

Tucson District
ADOT Plan Design Guidelines for Permittees
to Assist in Obtaining an Access Permit
04-07-2009

1. **Design** – Follow ADOT 2007 Roadway Design Guide with the latest revisions and AASHTO 2004 Roadway Design Guide for your project. The Roadway Engineering web site can be found at the following link drop down menu under design tools. http://www.azdot.gov/Highways/Roadway_Engineering/Roadway_Design/index.asp
Review the design memos for the latest design and ADOT Roadway Design Guide Chapters 100, 200, 300, 400, 500, 600 & 700. They can be found in Roadway Engineering Section's web site drop down menu under Design tools:

2. **General Notes** – Minimum Requirements:
 - a. All work shall be designed and constructed in accordance with ADOT 2008 edition Standard Specifications for Road And Bridge Construction, May 2007 Construction Standard Drawings, Signing & Marking Standard Drawings and Traffic Signals & Lighting Standard Drawings along with all current Revisions.
 - b. Traffic shall be protected in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), 2003 Edition with Revision 1, the Arizona Supplement to the MUTCD 2003 Edition, and the ADOT Traffic Control Design Guidelines. All signs, placement of signs, the necessity of flag persons and uniformed officers are the responsibility of the Permittee.
 - c. The contractor shall stripe the project roadway in accordance with the current edition of the Signing and Marking Standard Drawings, (M&S – Series) and the striping plans.
 - d. The information on these drawings showing the type, size and location of existing utilities is based on the best information available. The contractor shall verify the exact location and depth of all underground facility.
 - e. All Right of Way Markers, disturbed, destroyed or removed shall be replaced by a R.L.S. per Construction Standard Drawing C-21.10.
 - f. All work not in conformance with these Plans and ADOT Specifications shall be removed at the contractor's expense.
 - g. All disturbed area shall be seeded per ADOT specifications.
 - h. ADOT may make periodic site inspections and reserves the right to revise the location of sediment trapping devices and the types of structural controls as the field conditions dictate. The contractor agrees to implement any such revisions at ADOT request.
 - i. ADOT requires striping obliteration to be tested for lead based paint by project owner prior to obliteration. If test results are below policy threshold limits, no further action will be required. Please submit test results ASAP for further guidance.
 - j. All native plants in the right of way shall be tagged and relocated within the right of way prior to start of construction.

Additional notes may be required due to the design of the project.

3. **Design Data** – Provide the following design data on first plan sheet:
 - a. Design Speed,
 - b. Posted Speed Limit,
 - c. Average Daily Traffic (ADT),
 - d. If traffic impact analysis is required for your project, show future Average Daily Traffic (ADT).
 - e. Average Elevation of Project
4. **References** – Show all as-built plan project numbers referenced for your design. Some sections of highway have more than one as-built plan, so be sure to review all as-built plans for your project. As-built plans can be reviewed and obtained through our District Permits Office at 1221 S. 2nd Ave Tucson, AZ. You also may obtain as-built plans from ADOT Engineering Records in Phoenix. The most up to date as-built plans are usually maintained in the District Permits Office.
5. **Pertinent Information** – Show pertinent information for your project design under the heading including: length of project in feet and miles, beginning and ending stations, along with beginning and ending mileposts of project. Use ADOT stationing from as-built plans.
6. **Location Map** – Show a general vicinity of your project giving the State Route and intersecting State Routes.
7. **Site Map** – Show project site with major cross streets. Show beginning and ending stations of your project and show beginning and ending milepost. Use ADOT as-built plans to get this information. Use ADOT Stationing for your project.
8. **Font** – Font sizes should follow ADOT CADD specifications available at the following link drop down menu under Cadd Information:
http://www.azdot.gov/Highways/Roadway_Engineering/Roadway_Design/index.asp
Information on plans should be fully readable on 11" x 17" sheets.
9. **Drafting Standards** – It is recommended that you use ADOT CADD Standards, which can be found in the Roadway Engineering Sections web site at the following link drop down menu under Cadd Information:
http://www.azdot.gov/Highways/Roadway_Engineering/Roadway_Design/index.asp
10. **Legends & Abbreviations** – Use ADOT legends and abbreviations from ADOT Construction Standards Drawings, May 2007 edition, C-01.1 & C-01.30. All current and old Construction Standard Drawings can found in the Roadway Engineering Section's web site drop down menu under Constructyion Std Drawings.
http://www.azdot.gov/Highways/Roadway_Engineering/Roadway_Design/index.asp
Additional legends can be found in the Signing & Marking and Traffic Signals & Lighting Standard Drawings.

11. **ADOT Drawings, Specifications, and Manuals** – The ADOT Engineering Records Section has most of the current ADOT Standard Drawings, Manuals and Specifications for sale. Their address is:
Arizona Department of Transportation
Engineering Records Section
1655 W. Jackson, Room 175
Phoenix, Arizona 85007-3217
Their phone number is (602) 712-8216 or (602) 712-7498, their fax number is (602) 712-3235. There is a price list on their web site at,
http://www.azdot.gov/Inside_ADOT/Misc/Engineering_Records.asp
12. **Non-ADOT Standards** – Use ADOT Standards if they are available. Any non ADOT Standard used in your design, such as MAG Standards, City Standards, or County Standards, will need to be shown in your plans.
13. **Plans Housekeeping** – Sometimes plans become too busy and hard to read because of the contour lines on plans. It is recommended to turnoff the contour lines and show elevations, profiles and cross sections instead. Design plans need to be clear, concise and not cluttered. Do not show too many details on one sheet. Show general notes on separate sheets and plan notes on the same sheets. Show all details to construct your project; nothing should be left to the imagination.
14. **Benchmarks** – Show all pertinent data relating to datum lines for your project design.
15. **Index** – Provide plans index for your project.
16. **Quantities** – Show plans quantities for your project.
17. **Centerline Control** – Use ADOT construction centerline as the control line for your project.
18. **Typical Sections** – Show typical section(s) for the entire length of the project from ADOT construction centerline to the right of way line for asymmetrical widening or from right of way line to right of way line for symmetrical widening as applicable. Give applicable stations of section(s). If the cross slope of the pavement changes due to a super elevation, provide a diagram with stations showing the changes in super elevation. Show a typical section as necessary for each change in the roadway width, beginning and ending of tapers, etc. On typical section(s), show the following information: all dimensions from ADOT construction centerline to existing edge pavement, to new edge of pavement, to ditch line and to right of way line; cross slope of pavement; slope ratio of cut/fill slope off edge of pavement; back slope ratio citing appropriate C Standard (C-02.10, 02.20 or 02.30 for the design your are using); and reference pavement structural sections used. If widening of the roadway requires restriping, a surface course will be needed for the entire width of roadway. Surface course generally matches what exists (Chip Seal Coat, AR-ACFC). Examples of Typical Sections can be found in Roadway Design Web Site drop down menu under Cadd Information at the following link:

http://www.azdot.gov/Highways/Roadway_Engineering/Roadway_Design/index.asp
Chapter 300 of the ADOT Roadway Design Guide also shows typical sections.

19. **Pavement Structural Sections** – Show pavement structural sections for each different pavement section of your design. Examples of different pavement section would be aggregate base course thickness changes, thickness of AC changes, changing from milling to just an AC overlay, etc. On the pavement structural sections show any milling, aggregate base course thickness, number and thickness of lifts for asphaltic concrete, tack coat between lifts and surface course. Generally this information can be obtained from the District Permits Office. Show type of AC mix, ADOT 406, ADOT 409 and/or ADOT 414. Any project over 1000 tons of AC will require ADOT 406 mix and specifications. Any project under 1000 tons of AC will require ADOT 409 mix and specifications. Any narrow strips of pavement 4' or less in width, use ADOT 409. All chip seal coats use CRS-2P emulsion; the specifications for chip seal coat emulsion can be obtained from the District Permits Office. Examples of Pavement Structural Sections can be found in the ADOT Roadway Engineering Sections web link given in 11 above. Be sure to show all pavement structural sections in your plans.
20. **Rumble Strips** – When pavement widening is to be done in an area where there are rumble strips, the rumble strip must be removed entirely either by milling to a depth of 2" or by sawcutting the full depth of the pavement and removing the shoulder.
21. **Recessed Pavement Markers** – When pavement widening to create a left turn lane is to be done in an area where there are recessed pavement markers, the depression for the recessed pavement marker will need to be filled in a manner compatible with the pavement in the area. Check with the Permits Office to see what procedure is to be used.
22. **Slopes** – In cases where there are improvements such as drainage ways or widening of facilities, or if the design is using variable slopes; provide cross sections to clarify design. Evaluate impacts of design to adjacent and underground features to assure design will work. Chapter 300 of the ADOT Roadway Design Guide shows typical sections and slope design criteria. Section 303.3 gives **important** guidance on side slope design criteria to follow. Back slopes with a slope ratio 2.5:1 to 3:1 will require erosion control mats after seeding. Slopes 1.5:1 to 2.5:1 will require positive protection such as shotcrete. Slopes steeper than 1.5:1 will require a retaining wall. Show a detail for any slope 3:1 or steeper, which addresses the above.
23. **Environmental** – Submit an environmental clearance certification from a qualified firm for the area disturbed in ADOT right of way. **Guidelines will be given to you with your permit application.** Please do not submit the environmental clearance documentation.
24. **SWPPP** – If your total project (offsite) disturbs one acre or more, you are required to submit a SWPPP with BMPs that meet ADEQ and ADOT requirements. **Requirements will be given to you with your permit application.** The following are links to the ADOT Storm Water Program web site which has many documents and manuals to assist you in developing a SWPPP, including an Erosion Pollution Control Manual and SWPPP template:

http://www.azdot.gov/adot_and/storm_water/stormwater.asp#three
http://www.azdot.gov/adot_and/storm_water/Erosion_Pollution_Control_Manual.asp.

At a minimum, soil stabilization by seeding all disturbed areas is required and 70% background growth reestablished from the seeding before the project is accepted by ADOT. This method could possibly take two years in arid areas depending upon the rain. In the mean time, the permittee is still required to fill out the monthly SWPPP inspection forms and maintain the SWPPP devices until the growth is established. In lieu of the seeding, rock material meeting ADOT Standard Specification section 803 may be placed on the disturbed soil. By placing the material, the permittee has fulfilled ADEQ and ADOT requirements for soil stabilization. However, with rock material, the permittee is required to maintain all areas where it is placed. This can be accomplished by incorporating the maintenance in the CC&Rs of the development. If there is less than one acre of disturbance in ADOT right-of-way, but the total disturbance due to the development is one acre or greater, then the disturbance in ADOT right-of-way shall be shown in the SWPPP for the development and noted on the plans submitted to ADOT.

25. **Geometrics** – Show roadway geometric data on your plans.
26. **Right-of-Way** – Dedication of additional right of way may be needed if there is not enough right of way to accommodate required improvements and still allow ADOT the buffer necessary to maintain the road. Improvements that require the dedication of right of way may include clearance from toe of fill slope to right-of-way line (10' is minimum clearance, see section 303.6 of the Roadway Design Guidelines), drainage issues and clear zone requirements. Clear Zone requirements can be found in the Arizona Department of Transportation Traffic Control Design Guidelines 2003 at the following website. <http://www.azdot.gov/highways/traffic/Standards.asp>. Clear Zone requirements cannot be changed, so it is important to use this resource. If your project is in a City with limited Right of Way and sidewalk is required, ADOT will need 5' of Right of Way for signing outside the edge of Sidewalk. If new Right of Way is required, ADOT will need a letter stating the new right of way will be dedicated to ADOT with Legal Description before a permit will be issued, and the right of way must be dedicated before the permit work is accepted and the permit is closed. Show existing and new right of way on the Plans. Any existing easements affecting this property will need to be extinguished before ADOT will accept the new right-of-way. The following link is to the ADOT Right of Way Plans Group for right of way plans for most State Highways throughout the State. <http://www.azdot.gov/highways/row/rowplans/existingplansindex.asp>
27. **Roadway Stationing** – Show ADOT roadway stationing for beginning and ending of tapers, intersections and all existing features like drainage pipes, curb openings for drainage, existing driveways. Please review ADOT as-built plans to determine existing features. Show stations for all section corners and ¼ corners on your project.
28. **Dimensions** – Show width dimensions on your roadway plan view on each sheet. Show widths for beginning and ending of tapers, at the beginning and ending of each plan sheet, to edge of old pavement, to the edge of new pavement and to right of way line. Distance to curb returns should also be noted. Review ADOT Standard Drawing to see

where dimension line applies. Show right of way lines and all dimensions from the ADOT construction centerline, which can be found on ADOT as-built plans.

29. **Roadway Profile** – Show profile for existing roadway and new edge of pavement.
30. **Driveways, Turnouts, Side Streets** – Show profiles and typical sections for turnouts and side streets. Profile should extend at least 60 feet beyond ADOT right of way line. Review Construction Standard Drawing C-06.10 Sheets 1 and 2 and ADOT Roadway Design Guide Section 404.3 for information on driveways & turnouts in ADOT right of way. Use this information as a guideline for developing your plans.
31. **Intersection Sight Distance** – All at grade intersections need to be reviewed for adequacy of sight distance. If there appears to be a potential problem with sight distance, additional data may need to be gathered. Consideration should be given for the modification to obstructions within the sight triangle. The location of the intersection on the vertical alignment is also an important factor. Show sight triangle on your plans and note any removal of obstructions. Follow ADOT Roadway Design Guide section 408.4 and 408.5 for sight distance determination.
32. **ADOT Permits in Area** – Review permits issued in the project area that may impact your project. This information can be found in District Permits Office. Permit numbers are on as-built plans for the section of highway for your project.
33. **Utilities** – any existing longitudinal utilities that will fall under new pavement will have to be relocated a minimum of 12 feet from edge of pavement, with few exceptions. There may be utilities in conflict with the new features of your design or there may be inadequate clearance between new feature and a utility. ADOT may require a letter of clearance from each utility company. Be sure to give utility companies a copy of your plans for review. Show all existing utilities on your plans with the appropriate legends. It may be necessary to show cross sections for utilities if conflicts exist. Any utilities placed under pavement should be sleeved. No valves or manholes will be allowed in any paved access. Permits for relocation or placement of new utilities must be taken out by the utility company that owns/will own the facility. Follow ADOT Guide for Accommodation Utilities, which is available at the following link under Utility Guides: <http://www.azdot.gov/Highways/Utilities/index.asp>

Utilities Adjustment; prior to adjustment or relocation of manholes or any work by the Permittee's contractor on any Utility, the Utility Owner must approve in writing any work to be done. This written approval must be submitted to ADOT prior to issuing the permit.
Manhole Adjustment; Manholes shall be adjusted as shown in MAG Standard Detail 270.
All Frames and covers shall support HS20 loading at a minimum.
34. **Drainage Analysis** – If your design will impact existing drainage, a complete drainage analysis will be required. **Handouts on drainage requirements will be given with your permit application.**

35. **Retention Basins** – Retention basins for developments are not allowed in ADOT right-of-way, and no portion of the basin shall be in the right-of-way.
36. **Culvert Information** – Culverts in the right-of-way are allowed to be extended for roadway widening, but are not allowed to be attached to for drainage into or through a development. Culverts are required to be extended in lieu of placing guard rail to protect a hazard.
37. **Pipe References** – Reference ADOT Construction Standards Drawings for pipe installation (C-13.10, C-13.15, C-13.20, C-13.25). Use the applicable standard for whichever type of pipe being installed, CMP or RCP. End of pipe shall be outside of the recovery area as shown in C-13.10.
38. **Drainage Information** – Drainage channels may require a profile. Show all drainage flow Qs on your plans.
39. **Pipe Sizing** – The minimum diameter of pipe approved by ADOT is 24” or oval equivalent to a 24” except that pipes connecting catch basins to storm sewer systems be 18 inch. Eighteen inch may be used where conflicts with utilities or other highway appurtenance features preclude the use of a 24” pipe. Pipes less than 18” shall not be used. Show the type of pipe used, the wall thickness and corrugation for a CMP (see Section 1010 of the ADOT Standard Specifications for Road and Bridge Construction for guidance) or the class for an RCP. Follow ADOT Roadway Design Guidelines, Appendix A – Pipe Selection. Any pipe 36” in diameter or larger requires cement treated slurry bedding from the bottom of the pipe to the spring line.
40. **Rip Rap** – Headwalls, pipe end sections and cut to fill sections will require dumped riprap over filter fabric **as shown in Roadside Design Sections Rock Riprap/Rock Mulch BMP Details at:**
http://www.azdot.gov/Highways/Roadway_Engineering/Roadside_Development/Resources.asp
Other design details will also require dumped riprap over filter fabric. Show a cross section of the riprap area on the plans. Use high survivability filter fabric, meeting Standard Specification 1014-4.03, under any dumped riprap. Follow ADOT Roadway Design Guidelines section 613.3 for riprap design. Give gradation of dumped riprap. Thickness of riprap equals 2 x D50. See ADOT Hydraulics Manual (Draft Form) at the following web site drop down menu under manuals:
http://www.azdot.gov/Highways/Roadway_Engineering/Drainage_Design/index.asp
41. **Scuppers** – If a scupper is used in your design, handrail will be required. However; ADOT does not have Standard Drawings for scuppers and hand rail. We have been approving MAG Standard Detail 206-1 for scuppers and Detail 145 for handrail. Show the detail for the scupper and the handrail on the plans, but use ADOT C-4.10 spillway in lieu of the MAG Standard spillway (Section C-C 206-1). Handrail shall be painted according to the requirements of Standard Specification 610-3.05 with the color of the top coat specified in the plans.

42. **Fence** – Show existing fence lines and what will happen to fence. Retaining walls, block walls and wall foundations are not allowed on ADOT right-of-way. Walls shall not block historic drainage patterns.
43. **Guard Rail** – If your design will impact a run of guard rail, the whole length of guard rail will have to be brought up to current design standards. Specify the type of end treatment to use and provide a detail for the end treatment pad per ADOT standards, which can be found at the following web link drop down menu under detail drawing:
http://www.azdot.gov/Highways/Roadway_Engineering/Roadway_Design/index.asp
Specify the type of guard rail installation, type A or type B, according to standard drawing C-10.01 or C-10.02 and show a detail of it. . Follow ADOT Roadway Design Guide Section 305.8 to determine the length of need for the guard rail and submit the calculations for review.
44. **Air-Entrained Concrete** – All concrete placed above 3000' in elevation shall have air-entraining admixtures, which meet standard specification 1006-2.04 (B). The amount of entrained air in the concrete mixture shall not be less than four (4) percent and no more than seven (7) percent. If this specification applies to your project, place this specification on your plans.
45. **Saw Cutting** – Widening existing pavement and curb removal will require saw cutting existing pavement full depth. Show this on the plans.
46. **Landscaping** – Follow ADOT landscaping requirements if landscaping is requested to be placed on ADOT right-of-way. **A landscape packet is available that gives specifics on landscaping in the right-of-way.** For landscaping improvements at intersections or median openings, the use of low growth vegetation (no higher than 30 inches at full growth) is required within the sight triangle. Trees and shrubs at full growth shall not infringe in the sight triangle or overhang onto the roadway pavement.
47. **Concrete Headers** – New turnouts without curb will require a concrete header 6" wide by 12" deep the length of the radius. Show it on your plans.
48. **Curb and Gutter** - New curb and gutter installations will require Class 2 Aggregate Base from the top of subgrade as shown in ADOT Roadway Design Guide Figure 302.1. Show this treatment in the Typical Sections.
49. **Sidewalk Ramps** – New turnouts with single curb or curb and gutter will require new sidewalk ramps. These ramps shall be per ADOT Construction Std. drawings C-5.30. In the Construction Standards Drawings there are 7 types of sidewalk ramps, so make sure the appropriate type is used. In most cases Type A will be used. Specify the type of truncated dome detectable warning strips to be placed on the ramp, how they are to be attached and give the manufactures names where they may be purchased. ADOT's approved products list can be found at the following web link:
<http://www.azdot.gov/TPD/atrc/Pride/index.asp>.

50. **Sidewalk IGA** – An intergovernmental agreement is needed between a local government agency and ADOT for the maintenance of sidewalks whenever sidewalks are constructed on ADOT right-of-way. ADOT does not maintain sidewalks. This agreement shall be in place before sidewalks are constructed.
51. **Quality Control** – Any permit work that requires the roadway to be widened, requires structures to be extended, or has more than 2,000 feet of trenching will require that the **permittee provide quality control inspection according to the attached document.**
52. **Traffic Information** – ADOT Traffic Engineering Section’s web site has a considerable amount of information that will be useful when developing your plans. Listed below is the site and what can be found at this site. The web link is as follows:
<http://www.azdot.gov/highways/traffic/Standards.asp>
- a. Approved products list (ATRC web site, The PRIDE Program)
 - b. Arizona Motor Vehicle Crash Facts
 - c. Manual of Approved Signs (MOAS) English Version
 - d. Manual on Uniform Traffic Control Devices 2003 Edition (2003 MUTCD) (Without AZ Supplemental Amendments.
 - e. Arizona Supplement To The Manual On Uniform Traffic Control Devices (MUTCD) (2003 Edition)
 - f. ADOT Traffic Safety For School Area Guidelines
 - g. ADOT Traffic Control Design Guidelines (Guides for Design of State Highway System Construction, Maintenance, utility, and Incident Management Operations)
 - h. Traffic Signals and Lighting Standard Drawings 2004 Book
 - i. Traffic Signals and Lighting Standards 2002 Book (English Version)
 - j. Traffic Engineering Cadd Standards
 - k. Traffic Engineering Construction Standards Index Sheets 1-B and 1-C
 - l. Stored Specifications (Contracts and Specifications Web Site)
 - m. Traffic Engineering, Policies, Guidelines, and Procedures.
 - n. Traffic Structures (Bridge Group)
 - i. Median Sign Structure (One Sided)
 - ii. Median Sign Structure (Two Sided)
 - iii. Variable Message Sign Tubular Frame
 - o. Signing Location Guideline Figures Packet
 - p. Signing Checklist
53. **Energy Cost IGA** – An intergovernmental agreement is needed between a local government agency and ADOT for the energy costs associated with intersection signalization and roadway lighting. ADOT will not pay the energy costs associated with development driven impacts. This agreement shall be in place before a permit is issued.
54. **Signing & Marking** – All roadway-widening projects will require signing and striping plans. These plans should be on separate sheets, along with general notes for the

signing and striping. Traffic Engineering Section requirements for Signing & Striping Plans:

- a. Dimension distances between all pavement markings.
- b. Label beginning and ending of all tapers. Use ADOT Stationing.
- c. Label all radii.
- d. Check that the signing/striping plans match all generations of the civil plans.
- e. Label beginning and end of project. Please give an ADOT station and an approximate Mile Post.

55. **Signing & Marking Notes** – General Signing and Striping notes shall be something similar to the below:

a. **(Pavement Markings)**

- i. All work to be done within the ADOT Right-of-Way shall conform to the current edition of the ADOT Signing and Marking Standard Drawings.
- ii. It is the contractor's responsibility to ensure that the final surface course is placed so that the striping is offset 1-foot clear of the construction joint, unless otherwise directed by the engineer.
- iii. The dimensions shown to pavement striping are to the center of the striping or, in the case of double striping, to the center of the double striping.
- iv. At the completion of the final pavement surface, centerlines, lane lines, edge lines, and the stop bar shall be striped with one application of standard reflectorized traffic paint at the location of the permanent striping. The paint shall have a maximum thickness of 10 mils wet (5 mils dry).
- v. The final striping shall be 90 mil, (0.090 inch) thick alkyd extruded thermoplastic reflectorized striping placed over the existing striping 30 days after completion of the final pavement surface, or as directed by the engineer. All other markings shall be applied at the same time.
- vi. The final Stop Bar, Pavement Arrows, and "ONLY" legend shall be white 90 mil (0.090 inch) thick alkyd extruded thermoplastic reflectorized markings.
- vii. The contractor shall clean the roadway surface to the satisfaction of the engineer, by sweeping and air-jet blowing, immediately prior to the placement of all pavement markings. The roadway surface shall be dry and the air and pavement marking temperatures shall not be less than 55 degree F for the placement of thermoplastic markings.
- viii. All raised pavement markers shall have an abrasion resistant coating on the face of the prismatic reflectors and shall conform to the details of Std. Dwg. M-19. They shall be installed with a bituminous adhesive that is on the ADOT approved products list.
- ix. Where raised pavement markers are placed between double yellow striping, they shall be centered in the 6-inch gap between lines. Where raised pavement markers are placed along solid white striping, the nearest edge of each marker shall be offset 2 inches from the nearest edge of the striping. For broken white or yellow striping, the markers shall be placed to align with the broken striping.

- x. (If applicable) The contractor shall notify the engineer two weeks prior to the application of the final surface course to schedule a "No Passing Zone" survey by state forces. The "No Passing Zone" survey shall supersede the permanent pavement marking plans. The contractor shall not apply the pavement marking on the final pavement surface until the engineer approves the layout for the permanent pavement markings, including any adjustments based upon the "No Passing Zone" survey. The "No Passing Zone" crew may be reached at (602) 228-0889, (602) 228-2508, or (602) 228-4932.
 - xi. When stripe obliteration is necessary, it shall be accomplished by water blasting. If the existing surface is damaged due to the obliteration, a new surface course shall be placed as directed by ADOT.
 - xii. All raised pavement markers shall be installed so that the reflective face of each marker is facing the direction of traffic and is perpendicular to the direction of traffic flow.
 - xiii. Three working days prior to final striping layout, please contact ADOT Tucson Regional Signing and Striping Section at 520-838-2828, Xavier Casillas or Gary Hack, to coordinate the layout inspection.
- b. **(Signing)**
- i. All signs shall be in compliance with the Manual on Uniform Traffic Control Devices (MUTCD), the ADOT Signing and Marking Standard Drawings, and the Traffic Engineering Manual of Approved Signs.
 - ii. The bottom of each sign shall be at least 7 feet above the nearest edge of pavement and at least 7 feet above the ground under the sign.
 - iii. The contractor shall install the signs so the nearest edge of corner of each sign is offset 12 feet from the nearest edge of pavement, except as otherwise indicated.
 - iv. All signs shall be fabricated of flat sheet aluminum with direct applied copy or silk-screened legend.
 - v. All signs shall be installed on new square tube posts with foundations as indicated on Std. Dwg. S-1 and S-3.
 - vi. All bolts used to install signing shall have hex heads, not slotted heads.
 - vii. The contractor shall use only cadmium-plated steel washers, not nylon washers, between each bolt head and the face of the sign panel.
 - viii. The retro reflective sheeting on all new signs shall meet the criteria established for Type VIII, IX, or X sheeting in accordance with ASTM D4956-04
 - ix. The contractor shall preserve all roadway signs, sign supports, object markers, and milepost markers, and shall replace with new any signs, sign supports, and markers damaged as a result of the construction at the contractor's expense.
 - x. Existing signs not shown on the plans that do not need to be removed shall remain. If construction activities require the removal of signs, temporary signs shall be placed as near as possible to the previous location as directed by the engineer, unless otherwise specified in the plans, until new signs are installed.
 - xi. Shop drawings for any D-3 signing will be required to be submitted to Xavier Casillas (520-838-2828) for approval prior to installation.

- xii. Upon the installation of each finished sign, the contractor shall place information on the back of the sign as shown on the sign identification details in Std. Dwg. S-13.
- xiii. Three working days prior to final signing layout, please contact ADOT Tucson Regional Signing and Striping Section at 520-838-2828, Xavier Casillas or Gary Hack, to coordinate the layout inspections.

56. **Signalization** – For projects that have intersection signalization, review civil design plans to assure signals can be constructed as designed. Locations of signal poles need to be at their final location. **Permittee provided quality control inspection is required. Follow attached ADOT PGP 614 and 635 for the development and approval of traffic signal plans.** These policies are available at: <http://www.azdot.gov/highways/traffic/PGP.asp>.

57. **Signalization Plans** – Please provide the below information on your signal and lighting plans:

- a. Show all utilities on the signal and lighting plan sheet(s). For overhead utilities, do not just show the pole line but instead indicate the full width of the crossarm span.
- b. For new construction - Include Emergency Vehicle Pre-emption (EVP) conductors in the plan notes, conductor schedule and project plans.
- c. For reconstruction – Address any changes regarding EVP in the plan notes, conductor schedule and project plans.
- d. Video detection shall be installed at all ADOT signaled intersections.
- e. LED pedestrian indication to be side-by-side MAN / HAND with (filled) MAN and HAND.
- f. Install two conduit runs, for example (2 – 3” PVC C.) at each roadway crossing.
- g. Do not use 8” lens size in signal heads. Use only 12” lens.
- h. Use type “G” signal heads as per T.S. 8-2. No “Q” heads are to be used as per T.S. 8-3.
- i. Prior to drilling any holes for signals mounts, check for any possible conflicts of signals mounts & back plates, with signal mast arms. Also check for proper visibility of signal heads and aim accordingly to traffic. (Put a note on the plans)
- j. Do not center the signal heads over lane lines. For safety of maintenance personnel center signals heads between the lane lines.
- k. At skewed intersections, mast arms are also to be perpendicular to the roadway.
- l. All IMSA 20 conductor cable shall be un-spliced between the control cabinet and each Pole. (Put a note on the plans)
- m. The green insulation shall be removed from the No. 8 THW (green) Bond conductor in each pull box. (Put a note on the plans)
- n. A crimp connection shall be used for splicing No. 8 THW (white) signal common conductors at pull boxes. (Put a note on the plans)
- o. No signal equipment shall be installed on aluminum poles.
- p. Tucson Area, use ASC-2 signal controllers only.

- q. The electrical service shall be located at the same intersection corner as the control cabinet.