L mainline, between Gilbert Road and SR 101L.
- PM Peak Hour
  - Eastbound SR 202L mainline between Alma School Road and Cooper Road.

The majority of the study corridor is anticipated to operate at LOS E/F under existing conditions beginning in 2025 and by the design year, the entire study corridor will operate at LOS E/F in the peak hours.

The analysis process was repeated in an iterative manner by adding GPLs one at a time to each segment. The analysis found that the project corridor is anticipated to continue operating at congested levels of service for a majority of the study area with the addition of one additional GPL in each direction, in 2040. The segments between SR 101L and Gilbert Road are expected to experience the worst levels of service due to the high volume of traffic projected in those segments during 2040.

In order to address these capacity deficiencies, a final macro analysis iteration was completed for the area between SR 101L and Gilbert Road, assuming a second GPL of widening was completed in each direction. The addition of two GPLs in each direction from SR 101L to Gilbert Road is predicted to result in all of the evaluated segments operating at a LOS E or better during the peak hours of 2040 as shown in Tables 15 and 16.

The reason that HCM formulas alone cannot be used to evaluate the project corridor is that the methodology cannot evaluate multiple freeway segments at the same time. The formulas evaluate isolated segments, independent of any conditions upstream or downstream of the freeway. Another project condition that cannot be analyzed by HCM alone is the HOV lane restrictions. In light of these limitations, the computer program PTV Vissim was used for further micro level analysis and simulation of the Recommended Alternative.

Table 13. Westbound SR 202L LOS Analysis Results (AM Peak Hour, No Build)

Segments	Number of Lanes	2018		2025		2030		2035		2040	
		Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Under Val Vista Dr	3	5,040	D	5,550	D	5,950	E	6,370	F	6,820	F
Over Lindsay Rd	3	5,470	D	6,020	E	6,450	F	6,910	F	7,400	F
Under Gilbert Rd	3	4,960	D	5,530	D	5,980	E	6,470	F	6,990	F
Under Cooper Rd	3	5,930	E	6,450	F	6,850	F	7,270	F	7,720	F
Under McQueen Rd	3	5,910	E	6,550	F	7,050	F	7,590	F	8,170	F
Over Arizona Ave	3	6,690	F	7,370	F	7,890	F	8,450	F	9,050	F
Under Alma School Rd	3	7,050	F	7,750	F	8,280	F	8,860	F	9,470	F
Dobson Rd off Ramp to SR 101L off Ramp	3	7,460	F	8,170	F	8,720	F	9,300	F	9,920	F
SR 101L off Ramp to Price Rd off Ramp	3	5,040	D	5,730	E	6,270	E	6,870	F	7,520	F
Under Price Road	3	4,460	C	5,080	D	5,580	E	6,120	E	6,720	F
SR 101L On Ramp to McClintock Dr On Ramp	4	4,950	C	5,680	C	6,260	D	6,900	D	7,600	E
Under Kyrene Rd	3	3,730	C	4,380	C	4,920	D	5,530	D	6,200	E
I-10 off Ramp to I-10 On Ramp	2	1,490	B	2,030	B	2,530	C	3,140	D	3,910	E

Table 14. Eastbound SR 202L LOS Analysis Results (PM Peak Hour, No Build)

Segments	Number of Lanes	2018		2025		2030		2035		2040	
		Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
I-10 off Ramp to I-10 On Ramp	2	1,650	B	2,230	C	2,770	C	3,440	D	4,270	F
Under Kyrene Rd	3	4,310	C	5,020	D	5,590	E	6,240	E	6,950	F
McClintock Dr off Ramp to SR 101L off Ramp	3	5,280	D	6,040	E	6,650	F	7,320	F	8,050	F
SR 101L off Ramp to Price Rd off Ramp	3	5,010	D	5,720	E	6,280	E	6,900	F	7,580	F
Under Price Road	3	4,230	C	4,860	D	5,370	D	5,940	E	6,560	F
Price Rd On Ramp to SR 101L On Ramp	3	4,910	D	5,570	E	6,090	E	6,670	F	7,290	F
SR 101L On Ramp to Dobson Rd On Ramp	4	7,410	D	8,090	E	8,620	F	9,190	F	9,780	F
Under Alma School Rd	3	6,890	F	7,550	F	8,060	F	8,610	F	9,190	F
Over Arizona Ave	3	6,660	F	7,310	F	7,820	F	8,360	F	8,940	F
Under McQueen Rd	3	6,380	F	7,040	F	7,570	F	8,120	F	8,720	F
Under Cooper Rd	3	6,410	F	6,940	F	7,340	F	7,770	F	8,220	F
Under Gilbert Rd	3	5,470	D	6,060	E	6,520	F	7,010	F	7,540	F
Over Lindsay Rd	3	5,300	D	5,940	E	6,450	F	6,990	F	7,580	F
Under Val Vista Dr	3	4,230	C	4,750	D	5,150	D	5,580	E	6,050	E

Table 15. Westbound SR 202L LOS Analysis Results (AM Peak Hour, Recommended Alternative)

Segments	Number of Lanes	2018		2025		2030		2035		2040	
		Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Under Val Vista Dr	4	5,040	C	5,550	C	5,950	C	6,370	D	6,820	D
Over Lindsay Rd	4	5,470	C	6,020	C	6,450	D	6,910	D	7,400	D
Under Gilbert Rd	4	4,960	C	5,530	C	5,980	C	6,470	D	6,990	D
Under Cooper Rd	5	5,930	C	6,450	C	6,850	C	7,270	C	7,720	D
Under McQueen Rd	5	5,910	C	6,550	C	7,050	C	7,590	C	8,170	D
Over Arizona Ave	5	6,690	C	7,370	C	7,890	D	8,450	D	9,050	D
Under Alma School Rd	5	7,050	C	7,750	D	8,280	D	8,860	D	9,470	E
Dobson Rd off Ramp to SR 101L off Ramp	5	7,460	C	8,170	D	8,720	D	9,300	E	9,920	E
SR 101L off Ramp to Price Rd off Ramp	4	5,040	C	5,730	C	6,270	D	6,870	D	7,520	E
Under Price Road	4	4,460	C	5,080	C	5,580	C	6,120	D	6,720	D
SR 101L On Ramp to McClintock Dr On Ramp	5	4,950	B	5,680	C	6,260	C	6,900	C	7,600	C
Under Kyrene Rd	4	3,730	B	4,380	B	4,920	C	5,530	C	6,200	D
I-10 off Ramp to I-10 On Ramp	3	1,490	A	2,030	A	2,530	B	3,140	B	3,910	C

Table 16. Eastbound SR 202L LOS Analysis Results (PM Peak Hour, Recommended Alternative)

Segments	Number of Lanes	2018		2025		2030		2035		2040	
		Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
I-10 off Ramp to I-10 On Ramp	3	1,650	A	2,230	B	2,770	B	3,440	C	4,270	C
Under Kyrene Rd	4	4,310	B	5,020	C	5,590	C	6,240	D	6,950	D
McClintock Dr off Ramp to SR 101L off Ramp	4	5,280	C	6,040	C	6,650	D	7,320	D	8,050	E
SR 101L off Ramp to Price Rd off Ramp	4	5,010	C	5,720	C	6,280	D	6,900	D	7,580	E
Under Price Road	4	4,230	B	4,860	C	5,370	C	5,940	C	6,560	D
Price Rd On Ramp to SR 101L On Ramp	4	4,910	C	5,570	C	6,090	C	6,670	D	7,290	D
SR 101L On Ramp to Dobson Rd On Ramp	6	7,410	C	8,090	C	8,620	C	9,190	D	9,780	D
Under Alma School Rd	5	6,890	C	7,550	C	8,060	D	8,610	D	9,190	D
Over Arizona Ave	5	6,660	C	7,310	C	7,820	D	8,360	D	8,940	D
Under McQueen Rd	5	6,380	C	7,040	C	7,570	C	8,120	D	8,720	D
Under Cooper Rd	5	6,410	C	6,940	C	7,340	C	7,770	D	8,220	D
Under Gilbert Rd	4	5,470	C	6,060	C	6,520	D	7,010	D	7,540	E
Over Lindsay Rd	4	5,300	C	5,940	C	6,450	D	6,990	D	7,580	E
Under Val Vista Dr	4	4,230	B	4,750	C	5,150	C	5,580	C	6,050	C

2.4.2 SR 202L Mainline Vissim Analysis

A microsimulation model is the most detailed type of model that can be constructed for a study area. Such models are able to depict lanes, turn bays, parking, crosswalks, ramp meters, signals, and other physical characteristics of a network as one might see them in aerial imagery. It also allows the user to fine-tune a wide range of non-physical characteristics of the network, including priority and speed decisions.

Origin-destination (O-D) matrices were developed for the study corridor for use in the microsimulation models. Matrices were developed using the number of vehicles entering and exiting the network provided by the MAG TDM. Separate matrices were developed for the AM and PM peak hours and EB and WB directions of the Recommended Alternative. The vehicle inputs and static routing in the microsimulation models come directly from these matrices.

The Vissim models constructed for SR 202L include only the mainline segments and ramps along the study corridor; microsimulation modeling was not performed to assess intersection operations at ramp terminals. for all models, the traffic distribution was assumed to be ten percent HOV vehicles, seven percent trucks, and the remainder as passenger vehicles. The assumptions were based on actual HOV and truck volumes observed throughout the corridor, in the existing year conditions and in the MAG model estimates for the future year conditions.

Vissim models for the No-Build and two interim iterations were included in preliminary microsimulation iterations. However, the LOS output for these models was not in line with the results of the mainline macro analysis using the HCS software with HCM methodology. The levels of density and vehicle volumes traveling on the mainline segments in the Vissim model were significantly less than the densities reported by the HCS program and volumes projected in the MAG TDM. A review of the networkwide statistics for the Vissim models showed that there was a significant volume of latent traffic that was never able to even enter the corridor simulation because of congestion within the corridor. The congestion within the corridor would extend to the start of the corridor, blocking new vehicles from entering. This condition was resulting in decreased traffic volumes farther downstream, which made it appear as if levels of service were better than they would actually operate. The capacity added under the Recommended Alternative was the only condition where the simulation model was able to serve all of the projected 2040 demand volumes from the MAG TDM. As such, the Recommended Alternative is the only scenario with reported output from the microsimulation models.

Figures 7 and 8 show the LOS analysis results for the 2040 AM and PM peak hours with the Recommended Alternative, also known as Scenario C as described by the Final Traffic Report, respectively. The results of the LOS analysis show that the following segments are predicted to operate at below LOS D thresholds:

- AM Peak Hour
  - Eastbound SR 202L mainline, west of Ramp Eastbound 202 to Northbound I-10
  - Westbound SR 202L mainline, east of Val Vista Drive

- PM Peak Hour
  - Eastbound SR 202L mainline, from Cooper Road on-ramp to Val Vista Drive off-ramp

The LOS figures illustrate that the SR 202L mainline segments between SR 101L and Gilbert Road need the added capacity of two new GPLs in order to operate at an acceptable LOS. Due to the increased traffic flow that can now be handled with the two added lanes, EB SR 202L is now predicted to operate at a failing LOS F beginning at Gilbert Road where the widening transitions from two new lanes to one new lane. This bottle necking effect extends to Val Vista Drive before freeway volumes dissipate to levels the existing capacity can handle.

2.5 SERVICE INTERCHANGE INTERSECTION ANALYSIS

2.5.1 Signalized Intersections

The computer program Synchro/SimTraffic Version 9 was utilized to calculate the LOS at the service interchange signalized intersections. At signalized intersections, LOS is calculated for each movement and then is summed in a weighted fashion to yield the LOS for the approach and for the intersection as a whole. LOS D is typically considered adequate operation at signalized and un-signalized intersections in developed areas. The criteria for LOS at signalized intersections are shown in Table 17.

Table 17. Level of Service Criteria – Signalized Intersections

Level of Service	Average Total Delay
A	≤ 10.0 seconds
B	> 10.0 and ≤ 20.0 seconds/vehicle
C	> 20.0 and ≤ 35.0 seconds/vehicle
D	> 35.0 and ≤ 55.0 seconds/vehicle
E	> 55.0 and ≤ 80.0 seconds/vehicle
F	> 80.0 seconds per vehicle

One of the limitations found in the HCM 2010 methodology is that it does not allow for the consideration of clustered signalized intersections. Clustered signalized intersections are multiple signalized intersections that operate from a single controller cabinet. All of the signalized intersections at the service interchanges within the study area operate as clustered intersections. Synchro 9 addresses this limitation by providing an option for users to report results using Synchro methodology as opposed to HCM 6th Edition methodology. Synchro 9 calculates LOS at clustered intersections by taking the weighted total of both intersections, not each one independently. The calculated delays are then categorized into LOS using the HCM criteria shown in Table 17. Due to these limitations by the HCM and the available Synchro 9 methodology, all the signalized intersections on the project corridor were analyzed using Synchro 9 methodology.

Existing Synchro files, including existing signal timing plans, were provided by the City of Chandler for a subset of the intersections within the study corridor between and including the Dobson Road and Gilbert Road interchanges. The remaining existing interchanges and all future intersection models included the following input data for calculating LOS:

Cycle Length: 90 to 120 second
Right Turn on Red (RTOR): Allowed (Where Existing)
Lane Widths: 12 Feet
Lane Saturation Flow Rate: 2,000 vehicles per hour per lane (vphpl)
Peak Hour Factor: 0.92

Intersection lane configurations for all analysis scenarios were made to match existing conditions. Only the overall LOS for the signalized intersections were reported.

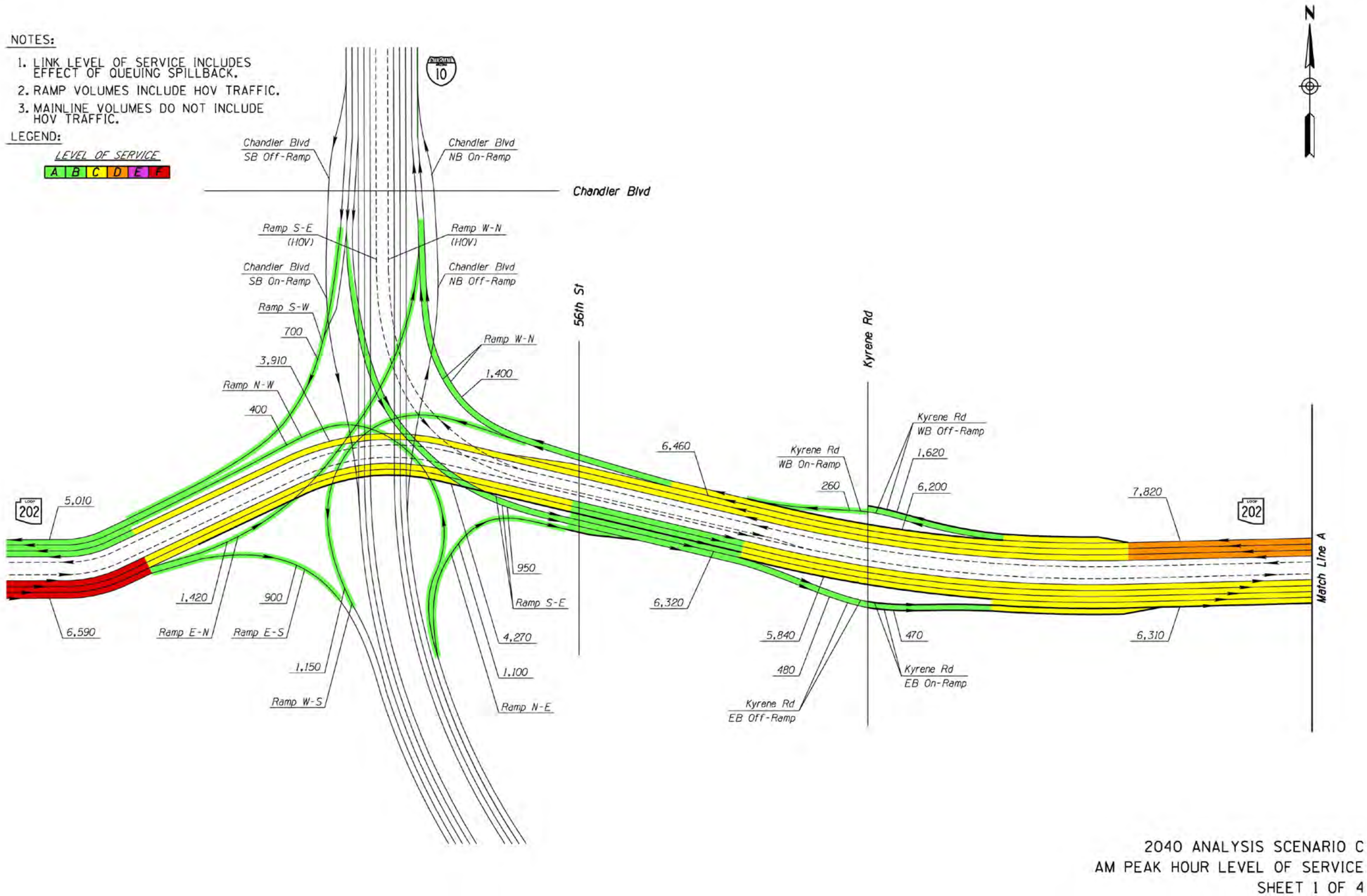


Figure 7. 2040 A.M. Peak Hour Level of Service

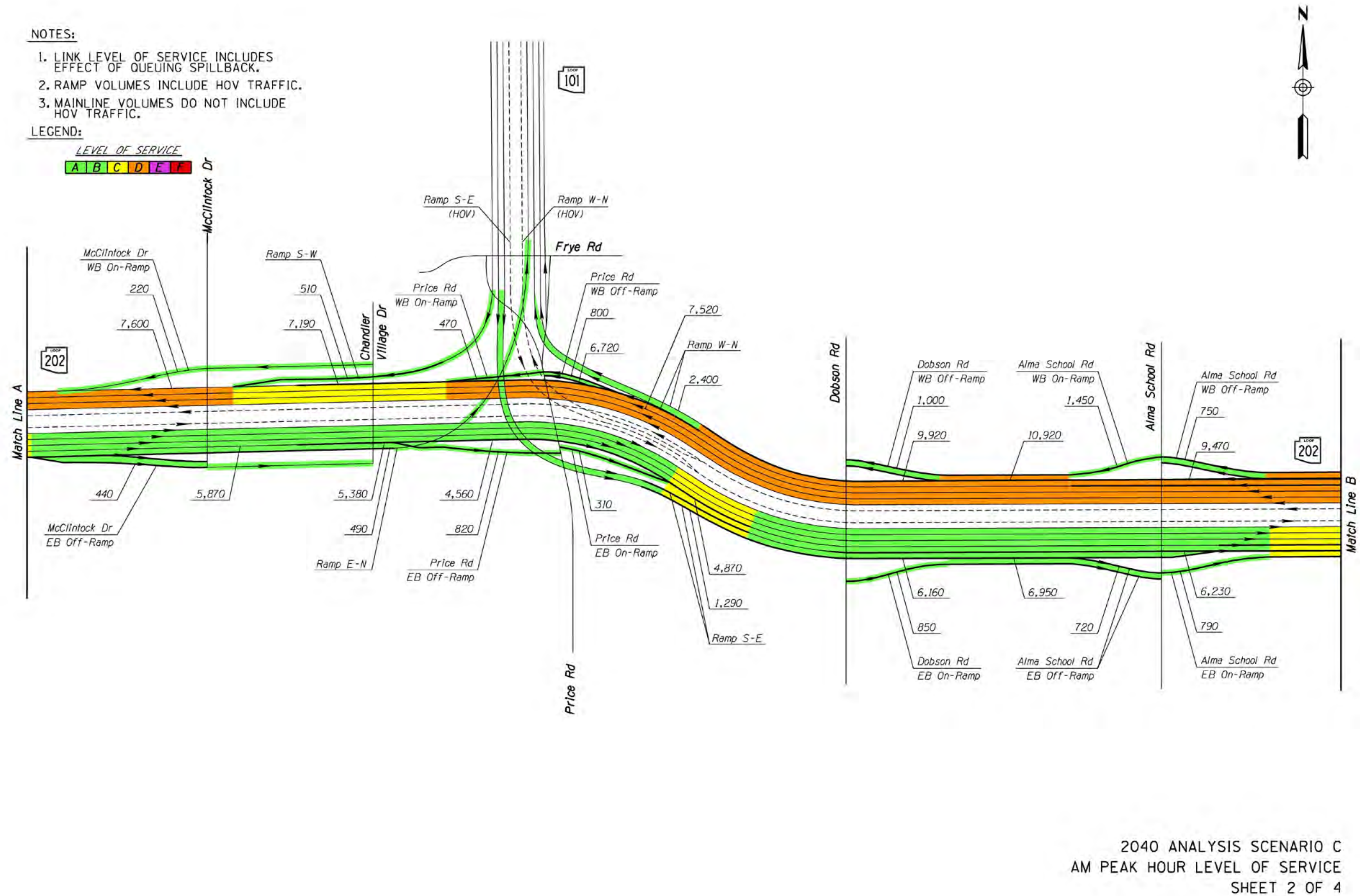


Figure 7. 2040 A.M. Peak Hour Level of Service

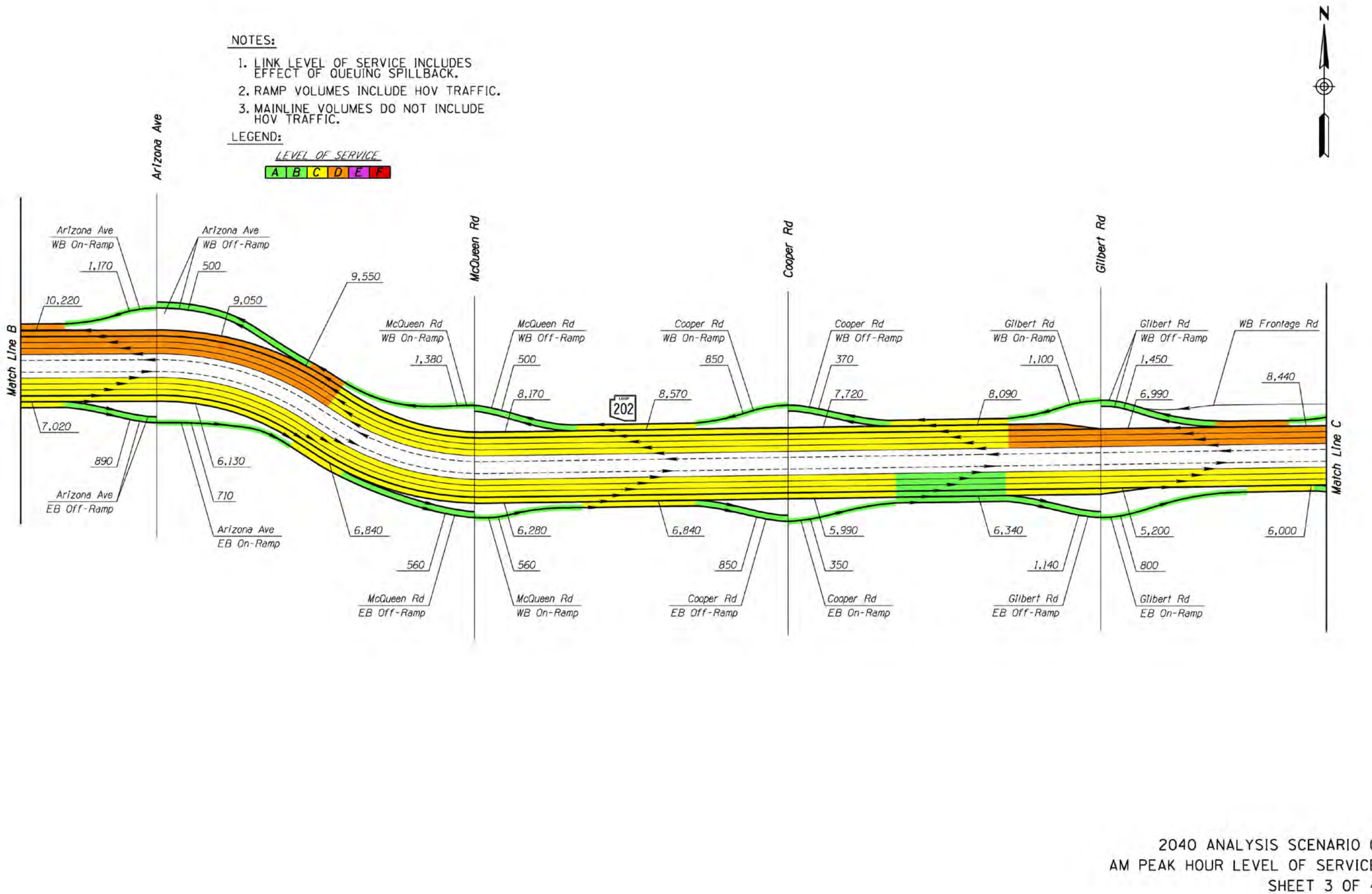


Figure 7. 2040 A.M. Peak Hour Level of Service

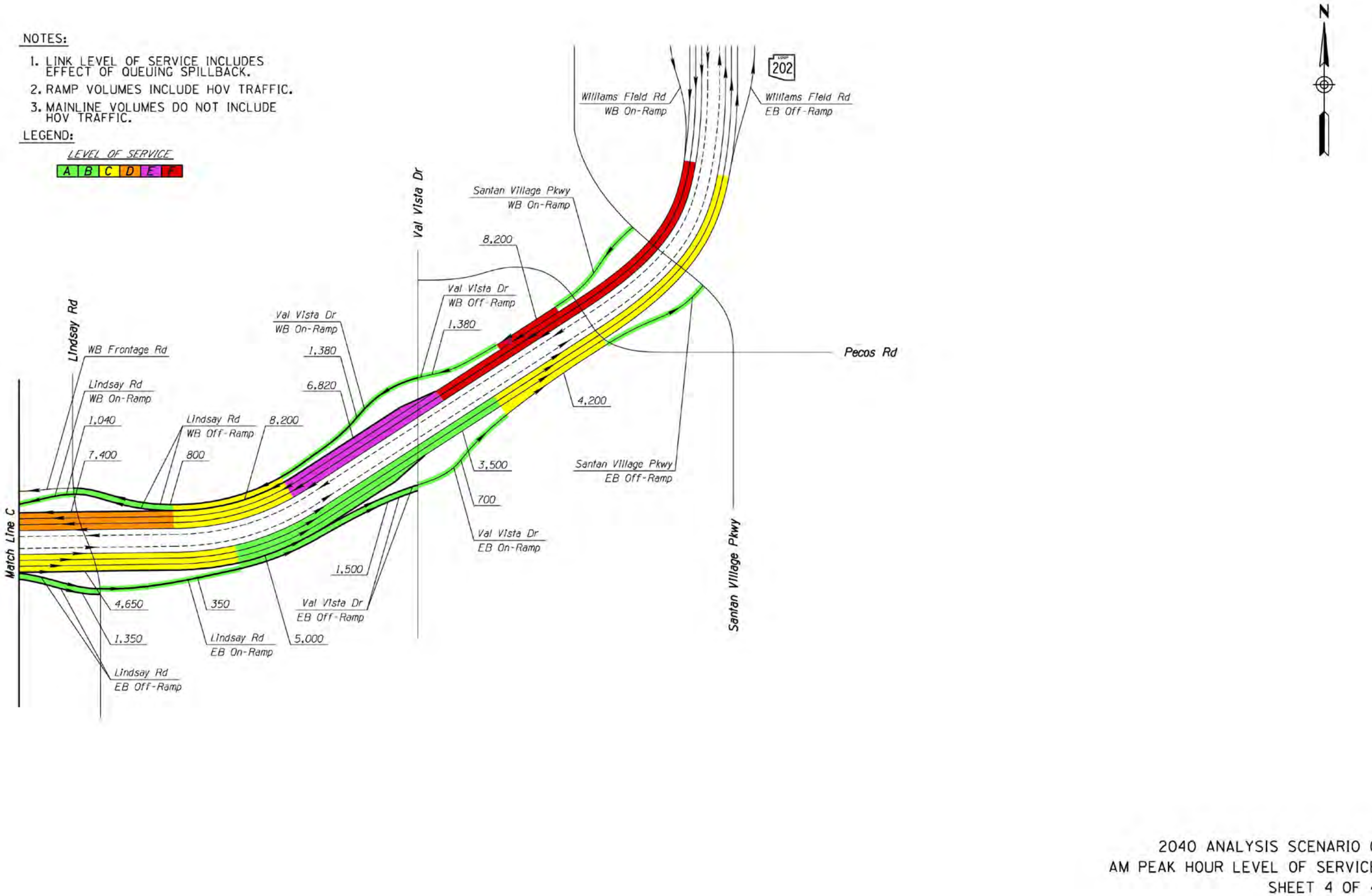


Figure 7. 2040 A.M. Peak Hour Level of Service

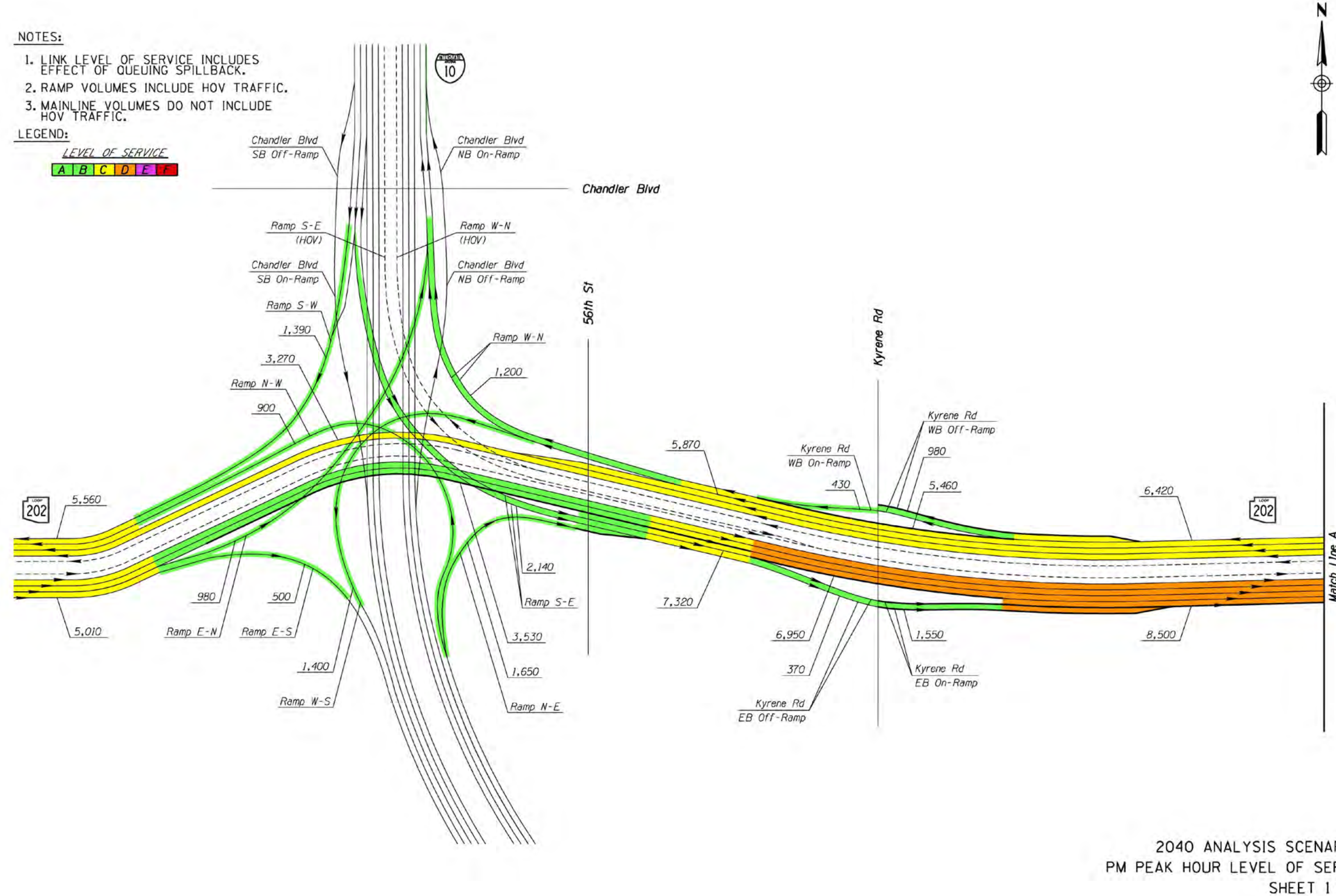


Figure 8. 2040 P.M. Peak Hour Level of Service

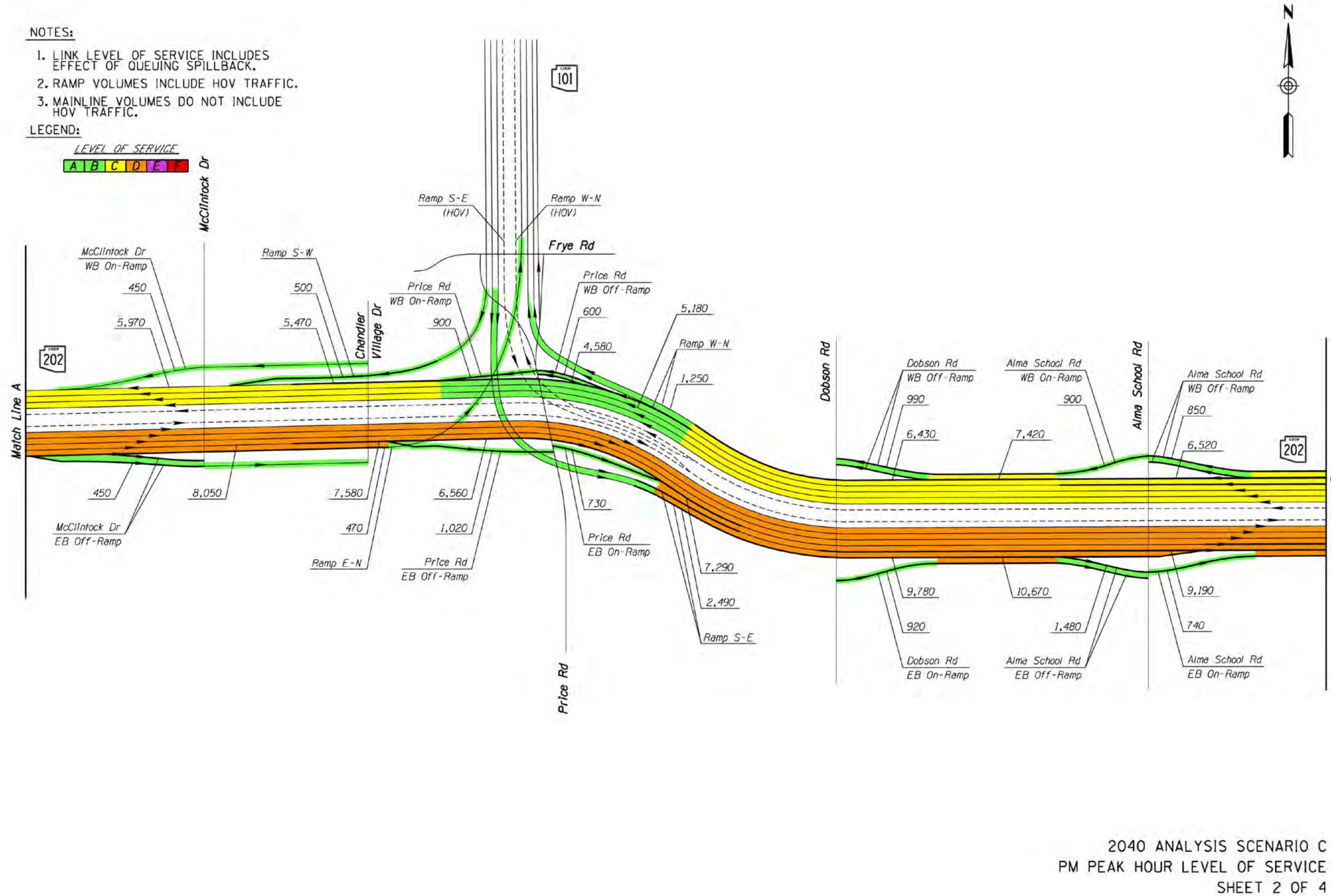


Figure 8. 2040 P.M. Peak Hour Level of Service

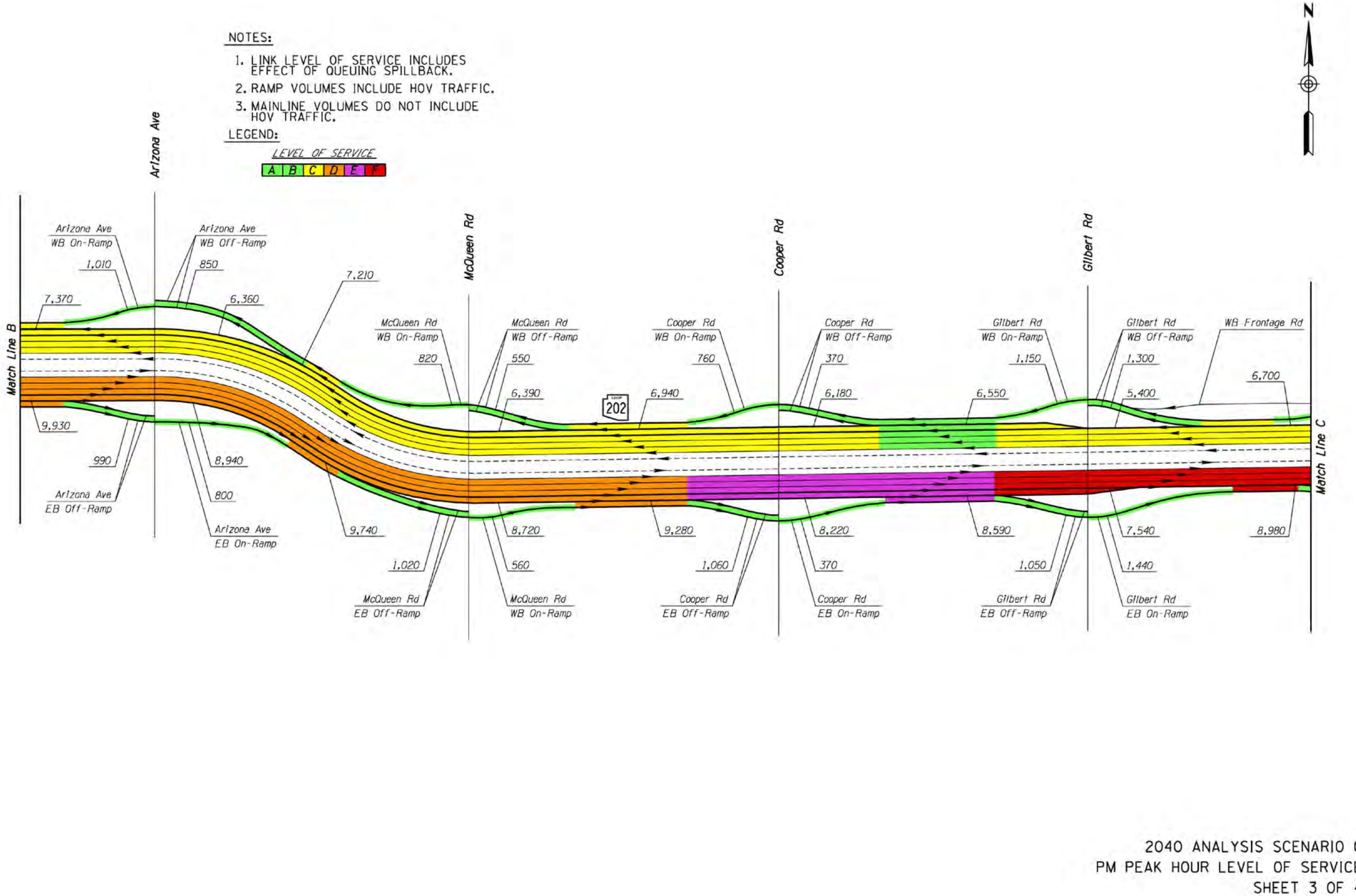


Figure 8. 2040 P.M. Peak Hour Level of Service

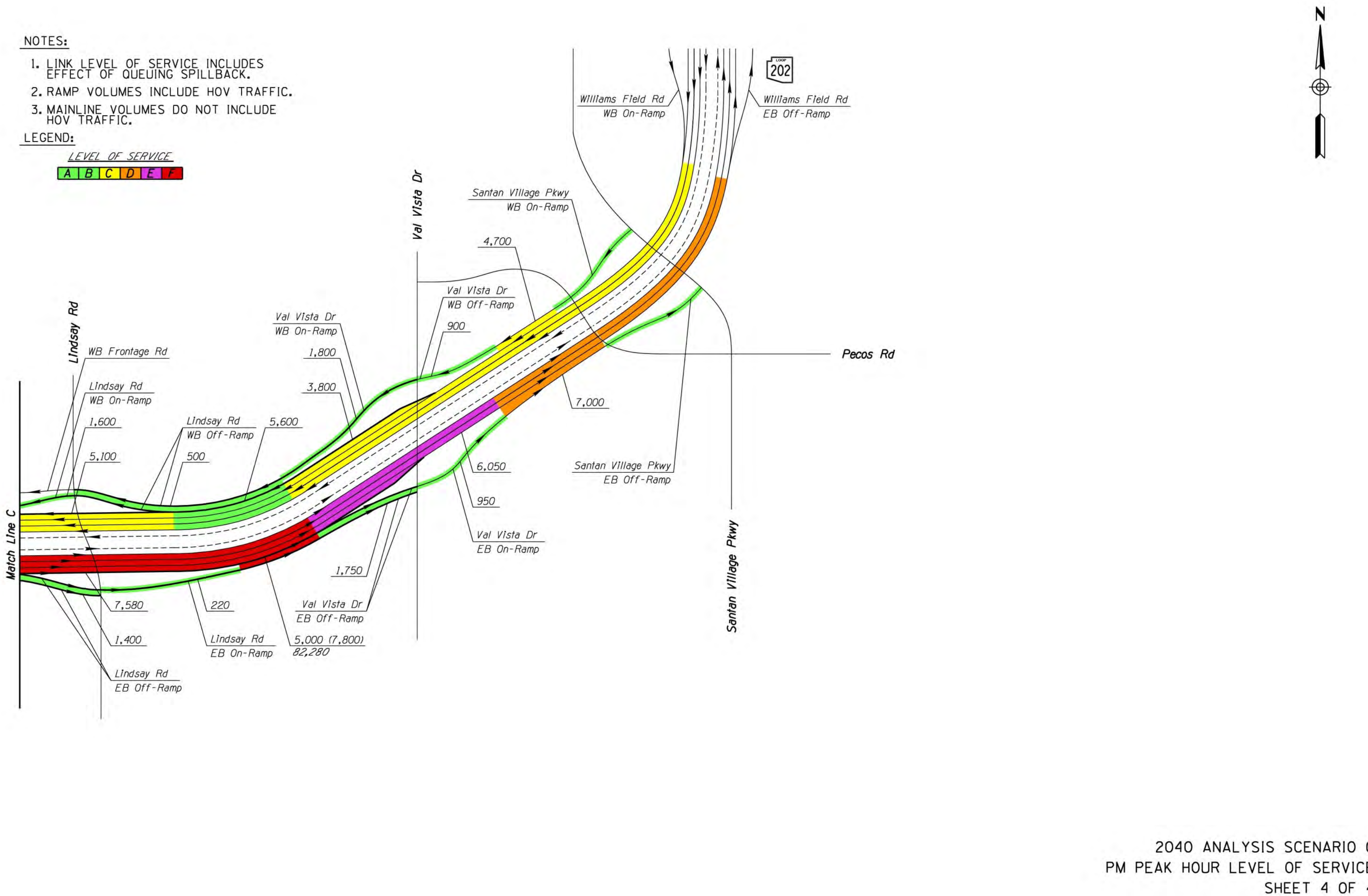


Figure 8. 2040 P.M. Peak Hour Level of Service

2.5.2 Signalized Intersection Analysis Results

Intersection capacity was calculated for all the study ramp intersections with existing and 2040 peak hour traffic volumes which are presented in the Final Traffic Report. Levels of service for all the ramp intersections in the project corridor are shown in Table 18.

Table 18. Signalized Intersections Analysis Results

Location	2018 Existing Conditions				2040			
	AM Peak		PM Peak		AM Peak		PM Peak	
	EB	WB	EB	WB	EB	WB	EB	WB
SR 202L/Kyrene Rd								
Avg TI Delay (sec/veh)	35.3	28.5	22.3	15.6	30.5	41.4	25.2	15.8
Overall TI LOS	D	C	C	B	C	D	C	B
SR 202L/McClintock Dr								
Avg TI Delay (sec/veh)	36.1	10.7	43.8	19.9	34.6	17.0	41.9	16.5
Overall TI LOS	D	B	D	B	C	B	D	B
SR 202L/Price Rd								
Avg TI Delay (sec/veh)	19.1	21.4	25.1	21.5	22.3	24.2	29.5	24.7
Overall TI LOS	B	C	C	C	C	C	C	C
SR 202L/Dobson Rd								
Avg TI Delay (sec/veh)	6.8	14.1	3.3	8.8	6.9	14.7	4.3	10.6
Overall TI LOS	A	B	A	A	A	B	A	B
SR 202L/Alma School Rd								
Avg TI Delay (sec/veh)	12.6	18.1	25.1	17.6	49.7	36.4	48.1	24.3
Overall TI LOS	B	B	C	B	D	D	D	C
SR 202L/Arizona Avenue								
Avg TI Delay (sec/veh)	14.0	19.1	17.6	17.2	24.0	28.8	40.4	36.7
Overall TI LOS	B	B	B	B	C	C	D	D
SR 202L/McQueen Rd								
Avg TI Delay (sec/veh)	15.4	16.2	26.6	15.2	23.5	31.9	29.5	18.2
Overall TI LOS	B	B	C	B	C	C	C	B
SR 202L/Cooper Rd								
Avg TI Delay (sec/veh)	18.0	14.8	15.5	16.3	20.7	16.0	18.3	20.2
Overall TI LOS	B	B	B	B	C	B	B	C
SR 202L/Gilbert Rd								
Avg TI Delay (sec/veh)	14.8	19.9	17.2	16.6	27.1	29.4	75.0	78.0
Overall TI LOS	B	B	B	B	C	C	E	E
No. of approaches at LOS 'E' or 'F'	0	0	0	0	0	0	1	2
SR 202L/Val Vista Dr								
Avg TI Delay (sec/veh)	25.3	28.6	59.4	92.7	54.2	48.6	61.4	62.7
Overall TI LOS	C	C	E	F	D	D	E	E
No. of approaches at LOS 'E' or 'F'	0	0	1	1	2	2	2	2

Table 18 shows that the intersections of Gilbert Road and Val Vista Drive are expected to operate at an inadequate LOS E during the 2040 peak hours with the existing lane configurations. 2040 peak hour traffic volumes for these two intersections are shown in Figure 9. The remaining study intersections currently operate at a LOS D or better and are predicted to continue doing so in 2040.

The signalized intersections at the Gilbert Road interchange and are anticipated to operate at an overall LOS E with future 2040 volumes. These delays are associated with the high number of vehicles expected to make left turns onto SR 202L from Gilbert Road, combined with the limited capacity provided by the single SB left turn lane. One mitigation measure that would improve capacity for left turns onto SR 202L would be restriping one of the existing SB through lanes on Gilbert Road into a second left turn lane. The added capacity of a second SB left turn lane would allow for more of the traffic signal green time to be redistributed to other movements, improving the overall LOS.

The signalized intersections at the Val Vista Drive interchange are expected to operate at overall levels of service E in the PM peak hour of 2040. The relatively high delays are due to the overall high volume of vehicles expected to use the intersections during the PM peak hour. 910 and 420 vehicles are expected to turn left onto SR 202L in the NB and SB directions, respectively. Adding an additional NB left turn lane to serve the 910 vehicles would improve delays for that specific turning movement but the overall intersection delay is not expected to improve significantly since the remainder of the approaches are still projected to operate at over capacity. Furthermore, the existing NB left turn lanes each currently provide approximately 500' of queue storage to accommodate left turning vehicles in the event that drivers need to wait more than one signal cycle to progress through the WB intersection. It is recommended that the configuration of triple NB left turn lanes is re-evaluated whenever future widenings of the Val Vista off ramps are evaluated.

2.6 EVALUATION OF RAMP METER QUEUE LENGTHS

2.6.1 Analysis Methodology

Guidance provided in ADOT's *Ramp Metering Design Guide* (November 2013) was used to determine the vehicle storage length required in advance of the ramp meters at each of the corridor entrance ramps.

The guide provides the following two warrants that both must be met in order to justify the installation of a ramp meter:

Warrant 1 – Freeway Right Lane and Entrance Ramp Flow Rate

During a typical 15-minute period, the combining flow rate of the entrance ramp and the rightmost freeway lane is greater than 2,050 vehicles per hour and during the same period, the entrance ramp flow rate is greater than 400 vehicles per hour.

Warrant 2 – Freeway Speed

During a typical 15-minute period, the speed of the freeway GPLs (not including HOV, auxiliary, and entrance ramp lanes) is less than 50 mph due to recurring congestion adjacent to or within 2 miles downstream of the entrance ramp.

The guide also provides an equation for calculating storage distance at on ramps.

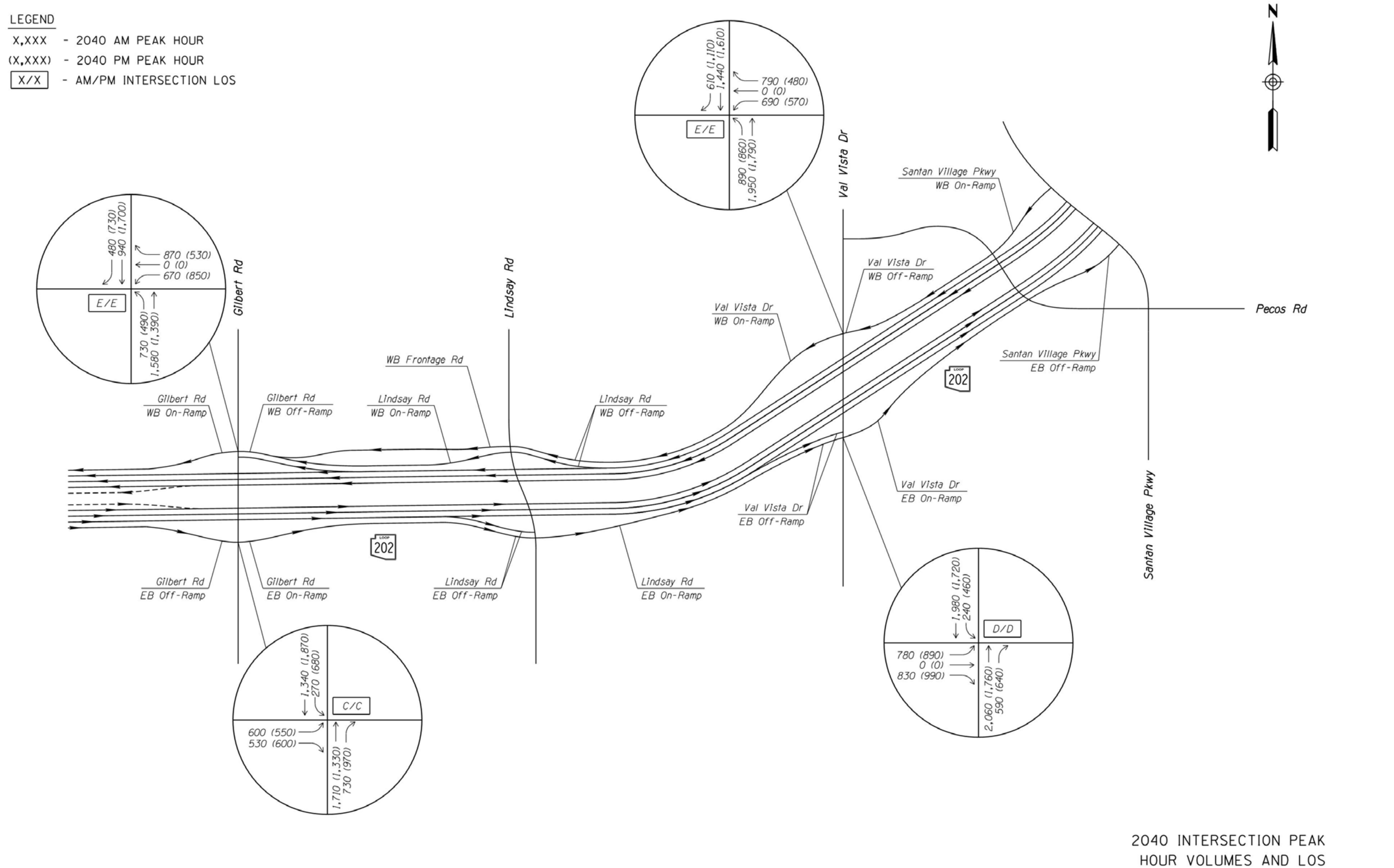


Figure 9. 2040 Gilbert Road and Val Vista Drive Intersection Peak Hour Traffic Volumes

2.6.2 Analysis Results

The ramp meter queue length evaluation was conducted for each entrance ramp along the study corridor using the 2040 peak hour volumes. Tables 19 and 20 show the calculated minimum storage lengths for each of the EB and WB entrance ramps, respectively.

Table 19. Eastbound Entrance Ramp Meter Storage Length Calculations

Ramp	2040 Volume (vph)		% Trucks	No. of Lanes	Meter Rate (vph)	A.M. Peak Calculated Queue Length (ft)	P.M. Peak Calculated Queue Length (ft)	Actual Queue Length (ft)
	A.M.	P.M.						
Kyrene Road	470	1,550	7.0%	2	1,200	400	2,738	725
Price Road	310	730	7.0%	2	1,200	400	400	925
Dobson Road	850	920	7.0%	2	1,200	400	400	925
Alma School Road	790	740	7.0%	2	1,200	400	400	725
Arizona Avenue	1,170	1,010	7.0%	2	1,200	400	400	725
McQueen Road	1,380	820	7.0%	2	1,200	1,408	400	550
Cooper Road	350	370	7.0%	2	1,200	400	400	600
Gilbert Road	1,100	1,150	7.0%	2	1,200	400	400	500
Lindsay Road	1,040	1,600	7.0%	2	1,200	400	3,129	-
Val Vista Drive	1,380	1,800	7.0%	2	1,200	1,408	4,694	890

Note: Queue lengths shown are per lane

Table 20. Westbound Entrance Ramp Meter Storage Length Calculations

Ramp	2040 Volume (vph)		% Trucks	No. of Lanes	Meter Rate (vph)	A.M. Peak Calculated Queue Length (ft)	P.M. Peak Calculated Queue Length (ft)	Actual Queue Length (ft)
	A.M.	P.M.						
Val Vista Drive	700	950	7.0%	2	1,200	400	400	900
Lindsay Road	350	220	7.0%	2	1,200	400	400	-
Gilbert Road	800	1,440	7.0%	2	1,200	400	1,877	575
Cooper Road	850	760	7.0%	2	1,200	400	400	550
McQueen Road	560	560	7.0%	2	1,200	400	400	700
Arizona Avenue	710	800	7.0%	2	1,200	400	400	650
Alma School Road	1,450	900	7.0%	2	1,200	1,956	400	725
Price Road	470	900	7.0%	2	1,200	400	400	400
McClintock Drive	220	450	7.0%	2	1,200	400	400	825
Kyrene Road	260	430	7.0%	2	1,200	400	400	525

Note: Queue lengths shown are per lane

Tables 19 and 20 indicate that entrance ramps at Kyrene Road, Gilbert Road, Lindsay Road and Val Vista Drive are predicted to have less storage length than required based on the *Ramp Metering Design Guide* criteria. Each of these ramps have physical constraints that do not make providing the calculated storage length feasible. It is recommended that ramp meter timing for the entire corridor be evaluated during final design in order to evaluate mitigating the storage length deficiencies. Field observations during the weekday peak hours should also be completed in order to adjust the meter timings as traffic volumes vary over time.

3.0 MAJOR DESIGN FEATURES OF THE RECOMMENDED ALTERNATIVE

3.1 DESIGN CONTROLS

SR 202L is classified as an Urban Principal Freeway. A summary of the design controls for SR 202L mainline is provided in Table 21. A summary of the design controls for the system and service interchange ramps, respectively, are provided in Tables 22 and 23.

Table 21. Design Controls for SR 202L Mainline

Description of Criteria	Values for Design
Design Year	2040
Design Speed	Match Existing (65 mph)
Superelevation	Match Existing (0.06 ft/ft Maximum)
Cross Slope	2.0%
Lane Width	12 ft.
Shoulder Width (Median)	10 ft.
Shoulder Width (Outside)	10 ft.*
Maximum Horizontal Curve	Match Existing (3°27'/1660.75 ft.)
Maximum Gradient	Match Existing (+3%/-3%)
Slope Standards	
- Cut Slopes	Varies, 3:1 Maximum Cut
- Fill Slopes	Varies, 3:1 Maximum Fill
Minimum Vertical Clearance - Highway Structure - Pedestrian Overpass - Over Railroad	 16.5 ft. 17.5 ft. 23.5 ft.

* When adjacent to barrier, outside shoulders shall have 2 ft. added to the required width, in accordance with the ADOT memo "2 Foot offset Distance to Roadside Barriers", dated 8/18/2005.

Table 22. Design Controls for non-HOV System (Directional) Ramps

Description of Criteria	Values for Design
Design Year	2040
Design Speed	Match Existing (55 mph)
Superelevation	Match Existing (0.06 ft/ft Maximum)
Cross Slope	2.0%
Pavement Width	Match Existing (see below)
- One lane ramps	28 ft.*
- Two lane ramps	36 ft.*
Lane Width	12 ft.
Shoulder Width	Match Existing (see below)
- Inside Shoulder (1 lane ramp)	6 ft.*
- Inside Shoulder (2 lane ramp)	4 ft.*
- Outside Shoulder (1 lane ramp)	10 ft.*
- Outside Shoulder (2 lane ramp)	8 ft.*
Maximum Horizontal Curvature	Match Existing (5°24'/1061.03 ft.)
Maximum Gradient	Match Existing (+4/-5% Desirable/6% Maximum)
Slope Standards	
- Cut Slopes	Varies, 3:1 Maximum
- Fill Slopes	Varies, 3:1 Maximum
Minimum Vertical Clearance - Highway Structure - Pedestrian Overpass - Over Railroad	 16.5ft. 17.5ft. 23.5 ft.

* When adjacent to barrier, ramp shoulders shall have 2 ft. added to the required width, in accordance with the ADOT memo "2 Foot offset Distance to Roadside Barriers", dated 8/18/2005.

Table 23. Design Controls for Service (non-Directional) Ramps

Description of Criteria	Values for Design
Design Year	2040
Design Speed	Match Existing (50 mph)
Superelevation	Match Existing (0.06 ft/ft Maximum)
Cross Slope	2.0%
Pavement Width	Match Existing (see below)
- One lane ramps	22 ft.*
- Two lane ramps	34 ft.*
Lane Width	12 ft.
Shoulder Width	Match Existing (see below)
- Inside Shoulders	2 ft.*
- Outside Shoulders	8 ft.*
Maximum Horizontal Curvature	Match Existing (6°53'/832.29 ft.)
Maximum Gradient	Match Existing (+4/-5% Desirable/6% Maximum)
Slope Standards	
- Cut Slopes	Varies, 3:1 Maximum
- Fill Slopes	Varies, 3:1 Maximum
Minimum Vertical Clearance - Highway Structure - Pedestrian Overpass - Over Railroad	 16.5ft. 17.5ft. 23.5 ft.

* When adjacent to barrier, ramp shoulders shall have 2 ft. added to the required width, in accordance with the ADOT memo "2 Foot offset Distance to Roadside Barriers", dated 8/18/2005. 2 lane onramps that are set up to be dual metered shall have 2 ft. inside and outside shoulders.

3.2 ROADWAY CONFIGURATION

The Recommended Alternative would construct one additional GPL in each direction on the SR 202L mainline from the I-10/SR 202L TI to the SR 101L/SR 202L TI, and again from Gilbert Road to Val Vista Drive; between the SR 101L/SR 202L TI and Gilbert Road, the Recommended Alternative would construct two additional GPLs in each direction. The configuration of the existing SR 202L HOV lanes will not be affected by the Recommended Alternative.

Eastbound SR 202L Mainline

The SMF projected opened to traffic in December 2019, and provides three GPLs and a HOV lane west of and under I-10. Three GPLs would approach the Ramp I-10/SR 202L N-E/S-E gore. The system interchange ramp would combine two lanes from Ramp S-E and one lane from Ramp N-E with a gore as far west of the SR 202L gore as possible. The ramp would have a parallel entrance at the gore with SR 202L, and would add one GPL and one auxiliary lane to SR 202L.

Four GPLs and an auxiliary lane would approach Kyrene Road. The Kyrene Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Kyrene Road or continuing the SR 202L through movement, similar to the existing condition.

The Kyrene Road entrance ramp would be unmetered, matching to the existing condition. It would be widened (to 2 lanes) near the SR 202L gore. It would be configured as a parallel entrance that becomes a fifth GPL. The outside entrance ramp lane would drop using an AASHTO lane merge approximately 700 feet east of the SR 202L gore.

Five GPLs would approach McClintock Drive. Starting approximately 660 feet in advance of the McClintock Drive/Chandler Village Drive exit, an outside auxiliary lane would open using a standard ADOT lane addition. The McClintock Drive/Chandler Village Drive exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the outside GPL would be configured as an optional exit, having a choice of exiting at McClintock Road or continuing the SR 202L through movement.

Four GPLs would approach SR 101L. Starting approximately 2,100 feet in advance of the NB SR 101L exit, the outside GPL would transition to become an auxiliary lane. The NB SR 101L exit ramp (1 lane) would be configured as a parallel exit with a mandatory exit from the auxiliary lane, similar to the existing condition.

Four GPLs would approach the Price Road exit ramp. Starting approximately 1,200 feet in advance of the Price Road exit, an outside exit-only lane would open using a standard ADOT lane addition. The Price Road exit ramp (1 lane) would be reconfigured as a parallel exit with a mandatory exit from the outside lane. Four GPLs would continue under SR 101L.

The Price Road entrance ramp (1 lane) would be unmetered. It would transition from 2 lanes to one lane, and be configured as a parallel entrance that transitions to an acceleration lane, similar to the existing condition. Approximately 500 feet past the Price Road entrance ramp, the acceleration lane would be dropped with an AASHTO merge.

Approximately 2,300 feet east of SR 101L, the SR 101L/SR 202L HOV direct connector would remain unchanged as a left parallel entrance adjacent to the HOV lane.

Four GPLs would approach the SR 101L/SR 202L Ramp 'S-E' entrance gore. The ramp (2 lanes) would be configured as a parallel entrance at the gore with SR 202L, similar to the existing condition, and would add two GPLs to EB SR 202L.

Six GPLs would approach the Dobson Road entrance ramp. The Dobson Road entrance ramp (1 lane) would be metered. It would transition from 2 lanes to 1 lane, and be configured as a parallel entrance that becomes an auxiliary lane, similar to the existing condition. The Alma School Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Alma School Road or continuing the SR 202L through movement, similar to the existing condition.

Approximately 900 feet past the Alma School Road exit, the outermost GPL would be dropped with an AASHTO merge. There would be five GPLs approaching the Alma School Road entrance ramp. The Alma School Road entrance ramp (1 lane) would be metered. It transitions from 2 lanes to 1 lane, and is configured as a parallel entrance that becomes an auxiliary lane. The Arizona Avenue exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Arizona Avenue or continuing the SR 202L through movement.

Five GPLs would approach the Arizona Avenue entrance ramp. The freeway widening and need to cross over the Union Pacific Railroad would necessitate the Arizona Avenue EB entrance ramp being reconstructed on a new structure utilizing revised horizontal and vertical geometry. The entrance ramp (1 lane) would be metered, transition from 2 lanes to 1 lane, and would be configured as a parallel entrance that becomes an auxiliary lane.

Five GPLs and an auxiliary lane would approach the McQueen Road exit ramp. This exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at McQueen Road or continuing the SR 202L through movement.

Five GPLs would approach the McQueen Road entrance ramp. The McQueen Road entrance ramp (1 lane) would be unmetered. It transitions from 2 lanes to 1 lane, and would be configured as a parallel entrance that becomes an auxiliary lane, similar to the existing condition. The Cooper Road exit ramp (2 lanes) is configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Cooper Road or continuing the SR 202L through movement.

Five GPLs would approach the Cooper Road entrance ramp. The Cooper Road entrance ramp (1 lane) would be metered. It would transition from 2 lanes to 1 lane, and would be configured as a parallel entrance that becomes an auxiliary lane, similar to the existing condition. The Gilbert Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Gilbert Road or continuing the SR 202L through movement.

Five GPLs would approach the Gilbert Road structure. Under the Gilbert Road structure, the outside GPL would be dropped using an AASHTO lane merge. Four GPLs would approach the Gilbert Road entrance ramp. The Gilbert Road entrance ramp (1 lane) would be unmetered. It would transition from 2 lanes to 1 lane, and would be configured as a parallel entrance that becomes an auxiliary lane.

As of September 2019, Lindsay Road was in the final design stage (ADOT Project No. 202L MA 043 H8873 01L, Federal Project No. 202-C(207)T, Gilbert CIP Project No. ST158) regarding new freeway access with a traffic interchange with SR 202L. Four GPLs and an auxiliary lane would approach the Lindsay Road exit ramp. The Lindsay Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Lindsay Road or continuing the SR 202L through movement.

Four GPLs would approach the Lindsay Road entrance ramp. The Lindsay Road entrance ramp (1 lane) would not be metered. It would transition from 2 lanes to 1 lane, and would be configured as a parallel entrance that becomes an auxiliary lane. The Val Vista Drive exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Val Vista Drive or continuing the SR 202L through movement. Approximately 700 feet past the Val Vista exit, the outside GPL would drop using an AASHTO lane merge.

Westbound SR 202L Mainline

Passing under the Val Vista Drive structure, WB SR 202L would have three GPLs, matching the existing condition. Starting approximately 1200 feet in advance of the Val Vista Drive entrance, a fourth GPL would be opened to the outside using a standard ADOT lane addition. Four GPLs would approach the Val Vista Drive entrance ramp. The Val Vista Drive entrance ramp (1 lane) would not be metered, similar to the existing condition. It would transition from 2 lanes to 1 lane, and would be configured as a parallel entrance that transitions to an auxiliary lane.

As of September 2019, Lindsay Road is in the final design stage (ADOT Project No. 202L MA 043 H8873 01L, Federal Project No. 202-C(207)T, Gilbert CIP Project No. ST158) regarding new freeway access with a traffic interchange with SR 202L. Four GPLs and an auxiliary lane would approach the Lindsay Road exit ramp. The Lindsay Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Lindsay Road or continuing the SR 202L through movement.

Four GPLs would approach the Lindsay Road entrance ramp. The entrance ramp (1 lane) would not be metered. It would transition from 2 lanes to 1 lane, and would be configured as a parallel entrance that becomes an auxiliary lane. The Gilbert Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Gilbert Road or continuing the SR 202L through movement.

Starting at the west edge of the Gilbert Road structure, a fifth GPL would be opened to the outside using a standard ADOT lane addition. Five GPLs would approach the Gilbert Road entrance ramp. The Gilbert Road entrance ramp (1 lane) would be metered, similar to the existing condition. It would transition from 2 lanes to 1 lane, and be configured as a parallel entrance that becomes an auxiliary lane. The Cooper Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Cooper Road or continuing the SR 202L through movement.

Five GPLs would approach the Cooper Road entrance ramp. The Cooper Road entrance ramp (1 lane) would not be metered, similar to the existing condition. It would transition from 2 lanes to 1 lane, and be configured as a parallel entrance that becomes an auxiliary lane. The McQueen Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at McQueen Road or continuing the SR 202L through movement.

Five GPLs would approach the McQueen Road entrance ramp. The McQueen Road entrance ramp (1 lane) would be metered, similar to the existing condition. It would transition from 2 lanes to 1 lane, and be configured as a parallel entrance that becomes an auxiliary lane. The Arizona Avenue exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Arizona Avenue or continuing the SR 202L through movement.

Five GPLs would approach the Arizona Avenue entrance ramp. The Arizona Avenue entrance ramp (1 lane) would be metered, similar to the existing condition. It would transition from 2 lanes to 1 lane, and would be configured as a parallel entrance that becomes an auxiliary lane. The Alma School Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Alma School Road or continuing the SR 202L through movement.

Five GPLs would approach the Alma School Road entrance ramp. The Alma School Road entrance ramp (1 lane) would be metered, similar to the existing condition. It would transition from 2 lanes to 1 lane, and would be configured as a parallel entrance that becomes an auxiliary lane. The Dobson Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the auxiliary lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Dobson Road or continuing the SR 202L through movement.

Starting approximately 1,200 feet past the Dobson exit, the outside GPL would become an exit-only lane. Four GPLs and the exit-only lane would approach 101L. The NB 101L exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the outside lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting to NB 101L or continuing the SR 202L through movement.

Approximately 2,200 feet east of SR 101L, the SR 101L/SR 202L HOV direct connector, a 1 lane, left parallel exit adjacent to the HOV lane, would remain unchanged.

Four GPLs would approach the Price Road exit ramp. Starting approximately 470 feet in advance of the Price Road exit, an outside exit-only lane would open using a standard ADOT lane addition. The Price Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the outside lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Price Road or continuing the SR 202L through movement.

Four GPLs would approach the Price Road entrance ramp. The Price Road entrance ramp (1 lane) would not be metered. It would transition from 2 lanes to 1 lane, and would be configured as a parallel entrance and would become an acceleration lane. Approximately 600 feet past the Price Road entrance ramp, the acceleration lane is dropped with an AASHTO merge.

Four GPLs would approach the SR 101L/SR 202L Ramp 'S-W' entrance gore. The ramp (1 lane) would be configured as a parallel entrance at the gore with SR 202L and would become an acceleration lane. Approximately 1500 feet past the Ramp 'S-W' entrance, the acceleration lane is dropped with an AASHTO merge.

Four GPLs would approach the McClintock Drive entrance ramp. The McClintock Drive entrance ramp (1 lane) would remain unchanged. It would remain unmetered, transitioning from 2 lanes to 1 lane, and maintaining a parallel entrance configuration that transitions to the existing acceleration lane. Approximately 800 feet past the Price Road entrance ramp, the existing acceleration lane would also remain as-is, dropping with an AASHTO merge.

Four GPLs would +approach the Kyrene Road exit ramp. Starting approximately 1,550 feet in advance of the Kyrene Road exit, an outside exit-only lane would open using a standard ADOT lane addition. The Kyrene Road exit ramp (2 lanes) would be configured as a parallel exit with a mandatory exit from the outside lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at Kyrene Road or continuing the SR 202L through movement.

Four GPLs would approach the Kyrene Road entrance ramp. The Kyrene Road entrance ramp (1 lane) would not be metered, similar to the existing condition. It would transition from 2 lanes to 1 lane, and would be configured as a parallel entrance that would become an acceleration lane. Approximately 700 feet past the Ramp 'S-W' entrance, the acceleration lane is dropped with an AASHTO merge.

The I-10 exit ramp (2 lanes) would be reconfigured as a parallel exit with a mandatory exit from the outside lane; the second lane would be configured as an optional exit, with the outside GPL having a choice of exiting at I-10 or continuing the SR 202L through movement. Three general lanes would proceed under I-10. Approximately 1,500 feet west of I-10, the outside GPL would be dropped with an AASHTO merge, matching the existing SR 202L cross section.

Approximately 2,000 feet east of I-10, the I-10/SR 202L HOV direct connector would remain unchanged as a left exit adjacent to the HOV lane, configured as a parallel exit (1 lane) at the I-10/SR 202L HOV gore.

Approximately 500 feet past the I-10 HOV exit, the HOV lane merge into the inside GPL would remain unchanged. Opened in December 2019, the SMF project constructed an HOV lane west of this point, which ties to the existing HOV lane on WB SR 202L.

3.3 HORIZONTAL AND VERTICAL ALIGNMENTS

Plans and profile sheets are provided in Appendix E. The plans include the horizontal and vertical alignments for the existing SR 202L, system and service interchange ramps and frontage roads. No modifications are proposed to the existing horizontal and vertical alignments for SR 202L mainline and crossroads.

3.4 ACCESS CONTROL

Access control exists on the SR 202L corridor and will be maintained in accordance with ADOT and FHWA Access Control Policy Requirements.

3.5 RIGHT-OF-WAY

Acquisition of new ROW within the project limits is not anticipated with the project.

Sound barrier walls are expected to be warranted by the noise technical study at several areas within the project limits; please see Section 3.7.2 for these locations. Maintenance agreements with the adjacent residential properties are not anticipated.

Temporary Construction Easements (TCE's) are not expected as part of the project, including at proposed sound barrier wall locations.

The Lindsay Road TI OP widening will require coordination with the Roosevelt Water Conservation District (RWCD); including a ROW crossing permit for construction; separate reviews and approvals of the bridge plans; and scheduling and coordination of all construction with the RWCD inspector.

3.6 BRIDGE STRUCTURES

This section describes the features of the structural elements needed to support the Recommended Alternative. This section also includes recommendations for the replacement of existing bridge structures, widening of existing bridge structures, retaining walls and sound barrier walls.

Modifications to existing box culverts and the need for new box culverts are discussed under Section 1.1.

3.6.1 Introduction

One Ramp structure will be replaced, two ramp structures will be widened, two mainline overpasses will be widened to accommodate a single new GPL and three mainline overpasses will be widened to accommodate two new GPLs associated with the Recommended Alternative.

Arizona Ave Ramp D RR OP (Structure No. 2677, MP 47.38) will be replaced to a new location south of its current location in order to avoid conflict with the widening of the mainline UPRR OP EB (Structure No. 2678, MP 47.38).

Ramp structures to be widened include:

- Arizona Ave Ramp C RR OP (Structure No. 2676, MP 47.38)
- Ramp S-E/56th St OP (Structure No. 2589, MP 54.74)

Mainline overpasses to be widened to accommodate a single new GPL include:

- Lindsay Rd OP (Structure No. 2789, MP 43.7)
- 56th St OP EB (Structure No. 2590, MP 54.74)

Mainline overpasses to be widened to accommodate two new GPLs include:
- Consolidated Canal OP (Structure No. 2683, MP 46.3)
- UPRR OP (Structure No. 2678, MP 47.38)
- Arizona Avenue TI OP (Structure No. 2693, MP 47.63)

The existing bridge superstructures are either cast-in-place post-tensioned concrete box girders or precast prestressed AASHTO girders; the existing bridge structures are summarized in Section 1.3.7, Table 2.

This study includes an evaluation of potential alternatives to modify the existing bridge structures. Alternatives were evaluated for their ability to maintain minimum vertical clearances during construction, minimum final vertical clearance, maintenance of traffic during construction, constructability, potential impacts to existing ramps and ramp intersections, aesthetics and construction costs.

The intent of this evaluation is not to select the final bridge configuration for each location, but instead provide feasible structure type(s) for each location that can be further evaluated under the bridge selection report and preliminary design processes.

3.6.2 Considerations for the Modification of Existing Bridge Structures

Primary bridge superstructure types utilized for the Phoenix urban freeway system include the cast-in-place post-tensioned concrete box girder (CIP PT box girder) and the precast prestressed concrete girder, with the steel girder being occasionally used.

Cast-in-Place Post-Tensioned Concrete Box Girder
Post-tensioned structures are utilized extensively throughout the Regional Freeway System. Advantages of using post-tensioned box girders for the widening of the existing structures include the following:

- Aesthetics: The CIP PT box girder is the same superstructure type as the existing roadway overpasses that are to be widened with this project and will result in consistent aesthetics.
- Performance: This superstructure configuration is the same as the existing roadway overpasses and would match the existing structural behavior.
- Flexibility: This superstructure configuration can accommodate various roadway geometric situations that occur at interchange ramp taper and gore areas.

Disadvantages of using post-tensioned box girders for the widening of existing structures include:

- Reduced vertical clearances: A 16-foot minimum vertical clearance is desired over existing roadways during construction. Previous projects have reduced the falsework clearance by using overhead crash beams. However, the use of crash beams for sites with less than 16-feet of vertical clearance is now discouraged due to safety and operational concerns. Falsework clearance can be increased by constructing the superstructure of the widening higher than the existing superstructure, and then lowering the new superstructure onto the abutments and piers with hydraulic jacks. However, this bridge construction method increases the cost of the bridge widening by adding complexity to the bridge design and construction.
- Steel Through-Girders: The use of steel through-girders to mitigate temporary construction clearances would add additional cost to the bridge construction, because additional fabrication will be required for non-standard, welded steel plate girders.
- Traffic impacts during construction: Falsework may require towers to be placed in existing lanes of the roadway that passes under the bridge structure, which would reduce the number of travel lanes open to traffic during construction. Typical falsework spans are generally limited to a maximum opening of 60-feet. Increasing the falsework spans beyond 60-feet is feasible; larger spans may require larger falsework girders that may not be readily available to the contractor, which could increase the project cost and construction duration. This type of bridge construction would also have an increased number of construction closures.
- Falsework: Multi-span bridges make the construction of falsework and lowering the superstructure into place by hydraulic jacking problematic. The hydraulic jacking of the superstructure must be sequenced carefully to ensure that the unintentional redistribution of forces does not lead to overstressing the superstructure.
- Matching the new and existing bridge decks: Many variables must be considered that affect the long and short term camber of a bridge including temperature, creep and shrinkage. Techniques that can be utilized to ensure the existing and new bridge deck elevations will match at the interface include larger closure pours, the placement of additional deck thickness with subsequent deck milling, placement of an asphalt overlay, developing more detailed camber calculations, providing additional creep and shrinkage testing of the concrete mix, providing additional post-tensioning that can be tensioned or de-tensioned to adjust the bridge structure widening profile, using high performance concrete to reduce creep and shrinkage effects and providing higher construction quality control.
- Construction costs: Post-tensioned structures are typically more cost effective when constructed on soffit fill. The overpass structures on this project support SR 202L over arterial streets, which precludes the soffit fill construction method. At those locations, widening the existing bridge superstructures with a CIP PT box girder will require falsework, which will increase the cost of the structure.
- Reduced safety: More construction activities will occur over and adjacent to traffic, thereby reducing worker and public safety.
- Construction duration: The construction duration of a CIP PT box girder superstructure generally exceeds the duration required for precast girder bridge by approximately 30 to 60 days. The construction duration is further increased by 60 days to allow for creep and shrinkage in the post-tensioned, widened structures to occur prior to placing a concrete deck closure pour. The construction of the PT box girder widening takes between 90 days and 120 days longer than that of a precast girder widening.

Precast Prestressed Concrete Girders/Beams
A significant number of precast, prestressed concrete girder/beam bridge structure widenings have been constructed throughout the Regional Freeway System. AASHTO girders, bulb-tee girders and precast prestressed box beams are some of the structure types available for widening CIP PT box girder and precast girder bridges.

Advantages of using precast sections include the following:

- Reduced construction duration: The majority of the creep and shrinkage that would occur in the precast girders would be completed prior to the erection of the girder. Therefore, the widened portion of the bridge deck can be placed with one pour, eliminating the need for a closure pour.
- Falsework: The use of precast girders eliminates the need for falsework, thereby reducing the impacts to traffic during the construction of the bridge. Crossroad closures would be required during the erection of the girders, placement of stay-in-place deck forms (if applicable) and concrete placement of the deck.
- Construction costs: Precast girder/beam structures are typically more cost effective when constructed over traffic, waterways, railroads or other obstacles that preclude the use of falsework or soffit fill.
- Improved safety: The erection of the beams and the installation of deck forms occur during a brief closure of the roadway below the bridge structure, thereby reducing worker and public safety.

- Construction duration: The construction of a precast girder/beam widening takes between 90 days and 120 days less than that of a post-tensioned box girder widening.
- Performance: This superstructure configuration is the same as the existing railroad overpasses and would match the existing structural behavior.

Disadvantages of using precast sections include the following:

- Depth of superstructure: A precast girder bridge may require a deeper superstructure section, which might reduce the vertical clearance over the crossroad.
- Roadway geometry: A precast girder superstructure is not as conducive as post-tensioned box girder bridges to accommodate unique roadway geometry situations that occur at traffic interchange ramp connections. Therefore, additional deck area (that would not be used to support traffic) may be necessary at certain locations.
- Aesthetics: The CIP PT Box Girder is the superstructure type used at the existing roadway overpasses. Using precast girders will result in inconsistent aesthetics. Box beams could be used to mimic the look of the CIP PT Box Girder.
- Performance: This precast girder/beam may have less inertia and may be more flexible than the existing CIP PT Box Girder overpasses. Special attention during design would need to be paid to the longitudinal joint between the existing and new bridge decks.

Steel Girders
The structures that are to be widened are either precast, prestressed concrete girders or post-tensioned concrete box girders. Steel girders tend to be more flexible than precast girders/beams, are not typically cost competitive in Arizona, require a long fabrication and delivery schedule, and require additional maintenance. Therefore, steel girder superstructure alternatives for the widening of existing concrete superstructures are not considered for the bridge structure widenings associated with this project.

3.6.3 Design and Constructability Requirements

The initial evaluation of alternatives for the widening of the existing bridge structures included the items shown below.

Vertical Clearance
A minimum vertical clearance of 16'-6", or the existing vertical clearance (whichever is less), over active traffic lanes is desirable during construction. Bridge widening alternatives shall provide 16'-6" vertical clearance over the crossroads in the final condition.

A minimum vertical clearance of 21'-6" is required over UPRR during construction. Bridge widening alternatives shall provide 23'-4" vertical clearance over the UPRR in the final condition.

Bridge Barriers
The SR 202L bridge structures that are to be widened under this project use ADOT Standard 32" height F-Shape half barriers at the outside edge of the bridge deck. These bridges will use ADOT Bridge Group Standard 34" F-Shape bridge concrete barrier (SD 1.01) along the widened bridge deck. The final designer will utilize, at ADOT's direction, barriers that comply with AASHTO's Manual for Assessing Safety Hardware (MASH). According to ADOT's "MASH Barrier Design Aids" (Revised December 2018) ADOT 32" barrier meets MASH TL3 and 42" barrier meets TL5. The ADOT Bridge Group Standard 34" and 44" F-Shape bridge concrete barriers meet TL4 and TL5 crash test level requirements of NCHRP 350.

Concrete Strength
The bridge practice guidelines limit the final (28-day) concrete compressive strength to 6.5 ksi for precast girders and 6.0 ksi for CIP PT box girders constructed within the Phoenix Metropolitan area. If needed, the final designer may consider higher concrete strengths with approval from ADOT Bridge Group. With recent projects, 28-day compressive strengths of up to 8,500 psi have been approved.

Design Codes
ADOT Bridge Group's current policy is to use Load and Resistance Factor Design (LRFD), as amended by the *ADOT Bridge Design Guidelines*, for the design of the widening of existing bridges that were previously designed using the *AASHTO Standard Specifications*. New bridge structures shall be designed in accordance with the most current *ADOT Bridge Design Guidelines*.

Design Loads
The existing bridge structures were originally designed for HS-20 live loading, with provisions for an additional 25 pounds per square foot of deck area for a future wearing surface. The widened structures should be designed for the HL-93 live load and additional future wearing surface.

AR-ACFC Overlay
All bridges proposed to be widened as part of this project have an AR-ACFC overlay. It is Central District's preference to not have an AR-ACFC overlay on the bridge decks because the overlay makes it impossible to inspect the condition of the surface of the bridge deck. The final designer shall work with ADOT to determine whether or not the existing overlays will be removed or extended with the bridge deck widenings.

Maintenance of Traffic Operations
Minimizing impacts to the traveling public will be an important consideration in the bridge widening type selection.

Condition of Existing Bridges
The condition of the existing bridge structures is summarized in the bridge evaluation request form included in Appendix A – AASHTO Controlling Design Criteria Report.

3.6.4 Evaluation of Bridge Modification Alternatives

The initial alternative consideration for the modification of each bridge is discussed in this section of the report. A summary of the bridge modifications is presented in Table 24 (on the following page) prior to the site-specific discussions. A preliminary feasible alternative was selected at each location for cost estimating purposes and is based upon the information known at the time of this report. A detailed structure evaluation and selection process will be performed during the next design phase of the project.

Unless noted otherwise, it is anticipated that all or part of the existing concrete deck overhangs on the existing bridges would be removed to allow the widened portion of the bridge to be connected to the existing superstructure.

Table 24. Bridge Structure Modification Concepts for the Recommended Alternative

Bridge Name	Length (Ft)	No. of Spans	Span Lengths (Ft)	Approx Width of Widening (1)	Proposed Superstructure Depth (2)	Existing Superstructure Depth	Existing Superstructure Type	Proposed Modifications
Lindsay Road OP EB	338	2	170 - 162	12'-0"	6'-11"	6'-11"	CIP PT Conc. Box Girder	Widen In-Kind
Lindsay Road OP WB	338	2	170 - 162	12'-0"	6'-11"	6'-11"	CIP PT Conc. Box Girder	Widen In-Kind
Consolidated Canal EB Bridge	132	1	126	24'-0"	5'-9"	5'-9"	CIP PT Conc. Box Girder	Widen In-Kind
Consolidated Canal WB Bridge	132	1	126	24'-0"	5'-9"	5'-9"	CIP PT Conc. Box Girder	Widen In-Kind
Arizona Ave Ramp C RR OP	108	1	102	12'-0"	5'-4"	5'-4"	Precast PS AASHTO Type IV Girder	Widen In-Kind
Arizona Ave Ramp D RR OP	100	1	97.41	N/A	5'-4"	5'-4"	Precast PS AASHTO Type IV Girder	Reconstruct
UPRR OP EB	105	1	99.41	24'-0"	5'-4"	5'-4"	Precast PS AASHTO Type IV Girder	Widen In-Kind
UPRR OP WB	105	1	99.25	24'-0"	5'-4"	5'-4"	Precast PS AASHTO Type IV Girder	Widen In-Kind
Arizona Avenue EB TI OP	157	2	70.75 - 80.77	24'-0"	3'-8"	3'-6"	CIP PT Conc. Box Girder	Widen with Precast Prestressed Box Beams
Arizona Avenue WB TI OP	157	2	70.75 - 80.77	24'-0"	3'-8"	3'-6"	CIP PT Conc. Box Girder	Widen with Precast Prestressed Box Beams
Ramp S-E/56th St OP	247	2	96 - 145	Varies 10' to 15'	6'-2"	6'-2"	CIP PT Conc. Box Girder	Widen In-Kind
56th Street OP EB	251	2	98 - 148	11'-0"	6'-2"	6'-2"	CIP PT Conc. Box Girder	Widen In-Kind

1) Structural widening does not include the width associated with the partial removal of the existing deck, but does include amount required to provide full 12'-0" GPL and outside shoulder.
2) Proposed superstructure depths are approximate and are subject to refinement during the next design phase.

3.6.4.1 Lindsay Road TI OP (Structure Nos. 2789 & 2790, MP 43.70)

The overpasses were constructed in 2006 under ADOT project number 202-C(009)B. The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 75, the Operating Rating as 99 and the Sufficiency Rating as 90.0.

Existing Roadway Geometry

At Lindsay Road, SR 202L is symmetrical in section about the median construction centerline. The EB and WB roadways each consist of a 12'-0" outside shoulder, three 12'-0" GPLs, a 21'-10" inside shoulder that will accommodate a future 12'-0" HOV lane and 10'-0" inside shoulder. At the overpass, each inside shoulder decreases to approximately 21'-4" and can accommodate a future 12'-0" HOV lane and a 9'-4" inside shoulder. Barrier is located along all shoulders.

The existing clear roadway width on the eastbound and westbound bridges is 69'-4". The widening of these structures would add one general purpose lane in each direction of travel, resulting in a clear roadway width of 81'-4".

The mainline SR 202L alignment is in tangent through this crossing. Both the EB and WB overpass have a constant -2% cross slope to the outside. The alignment is raised at this location with 3 to 1 fill slopes.

The EB and WB roadways are in a crest vertical curve.

Roosevelt Water Conservation District (RWCD) has approximately 110 feet of ROW under Span 1 of the existing overpasses. Within this ROW are a west O&M road, the Eastern Canal and an east O&M road.

Lindsay Road is located under Span 2 of the existing overpasses. The existing roadway is asymmetric in section about the median construction centerline. The SB roadway consists of a detached sidewalk behind curb and gutter, a 12'-0" outside shoulder and a 12'-0" lane. The NB roadway consists of a detach sidewalk behind curb and gutter, a 5'-6" outside shoulder, and two 11'-0" lanes. A 12'-0" median left-turn lane separates the SB and NB roadways. Lindsay Road is currently being re-designed as a full traffic interchange that includes a widening of the existing roadway. The current concept will provide a roadway section that consists of a 52-foot wide clear roadway in each direction separated by a 4-foot wide raised median. Each travel direction will include two 11-foot wide through lanes; two 12-foot wide left turn lanes; and a 6-foot wide bicycle lane. There will be a 6-foot wide raised sidewalk adjacent to the southbound lanes and a 10-foot wide raised sidewalk adjacent to the northbound lanes. The 10-foot sidewalk is to facilitate access to Zanjero Park located southeast of the interchange.

Existing Bridge Configuration

The overpasses are on tangent, are in a crest vertical curve and have a constant cross-slope of -2% to the outside. The centers of the WB & EB overpasses are 38'-2¾" and 37'-5" left and right, respectively, of the construction centerline and 3'-2¾" and 2'-5" left and right, respectively, of the profile grade lines.

The existing overpasses have 32-inch F-Shape bridge concrete barrier along the outside edge of deck. The existing WB overpass has 9" wide by 8'-0" tall concrete sound barrier wall along the outside edge of deck. Along the inside edge of deck, the existing overpasses have 42-inch F-Shape bridge concrete barrier. The clear roadway is 69'-4" and the resulting out-to-out bridge widths are 73'-1¾" (WB) and 72'-4" (EB).

The existing overpasses are two-span, cast-in-place post-tensioned concrete box girder bridges. The WB overpass consists of 10 webs, a 4'-9¾" exterior overhang, a 4'-0" interior overhang and an 8" concrete deck with a 1" AR-ACFC overlay. The EB overpass consists of 10 webs, 4'-0 overhangs and an 8" concrete deck with a 1" AR-ACFC overlay. The overlays do not extend into the inside shoulders, except at the deck joints at the abutments.

The overpasses are 337'-9½" long with spans of 170'-0" and 162'-0". The structure depths are 6'-11" (excludes AR-ACFC). The abutments and pier are skewed 18°16'21" from normal to the SR 202L median construction centerline.

Foundation Type
The overpasses utilize full-height abutments founded on spread footings. The roadway embankments behind each abutment are supported by concrete cantilever retaining walls that are located parallel to the outside edges of the roadways.

The pier consists of a reinforced integral cap beam supported by bladed columns founded on isolated spread footings.

Vertical Clearance
The existing minimum vertical clearance to the RWCD O&M roads at these overpasses is 20'-3" and occurs at the east O&M road below the WB overpass.

The existing minimum vertical clearance to Lindsay Road at these overpasses is 17'-7" and occurs at the WB overpass.

The vertical clearance for the widened superstructure would reduce to approximately 19'-8½" at the RWCD O&M road and 17'-0" at Lindsay Road.

Existing Utilities
Parallel to and adjacent to Lindsay Road are an 18-inch force main sewer, a 24-inch sewer, a gas main and a water main. These utilities do not in conflict with the pier and abutments.

Aesthetics
The existing pier columns, abutments, wing walls, retaining walls and sound wall have custom aesthetics that will need to be duplicated at the widenings.

The overpasses and walls are painted.

Site Specific Issues
Widening of Abutment 1 for the EB roadway along the existing abutment centerline will cross the RWCD ROW.

Soft soils may be encountered at the abutment and pier, and may require overexcavation and engineered fill if spread footings are used to support the widened abutments and pier.

The abutment widenings will be complicated by the presence of the existing wingwall and retaining wall footings. These footings overlap the footprint of the abutment widenings. A method of widening the abutments using drilled shafts, columns and stub abutment caps, with approach slabs that span from the existing embankment fill to the widened abutments, could provide cost savings and simplify construction.

Traffic Control Requirements
The outside shoulders of SR 202L in the vicinity of and through the crossing will need to be closed throughout the duration of the construction of the widening.

Temporary closures of Lindsay Road will be required for such activities as falsework erection or girder erection.

Section 16, Bridge Construction, of the Bridge Group Design Guidelines, requires a minimum of 16'-0" temporary vertical clearance at falsework openings. At Lindsay Road, the maximum depth available for falsework would be 1'-7". From Table 2 of Section 16, a falsework span of 28 feet is feasible. At the RWCD, the maximum depth available for falsework would be 4'-3". From Table 2 of Section 16, a falsework span of 64 feet is feasible and would span both O&M roads and the canal.

Feasible Structure Types
Two structural options would be feasible for widening of the existing structures. The first option for widening these overpasses would be to widen-in-kind using a cast-in-place post-tensioned concrete box girder configuration constructed on falsework.

A second option would be to use precast prestressed concrete bulb-tee girders that have been used locally for the South Mountain Freeway because the span lengths exceed the capabilities of AASHTO box beams and I-girders. It is anticipated that 28-day concrete strengths in excess of 8,000 psi would be required for this option. Because a deeper superstructure would be required for this option, resulting vertical clearances over Lindsay Road would need to be checked carefully.

Initial Recommendation
The cast-in-place post-tensioned concrete box girder was assumed for cost estimating purposes. However, the precast prestressed concrete bulb-tee option should also be evaluated in the next design phase. A higher unit cost was used to account for difficulty anticipated with in-kind abutment widenings.

3.6.4.2 Consolidated Canal Bridge (Structure No. 2683, MP 46.3)

The bridge was constructed in 2005 under ADOT project number 202-C(001)B. The east bound and west bound bridges were originally constructed as two separate structures under two structure numbers 2683 & 2684 respectively. Bridge records for the two bridges were consolidated in 2017 into one record under structure number 2683. The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 58, the Operating Rating as 99 and the Sufficiency Rating as 88.3.

Existing Roadway Geometry
At the Consolidated Canal Bridge, SR 202L is symmetrical in section about the median construction centerline. Both the EB and WB roadways consist of a 12'-0" outside shoulder, four 12'-0" GPLs, a 12'-0" HOV lane and a 10'-0" inside shoulder. At the bridges, the inside shoulders decrease to approximately 9'-4". Barrier is located along all shoulders.

The existing clear roadway width on the eastbound and westbound bridges is 81'-4". The widening of these structures would add two general purpose lanes in each direction of travel, resulting in a clear roadway width of 105'-4".

The mainline SR 202L alignment is on tangent through this crossing and is normally crowned with a 2% cross slope. The roadway profile at this location is in a crest vertical curve and is elevated above the natural ground with a 3 to 1 fill slopes.

Existing Bridge Configuration
The bridges are on tangent, are in a crest vertical curve and have a constant cross-slope of -2% to the outside. The center of the bridges are 7'-2" right (EB) and left (WB) of the profile grade line.

The existing bridges have 32-inch F-Shape bridge concrete barriers along outside edge of deck. Along the inside edge of deck, the existing bridges have 42-inch F-Shape bridge concrete barrier. The clear roadway is 81'-4" and the resulting out-to-out superstructure width is 84'-4".

The existing bridges are single-span, cast-in-place post-tensioned concrete box girder bridges, consisting of 10 webs each, 4'-1" overhangs and an 8½" concrete deck with a 1" AR-ACFC overlay.

The bridges are 131’-7¼” long, with spans of 126’-0”. The structure depths are 5’-9” (excludes AR-ACFC). The abutments are skewed 11 degrees from normal to the SR 202L median construction centerline.

Foundation Type
The overpass utilizes abutment caps supported on 4’-6” diameter columns that are founded on 5’-0” diameter drilled shafts. The roadway embankments behind each abutment are supported by concrete faced soil nail retaining walls that are located in front of the abutments.

Vertical Clearance
The existing minimum vertical clearance at these bridges is 15’-2½” and occurs at the north edge of the soffit of the WB bridge. The vertical clearance after the widening is discussed under Feasible Structure Types.

Existing Canal and Path
The Consolidated Canal Bridges span the Consolidated Canal and the Paseo Trail. The canal is approximately 43-foot wide. A 10-foot wide AC O&M road is located off the west edge of the canal and approximately 17’-6” off of abutment 1. Paseo Trail is a 10-foot wide concrete pathway located on the east side of the canal and is approximately 35’-6” west of Abutment 2.

Existing Utilities
The following utilities are present near the bridge:

- Two 48-inch diameter SRP irrigation pipes run parallel to the front face of abutment 1.
- Underground power for Paseo path lighting is located along the east side of the Consolidated Canal.
- 12kV overhead power line crosses SR 202L approximately 200-feet east of abutment 2.

Aesthetics
The existing soil nail retaining walls have a tortoise shell rustication pattern that will need to be replicated when modifying or reconstructing existing walls. The overpass and walls are painted ADOT tan color.

Site Specific Issues
In anticipation of a future one-lane, outside freeway widening, one extra drilled shaft was constructed outside the footprint of each abutment. These drilled shafts will be incorporated into the widened abutment. Additional drilled shafts will be needed to accommodate the proposed two-lane widening.

The existing soil nail retaining walls in front of abutment caps will need to be modified to accommodate the proposed widening. The modification may include full height removal where in conflict with the new drilled shafts and partial height removal where in conflict with abutment cap. The new wall will be constructed in front of and wrapped around the widened cap to connect to existing soil nail wall retaining the roadway embankment. The new wall may be a soil nail wall constructed by extending existing nails or a fascia wall with foamed concrete backfill filing the narrow gap between it and the existing embankment.

The two underground SRP irrigation pipes running parallel to the front face of Abutment 1 will constrain the location of falsework support. Care should be exercised in selecting the depth and location of the temporary support footings to avoid overloading the underground pipes.

Traffic Control Requirements
The outside shoulders of SR 202L in the vicinity of and through the crossing will need to be closed throughout the duration of the construction of the widenings. Both the pathway and the Consolidated Canal Operation and Maintenance (O&M) road will remain open during construction with the exception of a few intermittent closures. A minimum lateral clearance of 16-feet and a minimum vertical clearance of 12'-6” shall be maintained for the O&M road during construction.

Feasible Structure Types
Two structure types were evaluated for widening the existing overpasses: 1) widen-in-kind using cast-in-place post-tensioned concrete box girders and 2) widen with AASHTO Type V girders. Each of these options would match the span length and configuration of the existing overpass. Other feasible alternatives can be evaluated during the next design stage.

The vertical clearance for the widened superstructures would be reduced since the superstructures will be widened on the low side of the roadways. The approximate vertical clearance would be 14’-8½” for structure type number 1 and 14’-3” for structure type number 2.

Initial Recommendation
The cast-in-place post-tensioned concrete box girder alternative was used for cost estimating purposes. The structure depth of the widened portion will match that of the existing structure. The widened bridge will provide 105′-4″ clear opening for each of the EB and WB roadways. A 34″ F-shape bridge concrete barrier and lightweight sound wall panels will be provided at the edge of the new widening.

3.6.4.3 Arizona Ave Ramp C RR OP (Structure No. 2676, MP 47.38)

The overpass was constructed in 2005 under ADOT project number 202-C(001)B. The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 45, the Operating Rating as 99 and the Sufficiency Rating as 98.8.

Existing Roadway Geometry
The Ramp C typical section consists of a 10’-0” outside shoulder, one 12’-0” lane and a 4’-0” inside shoulder.

The existing clear roadway width on the ramp bridge is 26’-0”. The widening of this structure would add one exit lane, resulting in a clear roadway width of 38’-0”.

The Ramp C alignment is on a horizontal curve through this crossing and has a 3.6% cross slope. The ramp profile at this location is in a crest vertical curve and is elevated above the natural ground with a 3 to 1 fill slopes.

Existing Bridge Configuration
The overpass is located within a horizontal curve, is in a crest vertical curve and has a constant cross-slope of -3.6% to the inside (south). The center of the overpass is 3-feet right (south) of the construction centerline and profile grade line.

The existing overpass has 32-inch F-Shape bridge concrete barriers and modified bridge fence with railing along each edge of deck. The total height of the barrier and fence is 10-feet. The clear roadway is 26’-0” and the resulting out-to-out superstructure width is 28’-10”.

The existing overpass is a single-span, AASHTO Type IV prestressed concrete girder bridge, consisting of five girders at 6’-0” with varying overhangs from approximately 2’-2” to 2’-8” and a 7½” concrete deck with a 1” AR-ACFC overlay.

The overpass is 107'-11⅛" long, with a span of 102'-0". The structure depth is 5'-4" (excludes AR-ACFC). The abutments are skewed, on average, approximately 21 degrees 53 minutes from normal to the Ramp C construction centerline.

Foundation Type
The overpass utilizes abutment caps supported on 4'-6" diameter columns that are founded on 5'-0" diameter drilled shafts. The roadway embankments behind each abutment are supported by concrete faced MSE retaining walls that are located behind the abutments, which leaves the columns and caps exposed.

Union Pacific Railroad (UPRR), Vertical and Horizontal Clearances
A single UPRR track crosses under Ramp C approximately three feet east of the midspan of the overpass. The track is slightly elevated above adjacent ground and there is approximately 24'-4" of vertical clearance from the low chord of the overpass to the track. UPRR has 60'-0" of ROW that is centered about the track and there is approximately 38-feet minimum clearance from the track to abutment 2.

Vertical and horizontal clearance requirements are provided in the UPRR/BNSF Guidelines for Railroad Grade Separation Projects, 2007 and 2015. Minimum required vertical clearance is 23'-4" and extends 9-feet to each side of the assumed future track. Future track is assumed to be located 20-feet each side of the existing track.

Piers and abutments are to be located off of railroad property.

Fence with barrier shall be provided on the overpass and shall extend to the railroad ROW or a minimum of 25-feet beyond the centerline of the outermost existing track, future track or access roadway (whichever is greater). The total height of the fence with barrier shall be 10-feet minimum.

The vertical clearance for the widened superstructure would not reduce because the superstructure will be widened on the high side of the roadway.

The horizontal clearance for the widened substructures would not reduce because the new substructures will be located in-line with the existing substructures.

Existing Utilities
A 24-inch SRP irrigation pipe runs parallel to the abutments and is located approximately 12-feet east of the front face of Abutment 1.
Overhead powerlines run parallel to the abutments and are located approximately 20-feet west and 200-feet east of the front face of Abutment 2.

The existing overpass contains a single 2-inch diameter conduit for lighting in the north barrier and three 3-inch diameter conduits for FMS in the exterior girder bay on the north side of the bridge.

Aesthetics
The existing retaining walls have typical ADOT vertical rustication that will need to be duplicated at the widenings.

The overpass and walls are painted ADOT tan.

Site Specific Issues
Substructure construction will require contractor entrance into UPRR ROW. Girder erection may require cranes to be located near or within UPRR ROW. All other work would occur at the superstructure level above the UPRR. Demolition of the existing superstructure will require UPRR approval and shall comply with UPRR demolition requirements.

Traffic Control Requirements
The outside shoulder of Ramp C in the vicinity of and through the crossing will need to be closed throughout the duration of the construction of the widening.

Ramp C traffic can use the existing ramp pavement and overpass during construction of the widening.

Feasible Structure Types
The only reasonable option for widening this overpass would be to widen-in-kind.

Initial Recommendation
The AASHTO Type IV girder option was assumed for cost estimating purposes. Other feasible alternatives can be evaluated during the next design stage.

3.6.4.4 Arizona Ave Ramp D RR OP (Structure No. 2677, MP 47.38)

The overpass was constructed in 2005 under ADOT project number 202-C(001)B. The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 50, the Operating Rating as 99 and the Sufficiency Rating as 98.8.

Existing Roadway Geometry
The Ramp D typical section consists of a 2'-0" outside shoulder, two 12'-0" lanes and a 2'-0" inside shoulder.

The existing clear roadway width on ramp bridge is 32'-0". The replacement structure would maintain the same lane configuration, resulting in the same clear roadway width of 32'-0".

The Ramp D alignment is on a horizontal curve through this crossing and has a 3.6% cross slope. The ramp profile at this location is in a crest vertical curve and is elevated above the natural ground with a 3 to 1 fill slopes.

Existing Bridge Configuration
The overpass is located within a horizontal curve, is in a crest vertical curve and has a constant cross-slope of -3.6% to the outside (south). The center of the overpass coincides with the construction centerline and profile grade line.

The existing overpass has 32-inch F-Shape bridge concrete barriers and modified bridge fence with railing along each edge of deck. The total height of the barrier and fence is 10-feet. The roadway consists of a varying outside shoulder and varying lane due to the two lanes west of the overpass converging to one lane east of the overpass. The inside shoulder is 4'-0", the clear roadway is 32'-0" and the resulting out-to-out superstructure width is 34'-10".

The existing overpass is a single-span, AASHTO Type IV prestressed concrete girder bridge, consisting of six girders at 6'-0" with varying overhangs from approximately 2'-2" to 2'-8" and a 7½" concrete deck with a 1" AR-ACFC overlay.

The overpass is 103'-1" long, with a span of 97'-4⅞". The structure depth is 5'-4" (excludes AR-ACFC). The abutments are skewed, on average, approximately 13 degrees 41 minutes from normal to the Ramp D construction centerline.

Foundation Type
The overpass utilizes abutment caps supported on 4'-6" diameter columns that are founded on 5'-0" diameter drilled shafts. The roadway embankments behind each abutment are supported by concrete faced MSE retaining walls that are located behind the abutments, which leaves the columns and caps exposed.

Union Pacific Railroad (UPRR), Vertical and Horizontal Clearances
A single UPRR track crosses under Ramp D approximately three feet east of the midspan of the overpass. The track is slightly elevated above adjacent ground and there is approximately 23'-7½" of vertical clearance from the low chord of the overpass to the track. UPRR has 60'-0" of ROW that is centered about the track and there is approximately 38-feet minimum clearance from the track to abutment 2.

Vertical and horizontal clearance requirements are provided in the UPRR/BNSF Guidelines for Railroad Grade Separation Projects, 2007 and 2015. Minimum required vertical clearance is 23'-4" and extends 9-feet to each side of the assumed future track. Future track is assumed to be located 20-feet each side of the existing track.

Piers and abutments are to be located off of railroad property.

Fence with barrier shall be provided on the overpass and shall extend to the railroad ROW or a minimum of 25-feet beyond the centerline of the outermost existing track, future track or access roadway (whichever is greater). The total height of the fence with barrier shall be 10-feet minimum.

The vertical clearance for the widened superstructure would not reduce because the new superstructure can be constructed at a grade near the existing profile grade line.

The horizontal clearance for the widened substructures would not reduce because the new substructures will be located in-line with the existing substructures.

Existing Utilities
A 24-inch SRP irrigation pipe runs parallel to the abutments and is located approximately 12-feet east of the front face of Abutment 1.

Overhead powerlines run parallel to the abutments and are located approximately 20-feet west and 200-feet east of the front face of Abutment 2.

The existing overpass contains a single 2-inch diameter conduit for lighting in the north barrier and three 3-inch diameter conduits for FMS in the exterior girder bay on the north side of the overpass.

Aesthetics
The existing retaining walls have typical ADOT vertical rustication that will need to be duplicated at the widenings.

The overpass and walls are painted ADOT tan.

Site Specific Issues
Substructure construction will require contractor entrance into UPRR ROW. Girder erection may require cranes to be located near or within UPRR ROW. All other work would occur at the superstructure level above the UPRR. Demolition of the existing superstructure will require UPRR approval and shall comply with UPRR demolition requirements.

Traffic Control Requirements
Ramp D traffic can use the existing ramp pavement and overpass during construction of the new overpass. Upon completion of the new overpass, Ramp D would be closed until construction of the realigned Ramp D pavement is completed.

Feasible Structure Types
Two options for relocating this overpass would be to remove and replace with an AASHTO Type IV girder overpass, and a lateral slide of the existing superstructure to new substructures.

Initial Recommendation
The remove and replace option was assumed for cost estimating purposes. Other feasible alternatives can be evaluated during the next design stage.

3.6.4.5 UPRR OP EB (Structure No. 2678, MP 47.38)

The overpass was constructed in 2005 under ADOT project number 202-C(001)B. The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 54, the Operating Rating as 99 and the Sufficiency Rating as 88.1.

Existing Roadway Geometry
At the UPRR OP EB, SR 202L is symmetrical in section about the median construction centerline. The EB roadway consists of a 12'-0" outside shoulder, three 12'-0" GPLs, a 12'-0" HOV lane and a 10'-0" inside shoulder. At the overpass, the inside shoulder decreases to approximately 9'-4". Barrier is located along both shoulders.

The existing clear roadway width on the eastbound bridge is 69'-4". The widening of this structure would add two general purpose lanes, resulting in a clear roadway width of 93'-4".

The mainline SR 202L alignment is on a horizontal curve through this crossing and has a 3.6% cross slope. The roadway profile at this location is in a crest vertical curve and is elevated above the natural ground with a 3 to 1 fill slopes.

Existing Bridge Configuration
The overpass is located within a horizontal curve, is in a crest vertical curve and has a constant cross-slope of -3.6% to the outside (south). The center of the overpass is 36'-3" right of the construction centerline and 1'-3" right of the profile grade line.

The existing overpass has 32-inch F-Shape bridge concrete barrier with a modified bridge fence with railing along the outside edge of deck. The total height of the barrier and fence is 10-feet. Along the inside edge of deck, the existing overpass has 42-inch F-Shape bridge concrete barrier. The clear roadway is 69'-4" and the resulting out-to-out bridge width is 72'-4".

The existing overpass is a single-span, AASHTO Type IV prestressed concrete girder bridge, consisting of twelve girders at 6'-0" with varying overhangs from approximately 2'-10" to 3'-5" and a 7½" concrete deck with a 1" AR-ACFC overlay.

The overpass is 105'-2" long, with a span of 99'-4⅞". The structure depth is 5'-4" (excludes AR-ACFC). The abutments are skewed, on average, approximately 17 degrees 39 minutes from normal to the SR 202L median construction centerline.

Foundation Type
The overpass utilizes abutment caps supported on 4'-6" diameter columns that are founded on 5'-0" diameter drilled shafts. The roadway embankments behind each abutment are supported by concrete faced MSE retaining walls that are located behind the abutments, which leaves the columns and caps exposed.

Union Pacific Railroad (UPRR), Vertical and Horizontal Clearances
A single UPRR track crosses under SR 202L approximately three feet east of the midspan of the overpass. The track is slightly elevated above adjacent ground and there is approximately 24'-2¾" of vertical clearance from the low chord of the overpass to the track. UPRR has 60'-0" of ROW that is centered about the track and there is approximately 38-feet minimum clearance from the track to abutment 2.

Vertical and horizontal clearance requirements are provided in the UPRR/BNSF Guidelines for Railroad Grade Separation Projects, 2007 and 2015. Minimum required vertical clearance is 23'-4" and extends 9-feet to each side of the assumed future track. Future track is assumed to be located 20-feet each side of the existing track.

Piers and abutments are to be located off of railroad property.

Fence with barrier shall be provided on the overpass and shall extend to the railroad ROW or a minimum of 25-feet beyond the centerline of the outermost existing track, future track or access roadway (whichever is greater). The total height of the fence with barrier shall be 10-feet minimum.

The vertical clearance for the widened superstructure would reduce by 5-inches to 23'-8¾".

The horizontal clearance for the widened substructures would not reduce because the new substructures will be located in-line with the existing substructures.

Existing Utilities
A 24-inch SRP irrigation pipe runs parallel to the abutments and is located approximately 12-feet east of the front face of Abutment 1.

Overhead powerlines run parallel to the abutments and are located approximately 20-feet west and 200-feet east of the front face of Abutment 2.

The existing overpass contains a single 2-inch diameter conduit for lighting in the south barrier.

Aesthetics
The existing retaining walls have typical ADOT vertical rustication that will need to be duplicated at the widenings.

The overpass and walls are painted ADOT tan.

Site Specific Issues
Substructure construction will require contractor entrance into UPRR ROW. Girder erection may require cranes to be located near or within UPRR ROW. All other work would occur at the superstructure level above the UPRR. Demolition of the existing superstructure will require UPRR approval and shall comply with UPRR demolition requirements.

Traffic Control Requirements
The outside shoulder of SR 202L EB in the vicinity of and through the crossing will need to be closed throughout the duration of the construction of the widening.

SR 202L traffic can use the existing pavement and overpass during construction of the widening.

Feasible Structure Types
The only reasonable option for widening this overpass would be to widen-in-kind.

Initial Recommendation
The AASHTO Type IV girder option was assumed for cost estimating purposes. Other feasible alternatives can be evaluated during the next design stage.

3.6.4.6 UPRR OP WB (Structure No. 2679, MP 47.38)

The overpass was constructed in 2005 under ADOT project number 202-C(001)B. The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 54, the Operating Rating as 99 and the Sufficiency Rating as 88.1.

Existing Roadway Geometry
At the UPRR OP WB, SR 202L is symmetrical in section about the median construction centerline. The WB roadway consists of a 12'-0" outside shoulder, three 12'-0" GPLs, a 12'-0" HOV lane and a 10'-0" inside shoulder. At the overpass, the inside shoulder decreases to approximately 9'-4". Barrier is located along both shoulders.

The existing clear roadway width on the westbound bridge is 69'-4". The widening of this structure would add two general purpose lanes, resulting in a clear roadway width of 93'-4".

The mainline SR 202L alignment is on a horizontal curve through this crossing and has a 3.6% cross slope. The roadway profile at this location is in a crest vertical curve and is elevated above the natural ground with a 3 to 1 fill slopes.

Existing Bridge Configuration
The overpass is located within a horizontal curve, is in a crest vertical curve and has a constant cross-slope of -3.6% to the inside (south). The center of the overpass is 36'-3" left of the construction centerline and 1'-3" left of the profile grade line.

The existing overpass has 32-inch F-Shape bridge concrete barrier with a modified bridge fence with railing along the outside edge of deck. The total height of the barrier and fence is 10-feet. Along the inside edge of deck, the existing overpass has 42-inch F-Shape bridge concrete barrier. The clear roadway is 69'-4" and the resulting out-to-out bridge width is 72'-4".
The existing overpass is a single-span, AASHTO Type IV prestressed concrete girder bridge, consisting of twelve girders at 6'-0" with varying overhangs from approximately 2'-10" to 3'-4" and a 7½" concrete deck with a 1" AR-ACFC overlay.

The overpass is 105'-0" long, with a span of 99'-3". The structure depth is 5'-4" (excludes AR-ACFC). The abutments are skewed, on average, approximately 17 degrees 39 minutes from normal to the SR 202L median construction centerline.

Foundation Type
The overpass utilizes abutment caps supported on 4’-6” diameter columns that are founded on 5’-0” diameter drilled shafts. The roadway embankments behind each abutment are supported by concrete faced MSE retaining walls that are located behind the abutments, which leaves the columns and caps exposed.

Union Pacific Railroad (UPRR), Vertical and Horizontal Clearances
A single UPRR track crosses under SR 202L approximately three feet east of the midspan of the overpass. The track is slightly elevated above adjacent ground and there is approximately 24’-2⅜” of vertical clearance from the low chord of the overpass to the track. UPRR has 60’-0” of ROW that is centered about the track and there is approximately 38-feet minimum clearance from the track to abutment 2.

Vertical and horizontal clearance requirements are provided in the UPRR/BNSF Guidelines for Railroad Grade Separation Projects, 2007 and 2015. Minimum required vertical clearance is 23’-4” and extends 9-feet to each side of the assumed future track. Future track is assumed to be located 20-feet each side of the existing track.

Piers and abutments are to be located off of railroad property.

Fence with barrier shall be provided on the overpass and shall extend to the railroad ROW or a minimum of 25-feet beyond the centerline of the outermost existing track, future track or access roadway (whichever is greater). The total height of the fence with barrier shall be 10-feet minimum.

The vertical clearance for the widened superstructure would not reduce because the superstructure will be widened on the high side of the roadway.

The horizontal clearance for the widened substructure would not reduce because the new substructures will be located in-line with the existing substructures.

Existing Utilities
A 24-inch SRP irrigation pipe runs parallel to the abutments and is located approximately 12-feet east of the front face of Abutment 1.

Overhead powerlines run parallel to the abutments and are located approximately 20-feet west and 200-feet east of the front face of Abutment 2.

The existing overpass contains a single 2-inch diameter conduit for lighting in the north barrier.

Aesthetics
The existing retaining walls have typical ADOT vertical rustication that will need to be duplicated at the widenings.

The overpass and walls are painted ADOT tan.

Site Specific Issues
Substructure construction will require contractor entrance into UPRR ROW. Girder erection may require cranes to be located near or within UPRR ROW. All other work would occur at the superstructure level above the UPRR. Demolition of the existing superstructure will require UPRR approval and shall comply with UPRR demolition requirements.

Traffic Control Requirements
The outside shoulder of SR 202L WB in the vicinity of and through the crossing will need to be closed throughout the duration of the construction of the widening.

SR 202L traffic can use the existing pavement and overpass during construction of the widening.

Feasible Structure Types
The only reasonable option for widening this overpass would be to widen-in-kind.

Initial Recommendation
The AASHTO Type IV girder option was assumed for cost estimating purposes. Other feasible alternatives can be evaluated during the next design stage.

3.6.4.7 Arizona Avenue TI OP (Structure No. 2693, MP 47.63)

The overpass was constructed in 2004 under ADOT project number 202-C-002. The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 43, the Operating Rating as 90 and the Sufficiency Rating as 100.0.

Existing Roadway Geometry
At Arizona Avenue, SR 202L is symmetrical in section about the median construction centerline. The EB and WB roadways each consist of a 12’-0” outside shoulder, three 12’-0” GPLs, a 12’-0” HOV lane and a 10’-0” inside shoulder. At the overpass, each inside shoulder decreases to approximately 9’-4”. Barrier is located along all shoulders.

The existing clear roadway width on the eastbound and westbound bridges is 69’-4”. The widening of these structures would add two general purpose lanes in each direction of travel, resulting in a clear roadway width of 93’-4”.

The mainline SR 202L alignment is in tangent through the west half of the overpass and is in a horizontal curve through the east half of the overpass. Both the EB and WB overpasses have a varying cross slope that is downward to the south resulting in a bifurcated median. The alignment is raised at this location with 2 to 1 fill slopes that are protected with slope paving.

The EB and WB roadways are in a tangent profile that rises at +1.9546% to the east.

Arizona Avenue is asymmetric in section about the median construction centerline. The SB roadway consists of a 6’-0” sidewalk behind curb and gutter, a 6’-6” outside shoulder, a 12’-0” lane, two 11’-0” lanes and a 12’-0” left-turn lane. The NB roadway consists of a 6’-0” sidewalk behind curb and gutter, a 6’-6” outside shoulder, a 12’-0” lane, two 11’-0” lanes, an 11’-0” left-turn lane and a 12’-0” left-turn lane. A 12’-0” raised median separates the SB and NB roadways.

Existing Bridge Configuration
The overpasses are partially located within a horizontal curve, are in a tangent grade that rises to the east and have a varying cross-slope of to the south. The centers of the overpasses are 36’-3” left and right of the construction centerline, and 1’-3” left and right of the profile grade line.

The existing overpasses have 32-inch F-Shape bridge concrete barrier along the outside edge of deck. Along the inside edge of deck, the existing overpasses have 42-inch F-Shape bridge concrete barrier. The clear roadway is 69’-4” and the resulting out-to-out bridge width is 72’-4”, for each overpass.

The existing overpasses are two-span, cast-in-place post-tensioned concrete box girder bridges, consisting of 9 webs each, 4'-0" overhangs and an 8½" concrete deck with a 1" AR-ACFC overlay.

The EB overpass is 157'-5½" long, with spans of 70'-9" and 81'-8½". The WB overpass is 156'-6½" long, with spans of 70'-9" and 81'-9½". The structure depths are 3'-6" (excludes AR-ACFC). Abutment 1 and the pier are skewed 3º20'44" from normal to the SR 202L median construction centerline. Abutment 2 is skewed 4º5'40" from normal to the SR 202L median construction centerline.

Foundation Type
The overpasses utilize full-height abutments founded on spread footings. The roadway embankments behind each abutment are supported by concrete cantilever retaining walls that are located parallel to the outside edges of the roadways.

The pier consists of a reinforced integral cap beam supported by bladed columns founded on isolated spread footings.

Vertical Clearance
The existing minimum vertical clearance at these overpasses is 20'-2" and occurs at the southeast corner of the EB overpass.

The vertical clearance after the widening is discussed under Feasible Structure Types.

Existing Utilities
An existing drainage line will conflict with the new pier column foundations.

Aesthetics
The existing pier columns, abutments, wing walls, retaining walls and sound wall have custom aesthetics that will need to be duplicated at the widenings.

The overpasses and walls are painted.

Slope paving is standard.

Site Specific Issues
Soft soils may be encountered at Abutment 2 and may require overexcavation and engineered fill if spread footings are used to support the widened abutment. The existing pier foundation utilizes deep, isolated spread footings. New pier foundation types must consider constructability and maintenance of traffic on Arizona Avenue.

Traffic Control Requirements
The outside shoulders of SR 202L in the vicinity of and through the Arizona Avenue crossing will need to be closed throughout the duration of the construction of the widening.

Temporary closures of Arizona Avenue will be required for such activities as falsework erection or girder erection.

Section 16, Bridge Construction, of the Bridge Group Design Guidelines, requires a minimum of 16'-0" temporary vertical clearance at falsework openings. At the SR 202L EB outside widening, the maximum depth available for falsework would be 3'-6". From Table 2 of Section 16, a falsework span of 52 feet is feasible and would require either the inside left turn lane or the outside lane of the Arizona Avenue NB roadway to be closed during construction of the 202L EB outside widening.

Feasible Structure Types
Three structure types are feasible for widening the existing overpasses; 1) widen-in-kind using cast-in-place post-tensioned concrete box girders, 2) widen with AASHTO BII Box Beams, and 3) widen with AASHTO Type III girders. Each of these options would match the span lengths and configurations of the existing overpasses.

The vertical clearance for the widened EB superstructure will be reduced because that superstructure will be widened on the low side of the EB roadway. The approximate vertical clearance would be 19'-6" for structure type number 1, 19'-8" for structure type number 2 and 18'-7" for structure type number 3.

The vertical clearance for the widened WB superstructure is not reduced since the WB superstructure will be widened on the high side.

Initial Recommendation
The precast prestressed concrete box beam superstructure was assumed for cost estimating purposes because it does not require falsework for construction of the superstructure and the beams can be made continuous in order to approximate the behavior of the existing superstructure, which in turn should provide a superstructure with similar performance as the existing superstructure at a lower cost than the widen-in-kind structure type. Widen-in-kind was assumed for the bridge substructure and foundations.

3.6.4.8 Ramp S-E/56th St OP (Structure No. 2589, MP 54.74)

The overpass was constructed in 2003 under ADOT project number 202-C-507. The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 54, the Operating Rating as 90 and the Sufficiency Rating as 91.7.

Existing Roadway Geometry
The Ramp S-E typical section consists of a 10'-0" outside shoulder, a varying width merge lane, two 12'-0" lanes and a 6'-0" inside shoulder.

The existing clear roadway width on the ramp bridge varies from 48'-9" to 52'-0". The widening of this structure would add a sliver widening, resulting in a clear roadway width that varies from 56'-6¾" to 60'-6⅝". The overall bridge width will be increased between 10'-0" and 15'-0".

The Ramp S-E alignment is on a curve through this crossing and has a 2% cross slope. The roadway profile at this location is in a crest vertical curve and is elevated above the natural ground with a 2 to 1 fill slopes.

56th Street is located under Span 1 of the existing overpass. The roadway is asymmetric in section about the construction centerline. The SB roadway consists of a 19'-0" soft shoulder and a 12'-0" lane. The NB roadway consists of a 2'-6" outside shoulder flanked by TCB and a 12'-0" lane.

Existing Bridge Configuration
The overpass is located within a horizontal curve, is in a crest vertical curve and has a constant cross-slope of -2% to the outside (south). The center of the overpass is not coincidental with the construction centerline and profile grade line.

The existing overpass has 32-inch F-Shape bridge concrete barriers along each edge of deck. The south edge of deck is not parallel to the north edge of deck and follows the taper of the merge lane, resulting in a clear roadway that varies from 52'-0" at the west end of the overpass to approximately 48'-9" at the east end of the overpass. The resulting out-to-out superstructure width varies from 54'-10" at the west end of the overpass to approximately 51'-7" at the east end of the overpass.

The existing overpass is a two-span, cast-in-place post-tensioned concrete box girder bridge, consisting of 6 webs, 3'-8" overhangs and an 8½" concrete deck with a 1" AR-ACFC overlay.

The overpass is 246'-8" long, with spans of 96'-0" and 145'-0". The structure depth is 6'-2" (excludes AR-ACFC). The overpass is skewed 6º46'13" from normal to the Ramp S-E construction centerline.

Foundation Type
The overpass utilizes stub abutments founded on 54-inch diameter drilled shafts. The roadway embankments behind each abutment are supported by concrete cantilever wing walls that are located parallel to the outside edges of the roadways.

The pier consists of a reinforced integral cap beam supported by bladed columns founded on a continuous spread footing.

Vertical Clearance (56th Street)
The existing minimum vertical clearance to 56th Street at the overpass is 22'-5" and occurs at the south edge of the soffit.

The vertical clearance after the widening is discussed under **Feasible Structure Types**.

Union Pacific Railroad (UPRR), Vertical and Horizontal Clearances
A single UPRR track crosses under Ramp S-E near midspan of Span 2 of the overpass. The track is slightly elevated above adjacent ground. The existing minimum vertical clearance to UPRR is 24'-1¾" and occurs at the south edge of the soffit. UPRR has approximately 70'-0" of ROW and there is approximately 75-feet minimum clearance from the track to abutment 2.

Vertical and horizontal clearance requirements are provided in the UPRR/BNSF Guidelines for Railroad Grade Separation Projects, 2007 and 2015. Minimum required vertical clearance is 23'-4" and extends 9-feet to each side of the assumed future track. Future track is assumed to be located 20-feet each side of the existing track.

Piers and abutments are to be located off of railroad property.

Fence with barrier shall be provided on the overpass structure and shall extend to the railroad ROW or a minimum of 25-feet beyond the centerline of the outermost existing track, future track or access roadway (whichever is greater). The total height of the fence with barrier shall be 10-feet minimum.

The horizontal clearance for the widened superstructure would not reduce the existing horizontal clearance further because the new substructures will be located in-line with the existing substructures.

Existing Utilities
Overhead powerlines span Ramp S-E approximately 30-feet west of Abutment 1, and above Spans 1 and 2.

A 12kV underground power bank is located parallel to and in close proximity to Abutment 1.
Parallel to and adjacent to 56th Street are a fiber optic telephone bank, a telephone line, an 8-inch water line, a 4-inch gas line and a 2-inch gas line. These utilities do not in conflict with the pier and abutments.

A 15" sewer line in a 36" corrugated steel sleeve is located parallel to and in close proximity to the pier.

A 24" gas line runs parallel to Abutment 2 and is located near the toe of slope.

Aesthetics
The existing barriers, pier columns, abutments and wing walls have custom aesthetics and typical ADOT vertical rustication that will need to be duplicated at the widenings.

The overpass and walls are painted.

Slope paving is standard.

Site Specific Issues
Construction will require contractor entrance into UPRR ROW. Girder erection may require cranes to be located near or within UPRR ROW. All other work would occur at the superstructure level above the UPRR. Demolition of the existing superstructure will require UPRR approval and shall comply with UPRR demolition requirements.

Traffic Control Requirements
The outside shoulder of Ramp S-E in the vicinity of and through the crossing will need to be closed throughout the duration of the construction of the widening.

Temporary closures of 56th Street will be required for such activities as falsework erection or girder erection.

Section 16, Bridge Construction, of the Bridge Group Design Guidelines, requires a minimum of 16'-0" temporary vertical clearance at falsework openings. At 56th Street, the maximum depth available for falsework would be 6'-4". From Table 2 of Section 16, a falsework span of 28 feet is feasible.

UPRR/BNSF Guidelines for Railroad Grade Separation Projects, 2007 and 2015, requires a minimum of 21'-6" temporary vertical clearance at construction openings. At the UPRR, the maximum depth available for falsework would be 2'-6". From Table 2 of ADOT Section 16, a falsework span of 36 feet is feasible and would span the railroad.

Feasible Structure Types
Two structure types are feasible for widening the existing overpass; 1) widen-in-kind using cast-in-place post-tensioned concrete box girders and 2) widen with AASHTO Type VI girders. Each of these options would match the span lengths and configurations of the existing overpasses.

The vertical clearance at 56th Street for the widened superstructure would reduce to approximately 22'-4" for structure type number 1 and 21'-8" for structure type number 2.

The vertical clearance at UPRR for the widened superstructure would reduce to approximately 24'-0" for structure type number 1 and 23'-4" for structure type number 2.

Initial Recommendation
The cast-in-place post-tensioned concrete box girder was assumed for cost estimating purposes. The south edge of deck is assumed to be parallel to the north edge of deck to avoid a sliver widening that would otherwise widen the edge of deck approximately 3'-9" at the west abutment and 9'-6" at the east abutment. New barrier would be constructed on each side of the bridge that are parallel to the proposed realignment of

the Ramp S-E roadway. The resulting out-to-out width of the bridge would be 66'-11" with a clear roadway width that varies from approximately 55'-8" to 54'-5", in the direction of travel.

3.6.4.9 56th Street OP EB (Structure No. 2590, MP 54.74)

The overpass was constructed in 2003 under ADOT project number 202-C-507. The Aug-2018 Arizona State Highway System Bridge Record lists the Inventory Rating as 61, the Operating Rating as 99 and the Sufficiency Rating as 94.7.

Existing Roadway Geometry
At 56th Street, SR 202L EB consists of a 12'-0" outside shoulder, two 12'-0" GPLs, two 12'-0" HOV lanes and a 9'-6" inside shoulder. Barrier is located along all shoulders.

The existing clear roadway width on the eastbound bridge is 69'-5¾". The widening of this structure would add one general purpose lane, resulting in a clear roadway width of 81'-5¾".

The mainline SR 202L alignment is in tangent through the structure. The EB structure has a constant -2% cross slope to the outside. The alignment is raised at this location with 2 to 1 fill slopes that are protected with slope paving.

The EB roadway is in a crest vertical curve.

56th Street is located under Span 1 of the existing overpass. The roadway is asymmetric in section about the construction centerline. The SB roadway consists of a 21'-0" soft shoulder and a 12'-0" lane. The NB roadway consists of a 2'-8" outside shoulder flanked by TCB and a 12'-0" lane.

Existing Bridge Configuration
The overpass is on tangent, is in a crest vertical curve and has a constant cross-slope of -2% to the outside (south). The center of the overpass is 36'-3" right of the construction centerline and 10'-8" left of the profile grade line.

The existing overpass has 32-inch F-Shape bridge concrete barrier along the outside edge of deck. Along the inside edge of deck, the existing overpass has 42-inch F-Shape bridge concrete barrier. The clear roadway is 69'-4" and the resulting out-to-out bridge width is 72'-4".

The existing overpass is a two-span, cast-in-place post-tensioned concrete box girder bridge, consisting of 10 webs, 4'-0" overhangs and an 8" concrete deck with a 1" AR-ACFC overlay.

The overpass is 251'-1½" long, with spans of 98'-0" and 148'-0". The structure depth is 6'-2" (excludes AR-ACFC). The abutments are skewed 13º20'54" from normal to the SR 202L median construction centerline.

Foundation Type
The overpass utilizes stub abutments founded on 54-inch diameter drilled shafts. The roadway embankments behind each abutment are supported by concrete cantilever wing walls that are located parallel to the outside edges of the roadways.

The pier consists of a reinforced integral cap beam supported by bladed columns founded on a continuous spread footing.

Vertical Clearance (56th Street)
The existing vertical clearance to 56th Street at the EB overpass is 23'-10" and occurs at the south edge of the soffit adjacent to the 56th Street NB shoulder. The existing minimum vertical clearance to 56th Street is 22'-1" and occurs at the north edge of the WB soffit.

The vertical clearance after the widening is discussed under **Feasible Structure Types**.

Union Pacific Railroad (UPRR), Vertical and Horizontal Clearances
A single UPRR track crosses under SR 202L near midspan of Span 2 of the overpass. The track is slightly elevated above adjacent ground and there is approximately 25'-8½" of vertical clearance from the low chord of the EB overpass to the track. The existing minimum vertical clearance to UPRR is 24'-1¾" and occurs at the north edge of the WB soffit. UPRR has approximately 70'-0" of ROW and there is approximately 75-feet minimum clearance from the track to abutment 2.

Vertical and horizontal clearance requirements are provided in the UPRR/BNSF Guidelines for Railroad Grade Separation Projects, 2007 and 2015. Minimum required vertical clearance is 23'-4" and extends 9-feet to each side of the assumed future track. Future track is assumed to be located 20-feet each side of the existing track.

Piers and abutments are to be located off of railroad property.

Fence with barrier shall be provided on the overpass structure and shall extend to the railroad ROW or a minimum of 25-feet beyond the centerline of the outermost existing track, future track or access roadway (whichever is greater). The total height of the fence with barrier shall be 10-feet minimum.

The horizontal clearance for the widened superstructure would not reduce the existing horizontal clearance further because the new substructures will be located in-line with the existing substructures.

Existing Utilities
Overhead powerlines span SR 202L approximately 30-feet west of Abutment 1, and above Spans 1 and 2.

A 12kV underground power bank is located parallel to and in close proximity to Abutment 1.

Parallel to and adjacent to 56th Street are a fiber optic telephone bank, a telephone line, an 8-inch water line, a 4-inch gas line and a 2-inch gas line. These utilities do not in conflict with the pier and abutments.

A 15" sewer line in a 36" corrugated steel sleeve is located parallel to and in close proximity to the pier.

A 24" gas line runs parallel to Abutment 2 and is located near the toe of slope.

An FMS duct bank is located in the exterior cell of the box girder superstructure.

Aesthetics
The existing barriers, pier columns, abutments and wing walls have custom aesthetics and typical ADOT vertical rustication that will need to be duplicated at the widenings.

The overpass and walls are painted.

Slope paving is standard.

Site Specific Issues
Construction will require contractor entrance into UPRR ROW. Girder erection may require cranes to be located near or within UPRR ROW. All other work would occur at the superstructure level above the UPRR. Demolition of the existing superstructure will require UPRR approval and shall comply with UPRR demolition requirements.

Traffic Control Requirements
The outside shoulder of SR 202L EB in the vicinity of and through the crossing will need to be closed throughout the duration of the construction of the widening.

Temporary closures of 56th Street will be required for such activities as falsework erection or girder erection.

Section 16, Bridge Construction, of the Bridge Group Design Guidelines, requires a minimum of 16'-0" temporary vertical clearance at falsework openings. At 56th Street, the maximum depth available for falsework would be 7'-7". From Table 2 of Section 16, a falsework span of 28 feet is feasible.

UPRR/BNSF Guidelines for Railroad Grade Separation Projects, 2007 and 2015, requires a minimum of 21'-6" temporary vertical clearance at construction openings. At the UPRR, the maximum depth available for falsework would be 3'-11¾". From Table 2 of ADOT Section 16, a falsework span of 64 feet is feasible and would span the railroad.

Feasible Structure Types
Two structure types are feasible for widening the existing overpass; 1) widen-in-kind using cast-in-place post-tensioned concrete box girders and 2) widen with AASHTO Type VI girders. Each of these options would match the span lengths and configurations of the existing overpasses.

The vertical clearance at 56th Street for the widened superstructure would reduce to approximately 23'-7" for structure type number 1 and 22'-9" for structure type number 2.

The vertical clearance at UPRR for the widened superstructure would reduce to approximately 25'-5¾" for structure type number 1 and 24'-7¾" for structure type number 2.

Initial Recommendation
The cast-in-place post-tensioned concrete box girder was assumed for cost estimating purposes.

3.6.5 Mainline Underpasses

There are nine mainline underpasses though the project limits. Some underpasses will require retaining wall with barrier or retaining barrier adjacent to the shoulder, as a result of the mainline widening, to retain the soil ahead of the abutment. New retaining walls are discussed under Section 3.7.1 Retaining Walls. No modifications to mainline underpasses have been identified.

3.6.6 System Interchange Ramp Bridges

The ramp bridges of the I-10 / SR 202L Traffic Interchange are not impacted by this project.

The ramp bridges of the SR 101L / SR 202L Traffic Interchange are not impacted by this project.

3.7 RETAINING WALLS, SOUND BARRIER WALLS, AND BOX CULVERTS

3.7.1 Retaining Walls

New retaining walls are required throughout the corridor to accommodate the roadway widening for the Recommended Alternative. The retaining wall alternatives that could be considered for this project are; cast-in-place (CIP) cantilevered walls on spread footings, cantilevered walls on drilled shaft foundations, mechanically stabilized earth (MSE) walls, soil nailed walls, and soldier/tieback walls. The design of the walls will utilize the current AASHTO LRFD Specifications and the ADOT Bridge Design Guidelines.

The new retaining walls may require special design considerations due to the proximity of new walls to existing walls, new walls near existing or proposed ROW, new walls near existing drainage channels, or new walls near the end of box culverts. At these locations, the following alternatives should be evaluated during final design:

- Offset the new wall from the existing wall to provide enough area to construct a new spread footing.
- Provide a specialty wall design that could be founded on:
  - L-shape spread footings.
  - Single or multiple rows of drilled shaft foundations utilizing a shaft cap to transfer loads from the wall to the shafts.
  - Footings that are doweled into existing box culvert structures. Roadway barriers adjacent to these new walls would be founded on independent moment slabs.
- Tie-back or soil nail walls. Existing roadway embankment suitability for lateral restraints (tiebacks and soil nails) will need to be evaluated during final design.
- MSE walls are generally only desirable in fill wall situations.

During final design, wall alternatives must be evaluated based on location to determine the suitability. The evaluation criteria should include ROW constraints, construction access, adjacent structures or constraints, the ability to maintain traffic during construction, and estimated construction costs.

Preliminary Recommendations for Retaining Walls
For this report, retaining walls are divided into three categories; 1) standard cast-in-place walls, 2) specialty walls, and 3) combination walls. A summary of the new retaining walls used for cost estimating purposes is provided in Table 25. Table 26 lists existing retaining walls and removal lengths, where applicable.

Standard walls are considered as ADOT standard cast-in-place cantilevered walls or walls founded on similarly configured spread footing foundations. Specialty walls are walls that would require an unusual footing shape or would be founded on drilled shaft foundations; or are tie-back, soil nail, or MSE walls.

Retaining barrier or toe-down barrier can be used to accommodate shallow cut or fill situations. Retaining barrier is F-Shape concrete barrier that is designed to resist lateral earth pressure loading on the back face of the barrier. Toe-down barrier is F-Shape barrier that retains fill below through the utilization of a cut-off wall or toe-down below the outside edge of the barrier footing. The design utilizes both these items and the cost estimate includes pay items for each.

Preliminary noise/sound analysis indicated sound barrier walls are required on the project. There are situations where noise barrier wall locations coincide with retaining walls. These walls provide a sound barrier wall supported by a retaining wall and are identified as combination walls. Unless specified as a combination/specialty wall, combination walls are also anticipated to be founded on spread footings.

There are locations in which the proposed roadway widening requires shifting combination walls by only a few feet. These combination walls are large retaining walls and run parallel to the drainage channel along the North side of SR 202L. Removing and reconstructing these walls will require large excavations and impact the existing channel. Adjustments to the proposed roadway edges in these locations should be investigated during final design.

Table 25. New Retaining Wall Summary

Wall Name	Location	Approximate SR 202L Station Limits	Approx. Wall Length (ft)	Average Wall Height(1) (ft)	Max. Wall Height(1) (ft)	Wall Type
RW-2030+58 RT	Ramp S-E east of 56th Street	2030+58 to 2062+00	3150	5	6	Fill Wall Standard or Specialty
RW-2057+00 LT	SR 202L west of RCBC	2057+00 to 2060+20	320	6	8	Fill Wall Standard
RW-2102+80 RT	SR 202L east of Kyrene Rd	2102+80 to 2120+60	1780	6	7	Cut Wall Retaining Barrier or Specialty
RW-2244+60 RT	SR 202L at Price Rd	2244+60 to 2251+27	670	10	11	Cut Wall Retaining Barrier or Specialty
RW-2259+00 RT	SR 202L at Price Rd Ramp D	2259+00 to 2268+82	990	5	10	Cut Wall Retaining Barrier or Specialty
RW-2313+40 RT	SR 202L east of Dobson Road	2313+40 to 2234+20	2080	9	10	Cut Wall Retaining Barrier or Specialty
RW-2318+19 LT	SR 202L east of Dobson Road	2318+19 to 2328+40	1025	6	7.5	Cut Wall Retaining Barrier or Specialty
RW-2332+00 LT	SR 202L west of Alma School Rd	2332+00 to 2337+80	580	6.5	7.5	Cut Wall Retaining Barrier or Specialty
RW-2346+20 RT	SR 202L west of Alma School Rd	2346+20 to 2350+20	400	6	9	Cut Wall Retaining Barrier or Specialty
RW-2352+96 LT	SR 202L east of Alma School Rd	2352+96 to 2359+00	610	6.5	8	Cut Wall Retaining Barrier or Specialty
RW-2360+40 LT	Alma School Rd Ramp C	2360+40 to 2362+00	160	5	5.5	Cut Wall Retaining Barrier or Specialty
RW-2367+40 RT	SR 202L east of Alma School Rd	2367+40 to 2381+40	1400	8	10	Cut Wall Retaining Barrier or Specialty
RW-2367+80 LT	SR 202L east of Alma School Rd	2367+80 to 2371+20	340	5.5	6	Cut Wall Retaining Barrier or Specialty
RW-2397+52 RT	SR 202L west of Arizona Ave	2397+52 to 2404+54	710	7	10	Fill Wall Standard or Specialty
RW-2397+60 LT	SR 202L west of Arizona Ave	2397+60 to 2404+43	690	6	9	Fill Wall Standard or Specialty
RW-2406+20 LT	SR 202L east of Arizona Ave	2406+20 to 2418+16	1200	8	12	Fill Wall Standard or Specialty
RW-2406+34 RT	SR 202L east of Arizona Ave	2046+34 to 2416+80	1050	7	11	Fill Wall Standard or Specialty
RW-2422+20 LT	SR 202L Aux Lane east of UPRR Crossing	2422+20 to 2428+65	645	9	11	Fill Wall Standard or Specialty
CW-2428+65 LT	SR 202L Aux Lane east of UPRR Crossing	2428+65 to 2443+20	1485	9	13	Fill Wall Combination Wall
RW-2421+78 RT	SR 202L Aux Lane east of UPRR Crossing	2421+78 to 2444+40	2265	6	9	Fill Wall Standard or Specialty
RW-2455+00 LT	SR 202L at McQueen Rd UP	2455+00 to 2466+60	1160	6	6.5	Cut Wall Retaining Barrier or Specialty
RW-2457+20 RT	SR 202L at McQueen Rd UP	2457+20 to 2463+00	580	6	6.5	Cut Wall Retaining Barrier or Specialty
CW-2474+40 RT	SR 202L west of Consolidated Canal	2474+40 to 2483+12	880	5	7	Combination Wall
CW-2484+89 RT	SR 202L east of Consolidated Canal	2484+89 to 2489+61	480	4	7	Combination Wall
RW-2489+61 RT	SR 202L west of Consolidated Canal	2489+61 to 2500+00	1040	6	7	Fill Wall Standard or Specialty
CW-2486+59 LT	SR 202L west of Consolidated Canal	2486+59 to 2496+64	1010	12	15	Combination Wall
RW-2510+20 RT	SR 202L at Cooper Road UP	2510+20 to 2517+60	740	8	9	Cut Wall Retaining Barrier or Specialty
RW-2510+20 LT	SR 202L at Cooper Road UP	2510+20 to 2518+40	820	7	9	Cut Wall Retaining Barrier or Specialty

Table 25. New Retaining Wall Summary

Wall Name	Location	Approximate SR 202L Station Limits	Approx. Wall Length (ft)	Average Wall Height(1) (ft)	Max. Wall Height(1) (ft)	Wall Type
CW-2531+33 LT	SR 202L Aux Lane east of Cooper Road	2531+33 to 2546+41	1510	5	6	Combination Wall
RW-2561+80 RT	SR 202L at Gilbert Rd UP	2561+80 to 2567+80	600	7	8	Cut Wall Retaining Barrier or Specialty

1) For combination walls, height shown is the retained height.

Table 26. Existing Retaining Wall Summary

Wall No.	Original Construction Project No.	Location	Approximate SR 202L Station Limits	Approx. Removal Length(1) (ft)	Wall Type
EN-1	600-6-(1)	North Side of Ramp EN (202 EB to I-10 WB)	1981+ to 1988+	N/A	B-18.10 Case II
WS-4	600-7-(1)B	West Side of Ramp WS (202 WB to I-10 EB)	1995+	N/A	B-18.10 Case II
WS-3	600-7-(1)B	East Side of Ramp WS (202 WB to I-10 EB)	1995+	N/A	B-18.10 Case II
Wall 4	202-C(202)N	West Side of HOV Ramp (I-10 EB to 202 EB)	2001+ to 2004+	N/A	B-18.10 Case II
Wall 3A	202-C(202)N	East Side of HOV Ramp (202 WB to I-10 WB)	2002+	N/A	B-18.10 Case II
Wall 3B	202-C(202)N	East Side of HOV Ramp (202 WB to I-10 WB)	2004+	N/A	B-18.10 Case II
WN-1	600-7-(1)B	West Side of Ramp WN (202 WB to I-10 WB)	2003+	N/A	B-18.10 Case II
WN-2	600-7-(1)B	North Side of Ramp WN (202 WB to I-10 WB)	2003+ to 2022+	N/A	B-18.10 Case II
WS-1	600-7-(1)B	South Side of Ramp WS (202 WB to I-10 EB)	2004+	N/A	B-18.10 Case II
WS-2	600-7-(1)B	North Side of Ramp WS (202 WB to I-10 EB)	2004+	N/A	B-18.10 Case II
SE-1	600-7-(1)B	North Side of Ramp SE (I-10 EB to 202 EB)	2007+	N/A	B-18.10 Case II
SE-4	600-7-(1)B	South Side of Ramp SE (I-10 EB to 202 EB)	2007+	N/A	B-18.10 Case II
Wall 6	202-C(202)N	South Side of HOV Ramp (I-10 EB to 202 EB)	2008+ to 2012+	N/A	B-18.10 Case II
Wall 5	202-C(202)N	North Side of HOV Ramp (I-10 EB to 202 EB)	2008+ to 2011+	N/A	B-18.10 Case II
RW1	202-C-507	North Side of SR 202L	2140+ to 2166+	N/A	Concrete Cantilever
RW2	202-C-507	North Side of McClintock Ramp A	2173+ to 2178+	N/A	Concrete Cantilever
RW3	202-C-507	North Side of McClintock Ramp B	2186+ to 2187+	N/A	Concrete Cantilever
CV1	202-C(4)B	South Side of WB Frontage Rd	2203+ to 2215+	N/A	B-18.10 Case II
CV2	202-C(4)B	North Side of EB Frontage Rd	2208+ to 2215+	N/A	B-18.10 Case II
CV3	202-C(4)B	North Side of SR 202L	2216+ to 2218+	N/A	B-18.10 Case II
SW3	202-C(4)B	South Side of Ramp SW (101 SB to 202 WB)	2218+ to 2232+	N/A	B-18.10 Case II
EN1	202-C(4)B	South Side of Ramp EN (202 EB to 101 NB)	2221+ to 2231+	N/A	B-18.10 Case II
SW2	202-C(4)B	North Side of Ramp SW (101 SB to 202 WB)	2230+ to 2241+	N/A	B-18.10 Case II
PR5	202-C(4)B	South Side of Price Rd Ramp B	2231+ to 2244+	N/A	B-18.10 Case II
PR1	202-C(4)B	South Side of Price Rd Ramp A	2240+ to 2243+	N/A	B-18.10 Case II
PR2	202-C(4)B	North Side of Price Rd Ramp B	2241+ to 2244+	N/A	B-18.10 Case II
PR4	202-C(4)B	North Side of Price Rd Ramp D	2246+ to 2247+	N/A	B-18.10 Case II
WN1	202-C(4)B	South Side of Ramp WN (202 WB to 101 NB)	2248+ to 2254+	N/A	B-18.10 Case II
Wall 10	202-C(202)N	South Side of HOV Ramp (101 SB to 202 EB)	2252+ to 2256+	N/A	B-18.10 Case II
Wall 10	202-C(202)N	North Side of HOV Ramp (101 SB to 202 EB)	2252+ to 2256+	N/A	B-18.10 Case II

Table 26. Existing Retaining Wall Summary

Table 26. Existing Retaining Wall Summary

Wall No.	Original Construction Project No.	Location	Approximate SR 202L Station Limits	Approx. Removal Length(1) (ft)	Wall Type
Wall 13	202-C(202)N	South Side of Price Rd Ramp D	2256+ to 2261+	N/A	B-18.10 Case II
Wall 11	202-C(202)N	South Side of Price Rd Ramp D	2257+ to 2260+	350	B-18.10 Case II
RW3	202-C-(002)	South Side of SR 202L east of Dobson Road	2297+ to 2298+	N/A	B-18.10 Case II
RW2	202-C-(002)	Along West Side of Dobson Rd South of SR 202L	2298+	N/A	Concrete Cantilever Combination Wall w/ Masonry Sound Wall
RW1	202-C-(002)	Along East Side of Dobson Rd South of SR 202L	2299+	N/A	B-18.10 Case II
RW4	202-C-(002)	North Side of SR 202L	2303+ to 2327+	950	B-18.10 Case II
Wall 5	202-C-(002)	Along West Side of Alma School Rd South of SR 202L	2351+	N/A	Concrete Cantilever Combination Wall w/ Masonry Sound Wall
WB1	202-C(002)	Arizona Ave TI OP Abutment 1 LT	2404+	(1)	B-18.10 Case II
EB1	202-C(002)	Arizona Ave TI OP Abutment 1 RT	2404+	(1)	B-18.10 Case II
WB2	202-C(002)	Arizona Ave TI OP Abutment 2 LT	2404+	(1)	B-18.10 Case II
EB2	202-C(002)	Arizona Ave TI OP Abutment 2 RT	2404+	(1)	B-18.10 Case II
LW1	202-C(001)B	North Side of Arizona Ave Ramp C West of UPRR	2417+ to 2418+	(1)	MSE
RW1	202-C(001)B	South Side of Arizona Ave Ramp D West of UPRR	2418+ to 2419+	(1)	MSE
WB1	202-C(001)B	UPRR (west) between Ramp C & Ramp D	2417+	(1)	MSE
LW2	202-C(001)B	North Side of Arizona Ave Ramp C East of UPRR	2419+ to 2420+	(1)	MSE
RW2	202-C(001)B	South Side of Arizona Ave Ramp D East of UPRR	2420+ to 2421+	(1)	MSE
EB1	202-C(001)B	UPRR (east) between Ramp C & Ramp D	2419+	(1)	MSE

Table 26. Existing Retaining Wall Summary

Wall No.	Original Construction Project No.	Location	Approximate SR 202L Station Limits	Approx. Removal Length(1) (ft)	Wall Type
CW1	202-C(001)B	North Side of SR 202L	2428+ to 2460+	2428+65 to 2443+20 L~1500	Concrete Cantilever Combination Wall w/ Concrete Sound Wall
LW3	202-C(001)B	Consolidated Canal OP Abutment 1 LT	2483+ to 2484+	(1)	Soil Nail Wall
RW3	202-C(001)B	Consolidated Canal OP Abutment 1 RT	2484+	(1)	Soil Nail Wall
LW4	202-C(001)B	Consolidated Canal OP Abutment 2 LT	2485+ to 2486+	(1)	Soil Nail Wall
RW4	202-C(001)B	Consolidated Canal OP Abutment 2 RT	2486+	(1)	Soil Nail Wall
CW2	202-C(001)B	North Side of SR 202L	2486+ to 2513+	2486+59 to 2496+64 L~1000	Concrete Cantilever Combination Wall w/ Concrete Sound Wall
CW3	202-C(001)B	North Side of SR 202L	2516+ to 2546+	2531+30 to 2546+40 L~1500	Concrete Cantilever Combination Wall w/ Concrete Sound Wall

(1) Wall removal limits are dependent on bridge widening and will be included with final design bridge plans.

3.7.2 Sound Barrier Walls

Table 27 identifies the existing sound barrier walls, while Table 28 identifies the proposed new sound barrier walls that will be finalized during final design.

Table 27. Existing Sound Barrier Wall Summary

Wall No.	Original Construction Project No.	Location	Approximate SR 202L Station Limits	Approx. Wall Length (ft)	Average Wall Height (ft)	Max. Wall Height (ft)	Wall Type
SW1	202-C-507	North Side of SR 202L from Kyrene to McClintock Ramp A	2083+ to 2165+	8,288	17		Masonry
CV4	202-C(4)B	North Side of WB Frontage Rd from McClintock Dr to Chandler Village Dr	2191+ to 2214+	2,333	20	21	SD 8.01
SE2	202-C(4)B	South Side of SR 202L	2267+ to 2287+	2,010	6	9	SD 8.01
SW1	202-C(002)	South Side of SR 202L from Dobson Rd to Alma School Rd	2299+ to 2351+	5,193	21.5		SD 8.02

Table 27. Existing Sound Barrier Wall Summary

Wall No.	Original Construction Project No.	Location	Approximate SR 202L Station Limits	Approx. Wall Length (ft)	Average Wall Height (ft)	Max. Wall Height (ft)	Wall Type
SW2	202-C(002)	North Side of SR 202L	2302+ to 2341+	12,594	18		SD 8.02

Table 28. New Sound Barrier Wall Summary

Wall No.	Location	Approximate SR 202L Station Limits	Approx. Wall Length (ft)	Average Wall Height (ft)	Max. Wall Height (ft)	Wall Type
SBW 2284	West of Dobson Road, North Side of SR 202L	Sta 2284+87 to Sta 2298+23	1,439	12	18	SD 8.01
SBW 2463	East of McQueen Road, North Side of SR 202L	Sta 2463+14 to Sta 2486+59	2,347	12	18	SD 8.01
SBW 2469	East of McQueen Road, South Side of SR 202L	Sta 2469+76 to Sta 2489+60	1,985	14	18	SD 8.01
SBW 2641	West of Val Vista Drive, South Side of SR 202L	Sta 2641+14 to Sta 2660+74	2,000	12	18	SD 8.01

3.7.3 Box Culverts

SR 202L corridor offsite flows are managed by the north channel/RCBC interceptor system. There are two reinforced concrete box culverts that cross the SR 202L from north to south – one for storm water and one for irrigation.

The RCBC for storm water is a multi-barrel reinforced box culvert that is located about 1/3 mile west of Kyrene Road at mainline Station 2063+65. This RCBC conveys storm water from the north channel system into the Southeast Valley Regional Drainage System basin on the south side of the freeway. Review of the preliminary layout shows this RCBC will not need to be extended to accommodate either the EB or WB widening for the GPLs. The freeway improvements over this RCBC will be accomplished by a retaining wall system.

The other RCBC crossing is for the Gila Drain that crosses SR 202L at about one half mile west of Kyrene Road, near Station 2056+30. Both the north end and south end of this RCBC are over 100 ft from the back of barrier; widening associated with addition of GPLs will not impact this box culvert.

The existing RCBCs are shown in Table 29.

Table 29. Existing Reinforced Concrete Box Culvert Summary

Station	Location Description	Barrels (No.)	Size (ft)	Depth Cover (ft)	Length (ft)	Design Flow (cfs)
Sta 2021+65 to 2028+75 Lt	600 ft west of 56th St to 56th St	2	6 × 6	3	715	719
Sta 2056+00 to 2057+78 Lt	RCBC crossing Gila Drain	2	10 × 8	2	178	750
Sta 2056+30	Gila Drain crossing 202L	1	10 × 7	2 - 10	441	Irrigation
Sta 2063+65	Crosses 202L about 1800 ft west of Kyrene Road	6	12 × 8	5	238	750
Sta 2081+55 to 2083+13 Lt	Kyrene Road crossing	5	10 × 7	3	168	975
Sta 2187+19 to 2189+10	McClintock Dr crossing	3	8 × 8	5	191	975
Sta 2189+95 to 2216+30	McClintock Dr to Chandler Village Dr	3	8 × 8	5	2634	975
Sta 2232+55 to 2247+25	Through 101L/202L System TI	2	6 × 6	1	1981	377
Sta 2298+30 to 2318+15	Dobson Rd crossing to 2000 ft east of Dobson Rd	2	6 × 6	11	235	377
Sta 2350+95 to 235330	Alma School Rd crossing	1	8 × 6	2	255	345
Sta 2403+75 to 2406+30	Arizona Ave crossing	1	8 × 6	4	180	345
Sta 2417+65 to 2419+40 Lt	Drop into Basin K	2	7 × 6	2	70	514
Sta 2430+10 to 2430+80 Lt	McQueen Rd crossing	1	10 × 6	5	245	514
Sta 2460+15 to 2462+60 Lt	Consolidated canal crossing	1	10 × 5	5	155	514
Sta 2484+30 to 2485+85 Lt	Cooper St crossing	1	10 × 6	5	262	514
Sta 2513+20 to 2515+80 Lt	Gilbert Rd crossing	1	10 × 6	3	215	514

1) See Table 29 for a more detailed description of box culverts at the stations noted.
2) Preliminary recommendations shall be further evaluated during final design.

3.8 DRAINAGE

3.8.1 Off-Site Drainage Systems

Existing offsite Drainage System Overview

The proposed widening associated with the Recommended Alternative was reviewed to identify offsite drainage facilities that would be impacted by the improvements. The primary concern is along the north side of the SR 202L where the system of concrete lined channels and reinforced box culverts are located. Table 30 identifies offsite drainage channels along SR 202L.

In general, the area along the outside edge of the north concrete channel has a continuous maintenance access road throughout the corridor. There are also access ramps connecting the bottom and top of the channel, and they exist in the northern half of the channel. On the south side of the channel there are landscaped areas comprised of decomposed granite, which are sparsely vegetated and contain screen and noise walls.

Table 30. Offsite Drainage Channel Summary

Channel Configuration/ Channel Limits	Offset (Lt/Rt)	Lining Material	Length (ft)	Depth (ft)	Side Slopes (H:1)		Top Width (ft)	Bottom Width (ft)	Design Flow (cfs)
					Lt	Rt			
Trapezoidal Channel: I-10 to 56th St	Lt	Concrete	770	6.8	2	2	35	8	719
Trapezoidal Channel: 56th St to Gila Drain	Lt	Concrete	2700	7.5	2	2	40	10	750
Trapezoidal Channel: Gila Drain to 1/4 mile W of Kyrene Rd	Rt	Concrete	1265	12.5	2	2	60	10	975
Trapezoidal Channel: Gila Drain to Kyrene Rd	Lt	Concrete	2350	9.5	2	2	58	20	975
Trapezoidal Channel: Kyrene Rd to McClintock Dr	Lt	Concrete	10350	10.0	2	2	52	12	975
Trapezoidal Channel: Chandler Village Dr to 101L	Lt	Concrete	2170	12.0	2	2	60	12	975
Trapezoidal Channel: 101L to Dobson Rd	Lt	Concrete	5200	8.0	2	2	40	8	494
Trapezoidal Channel: Dobson Rd to Alma School Rd	Lt	Concrete	3280	6.8	2	2	35	8	380
Trapezoidal Channel: Alma School to Arizona Ave	Lt	Concrete	5060	9.5	2	2	46	8	380
Trapezoidal Channel: Arizona Ave to UPRR	Lt	Concrete	1210	8.0	2	2	40	8	380
Trapezoidal Channel: Hamilton St (Basin K) to McQueen Rd	Lt	Concrete	3000	10.0	2	2	48	8	514
Trapezoidal Channel: McQueen Rd to Consolidated Canal	Lt	Concrete	2160	10.5	2	2	50	8	514
Trapezoidal Channel: Consolidated Canal to Cooper Rd	Lt	Concrete	2740	8.0	2	2	40	8	514
Trapezoidal Channel: Cooper Rd to Gilbert Rd	Lt	Concrete	5050	7.5	2	2	38	8	514

The GPL widening to WB SR 202L will not compromise the maintenance road and channel access ramps on the north side of the channel. The area on the south side of the channel will be impacted and either eliminated entirely, or reduced to a narrow width.

The study reviewed the preliminary wall layouts to determine if they would compromise the channel hydraulics for the north side channel system. An initial assessment indicates one area that becomes affected by the GPL widening to the north. It starts about one third of a mile east of Cooper Road and extends about 1000 ft east (to about 0.4 miles west of Gilbert Road). At this location, the new screen wall will extend into the south edge of the concrete channel lining.

A review of the HEC-RAS analysis output contained in the SR 202L, Arizona Avenue to Gilbert Road drainage report indicates there is anywhere from 2 to 2.5 feet of freeboard for the concrete channel between Cooper Road and Gilbert Road. Therefore, if necessary, the relocated wall could project into the top portion of the channel lining for up to 4 feet horizontally without compromising the hydraulics of the channel system. As this project progresses through final design, this area of the channel will require further assessment from a hydraulics standpoint.

Another consequence of the wall protruding into the channel lining will be that a portion of the channel lining will need to be reconstructed to relocate the wall itself. The extent of the channel lining reconstruction will depend on the type of wall foundation system used.

3.8.2 On-Site Drainage Systems

Onsite drainage systems are a combination of closed conduit storm drain networks and open roadside ditches. Closed conduit systems are used throughout the project. Storm drain systems in the I-10 and SR 202L interchange are routed to a central trunk line. The trunkline is connected to a box culvert inflow storage chamber into the interchange pump station located at the southwest quadrant of the traffic interchange along the east to south traffic interchange ramp. From 56th Street to Kyrene Road, the storm drains mainly consist of short lateral storm drains that connect pavement inlets to the adjacent offsite channel draining east along WB SR 202L. The channel and storm drain outfall to the existing retention basin configuration at the southwest corner of Kyrene Road traffic interchange and ultimately the Gila Drain. From Kyrene Road to SR 202L Station 2120+50, catch basin laterals drainage pavement runoff to a trunkline running behind the EB curb and gutter. The trunkline outfalls to the Kyrene Road interchange pump station and ultimately the Gila Drain. From SR 202L Station 2120+50, Station 2120+50 to McClintock Drive, and McClintock Drive to 2224+00, storm drain catch basins and lateral pipes drain to a storm drain trunkline system along EB SR 202L. The trunkline diameter ranges up to a 96-inch storm drain before outfalling to the McClintock Drive stormwater pump station. From Station 2224+00 to the SR 101L Interchange, and from SR101L Interchange to Station 2410+00, storm drain catch basins and laterals drain to a Westbound storm drain trunkline. The storm drain trunkline diameter ranges up to a 96-inch diameter trunkline before outfalling into a 10’x10’ reinforced concrete box culvert at the SR 101L interchange pump station which then outfalls into the SR 202L West channel. From Station 2410+00 to Station 2445+00, storm drain laterals and catch basins drain directly into the Westbound ADOT stormwater interceptor channel. From Station 2445+00 to Station 2590+00, storm drain catch basins and laterals drain into a Westbound storm drain trunkline. The trunkline diameter ranges up to a 78-inch diameter pipe, which outfalls into the McQueen Road stormwater pump station through a 10’x10’ reinforced concrete box culvert intake storage conduit. From Station 2590+00 to 2675+00, storm drain catch basins and lateral pipes drain to a trunkline and the Lindsey Road Retention Basin. The Lindsey Road Retention Basin has an overflow storm drain trunkline which outfalls into the SR 202L WB interceptor channel.

Catch Basins

The drainage evaluation was based on the requirements of Chapter 600 of ADOT's Roadway Design Guidelines. The minimum catch basin spacing was based on the allowable spread requirements for each roadway classification. The delineation of the onsite drainage basins was conducted based on the location of inlets and roadway geometry for the Recommended Alternative. Rational method calculations were conducted using a minimum 10-minute time of concentration for the calculation of design peak flows.

Preliminary gutter and inlet hydrologic and hydraulic calculations follow guidelines and procedures in the ADOT Hydraulic Manual and HEC-22 publications. The method of calculation accounts for a roadway section with a 1" rubberized asphalt overlay above the lip of gutter and n-values of 0.013 for the gutter and 0.016 for the pavement segment.

Storm Drain Trunk Lines

The storm drain trunk lines constructed with the original freeway construction projects are mostly maintained throughout the corridor with the selected alternative widening. Where the existing trunkline remains outside the pavement widening or within the shoulder, the existing trunkline is maintained with new offset manhole access points and modified manhole construction details. Where the trunkline ends up under pavement beyond the shoulder into the travel lanes, the trunkline is relocated. There are exceptions to relocating trunklines under pavement in the SR 101L interchange where a large trunkline and box culvert pump station inflow storage tank remain under the second GPL travel lane with limited to no access. The trunkline will be accessible from the pump station wet well and at manholes located further east along the 96-inch storm drain trunkline. Table 31 summarizes specific trunkline locations where the trunkline exceeds 48-inch diameter and requires a special condition.

Table 31. Storm Drain Trunkline Recommendations for Widening

Trunkline Location (SR 202L Station)	Existing Trunkline Description	Situation	Preliminary Recommendation
Sta 2082+00 to 2117+70	66-inch to 42-inch Diameter RCP	Existing trunkline with manholes end up under Eastbound shoulder in asphalt overlay.	Cap existing manholes and install new oversized C-15.92 catch basins with offset 48" storm drain access details to capped manholes.
Sta 2131+80 to 2189+40	60-inch to 96-inch Diameter RCP	Existing trunkline with manholes end up under Eastbound shoulder in asphalt overlay.	Cap existing manholes and install new oversized C-15.92 catch basins with offset 48" storm drain access details to capped manholes or modify existing manhole to C-15.92 top grate access vault if manhole lines up with new concrete barrier location.
Sta 2240+00 to 2256+15	10'x10' Box Culvert to 96-inch Diameter RCP	Existing pump station inflow box culvert storage system and 96-inch trunkline with manholes end up under Westbound travel lanes in the second inside travel lane.	Leave box culvert and 96-inch trunklines in place and cap existing manholes. Access to box culvert will be maintained from SR 101L / SR 202L Santan interchange pump station wet well. Access to 96-inch trunkline will begin at Station 2256+50 new manhole location. The total distance between these two access points is approximately 2,050 LF. The cost and construction / MOT constraints associated with relocating this segment of trunkline provides justification for leaving the system in place and maintaining from end point access points. The system is currently underneath the first inside travel lane with capped manholes.
Sta 2256+15 to 2269+00	96-inch Diameter RCP	Existing trunkline with manholes end up under Westbound shoulder in asphalt overlay.	Relocate 96-inch trunkline to north of WB concrete barrier. The 96-inch trunkline is able to be reached without major MOT impacts and can be relocated to maintain new access points before it ends up under the second travel lane in the middle of the interchange flyover ramps.
Sta 2273+50 to 2312+00	96-inch to 96-inch Diameter RCP	Existing trunkline with manholes end up under Westbound shoulder in asphalt overlay.	Cap existing manholes and install new oversized C-15.92 catch basins with offset 48" storm drain access details to capped manholes or modify existing manhole to C-15.92 top grate access vault if manhole lines up with new concrete barrier location.
Sta 2312+00 to 2327+80	72-inch to 96-inch Diameter RCP	Existing trunkline with manholes end up under Westbound travel lane in asphalt overlay.	Due to proximity of retaining wall adjacent to offsite interceptor channel / box culvert, the 72-inch storm drain must be left in place with offset manhole access points. New oversized C-15.92 catch basins with 48" diameter RCP access points will be provided at current manhole locations.
Sta 2344+50 to 2359+50	72-inch Diameter RCP	Existing trunkline with manholes end up under Westbound travel lane in asphalt overlay.	Cap existing manholes and install new oversized C-15.92 catch basins with offset 48" storm drain access details to capped manholes.
Sta 2359+50 to 2364+50	72-inch to 66-inch Diameter RCP	Existing trunkline with manholes end up under Westbound travel lane in asphalt overlay.	Remove existing trunkline and relocate north of WB concrete barrier with new manholes and catch basin lateral connections.
Sta 2364+50 to 2397+00	66-inch to 54-inch Diameter RCP	Existing trunkline with manholes end up under Westbound travel lane in asphalt overlay.	Cap existing manholes and install new oversized C-15.92 catch basins with offset 48" storm drain access details to capped manholes.
Sta 2467+30 to 2256+15	10'x10' Box Culvert to 78-inch Diameter RCP	Existing pump station inflow box culvert storage system and 78-inch trunkline with manholes end up under Westbound travel lane.	Leave box culvert and 78-inch trunklines in place and cap existing manholes. Access to box culvert will be maintained from McQueen interchange pump station wet well. Access to 78-inch trunkline will begin at Station 2477+25 existing manhole location. The total distance between these two access points is approximately 1,418 LF. The cost and construction / MOT constraints associated with relocating this segment of trunkline provides justification for leaving the system in place and maintaining from end point access points.
Sta 2507+65 to 2567+95	78-inch to 66-inch Diameter RCP	Existing trunkline with manholes end up under Westbound shoulder in asphalt overlay.	Cap existing manholes and install new oversized C-15.92 catch basins with offset 48" storm drain access details to capped manholes or modify existing manhole to C-15.92 top grate access vault if manhole lines up with new concrete barrier location.

Pump Stations and Retention Basins

Effects of increased pavement runoff to retention basins and pump stations along SR 202L GPL corridor improvements should be evaluated in final design. Proposed pavement areas will impact inflow hydrograph to retention basins and pump stations. The effects of increased runoff volumes to existing retention basins should be evaluated in Final Design. The impacts to pump station operations due to altered inflow hydrograph to pump station storage and pump sensor systems should be evaluated to check pump station capacity in regards to pump system capacity, inflow storage capacity, and pump engine cycling following the ADOT Roadway Design Guidelines and FHWA HEC-24 requirements for stormwater pump station operations. Table 32 provides a summary of pump stations along SR 202L.

The Southeast Valley Regional Drainage System (SEVRDS) provides a 100-year flood drainage system within the Loop 202 Santan Freeway corridor from Price Road to 56th Street. A connecting channel extends from the basins and wetland complex near Kyrene Road and Pecos Road to the Gila Drain Floodway west of Interstate 10. When combined with flows from the Price Freeway drainage system, municipal and freeway drainage is conveyed for 58 square miles from Chandler, Tempe, Gilbert and Maricopa County.

Additionally, the SEVRDS provides protection for areas of the Gila River Indian Community (GRIC) from flows originating outside the Community. The SEVRDS was recommended in the Gilbert/Chandler Area Drainage Master Plan and was a cooperative effort between the District, Salt River Project (SRP), GRIC, the City of Chandler and the Arizona Department of Transportation (ADOT). In accordance with the IGA, the District was the lead on construction and construction management and was a cost share partner with Chandler and ADOT.

Due to the size of the watershed / drainage area (58 square miles) to the Kyrene retention basins, the increased impervious areas along the SR202L Santan freeway corridor for the GPL widening project impacts to the 100-year water surface elevations or the functions of the Kyrene retention basin and concrete channels flowing to the basin are expected to be negligible. The drainage area extends from I-10 to the east past Country Club Drive including offsite drainage areas that drain to the SR202L Santan collector channel along the north side of the westbound freeway. A large area of the SR101 price interchange drains into the collector channel along with east Tempe, Mesa, Gilbert, and Chandler. The design flows for the retention basin facility and freeway drainage channels are designed for large offsite peak flows based on a complex HEC-1 hydrology model. The SR202L Santan GPL widening is a small percentage of the overall drainage area and would have a short time of concentration. The water quality first flush flows from the freeway would be completely retained in the water quality basins as they are designed to. 100-year onsite and offsite flows would flow into the basins and throw the overflow weir into the Santan Outlet Channel as they are designed to.

The freeway stormwater pump stations will pump at their design capacity flow rates and attenuate flows into the freeway drainage channels which outfall into the Kyrene retention basin. The pump stations use the storm drain trunklines and inflow trunklines as storage in the pump station system operations. The trunklines would fill up with water during pump engine cycling and with the freeway draining through catch basin laterals during the 50-year depressed freeway segment design storm. The catch basin laterals and manholes rims would need to be checked against the 50-year hydraulic grade line results during final design to meet ADOT / FHWA criteria.

Table 32. Pump Station Summary

Station	Location Description	# of Pumps
Sta 2077+00 Rt	Kyrene Rd	4
Sta 2189+50 Lt	McClintock Dr	4
Sta 2237+70 Lt	101L/202L System TI	5
Sta 2420+00 Lt	Basin "K" East of UPRR	2
Sta 2465+00 Lt	McQueen Rd	3
Sta 2077+00 Rt	Kyrene Rd	4

3.8.3 Floodplains

There are no impacts to existing FEMA floodplains with the proposed project alternative widening. See the SR 202L Santan GPL DCR Drainage Report for further documentation of the FEMA floodplain impact analysis.

3.9 EARTHWORK

The earthwork required for the construction of the SR 202L GPLs would include approximately 304,000 cubic yards of excavation and 33,000 cubic yards of embankment.

3.10 TRAFFIC DESIGN

3.10.1 Begin and End Conditions on SR 202L

At the beginning of the project, a new travel lane in the EB direction will be added to the SR 202L mainline just west of the I-10 bridges using a standard ADOT lane addition. The additional lane in the WB direction will be dropped just west of the Kyrene Road service interchange by transitioning into an auxiliary lane that the Kyrene Road entrance ramp will merge into using a 50:1 taper per the ADOT Roadway Design Guidelines.

At the end of the project, a new WB travel lane will be added to SR 202L mainline underneath the Val Vista Drive bridge using a standard ADOT lane addition. The additional lane in the EB direction will be dropped underneath the Val Vista Drive bridge using a 65:1 AASHTO lane drop taper.

3.10.2 Existing Sign Structures

The preferred alternative will require modifications to several of the existing tubular sign structures in order to accommodate the additional width needed to add lanes to the mainline segment. Table 33 lists the sign structures that would require modification with this project as a result of the additional lanes.

Table 33. Existing Sign Structure Modifications

Direction of Travel	Station	Sign Structure Type
Eastbound	2013+00	Tubular Cantilever
Eastbound	2040+10	Tubular Cantilever
Eastbound	2065+25	Tubular Cantilever
Eastbound	2164+15	Tubular Cantilever
Eastbound	2172+15	Tubular Cantilever
Eastbound	2317+10	Tubular Cantilever
Eastbound	2338+90	Tubular Cantilever
Eastbound	2369+00	Tubular Cantilever
Eastbound	2392+15	Tubular Cantilever
Eastbound	2433+20	Tubular Cantilever
Eastbound	2447+50	Tubular Cantilever
Eastbound	2479+60	Tubular Cantilever
Eastbound	2502+65	Tubular Cantilever
Eastbound	2532+65	Tubular Cantilever
Eastbound	2554+75	Tubular Cantilever
Eastbound	2612+00	Tubular Cantilever
Eastbound	2636+25	Tubular Cantilever
Eastbound	2660+45	Tubular Cantilever
Westbound	2581+00	Tubular Cantilever
Westbound	2549+30	Tubular Cantilever
Westbound	2527+60	Tubular Cantilever
Westbound	2496+50	Tubular Cantilever
Westbound	2474+75	Tubular Cantilever
Westbound	2442+30	Tubular Cantilever
Westbound	2424+00	Tubular Cantilever
Westbound	2408+75	Tubular Cantilever
Westbound	2388+50	Tubular Cantilever
Westbound	2363+80	Tubular Cantilever
Westbound	2335+50	Tubular Frame
Westbound	2313+50	Tubular Cantilever
Westbound	2288+30	Tubular Frame
Westbound	2264+70	Tubular Cantilever
Westbound	2257+00	Tubular Cantilever
Westbound	2123+00	Tubular Cantilever
Westbound	2101+36	Tubular Cantilever
Westbound	2053+80	Tubular Frame
Westbound	2041+85	Tubular Frame

The cost estimate corresponding to the modification of the sign structures assumed that new structures would be used for any sign that has to be removed and replaced. However, an evaluation of the existing sign structures should be performed during final design to determine if it can be reused.

3.10.3 Lighting

Lighting Design Considerations

The lighting design for this project is a conversion from high pressure sodium (HPS) to light emitting diode (LED) luminaires. Preliminary lighting analysis shows that the existing pole locations and luminaire mounting heights will adequately illuminate the additional GPLs with new LED luminaires mounted on the existing lighting equipment. The existing electrical services and electrical conductors will accommodate the new LED lighting due to the reduced energy consumption of LED technology.

The design methodology and criteria for ADOT freeway lighting is based on the illuminance method set forth in the AASHTO Roadway Lighting Design Guide. The design criteria for freeway lighting is shown below.

- Minimum average maintained horizontal illuminance: 0.6 footcandles
- Minimum illuminance value: 0.2 footcandles
- Average to minimum uniformity ratio: 3:1 or better
- Light loss factor (LLF): 0.8

The average to minimum uniformity ratio of 3:1 is a target value. The freeway lighting on this portion of SR 202L was previously designed with a uniformity ratio of 4:1. In general, LED luminaires provide a more even light distribution than HPS luminaires which helps to keep the uniformity below 3:1. However, on lighting retrofit projects, the intent is not to relocate existing light poles, but to meet the design criteria using the existing pole spacing and mounting heights. Design values for average maintained horizontal illuminance can be attained by choosing the correct lumen output of the luminaires recommended for the project. If the targeted uniformity ratio of 3:1 cannot be met with the existing pole locations, then a 4:1 or better uniformity ratio should be met.

The lighting design shall consider impacts to the residential land uses adjacent to the ADOT ROW. Both light spill and glare outside the ADOT ROW should be addressed during design. The type and placement of a luminaire can have negative impacts on adjacent residential properties. Vertical mount (offset style) luminaires are typically mounted at a 45-degree angle making the light source visible to properties across the freeway causing significant glare. During final design, luminaire options such as a horizontal mount luminaire with a pole adapter or a high mast luminaire with forward throw optics should be evaluated at locations where glare may be an issue.

SR 202L at I-10 and SR 101L

High mast light poles ranging in height from 100’ to 150’ illuminate the widened portion of SR 202L through the I-10 and SR 101L interchanges. These poles each have lowering rings with four to twelve 400-watt HPS high mast luminaires. Preliminary design for this DCR proposes a one-for-one replacement of LED high mast luminaires on these poles. However, three-dimensional photometric modeling of the interchanges during final design with higher lumen output LED high mast luminaires will most likely result in fewer luminaires on each ring; especially those with eight to twelve luminaires. A symmetric (round) distribution pattern of the luminaires typically works better for the luminaires near the center of the interchange. An asymmetric (oval shaped) distribution pattern should be evaluated for the luminaires on the high mast poles with four luminaires located near the periphery of the interchanges.

The vertical mount (offset) luminaires east of 56th Street, on SR 101L Ramp SW and east of the SR 101L interchange should be replaced with LED luminaires with lumen outputs that will meet the design criteria. In addition to vertical mount LED luminaires, high mast luminaires with forward throw distribution or high lumen output horizontal mount luminaires may be considered at these locations. There are a variety of inexpensive options that allow for different luminaire mounts on the vertical tenon of the Type T and U light poles.

Median Mounted High Mast Luminaires
The high mast HPS luminaires mounted in the median of SR 202L will be replaced with high mast LED luminaires with a lumen output package that will meet the design criteria. Preliminary photometric analysis shows that an asymmetric distribution pattern will accommodate the existing light pole spacing and mounting heights while keeping most of the light within the roadway footprint. A symmetric luminaire distribution pattern should be considered adjacent to the ramp gore areas as it will throw light onto the ramp merge and diverge areas reducing the number of light poles required along the ramps.

The light poles between the SR 101L TI and Dobson Road are mounted on the median adjacent to the EB travel lanes. Preliminary lighting analysis shows that with the wide median in this area, these luminaires will not adequately illuminate the new GPL on WB SR 202L. New Type H poles are proposed along the north side of the widened WB lanes, centered between the existing median mounted light poles to illuminate the new outside lanes.

Ramp Lighting
The luminaires along the service interchange ramps from Kyrene Road to Gilbert Road will be converted from 250-watt HPS luminaires to equivalent LED luminaires. The impacts to the ramp geometry due to the new GPLs will require the removal of some of the existing light poles near the gore areas and installation of new ADOT standard aluminum light poles with new LED luminaires. Although most of the existing luminaire mast arms along the ramps are 20’ arms, the new poles may only require 6’ arms when mounted behind barrier. Also, due to the forward throw nature of LED luminaires, 6’ or 10’ luminaire mast arms may be appropriate even in locations without barrier.

Lighting Adjacent to Stellar Airpark and Connector Roads
Stellar Airpark is located adjacent to the north side of SR 202L at the McClintock Drive Ramp A and B gore areas. Two median mounted light poles aligned with the runway have a reduced mounting height of 30’. The four cobrahead style 250-watt HPS luminaires on these poles will be replaced with the LED luminaire equivalent. Several of the existing light poles along McClintock Drive Ramps A and B have reduced mounting heights with 150-watt HPS luminaires and will be replaced with an LED luminaire equivalent.

The EB and WB connector roads between McClintock Drive and Chandler Village Drive are currently illuminated with 150-watt HPS luminaires on ADOT standard Type G poles. These luminaires will be converted to LED luminaries that meet the design criteria for collector roads in a residential area.

Underdeck Lighting
The underdeck lighting at each underpass will also be converted to LED lighting using wallpack style luminaires. The existing underdeck luminaires at many locations are located behind the edge of pavement. The outside widening will put these luminaires over the traveled way which violates the minimum vertical clearance under the bridge structures. The new LED luminaires will need to be installed behind the new edge of pavement. The existing mounting brackets can be relocated and externally mounted metal conduit will be installed to feed these lights at the new locations. At some locations, the additional roadway width will require additional luminaires to be mounted in the median areas to provide illumination across all travelled lanes.

SR 202L Gilbert Road to Val Vista Drive
The Lindsay Road traffic interchange, currently under design, includes auxiliary lanes from Gilbert Road to Lindsay Road and from Lindsay Road to Val Vista Drive in both the EB and WB directions. The existing freeway mainline is illuminated with vertical mount (offset) luminaires located along the outside of the mainline because there are no HOV lanes or median barrier within this segment of SR 202L. The Lindsay TI project will design and install an LED lighting system along the outside of the mainline that will illuminate the entire freeway including the future GPLs.

The existing SR 202L mainline bridges over Lindsay Road and the Eastern Canal include median barrier for a length of approximately 500’ which precludes the opportunity to install median mounted lighting in the future. This GPL project will widen the existing bridges on the outside to accommodate the additional lanes. The existing ground mounted light poles can then be removed and new Type H light poles can be installed on the widened structures at or near the bridge abutments to illuminate this portion of the SR 202L mainline.

The design of Gilbert Road Ramps C and D and the Lindsay Road TI ramps in the current Lindsay Road TI project accommodates the geometry of the future GPLs. Therefore, no lighting modifications should be required along these ramps with the GPL project. The proposed GPLs at Val Vista Drive Ramps A and B do not impact the current light pole locations along these ramps, thus no lighting modifications are required.

3.10.4 Freeway Management Systems

Freeway Management System Design Considerations
The FMS design will try to protect as much conduit and pull box infrastructure and ITS field devices (CCTV and DMS) as possible. Where existing FMS trunk conduit will be located under future GPL pavement widening, new FMS conduit will be installed. Approximate stationing for new conduit will be listed for each segment in the following segment write-ups.

It is anticipated that all mainline loop detectors will have to be replaced when the shoulder is sawcut during construction. In addition, most of the loop detectors on ramps with existing ramp metering will likely have to be replaced. In locations where there is no existing ramp metering (and therefore no ramp loop detectors), the final design will conduct ramp meter warrants to determine if any additional ramp meters are warranted. If additional ramp meters are warranted, loop detectors and ramp meter equipment will be added to the final design at the warranted ramps.

Should any DMS or CCTV be required to be relocated, that topic will be addressed within each segment write-up for the specific DMS or CCTV device that is affected.

It appears that all existing load center locations will be able to be protected in place.

The design methodology and criteria for ADOT Freeway Management System Design will follow the ITS Design Guidelines and ADOT ITS Standard Details that are in effect as of the time of the final design.

I-10 TI
The I-10 TI segment starts east of the E-N/E-S ramp split and extends to the 56th St bridge structure. The Recommended Alternative is for one GPL to be added in each direction within this segment.

Along EB SR 202L, the nearest No. 9 pull box available for a fiber splice is located approximately 50’ east of the 48th Street overpass. New conduit will be required from the west project limit at Sta. 1981+00 to Sta. 1995+00 and Sta. 2004+00 to Sta. 2027+00 near the 56th Street Bridge.

Along WB SR 202L, the nearest No. 9 pull box available for a fiber splice is located approximately 50' east of the 48th Street overpass. New conduit will be required from the west project limits at Sta. 1981+00 to Sta. 2002+00, and from Sta. 2014+50 to Sta. 2019+00.

There are no DMS within the I-10 TI.

Two existing CCTV's will be protected in place, although branch splice location will need to be relocated for the CCTV at 56th St

EB and WB detector stations will require installation of new loop detectors in each existing lane plus the new GPL lane, as loop detector lead-ins will be damaged by pavement saw-cutting at the shoulders.

56th Street to SR 101L
This segment runs from 56th Street to the exit gores for the directional ramps to SR 101L. The Recommended Alternative is for one GPL to be added in each direction within this segment.

Along EB SR 202L, existing conduit generally runs at a great enough offset that it will not be impacted by construction of 1 GPL lane. However, new conduit will be required from approximately Sta. 2205+00 to Sta. 2212+00, from 2220+50 to 2231+00.

Along WB SR 202L, the existing conduit runs along the existing concrete lined drainage channel. Just east of the Gila Ditch crossing near Sta. 2058+00, the proposed GPL will encroach upon the drainage channel, which does not leave any room for FMS conduit to be installed beyond the new GPL lane and barrier, as the conduit would have to be in the drainage channel. It is anticipated that the FMS conduit will have to be installed in the shoulder of the GPL widening and then transition behind barrier into No. 9 pull boxes. This conduit will start at the existing No. 9 pull box at approximately 2059+00 and extend to a new No. 9 pull box behind barrier at approximately 2068+00. The new conduit will continue behind barrier to an existing No. 9 pull box at Sta. 2072+00. New conduit will also be required from 2096+00 to 2126+00 and from 2205+00 to 2211+50.

All CCTV locations will be protected in place.

The EB DMS east of 56th Street will have to be relocated onto a butterfly sign structure as the right shoulder foundation and control cabinet are impacted by the single GPL widening. The EB DMS sign structure between Kyrene and McClintock has sufficient length to accommodate one lane of GPL widening. There also is sufficient space to relocate the DMS onto a new butterfly structure along the right shoulder. By contrast, at the WB DMS between McClintock and Kyrene, there is not adequate space to provide a butterfly sign structure, so the DMS at this location will need to continue to be mounted on the existing overhead sign structure and foundations, which are not impacted by GPL widening as there is none at this location.

The EB ramp meter at Kyrene Road, and the WB ramp meters at Kyrene Road will have to be relocated. The WB ramp meter at McClintock Drive will be protected in place.

The EB mainline detector stations at 2045+00, 2095+00, 2150+75, and 2205+00 will require new loop installations, and the EB detector cabinets at Stations 2045+00, 2097+00 will have to be relocated as they are impacted by the single GPL widening. No WB detector cabinets will have to be relocated.

SR 202L/SR 101L System TI

The SR 202L/SR101 L System TI runs from the exit gores for the directional ramps to SR 101L to the entrance gores for the directional ramps from SR 101L. The Recommended Alternative is for one GPL to be added in each direction within the System TI.

Along EB SR 202L within the SR 202L/SR 101L System TI, existing conduit generally runs at a close proximity to the existing edge of pavement. New conduit will be required from approximately Sta. 2220+50 to 2231+00, from 2235+50 to 2247+50, from 2249+50 to 2251+00, from 2254+00 to 2267+00, from 2269+50 to 2272+50.

Along WB SR 202L within the SR 202L/SR 101L System TI, existing conduit generally runs at a close proximity to the existing edge of pavement. New conduit will be required from approximately Sta. 2218+50 to 2233+00.

The existing EB CCTV at Dobson Road, will be protected in place. The WB CCTV near Sta. 2265+00 will be impacted by the GPL widening and will need to be relocated.

There are no DMS within the SR 202L/SR 101L System TI.

The EB ramp meter and mainline detector station at Price Road, and the WB ramp meter at Price Road will also have to be relocated. The EB ramp meter cabinet will be protected in place, while the WB ramp meter cabinet will be relocated.

The EB mainline detector station at 2254+00 will require new loop installations, while a new WB mainline detector station will need to be installed at the proper location for the relocated WB ramp meter.

SR 202L/SR 101L System TI to Arizona Avenue
This segment runs from the WB exit gore for the directional ramps to SR 101L and the EB entrance gores for the directional ramps from SR 101L to Arizona Avenue. The Recommended Alternative is for two GPL's to be added in each direction within this segment.

Along EB SR 202L, new conduit will be required from approximately Sta. 2276+00 to 2313+00.

Along WB SR 202L, new conduit will be required from approximately Sta. 2280+00 to Sta. 2301+50 and Sta. 2304+00 to Sta. 2330+00.

The existing EB and WB CCTV within this area will be protected in place.

The EB DMS at Sta. 2327+40 will need to be relocated onto a new butterfly sign structure, as the existing right shoulder foundation is in the area of widening.

The WB DMS at Sta. 2323+50 will need to be relocated onto a new butterfly sign structure, as the existing right shoulder foundation is in the area of widening.

The EB ramp meter and mainline detection station at Dobson Road, and the EB mainline detection station at Alma School Road will need to be relocated/reinstalled. The WB ramp meter and mainline detector station at Alma School Road and Arizona Avenue will also have to be relocated/reinstalled.

The EB ramp meter cabinet at Dobson Road will have to be relocated. The EB ramp meter cabinet at Alma School Road and the WB ramp meter cabinets at Alma School Road and Arizona Avenue will be protected in place.

Arizona Avenue to Gilbert Road
This segment runs from Arizona Avenue to Gilbert Road. The Recommended Alternative is for two GPL's to be added in each direction within this segment.

Along EB SR 202L, new conduit will be required from approximately Sta. 2411+00 to 2422+00 through the new EB on ramp bridge over the UPRR, and new conduit extensions into and out of the Consolidated Canal bridge.

Along WB SR 202L, new conduit will be required from approximately Sta. 2411+00 to Sta. 2418+00, Sta. 2422+50 to Sta. 2454+00, Sta. 2486+50 to Sta. 2500+00 and Sta. 2524+00 to Sta. 2549+00.

The existing CCTV within this segment will be protected in place.

The EB DMS at Sta. 2491+50 and the WB DMS at Sta. 2488+50 will need to be relocated onto new butterfly sign structures, as the existing right shoulder foundations for each of these DMS is within the area of widening.

The EB mainline detection station at Arizona Avenue, McQueen Road and Cooper Road will need to be reinstalled. The WB ramp meter and mainline detector station at Gilbert Road, Cooper Road and McQueen Road will also have to be relocated / reinstalled. The EB ramp meter cabinet at Arizona Avenue will need to be relocated. The EB and WB ramp meter cabinets at McQueen Road and Cooper Road and the WB ramp meter cabinet at Gilbert Road will be protected in place.

Gilbert Road to Val Vista Drive
This segment runs from Gilbert Road to Val Vista Drive and includes the new Lindsay Road TI which is being designed by the Town of Gilbert's consultant. The Recommended Alternative is for one GPL to be added in each direction within this segment.

The following recommendations are based on the Lindsay Road TI 30% design submittal.

In the EB direction east of the Lindsay Road entrance ramp gore, new FMS conduit will be installed as part of the Lindsay Road TI between Sta. 2603+50 and Sta. 2612+50, and between Sta. 2627+00 and Sta. 2649+00. The Lindsay Road TI 30% design makes use of existing conduit through the Lindsay Road Bridge and along the existing retaining walls. This conduit will be impacted by the GPL construction. New conduit will be required between Sta. 2612+50 and Sta 2627+00 along the outside of the exit and entrance ramps to maintain the FMS during GPL construction.

In the WB direction west of the Lindsay Road exit ramp gore, new FMS conduit will be installed across Ramp C as part of the Lindsay Road TI. The Lindsay Road TI 30% design makes use of existing conduit through the Lindsay Road Bridge and along the existing retaining walls. This conduit will be impacted by the GPL construction. New conduit will be required between Sta. 2612+50 and Sta 2621+00 along the outside of the exit and entrance ramps to maintain the FMS during GPL construction.
The existing CCTV along NB Lindsay Road is remaining in place as part of the Lindsay Road TI 30% design. It is anticipated that this CCTV will have to be relocated in the GPL project due to its proximity to the existing retaining wall. The remaining CCTV within segment 6 will be protected in place.

The existing WB DMS at Sta 2664+75 will be protected in place.

The EB mainline detection station at Gilbert Road and Lindsay Road will need to be reinstalled. The WB mainline detector station at Val Vista Road will not be affected. It is anticipated that the WB mainline detector station at Lindsay Road will have to be reinstalled during the GPL project.

The Lindsay Road TI 30% design does not show if new cabinets will be installed along the EB and WB entrance ramps from Lindsay Road. It is anticipated that the EB and WB detector cabinets will have to be installed initially or relocated in the GPL project.

3.10.5 Photo Enforcement Systems

No photo enforcement systems exist within the project limits.

3.11 CONSTRUCTION PHASING AND TRAFFIC CONTROL

Traffic control plans will be developed during the final design to specify how traffic will be managed during the various phases of construction in accordance with the procedures and guidelines specified in Part VI of the current version of the Manual of Uniform Traffic Control Devices (MUTCD) with Revisions 1 and 2 incorporated, and the Arizona Supplement to Part VI of the MUTCD. The City of Chandler and Town of Gilbert traffic control manuals should be used for maintenance of traffic on the respective city's streets.

Coordination with local agencies will be made to identify project specific restrictions and requirements (special events, restricted closure times, etc.) that may impact traffic control. Traffic control should also coordinate with adjacent projects to minimize delays to traffic as well as conform to the respective agency standards. All full freeway closures and freeway lane restrictions will require a traffic control plan and will need to be coordinated with the appropriate agencies. Closures and temporary lane restriction will be limited to nights and weekends.

Smart work zones, which include ITS elements such as centrally controlled dynamic message signs and electronic notification of road conditions, will be included in the overall maintenance of traffic. Temporary concrete barrier would be placed adjacent to the SR 202L outside shoulders in order to construct the various discipline specific components. Access to the existing traffic interchanges will be kept open to traffic at all times, unless approved by a traffic control plan. Traffic control will adequately maintain the roadway conditions and ensure safe conditions for the traffic.

3.12 UTILITY AND RAILROAD COORDINATION

3.12.1 Utility Coordination

During final design, each city/town and utility companies will receive and review the preliminary design plans for this project. Utility conflicts will be resolved with cooperation from the affected companies. Construction plans for the relocations and/or adjustments to the utilities will be developed by the responsible parties.

All ADOT utilities that are in conflict will be included in the freeway design and utility relocation efforts. This will include the conversion of any existing unmetered freeway lighting, traffic signals or any other electrical facilities into metered services.

The City of Chandler, City of Phoenix, and Town of Gilbert have many water and sewer pipelines across the freeway mainline and cross streets. They will be protected in place during freeway construction operations. No major conflicts with these utilities are anticipated, pending utility designation and potholing that is to be performed during final design.

The Town of Gilbert has a few facilities crossing the project area. Town of Gilbert has one 20" ductile iron pipe (DIP) waterline east of Val Vista Drive. Town of Gilbert has a 16" DIP waterline, 18" force main line, & 24" sewer line crossing SR 202L on the west side of the Lindsay Road alignment. These utilities are not expected to be impacted by the widening of the freeway, but identification of their exact alignment and depth may be necessary to keep sufficient distance from any widened foundation. The Town of Gilbert also has one 15″ PVC (polyvinylchloride)-lined DIP sewer line crossing SR 202L east of Gilbert Road. This utility is not expected to be adversely impacted by the widening of the freeway. However, since the freeway mainline is in a depressed freeway section, potholing may be necessary to ensure there is sufficient pipe cover for this pipe location.

There are numerous City of Chandler water, reclaimed water, and sewer lines crossing the freeway mainline throughout this corridor. These locations include Gilbert Road (2-12″ DIP water), between Gilbert Road and Cooper Road (12″ water), Cooper Road (16″ DIP water & 36" water), McQueen Road (30″ sewer, 2-36″ water with 48″ casing, 24″ reclaimed water with 36″ casing, 18″ DIP sewer with 30″ casing, and 18″ inactive sewer), Willis Road (16″ water), Arizona Avenue (16″ water & 16″ reclaimed water), Alma School Road (16″ DIP water), between Alma School Road and Dobson Road (12″ ACP water), Dobson Road (24″ DIP water, 16″ DIP water, & 16″ reclaimed water), between Dobson Road and SR 101L (48″ sewer with 66″ casing), SR 101L (12″ sewer & 24″ water), Kyrene Road (24″ sewer & 8″ DI potable water), between Kyrene Road and 56th Street (15″ sewer), 56th Street (15″ VCP sewer & 12″ water), between 56th Street and I-10 (4″ VCP sewer), and I-10 (8″ VCP sewer). These water, reclaimed water, and sewer lines are not anticipated to be impacted, but potholing may be necessary during final design.

Air Products & Chemicals (AP) has a 24″ nitrogen gas line, in a 30″ casing, cross the SR 202L mainline, SE ramp, and WN ramp east of SR 101L (near the Ellis Road alignment). There is a second 30″ casing running parallel that is currently empty. AP advises that the west casing is the empty one. AP also has a 12″ nitrogen gas line, in a 16″ casing, crossing SR 202L along the Price alignment. No direct conflicts are anticipated. This gas line services the local high-tech industry, is highly sensitive to service disruptions, and is extremely costly to relocate.

AP has the following requirements for construction activities at or near their pipeline facilities:

- Contractor(s) will request and maintain a valid one call notice for the duration of the excavation period and are to contact AP 48 hours prior to any work within 10′ of pipeline to arrange for a monitor.
- Contractor shall use soft dig methods to locate and identify the 12″ or 24″" Nitrogen Pipeline when the work has brought them to within 10′ of the 12″ or 24″ pipeline. ***Monitor Required***
- Any continuous exposure that undermines the pipeline for 15′ or more shall be supported by the contractor using an approved method agreed upon by the AP Representative and the contractor.
- The contractor shall provide and allow safe job site access/egress for the AP Representative to the Nitrogen Pipeline for the purpose of monitoring activity, inspection of pipe and/or coating damage, as well as excavation for any repairs if required.
- New underground structures to be installed shall maintain a minimum 2′ separation from the Nitrogen pipeline in all directions.
- Back fill material shall consist of clean sand for 1′ around the nitrogen pipeline. Slurry is not to be placed on or within 2′ of the Nitrogen pipeline.
- Any directional drilling running parallel to APCI underground pipelines with less than 5′ separation, shall pothole the bore head at maximum 20′ intervals to confirm running line to be true and accurate. APCI line will be potholed every 100′ minimum or closer pending APCI assessment. No foreign utilities are to run parallel within APCI easements.
- If during the project the contractor encounters any Air Products Test Station(s), Wiring, and/or Casing Vent piping that is determined relocation of these facilities is necessary, the contractor shall provide trenching, vent pipe welding, and backfilling as required to an adequate depth and width from the existing test station/vent location to an area agreed upon by all parties in the field.
- Contractor will protect and maintain open access to all flush mounted valve hand-holes as well as providing material to make adjustments to match new elevation grade. Upon completion, hand-holes shall be free of obstruction, vacuum as necessary.
- Air Products may determine "Pipeline Crossing" points need to be established and maintained, dependent upon the Wheel Load Analysis report if deemed necessary- (equipment axel loading weight in relation to pipeline size, soil conditions, and depth of cover).
- The APCI pipeline is cathodically protected, therefore, please do not step, stand, place tools, or set shoring on the Nitrogen pipeline.
- Air Products signage and or pipeline markers may be removed during the construction phase to accommodate equipment operation but shall be reinstalled in close proximity by APCI, post construction.
- Use of "Root Barriers" shall be used when placing any type of tree or deep rooting plants within 12′ of the centerline of Air Products pipelines.
- Contractor shall provide protection for any and all Air Products facilities above and below ground within the scope of this project for the duration of the project.

AT&T/Teleport Communications America LLC has two 264 Fiber Cables that cross SR 202L. They are located at Cooper Road and Dobson Road. These lines are not anticipated to be impacted and shall be protected in place. However, potholing may be necessary to ensure there is sufficient cover at these locations.

There are two (2) locations where CenturyLink/Level 3 fiber optic lines cross the SR 202L mainline within the project limits and they are at Alma School Road and Dobson Road. No conflicts are anticipated and these lines shall be protected in place. Potholing may be necessary to ensure proper coverage.

There are numerous Cox Communications lines crossing the freeway mainline throughout the project. These locations include near Val Vista Drive (one line), Gilbert Road (two lines), Cooper Road (one line), McQueen Road (one line), Alma School Road (one line), Dobson Road (two lines), Kyrene Road (one line), and 56th Street (two lines). These lines are not anticipated to be impacted and shall be protected in place. Nevertheless, potholing may need in order to ensure sufficient cover of these lines.

Cox Communications, CenturyLink (Qwest), and SRP (power) have conduits in joint trenches at the following locations:
west of Val Vista Drive
east of Lindsay Road

Kinder Morgan/El Paso Natural Gas has a few lines that cross the mainline of SR 202L within the corridor. The locations include just east of SR 101L (16″ natural gas & 6″ gas), just east of 56th Street (two 10" gas), and 56th Street (24″ gas). A 6″ abandoned 1950's era steel pipeline runs parallel to the old Pecos Road alignment and crosses SR 202L roughly near the Ellis Road alignment. The abandoned line was originally owned by Santa Fe Pipeline (owned by Kinder Morgan) and will need to be located in the field. These facilities are not anticipated to be effected, but potholing may be necessary to confirm proper coverage. These lines shall be protected in place.

Roosevelt Water Conservation District (RWCD) has 54” RGRCP irrigation line crossing SR 202L approximately half way between Val Vista Drive and Lindsay Road. to the west, the facility runs along the southeast ROW and to the east, it runs along the Willis Road alignment. This utility is not expected to be adversely impacted by the widening. However, since the freeway mainline is in a depressed freeway section and in super elevation, potholing may be necessary to ensure there is sufficient pipe cover for this crossing location. RWCD also has an irrigation canal that crosses under the SR 202L alignment near Lindsay Road. This facility is not anticipated to be in conflict with the widening.

Salt River Project (SRP) has numerous irrigation pipeline and structures throughout the project, with several crossing the mainline of SR 202L. Throughout the project SRP irrigation lines run parallel to SR 202L, near the ROW. The locations of crossing facilities include at Mustang Drive (48” RGRCP), Consolidated Canal (30” & 48″ RGRCP), Arizona Avenue (24″ RGRCP & 36″ RGRCP), east of SR 101L (Ellis Road alignment, 72″), west of SR 101L (36″ RGRCP), Kyrene Road (30″ RGRCP), between Kyrene Road and 56th Street (10′x7′ Box Culvert), and between 56th Street and I-10 (36″ RGRCP). These lines are not anticipated to be effected, but potholing may be necessary in order to confirm exact location and depth. These facilities shall be protected in place.

SRP power also has numerous crossings of the mainline SR 202L along with parallel facilities. The crossing facilities are located at 150th Street (underground power, UGP), 144th Street (underground power, UGP), Lindsey Road (underground power, UGP), west of Lindsay Road (underground power, UGP), east of Gilbert Road (underground power, UGP), Gilbert Road (underground power, UGP), between Gilbert Road and Cooper Road (two UGP), Cooper Road (UGP), between Cooper Road and Consolidated Canal (UGP), east of Consolidated Canal (UGP), between Consolidated Canal and McQueen Road(UGP), McQueen Road (one overhead power, OHP & one UGP), between McQueen Road and the UPRR (two UGP), UPRR (two OHP), Arizona Avenue (UGP), between Arizona Avenue and Alma School Road (two UGP), Alma School Road (UGP), between Alma School and Dobson Road (two UGP), Dobson Road (UGP), between Dobson Road and SR 101L (two UGP & two OHP), SR 101L (UGP), between SR 101L and McClintock Drive (two UGP), McClintock Drive (OHP & UGP), between McClintock Drive and Kyrene Road (three UGP), Kyrene Road (UGP), between Kyrene Road and 56th Street (UGP), 56th Street (three OHP & one UGP), and between 56th Street and I-10 (UGP). These facilities are not anticipated to be in conflict and as such shall be protected in place. Potholing may be necessary to confirm location and depth for surrounding work. Care during construction shall be used near overhead power lines.

Southwest Gas (SWG) has several facilities crossing the mainline of SR 202L within the project limits. The facility crossing location are at Cooper Road (6″ polyethylene), McQueen Road (6″ polyethylene), Alma School Road (16″ steel within a 24″ steel casing), Dobson Road (6″ polyethylene), Kyrene Road (6″ polyethylene), and 56th Street (4″ polyethylene). SWG facilities are not anticipated to be in conflict and as such will be protected in place. Potholing may be necessary to ensure proper pipe cover.

Spectrum Irrigation System has a 14” PVC (polyvinylchloride)-lined DIP (ductile iron pipe) crossing SR 202L parallel and adjacent to the RWCD line between Val Vista Drive and Lindsay Road. As with the RWCD’s line, it is not expected to be adversely impacted by the widening, but potholing may be necessary to ensure there is sufficient cover.

3.12.2 Railroad Coordination

The SR 202L crosses over the Union Pacific Railroad (UPRR) Phoenix Subdivision at two locations. Coordination will be required with the UPRR and the Arizona Corporation Commission (ACC) prior to construction, and will take place during final design. This coordination is compulsory to confirm the necessary design details, permit requirements, construction requirements, and maintenance agreement requirements for the crossings. The UPRR will review and approve the bridge construction plan on a separate and parallel design submittal track. The railroad’s approval and all new or amendments to either existing construction and maintenance Agreement(s) (C&M), or new C&M Agreement(s) must be in place prior to start of construction. This process is always a critical path item in the design and construction schedule.

56th Street/UPRR Overpass (SR 202L Sta 2027+00)
The existing overpass was originally constructed with the original SR 202L freeway project, and included median structure for HOV lanes. The anticipated construction activities include the widening-in-kind on the south side of the bridge, milling of the existing AR-ACFC overlay on the existing bridge deck, placement of methacrylate seal, and a replacement AR-ACFC overlay. All design and construction activities within the UPRR ROW must be coordinated and scheduled with the railroad. A right-of-entry permit from UPRR would be required prior to construction activities.

56th Street/UPRR Overpass (Ramp S-E Sta 80+00)
The existing overpass was originally constructed with the original SR 202L freeway project. The anticipated construction activities include the widening-in-kind on the south side of the bridge, milling of the existing AR-ACFC overlay on the existing bridge deck, placement of methacrylate seal, and a replacement AR-ACFC overlay. All design and construction activities within the UPRR ROW must be coordinated and scheduled with the railroad. A right-of-entry permit from UPRR would be required prior to construction activities.

UPRR Overpass (SR 202L Sta 2419+00)
The existing overpass was originally constructed with the original SR 202L freeway project, and included median structure for HOV lanes. The anticipated construction activities include the widening-in-kind on the north and south sides of the bridge, milling of the existing AR-ACFC overlay on the existing bridge deck, placement of methacrylate seal, and a replacement AR-ACFC overlay. All design and construction activities within the UPRR ROW must be coordinated and scheduled with the railroad. A right-of-entry permit from UPRR would be required prior to construction activities.

UPRR Overpass (Arizona Avenue Ramp C Sta 24+00)
The existing overpass was originally constructed with the original SR 202L freeway project. The anticipated construction activities include the widening-in-kind on the north side of the bridge, milling of the existing AR-ACFC overlay on the existing bridge deck, placement of methacrylate seal, and a replacement AR-ACFC overlay. All design and construction activities within the UPRR ROW must be coordinated and scheduled with the railroad. A right-of-entry permit from UPRR would be required prior to construction activities.

UPRR Overpass (Arizona Avenue Ramp D Sta 24+00)
The existing overpass was originally constructed with the original SR 202L freeway project. The anticipated construction activities include the removal of the existing overpass and reconstruction of a new overpass south of the existing structure. All design and construction activities within the UPRR ROW must be coordinated and scheduled with the railroad. A right-of-entry permit from UPRR would be required prior to construction activities.

3.13 GEOTECHNICAL AND PAVEMENT DESIGN

3.13.1 Bridge Structures

The site soils along the project corridor are variably firm alluvial soils which are generally considered to be well suited for the use of drilled shaft foundations and in some cases, shallow spread foundations where designed at moderately low foundation bearing pressures. Based on review of the original As-Built borings, the subsurface soils consist primarily of fine-grained clayey to silty sands (SC-SM)) to sandy clays (CL) interbedded with occasional lenses of silt, sand and gravel. The soils are generally moderately firm to firm in the upper 10 to 15 feet, becoming firm to hard with increasing depth. Drilled shafts founded at depth within the generally firmer soils present at depth would provide adequate support for moderate to heavy foundation loads. Drilled shafts may also be preferred where ground disturbance must be minimized. As indicated in previous sections, portions of several of the existing bridge foundations are supported on spread footings. Most typically, the spread footings are founded at least 10 to 15 feet below original grades to take advantage of firmer soils which are present at those depths.

3.13.2 Retaining and Sound Barrier Walls

Existing retaining walls within the project limits consist primarily of either standard cast-in-place or mechanically stabilized earth (MSE) walls. Soil nail walls were utilized at the Consolidated Canal Bridge. Either of these wall types are likely suited for the project and the type selected may depend more on constructability given the presence of existing walls. Other wall types, such as tied-back, L-footing walls or walls backfilled with light-weight fill are all viable options where space is tight or the construction dictates. Sound barrier walls will likely consist of standard masonry walls on spread footings.

Over excavation or other subgrade modification may be warranted where walls are constructed near existing site grades due to the presence of relatively soft near surface native soils.

3.13.3 Recommended Pavement Structural Sections

The additional GP Lanes, outside shoulders, and ramps are recommended to be constructed to match the existing pavements. ADOT Pavement Design Section currently recommends the pavement sections in Table 34.

Table 34. Preliminary Recommended Pavement Sections

Location	AR-ACFC	PCCP	AB	Total
SR 202L Mainline & Outside Shoulders	1	13	4	18
Ramps	1	10	4	15

The project alignment is underlain by variable quality subgrade soils. Higher plasticity soils, not well suited for subgrade support, were identified in four areas along the project alignment, as part of the HOV lanes geotechnical investigation (RAMM, 2010). Roughly 3,950 lineal feet of the project alignment was identified as potentially having problematic near-surface soils (R-value less than 20). The HOV report indicated these soils should either be over excavated and replaced with higher quality soils or otherwise be stabilized with geogrid or lime treatment. Testing would be required to verify whether these materials will be suited for use within 3 feet of pavement subgrade or where these soils might qualify for structure backfill.

3.14 LANDSCAPE, IRRIGATION, AND AESTHETICS

This section establishes design criteria for the landscape, irrigation, and aesthetics for the corridor to address impacts the project improvements will have on these features. Preparation of landscape, irrigation and aesthetics concepts, plans, details and special provisions should be a collaborative effort involving members of ADOT departments, municipal stakeholders, and the final design team. The final design should consider the specific submittal requirements, approvals and processes with the objective to repair and restore landscape, irrigation and aesthetics elements disturbed during the implementation of this project.

The DCR information shall be used in conjunction with the Visual Analysis (VA) and Visual Analysis Supplement (VAS). The VA breaks the corridor into smaller project segments in order to describe the existing conditions, potential visual effects to and from the corridor, effects of the project and recommended remediation measures. The VAS identifies all walls and structures within the corridor, including the major project features that the final design team will be required to protect, replace, reconstruct and enhance paint within the project limits. The freeway interchange ramps at I-10 and SR 101L are not included in the VA. Any modifications to the freeway ramp structures shall receive rustication and paint to match existing.

3.14.1 Landscape

The final design shall maintain existing planting design character through collaboration with ADOT Roadside Development Services (RDS) to develop the plant palette(s), density requirements, and existing plant salvage and transplanting objectives based on construction impacts and site conditions. Design objectives should consider land use context, vegetative buffers to screen views both from and to the roadway, strategic gaps to frame preferred views, measures to blend disturbed areas into their surroundings, and consideration to visually sensitive and critical roadway areas.

Plant Density: Planting density should be established during Final Design at rates matching the existing plant densities and as-built information for the SR 202L. Densities should be applied to the plantable disturbance acreage.

Native Plant Inventory: A native plant inventory and transplant program should be implemented for all saguaros, barrel cactus, ocotillos, and all healthy trees within the disturbance areas meeting the requirements of the ADOT Native Plant Salvage & Replanting Guidelines.

Inert Materials: Inert materials consisting of granite mulch and riprap for erosion control shall be required in all disturbed landscape areas along the project corridor. Sizes and colors shall match existing undisturbed inert materials. Larger rip rap used for erosion control or slope stabilization shall match the color of the granite mulch in the area.

Soil Amendments and Agronomy Testing: Imported soils should be tested by a certified lab for nutrient content throughout the new project ROW to determine topsoil plating and prepared soil requirements.

3.14.2 Irrigation

Existing permanent irrigation disturbed by construction shall be modified and repaired to provide irrigation to all existing and new plant material and maintain irrigation to existing plants during construction phase. All water and electric services shall be maintained and utilized unless otherwise impacted by project improvements.

ADOT Controllers, as listed below, shall be upgraded and replaced to the most current specifications as per the manufacturer recommendations. In addition, ITS conduit and fiber shall be installed from the existing trunk line into the controller units for connection into the ADOT network. Controllers, controller enclosures, flow sensors, moisture sensors, master valves and associated equipment shall be reviewed for maintenance and functionality issues with intent to reuse existing equipment when possible. City of Chandler irrigation systems shall use reclaimed water approved piping and equipment.

Intersection	# of Controllers	Quadrant
• Kyrene Road	1	SW
• McClintock Drive	1	NE
• Price Road	1	SE
• Dobson Road	1	SE
• Alma School Road	1	NW
• Arizona Avenue	1	NW
• McQueen Road	1	SW
• Cooper Road	1	SW
• Gilbert Road	2	SE/SW
• Val Vista Drive	1	SW
TOTAL	**11**	

3.14.3 Aesthetics

The objectives for aesthetics include maintaining or replacing the existing aesthetic treatments as found along the project corridor. Final design shall identify all aesthetic treatments that will be impacted during the freeway widening along with all new structures and walls to receive rustication for all existing bridge and wall locations, the existing aesthetic treatments shall be reconstructed in coordination with RDS to determine rustication treatments for all new structures and walls.

Structures Rustication: Corridor restoration is further defined in the Visual Analysis and Visual Analysis Supplement. Final design should be coordinated with RDS to develop rustication designs and elements to recreate any impacted aesthetics. Drainage structures and headwalls are exempt from rustication. Structure elements that should be treated with rustication include:

New / Widened Bridges:
- Abutment/Wingwalls
- Piers
- Barriers (non-traffic side)
- Bridge Fencing

Walls:
- Noise Barriers
- Lightweight Noise Barriers
- Retaining

Painting: Final design shall include the painting of all new and modified structures and walls to blend with and match the existing painted elements within the corridor. Color selections should be coordinated with ADOT during final design and may include multiple color selections.

The City of Chandler and ADOT have an Intergovernmental Agreement for structure and wall enhancements along the SR 202L corridor, in the City of Chandler, from the I-10 Interchange to Gilbert Road. A complete list of the City of Chandler elements that will be painted and funded by the City of Chandler can be found on the last page of the Visual Analysis Supplement.

3.14.4 Slope Stabilization, Erosion, Sediment, and Stormwater Quality Control

Stabilization Goals: Minimizing dust and erosion of soils by wind and water are the primary goals of stabilization. Stabilization in urban areas is intended to enhance back-of-curb roadway areas with consistent color and gradation of rock for a clean, weed free appearance. Inert materials plans should be prepared in final design to document the placement locations, types, and colors of granite/rock mulch and decomposed granite throughout the project area within the limits of disturbance.

3.14.5 Noxious and Invasive Species Control Plan (NISCP)

The Final Designer shall prepare a Noxious and Invasive Species Control Plan to assist with controlling noxious and invasive plant species within the project area. The work under the NISCP shall consist of the detection and eradication or noxious and invasive plants. Proposed method(s) of noxious plant control include either manual eradication or herbicide application by recommended methods for each plant species identified in the NISCP and will be in accordance with the National Environmental Policy Act, and State of Arizona Statutes. The project area will be surveyed following rain events and during plant germination and growth periods prior to, during and post construction activities. Construction best managements practices shall include items of operation that may minimize the spread of noxious species. The NISCP shall also include post-construction measures to prevent invasive species seeds from leaving the site.

3.15 AIRPORT COORDINATION

This project is located beneath the Federal Aviation Regulation (FAR) Part 77 Navigable Airspace of two airports: Chandler Municipal Airport, and Stellar Airpark. Proposed freeway improvements may occur within the current Part 77 Surfaces of these airports.

During the construction of the existing SR 202L freeway, the height of the light poles were lowered near Stellar Airpark. Lighting design for the GPLs would conform to the prevailing FAA requirements.

Federal Aviation Administration (FAA) Form 7460-1 must be submitted to the FAA for their evaluation of any permanent or temporary penetrations of the Part 77 surface. All potential permanent and temporary encroachments into the Part 77 navigable airspace should be evaluated during the final design and construction phases of this project.

3.16 DIRECT HOV (DHOV) ALTERNATIVE ACCESS

In a letter dated March 9, 2018 from the City of Chandler (COC) to MAG and ADOT, the COC requested the design study a Direct-access High Occupancy Vehicle (DHOV) ramp located between McQueen Road and Arizona Avenue as a part of the Design Concept Report (DCR). The DHOV ramp would be two-lane from the HOV lanes to Armstrong Way south of the Freeway and accommodate EB-off and WB-on traffic movements. Through the investigation of the DHOV access, the design team determined that the connector would need to be a 90-degree turning movement for the turn to the south. The widening to facilitate the DHOV would incorporate a median opening 60' wide and about half a mile in length. To accommodate accel/decel/merge lanes, on and off ramps, barriers, walls, and the required structure over EB SR 202L, a 65:1 taper rate in the mainline lanes was utilized. The design team determined that the freeway widening for the DHOV would work best as a symmetric widening, to reduce the overall length of the freeway widening and also minimize impacts to the nearby interchanges at Arizona Avenue and McQueen Road. The adjacent ramps to the east (McQueen WB on ramp and EB off ramp, Ramps A & B, respectively) would need to be adjusted at their gores with SR202L, as the widening necessary for the DHOV is still underway at the location these ramps tie in. Similarly, the Arizona Avenue EB on ramp (Ramp D) would also need a minor realignment at its gore to tie into the shifted EB SR202L pavement; no change to the existing Ramp D structure would be anticipated as a result of the DHOV access. At the Arizona Avenue Ramp C gore, a striping taper begins and would have minor effects to the exit from the freeway; the Ramp C bridge would remain as-is. The symmetric widening would necessitate the relocation of the existing sound barrier wall to the north and necessitate construction of a combination wall to accommodate the fill condition that would be created. While relocation of the wall would be a considerable item of work, the channel on the north would be unaffected.

The opening of the SR 202L freeway median to accommodate the DHOV access would start at the mainline UPRR bridge east of Arizona Avenue, run east for 3,500' (EB) or 4,000' (WB), ending just west of the McQueen Road structure. The median opening would have minor effects to the ramp gores for the Arizona EB 202-on-ramp, the EB SR 202L off-ramp at McQueen, and the WB SR 202L ramp at McQueen. The opening of the median to accommodate the DHOV is currently estimated at approximately $10.2 million. This cost and design are not part of the Recommended Alternative; they include only the median opening and not the DHOV access, DHOV structures, and other necessary appurtenances.

3.17 AMERICANS WITH DIABILITIES ACT (ADA)

The existing pedestrian features located within the ADOT ROW were inventoried within the project limits. The existing features were evaluated for compliance with the 2010 ADA Standards for Accessible Design (2010 Standards).

Based upon the information included in the ADA Features Inventory System (FIS) and supplemental AZTEC field review, it was determined that 387 ADA features are located within the study area. Of the 387 ADA features, it was determined that 166 are non-compliant per the 2010 Standards.

Features not meeting the “Americans with Disabilities Act Accessibility Guidelines” (ADAAG) shall be replaced with the current standard at the time of final design. The precise standard to be used will be determined during final design. The cost estimates for the Recommended Alternative, Project 1, and Project 2 include a pay item for revisions to the ADA features at the crossroads’ intersections. The ADA costs are the result of a holistic examination of the existing features, and consider how upgrades to ADA features in one area of the intersection may affect others. Required ADA upgrades at one corner could result in necessary modification(s) to or replacements of adjacent features that are currently ADAAG compliant.

Each of the non-compliant features shall be addressed during the final design and construction of this project. A copy of the Draft ADA Compliance and Feasibility Report for this project in included in Appendix C.

The following documents shall be used for the design of the pedestrian facilities:

- *2010 American With Disabilities Act Standards for Accessible Design*
- *Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way, July 26,2011*

ADA/PROWAG compliant pedestrian access shall be maintained on at least one side of each crossroad at all times during construction.

4.0 ITEMIZED ESTIMATE OF PROBABLE COSTS

4.1 PROJECT COST ESTIMATES

The estimate of probable project costs for the SR 202L General Purpose Lanes Recommended Alternative is approximately $204.8 million as shown in Table 35. The estimated unit costs are based on unit prices obtained from recent ADOT bid results, and consistent with recently adopted guidance utilized by ADOT's Regional Freeway Program Management Consultant.

	Cost (millions)	
Project	**Design Cost**	**Construction Cost**
Overall (Val Vista Drive to I-10)	$18.8	$186.0
Project 1 (Val Vista Drive to SR 101L)	$13.2	$131.2
Project 2 (SR 101L to I-10)	$5.5	$54.8

Pavement structural sections used for this estimate are provided in Section 3.13.3 of this report. The following is a list of design parameters reflected in the cost estimates:

- No new ROW is anticipated for this project.
- Costs for landscaping are only for the restoration of disturbed areas.
- New freeway lighting will be provided within the freeway median except as otherwise noted.
- Drainage modifications would be limited to adjusting or replacing the existing drainage elements to match the new outside lane(s) pavement widening.
- Environmental mitigation costs are not included in this cost estimate.

Because funding is limited, the project owners and stakeholders are seeking to construct this project as two smaller projects: one from SR 101L to Val Vista Drive, and the other from I-10 to SR 101L, the estimates of which are shown in Tables 36 and 37. As of June 2020, design funding for the project from SR 101L to Val Vista Drive is anticipated in FY24, and construction funding in FY26. No funding for design or construction is yet identified for the second project from I-10 to SR 101L.

4.2 ESTIMATE OF FUTURE MAINTENANCE COSTS

An estimate of the additional future maintenance costs that would be the result of the additional roadway lane miles added to the freeway system was evaluated for the recommended Alternative. Information regarding maintenance costs was requested from the Central Construction District.

Annual Maintenance Cost Per Lane Mile Using PeCoS FY 2019 Data[1]	
Category	**Metropolitan Phoenix**
1. Paved Surfaces & Shoulders	2,300
2. Roadside	2,000
3. Drainage & Environmental	400
4. Rest Areas	-
5. Traffic Operations - Signal & Lighting; Signing & Striping - ITS	1,700
6. Landscaping	6,000
7. Winter Storms	-
8. Emergency Response	500
9. Miscellaneous Maintenance[2]	700
10. Support and Other Operating Expenses	5,200
11. Other Specialty Items[3]	-
MCL = Maintenance Cost per Lane Mile	**$ 18,800**
Annual Maintenance Cost of Project at PA/DCR Phase	**Metropolitan Phoenix[5]**
NL = Number of Lane Miles	36
PMC = Current Project Maintenance Cost	**$ 650,480**
Annual Maintenance Cost of Project at Beginning of Maintenance Phase	**Metropolitan Phoenix[5]**
IF = Inflation Factor[4]	1.10
N = Number of Years to Maintenance Phase	8
PMCI = Project Maintenance Cost Including Inflation	**$ 1,394,362**

Notes: 1- Lane mile width is 12 ft, Total maintenance lane miles = 29,974 miles
Metropolitan Phoenix maintenance lane miles = 2,586 miles, Other Locations = 27,388 miles
2- Miscellaneous maintenance includes building and yard maintenance, work for other divisions, training, material handling, vegetation control and contract administration for categories not considered in the maintenance cost breakdown.
3- For Other Specialty Items, contact Central Maintenance.
4- Inflation Factor provided by Central Maintenance.
5- Numbers for maintenance cost at PA/DCR phase and beginning of maintenance phase are for Project 1, assume it is constructed, and that it will not require maintenance expenditure until the first fiscal year beyond the current funding horizon (that is, FY 27).

Gray areas require manual entry
NL = Lane miles are calculated based on the actual added number of mainline and auxiliary lanes between traffic interchanges, lane additions, lane drops, or other key points along the corridor.
PMC = MCL x NL
PMCI = PMC x (IF^N)

Table 35. Overall (Val Vista Drive to I-10) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
ROADWAY					
2020021	REMOVAL OF CONCRETE CURB AND GUTTER	L.FT.	131,566	4.00	$ 526,264.00
2020027	REMOVAL OF CONCRETE BARRIER	L.FT.	16,651	25.00	$ 416,275.00
2020031	REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT	SQ.YD.	41,130	18.00	$ 740,340.00
2020053	REMOVE (END TREATMENT)	EACH	27	550.00	$ 14,850.00
2020081	REMOVE BITUMINOUS PAVEMENT (MILLING) (1")	SQ.YD.	1,086,071	2.75	$ 2,986,695.25
2020154	REMOVE (RAMPS/SIDEWALK/SIGNALS REMOVE AND REPLACE)	L.SUM	1	954,700.00	$ 954,700.00
2030201	EXCAVATION (OVEREX FOR ROADWAY AND WALLS)	CU.YD.	30,673	20.00	$ 613,460.00
2030301	ROADWAY EXCAVATION	CU.YD.	303,916	20.00	$ 6,078,320.00
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	23,161	47.00	$ 1,088,567.00
4010010	PORTLAND CEMENT CONCRETE PAVEMENT (10")	SQ.YD.	43,734	48.00	$ 2,099,232.00
4010014	PORTLAND CEMENT CONCRETE PAVEMENT (13")	SQ.YD.	248,120	54.00	$ 13,398,480.00
4090003	ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL)	TON	41,197	100.00	$ 4,119,700.00
4040111	BITUMINOUS TACK COAT	TON	461	500.00	$ 230,500.00
4140040	ASPHALTIC CONCRETE FRICTION COURSE (ASPHALT-RUBBER)	TON	81,300	48.00	$ 3,902,400.00
4140042	ASPHALT RUBBER MATERIAL (FOR AR-ACFC)	TON	7,727	492.00	$ 3,801,684.00
4140044	MINERAL ADMIXTURE (FOR AR-ACFC)	TON	738	90.00	$ 66,420.00
9050025	GUARD RAIL TERMINAL (AT GORE BARRIERS)	EACH	7	25,000.00	$ 175,000.00
9050026	GUARD RAIL TERMINAL (TANGENT TYPE)	EACH	31	3,000.00	$ 93,000.00
9050430	THRIE-BEAM GUARD RAIL TRANSITION SYSTEM	EACH	31	2,000.00	$ 62,000.00
9080085	CONCRETE CURB AND GUTTER (C-05.10) (TYPE C)	L.FT.	13,332	20.00	$ 266,640.00
9100001	CONCRETE BARRIER	L.FT.	116,666	80.00	$ 9,333,280.00
9100008	CONCRETE BARRIER (60")	L.FT.	19,533	100.00	$ 1,953,300.00
9100037	CONCRETE BARRIER (SPECIAL HALF) (TOE DOWN)	L.FT.	2,151	250.00	$ 537,750.00
9100112	CONCRETE HALF BARRIER TRANSITION (STD C-10.71)	EACH	31	5,000.00	$ 155,000.00
9140133	NOISE BARRIER WALL (	SQ.FT.	129,649	50.00	$ 6,482,450.00
9140158	RETAINING WALL (	SQ.FT.	169,850	85.00	$ 14,437,250.00
				ROADWAY SUB-TOTAL:	**$ 74,533,557.25**
TRAFFIC					
70415XX	PAVEMENT MARKINGS	L.SUM	1	2,683,064.00	$ 2,683,064.00
60801XX	SIGN	L.SUM	1	5,200,388.00	$ 5,200,388.00
				TRAFFIC SUB-TOTAL:	**$ 7,883,452.00**
ITS/FMS					
6000153	BUTTERFLY BRIDGE SIGN STRUCTURE FOR DMS	EACH	5	55,000.00	$ 275,000.00
6000154	FOUNDATION FOR BUTTERFLY BRIDGE SIGN STRUCTURE	EACH	5	12,500.00	$ 62,500.00
7310190	POLE (55 FT POLE WITH LOWERING DEVICE)	EACH	2	12,000.00	$ 24,000.00
7310371	POLE FOUNDATION (55 FT POLE)	EACH	2	4,000.00	$ 8,000.00
7320072	ELECTRICAL CONDUIT (3 - 3") (PVC)	L.FT.	43,300	20.00	$ 866,000.00
7320073	ELECTRICAL CONDUIT (2 - 3") (PVC)	L.FT.	400	15.00	$ 6,000.00

Table 35. Overall (Val Vista Drive to I-10) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
7320293	ELECTRICAL CONDUIT (3 - 3") (HDPE) (DIRECTIONAL DRILL)	L.FT.	1,450	30.00	$ 43,500.00
7320295	ELECTRICAL CONDUIT (3 - 3") (RMC)	L.FT.	400	50.00	$ 20,000.00
7320460	PULL BOX (NO. 7) (FMS STD FM-2.06)	EACH	24	750.00	$ 18,000.00
7320455	PULL BOX (NO. 9)	EACH	35	4,000.00	$ 140,000.00
7320461	PULL BOX (SPLIT NO. 9)	EACH	49	4,000.00	$ 196,000.00
7320765	SINGLE MODE FIBER OPTIC CABLE (12 FIBERS)	L.FT.	6,500	3.00	$ 19,500.00
7320787	SINGLE MODE FIBER OPTIC CABLE (144 FIBERS)	L.FT.	144,800	4.00	$ 579,200.00
7320794	FIBER OPTIC SPLICE CLOSURE (FMS)	EACH	7	1,800.00	$ 12,600.00
7340101	CONTROL CABINET (POLE MOUNTED CCTV)	EACH	2	3,000.00	$ 6,000.00
7340103	CONTROL CABINET (DETECTOR)	EACH	5	7,000.00	$ 35,000.00
7340251	CONTROLLER (MODEL 2070)	EACH	2	2,250.00	$ 4,500.00
7340304	CONTROL CABINET FOUNDATION (CONTROL CABINET AND XFMR)	EACH	6	1,500.00	$ 9,000.00
7340305	CONTROL CABINET FOUNDATION (DMS CABINET AND XFMR)	EACH	6	1,500.00	$ 9,000.00
7350040	LOOP DETECTOR (6' X 6')	EACH	368	1,000.00	$ 368,000.00
7350051	DETECTOR CARD	EACH	182	125.00	$ 22,750.00
7350165	LOOP DETECTOR LEAD-IN CABLE	L.FT.	50,800	1.00	$ 50,800.00
7370430	TRANSFORMER (CABINET ASSEMBLY, 3KVA)	EACH	3	2,000.00	$ 6,000.00
7370431	TRANSFORMER (CABINET ASSEMBLY, 10KVA)	EACH	6	2,200.00	$ 13,200.00
7370705	CCTV FIELD EQUIPMENT	EACH	2	5,000.00	$ 10,000.00
7379111	VARIABLE MESSAGE SIGN ASSEMBLY INSTALLATION	EACH	6	2,000.00	$ 12,000.00
737xxxx	VARIABLE MESSAGE SIGN PROCUREMENT	EACH	6	100,000.00	$ 600,000.00
9240119	MISCELLANEOUS WORK (ETHERNET SWITCH)	EACH	13	2,000.00	$ 26,000.00
9240120	MISCELLANEOUS WORK (RELOCATE RAMP METER ASSEMBLY)	EACH	8	20,000.00	$ 160,000.00
				ITS/FMS SUB-TOTAL:	**$ 3,602,550.00**
LIGHTING					
7310190	POLE (TYPE G) (ALUMINUM)	EACH	12	1,800.00	$ 21,600.00
7310092	POLE (TYPE H) (ALUMINUM)	EACH	29	2,000.00	$ 58,000.00
7310197	BREAKAWAY BASE FOR LIGHTING POLE OR SIGNAL FLASHER	EACH	1	600.00	$ 600.00
7310260	POLE FOUNDATION (TYPE G) (STANDARD BASE)	EACH	12	1,200.00	$ 14,400.00
7310270	POLE FOUNDATION (TYPE H) (STANDARD BASE)	EACH	29	1,500.00	$ 43,500.00
7310350	POLE FOUNDATION (TYPE U)	EACH	1	1,500.00	$ 1,500.00
7310650	MAST ARM (6 FOOT) (ALUMINUM)	EACH	31	600.00	$ 18,600.00
7310652	MAST ARM (20 FOOT) (ALUMINUM)	EACH	10	750.00	$ 7,500.00
7310800	REMOVAL OF LIGHT POLES AND BASES	EACH	37	600.00	$ 22,200.00
7310831	RELOCATE EXISTING LIGHT POLES (HIGH MAST INCLUDING FOUNDATION AND PLATFORM)	L.SUM	1	25,000.00	$ 25,000.00
7310832	RELOCATE EXISTING LIGHT POLES	EACH	1	1,000.00	$ 1,000.00
7320050	ELECTRICAL CONDUIT (2") (PVC)	L.FT.	9,700	12.00	$ 116,400.00
7320456	PULL BOX (NO 4B)	EACH	41	1,200.00	$ 49,200.00
7320520	CONDUCTOR (NO. 8)	L.FT.	38,600	0.90	$ 34,740.00
7320521	CONDUCTOR (NO. 8) (INSULATED BOND)	L.FT.	9,700	1.00	$ 9,700.00

Table 35. Overall (Val Vista Drive to I-10) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
7360110	LUMINAIRE (LED) (15L)	EACH	24	500.00	$ 12,000.00
7360111	LUMINAIRE (LED) (25L)	EACH	142	750.00	$ 106,500.00
7360112	LUMINAIRE (LED) (40L)	EACH	10	1,000.00	$ 10,000.00
7360113	LUMINAIRE (LED) (HIGH MAST)	EACH	512	2,000.00	$ 1,024,000.00
7360114	LUMINAIRE (LED) (UNDERDECK)	EACH	80	1,500.00	$ 120,000.00
7360115	LUMINAIRE (VERTICAL MOUNT) (25L)	EACH	2	1,500.00	$ 3,000.00
7360116	LUMINAIRE (VERTICAL MOUNT) (40L)	EACH	9	2,000.00	$ 18,000.00
7310351X	UNDERDECK LIGHTING (TOTAL)	L.SUM	1	113,000.00	$ 113,000.00
				LIGHTING SUB-TOTAL:	**$ 1,830,440.00**
DRAINAGE					
2020041	REMOVAL OF PIPE	L.FT.	11,351	26.00	$ 295,126.00
2020053	REMOVE (CATCH BASIN)	EACH	322	975.00	$ 313,950.00
2020054	REMOVE (MANHOLE)	EACH	41	975.00	$ 39,975.00
5012518	STORM DRAIN PIPE, 18"	L.FT.	354	71.50	$ 25,311.00
5012524	STORM DRAIN PIPE, 24"	L.FT.	10,137	71.50	$ 724,795.50
5012530	STORM DRAIN PIPE, 30"	L.FT.	86	65.00	$ 5,590.00
5012536	STORM DRAIN PIPE 36"	L.FT.	1,130	97.50	$ 110,175.00
5012542	STORM DRAIN PIPE, 42"	L.FT.	466	117.00	$ 54,522.00
5012548	STORM DRAIN PIPE, 48"	L.FT.	494	143.00	$ 70,642.00
5012566	STORM DRAIN PIPE, 66"	L.FT.	159	455.00	$ 72,345.00
5012572	STORM DRAIN PIPE, 72"	L.FT.	364	494.00	$ 179,816.00
5012596	STORM DRAIN PIPE (96" - PUMP STORAGE TRUNKLINE PIPE)	L.FT.	1,301	585.00	$ 761,085.00
5030142	CONCRETE CATCH BASIN (MEDIAN) (C-15.80 AREA INLET)	EACH	99	3,250.00	$ 321,750.00
5030604	CONCRETE CATCH BASIN (C-15.92 FREEWAY GRATE)	EACH	291	4,160.00	$ 1,210,560.00
5030605	CONCRETE CATCH BASIN (C-15.91 GUTTER GRATE)	EACH	4	3,450.00	$ 13,800.00
5030606	CONCRETE CATCH BASIN (OVERSIZED C-15.92)	EACH	3	7,360.00	$ 22,080.00
5050001	MANHOLE (C-18.10) (NO. 1) (FOR PIPES 6" TO 36")	EACH	3	5,750.00	$ 17,250.00
5050002	MANHOLE (C-18.10) (NO. 1) (FOR PIPES OVER 36")	EACH	13	11,500.00	$ 149,500.00
5050012	MANHOLE (C-18.10)(NO.1) (MODIFIED C-15.92 TOP)	EACH	33	10,000.00	$ 330,000.00
5050089	MANHOLE (CAP EXISTING MANHOLE)	EACH	108	4,000.00	$ 432,000.00
5050202	RESET FRAME AND COVER FOR MANHOLE (	EACH	3	1,150.00	$ 3,450.00
8080689	CONCRETE PIPE COLLAR	EACH	431	1,725.00	$ 743,475.00
9240050	MISCELLANEOUS WORK (CHANNEL ACCESS RAMP)	L.SUM	1	13,000.00	$ 13,000.00
				DRAINAGE SUB-TOTAL:	**$ 5,910,197.50**
STRUCTURES					
2020014	REMOVAL OF STRUCTURES AND OBSTRUCTIONS (WALLS)	L.SUM	1	419,500	$ 419,500.00
9140180	RETAINING WALL (COMBINATION WALL)	SQ.FT.	32,800	75.00	$ 2,460,000.00
9999910	LUMP SUM (56th STREET OVERPASS EB)	L.SUM	1	724,000.00	$ 724,000.00
9999910	LUMP SUM (RAMP S-E/56th STREET OVERPASS)	L.SUM	1	822,200.00	$ 822,200.00
9999910	LUMP SUM (ARIZONA AVENUE TI OVERPASS WB)	L.SUM	1	733,000.00	$ 733,000.00

Table 35. Overall (Val Vista Drive to I-10) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
9999910	LUMP SUM (ARIZONA AVENUE TI OP EB)	L.SUM	1	744,000.00	$ 744,000.00
9999910	LUMP SUM (ARIZONA AVENUE RAMP 'C')	L.SUM	1	315,600.00	$ 315,600.00
9999910	LUMP SUM (UPRR OVERPASS WB)	L.SUM	1	567,000.00	$ 567,000.00
9999910	LUMP SUM (UPRR OVERPASS EB)	L.SUM	1	568,000.00	$ 568,000.00
9999910	LUMP SUM (ARIZONA AVENUE RAMP 'D')	L.SUM	1	716,400.00	$ 716,400.00
9999910	LUMP SUM (CONSOLIDATED CANAL OVERPASS WB)	L.SUM	1	723,800.00	$ 723,800.00
9999910	LUMP SUM (CONSOLIDATED CANAL OVERPASS EB)	L.SUM	1	723,800.00	$ 723,800.00
9999910	LUMP SUM (LINDSAY ROAD TI OVERPASS WB)	L.SUM	1	1,026,000.00	$ 1,026,000.00
9999910	LUMP SUM (LINDSAY ROAD TI OVERPASS EB)	L.SUM	1	1,013,000.00	$ 1,013,000.00
				STRUCTURES SUB-TOTAL:	**$ 11,556,300.00**
LANDSCAPING					
7320291	ELECTRICAL CONDUIT (3") (FOR IRRIGATION CONTROLLERS)	L.FT.	1,750	15.00	$ 26,250.00
7320292	ELECTRICAL CONDUIT (3") (HDPE) (DIRECTIONAL DRILL)	L.FT.	190	30.00	$ 5,700.00
8030092	GRANITE MULCH (	SQ. YD	396,880	2.70	$ 1,071,576.00
8060001	PLANTING TREES, SHRUBS AND PLANTS	L.SUM	1	1,394,000.00	$ 1,394,000.00
8060051	REMOVE AND SALVAGE EXISTING VEGETATION	L.SUM	1	615,000.00	$ 615,000.00
8080003	LANDSCAPE IRRIGATION SYSTEM MODIFICATION	L.SUM	1	1,915,000.00	$ 1,915,000.00
9240111	MISCELLANEOUS WORK (SINGLE MODE FIBER OPTIC CABLE) (12 FIBERS) (FOR IRRIGATION CONTROLLERS)	L.FT.	2,880	3.00	$ 8,640.00
9240121	MISCELLANEOUS WORK (PULL BOX) (NO. 7) (FMS STD FM-2.06) (FOR IRRIGATION CONTROLLERS)	EACH	15	750.00	$ 11,250.00
9240122	MISCELLANEOUS WORK (FIBER OPTIC SPLICE CLOSURE) (FOR IRRIGATION CONTROLLERS)	EACH	5	1,800.00	$ 9,000.00
				LANDSCAPING SUB-TOTAL:	**$ 5,056,416.00**
				ITEM TOTAL (SUBTOTAL A):	**$ 110,372,912.75**
SEGMENT WIDE					
	MAINTENANCE AND PROTECTION OF TRAFFIC (8%)	COST	8.0%		$ 8,829,833.02
	DUST AND WATER PALLIATIVE (1.00%)	COST	1.0%		$ 1,103,729.13
	QUALITY CONTROL (1.00%)	COST	1.0%		$ 1,103,729.13
	CONSTRUCTION SURVEYING (1.5%)	COST	1.5%		$ 1,655,593.69
	EROSION CONTROL (1.0%)	COST	1.0%		$ 1,103,729.13
	MOBILIZATION (8% OF ALL CONSTRUCTION ITEMS)	COST	8.0%		$ 8,829,833.02
	UNIDENTIFIED ITEMS (20% OF ITEM TOTAL AND PROJECT WIDE SUBTOTAL)	COST	20.0%		$ 22,074,582.55
				PROJECT WIDE SUBTOTAL:	**$ 44,701,029.66**
				PROJECT WIDE TOTAL (SUBTOTAL B):	**$ 155,073,942.41**

Table 35. Overall (Val Vista Drive to I-10) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
OTHER PROJECT COSTS					
	DPS TRAFFIC CONTROL	COST	0%		$ -
	JOINT PROJECT AGREEMENT ITEMS	COST	0%		$ -
	CONTRACTOR INCENTIVES	COST	0%		$ -
	ENVIRONMENTAL MITIGATION	COST	0%		$ -
				PRESENT YEAR CONSTRUCTION BID COST (EXCLUDING UTILITIES & R/W):	**$ 155,073,942.41**
INFLATION AND BELOW THE LINE ITEMS					
	LABOR AND MATERIAL INFLATION TO CONSTRUCTION YEAR 20xx (X%/YR)	L.SUM	1	$ -	$-
	POST DESIGN SERVICES (1% OF SUBTOTAL A)	COST	1.0%		$ 1,103,729.13
	CONSTRUCTION CONTINGENCIES (5% OF SUBTOTAL A)	COST	5.0%		$ 5,518,645.64
	CONSTRUCTION ENGINEERING (8% OF SUBTOTAL A)	COST	8.0%		$ 8,829,833.02
	INDIRECT COST ALLOCATION (10.02% OF SUBTOTAL B + OTHER PROJECT COSTS)	COST	10.02%		$ 15,538,409.03
				CONSTRUCTION YEAR DEPARTMENT CONSTRUCTION COST (EXCLUDING UTILITIES & R/W):	**$ 186,064,559.23**
PREDESIGN AND FINAL DESIGN					
		L.SUM	1		
	PREDESIGN/NEPA/PI SERVICES (3% OF CONSTRUCTION YEAR COST)	COST	3.0%		$ 4,652,218.27
	FINAL DESIGN SERVICES (8% OF CONSTRUCTION YEAR COST)	COST	8.0%		$ 12,405,915.39
	INDIRECT COST ALLOCATION (10.02% OF ALL DESIGN COSTS)	COST	10.02%		$ 1,709,224.99
				TOTAL ESTIMATED DESIGN COST:	**$ 18,787,358.66**
UTILITY RELOCATION					
	PRIOR RIGHT UTILITY RELOCATIONS & SERVICE AGREEMENTS	L.SUM	1	$ -	$ -
	INDIRECT COST ALLOCATION (10.02% OF ALL UTILITY COSTS)	COST	10.02%		$ -
	UTILITY RELOCATION COST INFLATION TO CONSTRUCTION YEAR 20xx (X%/YR)	L.SUM	1	$ -	$ -
				TOTAL ESTIMATED UTILITY COST:	**$ -**
RIGHT-OF-WAY					
	RIGHT-OF-WAY	L.SUM	1	$ -	$ -
	INDIRECT COST ALLOCATION (10.02% OF ALL RIGHT-OF-WAY COSTS)	COST	10.02%		$ -
	RIGHT-OF-WAY PRICE ESCALATION TO ACQUISITION YEAR 20xx (X%/YR)	L.SUM	1	$ -	$ -
				ACQUISITION YEAR RIGHT-OF-WAY COSTS:	**$ -**
				TOTAL PROJECT COST	**$ 204,831,917.89**

Table 36. Project 1 (SR 101L to Val Vista Drive) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
ROADWAY					
2020021	REMOVAL OF CONCRETE CURB AND GUTTER	L.FT.	88,474	4.00	$ 353,896.00
2020027	REMOVAL OF CONCRETE BARRIER	L.FT.	3,287	25.00	$ 82,175.00
2020031	REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT	SQ.YD.	33,203	18.00	$ 597,654.00
2020053	REMOVE (END TREATMENT)	EACH	18	550.00	$ 9,900.00
2020081	REMOVE BITUMINOUS PAVEMENT (MILLING) (1")	SQ.YD.	603,006	2.75	$ 1,658,266.50
2020154	REMOVE (RAMPS/SIDEWALK/SIGNALS REMOVE AND REPLACE)	L.SUM	1	729,940.00	$ 729,940.00
2030201	EXCAVATION (OVEREX FOR ROADWAY AND WALLS)	CU.YD.	24,808	20.00	$ 496,160.00
2030301	ROADWAY EXCAVATION	CU.YD.	238,375	20.00	$ 4,767,500.00
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	20,194	47.00	$ 949,118.00
4010010	PORTLAND CEMENT CONCRETE PAVEMENT (10")	SQ.YD.	35,316	48.00	$ 1,695,168.00
4010014	PORTLAND CEMENT CONCRETE PAVEMENT (13")	SQ.YD.	179,452	54.00	$ 9,690,408.00
4090003	ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL)	TON	27,165	100.00	$ 2,716,500.00
4040111	BITUMINOUS TACK COAT	TON	273	500.00	$ 136,500.00
4140040	ASPHALTIC CONCRETE FRICTION COURSE (ASPHALT-RUBBER)	TON	48,249	48.00	$ 2,315,952.00
4140042	ASPHALT RUBBER MATERIAL (FOR AR-ACFC)	TON	4,585	492.00	$ 2,255,820.00
4140044	MINERAL ADMIXTURE (FOR AR-ACFC)	TON	438	90.00	$ 39,420.00
9050025	GUARD RAIL TERMINAL (AT GORE BARRIERS)	EACH	6	25,000.00	$ 150,000.00
9050026	GUARD RAIL TERMINAL (TANGENT TYPE)	EACH	17	3,000.00	$ 51,000.00
9050430	THRIE-BEAM GUARD RAIL TRANSITION SYSTEM	EACH	17	2,000.00	$ 34,000.00
9080085	CONCRETE CURB AND GUTTER (C-05.10) (TYPE C)	L.FT.	8,892	20.00	$ 177,840.00
9100001	CONCRETE BARRIER	L.FT.	72,700	80.00	$ 5,816,000.00
9100008	CONCRETE BARRIER (60")	L.FT.	14,429	100.00	$ 1,442,900.00
9100037	CONCRETE BARRIER (SPECIAL HALF) (TOE DOWN)	L.FT.	1,189	250.00	$ 297,250.00
9100112	CONCRETE HALF BARRIER TRANSITION (STD C-10.71)	EACH	17	5,000.00	$ 85,000.00
9140133	NOISE BARRIER WALL (	SQ.FT.	129,649	50.00	$ 6,482,450.00
9140158	RETAINING WALL (	SQ.FT.	130,200	85.00	$ 11,067,000.00
				ROADWAY SUB-TOTAL:	**$ 54,097,817.50**
TRAFFIC					
70415XX	PAVEMENT MARKINGS	L.SUM	1	1,463,929.00	$ 1,463,929.00
60801XX	SIGN (	L.SUM	1	2,800,593.00	$ 2,800,593.00
				TRAFFIC SUB-TOTAL:	**$ 4,264,522.00**
ITS/FMS					
6000153	BUTTERFLY BRIDGE SIGN STRUCTURE FOR DMS	EACH	4	55,000.00	$ 220,000.00
6000154	FOUNDATION FOR BUTTERFLY BRIDGE SIGN STRUCTURE	EACH	4	12,500.00	$ 50,000.00
7310190	POLE (55 FT POLE WITH LOWERING DEVICE)	EACH	1	12,000.00	$ 12,000.00
7310371	POLE FOUNDATION (55 FT POLE)	EACH	1	4,000.00	$ 4,000.00
7320072	ELECTRICAL CONDUIT (3 - 3") (PVC)	L.FT.	22,050	20.00	$ 441,000.00
7320293	ELECTRICAL CONDUIT (3 - 3") (HDPE) (DIRECTIONAL DRILL)	L.FT.	950	30.00	$ 28,500.00

Table 36. Project 1 (SR 101L to Val Vista Drive) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
7320295	ELECTRICAL CONDUIT (3 - 3") (RMC)	L.FT.	400	50.00	$ 20,000.00
7320460	PULL BOX (NO. 7) (FMS STD FM-2.06)	EACH	17	750.00	$ 12,750.00
7320455	PULL BOX (NO. 9)	EACH	22	4,000.00	$ 88,000.00
7320461	PULL BOX (SPLIT NO. 9)	EACH	22	4,000.00	$ 88,000.00
7320765	SINGLE MODE FIBER OPTIC CABLE (12 FIBERS)	L.FT.	3,600	3.00	$ 10,800.00
7320787	SINGLE MODE FIBER OPTIC CABLE (144 FIBERS)	L.FT.	83,000	4.00	$ 332,000.00
7320794	FIBER OPTIC SPLICE CLOSURE (FMS)	EACH	5	1,800.00	$ 9,000.00
7340101	CONTROL CABINET (POLE MOUNTED CCTV)	EACH	1	3,000.00	$ 3,000.00
7340103	CONTROL CABINET (DETECTOR)	EACH	2	7,000.00	$ 14,000.00
7340251	CONTROLLER (MODEL 2070)	EACH	2	2,250.00	$ 4,500.00
7340304	CONTROL CABINET FOUNDATION (CONTROL CABINET AND XFMR)	EACH	3	1,500.00	$ 4,500.00
7340305	CONTROL CABINET FOUNDATION (DMS CABINET AND XFMR)	EACH	4	1,500.00	$ 6,000.00
7350040	LOOP DETECTOR (6' X 6')	EACH	246	1,000.00	$ 246,000.00
7350051	DETECTOR CARD	EACH	123	125.00	$ 15,375.00
7350165	LOOP DETECTOR LEAD-IN CABLE	L.FT.	38,600	1.00	$ 38,600.00
7370430	TRANSFORMER (CABINET ASSEMBLY, 3KVA)	EACH	2	2,000.00	$ 4,000.00
7370431	TRANSFORMER (CABINET ASSEMBLY, 10KVA)	EACH	4	2,200.00	$ 8,800.00
7370705	CCTV FIELD EQUIPMENT	EACH	1	5,000.00	$ 5,000.00
7379111	VARIABLE MESSAGE SIGN ASSEMBLY INSTALLATION	EACH	4	2,000.00	$ 8,000.00
737xxxx	VARIABLE MESSAGE SIGN PROCUREMENT	EACH	4	100,000.00	$ 400,000.00
9240119	MISCELLANEOUS WORK (ETHERNET SWITCH)	EACH	6	2,000.00	$ 12,000.00
9240120	MISCELLANEOUS WORK (RELOCATE RAMP METER ASSEMBLY)	EACH	5	20,000.00	$ 100,000.00
				ITS/FMS SUB-TOTAL:	$ 2,185,825.00
LIGHTING					
7310190	POLE (TYPE G) (ALUMINUM)	EACH	8	1,800.00	$ 14,400.00
7310092	POLE (TYPE H) (ALUMINUM)	EACH	28	2,000.00	$ 56,000.00
7310197	BREAKAWAY BASE FOR LIGHTING POLE OR SIGNAL FLASHER	EACH	1	600.00	$ 600.00
7310260	POLE FOUNDATION (TYPE G) (STANDARD BASE)	EACH	8	1,200.00	$ 9,600.00
7310270	POLE FOUNDATION (TYPE H) (STANDARD BASE)	EACH	28	1,500.00	$ 42,000.00
7310650	MAST ARM (6 FOOT) (ALUMINUM)	EACH	26	600.00	$ 15,600.00
7310652	MAST ARM (20 FOOT) (ALUMINUM)	EACH	10	750.00	$ 7,500.00
7310800	REMOVAL OF LIGHT POLES AND BASES	EACH	31	600.00	$ 18,600.00
7320050	ELECTRICAL CONDUIT (2") (PVC)	L.FT.	8,800	12.00	$ 105,600.00
7320456	PULL BOX (NO 4B)	EACH	36	1,200.00	$ 43,200.00
7320520	CONDUCTOR (NO. 8)	L.FT.	35,200	0.90	$ 31,680.00
7320521	CONDUCTOR (NO. 8) (INSULATED BOND)	L.FT.	8,800	1.00	$ 8,800.00
7360110	LUMINAIRE (LED) (15L)	EACH	11	500.00	$ 5,500.00
7360111	LUMINAIRE (LED) (25L)	EACH	84	750.00	$ 63,000.00
7360112	LUMINAIRE (LED) (40L)	EACH	10	1,000.00	$ 10,000.00
7360113	LUMINAIRE (LED) (HIGH MAST)	EACH	180	2,000.00	$ 360,000.00
7360114	LUMINAIRE (LED) (UNDERDECK)	EACH	48	1,500.00	$ 72,000.00

Table 36. Project 1 (SR 101L to Val Vista Drive) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
7360116	LUMINAIRE (VERTICAL MOUNT) (40L)	EACH	5	2,000.00	$ 10,000.00
7310351X	UNDERDECK LIGHTING (TOTAL)	L.SUM	1	78,000.00	$ 78,000.00
				LIGHTING SUB-TOTAL:	**$ 952,080.00**
DRAINAGE					
2020041	REMOVAL OF PIPE	L.FT.	5,621	26.00	$ 146,146.00
2020053	REMOVE (CATCH BASIN)	EACH	182	975.00	$ 177,450.00
2020054	REMOVE (MANHOLE)	EACH	14	975.00	$ 13,650.00
5012518	STORM DRAIN PIPE, 18"	L.FT.	96	71.50	$ 6,864.00
5012524	STORM DRAIN PIPE, 24"	L.FT.	5,882	71.50	$ 420,563.00
5012536	STORM DRAIN PIPE 36"	L.FT.	492	97.50	$ 47,970.00
5012542	STORM DRAIN PIPE, 42"	L.FT.	306	117.00	$ 35,802.00
5012548	STORM DRAIN PIPE, 48"	L.FT.	287	143.00	$ 41,041.00
5012566	STORM DRAIN PIPE, 66"	L.FT.	121	455.00	$ 55,055.00
5012572	STORM DRAIN PIPE, 72"	L.FT.	364	494.00	$ 179,816.00
5030142	CONCRETE CATCH BASIN (MEDIAN) (C-15.80 AREA INLET)	EACH	57	3,250.00	$ 185,250.00
5030604	CONCRETE CATCH BASIN (C-15.92 FREEWAY GRATE)	EACH	191	4,160.00	$ 794,560.00
5030606	CONCRETE CATCH BASIN (OVERSIZED C-15.92)	EACH	1	7,360.00	$ 7,360.00
5050001	MANHOLE (C-18.10) (NO. 1) (FOR PIPES 6" TO 36")	EACH	1	5,750.00	$ 5,750.00
5050002	MANHOLE (C-18.10) (NO. 1) (FOR PIPES OVER 36")	EACH	5	11,500.00	$ 57,500.00
5050012	MANHOLE (C-18.10)(NO.1) (MODIFIED C-15.92 TOP)	EACH	12	10,000.00	$ 120,000.00
5050089	MANHOLE (CAP EXISTING MANHOLE)	EACH	93	4,000.00	$ 372,000.00
5050202	RESET FRAME AND COVER FOR MANHOLE (	EACH	3	1,150.00	$ 3,450.00
8080689	CONCRETE PIPE COLLAR	EACH	260	1,725.00	$ 448,500.00
				DRAINAGE SUB-TOTAL:	**$ 3,118,727.00**
STRUCTURES					
2020014	REMOVAL OF STRUCTURES AND OBSTRUCTIONS (WALLS)	L.SUM	1	395,000.00	$ 395,000.00
9140180	RETAINING WALL (COMBINATION WALL)	SQ.FT.	32,800	75.00	$ 2,460,000.00
9999910	LUMP SUM (ARIZONA AVENUE TI OVERPASS WB)	L.SUM	1	733,000.00	$ 733,000.00
9999910	LUMP SUM (ARIZONA AVENUE TI OP EB)	L.SUM	1	744,000.00	$ 744,000.00
9999910	LUMP SUM (ARIZONA AVENUE RAMP ‘C’)	L SUM	1	315,600.00	$ 315,600.00
9999910	LUMP SUM (UPRR OVERPASS WB)	L.SUM	1	567,000.00	$ 567,000.00
9999910	LUMP SUM (UPRR OVERPASS EB)	L.SUM	1	568,000.00	$ 568,000.00
9999910	LUMP SUM (ARIZONA AVENUE RAMP ‘D’)	L.SUM	1	716,400.00	$ 716,400.00
9999910	LUMP SUM (CONSOLIDATED CANAL OVERPASS WB)	L.SUM	1	723,800.00	$ 723,800.00
9999910	LUMP SUM (CONSOLIDATED CANAL OVERPASS EB)	L.SUM	1	723,800.00	$ 723,800.00
9999910	LUMP SUM (LINDSAY ROAD TI OVERPASS WB)	L.SUM	1	1,026,000.00	$ 1,026,000.00
9999910	LUMP SUM (LINDSAY ROAD TI OVERPASS EB)	L.SUM	1	1,013,000.00	$ 1,013,000.00
				STRUCTURES SUB-TOTAL:	**$ 9,985,600.00**
LANDSCAPING					

Table 36. Project 1 (SR 101L to Val Vista Drive) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
7320291	ELECTRICAL CONDUIT (3") (FOR IRRIGATION CONTROLLERS)	L.FT.	1,200	15.00	$ 18,000.00
7320292	ELECTRICAL CONDUIT (3") (HDPE) (DIRECTIONAL DRILL)	L.FT.	80	30.00	$ 2,400.00
8030092	GRANITE MULCH (	SQ. YD	251,680	2.70	$ 679,536.00
8060001	PLANTING TREES, SHRUBS AND PLANTS	L.SUM	1	884,000.00	$ 884,000.00
8060051	REMOVE AND SALVAGE EXISTING VEGETATION	L.SUM	1	390,000.00	$ 390,000.00
8080003	LANDSCAPE IRRIGATION SYSTEM MODIFICATION	L.SUM	1	1,240,000.00	$ 1,240,000.00
9240111	MISCELLANEOUS WORK (SINGLE MODE FIBER OPTIC CABLE) (12 FIBERS) (FOR IRRIGATION CONTROLLERS)	L.FT.	2,220	3.00	$ 6,660.00
9240121	MISCELLANEOUS WORK (PULL BOX) (NO. 7) (FMS STD FM-2.06) (FOR IRRIGATION CONTROLLERS)	EACH	10	750.00	$ 7,500.00
9240122	MISCELLANEOUS WORK (FIBER OPTIC SPLICE CLOSURE) (FOR IRRIGATION CONTROLLERS)	EACH	2	1,800.00	$ 3,600.00
				LANDSCAPING SUB-TOTAL:	**$ 3,231,696.00**
				ITEM TOTAL (SUBTOTAL A):	**$ 77,836,267.50**
SEGMENT WIDE					
	MAINTENANCE AND PROTECTION OF TRAFFIC (8%)	COST	8.0%		$ 6,237,394.20
	DUST AND WATER PALLIATIVE (1.00%)	COST	1.0%		$ 779,674.28
	QUALITY CONTROL (1.00%)	COST	1.0%		$ 779,674.28
	CONSTRUCTION SURVEYING (1.5%)	COST	1.5%		$ 1,169,511.41
	EROSION CONTROL (1.0%)	COST	1.0%		$ 779,674.28
	MOBILIZATION (8% OF ALL CONSTRUCTION ITEMS)	COST	8.0%		$ 6,237,394.20
	UNIDENTIFIED ITEMS (20% OF ITEM TOTAL AND PROJECT WIDE SUBTOTAL)	COST	20.0%		$ 15,593,485.50
				PROJECT WIDE SUBTOTAL:	**$ 31,523,688.34**
				PROJECT WIDE TOTAL (SUBTOTAL B):	**$ 109,359,955.84**
OTHER PROJECT COSTS					
	DPS TRAFFIC CONTROL	COST	0%		$ -
	JOINT PROJECT AGREEMENT ITEMS	COST	0%		$ -
	CONTRACTOR INCENTIVES	COST	0%		$ -
	ENVIRONMENTAL MITIGATION	COST	0%		$ -
				PRESENT YEAR CONSTRUCTION BID COST (EXCLUDING UTILITIES & R/W):	**$ 109,359,955.84**
INFLATION AND BELOW THE LINE ITEMS					
	LABOR AND MATERIAL INFLATION TO CONSTRUCTION YEAR 20xx (X%/YR)	L.SUM	1	$ -	$ -
	POST DESIGN SERVICES (1% OF SUBTOTAL A)	COST	1.0%		$ 778,362.68
	CONSTRUCTION CONTINGENCIES (5% OF SUBTOTAL A)	COST	5.0%		$ 3,891,813.38
	CONSTRUCTION ENGINEERING (8% OF SUBTOTAL A)	COST	8.0%		$ 6,226,901.40
	INDIRECT COST ALLOCATION (10.02% OF SUBTOTAL B + OTHER PROJECT COSTS)	COST	10.02%		$ 10,957,867.57

Table 36. Project 1 (SR 101L to Val Vista Drive) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
	CONSTRUCTION YEAR DEPARTMENT CONSTRUCTION COST (EXCLUDING UTILITIES & R/W):				**$ 131,214,900.86**
PREDESIGN AND FINAL DESIGN		L.SUM	1	-	
	PREDESIGN/NEPA/PI SERVICES (3% OF CONSTRUCTION YEAR COST)	COST	3.0%		$ 3,280,798.68
	FINAL DESIGN SERVICES (8% OF CONSTRUCTION YEAR COST)	COST	8.0%		$ 8,748,796.47
	INDIRECT COST ALLOCATION (10.02% OF ALL DESIGN COSTS)	COST	10.02%		$ 1,205,365.43
	TOTAL ESTIMATED DESIGN COST:				**$ 13,234,960.58**
UTILITY RELOCATION					
	PRIOR RIGHT UTILITY RELOCATIONS & SERVICE AGREEMENTS	L.SUM	1	$ -	$ -
	INDIRECT COST ALLOCATION (10.02% OF ALL UTILITY COSTS)	COST	10.02%		$ -
	UTILITY RELOCATION COST INFLATION TO CONSTRUCTION YEAR 20xx (X%/YR)	L.SUM	1	$ -	$ -
	TOTAL ESTIMATED UTILITY COST:				**$ -**
RIGHT-OF-WAY					
	RIGHT-OF-WAY	L.SUM	1	$ -	$ -
	INDIRECT COST ALLOCATION (10.02% OF ALL RIGHT-OF-WAY COSTS)	COST	10.02%		$ -
	RIGHT-OF-WAY PRICE ESCALATION TO ACQUISITION YEAR 20xx (X%/YR)	L.SUM	1	$ -	$ -
	ACQUISITION YEAR RIGHT-OF-WAY COSTS:				**$ -**
	TOTAL PROJECT COST				**$ 144,449,861.44**

Table 37. Project 2 (I-10 to SR 101L) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
ROADWAY					
2020021	REMOVAL OF CONCRETE CURB AND GUTTER	L.FT.	43,092	4.00	$ 172,368.00
2020027	REMOVAL OF CONCRETE BARRIER	L.FT.	13,364	25.00	$ 334,100.00
2020031	REMOVAL OF PORTLAND CEMENT CONCRETE PAVEMENT	SQ.YD.	7,927	18.00	$ 142,686.00
2020053	REMOVE (END TREATMENT)	EACH	9	550.00	$ 4,950.00
2020081	REMOVE BITUMINOUS PAVEMENT (MILLING) (1")	SQ.YD.	483,065	2.75	$ 1,328,428.75
2020154	REMOVE (RAMPS/SIDEWALK/SIGNALS REMOVE AND REPLACE)	L.SUM	1	224,760.00	$ 224,760.00
2030201	EXCAVATION (OVEREX FOR ROADWAY AND WALLS)	CU.YD.	5,865	20.00	$ 117,300.00
2030301	ROADWAY EXCAVATION	CU.YD.	65,541	20.00	$ 1,310,820.00
3030022	AGGREGATE BASE, CLASS 2	CU.YD.	2,967	47.00	$ 139,449.00
4010010	PORTLAND CEMENT CONCRETE PAVEMENT (10")	SQ.YD.	8,418	48.00	$ 404,064.00
4010014	PORTLAND CEMENT CONCRETE PAVEMENT (13")	SQ.YD.	68,668	54.00	$ 3,708,072.00
4090003	ASPHALTIC CONCRETE (MISCELLANEOUS STRUCTURAL)	TON	14,032	100.00	$ 1,403,200.00
4040111	BITUMINOUS TACK COAT	TON	188	500.00	$ 94,000.00
4140040	ASPHALTIC CONCRETE FRICTION COURSE (ASPHALT-RUBBER)	TON	33,051	48.00	$ 1,586,448.00
4140042	ASPHALT RUBBER MATERIAL (FOR AR-ACFC)	TON	3,142	492.00	$ 1,545,864.00
4140044	MINERAL ADMIXTURE (FOR AR-ACFC)	TON	300	90.00	$ 27,000.00
9050025	GUARD RAIL TERMINAL (AT GORE BARRIERS)	EACH	1	25,000.00	$ 25,000.00
9050026	GUARD RAIL TERMINAL (TANGENT TYPE)	EACH	14	3,000.00	$ 42,000.00
9050430	THRIE-BEAM GUARD RAIL TRANSITION SYSTEM	EACH	14	2,000.00	$ 28,000.00
9080085	CONCRETE CURB AND GUTTER (C-05.10) (TYPE C)	L.FT.	4,440	20.00	$ 88,800.00
9100001	CONCRETE BARRIER	L.FT.	43,966	80.00	$ 3,517,280.00
9100008	CONCRETE BARRIER (60")	L.FT.	5,104	100.00	$ 510,400.00
9100037	CONCRETE BARRIER (SPECIAL HALF) (TOE DOWN)	L.FT.	962	250.00	$ 240,500.00
9100112	CONCRETE HALF BARRIER TRANSITION (STD C-10.71)	EACH	14	5,000.00	$ 70,000.00
9140158	RETAINING WALL (	SQ.FT.	39,650	85.00	$ 3,370,250.00
				ROADWAY SUB-TOTAL:	**$ 20,435,739.75**
TRAFFIC					
70415XX	PAVEMENT MARKINGS	L.SUM	1	1,219,135.00	$ 1,219,135.00
60801XX	SIGN (	L.SUM	1	2,399,795.00	$ 2,399,795.00
				TRAFFIC SUB-TOTAL:	**$ 3,618,930.00**
ITS/FMS					
6000153	BUTTERFLY BRIDGE SIGN STRUCTURE FOR DMS	EACH	1	55,000.00	$ 55,000.00
6000154	FOUNDATION FOR BUTTERFLY BRIDGE SIGN STRUCTURE	EACH	1	12,500.00	$ 12,500.00
7310190	POLE (55 FT POLE WITH LOWERING DEVICE)	EACH	1	12,000.00	$ 12,000.00
7310371	POLE FOUNDATION (55 FT POLE)	EACH	1	4,000.00	$ 4,000.00
7320072	ELECTRICAL CONDUIT (3 - 3") (PVC)	L.FT.	21,250	20.00	$ 425,000.00
7320073	ELECTRICAL CONDUIT (2 - 3") (PVC)	L.FT.	400	15.00	$ 6,000.00
7320293	ELECTRICAL CONDUIT (3 - 3") (HDPE) (DIRECTIONAL DRILL)	L.FT.	500	30.00	$ 15,000.00
7320460	PULL BOX (NO. 7) (FMS STD FM-2.06)	EACH	7	750.00	$ 5,250.00

Table 37. Project 2 (I-10 to SR 101L) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
7320455	PULL BOX (NO. 9)	EACH	13	4,000.00	$ 52,000.00
7320461	PULL BOX (SPLIT NO. 9)	EACH	27	4,000.00	$ 108,000.00
7320765	SINGLE MODE FIBER OPTIC CABLE (12 FIBERS)	L.FT.	2,900	3.00	$ 8,700.00
7320787	SINGLE MODE FIBER OPTIC CABLE (144 FIBERS)	L.FT.	61,800	4.00	$ 247,200.00
7320794	FIBER OPTIC SPLICE CLOSURE (FMS)	EACH	2	1,800.00	$ 3,600.00
7340101	CONTROL CABINET (POLE MOUNTED CCTV)	EACH	1	3,000.00	$ 3,000.00
7340103	CONTROL CABINET (DETECTOR)	EACH	3	7,000.00	$ 21,000.00
7340304	CONTROL CABINET FOUNDATION (CONTROL CABINET AND XFMR)	EACH	3	1,500.00	$ 4,500.00
7340305	CONTROL CABINET FOUNDATION (DMS CABINET AND XFMR)	EACH	2	1,500.00	$ 3,000.00
7350040	LOOP DETECTOR (6' X 6')	EACH	122	1,000.00	$ 122,000.00
7350051	DETECTOR CARD	EACH	59	125.00	$ 7,375.00
7350165	LOOP DETECTOR LEAD-IN CABLE	L.FT.	12,200	1.00	$ 12,200.00
7370430	TRANSFORMER (CABINET ASSEMBLY, 3KVA)	EACH	1	2,000.00	$ 2,000.00
7370431	TRANSFORMER (CABINET ASSEMBLY, 10KVA)	EACH	2	2,200.00	$ 4,400.00
7370705	CCTV FIELD EQUIPMENT	EACH	1	5,000.00	$ 5,000.00
7379111	VARIABLE MESSAGE SIGN ASSEMBLY INSTALLATION	EACH	2	2,000.00	$ 4,000.00
737xxxx	VARIABLE MESSAGE SIGN PROCUREMENT	EACH	2	100,000.00	$ 200,000.00
9240119	MISCELLANEOUS WORK (ETHERNET SWITCH)	EACH	7	2,000.00	$ 14,000.00
9240120	MISCELLANEOUS WORK (RELOCATE RAMP METER ASSEMBLY)	EACH	3	20,000.00	$ 60,000.00
				ITS/FMS SUB-TOTAL:	$ 1,416,725.00
LIGHTING					
7310190	POLE (TYPE G) (ALUMINUM)	EACH	4	1,800.00	$ 7,200.00
7310092	POLE (TYPE H) (ALUMINUM)	EACH	1	2,000.00	$ 2,000.00
7310260	POLE FOUNDATION (TYPE G) (STANDARD BASE)	EACH	4	1,200.00	$ 4,800.00
7310270	POLE FOUNDATION (TYPE H) (STANDARD BASE)	EACH	1	1,500.00	$ 1,500.00
7310350	POLE FOUNDATION (TYPE U)	EACH	1	1,500.00	$ 1,500.00
7310650	MAST ARM (6 FOOT) (ALUMINUM)	EACH	5	600.00	$ 3,000.00
7310800	REMOVAL OF LIGHT POLES AND BASES	EACH	6	600.00	$ 3,600.00
7310831	RELOCATE EXISTING LIGHT POLES (HIGH MAST INCLUDING FOUNDATION AND PLATFORM)	L.SUM	1	25,000.00	$ 25,000.00
7310832	RELOCATE EXISTING LIGHT POLES	EACH	1	1,000.00	$ 1,000.00
7320050	ELECTRICAL CONDUIT (2") (PVC)	L.FT.	900	12.00	$ 10,800.00
7320456	PULL BOX (NO 4B)	EACH	5	1,200.00	$ 6,000.00
7320520	CONDUCTOR (NO. 8)	L.FT.	3,400	0.90	$ 3,060.00
7320521	CONDUCTOR (NO. 8) (INSULATED BOND)	L.FT.	900	1.00	$ 900.00
7360110	LUMINAIRE (LED) (15L)	EACH	13	500.00	$ 6,500.00
7360111	LUMINAIRE (LED) (25L)	EACH	58	750.00	$ 43,500.00
7360113	LUMINAIRE (LED) (HIGH MAST)	EACH	332	2,000.00	$ 664,000.00
7360114	LUMINAIRE (LED) (UNDERDECK)	EACH	32	1,500.00	$ 48,000.00
7360115	LUMINAIRE (VERTICAL MOUNT) (25L)	EACH	2	1,500.00	$ 3,000.00
7360116	LUMINAIRE (VERTICAL MOUNT) (40L)	EACH	4	2,000.00	$ 8,000.00

Table 37. Project 2 (I-10 to SR 101L) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
7310351X	UNDERDECK LIGHTING (TOTAL)	L.SUM	1	35,000.00	$ 35,000.00
				LIGHTING SUB-TOTAL:	**$ 878,360.00**
DRAINAGE					
2020041	REMOVAL OF PIPE	L.FT.	5,730	26.00	$ 148,980.00
2020053	REMOVE (CATCH BASIN)	EACH	140	975.00	$ 136,500.00
2020054	REMOVE (MANHOLE)	EACH	27	975.00	$ 26,325.00
5012518	STORM DRAIN PIPE, 18"	L.FT.	258	71.50	$ 18,447.00
5012524	STORM DRAIN PIPE, 24"	L.FT.	4,255	71.50	$ 304,232.50
5012530	STORM DRAIN PIPE, 30"	L.FT.	86	65.00	$ 5,590.00
5012536	STORM DRAIN PIPE 36"	L.FT.	638	97.50	$ 62,205.00
5012542	STORM DRAIN PIPE, 42"	L.FT.	160	117.00	$ 18,720.00
5012548	STORM DRAIN PIPE, 48"	L.FT.	207	143.00	$ 29,601.00
5012566	STORM DRAIN PIPE, 66"	L.FT.	38	455.00	$ 17,290.00
5012596	STORM DRAIN PIPE (96" - PUMP STORAGE TRUNKLINE PIPE)	L.FT.	1,301	585.00	$ 761,085.00
5030142	CONCRETE CATCH BASIN (MEDIAN) (C-15.80 AREA INLET)	EACH	42	3,250.00	$ 136,500.00
5030604	CONCRETE CATCH BASIN (C-15.92 FREEWAY GRATE)	EACH	100	4,160.00	$ 416,000.00
5030605	CONCRETE CATCH BASIN (C-15.91 GUTTER GRATE)	EACH	4	3,450.00	$ 13,800.00
5030606	CONCRETE CATCH BASIN (OVERSIZED C-15.92)	EACH	2	7,360.00	$ 14,720.00
5050001	MANHOLE (C-18.10) (NO. 1) (FOR PIPES 6" TO 36")	EACH	2	5,750.00	$ 11,500.00
5050002	MANHOLE (C-18.10) (NO. 1) (FOR PIPES OVER 36")	EACH	8	11,500.00	$ 92,000.00
5050012	MANHOLE (C-18.10)(NO.1) (MODIFIED C-15.92 TOP)	EACH	21	10,000.00	$ 210,000.00
5050089	MANHOLE (CAP EXISTING MANHOLE)	EACH	15	4,000.00	$ 60,000.00
8080689	CONCRETE PIPE COLLAR	EACH	171	1,725.00	$ 294,975.00
9240050	MISCELLANEOUS WORK (CHANNEL ACCESS RAMP)	L.SUM	1	13,000.00	$ 13,000.00
				DRAINAGE SUB-TOTAL:	**$ 2,791,470.50**
STRUCTURES					
2020014	REMOVAL OF STRUCTURES AND OBSTRUCTIONS (WALLS)	L.SUM	1	24,500.00	$ 24,500.00
9999910	CONSTRUCT STRUCTURE (TOTAL) (SEGMENT 1)	L.SUM	1	724,000.00	$ 724,000.00
9999910	CONSTRUCT STRUCTURE (TOTAL) (SEGMENT 2)	L.SUM	1	822,200.00	$ 822,200.00
				STRUCTURES SUB-TOTAL:	**$ 1,570,700.00**
LANDSCAPING					
7320291	ELECTRICAL CONDUIT (3") (FOR IRRIGATION CONTROLLERS)	L.FT.	550	15.00	$ 8,250.00
7320292	ELECTRICAL CONDUIT (3") (HDPE) (DIRECTIONAL DRILL)	L.FT.	110	30.00	$ 3,300.00
8030092	GRANITE MULCH (	SQ. YD	145,200	2.70	$ 392,040.00
8060001	PLANTING TREES, SHRUBS AND PLANTS	L.SUM	1	510,000.00	$ 510,000.00
8060051	REMOVE AND SALVAGE EXISTING VEGETATION	L.SUM	1	225,000.00	$ 225,000.00
8080003	LANDSCAPE IRRIGATION SYSTEM MODIFICATION	L.SUM	1	675,000.00	$ 675,000.00
9240111	MISCELLANEOUS WORK (SINGLE MODE FIBER OPTIC CABLE) (12 FIBERS) (FOR IRRIGATION CONTROLLERS)	L.FT.	660	3.00	$ 1,980.00

Table 37. Project 2 (I-10 to SR 101L) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
9240121	MISCELLANEOUS WORK (PULL BOX) (NO. 7) (FMS STD FM-2.06) (FOR IRRIGATION CONTROLLERS)	EACH	5	750.00	$ 3,750.00
9240122	MISCELLANEOUS WORK (FIBER OPTIC SPLICE CLOSURE) (FOR IRRIGATION CONTROLLERS)	EACH	3	1,800.00	$ 5,400.00
				LANDSCAPING SUB-TOTAL:	**$ 1,824,720.00**
				ITEM TOTAL (SUBTOTAL A):	**$ 32,536,645.25**
SEGMENT WIDE					
	MAINTENANCE AND PROTECTION OF TRAFFIC (8%)	COST	8.0%		$ 2,602,931.62
	DUST AND WATER PALLIATIVE (1.00%)	COST	1.0%		$ 325,366.45
	QUALITY CONTROL (1.00%)	COST	1.0%		$ 325,366.45
	CONSTRUCTION SURVEYING (1.5%)	COST	1.5%		$ 488,049.68
	EROSION CONTROL (1.0%)	COST	1.0%		$ 325,366.45
	MOBILIZATION (8% OF ALL CONSTRUCTION ITEMS)	COST	8.0%		$ 2,602,931.62
	UNIDENTIFIED ITEMS (20% OF ITEM TOTAL AND PROJECT WIDE SUBTOTAL)	COST	20.0%		$ 6,507,329.05
				PROJECT WIDE SUBTOTAL:	**$ 13,177,341.33**
				PROJECT WIDE TOTAL (SUBTOTAL B):	**$ 45,713,986.58**
OTHER PROJECT COSTS					
	DPS TRAFFIC CONTROL	COST	0%		$ -
	JOINT PROJECT AGREEMENT ITEMS	COST	0%		$ -
	CONTRACTOR INCENTIVES	COST	0%		$ -
	ENVIRONMENTAL MITIGATION	COST	0%		$ -
				PRESENT YEAR CONSTRUCTION BID COST (EXCLUDING UTILITIES & R/W):	**$ 45,713,986.58**
INFLATION AND BELOW THE LINE ITEMS					
	LABOR AND MATERIAL INFLATION TO CONSTRUCTION YEAR 20xx (X%/YR)	L.SUM	1	$ -	$ -
	POST DESIGN SERVICES (1% OF SUBTOTAL A)	COST	1.0%		$ 325,366.45
	CONSTRUCTION CONTINGENCIES (5% OF SUBTOTAL A)	COST	5.0%		$ 1,626,832.26
	CONSTRUCTION ENGINEERING (8% OF SUBTOTAL A)	COST	8.0%		$ 2,602,931.62
	INDIRECT COST ALLOCATION (10.02% OF SUBTOTAL B + OTHER PROJECT COSTS)	COST	10.02%		$ 4,580,541.45
				CONSTRUCTION YEAR DEPARTMENT CONSTRUCTION COST (EXCLUDING UTILITIES & R/W):	**$ 54,849,658.37**
PREDESIGN AND FINAL DESIGN		L.SUM	1	-	-
	PREDESIGN/NEPA/PI SERVICES (3% OF CONSTRUCTION YEAR COST)	COST	3.0%		$ 1,371,419.60
	FINAL DESIGN SERVICES (8% OF CONSTRUCTION YEAR COST)	COST	8.0%		$ 3,657,118.93
	INDIRECT COST ALLOCATION (10.02% OF ALL DESIGN COSTS)	COST	10.02%		$ 503,859.56

Table 37. Project 2 (I-10 to SR 101L) Estimate of Probable Cost

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
				TOTAL ESTIMATED DESIGN COST:	$ 5,532,398.08
UTILITY RELOCATION					
	PRIOR RIGHT UTILITY RELOCATIONS & SERVICE AGREEMENTS	L.SUM	1	$ -	$ -
	INDIRECT COST ALLOCATION (10.02% OF ALL UTILITY COSTS)	COST	10.02%		$ -
	UTILITY RELOCATION COST INFLATION TO CONSTRUCTION YEAR 20xx (X%/YR)	L.SUM	1	$ -	$ -
				TOTAL ESTIMATED UTILITY COST:	$ -
RIGHT-OF-WAY					
	RIGHT-OF-WAY	L.SUM	1	$ -	$ -
	INDIRECT COST ALLOCATION (10.02% OF ALL RIGHT-OF-WAY COSTS)	COST	10.02%		$ -
	RIGHT-OF-WAY PRICE ESCALATION TO ACQUISITION YEAR 20xx (X%/YR)	L.SUM	1	$ -	$ -
				ACQUISITION YEAR RIGHT-OF-WAY COSTS:	$ -
				TOTAL PROJECT COST	**$ 60,382,056.45**

5.0 IMPLEMENTATION PLAN

5.1 PROJECT IMPLEMENTATION

The project was originally scoped to design and construct one additional GPL in each direction of travel between I-10 and Gilbert Road. During preliminary design, the traffic team used the MAG traffic projections to create a traffic model. That model predicted that the required LOS E threshold (indicating the need for further capacity) would be met as soon as the current year. As a result, the Recommended Alternative was modified to include two additional GPLs in each direction between 101L and Gilbert Road. Through coordination with the Town of Gilbert, the decision was made to extend the project east to Val Vista Drive.

With the increase in the scope of work and the length of the project, the design team undertook the study of several design options for implementation of capacity increases. As part of this study, the design team performed preliminary predictive analysis in regard to the differing types of design exceptions that could result. The design team looked at ways to improve capacity at reduced cost, and looked at segments of roadway in order to make improvements/spend money where they do the most good for traffic. Some of the options to add capacity in the short term could have produced projects that were interim in nature, or could result in “throw away” costs as the future projects would be constructed throughout the corridor. The design options included:

- No Pavement Option - This would have re-striped the currently available roadway width to add one additional GPL in each direction. The outside shoulders would have remained at their standard width (10 ft or 12 ft), with narrower lanes (typically 11 ft) and a reduced width median shoulder. However, this option would have produced shoulders of zero width at several median bridge piers. As a result, the evaluation of this option was discontinued.
- Minimum 2’ Widening Option - Similar to the no pavement option, but this design would have added about two feet of width to the outside of SR 202L. This option would have resulted in median shoulders with a two feet minimum width at several median bridge piers. With this option, design exceptions for inside shoulder width and lane width would have been necessary for 15 miles continuously throughout the SR 202L corridor.
- +1 Lane Full Width Option - This option would have widened SR 202L to add one GPL in each direction, as originally programmed and scoped, and with standard width lanes and shoulders. No new design exceptions were anticipated with this option. Design exceptions for the median shoulders at spot locations (overhead bridges and sign structures) would have been perpetuated.
- +2 Lanes Full Width Option - This option would have widened SR 202L to add two GPLs in each direction, with standard width lanes and shoulders between SR 101L and Gilbert Road. No new design exceptions were anticipated with this option, save for perpetuation of the existing exceptions along the median shoulders.
- +2 Lanes Hybrid Option (Minimum 14’ Widening) - This option would have widened SR 202L approximately 14 ft in each direction between SR 101L and Gilbert Road, but striped the roadway for two additional purpose lanes. With this option, design exceptions for inside shoulder width and lane width would have been necessary for 15 miles continuously throughout the SR 202L corridor.

Application of these design options to several segments of roadway along the corridor was presented in a series of meetings to the project stakeholders, including ADOT, MAG, and FHWA.

5.2 PROGRAM CONSIDERATIONS

With the recent increase in construction costs and the limitations of the current program funding, and given the necessary additional widening between SR 101L/SR 202L TI and Gilbert Road, the design options were evaluated by the project stakeholders, who were not necessarily inclined toward constructing interim facilities (Projects 1 and 2). The Recommended Alternative was preferred and as of June 2020 is proposed to be completed in two projects.

The first project (Project 1) would consist of two additional GPLs in each direction from just east of SR 101L (MP 50.0) to Gilbert Road (MP 44.0), and one additional GPL in each direction from Gilbert Road (MP44.0) to Val Vista Drive (MP 42.0). The second project (Project 2) would construct one additional GPL in each direction from I-10 (MP 57.0) to just east of SR 101L (MP 50.0). The current MAG Freeway Lifecycle Program includes both design and construction funding for Project 1. That project’s design funds are slated for Fiscal Year 2024 (FY24) in the amount of $15.04 million. Construction funding is identified in FY26 in the amount of $148.82 million. Design and construction funding for Project 2 are deferred beyond FY26. ADOT and MAG are working together for future funding opportunities to include Project 2. Detailed cost estimates for Projects 1 and 2, as well as the overall corridor improvement cost, are included in Section 4.0 of this report.

6.0 AASHTO CONTROLLING DESIGN CRITERIA

American Association of State Highway and Transportation officials (AASHTO) Controlling Design Criteria have been reviewed for the existing roadways that will remain as a part of the proposed improvements. Existing and proposed features for each of the alternatives that do not meet current AASHTO (2011 Green Book) recommended guidelines are indicated below.

ADOT Design Criteria has also been reviewed for the existing roadways which will remain as a part of the proposed improvements. Existing and proposed features for each alternative that do not meet current ADOT Roadway Design Guidelines are also indicated below.

A complete listing of the existing SR 202L features and evaluation results are presented within the AASHTO Controlling Criteria Report, dated June 2020. This report is included in Appendix A.

6.1 AASHTO NON-CONFORMING GEOMETRIC DESIGN ELEMENTS

Non-conforming AASHTO design elements that would not be upgraded as part of this project include the following:

The proposed SR 202 median shoulder at existing bridges, sign bridges, and the open median between Gilbert Road and Val Vista Drive would provide less than the AASHTO recommended minimum width of 10 feet at the following locations:

MP 55.0 Median Mounted Cantilever Sign Structure EB & WB Sta 2020+39
Inside Shoulder = 5.00’ < 6’ Minimum

MP 54.8 56th Ave Overpass EB & WB Sta 2029+00
Inside Shoulder = 9.3’ < 10’ Minimum

MP 54.7 Overhead Sign Bridge EB & WB Sta 2036+09
Inside Shoulder = 8.99’ <10’ Minimum

MP 54.6 Overhead DMS Bridge EB & WB Sta 2041+00
Inside Shoulder = 9.0’ <10’ Minimum

MP 54.2 Overhead Sign Bridge EB & WB Sta 2062+00
Inside Shoulder = 8.99’ <10’ Minimum

MP 53.8 Kyrene Rd Underpass EB & WB Sta 2083+00
Inside Shoulder = 6.8’ <10’ Minimum

MP 52.9 Overhead Sign Bridge EB & WB Sta 2129+20
Inside Shoulder = 9.0’ < 10’ Minimum

MP 52.7 Overhead Sign Bridge EB & WB Sta 2139+60
Inside Shoulder = 9.0’ < 10’ Minimum

MP 52.7 Overhead DMS Bridge EB & WB Sta 2141+00
Inside Shoulder = 9.0’ < 10’ Minimum

MP 52.4 Overhead DMS Bridge EB & WB Sta 2155+00
Inside Shoulder = 9.0’ < 10’ Minimum

MP 51.8 McClintock Dr Underpass EB & WB Sta 2188+50
Inside Shoulder = 7.8’ < 10’ Minimum

MP 51.5 Overhead Sign Bridge EB & WB Sta 2200+50
Inside Shoulder = 9.0’ < 10’ Minimum

MP 51.4 Overhead Sign Bridge EB & WB Sta 2208+57
Inside Shoulder = 9.0’ < 10’ Minimum

MP 51.3 Chandler Village Dr Underpass EB & WB Sta 2215+55
Inside Shoulder = 7.3’ < 10’ Minimum

MP 49.2 Overhead DMS Bridge EB & WB Sta 2323+50
Inside Shoulder = 9.0’ < 10’ Minimum

MP 49.1 Overhead DMS Bridge EB & WB Sta 2327+35
Inside Shoulder = 9.0’ < 10’ Minimum

MP 48.7 Alma School Rd Underpass EB & WB Sta 2352+25
Inside Shoulder = 7.8’ < 10’ Minimum

MP 47.7 Arizona Ave Overpass EB & WB Sta 2405+30
Inside Shoulder = 9.4’ < 10’ Minimum

MP 47.4 UPRR Overpass EB & WB Sta 2419+50
Inside Shoulder = 9.3’ < 10’ Minimum

MP 46.6 McQueen Rd Underpass EB & WB Sta 2461+71
Inside Shoulder = 8.1’ < 10’ Minimum

MP 46.2 Consolidated Canal Overpass EB & WB Sta 2485+00
Inside Shoulder = 9.3’ < 10’ Minimum

MP 46.1 Overhead DMS Bridge EB & WB Sta 2488+50
Inside Shoulder = 9.0’ < 10’ Minimum

MP 46.0 Overhead DMS Bridge EB & WB Sta 2491+43
Inside Shoulder = 9.0’ < 10’ Minimum

MP 45.6 Cooper Rd Underpass EB & WB Sta 2514+50
Inside Shoulder = 8.1’ < 10’ Minimum

MP 45.3 EB & WB MP 44.76 to MP 42.5 Sta 2530+00 to Sta 2680+00
Inside Shoulder = 8.00’ < 10’ Minimum

The proposed SR 202 outside shoulder at a single bridge column would provide less than the AASHTO recommended minimum width of 10 feet at the following location:

MP 55.21 Existing Bridge Column at Ramp S-E Flyover
Inside Shoulder = 9.00’ < 10’ Minimum

6.2 AASHTO DESIGN EXCEPTIONS

The Design Exception Request has been submitted to FHWA and approved (See Appendix B). Non-conforming elements were evaluated with the proposed improvements to determine what AASHTO design exceptions were required. Many of the identified non-conforming elements above had been identified by an earlier project and were previously approved as design exceptions (See Project H7457 01L).

Proposed improvements that required design exceptions are as follows:

- A shoulder width design exception on EB SR 202L near Sta 2005+50 (3.0' less than recommended).
- Two new sign structures in the median of SR 202 causing a spot reduction of the median shoulder width (1.0' less than recommended).
- An inside shoulder width design exception for overpass structures (0.7' less than recommended – this is the existing condition)
- An inside shoulder width design exception at the open median between Gilbert Road and Val Vista Drive (2.0' less than recommended – this is the existing condition)

7.0 SOCIAL, ECONOMIC AND ENVIRONMENTAL CONSIDERATIONS

This section will discuss the social, economic, and environmental considerations for the Recommended Alternative. These considerations are examined as part of compliance with the National Environmental Policy Act (NEPA), which requires a study of potential impacts to land use, water quality, air quality, noise, hazardous materials, biological resources, cultural resources, socioeconomic issues, and Section 4(f) properties. As part of the NEPA compliance process, public involvement and coordination with agency stakeholders will also be performed. A NEPA clearance done separately from this DCR will be published to describe the results of the environmental studies and disclose any impacts. The following sections summarize the existing information and baseline data for resources and environmental concerns that will provide a basis for subsequent environmental studies and the NEPA clearance. The environmental study limits are between MP 42.00 and MP 57.00 extending out further than the design limits for potential traffic control items during construction. The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by ADOT pursuant to 23 U.S.C. 326 and a Memorandum of Understanding (MOU) dated January 3, 2018 and executed by FHWA and ADOT. In addition, the 327 NEPA Assignment MOU was signed by FHWA and ADOT on April 16, 2019 that assigns and assumes ADOT the responsibilities under NEPA for individual Categorical Exclusion (CE), Environmental Assessments, and Environmental Impact Statements.

7.1 LAND USE

The project would occur primarily within ADOT ROW, and crosses through the Cities of Phoenix and Chandler and the Town of Gilbert. A review of Maricopa Association of Governments (MAG) data (Land Use Explorer, 2016) identified several of land uses for adjacent properties along this 13-mile stretch of project area. These land uses include office, industrial, commercial, religious/institutional, single- and multi- family, open space and agricultural. The majority of adjacent lands are privately owned, with the exception of Gila River Indian Community property to the south between MP 57.00 to approximately MP 50.90 (SR 202L/SR 101L interchange), Bureau of Reclamation (Reclamation) owned canals at MPs 55.75 and 46.10 (Tempe and Consolidated, respectively) and City owned properties such as city parks, Quartz Hill Elementary School and the Chandler Municipal Airport. No new ROW is anticipated at this time. A more comprehensive determination of the project's ROW requirements will be made during final design. Any design items that may create visual, noise or other disturbances to adjacent land uses, environmental commitments to reduce these impacts would be considered in studies related to those topic areas, such as *Noise*, *Visual Resources*, or *Section 4(f) and Section 6(f)*.

7.2 PRIME AND UNIQUE FARMLAND

Farmland covered under the Farmland Protection Policy Act (FPPA) are those previously designated as significant by the National Resources Conservation Service (NRCS), such as those lands identified with soils that are prime, unique or of state and local importance, and not already in urban development as specified on the U.S. Census Bureau Maps. A review of the project identified several adjacent properties throughout the length of the project area that are potentially under the purview of FPPA, including lands considered "prime farmland if irrigated", "prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season" and "farmland of unique importance". Construction of this project will not involve new ROW takes and therefore will not result in the conversion of FPPA designated farmland to nonagricultural use. However, if new ROW acquisition or temporary construction easements are determined during final design, analysis on their impact to prime and unique farmland will be required.

7.3 WATER QUALITY

A survey of the project limits was completed on May 1, 2018, to identify potential waters of the US as regulated by the US Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act. No naturally occurring drainages were observed within the project limits, but three concrete-lined, storm water conveyance channels are present north of SR 202L, running parallel with the WB travel lanes. All three of these channels are excavated wholly in uplands and transport over-land flow generated from precipitation to retention basins in uplands. Therefore, these channels do not meet the 1986/1988 definition of waters of the U.S. under 40 Code of Federal Regulations (CFR) 230.3(s), and are not currently regulated by the Corps under Section 404 of the Clean Water Act. Prior to final design of the project, an Approved Jurisdictional Determination will be submitted to the Corps identifying the three channels within the project limits as not being regulated by the Corps under Section 404 of the Clean Water Act, and no permit under Section 404 of the Clean Water Act would be required to impact these three channels. Greater than 1 acre of land will be disturbed for this project; therefore, an Arizona Pollutant Discharge Elimination System (AZPDES) General Permit and Storm Water Pollution Prevention Plan would be required. During final design, the Maricopa County Floodplain Administrator will be provided an opportunity to review and comment on the design plans.

7.4 AIR QUALITY

The project area is located in the Phoenix nonattainment area for 8-hour ozone and Particulate Matter measuring less than 10 microns (PM_{10}). In addition, the project is located in the Phoenix Carbon Monoxide (CO) maintenance area. Based on the provided traffic data and air quality consultation, it will be determined during final design if CO hotspot analysis and/or PM quantitative hotspot analysis are warranted or not. In addition, these analysis will only be required if federal funds are used.

7.5 NOISE

This project would increase roadway capacity and a traffic noise analysis is warranted. This project will be evaluated using the ADOT's Noise Abatement Requirements, May 4, 2017. The policy was written to conform to the federal policy and guidelines as stated in Title 23 CFR 772. Noise monitoring for the ambient noise levels will be conducted and a quantitative analysis of potential traffic noise impacts using the FHWA approved noise model Traffic Noise Model (TNM) version 2.5 would be completed for this project.

A noise report was completed on March 19, 2019 that evaluated the existing condition, as well as future No Build and Build conditions. The existing condition was analyzed by conducting ambient noise levels within the project areas. The monitoring noise levels ranged from 54 to 68 dBA. The No Build condition was evaluated based on predicted noise levels from the existing configuration of Santan Freeway in the design year of 2040. The Build condition was evaluated based on predicted noise levels with proposed configuration with additional general-purpose lanes in the design year of 2040. A total of 375 receivers were modeled to generate noise levels for different categories of land use and activities.

A total of four (4) new noise barriers are potentially recommended. Barrier 1 is recommended for the Tempe Korean Presbyterian Church on the northwest quadrant between SR202 and Dobson Road interchange. Barrier 2 is recommended along WB SR202 mainline east of McQueen Road for Willis Gated Community under construction and approved Canal View Homes subdivision. Barrier 3 is recommended on EB SR202 mainline east of McQueen Road for San Valencia subdivision under construction. Barrier 4 is recommended for Quartz Hill Elementary School on the southwest quadrant between SR202 and Val Vista Drive interchange.

The noise barrier locations and termini are subject to adjustments during final design. A public meeting will also be required during final design per the ADOT's Noise Abatement Requirements.

7.6 HAZARDOUS MATERIALS

A total of 19 bulk concrete samples and 5 paint chip samples were collected between May 3, 2018 and August 21, 2018 from overpass structures that fall within the project limits and were tested for asbestos containing material (ACM) and Lead Containing Paint (LCP). An additional 34 roadway paint chip samples were collected and analyzed for ACM and another 34 were sampled for LCP. The analysis detected no regulated asbestos material in the structures or lead at a level equal to or greater than 0.5 percent by weight, or 5000 parts per million (ppm). However, lead at a level greater than 100 ppm but less than 5000 ppm was detected in pavement striping. Environmental commitments to mitigate the presence of low level LCP in the project footprint will be addressed in the NEPA document. Additionally, a records search of the Arizona Department of Environmental Quality (ADEQ) and Environmental Protection Agency (EPA) databases will be reviewed and a Preliminary Initial Site Assessment (PISA) was performed to satisfy the NEPA requirements and approved on May 9, 2019. The PISA and ACM/LCP will require updates during final design.

7.7 BIOLOGICAL RESOURCES

The US Fish and Wildlife Service (USFWS) Information, Planning, and Conservation (IPaC) system was accessed on May 10, 2018, to identify threatened, endangered, proposed, and candidate species potentially occurring within the project limits. Coordination with the Arizona Game and Fish Department (AGFD) was completed on the same day to identify any special status species that may occur in the area. On April 18, 2018, qualified biologists (Angela Muszynski and Nichole Cervin) conducted a general site visit and windshield survey to inspect all structures for evidence of use by birds and bats. During the April 2018 site visit and windshield survey, cliff swallow (*Petrochelidon pyrrhonota*) nests were observed on multiple structures within the project limits. Evidence of bat use was not observed; however, habitat is present within bridge deck down-drains that open into the bridge deck cavity space. A species-specific survey for the Western burrowing owl (*Athene cunicularia hypugaea*) was not completed during the April 2018 site visit as they are typically required as a pre-construction action, but potentially suitable habitat is present within the project limits. Therefore, it is anticipated that a pre-construction survey for the western burrowing owl would be required, as well as the implementation of mitigation measures to avoid impacts to bats and nesting birds protected by the Migratory Bird Treaty Act. No effect to federally listed species or impacts to any other special status species are anticipated. A biological evaluation short form was prepared as part of the NEPA clearance process and approved on April 16, 2019.

7.8 CULTURAL RESOURCES

The majority of the SR 202L ROW corridor has been previously surveyed for cultural resources. Information pertaining to each survey can be found in three Class I literature reviews conducted of the corridor. Seven cultural resource sites have been previously identified within the SR 202L ROW corridor. The seven sites consist of two historic canals, a historic railroad, a historic road, a prehistoric artifact scatter, a prehistoric canal alignment, and a prehistoric artifact scatter with a structure. The historic canals, railroad, and roadway will all be avoided as the SR 202L roadway passes over the in-use structures. Avoidance is not warranted for the three prehistoric sites as they were previously determined to be ineligible for inclusion in the National Register of Historic Places or were destroyed within the SR 202L ROW corridor. The portions of the project limits that have not been surveyed are highly disturbed by previous highway construction, urban development, and utility installations. It is highly likely that a Class III survey of those parcels would result in negative findings. Therefore, a survey of those parcels is not warranted. However, if new ROW and/or TCEs are needed in undeveloped/undisturbed areas, a new Class III survey would most likely be needed. If no new ROW or temporary construction easements will be needed for this project, it is recommended that the project be cleared using Stipulation X.F.1 of the *FHWA Statewide Section 106 Programmatic Agreement* (executed December 2015).

ADOT initiated consultation with the Arizona State Historic Preservation Office (SHPO), the Ak-Chin Indian Community, the Hopi Tribe (Hopi), the Gila River Indian Community (lead for the Four Southern Tribes), the Pascua Yaqui Tribe, the Salt River Pima-Maricopa Indian Community, the Tohono O'odham Nation (TON), the Tonto Apache Tribe (TAT), the White Mountain Apache Tribe (WMAT), and the Yavapai Apache Nation on a finding of "no adverse effect" on February 20, 2019. Concurrences were received from Hopi (2/27/2019), SHPO (2/25/2019), TAT (3/4/19), TON (2/27/2019), and WMAT (2/27/2019). The close-out memo was issued on March 28, 2019.

7.9 SOCIOECONOMIC

The project area spans three major cities within Maricopa County and is adjacent to a diverse landscape of land uses, from vacant to populated. Title VI of the Civil Rights Act of 1964 prohibits programs receiving federal assistance from discrimination based on race, color and national origin, while Executive Order 12898 (Environmental Justice [EJ]) seek to identify whether or not a project has a disproportionately high and adverse effect on the human health and environment of minority and low-income populations. Demographic composition of the project area was collected through the United States Census Bureau 2112-2016 American Community Survey (ACS) 5-year estimates, focusing on minority and low-income populations, the disabled, women as head of households, elderly populations and limited English proficiency (LEP) populations. In general, the total makeup of the project area is comparable to the populations found in the City of Chandler and Town of Gilbert, and in most cases have smaller percentages of protected populations than Maricopa County. At the smaller block group (BG) level, some BGs were found to have noticeably higher protected populations than Maricopa County, Chandler, and Gilbert, however effects to these populations would not be disproportionately higher than non-protected populations.

No displacements will occur as a result of this project. Temporary travel impacts may be experienced by nearby residents and businesses during construction. Traffic impacts will be identified in greater detail during final design. As such, no significant socioeconomic impacts are anticipated as a result of this project. A more detailed socioeconomic and EJ analysis will be included in the project's NEPA document.

7.10 SECTION 4(F) PROPERTIES

Public parks and recreational lands, wildlife and waterfowl refuges, and historic sites are afforded consideration under Section 4(f) of the U.S. Department of Transportation Act of 1966. Impacts to Section 4(f) resources were reviewed as part of the environmental clearance to determine if this project constitutes a "use" of these properties as defined by 23 CFR 774. Aerial review of the project area identified several Section 4(f) properties the vicinity of the SR 202L (see Figure 10). There are no wildlife and waterfowl refuges or historic sites (protected by Section 4[f]) within the project vicinity.

Public parks within the project vicinity that are protected under Section 4(f) have been identified. They include:

- Pecos Park
- Mountain View Park
- Price Park
- Pecos Ranch Park
- Tumbleweed Park
- LOS Arobles Park
- Arbuckle Park

No closures or other actions that would substantially impede access to these parks are anticipated as a result of this project. Furthermore, no ROW or easements from these properties will be required. Two multiuse facilities, Zanjero Park and Discovery District Park, are located adjacent to the SR 202L. Though these facilities are used for recreational purposes, their primary use, as designated by the underlying landowner (ADOT), is as a retention basin for the freeway. As such, Zanjero Park and Discovery District Park are not considered Section 4(f) properties.

Four recreation trails are located within the project vicinity:
- Maricopa/Sun Circle Trail
- Paseo Trail
- Santan Freeway Trail
- Santan Vista Trail.

The Maricopa/Sun Circle Trail is located along the Consolidated Canal and is included in the Maricopa County Regional Trail System Plan (adopted August 12, 2004). Additionally, this section of the Consolidated Canal is also associated with the City of Chandler's Paseo Trail (Chandler General Plan, 2016) that provides 6.5 miles of multi-use pathway for walkers, joggers, stroller-pushers, bicyclists, and horseback riders. Potential trail closures may be warranted during work on the Consolidated Canal Bridge If closures are warranted, coordination with Maricopa County Parks and Recreation, City of Chandler, Salt River Project, and Bureau of Reclamation is recommend during final design to determine 4(f) impacts and if any necessary considerations (e.g. detours) shall be undertaken.

The Santan Freeway Trail is 9.2 miles in length along the SR 202L connecting to parks within the area and the Gilbert Medical Campus. The Santan Vista Trail is along the Eastern Canal and is 9.16 miles and links northern Gilbert to Mesa. Both the Santan Freeway Trail and Santan Vista Trail are maintained by the Town of Gilbert and included in the Gilbert's Parks, Recreation, and Trails Master Plan (adopted February 13, 2014). No impeded access or closures of the trails are anticipated as a result of this project, and no ROW or easements from these properties are needed.

Project determination of a "use" or temporary occupancy of a Section 4(f) properties will be assessed in greater detail during final design, specifically as it relates to the work associated with the Consolidated Canal Bridge. The NEPA document will also address Section 4(f) impacts as a result of this project.

7.11 PUBLIC INVOLVEMENT

Scoping letters were drafted in an effort to invite early public comments. The letters described the project's purpose and need, scope of work, and details regarding scheduling, ROW needs and traffic restrictions. In coordination with ADOT and the City of Chandler, individuals and businesses were identified that would potentially be most affected by the project. The scoping letters were mailed out on April 30, 2018 to 708 members of the public, including nearby residents, home owner's association representatives, businesses, and medical facilities. Forty nine letters were returned as undeliverable, and efforts were made to find alternative mailing addresses for those individuals. Comments were requested to be submitted by May 31, 2018. Eleven responses were received from the public; 7 via email and 4 via telephone. Comments have been addressed by ADOT and additional coordination will occur during final design and construction. A more detailed summary of the responses will be included in the project's NEPA document.

7.12 AGENCY COORDINATION

Agency scoping was conducted in accordance with ADOT Environmental Planning Guidelines. Scoping letters were sent to the following agencies on April 30, 2018 seeking input on the project and identify project-specific concerns:

- Bureau of Reclamation
- City of Chandler
- City of Phoenix
- Town of Gilbert
- Gila River Indian Community
- Maricopa County
- Arizona Department of Public Safety
- Kyrene School District
- Gilbert Public School Systems
- Chandler Unified School District
- Union Pacific Railroad

Agency Responses were requested by May 31, 2018. A detailed summary of responses is included in the project's NEPA document.

7.13 NEPA CLEARANCE

At the time of the Final DCR, this project is funded with State funds only and thus a State clearance was issued on August 30, 2019. If federal funds are utilized, a NEPA clearance will be required. ADOT Environmental Planning will determine the level of NEPA clearance during final design. it is subject to NEPA review.

7.14 ENVIRONMENTAL COMMITMENTS

The following project environmental commitments from the approved State clearance issued on August 30, 2019 must be included in the project activities and are not subject to change without written approval from Environmental Planning:

Design Responsibilities:
- All disturbed soils not paved that will not be landscaped or otherwise permanently stabilized by construction will be seeded using species native to the project vicinity.
- During final design, the project manager will contact the Arizona Department of Transportation Environmental Planning Noise Specialist (Ivan Racic, 602.712.6161) to arrange for qualified personnel to review plan sheets, plan for public involvement, and update the noise analysis.
- During final design, structures, sidewalk ramps, and paint that will be affected by the project will be retested to determine the presence or absence of asbestos-containing materials (ACM).
- During final design, any painted materials that will be affected by the project will be reevaluated to determine the presence or absence of lead-based paint (LBP).

ADOT Roadside Development Requirement:
- Protected native plants within the project limits will be impacted by this project; therefore, the Arizona Department of Transportation Roadside Development Section will determine if Arizona Department of Agriculture notification is needed. If notification is needed, the Arizona Department of Transportation Roadside Development Section will send the notification at least 60 (sixty) calendar days prior to the start of construction.

Central District Responsibility:
- If any active bird nests cannot be avoided by vegetation clearing or construction activities, the Engineer will contact the Environmental Planning Biologist (602.341.9331 or 602.712.7134) to evaluate the situation.

Contractor Responsibilities:

- If vegetation clearing will occur during the migratory bird breeding season (March 1- August 31), the contractor shall avoid any active bird nests. If the active nests cannot be avoided, the contractor shall notify the Engineer to evaluate the situation. During the non-breeding season (September 1-February 28) vegetation removal is not subject to this restriction.
- The contractor shall not cause injury or death to swallows, including eggs and nestlings. If work will occur that will directly impact nesting swallows from February 1 to August 31 of any calendar year. the contractor shall adhere to the following:
  - The contractor shall completely remove all existing swallow nests within 100 feet of work areas after August 31 but prior to February 1 to prevent swallows from reusing those nests.
  - The contractor shall implement exclusionary measures to prevent swallows from building new nests within areas directly impacted by construction activities. Exclusionary measures shall be implemented in all areas where swallows are likely to nest, and may include (a) continually removing nesting materials during early nest construction when eggs or nestlings are not present, (b) installing exclusionary netting (wire or plastic mesh 0.75 inch or less in diameter), (c) installing deterrent spike strips, and/or (d) installing polytetrafluoroethylene (Teflon) sheeting
  - The contractor shall not disturb any active swallow nests (completed or partially completed nests that contain eggs or nestlings). If any active nest is discovered within 100 feet of construction activities, work shall stop and the Arizona Department of Transportation Environmental Planning biologist shall be contacted (602.341.9331 or 602.712.7134) to evaluate the potential for disturbance of nests.
  - The contractor shall monitor and maintain the effectiveness of exclusionary measures daily. Netting shall be maintained such that it remains in place without any loose areas or openings that could trap and/or entangle birds. Spike strips shall be maintained such that they remain in place. Teflon sheeting shall be reapplied as often as necessary to remain effective.
- If swallow exclusion measures fail, the contractor shall:
  - Inform the Engineer as soon as swallow nest building occurs and determine whether the area can be avoided until nests are no longer active;
  - Hire a qualified biologist to survey bird nests within 100 feet of construction areas and provide a report to the Environmental Planning biologist (602.341.9331 or 602.712.7134) with the number of affected nests for each species of bird. The resume for the selected biologist shall be approved by the Engineer in coordination with the ADOT Biologist prior to conducting the survey.
  - Determine whether to wait for the nestlings to fledge or apply for a US Fish and Wildlife Service Migratory Bird Treaty Act Special Purpose permit from the USFWS Regional office in Albuquerque, New Mexico.
  - If the permit is approved, hire a wildlife rehabilitator licensed by USFWS to relocate and rehabilitate all affected eggs or nestlings.
  - Any costs incurred as a result of delays related to failure of swallow exclusion measures, including waiting until the nests are not active and/or time required to obtain a Migratory Bird Treaty Act relocation permit and the eggs or nestlings to be relocated from the work area shall be the contractor's responsibility.
- The contractor shall remove all exclusionary measures after project completion to the satisfaction of the Engineer.
- Prior to construction, all personnel who will be on-site, including, but not limited to, contractors, Contractors' employees, supervisors, inspectors, and subcontractors shall review the attached Arizona Department of Transportation Environmental Planning "Western Burrowing Owl Awareness" flyer.
- If any burrowing owls or active burrows are identified the contractor shall notify the Engineer immediately. No construction activities shall take place within 100 feet of any active burrow.
- If the Engineer in cooperation with the Environmental Planning Biologist determines that burrowing owls cannot be avoided, the contractor shall employ a qualified biologist holding a permit from the US Fish & Wildlife Service to relocate burrowing owls from the project area, as appropriate.
- To prevent the introduction of invasive species seeds, all earthmoving and hauling equipment shall be washed prior to entering the construction site and the contractor shall inspect all construction equipment and remove all attached debris, including plant parts, soil and mud, prior to the equipment entering the construction site.
- To prevent invasive species seeds from leaving the site, the contractor shall inspect all construction and hauling equipment and remove all debris, including plant parts, soil and mud, prior to leaving the construction site.
- The contractor shall complete a National Emissions Standards for Hazardous Air Pollutants notification for work associated with bridge work and submit it to the Engineer for review.
- The Engineer, in association with the contractor, will complete the National Emission Standard for Hazardous Air Pollutants documentation and submit it to the Arizona Department of Transportation Environmental Planning Group hazardous materials coordinator (602.920.3882 or 602.712.7767) for review 5 (five) working days prior to being submitted to the regulatory agencies.
- After Engineer approval, the notification shall be submitted to the Arizona Department of Transportation Environmental Planning Group hazardous materials coordinator (602.920.3882 or 602.712.7767) for a 5(five) working-day review and approval. Upon approval by the Arizona Department of Transportation Environmental Planning Group hazardous materials coordinator, the contractor shall file the notification with the Maricopa County Air Quality Department at least 10 (ten) working days prior to bridgework.
- The contractor cannot start work associated with bridge work until 10 (ten) working days have passed since the submittal of the notification to the regulatory agencies.

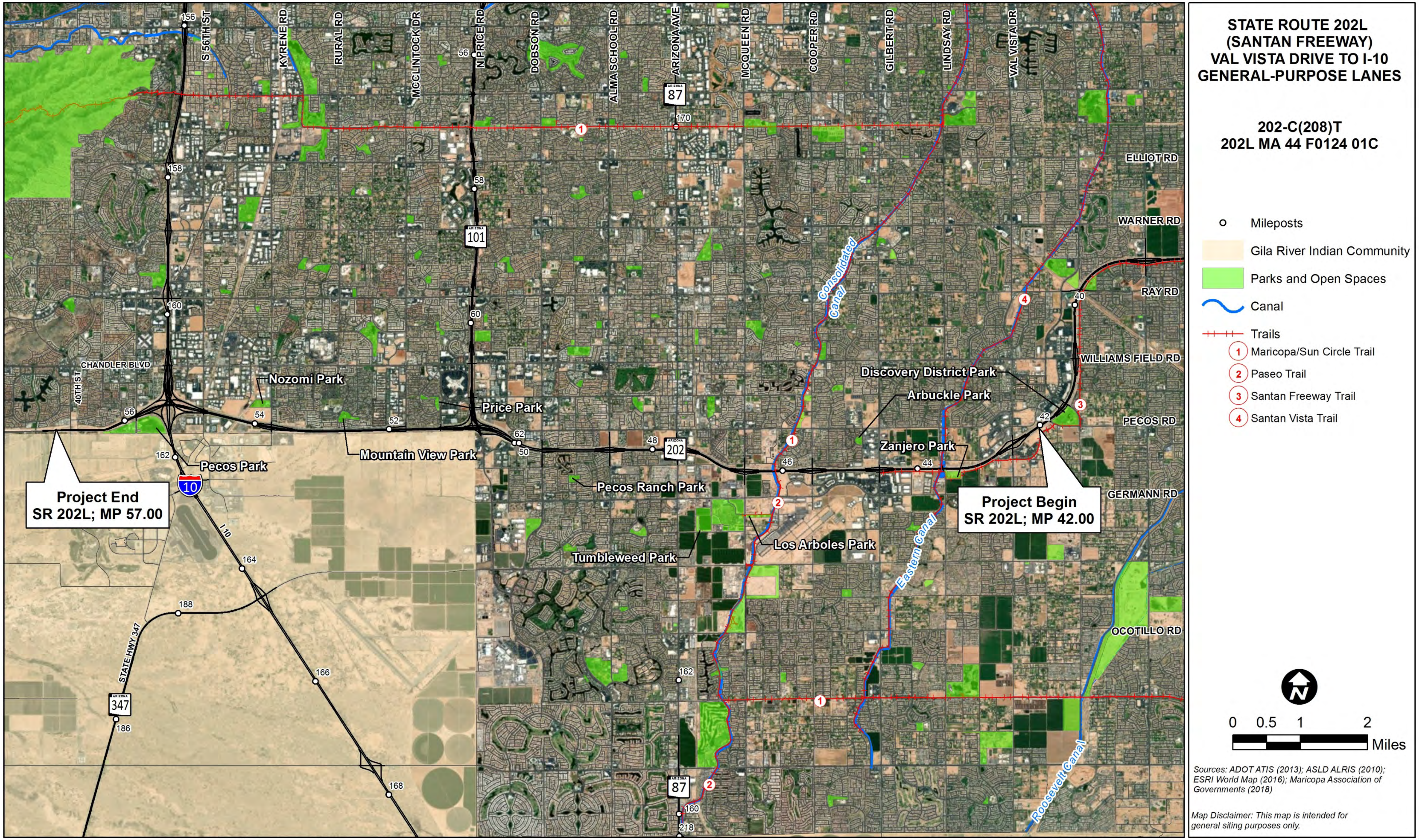


Figure 10. Section 4(f) Map

APPENDIX A – AASHTO CONTROLLING DESIGN CRITERIA REPORT

ADOT PROJECT NO. 202 MA 044 F0124 01L

FEDERAL AID PROJECT NO. 202-C(208)T

SR202L, GENERAL PURPOSE LANES VAL VISTA DR TO I-10

SANTAN FREEWAY

SR 202L

AASHTO CONTROLLING DESIGN CRITERIA REPORT

June 2020

Registered Professional Engineer (Civil)
CERTIFICATE NO.
45657
BRIAN D.
RILEY
Date Signed 6/10/2020
ARIZONA, U.S.A.

PREPARED FOR:

ADOT

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
ROADWAY ENGINEERING GROUP
ROADWAY PREDESIGN SECTION

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TABLE OF CONTENTS

Project Background.. iii

Summary of Non-Conforming Design Features .... iii-iv

Summary of AASHTO Controlling Design Criteria SR202L Summary 1-2

Summary of AASHTO Controlling Design Criteria I-10/SR202L TI Summary 3-8

Summary of AASHTO Controlling Design Criteria Kyrene TI Summary 9-16

Summary of AASHTO Controlling Design Criteria McClintock TI Summary 17-20

Summary of AASHTO Controlling Design Criteria SR202L/SR101L TI Summary 21-30

Summary of AASHTO Controlling Design Criteria Price TI Summary 31-38

Summary of AASHTO Controlling Design Criteria Dobson TI Summary 39-42

Summary of AASHTO Controlling Design Criteria Alma School TI Summary 43-50

Summary of AASHTO Controlling Design Criteria Arizona TI Summary 51-58

Summary of AASHTO Controlling Design Criteria McQueen TI Summary 59-66

Summary of AASHTO Controlling Design Criteria Cooper TI Summary 67-74

Summary of AASHTO Controlling Design Criteria Gilbert TI Summary 75-82

Summary of AASHTO Controlling Design Criteria Val Vista TI Summary 83-86

Attachment #1: Vertical Curve Inventory SR202L EB…………………………………………...87-88

Attachment #1: Vertical Curve Inventory SR202L WB…………………………………………..89-90

Attachment #2: Horizontal Curve Inventory SR202L EB………………………………………..91-92

Attachment #2: Vertical Curve Inventory SR202L Med……………………………………..…...93

Attachment #2: Horizontal Curve Inventory SR202L WB……………………………………….94-95

Attachment #3: Bridge Evaluation and Repair Forms…………………………………………96-103

PROJECT BACKGROUND

The State Route 202 Loop (SR202L) Santan Freeway is a loop freeway located in south east Phoenix Metropolitan Area. The study covers adding general purpose lanes from the limits east of Gilbert Road to the existing SR 202L/I-10 System Traffic Interchange.

This report contains an evaluation of SR 202L, Directional Ramps; I-10/SR202L W-N Ramp, I-10/SR202L S-E Ramp, I-10/SR202L HOV Ramp, SR101L/SR202L E-N Ramp, SR101L/SR202L S-W Ramp, SR101L/SR202L S-E Ramp, SR101L/SR202L W-N Ramp, SR101L/SR202L HOV Ramp, Service Ramps; Kyrene Rd TI, McClintock Dr TI, Price Rd TI, Dobson Rd TI, Alma School Rd TI, Arizona Ave TI, McQueen Rd TI, Cooper Rd TI, and Gilbert Rd TI.

SUMMARY OF NON-CONFORMING DESIGN FEATURES

All existing design features requiring design exceptions based upon *A Policy on Geometric Design of Highways and Streets* (AASHTO 2011) are listed below.

SR 202

MP 54.9 Median Mounted Cantilever Sign Structure EB & WB Sta 2020+39
Inside Shoulder = 5.00' < 6' Minimum

MP 54.8 56th Ave Overpass EB & WB Sta 2029+00
Inside Shoulder = 9.3' < 10' Minimum

MP 54.6 Overhead Sign Bridge EB & WB Sta 2036+09
Inside Shoulder = 8.99' <10' Minimum

MP 54.5 Overhead DMS Bridge EB & WB Sta 2041+00
Inside Shoulder = 9.0' <10' Minimum

MP 54.1 Overhead Sign Bridge EB & WB Sta 2062+00
Inside Shoulder = 8.99' <10' Minimum

MP 53.8 Kyrene Rd Underpass EB & WB Sta 2083+00
Inside Shoulder = 7.4' <10' Minimum

MP 52.9 Overhead Sign Bridge EB & WB Sta 2129+20
Inside Shoulder = 9.0' < 10' Minimum

MP 52.7 Overhead Sign Bridge EB & WB Sta 2139+60
Inside Shoulder = 9.0' < 10' Minimum

MP 52.6 Overhead DMS Bridge EB & WB Sta 2141+00
Inside Shoulder = 9.0' < 10' Minimum

MP 52.4 Overhead DMS Bridge EB & WB Sta 2155+00
Inside Shoulder = 9.0’ < 10’ Minimum

MP 51.8 McClintock Dr Underpass EB & WB Sta 2188+50
Inside Shoulder = 7.8’ < 10’ Minimum

MP 51.5 Overhead Sign Bridge EB & WB Sta 2200+50
Inside Shoulder = 9.0’ < 10’ Minimum

MP 51.4 Overhead Sign Bridge EB & WB Sta 2208+57
Inside Shoulder = 9.0’ < 10’ Minimum

MP 51.3 Chandler Village Dr Underpass EB & WB Sta 2215+55
Inside Shoulder = 7.4’ < 10’ Minimum

MP 49.2 Overhead DMS Bridge EB & WB Sta 2323+50
Inside Shoulder = 9.0’ < 10’ Minimum

MP 49.1 Overhead DMS Bridge EB & WB Sta 2327+35
Inside Shoulder = 9.0’ < 10’ Minimum

MP 48.7 Alma School Rd Underpass EB & WB Sta 2352+25
Inside Shoulder = 7.8’ < 10’ Minimum

MP 47.7 Arizona Ave Overpass EB & WB Sta 2405+30
Inside Shoulder = 9.4’ < 10’ Minimum

MP 47.4 UPRR Overpass EB & WB Sta 2419+50
Inside Shoulder = 9.3’ < 10’ Minimum

MP 46.6 McQueen Rd Underpass EB & WB Sta 2461+71
Inside Shoulder = 8.1’ < 10’ Minimum

MP 46.2 Consolidated Canal Overpass EB & WB Sta 2485+00
Inside Shoulder = 9.3’ < 10’ Minimum

MP 46.1 Overhead DMS Bridge EB & WB Sta 2488+50
Inside Shoulder = 9.0’ < 10’ Minimum

MP 46.0 Overhead DMS Bridge EB & WB Sta 2491+43
Inside Shoulder = 9.0’ < 10’ Minimum

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR202L MAINLINE SUMMARY (DIVIDED)

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION: FREEWAY MP 57 - MP 41.27

ROUTE: SR202L EB & WB
BEGINNING MP: 57
ENDING MP: 41.27

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: 65 MPH **TERRAIN:** LEVEL **AVERAGE ELEVATION IS:** 1,260 FT

LANE AND SHOULDER WIDTH:

	EXISTING (FEET)	AASHTO RECOMMENDED MINIMUM (FEET)
LANE WIDTH:	12	12
INSIDE SHOULDER WIDTH:	10	10
OUTSIDE SHOULDER WIDTH:	10	10

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)

SEE ATTACHMENT 1

REMARKS: [1] Traffic Volumes and K,D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR202L MAINLINE SUMMARY (DIVIDED)
(CONTINUED)

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN-END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH) SEE ATTACHMENT 2	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)

GRADES:

EXISTING MAXIMUM GRADE IS: 1.87%
AASHTO MAXIMUM GRADE IS: 3.00%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: 2.0%
AASHTO RANGE IS: 1.5% - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION[1] CLEARANCE	MINIMUM ALLOWABLE CLEARANCE
I-10 OP EB (#2716)		20'-8"	20'-10 7/8"	16'-0"
I-10 OP WB (#2717)		18'-5"	18'- 1/2"	16'-0"
S-E Ramp (#2715)		18'-0"	26'-1"	16'-0"
N-W Ramp (#2718)		17'-1"	37'- 2/5 "	16'-0"
E-N Ramp (#2713)		19'-10"	19'-10"	16'-0"
W-S Ramp (#2714)		18'-0"	18'-0"	16'-0"
I-10/SR202L HOV Ramp (#2993)		20'-8"	17'-4"	16'-0"
Kyrene Rd UP (#2330)		17'-5"	16'-11"	16'-0"
McClintock Dr UP (#2331) Chandler		17'-1"	16'-8"	16'-0"
Village Dr UP (#2614)		17'-0"	16'-11"	16'-0"
EN1 Ramp (#2616)		17'-5"	18'-2"	16'-0"
SE2 Ramp (#2620)		59'-9"	59'-6"	16'-0"
Price Rd UP (#2613)		17'-4"	17'-1/2"	16'-0"
SR101L/SR202L HOV Ramp (#2991)		20'-1"	20'-1"	16'-0"
Dobson Rd UP (#2689)		17'-2"	16'-2/5"	16'-0"
Alma School Rd UP (#2692)		17'-0"	17'-7"	16'-0"
McQueen Rd UP (#2672 #2673)		17'-3"	16'-8"	16'-0"
Cooper Rd UP (#2674 #2675)		17'-3"	17'-1"	16'-0"
Gilbert Rd UP (#2670 #2671)		17'-2"	16'-10 3/8"	16'-0"
Val Vista Drive UP (#2792 #2793)		17'-0"	17'-0"	16'-0"

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

STRUCTURE #2590, 2591, 2693, 2878, 2679, 2683, 2684, 2789 SEE ATTACHMENT 3

REMARKS: 1 Minimum Elevation after improvments

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
I-10 TI — RAMP 54WN

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY — **MAINLINE MILEPOST:** 54.60
FUNCTIONAL CLASSIFICATION: DIRECTIONAL
DESCRIPTION: W-N RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS K[1]	D[1]	T[1]
AADT (VPD)[1]	AADT (VPD)[2]			
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,175 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	36	28	26	12	14	4	8	12	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
26+41.82			0.4101%	2.7405%	600	1549	421	>100	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
22+92.50			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
I-10 TI — RAMP 54WN
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	2.7405%	-3.4803%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

STRUCTURE #2592 SEE ATTACHMENT 3

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
I-10 TI — RAMP 54SE

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY — **MAINLINE MILEPOST:** 54.60
FUNCTIONAL CLASSIFICATION: DIRECTIONAL
DESCRIPTION: S-E RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024 AADT (VPD)[1]	DESIGN YEAR 2040 AADT (VPD)[2]	TRAFFIC FACTORS K[1]	TRAFFIC FACTORS D[1]	TRAFFIC FACTORS T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,175 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	36	28	26	12	14	4	8	12	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
79+40.00			1.5884%	0.3736%	600	1188	421	94	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
82+57.73			0.060	0.020	0.015	>100	50	0°45'00"	6°53'	NA			

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
I-10 TI — RAMP 54SE
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
1.5884%	-2.8541%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: 2.0%
AASHTO RANGE IS: 1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

STRUCTURE #2589 SEE ATTACHMENT 3

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
I-10 TI — RAMP 54HOV

PROJECT NUMBER:	202 MA 044 F0124 01L		
PROJECT LOCATION:	I-10 TO VAL VISTA DR		
HIGHWAY SECTION:	SANTAN FREEWAY	**MAINLINE MILEPOST:**	54.60
FUNCTIONAL CLASSIFICATION:	DIRECTIONAL		
DESCRIPTION:	HOV Ramp		

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,175 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	24	12	14	6	10	16	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
						EASTBOUND			
44+50.00			-3.9078%	2.0000%	735	529	454	55	50
						WESTBOUND			
45+05.76			-2.2950%	3.9000%	770	529	440	56	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
37+17.88			0.060	0.060	0.058	56	50	5°24'00"	6°53'	NA			
52+62.09			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			
56+67.59			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
I-10 TI — RAMP 54HOV
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING		AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
			EASTBOUND		
	2.0000%	-3.9078%		5.0000%	-5.0000%
			WESTBOUND		
	3.9078%	2.2950%		5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION[1] CLEARANCE	MINIMUM CLEARANCE
W-S Ramp (#2714)		17'-4"	17'-4"	16'-0"

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

STRUCTURE #2993, SEE ATTACHMENT 3

REMARKS: 1 Minimum Elevation after improvments

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
KYRENE TI — RAMP 53A

PROJECT NUMBER:	202 MA 044 F0124 01L		
PROJECT LOCATION:	I-10 TO VAL VISTA DR		
HIGHWAY SECTION:	SANTAN FREEWAY	**MAINLINE MILEPOST:**	53.75
FUNCTIONAL CLASSIFICATION:	DIAGONAL		
DESCRIPTION:	WB ENTRANCE RAMP		

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,140 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
08+05.00			-2.0668%	1.1292%	500	691	438	66	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
4+31.79			0.060	0.020	0.020	>100	50	1°00'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
KYRENE TI — RAMP 53A
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
1.1292%	-2.0668%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: 2.0%
AASHTO RANGE IS: 1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
KYRENE TI — RAMP 53B

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY **MAINLINE MILEPOST:** 53.75
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: EB EXIT RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,140 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	36	28	26	12	14	2	10	12	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
21+25.00			-1.1952%	1.8196%	800	1112	432	89	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
12+32.21			0.060	0.030	0.020	>100	50	0°59'59.73"	6°53'	NA			
25+26.14			0.060	0.025	0.024	>100	50	1°15'0"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
KYRENE TI — RAMP 53B
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
1.8196%	-1.1952%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
KYRENE TI — RAMP 53C

PROJECT NUMBER:	202 MA 044 F0124 01L		
PROJECT LOCATION:	I-10 TO VAL VISTA DR		
HIGHWAY SECTION:	SANTAN FREEWAY	**MAINLINE MILEPOST:**	53.75
FUNCTIONAL CLASSIFICATION:	DIAGONAL		
DESCRIPTION:	WB EXIT RAMP		

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	**K**[1]	**D**[1]	**T**[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,140 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	22	20	12	12	14	2	8	10	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
12+50.00			-0.5019%	1.7777%	500	1454	427	>100	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
17+70.53			0.060	0.020	0.015	>100	50	0°34'18.72"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
KYRENE TI — RAMP 53C
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	1.7777%	-0.5019%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE
			NONE	

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY
					NONE			

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
KYRENE TI — RAMP 53D

PROJECT NUMBER:	202 MA 044 F0124 01L
PROJECT LOCATION:	I-10 TO VAL VISTA DR
HIGHWAY SECTION:	SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION:	DIAGONAL
DESCRIPTION:	EB ENTRANCE RAMP

MAINLINE MILEPOST: 53.75

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,140 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
2+50.00			-2.0489%	-2.3998%	300	3225	441	>100	50
10+00.00			-2.3998%	0.4762%	500	816	441	73	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
							NONE						

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
KYRENE TI — RAMP 53D
(CONTINUED)

GRADES:	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	0.4762%	-2.3998%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McCLINTOCK TI — RAMP 51A

PROJECT NUMBER:	202 MA 044 F0124 01L
PROJECT LOCATION:	I-10 TO VAL VISTA DR
HIGHWAY SECTION:	SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION:	DIAGONAL
DESCRIPTION:	WB ENTRANCE RAMP

MAINLINE MILEPOST: 51.75

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,140 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
18+00.00			-2.2500%	0.5300%	600	1004	440	83	50
25+00.00			-1.5918%	-2.2500%	400	1839	440	>100	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
10+95.29			0.060	0.020	0.015	>100	50	0°40'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McCLINTOCK TI — RAMP 51A
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	0.5300%	-2.2500%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE
			NONE	

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY
					NONE			

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McCLINTOCK TI — RAMP 51B

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 51.75
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: EB EXIT RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,140 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	22	21	20	12	14	2	8	10	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
14+00.00			-0.5500%	1.6767%	500	1587	427	>100	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
6+65.74			0.060	0.020	0.015	>100	50	0°40'00"	6°53'	NA			
20+06.75			0.060	0.020	0.020	>100	50	1°00'00"	6°53'				

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McCLINTOCK TI — RAMP 51B
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
1.6767%	-0.5500%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: 2.0%
AASHTO RANGE IS: 1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR 101 TI — RAMP 50EN

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY **MAINLINE MILEPOST:** 50.75
FUNCTIONAL CLASSIFICATION: DIRECTIONAL
DESCRIPTION: E-N RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,185 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	22	20	12	14	6	10	16	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
10+25.00			0.4538%	1.6732%	600	>9999	420	>100	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
3+50.68			0.060	0.020	0.015	>100	50	0°34'13.99"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR 101 TI — RAMP 50EN
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	1.6732%	-3.7226%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION[1] CLEARANCE	MINIMUM CLEARANCE
Chandler Village OP (#2614)		16'-11"	16'-11"	16'-0"

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS: 1 Minimum Elevation after improvments

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR 101 TI — RAMP 50SW

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY — **MAINLINE MILEPOST:** 50.75
FUNCTIONAL CLASSIFICATION: DIRECTIONAL
DESCRIPTION: S-W RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,185 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	22	20	12	14	6	10	16	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
						NONE			

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
53+07.40			0.060	0.020	0.015	>100	55	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR 101 TI — RAMP 50SW
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	3.5800%	-2.5368%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: 2.0%
AASHTO RANGE IS: 1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION[1] CLEARANCE	MINIMUM CLEARANCE
Chandler Village OP (#2614)		16'-11"	16'-11"	16'-0"

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY
					NONE			

REMARKS: 1 Minimum Elevation after improvments

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR 101 TI — RAMP 50SE

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION: DIRECTIONAL
DESCRIPTION: S-E RAMP
MAINLINE MILEPOST: 50.75

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,185 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	40	28	26	12	14	6	10	16	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
49+00.00			-1.2743%	-0.3516%	400	>9999	432	>100	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
46+87.87			0.060	0.050	0.044	67	50	3°00'00"	6°53'	NA			
63+67.95			0.060	0.036	0.020	>100	50	0°52'30"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR 101 TI — RAMP 50SE
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
3.7337%	-1.2743%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: 2.0%
AASHTO RANGE IS: 1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR 101 TI — RAMP 50WN

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 50.75
FUNCTIONAL CLASSIFICATION: DIRECTIONAL
DESCRIPTION: W-N RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,185 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	40	28	26	12	14	6	10	16	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
19+30.00			0.4012%	-0.9145%	600	2402	430	>100	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
03+94.06			0.060	0.036	0.031	82	50	1°45'0.01"	6°53'	NA			
22+91.36			0.060	0.028	0.024	98	50	1°15'0"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR 101 TI — RAMP 50WN
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
0.4012%	-0.9145%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR 101 TI — RAMP 50HOV

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION: DIRECTIONAL
DESCRIPTION: HOV RAMP

MAINLINE MILEPOST: 50.75

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,185 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	24	12	14	6	10	16	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
						EASTBOUND			
3395+61.00			5.0000%	-4.6502%	1310	541	460	55	50
3411+80.00			-4.0694%	1.6667%	720	533	455	55	50
						WESTBOUND			
3395+61.00			4.6502%	-5.0000%	1310	541	464	55	50
3412+10.00			-1.8077%	4.1538%	780	553	436	58	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
3398+93.70			0.060	0.06	0.057	57	50	5°06'57"	6°53'	NA			
3417+16.80			0.060	0.028	0.024	64	50	1°15'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
SR 101 TI — RAMP 50HOV
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING		AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
			EASTBOUND		
	5.0000%	-4.6502%		5.0000%	-5.0000%
			WESTBOUND		
	4.6502%	-5.0000%		5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE
			NONE	

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY
				STRUCTURE #2991, SEE ATTACHMENT 3				

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
PRICE TI — RAMP 50A

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: WB ENTRANCE RAMP
MAINLINE MILEPOST: 50.70

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS K[1]	D[1]	T[1]
AADT (VPD)[1]	AADT (VPD)[2]			
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,185 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	30	28	26	12	14	4	2	6	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
10+00.00			-4.9750%	0.5139%	700	541	463	55	50
14+60.00			-1.6777%	-4.9750%	200	677	463	63	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
3+07.38			0.060	0.020	0.020	>100	50	0°45'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
PRICE TI — RAMP 50A
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
0.5139%	-4.9750%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION[1] CLEARANCE	MINIMUM CLEARANCE
E-N1 Ramp (#2616)		21'-10"	21'-10"	16'-0"
S-E2 Ramp (#2620)		48'-4"	48'-4"	16'-0"

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY
					NONE			

REMARKS: 1 Minimum Elevation after improvments

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
PRICE TI — RAMP 50B

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 50.70
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: EB EXIT RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS K[1]	D[1]	T[1]
AADT (VPD)[1]	AADT (VPD)[2]			
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,185 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	30	20	12	12	14	2	10	12	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
9+00.00			-0.6767%	3.3360%	500	532	428	57	50
16+75.00			3.3360%	1.7325%	200	773	412	74	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
7+65.00			0.060	0.020	0.020	>100	50	0°30'00"	6°53'	NA			
13+44.66			0.060	0.020	0.020	>100	50	1°00'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
PRICE TI — RAMP 50B
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
3.3360%	-0.6767%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: 2.0%
AASHTO RANGE IS: 1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION[1] CLEARANCE	MINIMUM CLEARANCE
E-N1 Ramp (#2616)		17'-0"	17'-0"	16'-0"
S-E2 Ramp (#2620)		35'-7"	35'-7"	16'-0"

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY
					NONE			

REMARKS: 1 Minimum Elevation after improvments

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
PRICE TI — RAMP 50C

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 50.70
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: WB EXIT RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024 AADT (VPD)[1]	DESIGN YEAR 2040 AADT (VPD)[2]	TRAFFIC FACTORS K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,185 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	22	20	12	12	14	2	8	10	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
02+20.00			1.6318%	1.0865%	200	2079	416	>100	50
09+00.00			-1.3283%	1.6318%	500	777	433	72	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
6+00.21			0.060	0.046	0.046	73	50	3°14'59.98"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
PRICE TI — RAMP 50C
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	1.6318%	-1.3283%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	3.3% **
AASHTO RANGE IS:	1.5 - 2.0%

** Matches mainline superelevation.

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE
			NONE	

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY
					NONE			

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
PRICE TI — RAMP 50D

PROJECT NUMBER:	202 MA 044 F0124 01L
PROJECT LOCATION:	I-10 TO VAL VISTA DR
HIGHWAY SECTION:	SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION:	DIAGONAL
DESCRIPTION:	EB ENTRANCE RAMP

MAINLINE MILEPOST: 50.70

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,185 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	30	28	26	12	14	4	2	6	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
2+00.00			-1.0865%	-3.0756%	200	642	447	63	50
8+25.00			-3.0756%	1.8521%	625	538	447	56	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
5+08.84			0.060	0.041	0.041	81	50	2°37'29.98"	6°53'	NA			
13+16.48			0.060	0.039	0.035	92	51	2°00'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
PRICE TI — RAMP 50D
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	1.8521%	-3.0756%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
DOBSON TI — RAMP 49C

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY — **MAINLINE MILEPOST:** 49.62
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: WB EXIT RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,200 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	22	20	12	12	14	2	8	10	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
13+50.00			1.9067%	0.7500%	400	1133	418	92	50
22+00.00			-0.6000%	1.9067%	400	927	428	80	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
29+31.31			0.060	0.020	0.015	>100	50	0°45'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
DOBSON TI — RAMP 49C
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
1.9067%	-0.6000%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
DOBSON TI — RAMP 49D

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 49.62
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: EB ENTRANCE RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,200 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
11+50.00			-1.4985%	-3.9088%	200	548	454	56	50
17+00.00			-3.9088%	0.4500%	600	577	454	58	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
22+93.57			0.060	0.020	0.015	>100	50	0°25'27.89"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
DOBSON TI — RAMP 49D
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	0.4500%	-3.9088%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ALMA SCHOOL TI — RAMP 48A

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY — **MAINLINE MILEPOST:** 48.64
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: WB ENTRANCE RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024 AADT (VPD)[1]	DESIGN YEAR 2040 AADT (VPD)[2]	TRAFFIC FACTORS K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,200 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
18+10.00			-2.2345%	-0.1000%	400	1630	440	>100	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
13+61.22			0.060	0.020	0.015	>100	50	0°45'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ALMA SCHOOL TI — RAMP 48A
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	N/A	-2.2345%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ALMA SCHOOL TI — RAMP 48B

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 48.64
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: EB EXIT RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024 AADT (VPD)[1]	DESIGN YEAR 2040 AADT (VPD)[2]	TRAFFIC FACTORS K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,200 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	36	28	26	12	14	4	8	12	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
21+00.00			0.3000%	2.0038%	400	>9999	421	>100	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
12+66.78			0.060	0.020	0.015	>100	50	0°45'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ALMA SCHOOL TI — RAMP 48B
(CONTINUED)

GRADES:	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	2.0038%	N/A	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ALMA SCHOOL TI — RAMP 48C

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 48.64
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: WB EXIT RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,200 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	22	20	12	12	14	2	8	10	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
13+50.00			1.9562%	1.0000%	400	1328	417	>100	50
21+00.00			-0.8143%	1.9562%	400	739	429	70	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
25+68.63			0.060	0.020	0.015	>100	50	0°45'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ALMA SCHOOL TI — RAMP 48C
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
1.9562%	-0.8143%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: 2.0%
AASHTO RANGE IS: 1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ALMA SCHOOL TI — RAMP 48D

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 48.64
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: EB ENTRANCE RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,200 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
19+20.00			-2.0788%	0.5000%	400	864	439	76	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
23+67.51			0.060	0.020	0.015	>100	50	0°45'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ALMA SCHOOL TI — RAMP 48D
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	0.5000%	-2.0788%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ARIZONA TI — RAMP 47A

PROJECT NUMBER:	202 MA 044 F0124 01L
PROJECT LOCATION:	I-10 TO VAL VISTA DR
HIGHWAY SECTION:	SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION:	DIAGONAL
DESCRIPTION:	WB ENTRANCE RAMP

MAINLINE MILEPOST: 47.64

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024 AADT (VPD)[1]	DESIGN YEAR 2040 AADT (VPD)[2]	TRAFFIC FACTORS K[1]	TRAFFIC FACTORS D[1]	TRAFFIC FACTORS T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,200 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
19+10.00			1.7733%	-0.4000%	600	796	426	74	50
24+00.00			-0.6835%	1.7733%	300	804	428	74	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
13+60.75			0.060	0.020	0.015	>100	50	0°45'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ARIZONA TI — RAMP 47A
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	1.7733%	-0.6835%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ARIZONA TI — RAMP 47B

PROJECT NUMBER:	202 MA 044 F0124 01L		
PROJECT LOCATION:	I-10 TO VAL VISTA DR		
HIGHWAY SECTION:	SANTAN FREEWAY	**MAINLINE MILEPOST:**	47.64
FUNCTIONAL CLASSIFICATION:	DIAGONAL		
DESCRIPTION:	EB EXIT RAMP		

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,200 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	20	12	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
21+90.00			0.5000%	-1.8808%	600	753	437	70	50
27+50.00			-1.8808%	2.0000%	300	640	437	63	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
14+92.61			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ARIZONA TI — RAMP 47B
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
2.0000%	-1.8808%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: 2.0%
AASHTO RANGE IS: 1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ARIZONA TI — RAMP 47C

PROJECT NUMBER:	202 MA 044 F0124 01L
PROJECT LOCATION:	I-10 TO VAL VISTA DR
HIGHWAY SECTION:	SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION:	DIAGONAL
DESCRIPTION:	WB EXIT RAMP

MAINLINE MILEPOST: 47.64

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,200 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	24	20	12	12	14	2	10	12	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
14+00.00			-4.6487%	-2.0925%	200	565	46	57	50
20+00.00			-2.3183%	-4.6487%	400	663	460	63	50
15+70.00			0.4885%	-2.3183%	740	754	440	70	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
21+62.06			0.060	0.036	0.031	92	50	1°45'0.01"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ARIZONA TI — RAMP 47C
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	0.4885%	-4.6487%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE
			NONE	

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY
				STRUCTURE#2676 SEE ATTACHMENT 3				

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ARIZONA TI — RAMP 47D

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 47.64
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: EB ENTRANCE RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024 AADT (VPD)[1]	DESIGN YEAR 2040 AADT (VPD)[2]	TRAFFIC FACTORS K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,200 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
12+00.00			3.0000%	4.6579%	200	>9999	404	>100	50
18+50.00			4.6579%	1.6745%	500	612	412	64	50
13+05.00			1.6745%	-0.3219%	410	745	426	71	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
25+66.78			0.060	0.036	0.031	92	50	1°45'0.01"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
ARIZONA TI — RAMP 47D
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
4.6579%	-0.3219%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

STRUCTURE#2677 SEE ATTACHMENT 3

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McQUEEN TI — RAMP 46A

PROJECT NUMBER:	202 MA 044 F0124 01L
PROJECT LOCATION:	I-10 TO VAL VISTA DR
HIGHWAY SECTION:	SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION:	DIAGONAL
DESCRIPTION:	WB ENTRANCE RAMP

MAINLINE MILEPOST: 46.57

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024 AADT (VPD)[1]	DESIGN YEAR 2040 AADT (VPD)[2]	TRAFFIC FACTORS K[1]	TRAFFIC FACTORS D[1]	TRAFFIC FACTORS T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,235 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
09+80.00			-1.8457%	1.2942%	400	596	437	61	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
7+86.90			0.060	0.036	0.031	92	50	1°45'0.01"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McQUEEN TI — RAMP 46A
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	1.2942%	-1.8457%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McQUEEN TI — RAMP 46B

PROJECT NUMBER:	202 MA 044 F0124 01L		
PROJECT LOCATION:	I-10 TO VAL VISTA DR		
HIGHWAY SECTION:	SANTAN FREEWAY	**MAINLINE MILEPOST:**	46.57
FUNCTIONAL CLASSIFICATION:	DIAGONAL		
DESCRIPTION:	EB EXIT RAMP		

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	**K**[1]	**D**[1]	**T**[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,235 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2

TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	22	20	12	12	14	2	8	10	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
16+50.00			-1.2942%	1.9448%	500	678	433	66	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
11+06.82			0.060	0.020	0.020	>100	50	01°00'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McQUEEN TI — RAMP 46B
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
1.9448%	-1.2942%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McQUEEN TI — RAMP 46C

PROJECT NUMBER:	202 MA 044 F0124 01L
PROJECT LOCATION:	I-10 TO VAL VISTA DR
HIGHWAY SECTION:	SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION:	DIAGONAL
DESCRIPTION:	WB EXIT RAMP

MAINLINE MILEPOST: 46.57

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,235 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	22	20	12	12	14	2	8	10	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
07+75.00			-2.6758%	1.3139%	600	624	443	62	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
14+18.64			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McQUEEN TI — RAMP 46C
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	1.3139%	-2.6758%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McQUEEN TI — RAMP 46D

PROJECT NUMBER:	202 MA 044 F0124 01L
PROJECT LOCATION:	I-10 TO VAL VISTA DR
HIGHWAY SECTION:	SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION:	DIAGONAL
DESCRIPTION:	EB ENTRANCE RAMP

MAINLINE MILEPOST: 46.57

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,235 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
7+80.00			-1.5073%	2.6758%	600	598	434	61	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
12+82.53			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
McQUEEN TI — RAMP 46D
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	2.6758%	-1.5073%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE
			NONE	

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY
					NONE			

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
COOPER TI — RAMP 45A

PROJECT NUMBER:	202 MA 044 F0124 01L
PROJECT LOCATION:	I-10 TO VAL VISTA DR
HIGHWAY SECTION:	SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION:	DIAGONAL
DESCRIPTION:	WB ENTRANCE RAMP

MAINLINE MILEPOST: 45.57

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,235 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
10+10.00			-1.8787%	1.6808%	500	602	437	61	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
5+90.36			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
COOPER TI — RAMP 45A
(CONTINUED)

GRADES:	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	1.6806%	-1.8787%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
COOPER TI — RAMP 45B

PROJECT NUMBER:	202 MA 044 F0124 01L		
PROJECT LOCATION:	I-10 TO VAL VISTA DR		
HIGHWAY SECTION:	SANTAN FREEWAY	**MAINLINE MILEPOST:**	45.57
FUNCTIONAL CLASSIFICATION:	DIAGONAL		
DESCRIPTION:	EB EXIT RAMP		

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,235 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	22	20	12	12	14	2	8	10	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
11+50.00			-1.6808%	2.8191%	550	522	435	56	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
5+98.38			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
COOPER TI — RAMP 45B
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
-1.6808%	2.8191%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: 2.0%
AASHTO RANGE IS: 1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
COOPER TI — RAMP 45C

PROJECT NUMBER:	202 MA 044 F0124 01L		
PROJECT LOCATION:	I-10 TO VAL VISTA DR		
HIGHWAY SECTION:	SANTAN FREEWAY	**MAINLINE MILEPOST:**	45.57
FUNCTIONAL CLASSIFICATION:	DIAGONAL		
DESCRIPTION:	WB EXIT RAMP		

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	**K[1]**	**D[1]**	**T[1]**
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,235 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	22	20	12	12	14	2	8	10	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
08+85.00			-0.8411%	2.0785%	400	670	429	66	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
14+51.66			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
COOPER TI — RAMP 45C
(CONTINUED)

GRADES:

	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	2.0785%	-0.8411%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
COOPER TI — RAMP 45D

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: EB ENTRANCE RAMP
MAINLINE MILEPOST: 45.57

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,235 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
8+85.00			-2.1453%	0.8411%	400	645	439	63	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	METHOD 2 SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
12+55.92			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
COOPER TI — RAMP 45D
(CONTINUED)

GRADES:	EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
	0.8411%	-2.1453%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE
			NONE	

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY
					NONE			

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
GILBERT TI — RAMP 44A

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 44.57
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: WB ENTRANCE RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024 AADT (VPD)[1]	DESIGN YEAR 2040 AADT (VPD)[2]	TRAFFIC FACTORS K[1]	TRAFFIC FACTORS D[1]	TRAFFIC FACTORS T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,245 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
09+60.00			-2.2977%	0.6342%	400	665	440	65	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
5+91.80			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
GILBERT TI — RAMP 44A
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
0.6342%	-2.2977%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
GILBERT TI — RAMP 44B

PROJECT NUMBER: SR 202L MA 043 H8873 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 44.57
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: EB EXIT RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1260 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	26	12	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
10+75.00			-0.6342%	2.4386%	400	616	428	63	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
5+39.06			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
GILBERT TI — RAMP 44B
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
2.4386%	-0.6342%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.00%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
GILBERT TI — RAMP 44C

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
MAINLINE MILEPOST: 44.57
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: WB EXIT RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1,245 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	22	20	12	14	14	2	8	10	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
8+90.00			-1.3090%	1.9657%	400	561	433	59	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
14+46.68			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
GILBERT TI — RAMP 44C
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
1.9657%	-1.3090%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: 2.0%
AASHTO RANGE IS: 1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
GILBERT TI — RAMP 44D

PROJECT NUMBER: SR 202L MA 043 H8873 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY — **MAINLINE MILEPOST:** 44.57
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: EB ENTRANCE RAMP

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR 2024	DESIGN YEAR 2040	TRAFFIC FACTORS		
AADT (VPD)[1]	AADT (VPD)[2]	K[1]	D[1]	T[1]
212,000	261,000	8%	60%	7%

THE POSTED SPEED LIMIT IS: NONE, USE 50 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1260 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	24	14	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
8+90.00			-1.9190%	1.2791%	400	580	437	60	50

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
12+53.63			0.060	0.020	0.015	>100	50	0°30'00"	6°53'	NA			

REMARKS: [1] Traffic Volumes and K, D, and T factors from Traffic Report by Burgess and Niple. Data from the highest volume segment SR 101L to Dobson Road.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
GILBERT TI — RAMP 44D
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
1.2791%	-1.9190%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS:

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
VAL VISTA TI — RAMP 42A

PROJECT NUMBER:	202 MA 044 F0124 01L
PROJECT LOCATION:	I-10 TO VAL VISTA DR
HIGHWAY SECTION:	SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION:	DIAGONAL
DESCRIPTION:	WB ENTRANCE RAMP

MAINLINE MILEPOST: 42.50

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR	CONSTRUCTION YEAR	DESIGN YEAR	TRAFFIC FACTORS
2013	NA	2040	K= 9%[1]
AADT (VPD)[1]	AADT (VPD)	AADT (VPD)[3]	D= NA
19,028	NA	17,000	T= 2%[2]

THE POSTED SPEED LIMIT IS: NONE, USE 55 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1260 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 3

TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	3-C WIDTH (FT)	3-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	28	28	24	14	14	2	2	4	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
11+25.00			-2.2562%	0.9556%	600	796	512	72	55

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
6+70.02			0.060	0.030	0.030	82	55	1°22'30"	5°24'	NA			
17+18.12			0.060	0.050	0.048	46	35	7°52'30"	16°50'	NA			

REMARKS:
[1] Obtained from ADOT Transportation Data Management System.
[2] Obtained from Town of Gilbert's Synchro model.
[3] Determined by average of projected AM and PM peak hour and a K factor of 8 (assuming construction of the Lindsay TI).

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
VAL VISTA TI — RAMP 42A
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
0.9556%	-2.2562%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS: VARIES*
AASHTO RANGE IS: 1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE

NONE

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY

NONE

REMARKS: * Ramp is entirely in superelevation.

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
VAL VISTA TI — RAMP 42B

PROJECT NUMBER: 202 MA 044 F0124 01L
PROJECT LOCATION: I-10 TO VAL VISTA DR
HIGHWAY SECTION: SANTAN FREEWAY
FUNCTIONAL CLASSIFICATION: DIAGONAL
DESCRIPTION: EB EXIT RAMP
MAINLINE MILEPOST: 42.50

TRAFFIC VOLUMES AND FACTORS:

CURRENT YEAR	CONSTRUCTION YEAR	DESIGN YEAR	TRAFFIC FACTORS
2013	NA	2040	**K=** 9%[1]
AADT (VPD) [1]	**AADT (VPD)**	**AADT (VPD)** [3]	**D=** NA
19,623	NA	17,200	**T=** 2%[2]

THE POSTED SPEED LIMIT IS: NONE, USE 55 MPH **TERRAIN IS:** LEVEL **AVERAGE ELEVATION IS:** 1260 FT

RAMP WIDTH:

CASE (1 OR 2 OR 3): 2
TRAFFIC CONDITION (A OR B OR C): C

MINIMUM RADIUS (FT)	TOTAL PAVED WIDTH (FT)	2-C WIDTH (FT)	2-C WIDTH EXCLUDING SHOULDERS (FT)	TRAVELED-WAY WIDTH EXISTING WIDTH (FT)	TRAVELED-WAY WIDTH MINIMUM 1-C (FT)	EXISTING LEFT SHOULDER (FT)	EXISTING RIGHT SHOULDER (FT)	EXISTING LEFT & RIGHT SHOULDER (FT)	AASHTO MAXIMUM SHOULDERS (FT)
TANGENT	22	20	12	14	14	2	8	10	12

VERTICAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

VPI STATION	MILEPOST BEGIN	MILEPOST END	APPROACH GRADE (%)	DEPARTURE GRADE (%)	LENGTH OF CURVE (FT)	STOPPING SIGHT DISTANCE EXISTING (FT)	STOPPING SIGHT DISTANCE REQUIRED (FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)
12+50.00			-0.7754%	2.7556%	400	509	499	56	55

HORIZONTAL ALIGNMENT AND STOPPING SIGHT DISTANCE:

HPI STATION	MILEPOST BEGIN	MILEPOST END	SUPERELEVATION RDG MAX (FT/FT)	SUPERELEVATION EXISTING (FT/FT)	SUPERELEVATION MINIMUM (FT/FT)	EXISTING SPEED (MPH)	POSTED SPEED (MPH)	EXISTING DEGREE OF CURVE	MAXIMUM DEGREE OF CURVE	EXISTING HSO (FT)	EXISTING GRADE (%)	HORIZONTAL SSD EXISTING (FT)	HORIZONTAL SSD REQUIRED (FT)
16+57.28			0.060	0.051	0.039	56	35	5°00'00"	16°50'	NA			

REMARKS:
[1] Obtained from ADOT Transportation Data Management System.
[2] Obtained from Town of Gilbert's Synchro model.
[3] Determined by average of projected AM and PM peak hour and a K factor of 8 (assuming construction of the Lindsay TI).

SUMMARY OF AASHTO CONTROLLING DESIGN CRITERIA
VAL VISTA TI — RAMP 42B
(CONTINUED)

GRADES:

EXISTING MAXIMUM ASCENDING	EXISTING MAXIMUM DESCENDING	AASHTO MAXIMUM ASCENDING	AASHTO MAXIMUM DESCENDING
2.7556%	-0.7754%	5.0000%	-5.0000%

CROSS SLOPE:

EXISTING CROSS SLOPE IS:	2.0%
AASHTO RANGE IS:	1.5 - 2.0%

VERTICAL CLEARANCE:

STRUCTURE	MILEPOST	PRECONSTRUCTION CLEARANCE	POST CONSTRUCTION CLEARANCE	MINIMUM CLEARANCE
			NONE	

STRUCTURES:

STRUCTURE	MILEPOST	EXISTING BRIDGE LENGTH	EXISTING BRIDGE WIDTH	RECOMMENDED BRIDGE WIDTH	BRIDGE BARRIER GEOMETRY ADEQUATE	BRIDGE BARRIER STRUCTURAL ADEQUATE	EXISTING STRUCTURE CAPACITY	RECOMMENDED STRUCTURE CAPACITY
					NONE			

REMARKS:

Attachment 1 - Vertical Curve Inventory

Project Name: SR202 I-10 to Val Vista Dr (SR 202 EB)
Project No: 202 MA 044 F0124 01L
Roadway Type: Divided Roadway (Uni-directional)

VPI Station (ft)	Milepost		Grade (%)		Curve	Curve	Stopping Sight Distance (ft)		Speed (mph)	
	Begin	End	Approach	Departure	Length (ft)	Type	Existing	Required	Existing	Posted
1997+90.00			-0.5727	1.7644	1000.00	Sag	2331	651	+100	65
2029+20.00			1.7516	-1.0104	1200.00	Crest	968	656	82	65
2083+19.00			-1.0104	0.4018	1000.00	Sag	+9999	656	+100	65
2153+25.00			0.4018	-0.4000	800.00	Crest	1746	648	+100	65
2196+23.50			-0.4000	0.4100	1000.00	Sag	+9999	648	+100	65
2222+20.00			0.4099	-0.4008	800.00	Crest	1731	648	+100	65
2247+15.00			-0.4008	1.7500	2000.00	Sag	5865	648	+100	65
2275+75.00			1.7500	-1.2495	2400.00	Crest	1314	659	98	65
2298+70.00			-1.2490	0.5158	800.00	Sag	+9999	659	+100	65
2341+20.00			0.5199	-0.5000	800.00	Crest	1458	650	+100	65
2351+50.00			-0.5000	0.5476	800.00	Sag	+9999	650	+100	65
2396+75.00			0.5476	1.9546	800.00	Sag	+9999	637	+100	65
2419+45.00			1.9546	-1.2942	1800.00	Crest	1093	659	88	65
2462+55.00			-1.2942	2.6758	1000.00	Sag	984	659	83	65
2485+90.00			2.6758	-1.6808	2200.00	Crest	1044	664	85	65
2513+00.00			-1.6808	0.8411	1000.00	Sag	1893	664	+100	65
2541+00.00			0.8411	-0.6342	1000.00	Crest	1231	651	95	65
2568+20.00			-0.6342	1.1581	800.00	Sag	+9999	651	+100	65

Note:
Input grade with direction of traffic for one-way traffic

Attachment 1 - Vertical Curve Inventory

Project Name: SR202 I-10 to Val Vista Dr (SR 202 EB)(Continued)
Project No: 202 MA 044 F0124 01L
Roadway Type: Divided Roadway (Uni-directional)

VPI Station (ft)	Milepost		Grade (%)		Curve	Curve	Stopping Sight Distance (ft)		Speed (mph)	
	Begin	End	Approach	Departure	Length (ft)	Type	Existing	Required	Existing	Posted
2567+90.07			-0.6340	1.1579	800.00	Sag	+9999	651	+100	65
2594+00.07			1.1579	1.8690	800.00	Sag	+9999	631	+100	65
2614+75.00			1.8690	-0.6790	1200.00	Crest	1008	652	84	65
2676+75.00			-0.6790	1.2525	1050.00	Sag	6689	652	+100	65

Note:
Input grade with direction of traffic for one-way traffic

Attachment 1 - Vertical Curve Inventory

Project Name: SR202 I-10 to Val Vista Dr (SR 202 WB)
Project No: 202 MA 044 F0124 01L
Roadway Type: Divided Roadway (Uni-directional)

VPI Station (ft)	Milepost		Grade (%)		Curve	Curve	Stopping Sight Distance (ft)		Speed (mph)	
	Begin	End	Approach	Departure	Length (ft)	Type	Existing	Required	Existing	Posted
1998+10.00			-1.7359	0.5727	1000.00	Sag	2424	665	+100	65
2029+20.00			1.0104	-1.7516	1200.00	Crest	968	665	81	65
2083+19.00			-0.4018	1.0104	1000.00	Sag	+9999	649	+100	65
2153+25.00			0.4000	-0.4018	800.00	Crest	1746	649	+100	65
2196+23.50			-0.4100	0.4000	1000.00	Sag	+9999	649	+100	65
2222+20.00			0.4000	-0.4099	800.00	Crest	1732	649	+100	65
2247+20.00			-1.8067	0.4000	1700.00	Sag	4545	666	+100	65
2271+25.00			0.8118	-1.8067	1150.00	Crest	974	666	82	65
2298+60.00			-0.5346	0.8116	800.00	Sag	+9999	650	+100	65
2341+20.00			0.5000	-0.5199	800.00	Crest	1458	650	+100	65
2351+50.00			-0.5476	0.5000	800.00	Sag	+9999	650	+100	65
2396+75.00			-1.9546	-0.5476	800.00	Sag	+9999	668	+100	65
2419+45.00			1.2942	-1.9546	1800.00	Crest	1093	668	87	65
2462+55.00			-2.6758	1.2942	1000.00	Sag	984	678	81	65
2485+90.00			2.6758	-1.6808	2200.00	Crest	1044	664	85	65
2513+00.00			-0.8411	1.6808	1000.00	Sag	1893	654	+100	65
2541+00.00			0.6342	-0.8411	1000.00	Crest	1231	654	95	65
2568+20.00			-1.1581	0.6342	800.00	Sag	+9999	658	+100	65

Note:
Input grade with direction of traffic for one-way traffic

Attachment 1 - Vertical Curve Inventory

Project Name: SR202 I-10 to Val Vista Dr (SR 202 WB)(Continued)
Project No: 202 MA 044 F0124 01L
Roadway Type: Divided Roadway (Uni-directional)

VPI Station (ft)	Milepost		Grade (%)		Curve	Curve	Stopping Sight Distance (ft)		Speed (mph)	
	Begin	End	Approach	Departure	Length (ft)	Type	Existing	Required	Existing	Posted
2567+90.07			-1.1579	0.6342	800.00	Sag	+9999	658	+100	65
2594+00.07			-1.8690	-1.1579	800.00	Sag	+9999	667	+100	65
2614+75.00			0.6706	-1.8690	1200.00	Crest	1010	667	83	65
2677+75.00			-1.5192	-0.6706	1050.00	Sag	+9999	662	+100	65

Note:
Input grade with direction of traffic for one-way traffic

Attachment 2 - Horizontal Curve Inventory

Project Name: SR202 I-10 to Val Vista Dr (SR 202 EB)
Project No: 202 MA 044 F0124 01L

HPI Station	Milepost		Superelevation (ft/ft)			Degree Of Curve		Speed (mph)		HSO	Grade	Horizontal SSD (ft)	
(ft)	Begin	End	Existing	AASHTO Min	RDG Max	Existing	AASHTO Max	Method 2	Posted	(ft)	(%)	Existing	Required
1996+90.03			0.043	0.043	0.06	1°-36'-50"	3°-27'	81	65	NA			
2234+30.00			0.020	0.015	0.06	0°-15'-00"	3°-27'	>100	65	NA			
4256+13.55			0.039	0.035	0.06	1°-11'-50"	3°-27'	87	65	NA			
2287+83.20			0.036	0.036	0.06	1°-15'-00"	3°-27'	85	65	NA			

Note:
AASHTO Minimum superelevation derived from Method 5 to meet posted speed.
Roadway Engineering Design Guidelines (RDG) Maximum is based on elevation (See RDG Table 202.1A).
Input grade with respect to traffic for inside lane of curve; if both - & + grades within the curve, choose the negative grade;
if all negative grades, choose the largest negative grade; if all positive grades, choose the smallest positive grade.
(See Help file under Help Topics/Approach Grade)
HSO = Horizontal Sightline Offset

Attachment 2 - Horizontal Curve Inventory

Project Name: SR202 I-10 to Val Vista Dr (SR 202 EB)(Continued)
Project No: 202 MA 044 F0124 01L

HPI Station	Milepost		Superelevation (ft/ft)			Degree Of Curve		Speed (mph)		HSO	Grade	Horizontal SSD (ft)	
(ft)	Begin	End	Existing	AASHTO Min	RDG Max	Existing	AASHTO Max	Method 2	Posted	(ft)	(%)	Existing	Required
2643+77.66			0.036	0.036	0.06	1°-14'-26"	3°-27'	85	65	NA			

Note:
AASHTO Minimum superelevation derived from Method 5 to meet posted speed.
Roadway Engineering Design Guidelines (RDG) Maximum is based on elevation (See RDG Table 202.1A).
Input grade with respect to traffic for inside lane of curve; if both - & + grades within the curve, choose the negative grade;
if all negative grades, choose the largest negative grade; if all positive grades, choose the smallest positive grade.
(See Help file under Help Topics/Approach Grade)
HSO = Horizontal Sightline Offset

Attachment 2 - Horizontal Curve Inventory

Project Name: SR202 I-10 to Val Vista Dr (SR 202 Med)
Project No: 202 MA 044 F0124 01L

HPI Station	Milepost		Superelevation (ft/ft)			Degree Of Curve		Speed (mph)		HSO	Grade	Horizontal SSD (ft)	
(ft)	Begin	End	Existing	AASHTO Min	RDG Max	Existing	AASHTO Max	Method 2	Posted	(ft)	(%)	Existing	Required
2097+48.37			0.020	0.015	0.06	0°-15'-00"	3°-27'	>100	65	NA			
2419+21.34			0.036	0.036	0.06	1°-15'-00"	3°-27'	85	65	NA			
2450+55.46			0.036	0.036	0.06	1°-15'-00"	3°-27'	85	65	NA			

Note:
AASHTO Minimum superelevation derived from Method 5 to meet posted speed.
Roadway Engineering Design Guidelines (RDG) Maximum is based on elevation (See RDG Table 202.1A).
Input grade with respect to traffic for inside lane of curve; if both - & + grades within the curve, choose the negative grade;
if all negative grades, choose the largest negative grade; if all positive grades, choose the smallest positive grade.
(See Help file under Help Topics/Approach Grade)
HSO = Horizontal Sightline Offset

Attachment 2 - Horizontal Curve Inventory

Project Name: SR202 I-10 to Val Vista Dr (SR 202 WB)
Project No: 202 MA 044 F0124 01L

HPI Station	Milepost		Superelevation (ft/ft)			Degree Of Curve		Speed (mph)		HSO	Grade	Horizontal SSD (ft)	
(ft)	Begin	End	Existing	AASHTO Min	RDG Max	Existing	AASHTO Max	Method 2	Posted	(ft)	(%)	Existing	Required
1999+33.03			0.041	0.040	0.06	1°-26'-00"	3°-27'	83	65	NA			
2022+32.81			0.020	0.016	0.06	0°-15'-00"	3°-27'	>100	65	NA			
2234+30.00			0.020	0.015	0.06	0°-15'-00"	3°-27'	>100	65	NA			
2255+65.15			0.036	0.036	0.06	0°-15'-00"	3°-27'	85	65	NA			
2289+18.39			0.036	0.036	0.06	1°-15'-00"	3°-27'	85	65	NA			

Meaning Of Symbols:

Note:
AASHTO Minimum superelevation derived from Method 5 to meet posted speed.
Roadway Engineering Design Guidelines (RDG) Maximum is based on elevation (See RDG Table 202.1A).
Input grade with respect to traffic for inside lane of curve; if both - & + grades within the curve, choose the negative grade; if all negative grades, choose the largest negative grade; if all positive grades, choose the smallest positive grade.
(See Help file under Help Topics/Approach Grade)
HSO = Horizontal Sightline Offset

Attachment 2 - Horizontal Curve Inventory

Project Name: SR202 I-10 to Val Vista Dr (SR 202 WB)(Continued)
Project No: 202 MA 044 F0124 01L

HPI Station	Milepost		Superelevation (ft/ft)			Degree Of Curve		Speed (mph)		HSO	Grade	Horizontal SSD (ft)	
(ft)	Begin	End	Existing	AASHTO Min	RDG Max	Existing	AASHTO Max	Method 2	Posted	(ft)	(%)	Existing	Required
2643+53.18			0.036	0.036	0.06	1°-15'-35"	3°-27'	85	65	NA			

Note:
AASHTO Minimum superelevation derived from Method 5 to meet posted speed.
Roadway Engineering Design Guidelines (RDG) Maximum is based on elevation (See RDG Table 202.1A).
Input grade with respect to traffic for inside lane of curve; if both - & + grades within the curve, choose the negative grade;
if all negative grades, choose the largest negative grade; if all positive grades, choose the smallest positive grade.
(See Help file under Help Topics/Approach Grade)
HSO = Horizontal Sightline Offset

ATTACHMENT #3

ROADWAY ENGINEERING GROUP
ROADWAY PREDESIGN SECTION

DATE: 4/11/2018

TO: **Amin Aman**
BRIDGE GROUP
BRIDGE MANAGEMENT SECTION, MD 635E

FEDERAL REFERENCE NO: ______ TRACS NO: 202 MA 044 F0124 01L
HIGHWAY: SR202
LOCATION: SANTAN FREEWAY
MP LIMITS: 44.50 TO: 53.60
PROJECT DESCRIPTION: I-10 TO VAL VISTA DR

FROM: **Stanley Consultants**
1661 E Camelback Rd Suite 400
Phoenix AZ 85016

SUBJECT: **BRIDGE EVALUATION REQUEST**

Please evaluate the following structures per AASHTO guidelines:

ROUTE NO. N7*	MILE POST N11	STR. NO. AND NAME N8 & A209	BRIDGE LENGTH N49	BRIDGE ROADWAY WIDTH N51	BRIDGE RAIL / BARRIER: TYPE A206A	GEOM. OK A206B	STRUC OK A206C	Railings OK N36A	Transitions OK N36B	AC OVERLAY: THICKNESS (EXISTING) A201	REMOVE (MINIMUM)	REPLACE / NEW (MAXIMUM)	VERTICAL CLEARANCE (MINIMUM) NB/EB	SB/WB	BRIDGE LOAD RATING N66	BRIDGE SUFFICIENCY RATING SRB
202L	54.74	2590 56th Street OP EB	251	69.00	Concrete Barrier	Yes	Yes	Yes	NA	2"	2"	1"	23.32	23.28	HS20+	F 92.2
			Comments: Existing 2" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with Methacrylate then overlaid with 1" appropriate asphaltic or similar material.													
202L	54.78	2591 56th Street OP WB	251	69.00	Concrete Barrier	Yes	Yes	Yes	NA	2"	2"	1"	22.1	22.1	HS20+	F 92.2
			Comments: Existing 2" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with Methacrylate then overlaid with 1" appropriate asphaltic or similar material.													
202L	54.78	2592 56th Street W-N Ramp OP	259	40.00	Concrete Barrier	Yes	Yes	Yes	NA	2"	2"	1"	23.07	23.28	HS20+	F 91.4
			Comments: Existing 2" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with Methacrylate then overlaid with 1" appropriate asphaltic or similar material.													
202L	54.74	2589 Ramp S-E/56th St OP	247	52.00	Concrete Barrier	Yes	Yes	Yes	NA	2"	2"	1"	22.44	22.42	HS20+	F 91.4
			Comments: Existing 2" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with Methacrylate then overlaid with 1" appropriate asphaltic or similar material.													
202L	47.63	2693 Arizona Avenue TI OP	157	138.70	Concrete Barrier	Yes	Yes	Yes	NA	2"	2"	1"	20.17	20.69	HS20+	100.00
			Comments: Existing 2" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with Methacrylate then overlaid with 1" appropriate asphaltic or similar material.													

ROUTE NO. N7*	MILE POST N11	STR. NO. AND NAME N8 & A209	BRIDGE LENGTH N49	BRIDGE ROADWAY WIDTH N51	BRIDGE RAIL / BARRIER: TYPE A206A	BRIDGE RAIL / BARRIER: GEOM. OK A206B	BRIDGE RAIL / BARRIER: STRUC OK A206C	BRIDGE RAIL / BARRIER: Railings OK N36A	BRIDGE RAIL / BARRIER: Transitions OK N36B	AC OVERLAY: THICKNESS (EXISTING) A201	AC OVERLAY: REMOVE (MINIMUM)	AC OVERLAY: REPLACE / NEW (MAXIMUM)	VERTICAL CLEARANCE (MINIMUM): NB/EB	VERTICAL CLEARANCE (MINIMUM): SB/WB	BRIDGE LOAD RATING N66	BRIDGE SUFFICIENCY RATING SRB
202L	47.63	2678 UPRR OP	105	138.60	Concrete Barrier	Yes	Yes	Yes	NA	1"	1"	1"	24.2	24.2	HS20+	88.10
			Comments: Existing 1" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with Methacrylate then overlaid with 1" appropriate asphaltic or similar material.													
202L	47.63	2679 UPRR OP WB	105	69.30	Concrete Barrier	Yes	Yes	Yes	NA	1"	1"	1"	24.2	24.2	HS20+	96.30
			Comments: Existing 1" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with Methacrylate then overlaid with 1" appropriate asphaltic or similar material.													
202L	47.38	2676 Arizona Ave Ramp C RR OP	108	26.00	Concrete Barrier	Yes	Yes	Yes	NA	1"	1"	1"	24.34	24.34	HS20+	98.80
			Comments: Existing 1" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with Methacrylate then overlaid with 1" appropriate asphaltic or similar material.													
202L	47.38	2677 Arizona Ave Ramp D RR OP	100	32.00	Concrete Barrier	Yes	Yes	Yes	NA	1"	1"	1"	23.63	23.63	HS20+	98.50
			Comments: Existing 1" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with Methacrylate then overlaid with 1" appropriate asphaltic or similar material.													
202L	46.3	2683 Consolidated Cnl Br	132	162.60	Concrete Barrier	Yes	Yes	Yes	NA	2"	2"	1"	15.36	15.36	HS20+	88.30
			Comments: Existing 2" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with Methacrylate then overlaid with 1" appropriate asphaltic or similar material.													
202L	46.3	2684 Consolidated Cnl Br WB	132	81.30	Concrete Barrier	Yes	Yes	Yes	NA	2"	2"	1"	15.23	15.23	HS20+	94.70
			Comments: Existing 2" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with Methacrylate then overlaid with 1" appropriate asphaltic or similar material.													
101L	57.69	2991 101L/202L HOV Ramp	1989	56.00	Concrete Barrier	Yes	Yes	Yes	NA	0"	NA	NA	16.84	16.79	HS20	98.00
			Comments:													
202L	55.23	2993 10/202L HOV Ramp#2	411	56.00	Concrete Barrier	Yes	Yes	Yes	NA	0"	NA	NA	20.7	20.7	HS20	98.00
			Comments:													
			Comments:													

Evaluation Completed by: Masudur Rahman

Date: 4/11/2018

Note: *N numbers are NBI numbers and A numbers are Arizona Items Number for bridge inventory

ATTACHMENT #3 (Continued)

ROADWAY ENGINEERING GROUP
ROADWAY PREDESIGN SECTION

DATE: 2/29/2019

TO: **Amin Aman**
BRIDGE GROUP
BRIDGE MANAGEMENT SECTION, MD 635E

FEDERAL REFERENCE NO:

TRACS NO: 202 MA 044 F0124 01L

HIGHWAY: SR202

LOCATION: SANTAN FREEWAY

MP LIMITS: 53.60 TO: 44.50

PROJECT DESCRIPTION: I-10 TO VAL VISTA DR

FROM: **Stanley Consultants**
1661 E Camelback Rd Suite 400
Phoenix AZ 85016

SUBJECT: **BRIDGE EVALUATION REQUEST**

g structures per AASHTO guidelines:

ROUTE NO.	MILEPOST	STR. NO. AND NAME	BRIDGE LENGTH	BRIDGE ROADWAY WIDTH	BRIDGE RAIL / BARRIER					AC OVERLAY			VERTICAL CLEARANCE (MINIMUM)		BRIDGE LOAD RATING	BRIDGE SUFFICIENCY RATING
					TYPE	GEOM. OK	STRUC OK	Railings OK	Transitions OK	THICKNESS (EXISTING)	REMOVE	REPLACE / NEW				
N7*	N11	N8 & A209	N49	N51	A206A	A206B	A206C	N36A	N36B	A201	(MINIMUM)	(MAXIMUM)	NB/EB	SB/WB	N66	SRB
SR202	53.75	2330 Kyrene Road TI UP	272	76.00	Concrete w/Rail	Yes	Yes	Yes	NA	0"	NA	NA	17.48	17.44	HS20+	95.90
			Comments: Repair deteriorated and raised joint sealants at end of approach sidewalks near northwest, southwest, and northeast corners. Existing steel railing could be replaced by standard concrete barrier.													
SR202	51.73	2331 McClintock Road TI UP	279	105.00	Concrete w/Rail	Yes	Yes	Yes	NA	0"	NA	NA	17.08	17.14	HS20+	99.30
			Comments: Existing steel railing could be replaced by standard concrete barrier.													
SR202	50.65	2613 Price Rd TI UP	264	123.00	Concrete w/Rail	Yes	Yes	Yes	NA	0"	NA	NA	18.52	17.35	HS20+	82.00
			Comments: Existing steel railing could be replaced by standard concrete barrier.													
SR202	51.22	2614 Chandler Village Drive UP	309	68.00	Concrete w/Rail	Yes	Yes	Yes	NA	0"	NA	NA	17.09	17.03	HS20+	91.50
			Comments: Repair lifted joint sealant in sidewalk near northeast corner. Existing steel railing could be replaced by standard concrete barrier.													

SR202	60.98	2616 Ramp E-N 1	639	28.00	Concrete Barrier	Yes	Yes	Yes	NA	2"	2"	1"	17.43	21.58	HS20+	92.70
			Comments:	Existing 2" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with sealant then overlaid with 1" appropriate asphaltic or similar material.												
SR202	44.59	2670 Gilbert Road TI UP	262	116.00	Single Rail w/parapet	Yes	Yes	Yes	NA	0"	NA	NA	17.21	17.19	HS20+	91.30
			Comments:	Existing steel railing could be replaced by standard concrete barrier.												
SR202	44.59	2671 Gilbert Road SB TI UP														
			Comments:	Retired and combined with Structure #2670												
SR202	46.6	2672 McQueen Road TI UP	260	116.00	Concrete w/Rail	Yes	Yes	Yes	NA	0"	NA	NA	17.47	17.29	HS20+	96.80
			Comments:	Existing steel railing could be replaced by standard concrete barrier.												
SR202	46.6	2673 McQueen Road (SB)TI UP														
			Comments:	Retired and combined with Structure #2672												
SR202	45.5	2674 Cooper Road TI UP	262	116.00	Single Rail w/parapet	Yes	Yes	Yes	NA	0"	NA	NA	17.27	17.25	HS20+	97.20
			Comments:	Existing steel railing could be replaced by standard concrete barrier.												
SR202	45.5	2675 Cooper Road (SB) TI UP														
			Comments:	Retired and combined with Structure #2674												
SR202	49.64	2689 Dobson Road TI UP	231	95.00	Concrete w/Rail	Yes	Yes	Yes	NA	0"	NA	NA	17.2	18.32	HS20+	F 89.10
			Comments:	Existing steel railing could be replaced by standard concrete barrier. Repair raised joint sealant at end approach slab near northwest corner.												
SR202	48.64	2692 Alma School Road TI UP	210	127.00	Concrete w/Rail	Yes	Yes	Yes	NA	0"	NA	NA	17	17.03	HS20+	90.50
			Comments:	Existing steel railing could be replaced by standard concrete barrier.												
SR202	161.2	2713 Ramp EN	639	28.00	Concrete Barrier	Yes	Yes	Yes	NA	1"	1"	1"	19.84	19.84	HS20+	98.60
			Comments:	Existing 1" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with sealant then overlaid with 1" appropriate asphaltic or similar material. Replace Joint seals at both abutments at the N and S.												

SR202	161.27	2714 Ramp WS	1191	28.00	Concrete Barrier	Yes	Yes	Yes	NA	1"	1"	1"	18	18	HS20+	98.60
			Comments:	Existing 1" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with sealant then overlaid with 1" appropriate asphaltic or similar material. Replace Joint seal failed at abutment 2												
SR202	161.16	2715 Ramp SE	1486	36.00	Concrete Barrier	Yes	Yes	Yes	NA	1"	1"	1"	18	18.43	HS20+	100.00
			Comments:	Existing 1" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with sealant then overlaid with 1" appropriate asphaltic or similar material. Replace joint seal which is failed at Abutment 1 at the north												
SR202	161.37	2716 I-10 EB OP	292	87.00	Concrete Barrier	Yes	Yes	Yes	NA	1"	1"	1"	20.67	21.39	HS20+	93.10
			Comments:	Existing 1" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with sealant then overlaid with 1" appropriate asphaltic or similar material.												
SR202	161.34	2717 I-10 WB OP	283	92.10	Concrete Barrier	Yes	Yes	Yes	NA	1"	1"	1"	18.48	19	HS20+	93.10
			Comments:	Existing 1" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with sealant then overlaid with 1" appropriate asphaltic or similar material.												
SR202	161.32	2718 Ramp NW	942	28.00	Concrete Barrier	Yes	Yes	Yes	NA	1"	1"	1"	17.12	17.42	HS20+	97.00
			Comments:	Existing 1" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with sealant then overlaid with 1" appropriate asphaltic or similar material. Replace ripped strip seal at the hinge expansion joint.												
SR202	43.7	2789 Lindsay Road OP	338	140.00	Concrete Barrier	Yes	Yes	Yes	NA	2"	2"	1"	17.59	17.75	HS20+	90.00
			Comments:	Existing 2" AC overlay on bridge deck should be removed to full depth, bare concrete deck top be inspected, repaired if needed, then seal deck with sealant then overlaid with 1" appropriate asphaltic or similar material.												
SR202	43.7	2790 Lindsay Road OP WB														
			Comments:	Retired and combined with Structure #2789												
SR202	42.5	2792 Val Vista DriveTI UP	312	128.00	Single Rail w/parapet	Yes	Yes	Yes	NA	0"	NA	NA	17	17.03	HS20	95.00
			Comments:	Existing steel railing could be replaced by standard concrete barrier.												
SR202	42.5	2793 Val Vista DriveTI UP SB														
			Comments:	Retired and combined with Structure #2792												

Evaluation Completed by: Masudur Rahman

Date: 3/4/2019

\ numbers are Arizona Items Number for bridge inventory

ROADWAY ENGINEERING GROUP
ROADWAY PREDESIGN SECTION

DATE: 4/16/2018

TO: **AMAN AMIN, Ph.D P.E.**
BRIDGE GROUP
BRIDGE TECHNICAL SECTION, MD 636E

FEDERAL REFERENCE NO:
HIGHWAY: SR202 TRACS NO: 202 MA 044 F0124 01L
LOCATION: SANTAN FREEWAY
MP LIMITS: 44.50 TO: 53.60
PROJECT DESCRIPTION: I-10 TO VAL VISTA DR

FROM: **Stanley Consultants**
1661 E Camelback Rd Suite 400
Phoenix AZ 85016

SUBJECT: **BRIDGE REPAIR FORM**

Please evaluate the following structures for recommended repairs to be included within the project scope of work

ROUTE NO.	MILEPOST	STR. NO. AND NAME	Repair Recommendations: Item of work	Quantity	Unit	Unit cost	Cost	Comment
202L	54.74	2590 56th Street OP EB	Seal the deck with methacrylate	17319	SQ FT	$5	$86,595.00	
202L	54.78	2591 56th Street OP WB	Seal the deck with methacrylate	17319	SQ FT	$5	$86,595.00	
202L	54.78	2592 56th Street W-N Ramp OP	Seal the deck with methacrylate	10360	SQ FT	$5	$51,800.00	
202L	54.74	2589 Ramp S-E/56th St OP	Seal the deck with methacrylate	12844	SQ FT	$5	$64,220.00	
202L	47.63	2693 Arizona Avenue TI OP	Seal the deck with methacrylate	21775.9	SQ FT	$5	$108,879.50	
202L	47.63	2678 UPRR OP	Seal the deck with methacrylate	14553	SQ FT	$5	$72,765.00	
202L	47.63	2679 UPRR OP WB	Seal the deck with methacrylate	7276.5	SQ FT	$5	$36,382.50	
202L	47.38	2676 Arizona Ave Ramp C RR OP	Seal the deck with methacrylate	2808	SQ FT	$5	$14,040.00	
202L	47.38	2677 Arizona Ave Ramp D RR OP	Seal the deck with methacrylate	3200	SQ FT	$5	$16,000.00	
202L	46.3	2683 Consolidated Cnl Br	Seal the deck with methacrylate	21463.2	SQ FT	$5	$107,316.00	
202L	46.3	2684 Consolidated Cnl Br WB	Seal the deck with methacrylate	10734.24	SQ FT	$5	$53,671.20	
						Total Cost	$698,264.20	

Masudur Rahman

Date 4/16/2018

ROADWAY ENGINEERING GROUP
ROADWAY PREDESIGN SECTION

DATE: 3/4/2019

TO: **AMAN AMIN, Ph.D P.E.**
BRIDGE GROUP
BRIDGE TECHNICAL SECTION, MD 636E

FEDERAL REFERENCE NO:
HIGHWAY: SR202 TRACS NO: 202 MA 044 F0124 01L
LOCATION: SANTAN FREEWAY
MP LIMITS: 41.27 TO: 57
PROJECT DESCRIPTION: I-10 TO VAL VISTA DR

FROM: **Stanley Consultants**
1661 E Camelback Rd Suite 400
Phoenix AZ 85016

SUBJECT: **BRIDGE REPAIR FORM**

Please evaluate the following structures for recommended repairs to be included within the project scope of work

ROUTE NO.	MILEPOST	STR. NO. AND NAME	Repair Recommendations					Comment
			Item of work	Quantity	Unit	Unit cost	Cost	
202L	53.75	2330 Kyrene Road TI UP	Bridge Concrete Barrier and Transition	544	LF	$150	$81,600.00	
			Barrier Transition System	4	EACH	$2,500	$10,000.00	
			Joint seal replacement	186	LF	$75	$13,950.00	
202L	51.73	2331 McClintock Road TI UP	Bridge Concrete Barrier and Transition	558	LF	$150	$83,700.00	
			Barrier Transition System	4	EACH	$2,500	$10,000.00	
202L	50.65	2613 Price Road TI UP	Bridge Concrete Barrier and Transition	528	LF	$150	$79,200.00	
			Barrier Transition System	4	EACH	$2,500	$10,000.00	
202L	51.22	2614 Chandler Village Drive UP	Bridge Concrete Barrier and Transition	618	LF	$150	$92,700.00	
			Barrier Transition System	4	EACH	$2,500	$10,000.00	
			Joint seal replacement	160	LF	$75	$12,000.00	
202L	60.98	2616 Ramp EN 1	Seal the deck with methacrylate	17892	SQ FT	$5	$89,460.00	
202L	44.59	2670 Gilbert Road TI UP	Bridge Concrete Barrier and Transition	524	LF	$150	$78,600.00	
			Barrier Transition System	4	EACH	$2,500	$10,000.00	
202L	46.6	2672 McQueen Road TI UP	Bridge Concrete Barrier and Transition	520	LF	$150	$78,000.00	
			Barrier Transition System	4	EACH	$2,500	$10,000.00	
202L	45.5	2674 Cooper Road TI UP	Bridge Concrete Barrier and Transition	524	LF	$150	$78,600.00	
			Barrier Transition System	4	EACH	$2,500	$10,000.00	

202L	49.64	2689 Dobson Road TI UP	Bridge Concrete Barrier and Transition	462	LF	$150	$69,300.00	
			Barrier Transition System	4	EACH	$2,500	$10,000.00	
			Joint seal replacement	225	LF	$75	$16,875.00	
202L	48.64	2692 Alma School Road TI UP	Bridge Concrete Barrier and Transition	420	LF	$150	$63,000.00	
			Barrier Transition System	4	EACH	$2,500	$10,000.00	
202L	161.2	2713 Ramp EN	Seal the deck with methacrylate	17892	SQ FT	$5	$89,460.00	
			Joint seal replacement	155	LF	$75	$11,625.00	
202L	161.27	2714 Ramp WS	Seal the deck with methacrylate	33348	SQ FT	$5	$166,740.00	
			Joint seal replacement	84	LF	$75	$6,300.00	
202L	161.16	2715 Ramp S-E	Seal the deck with methacrylate	53496	SQ FT	$5	$267,480.00	
			Joint seal replacement	72	LF	$75	$5,400.00	
202L	161.37	2716 I-10 EB OP	Seal the deck with methacrylate	25404	SQ FT	$5	$127,020.00	
202L	161.34	2717 I-10 WB OP	Seal the deck with methacrylate	26064	SQ FT	$5	$130,320.00	
202L	161.32	2718 Ramp NW	Seal the deck with methacrylate	26376	SQ FT	$5	$131,880.00	
			Joint seal replacement	96	LF	$75	$7,200.00	
202L	43.7	2789 Lindsay Road OP	Seal the deck with methacrylate	47320	SQ FT	$5	$236,600.00	
202L	42.5	2792 Val Vista Drive TI UP	Bridge Concrete Barrier and Transition	624	LF	$150	$93,600.00	
			Barrier Transition System	4	EACH	$2,500	$10,000.00	
						Total Cost	$2,210,610.00	

Masudur Rahman

Date 4/16/2018

APPENDIX B – DESIGN EXCEPTION REQUEST

U.S. Department
of Transportation
Federal Highway
Administration

Arizona Division

4000 N. Central Ave, Suite 1500
Phoenix, Arizona 85012-3500
(602) 379-3646
(602) 382-8998 (FAX)
http://www.fhwa.dot.gov/azdiv

May 27, 2020

In Reply Refer to:
202-C(208)T
202L MA 044 F0124 01L
SR 202L: Val Vista Drive to I-10 General Purpose Lanes (GPLs)
Design Exception Request

John S. Halikowski
Director
Arizona Department of Transportation
206 South 17th Avenue
Phoenix, AZ 85007

Attention: Michael DenBleyker, P.E.

Dear Mr. Halikowski:

We have received your letter dated May 11, 2020, requesting approval of design exceptions to be included in the referenced project. The proposed design exceptions are for shoulder width deficiencies at several locations in both the eastbound and westbound directions of SR202L. As noted in your letter and supporting documents, most of the design exceptions were previously approved on June 21, 2010, for project 202-B(202)B SR 202L, Red Mountain/Santan Freeway Gilbert Rd to I-10 HOV Lanes (SR 202L HOV Lanes).

The requested design exceptions on SR 202L mainline are:

1) Eight previously approved locations where the existing bridge piers cause the median shoulder to be less than the 10-foot width recommended by AASHTO Standards.
2) Four locations where existing overpass structures cause the median shoulder to be less than the 10-foot recommended width. These four deficiencies currently exist but were not included in the previously approved design exceptions for the SR 202L HOV Lanes project.
3) A total of 16 locations where existing sign structures cause the median shoulder to be less than the 10-foot recommended width. Two of these locations are new to this project; 14 were previously approved as part of the SR 202L HOV Lanes project.
4) One new location where the existing bridge pier causes the outside shoulder to be less than the 10-foot recommended width.
5) One existing 2.3-mile stretch with an open median with cable barrier, and 8-foot median shoulders. Per your documentation, when the SR 202L Santan Freeway was originally constructed, the 8-foot width was standard for urban areas or if the shoulder was an interim condition. The existing median shoulders were paved with AC due to their interim status.

Based on the information provided, we consider the requested design exceptions to be acceptable. While we understand that the substandard shoulder widths will be relatively permanent and that design exceptions may adversely impact overall safety, we agree that it is not practical or prudent to relocate bridge piers and sign structures as part of this project. We agree that these deficiencies are relatively minor, and are not out of character with other similar segments of the Regional Freeway System. We also agree that the benefits of constructing the additional GP lanes far outweigh the impediments of the existing and proposed decreased shoulder widths. We therefore approve the design exceptions as requested.

Sincerely,

Karla S. Petty
Division Administrator

THOMAS P DEITERING

Digitally signed by THOMAS P DEITERING
Date: 2020.05.27 13:55:15 -07'00'

By: Thomas P. Deitering

cc: Reed Henry – ADOT Pre-Design
Ron Foluch – ADOT Pre-Design
Madhav Mundle – ADOT Project Management Group
Iqbal Hossain – ADOT Contracts and Specifications
Tom Deitering – FHWA
Susan Webber - FHWA

Douglas A. Ducey, Governor
John S. Halikowski, Director
Dallas Hammit, State Engineer
Steve Boschen, Division Director

May 11, 2020

Karla Petty
Division Administrator
Federal Highway Administration
4000 North Central Ave, Suite 1500
Phoenix, AZ 85012-3500

ATTN: Susan Webber

Re: Design Exception Request
SR202L: Val Vista Drive to I-10 General Purpose Lanes (GPL
Project: 202L MA 044 F0124 01L
Federal Project No. 202-C(208)T

Dear Ms. Webber:

This project is a capacity improvement project on SR202 from Val Vista Drive to I-10. This project will provide an additional General Purpose Lane for the entire project limits from I-10 to Val Vista Drive (approximately 15 miles). Within the project limits, from SR101L to Gilbert Road (approximately 6 miles) a total of two additional GPLs will be added in each direction. ADOT's 2020-2024 Five-Year Transportation Facilities Construction Program includes a line item for the design of this work.

Design exceptions are requested to address the shoulder width design deficiencies within the project limits. Locations where the deficiencies exist are detailed in the attached letter. It is noted that a majority of the Design Exceptions have been previously approved by ADOT and FHWA. A Crash Analysis for 2015-2019 as well as crash data for that time period have been included as requested.

The attached letter and supporting documents identify the specific exception requests, evaluations, and recommendations. Based upon the information contained in the attached design exception request, ADOT believes that the proposed SR202 improvements and the associated design exceptions will result in a net improvement in the operations and safety performance of the SR202L corridor. ADOT is requesting approval of these design exceptions.

Please advise if further action is required on the above matter.

Sincerely,

Michael J. DenBleyker, P.E.
State Roadway Engineer

Attachments: Design Exception/Variance Request Letter – May 9, 2020

cc: Reed Henry – ADOT Pre-Design
Ron Foluch – ADOT Pre-Design
Madhav Mundle – ADOT Project Management Group
Iqbal Hossain – ADOT Contracts and Specification

MEMO

May 9, 2020

TO: MICHAEL DENBLEYKER, P.E.
ADOT State Roadway Engineer

THRU: REED HENRY, P.E.
ADOT Roadway Predesign Manager

THRU: MADHAV MUNDLE, P.E.
ADOT Project Manager

FROM: BRIAN D. RILEY, P.E.
STANLEY CONSULTANTS, INC.

SUBJECT: DESIGN EXCEPTION/VARIANCE REQUEST
Project No. 202L MA 044 F0124 01L
Federal Project No.202-C(208)T
SR 202L: Val Vista Drive To I-10 General Purpose Lanes (GPL)

Dear Mr. DenBleyker:

The Design Exceptions listed in this memo were identified in the AASHTO Controlling Design Criteria Report that was included with the Draft SR 202L: Val Vista Drive To I-10 General Purpose Lanes (GPL) Design Concept Report. The majority of the Design Exceptions have been previously approved by ADOT and FHWA with the Red Mountain/Santan Freeway (SR202L) Gilbert to I-10 High Occupancy Vehicle (HOV) Lanes Design Concept Report in 2010.

The requested Design Exceptions listed in this memo are justified based upon corridor consistency, driver expectation/familiarity, practical design, construction impacts to the traveling public, and consideration for project cost. Review of the latest five-year crash data suggests that 76.4% of crashes in the project limits are rear-end collisions primarily occurring at the most congested peak hours for each direction. The traffic analyses included in the DCR indicated that the added capacity provided by the general purpose lanes will alleviate traffic congestion, improving operational and safety performance overall.

We respectfully request your concurrence with the listed design exceptions and recommendations.

Sincerely,

Brian D. Riley, P.E.
Stanley Consultants, Inc.

Concur: ______________________
Michael DenBleyker, P.E.
State Roadway Engineer

Date: _______________

This report is subject to the provisions of 23 USC § 409. Any intentional or inadvertent release of this material, or any data derived from its use, does not constitute a waiver of privilege pursuant to 23 USC § 409, which reads as follows:
23 USC § 409 — Discovery and admission as evidence of certain reports and surveys Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or railway-highway crossings, pursuant to sections 130, 144, and 148 of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

PROFESSIONAL ENGINEERING SEALS

This design exception request represents the combined efforts of the following firms:

1. Stanley Consultants
2. AZTEC Engineering

A professional of each firm has affixed their seal below, which attests that portions of the work, which relate to their respective discipline area, were prepared under his/her direction**.

1. The design exception analysis and text, predictive method safety performance, and crash analysis:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
45657
BRIAN D.
RILEY
Date Signed 5/9/2020
ARIZONA, U.S.A.

2. The preliminary roadway design:

Registered Professional Engineer (Civil)
CERTIFICATE NO.
37270
JEFFREY LYLE
CALLICOTT
Date Signed 05/09/2020
ARIZONA, U.S.A.

** The previously approved design exceptions were prepared and approved by others. They are included for informational purposes only.

The State Route 202 Loop (SR202L) Santan Freeway is a major component of the Maricopa Association of Governments (MAG) Regional Transportation Plan (RTP). This segment of SR202L serves traffic from I-10, the Red Mountain Freeway (SR202L), the Price Freeway (SR101L), the Mesa-Gateway Freeway (SR24), and soon the South Mountain Freeway (SR202L). It also serves as an alternate route to the Superstition Freeway (US60) and is the closest urban freeway serving the growing communities of Chandler, Gilbert, Queen Creek, Mesa, and areas of Pinal County.

The scope of this project is to increase capacity to the SR202L by the addition of a general purpose lane (GPL) in each direction for the entire project limits from I-10 to Val Vista Drive (15 miles). Within the project limits, from SR101L to Gilbert (6 miles), a total of two additional GPLs will be added in each direction. The scoping process will be complete with the completion of the Final Design Concept Report (F0124).

The existing SR202L centerline and profile grade line would not be changed with the GPL widening of the existing pavement. The added pavement width would match the existing superelevation and pavement cross slope of the mainline SR202L. The existing ramps will require horizontal and vertical modification to tie into the widening.

The existing closed median has typical shoulder widths of 10’ between I-10 and Gilbert Road with several spot locations less than 10’. From Gilbert Road to Val Vista Drive, the open median with cable barrier has shoulder widths of 8’ in each direction, with a 4’ wide AB graded platform. There is a project planned for FY 2022 to design the high occupancy vehicle (HOV) improvements from Gilbert Road to Broadway Road that would upgrade the median shoulders to 10’. Due to the most recent rebalancing of the MAG Freeway Life Cycle Program, construction of that project has been deferred to beyond FY 2026.

Currently, this study segment of the SR202L has an annual average daily traffic (AADT) that can reach 190,000 vehicles per day with a 7% truck factor (between Dobson Road and Alma School Road). Typically, it is desirable to provide 12’ median shoulders when trucks directional design hourly volume (DDHV) exceed 250.

The portion of SR202L that has a closed median, I-10 to Gilbert Road, has previously approved spot median shoulder reductions. Those median shoulder reductions were located at median sign structure blisters and bridge piers. Those design exception locations received FHWA approval in 2010 as part of project 202 MA 016 H7457 01L (See Appendix A). This project will not modify the median shoulder at those locations nor alter the conditions that received approval in 2010. The previously approved locations will be identified in the following tables.

The crash data provided by the DCR was observed between 2013-2017. The most recent crash data provided by ADOT (2015-2019) indicated that there were 2,604 total crashes on SR 202L within the project limits. Of the 2,604 crashes, there were 2,211 (84.9%) crashes that involved multiple vehicles. Approximately 1,690 (76.4%) of the multi-car crashes were rear end collisions which is characteristic of congested corridors. The crash “heat map” from the DCR (202L MA 044 F0124 01L) is included as Appendix B, for reference only. It illustrates the even distribution of crashes with respect to traffic volumes encountered, and the absence of “hot spots” at locations where design exceptions already exist. While the heat map uses the crash data from the DCR, the most recent five-year crash data (2015-2019 – Appendix D) indicates no discernable differences in crash distribution through the corridor, either by location or severity. The crash distribution remains relatively even, without “spikes” in the most recent data, indicating a lack of crashes at any specific Design Exception location. The fatal crashes shown below are not attributed to the existing or requested design exceptions – See Appendix C for additional analysis.

Table I provides a summary of total crashes and severity on the SR 202L within the project limits from 2015 through 2019 (see Appendix D for detailed 2015-2019 crash data). The table further breaks down the crash data by direction of travel.

Table I - 2015-2019 Crash Severity							
SR 202L – Val Vista Drive to I-10							
Crash Severity (2015-2019)							
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Percentage**
Fatal	1	1	2		1	5	**0.19%**
No Injury	333	345	376	432	402	1888	**72.50%**
Possible Injury	64	59	101	87	77	388	**14.90%**

Table I - 2015-2019 Crash Severity							
Suspected Minor Injury	55	55	66	54	54	284	**10.91%**
Suspected Serious Injury	11	9	5	8	6	39	**1.50%**
Grand Total	**464**	**469**	**550**	**581**	**540**	**2604**	**100.00%**

Crash Severity (2015-2019) by Direction of Travel							
Eastbound SR 202L							
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Percentage**
Fatal	1	1	2		1	5	**0.44%**
No Injury	137	168	163	182	183	833	**73.65%**
Possible Injury	21	25	45	41	36	168	**14.85%**
Suspected Minor Injury	23	17	29	20	20	109	**9.64%**
Suspected Serious Injury	7	2	1	4	2	16	**1.41%**
Grand Total	**189**	**213**	**240**	**247**	**242**	**1131**	**100.00%**
Westbound SR 202L							
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Percentage**
Fatal	0	0	0	0	0	0	**0.0 %**
No Injury	196	177	213	250	219	1055	**71.62%**
Possible Injury	43	34	56	46	41	220	**14.94%**
Suspected Minor Injury	32	38	37	34	34	175	**11.88%**
Suspected Serious Injury	4	7	4	4	4	23	**1.56%**
Grand Total	**275**	**256**	**310**	**334**	**298**	**1473**	**100.00%**

Table II summarizes the crash type with further breakdowns by direction of travel.

Table II - 2015-2019 Crash Type SR 202L – Val Vista Drive to I-10 Crash Type (2015-2019)							
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Percentage**
Angle (front to side other than left turn)	9	11	7	1		28	**1.08%**
Head On		1	1	1		3	**0.12%**
Left Turn			2			2	**0.08%**
Other	16	10	18	32	14	90	**3.46%**
Rear End	275	319	377	364	355	1690	**64.90%**
Rear to Side			1			1	**0.04%**
Sideswipe Opposite Direction		1	2			3	**0.12%**
Sideswipe Same Direction	72	56	65	104	95	392	**15.05%**
Single Vehicle	92	71	77	78	75	393	**15.09%**
Unknown				1	1	2	**0.08%**
Grand Total	**464**	**469**	**550**	**581**	**540**	**2604**	**100%**

Crash Type by Direction (2015-2019)							
Eastbound SR 202L							
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Percentage**
Angle (front to side other than left turn)	2	5	2			9	**0.80%**
Head On						0	**0%**
Left Turn			1			1	**0.09%**
Other	6	4	8	10	4	32	**2.83%**
Rear End	118	150	162	159	159	748	**66.14%**
Rear To Side						0	**0%**
Sideswipe Opposite Direction		1	2			3	**0.27%**
Sideswipe Same Direction	28	23	27	40	45	163	**14.41%**
Single Vehicle	35	30	38	37	33	173	**15.30%**
Unknown				1	1	2	**0.18%**
Grand Total	**189**	**213**	**240**	**247**	**242**	**1131**	**100%**
Westbound SR 202L							
	2015	**2016**	**2017**	**2018**	**2019**	**Total**	**Percentage**
Angle (front to side other than left turn)	7	6	5	1		19	**1.29%**
Head On		1	1	1		3	**0.20%**
Left Turn			1			1	**0.07%**
Other	10	6	10	22	10	58	**3.94%**
Rear End	157	169	215	205	196	942	**63.95%**
Rear to Side			1			1	**0.07%**
Sideswipe Opposite Direction						0	**0%**
Sideswipe Same Direction	44	33	38	64	50	229	**15.55%**
Single Vehicle	57	41	39	41	42	220	**14.94%**
Unknown						0	**0%**
Grand Total	**275**	**256**	**310**	**334**	**298**	**1473**	**100%**

Table III is included from the DCR (202L MA 044 F0124 01L) for reference only, and summarizes crash locations by freeway segment and direction of travel.

Table III - Crash Occurrences by Segment (2013-2017) *				
SR 202L – Val Vista Drive to I-10				
	Eastbound SR 202		**Westbound SR 202**	
Note: Information sourced from the DCR per the traffic volumes studied and the observed crashes for that study period. These rates are not based on the updated 2015-2019 crash data presented above.	**Crashes**	**Crash Rate [crashes/MVMT]**	**Crashes**	**Crash Rate [crashes/MVMT]**
I-10 Interchange	15	0.117	37	0.290
I-10 to Kyrene Road	14	0.253	25	0.452
Kyrene Road Interchange	11	0.136	22	0.271
Kyrene Road to McClintock Drive	31	0.217	69	0.482
McClintock Drive Interchange	22	0.249	20	0.227
West Outer 101 Ramps to West Price Road Ramps	14	0.176	10	0.126

Table III - Crash Occurrences by Segment (2013-2017) *				
SR 202L – Val Vista Drive to I-10				
	Eastbound SR 202		**Westbound SR 202**	
Note: Information sourced from the DCR per the traffic volumes studied and the observed crashes for that study period. These rates are not based on the updated 2015-2019 crash data presented above.	**Crashes**	**Crash Rate [crashes/MVMT]**	**Crashes**	**Crash Rate [crashes/MVMT]**
West Price Road Ramps to East Price Road Ramps	7	0.106	5	0.076
East Price Road Ramps to East 101 Ramps	19	0.287	38	0.574
Dobson Road Interchange	81	0.819	70	0.708
Dobson Road to Alma School Road	73	1.236	44	0.745
Alma School Road Interchange	90	0.915	65	0.661
Alma School Road to Arizona Avenue	48	0.857	54	0.964
Arizona Avenue Interchange	48	0.453	61	0.576
Arizona Avenue to McQueen Road	26	0.433	68	1.133
McQueen Road Interchange	29	0.345	134	1.594
McQueen Road to Cooper Road	31	0.549	85	1.505
Cooper Road Interchange	90	0.996	101	1.117
Cooper Road to Gilbert Road	77	1.631	63	1.334
Gilbert Road Interchange	89	1.131	61	0.775
Gilbert Road to Val Vista Drive	227	1.332	127	0.745
Val Vista Drive Interchange	32	0.365	42	0.479

* Based on the analysis of the latest five-year crash data (2015-2019) included in Appendices C & D, and the crash distribution by milepost in Appendix D, there is no discernable difference regarding crash rates. The 2015-2019 crash data and analysis suggest crash rates will be similar for the segments above.

The final design of this project is included in the Arizona Department of Transportation's Tentative 2020-2024 Five-Year Transportation Facilities Construction Program as shown in Table IV below.

Table IV - Tentative 2020-2024 Five-Year Transportation Facilities Construction Program			
Route	**Location**	**Fiscal Year**	**Dollars ($000)**
SR 202L	Val Vista Drive to I-10 – Final Design	2022	6,000
SR 202L	Lindsay Road TI – Construct TI	2021	22,140

Under the requirements of the Design Exception and Design Variance Process Guide (ADOT) 2009, this project falls within Project Type 3 - Widen Existing Roadway (add general purpose lane/s). It also meets criteria for Project Type 2 - Reconstruct Existing Roadway (ramp modifications for widened mainline). Design exceptions were identified during the development of the DCR, against the American Association of State Highway and Transportation Officials (AASHTO) - A Policy on Geometric Design of Highways and Streets, 2011.

Table V below summarizes the design exceptions, their locations, and the discrepancies between the AASHTO requirements. At ADOT's request, previously approved design exceptions are listed and noted as such (**). Please refer to the Design Exception Approval letter dated June 21, 2010 as part of project 202 MA 016 H7457 01L for additional information. Please note that the previously approved 2010 design exceptions for median sign foundations were based on a Design Concept Report. After final design and construction, some of the actual physical locations had shifted from the original concept. In these instances, the originally proposed (in 2010) milepost is shown in brackets [MP xx.xx] in the table below.

In addition to the previously approved locations, new design exceptions are being requested at the locations shown in **bold** in Table V.

Table V - Summary of Design Exceptions

Design Feature	**Type of Exception**	**Location**	**Discrepancy from Recommended Design Value**
1.) SR 202L median shoulder width at bridge piers --Existing Deficiency--	AASHTO	MP 45.59 - MP 45.53 WB & EB Cooper Road TI MP 46.59 - MP 46.53 WB & EB McQueen Road TI MP 48.66 - MP 48.61 WB & EB Alma School Road TI MP 49.67 - MP 49.61 WB & EB Dobson Road TI MP 51.25 - MP 51.20 WB & EB Chandler Village Drive TI MP 51.76 - MP 51.71 WB & EB McClintock Road TI MP 53.76 - MP 53.71 EB Kyrene Road TI MP 53.76 - MP 53.71 WB Kyrene Road TI	2.3’ less than 10’ min. ** 2.4’ less than 10’ min. ** 2.2’ less than 10’ min. ** 2.2’ less than 10’ min. ** 2.1’ less than 10’ min. ** 2.2’ less than 10’ min. ** 2.6’ less than 10’ min. ** 2.4’ less than 10’ min. **
2.) SR 202L median shoulder width at overpass structures --Existing Deficiency--	AASHTO	**MP 46.1 - MP 46.2 WB & EB Consolidated Canal** **MP 47.4 - MP 47.5 WB & EB UPRR Crossing** **MP 47.6 - MP 47.7 WB & EB Arizona Avenue TI** **MP 54.73 - MP 54.75 WB & EB 56th Street Crossing**	**0.7’ less than 10’ min.***** **0.7’ less than 10’ min.***** **0.7’ less than 10’ min.***** **0.7’ less than 10’ min.*****
3.) SR 202L median shoulder width at sign structures -14 Existing Deficiencies- **-2 Proposed Deficiencies-**	AASHTO	MP 46.0 [MP 47.1] EB & WB SR 202L MP 46.1 [MP 48.1] EB & WB SR 202L MP 49.1 [MP 49.5] EB & WB SR 202L MP 49.2 [MP 49.9] EB & WB SR 202L MP 51.4 [MP 51.3] EB & WB SR 202L MP 51.5 EB & WB SR 202L MP 52.4 [MP 52.3] EB & WB SR 202L MP 52.6 EB & WB SR 202L MP 52.7 EB & WB SR 202L MP 52.9 EB & WB SR 202L MP 54.1 EB & WB SR 202L **MP 54.3 EB & WB SR 202L** MP 54.5 EB & WB SR 202L **MP 54.52 EB & WB SR 202L** MP 54.6 EB & WB SR 202L MP 54.9 EB & WB SR 202L	1’ less than 10’ min. ** 1’ less than 10’ min. ** 1’ less than 10’ min. ** 1’ less than 10’ min. ** 1’ less than 10’ min. ** 1’ less than 10’ min. ** 1’ less than 10’ min. ** 1’ less than 10’ min. ** 1’ less than 10’ min. ** 1’ less than 10’ min. ** 1’ less than 10’ min. ** **1’ less than 10’ min.** 1’ less than 10’ min. ** **1’ less than 10’ min.** 1’ less than 10’ min. ** 1’ less than 10’ min. **
4.) SR 202L outside shoulder width at bridge pier **--Proposed Deficiency--**	AASHTO	**MP 55.21 EB SR 202L**	**1’ less than 10’ min.**
5.) SR 202L median shoulder width --Existing Deficiency--	AASHTO	**MP 44.8 to MP 42.5 EB & WB SR202L**	**2’ less than 10’ min.**

** Exception previously approved by FHWA for project 202 MA 016 H7457 01L and will not be modified by this project.
*** Deficiency is currently an existing condition that was not included in the Design Exception Letter for project 202 MA 016 H7457 01L in 2010. The deficiency was noted with this project and included in this request accordingly.
[MP X.X] = Originally intended exception location from 2010 Design Exception Request Letter for project 202 MA 016 H7457 01L
Newly requested design exceptions shown **BOLD**.

The following sections 1 through 5 provide additional detail and justification for each type of design exception being requested.

1.) Design Exception: SR 202L Median Shoulder Width at Bridge Piers

--EXISTING DEFCIENCY--

The SR 202L median shoulder width would be less than the AASHTO recommended 10-foot minimum. Those locations are shown in the following table:

Design Feature	Type of Exception	Location	Discrepancy from Recommended Design Value
1.) SR 202L median shoulder width at bridge piers	AASHTO	MP 45.59 - MP 45.53 WB & EB Cooper Road TI	2.3' less than 10' min. **
		MP 46.59 - MP 46.53 WB & EB McQueen Road TI	2.4' less than 10' min. **
		MP 48.66 - MP 48.61 WB & EB Alma School Road TI	2.2' less than 10' min. **
		MP 49.67 - MP 49.61 WB & EB Dobson Road TI	2.2' less than 10' min. **
		MP 51.25 - MP 51.20 WB & EB Chandler Village Drive TI	2.1' less than 10' min. **
		MP 51.76 - MP 51.71 WB & EB McClintock Road TI	2.2' less than 10' min. **
		MP 53.76 - MP 53.71 EB Kyrene Road TI	2.6' less than 10' min. **
		MP 53.76 - MP 53.71 WB Kyrene Road TI	2.4' less than 10' min. **
** Exception previously approved by FHWA for project 202 MA 016 H7457 01L and will not be modified by this project.			

General Description

The existing SR 202L median shoulder width is a continuous 10' throughout the project limits. At freeway underpass locations, the median shoulder width narrows to accommodate the bridge piers. This condition occurs at seven bridge locations within the project limits. Removal of existing bridge piers or bridge pier barrier is not included in this project.

Justification

- These locations were previously approved as Design Exceptions in 2010 (Project No. 202 MA 016 H7457 01L). The project was constructed in 2012 and the deficiencies have been the existing condition since 2012.
- By adding 2.6' of width to the median shoulder, the mainline lanes would be shifted out the same amount toward the outside shoulder. This would place the existing longitudinal PCCP joints under the wheel path for all lanes for the entire corridor. This condition would place larger stresses on the edges of PCCP slabs which will likely result in decreased pavement life.
- By adding 2.6' of shoulder width to each direction for the entire corridor (~15 mi.) would add significant construction cost to the project (~$30,000,000 additional cost) and result in providing a wider shoulder (12.6') than required for all locations other than the underpasses. The AASHTO Green Book discourages the use of shoulders wider than 10' as this may encourage unauthorized use as a travel lane.
- By adding 2.6' of shoulder width at only the underpass locations would result in multiple striping transitions shifting all lanes of traffic out from the 10' shoulder and then back into the 10' on the other side of the underpass.
- Narrowing the lane width of three mainline lanes from 12' to 11' could provide the 10' median shoulder width. This would affect a majority of the freeway users rather than the few distressed vehicles that would seek to use the median shoulder. However, this option would trigger the need for a different design exception (lane width).

- The average length of the narrowed shoulder is approximately 300', which includes the median barrier transition length and bridge width.
- The 2.1'-2.6' median shoulder deficiency is characteristic of the urban freeway system in the metropolitan area, the SR202L corridor, and it is the existing condition.
- There is no noticeable crash pattern associated with the median shoulder width at bridge piers. See Crash Analysis in Appendix C.

Crash Data

Utilizing the Highway Safety Manual (HSM) Chapter 18 – Predictive Method for Freeways, inside shoulder reductions were reviewed and Crash Modification Factors (CMFs) were calculated using equation 18-26. They are tabulated as follows:

Inside Shoulder Width	Crash Modification Factor (CMF)		Percent Increase in Likelihood from AASHTO Value	
*** See Eqn 18-26 in HSM**	Fatal / Injury	Property Damage Only	Fatal / Injury	Property Damage Only
6' – HSM Baseline	1.0000	1.0000		
10' – AASHTO Minimum	0.93351	0.94064	0%	0%
7.4' – Proposed Shoulder	0.97621	0.97881	4.57%	4.06%

The purpose of this analysis was to identify how a change in inside shoulder width from 10 feet to 7.4 feet for eight separate freeway underpass locations within the project limits affects crash frequency and severity. The spot locations are approximately 300' long with generally one-mile separation. AASHTO's minimum inside shoulder width of 10' has a CMF=0.9335 for fatal/injury (F/I) crashes and a CMF=0.9406 for property damage only (PDO) crashes. The HSM uses a 6' shoulder as a baseline where the CMF for both F/I and PDO crashes equals 1.0000. For the existing 7.4' median shoulder, the F/I CMF=0.9762 and the PDO CMF=0.9788. When these values are compared against the CMFs for the AASHTO 10' requirement, the result is that a 7.4' shoulder has a 4.57% potential increase in occurrence of F/I crashes and a 4.06% increase in PDO crashes. In review of the crash data, there does not appear to be a correlation between crash frequency/type and the narrowed shoulder at underpass locations (See Appendix C for analysis). It should be noted that the percent increase shown above is not likely to be observed since the calculated increase represents implementing a 7.4' shoulder from a 10' shoulder. The 7.4' shoulder has already been implemented. These spot shoulder reductions are the existing condition and the design exceptions have been previously approved by ADOT & FHWA.

Mitigation Measures

The above locations were approved as design exceptions in 2010. The DCR for 202 MA 044 F0124 01L recommends upgraded LED lighting throughout the project limits as well as upgraded signing using Type XI retroreflective sheeting. The final design team could consider installing reflective markers at locations with reduced shoulder width.

2.) Design Exception: SR 202L Median Shoulder Width at Overpasses

--EXISTING DEFCIENCY--

The SR 202L median shoulder width would be less than the AASHTO recommended 10-foot minimum. Those locations are shown in the following table:

Design Feature	**Type of Exception**	**Location**	**Discrepancy from Recommended Design Value**
2.) SR 202L median shoulder width at overpass structures	AASHTO	**MP 46.1 - MP 46.2 WB & EB Consolidated Canal**	**0.7' less than 10' min.**
		MP 47.4 - MP 47.5 WB & EB UPRR Crossing	**0.7' less than 10' min.**
		MP 47.6 - MP 47.7 WB & EB Arizona Avenue TI	**0.7' less than 10' min.**
		MP 54.73 - MP 54.75 WB & EB 56th Street Crossing	**0.7' less than 10' min.**

General Description

The existing SR 202L median shoulder width is a continuous 10' throughout the project limits. At freeway overpass locations, the median shoulder width narrows ~0.7' to accommodate back to back bridge barriers. The overpass structures are typically independent eastbound and westbound structures requiring two half barriers constructed back to back. This condition occurs at four bridge locations within the project limits. Removal of existing bridge barrier is not included in this project.

Justification

- The 0.7' median shoulder deficiency is the existing condition and is characteristic of the urban freeway system in the metropolitan area and the SR202L corridor. These four deficiency locations are existing and do not present any noticeable crash pattern (See Appendix C for analysis). When the project was designed and constructed, the minimum inside shoulder was 8'. AASHTO criteria has been updated and now these shoulders are deficient by 0.7'.
- By adding 0.7' of width to the median shoulder, the mainline lanes would be shifted out the same amount toward the outside shoulder. This would place the existing longitudinal PCCP joints closer to the wheel path for all lanes for the entire corridor. This condition would place larger stresses on the edges of PCCP slabs which will likely result in decreased pavement life.
- By adding 0.7' of shoulder width to each direction for the entire corridor (~15 mi.) would add significant construction cost to the project (~$8,000,000 additional cost) and result in providing a wider shoulder (10.7') than required for all locations other than the overpasses.
- By adding 0.7' of shoulder width at only the overpass locations would result in multiple striping transitions shifting all lanes of traffic out from the 10' shoulder and then back into the 10' on the other side of the overpass.
- Narrowing lane width of two mainline lanes from 12' to 11.65' could provide the 10' median shoulder width. This would affect a high percentage of the freeway users rather than the few distressed vehicles that would seek to use the median shoulder. This option would trigger the need for a different design exception (lane width).
- The average length of the narrowed shoulder is approximately 275', which includes the median barrier transition length and bridge length.

Crash Data

Utilizing the Highway Safety Manual (HSM) Chapter 18 – Predictive Method for Freeways, inside shoulder reductions were reviewed and Crash Modification Factors (CMFs) were calculated using equation 18-26. They are tabulated as follows:

Inside Shoulder Width	Crash Modification Factor (CMF)		Percent Increase in Likelihood from AASHTO Value	
*** See Eqn 18-26 in HSM**	Fatal / Injury	Property Damage Only	Fatal / Injury	Property Damage Only
6' – HSM Baseline	1.0000	1.0000		
10' – AASHTO Minimum	0.93351	0.94064	0%	0%
9.3' – Proposed Shoulder	0.94482	0.95076	1.21%	1.08%

The purpose of this analysis was to identify how a change in inside shoulder width from 10 feet to 9.3 feet for four separate freeway overpass locations within the project limits affects crash frequency and severity. The spot locations are approximately 275' long. AASHTO's minimum inside shoulder width of 10' has a CMF=0.9335 for fatal/injury (F/I) crashes and a CMF=0.9406 for property damage only (PDO) crashes. The HSM uses a 6' shoulder as a baseline where the CMF for both F/I and PDO crashes equals 1.0000. For the existing 9.3' median shoulder, the F/I CMF=0.9448 and the PDO CMF=0.9508. When these values are compared against the CMFs for the AASHTO 10' requirement, the result is that a 9.3' shoulder has a 1.21% potential increase in occurrence of F/I crashes and a 1.08% increase in PDO crashes. In review of the crash data, there does not appear to be a correlation between crash frequency/type and the narrowed shoulder at the four overpass locations. It should be noted that the percent increase shown above is not likely to be observed since the calculated increase represents implementing a 9.3' shoulder from a 10' shoulder. The 9.3' shoulder has already been implemented, as these spot shoulder reductions are the existing condition and there are no noticeable crash patterns associated with this deficiency. See Crash Analysis in Appendix C.

Mitigation Measures
The existing condition will remain. The DCR for 202 MA 044 F0124 01L recommends upgraded LED lighting throughout the project limits as well as upgraded signing using Type XI retroreflective sheeting. The final design team could consider installing reflective markers at locations with reduced shoulder width.

3.) Design Exception: SR 202L Median Shoulder Width at Sign Structures

--EXISTING DEFCIENCY & PROPOSED DEFICIENCY--
The SR 202L median shoulder width would be less than the AASHTO recommended 10-foot minimum. Those locations are shown in the following table:

Design Feature	Type of Exception	Location	Discrepancy from Recommended Design Value
3.) SR 202L median shoulder width at sign structures	AASHTO	MP 46.0 [MP 47.1] EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 46.1 [MP 48.1] EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 49.1 [MP 49.5] EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 49.2 [MP 49.9] EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 51.4 [MP 51.3] EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 51.5 EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 52.4 [MP 52.3] EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 52.6 EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 52.7 EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 52.9 EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 54.1 EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 54.3 EB & WB SR 202L (64' long)	**1' less than 10' min.**
		MP 54.5 EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 54.52 EB & WB SR 202L (64' long)	**1' less than 10' min.**
		MP 54.6 EB & WB SR 202L (64' long)	1' less than 10' min. **
		MP 54.9 EB & WB SR 202L (64' long)	1' less than 10' min. **

** Exception previously approved by FHWA for project 202 MA 016 H7457 01L and will not be modified by this project.
[MP X.X] = Originally intended exception location from 2010 Design Exception Request Letter for project 202 MA 016 H7457 01L
Newly requested design exceptions shown **BOLD**.

General Description
The existing SR 202L median shoulder width is a continuous 10' throughout the project limits. At freeway sign bridge or DMS locations, the median shoulder width narrows to a width of 9.0' to accommodate the median sign foundation. Removal of median sign structures is not included in this project. The locations identified in the table above are existing sign locations with the exception of two new locations presented in the sign concept plans from the SR 202L Design Concept Report (F0124).

Justification

- Fourteen of the locations have previously been approved as Design Exceptions (H7457) in 2010. Those 14 locations were constructed in 2012 and have been the existing condition since 2012.
- Two proposed locations are in close proximity (~1,000') to existing median sign foundations and are

consistent with driver expectation.

- The two proposed locations occur in a segment of the SR 202L with one of the lowest crash rates within the project limits (0.45 crash/million vehicle miles – see Table III).
- By adding 1.0’ of width to the median shoulder, the mainline lanes would be shifted out the same amount toward the outside shoulder. This would place the existing longitudinal PCCP joints closer to the wheel path for all lanes for the entire corridor. This condition would place larger stresses on the edges of PCCP slabs which will likely result in decreased pavement life.
- By adding 1.0’ of shoulder width to each direction for the entire corridor (~15 mi.) would add significant construction cost to the project (~$11,500,000 additional cost) and result in providing a wider shoulder (11.0’) than required for all locations other than at the median sign structures.
- By adding 1.0’ of shoulder width at only the median sign structure locations would result in multiple striping transitions shifting all lanes of traffic out from the 10’ shoulder and then back into the 10’ on the other side of the median sign structure.
- Narrowing lane width of two mainline lanes from 12’ to 11.5’ could provide the 10’ median shoulder width. This would affect a high percentage of the freeway users rather than the few distressed vehicles that would seek to use the median shoulder. This option would trigger the need for a different design exception (lane width).
- The average length of the narrowed shoulder is approximately 64’, which includes the median barrier transition length and sign foundation length.
- The 1.0’ median shoulder deficiency is characteristic of the urban freeway system in the metropolitan area, the SR202L corridor, and it is the existing condition for all but two of the locations. There are no noticeable crash patterns associated with this deficiency. See Crash Analysis in Appendix C.

Crash Data

Utilizing the Highway Safety Manual (HSM) Chapter 18 – Predictive Method for Freeways, inside shoulder reductions were reviewed and Crash Modification Factors (CMFs) were calculated using equation 18-26. They are tabulated as follows:

Inside Shoulder Width	Crash Modification Factor (CMF)		Percent Increase in Likelihood from AASHTO Value	
*** See Eqn 18-26 in HSM**	Fatal / Injury	Property Damage Only	Fatal / Injury	Property Damage Only
6’ – HSM Baseline	1.0000	1.0000		
10’ – AASHTO Minimum	0.93351	0.94064	0%	0%
9’ – Proposed Shoulder	0.94971	0.95514	1.73%	1.54%

The purpose of this analysis was to identify how a change in inside shoulder width from 10 feet to 9 feet for various median sign foundation locations within the project limits affects crash frequency and severity. The spot locations are approximately 64’ long. AASHTO’s minimum inside shoulder width of 10’ has a CMF=0.9335 for fatal/injury (F/I) crashes and a CMF=0.9406 for property damage only (PDO) crashes. The HSM uses a 6’ shoulder as a baseline where the CMF for both F/I and PDO crashes equals 1.0000. For a 9’ median shoulder, the F/I CMF=0.9497 and the PDO CMF=0.9551. When these values are compared against the CMFs for the AASHTO 10’ requirement, the result is that a 9’ shoulder has a 1.73% potential increase in occurrence of F/I crashes and a 1.54% increase in PDO crashes. The 9’ shoulder has been implemented at approximately 14 sign foundation locations, as these spot shoulder reductions are the existing condition and design exceptions have been previously approved by ADOT & FHWA. This project will add two additional foundation locations as shown in **bold** above. In review of the crash data, there does not appear to be a correlation between crash frequency/type and the narrowed shoulder at the existing sign foundation locations. The two proposed locations are in close proximity to existing locations and should not adversely affect driver expectation. There are no noticeable patterns in crashes at the existing 14 locations, therefore a crash pattern is not anticipated at the two proposed locations (See Appendix C for analysis).

Mitigation Measures

The existing condition at the 14 locations will remain. Two new locations are proposed in-kind. The DCR for 202

MA 044 F0124 01L recommends upgraded LED lighting throughout the project limits as well as upgraded signing using Type XI retroreflective sheeting. The final design team could consider installing reflective markers at locations with reduced shoulder width.

4.) Design Exception: SR 202L Outside Shoulder Width at Bridge Pier

--PROPOSED DEFICIENCY--

The SR 202L outside shoulder width would be less than the AASHTO recommended 10-foot minimum. The location is shown in the following table:

Design Feature	Type of Exception	Location	Discrepancy from Recommended Design Value
4.) SR 202L outside shoulder width at bridge pier	AASHTO	**MP 55.21 EB SR 202L**	**1' less than 10' min.**

General Description

The existing SR 202L outside shoulder width is a continuous 10' (12' where barrier is present) throughout the project limits. There is a spot location on a SR202L horizontal curve within the I-10 / SR 202L system interchange (MP 55.21) where the outside shoulder of the proposed eastbound GPL must narrow to a width of 9.0' to avoid an existing bridge pier of the Ramp S-E flyover. The length of the narrowed shoulder is approximately 95', which includes the outside shoulder taper in and out of the 9' width. Removal or relocation of the bridge pier is not included in this project.

Justification

- By adding 1.0' of shoulder width to the outside at this location would result in either the reconfiguration and reconstruction of the HOV flyover abutment, or realignment and reconstruction of a lengthy portion of the Ramp S-E structure. This would add significant construction cost and complexity to the project.
- Reviewing the crash data, there has not been a crash at this location in the last five years. Additionally, this segment has one of the lowest crash rates in the project limits (0.29 crash/million vehicle miles – see Table III).
- Narrowing lane width of two mainline lanes from 12' to 11.5' could provide the 10' outside shoulder width. This would affect a high percentage of the freeway users rather than the few distressed vehicles that would seek to use the outside shoulder. This option would trigger the need for a different design exception (lane width).
- The location is a spot location rather than a lengthy stretch of reduced shoulder. The length of the narrowed shoulder is approximately 95', which includes the outside shoulder taper in and out of the 9' width. Additionally, it is located on the inside of a horizontal curve. The horizontal stopping sight distance would still meet the 65 MPH design speed.

Crash Data

Utilizing the Highway Safety Manual (HSM) Chapter 18 – Predictive Method for Freeways, an outside shoulder reduction was reviewed and Crash Modification Factors (CMFs) were calculated using equation 18-42. They are tabulated as follows:

Inside Shoulder Width	Crash Modification Factor (CMF)		Percent Increase in Likelihood from AASHTO Value	
*** See Eqn 18-42 in HSM**	Fatal / Injury	Property Damage Only	Fatal / Injury	Property Damage Only
10' – HSM Baseline	1.0000	1.0000		
10' – AASHTO Minimum	1.0000	1.0000	0%	0%
9' – Proposed Shoulder	1.09385	1.08763	9.38%	8.76%

The purpose of this analysis was to identify how a change in outside shoulder width from 10 feet to 9 feet for a spot bridge column location within the project limits affects crash frequency and severity. The spot location is approximately 95' long – including tapers. AASHTO's minimum outside shoulder width of 10' has a CMF=1.0000 for fatal/injury (F/I) crashes and a CMF=1.0000 for property damage only (PDO) crashes. The HSM uses a 10' shoulder as a baseline where the CMF for both F/I and PDO crashes equals 1.0000. For a 9' outside shoulder, the F/I CMF=1.09385 and the PDO CMF=1.08763. When these values are compared against the CMFs for the AASHTO 10' requirement, the result is that a 9' shoulder has a 9.83% potential increase in occurrence of F/I crashes and an 8.76% increase in PDO crashes. In review of the crash data, this location has zero crashes within the five-year period reviewed. Since this is a proposed outside shoulder narrowing, the crash frequency and severity are predicted to increase as indicated above. However, a small incremental increase to this spot location of zero crashes results in negligible change in safety and operational performance.

Mitigation Measures

The DCR for 202 MA 044 F0124 01L recommends upgraded LED lighting throughout the project limits as well as upgraded signing (using Type XI retroreflective sheeting). The final design team could consider installing reflective markers at locations with reduced shoulder width.

5.) Design Exception: SR 202L Median Shoulder Width

--EXISTING DEFCIENCY--

The SR 202L median shoulder width would be less than the AASHTO recommended 10-foot minimum. Those locations are shown in the following table:

Design Feature	Type of Exception	Location	Discrepancy from Recommended Design Value
5.) SR 202L median shoulder width	AASHTO	**MP 44.8 to MP 42.5 EB & WB SR202L**	**2' less than 10' min.**

General Description

Between Gilbert Road and Val Vista Drive, the existing SR 202L has an open median with cable barrier where the inside shoulder widths are 8' throughout the milepost limits shown above. When originally constructed, this was the standard for urban areas, or if the shoulder was an interim condition. Subsequent revisions to ADOT Roadway Design Guidelines have increased the required median shoulder width to 10'. The median shoulders were constructed of asphalt concrete (AC) due to their interim status. Removal of the existing AC median shoulders is not included in this project.

Justification

- There is a project planned for FY 2022 to design the high occupancy vehicle (HOV) improvements from Gilbert Road to Broadway Road that would upgrade the median shoulders to 10'. Due to the most recent rebalancing of the MAG Freeway Life Cycle Program, construction of that project has been deferred to beyond FY 2026.
- The existing median has shoulder widths of 8' in each direction, with a 4' wide AB graded platform, creating a 12' wide unobstructed swath for each direction. The 8' median shoulder was constructed in 2006. There is no noticeable operational or safety performance issue in this stretch of freeway that can be attributed to median shoulder width – See Appendix C for analysis.
- By adding 2' of shoulder width to each direction for the entire length of the 8' shoulder would add significant construction cost (~$1,000,000 additional cost) that is throw-away when the HOV project is constructed.
- Narrowing lane width of two mainline lanes from 12' to 11' could provide the 10' median shoulder width. This would affect a high percentage of the freeway users rather than the few distressed vehicles that would

seek to use the median shoulder. This option would trigger the need for a different design exception (lane width).

- This stretch of the SR202L is characteristic of the open medians with cable barrier within the urban freeway system in the metropolitan area, and it is the existing condition. Additionally, the 8' median shoulder is an interim condition. A planned HOV improvement project will mitigate the median shoulder width deficiency. Design of the HOV project from Broadway Road to Gilbert Road is included in the State's five-year program (Item# 8897, Pre-Design FY2021, Design FY2022), but the construction was moved out beyond the current five-year program.

Crash Data

Utilizing the Highway Safety Manual (HSM) Chapter 18 – Predictive Method for Freeways, inside shoulder reductions were reviewed and Crash Modification Factors (CMFs) were calculated using equation 18-26. They are tabulated as follows:

Inside Shoulder Width	Crash Modification Factor (CMF)		Percent Increase in Likelihood from AASHTO Value	
*** See Eqn 18-26 in HSM**	Fatal / Injury	Property Damage Only	Fatal / Injury	Property Damage Only
6' – HSM Baseline	1.0000	1.0000		
10' – AASHTO Minimum	0.93351	0.94064	0%	0%
8' – Proposed Shoulder	0.96618	0.96986	3.50%	3.11%

The purpose of this analysis was to identify how a difference in inside shoulder width from 10 feet to 8 feet for a 2.1-mile segment within the project limits affects crash frequency and severity. AASHTO's minimum inside shoulder width of 10' has a CMF=0.9335 for fatal/injury (F/I) crashes and a CMF=0.9406 for property damage only (PDO) crashes. The HSM uses a 6' shoulder as a baseline where the CMF for both F/I and PDO crashes equals 1.0000. For the existing 8' median shoulder, the F/I CMF=0.9662 and the PDO CMF=0.9699. When these values are compared against the CMFs for the AASHTO 10' requirement, the result is that an 8' shoulder has a 3.50% potential increase in occurrence of F/I crashes and a 3.11% increase in PDO crashes. In review of the crash data (Appendix C), there does not appear to be a correlation between crash frequency/type and the existing 8' wide shoulder between Val Vista Drive and Gilbert Road. It should be noted that the percent increase shown above is not likely to be observed since the calculated increase represents implementing an 8' shoulder from a 10' shoulder. The 8' shoulder has already been implemented and is the existing condition.

Mitigation Measures

The existing condition will remain. The DCR for 202 MA 044 F0124 01L recommends upgraded LED lighting throughout the project limits as well as upgraded signing using Type XI retroreflective sheeting. The final design team could consider installing reflective markers at locations with reduced shoulder width.

Conclusion

The majority of the Design Exceptions listed in this memo were identified in the AASHTO Controlling Design Criteria Report that was included with the SR 202L Red Mountain/Santan Freeway, Gilbert to I-10 High Occupancy Vehicle (HOV) Lanes Design Concept Report (DCR). The DCR, AASHTO Report, and Design Exception Request were all approved by ADOT and FHWA in 2010.

The requested Design Exceptions listed in this memo are justified based upon corridor consistency, driver expectation/familiarity, practical design approaches, impact on the traveling public, and project construction costs.

There is no apparent correlation between crash frequency/type with the documented design exceptions listed above (See Appendix C).

The proposed improvements that result in new spot location deficiencies are based on geometries that will result in the improvement of operations and safety performance of the SR202L corridor.

The proposed improvements and additional capacity provided by the GPLs will reduce congestion thus reducing rear-end collisions that are prevalent on congested facilities, resulting in improved operational and safety performance of the SR202L system.

Project costs to mitigate the design exceptions are as follows:

- Freeway underpass locations: Median shoulder width design exceptions for the 2.6’ deficiency (total of 5.2’ – 2.6’ in each direction for entire length of project), the project cost would increase approximately $30,000,000 (not including right-of-way). Cost does not include bridge demolition/reconstruction if there is insufficient span width at freeway underpasses. This would mitigate both the 2.6’ deficiency and the 0.7’ deficiency. A separate cost to mitigate the 0.7’ deficiency was not considered as it would not mitigate the 2.6’ deficiency.
- To mitigate the 1.0’ outside shoulder deficiency would require the closure of a key flyover and extensive bridge reconstruction, the total cost of which is difficult to determine due to significant impact on system operations, public opinion, and construction cost.

We respectfully request your concurrence with the above listed design exceptions and recommendations.

Sincerely,

Brian D. Riley

Date: 05/09/2020

APPENDIX A

Approved Design Exception Request Letter for project 202 MA 016 H7457 01L
2010

U.S. Department of Transportation
Federal Highway Administration

ARIZONA DIVISION

4000 N. Central Avenue Buren
Suite 1500
Phoenix, Arizona 85004-0674
602-379-3646

June 21, 2010

In Reply Refer To:
HOP-AZ

Project NH-202-B(BCC)
SR 202L, Red Mountain /Santan Freeways
Gilbert Rd to I-10 HOV Lanes
Design Exception Approval

Ms. Mary Viparina, P.E.
Assistant State Engineer
ADOT Intermodal Transportation Division
Roadway Engineering Group
206 South 17th Avenue
Phoenix, Arizona 85007-3213

Dear Ms. Viparina:

Your June 1, 2010 letter, pertaining to Project NH-202-B(BCC) [TRACS No. 202L MA 016 H7457 01L] located on SR 202L (Red Mountain / Santan Freeways) from Interstate 10 (I-10) to Gilbert Road, requested Federal Highway Administration (FHWA) approval of design exceptions involving horizontal stopping sight distances and median shoulder widths which are less than recommended by AASHTO standards. The deficiencies documented in the report will be created through the construction of High Occupancy Vehicle (HOV) lanes and directional HOV ramps at 3 system interchanges on the Loop 202 Freeway.

The requested design exceptions on the SR 202L Mainline are the following:

1) A total of 5 curve locations were identified that required a design exception for horizontal stopping sight distance that did not meet the AASHTO minimum requirements.

2) There are a total of 48 locations where existing bridge piers cause the shoulder to be less than the 10-ft. width recommended by AASHTO Standards.

3) There are three locations where the median shoulder width was reduced below the AASHTO recommended minimum of 10-ft. to provide for the HOV ramps.

4) A total of 72 locations were identified in which the median barrier was widened to accommodate the overhead sign supports. The widened barrier causes reduced shoulder widths by one foot, and are thus below the 10-ft. AASHTO recommended minimum.

The requested design exceptions on the SR 202L HOV Ramps are the following:

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JUN 24 2010
Roadway Predesign Section

1) A total of 10 curve locations were identified in which the stopping sight distance for the HOV lane is less than the AASHTO recommended minimums due to the presence of the concrete median barrier.

2) Two locations were identified in which the ramp's width for the left shoulder is below the AASHTO recommended 6-ft.

We have considered the design exceptions request and the supporting information. While we realize that the substandard shoulder widths and sight distances created will be relatively permanent – not likely to be corrected (widened or restored) for a long period into the future – and while we also realize that the design exceptions may adversely affect overall safety, we agree that it is not practical or prudent to relocate piers, replace structures, or reconstruct and realign the SR 202L under this project. Further, we believe these deficiencies are relatively minor, and are not out of character with other segments of the Regional Freeway System that has had HOV lanes constructed. Lastly, we strongly believe that the benefits of constructing HOV lanes to the traveling public far outweigh the disadvantages of creating minor reductions in sight distances and shoulder widths. Accordingly, we hereby approve the design exceptions as requested.

If you have any question regarding this design exception approval, please contact Tom Deitering at 602.382.8971.

Sincerely yours,
TOM DEITERING

Kenneth H. Davis
FHWA Operations Manager

cc:

Larry Langer, Valley Project Management Manger	(MD614E)
Don Gorman, Project Manager,	(MD 614E)
Barry Crockett, Contracts and Specifications	(MD 121F)
Marta Raiford, Predesign Records Retention	(MD 605E)

ecc:
TDeitering
SGordon
KDavis
AHansen
TDeitering:cdm

Arizona Department of Transportation

Intermodal Transportation Division

206 South Seventeenth Avenue Phoenix, Arizona 85007-3213

ADOT

Janice K. Brewer
Governor

John S. Halikowski
Director

Floyd Roehrich Jr.
State Engineer

June 1, 2010

Robert E Hollis
Division Administrator
Federal Highway Administration
ATTN: Tom Deitering
4000 North Central Ave.
Suite 1500
Phoenix, AZ 85012-1906

Subject: DESIGN EXCEPTION REQUEST
Project Number: 202L MA 016 H7457 01L
Federal Aid ID Number: 202-B(202)B
Red Mountain/Santan Freeway (SR 202L)
Gilbert to I-10 High Occupancy Vehicle (HOV) Lanes

Dear Mr. Deitering

This project would construct additional HOV lanes on SR 202L (Red Mountain Freeway) from Gilbert Road to US 60 and on SR 202L (Santan Freeway) from US 60 to I-10. The project also includes the construction of directional HOV ramps at the US 60, SR 101L and I-10 system traffic interchanges.

The following roadway construction project is included in the ADOT Five Year Transportation Facilities Construction Program (2010-2014) SR 202L Santan:

- MP 49.64 to MP 55.34, Dobson to I-10 HOV Lanes, Construct HOV Lanes, $42,000,000, FY '13

The following roadway construction projects are included in the ADOT 20 Year Transportation Regional Transportation Plan Freeway Program (2010-2025) but the Fiscal Year has not yet been determined and is currently being evaluated to balance anticipated revenue and project costs. The updated Regional Transportation Plan Freeway Program (RTPFP) is anticipated in July 2010. The projects on the SR 202L Santan and Red Mountain are:

- MP 42.49 to MP 49.64, Val Vista Drive to Dobson Road, Construct HOV Lanes, $35,000,000, TBD
- MP 50.08 to MP 50.76, SR 101L/Price TI, Construct HOV Lanes, $21,200,000, FY TBD
- MP 30.57 to MP 42.49, US 60 Superstition to Val Vista Drive, Construct HOV Lanes, $55,000,000, FY TBD
- MP 16.28 to MP 21.09, Gilbert Road to Higley Road, Construct HOV Lanes, $25,000,000, FY TBD
- MP 21.09 to MP 30.57, Higley Road to US 60, Construct HOV Lanes, $50,000,000, FY TBD
- MP 30.54 to MP 31.01, US 60, Superstition TI, Construct HOV Lanes, $21,200,000, FY TBD

A design exception is requested per the attached Design Exception Request Memorandum and AASHTO Controlling Design Criteria Report. A Crash Analysis for the Design Exception Report has been prepared and is also attached. Though the Crash Analysis cannot account for the proposed features, the evaluation of the crash data in the design exception segments did not reveal crash patterns that would correlate with the exiting roadway features. These projects will construct HOV lanes on SR 202L from Gilbert Road to I-10.

Please advise if further action is required on the above matter.

Sincerely,

Mary Viparina

Mary Viparina, P.E.
Assistant State Engineer
Roadway Engineering Group

Attachment:
1. Design Exception Request Memorandum with concurrence of the Assistant State Engineer, Roadway Group.
2. Crash Analysis for Design Exception Report
3. AASHTO Controlling Design Criteria Report

CC:	Project Manager, Don Gorman	MD EM01
	Contracts & Specifications, Barry Crockett	MD 121F
	Roadway Predesign Manager, Paul O'Brien	MD 605E
	Predesign Record Retention, Marta Raiford	MD 605E

AECOM

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June 1, 2010

TO: Mary Viparina, MP 611E MAV
Assistant State Engineer
Roadway Engineering Group

THRU: Paul O'Brien, MD 605E Initial: PAO 6/2/10
Manager
Roadway Predesign Section

THRU: Don Gorman, MD EM01 Initial: DG 6/2/2010
Project Manager
Valley Project Management

FROM: Robert Ringwald
AECOM

SUBJECT: DESIGN EXCEPTION REQUEST
Project Number: 202L MA 016 H7457 01L
Federal Aid ID Number: 202-B(202)B
Red Mountain/Santan Freeway (SR 202L)
Gilbert to I-10 High Occupancy Vehicle (HOV) Lanes

The following roadway construction project is included in the ADOT Five Year Transportation Facilities Construction Program (2010-2014) SR 202L Santan:

- MP 49.64 to MP 55.34,Dobson to I-10 HOV Lanes, Construct HOV Lanes, $42,000,000, FY '11

The following roadway construction projects are included in the ADOT regional Transportation Plan Freeway Program (2010-2025) but the Fiscal Year has not yet been determined and is currently being evaluated to balance anticipated revenue and project costs. The updated Regional Transportation Plan Freeway Program (RTPFP) is anticipated in July 2010. The projects on the SR 202L Santan and Red Mountain are:

- MP 42.49 to MP 49.64, Val Vista Drive to Dobson Road, Construct HOV Lanes, $35,000,000, TBD
- MP 50.08 to MP 50.76, SR 101L/Price TI, Construct HOV Lanes, $21,200,000, FY TBD
- MP 30.57 to MP 42.49, US 60 Superstition to Val Vista Drive, Construct HOV Lanes, $55,000,000, FY TBD
- MP 16.28 to MP 21.09, Gilbert Road to Higley Road, Construct HOV Lanes, $25,000,000, FY TBD
- MP 21.09 to MP 30.57, Higley Road to US 60, Construct HOV Lanes, $50,000,000, FY TBD
- MP 30.54 to MP 31.01, US 60, Superstition TI, Construct HOV Lanes, $21,200,000, FY TBD

Design exceptions are hereby requested for the 202L Mainline for: 1.) horizontal stopping sight distance at five locations between MP 16.69 and MP 28.79; 2) median shoulder width at existing bridge piers at 48 locations; 3.) median shoulder width at SR 202L EB MP 30.71-MP 30.78, SR 202L EB MP 50.20-MP 50.34

and I-10 EB MP 160.67 – MP 160.72; and 4) median shoulder width for 36 locations for overhead sign supports.

Design exceptions are hereby requested for the 202L HOV Ramps for: 1.) horizontal stopping sight distance at five locations and 2.) median shoulder width at I-10 WB MP 160.57-MP 160.73, and US60 EB MP 191.16-MP 191.24.

The table below identifies the location by milepost for the SR 202L Mainline (Attachment 1 shows station), type of design exception, and variance between the proposed features and AASHTO recommendations:

Design Feature	Type of Exception	Location	Variance from Recommended Design Value
1.) Horizontal stopping sight distance	AASHTO	MP 16.86 McDowell Road TI EB	60'
		MP 19.06 Val Vista Drive TI WB	59'
		MP 27.07 to MP 27.72 WB	24'
		MP 28.21 to MP 28.54 Apache Trail TI WB	125'
		MP 28.61 to MP 28.95 EB	85'
2.) Median shoulder width at existing bridge piers	AASHTO	MP 18.08 - MP 18.11 WB Thomas Road TI	1.0'
		MP 18.08 - MP 18.10 EB Thomas Road TI	1.0'
		MP 19.04 - MP 19.07 WB Val Vista Drive TI	1.7'
		MP 19.04 - MP 19.07 EB Val Vista Drive TI	1.3
		MP 20.06 - MP 20.11 WB & EB Greenfield Road TI	2.5'
		MP 21.06 - MP 21.11 WB & EB Higley Road TI	2.3'
		MP 22.16 - MP 22.21 WB Recker Road TI	2.3'
		MP 22.16 - MP 22.20 EB Recker Road TI	1.3'
		MP 27.91 - MP 27.96 WB University Drive TI	1.5'
		MP 27.91 - MP 27.96 EB University Drive TI	2.0'
		MP 28.40 - MP 28.45 WB Apache Trail TI	3.2'
		MP 28.40 - MP 28.45 EB Apache Trail TI	2.3'
		MP 28.96 - MP 29.02 WB Broadway Road TI	2.3'
		MP 28.96 - MP 29.02 EB Broadway Road TI	2.5'
		MP 32.15 - MP 32.10 WB & EB Guadalupe Road TI	1.3'
		MP 38.65 - MP 38.61 EB Higley Road TI	1.3'
		MP 38.65 - MP 38.61 WB Higley Road TI	1.4'
		MP 39.41 - MP 39.39 WB & EB Pedestrian Bridge	1.2'
		MP 39.83 - MP 39.75 EB Ray Road TI/UPRR TI	1.6'
		MP 39.83 - MP 39.74 WB Ray Road TI/UPRR TI	1.7'
		MP 40.79 - MP 40.81 EB Williams Field Road TI	1.1'
		MP 40.79 - MP 40.81 WB Williams Field Road TI	1.5'
		MP 41.50 - MP 41.18 WB & EB Santan Village Parkway TI	1.2'
		MP 41.86 - MP 41.83 EB Pecos Road TI	1.3'

Design Feature	Type of Exception	Location	Variance from Recommended Design Value
		MP 41.86 - MP 41.82 WB Pecos Road TI	1.3'
		MP 42.52 - MP 42.47 WB & EB Val Vista Drive TI	1.3'
		MP 44.59 - MP 44.54 WB & EB Gilbert Road TI	2.3'
		MP 45.59 - MP 45.53 WB & EB Cooper Road TI	2.3'
		MP 46.59 - MP 46.53 WB & EB McQueen Road TI	2.4'
		MP 48.66 - MP 48.61 WB & EB Alma School Road TI	2.2'
		MP 49.67 - MP 49.61 WB & EB Dobson Road TI	2.2'
		MP 51.25 - MP 51.20 WB & EB Chandler Village Parkway TI	2.1'
		MP 51.76 - MP 51.71 WB & EB McClintock Road TI	2.2'
		MP 53.76 - MP 53.71 EB Kyrene Road TI	2.6'
		MP 53.76 - MP 53.71 WB Kyrene Road TI	2.4'
3.) Median shoulder width	AASHTO	MP 30.71– MP 30.78 EB SR 202L	1'
		MP 50.20 – MP 50.34 EB SR 202L	4'
		MP 160.67 – MP 160.72 EB I-10	2.5'
4.) Median Shoulders at sign foundations	AASHTO	MP 29.3 EB & WB SR 202L	1'
		MP 29.4 EB & WB SR 202L	1'
		MP 29.9 EB & WB SR 202L	1'
		MP 30.3 EB & WB SR 202L	1'
		MP 31.5 EB & WB SR 202L	1'
		MP 31.7 EB & WB SR 202L	1'
		MP 31.8 EB & WB SR 202L	1'
		MP 32.5 EB & WB SR 202L	1'
		MP 32.8 EB & WB SR 202L	1'
		MP 33.2 EB & WB SR 202L	1'
		MP 34.3 EB & WB SR 202L	1'
		MP 36.1 EB & WB SR 202L	1'
		MP 36.1 EB & WB SR 202L	1'
		MP 39.7 EB & WB SR 202L	1'
		MP 39.8 EB & WB SR 202L	1'
		MP 45.0 EB & WB SR 202L	1'
		MP 45.1 EB & WB SR 202L	1'
		MP 47.1 EB & WB SR 202L	1'
		MP 48.1 EB & WB SR 202L	1'
		MP 49.5 EB & WB SR 202L	1'
		MP 49.9 EB & WB SR 202L	1'
		MP 50.0 EB & WB SR 202L	1'
		MP 51.3 EB & WB SR 202L	1'
		MP 51.5 EB & WB SR 202L	1'
		MP 51.5 EB & WB SR 202L	1'
		MP 52.3 EB & WB SR 202L	1'
		MP 52.6 EB & WB SR 202L	1'

Design Feature	Type of Exception	Location	Variance from Recommended Design Value
		MP 52.7 EB & WB SR 202L	1'
		MP 52.9 EB & WB SR 202L	1'
		MP 54.1 EB & WB SR 202L	1'
		MP 54.2 EB & WB SR 202L	1'
		MP 54.5 EB & WB SR 202L	1'
		MP 54.6 EB & WB SR 202L	1'
		MP 54.9 EB & WB SR 202L	1'
		MP 61.2 EB & WB SR 101L	1'
		MP 160.9 EB & WB I-10	1'

The table below identifies the location by milepost for the SR 202L HOV Ramps (Attachment 1 shows station), type of design exception, and variance between the proposed features and AASHTO recommendations:

Design Feature	Type of Exception	Location	Variance from Recommended Design Value
1.) Horizontal stopping sight distance	AASHTO	MP 50.34 SR 202L – WB 202 to NB 101 Ramp	89'
		MP 50.34 SR 202L – SB 101 to EB 202 Ramp	102'
		MP 50.64 SR 202L – WB 202 to NB 101 Ramp	164'
		MP 50.64 SR 202L – SB 101 to EB 202 Ramp	169'
		MP 30.72 SR 202L – EB 202 to EB 60 Ramp	142'
		MP 30.72 SR 202L – EB 60 to EB 202 Ramp	138'
		MP 161.12 I-10 – SB I-10 to EB 202 Ramp	148'
		MP 161.12 I-10 – WB 202 to NB I-10 Ramp	99'
		MP 161.29 I-10 – SB I-10 to EB 202 Ramp	200'
		MP 161.29 I-10 – WB 202 to NB I-10 Ramp	125'
2.) Median shoulder width	AASHTO	MP 160.57-MP 160.73 I-10 WB,	2.0'
		MP 191.16-MP 191.24 US60 EB	2.0'

Evaluation and justification for design exceptions on the SR 202L Mainline include the following:

1.) Horizontal Stopping Sight Distance: The proposed roadway shoulders would provide less than the AASHTO recommended horizontal stopping sight distance for the HOV lane where the roadway includes a concrete half barrier adjacent to the median shoulder. Attachment 2 provides a summary of the calculated SSD with the associated design speed for each location. The sight distance formula considers a 2' height of object in accordance with the 2004 AASHTO Green Book. Another vehicle is the most likely object that needs to be detected for the HOV lanes, and most vehicles in the HOV lane can still be seen by other drivers over the top of the barrier.

In order to achieve the desired minimum design speed of 65 mph, the shoulder width of the HOV lane would have to expand dramatically as shown in the attachment. These excessively wide shoulders would potentially introduce a safety issue by enticing drivers to use the roadway shoulders as passing lanes, and are inconsistent with the design of the mainline general-purpose and HOV lanes throughout the Regional Freeway System.

Another alternative to provide the horizontal stopping sight distance would be to reduce the HOV and general-purpose lane widths at each location to provide a wider shoulder. Reducing the lane widths could negatively impact the capacity of the roadway.

The current design of the project in accordance with the Design Concept Report is warranted in this situation.

2.) **Median Shoulder Width at Existing Bridge Piers:** The mainline median shoulder width varies between 10' and 12' throughout the project limits, except in areas where the median barrier is widened to accommodate crossroad and pedestrian underpass bridge piers. There are 48 locations where bridge piers causes the shoulder width to be less that the 10' AASHTO recommended minimum, as shown on Attachment 1. Of these 48 locations, 23 meet the ADOT RDG minimum of 8' at bridge piers.

The reduced shoulder widths at these isolated locations will allow the existing lanes to remain in their current configuration. Other options would include widening the existing roadway to provide additional roadway and bridge width to support a minimum 10' wide median shoulder throughout the project limits. Another option is reducing the width of the HOV or general-purpose lanes. Reducing the HOV and general-purpose lane widths could negatively impact the capacity of the roadway.

It is preferable from a safety perspective to have a reduced median shoulder for a short length rather than reducing the HOV lane widths.

Based on this information the current design of the project with reduced median shoulder widths at existing bridge TIs is considered the preferable treatment for this project.

3.) **Median Shoulder Width:** The mainline median shoulder width varies between 10' and 12' throughout the project limits. There are 3 locations where the shoulder width is less that the 10' AASHTO recommended minimum. At these locations, the shoulder was reduced to provide for the HOV ramps, as shown on Attachment 1

The reduced shoulder widths at these isolated locations will allow the existing lanes and ramps to remain in their current configuration. Other options would include widening the existing roadway to provide additional roadway width to support a minimum 10' wide median shoulder throughout the project limits. Another option is reducing the width of the HOV or general-purpose lanes. Reducing the HOV and general-purpose lane widths could negatively impact the capacity of the roadway.

It is preferable from a safety perspective to have a reduced median shoulder for a short length rather than reducing the HOV lane widths.

Based on this information the current design of the project with reduced median shoulder widths at the HOV ramps is considered the preferable treatment for this project.

4.) **Median Shoulder Width at Overhead Sign Supports:** The mainline median shoulder width varies between 10' and 12' throughout the project limits, except where the median barrier was widened for the overhead sign supports. 36 sign supports require a wider median reducing the median shoulder widths (both directions) by one foot as shown in Attachment 3. These are approximate locations as the final location of the overhead signs will be determined during the final design.

The reduced shoulder widths at these spot locations will allow the existing lanes and ramps to remain in their current configuration. Other options would include widening the existing roadway to provide additional roadway width to support a minimum 10' wide median shoulder throughout the project limits. Another option is reducing the width of the HOV or general-purpose lanes. Reducing the HOV and general-purpose lane widths could negatively impact the capacity of the roadway.

It is preferable from a safety perspective to have a reduced median shoulder for a short length rather than reducing the HOV lane widths.

Based on this information the current design of the project with reduced median shoulder widths at the overhead sign supports is considered the preferable treatment for this project.

Evaluation and justification for design exceptions on the SR 202L HOV Ramps include the following:

1.) **HOV Ramp Horizontal Stopping Sight Distance:** The proposed ramp shoulders would provide less than the AASHTO recommended horizontal stopping sight distance for the HOV lane where the roadway includes a concrete half barrier adjacent to the median shoulder. Attachment 2 provides a summary of the calculated SSD with the associated design speed for each location. The sight distance formula considers a 2' height of object in accordance with the 2004 AASHTO Green Book. Another vehicle is the most likely object that needs to be detected for the HOV lanes, and most vehicles in the HOV lane can still be seen by other drivers over the top of the barrier.

In order to achieve the desired minimum design speed of 55 mph, the shoulder width of the ramps would have to expand dramatically as shown in the attachment. These excessively wide shoulders would potentially introduce a safety issue by enticing drivers to use the roadway shoulders as passing lanes, and are inconsistent with the design of system freeway ramps throughout the valley.

Another alternative to provide the horizontal stopping sight distance would be to reduce the ramp lane widths at each location to provide a wider shoulder. Reducing the lane widths could negatively impact the capacity of the roadway.

The current design of the project in accordance with the Final Design Concept Report is warranted in this situation.

2.) **HOV Ramp Median Shoulder Width:** The ramp median shoulder width is 6' throughout the project limits, except at two locations (one where the HOV ramp ties into WB I-10 and where the HOV ramp ties into EB US 60), the shoulder width would be less than the AASHTO recommended 6' minimum. The locations and widths are shown on Attachment 1.

The reduced shoulder widths at these isolated locations will allow the existing ramps and underpasses to remain in their current configuration. Other options would include widening the existing roadway to provide additional roadway and bridge width to support a minimum 6' wide median HOV Ramp shoulders, or reducing the width of the HOV ramp. Reducing the HOV ramp lane widths could negatively impact the capacity of the roadway.

It is preferable from a safety perspective to have a reduced median shoulder for a short length rather than reducing the HOV lane widths.

Based on this information the current design of the project with reduced median shoulder widths at these two locations is considered the preferable treatment for this project.

Requested by: _[signature]_
Robert Ringwald, AECOM

Date: 6.1.2010

Concur: Mary Viparina
Mary Viparina, Assistant State Engineer

Date: 6/11/10

ATTACHMENT 1

1) HORIZONTAL STOPPING SIGHT DISTANCE

See Attachment 2

2) MAINLINE MEDIAN SHOULDER WIDTH AT BRIDGE PIERS

Milepost Location	Station Location	Shoulder Width Recommended	Shoulder Width Provided	Description of Location
MP 18.08 to MP 18.11	792+03.13 to 793+22.79	10'	9.0'	WB Thomas Road TI
MP 18.08 to MP 18.10	791+80.78 to 792+94.08	10'	9.0'	EB Thomas Road TI
MP 19.04 to MP 19.07	842+39.88 to 844+17.87	10'	8.3'	WB Val Vista Drive TI
MP 19.04 to MP 19.07	842+37.79 to 844+28.03	10'	8.7'	EB Val Vista Drive
MP 20.06 to MP 20.11	896+29.63 to 898+87.15	10'	7.5'	WB & EB Greenfield Road TI
MP 21.06 to MP 21.11	948+93.09 to 951+95.95	10'	7.7'	WB & EB Higley Road TI
MP 22.16 to MP 22.21	1007+05.03 to 1009+77.18	10'	7.7	WB Recker Road TI
MP 22.16 to MP 22.20	1007+47.90 to 1009+41.70	10'	8.7'	EB Recker Road TI
MP 27.91 to MP 27.96	1310+83.94 to 1313+13.95	10'	8.5'	WB University Drive TI
MP 27.91 to MP 27.96	1310+74.27 to 1313+13.45	10'	8.0'	EB University Drive TI
MP 28.40 to MP 28.45	1336+56.09 to 1339+45.40	10'	6.8	WB Apache Trail TI
MP 28.40 to MP 28.45	1336+56.09 to 1339+45.40	10'	7.7'	EB Apache Trail TI
MP 28.96 to MP 29.02	1366+50.91 to 1369+40.96	10'	7.7'	WB Broadway Road TI
MP 28.96 to MP 29.02	1366+50.91 to 1369+40.96	10'	7.5'	EB Broadway Road TI
MP 32.15 to MP 32.10	3222+88.73 to 3225+10.70	10'	8.7	EB Guadalupe Road TI
MP 32.15 to MP 32.10	3222+92.21 to 3225+34.24	10'	8.7'	WB Guadalupe Road TI
MP 38.65 to MP 38.61	2879+51.03 to 2881+79.26	10'	8.7'	EB Higley Road TI
MP 38.65 to MP 38.61	2879+46.22 to 2881+84.04	10'	8.6'	WB Higley Road TI
MP 39.41 to MP 39.39	2839+58.68 to 2840+37.15	10'	8.8'	EB Pedestrian Bridge
MP 39.41 to MP 39.39	2839+59.12 to 2840+37.04	10'	8.8'	WB Pedestrian Bridge
MP 39.83 to MP 39.75	2817+38.10 to 2821+62.14	10'	8.4'	EB Ray Road/UPRR TI
MP 39.83 to MP 39.74	2817+41.73 to 2821+69.13	10'	8.3	WB Ray Road/UPRR TI
MP 40.79 to MP 40.81	2767+02.29 to 2766+02.29	10'	8.9'	EB Williams Field Road TI
MP 40.79 to MP 40.81	2767+08.09 to 2766+08.09	10'	8.5	WB Williams Field Road TI
MP 41.50 to MP 41.18	2728+72.71 to 2730+06.37	10'	8.8	EB Santan Village Parkway TI
MP 41.50 to MP 41.18	2728+73.38 to 2730+05.77	10'	8.8'	WB Santan Village Parkway TI
MP 41.86 to MP 41.83	2709+90.87 to 2711+75.58	10'	8.7'	EB Pecos Road TI
MP 41.86 to MP 41.82	2709+90.86 to 2711+84.05	10'	8.7	WB Pecos Road TI
MP 42.52 to MP 42.47	2675+38.03 to 2677+72.43	10'	8.7	WB & EB Val Vista Drive TI
MP 44.59 to MP 44.54	2565+64.60 to 2568+42.93	10'	7.7'	WB & EB Gilbert Road TI
MP 45.59 to MP 45.53	2513+19.62 to 2515+99.09	10'	7.7'	WB & EB Cooper Road TI
MP 46.59 to MP 46.53	2460+24.61 to 2463+18.31	10'	7.6'	WB & EB McQueen Road TI
MP 48.66 to MP 48.61	2350+82.11 to 2353+67.48	10'	7.8'	WB & EB Alma School Road TI
MP 49.67 to MP 49.61	2297+48.77 to 2300+85.37	10'	7.8'	WB & EB Dobson Road TI
MP 51.25 to MP 51.20	2214+45.00 to 2216+75.00	10'	7.9'	WB & EB Chandler Village Parkway TI

2) MAINLINE MEDIAN SHOULDER WIDTH AT BRIDGE PIERS (CONTINUED)

Milepost Location	Station Location	Shoulder Width Recommended	Shoulder Width Provided	Description of Location
MP 51.76 to MP 51.71	2187+22.00 to 2189+88.00	10'	7.8'	WB & EB McClintock Road TI
MP 53.76 to MP 53.71	2081+85.02 to 2084+04.89	10'	7.4'	EB Kyrene Road TI
MP 53.76 to MP 53.71	2081+85.02 to 2084+04.89	10'	7.6'	WB Kyrene Road TI

3) MAINLINE MEDIAN SHOULDER WIDTH

Milepost Location	Station Location	Shoulder Width Recommended	Shoulder Width Provided	Description of Location
SR 202L EB				
MP 30.71to MP 30.78	1458+51.84 to 1462+11.77	10'	9.0'	US 60/SR 202L HOV Ramp
MP 50.20 to MP 50.34	2269+75.24 to 2262+62.01	10'	6.0'	SR 101L/SR 202L HOV Ramp
I-10 EB				
MP 160.67-MP 160.72	8475+25.00 to 8478+15.00	10'	7.5'	I-10/SR 202L HOV Ramp

4) HORIZONTAL STOPPING SIGHT DISTANCE

See Attachment 2

5) HOV RAMP MEDIAN SHOULDER WIDTH

Milepost Location	Station Location	Shoulder Width Recommended	Shoulder Width Provided	Description of Location
I-10 WB				
MP 160.57-MP 160.73	8473+69.08 to 8480+33.11	6'	4.0'	I-10/SR 202L HOV Ramp
US 60 EB				
MP 191.16-MP191.24	1010+58.60 to 1015+05.06	6'	4.0'	US 60/SR 202L HOV Ramp

ATTACHMENT 2

Stopping Sight Distances - Horizontal Obstruction

Project : SR 202L HOV Lanes, Gilbert Road to I-10

Locations	*MP*	*Design Speed (mph)*	*Horizontal Curvature at CL of ML (Deg)*	*Horizontal Radius at Center of Target Lane (ft)*	*Effective Vertical Grade (%)*	*SSD Required (ft)*	*Horizontal SSD Provided (ft)*	*Horizontal Offset Required to face of Barrier (ft)*	*Horizontal Offset Provided to face of Barrier (ft)*	*Design Speed Provided (mph)*
Proposed SR 202L HOV Lanes										
McDowell Rd TI Sta 727+53.35 EB	*16.86*	*65*	*2°-30'-00"*	*2314.83*	*0.48*	*638*	*578*	*21.9*	*18.0*	*61.2*
Val Vista Dr TI Sta 843+28.89 WB	*19.06*	*65*	*1°-45'-00"*	*3292.04*	*-3.00*	*681*	*622*	*17.6*	*14.7*	*61.5*
Sta 1266+45.37 to Sta 1300+78.05 WB	*27.07 to 27.72*	*65*	*2°-00'-00"*	*2882.79*	*-0.60*	*650*	*626*	*18.3*	*17.0*	*63.5*
Apache Trail TI Sta 1326+68.06 to Sta 1344+21.15 WB	*28.21 to 28.54*	*65*	*2°-15'-00"*	*2563.48*	*0.47*	*638*	*513*	*19.8*	*12.8*	*56.7*
Sta 1348+19.39 to 1366+04.46 EB	*28..61 to 28.95*	*65*	*2°-15'-00"*	*2563.48*	*-1.27*	*658*	*573*	*21.1*	*16.0*	*59.7*
Proposed SR 202L HOV Ramps										
SR 101L Sta 30+08.76 EB	*202 MP 50.64*	*55*	*5° 15' 00"*	*1105.00*	*-0.40*	*495*	*326*	*27.6*	*12.0*	*42.1*
SR 101L Sta 30+08.76 NB	*202 MP 50.64*	*55*	*5° 15' 00"*	*1077.68*	*-4.65*	*536*	*372*	*33.2*	*16.0*	*43.7*
SR 101L Sta 46+74.37 NB	*202 MP 50.34*	*55*	*4° 00' 00"*	*1445.39*	*4.00*	*462*	*373*	*18.4*	*12.0*	*47.9*
SR 101L Sta 46+74.37 EB	*202 MP 50.34*	*55*	*4° 00' 00"*	*1419.39*	*-4.00*	*529*	*427*	*24.6*	*16.0*	*48.1*
US 60 Sta 31+42.42 EB SR 202L	*202 MP 30.72*	*55*	*4° 45' 00"*	*1219.23*	*0.93*	*484*	*342*	*23.9*	*12.0*	*44.0*
US 60 Sta 31+42.42 EB US 60	*202 MP 30.72*	*55*	*4° 45' 00"*	*1193.23*	*-4.00*	*529*	*391*	*29.2*	*16.0*	*45.5*
I-10 Sta 22+89.17 EB	*I-10 MP 161.12*	*55*	*4° 00' 00"*	*1445.40*	*-3.20*	*521*	*373*	*23.4*	*12.0*	*44.5*
I-10 Sta 22+89.17 NB	*I-10 MP 161.12*	*55*	*4° 00' 00"*	*1417.40*	*-3.60*	*525*	*426*	*24.2*	*16.0*	*48.3*

Project : SR 202L HOV Lanes, Gilbert Road to I-10 (Continued)

Locations	MP	Design Speed (mph)	Horizontal Curvature at CL of ML (Deg)	Horizontal Radius at Center of Target Lane (ft)	Effective Vertical Grade (%)	SSD Required (ft)	Horizontal SSD Provided (ft)	Horizontal Offset Required to face of Barrier (ft)	Horizontal Offset Provided to face of Barrier (ft)	Design Speed Provided (mph)
I-10 Sta 31+20.61 EB	I-10 MP 161.29	55	5° 24' 00"	1074.03	-3.20	521	321	31.4	12.0	40.5
I-10 Sta 31+20.61 NB	I-10 MP 161.29	55	5° 24' 00"	1048.03	0.00	492	367	28.7	16.0	45.6

1. SSD required was calculated from grade adjusted AASHTO 2004 formula 3-3, page 114

2. SSD provided was calculated from AASHTO 2004 formula 3-38, page 227

ATTACHMENT 3

MAINLINE MEDIAN SHOULDER WIDTH AT OVERHEAD SIGN SUPPORTS

MEDIAN BARRIER OVERHEAD SIGN SUPPORTS			
Roadway	MP ±	Shoulder Width	
		Recommended	Provided
SR 202L	29.3	10'	9'
SR 202L	29.4	10'	9'
SR 202L	29.9	10'	9'
SR 202L	30.3	10'	9'
SR 202L	31.5	10'	9'
SR 202L	31.7	10'	9'
SR 202L	31.8	10'	9'
SR 202L	32.5	10'	9'
SR 202L	32.8	10'	9'
SR 202L	33.2	10'	9'
SR 202L	34.3	10'	9'
SR 202L	36.1	10'	9'
SR 202L	36.1	10'	9'
SR 202L	39.7	10'	9'
SR 202L	39.8	10'	9'
SR 202L	45.0	10'	9'
SR 202L	45.1	10'	9'
SR 202L	47.1	10'	9'
SR 202L	48.1	10'	9'
SR 202L	49.5	10'	9'
SR 202L	49.9	10'	9'
SR 202L	50.0	10'	9'
SR 202L	51.3	10'	9'
SR 202L	51.5	10'	9'
SR 202L	51.5	10'	9'
SR 202L	52.3	10'	9'
SR 202L	52.6	10'	9'
SR 202L	52.7	10'	9'
SR 202L	52.9	10'	9'
SR 202L	54.1	10'	9'
SR 202L	54.2	10'	9'
SR 202L	54.5	10'	9'
SR 202L	54.6	10'	9'
SR 202L	54.9	10'	9'
SR 101L	61.2	10'	9'
I-10	160.9	10'	9'

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May 25, 2010

Donald Gorman, Jr., R.L.S., P.E
Project Manager
Arizona Department of Transportation
Valley Project Management
1611 West Jackson Street, MD EM01
Phoenix, Arizona 85007-3217

Re: Contract No. 09-01
Design Exception Report Crash Analysis
Project No. 202L MA 016 H745701L
SR202L HOV Lanes, Gilbert Road to I-10

Dear Mr. Gorman;

The crash history for the existing SR 202L was reviewed in order to assess the safety performance of the existing roadway. The crash data has been evaluated for the existing roadway conditions at the locations of the following proposed design exceptions (Note: the existing roadway conditions do not currently include the proposed design exceptions):

- The installation of median barrier adjacent to the HOV lane shoulder would restrict the available stopping sight distance (SSD) on SR 202L mainline at five horizontal curves on this project. Median barrier adjacent to HOV lane shoulders is a typical section found on Valley Freeways. On certain horizontal curves this barrier placement restricts available stopping sight distance (SSD). The crash summary for the existing conditions is presented below for each of the five horizontal curve locations.
- The proposed Mainline inside shoulder would provide less than the ADOT recommended width at numerous locations at existing bridge piers.
- The proposed HOV lane left shoulder is less than the ADOT recommended width on HOV ramps at two locations. One location is at the I-10 system interchange and the other is at the US 60 system interchange.
- The proposed HOV lane right shoulder is less than the ADOT recommended width on HOV ramps at two locations. These two locations are at the SR 101L system interchange.

Crash data was provided by the ADOT Traffic Records Section for the period starting January 2003 (or the opening date of the freeway segment) through December 2008. The crash records were reviewed in order to identify crash patterns related to existing roadway features or characteristics that might be exacerbated by the proposed design.

The crash experience summary for the five mainline locations with reduced stopping sight distance follows.

McDowell Road Structure vicinity: The available eastbound SSD is less than the recommended distance. At this location 60 months of crash data was reviewed. A total of 11 crashes were reported on this section of eastbound SR 202L (MP 16.6 to MP 16.9). The following is a summary of some key characteristics of the crash data:

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- 6 crashes resulted in no injury, 2 crashes resulted in possible injury, and 3 crashes resulted in non-incapacitating injury. There were no fatal crashes.
- The crash types were: 8 single vehicle, and 3 same direction sideswipe.
- First harmful events were: 5 collisions with median barrier, 3 collisions with other motor vehicle, 2 overturning, and 1 collision with object dropped from vehicle.

Val Vista Road Structure vicinity: The available westbound SSD is less than the recommended distance. At this location 58 months of crash data was reviewed. A total of 19 crashes were reported on this section of westbound SR 202L (MP 18.9 to MP 19.1). The following is a summary of some key characteristics of the crash data:

- 14 crashes resulted in no injury, 2 crashes resulted in possible injury, 2 crashes resulted non-incapacitating injury, and one crash resulted in incapacitating injury. There were no fatal crashes.
- The crash types were: 13 single vehicle, 4 were rear-end, and 2 were same direction sideswipe.
- First harmful events were: 6 collisions with median barrier, 6 collisions with other motor vehicle, 2 overturning, 2 all other non-collision, 2 collision with object dropped from vehicle, and 1 collision with other fixed object.

Brown Road vicinity: The available SSD is less than the recommended distance. At this location 14 months of crash data was reviewed. No crashes were reported on this section of SR 202L (MP 27.1 to MP 27.8).

Apache Trail vicinity: The available SSD on this curve is less than the recommended distance. At this location 14 months of crash data was reviewed. One crash was reported on this section of SR 202L (MP 28.2 to MP 28.6). This single vehicle collision with median barrier crash resulted in property damage only. (The available westbound SSD at the Apache Trail Structure is less than the recommended distance. No crashes were reported at the structure.)

University Drive vicinity: The available SSD is less than the recommended distance. At this location 14 months of crash data was reviewed. A total of 7 crashes were reported on this section of SR 202L (MP 28.6 to MP 29.0). The following is a summary of some key characteristics of the crash data:

- 4 crashes resulted in no injury, 2 crashes resulted in possible injury, and 1 crash resulted in incapacitating injury. There were no fatal crashes.
- 6 crashes were single vehicle types, and 1 was a rear-end crash.
- First harmful events were: 2 collisions with median barrier, and 1 each collision with: traffic sign, other fixed object, other motor vehicle, special devices, and object dropped from vehicle.

There were no fatal crashes reported at these five locations during the evaluation period. Two serious (incapacitating injury) crashes occurred during the evaluation period, one (motorcycle struck object dropped from vehicle) at MP 29.0 and one (blowout) at MP 19.1. The evaluation of the crash history for these curves did not exhibit crash patterns that could be attributed to existing roadway features or characteristics.

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The proposed Mainline inside shoulder would provide less than the AASHTO recommended width at numerous locations. These locations are at the bridge piers for structures over SR 202L. Following is a summary of some key characteristics of the crash data for these locations.

- 275 total crashes – 12 incapacitating, 21 non-incapacitating, 54 possible injury, 185 no injury, 3 unknown, no fatal crashes
- 121 crashes were rear-end type, 34 were same direction sideswipe, 100 were single vehicle, and 20 were other categories.
- First harmful events were 163 collisions with other motor vehicle, 43 collisions with median barrier, 20 collisions with a fixed roadside object, 16 overturning, 15 collisions with object dropped from vehicle, and 18 were a variety of 7 other first harmful event categories.

No fatal injury crashes were reported at these shoulder width exception locations during the evaluation period. The evaluation of the SR 202L mainline crash history for the locations in the vicinity of the proposed reduced width inside shoulder did not exhibit crash patterns that could be attributed to existing roadway features or characteristics.

The Mainline crash experience in the vicinity of the proposed HOV ramps with reduced shoulder width is discussed below. At these locations crash records were evaluated to identify crash patterns related to existing mainline roadway features or characteristics in the vicinity of the proposed HOV shoulder exceptions.

I-10 westbound: The proposed HOV lane left shoulder width is less than the recommended width. At this location (MP 160.5 to MP 160.9) 60 months of crash data was reviewed. A total of 37 crashes were reported in this segment. Following are some key characteristics of the crash data:

- 30 crashes resulted in no injury, 4 resulted in possible injury, 2 resulted in non-incapacitating injuries, and 1 crash resulted in a fatality. The fatal crash occurred at MP160.5 and was a same-direction sideswipe crash resulting from a motorcycle attempting an unsafe lane change.
- The crash types were: 8 single vehicle, 19 rear-end, 9 same direction sideswipe, and 1 other.
- First harmful events were: 28 collisions with other motor vehicle, 2 collisions with concrete barrier, 3 other non-fixed object collisions, and 1 each collision with falling object, other fixed object, fence, and fire.

US 60 eastbound: The proposed HOV lane left shoulder width is less than the recommended width. At this location (MP 191.1 to MP 191.3) 60 months of crash data was reviewed. A total of 12 crashes were reported on this segment. Following are some key characteristics of the crash data:

- Seven crashes resulted in no injury, 2 crashes resulted in possible injury, 1 resulted in non-incapacitating injury, and 2 resulted in incapacitating injury. There were no fatal crashes.
- The crash types were: 7 single vehicle, 3 same direction sideswipe, and 2 other.
- First harmful events were: 3 collision with other motor vehicle, 3 collision other non fixed object, 2 collision with concrete traffic barrier, and 1 collision each with guardrail, other fixed object, tree, and non-fixed object.

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SR 101L from westbound SR 202L: The proposed HOV lane right shoulder is less than the recommended width. At this location 42 months of crash data was reviewed. A total of 6 crashes were reported on this section of SR 202L (MP 50.1 to MP 50.4). The following is a summary of some key characteristics of the crash data:

- Three of the crashes were reported as no injury, one was reported as possible injury, and 2 were reported as fatal crashes. The fatal crash at MP 50.24 was an overturning type crash resulting from an attempt to avoid another motor vehicle. The fatal crash at 50.40 was a same direction sideswipe type crash resulting from an attempt to avoid another motor vehicle. Speed too fast for conditions was reported as a contributing factor.
- Crash types were 5 single vehicle and 1 sideswipe.
- First harmful events were 2 overturning, 1 collision with other fixed object, 1 collision with median barrier, 1 other non-collision, and 1 collision with parked vehicle.

SR 101L to eastbound SR 202L: The proposed HOV lane right shoulder is less than the recommended width. At this location 42 months of crash data was reviewed. A total of 10 crashes were reported on this section of SR202L (MP 49.50 to MP 50.50). (Note: This location is one of the mainline inside shoulder width exception locations, and these 10 crashes were also included in that evaluation.) The following is a summary of some key characteristics of the crash data:

- Five of the crashes were reported as no injury, five were reported as possible injury.
- Crash types were 4 single vehicle, 5 rear-end, and 1 other.
- First harmful events were 5 collision with other motor vehicle, 1 overturning, 2 collision with median barrier, 1 breakage of vehicle, and 1 other non-collision.

The evaluation of the crash history on the existing mainline in the vicinity of these proposed HOV ramp gore locations did not exhibit crash patterns that could be attributed to existing mainline roadway features or characteristics.

Following is a summary of some key characteristics of the crashes (38) for all of the SR 202L mainline horizontal curve design exception locations:

- 66% were property damage only, 29% resulted in minor injuries, 5% resulted in serious injuries, and 0% resulted in fatalities.
- 26% of the crashes involved more than one motor vehicle while 47% of the crashes involved a fixed object.
- 13% of the crashes were rear-end type and 13% were sideswipe type crashes.
- 50% of the crashes occurred during daylight hours, 11% occurred at dusk or dawn and the remaining 39% occurred during hours of darkness.
- Excessive speed was a factor in 39% of the crashes
- 29% of all crashes occurred on weekends
- 52% of weekday crashes occurred during the AM and PM rush hours.

Following is a summary of some key characteristics of crashes (275) for all of the SR 202L mainline reduced inside shoulder width design exception locations:

- 68% were property damage only, 28% resulted in minor injuries, 4% resulted in serious injuries, and 0% resulted in fatalities.
- 64% of the crashes involved more than one motor vehicle while 24% of the crashes involved a fixed object.

AECOM

- 44% of the crashes were rear-end type, 6% were overturning, and 12% were sideswipe type crashes.
- 79% of the crashes occurred during daylight hours and 21% occurred during hours of darkness.
- Excessive speed was a factor in 57% of the crashes
- 14% of all crashes occurred on weekends
- 57% of weekday crashes occurred during the AM and PM rush hours.

Following is a summary of some key characteristics of all mainline crashes (55) in the vicinity of the four HOV ramp reduced shoulder width design exception locations:

- 73% were property damage only, 15% resulted in minor injuries, and 7% resulted in serious injuries, and 5% resulted in fatalities.
- 64% of the crashes involved more than one motor vehicle while 28% of the crashes involved a fixed object.
- 35% of the crashes were rear-end type and 24% were sideswipe type crashes.
- 75% of the crashes occurred during daylight hours, 7% occurred at dusk or dawn and the remaining 18% occurred during hours of darkness.
- Excessive speed was a factor in 20% of the crashes
- 12% of all crashes occurred on weekends
- 65% of weekday crashes occurred during the AM and PM rush hours.

The evaluation of the crash data at the design exception segments did not reveal crash patterns that would correlate with existing roadway features or characteristics.

If you have any questions or need additional information please call.

Respectfully,
AECOM

Richard S. Weeks, PE
Traffic Engineer

APPENDIX B

Crash Heat Map from Design Concept Report
Project No. 202L MA 044 F0124 01L

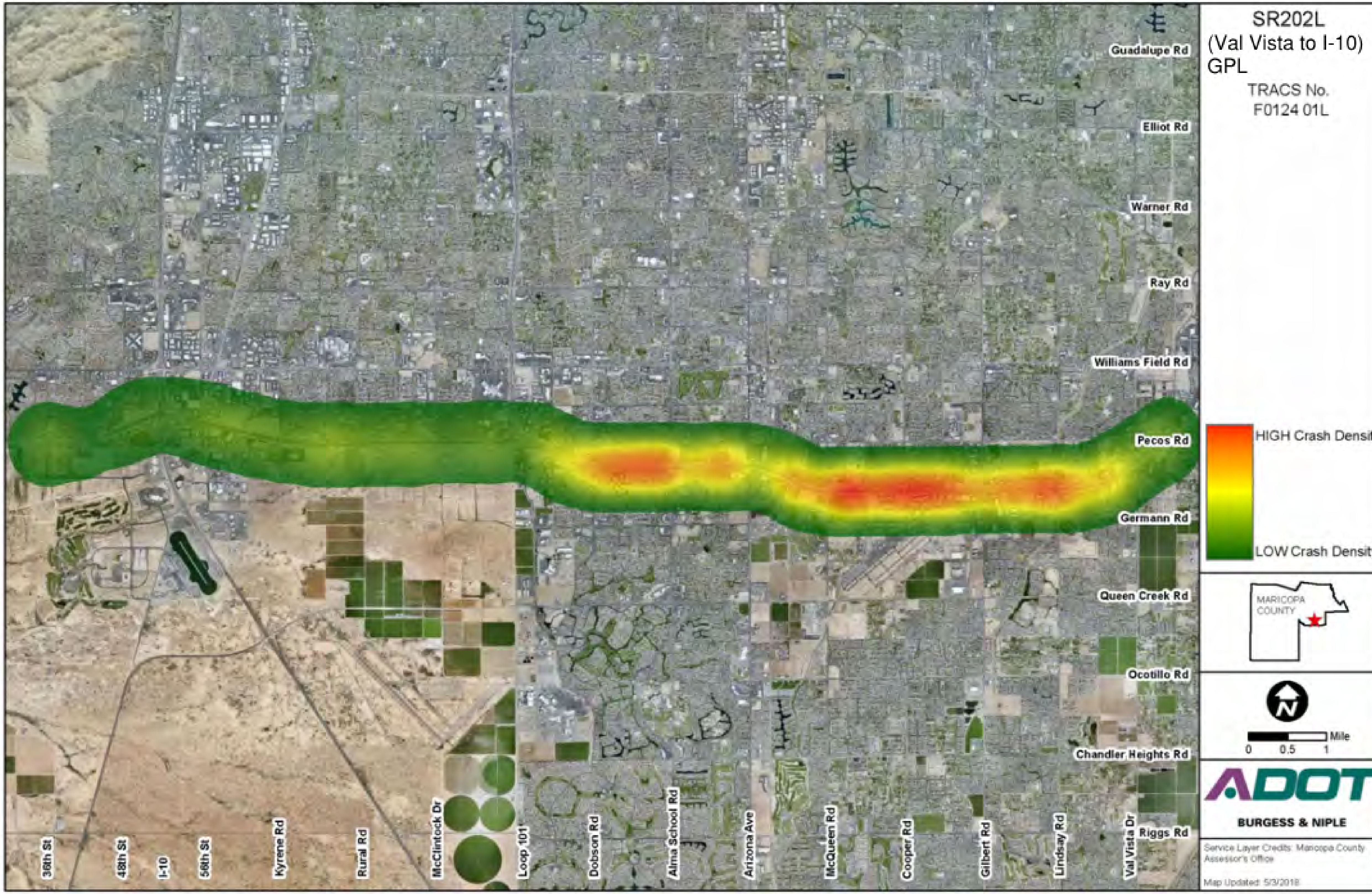


Figure 4. **Crash Heat Map**

APPENDIX C

Additional Crash Analysis for 2015-2019
Project No. 202L MA 044 F0124 01L

April 22, 2020

TO: MICHAEL DENBLEYKER, P.E.
ADOT State Roadway Engineer

THRU: REED HENRY, P.E.
ADOT Roadway Predesign Manager

THRU: MADHAV MUNDLE, P.E.
ADOT Project Manager

FROM: BRIAN D. RILEY, P.E.
STANLEY CONSULTANTS, INC.

SUBJECT: Crash Analysis to Support the Design Exception Request
Project No. 202L MA 044 F0124 01L
Federal Project No.202-C(208)T
SR 202L: Val Vista Drive To I-10 General Purpose Lanes (GPL)

Project Description

The scope of this project is to increase capacity to the SR202L by the addition of a general purpose lane (GPL) in each direction for the entire project limits from I-10 to Val Vista Drive (15 miles). Within the project limits, from SR101L to Gilbert (6 miles), a total of two additional GPLs will be added in each direction. The scoping process will be complete with the completion of the Final Design Concept Report (F0124).

Existing Roadway Conditions

The existing SR202L centerline and profile grade line would not be changed with the GPL widening of the existing pavement. The added pavement width would match the existing superelevation and pavement cross slope of the mainline SR202L. The existing ramps will require horizontal and vertical modification to tie into the widening. The existing closed median has typical shoulder widths of 10’ between I-10 and Gilbert Road with several spot locations less than 10’. From Gilbert Road to Val Vista Drive, the open median with cable barrier has shoulder widths of 8’ in each direction, with a 4’ wide AB graded platform.

The project limits are shown below in Figure 1.

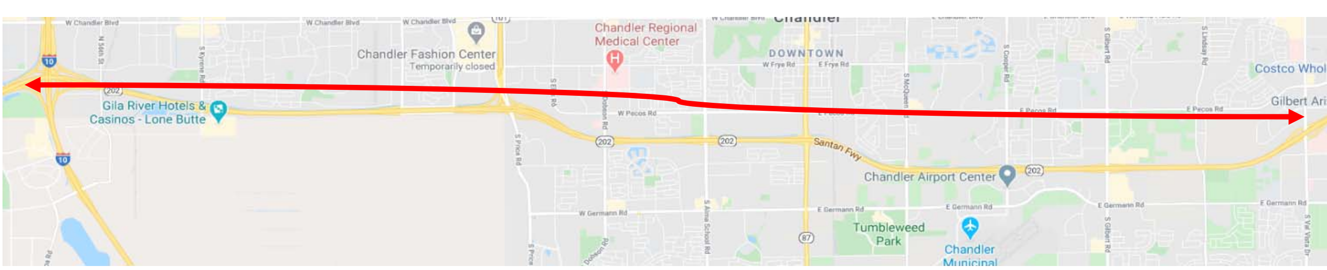


Figure 1. SR202 GPL DCR Project Limits

Crash Data

ADOT Traffic Safety Section provided the latest available crash data which is comprised of the data collected from 2015-2019 from Milepost 42 through Milepost 57. The data shows that there were 2604 crashes on SR202 within the project limits. The crash severity is shown below in Table I:

Table I - 2015-2019 Crash Severity

SR 202L – Val Vista Drive to I-10

Crash Severity (2015-2019)

	2015	2016	2017	2018	2019	Total	Percentage
Fatal	1	1	2		1	5	**0.19%**
No Injury	333	345	376	432	402	1888	**72.50%**
Possible Injury	64	59	101	87	77	388	**14.90%**
Suspected Minor Injury	55	55	66	54	54	284	**10.91%**
Suspected Serious Injury	11	9	5	8	6	39	**1.50%**
Grand Total	**464**	**469**	**550**	**581**	**540**	**2604**	**100.00%**

See further crash related data and graphs in Appendix D.

Summary of Findings

Fatal Crashes:

There were five fatal crashes within the project limits in the latest 5-year period. Brief summaries are included below.

Incident 2934395 – 2/20/2015 - 9:36 AM – MP 49.68: This crash involved a single eastbound pick up truck with one occupant that ran off the road to the right and hit a bridge structure. The vehicle exploded and was severely burned. Witness reports indicate that the vehicle was speeding when it suddenly veered right and went up the embankment and hit the bridge support.

Incident 3171668 – 11/13/2016 - 6:33 AM – MP 47.54: This crash involved an eastbound passenger car with four occupants. The car was traveling in the high speed lane. Witnesses report the car turned 90 degrees to the right and rolled over. A non-restrained passenger in the back seat was ejected and died as a result of their injuries. Witnesses report no other cars near the subject car behaved out of the ordinary.

Incident 3230929 – 5/10/2017 – 3:37 PM – MP 45.50: This crash involved an eastbound sport utility vehicle (SUV) traveling in the HOV lane. The vehicle was traveling at a speed to fast for conditions and had to veer right to avoid a collision. Subject vehicle struck two other vehicles (sideswipe) while running off the road right, hitting a sign, then went back across the lanes and hit a third vehicle before stopping. The driver of the vehicle was not restrained and later died of a result of their injuries (19 days later).

*Incident 3323192 – 12/06/2017 – 10:53 PM – MP 43.34:*This crash involved a car headed eastbound in the HOV lane. Witnesses report the car was driving aggressively and tailgating the SUV in front of it. The subject car apparently revved its engine as it passed the slower SUV then veered into and sideswiped that SUV. The subject car lost control and ran off the road to the right side and struck a light pole and stopped. The driver of the subject vehicle was transported to the hospital where they died as a result of their injuries. The crash data indicates that alcohol was involved in the accident.

Incident 3498170 – 1/06/2019 – 2:02 AM – MP 47.40: This crash involved a sedan that was eastbound with four total passengers. Witness accounts from inside the vehicle stated that the driver was going to "drift" the vehicle – purposefully losing traction – in the rain. The car veered right, lost traction, gradually ran off the road to the right, spun 1 and a half times counterclockwise, and struck a sign structure just behind the driver door. The rear driver side passenger was deceased at the scene. Alcohol was involved in the accident.

Based on review of the crash data and the incident reports, the five fatal accidents were attributed to excessive speed, driver behavior, and alcohol. The median shoulder width is not a factor in any of the accidents.

Fatalities and Serious Injury Crashes in Relation to Median Shoulder Width:

The fatal crash review above indicates that median shoulder width was not a contributing factor to the crashes.

An analysis of the corridor crash data was completed for Serious Injury crashes where median shoulder width may have been a factor. The following tables illustrate the findings from the most recent five-year data (2015-2019).

Total Crashes:

Crash Data 2015-2019	**EB**	**WB**	**TOTAL**
Total Crashes (Project Limits)	1131	1473	**2604**
• **Fatal**	5	0	**5**
• **Suspected Serious Injury**	16	23	**39**

Severe Crashes that involve the median shoulder (crash logged as Run Off Left):

Crash Data 2015-2019	**EB**		**WB**		**TOTAL**
Total Crashes (Project Limits)	1131		1473		**2604**
Total Crashes – Run Off Left	48	4.24%	55	3.73%	**103**
• **Fatality – Run Off Left**	0	0%	0	0%	**0**
• **Suspected Serious Injury – Run Off Left**	1	0.09%	1	0.07%	**2**

There were no fatal accidents that ran off left. There were two suspected serious injury crashes that ran off left in the latest five-year period, one eastbound and one westbound. The eastbound crash had a tire/brake failure that caused the accident. The westbound crash was logged as driver illness. The above data indicates that median shoulder width was not a contributing factor to the suspected serious injury crashes.

Further analysis of the run off left data shows that the majority of crashes were a result of improper driver action. The following table shows the distribution of violations cited for the run off left crashes.

Crash Data 2015-2019	**EB**		**WB**		**TOTAL**
Total Crashes (Project Limits)	**1131**	% of Total	**1473**	% of Total	**2604**
Total Crashes – Run Off Left	48	4.24%	55	3.73%	**103**
• **Violation – Speed too Fast for Conditions**	22	1.95%	28	1.90%	**50**
• **Violation – Failed to Keep in Proper Lane**	3	0.27%	3	0.20%	**6**
• **Violation – Unsafe Lane Change**	1	0.09%	1	0.07%	**2**
• **Violation – Other (Alcohol, etc.)**	6	0.53%	4	0.27%	**10**
• **Violation – Unknown**	4	0.35%	4	0.27%	**8**
• **No Improper Action**	12	1.06%	15	1.02%	**27**

In analyzing the driver behavior through violations assigned to each crash, it can be shown that the majority of run off left crashes were improper driver behavior. For the eastbound direction, approximately 36 of the 48 crashes were cited for a violation (75%). For the westbound direction, approximately 40 of 55 crashes were cited (72.7%).

Congestion Related Crashes:

The analyzed crash data shows that the most common crash type was a rear end collision. They accounted for over 75% of multi-vehicle accidents. The majority of crashes occurred during the peak hours per direction. This suggests that the majority of collisions are rear end collisions that happen during rush hour traffic congestion.

	SR 202L EB		**SR 202L WB**	
Total crashes 2015-2019	1131		1473	
Multi-vehicle Crashes	958		1253	
Most Common Crash Type				
Rear End	748	78.1%	942	75.2%
Peak crash times				
6 AM - 10 AM			837	56.8%
3 PM - 6 PM	692	61.2%		

Conclusion

From the tables and analysis above, it can be concluded that the median width is not a factor in the causes of run off left crashes within the study limits. This is due to two main factors. First, there were no fatal crashes for vehicles that ran off left. Second, there was one crash eastbound, and one crash westbound that ran off left which resulted in suspected serious injury, however, these two crashes were attributed to faulty equipment (EB) and driver illness (WB). The remaining ran off left crashes suggest that improper driver behavior was the cause and not median shoulder width. Further, the majority of accidents that occur on the facility are rear end collisions happening during the peak hours, both correlating to congestion. The addition of general purpose lanes will add capacity that will reduce the congestion experienced at peak hours. This should correlate to a reduction in rear end collisions and collisions overall, thus improving operations and safety of the corridor.

APPENDIX D

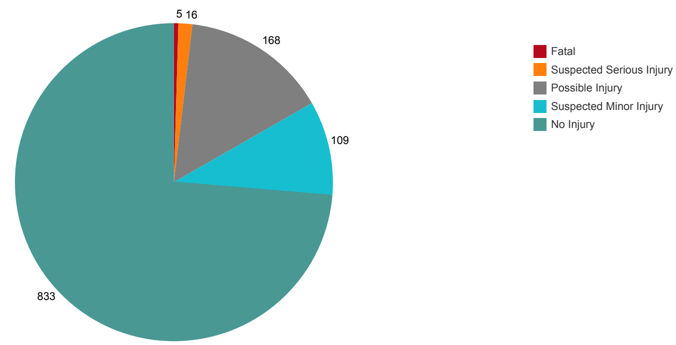
ADOT Traffic Safety Section Site Summary

SR202L EB & WB, MP 42-57

ADOT ARIZONA DEPARTMENT OF TRANSPORTATION

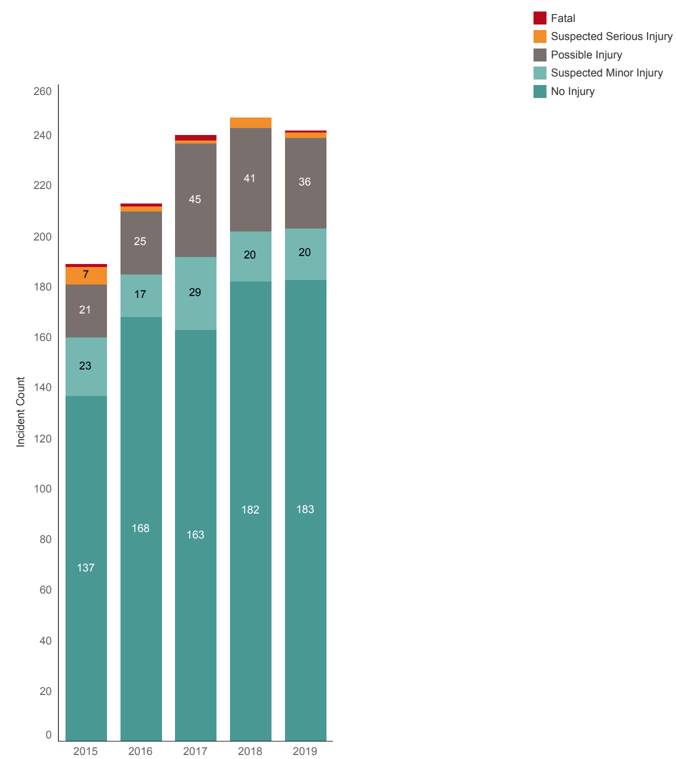
Collision By Severity

Injury Severity	Incident Count	Percent Of Total By Injury Severity
Fatal	5	0.44%
No Injury	833	73.65%
Possible Injury	168	14.85%
Suspected Minor Injury	109	9.64%
Suspected Serious Injury	16	1.41%
Grand Total	1,131	100.00%



Collision By Severity And By Incident Year

IncidentYear	InjurySeverity				
	Fatal	No Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury
2015	1	137	21	23	7
2016	1	168	25	17	2
2017	2	163	45	29	1
2018		182	41	20	4
2019	1	183	36	20	2
Grand Total	5	833	168	109	16



Report Fiter(s) Selected:
January 1, 2015 - December 31, 2019

Start Date :**January 1, 2015**
End Date :**December 31, 2019**
County :**Null**
City :**Null**
Route :**State Route 202 (WB)**
Crossing Feature : **M042 - M057**
Flags : **Null**
Engineering District: **Null**
COG/MPO: **Null**
Tribal Area: **Null**

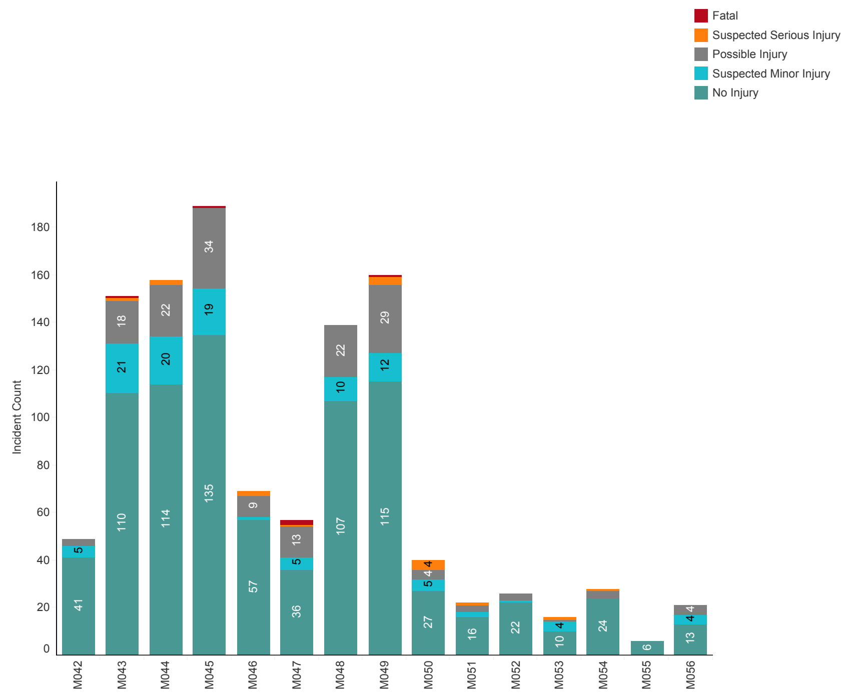
Report Summary

Total Incidents: **1,131**
Total Units: **2,343**
Total Persons: **2,843**

ADOT ARIZONA DEPARTMENT OF TRANSPORTATION

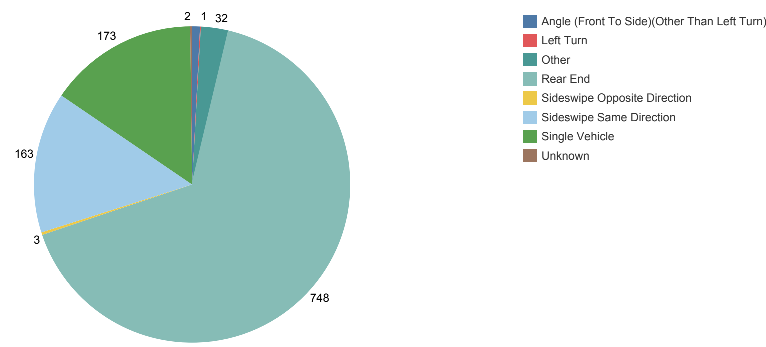
Collision By Severity And By Milepost

Geocode Crossing Feature Name	Injury Severity	Incident Count	Percent Of Total By Injury Severity And By MP
M042	No Injury	41	3.63%
	Possible Injury	3	0.27%
	Suspected Minor Injury	5	0.44%
M043	Fatal	1	0.09%
	No Injury	110	9.73%
	Possible Injury	18	1.59%
	Suspected Minor Injury	21	1.86%
	Suspected Serious Injury	1	0.09%
M044	No Injury	114	10.08%
	Possible Injury	22	1.95%
	Suspected Minor Injury	20	1.77%
	Suspected Serious Injury	2	0.18%
M045	Fatal	1	0.09%
	No Injury	135	11.94%
	Possible Injury	34	3.01%
	Suspected Minor Injury	19	1.68%
M046	No Injury	57	5.04%
	Possible Injury	9	0.80%
	Suspected Minor Injury	1	0.09%
	Suspected Serious Injury	2	0.18%
M047	Fatal	2	0.18%
	No Injury	36	3.18%
	Possible Injury	13	1.15%
	Suspected Minor Injury	5	0.44%
	Suspected Serious Injury	1	0.09%
M048	No Injury	107	9.46%
	Possible Injury	22	1.95%
	Suspected Minor Injury	10	0.88%
M049	Fatal	1	0.09%
	No Injury	115	10.17%
	Possible Injury	29	2.56%
	Suspected Minor Injury	12	1.06%
	Suspected Serious Injury	3	0.27%
M050	No Injury	27	2.39%
	Possible Injury	4	0.35%
	Suspected Minor Injury	5	0.44%
	Suspected Serious Injury	4	0.35%
M051	No Injury	16	1.41%
	Possible Injury	3	0.27%
	Suspected Minor Injury	2	0.18%
	Suspected Serious Injury	1	0.09%
M052	No Injury	22	1.95%
	Possible Injury	3	0.27%
	Suspected Minor Injury	1	0.09%
M053	No Injury	10	0.88%
	Possible Injury	1	0.09%
	Suspected Minor Injury	4	0.35%
	Suspected Serious Injury	1	0.09%
M054	No Injury	24	2.12%
	Possible Injury	3	0.27%
	Suspected Serious Injury	1	0.09%
M055	No Injury	6	0.53%
M056	No Injury	13	1.15%
	Possible Injury	4	0.35%
	Suspected Minor Injury	4	0.35%
Grand Total		1,131	100.00%



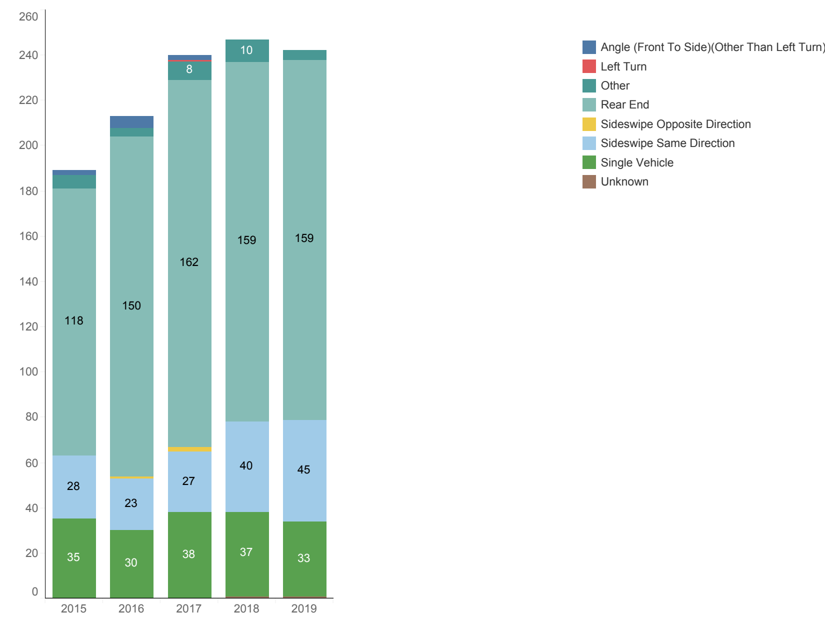
Collision By Manner

Collision Manner	Incident Count	Percent Of Total By Collision Manner
Angle (Front To Side)(Other Than Left Turn)	9	0.80%
Left Turn	1	0.09%
Other	32	2.83%
Rear End	748	66.14%
Sideswipe Opposite Direction	3	0.27%
Sideswipe Same Direction	163	14.41%
Single Vehicle	173	15.30%
Unknown	2	0.18%
Grand Total	1,131	100.00%



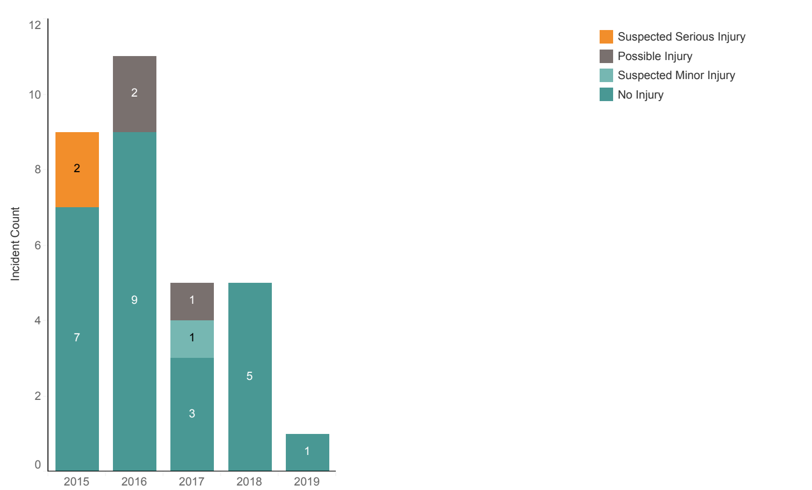
Collision By Manner And By Incident Year

Incident Year	Collision Manner	Incident Count	Percent Of Total By CollisionManner And By Incident Year
2015	Angle (Front To Side)(Other Than ..	2	0.18%
	Other	6	0.53%
	Rear End	118	10.43%
	Sideswipe Same Direction	28	2.48%
	Single Vehicle	35	3.09%
2016	Angle (Front To Side)(Other Than ..	5	0.44%
	Other	4	0.35%
	Rear End	150	13.26%
	Sideswipe Opposite Direction	1	0.09%
	Sideswipe Same Direction	23	2.03%
	Single Vehicle	30	2.65%
2017	Angle (Front To Side)(Other Than ..	2	0.18%
	Left Turn	1	0.09%
	Other	8	0.71%
	Rear End	162	14.32%
	Sideswipe Opposite Direction	2	0.18%
	Sideswipe Same Direction	27	2.39%
	Single Vehicle	38	3.36%
2018	Other	10	0.88%
	Rear End	159	14.06%
	Sideswipe Same Direction	40	3.54%
	Single Vehicle	37	3.27%
	Unknown	1	0.09%
2019	Other	4	0.35%
	Rear End	159	14.06%
	Sideswipe Same Direction	45	3.98%
	Single Vehicle	33	2.92%
	Unknown	1	0.09%
Grand Total		1,131	100.00%



Secondary Collision By Severity And By Incident Year

IncidentYear	InjurySeverity	Incident Count	Percent Of Total By Severity And By Incident Year
2015	No Injury	7	22.58%
	Suspected Serious Injury	2	6.45%
	Total	9	29.03%
2016	No Injury	9	29.03%
	Possible Injury	2	6.45%
	Total	11	35.48%
2017	No Injury	3	9.68%
	Possible Injury	1	3.23%
	Suspected Minor Injury	1	3.23%
	Total	5	16.13%
2018	No Injury	5	16.13%
	Total	5	16.13%
2019	No Injury	1	3.23%
	Total	1	3.23%
Grand Total		31	100.00%

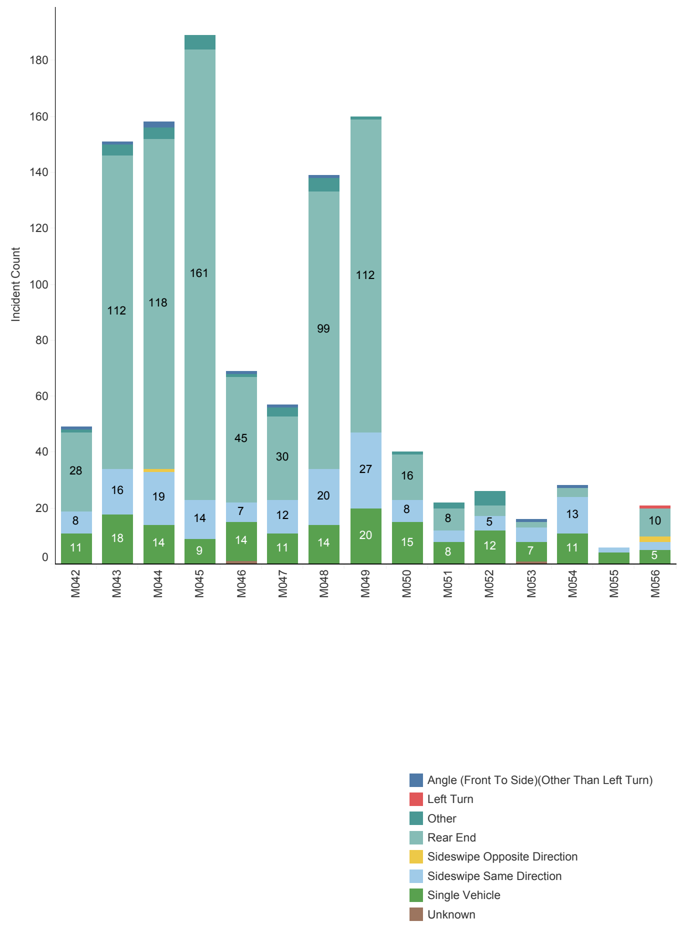


Secondary collision data is available starting with crashes that occured in July 2014 or later depending on the version of the crash report used.

ARIZONA DEPARTMENT OF TRANSPORTATION

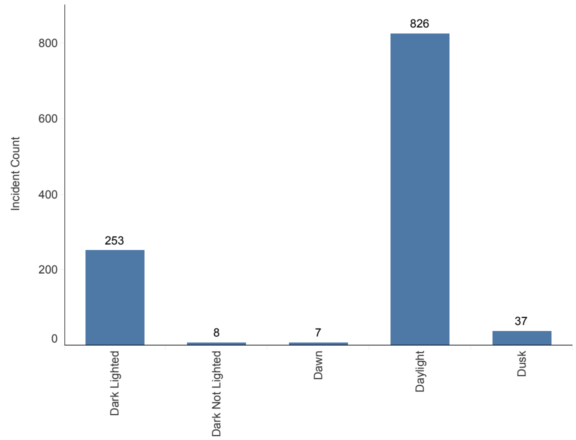
Collision By Manner And By MP

Geocode Crossing Feature Name	Collision Manner	Incident Count	Percent Of Total By Collision Manner
M042	Angle (Front To Side)(Other Than Left Turn)	1	0.09%
	Other	1	0.09%
	Rear End	28	2.48%
	Sideswipe Same Direction	8	0.71%
	Single Vehicle	11	0.97%
M043	Angle (Front To Side)(Other Than Left Turn)	1	0.09%
	Other	4	0.35%
	Rear End	112	9.90%
	Sideswipe Same Direction	16	1.41%
	Single Vehicle	18	1.59%
M044	Angle (Front To Side)(Other Than Left Turn)	2	0.18%
	Other	4	0.35%
	Rear End	118	10.43%
	Sideswipe Opposite Direction	1	0.09%
	Sideswipe Same Direction	19	1.68%
	Single Vehicle	14	1.24%
M045	Other	5	0.44%
	Rear End	161	14.24%
	Sideswipe Same Direction	14	1.24%
	Single Vehicle	9	0.80%
M046	Angle (Front To Side)(Other Than Left Turn)	1	0.09%
	Other	1	0.09%
	Rear End	45	3.98%
	Sideswipe Same Direction	7	0.62%
	Single Vehicle	14	1.24%
	Unknown	1	0.09%
M047	Angle (Front To Side)(Other Than Left Turn)	1	0.09%
	Other	3	0.27%
	Rear End	30	2.65%
	Sideswipe Same Direction	12	1.06%
	Single Vehicle	11	0.97%
M048	Angle (Front To Side)(Other Than Left Turn)	1	0.09%
	Other	5	0.44%
	Rear End	99	8.75%
	Sideswipe Same Direction	20	1.77%
	Single Vehicle	14	1.24%
M049	Other	1	0.09%
	Rear End	112	9.90%
	Sideswipe Same Direction	27	2.39%
	Single Vehicle	20	1.77%
M050	Other	1	0.09%
	Rear End	16	1.41%
	Sideswipe Same Direction	8	0.71%
	Single Vehicle	15	1.33%
M051	Other	2	0.18%
	Rear End	8	0.71%
	Sideswipe Same Direction	4	0.35%
	Single Vehicle	8	0.71%
M052	Other	5	0.44%
	Rear End	4	0.35%
	Sideswipe Same Direction	5	0.44%
	Single Vehicle	12	1.06%
M053	Angle (Front To Side)(Other Than Left Turn)	1	0.09%
	Rear End	2	0.18%
	Sideswipe Same Direction	5	0.44%
	Single Vehicle	7	0.62%
	Unknown	1	0.09%
M054	Angle (Front To Side)(Other Than Left Turn)	1	0.09%
	Rear End	3	0.27%
	Sideswipe Same Direction	13	1.15%
	Single Vehicle	11	0.97%
M055	Sideswipe Same Direction	2	0.18%
	Single Vehicle	4	0.35%
M056	Left Turn	1	0.09%
	Rear End	10	0.88%
	Sideswipe Opposite Direction	2	0.18%
	Sideswipe Same Direction	3	0.27%
	Single Vehicle	5	0.44%
Grand Total		1,131	100.00%



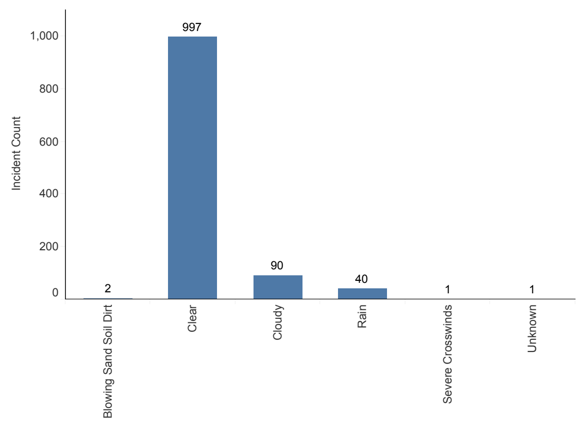
Collision By Light Condition

Light Condition	Incident Count	Percent Of Total By Light Condition
Dark Lighted	253	22.37%
Dark Not Lighted	8	0.71%
Dawn	7	0.62%
Daylight	826	73.03%
Dusk	37	3.27%
Grand Total	1,131	100.00%



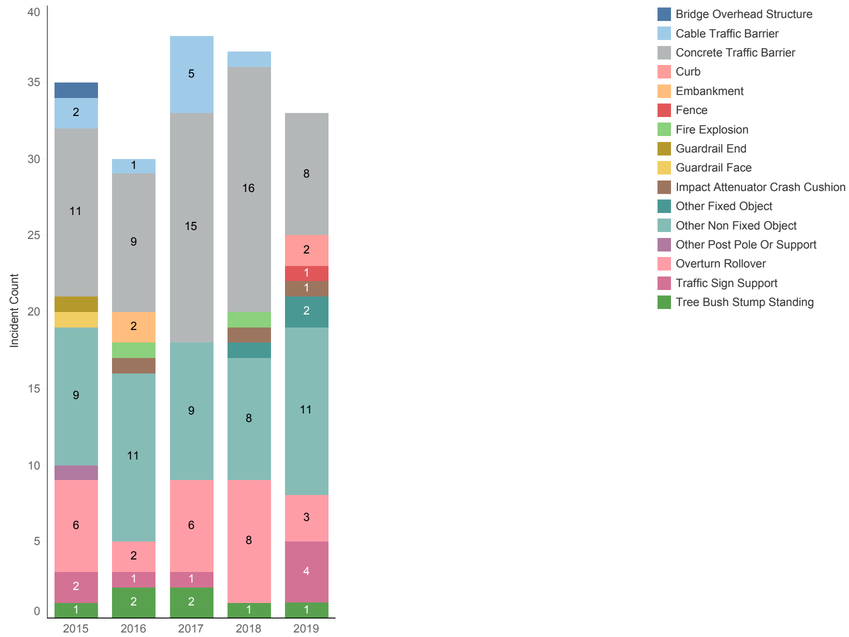
Collision By Weather

Weather	Incident Count	Percent Of Total By Weather
Blowing Sand Soil Dirt	2	0.18%
Clear	997	88.15%
Cloudy	90	7.96%
Rain	40	3.54%
Severe Crosswinds	1	0.09%
Unknown	1	0.09%
Grand Total	1,131	100.00%



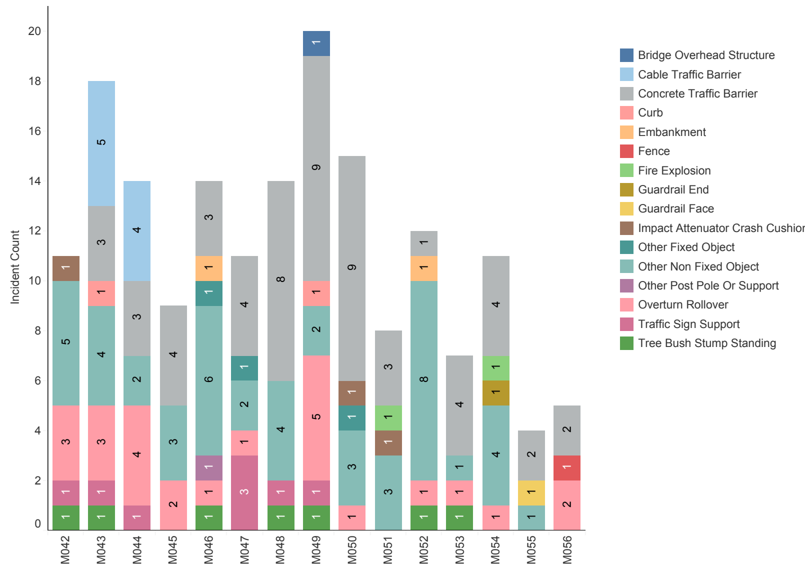
Single Vehicle Collision By First HarmfulDesc And By Incident Year

Incident Year	First Harmful Desc	Incident Count	Percent of Totals by IncidentYear and by First Harmful
2015	Bridge Overhead Structure	1	0.58%
	Cable Traffic Barrier	2	1.16%
	Concrete Traffic Barrier	11	6.36%
	Guardrail End	1	0.58%
	Guardrail Face	1	0.58%
	Other Non Fixed Object	9	5.20%
	Other Post Pole Or Support	1	0.58%
	Overturn Rollover	6	3.47%
	Traffic Sign Support	2	1.16%
	Tree Bush Stump Standing	1	0.58%
2016	Cable Traffic Barrier	1	0.58%
	Concrete Traffic Barrier	9	5.20%
	Embankment	2	1.16%
	Fire Explosion	1	0.58%
	Impact Attenuator Crash C..	1	0.58%
	Other Non Fixed Object	11	6.36%
	Overturn Rollover	2	1.16%
	Traffic Sign Support	1	0.58%
	Tree Bush Stump Standing	2	1.16%
2017	Cable Traffic Barrier	5	2.89%
	Concrete Traffic Barrier	15	8.67%
	Other Non Fixed Object	9	5.20%
	Overturn Rollover	6	3.47%
	Traffic Sign Support	1	0.58%
	Tree Bush Stump Standing	2	1.16%
2018	Cable Traffic Barrier	1	0.58%
	Concrete Traffic Barrier	16	9.25%
	Fire Explosion	1	0.58%
	Impact Attenuator Crash C..	1	0.58%
	Other Fixed Object	1	0.58%
	Other Non Fixed Object	8	4.62%
	Overturn Rollover	8	4.62%
	Tree Bush Stump Standing	1	0.58%
2019	Concrete Traffic Barrier	8	4.62%
	Curb	2	1.16%
	Fence	1	0.58%
	Impact Attenuator Crash C..	1	0.58%
	Other Fixed Object	2	1.16%
	Other Non Fixed Object	11	6.36%
	Overturn Rollover	3	1.73%
	Traffic Sign Support	4	2.31%
	Tree Bush Stump Standing	1	0.58%
Grand Total		173	100.00%



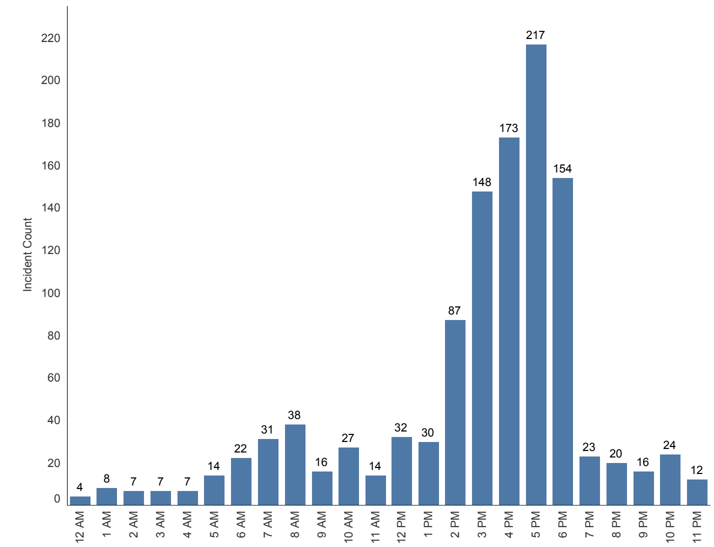
Single Vehicle Collision By First Harmful Desc And By MilePost

Geocode Crossing Feature Name	First Harmful Desc	Incident Count	Percent Of Total By Crossing Feature
M042	Impact Attenuator Crash Cushion	1	0.58%
	Other Non Fixed Object	5	2.89%
	Overturn Rollover	3	1.73%
	Traffic Sign Support	1	0.58%
	Tree Bush Stump Standing	1	0.58%
M043	Cable Traffic Barrier	5	2.89%
	Concrete Traffic Barrier	3	1.73%
	Curb	1	0.58%
	Other Non Fixed Object	4	2.31%
	Overturn Rollover	3	1.73%
	Traffic Sign Support	1	0.58%
	Tree Bush Stump Standing	1	0.58%
M044	Cable Traffic Barrier	4	2.31%
	Concrete Traffic Barrier	3	1.73%
	Other Non Fixed Object	2	1.16%
	Overturn Rollover	4	2.31%
	Traffic Sign Support	1	0.58%
M045	Concrete Traffic Barrier	4	2.31%
	Other Non Fixed Object	3	1.73%
	Overturn Rollover	2	1.16%
M046	Concrete Traffic Barrier	3	1.73%
	Embankment	1	0.58%
	Other Fixed Object	1	0.58%
	Other Non Fixed Object	6	3.47%
	Other Post Pole Or Support	1	0.58%
	Overturn Rollover	1	0.58%
	Tree Bush Stump Standing	1	0.58%
M047	Concrete Traffic Barrier	4	2.31%
	Other Fixed Object	1	0.58%
	Other Non Fixed Object	2	1.16%
	Overturn Rollover	1	0.58%
	Traffic Sign Support	3	1.73%
M048	Concrete Traffic Barrier	8	4.62%
	Other Non Fixed Object	4	2.31%
	Traffic Sign Support	1	0.58%
	Tree Bush Stump Standing	1	0.58%
M049	Bridge Overhead Structure	1	0.58%
	Concrete Traffic Barrier	9	5.20%
	Curb	1	0.58%
	Other Non Fixed Object	2	1.16%
	Overturn Rollover	5	2.89%
	Traffic Sign Support	1	0.58%
	Tree Bush Stump Standing	1	0.58%
M050	Concrete Traffic Barrier	9	5.20%
	Impact Attenuator Crash Cushion	1	0.58%
	Other Fixed Object	1	0.58%
	Other Non Fixed Object	3	1.73%
	Overturn Rollover	1	0.58%
M051	Concrete Traffic Barrier	3	1.73%
	Fire Explosion	1	0.58%
	Impact Attenuator Crash Cushion	1	0.58%
	Other Non Fixed Object	3	1.73%
M052	Concrete Traffic Barrier	1	0.58%
	Embankment	1	0.58%
	Other Non Fixed Object	8	4.62%
	Overturn Rollover	1	0.58%
	Tree Bush Stump Standing	1	0.58%
M053	Concrete Traffic Barrier	4	2.31%
	Other Non Fixed Object	1	0.58%
	Overturn Rollover	1	0.58%
	Tree Bush Stump Standing	1	0.58%
M054	Concrete Traffic Barrier	4	2.31%
	Fire Explosion	1	0.58%
	Guardrail End	1	0.58%
	Other Non Fixed Object	4	2.31%
	Overturn Rollover	1	0.58%
M055	Concrete Traffic Barrier	2	1.16%
	Guardrail Face	1	0.58%
	Other Non Fixed Object	1	0.58%
M056	Concrete Traffic Barrier	2	1.16%
	Fence	1	0.58%
	Overturn Rollover	2	1.16%
Grand Total		173	100.00%



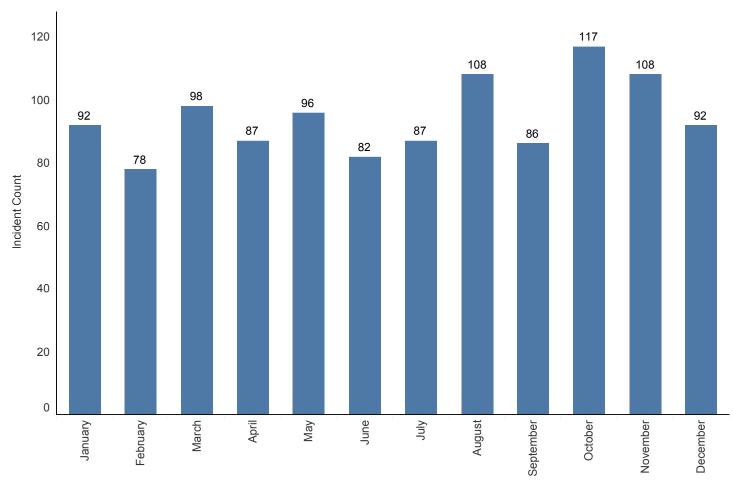
Collision By Hour Of Day

Hour	Incident Count	Percent Of Total by Hour
12 AM	4	0.35%
1 AM	8	0.71%
2 AM	7	0.62%
3 AM	7	0.62%
4 AM	7	0.62%
5 AM	14	1.24%
6 AM	22	1.95%
7 AM	31	2.74%
8 AM	38	3.36%
9 AM	16	1.41%
10 AM	27	2.39%
11 AM	14	1.24%
12 PM	32	2.83%
1 PM	30	2.65%
2 PM	87	7.69%
3 PM	148	13.09%
4 PM	173	15.30%
5 PM	217	19.19%
6 PM	154	13.62%
7 PM	23	2.03%
8 PM	20	1.77%
9 PM	16	1.41%
10 PM	24	2.12%
11 PM	12	1.06%
Grand Total	1,131	100.00%



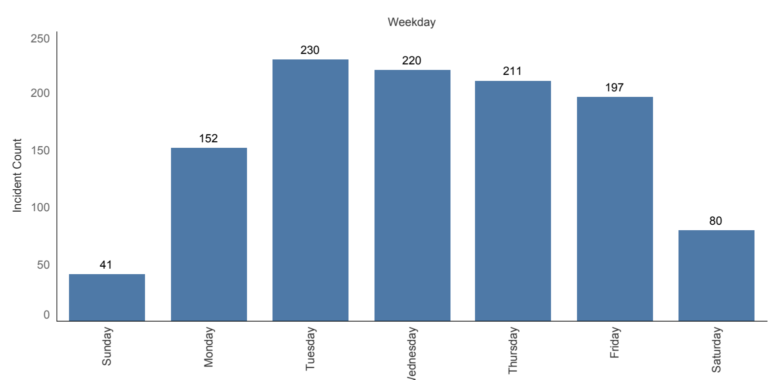
Collision By Month

Month	Incident Count	Percent Of Total By Month
January	92	8.13%
February	78	6.90%
March	98	8.66%
April	87	7.69%
May	96	8.49%
June	82	7.25%
July	87	7.69%
August	108	9.55%
September	86	7.60%
October	117	10.34%
November	108	9.55%
December	92	8.13%
Grand Total	1,131	100.00%



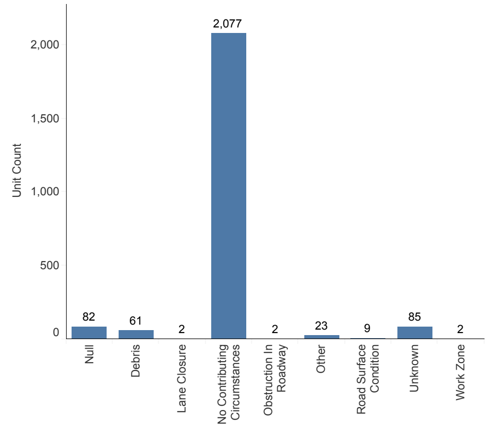
Collision by Weekday

Weekday	Incident Count	Percentage Of Total By Weekday
Sunday	41	3.63%
Monday	152	13.44%
Tuesday	230	20.34%
Wednesday	220	19.45%
Thursday	211	18.66%
Friday	197	17.42%
Saturday	80	7.07%
Grand Total	1,131	100.00%



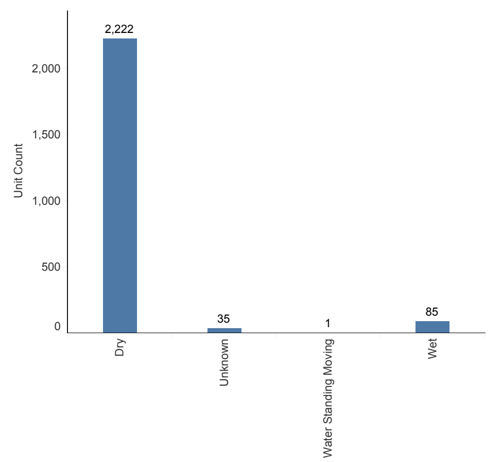
Collision By Road Condition

Road Condition	Unit Count	Percent Of Total By Road Condition
Null	82	3.50%
Debris	61	2.60%
Lane Closure	2	0.09%
No Contributing Circumstances	2,077	88.65%
Obstruction In Roadway	2	0.09%
Other	23	0.98%
Road Surface Condition	9	0.38%
Unknown	85	3.63%
Work Zone	2	0.09%
Grand Total	2,343	100.00%



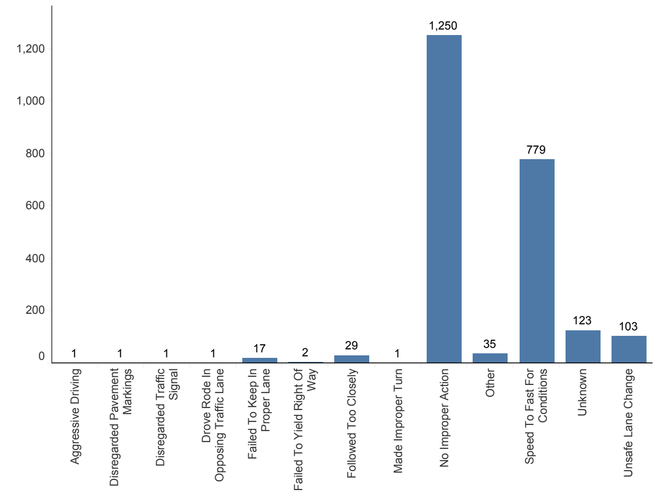
Collision By Surface Condition

Surface Condition	Unit Count	Percent Of Total By Surface Condition
Dry	2,222	94.84%
Unknown	35	1.49%
Water Standing Moving	1	0.04%
Wet	85	3.63%
Grand Total	2,343	100.00%



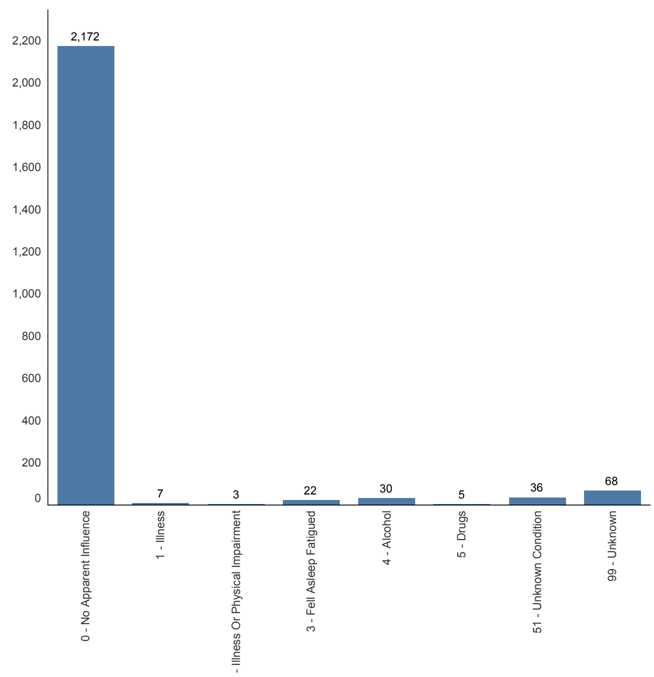
Collision By Violation

Person Violation	Unit Count	Percent Of Total By Violation
Aggressive Driving	1	0.04%
Disregarded Pavement Markings	1	0.04%
Disregarded Traffic Signal	1	0.04%
Drove Rode In Opposing Traffic Lane	1	0.04%
Failed To Keep In Proper Lane	17	0.73%
Failed To Yield Right Of Way	2	0.09%
Followed Too Closely	29	1.24%
Made Improper Turn	1	0.04%
No Improper Action	1,250	53.35%
Other	35	1.49%
Speed To Fast For Conditions	779	33.25%
Unknown	123	5.25%
Unsafe Lane Change	103	4.40%
Grand Total	2,343	100.00%



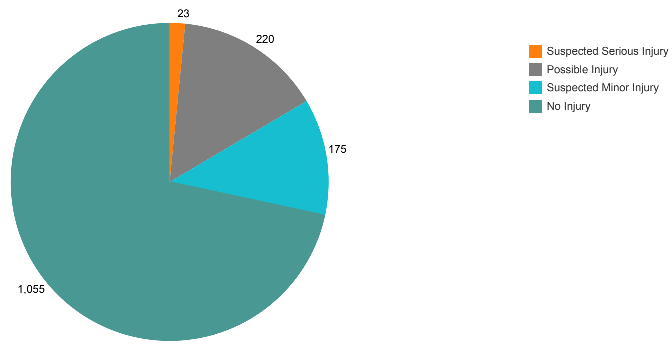
Collision By Physical

Physical	Unit Count	Percent Of Total By Physical
0 - No Apparent Influence	2,172	92.70%
1 - Illness	7	0.30%
1 - Illness Or Physical Impairment	3	0.13%
3 - Fell Asleep Fatigued	22	0.94%
4 - Alcohol	30	1.28%
5 - Drugs	5	0.21%
51 - Unknown Condition	36	1.54%
99 - Unknown	68	2.90%
Grand Total	2,343	100.00%



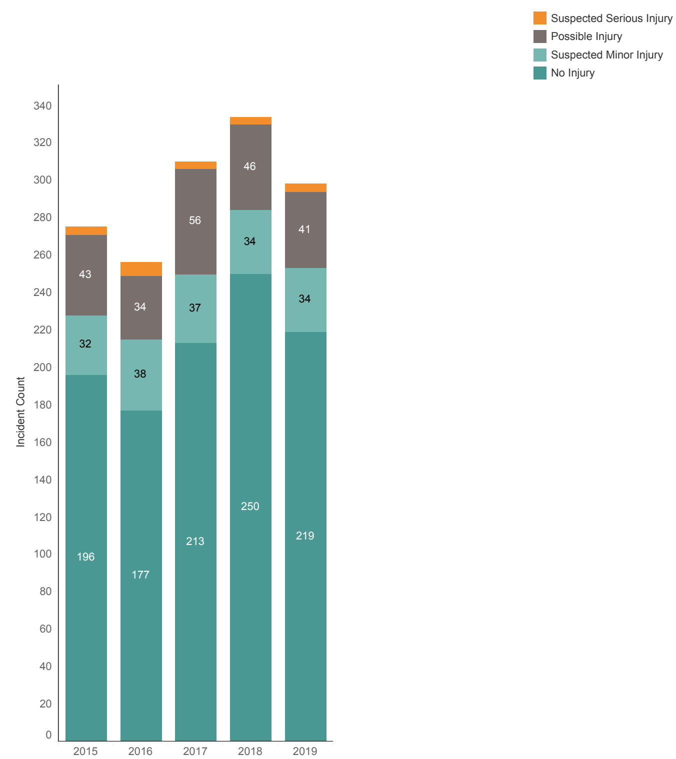
Collision By Severity

Injury Severity	Incident Count	Percent Of Total By Injury Severity
No Injury	1,055	71.62%
Possible Injury	220	14.94%
Suspected Minor Injury	175	11.88%
Suspected Serious Injury	23	1.56%
Grand Total	1,473	100.00%



Collision By Severity And By Incident Year

IncidentYear	InjurySeverity			
	No Injury	Possible Injury	Suspected Minor Injury	Suspected Serious Injury
2015	196	43	32	4
2016	177	34	38	7
2017	213	56	37	4
2018	250	46	34	4
2019	219	41	34	4
Grand Total	1,055	220	175	23



Report Fiter(s) Selected:
January 1, 2015 - December 31, 2019

Start Date :**January 1, 2015**
End Date :**December 31, 2019**
County :**Null**
City :**Null**
Route :**State Route 202 (EB)**
Crossing Feature : **M042 - M057**
Flags : **Null**
Engineering District: **Null**
COG/MPO: **Null**
Tribal Area: **Null**

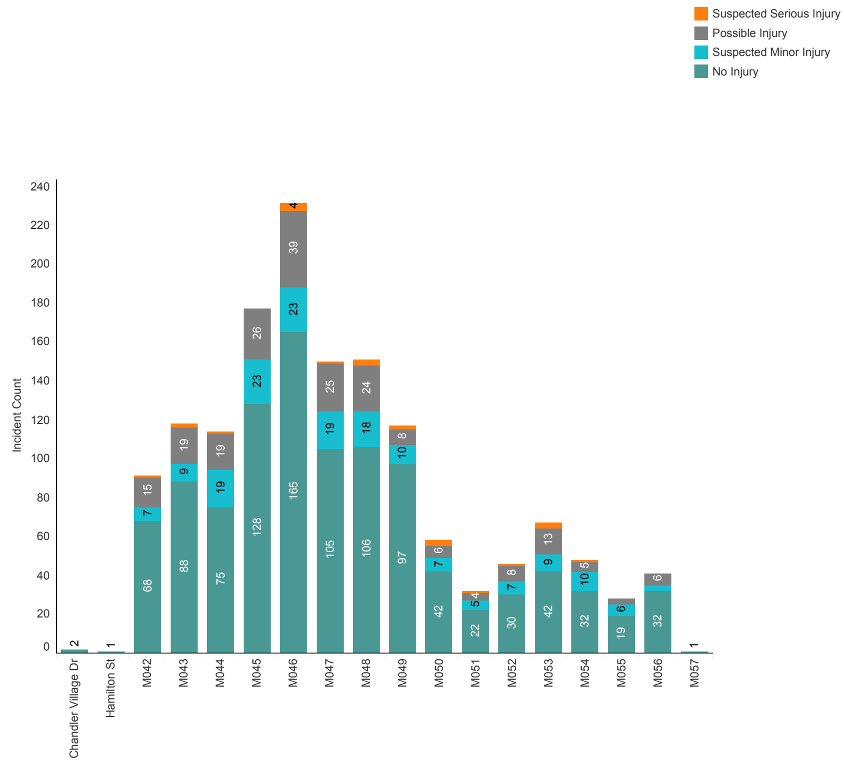
Report Summary

Total Incidents: **1,473**
Total Units: **3,067**
Total Persons: **3,654**

ADOT ARIZONA DEPARTMENT OF TRANSPORTATION

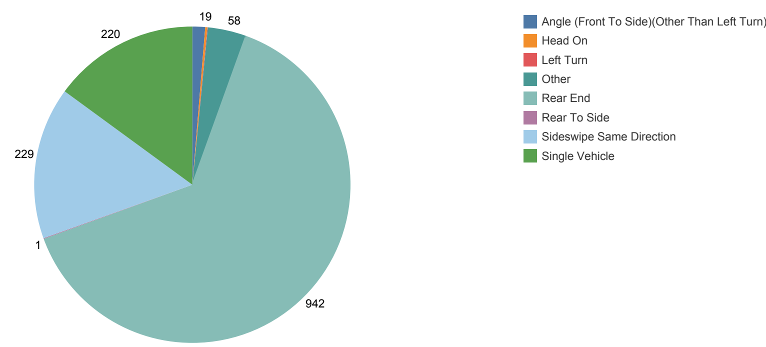
Collision By Severity And By Milepost

Geocode Crossing Feature Name	Injury Severity	Incident Count	Percent Of Total By Injury Severity And By MP
Chandler Village Dr	No Injury	2	0.14%
Hamilton St	No Injury	1	0.07%
M042	No Injury	68	4.62%
	Possible Injury	15	1.02%
	Suspected Minor Injury	7	0.48%
	Suspected Serious Injury	1	0.07%
M043	No Injury	88	5.97%
	Possible Injury	19	1.29%
	Suspected Minor Injury	9	0.61%
	Suspected Serious Injury	2	0.14%
M044	No Injury	75	5.09%
	Possible Injury	19	1.29%
	Suspected Minor Injury	19	1.29%
	Suspected Serious Injury	1	0.07%
M045	No Injury	128	8.69%
	Possible Injury	26	1.77%
	Suspected Minor Injury	23	1.56%
M046	No Injury	165	11.20%
	Possible Injury	39	2.65%
	Suspected Minor Injury	23	1.56%
	Suspected Serious Injury	4	0.27%
M047	No Injury	105	7.13%
	Possible Injury	25	1.70%
	Suspected Minor Injury	19	1.29%
	Suspected Serious Injury	1	0.07%
M048	No Injury	106	7.20%
	Possible Injury	24	1.63%
	Suspected Minor Injury	18	1.22%
	Suspected Serious Injury	3	0.20%
M049	No Injury	97	6.59%
	Possible Injury	8	0.54%
	Suspected Minor Injury	10	0.68%
	Suspected Serious Injury	2	0.14%
M050	No Injury	42	2.85%
	Possible Injury	6	0.41%
	Suspected Minor Injury	7	0.48%
	Suspected Serious Injury	3	0.20%
M051	No Injury	22	1.49%
	Possible Injury	4	0.27%
	Suspected Minor Injury	5	0.34%
	Suspected Serious Injury	1	0.07%
M052	No Injury	30	2.04%
	Possible Injury	8	0.54%
	Suspected Minor Injury	7	0.48%
	Suspected Serious Injury	1	0.07%
M053	No Injury	42	2.85%
	Possible Injury	13	0.88%
	Suspected Minor Injury	9	0.61%
	Suspected Serious Injury	3	0.20%
M054	No Injury	32	2.17%
	Possible Injury	5	0.34%
	Suspected Minor Injury	10	0.68%
	Suspected Serious Injury	1	0.07%
M055	No Injury	19	1.29%
	Possible Injury	3	0.20%
	Suspected Minor Injury	6	0.41%
M056	No Injury	32	2.17%
	Possible Injury	6	0.41%
	Suspected Minor Injury	3	0.20%
M057	No Injury	1	0.07%
Grand Total		1,473	100.00%



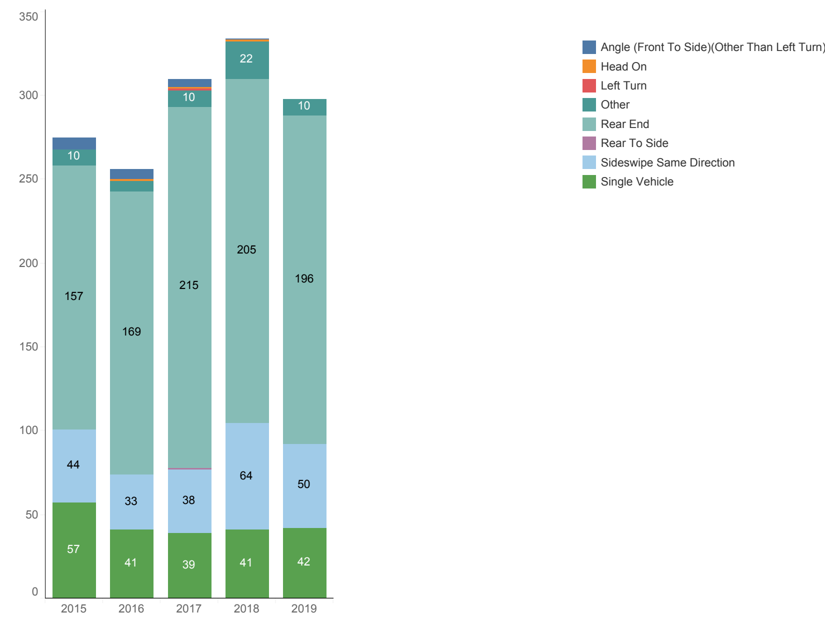
Collision By Manner

Collision Manner	Incident Count	Percent Of Total By Collision Manner
Angle (Front To Side)(Other Than Left Turn)	19	1.29%
Head On	3	0.20%
Left Turn	1	0.07%
Other	58	3.94%
Rear End	942	63.95%
Rear To Side	1	0.07%
Sideswipe Same Direction	229	15.55%
Single Vehicle	220	14.94%
Grand Total	1,473	100.00%



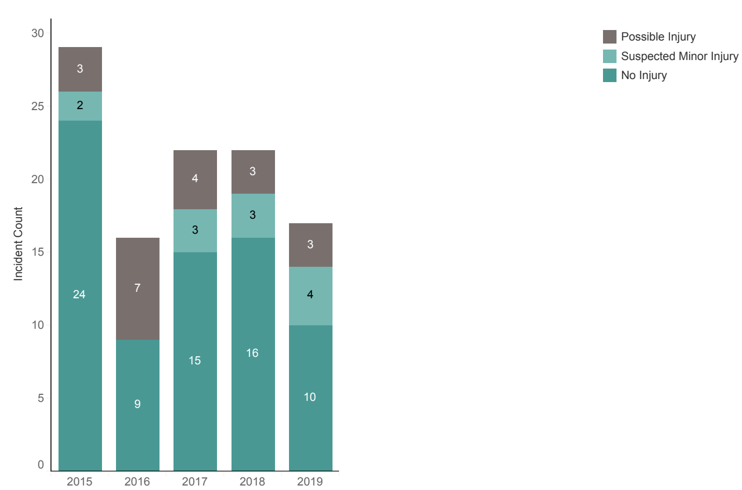
Collision By Manner And By Incident Year

Incident Year	Collision Manner	Incident Count	Percent Of Total By CollisionManner And By Incident Year
2015	Angle (Front To Side)(Other Than ..	7	0.48%
	Other	10	0.68%
	Rear End	157	10.66%
	Sideswipe Same Direction	44	2.99%
	Single Vehicle	57	3.87%
2016	Angle (Front To Side)(Other Than ..	6	0.41%
	Head On	1	0.07%
	Other	6	0.41%
	Rear End	169	11.47%
	Sideswipe Same Direction	33	2.24%
	Single Vehicle	41	2.78%
2017	Angle (Front To Side)(Other Than ..	5	0.34%
	Head On	1	0.07%
	Left Turn	1	0.07%
	Other	10	0.68%
	Rear End	215	14.60%
	Rear To Side	1	0.07%
	Sideswipe Same Direction	38	2.58%
	Single Vehicle	39	2.65%
2018	Angle (Front To Side)(Other Than ..	1	0.07%
	Head On	1	0.07%
	Other	22	1.49%
	Rear End	205	13.92%
	Sideswipe Same Direction	64	4.34%
	Single Vehicle	41	2.78%
2019	Other	10	0.68%
	Rear End	196	13.31%
	Sideswipe Same Direction	50	3.39%
	Single Vehicle	42	2.85%
Grand Total		1,473	100.00%



Secondary Collision By Severity And By Incident Year

IncidentYear	InjurySeverity	Incident Count	Percent Of Total By Severity And By Incident Year
2015	No Injury	24	22.64%
	Possible Injury	3	2.83%
	Suspected Minor Injury	2	1.89%
	Total	29	27.36%
2016	No Injury	9	8.49%
	Possible Injury	7	6.60%
	Total	16	15.09%
2017	No Injury	15	14.15%
	Possible Injury	4	3.77%
	Suspected Minor Injury	3	2.83%
	Total	22	20.75%
2018	No Injury	16	15.09%
	Possible Injury	3	2.83%
	Suspected Minor Injury	3	2.83%
	Total	22	20.75%
2019	No Injury	10	9.43%
	Possible Injury	3	2.83%
	Suspected Minor Injury	4	3.77%
	Total	17	16.04%
Grand Total		106	100.00%

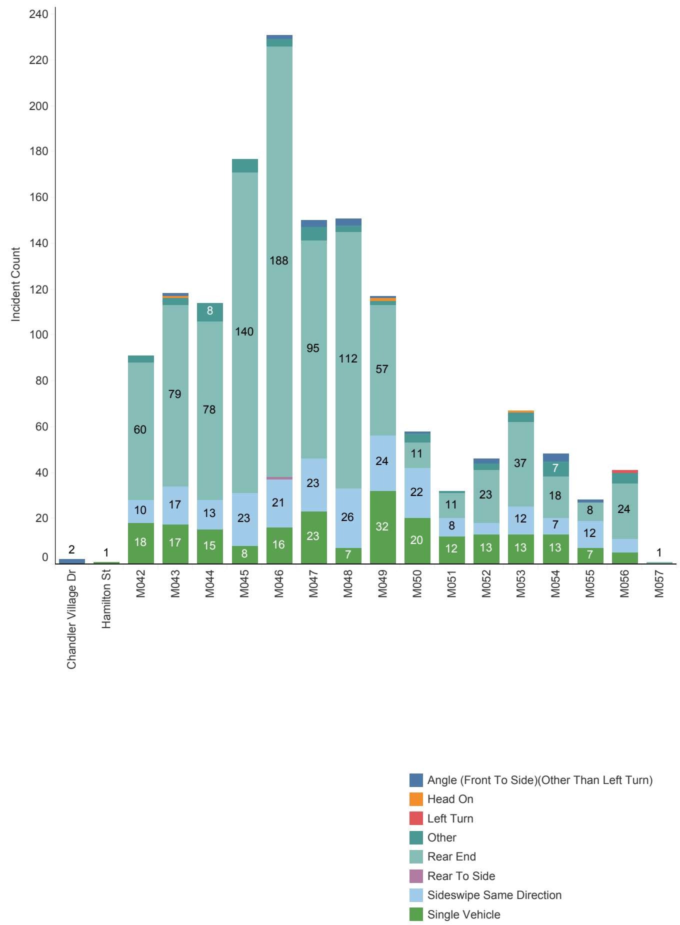


Secondary collision data is available starting with crashes that occured in July 2014 or later depending on the version of the crash report used.

ADOT ARIZONA DEPARTMENT OF TRANSPORTATION

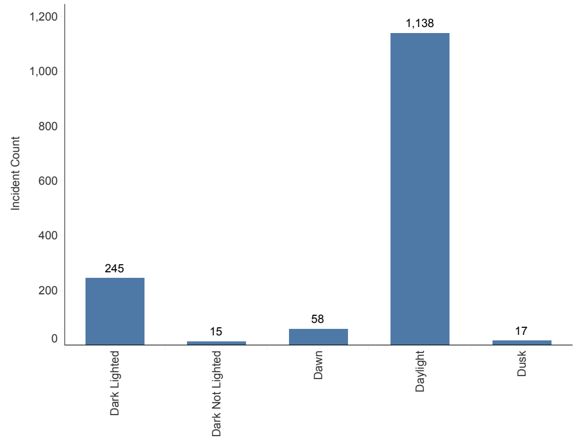
Collision By Manner And By MP

Geocode Crossing Feature Name	Collision Manner	Incident Count	Percent Of Total By Collision Manner
Chandler Vi..	Angle (Front To Side)(Other Than Left Turn)	2	0.14%
Hamilton St	Single Vehicle	1	0.07%
M042	Other	3	0.20%
	Rear End	60	4.07%
	Sideswipe Same Direction	10	0.68%
	Single Vehicle	18	1.22%
M043	Angle (Front To Side)(Other Than Left Turn)	1	0.07%
	Head On	1	0.07%
	Other	3	0.20%
	Rear End	79	5.36%
	Sideswipe Same Direction	17	1.15%
	Single Vehicle	17	1.15%
M044	Other	8	0.54%
	Rear End	78	5.30%
	Sideswipe Same Direction	13	0.88%
	Single Vehicle	15	1.02%
M045	Other	6	0.41%
	Rear End	140	9.50%
	Sideswipe Same Direction	23	1.56%
	Single Vehicle	8	0.54%
M046	Angle (Front To Side)(Other Than Left Turn)	2	0.14%
	Other	3	0.20%
	Rear End	188	12.76%
	Rear To Side	1	0.07%
	Sideswipe Same Direction	21	1.43%
	Single Vehicle	16	1.09%
M047	Angle (Front To Side)(Other Than Left Turn)	3	0.20%
	Other	6	0.41%
	Rear End	95	6.45%
	Sideswipe Same Direction	23	1.56%
	Single Vehicle	23	1.56%
M048	Angle (Front To Side)(Other Than Left Turn)	3	0.20%
	Other	3	0.20%
	Rear End	112	7.60%
	Sideswipe Same Direction	26	1.77%
	Single Vehicle	7	0.48%
M049	Angle (Front To Side)(Other Than Left Turn)	1	0.07%
	Head On	1	0.07%
	Other	2	0.14%
	Rear End	57	3.87%
	Sideswipe Same Direction	24	1.63%
	Single Vehicle	32	2.17%
M050	Angle (Front To Side)(Other Than Left Turn)	1	0.07%
	Other	4	0.27%
	Rear End	11	0.75%
	Sideswipe Same Direction	22	1.49%
	Single Vehicle	20	1.36%
M051	Other	1	0.07%
	Rear End	11	0.75%
	Sideswipe Same Direction	8	0.54%
	Single Vehicle	12	0.81%
M052	Angle (Front To Side)(Other Than Left Turn)	2	0.14%
	Other	3	0.20%
	Rear End	23	1.56%
	Sideswipe Same Direction	5	0.34%
	Single Vehicle	13	0.88%
M053	Head On	1	0.07%
	Other	4	0.27%
	Rear End	37	2.51%
	Sideswipe Same Direction	12	0.81%
	Single Vehicle	13	0.88%
M054	Angle (Front To Side)(Other Than Left Turn)	3	0.20%
	Other	7	0.48%
	Rear End	18	1.22%
	Sideswipe Same Direction	7	0.48%
	Single Vehicle	13	0.88%
M055	Angle (Front To Side)(Other Than Left Turn)	1	0.07%
	Rear End	8	0.54%
	Sideswipe Same Direction	12	0.81%
	Single Vehicle	7	0.48%
M056	Left Turn	1	0.07%
	Other	5	0.34%
	Rear End	24	1.63%
	Sideswipe Same Direction	6	0.41%
	Single Vehicle	5	0.34%
M057	Rear End	1	0.07%
Grand Total		1,473	100.00%



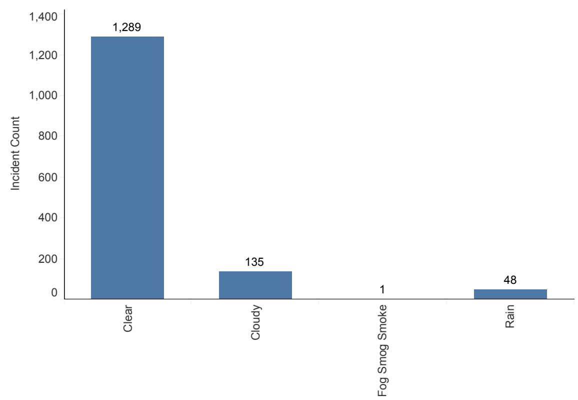
Collision By Light Condition

Light Condition	Incident Count	Percent Of Total By Light Condition
Dark Lighted	245	16.63%
Dark Not Lighted	15	1.02%
Dawn	58	3.94%
Daylight	1,138	77.26%
Dusk	17	1.15%
Grand Total	1,473	100.00%



Collision By Weather

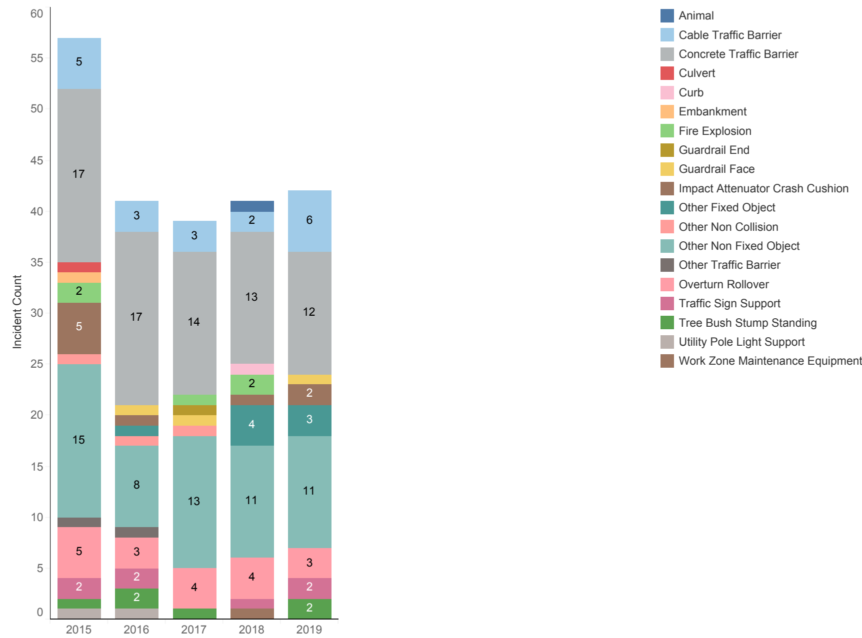
Weather	Incident Count	Percent Of Total By Weather
Clear	1,289	87.51%
Cloudy	135	9.16%
Fog Smog Smoke	1	0.07%
Rain	48	3.26%
Grand Total	1,473	100.00%



ADOT ARIZONA DEPARTMENT OF TRANSPORTATION

Single Vehicle Collision By First HarmfulDesc And By Incident Year

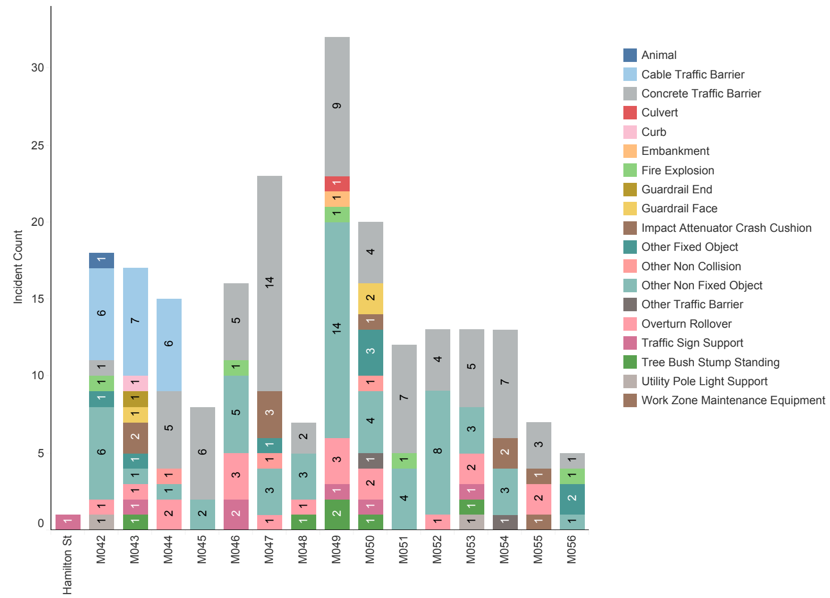
Incident Year	First Harmful Desc	Incident Count	Percent of Totals by IncidentYear and by First Harmful
2015	Cable Traffic Barrier	5	2.27%
	Concrete Traffic Barrier	17	7.73%
	Culvert	1	0.45%
	Embankment	1	0.45%
	Fire Explosion	2	0.91%
	Impact Attenuator Crash C..	5	2.27%
	Other Non Collision	1	0.45%
	Other Non Fixed Object	15	6.82%
	Other Traffic Barrier	1	0.45%
	Overturn Rollover	5	2.27%
	Traffic Sign Support	2	0.91%
	Tree Bush Stump Standing	1	0.45%
	Utility Pole Light Support	1	0.45%
2016	Cable Traffic Barrier	3	1.36%
	Concrete Traffic Barrier	17	7.73%
	Guardrail Face	1	0.45%
	Impact Attenuator Crash C..	1	0.45%
	Other Fixed Object	1	0.45%
	Other Non Collision	1	0.45%
	Other Non Fixed Object	8	3.64%
	Other Traffic Barrier	1	0.45%
	Overturn Rollover	3	1.36%
	Traffic Sign Support	2	0.91%
	Tree Bush Stump Standing	2	0.91%
	Utility Pole Light Support	1	0.45%
2017	Cable Traffic Barrier	3	1.36%
	Concrete Traffic Barrier	14	6.36%
	Fire Explosion	1	0.45%
	Guardrail End	1	0.45%
	Guardrail Face	1	0.45%
	Other Non Collision	1	0.45%
	Other Non Fixed Object	13	5.91%
	Overturn Rollover	4	1.82%
	Tree Bush Stump Standing	1	0.45%
2018	Animal	1	0.45%
	Cable Traffic Barrier	2	0.91%
	Concrete Traffic Barrier	13	5.91%
	Curb	1	0.45%
	Fire Explosion	2	0.91%
	Impact Attenuator Crash C..	1	0.45%
	Other Fixed Object	4	1.82%
	Other Non Fixed Object	11	5.00%
	Overturn Rollover	4	1.82%
	Traffic Sign Support	1	0.45%
	Work Zone Maintenance E..	1	0.45%
2019	Cable Traffic Barrier	6	2.73%
	Concrete Traffic Barrier	12	5.45%
	Guardrail Face	1	0.45%
	Impact Attenuator Crash C..	2	0.91%
	Other Fixed Object	3	1.36%
	Other Non Fixed Object	11	5.00%
	Overturn Rollover	3	1.36%
	Traffic Sign Support	2	0.91%
	Tree Bush Stump Standing	2	0.91%
Grand Total		220	100.00%



ADOT ARIZONA DEPARTMENT OF TRANSPORTATION

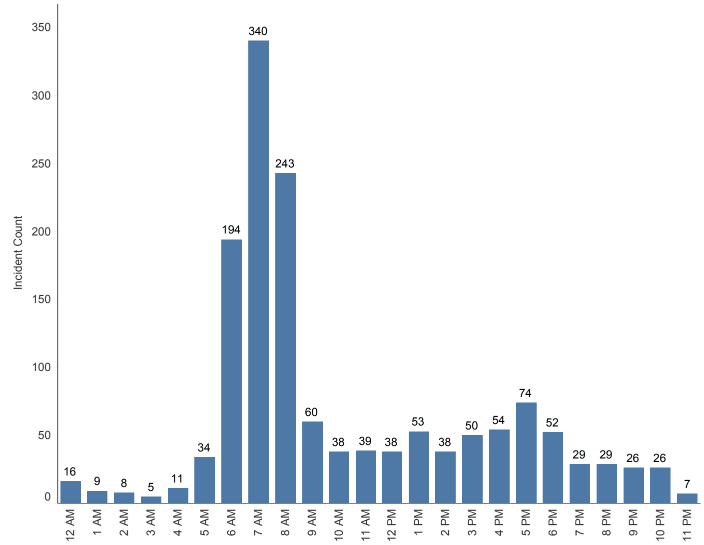
Single Vehicle Collision By First Harmful Desc And By MilePost

Geocode Crossing Feature Name	First Harmful Desc	Incident Count	Percent Of Total By Crossing Feature
Hamilton St	Traffic Sign Support	1	0.45%
M042	Animal	1	0.45%
	Cable Traffic Barrier	6	2.73%
	Concrete Traffic Barrier	1	0.45%
	Fire Explosion	1	0.45%
	Other Fixed Object	1	0.45%
	Other Non Fixed Object	6	2.73%
	Overturn Rollover	1	0.45%
	Utility Pole Light Support	1	0.45%
M043	Cable Traffic Barrier	7	3.18%
	Curb	1	0.45%
	Guardrail End	1	0.45%
	Guardrail Face	1	0.45%
	Impact Attenuator Crash Cushion	2	0.91%
	Other Fixed Object	1	0.45%
	Other Non Fixed Object	1	0.45%
	Overturn Rollover	1	0.45%
	Traffic Sign Support	1	0.45%
	Tree Bush Stump Standing	1	0.45%
M044	Cable Traffic Barrier	6	2.73%
	Concrete Traffic Barrier	5	2.27%
	Other Non Collision	1	0.45%
	Other Non Fixed Object	1	0.45%
	Overturn Rollover	2	0.91%
M045	Concrete Traffic Barrier	6	2.73%
	Other Non Fixed Object	2	0.91%
M046	Concrete Traffic Barrier	5	2.27%
	Fire Explosion	1	0.45%
	Other Non Fixed Object	5	2.27%
	Overturn Rollover	3	1.36%
	Traffic Sign Support	2	0.91%
M047	Concrete Traffic Barrier	14	6.36%
	Impact Attenuator Crash Cushion	3	1.36%
	Other Fixed Object	1	0.45%
	Other Non Collision	1	0.45%
	Other Non Fixed Object	3	1.36%
	Overturn Rollover	1	0.45%
M048	Concrete Traffic Barrier	2	0.91%
	Other Non Fixed Object	3	1.36%
	Overturn Rollover	1	0.45%
	Tree Bush Stump Standing	1	0.45%
M049	Concrete Traffic Barrier	9	4.09%
	Culvert	1	0.45%
	Embankment	1	0.45%
	Fire Explosion	1	0.45%
	Other Non Fixed Object	14	6.36%
	Overturn Rollover	3	1.36%
	Traffic Sign Support	1	0.45%
	Tree Bush Stump Standing	2	0.91%
M050	Concrete Traffic Barrier	4	1.82%
	Guardrail Face	2	0.91%
	Impact Attenuator Crash Cushion	1	0.45%
	Other Fixed Object	3	1.36%
	Other Non Collision	1	0.45%
	Other Non Fixed Object	4	1.82%
	Other Traffic Barrier	1	0.45%
	Overturn Rollover	2	0.91%
	Traffic Sign Support	1	0.45%
	Tree Bush Stump Standing	1	0.45%
M051	Concrete Traffic Barrier	7	3.18%
	Fire Explosion	1	0.45%
	Other Non Fixed Object	4	1.82%
M052	Concrete Traffic Barrier	4	1.82%
	Other Non Fixed Object	8	3.64%
	Overturn Rollover	1	0.45%
M053	Concrete Traffic Barrier	5	2.27%
	Other Non Fixed Object	3	1.36%
	Overturn Rollover	2	0.91%
	Traffic Sign Support	1	0.45%
	Tree Bush Stump Standing	1	0.45%
	Utility Pole Light Support	1	0.45%
M054	Concrete Traffic Barrier	7	3.18%
	Impact Attenuator Crash Cushion	2	0.91%
	Other Non Fixed Object	3	1.36%
	Other Traffic Barrier	1	0.45%
M055	Concrete Traffic Barrier	3	1.36%
	Impact Attenuator Crash Cushion	1	0.45%
	Overturn Rollover	2	0.91%
	Work Zone Maintenance Equipment	1	0.45%
M056	Concrete Traffic Barrier	1	0.45%
	Fire Explosion	1	0.45%
	Other Fixed Object	2	0.91%
	Other Non Fixed Object	1	0.45%
Grand Total		220	100.00%



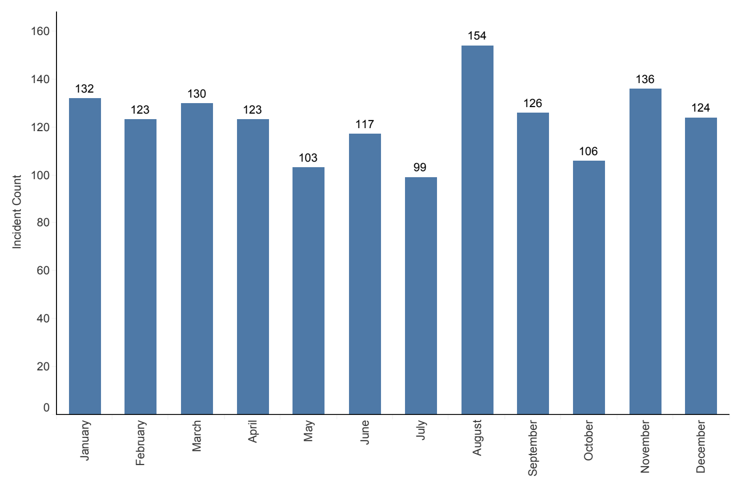
Collision By Hour Of Day

Hour	Incident Count	Percent Of Total by Hour
12 AM	16	1.09%
1 AM	9	0.61%
2 AM	8	0.54%
3 AM	5	0.34%
4 AM	11	0.75%
5 AM	34	2.31%
6 AM	194	13.17%
7 AM	340	23.08%
8 AM	243	16.50%
9 AM	60	4.07%
10 AM	38	2.58%
11 AM	39	2.65%
12 PM	38	2.58%
1 PM	53	3.60%
2 PM	38	2.58%
3 PM	50	3.39%
4 PM	54	3.67%
5 PM	74	5.02%
6 PM	52	3.53%
7 PM	29	1.97%
8 PM	29	1.97%
9 PM	26	1.77%
10 PM	26	1.77%
11 PM	7	0.48%
Grand Total	1,473	100.00%



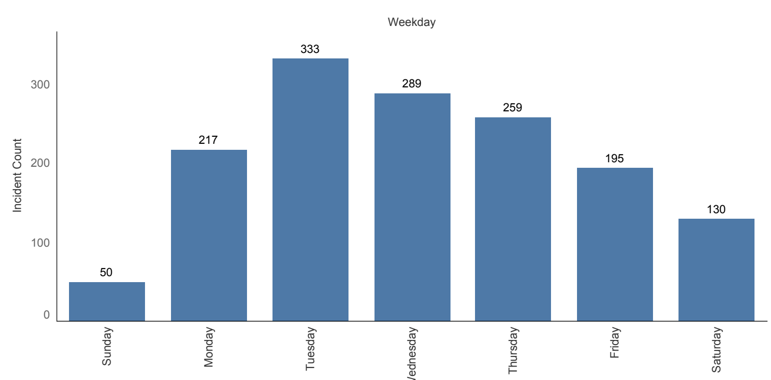
Collision By Month

Month	Incident Count	Percent Of Total By Month
January	132	8.96%
February	123	8.35%
March	130	8.83%
April	123	8.35%
May	103	6.99%
June	117	7.94%
July	99	6.72%
August	154	10.45%
September	126	8.55%
October	106	7.20%
November	136	9.23%
December	124	8.42%
Grand Total	1,473	100.00%



Collision by Weekday

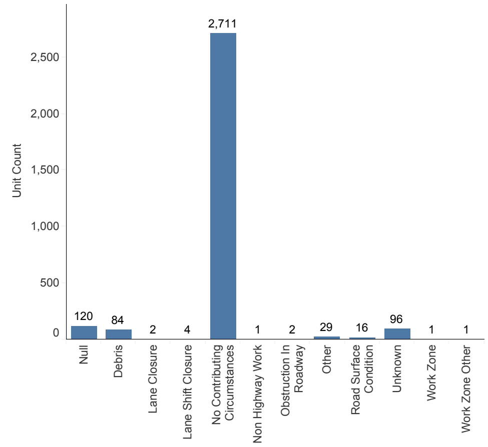
Weekday	Incident Count	Percentage Of Total By Weekday
Sunday	50	3.39%
Monday	217	14.73%
Tuesday	333	22.61%
Wednesday	289	19.62%
Thursday	259	17.58%
Friday	195	13.24%
Saturday	130	8.83%
Grand Total	1,473	100.00%



ADOT ARIZONA DEPARTMENT OF TRANSPORTATION

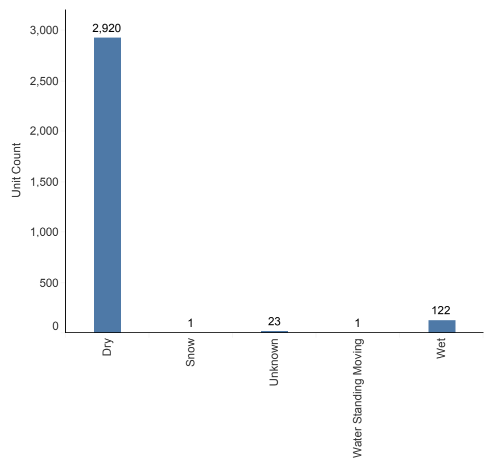
Collision By Road Condition

Road Condition	Unit Count	Percent Of Total By Road Condition
Null	120	3.91%
Debris	84	2.74%
Lane Closure	2	0.07%
Lane Shift Closure	4	0.13%
No Contributing Circumstances	2,711	88.39%
Non Highway Work	1	0.03%
Obstruction In Roadway	2	0.07%
Other	29	0.95%
Road Surface Condition	16	0.52%
Unknown	96	3.13%
Work Zone	1	0.03%
Work Zone Other	1	0.03%
Grand Total	3,067	100.00%



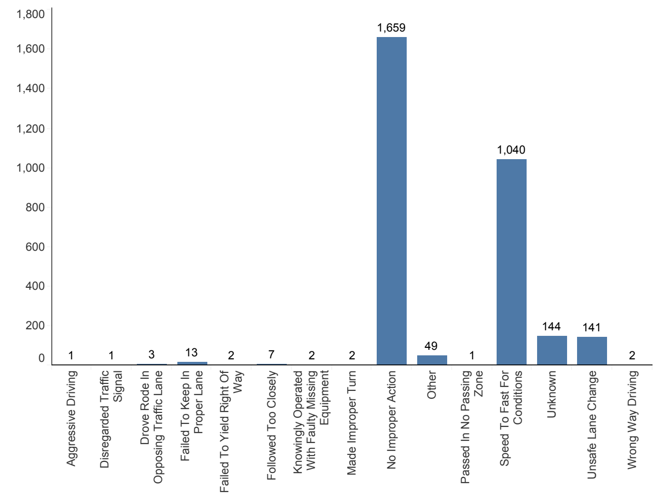
Collision By Surface Condition

Surface Condition	Unit Count	Percent Of Total By Surface Condition
Dry	2,920	95.21%
Snow	1	0.03%
Unknown	23	0.75%
Water Standing Moving	1	0.03%
Wet	122	3.98%
Grand Total	3,067	100.00%



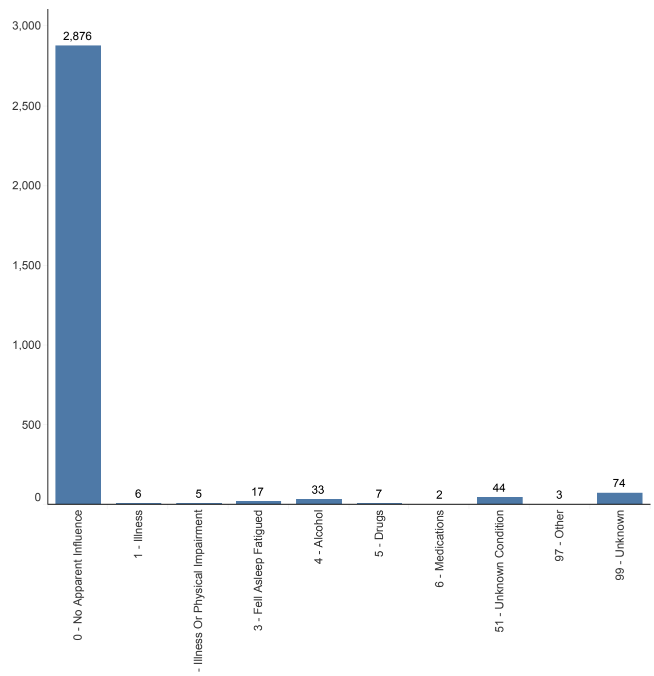
Collision By Violation

Person Violation	Unit Count	Percent Of Total By Violation
Aggressive Driving	1	0.03%
Disregarded Traffic Signal	1	0.03%
Drove Rode In Opposing Traffic Lane	3	0.10%
Failed To Keep In Proper Lane	13	0.42%
Failed To Yield Right Of Way	2	0.07%
Followed Too Closely	7	0.23%
Knowingly Operated With Faulty Missing Equipment	2	0.07%
Made Improper Turn	2	0.07%
No Improper Action	1,659	54.09%
Other	49	1.60%
Passed In No Passing Zone	1	0.03%
Speed To Fast For Conditions	1,040	33.91%
Unknown	144	4.70%
Unsafe Lane Change	141	4.60%
Wrong Way Driving	2	0.07%
Grand Total	3,067	100.00%



Collision By Physical

Physical	Unit Count	Percent Of Total By Physical
0 - No Apparent Influence	2,876	93.77%
1 - Illness	6	0.20%
1 - Illness Or Physical Impairment	5	0.16%
3 - Fell Asleep Fatigued	17	0.55%
4 - Alcohol	33	1.08%
5 - Drugs	7	0.23%
6 - Medications	2	0.07%
51 - Unknown Condition	44	1.43%
97 - Other	3	0.10%
99 - Unknown	74	2.41%
Grand Total	3,067	100.00%



APPENDIX C – ADA COMPLIANCE AND FEASABILITY REPORT

ADOT PROJECT NUMBER 202 MA 044 F0124 01L
FEDERAL NO. 202-C(208)T
SR 202L (SANTAN FREEWAY)-ADD GP LANES
VAL VISTA DRIVE TO I-10

ADA COMPLIANCE AND FEASIBILITY REPORT

JUNE 3, 2020

PREPARED BY

PROPOSED:	AZTEC ENGINEERING	06-03-2020
FINAL DESIGN:	NAME	DATE
CONSTRUCTED:	NAME	DATE

ROADWAY PREDESIGN SECTION

ROADWAY ENGINEERING GROUP

ADOT
Infrastructure Delivery and Operations

Registered Professional Engineer (Civil)
CERTIFICATE NO.
37270
JEFFREY LYLE
CALLICOTT
Date Signed 06/03/2020
ARIZONA, U.S.A.

TABLE OF CONTENTS

INTRODUCTION 1
1. SIDEWALK 5
2. CURB RAMPS 11
3. DRIVEWAYS 25
4. ACCESSIBLE PEDESTRIAN SIGNALS (APS) 27
5. RAILING 38
6. PEDESTRIAN ISLAND CROSSING 40
7. OBSTRUCTIONS 43
8. CROSSWALKS 44
9. PEDESTRIAN FURNITURE & BUS STOPS 52
10. PEDESTRIAN AT-GRADE RAIL CROSSINGS 52
APPENDIX 53

LIST OF TABLES

Table 1: FIS List of Total ADA Features 2
Table 2: Summary All Proposed Action Items 3
Table 3: Summary of Proposed Sidewalk Action Items 5
Table 4: ADA Non-Compliant Sidewalk 5
Table 5: ADA Compliant Sidewalk 7
Table 6: Summary of Proposed Curb Ramp Action Items 11
Table 7: ADA Non-Compliant Curb Ramps 12
Table 8: ADA Compliant Curb Ramps 21
Table 9: Summary of Proposed Driveway Action Items 25
Table 10: ADA Non-Compliant Driveways 25
Table 11: ADA Compliant Driveways 26
Table 12: Summary of Proposed APS Action Items 27
Table 13: ADA Non-Compliant PS Locations 27
Table 14: ADA Compliant APS Locations 35
Table 15: Summary of Proposed Railing Action Items 38
Table 16: ADA Compliant Railing 38
Table 17: Summary of Proposed Pedestrian Island Crossing Action Items 40
Table 18: ADA Non-Compliant Pedestrian Island Crossings 40
Table 19: ADA Compliant Pedestrian Island Crossings 42
Table 20: Obstructions requiring new ADA features for compliance43
Table 21: Summary of Crosswalk Action Items 44
Table 22: ADA Non-Compliant Crosswalks 44
Table 23: Locations with Crosswalks 44

INTRODUCTION

Project No. 202 MA 044 F0124 01C [Federal Reference No. 202-C-(208)T] VAL VISTA DRIVE TO I-10, is a freeway widening project which is described as add general purpose lanes. It is located on SR 202L in Maricopa County, in the ADOT Central District, and is located in the City of Phoenix, Arizona, the City of Chandler, Arizona, and the Town of Gilbert, Arizona. The proposed project limits begin at milepost (MP) 57.00, and end at MP 42.00.

The existing typical section is eight lanes; three general purpose lanes and one HOV in each direction. There are two system (fully directional) interchanges, eight full access interchanges, two half access interchanges, and three roads crossing SR202L with no direct access.

The project limits assessed in this report are within the area of construction along State Route 202L (I-10) from Val Vista Drive to Interstate 10 (I-10. This report includes an Americans with Disabilities Act (ADA) compliance analysis for the following locations: SR 202L traffic interchanges (TIs) with Kyrene Road, McClintock Drive, Chandler Village Drive, Price Road, Dobson Road, Alma School Road, Arizona Avenue, McQueen Road, Cooper Road, Gilbert, Road, and Val Vista Drive. Some areas extend past ADOT's right-of-way limits but are adjacent to construction performed with this project.

On June 1, 3, and 4, 2018, and again on February 12, 2019, the project team made a field investigation of the existing ADA facilities. The team used equipment consisting of:

- A 25' retractable, metal tape measure
- An electronic 48" M-D Smart Tool Digital level; the level was properly calibrated before its first use
- Photos were taken using two phones: A Samsung Galaxy S9, and an iPhone 7 Plus

Approximately one and a half hours were spent at each traffic interchange. One person would make measurements using the tape measure, a second would measure slopes, while a third recorded the measurements and took photos. Only features within ADOT right-of-way (ROW) were inventoried in the field. Where ADOTs Feature Inventory System (FIS) had data about items beyond this limit, those features are listed in this report. Where another project will be constructing in these areas, reference has been made to that project number.

Features not meeting the "Americans with Disabilities Act Accessibility Guidelines" (ADAAG) shall be replaced with the current standard at the time of final design. The precise standard to be used will be determined during final design.

The ADA costs included in the Final DCR are the result of a holistic examination of the existing features, and consider how upgrades to ADA features in one area of the intersection may affect others. Required ADA upgrades at one corner could result in necessary modification(s) to or replacements of adjacent features that are currently ADAAG compliant.

The ADA costs included in the Final DCR only cover features within ADOT ROW; no costs are included for features outside ADOT ROW.

As of May 2019, the ADOT FIS indicated that there are 306 ADA features within the project limits. Of those features, 169 are not in compliance with current ADA standards. A summary of the non-compliant locations and locations which were evaluated for compliance is included in this listing. The table below provides a summary of all the ADA features listed within the *ADA Transition Plan for Public Rights of Way*.

Table 1: FIS List of Total ADA Features

Feature Type	Compliant	Non-Compliant	Not in FIS Database	Existing ADA Total	Total Proposed Improvements	Constructed Improvements
Sidewalk	64	11	8	75	11	
Curb Ramps (& Curb Ramp Needs)	34	71	16	105	63	
Driveways	15	4	13	19	4	
Accessible Pedestrian Signals (APS)	21	56	38	77	56	
Railing	20	0	20	20	0	
Pedestrian Island Crossings	10	8	2	18	8	
Pedestrian Overpass/Underpass	n/a	n/a	n/a	n/a	n/a	
Obstructions & Needs	n/a	16	4	16	16	
Crosswalks	57	0	n/a	57	0	
Pedestrian Furniture & Bus Stops	n/a	n/a	n/a	n/a	n/a	
Pedestrian At-Grade Rail Crossings	n/a	n/a	n/a	n/a	n/a	
Total	221	166	101	**387**	158	

In conjunction with any work done on existing ADA features, work zone traffic control plans should follow ADA requirements, where applicable.

Table 2: Summary All Proposed Action Items

Proposed Action Item- Sidewalk	
Reconstruct Sidewalk to Repair Cross Slope	11
Compliant (No Action)	64
Proposed Action Item- Curb Ramps	
Reconstruct Curb Ramp	54
Add Truncated Domes	6
Reconstruct Gutter	1
Install Curb Ramp	2
Not in Project	5
In ADOT FIS, But Outside ADOT Maintenance Limits (No Action)	3
Compliant (No Action)	33
Proposed Action Item- Driveways	
Reconstruct Sidewalk Behind Driveway (Cross Slope)	3
Add Sidewalk Behind Driveway	1
Compliant (No Action)	15
Proposed Action Item- Accessible Pedestrian Signals (APS)	
Reconstruct Ramp Landing (for Reach Distance)	2
Extend Existing Sidewalk	36
Install Ped Push Button (x1 or x2)	14
Replace Ped Push Button with 2 Ped Push Buttons	4
Compliant (No Action)	21
Proposed Action Item- Railing	
Handrail Not Adjacent to ADA Route (No Action)	81
Bridge Railing Compliant (No Action)	20
Proposed Action Item- Pedestrian Island Crossings	
Reconstruct Ped Island Crossing	4

Install Detectable Warnings (Domes)	4
Compliant (No Action)	10
Proposed Action Item- Pedestrian Overpass/Underpass	
	n/a
Proposed Action Item- Obstructions	
Repair Bridge Seal	4
Repair Concrete	12
Proposed Action Item- Crosswalks	
Cross Slope Improvements	0
Compliant (No Action)	57
Proposed Action Item- Pedestrian Furniture & Bus Stops	
	n/a
Proposed Action Item- Pedestrian At-Grade Rail Crossings	
	n/a
Subtotal Proposed Improvements	170
Subtotal (No Action)	218
Total	388

1. SIDEWALK

A total of 75 **sidewalk** locations with an overall length of 25,408 feet of sidewalk are located throughout the project limits. ADOT FIS listed 67 locations, and 8 locations were not included in ADOT FIS. There are 11 locations with non-compliant sidewalks totaling 2,829 feet, and one location where new sidewalk is to be added. The remaining 64 locations include 22,579 feet of ADA compliant sidewalk. Some locations in the ADOT FIS are for sidewalk not part of the project, or are for sidewalk that has since been destroyed as part of other project improvements; these IDs have been noted. Sidewalk to be reconstructed is only within the limits of ADOT ROW; if the FIS length for a location exceeds the limit of the ROW, only the portion in ADOT ROW is noted to be replaced.

The following table summarizes the proposed action items for sidewalk.

Table 3: Summary of Proposed Sidewalk Action Items

Proposed Action Item- Sidewalk	Total
Reconstruct Sidewalk to Repair Cross Slope (LF)	2692
Total	**2692**

The following tables summarize **sidewalk** locations throughout the project limits. The first table lists ADA non-compliant sidewalk. Note that the side listed in the Location column refers to the side north or south of SR 202L:

Table 4: ADA Non-Compliant Sidewalk

Asset ID	Location	Beginning MP	Approx. Length (Ft)	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1012784	Kyrene South of SR 202L, SWC	53.75	35.5	-Cross Slope > 2%	Reconstruct Sidewalk (35.5’ in ADOT ROW)		
1393586	Kyrene North of SR 202L, NWC	53.77	106.4	-Cross Slope > 2%	Reconstruct Sidewalk (69’ in ADOT ROW)		
1014079	Kyrene North of SR 202L, NEC	53.76	203.2	-Cross Slope > 2%	Reconstruct Sidewalk (124’ in ADOT ROW)		

Asset ID	Location	Beginning MP	Approx. Length (Ft)	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1012748	McClintock North of SR 202L, NWC	51.77	247.7	-Cross Slope > 2%	Reconstruct Sidewalk (48' in ADOT ROW)		
MCSI001	McClintock North of SR 202L, NWC	51.77	165	n/a	Add New Sidewalk (133')		
1008850	Alma School West Central on bridge	48.65	337.0	-Cross Slope > 2%	Reconstruct Sidewalk (south of bridge) (319' in ADOT ROW)		
1008765	Arizona Ave West central under bridge	47.66	326.4	-Cross Slope > 2%	Reconstruct Sidewalk (305' in ADOT ROW)		
1380283	McQueen Rd North of SR 202L, NEC	46.55	705.8	-Cross Slope > 2%	Reconstruct Sidewalk (129' in ADOT ROW)		
1383931	Cooper Rd North of SR 202L, NEC	45.55	355.5	-Cross Slope > 2%	Reconstruct Sidewalk (122' in ADOT ROW)		
1380304	Gilbert Rd South of SR 202L, NEC	44.55	354.3	-Sidewalk Damaged -Cross Slope > 2%	Reconstruct Sidewalk (south of bridge) (28' in ADOT ROW)		
1380323	Val Vista Dr North of SR 202L, NEC	42.44	20	-Lip in sidewalk and damage North of crosswalk	Reconstruct Sidewalk (146' in ADOT ROW) ADOT FIS listed 157.5 feet total length.		
		Total:	2691.7'		1458.5' Sidewalk		

The table below contains a listing of all ADA compliant **sidewalk**:

Table 5: ADA Compliant Sidewalk

Asset ID	Location	Direction	Beginning MP	Approx. Length (Ft)
1065622	40th St (Destroyed by 202 MA 054 H8827 01C, Seg A)	NWC	56.84	51.1
1065623	40th St (Destroyed by 202 MA 054 H8827 01C, Seg A)	SEC	56.82	41.3
1065621	40th St (Destroyed by 202 MA 054 H8827 01C, Seg A)	NEC	56.82	35.3
1012782	Kyrene	South of SR 202L, SEC	53.73	43.3
1012781	Kyrene	East central on bridge	53.75	363.6
1012783	Kyrene	West central on bridge	53.77	372.1
1012738	McClintock	South of SR 202L, NWC	51.77	19.1
1012747	McClintock	North of SR 202L, NEC	51.74	244.2
1012746	McClintock	East central on bridge	51.74	400.0
1421119	McClintock	West central on bridge	51.77	352.4
1393603	Chandler Village	South of SR 202L, SWC	51.26	37.0
1393605	Chandler Village	East central on bridge	51.24	564.7
1393606	Chandler Village	North of SR 202L, NWC	51.25	98.4

Asset ID	Location	Direction	Beginning MP	Approx. Length (Ft)
1393604	Chandler Village	West central on bridge	51.25	335.0
PRSI006	Price Rd	North of SR 202L, NW	50.71	1295
PRSI005	Price Rd	North of SR 202L, Free Right Island	50.70	53
1428576	Price Rd	West central on bridge	50.69	267.8
PRSI007	Price Rd	North of SR 202L, NEC	50.66	990
PRSI004	Price Rd	South of SR 202L, SWC	50.65	234
PRSI001	Price Rd	East central on bridge	50.64	276
PRSI002	Price Rd	South of SR 202L, Free Right Island	50.64	29
PRSI003	Price Rd	South of SR 202L, SEC	50.62	145
1428576	Price Rd	West central on bridge	50.69	267.8
1008880	Dobson Rd	West side, North of SR 202L	49.66	253.3
1393556	Dobson Rd	West side, North of SR 202L	49.66	140.2
1393553	Dobson Rd	East central on bridge	49.63	344.3
1008894	Dobson Rd	North of SR 202L, NE	49.63	572.9
1008881	Dobson Rd	North of SR 202L, NWC	49.64	1712.7
1008882	Dobson Rd	South of SR 202L, SEC	49.63	161.2

Asset ID	Location	Direction	Beginning MP	Approx. Length (Ft)
1008851	Alma School Rd	West Side North of SR 202L	48.66	1015.5
1008837	Alma School Rd	West Side South of SR 202L	48.64	320.8
1008840	Alma School Rd	East Side North of SR 202L	48.65	145.8
1008838	Alma School Rd	East Side, South of SR 202L	48.62	331.3
1393533	Alma School Rd	East central on bridge	48.62	123.0
1008780	Arizona Ave	South of SR 202L, SEC	47.64	348.2
1008781	Arizona Ave	East central under bridge	47.64	169.8
1008766	Arizona Ave	North of SR 202L, NWC	47.67	326.4
1008765	Arizona Ave	West central under bridge	47.67	140.8
1008778	Arizona Ave	West Side North of SR 202L	47.67	152.6
1008779	Arizona Ave	South of SR 202L, SWC	47.66	347.3
1380276	McQueen Rd	West central on bridge	46.58	707.8
1380273	McQueen Rd	North of SR 202L, NWC	46.58	489.2
1383924	McQueen Rd	South of SR 202L, SWC	46.57	357.8
1380280	McQueen Rd	East central on bridge	46.55	155.1
1380277	McQueen Rd	South of SR 202L, SEC	46.55	150.4

Asset ID	Location	Direction	Beginning MP	Approx. Length (Ft)
1380293	Cooper Rd	South of SR 202L, SEC	45.55	355.9
1380289	Cooper Rd	West central on bridge	45.58	888.2
1380286	Cooper Rd	South of SR 202L, SWC	45.57	156.8
1380292	Cooper Rd	North of SR 202L, NWC	45.57	349.1
1383935	Cooper Rd	East central on bridge	45.55	790.9
1380296	Gilbert Rd	South side SWC	44.58	874.2
1380302	Gilbert Rd	North side NWC	44.58	370.4
1380299	Gilbert Rd	West central on bridge	44.58	139.8
1380303	Gilbert Rd	North of SR 202L, NWC	44.58	168.0
1380305	Gilbert Rd	South of SR 202L, SEC (Not in Project)	44.55	415.2
1383943	Lindsay Rd	North of SR 202L, NEC (Not in Project)	43.63	415.2
1383946	Lindsay Rd	East central (Not in Project)	43.62	95.0
1383946	Lindsay Rd	South of SR 202L, SEC (Not in Project)	43.61	165.6
1383951	Lindsay Rd	West central	43.60	553.7
1380312	Val Vista Dr	South of SR 202L, SWC	42.55	203.9
1380313	Val Vista Dr	West central on bridge	42.53	546.0

Asset ID	Location	Direction	Beginning MP	Approx. Length (Ft)
1380314	Val Vista Dr	North of SR 202L, NWC	42.47	204.9
1380324	Val Vista Dr	East central on bridge	42.45	51.1
1380325	Val Vista Dr	South of SR 202L, SEC	42.51	41.3
1380323	Val Vista Dr	North of SR 202L, NEC ADOT FIS listed 157.5 feet total length; 20 feet is damaged (See Table 4)	42.44	137.5
			Total:	20032.9’

2. CURB RAMPS

There are a total of 105 **curb ramp** locations throughout the project limits. ADOT FIS listed 89 locations, and 16 locations were not included in ADOT FIS. 34 of the curb ramps meet current ADA standards. The remaining 71 locations do not comply with ADA standards; note that due to several of these ramps being outside the project limits, only 63 ramps are proposed to have improvements. The following table summarizes the recommended action for each feature to become compliant. Detailed survey will be necessary at all locations where a new curb ramp is required.

Table 6: Summary of Proposed Curb Ramp Action Items

Proposed Action Item- Curb Ramps	Total
Reconstruct Curb Ramp	54
Add Truncated Domes	6
Reconstruct Gutter	1
Install Curb Ramp	2
Not in Project	5
In ADOT FIS, But Outside ADOT Maintenance Limits (No Action)	3
Compliant (No Action)	34
Total	**105**

Non-compliant ramps shall be replaced with the current standard at the time of final design. The determination of the ramp layout and geometry, as well as the precise standard to be used, will be made during final design. Avoiding single ramps and use of directional or blended curb ramps is anticipated at final design. As curb ramps are evaluated during final design, the replacement of curb ramps on the radius returns would likely supersede the proposed actions listed below.

Several of the ramps listed in the ADOT FIS within limits of this corridor are located outside the scope of the project, and thusly were not surveyed as part of this project. Because these facilities are included on ADOT's FIS, such ramps are listed in this report; where another project will be constructing in these areas, reference has been made to that project number.

The following table gives a detailed summary of the non-compliant **curb ramp** locations:

Table 7: ADA Non-Compliant Curb Ramps

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1421141	Kyrene Rd South of SR 202L, SWC EB Offramp	53.76	-Warning Grooves -Ramp Landing >2%	Reconstruct Curb Ramp		
1421139	Kyrene Rd South of SR 202L, NWC EB Offramp	53.76	-Warning Grooves -Ramp Landing >2% -Cross Slope >2%	Reconstruct Curb Ramp		
1421135	Kyrene Rd North of SR 202L, SWC WB Onramp	53.77	-Warning Grooves -Ramp Landing >2%	Reconstruct Curb Ramp		
1421133	Kyrene Rd North of SR 202L, NWC WB Onramp	53.78	-Warning Grooves -Ramp Landing >2% -Cross Slope >2%	Reconstruct Curb Ramp		
1421152	Kyrene Rd North of SR 202L, NEC WB Offramp	53.75	-Warning Grooves	Install Detectable Warnings (Domes)		
1421150	Kyrene Rd North of SR 202L, SEC WB Offramp	53.75	-Warning Grooves -Ramp Landing >2%	Reconstruct Curb Ramp		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1421146	Kyrene Rd South of SR 202L, NEC EB Onramp	53.73	-Warning Grooves -Ramp Landing >2% -Cross Slope >2%	Reconstruct Curb Ramp		
1421144	Kyrene Rd South of SR 202L, SEC EB Onramp	53.73	-Warning Grooves -Cross Slope >2%	Reconstruct Curb Ramp		
1421120	McClintock Dr South of SR 202L, NWC EB Offramp	51.77	-Warning Grooves -Ramp Landing >2% -Cross Slope >2%	Reconstruct Curb Ramp		
1421121	McClintock Dr South of SR 202L, SWC EB Offramp	51.77	No Ramp Present	Install Curb Ramp Install Sidewalk Between 1421121 and 1421122		
1421118	McClintock Dr North of SR 202L, SWC EB Onramp	51.77	-Warning Grooves -Ramp Landing >2% -Cross Slope >2%	Reconstruct Curb Ramp		
1421116	McClintock Dr North of SR 202L, NWC WB Onramp	51.77	-Warning Grooves	Install Detectable Warnings (Domes)		
1421127	McClintock Dr North of SR 202L, NEC WB Offramp	51.74	-Warning Grooves	Install Detectable Warnings (Domes)		
1421126	McClintock Dr North of SR 202L, SEC WB Offramp	51.74	-Warning Grooves -Ramp Landing >2% -Cross Slope >2%	Reconstruct Curb Ramp		
1421123	McClintock Dr South of SR 202L, NEC EB Frontage Rd	51.74	-Warning Grooves -Ramp Landing >2% -Cross Slope >2%	Reconstruct Curb Ramp		
1421122	McClintock Dr South of SR 202L, NEC EB Frontage Rd	51.75	No Ramp Present	Install Curb Ramp		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1421110	Chandler Village Dr South of SR 202L, SWC EB Frontage Rd	51.26	-Warning Grooves -Ramp Landing >2%	Reconstruct Curb Ramp		
1421109	Chandler Village Dr South of SR 202L, NWC EB Frontage Rd	51.26	-Warning Grooves -Ramp Landing >2% -Cross Slope >2% -Change of Grade >11%	Reconstruct Curb Ramp		
1421111	Chandler Village Dr South of SR 202L, East Side	51.24	-Warning Grooves -Ramp Landing >2% -Gutter Slope >5%	Reconstruct Curb Ramp		
1421107	Chandler Village Dr North of SR 202L, SWC WB Frontage Rd	51.25	-Warning Grooves -Ramp Landing >2% -Running Slope >8.33%	Reconstruct Curb Ramp		
1421106	Chandler Village Dr North of SR 202L, NWC WB Frontage Rd	51.25	-Warning Grooves	Install Detectable Warnings (Domes)		
1421113	Chandler Village Dr North of SR 202L, East Side	51.23	-Warning Grooves -Ramp Landing >2% -Cross Slope >2% -Gutter Slope >5%	Reconstruct Curb Ramp		
PRCU005	Price Rd South of SR 202L, SW Island, West Ramp, NB Free Right	50.67	-Ramp Landing >2%	Reconstruct Curb Ramp		
PRCU007	Price Rd South of SR 202L, SE of Island, SEC Ramp, NB Free Right	50.67	-Running Slope >8.33%	Reconstruct Curb Ramp		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
PRCU008	Price Rd South of SR 202L, SWC, East Ramp, EB Offramp	50.68	-Ramp Landing >2%	Reconstruct Curb Ramp		
PRCU010	Price Rd South of SR 202L, NWC, EB Offramp	50.67	-Ramp Landing >2% -Running Slope >8.33%	Reconstruct Curb Ramp		
PRCU011	Price Rd North of SR 202L, SWC, WB Onramp	50.68	-Ramp Landing >2%	Reconstruct Curb Ramp		
PRCU012	Price Rd North of SR 202L, NW Island, South Ramp, EB Onramp	50.69	-Cross Slope >2% -Ramp Landing >2% -Gutter Slope >5%	Reconstruct Curb Ramp		
PRCU013	Price Rd North of SR 202L, NW of Island, NWC Ramp, SB Free Right	50.70	-Ramp Landing >2% -Gutter Slope >5%	Reconstruct Curb Ramp		
PRCU015	Price Rd North of SR 202L, NW Island, West Ramp, SB Free Right	50.69	-Ramp Landing >2% -Cross Slope >2% -Gutter Slope >5%	Reconstruct Curb Ramp		
1420721	Dobson Rd North of SR 202L, NW of Theoretical EB Onramp (S. Church Entrance)	49.66	-Warning Grooves -Gutter Slope > 5% -Cross Slope > 2% Outside ADOT Maintenance Limits (N. of PCCP)	(none)		
1420723	Dobson Rd North of SR 202L, NWC WB Offramp	49.65	-Warning Grooves	Install Detectable Warnings (Domes)		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1420722	Dobson Rd North of SR 202L, NW of Theoretical EB Onramp (S. Church Entrance)	49.65	-Warning Grooves	Install Detectable Warnings (Domes)		
1420720	Dobson Rd North of SR 202L, NW of Theoretical EB Onramp (Business Entrance)	49.65	-Warning Grooves Outside ADOT Maintenance Limits (N. of PCCP)	(none)		
1420730	Dobson Rd North of SR 202L, at Springfield Way (NE of WB Offramp)	49.64	(Per ADOT FIS) -Gutter Slope > 5% -Warning Grooves Outside ADOT Maintenance Limits (N. of PCCP)	(none)		
1420725	Dobson Rd South of SR 202L, SEC EB Onramp	49.63	-Cross Slope >2% -Running Slope >8.33%	Reconstruct Curb Ramp		
1420726	Dobson Rd South of SR 202L, NEC EB Onramp	49.63	-Ramp Landing >2%	Reconstruct Curb Ramp		
1420727	Dobson Rd North of SR 202L, SEC WB Offramp	49.63	-Cross Slope >2% -Ramp Landing >2%	Reconstruct Curb Ramp		
1420713	Alma School Rd South of SR 202L, NWC EB Offramp	48.65	-Running Slope >8.33%	Reconstruct Curb Ramp		
1420712	Alma School Rd North of SR 202L, SWC WB Onramp	48.65	-Running Slope >8.33%	Reconstruct Curb Ramp		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1420710	Alma School Rd North of SR 202L, NWC WB Onramp	48.66	-Ramp Landing >2%	Reconstruct Curb Ramp		
1420706	Alma School Rd North of SR 202L, SEC WB Offramp	48.62	-Ramp Landing >2%	Reconstruct Curb Ramp		
1420705	Alma School Rd South of SR 202L, NEC EB Onramp	48.62	-Ramp Landing >2%	Reconstruct Curb Ramp		
1420700	Arizona Ave North of SR 202L, SEC WB Offramp	47.64	-Ramp Landing >2%	Reconstruct Curb Ramp		
1420699	Arizona Ave South of SR 202L, NEC EB Onramp	47.64	-Ramp Landing >2%	Reconstruct Curb Ramp		
1420698	Arizona Ave South of SR 202L, SEC EB Onramp	47.63	-Ramp Landing >2%	Reconstruct Curb Ramp		
1420694	Arizona Ave South of SR 202L, NWC EB Offramp	47.67	-Cross Slope >2%	Reconstruct Curb Ramp		
1420691	Arizona Ave North of SR 202L, NWC EB Onramp	47.67	-Running Slope >8.33%	Reconstruct Curb Ramp		
1420692	Arizona Ave North of SR 202L, SWC EB Onramp	47.67	-Cross Slope >2%	Reconstruct Curb Ramp		
1420684	McQueen Rd South of SR 202L, NWC EB Offramp	46.57	-Cross Slope >2%	Reconstruct Curb Ramp		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1420683	McQueen Rd North of SR 202L, SWC EB Onramp	46.58	-Cross Slope >2%	Reconstruct Curb Ramp		
1420681	McQueen Rd North of SR 202L, NWC EB Onramp	46.58	-Ramp Landing >2%	Reconstruct Curb Ramp		
1420670	McQueen Rd South of SR 202L, SEC EB Onramp	46.54	-Ramp Landing >2%	Reconstruct Curb Ramp		
1420653	Cooper Rd South of SR 202L, NWC EB Offramp	45.58	-Cross Slope >2%	Reconstruct Curb Ramp		
1420656	Cooper Rd North of SR 202L, SWC EB Onramp	45.58	-Cross Slope >2%	Reconstruct Curb Ramp		
1420663	Cooper Rd North of SR 202L, SEC WB Offramp	45.55	-Cross Slope >2% -Ramp Landing >2%	Reconstruct Curb Ramp		
1420665	Cooper Rd South of SR 202L, NEC EB Onramp	45.55	-Cross Slope >2% -Ramp Landing >2% -Running Slope >8.33%	Reconstruct Curb Ramp		
1420635	Gilbert Rd South of SR 202L, NWC EB Offramp	44.58	-Cross Slope >2% -Ramp Landing >2%	Reconstruct Curb Ramp		
1420634	Gilbert Rd North of SR 202L, SWC EB Onramp	44.58	-Running Slope >8.33% -Ramp Landing >2%	Reconstruct Curb Ramp		
1420632	Gilbert Rd North of SR 202L, NWC EB Onramp	44.58	-Gutter Slope >5%	Reconstruct Gutter		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1420646	Gilbert Rd North of SR 202L, SEC WB Offramp	44.55	-Cross Slope >2%	Reconstruct Curb Ramp		
1420642	Gilbert Rd South of SR 202L, SEC EB Onramp	44.55	-Cross Slope >2% -Ramp Landing >2%	Reconstruct Curb Ramp		
1420623	Lindsay Rd E Side S Zanjero Park Ent (S of SR 202L)	43.63	(Per ADOT FIS) -Cross Slope >2%	Not in Project See 202 MA 043 H8873 01C		
1420626	Lindsay Rd E Side N Zanjero Park Ent (S of SR 202L)	43.62	(Per ADOT FIS) -Ramp transition not flush	Not in Project See 202 MA 043 H8873 01C		
1420630	Lindsay Rd W Side (S of SR 202L)	43.62	(Per ADOT FIS) -Running Slope > 8.3%	Not in Project See 202 MA 043 H8873 01C		
1420628	Lindsay Rd E Side at 144th St S Side (N of SR 202L)	43.60	(Per ADOT FIS) -Running Slope > 8.3%	Not in Project See 202 MA 043 H8873 01C		
1420629	Lindsay Rd E Side at 144th St N Side (N of SR 202L)	43.59	(Per ADOT FIS) -Running Slope > 8.3%	Not in Project See 202 MA 043 H8873 01C		
1420604	Val Vista South of SR 202L, SWC EB Offramp	42.55	-Ramp Landing >2% -Gutter Slope >5%	Reconstruct Curb Ramp		
1420603	Val Vista South of SR 202L, NWC EB Offramp	42.54	-Ramp Landing >2% -Ramp Length > 15’	Reconstruct Curb Ramp		
1420597	Val Vista North of SR 202L, SWC WB Onramp	42.48	-Ramp Landing >2% -Ramp Length > 15’	Reconstruct Curb Ramp		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1420615	Val Vista North of SR 202L, SEC WB Offramp	42.45	-Ramp Length > 15’	Reconstruct Curb Ramp		

The following are locations with **curb ramps** which are compliant with ADA Standards.

Table 8: ADA Compliant Curb Ramps

Asset ID	Location	Beginning MP
PRCU001	Price Rd North of SR 202L, NEC, East Ramp, WB Offramp	50.66
PRCU002	Price Rd North of SR 202L, SEC, WB Onramp	50.66
PRCU003	Price Rd South of SR 202L, NEC, EB Onramp	50.65
PRCU004	Price Rd South of SR 202L, SE Island, North Ramp, EB Onramp	50.65
PRCU006	Price Rd South of SR 202L, SW Island, East Ramp, NB Free Right	50.64
PRCU009	Price Rd South of SR 202L, SWC, West Ramp, EB Offramp	50.68
PRCU014	Price Rd North of SR 202L, NW Island, West Ramp, SB Free Right	50.69
PRCU016	Price Rd North of SR 202L, NEC, West Ramp, WB Offramp	50.66

Asset ID	Location	Beginning MP
1420728	Dobson Rd North of SR 202L, NEC WB Offramp	49.63
1420718	Dobson Rd North of SR 202L, NW of Theoretical EB Onramp (N. Church Entrance)	49.66 (Per ADOT FIS) (Outside ADOT Maintenance Limits/N. of PCCP)
1420703	Alma School Rd South of SR 202L, SEC EB Onramp	48.62
1420651	Cooper Rd South of SR 202L, SWC EB Offramp	45.58
1420657	Cooper Rd North of SR 202L, NWC EB Onramp	45.58
1420661	Cooper Rd North of SR 202L, NEC WB Offramp	45.55
1420666	Cooper Rd South of SR 202L, SEC EB Onramp	45.54
1420639	Gilbert Rd South of SR 202L, SWC EB Offramp	44.58
1420648	Gilbert Rd North of SR 202L, NEC WB Offramp	44.55
1420596	Val Vista North of SR 202L, NWC WB Onramp	42.47

1420717	Dobson Rd North of SR 202L, NW of Theoretical EB Onramp (N. Church Entrance)	49.66 (Per ADOT FIS) (Outside ADOT Maintenance Limits/N. of PCCP)
1420714	Alma School Rd South of SR 202L, SWC EB Offramp	48.65
1420707	Alma School Rd North of SR 202L, NEC WB Offramp	48.62
1420701	Arizona Ave North of SR 202L, NEC WB Offramp	47.64
1420695	Arizona Ave South of SR 202L, SWC EB Offramp	47.67
1420686	McQueen Rd South of SR 202L, SWC EB Offramp	46.57
1420677	McQueen Rd North of SR 202L, NEC WB Offramp	46.55
1420675	McQueen Rd North of SR 202L, SEC WB Offramp	46.55
1420673	McQueen Rd South of SR 202L, NEC EB Onramp	46.55
1420644	Gilbert Rd South of SR 202L, NEC EB Onramp	44.55
1420625	Lindsay Rd E Side N Zanjero Park Ent (S of SR 202L,)	43.60

1420624	Lindsay Rd E Side N Zanjero Park Ent (S of SR 202L,)	43.60
1420622	Lindsay Rd E Side S Zanjero Park Ent (S of SR 202L,)	43.59
1420617	Val Vista North of SR 202L, NEC WB Offramp	42.44
1420610	Val Vista South of SR 202L, NEC EB Onramp	42.51
1420609	Val Vista South of SR 202L, SEC EB Onramp	42.51

3. DRIVEWAYS

A total of 19 **driveway** locations are located within the project limits. ADOT FIS listed 6 locations, and 13 locations were not included in ADOT FIS. There are 19 single and 0 multiple locations. Of these locations, there are 15 driveway locations (15 Single, 0 Multiple) which comply with ADA standards and 4 driveway locations (4 Single, 0 Multiple) which are not compliant with ADA standards. A table summarizing the proposed action items for these ADA features is listed below:

Table 9: Summary of Proposed Driveway Action Items

Proposed Action Item- Driveways	Total
Reconstruct Sidewalk Behind Driveway (Cross Slope)	3
Add Sidewalk Behind Driveway	1
Total	**4**

The following are detailed descriptions of the **driveway** locations which need to be addressed for compliance with ADA Standards:

Table 10: ADA Non-Compliant Driveways

Asset ID	Location	Beginning MP	Single or Multiple (#)	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1421154	Kyrene Rd North of SR 202L, E side of road	53.76	1	-No Sidewalk behind driveway	Construct (add) Sidewalk behind Existing Driveway Concrete (2% Max Cross Slope)		
1427396	McClintock Dr North of SR 202L, E side of road (Southern DW)	51.74	1	-Cross Slope > 2%	Reconstruct Sidewalk behind Existing Driveway Concrete (2% Max Cross Slope)		
ASDR002	Alma School Rd North of SR 202L, E side of road (Middle DW)	48.63	1	-Cross Slope > 2%	Reconstruct Sidewalk behind Existing Driveway Concrete		
VVDR001	Val Vista North of SR 202L, E side of road	42.43	1	-Cross Slope > 2%	Reconstruct Sidewalk behind Existing Driveway Concrete		

The following table describes compliant ADA **driveway** locations:

Table 11: ADA Compliant Driveways

Asset ID	Direction	Beginning MP	Single or Multiple (#)	Location
1421132	SB	53.77	1	Kyrene Rd North of SR 202L, W side of road
1421115	SB	51.77	1	McClintock Dr North of SR 202L, W side of road
1427397	NB	51.74	1	McClintock Dr North of SR 202L, E side of road (Northern DW)
1421105	SB	51.25	1	Chandler Village Dr North of SR 202L, W side of road
PRDR001	SB	50.72	1	Price Rd North of SR 202L, W side of road
DODR001	SB	49.66	1	Dobson Rd North of SR 202, W side of road
DODR002	SB	49.66	1	Dobson Rd South of SR 202L, W side of road
ASDR001	NB	48.63		Alma School Rd North of SR 202L, E side of road (Southern DW)
ASDR003	NB	48.63	1	Alma School Rd North of SR 202L, E side of road (Northern DW)
GIDR001	SB	44.59	1	Gilbert Rd South of SR 202L, W side of road
GIDR002	SB	44.59	1	Gilbert Rd North of SR 202L, W side of road
GIDR003	NB	44.56	1	Gilbert Rd North of SR 202L, E side of road
GIDR004	NB	44.56	1	Gilbert Rd South of SR 202L, E side of road
VVDR001	SB	43.44	1	Val Vista South of SR 202L, W side of road
VVDR002	SB	43.54	1	Val Vista North of SR 202L, W side of road

4. ACCESSIBLE PEDESTRIAN SIGNALS (APS)

There are a total of 77 locations with **pedestrian signals (PS)** within the project limits. Of these locations, 21 APS locations comply with ADA standards, 56 APS locations are not compliant with ADA standards, of which 11 do not currently have a PS pushbutton. ADOT FIS did not include 38 locations. These locations have been evaluated for compliancy.

A table summarizing the proposed action items for these ADA features is listed below:

Table 12: Summary of Proposed APS Action Items

Proposed Action Item- Accessible Pedestrian Signals (APS)	Total
Reconstruct Ramp Landing (for Reach Distance)	2
Extend Existing Sidewalk	36
Install Ped Push Button (x1 or x2)	14
Replace Ped Push Button with 2 Ped Push Buttons	4
Total	**56**

As determination of curb ramps to be replaced is made during final design, the replacement of curb ramps on the radius returns, or the need to relocate a pedestrian island crossing, may result in additional PS locations not listed herein. Such a determination will need to be made during final design, but would likely supersede the proposed actions listed below.

The following are existing **PS** locations which do not comply with ADA standards:

Table 13: ADA Non-Compliant PS Locations

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1421145	Kyrene Rd South of SR 202L, SEC EB Onramp	53.73	-Reach Distance > 10”	Reconstruct Ramp Landing at Face of Push Button		
1421147	Kyrene Rd South of SR 202L, NEC EB Onramp	53.74	-Reach Distance > 10”	Reconstruct Ramp Landing at Face of Push Button		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1421142	Kyrene Rd South of SR 202L, SWC EB Offramp	53.76	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1421140	Kyrene Rd South of SR 202L, NWC EB Offramp	53.76	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1421136	Kyrene Rd North of SR 202L, SWC EB Onramp	53.77	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1421134	Kyrene Rd North of SR 202L, NWC EB Onramp	53.78	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1421156	Kyrene Rd North of SR 202L, Island between WB Ramps	53.76	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1421153	Kyrene Rd North of SR 202L, NEC WB Offramp	53.75	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1421151	Kyrene Rd North of SR 202L, SEC WB Offramp	53.77	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1421117	McClintock Dr North of SR 202L, NWC EB Onramp	51.77	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1421128	McClintock Dr North of SR 202L, NEC WB Offramp	51.74	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
MCPE001	McClintock Dr South of SR 202L, NEC EB Onramp	51.73	(n/a)	Install Ped Push Button		
MCPE002	McClintock Dr North of SR 202L, Island Between WB Ramps	51.74	(n/a)	Install Ped Push Button		
MCPE003	McClintock Dr North of SR 202L, SEC WB Offramp	51.73	(n/a)	Install Ped Push Button		
MCPE004	McClintock Dr South of SR 202L, NWC EB Offramp	51.76	(n/a)	Install Ped Push Button		
MCPE005	McClintock Dr South of SR 202L, SWC EB Offramp	51.76	(n/a)	Install Ped Push Button		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
MCPE006	McClintock Dr South of SR 202L, SWC EB Onramp	51.73	(n/a)	Install Ped Push Button		
PRPE001	Price Rd South of SR 202L, NEC EB Onramp	50.64	(n/a)	Install Ped Push Button		
PRPE002	Price Rd North of SR 202L, NWC EB Onramp	50.70	(n/a)	Install Ped Push Button		
PRPE003	Price Rd North of SR 202L, Island Between EB Ramps	50.69	-Distance from EP or Curb > 10’	Replace Ped Push Button with 2 Ped Push Buttons		
DOPE001	Dobson Rd North of SR 202L, SEC WB Offramp	49.64	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
DOPE002	Dobson Rd North of SR 202L, NWC EB Onramp	49.65	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
ASPE001	Alma School Rd South of SR 202L, SWC EB Offramp	48.66	-Distance from EP or Curb > 10’	Install Ped Push Button (x2)		
1420709	Alma School Rd North of SR 202L, Island between WB Ramps	48.64	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
ASPE002	Alma School Rd North of SR 202L, NEC WB Offramp	48.63	-Distance from EP or Curb > 10’	Install Ped Push Button (x2)		
1420716	Alma School Rd South of SR 202L, Island between EB Ramps	48.64	-Reach Distance > 10” -Distance from EP or Curb > 10’	Install Ped Push Button (x2)		
AAPE001	Arizona Ave South of SR 202L, Island between EB Ramps	47.64	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420687	McQueen Dr South of SR 202L, SWC EB Offramp	46.58	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420685	McQueen Dr South of SR 202L, NWC EB Offramp	46.58	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420682	McQueen Dr North of SR 202L, NWC EB Onramp	46.58	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420680	McQueen Dr North of SR 202L, Island between WB Ramps	46.56	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1420678	McQueen Dr North of SR 202L, NEC WB Offramp	46.55	-Reach Distance > 10"	Extend Concrete Sidewalk to Face of Push Button		
1420676	McQueen Dr North of SR 202L, SEC WB Offramp	46.55	-Reach Distance > 10"	Extend Concrete Sidewalk to Face of Push Button		
1420671	McQueen Dr South of SR 202L, SEC EB Onramp	46.54	-Reach Distance > 10"	Extend Concrete Sidewalk to Face of Push Button		
1420689	McQueen Dr South of SR 202L, Island between EB Ramps	46.56	-Reach Distance > 10"	Extend Concrete Sidewalk to Face of Push Button		
1420667	Cooper Rd South of SR 202L, SEC EB Onramp	45.54	-Reach Distance > 10"	Extend Concrete Sidewalk to Face of Push Button		
1420669	Cooper Rd South of SR 202L, Island between EB Ramps	45.56	-Reach Distance > 10"	Extend Concrete Sidewalk to Face of Push Button		
1420652	Cooper Rd South of SR 202L, SWC EB Offramp	45.58	-Reach Distance > 10"	Extend Concrete Sidewalk to Face of Push Button		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1420654	Cooper Rd South of SR 202L, NWC EB Offramp	45.58	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
COPE001	Cooper Rd North of SR 202L, SWC EB Onramp	45.59	(n/a)	Install Ped Push Button		
1420658	Cooper Rd North of SR 202L, NWC EB Onramp	45.58	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420660	Cooper Rd North of SR 202L, Island between WB Ramps	45.56	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420662	Cooper Rd North of SR 202L, NEC WB Offramp	45.54	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420664	Cooper Rd North of SR 202L, SEC WB Offramp	45.54	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
COPE002	Cooper Rd South of SR 202L, NEC EB Onramp	45.57	(n/a)	Install Ped Push Button		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1420637	Gilbert Rd South of SR 202L, SWC EB Offramp	44.58	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420636	Gilbert Rd South of SR 202L, NWC EB Offramp	44.58	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420633	Gilbert Rd North of SR 202L, NWC EB Onramp	44.59	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420650	Gilbert Rd North of SR 202L, Island between WB Ramps	44.57	-Distance from EP or Curb > 10’	Replace Ped Push Button with 2 Ped Push Buttons		
GIPE001	Gilbert Rd North of SR 202L, NEC WB Offramp	44.56	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420647	Gilbert Rd North of SR 202L, SEC WB Offramp	44.55	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
GIPE002	Gilbert Rd South of SR 202L, NEC EB Onramp	44.56	(n/a)	Install Ped Push Button		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1420643	Gilbert Rd South of SR 202L, SEC EB Onramp	44.55	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420641	Gilbert Rd South of SR 202L, Island between EB Ramps	44.57	-Reach Distance > 10”	Extend Concrete Sidewalk to Face of Push Button		
1420621	Val Vista North of SR 202L, Island between WB Ramps	42.46	-Distance from EP or Curb > 10’ -Reach Distance > 10”	Replace Ped Push Button with 2 Ped Push Buttons		
1420606	Val Vista South of SR 202L, Island between EB Ramps	42.53	-Distance from EP or Curb > 10’ -Reach Distance > 10”	Replace Ped Push Button with 2 Ped Push Buttons		

PS locations which are compliant with ADA standards are typically not included in the ADOT FIS system. A summary of existing **PS** locations which are not currently listed in the ADOT FIS system are as follows:

Table 14: ADA Compliant APS Locations

Asset ID	Location	Beginning MP	Pole No.	Notes
PRPE001	Price Rd North of SR 202L, NEC WB Offramp	50.66	Not indicated in ADOT FIS	
PRPE002	Price Rd South of SR 202L, SEC EB Onramp	50.64	Not indicated in ADOT FIS	

Asset ID	Location	Beginning MP	Pole No.	Notes
PRPE003	Price Rd South of SR 202L, island in between EB Ramps	50.69	Not indicated in ADOT FIS	
PRPE004	Price Rd (EB) SWC EB Offramp	50.70	Not indicated in ADOT FIS	
DOPE001	Dobson Rd (EB) SEC EB Onramp	49.64	Not indicated in ADOT FIS	
DOPE002	Dobson Rd (EB) NEC EB Onramp	49.64	Not indicated in ADOT FIS	
DOPE003	Dobson Rd North of SR 202L, NEC WB Offramp	49.64	Not indicated in ADOT FIS	2 buttons
ASPE001	Alma School Rd South of SR 202L, NWC EB Offramp	48.66	Not indicated in ADOT FIS	
ASPE002	Alma School Rd North of SR 202L, SWC EB Onramp	48.65	Not indicated in ADOT FIS	
ASPE003	Alma School Rd North of SR 202L, NWC EB Onramp	48.65	Not indicated in ADOT FIS	
ASPE004	Alma School Rd North of SR 202L, SEC WB Offramp	48.63	Not indicated in ADOT FIS	

Asset ID	Location	Beginning MP	Pole No.	Notes
ASPE005	Alma School Rd of SR 202L, NEC EB Onramp	48.63	Not Recorded	
ASPE006	Alma School Rd of SR 202L, SEC EB Onramp	48.63	Not indicated in ADOT FIS	
AAPE001	Arizona Ave North of SR 202L, NEC WB Offramp	47.64	Not indicated in ADOT FIS	
AAPE002	Arizona Ave North of SR 202L, SEC WB Offramp	47.64	Not indicated in ADOT FIS	
1420627	Lindsay Road East side	43.60	Not indicated in ADOT FIS	The ADOT FIS reported this feature, but no such feature shows in the field. It is not part of this project. See Project 202 MA 043 H8873 01C for this area.
VVPE001	Val Vista of SR 202L, SWC EB Offramp	42.46	Not indicated in ADOT FIS	
VVPE002	Val Vista of SR 202L, NWC EB Offramp	42.46	Not indicated in ADOT FIS	
VVPE003	Val Vista North of SR 202L, NEC WB Offramp	42.44	Not indicated in ADOT FIS	
VVPE004	Val Vista South of SR 202L, NEC EB Onramp	42.43	Not indicated in ADOT FIS	
VVPE005	Val Vista South of SR 202L, SEC EB Onramp	42.43	Not indicated in ADOT FIS	

5. RAILING

The ADOT FIS lists a total of 81 locations with **railing**. Of these locations, 0 are hand rail locations, 81 are safety rail locations (not part of a continuous pedestrian pathway) and 0 are detectable rail locations (beside a sidewalk, not used as a gripping surface). Railing is evaluated according to applicable ADA requirements (PROWAG & ADAAG) and/or OSHA requirements depending on the function of the railing. A table summarizing the proposed action items for these ADA features is listed below:

Table 15: Summary of Proposed Railing Action Items

Proposed Action Item- Railing	Total
Remove Railing	0
Evaluate as Safety Rail	0
Duplicate FIS Entry OR Feature No Longer Exists Update FIS (No Action)	0
Railing is Not Within Pedestrian Accessible Route (No Action)	81
Total	**81**

The following table describes 20 locations of **bridge railing**, none of which are in the ADOT FIS, and all of which are compliant with respective standards:

Table 16: ADA Compliant Railing

Asset ID	Direction	Beginning MP	Location
KYRA001	NB	53.74	Kyrene Rd East central on bridge
KYRA002	SB	53.76	Kyrene Rd West central on bridge
MCRA001	NB	51.74	McClintock Dr East central on bridge
MCRA002	SB	51.76	McClintock Dr West central on bridge
CVRA001	NB	51.23	Chandler Village Dr East central on bridge
CVRA002	SB	51.24	Chandler Village Dr West central on bridge
PRRA001	NB	50.68	Price Rd East central on bridge
PRRA002	SB	50.70	Price Rd West central on bridge
DORA001	NB	49.64	Dobson Rd East central on bridge
DORA002	SB	49.66	Dobson Rd West central on bridge
ASRA001	NB	48.63	Alma School Rd East central on bridge

Asset ID	Direction	Beginning MP	Location
ASRA002	SB	48.66	Alma School Rd West central on bridge
1008714	NB	46.58	McQueen Rd East central on bridge
1008700	SB	46.54	McQueen Rd West central on bridge
1008658	NB	45.57	Cooper Rd East central on bridge
1008648	SB	45.59	Cooper Rd West central on bridge
1008582	NB	44.56	Gilbert Rd East central on bridge
1008608	SB	44.59	Gilbert Rd West central on bridge
VVRA001	NB	42.44	Val Vista Dr East central on bridge
VVRA002	SB	42.47	Val Vista Dr West central on bridge

6. PEDESTRIAN ISLAND CROSSING

There are 18 locations throughout the project limits which have **pedestrian crossing at islands**. There are 8 ADA non-compliant locations. The remaining 10 pedestrian island crossings are ADA compliant. There were 2 pedestrian island crossings not listed in the ADOT FIS. The following table summarizes the recommended action for each feature to become compliant.

Table 17: Summary of Proposed Pedestrian Island Crossing Action Items

Proposed Action Item- Pedestrian Island Crossing	Total
Reconstruct Ped Island Crossing	4
Install Detectable Warnings (Domes)	4
Total	**8**

As curb ramps are evaluated during final design, the replacement of curb ramps on the radius returns could result in the need to relocate a pedestrian island crossing. Such a determination will need to be made during final design, but would likely supersede the proposed actions listed below.

A detailed description of the ADA non-compliant **pedestrian crossings at islands** is as follows:

Table 18: ADA Non-Compliant Pedestrian Island Crossings

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1421155	Kyrene Rd North of SR 202L, Island between WB Ramps	53.76	-Warning Grooves	Install Detectable Warnings (Domes)		
1421129	McClintock Dr North of SR 202L, Island between EB Ramps	51.76	-Warning Grooves	-Reconstruct Ped Island Crossing -Add Ped Button		

Asset ID	Location	Beginning MP	Reason for Non-Compliance	Proposed Action	Final Design	Constructed
1421114	Chandler Village Dr North of SR 202L, Island between WB Ramps	51.24	-Warning Grooves	Install Detectable Warnings (Domes)		
PRPI001	Price Rd North of SR 202L, Island between WB Ramps	50.65	-Cross Slope > 2% -Gutter Slope >5%	Reconstruct Island/Adjust X-Slope		
1420729	Dobson Rd North of SR 202L, Island	49.64	-Running Slope >5%	Reconstruct Island/Adjust Slope		
1420708	Alma School Rd North of SR 202L, Island between WB Ramps	48.63	-Warning Grooves	Install Detectable Warnings (Domes)		
1420715	Alma School Rd South of SR 202L, Island between EB Ramps	48.64	--Warning Grooves	Install Detectable Warnings (Domes)		
1420696	Arizona Ave South of SR 202L, Island between EB Ramps	47.65	-Cross Slope > 2%	Reconstruct Island/Adjust X-Slope		

The following are existing locations with **pedestrian crossings at islands** which are compliant with ADA standards:

Table 19: ADA Compliant Pedestrian Island Crossings

Asset ID	Direction	Beginning MP	Location
PRPI002	WB	50.68	Price Rd Island between EB Ramps
1420702	WB	47.65	Arizona Ave Island between WB Ramps
1420679	WB	46.56	McQueen Dr Island between WB Ramps
1420688	EB	46.56	McQueen Dr Island between WB Ramps
1420668	EB	45.56	Cooper Rd Island between EB Ramps
1420659	WB	45.56	Cooper Rd Island between WB Ramps
1420649	WB	44.57	Gilbert Rd Island between WB Ramps
1420640	EB	44.57	Gilbert Rd Island between EB Ramps
1420621	WB	42.46	Val Vista Dr North of SR 202L, Island between WB Ramps
1420606	EB	42.53	Val Vista Dr South of SR 202L, Island between EB Ramps

7. OBSTRUCTIONS

There are 16 areas containing **obstructions**, 4 of which were not listed in the ADOT FIS. These 16 locations will require new ADA features for the area to become compliant.

Table 20: Obstructions requiring new ADA features for compliance

Asset ID	Direction	Reason For Non-Compliance	Beginning MP	Location
KYOB001	EB	Lip at Bridge Seal	53.74	Kyrene Rd, NEC EB Onramp
KYOB002	EB	Lip at each end 1" high	53.75	Kyrene Rd Island between EB Ramps
1421125	WB	AC Patchwork at WB Offramp Corner	51.74	McClintock Dr, SEC WB Offramp
1421112	EB	Lip at Bridge Seal	51.25	Chandler Village Dr, NWC EB Offramp
1420729	EB	Lip at each end 2" high	49.66	Dobson Rd Island between WB Ramps
DOOB002	EB	Lip at Bridge Seal	49.65	Dobson Rd at EB Offramp
1420697	EB	Ramp damaged, curb hit	47.65	Arizona Ave Island between EB Ramps
MCOB001	WB	Curb damage	46.59	McQueen Dr, NWC WB Onramp
1420674	EB	Curb damage	46.55	McQueen Dr, NEC EB Onramp
1420655	EB	Lip in sidewalk	45.57	Cooper Rd, NWC EB Offramp
1420732	WB	Pavement Damage	44.58	Gilbert Rd, NWC WB Onramp
1420631	WB	Lip at Edge of Ramp	44.58	Gilbert Rd, NWC WB Onramp
1420645	EB	Damaged Sidewalk with Lip	44.56	Gilbert Rd, NEC EB Onramp
1420638	EB	Damage at Lip	44.58	Gilbert Rd, SWC EB Offramp
1420618	WB	Lip in sidewalk to North of Ramp	42.44	Val Vista Dr, NEC WB Offramp
1420607	EB	Curb Damage on Median side	42.53	Val Vista Dr Island Median between EB Ramps

8. CROSSWALKS

There are 57 **crosswalks** located within the project limits. These were evaluated for a maximum cross slope of 2.0% for a continuous pedestrian pathway in a stop controlled or yield situation, and a maximum cross slope of 5.0% in a non-yield situation. Mid-block crossings are permitted to equal the street or highway grade. (Refer to PROWAG R302.6 Cross Slope).

The type of crosswalk (Yield, Non-Yield, Mid-Block) is indicated in the table below along with the cross slope of each crosswalk and the two curb ramps (Asset ID) which are connected by the crosswalk. The crosswalk cross slope shall be measured at various points in the crosswalk (wherever it appears there may be a grade change), and the crosswalk's compliancy determined. Any proposed action items for non-compliant crosswalks are summarized in the table below:

Table 21: Summary of Crosswalk Action Items

Proposed Action Item- Crosswalks	Total
Cross Slope Improvements	0
Compliant (no action)	57
Total	**0**

Field data for locations containing **crosswalks** was gathered and is detailed in the tables below:

Table 22: ADA Non-Compliant Crosswalks

There are no non-compliant crosswalks within the project limits.

Table 23: Locations with Crosswalks

Connecting Curb Ramps	Location	Beginning MP	Field Data	Proposed Action	Final Design	Constructed
1421139 (N) 1421141 (S)	Kyrene Rd South of SR 202L, EB Offramp	53.76	-Cross Slope = 2.0% -Longitudinal Slope = 1.4%	Compliant, Crosswalk to remain		

Connecting Curb Ramps	Location	Beginning MP	Field Data	Proposed Action	Final Design	Constructed
1421133 (N) 1421135 (S)	Kyrene Rd North of SR 202L, WB Onramp	53.76	-Cross Slope = 1.3% -Longitudinal Slope = 2.4%	Compliant, Crosswalk to remain		
1421133 (W) 1421155 (median) 1421152(E)	Kyrene Rd North of SR 202L, North Side	51.76	-Cross Slope = 1.1% (W), 1.1% (E) -Longitudinal Slope = 2.2% (W), 1.9% (E)	Compliant, Crosswalk to remain		
1421141 (W) 1421143 (median) 1421144 (E)	Kyrene Rd South of SR 202L, South Side	51.76	-Cross Slope = 1.0% (W), 1.0% (E) -Longitudinal Slope = 1.8% (W), 2.0% (E)	Compliant, Crosswalk to remain		
1421146 (N) 1421144 (S)	Kyrene Rd South of SR 202L, EB Onramp	53.74	-Cross Slope = 2.0% -Longitudinal Slope = 2.3%	Compliant, Crosswalk to remain		
1421152 (N) 1421150 (S)	Kyrene Rd North of SR 202L, WB Offramp	53.74	-Cross Slope = 0.9% -Longitudinal Slope = 2.3%	Compliant, Crosswalk to remain		
1421120 (N) 1421121 (S)	McClintock Dr South of SR 202L, EB Offramp	51.76	-Cross Slope = 1.8% -Longitudinal Slope = 1.8%	Compliant, Crosswalk to remain		
1421116 (N) 1421118 (S)	McClintock Dr North of SR 202L, WB Onramp	51.76	-Cross Slope = 1.7% -Longitudinal Slope = 1.2%	Compliant, Crosswalk to remain		
1421116 (W) 1421129 (median) 1421127 (E)	McClintock Dr North of SR 202L, North Side	51.76	-Cross Slope = 0.5% (W), 0.3% (E) -Longitudinal Slope = 1.6% (W), 1.2% (E)	Compliant, Crosswalk to remain		

Connecting Curb Ramps	Location	Beginning MP	Field Data	Proposed Action	Final Design	Constructed
1421127 (N) 1421126 (S)	McClintock Dr North of SR 202L, WB Offramp	51.73	-Cross Slope = 0.8% -Longitudinal Slope = 1.7%	Compliant, Crosswalk to remain		
PRCU012 (N) PRCU011 (S)	Price Rd North of SR 202L, WB Onramp	50.67	-Cross Slope = 2.0% -Longitudinal Slope = 0.2%	Compliant, Crosswalk to remain		
PRCU001 (N) PRCU002 (S)	Price Rd North of SR 202L, WB Offramp	50.67	-Cross Slope = 2.0% -Longitudinal Slope = 0.2%	Compliant, Crosswalk to remain		
PRCU013 (W) PRCU014 (E)	Price Rd North of SR 202L, SB Free Right	50.71	-Cross Slope = 1.0% -Longitudinal Slope = 2.5%	Compliant, Crosswalk to remain		
PRCU0015 (W) PRPI001 (median) PRCU016 (E)	Price Rd North of SR 202L, North Side	50.70	-Cross Slope = 1.6% -Longitudinal Slope = 0.0%	Compliant, Crosswalk to remain		
PRCU008 (W) PRPI002 (median) PRCU005 (E)	Price Rd South of SR 202L, South Side	50.67	-Cross Slope = 0.9% -Longitudinal Slope = 0.7%	Compliant, Crosswalk to remain		
PRCU010 (N) PRCU009 (S)	Price Rd South of SR 202L, EB Offramp	50.67	-Cross Slope = 1.4% -Longitudinal Slope = 0.9%	Compliant, Crosswalk to remain		
PRCU003 (N) PRCU004 (S)	Price Rd South of SR 202L, EB Onramp	50.67	-Cross Slope = 2.0% -Longitudinal Slope = 0.2%	Compliant, Crosswalk to remain		

Connecting Curb Ramps	Location	Beginning MP	Field Data	Proposed Action	Final Design	Constructed
PRCU006 (W) PRCU007 (E)	Price Rd South of SR 202L, NB Free Right	50.64	-Cross Slope = 2.9% -Longitudinal Slope = 2.0%	Compliant, Crosswalk to remain		
1420723 (W) 1420729 (median) 1420728 (E)	Dobson Rd North of SR 202L, North Side	49.66	-Cross Slope = 1.0% (W),0.5% (E) -Longitudinal Slope = 1.7% (W), 3.0% (E)	Compliant, Crosswalk to remain		
1420728 (N) 1420727 (S)	Dobson Rd North of SR 202L, WB Offramp	49.65	-Cross Slope = 0.8% -Longitudinal Slope = 0.8%	Compliant, Crosswalk to remain		
1420726 (N) 1420725 (S)	Dobson Rd South of SR 202L, EB Onramp	49.64	-Cross Slope = 2.3% -Longitudinal Slope = 0.3%	Compliant, Crosswalk to remain		
1420713 (N) 1420714 (S)	Alma School Rd South of SR 202L, EB Offramp	48.66	-Cross Slope = 1.7% -Longitudinal Slope = 1.9%	Compliant, Crosswalk to remain		
1421116 (N) 1421118 (S)	Alma School Rd North of SR 202L, WB Onramp	48.66	-Cross Slope = 1.3% -Longitudinal Slope = 1.4%	Compliant, Crosswalk to remain		
1420691 (W) 1420702 (median) 1420701 (E)	Alma School Rd North of SR 202L, North Side	48.66	-Cross Slope = 3.1% (W),<5.0% (E) -Longitudinal Slope = 1.1% (W), <5.0% (E)	Compliant, Crosswalk to remain		
1420695 (W) 1420696 (median) 1420698 (E)	Alma School Rd South of SR 202L, South Side	48.66	-Cross Slope = <5.0% (W), 3.0% (E) -Longitudinal Slope = <5.0% (W), 1.7% (E)	Compliant, Crosswalk to remain		

Connecting Curb Ramps	Location	Beginning MP	Field Data	Proposed Action	Final Design	Constructed
1420710 (N) 1420712 (S)	Alma School Rd North of SR 202L, WB Offramp	48.63	-Cross Slope = 1.1% -Longitudinal Slope = 1.1%	Compliant, Crosswalk to remain		
1420710 (N) 1420712 (S)	Alma School Rd South of SR 202L, EB Onramp	48.63	-Cross Slope = <5.0% -Longitudinal Slope = <5.0%	Compliant, Crosswalk to remain		
1420694 (N) 1420695 (S)	Arizona Ave South of SR 202L, EB Offramp	47.66	-Cross Slope = 2.9% -Longitudinal Slope = 2.4%	Compliant, Crosswalk to remain		
1420691 (N) 1420692 (S)	Arizona Ave North of SR 202L,WB Onramp	47.66	-Cross Slope = 2.0% -Longitudinal Slope = 0.9%	Compliant, Crosswalk to remain		
1420691 (W) 1420702 (median) 1420701 (E)	Arizona Ave North of SR 202L, North Side	47.66	-Cross Slope = 2.9% (W), 1.1% (E) -Longitudinal Slope = 1.9% (W), 0.9% (E)	Compliant, Crosswalk to remain		
1420695 (W) 1420696 (median) 1420698 (E)	Arizona Ave South of SR 202L, South Side	47.66	-Cross Slope = 0.8% (W), 1.9% (E) -Longitudinal Slope = 1.8% (W), 0.7% (E)	Compliant, Crosswalk to remain		
1420701 (N) 1420700 (S)	Arizona Ave North of SR 202L, WB Offramp	47.63	-Cross Slope = 1.6% -Longitudinal Slope = 0.9%	Compliant, Crosswalk to remain		
1420699 (N) 1420698 (S)	Arizona Ave South of SR 202L, EB Onramp	47.63	-Cross Slope = 2.4% -Longitudinal Slope = 2.6%	Compliant, Crosswalk to remain		

Connecting Curb Ramps	Location	Beginning MP	Field Data	Proposed Action	Final Design	Constructed
1420686 (N) 1420684 (S)	McQueen Rd South of SR 202L, EB Offramp	46.59	-Cross Slope = 0.4% -Longitudinal Slope = 2.1%	Compliant, Crosswalk to remain		
1420681 (N) 1420683 (S)	McQueen Rd North of SR 202L, WB Onramp	46.59	-Cross Slope = 2.0% -Longitudinal Slope = 2.1%	Compliant, Crosswalk to remain		
1420681 (W) 1420679 (median) 1420677 (E)	McQueen Rd North of SR 202L, North Side	46.59	-Cross Slope = 2.0% (W), 1.7% (E) -Longitudinal Slope = 2.9% (W), 1.3% (E)	Compliant, Crosswalk to remain		
1420686 (W) 1420688 (median) 1420670 (E)	McQueen Rd South of SR 202L, South Side	46.59	-Cross Slope = 0.9% (W), 1.0% (E) -Longitudinal Slope = 1.8% (W), 0.7% (E)	Compliant, Crosswalk to remain		
1420677 (N) 1420675 (S)	McQueen Rd North of SR 202L, WB Offramp	46.57	-Cross Slope = 1.3% -Longitudinal Slope = 0.8%	Compliant, Crosswalk to remain		
1420673 (N) 1420670 (S)	McQueen Rd South of SR 202L, EB Onramp	46.57	-Cross Slope = 1.3% -Longitudinal Slope = 0.9%	Compliant, Crosswalk to remain		
1420653 (N) 1420651 (S)	Cooper Rd South of SR 202L, EB Offramp	45.59	-Cross Slope = 3.0% -Longitudinal Slope = 1.5%	Compliant, Crosswalk to remain		
1420657 (N) 1420656 (S)	Cooper Rd North of SR 202L, WB Onramp	45.59	-Cross Slope = 3.0% -Longitudinal Slope = 2.1%	Compliant, Crosswalk to remain		

Connecting Curb Ramps	Location	Beginning MP	Field Data	Proposed Action	Final Design	Constructed
1420657 (W) 1420659 (median) 1420661 (E)	Cooper Rd North of SR 202L, North Side	45.59	-Cross Slope = 1.6% (W), 1.4% (E) -Longitudinal Slope = 1.2% (W), 2.8% (E)	Compliant, Crosswalk to remain		
1420651 (W) 1420668 (median) 1420666 (E)	Cooper Rd South of SR 202L, South Side	45.59	-Cross Slope = 1.3% (W), 1.5% (E) -Longitudinal Slope = 1.4% (W), 1.5% (E)	Compliant, Crosswalk to remain		
1420661 (N) 1420663 (S)	Cooper Rd North of SR 202L, WB Offramp	45.57	-Cross Slope = 1.7% -Longitudinal Slope = 1.3%	Compliant, Crosswalk to remain		
1420666 (N) 1420665 (S)	Cooper Rd South of SR 202L, EB Onramp	45.57	-Cross Slope = 1.9% -Longitudinal Slope = 1.0%	Compliant, Crosswalk to remain		
1420635 (N) 1420639 (S)	Gilbert Rd South of SR 202L, EB Offramp	44.57	-Cross Slope = 2.9% -Longitudinal Slope = 1.2%	Compliant, Crosswalk to remain		
1420632 (N) 1420634 (S)	Gilbert Rd North of SR 202L, WB Onramp	44.57	-Cross Slope = 2.7% -Longitudinal Slope = 1.9%	Compliant, Crosswalk to remain		
1420632 (W) 1420649 (median) 1420648 (E)	Gilbert Rd North of SR 202L, North Side	44.57	-Cross Slope = 1.2% (W), 1.7% (E) -Longitudinal Slope = 1.5% (W), 2.6% (E)	Compliant, Crosswalk to remain		
1420639 (W) 1420640 (median) 1420642 (E)	Gilbert Rd South of SR 202L, South Side	44.57	-Cross Slope = 1.6% (W), 0.9% (E) -Longitudinal Slope = 1.3% (W), 2.8% (E)	Compliant, Crosswalk to remain		

Connecting Curb Ramps	Location	Beginning MP	Field Data	Proposed Action	Final Design	Constructed
1420648 (N) 1420646 (S)	Gilbert Rd North of SR 202L, WB Offramp	44.56	-Cross Slope = 2.0% -Longitudinal Slope = 1.2%	Compliant, Crosswalk to remain		
1420644 (N) 1420642 (S)	Gilbert Rd South of SR 202L, EB Onramp	44.56	-Cross Slope = 1.6% -Longitudinal Slope = 1.6%	Compliant, Crosswalk to remain		
1420603 (N) 1420604 (S)	Val Vista Dr South of SR 202L, EB Offramp	42.47	-Cross Slope = 2.3% -Longitudinal Slope = 1.5%	Compliant, Crosswalk to remain		
1420596 (N) 1420597 (S)	Val Vista Dr North of SR 202L, WB Onramp	42.47	-Cross Slope = 2.0% -Longitudinal Slope = 1.2%	Compliant, Crosswalk to remain		
1420596 (W) 1420620 (median) 1420617 (E)	Val Vista Dr North of SR 202L, North Side	42.47	-Cross Slope = 0.9% (W), 1.2% (E) -Longitudinal Slope = 2.8% (W), 2.0% (E)	Compliant, Crosswalk to remain		
1420604 (W) 1420605 (median) 1420609 (E)	Val Vista Dr South of SR 202L, South Side	42.47	-Cross Slope = 0.8% (W), 1.8% (E) -Longitudinal Slope = 2.8% (W), 2.0% (E)	Compliant, Crosswalk to remain		
1420617 (N) 1420615 (S)	Val Vista Dr North of SR 202L, WB Offramp	42.44	-Cross Slope = 2.7% -Longitudinal Slope = 1.0%	Compliant, Crosswalk to remain		

Connecting Curb Ramps	Location	Beginning MP	Field Data	Proposed Action	Final Design	Constructed
1420610 (N) 1420609 (S)	Val Vista Dr South of SR 202L, EB Onramp	42.44	-Cross Slope = 2.2% -Longitudinal Slope = 1.7%	Compliant, Crosswalk to remain		

9. PEDESTRIAN FURNITURE & BUS STOPS

There are no **pedestrian furniture** locations in the right of way within the project limits. There are also no **bus stops** located within the project limits.

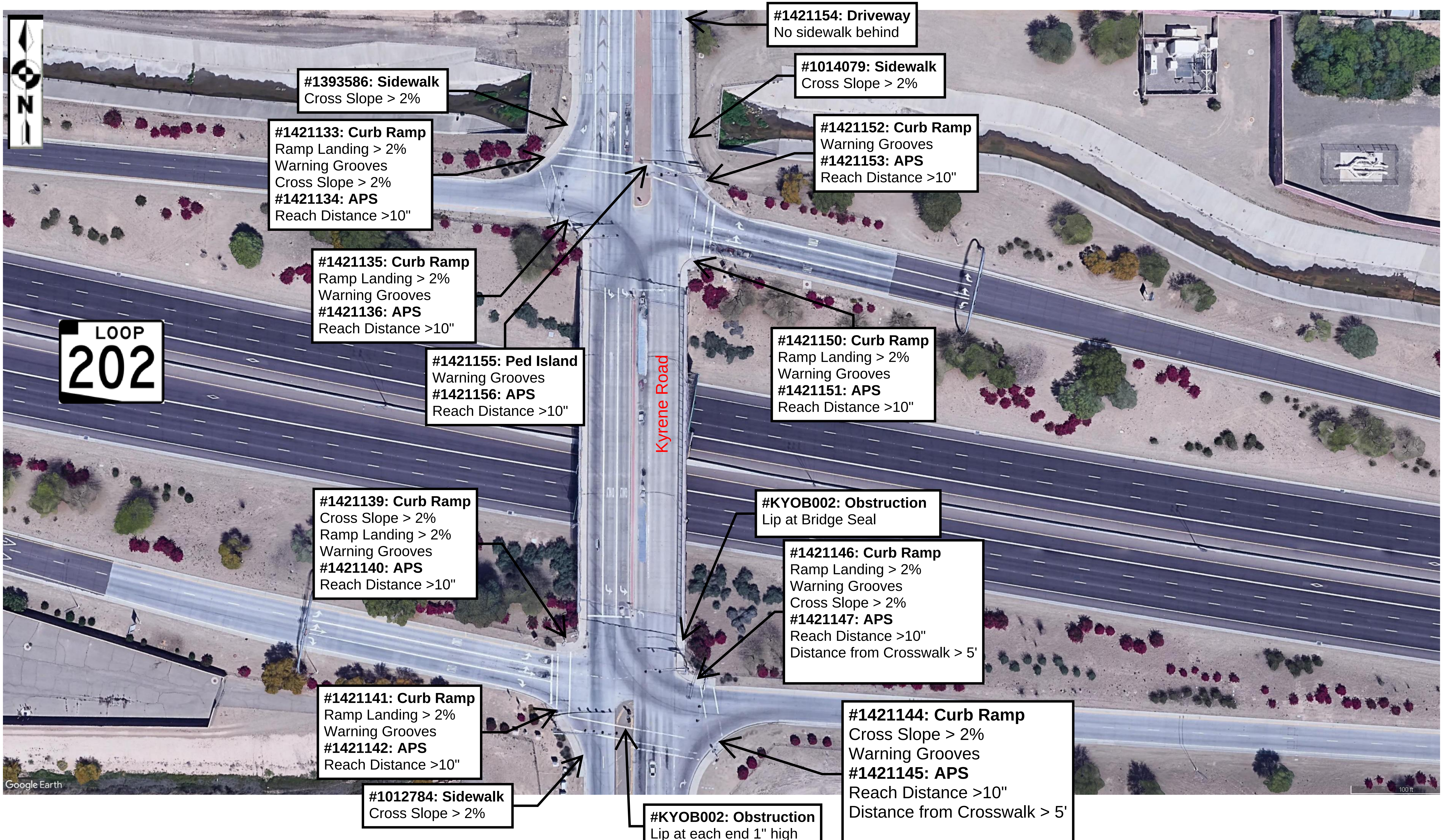
10. PEDESTRIAN AT-GRADE RAIL CROSSINGS

There are no **pedestrian at-grade rail crossings** locations in the right of way within the project limits.

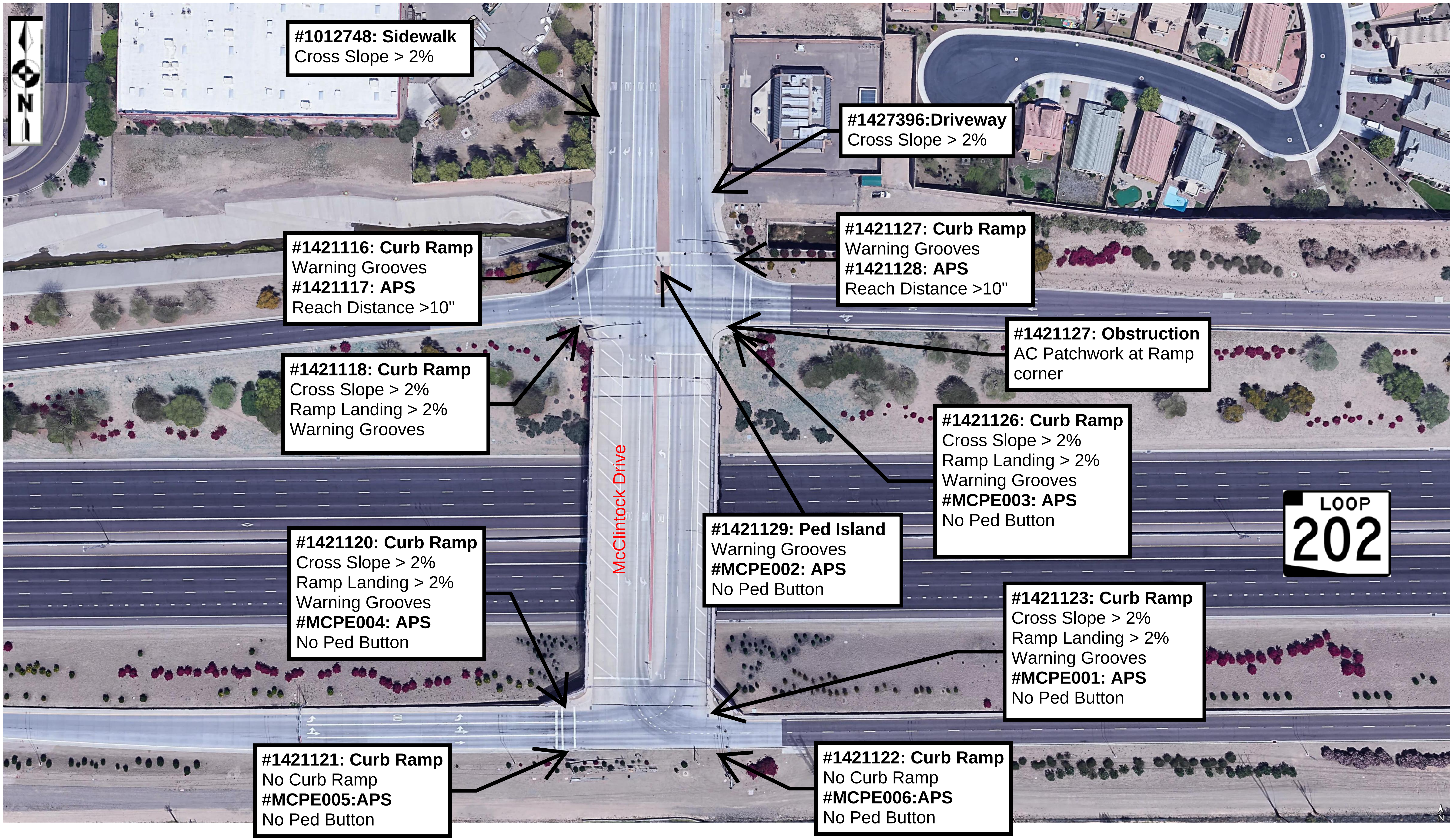
APPENDIX

ADA Feature Location Map (Non-Compliant Only)..Section A-1

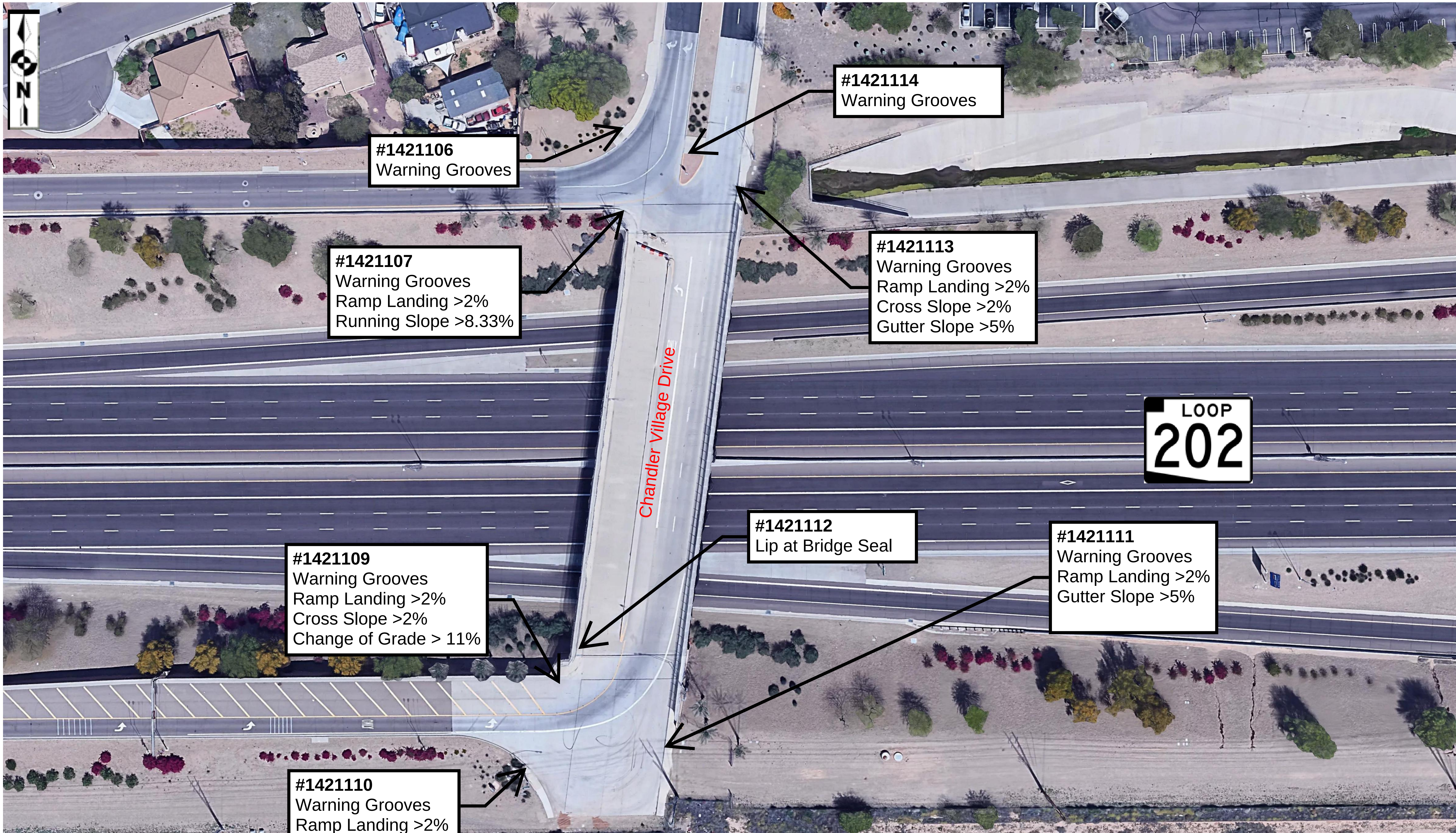
KYRENE ROAD INTERSECTION



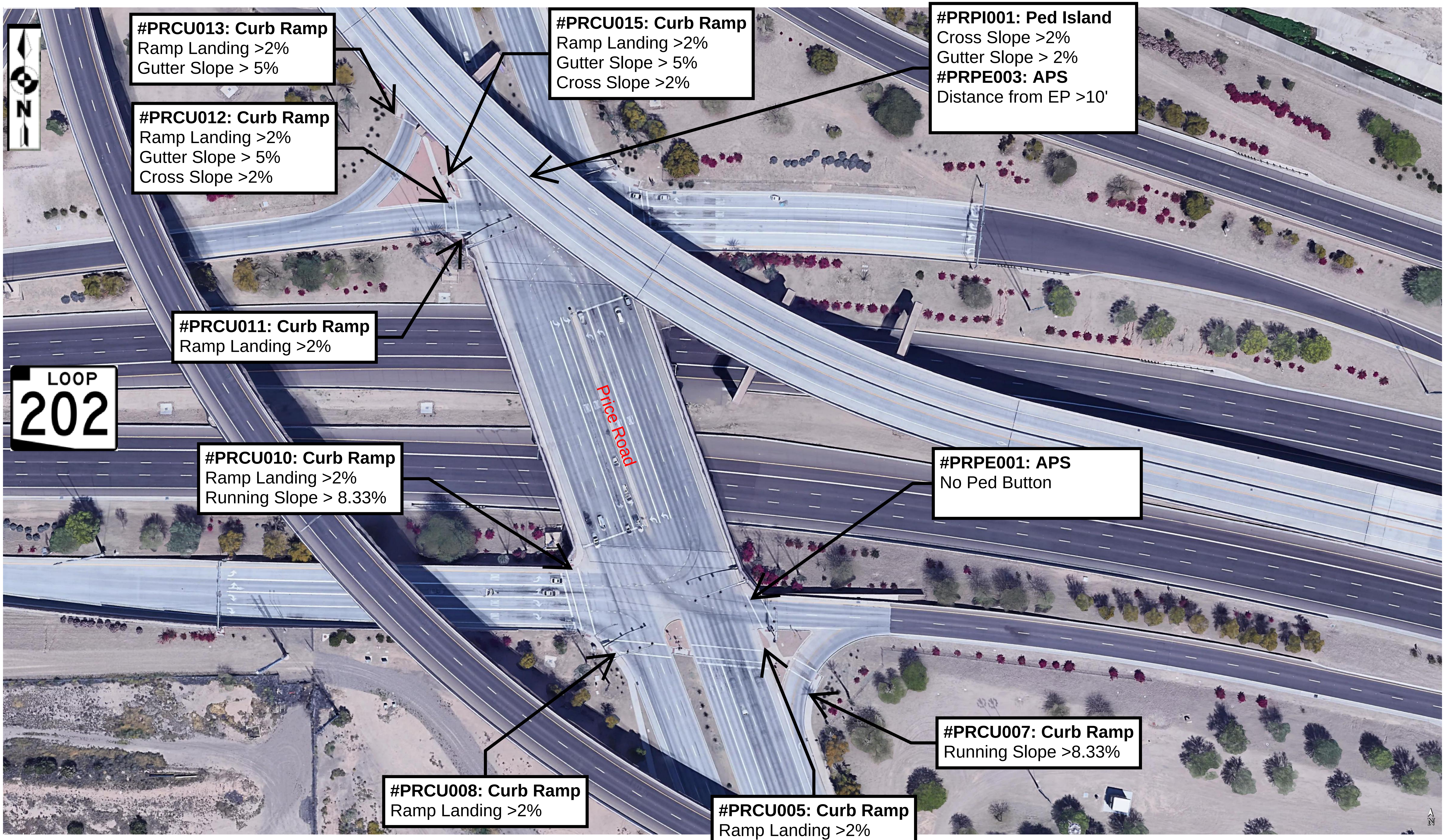
MCCLINTOCK DRIVE INTERSECTION



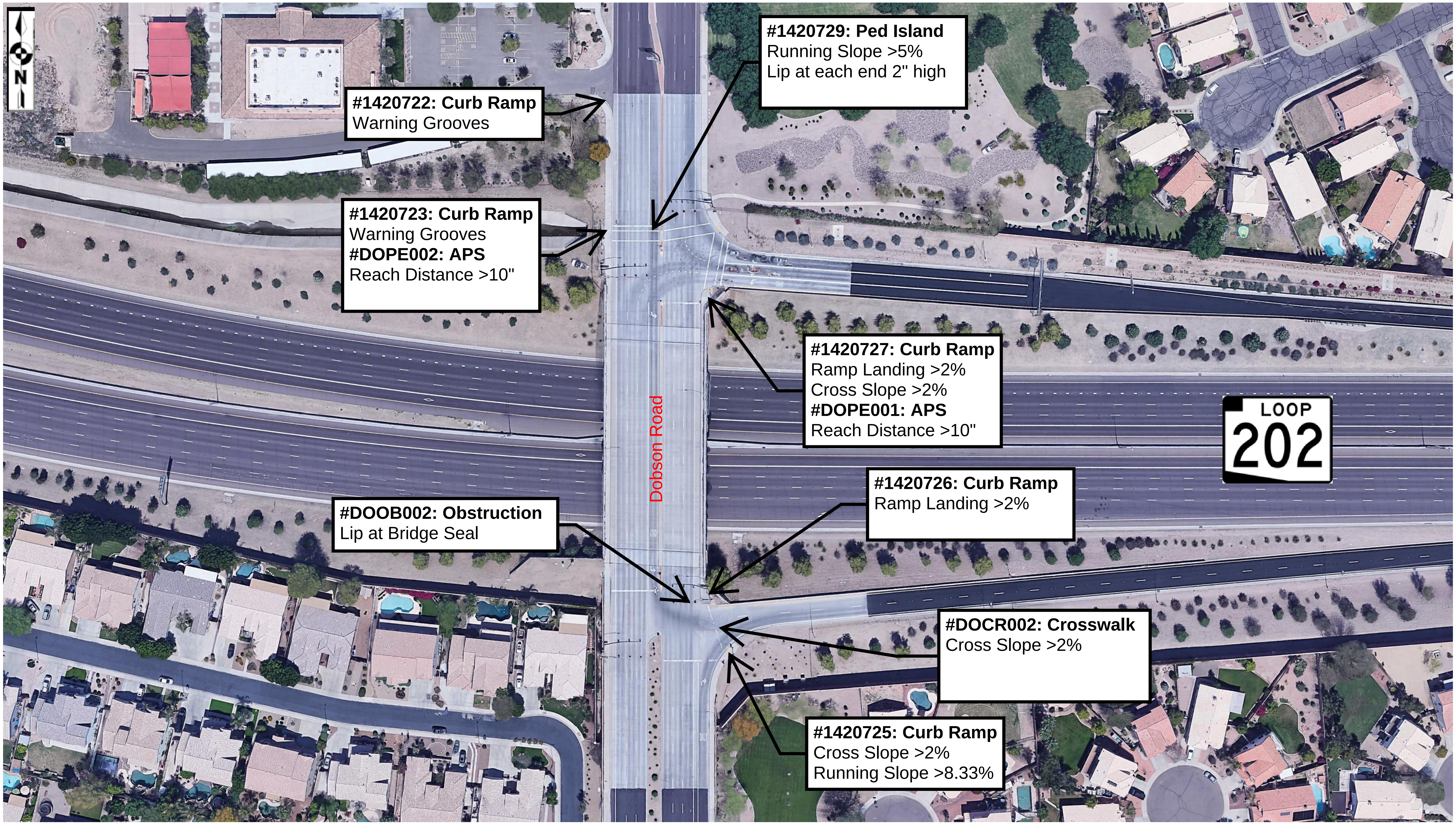
CHANDLER VILLAGE DRIVE INTERSECTION



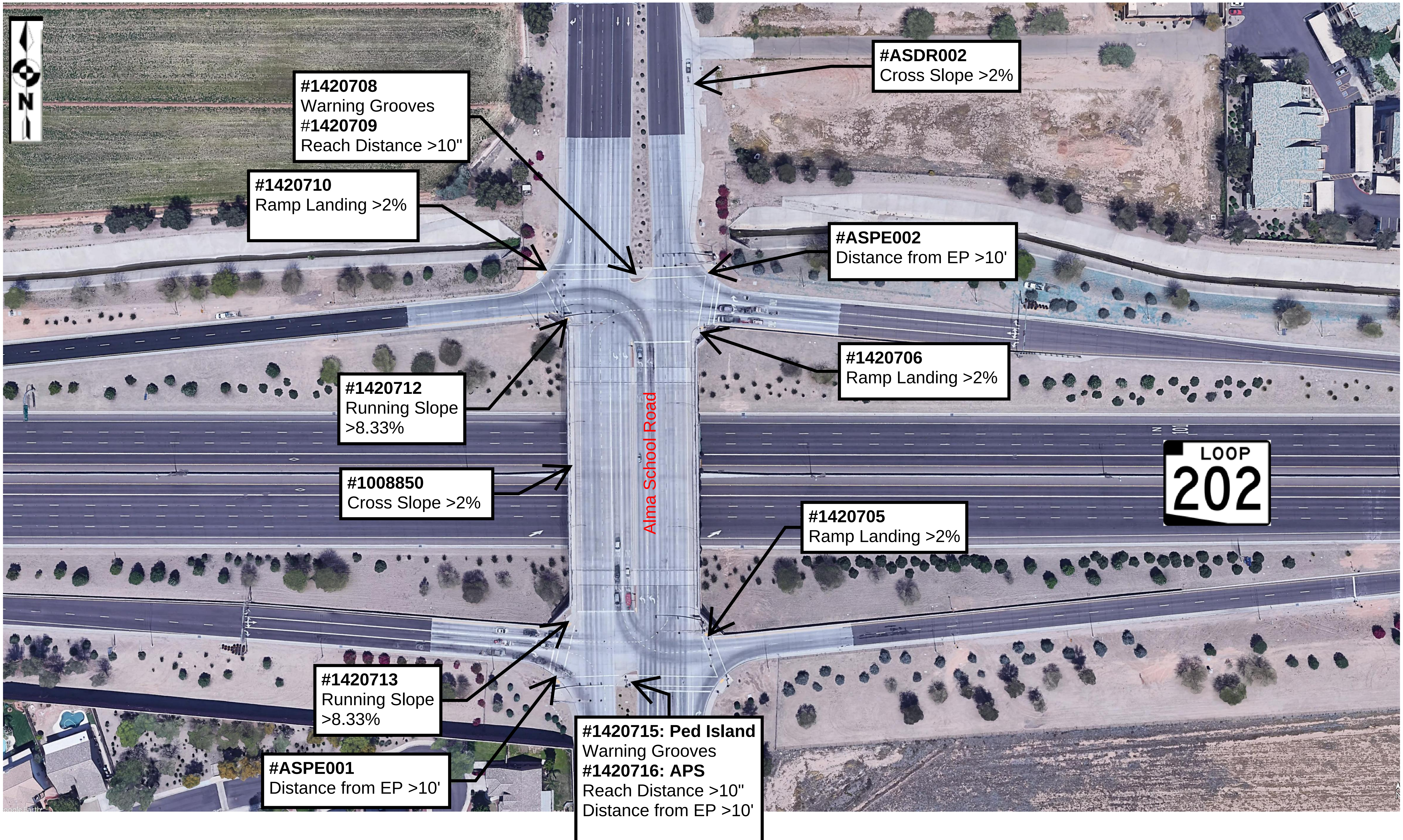
PRICE ROAD INTERSECTION



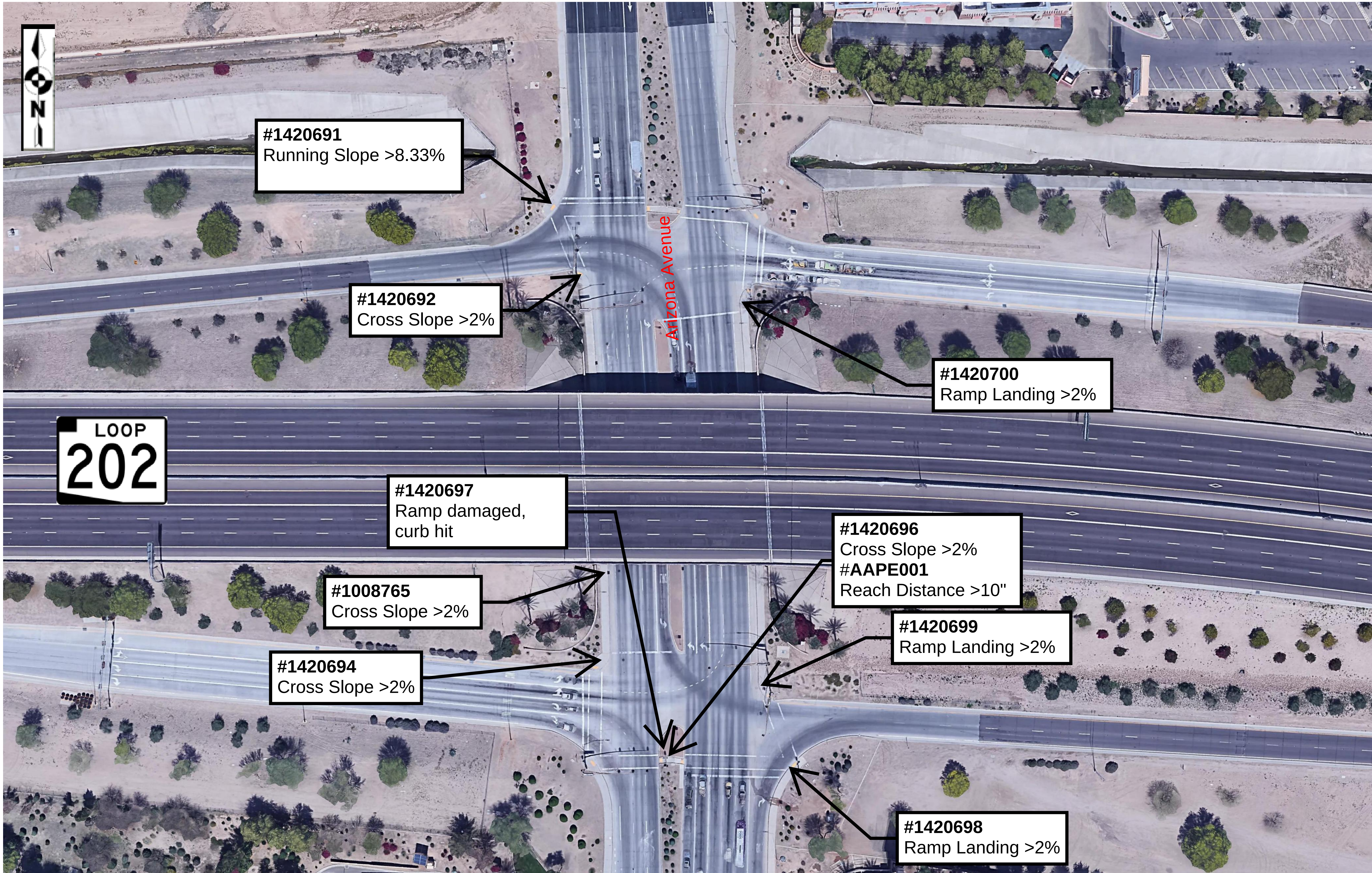
DOBSON ROAD INTERSECTION



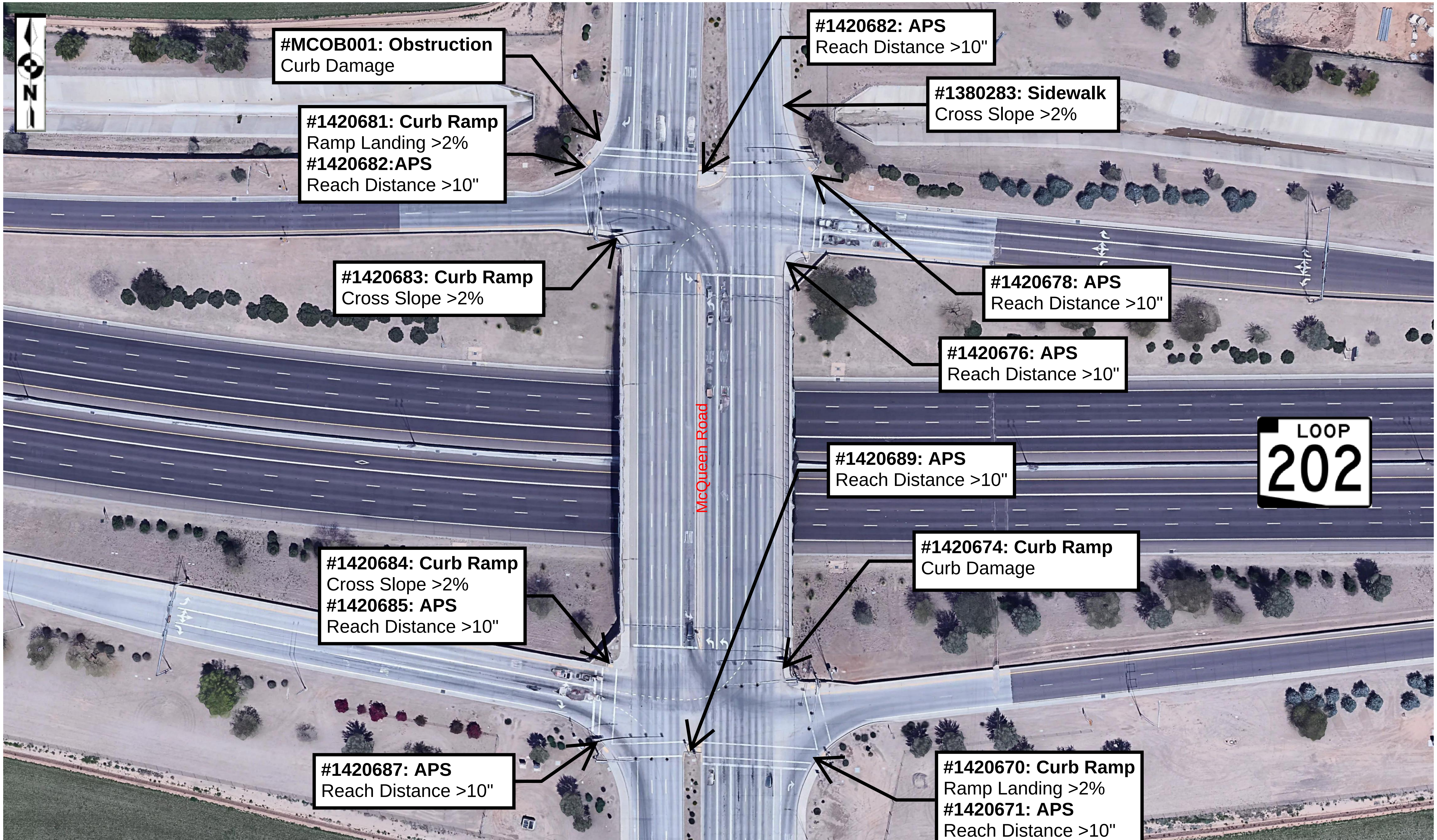
ALMA SCHOOL ROAD INTERSECTION



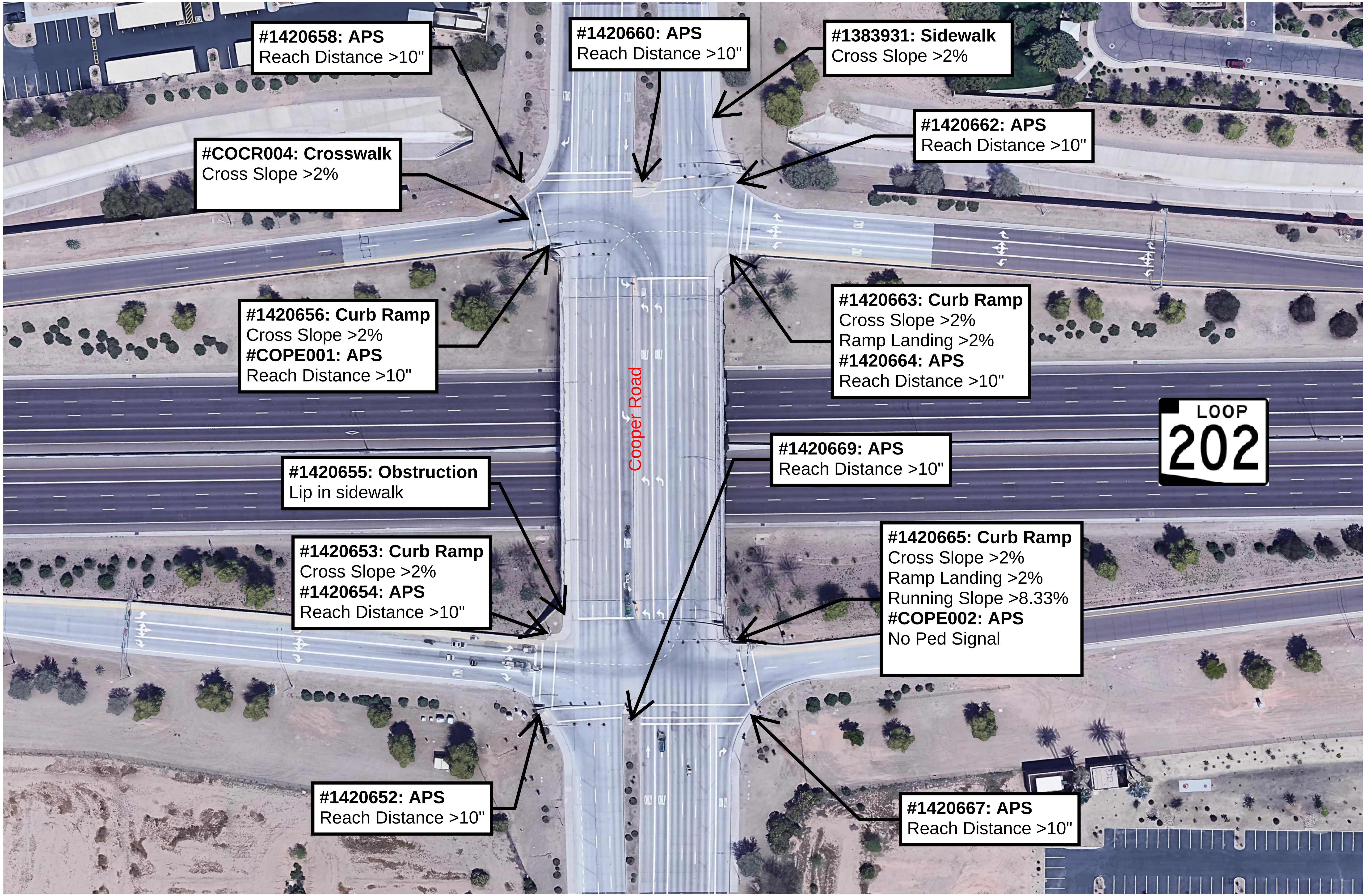
ARIZONA AVENUE INTERSECTION



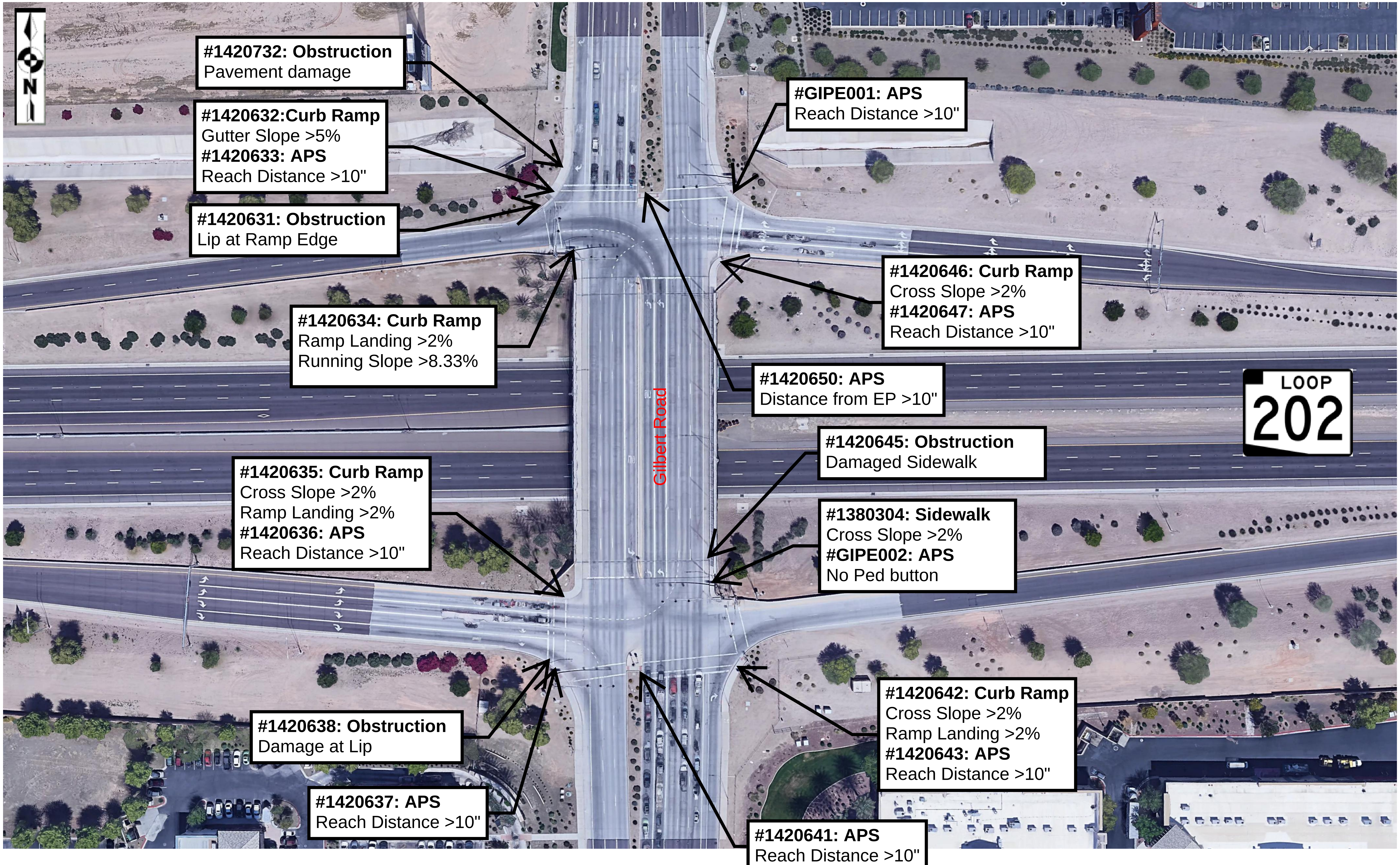
MCQUEEN ROAD INTERSECTION



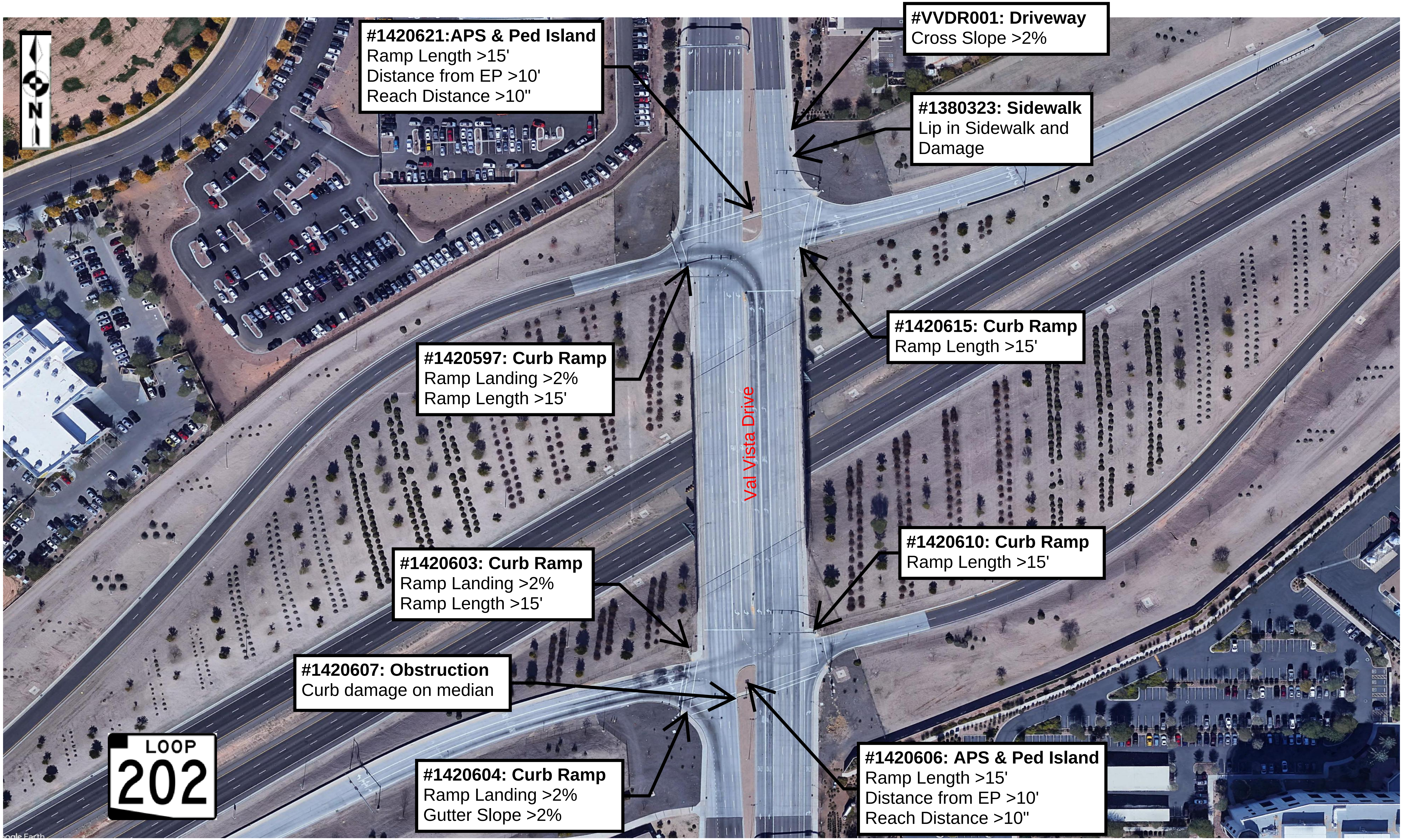
COOPER ROAD INTERSECTION



GILBERT RD INTERSECTION



VAL VISTA DRIVE INTERCHANGE



APPENDIX D – SUMMARY OF COMMENTS

MASTER SUMMARY OF COMMENTS

Submittal	**Initial DCR**		**Project Name**	**SR 202L I-10 to Val Vista Dr**		
Return Date			**Federal Number**	**202-C(208)T**		
Milepost	**57.0 - 42.0**		**TRACS NO.**	**202 MA 044 F0124 01L**		
Submittal Date	**04/26/19**		**Designer**	**AZTEC**		
ADOT PM	**Madhav Mundle**		**Route**	**NA**		

RESPONSE CODES: A=WILL COMPLY, B=CONSULTANT TO EVALUATE, C=CLIENT TO EVALUATE, D=NO FURTHER ACTION, E=NOT APPLICABLE

Comment Number	Reviewer	Discipline	Section Number	Page Number	Comment	Initial Response	Final Response	Response By	Resolution
Initial DCR									
1	Rafe Davis	ADOT Bridge	General	General	No Comments.	D	D	JLC	Thank you.
2	S. Webber	FHWA	General (All Docs)	General	Multiple typos and grammatical mistakes throughout the documents. You should have someone who is knowledgable about grammar and punctuation thoroughly review your reports before submitting.	A	A	JLC	Grammar/spelling will be re-reviewed for the Final DCR.
3	S. Webber	FHWA	DCR	General	Please consider changing project name to "SR 202L; Val Vista - I-10." This is likely what it will be changed to when the authorization for Federal-aid for construction is submitted. This also matches what is currently being used by MAG.	C	A	JLC	The ADOT PM indicated to match what MAG has for the name.
4	S. Webber	FHWA		General	It appears that MAG is reprogramming this project into two separate projects (Val Vista - SR 101L and SR 101L - I-10). Even if a single DCR is prepared for both projects, this separation should be identified consistently throughout the Final DCR.	A	A	JLC	At the time the IDCR was being prepared, the information about the reprogramming of future projects was late-breaking. Two forthcoming projects will be mentioned consistently when future funding/programming is discussed in the document.
5	S. Webber	FHWA		General	Some locations are given as mileposts, others as stations. But there are no sheets showing both stations and mileposts so the readers can see where different features are in relation to each other. (The roll plots provided show only stationing, not mileposts.)	A	A	JLC	Mileposts will be added to the roll plots.
6	Adam Carreon	Traffic		General	Missing signal controller information for Vissim model. Please provide all files needed to run simulation. See inserted error message	A	A	TEE	Signal controller information will be included.

A. Will Comply
B. Designer to evaluate
C. ADOT to evaluate
D. No Further Action

MASTER SUMMARY OF COMMENTS

Submittal	Initial DCR		Project Name	SR 202L I-10 to Val Vista Dr		
Return Date			Federal Number	202-C(208)T		
Milepost	57.0 - 42.0		TRACS NO.	202 MA 044 F0124 01L		
Submittal Date	04/26/19		Designer	AZTEC		
ADOT PM	Madhav Mundle		Route	NA		

RESPONSE CODES: A=WILL COMPLY, B=CONSULTANT TO EVALUATE, C=CLIENT TO EVALUATE, D=NO FURTHER ACTION, E=NOT APPLICABLE

Comment Number	Reviewer	Discipline	Section Number	Page Number	Comment	Initial Response	Final Response	Response By	Resolution
7	Adam Carreon	Traffic		General	Tables showing LOS for cross roads. With no work being done on the ramps or cross-roads, how much traffic will back-up onto mainline?	B	A	TEE	The team will double-check if the 2040 traffic model indicates any possibility of ramps being over capacity. With few exceptions, all off ramps are being widened to two lane ramps.
8	R,Foluch	Roadway	General	General	Show lane balance calculation.	D	D	TEE/JLC	Per a phone conversation on 6/5/19, the reviewer indicated this comment could be dropped. He was trying to ascertain how many Type B or C weaving movements (i.e. across more than one lane) there are and if they have been minimized. There are only 2 weaving movements where a vehicle will cross more than one lane.
9	R,Foluch	Roadway	General	General	The IDCR should have plans for review.	D	D	JLC	Roll plots were provided with IDCR.
10	Adam Carreon	Traffic	General	General	Please provide Synchro files.	A	A	APM	Synchro files will be provided with final DCR.
11	Adam Carreon		1.00	1	2 cover pages on DCR	D	D	JLC	In the past several years, the use of two cover pages is common, anticipated practice with ADOT DCRs. The second, inner cover page is used by engineers to sign and seal the document, leaving a "clean" cover showing.
12	S. Webber	FHWA	1.3	3	How were the existing measurements for the median shoulder at the freeway overpasses (9.4') and freeway underpasses (6.9') determined? The design exceptions approved in June 2010 indicate the shoulder widths at the underpasses vary from 8.7' (10' - 1.3') to 7.4' (10' - 2.6'). Also, along EB 202, from MP 50.20 to 50.34, the median shoulder is reduced to 6' (10' - 4').	A	A	BR	Shoulder width measurements were determined by record drawing research. The need for the design exception for MP 50.20 to 50.34 was eliminated by the alternate design of the HOV flyover that was constructed after the 2010 DE letter was approved.

A. Will Comply
B. Designer to evaluate
C. ADOT to evaluate
D. No Further Action

MASTER SUMMARY OF COMMENTS

Submittal	**Initial DCR**		**Project Name**	**SR 202L I-10 to Val Vista Dr**
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Submittal Date	**04/26/19**		**Designer**	**AZTEC**
ADOT PM	**Madhav Mundle**		**Route**	**NA**

RESPONSE CODES: A=WILL COMPLY, B=CONSULTANT TO EVALUATE, C=CLIENT TO EVALUATE, D=NO FURTHER ACTION, E=NOT APPLICABLE

Comment Number	Reviewer	Discipline	Section Number	Page Number	Comment	Initial Response	Final Response	Response By	Resolution
13	Dan Cook	Chandler	1.3.3	6	Initial DCR, Section 1.3.3, in the subsection titled Parks, do you need to mention the Paseo Canal bike/ped that is along the Consolidated Canal.	A	A	JLC	The following sentence will be added "The Paseo Canal Shared Use Path runs along the consolidated canal."
14	Dan Cook	Chandler	1.3.5	6, 8	Initial DCR, Section 1.3.5; I am not sure where this comments belongs, but all of the Bridges along the Santan on the aretrial streets have several spare conduits that the City owns	A	A	JMC	We will add a sentence to Section 1.3.5 that addresses the reviewer's comment.
15	S. Webber	FHWA	1.3.8	10	At the end of the first paragraph of this section, where Table 33 is mentioned, consider adding the page number where the table is located so the reader doesn't need to search for it. Why is the table placed so far back in the document, instead of being included as Table 3 here?	A	A	TEE/JLC	The table is in discussion of the preferred alternative. The discussion of existing conditions in section 1.3.8 could be revised to remove mention of Table 33, since it isn't relevant to discuss it here or table moved to section 1.3.8. Per a telephone discussion on 6/5/19, the reviewer indicated she was okay with the approach of not mentioning Table 33 here. So the reference to the table will be removed from section 1.3.8.
16	S. Webber	FHWA	1.3.9	12	In the second paragraph, please consider changing 3-3" to: three 3-inch or three 3" to make it easier to read/understand.	D	D	DLT	This should remain as-is, as this verbiage is what ADOT expects. The 3-3" description for FMS conduit has been in common use since the 1990's and is consistent with ADOT's bid item description for FMS conduit. CRM: per ADOT PM, check how other DCRs have done this.

A. Will Comply
B. Designer to evaluate
C. ADOT to evaluate
D. No Further Action

MASTER SUMMARY OF COMMENTS

Submittal	Initial DCR		Project Name	SR 202L I-10 to Val Vista Dr		
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Milepost	57.0 - 42.0		TRACS NO.	202 MA 044 F0124 01L		
Submittal Date	04/26/19		Designer	AZTEC		
ADOT PM	Madhav Mundle		Route	NA		

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Comment Number	Reviewer	Discipline	Section Number	Page Number	Comment	Initial Response	Final Response	Response By	Resolution
17	S. Webber	FHWA	1.3.11	13	Last paragraph before Section 1.3.12, please consider rewriting the second-to-last sentence ("Based on cursory review it does not appear that earth fissures have been identified within or within about 10 miles….")	A	A	KD	The sentence will be revised to "Based on cursory review it does not appear that earth fissures have been identified within about 10 miles of the project alignment (ADWR Hazards Map)."
18	S. Webber	FHWA	1.3.12	13	The typical pavement sections for the at-grade and elevated sections is the same as that for the depressed areas, so why are they identified separately? Should one of them be different?	A	A	KD	The Table will be updated to show AB or ACB used as base course. The exisitng note indicates AB for at-grade to elevated sections and ACB for depressed sections.
19	S. Webber	FHWA	1.4	14	Standard practice is to "start" a project at the lower MP and "end" at the higher MP. Is there a reason for beginning and ending points of this project being shown in the opposite direction/order? (See Comment #1.)	D	D	JLC	Agree on the standard practice, but in this case the stationing and milepost are going opposite directions. The previous projects show the project from west to east (in order of increasing stationing), so in order to maintain consistency these plans were setup from west to east.
20	S. Webber	FHWA	1.4	14	In the bulleted paragraphs, please consider adding "in each direction" to the portions that show the number of GPL and HOV lanes. [For example, "(3 GPL + 1 HOV in each direction)."]	A	A	JLC	The text "in each direction" will be added to sentences in this section to help clarify the report.

A. Will Comply
B. Designer to evaluate
C. ADOT to evaluate
D. No Further Action

MASTER SUMMARY OF COMMENTS

Submittal	**Initial DCR**		**Project Name**	**SR 202L I-10 to Val Vista Dr**
Return Date			**Federal Number**	**202-C(208)T**
Milepost	**57.0 - 42.0**		**TRACS NO.**	**202 MA 044 F0124 01L**
Submittal Date	**04/26/19**		**Designer**	**AZTEC**
ADOT PM	**Madhav Mundle**		**Route**	**NA**

RESPONSE CODES: A=WILL COMPLY, B=CONSULTANT TO EVALUATE, C=CLIENT TO EVALUATE, D=NO FURTHER ACTION, E=NOT APPLICABLE

Comment Number	Reviewer	Discipline	Section Number	Page Number	Comment	Initial Response	Final Response	Response By	Resolution
21	Dan Cook	Chandler	1.4	14	Initial DCR, Section 1.4: I am not sure where this comment belongs, but, as was mentioned in prior team meetings, the City is considering having a frontage road along the north side of the L202 west of Kyrene Road for access to the adjacent land. This would be a City funded project likely done outside of the ADOT project. However, I think shoud be included in the DCR and environmental reports so there are not issues in the future.	C	D	JLC	The Kyrene improvements will not be covered by this project's environmental clearance; the environmental clearance is likely to be updated in the coming years anyway. This will not be added to the DCR.
22	R,Foluch	Roadway	1.40	14	First bullet. Explain the open median in more detail (min. dimension, cable etc.)"	A	A	JLC	"Open median" will be expounded upon. The open area is actually divided by two half barriers, and this will be stated.
23	R,Foluch	Roadway	1.40	14	Second bullet. Correct segment location.	A	A	JLC	The sentence will be revised to start: "From the I-10/SR 202L TI east to the SR 202L/SR 1011L TI..."
24	Sara Howard	Central Dist.	1.4	14	Second bullet - Should this be I-10/202L TI east?	A	A	JLC	Yes. The sentence will be revised to start: "From the I-10/SR 202L TI east to the SR 202L/SR 1011L TI..."
25	R,Foluch	Roadway	2.10	15	Please report the crashes using the KABCO Scale. In particular split out the A & B type crashes.	A	A	TEE	A table will be added with the overall crashes categorized in the KABCO format.
26	R,Foluch	Roadway	2.10	15	Include Data from the RDSIP, check with ADOT Traffic Safety, high speed on this segment may be an issue.	B/C	D	TEE/JLC	Per a telephone conversation on 8/8/19, the reviewer indicated he wanted the designers to be aware of the RDSIP (Roadway Departure Safety Improvement Plan) and that the comment can be disregarded.

A. Will Comply
B. Designer to evaluate
C. ADOT to evaluate
D. No Further Action

MASTER SUMMARY OF COMMENTS

Submittal	Initial DCR		Project Name	SR 202L I-10 to Val Vista Dr
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Submittal Date	04/26/19		Designer	AZTEC
ADOT PM	Madhav Mundle		Route	NA

RESPONSE CODES: A=WILL COMPLY, B=CONSULTANT TO EVALUATE, C=CLIENT TO EVALUATE, D=NO FURTHER ACTION, E=NOT APPLICABLE

Comment Number	Reviewer	Discipline	Section Number	Page Number	Comment	Initial Response	Final Response	Response By	Resolution
27	Dan Cook	Chandler		27	Initial DCR, Page 27, map of build alt btw match lines A and B; I thought the EB off ramp to Price Road was suppose to be a two lane off ramp, the map just shows a one lane off ramp.	D	D	TEE	The single lane is due to existing physical constraints and the resulting high cost of widening the EB off ramp at Price. A traffic operations sensitivity analysis was performed and it confirmed that a single lane off ramp at Price would perform efficiently with projected 2040 volumes.
28	Dan Cook	Chandler		28	Initial DCR, Page 28, map of the build alt btw match lines B and C; the WB off ramp at Gilbert Rd seems to be problematic bringing the WB frontage road into the ramp traffic, I am assuming this will be looked at in more detail during the final design and with the design of the Lindsay TI. That frontage road was anticipated to have a high volume going to the Gilbert Road WB on ramp. This could likely back traffic up onto the main line, and cause a weave problem with left turn movements, which are high.	B	D	TEE	The traffic designer has confirmed (through the review of traffic simulations) that traffic backing up onto mainline at any exit ramp is not anticipated.
29	Dan Cook	Chandler		34	Intial DCR, starting on page 34, as someone who is color blind, this map reads as three colors for 6 LOS's, in fact LOS A, B, D, and F all look the same. Perhaps you could use some greater contrasting colors.	B	D	TEE	Revised exhibits with shading to differentiate the LOS values were provided to the commenter but traditional colors were used in the DCR.
30	R,Foluch	Roadway	3.20	46	Page 14 states this project wiil construct 3 +1 but page 46 states the SMF Project would provide three GPLs and a HOV lane under I-10	D	D	JLC	Per a telephone conversation on 6/5/19, the reviewer indicated this comment could be dropped.
31	Sara Howard	Central Dist.	Table 32	68	There is a pump station at Kyrene.	A	A	TMM	Will add Kyrene pump station to Table 32.

A. Will Comply
B. Designer to evaluate
C. ADOT to evaluate
D. No Further Action

MASTER SUMMARY OF COMMENTS

Submittal	**Initial DCR**		**Project Name**	**SR 202L I-10 to Val Vista Dr**
Return Date			**Federal Number**	**202-C(208)T**
Milepost	**57.0 - 42.0**		**TRACS NO.**	**202 MA 044 F0124 01L**
Submittal Date	**04/26/19**		**Designer**	**AZTEC**
ADOT PM	**Madhav Mundle**		**Route**	**NA**

RESPONSE CODES: A=WILL COMPLY, B=CONSULTANT TO EVALUATE, C=CLIENT TO EVALUATE, D=NO FURTHER ACTION, E=NOT APPLICABLE

Comment Number	Reviewer	Discipline	Section Number	Page Number	Comment	Initial Response	Final Response	Response By	Resolution
32	Dan Cook	Chandler	3.11	72	Initial DCR, Section 3.11; the City of Chandler Traffic Control maual and the Town of Gilbert manual should be used for traffic control in that city.	A	A	TEE	Language will be added to this section stating that Chandler and Gilbert traffic control manuals should be used on the respective city's streets.
33	Adam Carreon	Traffic	3.11	72	Add : "Smart Work Zones will be included in the overall Maintenance of Traffic."	A	A	TEE	Will add a sentence "Smart Work Zones will be included in the overall Maintenance of Traffic".
34	Sayeed Hani	Util&RR	3.12.2	74	This comment was to document a conversation between the reviewer and the designer. The reviewer remarked thusly: it is good that the need for coordination with both the UPRR and the ACC was mentioned. Coordination with the UPRR commence during the Final DCR stage of design, so they are aware of this project.	A	A	JLC	Thank you for your comment. Verbiage will be added to the DCR indicating the need to coordinate with the railroad prior to construction.
35	John Hucko	ADOT RDS	3.14.2	75	Irrigation: Some of the irrigation controllers may be outdated and not reusable. Clarify the paragraph to state that some irrigation controllers may need to be replaced. New Irrigation system automatic controllers (field satellite) shall be Motorola MIR Irrinet ACE.	A	A	BP	Irrigation controllers can be replaced in this project. There are (10) controllers in the project area. The cost estimate will be updated. ITS will need to include verbiage and pricing to provide a conduit to each controller location for future fiber connection.
36	John Hucko	RDS	3.14.3	75	2nd. Paragraph last sentence "Drainage structures and headwalls are "exempt" from rustication not "except"	A	A	BP	Will revise
37	John Hucko	RDS	3.14.3	75	Are all existing structures to be re-painted? Or only new or modified structures?	D	D	BP	Only new, modified, and structures on the City of Chandler list will be repainted
38	John Hucko	RDS	3.14.3	75	Last paragraph, last sentence: Is the visual analysis and visual analysis supplement included in the DCR? Are they attachments?	B	D	BP	They are independent of the DCR. Will verify referencing within the DCR to accurately identify.

A. Will Comply
B. Designer to evaluate
C. ADOT to evaluate
D. No Further Action

MASTER SUMMARY OF COMMENTS

Submittal	**Initial DCR**		**Project Name**	**SR 202L I-10 to Val Vista Dr**
Return Date			**Federal Number**	**202-C(208)T**
Milepost	**57.0 - 42.0**		**TRACS NO.**	**202 MA 044 F0124 01L**
Submittal Date	**04/26/19**		**Designer**	**AZTEC**
ADOT PM	**Madhav Mundle**		**Route**	**NA**

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Comment Number	Reviewer	Discipline	Section Number	Page Number	Comment	Initial Response	Final Response	Response By	Resolution
39	Dan Cook	Chandler	4.1	77	Initial DCR, Section 4.1; in the first paragraph the reference should be to Table 35. Also, verify that tables 36 and 37 are for the correct segments.	A	A	JLC	The reference in Section 4.1 will be updated to Table 35. The location of Tables 36 and 37 will be confirmed.
40	Ed Green	Haz-Mat	7.60	99	change "low lever LBP" to "low level LCP", Lead Containing Paint.	A	A	DMD	Will revise
41	S. Webber	FHWA	6	97 - 98	I am concerned about the lack of discussion about possible Design Exceptions, since we have had meetings to talk about them at length.	D	D	JLC	During the alternative determination process, the need for design exceptions of varying shoulder and lane width were indeed discussed at length. However, the build alternative proposes standard width lanes and shoulders. The design exceptions are listed in Section 6.2
42	S. Webber	FHWA	6	97 - 98	May want to verify if some of the proposed shoulder widths already exist as part of the Design Exceptions approved for Project H7457 (June 1, 2010).	A	A	JLC	The approved Design Exceptions from the previous project are included with the Design Exceptions being submitted with project.

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ADOT PM	Madhav Mundle		Route	NA		

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Roadway Plans									
43	Sara Howard		Roadway Plans	3 of 14	Is anything going to be done to address the drainage maintenance issues we having on the southside west of Kyrene?	B/C	D	TMM/RFS	The basin is part of a series of basins, channels and pump stations for the Southeast Valley Regional Drainage System (SVRDS) that was constructed in consort with Maricopa County, the Gila River Indian Community and ADOT. The basins at Kyrene are part of a “wetlands treatment system” detailed in the original SVRDS design drainage report that designed and built the basin. The watershed / drainage area (58 square miles) to the Kyrene retention basins is extensive. The SR202L Santan freeway GPL widening project will only increase the watershed’s impervious percentage by less than one percent. Therefore the impacts to the 100-year water surface elevations and the SVRDS hydraulics as a whole should be considered negligible. Therefore, no modifications are required to maintain current function of the Kyrene Basin and none will be included in the final DCR.

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ADOT PM	Madhav Mundle		Route	NA		

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Bridge Plans									
44	Sara Howard	Central Dist.	Bridge Plans	General	Have the bridge deck joints been looked at to see if the AR-ACFC doesn't have to be put back? This would be District preference.	D	A	JAG	The deck joints received retrofits using special steel bars to accommodate the AR-ACFC overlay. The bars can be removed as part of a future construction project in order to eliminate the need to replace the AR-ACFC. CRM: District assists Bridge Group wth inspections, which are harder to do. The bridge joints are configured to go either way. Per ADOT PM, this is more a final design question. Evaluate at that time, and this will be stated accordingly in the DCR.
45	Sara Howard	Central Dist.	Bridge Plans	General	The SD 34" barrier is currently being updated for MASH.	D	A	JAG	The new SD will be incorporated by the Final Designer. A statement will be added in the DCR bridge section that the final design will need to utilize the latest Bridge Standard Drawings, including MASH-compliant barriers.
46	Sara Howard	Central Dist.	Bridge Plans	General	Can we salvage thie fencing called out?	A	D	JAG/JLC	Salvage is called out for the fencing at Arizona Ramp C, Arizona Ramp D, and the mainline UPRR OP. A review of the other locations (56th Street and Consolidated Canal) shows no fence to call out to salvage.

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47	Sara Howard	Central Dist.	Bridge Plans	S-08.02	can this lightweight sound barrier just be taller barrier?	D	D	JAG	Another consultant is responsible for developing the Noise Study and noise barrier height requirements at this location; so that the height of barrier is currently unknown. Moreover, it is typical to provide the lightweight panels mounted on the standard barrier because of the dead load impacts to the bridge deck overhang presented by conventional concrete. CRM: The designer's last two design-builds were designed for 20 foot walls.

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ADOT PM	**Madhav Mundle**		**Route**	**NA**

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Drainage Report									
48	Haldun Guvener	ADOT Roadway Group Drainage Design Section	Initial Drainage Report Section 1.3	1	I reviewed the Initial DCR and Initial Drainage Report for the subject project. Section 1.3 of the Initial Drainage Report states that "Final drainage reports prepared for the original freeway projects and HOV widening were reviewed and make no mention of the existing drainage systems accomodating widening for future general purpose lanes". No discussuion was found in the Initial DCR or Initial Drainage Report on how the existing trunkline will be analyzed to ensure it can accomodate the additional pavement runoff or it needs to be modified.	B/C	A	TMM	We will add recommendation text in the DCR text and Drainage Report directing final design efforts to analyze capacity of existing and proposed storm drain and to upsize trunkline based on analysis results following ADOT RDG, ADOT Hydraulics Manual, and FHWA, HEC-24 pump station hydraulics criteria. The pump station outfall at trunkline terminations will heavily control the 50-Yr design Hydraulic Grade Line in the storm drain networks along the corridor. The existing control system settings of pump stations, the pump capacities, and their effects on storm drain hydraulics should be taken into consideration for the additional pavement runoff flows into the freeway sump drainage systems. Storm Drain hydraulics into existing ADOT retention basins and ADOT concrete lined channels should be checked against tailwater conditions at the existing outlet pipes for the design storms per ADOT RDG manual. CRM: please use phraseology that an upsizing of the trunkline is "not expected". The text has been added to section 1.5 of the final drainage report.

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ADOT PM	**Madhav Mundle**		**Route**	**NA**

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Comment Number	Reviewer	Discipline	Section Number	Page Number	Comment	Initial Response	Final Response	Response By	Resolution
49	Dan Cook	Chandler	Drainage Report	9	Initial Drainage Report; page 9 is the City of Surpise FIRM map, pls update	A	A	TMM	Will update to show correct FIRM map for DCR area.

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ADOT PM	**Madhav Mundle**		**Route**	**NA**

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					AASHTO Report				
50	Dan Cook	Chandler	AASHTO Report	General	In the AASHTO Controlling Design Memo document, Attachment 3, at a number of items listed, this commet is "existing steel rail could be replaced by a standard concrete barries. We recommend that the steel bridge railing remain at all existing locations as they are an aesthetic element of the bridge, if necessary they should be modified to meet AASHTO criteria.	A	D	BR	That is a comment made by ADOT Bridge Group based on their inspection of the existing structure. The existing underpasses where the crossroad has aesthetic railings are not affected by this project.
51	Dan Cook	Chandler	AASHTO Report	General	In the AASHTO Controlling Design Memo document, Attachement 3, another item that should be looked into, is the deck joints on the South to East GP fly over ramp, there at least one deck joint that does not meet AASHTO or ADOT pavement smoothness criteria.	A	A	BR	Will pass this information along to ADOT Bridge Group and Central District.
52	R,Foluch		AASHTO	General	The AASHTO report should include a detailed crash report.	B/C	D	BR/JLC	Crash data will not be added to the ASHTO Report. crash data will be used in support of the Design Exception request.
53	S. Webber	FHWA	**AASHTO Report** Summary of N-C Design Features	iii - vi	Are any of the listed locations included in the Design Exception approval dated June 1, 2010? Can't tell, because the AASHTO Report shows the locations at stations, whereas the letter provides locations as mileposts.	A	A	BR	Yes, they are. There are mileposts listed in the DCR, Section 6.1, and will add to the AASHTO Report.

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ADOT PM	**Madhav Mundle**		**Route**	**NA**

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Visual Analysis Supplement									
54	Dan Cook	Chandler	Visual Analysis Suppl		In the visual analysis report and the amendment, the documents do recommend to re-paint the new and existing structures. I am assuming that means that all of the base paint of the wall and structures will be repainted as part of the project.	D	D	BP	Only new, modified, and structures on the City of Chandler list will be repainted
ADA Report									
55	Wisam Qasim	Roadway /ADA	ADA Report	General	I highlighted the missing asset ID's to incorporate them within the report (see FIS data attachment).	A	A	JLC	Thank you. The assets noted as missing will be updated in the ADA report.
56	S. Webber	FHWA	General	General	Please make sure Wisam Qasim at ADOT reviews this report in detail.	A	A	JLC	Wisam Qasim has reviewed the ADA Report and provided comments.
57	Wisam Qasim	Roadway /ADA	ADA Report	1	Change the Project no. 202 MA 042 F0124 01D to 044	A	A	JLC	The project number will be revised to use 044.
58	Wisam Qasim	Roadway /ADA	ADA Report	1	would you please elaborate if there was any field visit and what tools/equipment has been use to measure the feature?	A	A	JLC	Text will be added that a series of field visit in early June 2018 were undertaken to evaluate the existing features, and they will include descriptions of the measuring equipment that was used.
59	Wisam Qasim	Roadway /ADA	ADA Report	2 / Table 1	I will attach the updated FIS report for the new project limits since the FIS data that I sent was before the limits extended. Please update the table with the new numbers	A	A	JLC	Thank you. The reviewer had provided data for the extended limits at the designer's request. This most recent data will be double-checked and updated if there are changes.
60	S. Webber	FHWA	Table 4	5	Asset 1008765 is on Arizona Ave, not on the bridge	A	A	JLC	The words "on bridge" will be revised to "under bridge".
61	Wisam Qasim	Roadway /ADA	ADA Report	5	Overall length of 22,265.44 from FIS report please make all the changes accordingly	A	A	JLC	Lengths from the FIS will be used, but often exceed the limits of ADOT R/W.

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62	S. Webber	FHWA	ADA Report Tables	5-41	Beginning locations are all provided as whole mileposts. More accurate locations should be provided.	A	A	JLC	Mileposts to the nearest hundredth (based on the ADOT FIS) will be provided.
63	Dan Cook	Chandler	ADA Report	5-6	ADA Report; in general, tables 4 and 5, the sidewalk locations on AZ Ave are all under the bridge, not on the bridge.	A	A	JLC	The words "on bridge" will be revised to "under bridge".
64	Wisam Qasim	Roadway /ADA	ADA Report	5 / Table 4	Fix the table format	A	A	JLC	The table's horizontal lines will be made continuous (not dotted).
65	Wisam Qasim	Roadway /ADA	ADA Report	6 / Table 5	Fix the table format	A	A	JLC	The table's horizontal lines will be made continuous (not dotted).
66	Wisam Qasim	Roadway /ADA	ADA Report	6 / Table 5	Asset ID 1008881 duplicated Asset ID 1380304 duplicated in Table 4	A	A	JLC	The duplicate entry for 1008881 will be removed. The entry for 1380304 will be removed from Table 5.
67	Dan Cook	Chandler	ADA Report	7	ADA Report; general comment; in Table 7 the description of work does not address the issue of reconstructing the curb ramps to be directional curb ramps or blended transition ramps, ie, generally having the perpendicular direction of the truncated domes pointing in the direction of the accessable path. An example of this is at the NWC of the Price Road TI	A	A	JLC	Text will be added indicating "Non-compliant ramps shall be replaced with the current standard at the time of final design. The determination of the ramp layout and geometry, as well as the precise standard to be used, will be made during final design. Avoiding single ramps and use of directional or blended curb ramps is anticipated at final design. As curb ramps are evaluated during final design, the replacement of curb ramps on the radius returns would likely supersede the proposed actions listed below."
68	Dan Cook	Chandler	ADA Report	7	ADA Report; Table 7, for Kyrene Road, truncated domes need to be added in the pedestrian refuge areas in the median in Kryene Road.	D	D	JLC	On Page 33, Table 18, installation of detectable warnings is indicated for median refuge areas on Kyrene Road.

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ADOT PM	**Madhav Mundle**		**Route**	**NA**

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69	Dan Cook	Chandler	ADA Report	7	ADA Report; Table 7, for McClintock Road, truncated domes need to be added to the pedestrian refuge area in the median; and on the south side of the TI there are ramps and a crosswalk across the frontage road with no ADA facilities on the south side, basically leading someone to a non accessible area. I would suggest that instead provide a cross walk across McClintock on the south side of the TI, then there is a continous accessable route.	D B/C	D A	JLC	On Page 33, Table 18, installation of detectable warnings is indicated for median refuge areas on McClintock Road. Ramps and a sidewalk in between them will be installed on the south side of McClintock.
70	Dan Cook	Chandler	ADA Report	7	ADA Report, Table 7, for Chandler Village Drive: the median refuge area needs truncated domes; the ramp on the SW corner leads to no where, the accessable route needs to be clearly defined.	D D	D	JLC	On Page 33, Table 18, installation of detectable warnings is indicated for median refuge areas on Chandler Village Drive. No update to Chandler Village is anticipated at this time.
71	Dan Cook	Chandler	ADA Report	7	ADA Report, Table 7, for Price Road; the ramps in the NEC and the SWC are pointing the HC user into the middle of the intersection, and out of the accessable path.	A	A	JLC	Please see response to Comment No. 67.
72	Dan Cook	Chandler	ADA Report	7	ADA Report, Table 7, Dobson Road; the ramp at the NEC is a diagonal ramp, it should be two directional ramps or a blended transition ramp; truncated domes are needed at the NWC corner.	A	A	JLC	Please see response to Comment No. 67.

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ADOT PM	**Madhav Mundle**		**Route**	**NA**

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73	Dan Cook	Chandler	ADA Report	7	ADA Report, Table 7, Alma School Road: change all the diagional ramps to directional or blended transition ramps; the median refuge areas on both side needs truncated domes; on the NWC the signal pole is obstructing the accessable path.	D A B/C	D A A	JLC	On Page 34, Table 19, installation of detectable warnings is indicated for median refuge areas on Alma School Road. Please see response to Comment No. 67. The ramp on the NWC will be identified to be replaced.
74	Dan Cook	Chandler	ADA Report	7	ADA Report, Table 7, AZ Ave, change all the diagional ramps to directional or blended transitions.	A	A	JLC	Please see response to Comment No. 67.
75	Dan Cook	Chandler	ADA Report	7	ADA Report, Table 7, McQueen Rd, change all the diagional ramps to directional or blended transitions.	A	A	JLC	Please see response to Comment No. 67.
76	Dan Cook	Chandler	ADA Report	7	ADA Report, Table 7, Cooper Rd, change all the diagional ramps to directional or blended transitions.	A	A	JLC	Please see response to Comment No. 67.
77	Dan Cook	Chandler	ADA Report	7	ADA Report, Table 7, Gilbert Road, change all the diagional ramps to directional or blended transitions.	A	A	JLC	Please see response to Comment No. 67.
78	Dan Cook	Chandler	ADA Report	7	ADA Report, Table 7, Val Vista, change all the diagional ramps to directional or blended transitions.	A	A	JLC	Please see response to Comment No. 67.
79	Wisam Qasim	Roadway /ADA	ADA Report	9	Update the numbers based on the new FIS report with your field visit data.	A	A	JLC	Table 6 totals will be updated.
80	Wisam Qasim	Roadway /ADA	ADA Report	22	Update the numbers based on the new FIS report with your field visit data.	A	A	JLC	Table 12 totals will be updated.
81	Wisam Qasim	Roadway /ADA	ADA Report	37	please correct the table numbering	A	A	JLC	The table numbering will be made sequential.
82	Wisam Qasim	Roadway /ADA	ADA Report	38	Format: please change the table format to match other compliant tables for the crosswalks.	A	A	JLC	The table's horizontal lines will be made continuous (not dotted).

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83	S. Webber	FHWA	Table 7	9-16	Considerable details missing. What types of ramps to be constructed? Where are truncated domes to be included/added?	A	A	JLC	The detail regarding the ramp reconstructions as-entered in the table is in keeping with what ADOT expects in an ADA report. However, text will be added to clarify the intent of reconstruction; please see response to Comment No. 67.
84	Wisam Qasim	Roadway /ADA	ADA Report	17/Table 8	1420707, 1420695, 1420610 and 1420686 listed as non compliance in table 7.	A	A	JLC	These features will be removed from Table 8. Update: these items were removed from Table 7 and left in Table 8, as they are ADA compliant.
85	Wisam Qasim	Roadway /ADA	ADA Report	19 / Table 10	The sidewalk behind the driveway: if it's 36" width it's still in compliance with ADAAG as long as meets other compliance criteria. However we will build 4' or greater sidewalk when we build new sidewalk to meet PROWAG.	A	A	JLC	Features with at least 3 feet of sidewalk behind a driveway that meets other ADAAG criteria will be shown as compliant. Update: having sidewalk at 3' wide but otherwise meeting ADA, seven such features were moved to Table 11 and shown as complaint. The exhibits were similarly updated.
86	Wisam Qasim	Roadway /ADA	ADA Report	24,27 / Table 13	1421125 and 1420638 these asset ID's are obstruction not an APS.	A	A	JLC	These assets will be removed from the APS table. Update: IDs for these features have been updated to MCPE003 and 1420637, respectively, in the report and on the exhibits.

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87	Wisam Qasim	Roadway /ADA	ADA Report	31 / Table 18	Asset ID 1421155: would you check the reason for non-compliance for a reaching distance for the Pushbutton?	A	A	JLC	The sides of this pedestrian island refuge are not vertical curb, but are sloped up to the curb height. This sideslope would make it difficult for a wheelchair to approach so a person would be within the 10" reach. Suggest this feature continue to be shown as non-compliant. Per a discussion with the reviewer, all such features will be shown as non-compliant. Where these refuges have pushbuttons, the median refuge areas will be indicated to extend concrete to the facte of the pushbutton.
88	Wisam Qasim	Roadway /ADA	ADA Report	33 / Table 18	Asset ID 1421129: Consider adding a pushbutton under the proposed action after checking the pedestrian crossing time.	A	A	JLC	The ped median refugewill be indicated to be reconstructed.
89	Wisam Qasim	Roadway /ADA	ADA Report	33 / Table 18	Asset ID 1420729: does not need domes if the it's less than 6' in length (walking direction).	A	A	JLC	As this refuge is less than six feet in length, this feature will be indicated as compliant.
90	Wisam Qasim	Roadway /ADA	ADA Report	34 / Table 18	Asset ID's 1420621 and 1420606 are in compliance as the listed reason (Length >15 is not a reason for non compliance.	A	A	JLC	These two assets will be listed as compliant.
91	Wisam Qasim	Roadway /ADA	ADA Report	38 / Table 21	Format: please change the table format to match other non compliant tables.	A	A	JLC	The table's horizontal lines will be made continuous (not dotted).
92	S. Webber	FHWA	Appen.A-1	45-55	Some of the callouts show Reach Distance > 10' - should be 10" (Table 13 appears to have all of these correct.)	A	A	JLC	All reach distances will be noted as 10" and not 10'.

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D. No Further Action

MASTER SUMMARY OF COMMENTS

Submittal	Initial DCR		Project Name	SR 202L I-10 to Val Vista Dr		
Return Date			Federal Number	202-C(208)T		
Milepost	57.0 - 42.0		TRACS NO.	202 MA 044 F0124 01L		
Submittal Date	04/26/19		Designer	AZTEC		
ADOT PM	Madhav Mundle		Route	NA		

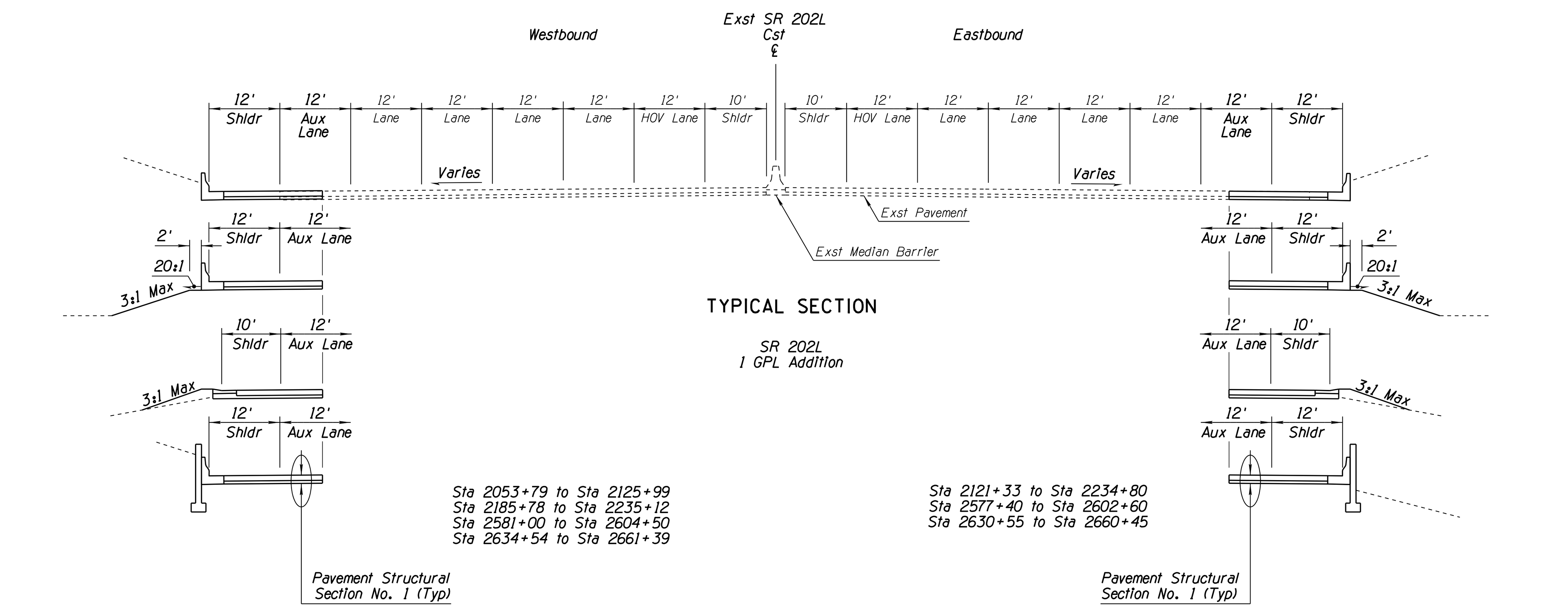
RESPONSE CODES: A=WILL COMPLY, B=CONSULTANT TO EVALUATE, C=CLIENT TO EVALUATE, D=NO FURTHER ACTION, E=NOT APPLICABLE

Comment Number	Reviewer	Discipline	Section Number	Page Number	Comment	Initial Response	Final Response	Response By	Resolution
93	Elisabett Vargas	ADOT R/W	General	General	Please confirm that no new permanent right of way is anticipated at this time. I have notes from our previous meeting about concerns regarding potential sound barrier walls and TCE need for construction/outside widening which is to be determined during the "final design stage". Please be aware that even if no new permanent real property rights are anticipated, a TCE is considered a real property right and therefore ROW will need to go to the AZ Transportation Board for a resolution among other ROW activities. Therefore, if TCE's are needed the design team will need to show existing right of way lines as well as TCE parcels since there will be no ROW plans. ROW recently met with ADOT Roadway to show how important is it to prepare for this early on in the design and not during the "final design stage", as identified in the DCR. The number of TCE's will need to be determined early on for cost estimate and in order to meet the project's timeline. Our ROW Plans Manager is available should there be a need for assistance from the Roadway Group/Design team.	A	A	JLC	No new R/W nor TCEs are anticipated. Reference to determination during final design will be removed from the Final DCR.

A. Will Comply
B. Designer to evaluate
C. ADOT to evaluate
D. No Further Action

APPENDIX E – RECOMMENDED ALTERNATIVE TYPICAL SECTION AND 15% PLANS

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

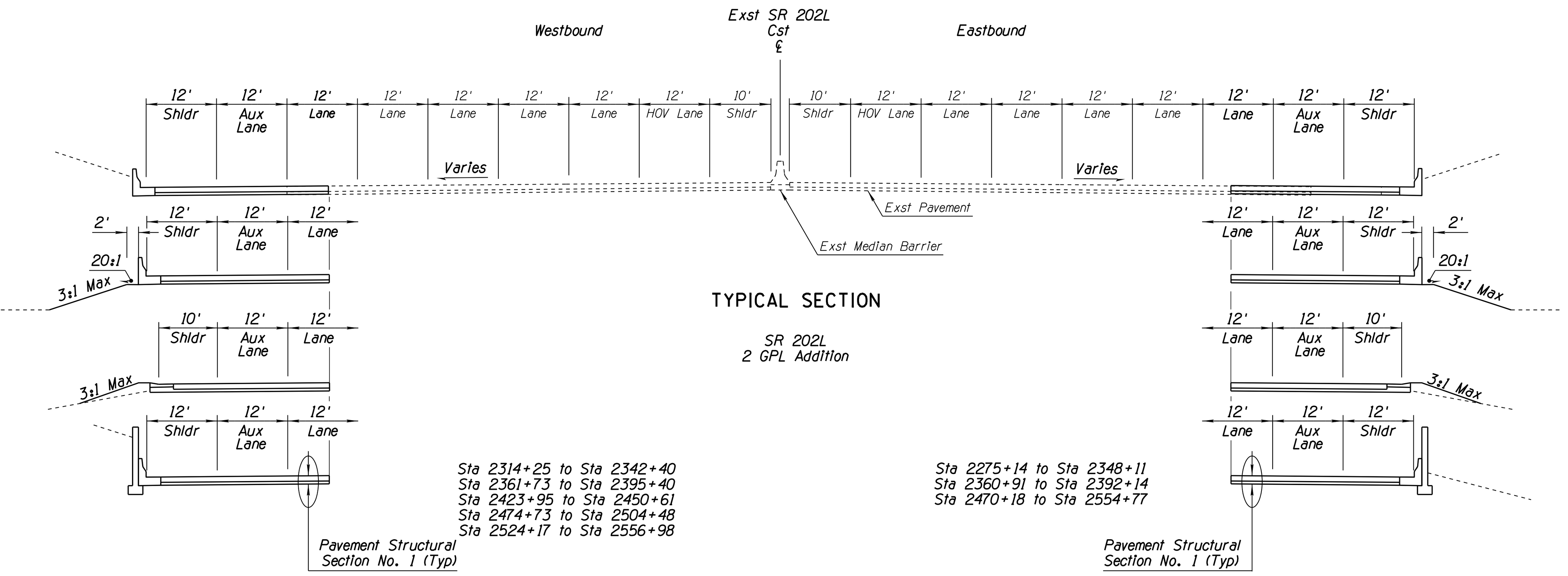


TYPICAL SECTION

SR 202L
1 GPL Addition

Sta 2053+79 to Sta 2125+99
Sta 2185+78 to Sta 2235+12
Sta 2581+00 to Sta 2604+50
Sta 2634+54 to Sta 2661+39

Sta 2121+33 to Sta 2234+80
Sta 2577+40 to Sta 2602+60
Sta 2630+55 to Sta 2660+45

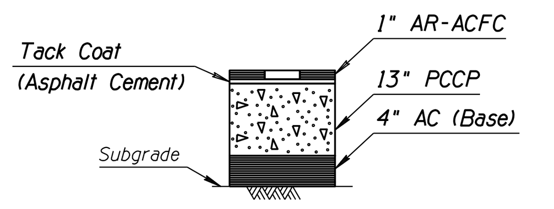


TYPICAL SECTION

SR 202L
2 GPL Addition

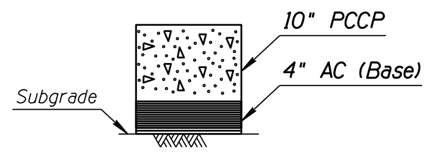
Sta 2314+25 to Sta 2342+40
Sta 2361+73 to Sta 2395+40
Sta 2423+95 to Sta 2450+61
Sta 2474+73 to Sta 2504+48
Sta 2524+17 to Sta 2556+98

Sta 2275+14 to Sta 2348+11
Sta 2360+91 to Sta 2392+14
Sta 2470+18 to Sta 2554+77



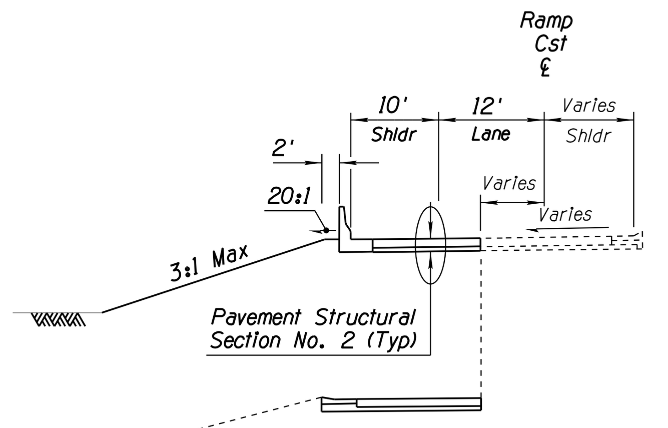
Total Thickness = 18"
SR 202L Mainline & Outside Shoulder (Depressed)

SECTION NO. 1

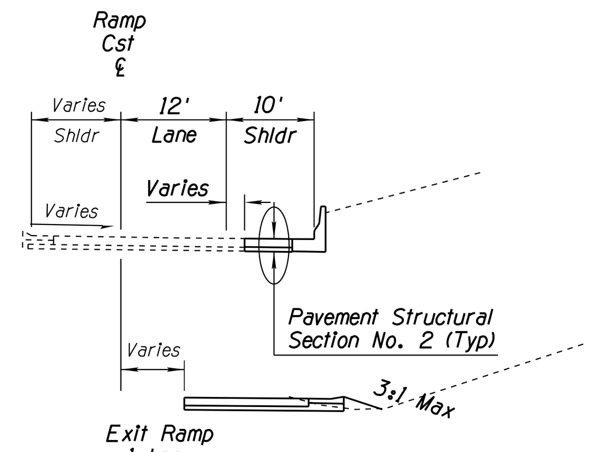


Total Thickness = 14"
Ramps (Depressed)

SECTION NO. 2

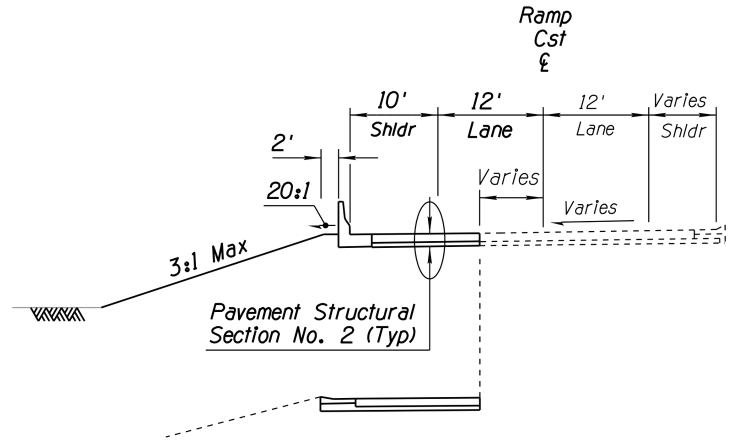


Entrance Ramp
1 Lane



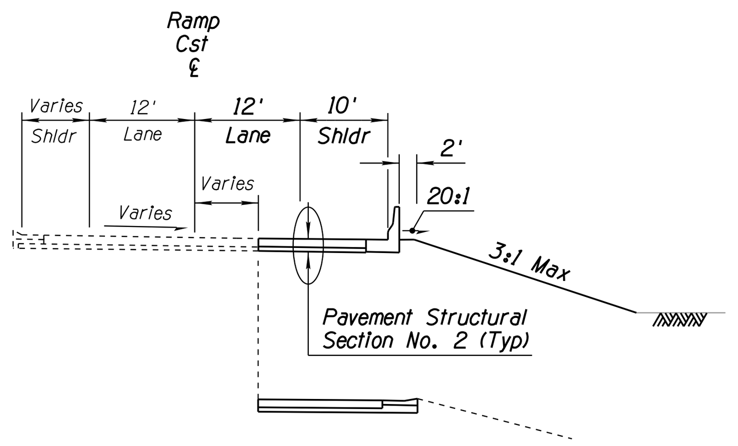
Exit Ramp
1 Lane

Price Ramp B



Entrance Ramp
2 Lanes

Kyrene Ramp A & D
Price Ramp D
Dobson Ramp D
Alma School Ramp A & D
Arizona Ramp A & D
McQueen Ramp A & D
Cooper Ramp A & D
Gilbert Ramp A & D
Linsday Ramp A
Val Vista Ramp A



Exit Ramp
2 Lanes

Kyrene Ramp B & C
McClintock Ramp B
Price Ramp C
Dobson Ramp C
Alma School Ramp B & C
Arizona Ramp B & C
McQueen Ramp B & C
Cooper Ramp B & C
Gilbert Ramp B & C
Linsday Ramp B & C
Val Vista Ramp B

ROLL PLOT NO.
1 of 1

	NAME	DATE	
DESIGN			ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION TRAFFIC DESIGN SERVICES
DRAWN			
CHECKED			
AZTEC			ROADWAY TYPICAL SECTIONS
ROUTE SR 202L	LOCATION GILBERT ROAD TO I-10		
TRACS NO. F0124 01L			202-C-(208)T

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

___ OF ___

NO. | DESCRIPTION OF REVISION | MADE BY | DATE

ROLL PLOT NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

SCALE: 1 INCH = 100 FEET

N

ROLL PLOT NO.

ROLL PLOT NO.
1 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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4561 E. McDowell Road
Phoenix, AZ 85008-4505
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Fax (602) 454-0403
www.aztec.us

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
1902+00 to 1965+00

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE: SR 202L
LOCATION: GILBERT ROAD TO I-10

TRACS NO. F0124 01L | 202-C-(208)T | ____ OF ____

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

SCALE: 1 INCH = 100 FEET

N

ROLL PLOT NO.

ROLL PLOT NO.
2 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
1965+00 to 2025+00

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE SR 202L | LOCATION GILBERT ROAD TO I-10

TRACS NO. F0124 01L | 202-C-(208)T | ____ OF ____

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6/2/2020

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

SCALE: 1 INCH = 100 FEET

Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.
3 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
2025+00 to 2090+00

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE SR 202L
LOCATION GILBERT ROAD TO I-10

TRACS NO. F0124 01L | 202-C-(208)T | ____ OF ____

ROLL PLOT NO.

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6/2/2020

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

100 50 0 100 200 300

SCALE: 1 INCH = 100 FEET

Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.

4 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
2090+00 to 2155+00

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

ROUTE SR 202L

LOCATION GILBERT ROAD TO I-10

TRACS NO. F0124 01L

202-C-(208)T

____ OF ____

ROLL PLOT NO.

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6/2/2020

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

SCALE: 1 INCH = 100 FEET

Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.
5 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
2155+00 to 2220+00

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE SR 202L
LOCATION GILBERT ROAD TO I-10

TRACS NO. F0124 01L

202-C-(208)T

____ OF ____

ROLL PLOT NO.

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6/2/2020

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

SCALE: 1 INCH = 100 FEET

Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.
6 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
2220+00 to 2285+00

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

ROUTE: SR 202L
LOCATION: GILBERT ROAD TO I-10

TRACS NO. F0124 01L | 202-C-(208)T | ____ OF ____

ROLL PLOT NO.

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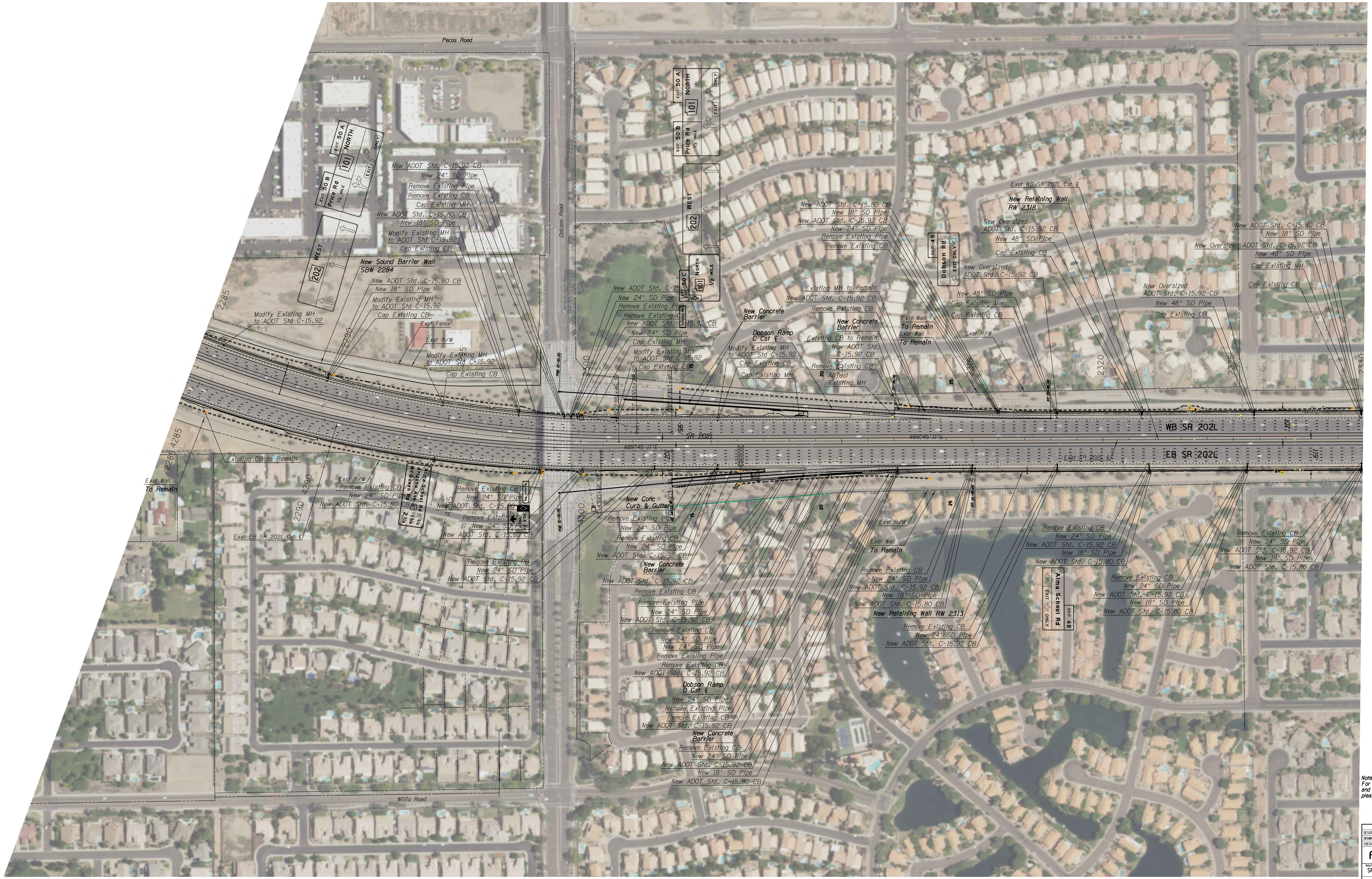
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

100 50 0 100 200 300

SCALE: 1 INCH = 100 FEET

N



Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.
7 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
2285+00 to 2330+00

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE SR 202L
LOCATION GILBERT ROAD TO I-10

TRACS NO. F0124 01L
202-C-(208)T
____ OF ____

ROLL PLOT NO.

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6/2/2020

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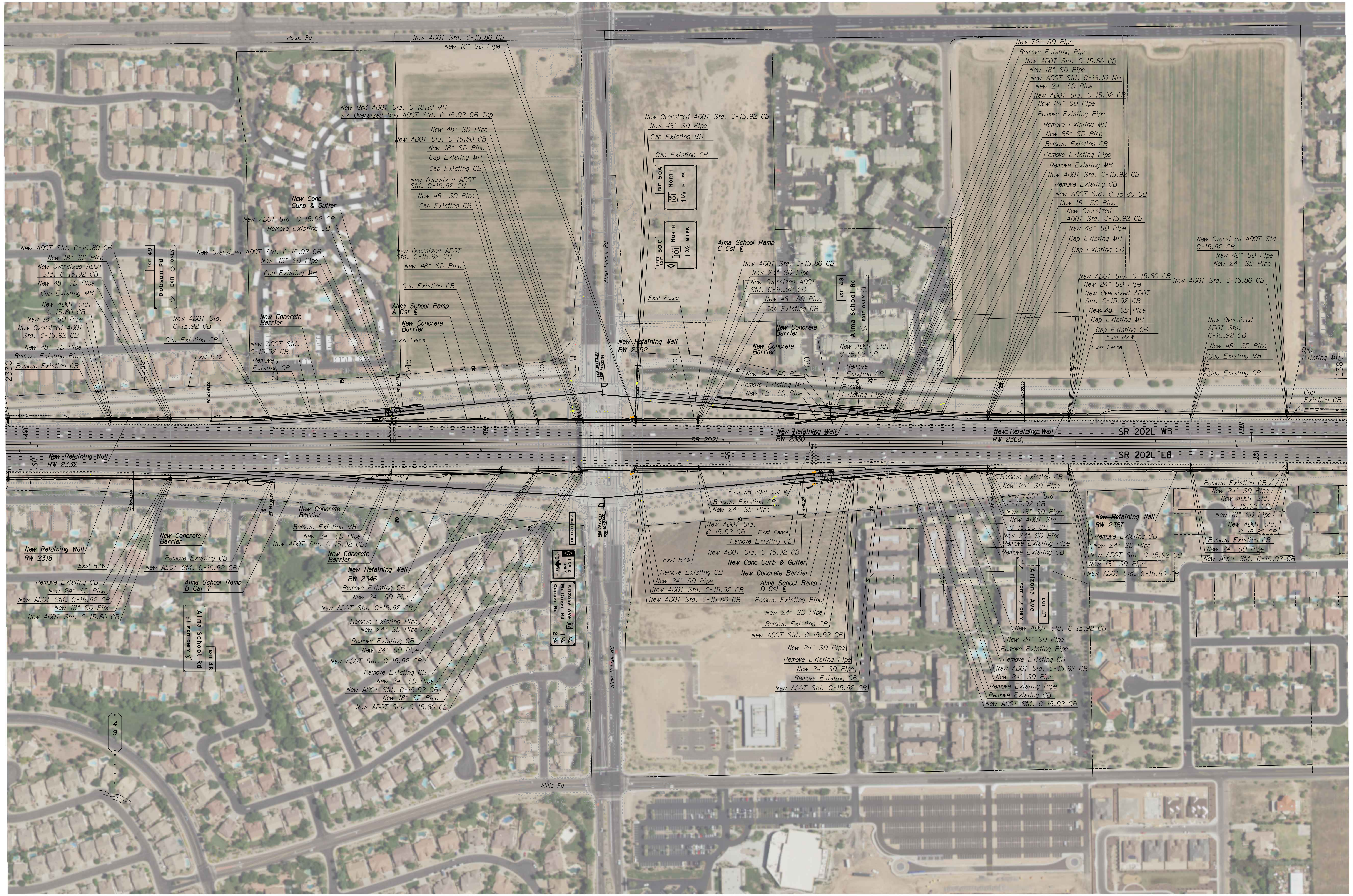
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

SCALE: 1 INCH = 100 FEET



Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.
8 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
2330+00 to 2380+00

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE: SR 202L
LOCATION: GILBERT ROAD TO I-10

TRACS NO. F0124 01L | 202-C-(208)T | ____ OF ____

ROLL PLOT NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

100 50 0 100 200 300

SCALE: 1 INCH = 100 FEET

Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.

9 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
2380+00 to 2435+00

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

ROUTE SR 202L | LOCATION GILBERT ROAD TO I-10

TRACS NO. F0124 01L | 202-C-(208)T | ____ OF ____

ROLL PLOT NO.

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6/2/2020

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

SCALE: 1 INCH = 100 FEET

N

Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.
10 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

AZTEC

ROADWAY PLAN
2435+00 to 2490+00

ROUTE SR 202L
LOCATION GILBERT ROAD TO I-10

TRACS NO. F0124 01L
202-C-(208)T
____ OF ____

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROLL PLOT NO.

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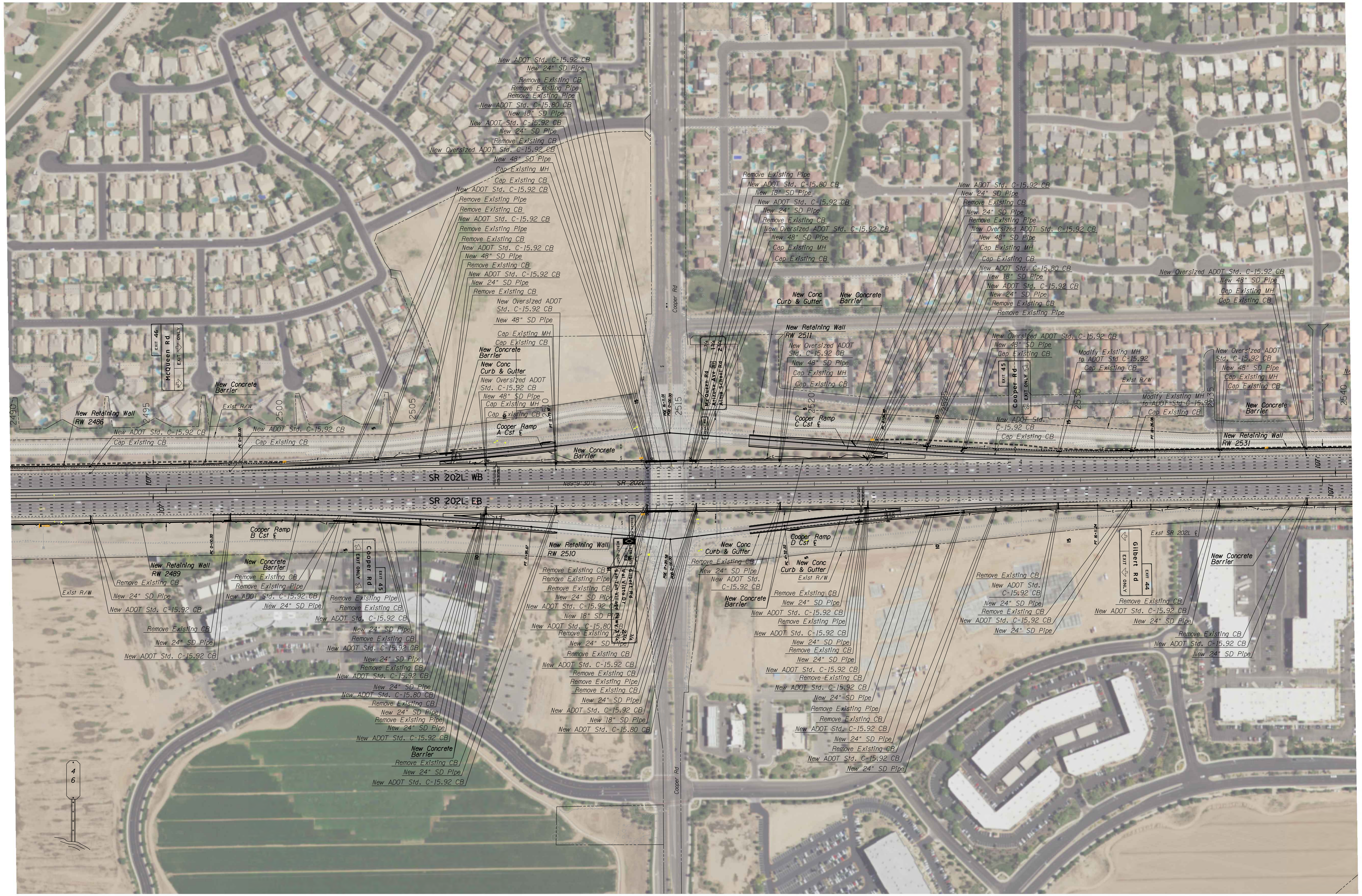
6/2/2020

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

SCALE: 1 INCH = 100 FEET

N



Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.
11 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
2490+00 to 2540+00

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

ROUTE SR 202L
LOCATION GILBERT ROAD TO I-10

TRACS NO. F0124 01L | 202-C-(208)T | ___ OF ___

ROLL PLOT NO.

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

SCALE: 1 INCH = 100 FEET

Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.
12 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
2540+00 to 2602+00

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE SR 202L
LOCATION GILBERT ROAD TO I-10

TRACS NO. F0124 01L
202-C-(208)T
____ OF ____

ROLL PLOT NO.

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6/27/2020
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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

100 50 0 100 200 300

SCALE: 1 INCH = 100 FEET

N

Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.
13 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
2602+00 to 2669+00

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE SR 202L

LOCATION GILBERT ROAD TO I-10

TRACS NO. F0124 01L

202-C-(208)T

____ OF ____

ROLL PLOT NO.

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6/2/2020

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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

SCALE: 1 INCH = 100 FEET

N

Note:
For sidewalk ramps, pedestrian pushbuttons, crosswalks, and other ADA facilities' improvements located at intersections, please see the ADA Compliance and Feasability report.

ROLL PLOT NO.
14 of 14

	NAME	DATE
DESIGN		
DRAWN		
CHECKED		

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

ROADWAY PLAN
2669+00 to 2692+07

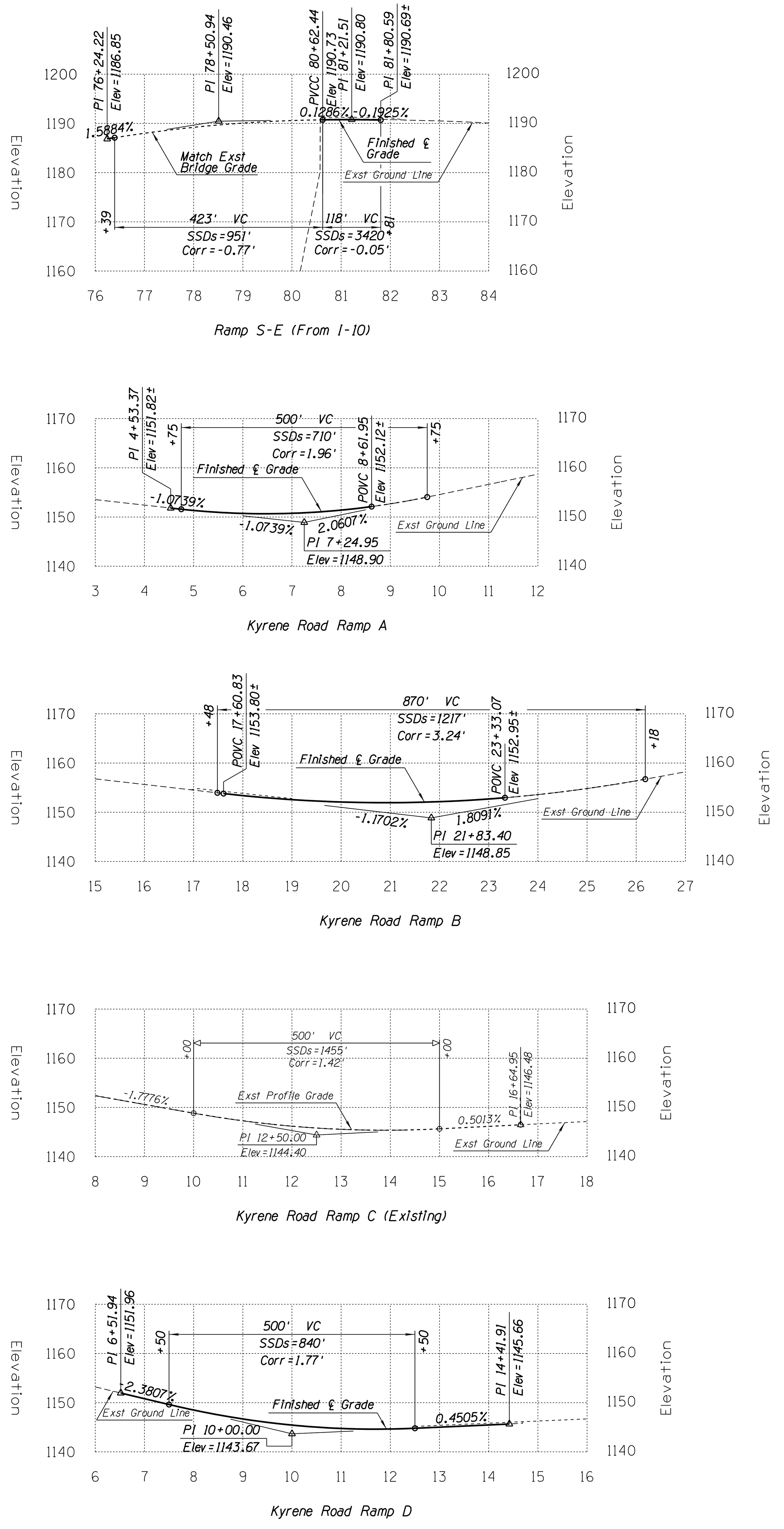
PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

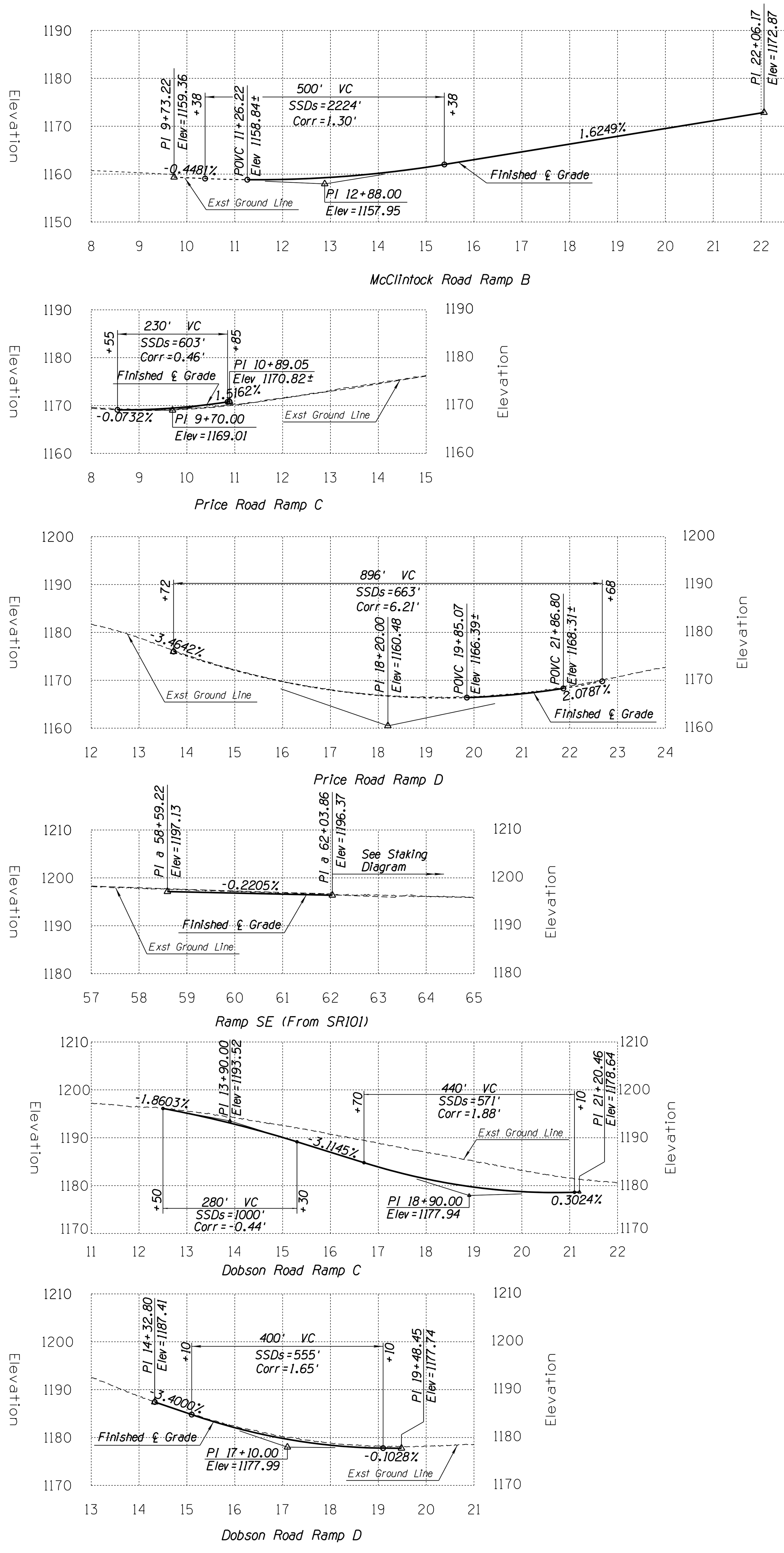
ROUTE SR 202L | LOCATION GILBERT ROAD TO I-10

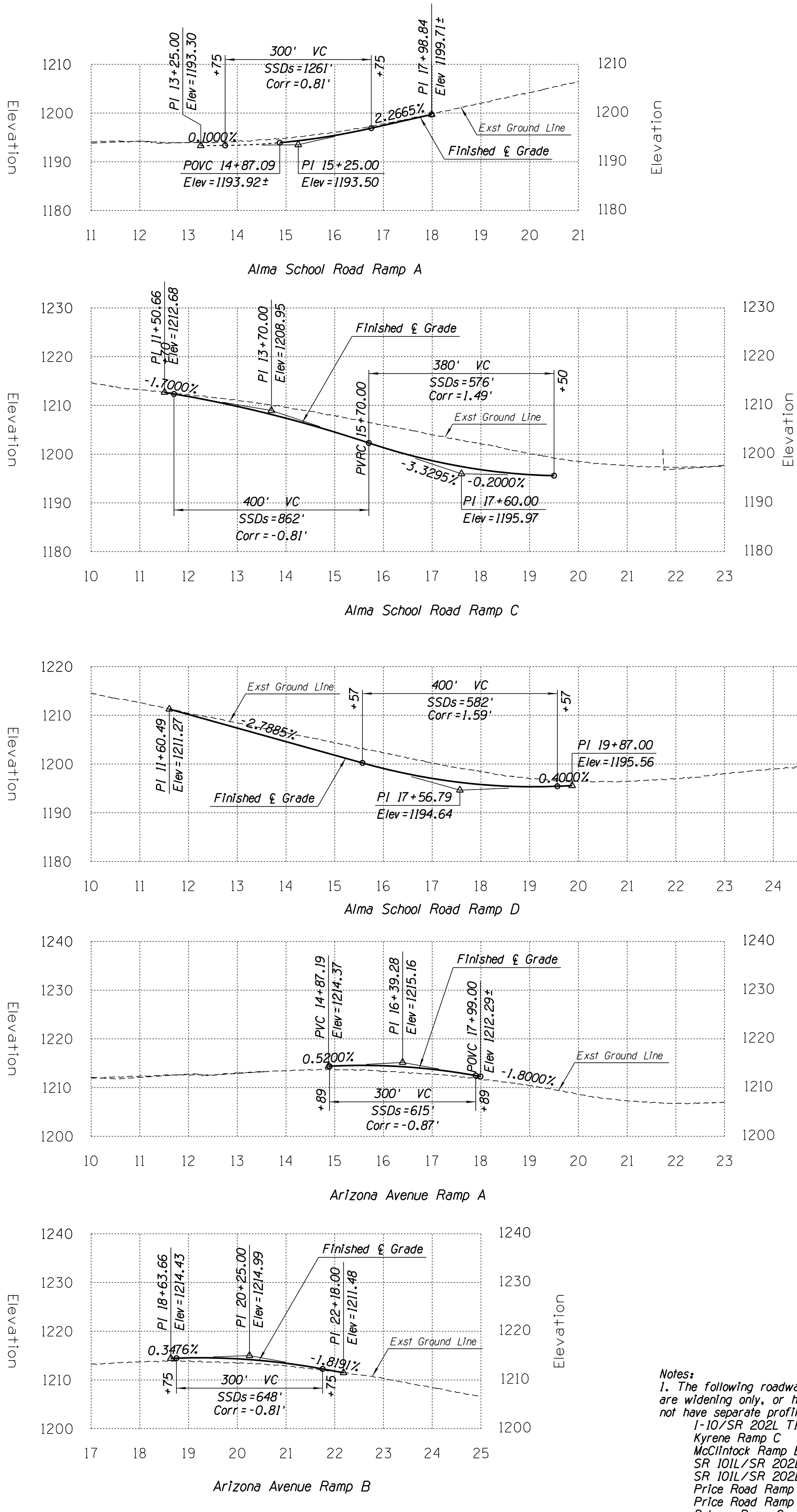
TRACS NO. F0124 01L | 202-C-(208)T | ___ OF ___

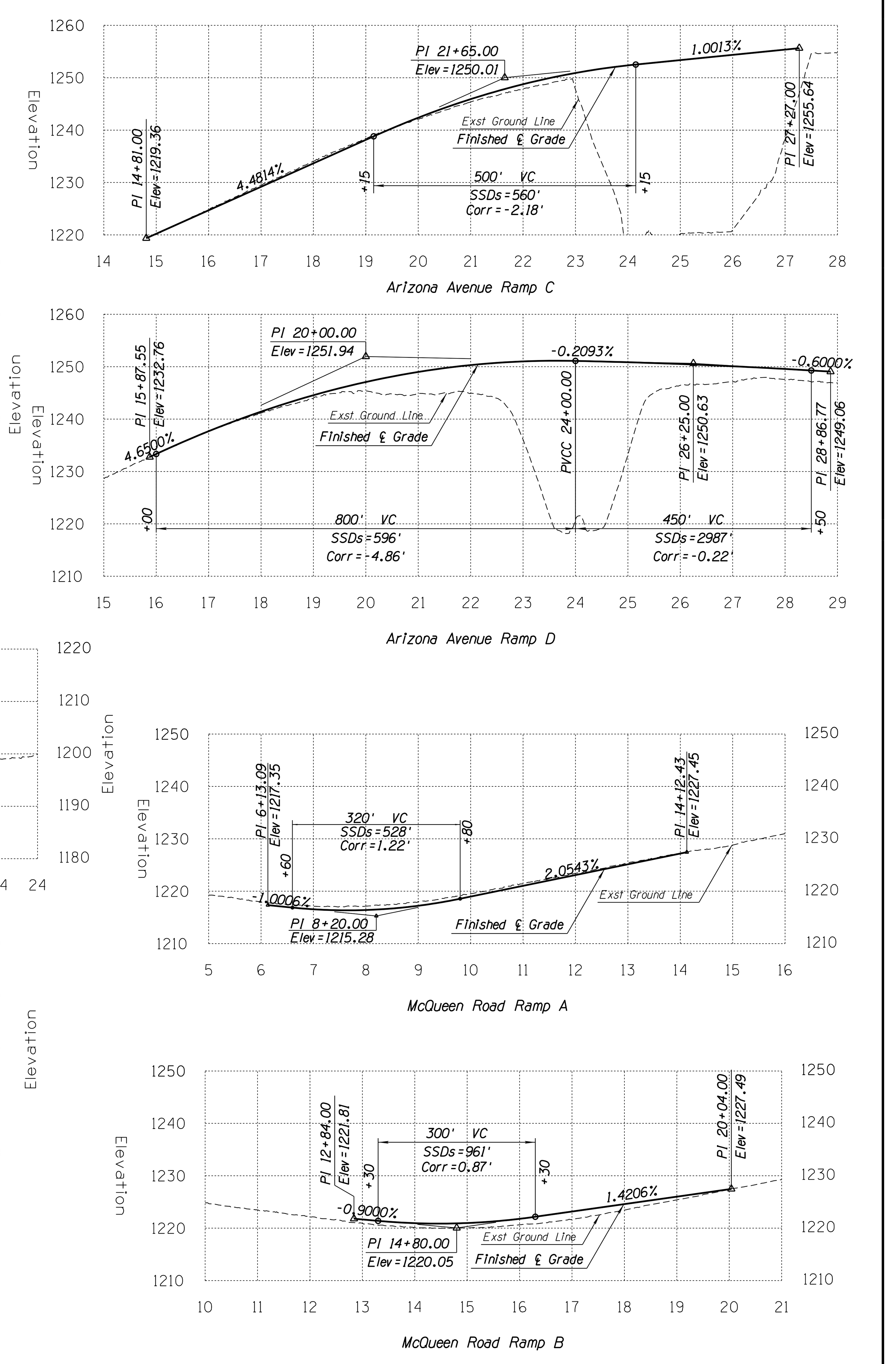
ROLL PLOT NO.

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			









Notes:
1. The following roadway profiles are controlled by SR 202L, are widening only, or have no work at their location; they do not have separate profile grades:
   - I-10/SR 202L TI Ramp W-N
   - Kyrene Ramp C
   - McClintock Ramp E-N
   - SR 101L/SR 202L TI Ramp S-W
   - SR 101L/SR 202L TI Ramp E-N
   - Price Road Ramp A
   - Price Road Ramp B
   - Dobson Ramp C
   - Alma School Ramp A
2. The profiles shown herein are preliminary and will be refined during final design.

ROLL PLOT NO.
1 of 2

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION
TRAFFIC DESIGN SERVICES

AZTEC

ROADWAY PROFILES

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

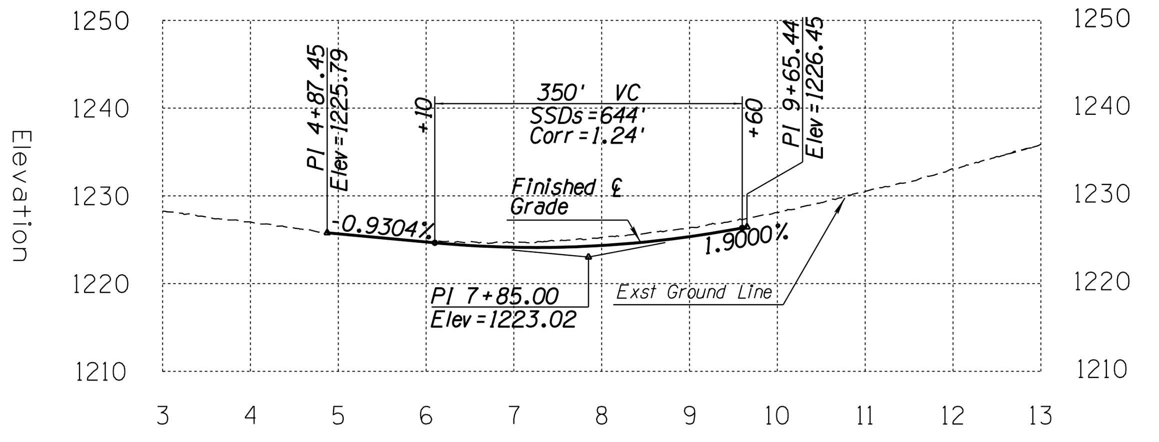
ROUTE SR 202L | LOCATION GILBERT ROAD TO I-10

TRACS NO. F0124 01L | 202-C-(208)T | ___ OF ___

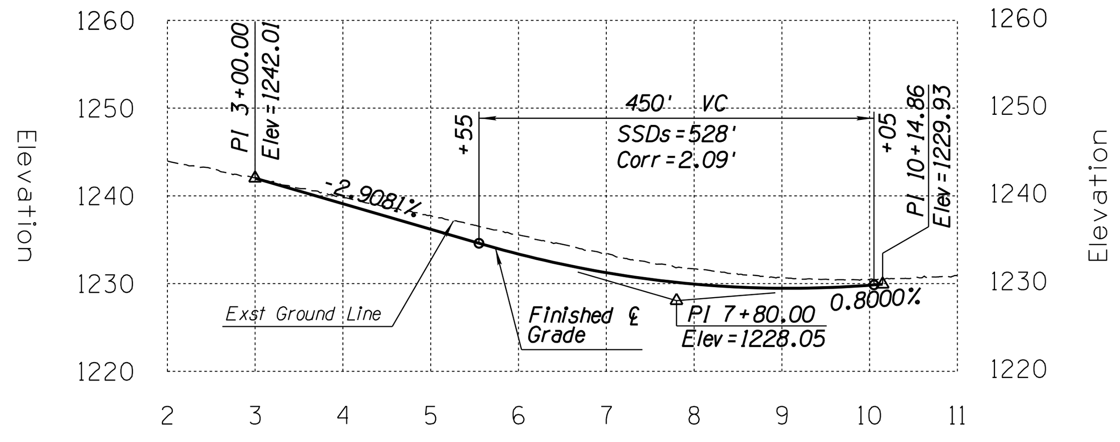
ROLL PLOT NO.

c:\pw_working\pw_prod\jcallicott\dms29090\f0124rdwy01.dgn 6/27/2020

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C-(208)T			

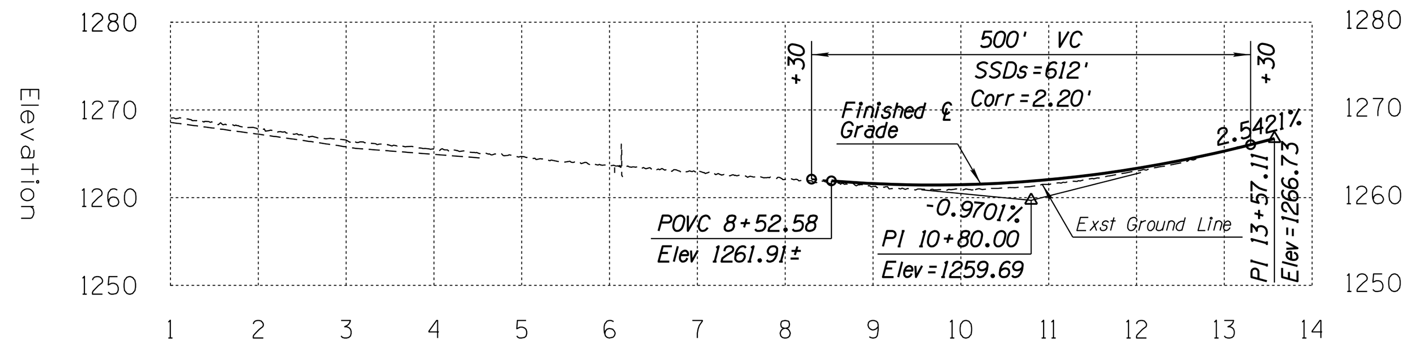


McQueen Road Ramp C

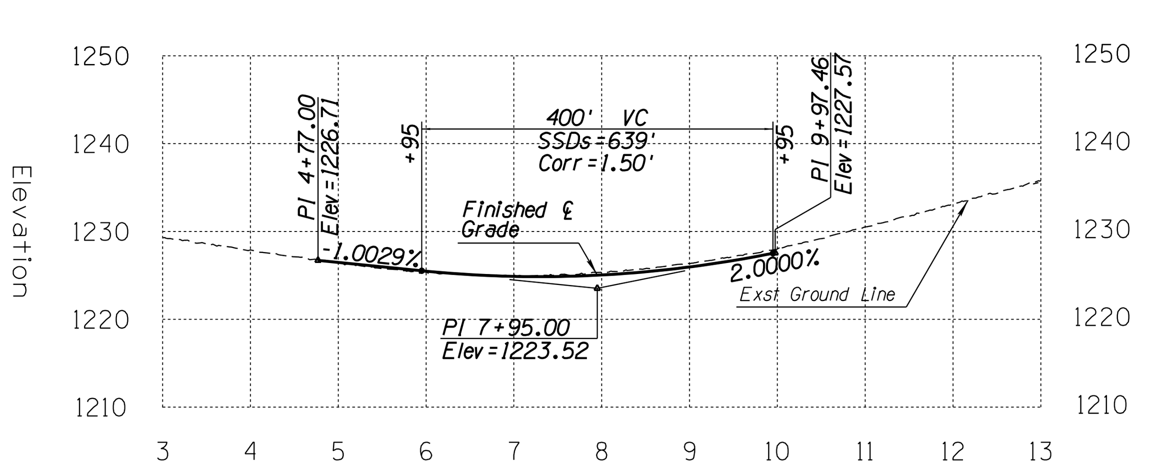


Cooper Road Ramp D

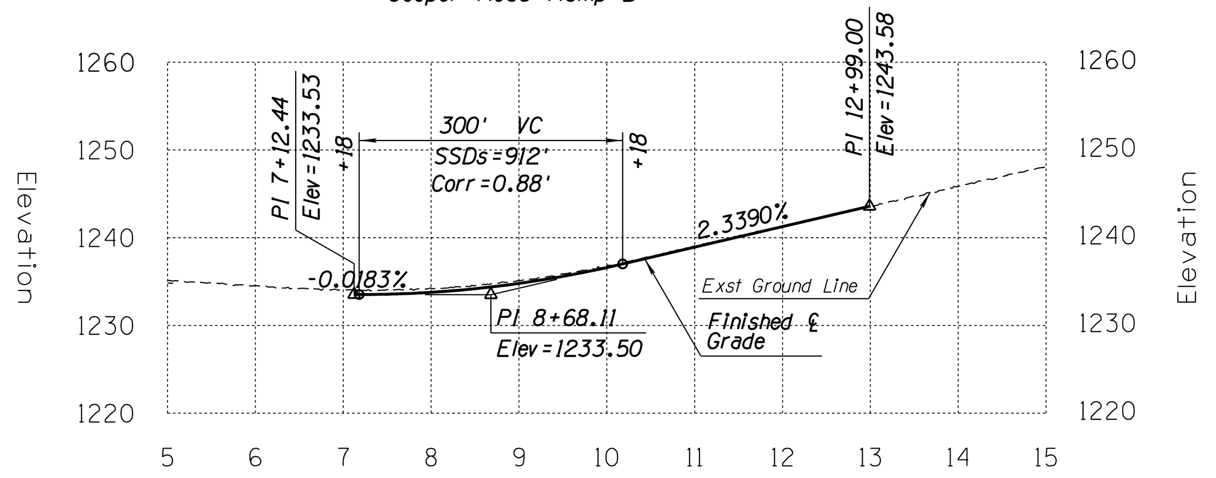
(Lindsay Ramp A - See Note 3)



Val Vista Drive Ramp B

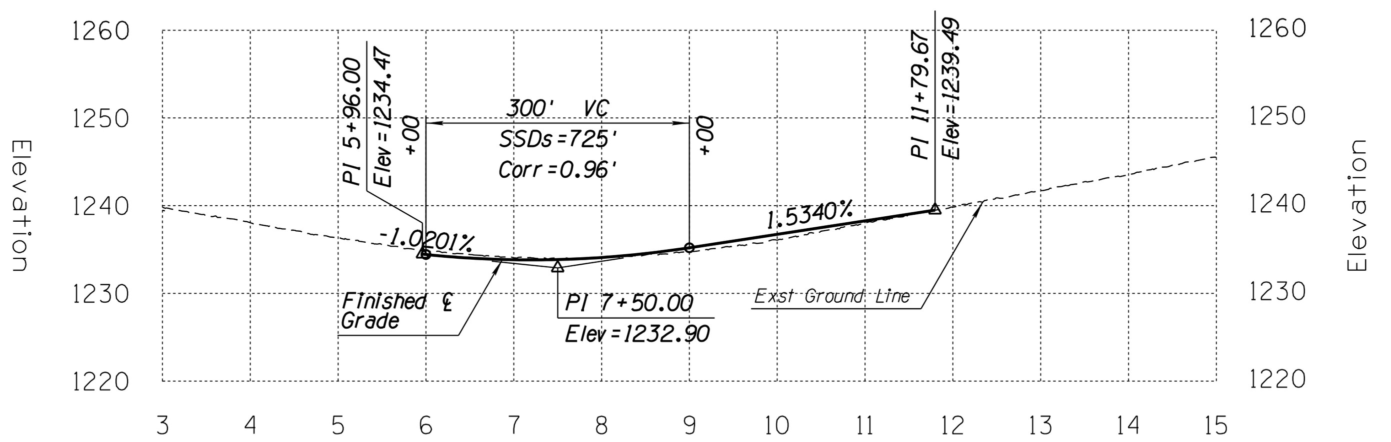


McQueen Road Ramp D

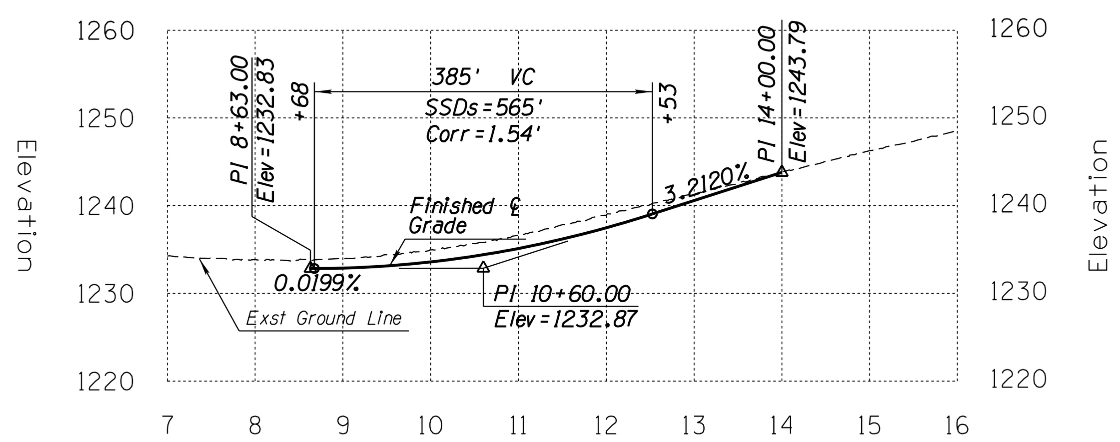


Gilbert Road Ramp A

(Lindsay Ramp B - See Note 3)

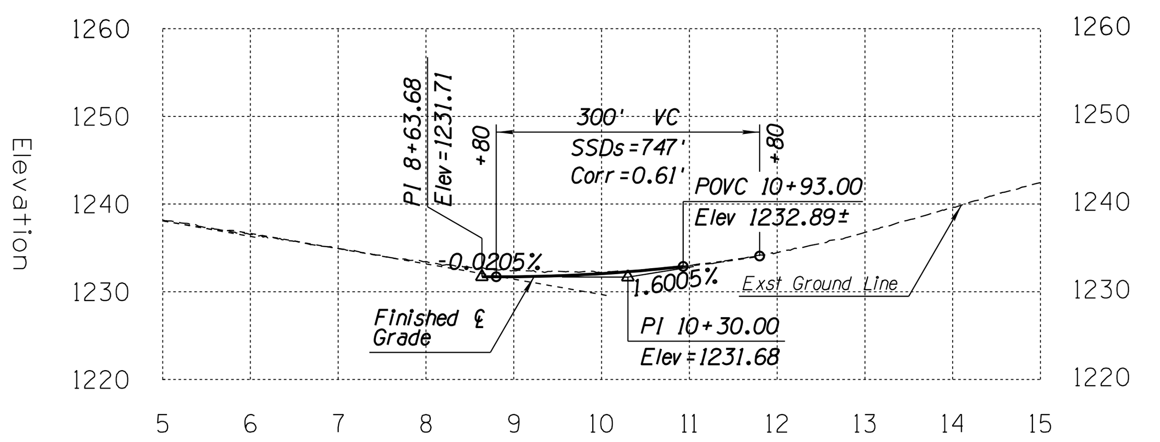


Cooper Road Ramp A

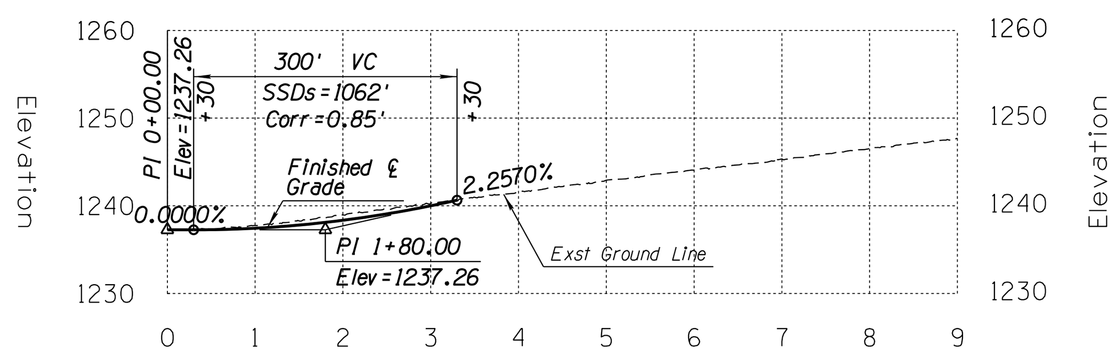


Gilbert Road Ramp B

(Lindsay Ramp C - See Note 3)

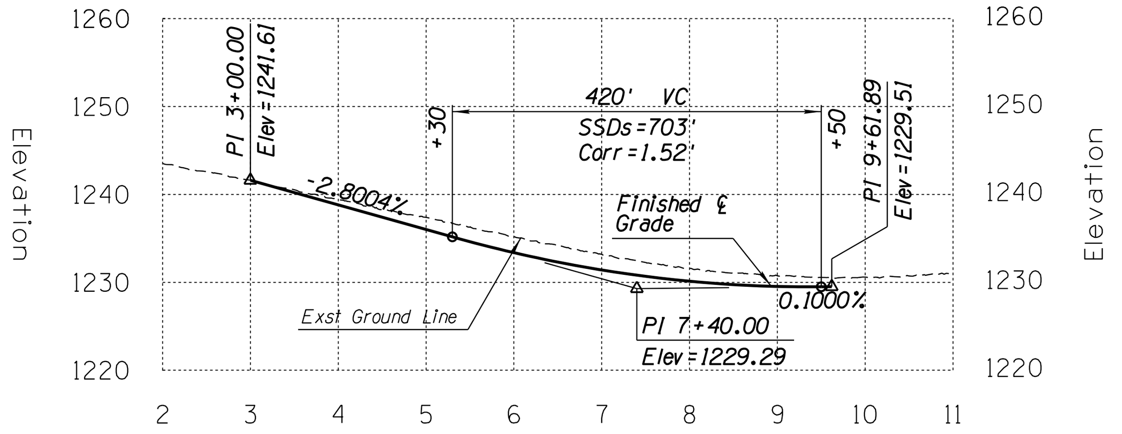


Cooper Road Ramp B

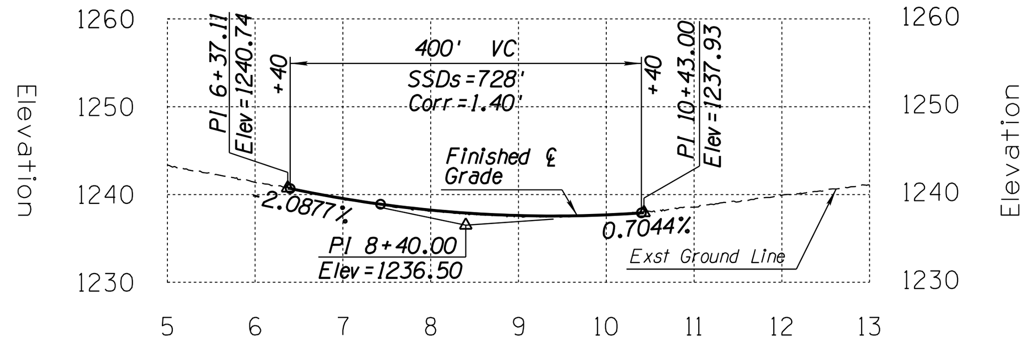


Gilbert Road Ramp C

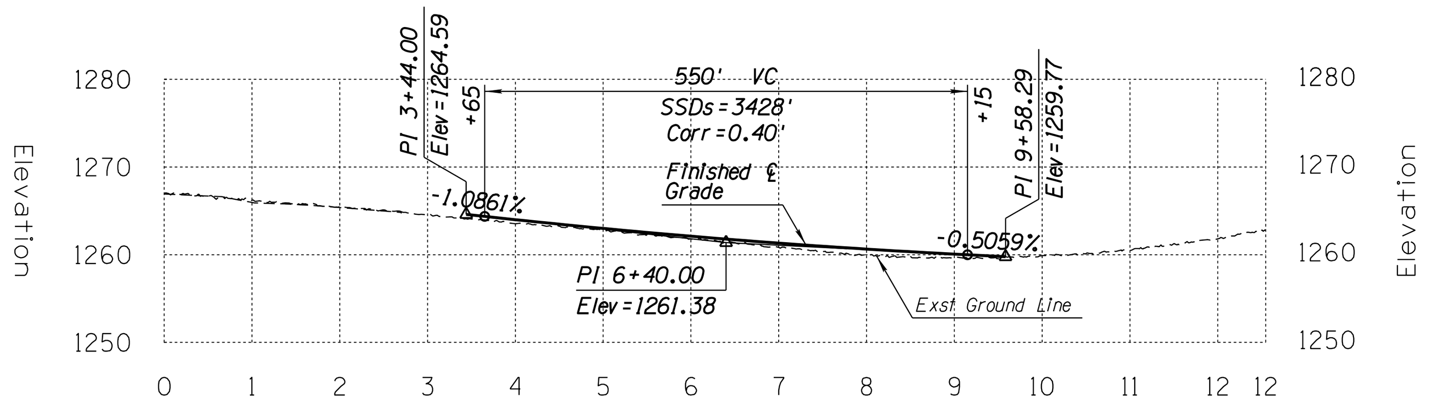
(Lindsay Ramp D - See Note 3)



Cooper Road Ramp C



Gilbert Road Ramp D



Val Vista Drive Ramp A

Notes:
1. The following roadway profiles are controlled by SR 202L and will be staked, are widening only, or have no work at their location; they will not require separate profile grades:
- I-10/SR 202L TI Ramp W-N
- Kyrene Ramp C
- McClintock Ramp E-N
- SR 101L/SR 202L TI Ramp S-W
- SR 101L/SR 202L TI Ramp E-N
- Price Road Ramp A
- Price Road Ramp B
- Dobson Ramp C
- Alma School Ramp A

2. The profiles shown herein are preliminary and will be refined during final design.
3. The profiles at Lindsay Road are to be determined upon receipt of updated information from Kimley-Horn, the engineer for the Lindsay TI project.

ROLL PLOT NO.
2 of 2

	NAME	DATE	ARIZONA DEPARTMENT OF TRANSPORTATION INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISION TRAFFIC DESIGN SERVICES	PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING
DESIGN				
DRAWN				
CHECKED				
AZTEC			ROADWAY PROFILES	
ROUTE SR 202L	LOCATION GILBERT ROAD TO I-10			
TRACS NO. F0124 01L			202-C-(208)T	____ OF ____

ROLL PLOT NO.

c:\pw_working\pw_prod\jcallicott\dms29080\f0124rdwy02.dgn

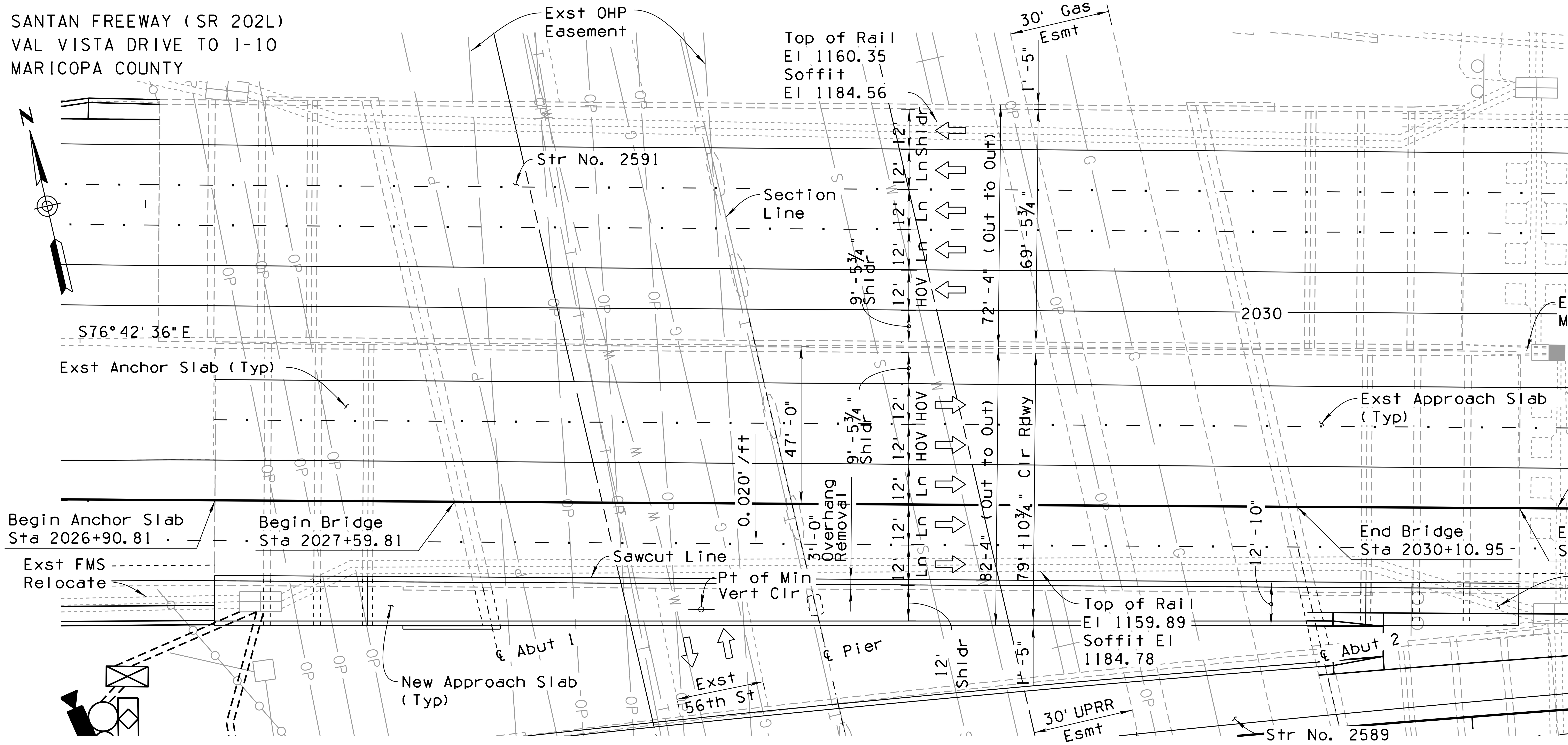
6/27/2020

c:\pw_working\pw_prod\jcallicott\dms29080\f0124rdwy02.dgn

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

202L MA 44

SANTAN FREEWAY (SR 202L)
VAL VISTA DRIVE TO I-10
MARICOPA COUNTY



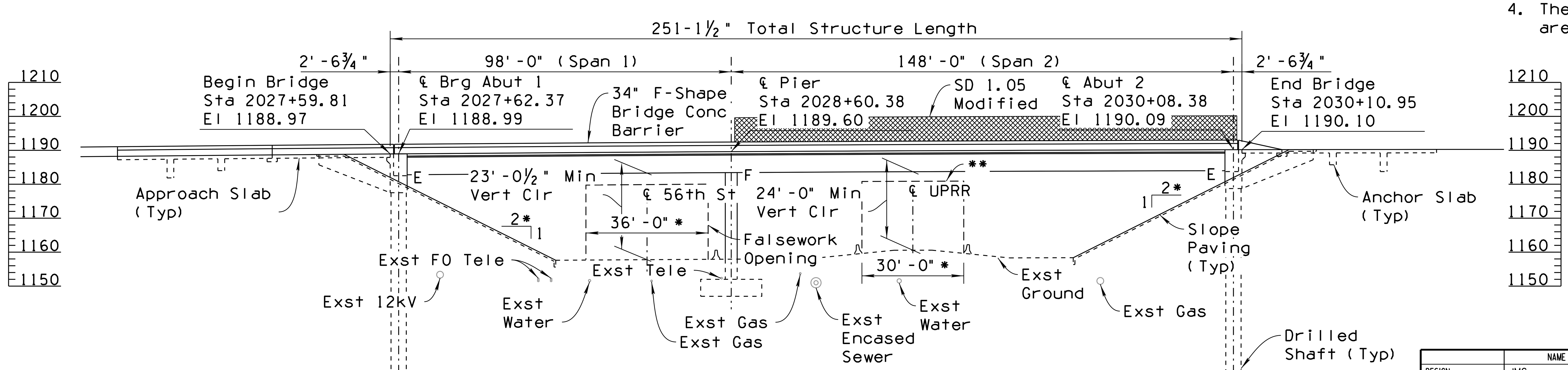
PLAN
Exst 2-Span Cast-in-Place Post-Tensioned Concrete Box Girder Bridge Widening
Skew 13°20'54" Lt
1' Contour interval
Scale: 1" = 20'

INDEX OF DRAWINGS

TITLE	DRAWING NO.
GENERAL PLAN & ELEVATION	S-01.01
TYPICAL SECTION & GEOMETRICS	S-01.02

NOTES:

1. The Original bridge was built in 2003 under Project No. 202-C-507.
2. Dimensions & stationing of the existing structure are based on as-built plans. Actual structural features shall be field verified during final design.
3. The location of all utilities was determined from as-built plans & is approximate.
4. The profile grade & elevations for SR202L are based on the as-built plans.



ELEVATION
Scale: 1" = 20'

USDOT RR CROSSING NO.: 748497R
UPRR DIVISION NAME: SUNSET
RAILROAD MILE POST: 008.425
SUBDIVISION NAME: TEMPE INDUSTRIAL LEAD
CITY: CHANDLER
COUNTY: MARICOPA
STATE: ARIZONA

NOTE:
Stationing is measured along the Exst SR 202L Med Constr ℄. Elevations & dimensions are measured along the Profile Grade Line.

NOTES:
* Measured perpendicular to 56th Street & UPRR.
** UPRR Minimum Construction Clearance Envelope.

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

AZTEC
4561 E. McDowell Road
Phoenix, AZ 85008-4505
Tel (602) 454-0402
Fax (602) 454-0403
www.aztec.us

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 2027+
56th ST OVERPASS EB
GENERAL PLAN & ELEVATION

202L	54.74	2590 (EB)
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION: VAL VISTA DRIVE TO I-10

TRACS NO. F0124 01C | 202-C(208)T

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-01.01
____ OF ____

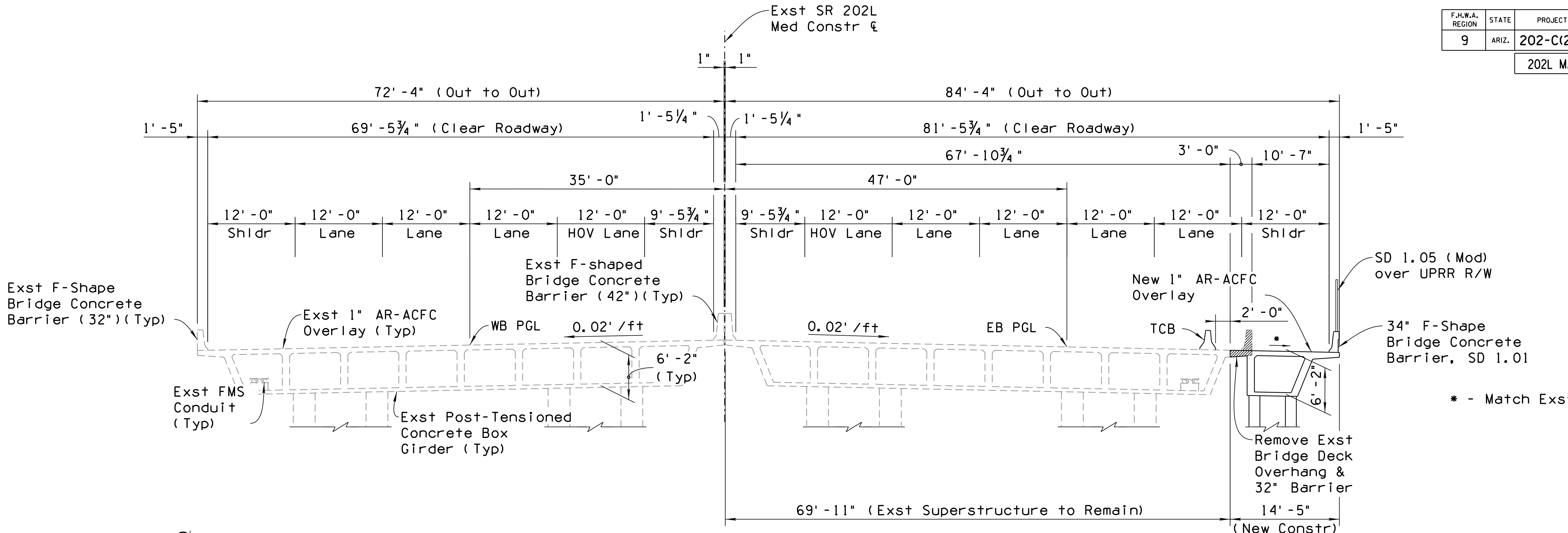
ADOT_SUBDUE_I.TBL

DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO. DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO.

PLOTTED BY: JCAMPBELL AT 10:30:17 AM 4/24/2019 c:\pw_working\pw_prod\jcampbell\dms33033\1-s2590gp.dgn

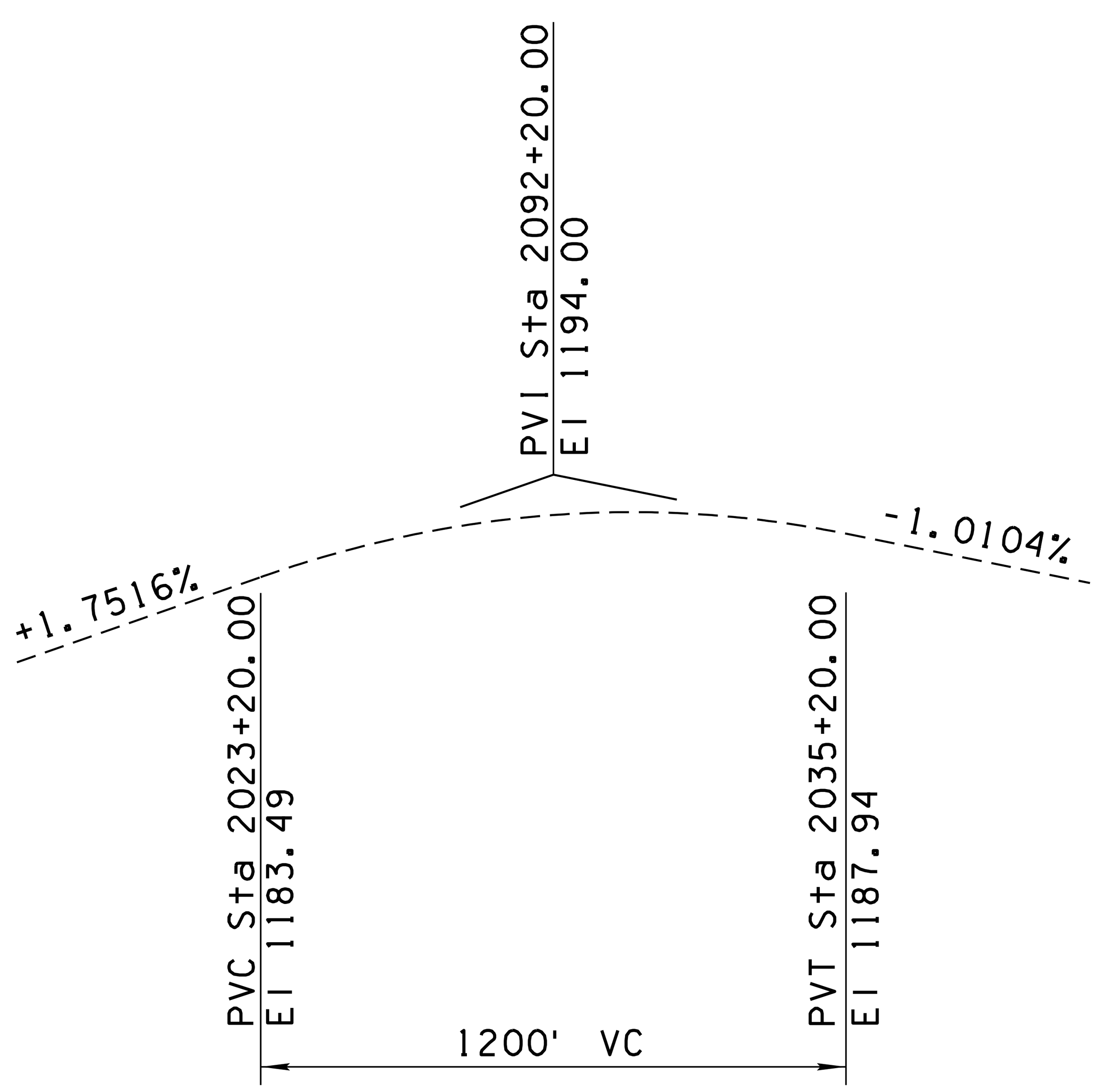
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

202L MA 44

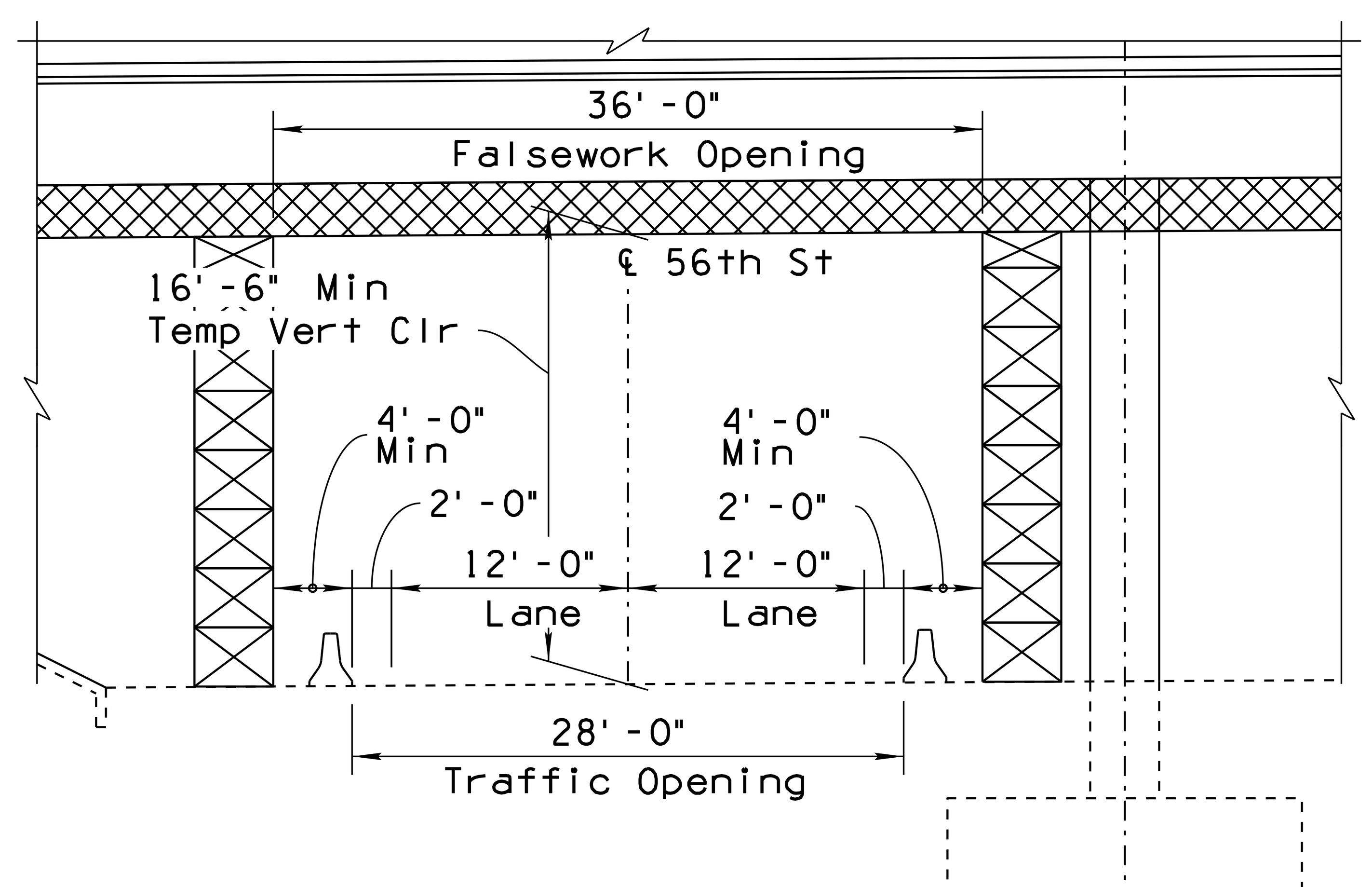


* - Match Exst

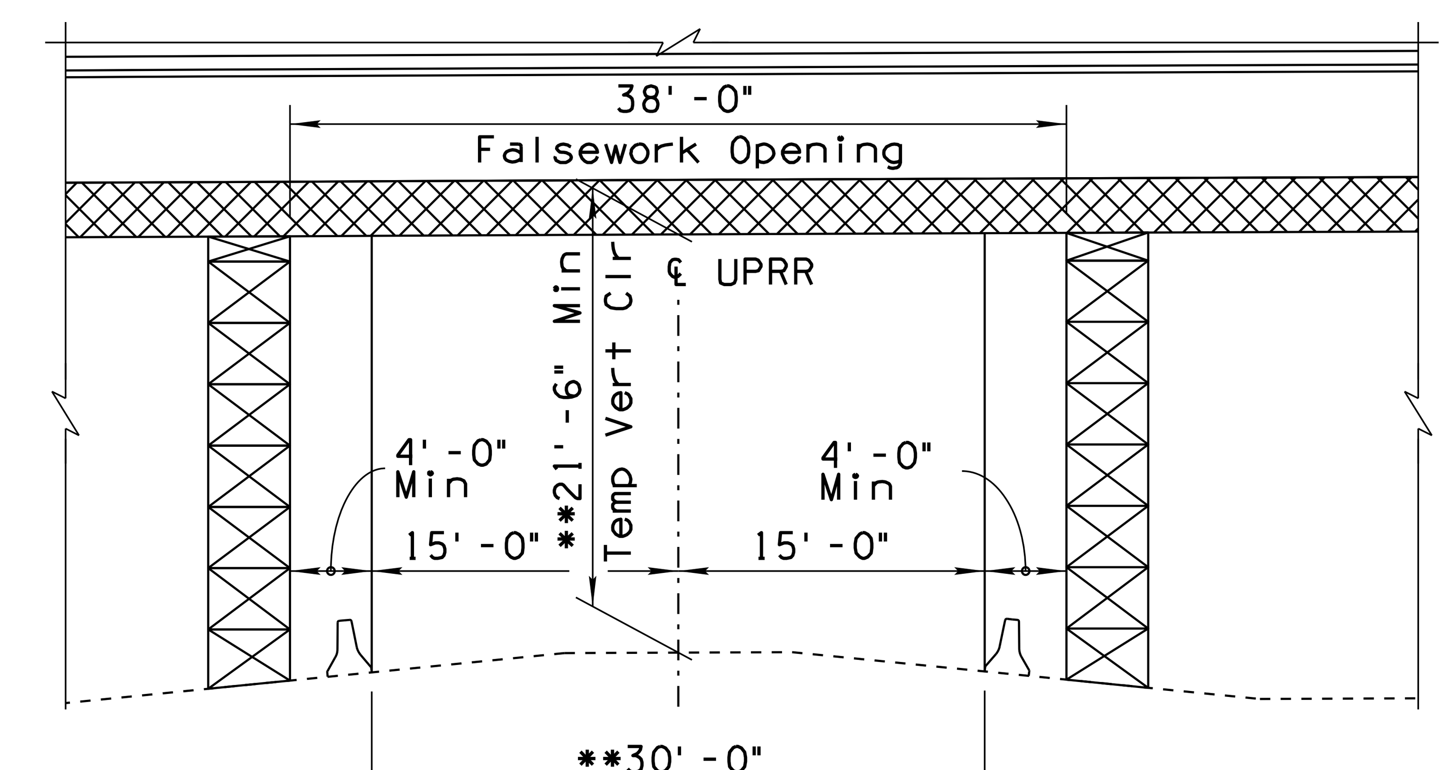
TYPICAL SECTION
Scale: ⅛"=1'-0"



SR 202L EB & WB PROFILE GRADE
No Scale



FALSEWORK OPENING DETAIL - 56th STREET
No Scale



** No construction activities or other obstructions shall be placed within these limits.

FALSEWORK OPENING DETAIL - UPRR
No Scale

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

AZTEC 4561 E. McDowell Road Phoenix, AZ 85008-4505 Tel (602) 454-0402 Fax (602) 454-0403 www.aztec.us

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 2027+
56th St OVERPASS EB
TYPICAL SECTION & GEOMETRICS

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

202L	54.74	2590 (EB)
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION VAL VISTA DRIVE TO I-10

DWG NO. S-01.02

TRACS NO. F0124 01C

202-C(208)T

___ OF ___

ADOT_SUBDUE_I.TBL

DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO. DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO.

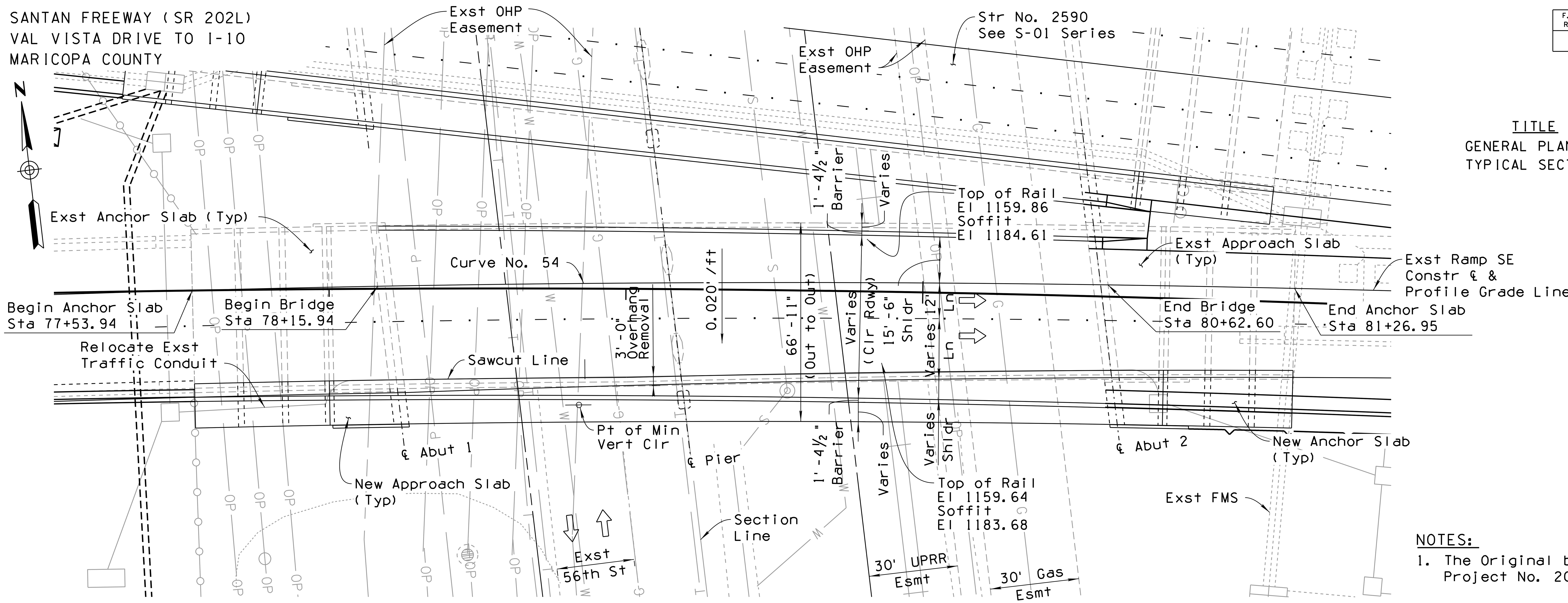
SANTAN FREEWAY (SR 202L)
VAL VISTA DRIVE TO I-10
MARICOPA COUNTY

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

202L MA 44

INDEX OF DRAWINGS

TITLE	DRAWING NO.
GENERAL PLAN & ELEVATION	S-02.01
TYPICAL SECTION & GEOMETRICS	S-02.02



PLAN

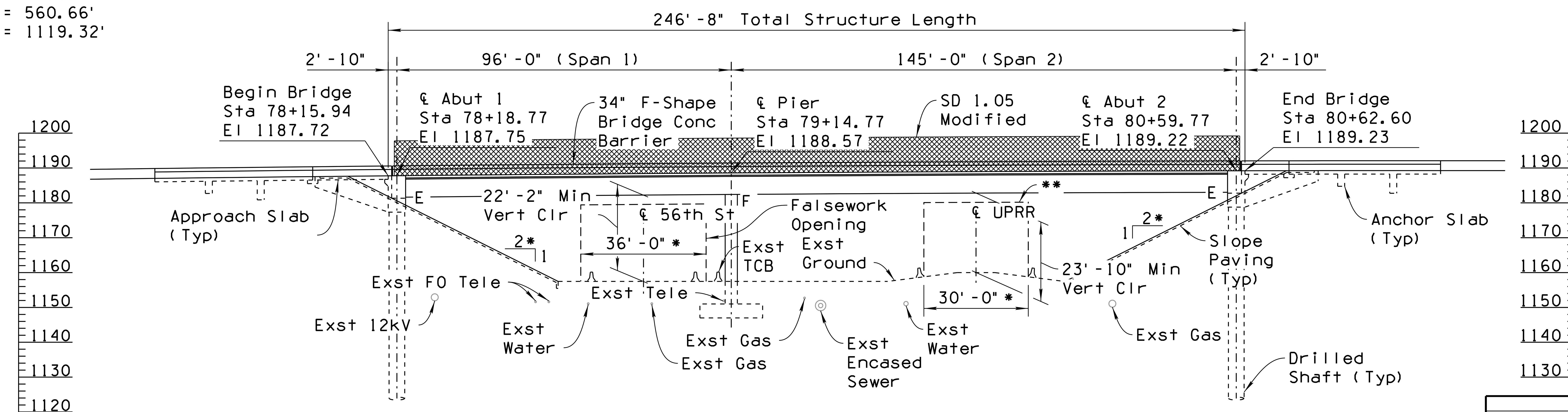
Exst 2-Span Cast-in-Place Post-Tensioned Concrete Box Girder Bridge Widening
Skew Varies
1' Contour interval
Scale: 1" = 20'

CURVE NO. 54:

PC 76+97.04
PI 82+57.70
PT 88+16.36
Δ = 08°23'42"
D = 00°45'00"
R = 7639.44'
T = 560.66'
L = 1119.32'

NOTES:

1. The Original bridge was built in 2003 under Project No. 202-C-507.
2. Dimensions & stationing of the existing structure are based on as-built plans. Actual structural features shall be field verified during final design.
3. The location of all utilities was determined from as-built plans & is approximate.
4. The profile grade & elevations for Ramp SE are based on the as-built plans.



USDOT RR CROSSING NO.: 748497R
UPRR DIVISION NAME: SUNSET
RAILROAD MILE POST: 008.425
SUBDIVISION NAME: TEMPE INDUSTRIAL LEAD
CITY: CHANDLER
COUNTY: MARICOPA
STATE: ARIZONA

ELEVATION

Scale: 1" = 20'

NOTE:

Stationing & dimensions are measured along the Exst Ramp SE Constr ℄. Elevations are measured along the Profile Grade Line.

NOTES:

* Measured perpendicular to 56th Street & UPRR.
** UPRR Minimum Construction Clearance Envelope.

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

AZTEC — 4561 E. McDowell Road, Phoenix, AZ 85008-4505, Tel (602) 454-0402, Fax (602) 454-0403, www.aztec.us

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 79+
RAMP SE/56th ST OP
GENERAL PLAN & ELEVATION

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

202L ROUTE	54.74 MILEPOST	2589 STRUCTURE NO.	LOCATION VAL VISTA DRIVE TO I-10

DWG NO. S-02.01

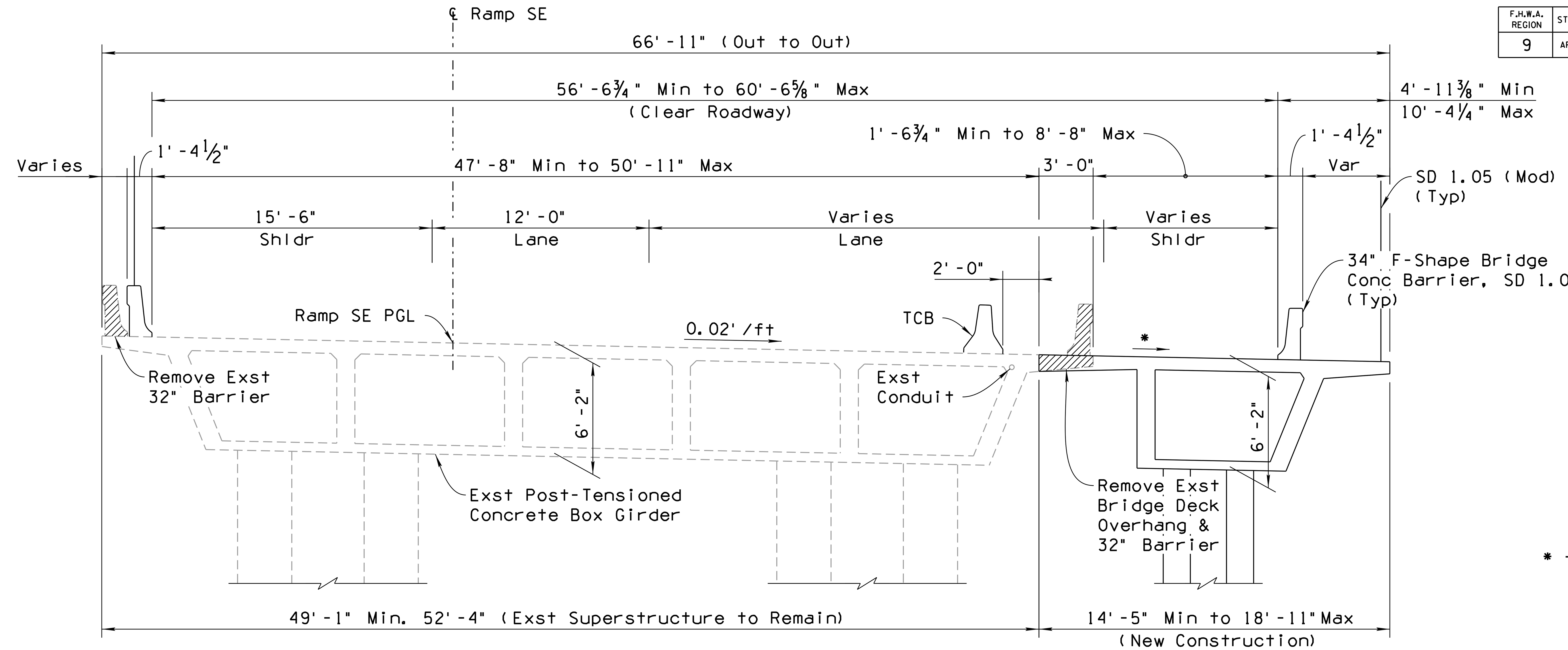
TRACS NO. F0124 01C | 202-C(208)T | ___ OF ___

ADOT_SUBDUE_I.TBL

PLOTTED BY: JCAMPBELL AT 10:25:33 AM 4/24/2019 c:\pw_working\pw_prod\jcampbell\dms33034\l-s2589gp.dgn

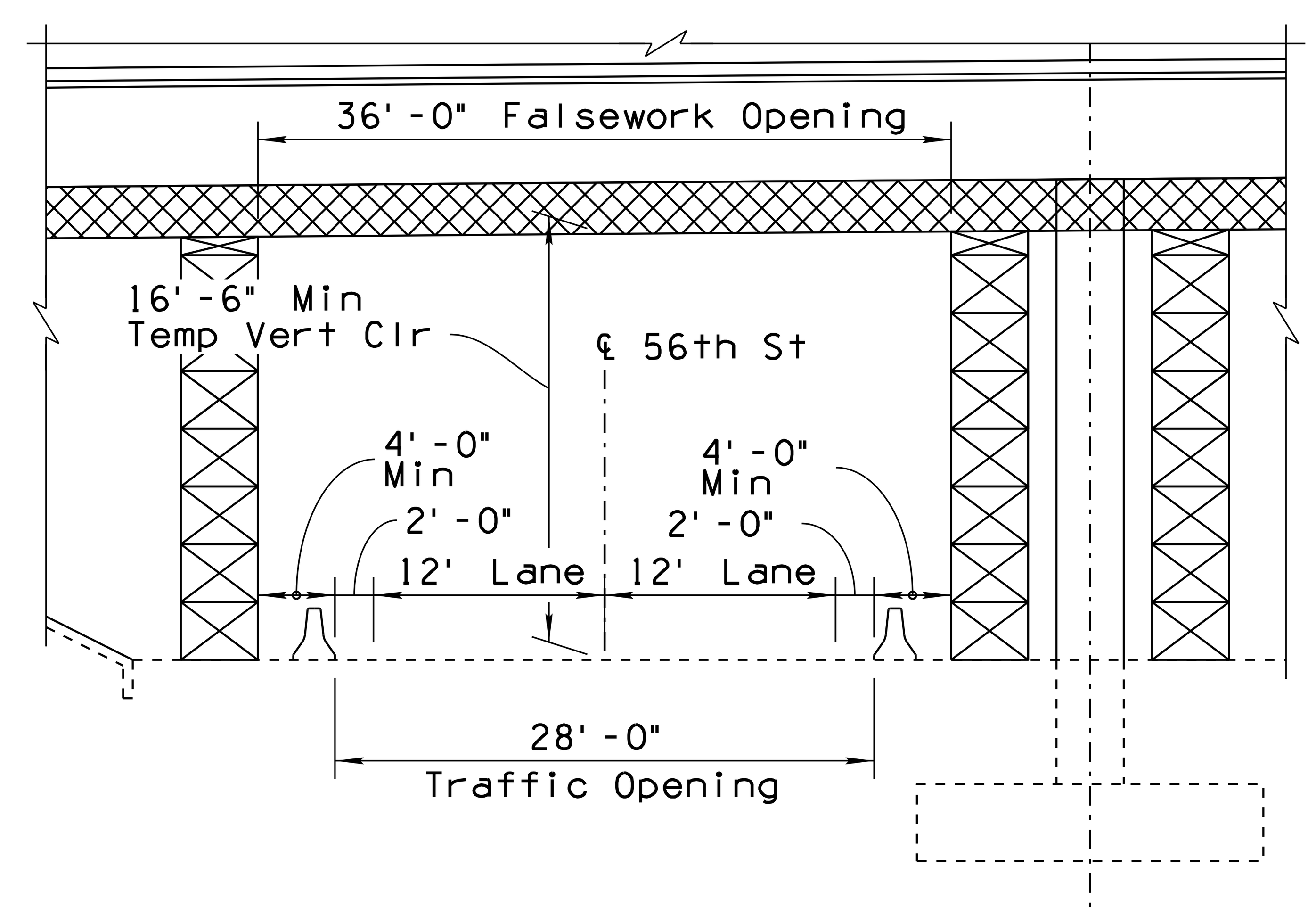
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

202L MA 44

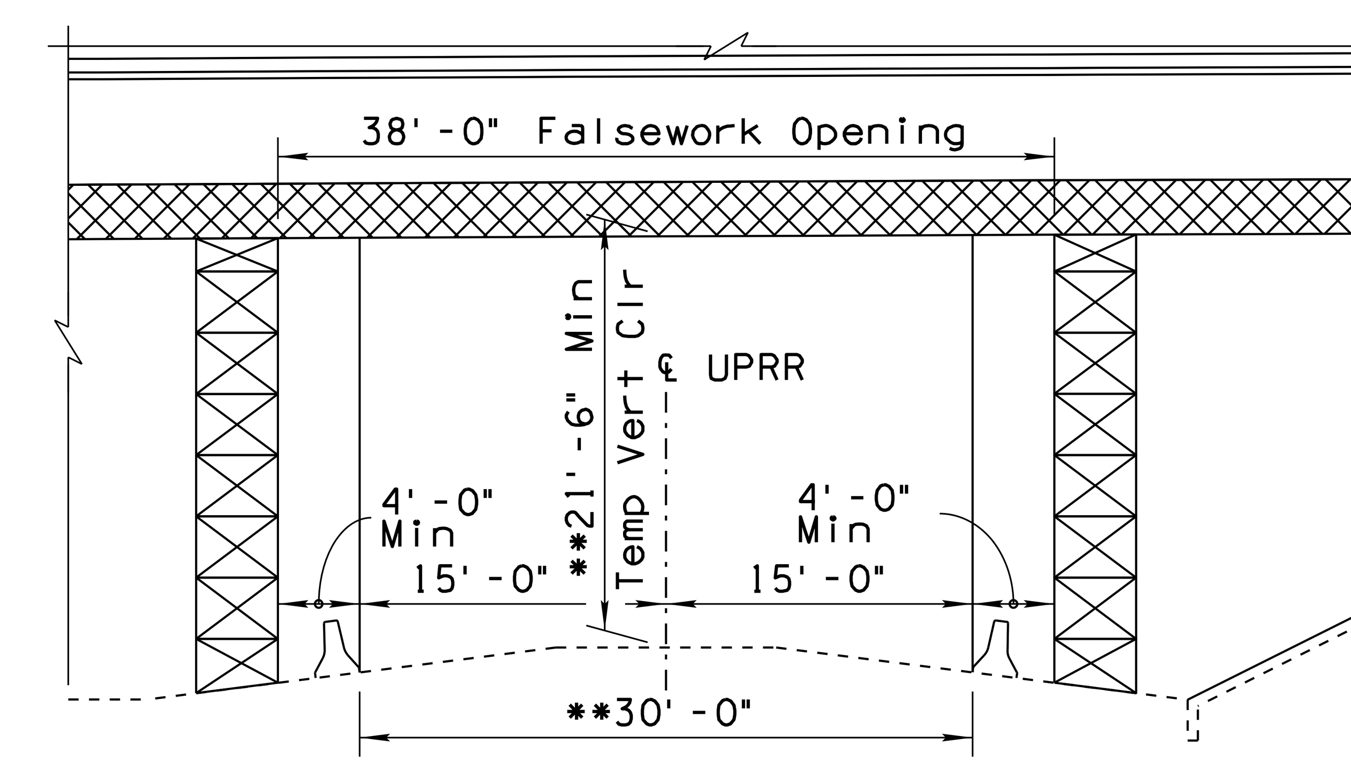


* - Match Exst

TYPICAL SECTION
Scale: ¼"=1'-0"

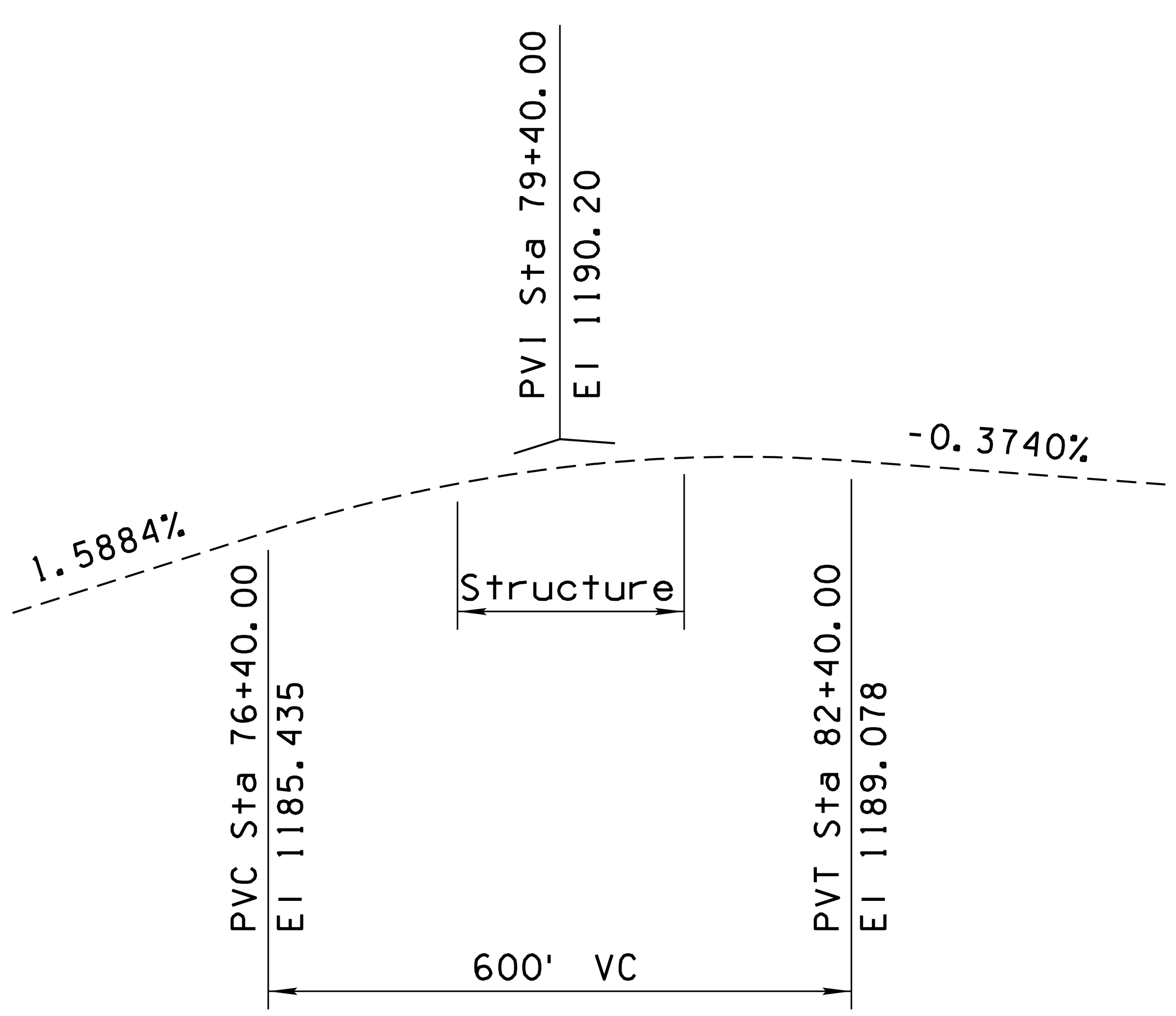


FALSEWORK OPENING DETAIL - 56TH STREET
No Scale



** No construction activities or other obstructions shall be pl;aced within these limits.

FALSEWORK OPENING DETAIL - UPRR
No Scale



RAMP SE PROFILE GRADE
No Scale

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

AZTEC 4561 E. McDowell Road Phoenix, AZ 85008-4505 Tel (602) 454-0402 Fax (602) 454-0403 www.aztec.us

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 79+
RAMP SE/56th ST OP
TYPICAL SECTION DETAILS

202L ROUTE	54.74 MILEPOST	2589 STRUCTURE NO.	LOCATION VAL VISTA DRIVE TO I-10

TRACS NO. F0124 01C | 202-C(208)T

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-02.02

____ OF ____

ADOT_SUBDUE_I.TBL

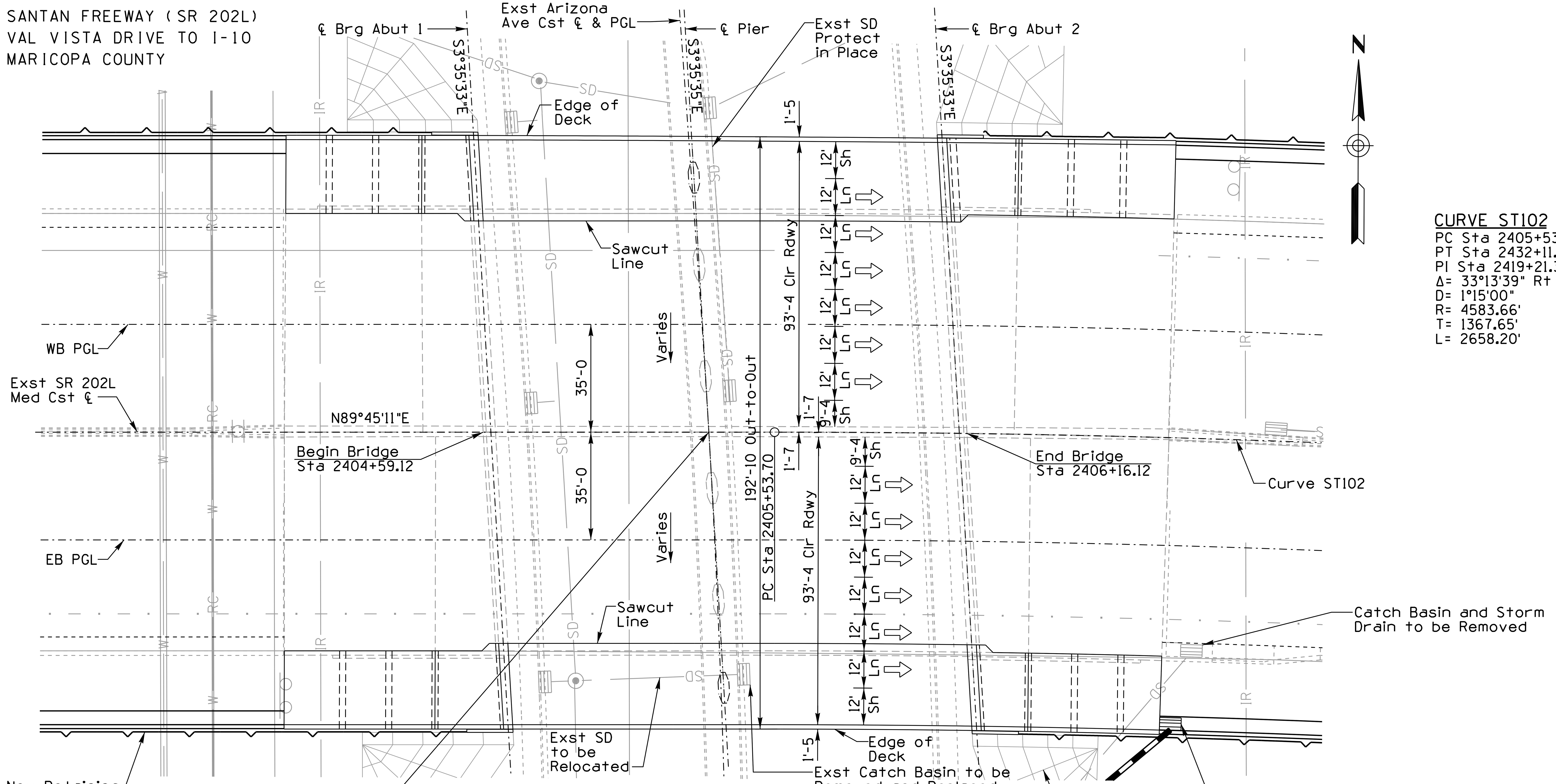
PLOTTED BY: JCAMPBELL AT 12:55:02 PM 4/16/2019 c:\pw_working\pw_prod\jcampbell\dms33034\2-s2589typ.dgn

SURVEY NO. FINISHED PLANS- REVISIONS- LOCATION- DATE-
SURVEY NO. FINISHED PLANS- REVISIONS- LOCATION- DATE-

SANTAN FREEWAY (SR 202L)
VAL VISTA DRIVE TO I-10
MARICOPA COUNTY

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

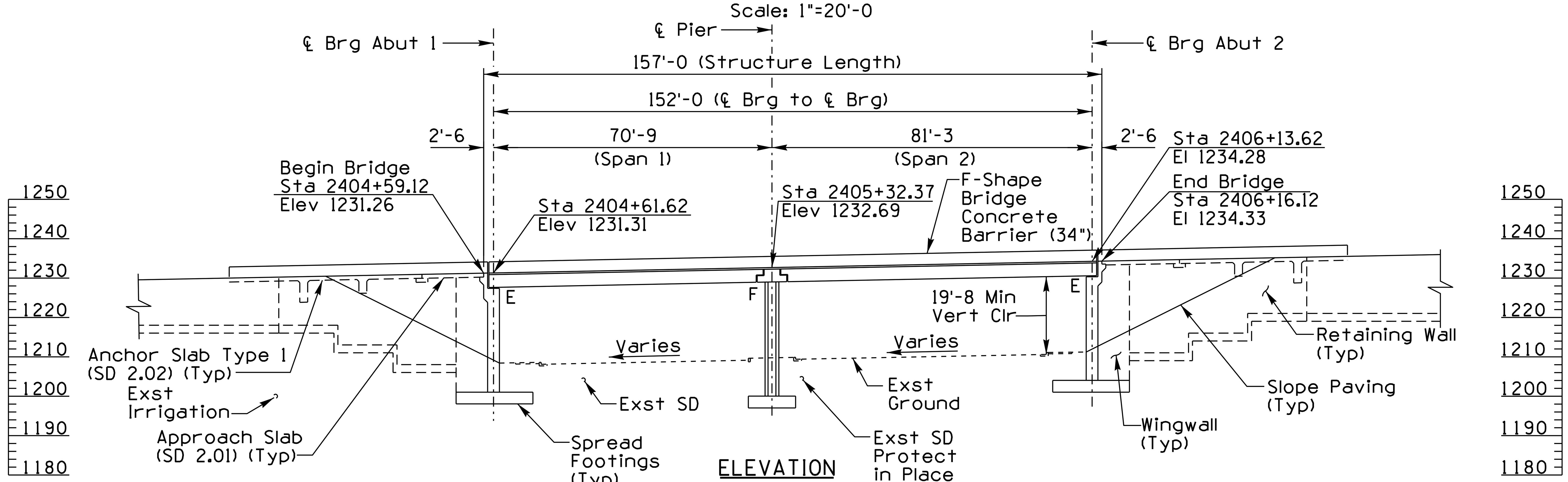
202L MA 44



GENERAL PLAN

Exst 2 Span Cast-in-Place Post-Tensioned Concrete Box Girder Bridge
Widened with 2 Span Precast Prestressed Concrete Box Beams
Skew Varies
1' Contour Interval
Scale: 1"=20'-0

CURVE ST102	CURVE AZ03
PC Sta 2405+53.70	PC Sta 19+48.74
PT Sta 2432+11.90	PT Sta 22+12.80
PI Sta 2419+21.35	PI Sta 20+80.82
Δ= 33°13'39" Rt	Δ= 3°57'39" Rt
D= 1°15'00"	D= 1°30'00"
R= 4583.66'	R= 3819.72'
T= 1367.65'	T= 132.08'
L= 2658.20'	L= 264.06'



ELEVATION

Scale: 1"=20'-0

	NAME	DATE
DESIGN	JML	05-19
DRAWN	NRD	05-19
CHECKED	DRS	05-19

Stanley Consultants INC. 1661 East Camelback Road, Suite 400 Phoenix, Arizona 85016 Phone: (602) 333-2200

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 2404+
ARIZONA AVE T.I. OP
GENERAL PLAN & ELEVATION

ROUTE	MILEPOST	STRUCTURE NO.
202L	49.18	2693

LOCATION VAL VISTA DRIVE TO I-10

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-3.01

TRACS NO. F0124 01C

202-C(208)T

____ OF ____

ADOT_SUBDUE_I.TBL

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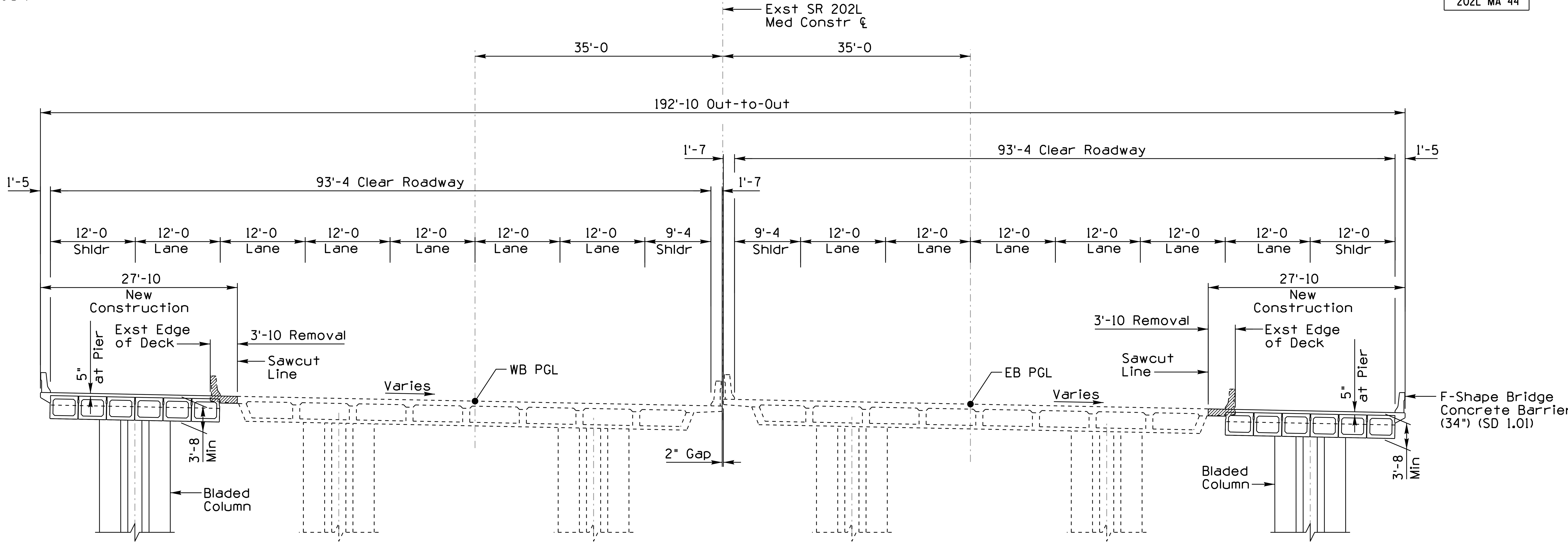
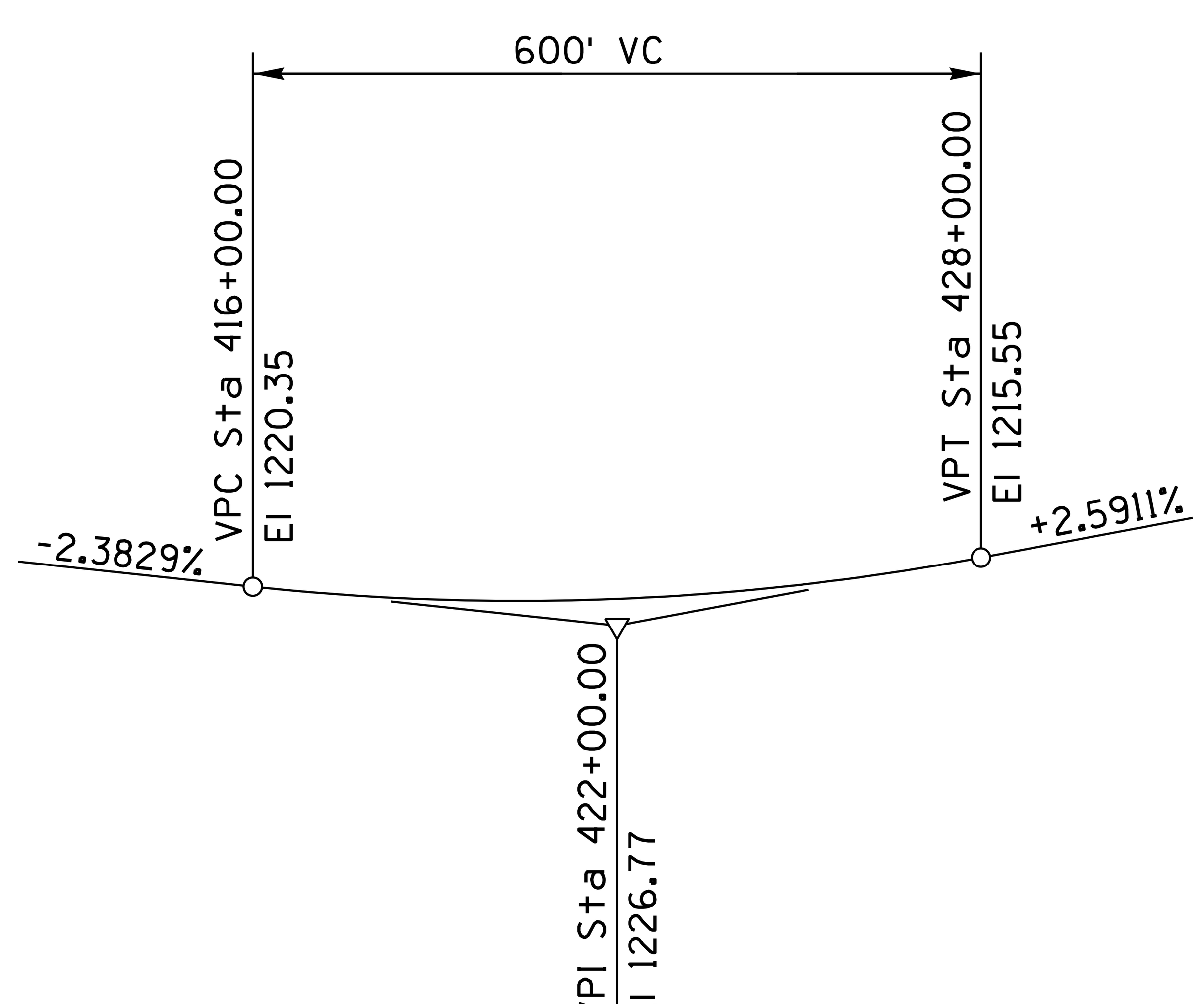
SANTAN FREEWAY (SR 202L)
VAL VISTA DRIVE TO I-10
MARICOPA COUNTY

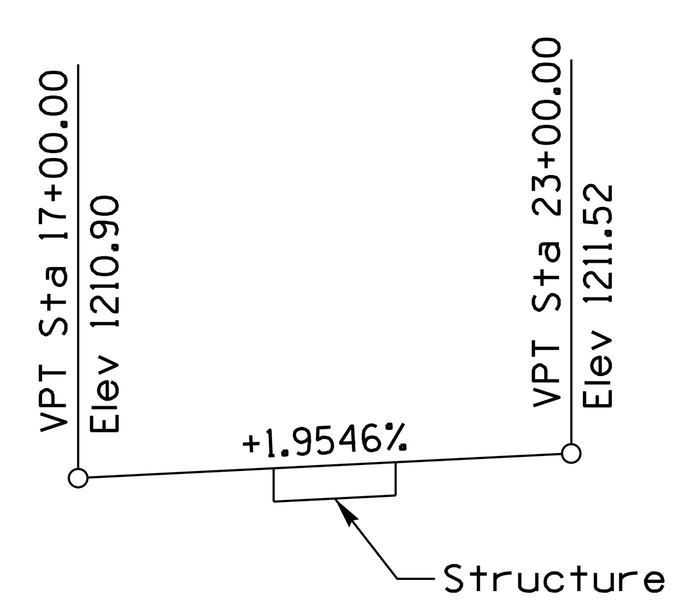
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			
		202L MA 44			



TYPICAL SECTION AT PIER
(Looking Ahead Station)
Scale: 1/8"=1'-0



ARIZONA AVE PROFILE GRADE
Scale: None



EXISTING SR 202L EB AND WB PROFILE GRADE
Scale: None

	NAME	DATE
DESIGN	JML	05-19
DRAWN	NRD	05-19
CHECKED	DRS	05-19

Stanley Consultants INC. 1661 East Camelback Road, Suite 400 Phoenix, Arizona 85016 Phone: (602) 333-2200

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 2404+
ARIZONA AVE T.I. OP
TYPICAL SECTION & GEOMETRICS

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
202L	49.18	2693	VAL VISTA DRIVE TO I-10

DWG NO. S-3.02

TRACS NO. F0124 01C | 202-C(208)T | ___ OF ___

ADOT_SUBDUE_I.TBL

PLOTTED BY: 6271 AT 3:33:52 PM 8/2/2019 c:\pw_working\pw_prod\ndorsey\dms39815\1-s2693xs.dgn

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

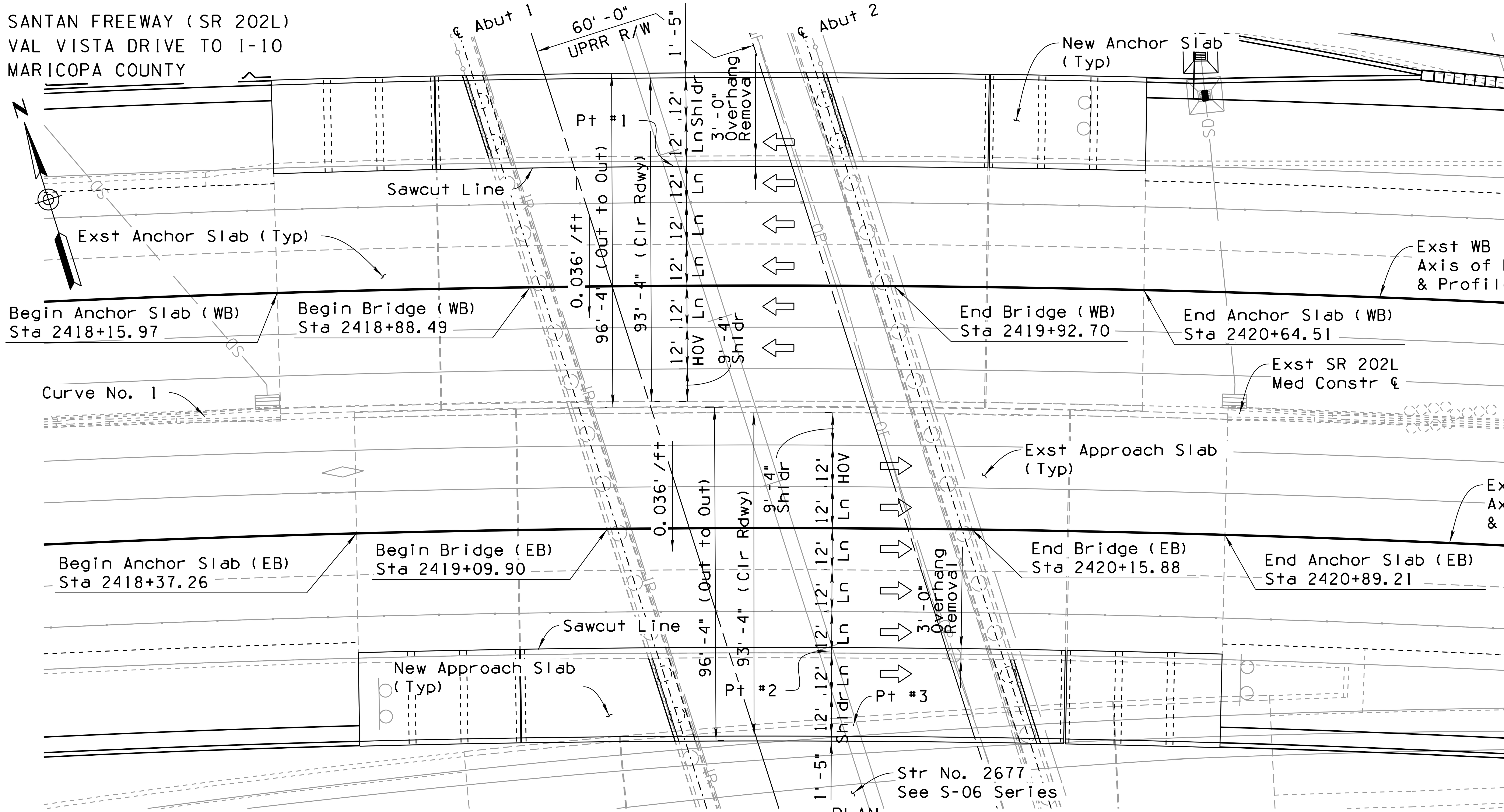
SANTAN FREEWAY (SR 202L)
VAL VISTA DRIVE TO I-10
MARICOPA COUNTY

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

202L MA 44

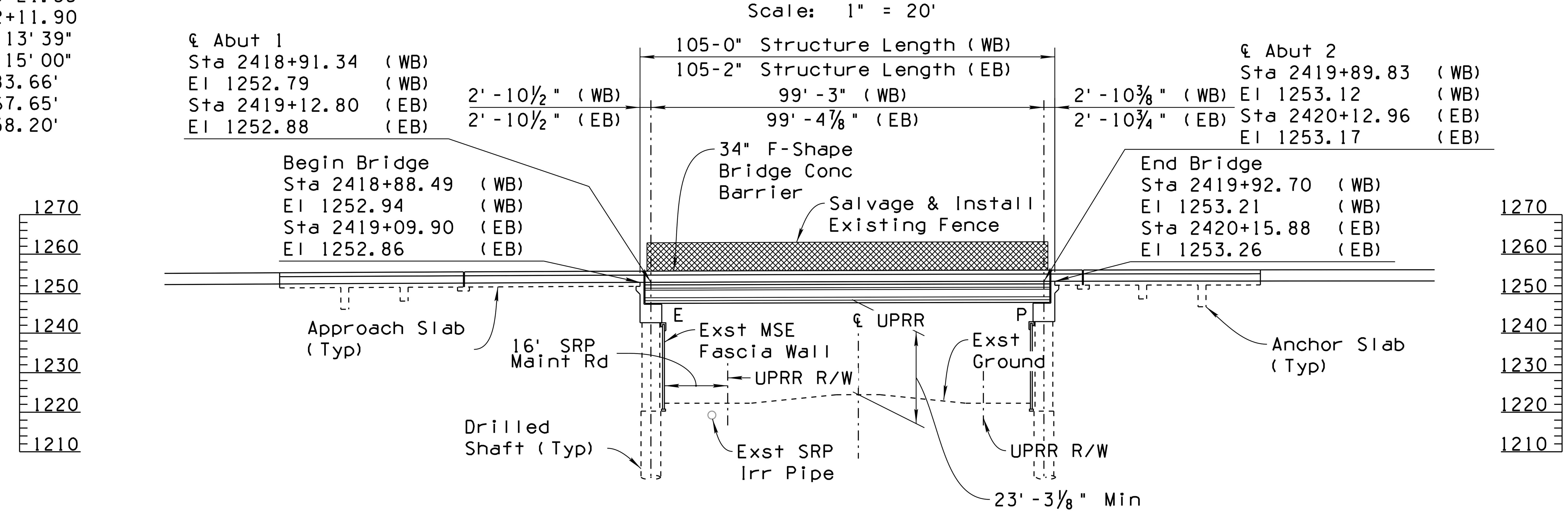
INDEX OF DRAWINGS

TITLE	DRAWING NO.
GENERAL PLAN & ELEVATION	S-04.01
TYPICAL SECTION & GEOMETRICS	S-04.02



PLAN
Exst Single-Span Precast Prestressed AASHTO Type IV Concrete Girder Bridge Widening
Skew Varies
1' Contour interval
Scale: 1" = 20'

CURVE NO 1:
PC 2405+53.70
PI 2419+21.35
PT 2432+11.90
Δ = 33°13'39"
D = 01°15'00"
R = 4583.66'
T = 1367.65'
L = 2658.20'



ELEVATION
Scale: 1" = 20'

NOTE:
Stationing & dimensions are measured along the Exst SR 202L Med Constr &. Elevations are measured along the Profile Grade Line.

NOTES:

1. The Original bridges were built in 2005 under Project No. 202-C(001)B.
2. Dimensions & stationing of the existing structures are based on as-built plans. Actual structural features shall be field verified during final design.
3. The location of all utilities was determined from as-built plans & is approximate.
4. The profile grade & elevations for SR202L are based on the as-built plans.

RAIL & BRIDGE SURVEY DATA

Point No.	Top of Rail	Bot of Girder
Pt #1	1222.08	1248.59
Pt #2	1222.04	1246.25
Pt #3	1222.10	1246.84

USDOT RR CROSSING NO.: 920493E (EB), 920429X (WB)
UPRR DIVISION NAME: SUNSET
SUBDIVISION NAME: CHANDLER INDUSTRIAL LEAD
MILEPOST: 930.410 (EB), 930.396 (WB)
CITY: CHANDLER
COUNTY: MARICOPA
STATE: ARIZONA

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

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4561 E. McDowell Road
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Tel (602) 454-0402
Fax (602) 454-0403
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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 2419+
UPRR OP EB & WB
GENERAL PLAN & ELEVATION

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

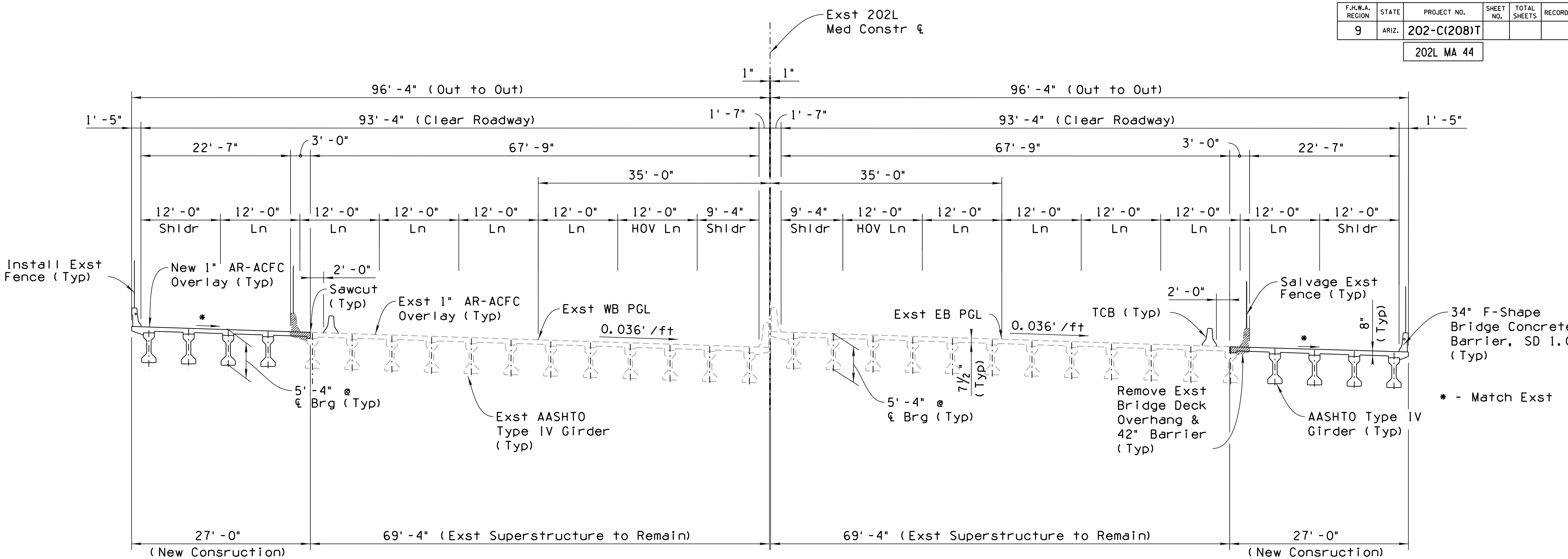
ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
202L	47.38	2678 (EB) 2679 (WB)	VAL VISTA DRIVE TO I-10

DWG NO. S-04.01

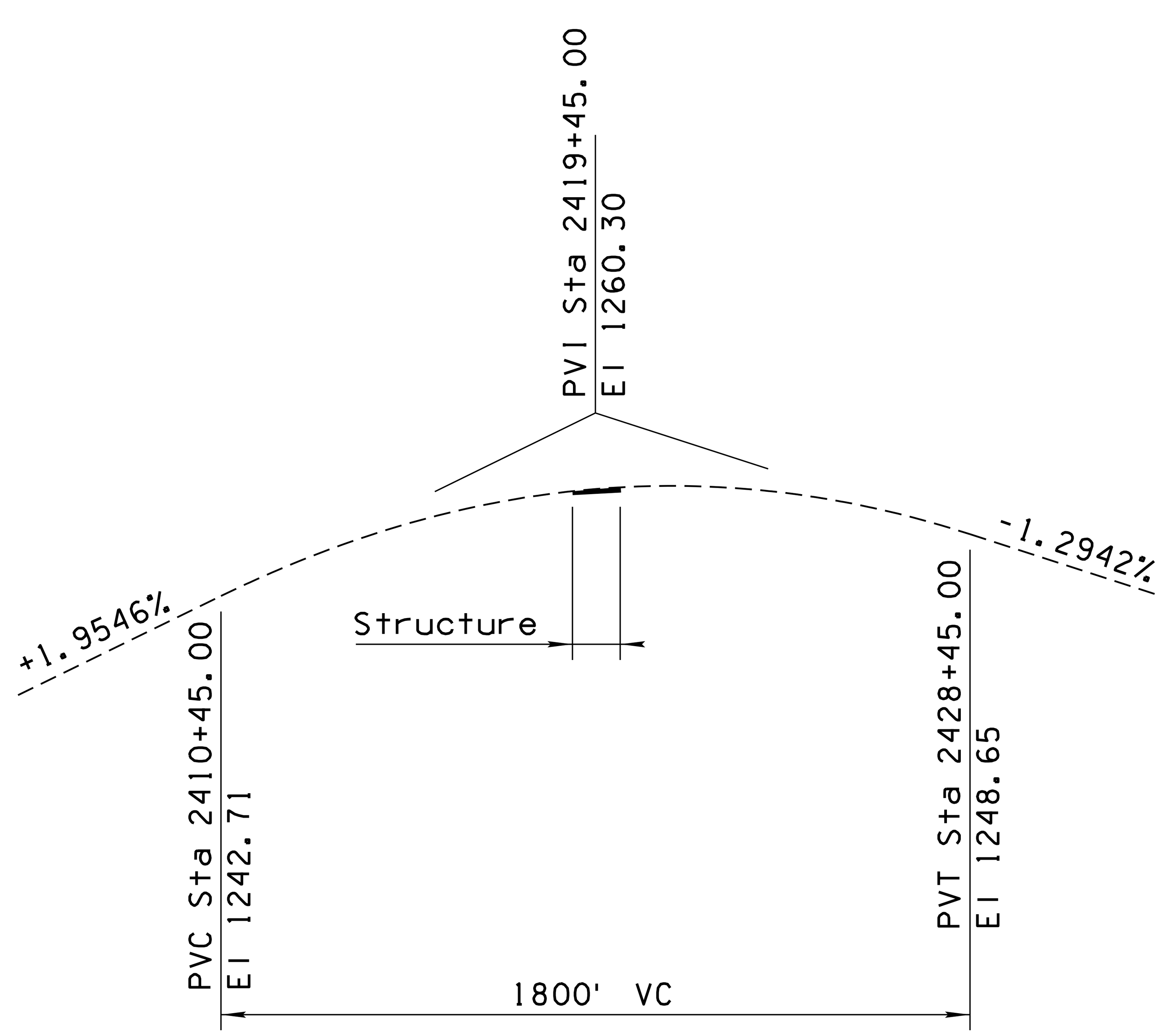
TRACS NO. F0124 01C — 202-C(208)T — ____ OF ____

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

202L MA 44



TYPICAL SECTION
Scale: ⅛" = 1'-0"



SR 202L EB & WB PROFILE GRADE
No Scale

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

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INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 2419+
UPRR OP EB & WB
TYPICAL SECTION DETAILS

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
202L	47.38	2678 EB 2679 WB	VAL VISTA DRIVE TO I-10

DWG NO. S-04.02

TRACS NO. F0124 01C | 202-C(208)T | ___ OF ___

ADOT_SUBDUE_I.TBL

PLOTTED BY: JCAMPBELL AT 1:10:10 PM 4/16/2019 c:\pw_working\pw_prod\jcampbell\dms39816\2-s2678_2679typ.dgn

DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO.
DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO.

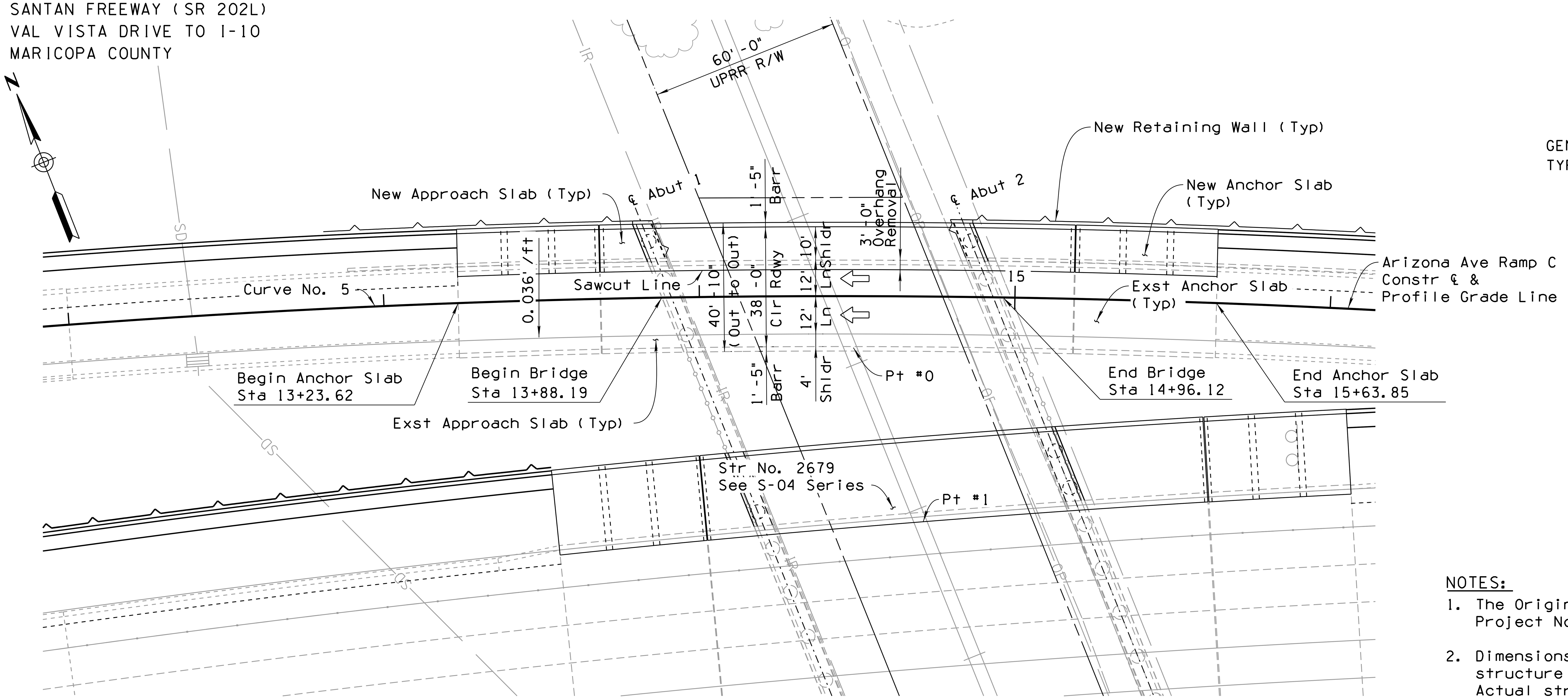
SANTAN FREEWAY (SR 202L)
VAL VISTA DRIVE TO I-10
MARICOPA COUNTY

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

202L MA 44

INDEX OF DRAWINGS

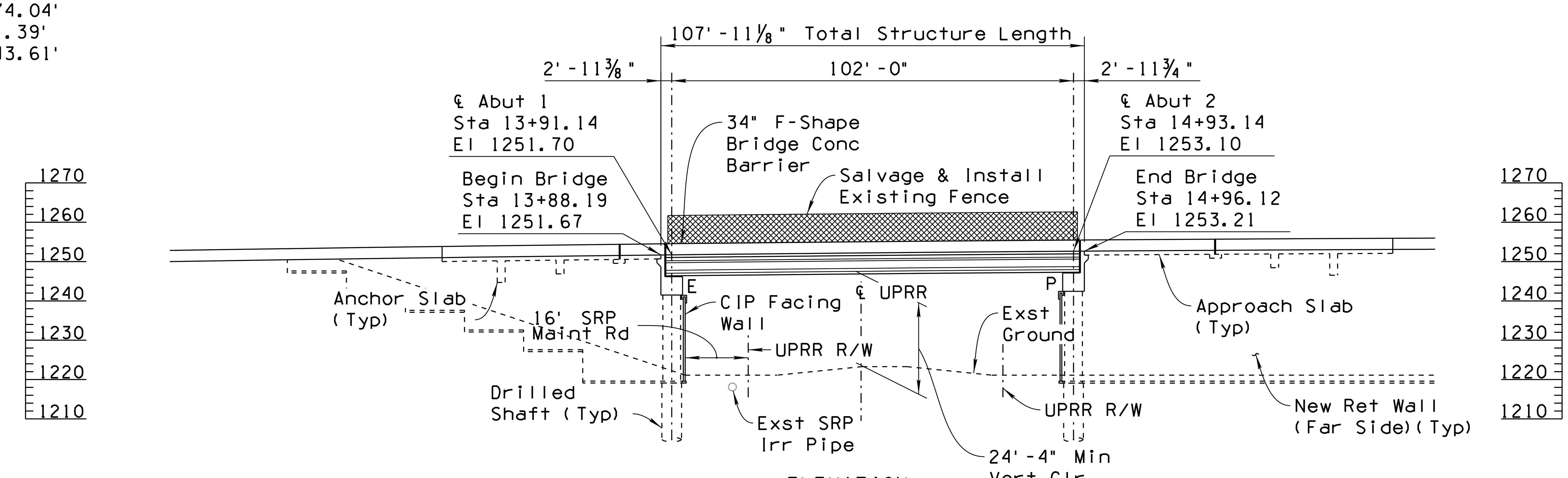
TITLE	DRAWING NO.
GENERAL PLAN & ELEVATION	S-05.01
TYPICAL SECTION & GEOMETRICS	S-05.02



CURVE NO. 5:
PC 4+80.66
PI 11+62.06
PT 18+24.26
Δ = 23°30'47"
D = 01°45'00"
R = 3274.04'
T = 681.39'
L = 1343.61'

PLAN
Exst Single-Span Precast Prestressed AASHTO Type IV Concrete Girder Bridge Widening
Skew 21°53'34" Lt
1' Contour interval
Scale: 1" = 20'

NOTES:
1. The Original bridge was built in 2005 under Project No. 202-C(001)B.
2. Dimensions & stationing of the existing structure is based on as-built plans. Actual structural features shall be field verified during final design.
3. The location of all utilities was determined from as-built plans & is approximate.
4. The profile grade & elevations for Ramp C are based on the as-built plans.



ELEVATION
Scale: 1" = 20'

NOTE:
Stationing & dimensions are measured along the Exst Ramp C Constr ℄. Elevations are measured along the Profile Grade Line.

RAIL & BRIDGE SURVEY DATA		
Point No.	Top of Rail	Bot of Girder
Pt #0	1222.17	1246.53
Pt #1	1222.08	1248.59

USDOT RR CROSSING NO.: 920491R
UPRR DIVISION NAME: SUNSET
SUBDIVISION NAME: CHANDLER INDUSTRIAL LEAD
MILEPOST: 930.375
CITY: CHANDLER
COUNTY: MARICOPA
STATE: ARIZONA

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 14+
ARIZONA AVE RAMP C
GENERAL PLAN & ELEVATION

PRELIMINARY NOT FOR CONSTRUCTION OR RECORDING

202L ROUTE	47.38 MILEPOST	2676 STRUCTURE NO.	LOCATION VAL VISTA DRIVE TO I-10

DWG NO. S-05.01

TRACS NO. F0124 01C — 202-C(208)T — ___ OF ___

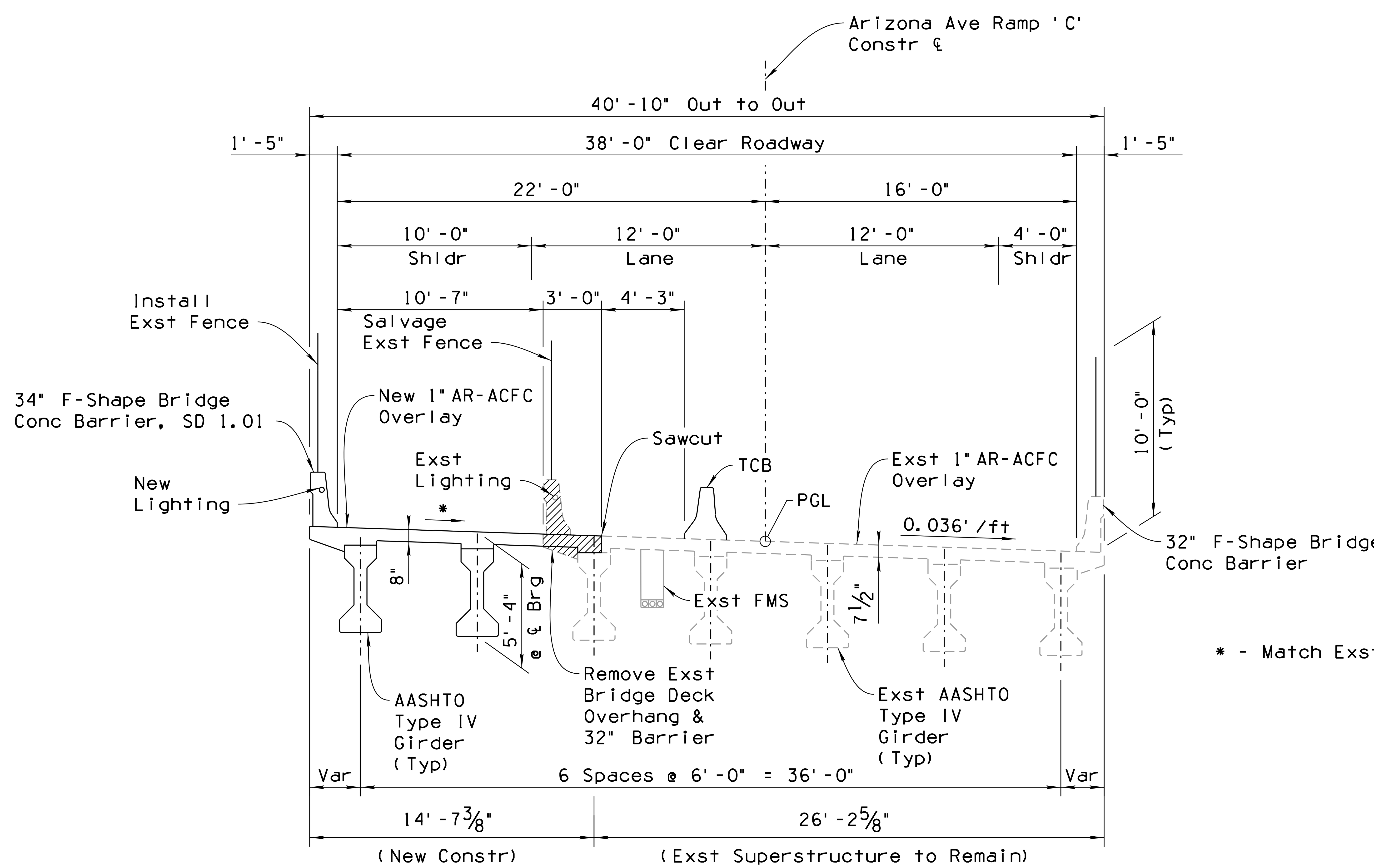
ADOT_SUBDUE_I.TBL

DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO.

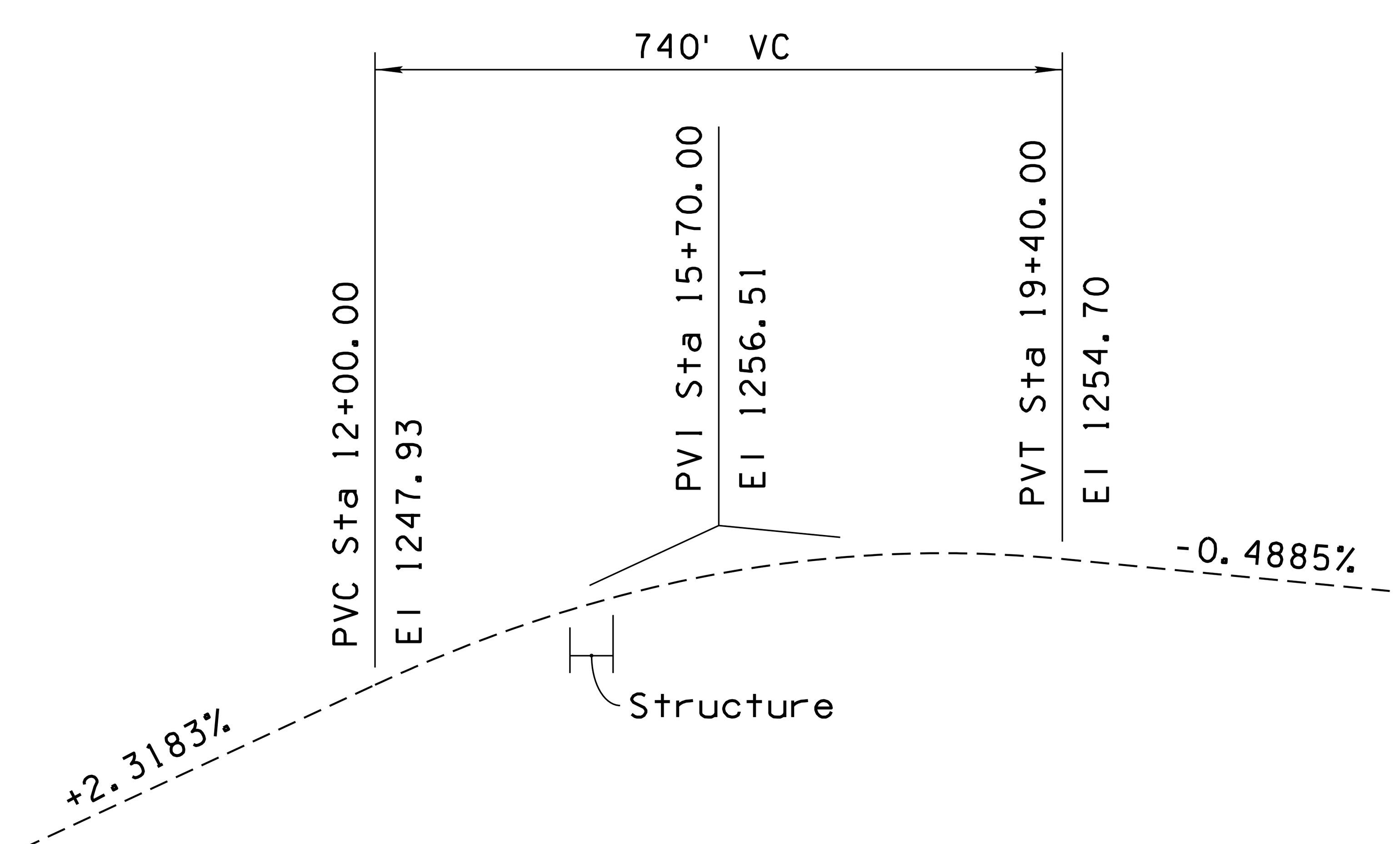
PLOTTED BY: JCAMPBELL AT 10:34:44 AM 4/24/2019 c:\pw_working\pw_prod\jcampbell\dms39817\1-s2676gp.dgn

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

202L MA 44



TYPICAL SECTION
Scale: ¼" = 1'-0"



ARIZONA AVENUE RAMP 'C' - PROFILE GRADE
Not Scale

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 14+
ARIZONA AVE RAMP C
GENERAL PLAN & ELEVATION

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
202L	47.38	2676	VAL VISTA DRIVE TO I-10

DWG NO. S-05.02

TRACS NO. F0124 01C | 202-C(208)T | ___ OF ___

ADOT_SUBDUE_I.TBL

PLOTTED BY: JCAMPBELL AT 12:59:20 PM 4/16/2019 c:\pw_working\pw_prod\jcampbell\dms39817\2-s2676typ.dgn

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-
SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

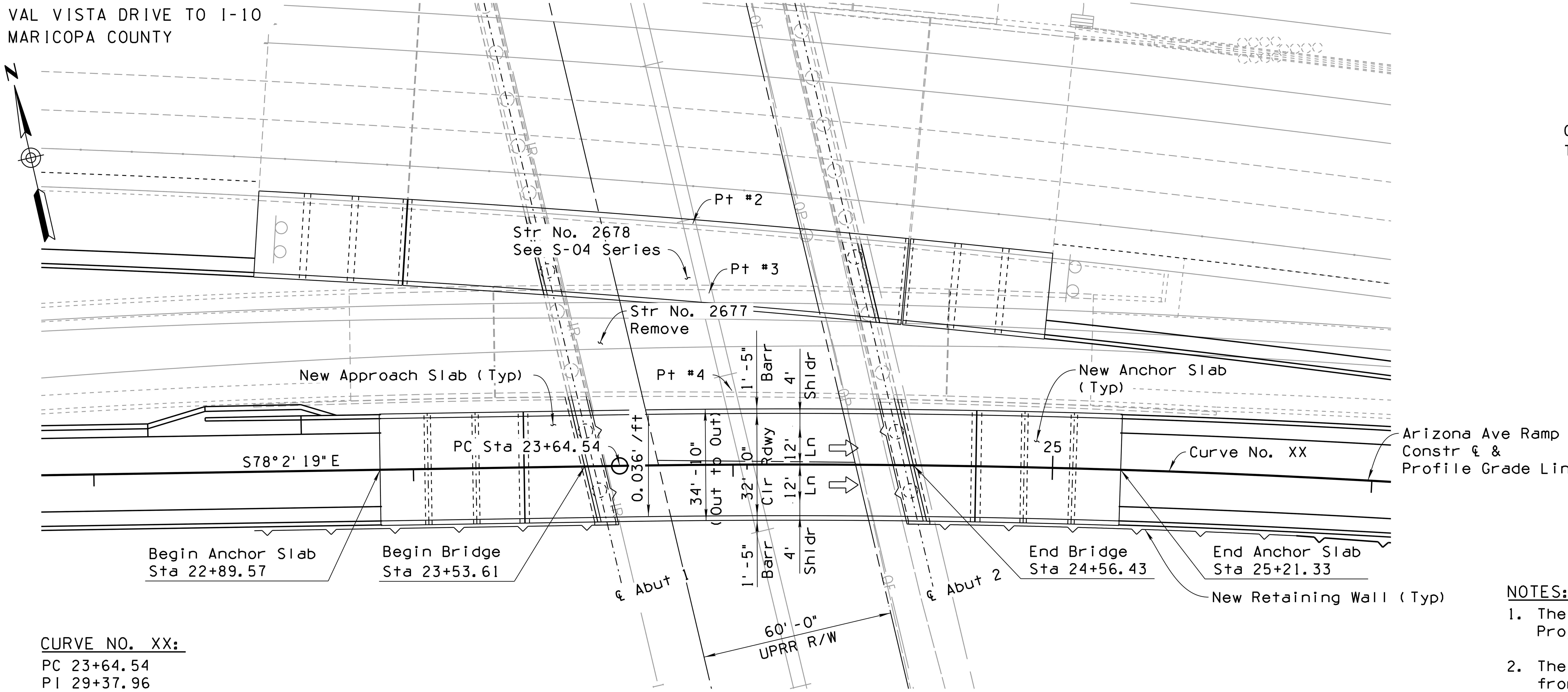
SANTAN FREEWAY (SR 202L)
VAL VISTA DRIVE TO I-10
MARICOPA COUNTY

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

202L MA 44

INDEX OF DRAWINGS

TITLE	DRAWING NO.
GENERAL PLAN & ELEVATION	S-06.01
TYPICAL SECTION & GEOMETRICS	S-06.02



CURVE NO. XX:

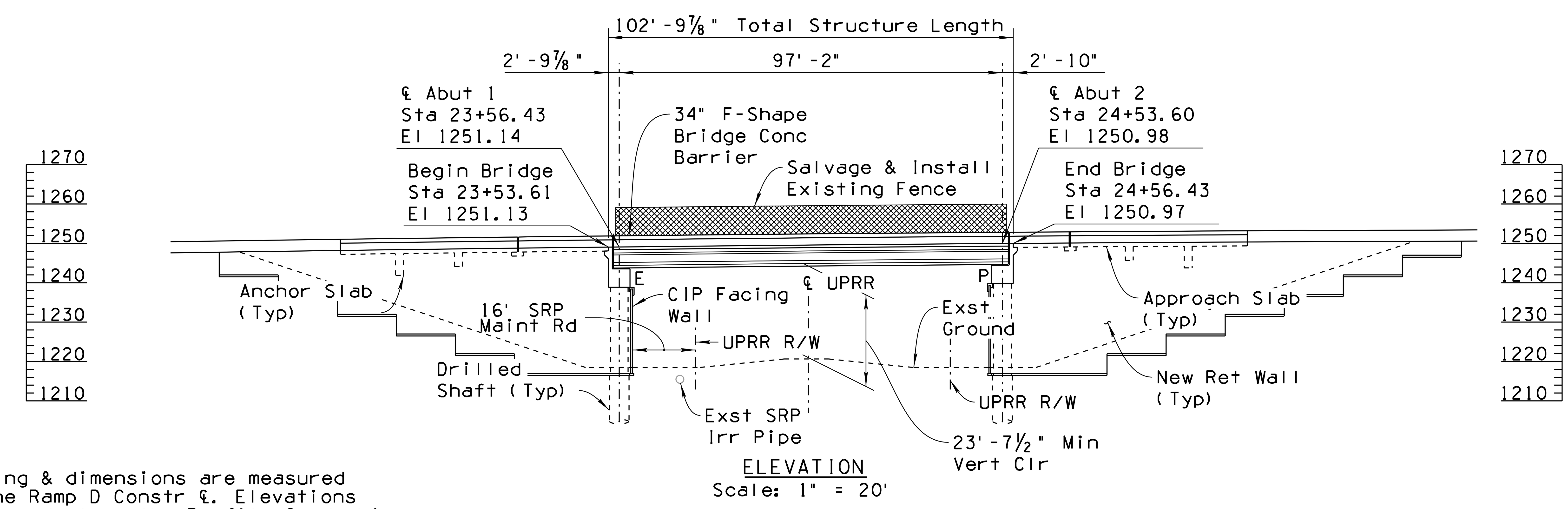
PC 23+64.54
PI 29+37.96
PT 34+99.87
Δ = 19°52'06"
D = 01°45'00"
R = 3274.04'
T = 573.42'
L = 1135.33'

PLAN
Single-Span Precast Prestressed AASHTO Type IV Concrete Girder Bridge Replacement
Skew Varies
1' Contour interval
Scale: 1" = 20'

NOTES:

1. The Original bridge was built in 2005 under Project No. 202-C(001)B.
2. The location of all utilities was determined from as-built plans & is approximate.

RAIL & BRIDGE SURVEY DATA		
Point No.	Top of Rail	Bot of Girder
Pt #2	1222.04	1246.25
Pt #3	1222.10	1246.84
Pt #4	1222.14	1245.79



ELEVATION
Scale: 1" = 20'

USDOT RR CROSSING NO.: 920494L
UPRR DIVISION NAME: SUNSET
SUBDIVISION NAME: CHANDLER INDUSTRIAL LEAD
MILEPOST: 930.425
CITY: CHANDLER
COUNTY: MARICOPA
STATE: ARIZONA

NOTE:
Stationing & dimensions are measured along the Ramp D Constr ℄. Elevations are measured along the Profile Grade Line.

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

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www.aztec.us

STA 23+
ARIZONA AVE RAMP D
GENERAL PLAN & ELEVATION

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

202L	47.38	TBD
ROUTE	MILEPOST	STRUCTURE NO.

LOCATION
VAL VISTA DRIVE TO I-10

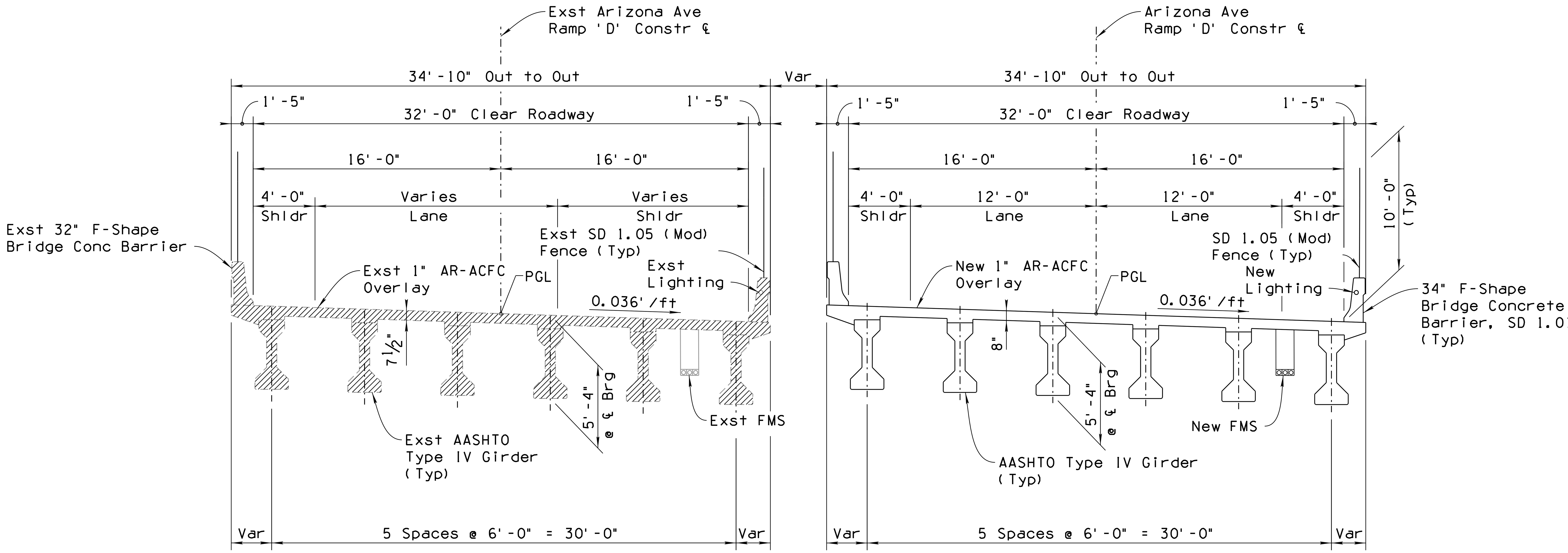
DWG NO. S-06.01

TRACS NO. F0124 01C | 202-C(208)T | ____ OF ____

DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO. DATE- LOCATION- REVISIONS- FINISHED PLANS- SURVEY NO.

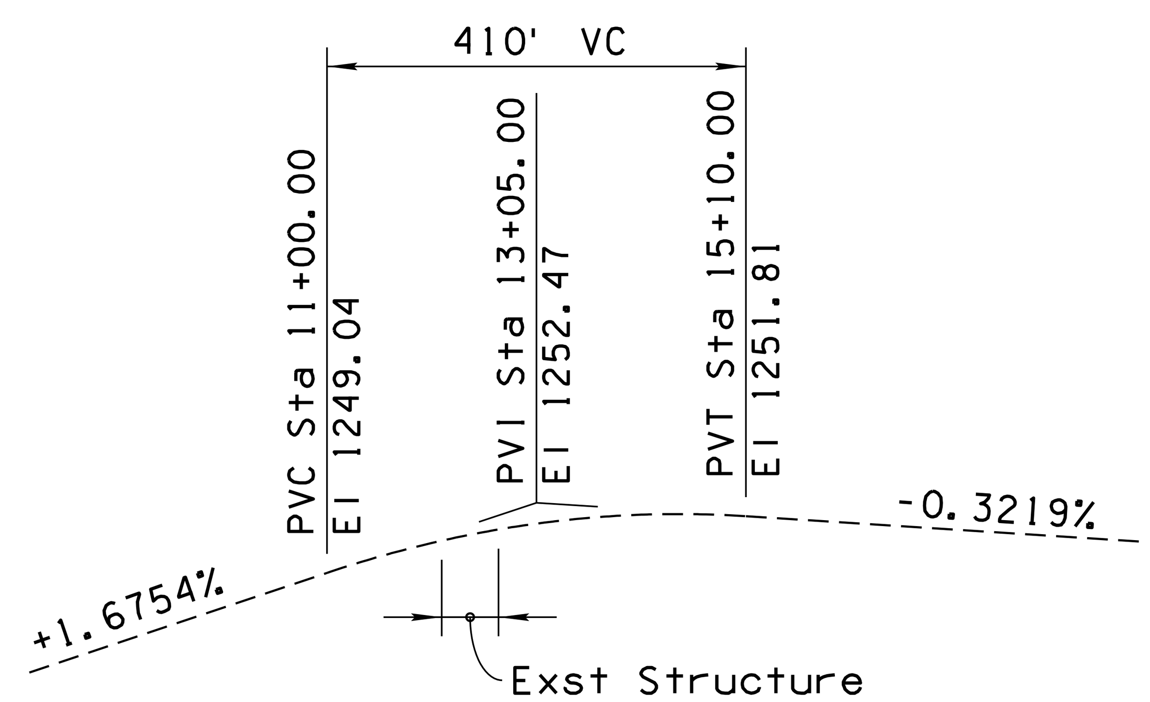
F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

202L MA 44



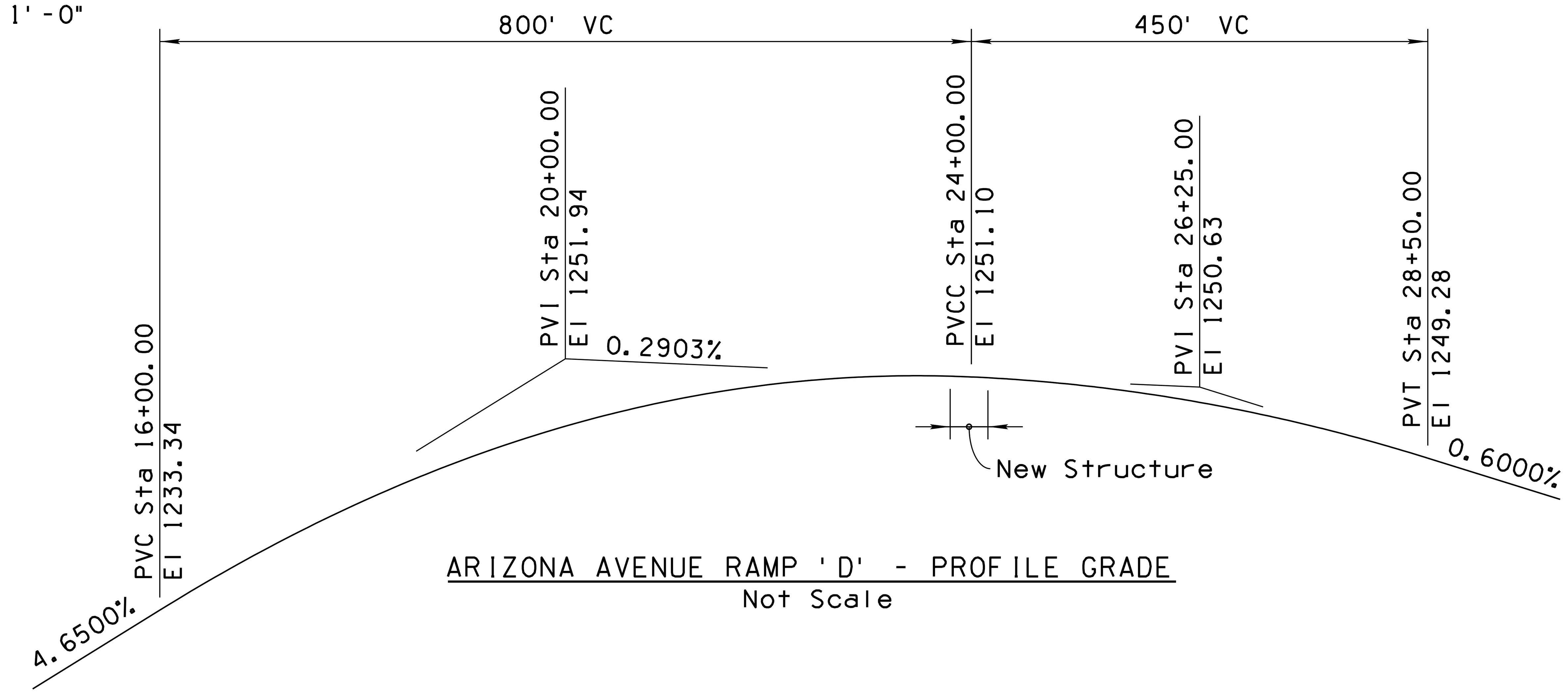
TYPICAL SECTION

Scale: ¼" = 1'-0"



EXST ARIZONA AVENUE RAMP 'D' - PROFILE GRADE

Not Scale



ARIZONA AVENUE RAMP 'D' - PROFILE GRADE

Not Scale

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

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INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 23+
ARIZONA AVE RAMP D
TYPICAL SECTION & GEOMETRICS

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
202L	47.38	TBD	VAL VISTA DRIVE TO I-10

DWG NO. S-06.02

TRACS NO. F0124 01C | 202-C(208)T | ___ OF ___

ADOT_SUBDUE_I.TBL

SURVEY NO. | FINISHED PLANS- | REVISIONS- | LOCATION- | DATE-

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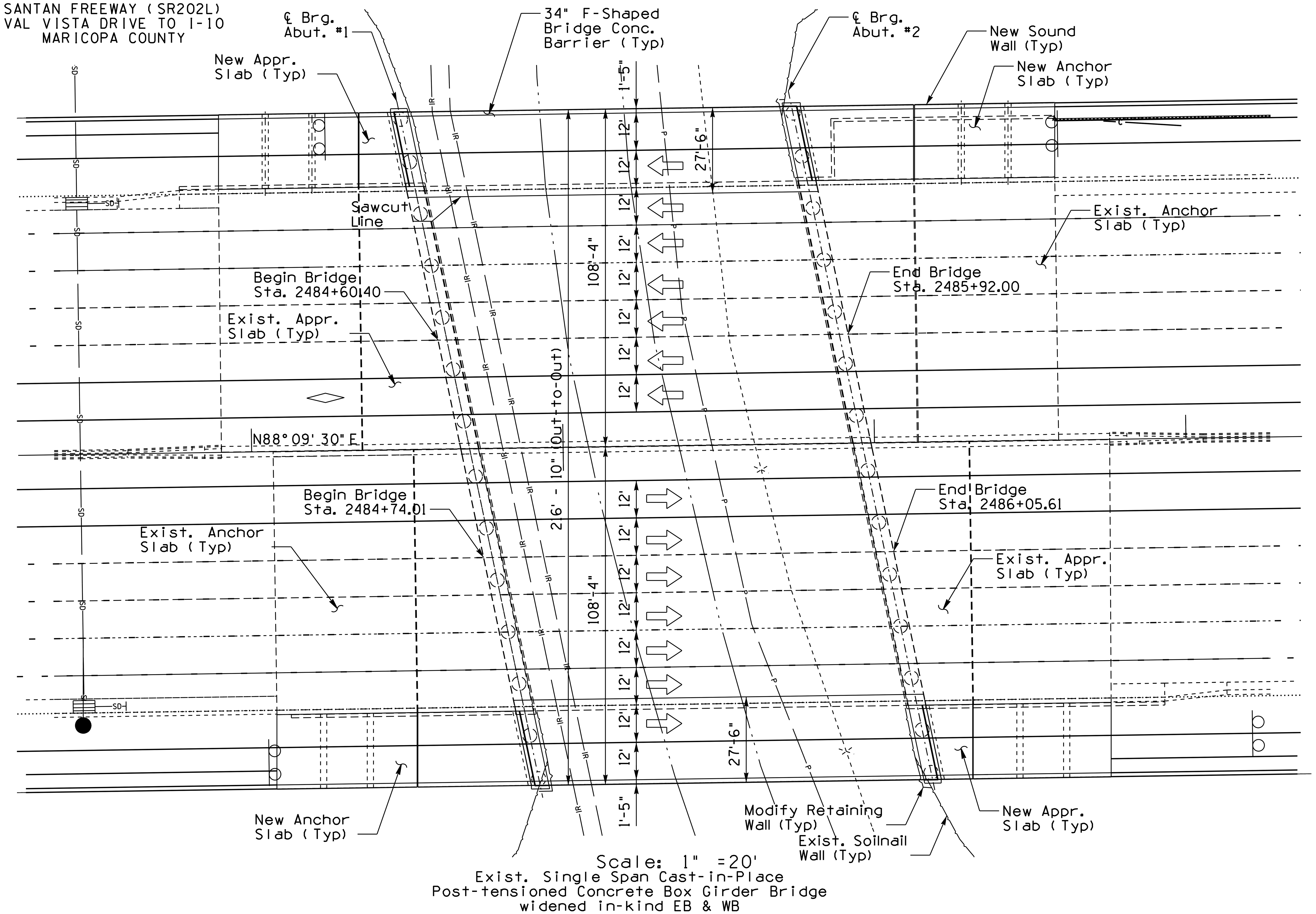
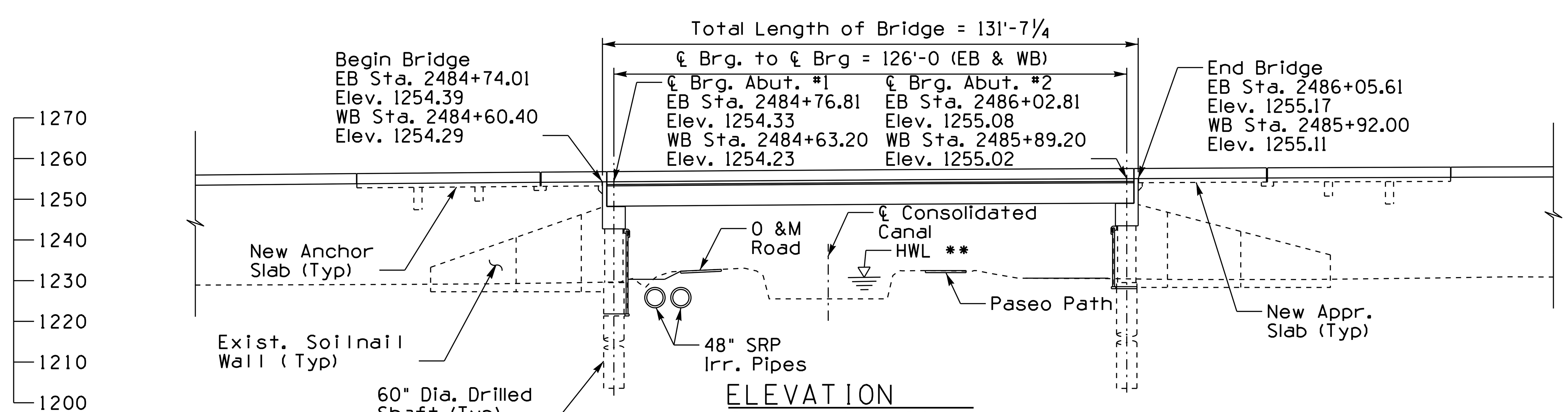




ELEVATION
Scale: 1" =20'

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C(208)T			

202L MA 44

N

GENERAL PLAN & ELEVATION S-7.01
TYPICAL SECTION S-7.02

* Sound wall panels not shown for clarity

** High Water Level is 1230.6±
Q = 188 cfs

	NAME	DATE
DESIGN	SK	05-19
DRAWN	AKM	05-19
CHECKED	SLG	05-19

NFra Inc.
a transportation engineering firm
77 East Thomas Road, Suite 200
Phoenix, Arizona 85012

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
BRIDGE GROUP

STA. 2485+
CONSOLIDATED CANAL OVERPASS
GENERAL PLAN & ELEVATION

ROUTE	MILEPOST	STRUCTURE NO.
202L	46.3	2683

LOCATION VAL VISTA DRIVE TO I-10

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING
DWG NO. S-7.01

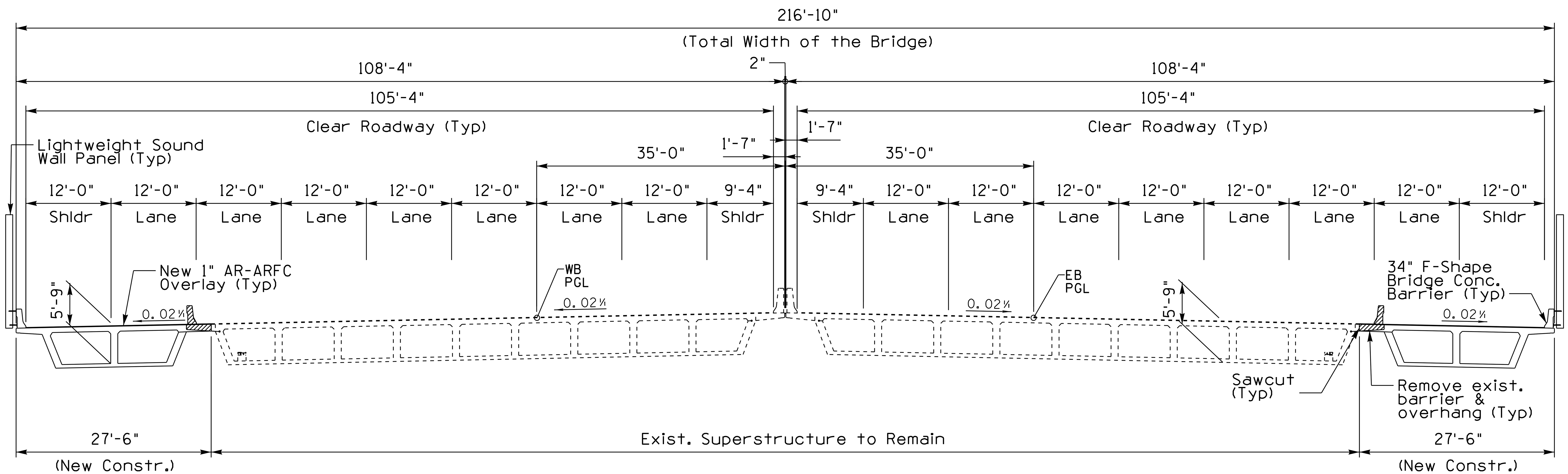
TRACS NO. F0124 01C
202-C(208)T
____ OF ____

ADOT_SUBDUE_I.TBL

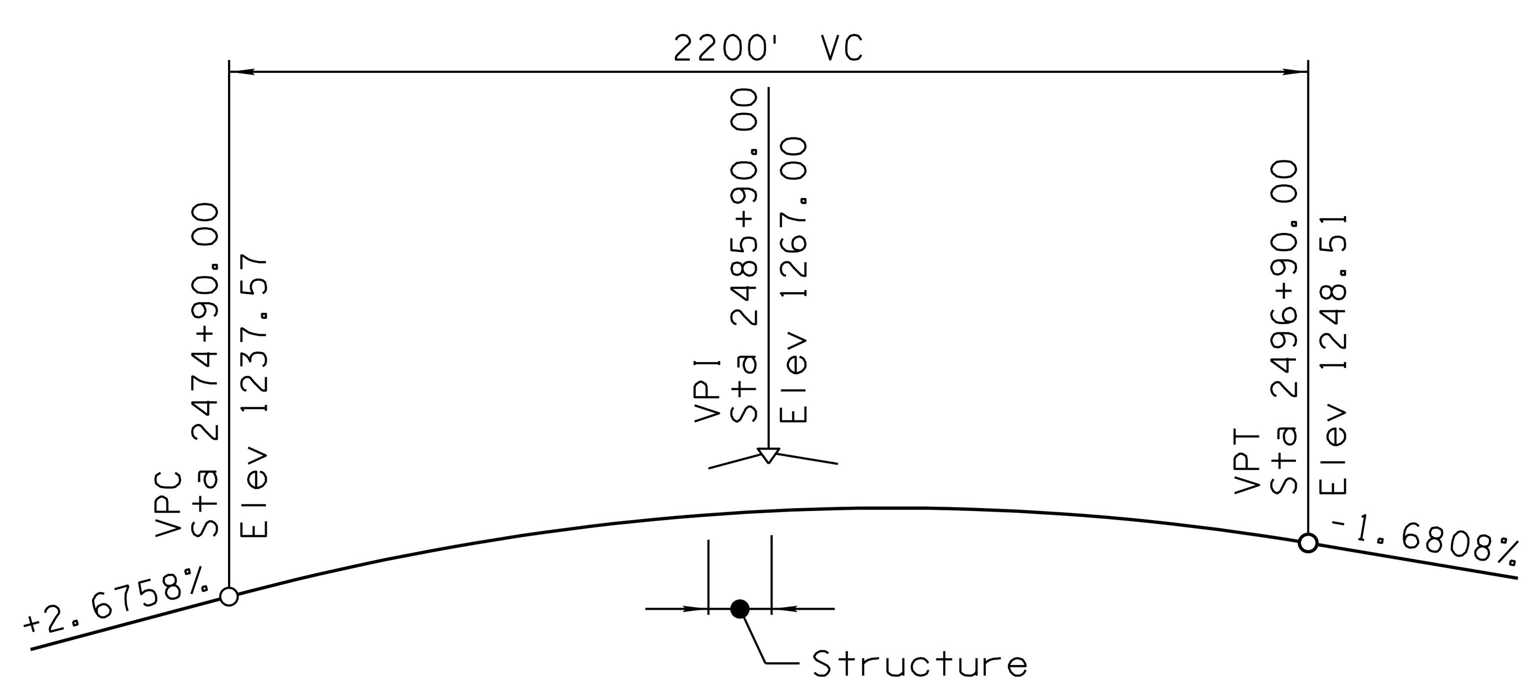
PLOTTED BY: AMOTHUKURI AT 11:24:18 AM 4/17/2019 c:\pw_working\pw_prod\amothukuri\dms39819\s2683_gp.dgn

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202-C(208)T			

202L MA 44



TYPICAL SECTION
Scale: 1/8" = 1'-0



PROFILE GRADE - 202L EB & WB (2)
Not To Scale

	NAME	DATE
DESIGN	SK	05-19
DRAWN	AKM	05-19
CHECKED	SLG	05-19

NFra Inc.
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Phoenix, Arizona 85012

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION
BRIDGE GROUP

STA. 2485+
CONSOILIDATED CANAL OVERPASS
TYPICAL SECTION

ROUTE	MILEPOST	STRUCTURE NO.
202L	46.3	2683

LOCATION VAL VISTA DRIVE TO I-10

PRELIMINARY
STAGE II
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. S-7.02

TRACS NO. F0124 01C | 202-C(208)T | ____ OF ____

ADOT_SUBDUE_I.TBL

PLOTTED BY: AMOTHUKURI AT 11:40:12 AM 4/22/2019 c:\pw_working\pw_prod\amothukuri\dms39819\s2683_typ.dgn

REVISIONS- LOCATION- DATE- FINISHED PLANS- SURVEY NO.

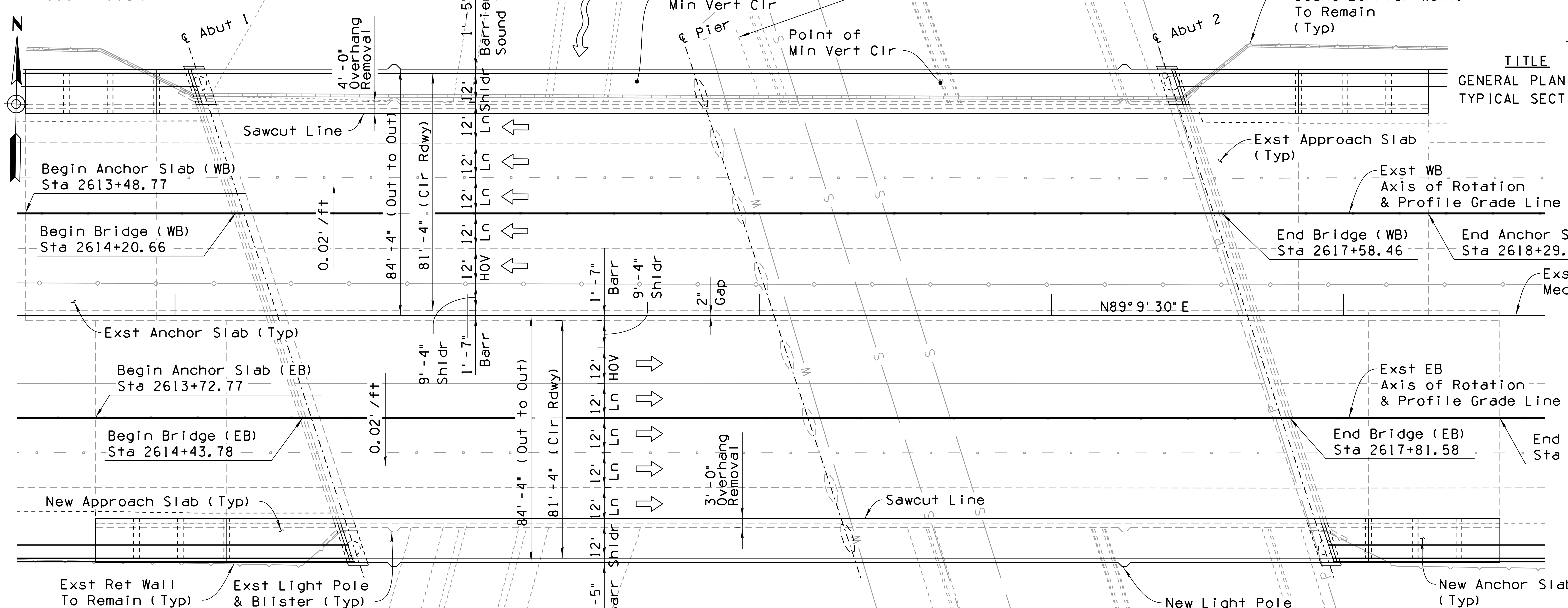
SANTAN FREEWAY (SR 202L)
VAL VISTA DRIVE TO I-10
MARICOPA COUNTY

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

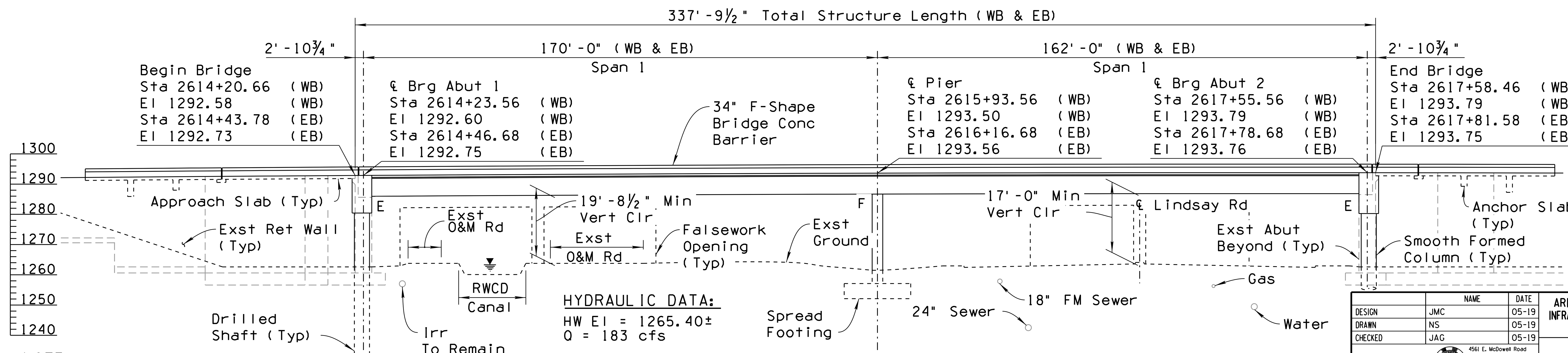
202L MA 44

INDEX OF DRAWINGS

TITLE	DRAWING NO.
GENERAL PLAN & ELEVATION	S-08.01
TYPICAL SECTION & GEOMETRICS	S-08.02



PLAN
Exst 2-Span Cast-in-Place Post-Tensioned Concrete Box Girder Bridge Widening
Skew 18°16'21" Lt
1' Contour interval
Scale: 1" = 20'



ELEVATION
Scale: 1" = 20'-0"

NOTE:
Stationing & dimensions are measured along the Exst SR 202L Med Constr ℄. Elevations are measured along the Profile Grade Line.

NOTES:
1. The Original bridges were built in 2006 under Project No. 202-C(009)B.
2. Dimensions & stationing of the existing structure are based on as-built plans. Actual structural features shall be field verified during final design.
3. The location of all utilities was determined from as-built plans & is approximate.
4. The profile grade & elevations for SR202L are based on the as-built plans.

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

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STA 2616+
LINDSAY ROAD OP
GENERAL PLAN & ELEVATION

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

202L ROUTE	43.7 MILEPOST	2789 STRUCTURE NO.	LOCATION VAL VISTA DRIVE TO I-10

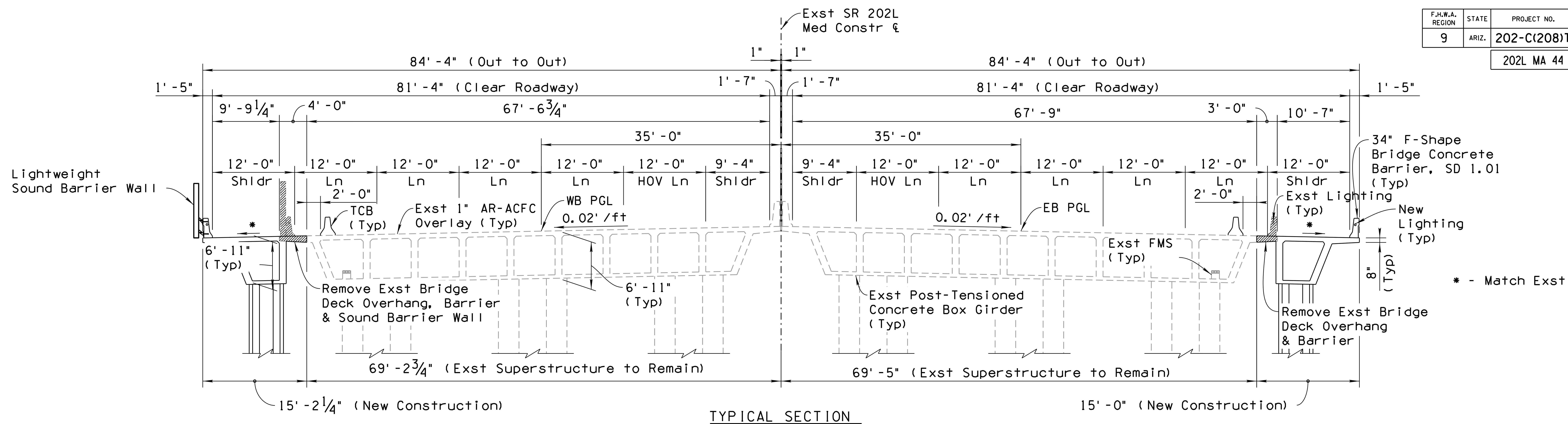
DWG NO. S-08.01

TRACS NO. F0124 01C | 202-C(208)T | ____ OF ____

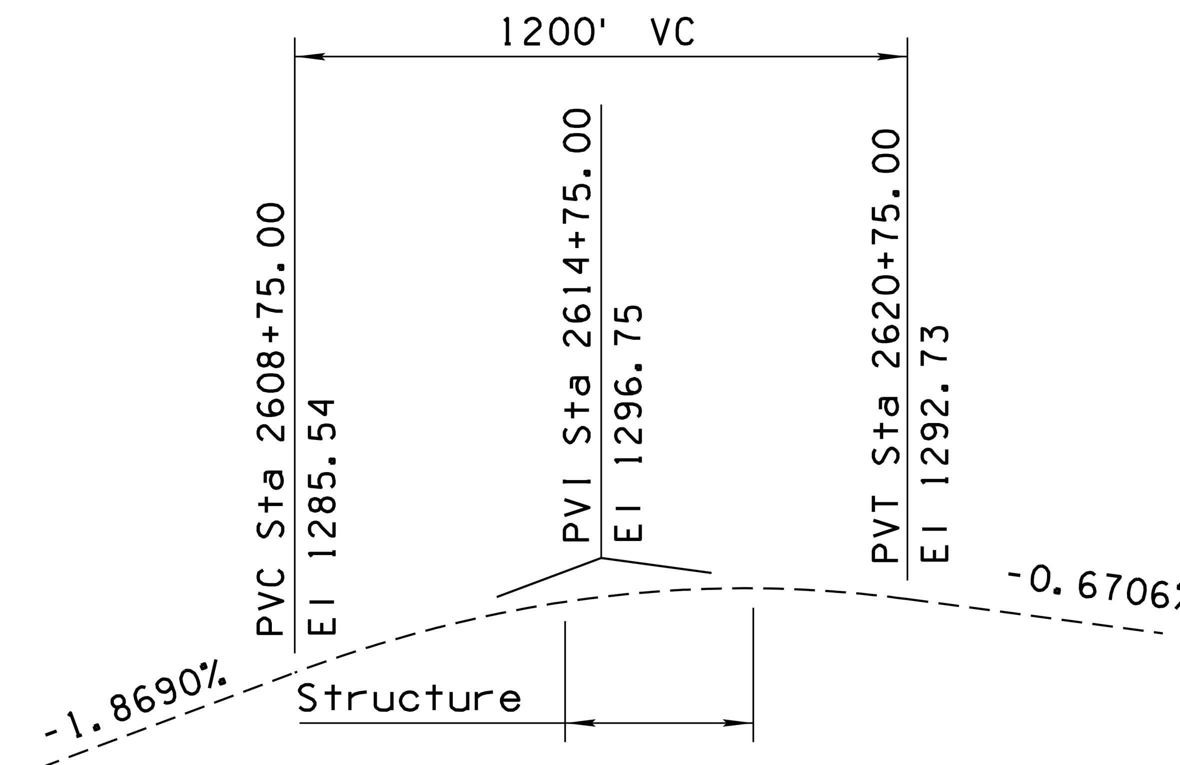
ADOT_SUBDUE_I.TBL

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	RECORD DRAWING
9	ARIZ.	202-C(208)T			

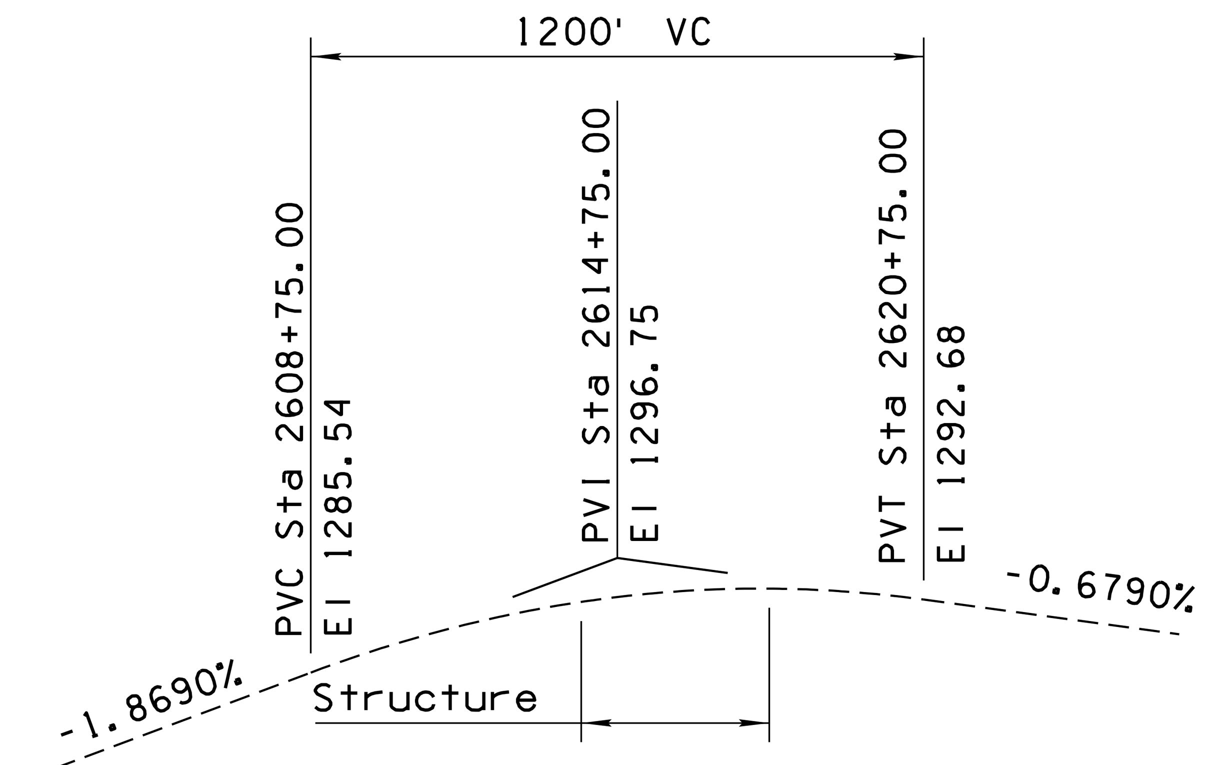
202L MA 44



TYPICAL SECTION
Scale: ⅛" = 1'-0"



PROFILE GRADE-202L WB
No Scale



PROFILE GRADE-202L EB
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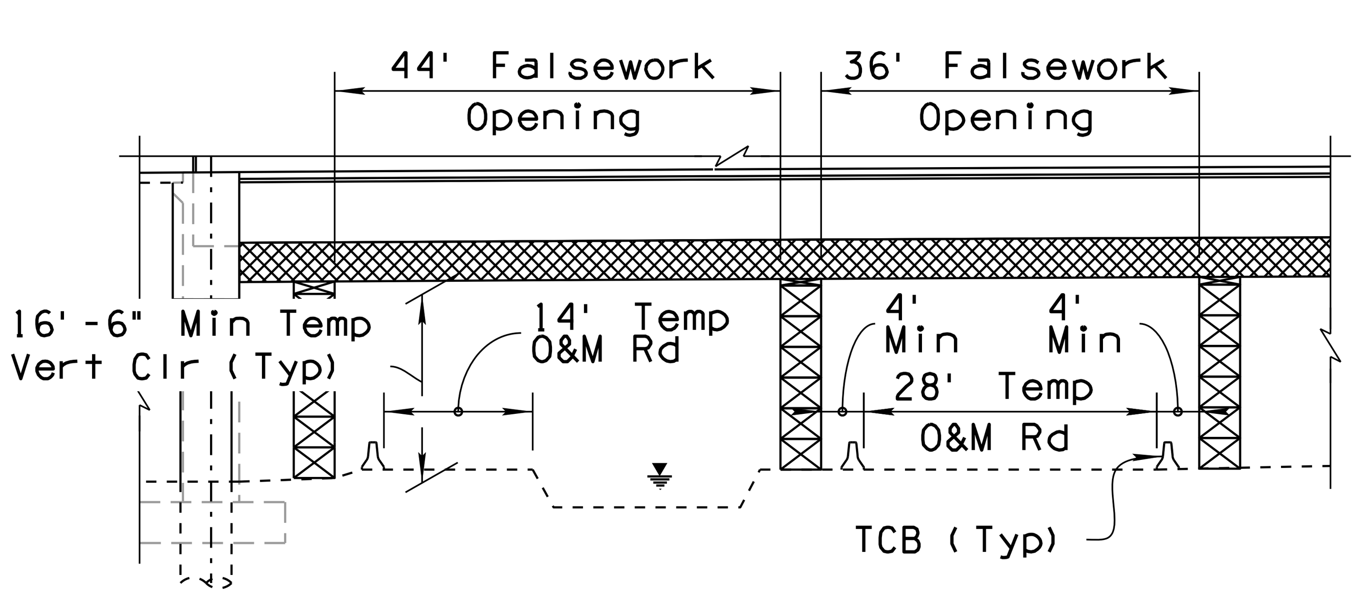
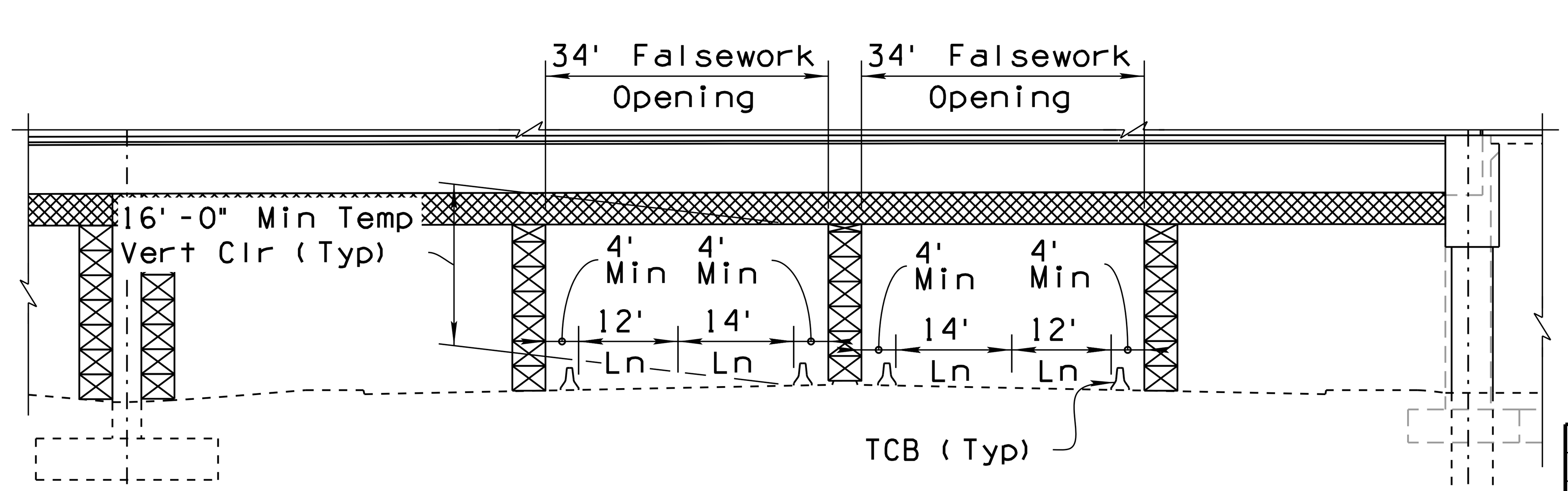


FALSEWORK DETAIL - RWCD CANAL
No Scale



FALSEWORK DETAIL - LINDSAY RD
No Scale

	NAME	DATE
DESIGN	JMC	05-19
DRAWN	NS	05-19
CHECKED	JAG	05-19

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ARIZONA DEPARTMENT OF TRANSPORTATION
INFRASTRUCTURE DELIVERY AND OPERATIONS DIVISIONS
BRIDGE GROUP

STA 2616+
LINDSAY ROAD OP
TYPICAL SECTION & GEOMETRICS

PRELIMINARY
NOT FOR
CONSTRUCTION
OR RECORDING

ROUTE	MILEPOST	STRUCTURE NO.	LOCATION
202L	43.9	2789	VAL VISTA DRIVE TO I-10

DWG NO. S-08.02

TRACS NO. F0124 01C | 202-C(208)T | ____ OF ____

ADOT_SUBDUE_I.TBL

PLOTTED BY: JCAMPBELL AT 1:03:19 PM 4/16/2019 c:\pw_working\pw_prod\jcampbell\dms39820\2-s2789_2790typ.dgn