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<b>9-2.100</b>	<b>Plan Sheet Numbering &amp; Sequencing</b> . . . . .	<b>2</b>
<b>9-2.200</b>	<b>Detailed Sheet Information</b> . . . . .	<b>3</b>
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<b>9-3.200</b>	<b>Doors &amp; Hardware Systems</b>	<b>7</b>
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<b>9-4.300</b>	<b>Bid Documents</b>	<b>1</b>
<b>9-4.400</b>	<b>Bid Schedule</b>	<b>2</b>
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# DEFINITIONS

TERM	DEFINITION	SECTION
<b>100-Year Flood</b>	A flood with a one percent chance of being equaled or exceeded in any given year. Throughout the United States, the standard for floodplain management is protection from flooding up to and including the 100-year flood event. In hydrology the 100-year flood is determined statistically from long-term records of streamflow or rainfall data.	4-1
<b>50 cubic feet per second (c.f.s.)</b>	The active stream channel can contain a 50 c.f.s. flow within its cross section, as measured from top of bank, or bankfull. Figure 2.1-1 illustrates the cross section of the active stream channel in relation to the 100-year floodplain.	4-1
<b>Abandonment Resolution</b>	Document acting as a deed to transfer the public interest back to the adjacent private property owner (as authorized by State Statutes). It is approved by the City Council, and signed by the Mayor. Recording this resolution is the final step in the public roadway abandonment process.	3-1
<b>Adjacent Grade</b>	The elevation of the ground, sidewalk, patio, deck support, or basement entryway immediately next to the structure. ( <i>FEMA Form 81-31, May 93</i> )	4-1
<b>ALTA / ACSM Land Title Survey</b>	A land survey that is performed according to the set of Minimum Standard Detail Requirements published jointly by the American Land Title Association (ALTA), American Congress on Surveying & Mapping (ACSM), and the National Society of Professional Surveyors, Inc. (NSPS).	3-1
<b>Arterial Streets</b>	Arterial streets with raised medians provide regional continuity and carry large volumes of traffic between areas of the City and through the City. Full access to abutting commercial and multi-family land uses is limited to the greatest extent possible to facilitate the movement of traffic. Pedestrian and bicycle crossings should be grade separated when feasible.	5-3
<b>Asphalt Concrete Course</b>	The total depth of asphalt concrete that may be placed in two or more layers. An asphalt concrete course of three or four inches in depth will have two layers which are the asphalt concrete base course (ACBC) and the rubberized asphalt concrete surface course (RACSC).	5-10
<b>Backslope</b>	The cut bank formed by the excavation of material on the uphill side of the trail tread.	8-2
<b>Batter</b>	The amount that a retaining wall leans into a hillside, usually expressed by ratio.	8-2
<b>Bench</b>	The terrace formed when a hillside is excavated for the purpose of constructing a trail.	8-2
<b>Berm</b>	A ridge of material formed on the outer edge of the trail tread that is greater in height than the center of the trail tread.	8-2
<b>Bike Lanes</b>	An integral section of a roadway that is marked for exclusive bicycle use. Bike Lanes are always one-way.	5-7
<b>Bike Routes</b>	May include shared streets, bike lanes, or multiuse paths, in any combination. Routes may be designated by signing or by placement on a map.	5-7
<b>Brushing</b>	The selective removal of vegetation.	2-2
<b>Building Envelope</b>	A specified area of a lot or parcel of land within which all buildings, structures, driveways, parking areas, patios, decks, walks, swimming pools, walls, non-native landscaping and utilities are located.	2-1

# DEFINITIONS

TERM	DEFINITION	SECTION
<b>Building Height</b>	The vertical distance measured from the finished ground surface at an exterior wall of a building to the highest point of the building roof. The height of a stepped or terraced building shall be the maximum height of any segment of the building.	2-2
<b>Building Height Outline</b>	An outline elevation established from existing grades prior to any development.	2-2
<b>Cairn</b>	Constructed mound of rock located adjacent to a trail; used where the trail tread is indistinct.	8-2
<b>Circuit Piping</b>	Piping downstream from control valves to irrigation system sprinklers, emitters, devices, and drain valves. Piping is under pressure (less than pressure piping) during flow.	8-1
<b>Climbing Turn</b>	A section of trail that reverses the direction of travel while gaining elevation. The longitudinal slope of the trail is maintained through the turn.	8-2
<b>Clinometer</b>	Instrument used for measuring angles of elevation or inclination.	8-2
<b>Collector Streets</b>	Collector streets provide for traffic movement between arterial and local streets, with some direct access to abutting commercial and multi-family land uses. Center left-turn lanes are provided to allow for greater access. Driveway access should be evenly spaced.	5-3
<b>Condominium</b>	A system of individual fee ownership of units in a multi-unit structure, combined with joint ownership of common areas of the structure and the land.	3-1
<b>Control Valve</b>	Manual or automatic (electrically operated) valve for control water flow to irrigation zone.	8-1
<b>Cross Slope</b>	The slope of the trail surface perpendicular to the center line, expressed as a percent or a ratio. Gradient determined by dividing the difference in elevation from crown to pavement edge by the horizontal distance from crown to pavement edge, expressed as a percentage.	2-2
<b>Culvert</b>	Drainage structure constructed of rock or pipe that allows water to flow under the trail without causing erosion.	8-2
<b>Datum</b>	A datum is as a set of information that acts as a foundation for other data.	3-1
<b>Dedication</b>	The setting apart by the owner and acceptance by the public of property for public use, in accordance with state statute or common law. No compensation is paid by the public.	3-1
<b>Denier</b>	A unit of measure indicating the fineness of a weave of a material.	1-1
<b>Destroy</b>	To kill, or to cause the death of any protected native plant by any means.	10-1
<b>Drain Piping</b>	Downstream from circuit piping drain valves. Piping is not under pressure.	8-1
<b>Easement</b>	A right to use land of another for designated purposes, as shown on a recorded subdivision, recorded plat or map, or described by metes and bounds.	3-1
<b>Embankment</b>	An earthen structure formed by placing and compacting earth material using artificial means (used interchangeably with "fill").	2-2
<b>Erosion</b>	The wearing away of the ground surface as a result of movement by wind or water.	2-1



# DEFINITIONS

TERM	DEFINITION	SECTION
<b>Fillslope</b>	Material added to the downhill edge of the trail tread; this material is often removed as part of the backslope or is derived from nearby borrow pits.	8-2
<b>Final Plat</b>	The map of all or part of a master planned property, subdivision, minor subdivision, condominium or perimeter exception, intended, upon approval, for recordation.	3-1
<b>Floodway</b>	A part of the floodplain which, to facilitate the passage of floodwater, is kept clear of encumbrances (USGS WSP 1541-A, 1960). The channel of a river or stream and those parts of the flood plains adjoining the channel, which are reasonably required to carry and discharge the floodwater or flood-flow of any river or stream (Erbe and Flores, 1957). The channel of a river and the adjacent floodplain that must be reserved in an unobstructed condition in order to discharge the base flood without increasing flood levels by more than one foot (FEMA FIA-2, 2/1990).	4-1
<b>Freeways</b>	Freeways will be designed to safely handle very large volumes of through traffic. Direct access will be limited to widely spaced interchanges. Design, construction, and operations shall be provided by the Arizona Department of Transportation.	5-3
<b>GLO</b>	General Land Office of the United States. The Department, now incorporated into the Bureau of Land Management (BLM), once charged with the duties of the survey of the Public Lands.	3-1
<b>Grade Dip (also known as "Drain Dip")</b>	Short segment of trail with a grade opposite of the prevailing grade designed to route surface water off the trail. The lowest point of the dip is outsloped to assure the surface water is routed off the side of the trail.	8-2
<b>Grade, Maximum</b>	The steepest grade permitted on any segment of the trail, not to exceed a distance specified for the particular trail classification.	8-2
<b>Grade, Sustained</b>	The steepest grade permitted over the majority of the trail length.	8-2
<b>Grade-Separated Crossings</b>	Underpasses or overpasses, which serve to isolate motorized and non-motorized traffic from each other at points of intersections.	5-7
<b>Header Stone</b>	A long uniform stone laid with its end towards the face of a retaining wall or crib used intermittently to structurally tie in the other rocks laid in the wall.	8-2
<b>Hillside Area</b>	Any parcel of land or portion thereof located within the Hillside Landform boundaries, as designated by the City of Scottsdale Landform Class Map.	2-2
<b>Inslope</b>	Where the trail surface slopes downward from the outside (downhill) to the inside (uphill) edge of the trail. Insloping must be accompanied by a rock-lined swale between the inside edge of the trail and the backslope.	8-2
<b>Local Streets</b>	Local streets provide direct access to abutting land uses, provide access to the collector street system, and accommodate low traffic volumes. Local streets should be designed to discourage high travel speeds.	5-3
<b>Longitudinal Slope</b>	The slope of a trail along the centerline, expressed as a percentage or a ratio.	8-2
<b>MAG Specifications</b>	The Uniform Standard Specifications for Public Works Construction distributed by the Maricopa Association of Governments.	5-10



# DEFINITIONS

TERM	DEFINITION	SECTION
<b>Major streets</b>	A group of streets classified as: Major Collector Streets, Minor Arterial Streets, Major Arterial Streets	5-10
<b>Major Wash</b>	Those natural washes that demonstrate riverine flow characteristics and have an estimated 100 yr. flow rate in excess of 750 cubic feet per second.	2-1
<b>Methodology</b>	A written outline of the method or methods to be used to relocate, remove, and/or destroy protected plant material.	10-1
<b>Minor streets</b>	A group of streets classified as: Local Residential Streets, Minor Collector Streets, Local Commercial Streets, Local Industrial Streets	5-10
<b>Minor Wash</b>	Those natural washes that demonstrate riverine flow characteristics and have an estimated 100 yr. flow rate in between 250 and 750 cubic feet per second.	2-2
<b>Multiuse Paths</b>	Paved pathways set aside for the exclusive use of non-motorized travel. They are typically separate from the road infrastructure and intended for two-way traffic.	5-7
<b>Multiuse Trails</b>	Unpaved trails designed primarily for equestrians, but open to bicycle and pedestrian travel.	7-1
<b>Mutilate</b>	To deface, maim, damage, or disfigure any protected native plant by shooting, chopping, pushing over, burning, cutting, or any other means.	10-1
<b>Native Plant</b>	Any plant listed on the City of Scottsdale protected native plant list as defined in Sec. 46-105 of the Scottsdale Revised Code.	10-1
<b>Native Plant Permit</b>	A permit issued by the City of Scottsdale pursuant to the provisions of Article 5, Chapter 46 of the Scottsdale Revised Code for the purpose of removing from the premises, relocating back on to the site, or destroying any protected native plant.	10-1
<b>Native Plant Program</b>	A development plan specifying the proposed treatment of protected native plants for which a native plant permit is required.	10-1
<b>Native Vegetation</b>	Indigenous plant materials.	2-2
<b>Natural Area</b>	Areas of untouched natural desert and revegetated areas.	2-1
<b>Natural Grade</b>	The vertical location of the natural or undisturbed ground surface prior to any grading operation.	2-2
<b>NAVD 88</b>	North American Vertical Datum of 1988. The City of Scottsdale has used a uniform 1.77' to convert from NGVD 29 to NAVD 88. $NGVD\ 29 + 1.77' = NAVD\ 88$ . Elevations on all improvement plans submitted to the City must use or equate to the NAVD 88 datum.	3-1
<b>NGVD 29</b>	National Geodetic Vertical Datum of 1929. In 1988, NGVD 29 was adjusted to remove inaccuracies and renamed NAVD 88.	3-1
<b>Outslope</b>	Where the trail surface slopes downward from the inside (uphill) to the outside (downhill) edge of the trail.	8-2
<b>Patent</b>	An instrument conveying title to land, usually the original conveyance of state, or Federal Government land.	3-1
<b>Patent Easement</b>	An easement right which passes with a parcel of land at the time of its original conveyance.	3-1



# DEFINITIONS

TERM	DEFINITION	SECTION
<b>Preliminary Plat</b>	The proposed plan of a subdivision, including supporting data, indicating a proposed subdivision development prepared in accordance with the City of Scottsdale's Codes and Ordinances, and in accordance with any applicable state statutes.	3-1
<b>Pressure Piping</b>	Piping downstream from supply piping to and including control valves. Piping is under irrigation system pressure. Piping in this category includes pressure regulators, water meters, and backflow preventors, when used.	8-1
<b>Protected Native Plant</b>	Cacti which are 3 feet or greater in height and indigenous trees which are 4 inches or greater in caliper as specified in Chapter 10.	10-1
<b>Public Improvements</b>	All installations, equipment and facilities for all public services and uses, including, but not limited to, streets, trails, storm and sanitary sewers, drainage, irrigation, flood control, recreation, landscaping, water and other public utilities.	3-1
<b>Public Roadway Dedication</b>	Any document that conveys rights to the City of Scottsdale, and consequently the general public, for use of a particular strip of land over which certain transportation and/or other public facilities are built including but not limited to roads, utilities, drainage structures, bridges and all associated improvements to accommodate those facilities. These public roadways may be conveyed to the city by a number of legal instruments such as subdivision plats dedicating streets and alleys; right-of-way dedication documents; roadway easements; and roadway reservations such as General Land Office patent roadway easements.	3-1
<b>Public Viewpoint</b>	A location from which the impacts on the viewshed are analyzed. This may include sections of public roadway, a public gathering area, a public park, or public building complex. These points will be identified by the City of Scottsdale.	2-2
<b>Real Property</b>	Real estate, physical land and appurtenances.	3-1
<b>Relocate</b>	To transplant a protected native plant to another location on the premises.	10-1
<b>Remove</b>	To transport a protected native plant from the premises on which it has been growing for the purpose of transplanting it on another site.	10-1
<b>Revegetation</b>	The replacement of indigenous living plant materials or seeds on areas where the natural vegetation has been removed. The areas include disturbed natural areas and manmade cut and fill slopes.	2-2
<b>Rights of Way</b>	Land which by deed, conveyance, agreement, easement, dedication, usage or process of law is intended for use by the public for street, highway, alley, pedestrian walkway, bikeway, utilities or drainage purposes.	3-1
<b>Rock Aggregate Base Material</b>	The total depth of rock aggregate material that may be placed in one or more layers. If one layer is placed, it will be "Aggregate Base Course" (ABC) in accordance with Table 702 of the MAG Specifications. If two layers are placed, the top four inches must be ABC and the bottom layer may be ABC or "Select Material" in accordance with Table 702 of the MAG Specifications. For the sake of brevity, the rock aggregate base material is called the "base course" in this manual.	5-10
<b>Semi-Opaque Screening</b>	A partially transparent fabric or vinyl screening that has a minimum woven denier of 80 percent to allow the passage of wind and light.	1-1



# DEFINITIONS

TERM	DEFINITION	SECTION
<b>Shared Streets</b>	All streets that do not have bike lanes where bicycles and motor vehicles share the same roadway. This includes all public streets except those specifically posted to prohibit bicycles.	5-7
<b>Shared-Use Trail</b>	A natural surfaced trail collectively shared by a range of users including, but not limited to, equestrians, walkers, bicyclists, hikers, and joggers.	8-2
<b>Sideslope</b>	The natural slope of the ground measured at right angles to the centerline of the trail.	8-2
<b>Slope</b>	The inclined exposed ground surface of an embankment, excavation or natural terrain.	2-1
<b>Slough (pronounced "sluff")</b>	Material that has moved downhill from the backslope onto the inside (uphill) edge of the trail.	8-2
<b>Soil</b>	All earth material of any origin that overlies bedrock and may include a decomposed zone of bedrock that can be excavated readily by mechanical equipment.	2-2
<b>Specimen</b>	A plant that is relatively free of disease and physical deformations and is representative of the form and character of the species.	10-1
<b>Stipulations</b>	Design and construction requirements regarding water, sewer, paving, traffic, dedications, grading and planning as well as other conditions that must be met in order to proceed to the next step in the process. Project stipulations are staff recommendations which become development requirements after ratification by the presiding council, commission or board.	1-1
<b>Street</b>	Any right-of-way or tract used for road, highway and/or alley purposes, which may also include facilities used for pedestrian walkway, bikeway, trails, utilities or drainage purposes, whether or not (1) improved, (2) accepted for maintenance by the city, or (3) shown on a recorded plat or other document.  Private street: any street owned and maintained by an entity other than the city.  Public street: any street that is dedicated as public right-of way.  New street: a (i) public street created by dedicating public right-of-way or private street created by granting a tract, and (ii) designed primarily to serve only the lots in the land division requiring its creation.	3-1
<b>Structural Section</b>	The combination of an asphalt concrete surface course and one or more base courses of either rock aggregate materials or asphalt concrete.	5-10
<b>Sub-grade</b>	Native soil or fill material over which the structural section is to be placed.	5-10
<b>Swale</b>	A constructed watercourse that channels water away from the trail. Typically lined with rocks to reduce erosion.	8-2
<b>Switchback</b>	A sharp short radius curve in a trail that is used on hillsides to reverse the direction of travel and to gain elevation. Switchbacks have relatively level turning platforms.	8-2
<b>Title Commitment</b>	A commitment on the part of the insurer, once a title search has been conducted, to provide the proposed insured with a title insurance policy upon closing.	3-1
<b>Title Insurance Policy</b>	A title insurance policy insures the status of the state of title to a specific parcel of real property. It insures a party against loss due to a defective title.	3-1



# DEFINITIONS

TERM	DEFINITION	SECTION
<b>Title Report</b>	An abstract of the title to a piece of property. It consists of notes regarding, or copies of, all of the documents pertaining to the title of a particular piece of property, based upon the original documents filed in the office of the Clerk of Court.	3-1
<b>Trailhead</b>	The beginning or ending access point to a trail, often accompanied by various trail support facilities such as horse trailer and regular vehicle parking spaces, hitching rails, corrals, bike racks, shade ramadas, picnic tables, drinking fountains, water troughs, restrooms, directional and informational signing, and entrance gates.	8-2
<b>Tread</b>	The surface of the trail upon which trail users travel.	8-2
<b>Turnout</b>	Short section of widened trail that provides safer passage of trail users. Helpful when visibility along the trail is limited.	8-2
<b>Unsalvageable Plant</b>	A protected native plant that cannot be successfully relocated due to any of the following: Deteriorated health from disease, infestation, or natural causes. Physical constraints related to plant location, soil conditions, orientation, or general conditions that obstruct and/or prevent the application of city-approved relocation techniques.	10-1
<b>Utilities</b>	All installations, equipment and facilities furnishing public services such as electricity, gas, communications, water, drainage, sewage disposal or flood control.	3-1
<b>Vegetation / Habitat</b>	The existing vegetation patterns (type, size, density) and the wildlife habitat that exist are included in this element.	2-2
<b>View Corridor</b>	A continuous, undisturbed open space often terminating in a significant visual landmark.	2-2
<b>Viewshed</b>	A given, visible area, usually calculated from public viewpoints such as roadways, parks, and open spaces. The viewshed category characterizes specific forms of landmark topography found within each landform. Adjacent viewshed opportunities, including the designation of scenic corridors, are important parameters.	2-2
<b>Wash</b>	A natural watercourse, wet or dry.	8-2
<b>Waterbar</b>	Drainage structures constructed of rock or logs embedded in the trail surface at a 45 degree angle to the direction of travel for the purpose of directing surface water off the trail.	8-2





# ACRONYMS

## A

A/C	Air Conditioning
AAC	Arizona Administrative Code
AASHTO	American Association of State Highway & Transportation Officials
ABC	Aggregate Base Course
ABS	Acrylonitrile-Butadiene-Styrene
AC	Asphalt Concrete
ACP	Asbestos Cement Pipe
ACSM	American Congress on Surveying & Mapping
ADA	Americans with Disabilities Act
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
ADT	Average Daily Trips
ADWR	Arizona Department of Water Resources
AFF	Above Finish Floor
AIA	American Institute of Architects
ALTA	American Land Title Association
ALUM	Aluminum
amps	Amperage
ANSI	American National Standards Institute
APP	Atactic Polypropylene
APS	Arizona Public Service
ARI	Air Conditioning and Refrigeration Institute
ARS	Arizona Revised Statutes
ASHRA	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASTM	American Society for Testing Materials
ATSSA	American Traffic Safety Services Association
AUCC	Arizona Utility Coordinating Committee
AWG	Gauge
AWI	Architectural Woodwork Institute
AWWA	American Water Works Association
AZPDES	Arizona Pollutant Discharge Elimination System

## B

BC	Back of Curb
BHMA	Building Hardware Manufacturers Association

## C

CAD	Computer Aided Drafting / Design
CAP	Central Arizona Project
CBD	Central Business District
CC&Rs	Conditions, Covenants, & Restrictions
cfs	Cubic Feet Per Second
CIP	Capital Improvement Plan
CNR	Citizen and Neighborhood Resources Department
Corps	US Army Corps of Engineers
COS	City of Scottsdale
CPM	Capital Project Management
CPSC	U.S. Consumer Products Safety Commission
CUSH	Cushion Stop Arm
CWA	Clean Water Act

## D

DDC	direct digital control
DHI	Door and Hardware Institute
DIP	ductile iron pipe
DR	Development Review
DRB	Development Review Board
DS&PM	Design Standards & Policies Manual
DU/ac	Dwelling unit per acre
DWV	drain, waste, and vent
DX	direct expansion

# ACRONYMS



## E

E.M.T.	electrical metallic tubing
EB	East bound
EDA	extra duty arms
EER	energy efficiency ratio
EMS	energy managemet system
EMTCS	energy management and temperature control system
EPA	United States Environmental Protection Agency
EPA	US Environmental Protection Agency
ESL	Environmentally Sensitive Lands
ESLO	Environmentally Sensitive Lands Ordinance

## F

FCDMC	Flood Control District of Maricopa County
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
fps	feet per second
ft/ft	feet per feet

## G

G	General
G&A	Green and Ampt
GFCI	ground fault circuit interrupter
GLO	Government Land Office
GP	General Plan
gpcpd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
GPM	Gallons per minute

## H

HCM	Highway Capacity Manual
HD	Hillside District
HFC	hydrogen fluorine carbon
HID	high intensity discharge
HVAC	Heating, Ventilation and Air Conditioning

## I

I	Irrigation
IES	International Illumination Society
IFC	International Fire Code
IMSA	Internation Municipal Signal Association
IPEMA	International Play Equipment Manufacturers Association
IPLV	Integrated Part Load Value
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation System

## L

L	Landscape
LED	Light emitting diode
LF	lowest floor elevations
LOS	Level of Service
LT	left turn

## M

M	Miscellaneous Plans By Others
M/A	Mast arm
MAG	Maricopa Association of Governments
MCESD	Maricopa County Environmental Services D
MEDCAPs	Master Environmental Design Concepts and Plans
mil	millimeter
MOAS	Manual of Approved Signs
MOD	Map of Dedication
mph	miles per hour
MUTCD	Manual on Uniform Traffic Control Devices

## N

NAD	North America Datum
NAOS	Natural Area Open Space
NAVD	North America Vertical Datum
NAVD 88	North America Vertical Datum of 1988
NB	North bound
NFPA	National Fire Protection Association Standards
NGVD 29	National Geodetic Vertical Datum of 1929.
NOI	Notice of Intent
NOT	Notice of Termination
NPSI	National Playground Safety Inspector
NSF	Nationa Sanitation Foundation
NSPS	National Society of Professional Surveyors
NTMP	Neighborhood Traffic Management Program

## O

OL	Overlap
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## P

P	Paving
PB	Push Button
PC	point of curvature
PC	Point of Curvature
PCP	Planned Commerce Park
PED	Pedestrian
Ped Com	Pedestrian Common
Ph	Phase
PI	Point of Intersection
POTW	Publicly Owned Treatment Works
PP	Preliminary Plat
PRD	Planned Residential Development
PRVs	pressure reducing valves
psi	pounds per square inch
PT	Point of Tangent
PUE	Public Utility Easement
PVC	Polyvinyl chloride; conduit type

## Q

Q <sub>100</sub>	100 year peak discharge in channel or wash
QPL	Qualified Product List

## R

R	Radius
R/W	Right of Way
RITS	Reinforced Integral Truss System
ROCN	runoff curve numbers
ROSS	Regional Off-Street System Plan
ROW	right-of-way
RPMs	Raised Pavement Markers
RT	right turn
RW	Right of Way

## S

S	Structural
SA	Staff Approval
SAP	Speed Awareness Program
SB	South bound
SCS	Soil Conservation Service (now the Natural Resources Conservation Service)
SD	Storm Drain
SDR	standard dimension ratio
SEER	seasonal energy efficiency ratio
SFHA	Special Flood Hazard Area
SM	Select Material
SN	Structural Number
spp.	species
sq.ft.	square foot
SRP	Salt River Project
SRVWUA	Salt River Valley Water Users Association
SS	soil support value
SS	Sanitary Sewer
SSA	Arizona State Standard Attachment
STED	Scottsdale Traffic Engineering Division
SU	Single Unit (Truck)
SWPPP	Stormwater Pollution Prevention Plan

# ACRONYMS

---

## T

TIMA	Transportation Impact Mitigation Analysis
TS	Transit Shelter
TS	Traffic Signalization/Signing/Markings

## U

UP	Use Permit
UPC	Uniform Plumbing Code
USDOT	United States Department Of Transportation
USTA	United States Tennis Association

## V

V.A.V.	variable air volume
V.F.D.	variable frequency drive
V.N.E.	vehicular non-access easement
VCP	vitrified clay pipe
Veh Com	Vehicle Common
VMB	Variable Message Board
vpd	vehicles per day

## W

W	Water
WB	West Bound

## Z

ZN	Zoning
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# INTRODUCTION

This chapter presents an overview of the city's development process to assist design professionals in preparing plans and reports needed for project development. It identifies requirements for preparing improvement plans and documents to submit for city review and approval.

## **1-1 DEVELOPMENT PROCESSES**

## **1-2 IMPROVEMENT PLAN REQUIREMENTS**



## DEPARTMENT RESOURCE INFORMATION

---

Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# DEVELOPMENT PROCESSES

# 1-1

This section provides details of Scottsdale's development process which normally includes a pre-application, formal application and entitlement, plan review and permitting, inspections and issuance of a certificate of occupancy. It includes information about the city's public hearing processes, neighborhood notification and involvement, ROW and roadway abandonments, establishing new addresses, title evidence requirements, the recording process and temporary construction fencing requirements. It also identifies plan submittal requirements and anticipated review timeframes.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
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Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
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City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

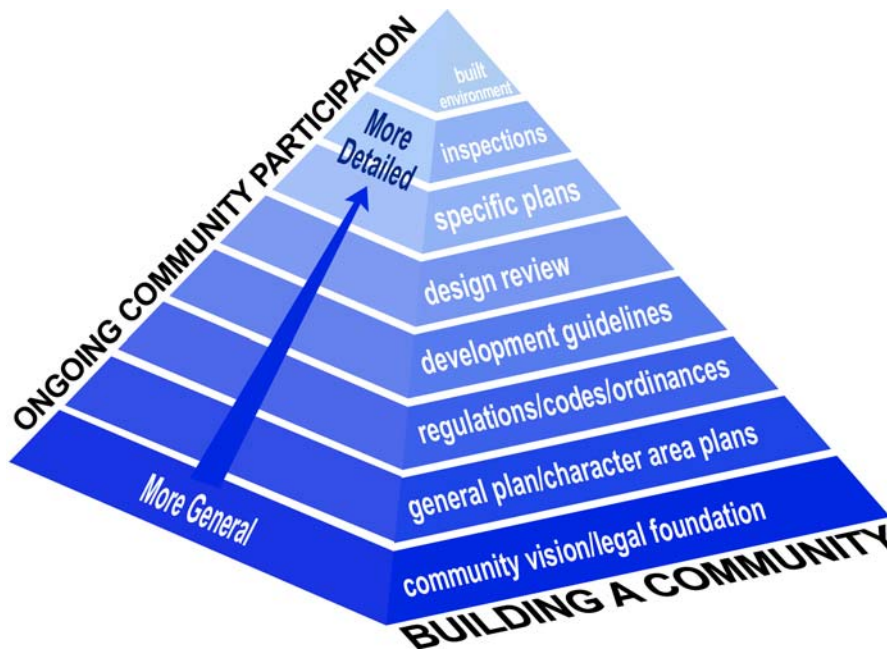
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# DEVELOPMENT PROCESSES

## GENERAL INFORMATION

The Design Standards and Policies Manual (DS&PM) presents clear and concise technical requirements, policies, and processes to enable design professionals to prepare plans and reports necessary for development of both public and private projects within the city.

The City of Scottsdale Planning and Development Service's mission is to assist the development and improvement of property in a way that protects the public's health, safety and welfare, recognizes landowners' rights, and achieves lasting value and quality of life. The city accomplishes this through processes that enable compliance with zoning and technical codes, and advance the community's vision and values which are then reflected in the built environment, see Figure 1.1-1 below.



**FIGURE 1.1-1 COMMUNITY DEVELOPMENT PYRAMID**

This manual consists of twelve chapters that address the development process, site planning issues, land divisions, grading and drainage, transportation, water systems, wastewater systems, streetscapes, parks and trails, public works and facilities, native plants, and fire. The information is presented in a sequence that parallels developing a raw tract of land from site planning and platting issues to grading and drainage considerations and through the rest of the chapters.

These guidelines clarify and supplement requirements in the Scottsdale Revised Code (SRC), including the zoning and land division ordinances, floodplain and stormwater regulation, fire

and building codes, and other regulations for land development and construction within Scottsdale. The intent is to assist homeowners, architects, developers, engineers, contractors and others through the development process.

## 1-1.001

**ADOPTION, INTERPRETATION AND APPEAL**

The Design Standards and Policies Manual is one of the official documents setting forth city requirements, standards, policies and procedures. This manual has been adopted by the Development Review Board under the authority delegated to it by the City Council. The DRB has delegated to the city staff the authority to review, maintain and distribute the DS&PM.

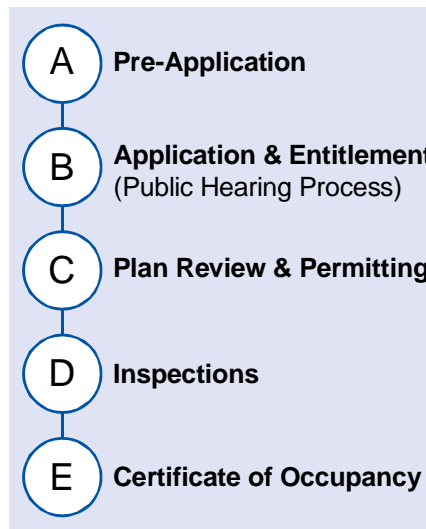
The Planning and Development Services General Manager shall interpret the DS&PM.

If a property is subject to unique problematic development issues beyond the developer's control, a developer may appeal the application of these guidelines, using the appeal provisions of the Land Divisions Ordinance, see [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

## 1-1.100

**DEVELOPMENT PROCESS**

Land development in Scottsdale typically involves five steps as shown in Figure 1.1-2 below. Fewer steps may be necessary for less complex projects such as a residential development project or those eligible for a minimum building permit. See [www.ScottsdaleAZ.gov/bldgresources/counterresources](http://www.ScottsdaleAZ.gov/bldgresources/counterresources) for a list of minimum permit activities.



**FIGURE 1.1-2 SCOTTSDALE DEVELOPMENT PROCESS**

1. Pre-Application: Most development activities begin with a pre-application to the city, which will help identify the process, submittal requirements, review parameters and time frames. See [Figure 1.1-3](#) for projects requiring a pre-application (pre-app) and [Section 1-1.200](#) for a discussion of the pre-app process.
2. Entitlement Process: The Entitlement Process consists of making a formal application to the city and obtaining development approval through one or more of the four public hearing approval processes, see [Section 1-1.304](#). Neighborhood notification and involvement requirements must be met PRIOR to formal application. See [Section 1-1.301](#) for a discussion of these processes. Once neighborhood notification and involvement requirements are met and formal application is made, projects must go through specific approval processes identified in [Figure 1.1-3](#). Residential development that complies with

current Zoning District development standards and minimum permits may bypass this entitlement step; all other projects must complete the entitlement process before submitting for Plan Review and Permitting.

3. Plan Review & Permitting: This step consists of preparing plans, submitting documents for plan review and obtaining permits for construction activities, see [Section 1-1.400](#). Time frames for first, second and third reviews differ by project type.
4. Inspections: All permitted construction activities must be inspected by the city's Inspection Services staff. See [Section 1-1.600](#) for inspection information.
5. Certificate of Occupancy: Obtaining a Certificate of Occupancy (C of O) is the final step before any development can be occupied or used. Prior to the issuance of a certification of shell building or a final C of O there must be full compliance with all stipulations of the Development Review Board. See [Section 1-1.600](#) for C of O requirements.

DEVELOPMENT APPROVAL PROCESSES							
Project Type	Other Processes			Public Hearing Processes			
	PA	N/C	SA	BOA	PC	CC	DRB
Abandonment	✓	NN			✓	✓	
Amended Development Stds.	✓	CR			✓	✓	*
Amd. Dev. Stds.: Preliminary Plat	✓	NN					✓
Amended Stipulations	✓	CR			✓	✓	*
Annexation	✓	**			✓	✓	
Change to Land Divisions	✓	*	✓			*	
Character Area Plan Amendment	✓	NI			✓	✓	
Commercial Repainting	✓	*	*				*
Condominium			✓				*
ESLO Hardship Exemption	✓	NN				✓	
General Plan Amendment	✓	NI			✓	✓	
Land Assemblage			✓				
Master Planned Community	✓	*			✓	✓	*
Master Planned Property (plat)	✓		✓			*	*
Master Sign Plan	✓	*					✓
Master Site Plan	✓	NN					✓
Minor Subdivision	✓	*	✓				*
Municipal Use Master Site Plan	✓	NN			✓	✓	✓
New Construction - Major	✓	NN					✓
New Construction - Minor	✓	*	*				*
Perimeter Exception	✓	NN				✓	✓
Plat (Preliminary Plat)	✓	NN					✓
Plat (Final Plat)						✓	
Release of Easement			✓				
Rezoning	✓	CR			✓	✓	✓
Text Amendment	✓	CR			✓	✓	
Use Permit	✓	NN			✓	✓	✓
Wash Modification (ESL)	✓	*	✓				
Wireless Comm. Facility	✓	CR	*		*	*	*
Zoning Variance	✓	NN		✓			
PA = Pre-Application SA = Staff Approval BOA = Board of Adjustment PC = Planning Commission CC = City Council DRB = Development Review Board		CR = Citizen Review Policy NI = GP and CA Neighborhood Involvement Policy NN = Neighborhood Notification Policy N/C: Depending on the size and nature of the proposed development, additional or reduced involvement plans may be required.					
*A pre-application meeting will determine what process will be required; in some instances a staff approval may be issued, in others a public hearing will be necessary.							
** Consult Project Coordinator for City, County, and State requirements.							

FIGURE 1.1-3 DEVELOPMENT APPROVAL PROCESSES



## PRE-APPLICATION

### 1-1.200

Most development projects require a Pre-Application (pre-app). See [Figure 1.1-3](#) for a listing of projects that require pre-applications. Pre-application process and forms are available at [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

**Note:** A pre-application is optional, NOT required for single family residences within R1 districts (where development complies with current Zoning District development standards) and for minimum permits. Minimum permits can be obtained directly from the One Stop Shop or [www.ScottsdaleAZ.gov/bldgresources/counterresources](http://www.ScottsdaleAZ.gov/bldgresources/counterresources). A single family residence in any multifamily residential zoned area may require a Pre-Application and Staff Approval. A single family residence in ESLO areas may require a Pre-Application and Staff Approval, or DRB approval for cuts and fills, amended development standards and/or wash modifications.

### SUBMITTAL REQUIREMENTS

#### 1-1.201

The specific pre-application requirements will vary by project type (see the pre-application form), but all submittals must include the following:

1. Pre-Application Questionnaire and Fee
2. Conceptual Drawing
3. Context Photos
4. Records Packet Fee – Records Packet will contain Assessors Map, Zoning Map, Water & Sewer Maps and Aerial Photo.

The City is offering a new optional pre-application for Single Family Residential plans. <http://www.scottsdaleaz.gov/bldgresources/sfrprocess.asp>

This process may be beneficial to the applicant prior to submitting their single family plans. The applicant will meet with a representative from the Planning Department and a Stormwater Engineer to discuss the property. City staff will inform the applicant of any major issues with the property and guide them through the Single Family Review process. This process requires the same fee and submittal requirements as a pre-application.

### PRE-APPLICATION CONFERENCE

#### 1-1.202

The pre-application meeting is typically a 1/2 to 1-hour meeting where the applicant meets with the assigned Principal Planner or designee to discuss the project request. The initial meeting is usually scheduled within one week of receipt of pre-application questionnaire. Information exchanged at the pre-application meeting allows the city and the applicant to come to a more complete understanding of the size, scope and feasibility of the request.

Following the meeting with the principal planner or designee, the application will be processed in one of three ways:

1. Staff approval
2. An additional meeting to conduct further review
3. A Principal Planner or designee provides applicant with application submittal checklist(s)

Download a complete listing of issues at [www.ScottsdaleAZ.gov/bldgresources/devprocess/pre-app](http://www.ScottsdaleAZ.gov/bldgresources/devprocess/pre-app).

## ENTITLEMENT PROCESS

### 1-1.300

The Entitlement Process consists of making a formal application to the city, gaining development approval. This may include a Pre-Application, neighborhood notification and involvement, citizen review, staff approval and approval from one or more of the following public hearing approval processes; Board of Adjustment, Planning Commission, City Council and Development Review Board. See [Figure 1.1-3](#) for specific approval processes.

Single family residential development that complies with current Zoning District development standards and minimum permits can bypass the entitlement process. All other projects must complete the entitlement process before submitting for Plan Review and Permitting. Neighborhood Notification & Involvement and Citizen Review requirements must be met PRIOR to formal application.

## 1-1.301

## NEIGHBORHOOD NOTIFICATION & INVOLVEMENT

Scottsdale has three community notification and involvement policies: the Neighborhood Notification Plan, the Citizen Review Process and the Neighborhood Involvement for General Plan Amendments. Staff determines which policy is applicable based on the type of project being proposed. [Figure 1.1-3](#) lists the most common project types and identifies the required notification policies and approval process. For additional information on the individual policies see current checklists.

The goal is to ensure community notification and involvement prior to the filing of a formal application. Additional notification is required for the public hearing process pursuant to State Statutes and the Scottsdale Zoning Ordinance. See [Appendix 1-1A](#) and [www.ScottsdaleAZ.gov/bldgresources/devprocess/](http://www.ScottsdaleAZ.gov/bldgresources/devprocess/).

### A. Neighborhood Notification Plans

1. Neighborhood Notification is required for the following projects:
  - a. Abandonments
  - b. Board of Adjustment cases (Zoning variances)
  - c. Conditional Use Permits (including Municipal Use Master Site Permits)
  - d. Development Review Board Amended Development Standards
  - e. Development Review Board cases (Design Review)
2. Typical Neighborhood Notification Requirements
  - a. Inform neighbors of proposal
  - b. Post a "Project Under Consideration" sign on the property
  - c. Hold an open house
  - d. Create a Neighborhood Notification Report that documents completion of requirements

The scope and scale of the project influence the specific requirements that are outlined by staff at the pre-application conference. For additional information on Neighborhood Notification and Involvement, see current checklist, [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

### B. Citizen Review Process

Much more detailed and complex than the Neighborhood Notification Plans, the Citizen Review Process is intended for the more intricate projects with a greater impact on neighboring properties.

1. The Citizen Review Process is required for:
  - a. Rezoning
  - b. Zoning Ordinance Text Amendments
  - c. Zoning Stipulation Amendments
  - d. City Council Approved Amended Development Standards
  - e. City Council Site Plan Approvals
  - f. General Plan Amendments
2. Typical Citizen Review Process Requirements
  - a. Submit a Citizen Review Plan prior to notification and involvement efforts
  - b. Inform neighbors of proposal

- c. Post a "Project Under Consideration" sign on the property
- d. Hold at least one open house
- e. Create a Citizen Review Report that documents completion of requirements

For additional information on Citizen Review, see current checklist, [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

### C. Neighborhood Involvement

Neighborhood involvement is required for General Plan Amendments.

### FORMAL APPLICATION SUBMITTAL

1-1.302

At the pre-application conference, the principal planner or designee provides the applicant with the appropriate application checklist(s) for the formal submittal(s). Submittal requirements are project-specific, and vary by project type, scope, and the approval process required. All submittal requirements must be completed before the application will be accepted. A submittal meeting with the Principal Planner or designee is required. Planning staff will confirm that the submittal package is complete for filing.

### STAFF REVIEW

1-1.303

Depending on the application type, within 30-60 days of the formal submittal, staff will provide a letter to the applicant with one of the following:

1. List of issues that need to be resolved before a public hearing date is set, or
2. A notification of tentative public hearing date.

If new/revised materials need to be submitted, staff review time for the review of these materials is approximately three weeks. Once identified issues have been resolved, the project will be scheduled for public hearing.

Process flowcharts can be found at [www.ScottsdaleAZ.gov/bldgresources/devprocess/flowcharts](http://www.ScottsdaleAZ.gov/bldgresources/devprocess/flowcharts).

### PUBLIC HEARINGS

1-1.304

There are four types of public hearings that may be a part of the entitlement process: the Board of Adjustment, Planning Commission, City Council and Development Review Board. See [Figure 1.1-3](#) for common project types and which public hearing, if any, is required.

The application, all maps, plans and other accompanying data and material are of public record and is available for public inspection during office hours in the Records Division. Summary information and key application materials are also posted to a Case Fact Sheet online at [www.ScottsdaleAZ.gov/projects/projectsinprocess/](http://www.ScottsdaleAZ.gov/projects/projectsinprocess/).

### A. Board of Adjustment (BOA)

The Board of Adjustment generally meets once a month, and has the power to review and approve variances from zoning ordinance requirements and administrative decisions (Zoning Interpretations) that create unnecessary hardships in the development of property because of exceptional or extraordinary conditions. If a proposed project does not comply with the Zoning Ordinance requirements, but the applicant does not want to rezone or request amended development standards, Board of Adjustment approval must be obtained prior to proceeding through any other entitlement process.

The Board of Adjustment is not authorized to:

- a. Make any changes in special circumstances self-imposed by the property owner, or
- b. Adjust or change conditions placed by the City Council at the time of rezoning or use permit approval.

Board of Adjustment cases are typically scheduled for public hearing within 4 to 6 weeks after formal submittal. For more information, visit [www.ScottsdaleAZ.gov/boards/BOA/](http://www.ScottsdaleAZ.gov/boards/BOA/) or contact Planning and Development Services Department at 480-312-7000.

### 1. Zoning Ordinance Variance

The Board of Adjustment typically hears requests for a variance from zoning development standards, such as a set back, an open space requirement, or a building height. See [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms) for a zoning ordinance variance checklist.

A variance shall not be authorized unless the Board shall find sufficient evidence of the following as required by state statute, see Zoning Ordinance Sec. 1.804:

- a. There are special circumstances or conditions applying to the land, building, or use referred to in the application which do not apply to other properties in the district; and
- b. Such special circumstances were not created by the owner or applicant; and
- c. The authorizing of the variance is necessary for the preservation and enjoyment of substantial property rights; and
- d. The authorizing of the application will not be materially detrimental to persons residing or working in the vicinity, to the adjacent property, to the neighborhood, or to the public welfare in general.

### 2. Zoning Interpretations

The Board will hear appeals from decisions made by staff responsible for interpreting and enforcing the Zoning Ordinance. These appeals shall be filed with the City Clerk within 30 days of such decisions on a form provided by the City. For more information on requesting Zoning Interpretations contact the Planning and Development Services Department at 480-312-7000.

### 3. Appeals

Board of Adjustment decisions may be appealed to the Maricopa County Superior Court; any appeal must be made to the Court within 30 days of the Board's decision. The special action is filed as a civil matter at the Court Clerk's office counter at the following locations:

- a. Downtown Phoenix: 201 W Jefferson
- b. Southeast Campus (Mesa): 222 E Javalina

For more information on fees and filing a special action, contact the Clerk of the Superior Court at 602-506-3676 or go to [www.clerkofcourt.maricopa.gov](http://www.clerkofcourt.maricopa.gov).

*PLEASE NOTE: This information is for informational use only and does not constitute legal advice. Those who wish to file a special action may wish to retain counsel.*

## B. Planning Commission

The Planning Commission typically holds public hearings twice a month (Wednesdays) on all matters relating to:

- a. Creation of zoning districts;
- b. Amendments to all zoning ordinances;
- c. Any other matter within the scope of the zoning power; and
- d. The General Plan

The Planning Commission acts in an advisory capacity to the City Council on land use and zoning matters, upon which the City Council will make the final decision. The Planning Commission is also authorized to confer with other advisory commissions, such as the Transportation or Historic Preservation Commissions.

Typical cases to be heard before the Planning Commission include, but are not limited to:

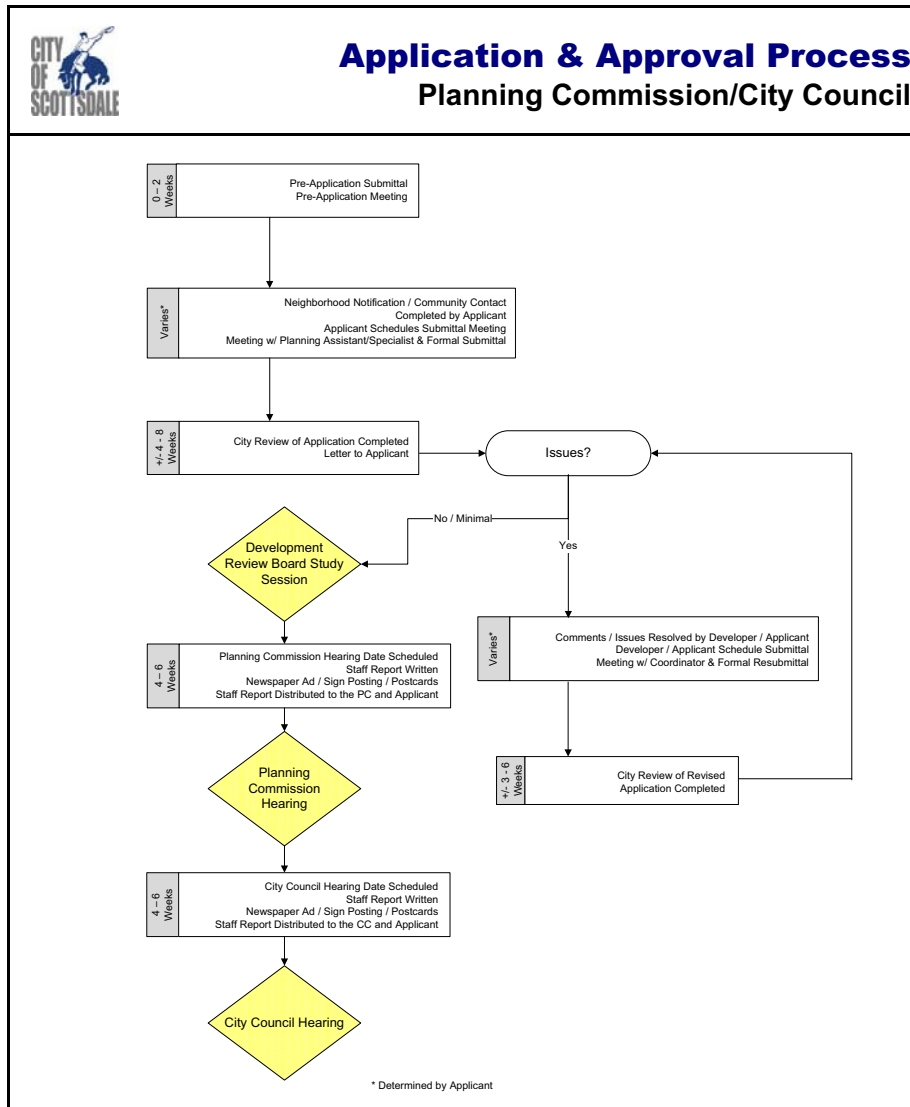
- a. Zoning Map Amendment (ZN) - amend the zoning map from the current zoning designation to another;

- b. General Plan Amendment (GP) - change the general plan from current land use designation to another designation. See [www.ScottsdaleAZ.gov/generalplan/](http://www.ScottsdaleAZ.gov/generalplan/);
- c. Conditional Use Permit (UP) - request for a use listed as “conditionally permitted” in the zoning district. See [www.ScottsdaleAZ.gov/bldgresources/devprocess/](http://www.ScottsdaleAZ.gov/bldgresources/devprocess/);
- d. Abandonment (AB) - request that the City release its interest in public right of way, roadway easement and alleys; and
- e. Municipal Use Master Site Plan (MUP) - required for all City projects 1 acre and over.

For the Planning Commission process see [Figure 1.1-4](#). Additional information is available at [www.ScottsdaleAZ.gov/bldgresources/devprocess/](http://www.ScottsdaleAZ.gov/bldgresources/devprocess/).

**C. City Council**

The City Council makes the final determination of approval or denial of cases that are heard by the Planning Commission, see [Figure 1.1-3](#). The City Council hears all matters concerning or relating to General Plan Amendments, zoning district map amendments, zoning ordinance text amendments, conditional use permits, conditional use permit revocations, municipal use master plans, abandonments, and appeals from Development Review Board. For more information visit [www.ScottsdaleAZ.gov/bldgresources/devprocess/](http://www.ScottsdaleAZ.gov/bldgresources/devprocess/).



**FIGURE 1.1-4 PLANNING COMMISSION / CITY COUNCIL PROCESS**

A few case types (ESLO Hardship exemptions, development agreements, etc.) go directly to City Council for approval, see [www.ScottsdaleAZ.gov/bldgresources/devprocess/](http://www.ScottsdaleAZ.gov/bldgresources/devprocess/). In many cases, these projects are still required to complete some aspect of neighborhood notification and involvement.

Most City Council decisions go into effect 30 days after City Council approval (Rezoning, Text Amendments, etc.), but some City Council approvals are effective immediately (Conditional Use Permits) and some are not effective until recording (Abandonments, Plats). The project coordinator will notify applicants of specific effective dates for each project. See above Figure 1.1-4 for the City Council approval process.

### 1. Legal Protest by Property Owners

Legal protests may be filed against a requested rezoning (zoning map amendment). See Zoning Ordinance Section 1.706 for details on when and how to file a legal protest, or contact Planning and Development Services at 480-312-7000 or email [planninginfo@scottsdaleaz.gov](mailto:planninginfo@scottsdaleaz.gov).

### 2. Conditional Use Permit Revocation/Modification

- a. See Zoning Ordinance Section 1.707 for City Council procedures on revocation of Conditional Use Permits.
- b. A revocation hearing shall be conducted by the City Council following the notice and hearing procedures of Section 1.702 of the Zoning Ordinance.

### 3. Appeals

Appeals of Rezoning, Text Amendment, and Use Permit decisions can be made to the Maricopa County Superior Court within 30 days of the City Council's decision.

The special action is filed as a civil matter at the Court Clerk's office counters at the following locations:

- a. Downtown Phoenix: 201 W Jefferson
- b. Southeast Campus (Mesa): 222 E Javalina

For more information on fees and filing a special action, contact the Clerk of the Superior Court at 602-506-3676 or go to [www.clerkofcourt.maricopa.gov](http://www.clerkofcourt.maricopa.gov).

*PLEASE NOTE: This information is for informational use only, and does not constitute legal advice. Those who wish to file a special action may wish to retain counsel.*

## D. Public Right-of-Way and Roadway Easement Abandonments

### 1. General Information

Abandonment is the process by which the City of Scottsdale gives up its public interest in public roadways. Typically, these roadways may have been obtained through subdivision plats, deeds, easements, and reservations and may be called streets, alleys, rights-of-way, roadway easements and roadway reservations. All of these forms of roadways are typically recorded in Maricopa County Recorder's Office as a matter of public record.

The common element of these roadways is they all contain roadway rights in favor of the City of Scottsdale (general public). The abandonment releases the publicly held interest in a roadway, including, but not limited to the right to access, build roads, bridges, sidewalk curbs and gutters, drainage facilities, and utilities.

Abandonments typically occur when a property owner wishes to eliminate the public interest in a public roadway, alley or easement affecting, or adjacent to their property. Once abandoned, the roadway area becomes part of the adjacent property(ies).

Examples:

1. A sub-divider or a developer may want to eliminate excess public roadways to facilitate creating a new subdivision or commercial project.



2. A neighborhood may want to form a gated, private community.
3. The city may determine that a public roadway is no longer necessary, and may initiate abandonment.

#### Applicable Regulations

- a. City Code, Chapter 47, Article IV. Streets, Sidewalks & Public Works
- b. Arizona Revised Statutes, Title 28, Chapter 20, Article 8

The abandonment process consists of Pre-Application, Formal Submittal, and the Public Hearing Process, see [Section 1-1.000](#). The public rights are transferred back to the property owner(s) in a Resolution approved by City Council. Additional information, including fee sheets, can be found on-line at [www.ScottsdaleAZ.gov/bldgresources/devprocess](http://www.ScottsdaleAZ.gov/bldgresources/devprocess). See [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms) for a pre-application and abandonment checklist.

### 2. Abandonment Pre-Application

A pre-application is required for each abandonment proposal, see [Section 1-1.200](#). Obtain forms and fee schedules from the Planning and Development Services Department online at [www.ScottsdaleAZ.gov/bldgresources/devprocess](http://www.ScottsdaleAZ.gov/bldgresources/devprocess), or by calling 480-312-7000.

At the pre-application conference the Principal Planner or designee will review the request, outline the approval process and may provide an application checklist. Occasionally the Principal Planner or designee may provide some insight of whether or not staff can support the request. All abandonment applications require a Neighborhood Notification Plan, see [Section 1-1.301](#). The Principal Planner or designee will determine specific notification requirements at this pre-application meeting. Requirements may include neighborhood/HOA notification, posting a sign on the property, an open house or other notification requirements.

### 3. Formal Application Submittal

After the applicant completes the requirements of the application checklist and has assembled the related materials, the applicant must schedule a meeting with the Planning and Development Services Department to verify the application submittal is complete; staff will sign the application indicating that all submittal requirements have been met. After obtaining staff signature the applicant is to pay for application at the One Stop Shop.

### 4. Public Hearings

Abandonments are required to go through two public hearings (Planning Commission and City Council) to allow neighbors and other interested parties (HOAs, etc.) an opportunity to review and comment on the proposal. Due to the legal noticing requirements for public hearings, it may take 5 to 7 months to process an abandonment application.

### 5. Recorded Document Finalizes Abandonment

If the Council approves the abandonment and adopts the abandonment resolution of the request, the resolution will be sent to the Maricopa County Recorder's office for recordation. The recordation of the resolution legally abandons the city's public interest in the property (as authorized by State Statutes). Occasionally, the council will withhold adopting the resolution until any associated stipulations have been addressed or a related subdivision plat is approved by the City Council. The recordation of the resolution is the final step in the public roadway abandonment process. A copy of the recorded document is sent to the applicant approximately 1 month after the Council passes the resolution.

### E. General Land Office (GLO) Easements

The General Land Office (GLO) roadway easements were created by the Federal Small Tract Act (1938) to assure legal access for future street planning by prohibiting the building of any structures across these easements. The city has viewed these patent roadway and utility easements as assured access at least until a local circulation plan is established. As GLO lots

come in for development (such as minor subdivisions, subdivisions, or requesting building permits) staff requires city rights-of-way dedications per city circulation plans.

Any patent easement in excess of the current circulation plan requirements (including trails) and roadway standards that are not required to insure access to any other lot, may be requested to be abandoned. GLO roadway easements go through the same process as the public roadway abandonment; only the public rights are abandoned in a Resolution approved by City Council. See [Figure](#) for GLO Easements in the city.

The city's abandonment of a GLO easement does not include any determination of private rights; similar to other private easement rights, those are matters between property owners.



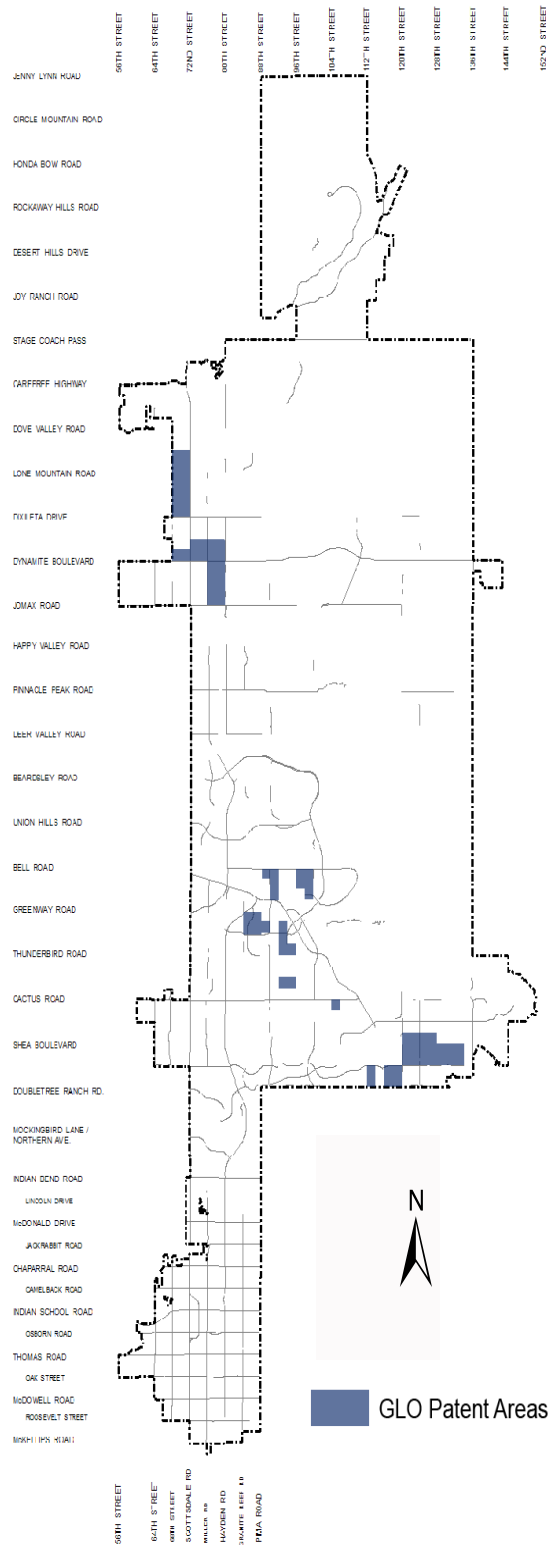
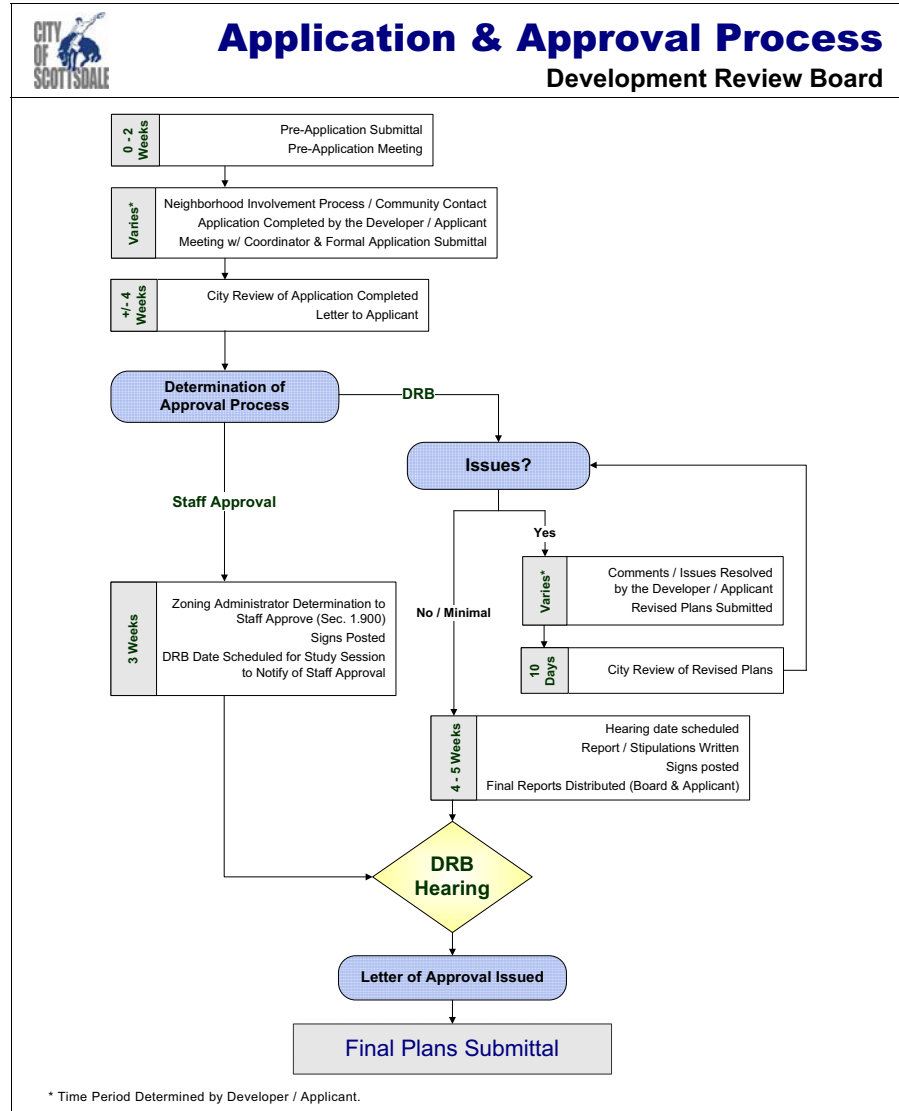


FIGURE 1.1-5 GENERAL LAND OFFICE (GLO) EASEMENT LOCATIONS

**F. Development Review Board (DRB)**

The purpose of the Development Review Board is to maintain the quality of development in Scottsdale through review of architectural design and layout of proposed development plans for commercial development and preliminary plats for residential subdivisions. This includes, but is not limited to site planning and the relationship of the development to the surrounding environment and the community. See [Figure 1.1-6](#) for the Development Review Board process and [www.ScottsdaleAZ.gov/bldgresources/forms/](http://www.ScottsdaleAZ.gov/bldgresources/forms/) for an application.

The Development Review Board typically meets twice per month, on the 1st and 3rd Thursday of the month, and is in the same week as the City Council meetings. The precise schedule each month may vary, depending on holidays, elections, etc.



**FIGURE 1.1-6 DEVELOPMENT REVIEW BOARD PROCESS**

### 1. Expiration of Approval

The DRB approval of plans for development shall expire 1 year from the date of approval, providing that a building permit has not been issued, unless a different time period is made a condition of DRB approval.

The Zoning Administrator or designee may grant a one-time extension of the approval for up to 1 year if the applicant files for the extension prior to the approval becoming void.

### 2. Appeals

An applicant can appeal a DRB decision. See the Zoning Ordinance Section 1.907 for details on when and how to appeal or contact Planning and Development Services at 480-312-7000 or email [planninginfo@scottsdaleaz.gov](mailto:planninginfo@scottsdaleaz.gov).

The City Council has the right to review DRB decisions and can uphold, modify or over-rule the Board's decision.

## SPECIAL CIRCUMSTANCES

1-1.305

### A. ESLO Hardship Exemptions

In 2004 the City Council adopted revisions to the Environmentally Sensitive Lands Ordinance (ESLO), including provisions that allow a property owner to apply for a hardship exemption from the regulation, see Zoning Ordinance Section 6.1022.

The ESLO Hardship Exemptions are heard by the City Council, and are only granted if the applicant demonstrates that the proposal meets specific criteria. The three criteria for an exemption are:

1. The applicant must demonstrate a Substantial Hardship that reduces the ability to use the parcel(s).
2. The requested exemption must be consistent with the intent and purpose of the ESL Ordinance.
3. The application of the new ESLO standards would not achieve significant benefit for protection of the environment and community.

For the ESLO Hardship Exemption application form and further information visit [www.ScottsdaleAZ.gov/codes/ESLO/](http://www.ScottsdaleAZ.gov/codes/ESLO/) or call 480-312-7000.

### B. General Plan Amendments

The General Plan is designed to be a broad, flexible document that changes as the community needs, conditions, and direction change. It can be revised through city-initiated amendments, and through citizen/property owner requests. The decision to amend the General Plan is determined by the City Council. For definitions of "major" and "non-major" amendments, and further information, see [www.ScottsdaleAZ.gov/generalplan/amendments](http://www.ScottsdaleAZ.gov/generalplan/amendments).

The amendment process involves a review and notification process and requires two Planning Commission hearings before going to the City Council for final approval or denial. See [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms) for a GP Amendment checklist.

#### 1. Major Amendments

Major General Plan Amendments are processed once a year with a spring submittal deadline (usually in April), two Planning Commission hearings, (usually in August and September) and a City Council hearing in late fall (October or November).

#### 2. Non-Major Amendments

General Plan Amendments not meeting the "major" amendment criteria can be submitted and processed at any time in the year.

## 1-1.306

**NOTICE OF MEETINGS**

State law governs the majority of notification requirements for cases that must be heard at a public hearing (ARS §§ 38-431.02). The type of notification required varies by case and hearing type. City requirements can be found in Article I of the Zoning Code online at [www.ScottsdaleAZ.gov/codes/zoning](http://www.ScottsdaleAZ.gov/codes/zoning). Please Note: The City of Scottsdale has established policies that are in some cases more rigorous than required by state law.

The city may use the following methods for hearing notification:

- a. Posting a sign on the subject property
- b. Postcards to particular addresses
- c. Case Fact Sheets posted to [www.ScottsdaleAZ.gov/projects/projectsinprocess/](http://www.ScottsdaleAZ.gov/projects/projectsinprocess/)
- d. Legal Notice published in the newspaper

A summary of notification requirements is shown in [Appendix 1-1A](#). See the Project Coordinator for more information or call 480-312-7000.

## 1-1.307

**APPEALS OF CITY ACTIONS**

Property owners have a right to appeal the following City actions:

1. Any dedication or exaction required by an administrative agency or official of the city as a condition of granting approval of a request to use, improve or develop real property. This appeal right does not apply to a dedication or exaction required as part of a city legislative act (for example a zoning ordinance) where an administrative agency or official has no discretion to determine the dedication or exaction.
2. The adoption or amendment of a zoning regulation that creates a taking of property in violation of Arizona and federal court decisions.
3. The appeal must be in writing and specify the City action appealed and the date final action was taken, and it must be filed with the City Clerk, or mailed to the hearing officer in care of the City Clerk within 30 days after the final action is taken. No fee will be charged for filing.
4. Address Appeals to: Hearing Officer c/o City Clerk  
3939 Drinkwater Boulevard  
Scottsdale, AZ 85251

The City Attorney's Office will review the appeal for compliance with the above requirements, and will notify the property owner if the appeal does not comply. Eligible appeals will be forwarded to the hearing officer, who will schedule a hearing within 30 days of receipt. Ten days notice will be given of the date, time and place of the hearing unless less notice is acceptable to the property owner.

The city will submit a takings impact report to the hearing officer.

In an appeal from a dedication or exaction, the City will bear the burden of proving that the dedication or exaction to be imposed bears an essential nexus between the requirement and a legitimate governmental interest and that the proposed dedication or exaction is roughly proportional to the impact of the use, improvement or development proposed.

In an appeal from the adoption or amendment of a zoning regulation, the City will bear the burden of proving that any dedication or exaction requirement in the zoning regulation is roughly proportional to the impact of the proposed use, improvement, or development, and that the zoning regulation does not create a taking of property in violation of Arizona and federal court cases.

The hearing officer must render his decision within five working days after the appeal is heard. The hearing officer can modify or delete a dedication or exaction or, in the case of an appeal from a zoning regulation, transmit a recommendation to the City Council.

If dissatisfied with the decision of the hearing officer, a complaint may be filed for a trial de novo with the Superior Court within 30 days of the hearing officer's decision. For more information contact the City Attorney's office at 480-312-2405.

*PLEASE NOTE: This information is for informational use only, and does not constitute legal advice. Those who wish to file a special action may wish to retain counsel.*

## PLAN REVIEW & PERMITTING

1-1.400

Residential development that complies with current Zoning District development standards and minimum permits can bypass the entitlement process; all other projects must complete the entitlement process before submitting for Plan Review & Permitting.

Application for plan check and building permits are made at the One Stop Shop. For a fee schedule call 480-312-2500 or visit [www.ScottsdaleAZ.gov/bldgresources/fees](http://www.ScottsdaleAZ.gov/bldgresources/fees).

### PLAN PREPARATION

1-1.401

#### A. Resources

##### 1. COS Standard Plans and Architectural Design Guidelines

The city provides standards plans for use in smaller/simpler projects. Standard Plans can be downloaded from [www.ScottsdaleAZ.gov/bldgresources/counterresources](http://www.ScottsdaleAZ.gov/bldgresources/counterresources). These include:

- Attached Residential Patio Cover
- Detached Garage/Storage Shed
- Carport Enclosure to Garage
- Masonry Fence/Wall

Architectural design guidelines for specific uses are available for:

- Restaurants
- Gas Stations and Convenience Stores
- Medical Campus
- Desert Parks
- Commercial Retail
- Office
- Golf Course

See [Section 2-1.500](#) or [www.ScottsdaleAZ.gov/design](http://www.ScottsdaleAZ.gov/design).

##### 2. Standard Detail Drawings

Standard Detail drawings are provided online in both pdf and dwg format. Files can be downloaded at [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

- a. Building Review Detail Drawings
- b. CADD Files for Public Works Construction

##### 3. MAG Standard Details & Specifications

Maricopa Association of Governments (MAG) sponsors and distributes the Uniform Standard Specifications and Details for Public Works Construction, which in addition to the City of Scottsdale (COS) Supplement to MAG Specifications and Details is the basis for public works construction in Scottsdale, see [www.mag.maricopa.gov/publications.cms](http://www.mag.maricopa.gov/publications.cms).

##### 4. COS Supplement to MAG

The City annually prepares and adopts its Supplement to MAG Uniform Standard Specifications and Details to provide the highest quality of construction within the public right-of-way. This document can be downloaded at [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

#### B. Construction Plan Requirements

Guidelines and standards for preparing improvement plans and documents for submittal to the city for approval are identified in [Section 1-2.100](#).

**C. Green Building**

Scottsdale's Green Building Program is designed to reduce the environmental impact of building. The concept of green building involves a whole-systems approach, which uses design and building techniques to minimize environmental impact and reduce energy use while improving the health of its occupants. Scottsdale's program rates buildings in the areas of site, energy, building materials, indoor air quality, water, and solid waste. This voluntary program offers incentives to influence design and product choices. For more information visit [www.ScottsdaleAZ.gov/greenbuilding/](http://www.ScottsdaleAZ.gov/greenbuilding/).

**D. Disability Access**

Developers adhering to the following accessibility standards, with a few exceptions, are assured conformance with City of Scottsdale codes:

- a. The 1994 Americans with Disabilities Accessibility Guidelines (ADAAG)
- b. 1991 HUD Fair Housing Accessibility Guidelines
- c. The 2003 International Building Code
- d. The ICC/ANSI A117.1-2003

See [Section 12-1.000](#) for more information.

**1-1.402****ESTABLISHING NEW ADDRESSES**

All addressing, street naming, and unit number assignments are fully described in MAG Address and Street Assignment Policy Manual (ASAP) 2003 Update, and amended in City of Scottsdale Amendment to MAG ASAP.

**A. Individual SFR Address Assignment**

1. A site address must be assigned prior to plan submittal.
2. Applicant must contact Records Department with site plan for lot showing access point.
3. Address for lot will be given according to the street in which the lot is accessed.
4. If lot will have two access points (ex. circle driveway on a corner lot), the applicant may be able to choose which street the address number is assigned from.
5. Once an address is agreed upon, it will be entered into the address database, which can take up to five working days.
6. After the address is entered, an electronic mail-out is sent to Maricopa County, emergency services, utility companies and the Post Office, notifying them of the newly assigned address.

**B. Subdivision Address Assignment**

1. A copy of the preliminary plat is sent from Planning Department to GIS Department for street name assignments within the subdivision.
2. City of Scottsdale uses Maricopa County street alignment grid to assign appropriate and consistent street names throughout Maricopa County.
3. At the time of street name assignments, the name of the final plat will also be checked to verify that there are no duplicate subdivision names within the City of Scottsdale.
4. Addresses for individual lots will not be assigned until final plat is recorded.
5. After the recorded plat is returned to City of Scottsdale from title company, plat is sent back to GIS Department for mapping and individual addressing.
6. Mapping and addressing the recorded plat can take up to ten working days, assuming there are no errors on the recorded plat.
7. If any errors are found, the engineer for the plat will be contacted to request an Affidavit of Correction for the errors.

8. Once the Affidavit of Correction is prepared, recorded, and returned to GIS Department the mapping and addressing process will continue.
9. After the plat is mapped and addressed, an electronic mail-out is sent to Maricopa County, emergency services, utility companies, and the Post Office, notifying them of the newly assigned addresses for the recorded plat.

**C. Minor Subdivision Address Assignment**

1. Site address must be assigned prior to pre-application submittal.
2. Additional addresses will be assigned for a minor subdivision only after the minor subdivision has been recorded.
3. Once recorded, the minor subdivision is sent to GIS Department for mapping and address assignments.
4. Mapping and addressing the recorded minor subdivision can take up to ten working days, pending there are no errors on the recorded minor subdivision.
5. If any errors are found, the engineer/ surveyor for the minor subdivision will be contacted to request an Affidavit of Correction for the errors.
6. Only once the Affidavit of Correction is prepared, recorded, and returned to the GIS Department will the mapping and addressing process continue.
7. After the minor subdivision is mapped and addressed, an electronic mail-out is sent to Maricopa County, emergency services, utility companies, and the Post Office, notifying them of the newly assigned addresses for the minor subdivision.

**D. Commercial Address Assignment**

1. Site address must be assigned prior to pre-application submittal (if applicable) or final plan submittal.
2. Additional building addresses may be assigned after DRB site plan approval.
3. Contact the Records Department with approved site plan and request building addresses.
4. Once addresses are agreed upon, they will be entered in the address database, which can take up to five working days.
5. After addresses are entered, an electronic mail-out is sent to Maricopa County, emergency services, utility companies, and the Post Office, notifying them of the newly assigned addresses.

**E. Suite Assignment**

1. Suites, for addressing purposes, are considered spaces that are not platted.
2. After building addresses are determined, suite numbers may be requested.
3. Contact the Records Department with a plan showing the suite layout.
4. Suite numbers must be three digit numbers with the first number of each indicating the appropriate floor (ex. Ste 100- first floor, Ste 325- third floor).
5. Once suite numbers are agreed upon, they will be entered into the address database, which can take up to five working days.
6. After suite numbers are entered, an electronic mail-out is sent to Maricopa County, emergency services, utility companies, and the Post Office, notifying them of the newly assigned suites.

**F. Commercial Condo Unit Assignment**

1. Units, for addressing purposes, are considered spaces that are platted.
2. Contact the Records Department with a preliminary plat showing unit layout.



3. Commercial unit numbers must be three digit numbers, with the first number of each indicating the appropriate floor (ex. Unit 200- second floor, Unit 410- fourth floor).
4. Once the unit numbers are agreed upon, they are sent back to the applicant within five working days.
5. These unit numbers must be put on the plat prior to Mylar submittal/ recording.
6. The plat is then recorded by the applicant's title company and is then returned to the Records Department so that it can be mapped and the unit numbers can be added to the address database.
7. Finally, an electronic mail-out is sent to Maricopa County, emergency services, utility companies and the Post Office, notifying them of the newly assigned units for the plat.

#### **G. Residential Condo Unit Assignment**

1. Units, for addressing purposes, are considered spaces that are platted.
2. Contact the Records Department with a preliminary plat showing unit layout.
3. Residential unit numbers must be four digit numbers, with the first number of each indicating the appropriate floor (ex. Unit 1003- first floor, Unit 4001- fourth floor).
4. Building designations must be single letter identifiers and are only used for multi-building complexes that are using one address throughout the complex.
5. Once the unit numbers are agreed upon, they are sent back to the applicant within five working days.
6. These unit numbers must be put on the plat prior to Mylar submittal/ recording.
7. The plat is then recorded by the applicant's title company and is then returned to the Records Department so that it can be mapped and the unit numbers can be added to the address database.
8. Finally, an electronic mail-out is sent to Maricopa County, emergency services, utility companies and the Post Office, notifying them of the newly assigned units for the plat.

#### **H. Live/ Work Unit Assignment**

1. Unit number assignment process is the same as commercial and residential unit assignment.
2. The commercial portion of unit must have a three digit unit number and the residential portion of the unit must have a four digit unit number.
3. The unit numbers must reflect the entrance to each portion of the unit.
4. Any questions or problems should be directed to Records Department.

#### **I. Residential Condo Conversion Unit Assignment**

1. Unit number assignment process is the same as residential unit assignment.
2. If an existing apartment complex is not using four digit unit numbering, the applicant will be required to convert to four digit unit numbers through the plan review process.
3. Once the plat is recorded, old unit numbers in the City of Scottsdale address database will be replaced with the new four digit unit numbers.
4. After the electronic mail-out is sent, the Post Office will no longer deliver mail to the old retired unit numbers.
5. If there is a discrepancy between newly assigned unit numbers and the unit numbers posted on site, a Compliance Order may be issued by Inspection Services requiring corrective action.



**J. Guest House Address Assignment**

- Per Zoning Ordinance, a guest house may not be offered for rent and therefore may not have a separate address from the main house.

**K. Utility Address Assignment**

1. Contact the Records Department with a site plan or location map for utility address requested.
2. An address for utilities can be assigned over the counter, over the phone or through email.
3. Addresses that are assigned for utilities (ex. water meter, electric meter, etc.) will be kept in an electronic list by the Records Department, but will not be added into the address database.

**PLAN REVIEW**

The following information identifies submittal requirements for each type of development project for plan review. See [www.ScottsdaleAZ.gov/bldgresources/planreview](http://www.ScottsdaleAZ.gov/bldgresources/planreview) for review cycle timeframes.

Case documents identify specific items required for final plan submittal, including additional documents, such as design reports and dedication documents. See the Construction Document Submittal Checklist from the Case file for this information.

Scottsdale has developed a program for digital plan submittal for Tenant Improvement, Plats, Land Division/Land Assembly, Maps of Dedication, Sprinkler Plans and Single Family Residential zoned R1-###, see [Section 1-2.200](#). More information on this process is available at [www.ScottsdaleAZ.gov/bldgresources/digital](http://www.ScottsdaleAZ.gov/bldgresources/digital).

**A. Residential Development**

Homeowners should check the deed restrictions in their subdivision, since deed restrictions may be more stringent than city ordinances. Call 480-312-7800 for information on required setbacks, easements, flood zones, and legal descriptions. For submittal requirements see [www.ScottsdaleAZ.gov/bldgresources/SFRProcess](http://www.ScottsdaleAZ.gov/bldgresources/SFRProcess), or contact Planning and Development Services.

1. Plan checks for home improvements may be made over the counter at the One Stop Shop.
2. Plan checks for new single-family residences and other new construction are also submitted to the One Stop Shop. Most plans will be reviewed within 30 days for first review and 25 days for subsequent reviews.

A permit is issued once building plans are approved and permit fees paid. Failure to obtain a building permit within 180 days of submitting plans requires the resubmission of the plans and payment of the appropriate plan review fees. Prior to the plan review expiration date, the Chief Development Officer may grant a one time 180-day extension depending on the relationship of the plans to the current codes, and depending on whether or not any required DRB approval has expired.

Key web sites for additional information:

- Homeowner Resources: [www.ScottsdaleAZ.gov/bldgresources/Homeowner/](http://www.ScottsdaleAZ.gov/bldgresources/Homeowner/)
- Setbacks: [www.ScottsdaleAZ.gov/bldgresources/setbacks](http://www.ScottsdaleAZ.gov/bldgresources/setbacks)
- Plan Requirements: [www.ScottsdaleAZ.gov/bldgresources/PlanReview/SFR\\_review](http://www.ScottsdaleAZ.gov/bldgresources/PlanReview/SFR_review)

**B. Commercial Development**

Commercial development requires review and approval of the site plan, elevations, exterior colors, landscaping materials, exterior lighting, etc., from the Development Review Board (DRB). In accordance with the Zoning Ordinance Section 1.906, the Zoning Administrator may

1-1.403

determine if an application is minor and approve it without a public hearing by the Development Review Board. All new construction and major tenant improvements require DRB approval. See [www.ScottsdaleAZ.gov/bldgresources/commercialprocess](http://www.ScottsdaleAZ.gov/bldgresources/commercialprocess).

Once DRB approval is obtained, submit construction documents for review to the One Stop Shop. Single Family, Multifamily, Commercial, Civil, and Tenant Improvement plans should use the e-Application for plan review and permitting at [www.ScottsdaleAZ.gov/bldgresources/couterresources](http://www.ScottsdaleAZ.gov/bldgresources/couterresources).

### **C. Land Divisions, Assemblages and Final Plats**

Land divisions, land assemblages and final plats require approval from either the Development Review Board, the Planning and Development Services General Manager or designee. Once approval is obtained, the city will provide the applicant with case stipulations, construction document requirements, and plat submittal requirements. The applicant must use these documents in conjunction with Chapter 3-1 Land Division, [Appendix 3-1A](#) through [Appendix 3-1F](#), and standards identified in [Section 3-1.000](#) for final plat preparation.

All land division final plat plans should be accompanied by the associated improvement plans for public infrastructure. The final plat will not be approved until the improvement plans are approved, and both plans conform to each other. Once approved, all land divisions and land assemblage plats will be recorded by the city at the Maricopa County Recorder's Office, see [www.recorder.maricopa.gov/](http://www.recorder.maricopa.gov/).

### **D. Public Works/Infrastructure**

Construction within city rights-of-way, including infrastructure improvements, may require review and approval from DRB, particularly for landscaping, walls, or other aesthetic elements. Improvement plans may be submitted once DRB approval (if required) is obtained. Improvement plans for Capital Improvement Projects must be submitted according to procedures established in [Chapter 9, Public Works & Facilities](#).

### **E. Dedication by Separate Instrument**

Some developments require dedications of public rights-of-way, easements, or other types of property rights that may not need a plat or a map of dedication. In these instances, dedications are acquired through separate legal dedication forms, including confirmation forms from any lienholders with interest in the property. For dedication descriptions, see [Appendix 1-1C](#).

Submit the following documents for review and approval by the final plans staff. The city will record these documents with the Maricopa County Recorder's Office. Dedications must be approved and recorded before the city will approve final plans and issue permits.

1. Complete the appropriate dedication form and/or confirmation form available at [www.ScottsdaleAZ.gov/bldgresources/forms/](http://www.ScottsdaleAZ.gov/bldgresources/forms/). All property owners must sign and notarize the form. All lienholders with an interest in the subject property must sign and notarize a confirmation form. If there are no lienholders, there is no requirement for a confirmation form.
2. A Legal Description and Exhibit defining the dedication area must be prepared and sealed by a Registered Land Surveyor. Attach the legal description and exhibit to the dedication document and the confirmation form (if there are lienholders). The combined forms will be recorded as a single dedication document.
3. Submit a commitment for title insurance (dated within 30 days prior to submittal date) identifying the City of Scottsdale as the proposed insured, with the dedication documents.

### **F. Dedication by Map of Dedication**

A map of dedication is used on commercial and industrial sites in place of individual easements that may require lengthy metes and bounds legal descriptions and exhibits. Use these maps to dedicate land to the public for the purpose of roadway, drainage, flood control, utility line, emergency or service vehicle access, or other public use. A map may also dedicate easement rights for private purposes.

Maps of dedication are approved administratively by the Planning and Development Services Department and do not require City Council approval. The requirements for a Map of Dedication and an example are provided in [Appendix 1-1D](#).

### G. Title Evidence

Many of the entitlement and plan review processes require an applicant to submit evidence of land ownership. Unless City staff directs otherwise, the evidence of ownership shall be a title insurance commitment.

Since confidence in ownership is dependent upon the thoroughness of title search and the subsequent willingness to insure title, the City requires that the title insurance commitment be of a diligence, form and quality that would accompany an actual real estate transaction between a sophisticated buyer and a sophisticated seller. The commitment must be prepared with the understanding that the City or applicant will actually purchase the title insurance (see #9 below).

Therefore, the title insurance commitment must meet the following requirements:

1. The title insurance commitment shall be in the same form and have the same wording that the title insurer would use when a sophisticated real estate purchaser is buying land from a sophisticated seller. For example, the commitment must not have any extra language that is not in a normal title insurance commitment for a straightforward land purchase.
2. The commitment must cover the entire project site, as if the City were a commercial real estate developer purchasing the land from its current owner.
3. The City of Scottsdale must be listed as the proposed insured.
4. The insurance amount must be based on a reasonable estimate of the actual dollar value of the entire site. For example, the price established during the most recent arms-length sale of the entire site is usually an acceptable amount.
5. The Schedule B requirements must call for:
  - a. An instrument to transfer interest from the current owner to the City.
  - b. Release of all liens, as if the city were going to pay cash for the land and not assume any liens or take subject to any liens.
  - c. Any other specific payments or specific document recordings that the title insurer would normally call for (such as payment of delinquent property taxes).
  - d. The schedule B exceptions must show any other specific title matters that may exist.
6. The title company may state in its title commitment that it will update the title search before issuing a title insurance policy. This is permissible if the language makes clear that the update will include only new title documents that are recorded after the title commitment date. For example, language such as "Additional items may be added based on new documents recorded before closing" is permissible. Language such as "Check with the title examiner for additional items before closing" is not permissible.
7. The title commitment must be less than 30 days old.
8. Both "standard coverage" and "extended coverage" title commitments are acceptable. The title information on an extended coverage commitment must be identical to the title information on a standard coverage commitment. The only difference is that the Schedule B requirements will call for a survey and will allow the title company to add Schedule B exceptions or Schedule B requirements for any problems the survey reveals.
9. There is no need to open an escrow to make the dedication. The City will record the dedication directly without sending it through the title company. Often, the City will not actually buy the title insurance described in the commitment or require the applicant to buy it. If either the City or applicant must purchase the insurance, the City or applicant will follow up with the title insurer to pay the insurance premium and satisfy the Schedule B requirements so that the title insurer will issue the policy.

10. The applicant shall inform City staff in writing of any and all title changes that occur after the title commitment is issued.
11. The City reserves the right for City staff to require additional evidence of title, including but not limited to an extended title insurance policy in favor of the City.

Also visit [www.scottsdaleaz.gov/bldgresources/planreview/title](http://www.scottsdaleaz.gov/bldgresources/planreview/title).

#### **H. Preparation for Recording**

The applicant shall submit the required original plats on 4-mil Mylar and recording fee to the city for recording with the Maricopa County Recorder's Office within 30 days after:

1. City Council approval of the subdivision, or
2. City approval of all other plats.

For dedication only recording, one (1) original document is required. For plat recording, three (3) original plats are required.

#### **I. Recording Process**

1. Each document reflecting a land division or a change to a land division, including master planned property plats, subdivision plats, minor subdivision plats, condominium plats, perimeter exception plats, amended plats, certificates of correction and maps of dedication, plus related development agreements and shared facilities agreements, must be recorded at the Maricopa County Recorder's Office. The City of Scottsdale recording fees for these documents are found in the city's current Fee Schedule, [www.ScottsdaleAZ.gov/bldgresources/fees](http://www.ScottsdaleAZ.gov/bldgresources/fees).
2. Within 30 days of receiving the final plat Mylars and recording fee, the city shall record the plat at the Maricopa County Recorder's Office.
  - a. Staff may approve recordation by a reputable title company. The owner or agent will provide the city with the name, address, phone number and e-mail address of a title company satisfactory to the city, and name, address, phone number and e-mail address of the title officer who is responsible for the recordation. The title officer will be contacted when the plat is fully executed by the city and ready for recording. Within 5 days after the city contacts the title officer with the information that the document(s) are ready for recordation, the title officer shall record the documents and return one original Mylar to the city Records Department.
  - b. If the title company is unable to perform the recording within five days, it will either arrange for an extension through city staff or return the plat.
3. Easement or dedication documents are submitted to Records Department by City of Scottsdale plan review staff. Before recording, all documents are sent to GIS Department to verify paper size, legal descriptions and any graphics attached to documents. The Maricopa County Recorder's Office will only accept document paper sizes of 8-1/2 inches by 11 inches or 8-1/2 inches by 14 inches. If the legal description or graphic has errors, GIS Department will contact the engineer to request corrections be made to the document. If the legal description and graphic have no errors, GIS Department will send the document to Records Department for recording. The Records Department then electronically records the document with Maricopa County Recorder's Office, see [www.recorder.maricopa.gov](http://www.recorder.maricopa.gov).
4. Maricopa County Recorder's Office has the final decision as to what documents are accepted for recording. If all provisions set by Maricopa County are not met, the document will be rejected. Maricopa County must be able to reproduce the entire document legibly on microfiche. Common rejection notes from Maricopa County include:
  - a. Signatures must be original
  - b. 2 inch margin at the top of first page
  - c. ½ inch margin around every page of entire document

- d. Signatures, stamps and seals must be in black ink
  - e. All text must be at least 11pt font
  - f. No mirrored images
  - g. No lines over text
  - h. No text over text
  - i. No faded print
  - j. No streaks, smudges, shading or speckles
  - k. No lines
5. Once the map or document is successfully recorded with Maricopa County Recorder's Office, the document is sent to the GIS Department to have the image illustrated on City of Scottsdale rights-of-way maps. One original is returned to the city (and kept in the City's Record Department docket books), one original stays at the Recorder's Office, and one original is returned to the surveyor/engineer.

### J. Plan Review Fees

Plan review fees are outlined at [www.ScottsdaleAZ.gov/bldgresources/fees](http://www.ScottsdaleAZ.gov/bldgresources/fees).

## BUILDING PERMITS

1-1.404

### A. Applying for a Building Permit

To obtain a building permit complete the e-Application, the Minimum Permit application, or obtain these forms from the One Stop Shop, see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

Information required for application includes:

1. Describe the work to be done under the permit.
2. Provide the legal description of the land, including street address or similar description, which will identify the specific location of the proposed building or work.
3. Indicate the use and occupancy for the proposed work.
4. Provide construction documents and other information as required by the most recently adopted International Building Code.
5. State the valuation of the proposed work.
6. Provide the applicant's or applicant's authorized agent's signature.
7. Provide other information on the application as required by the city's building official.

### B. Action on Application

Building plan review staff reviews applications for completeness and conformance with applicable laws. The building official will reject applications that do not conform, and will provide written reasons for this action. Staff will issue permits as soon as practicable once applications conform to code requirements.

### C. Time Limitation of Application

An application for a permit for proposed work expires after 180 days from the date of filing, unless it was pursued in good faith or a permit was issued. The building official may grant time extensions for additional periods, each not exceeding 180 days. A time extension request must be made in writing prior to the application expiring, and must demonstrate a justifiable cause. If the application expires, an additional fee is required to reinstate the application as calculated below:

- If within 6 months of the expiration date, the fee is half of the original application cost; or
- If beyond 6 months of the expiration date, a re-application and the full application fee are required, based on the current fee schedule.

## D. Activities Requiring Building Permits

Building permits are necessary to safeguard health, property, safety, and welfare of citizens. Homeowners, contractors, or developers who build or undertake improvements, repairs, or demolition must obtain a building permit. Permits are required for all construction work, ranging from a swimming pool or room addition by a homeowner to a major development site undertaking. Work started without a permit will be fined an amount equal to double the permit fee.

### 1. Examples of activities requiring building permits:

- Spa installation
- Swimming pools
- Fences
- Barns - including port-a-stalls
- Corrals
- Patio/garage enclosures
- Carports
- Room additions
- Guest homes
- Solar heater installation
- Rewiring of any electrical
- Repair of residential/commercial sewer
- Tenant improvements
- Alteration of building exterior

### 2. Minimum Building Permits

Minimum Building Permits, as listed below, typically apply only to single-family residential development. These permits can be obtained online with a credit card at [www.ScottsdaleAZ.gov/bldgresources/counterresources](http://www.ScottsdaleAZ.gov/bldgresources/counterresources).

- Replace gas water heater
- Replace water lines for single family residence
- Repair broken water lines
- Hot water recirculator
- Exterior appliance natural gas line (BBQ, Pool Heater, Fire Pit/Fireplace, Torches, Gaslights, Patio Heater)
- Exterior appliance propane gas line (BBQ, Pool Heater, Fire Pit/Fireplace, Torches, Gaslights, Patio Heater)
- Repair natural gas line
- Repair propane gas line
- Meter clearance
- Replace pool pump
- Plumbing for a water softener
- Sewer line repair
- Service upgrade or change out (400 AMP max.)
- Replace electric water heater
- Relocate panel box
- Raise electrical mast
- Electrical re-wire
- Residential load controller
- Ceiling fan
- Replace main breaker
- Temporary power pole
- Air conditioner change out
- Accessible ramp

Minimum permits require an inspection to confirm installation per the Building Code. Inspection requirements will be provided at permit issuance. For more information or to schedule an inspection, call Inspection Services at 480-312-5750.

## E. Permit Expiration & Renewal

Once a permit is issued there are 180 days to obtain the first inspection or the permit will expire. Each successive inspection must occur within 180 days of the previous inspection. A fee is required to reinstate an expired permit.

- Up to 90 days following expiration; no charge.
- 91 to 180 days following expiration; one half fee based on current fee schedule.
- Over 180 days following expiration; full fee based on the current fee schedule.



- Should the permit be expired for more than 180 days, and different building codes are in effect, plans shall be resubmitted showing current code compliance and approval before issuance of a new permit. Plans will be reviewed at an hourly review fee (minimum one hour).

**F. Revocation of Permits**

The building official is authorized to suspend or revoke a permit wherever the permit is issued in error or on the basis of incorrect, inaccurate or incomplete information, or in violation of any ordinance or regulation, or any of the provisions of building codes as adopted by the city.

**G. Building Permit Fees**

Permit fees for commercial, residential and miscellaneous permits, and a fee calculator for estimating residential plan review and permit fees are outlined at [www.ScottsdaleAZ.gov/bldgresources/fees](http://www.ScottsdaleAZ.gov/bldgresources/fees).

**ENCROACHMENT PERMITS****1-1.405****A. Activities Requiring an Encroachment Permit**

Encroachment Permits are necessary to protect the health, safety and welfare of the general public. They are required for any construction activity in a public right-of-way, including easements where the city has an interest, such as Natural Area Open Space (NAOS) or drainage easements. Work initiated without an Encroachment Permit will be fined an amount equal to double the permit fee.

**B. Certificate of Insurance**

A Certificate of Insurance is required prior to obtaining an Encroachment Permit. The certificate must be in the amount of 1 million dollars. The City of Scottsdale must be named as "Additionally Insured". For more information call 480-312-2500.

**C. Permit Expiration & Renewal**

Improvement plan approvals are valid for a period of 6 months. An Encroachment Permit must be issued within this period or the plan approval expires. Expired plans must be re-submitted for approval, a full fee must be paid (calculated at the current fee schedule), and shall be subject to current standards and requirements. Once an Encroachment Permit is issued, an inspection must be obtained within 6 months or the permit will expire. Each successive inspection must occur within 6 months of the previous inspection or the permit will expire. If an Encroachment Permit expires the plan approval also expires and will require re-approval.

**D. Revocation**

The city may revoke an Encroachment Permit or plan approval if any false statement or misrepresentation was made in the application of the plans on which the permit or approval was based.

**E. Encroachment Permit Fees**

Additional inspection and permits fees for specified encroachments are required as outlined at [www.ScottsdaleAZ.gov/bldgresources/fees](http://www.ScottsdaleAZ.gov/bldgresources/fees).

**CONSTRUCTION ACTIVITY****1-1.406****A. Construction Crew Hours**

Construction may not start more than 30 minutes prior to official sunrise and must stop at official sundown. Official times are as recorded by the National Weather Service. Starting and

ending times vary throughout the year. During the summer, contractors may be allowed to start work as early as 4:45 a.m. if the official sunrise is at 5:15 a.m.

For more information call Inspection Services at (480) 312-5750. For official sunrise and sundown times visit the National Weather Service at [www.weather.gov](http://www.weather.gov).

### **B. Construction Debris and Alleys**

It is unlawful to use the alley for disposal of construction debris or to cover/damage the surface of the alley in any way. It is illegal to place cement, dirt or any other construction debris in alleys or in any city refuse container. The city recommends the following practices:

1. Contain all construction waste (dirt, cement, etc.) away from the alley surface and arrange for proper disposal.
2. Do not use the alley to clean out cement mixers and/or other tools.
3. Remove (sweep and hose off) any dirt or other material that may spill in the alley.
4. Leave the alley in pre-construction condition when construction is complete.
5. Inspection Services will inspect the condition of the alley during all phases of construction. Failure to comply with these requirements may result in:
  - a. A "Stop Work Order" being issued until the project is brought into compliance and the alley restored to its original condition.
  - b. Issuance of a citation for illegal dumping and/or failure to properly maintain the alley in accordance with the Scottsdale Revised Code.
6. Best Practices for managing construction debris include:
  - a. Protect the alley surface by placing roofing paper, plywood, and landscaping fabric, etc. along the fence line.
  - b. Contain all construction debris inside the fence line.
  - c. Remove debris immediately after construction is completed.
  - d. Do not clean out cement mixers and/or tools in the alley.
  - e. Do not block the alley at any time.
7. In the event construction waste (dirt or cement, etc.) is not contained away from the alley:
  - a. Remove all large debris and haul it away.
  - b. Sweep any dirt, cement or gravel off the treated portion of the alley.
  - c. Hose off any remaining dirt, cement, or gravel from the treated portion of the alley.
  - d. Return the portion of the alley along the fence line to its original condition and grade.

## **1-1.407**

### **TEMPORARY CONSTRUCTION FENCING**

Temporary/Security fencing required by the Building Code, Zoning Ordinance, Planning and Development Services General Manager or designee, or electively provided shall be installed in accordance with the following:

#### **A. Screening**

Unless otherwise required by the Building Code, or the Planning and Development Services General Manager or designee, temporary/security fencing on construction sites visible from a public or private street shall include semi-opaque screening on the side of the fence adjacent to the public or private street.

1. Screening made of fabric and/or vinyl shall be attached on all sides to the outside of the Temporary/Security fence.
2. Fabric and/or vinyl screening shall be partially transparent with a woven denier no less than eighty percent (80%).
  - a. Half hemisphere slits with a maximum radius of one (1) foot may be provided in the screening to allow air to pass through. The half hemisphere slits shall have a minimum



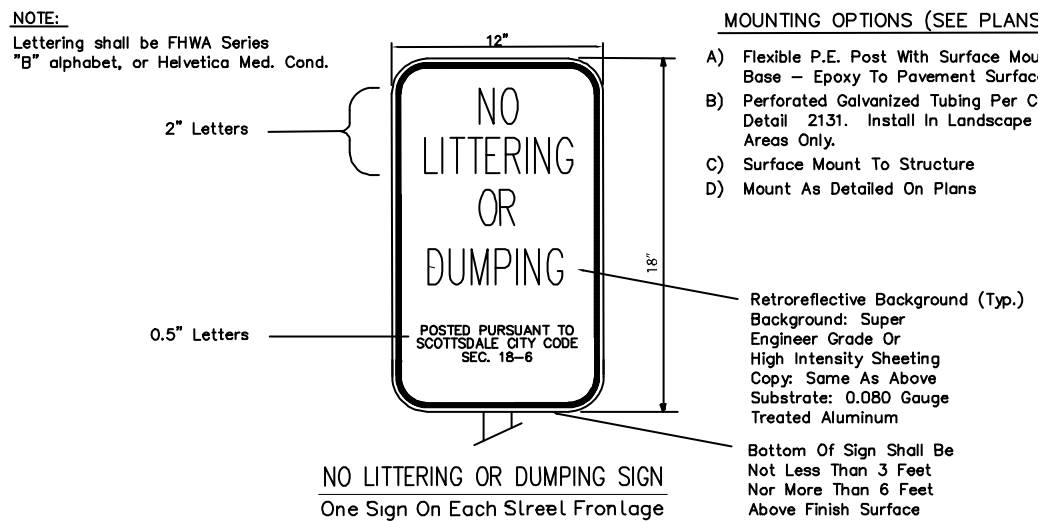
separation of six (6) feet. Other slits and holes shall not be made in fabric and vinyl screening.

3. Temporary/Security fence screening in the environmentally sensitive lands ordinance designated areas shall be a dark green or dark brown color.
4. Other than an individual single-family dwellings (and related individual lot improvements), the Planning and Development Services General Manager or designee may approve temporary/security fence screening that may contain development images of the building elevations, site plan, and landscape plan that were approved by the development review board.
  - a. Applicants that desire to utilize development images on, or part of the screening shall submit a staff approval application to the planning and development services department. Applications shall include:
    - Application and narrative,
    - A dimensioned site plan showing the location of all improvements (new and to remain), easements, intersection & driveway sight distance, traffic safety triangle, the location of the temporary/security fence and screening, etc.,
    - Dimensioned color elevations of the proposed fence, screening, and development images, and
    - Total square feet of the screening and total square feet of the proposed images.
  - b. Upon review of the application, the Planning and Development Services General Manager or designee may approve, deny, or require correction to be made to the application in order to receive approval.
5. Temporary/Security fencing to be erected in the public right-of-way, private roads, and/or across public access sidewalks shall be provided in accordance with the City of Phoenix barricade manual and the manual on uniform traffic control devices, and shall be subject to the approval of the Transportation General Manager or designee.
6. Temporary/Security fencing to be erected that will enclose or prohibit access to a public transit stop, shall be subject to the approval of the Transportation General Manager or designee.
7. Temporary/Security fencing erected in a traffic safety triangle and/or intersection and driveway sight distance triangle shall be subject to the approval of the Transportation General Manager or designee.
8. Unless required by the building official or designee, temporary/security fencing shall not enclose a fire hydrant. A temporary/security fence adjacent to a fire hydrant shall be setback a minimum of a five-foot radius distance from the fire hydrant.
9. All emergency access points shall be marked with a sign in compliance with the Fire Department requirements, see [Section 11-1.700](#) and [Figure 11.1-1](#).
10. Emergency access identification, access identification, safety identification, visitor check-in and identification as required by the occupational health and safety organization and/or the Building Code may be attached to the fencing only on both side of an entrance for a distance of 10 feet, or in locations required by the Planning and Development Services General Manager or designee.
11. Locations of traffic control identification attached to the temporary/security fencing shall be subject to the approval of the Transportation General Manager or designee.
12. Access openings in the temporary/security fencing shall be protected by doors/gates with screening.

## **B. Vacant Sites and/or Vacant Buildings**

A temporary/security fence provided on a vacant site and/or around a vacant building:

1. Shall have a maximum height of three-feet.
2. May consist of posts or bollards with wire or chain connecting the posts or bollards.
3. May not have more than three horizontal members.
4. May not be located in right-of-way, roadway easements, or roadway tracts.
5. Shall comply with the setback and location requirements of the Zoning Ordinance.
  - a. Applications for temporary/security fence provided on a vacant site shall include:
    - Application and narrative,
    - A dimensioned site plan showing the location of all improvements (new and to remain), easements, intersection & driveway sight distance, traffic safety triangle, the location of the temporary/security fence and screening, etc. and signs required in Section 1-1.407, paragraph B5b, and
    - Details of the fencing.
  - b. A vacant site shall be posted with at least one no littering or dumping sign in accordance with Figure 1-1.7.



**FIGURE 1.1-7 NO LITTERING OR DUMPING SIGN**

### C. Special Events

Temporary/Security fencing required for a special event permit shall be provided in accordance with the requirements determined by the city's special events committee.

### D. Construction Sites

Unless otherwise required by the Building Code, or the Planning and Development Services General Manager or designee, a construction site shall be enclosed with a temporary/security fencing that is six (6) foot high chain link fence. An alternative to the chain link fence requires the approval of the Planning and Development Services General Manager or designee.

1. The location of a fence is to be shown on the site plan or a separate fence plan that also identifies the location of all improvements (new and to remain), easements, intersection and driveway sight distance, traffic safety triangle, etc.

- a. Fencing provided in the environmentally sensitive lands ordinance designated areas also must identify the color of the screening on the site plan.

## INSPECTIONS

1-1.500

Inspections are made for building, electrical, mechanical and plumbing for residential, commercial and industrial development, and remodeling of existing buildings. Water, sewer, paving, concrete and grading activities also require city inspection. As part of the development process all permitted construction activities must be inspected by the city's Inspection services staff. Examples of activities requiring inspection include replacing water heaters, major commercial projects, construction and landscaping within the public rights-of-way, survey benchmarks, compliance with Natural Area Open Space and Native Plant Ordinance requirements, and coordination with the Fire Department for fire code inspections. The review of plans and issuance of permits do not authorize code or ordinance violations that may be discovered by City Inspectors.

### A. Scheduling or Canceling an Inspection

The Inspection Job Card, received at the time of permit issuance, must be posted on the job site with an approved set of plans for the inspector's use. All construction must be inspected before any completed work is covered or concealed; such as foundation, electrical rough wiring, etc.

Inspections can be scheduled or canceled in several ways:

- a. Online at [www.ScottsdaleAZ.gov/bldgresources/inspections](http://www.ScottsdaleAZ.gov/bldgresources/inspections)
- b. Via automated phone scheduling system at 480-312-5796, or
- c. By calling Inspection Services at 480-312-5750.

See [Appendix 1-1B](#) or [www.ScottsdaleAZ.gov/bldgresources/inspections](http://www.ScottsdaleAZ.gov/bldgresources/inspections) for a listing of the three-digit inspection codes required when using the automated systems. Using these systems also requires the keycode printed on the permit receipt.

### B. Estimated Time of Arrival

To determine the estimated time of an inspection, call 480-312-5750 and have the permit number or address available so staff can direct the call to the appropriate inspector. Only the assigned inspector can provide the estimated time of arrival.

## CERTIFICATE OF OCCUPANCY

1-1.600

### A. Issuance of Certificate of Occupancy

Before any development can be occupied or used, an applicant must apply for a Certificate of Occupancy (C of O). Additionally, all Development Review Board stipulations must be complied with before the city will issue a certification of shell building or a Final C of O. Within 3 days of submitting an application, the C of O or certification of shell building will be issued, provided the project passes a Final Inspection. The issuance of a Certificate of Occupancy shall not be construed as an approval of a violation of the provisions of any city code or ordinance.

The city's building code requires certain information to be included on the C of O. Most important is the project address; the code also requires the name of the owner of the property at the time the certificate was issued. The C of O stays with the property for perpetuity, even with changes in ownership. If the property ownership changes during construction, documentation to that fact can be submitted and a change made to the permit.

See [www.ScottsdaleAZ.gov/bldgresources/devprocess/](http://www.ScottsdaleAZ.gov/bldgresources/devprocess/).

### **B. Temporary Certificate of Occupancy**

The issuance of a Temporary Certificate of Occupancy allows temporary occupancy until the building is completed and a Final Certificate of Occupancy is issued. Should the Temporary Certificate of Occupancy expire prior to the issuance of the Final Certificate of Occupancy, the expiration will require the City of Scottsdale to take appropriate steps as outlined in the Scottsdale Revised Code, Ordinance 3505, Section 110.4.

For each Temporary Certificate of Occupancy issued, a refundable cash deposit is required, or an irrevocable letter of credit (acceptable to the Inspection Services Director or City Attorney) paid to the City of Scottsdale, to assure compliance to code and ordinance requirements. For most projects, the amount of the cash deposit will be the same as the cost of a combination building, electrical, mechanical and plumbing permit fee, as specified in Scottsdale Revised Code, Chapter 46, Article VII, or \$1,000.00, whichever is greater. For single-family residential projects, the deposit shall be the same as the cost of a combination permit, or \$1,000.00, whichever is less.



# PUBLIC NOTIFICATION REQUIREMENTS

PROCESS	PLANNING COMMISSION AND CITY COUNCIL					DEVELOPMENT REVIEW BOARD	BOARD OF ADJUSTMENT	RESPONSIBLE PARTY
	General Plan Amendment (Major & Non-Major) Character Area Plan Amendment	Zoning Change / Amendment (includes site plan and stip changes)	Zoning Text Amendment	Conditional Use Permit (includes municipal use master site plan)	Abandonment	Site Plan, Prelim. Plat, Building Elevation, etc.	Variance	
<b>PRE-APPLICATION</b>								
<b>City Web Site</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	City
<b>Citizen Review Plan</b>	▼	Required	Required	No	No	No	No	Applicant
<b>GP and CA Neighborhood Involvement Plan</b>	Required	No	No	No	No	No	No	Applicant
<b>Neighborhood Notification Plan</b>	No	No	No	Required	▼	Required	Required	Applicant
<b>Project Under Consideration Sign</b>	▼	4'x4'	▼	▼	No	▼	No	Applicant
<b>Project Information Letter/Postcard</b> Radius of Notification Area	750' ***	750' **	750' *	750' **	▼	750' **	750' **	Applicant
<b>Open House Meeting -</b> Notify Project Coordinator in Advance	Required	Required	Required	▼	▼	▼	▼	Applicant
<b>Citizen/Neighborhood Report Report</b>	Required	Required	Required	Required	▼	Required	▼	Applicant
<b>FORMAL APPLICATION</b>								
<b>Keeping You Informed Postcard</b> Radius of Notification Area (10-14 days after submittal)	750'	750' **	*	750' **	750'	750'	750' ◇	City
<b>Notice of Public Hearing Sign</b>	4'x4' Applicant	4'x4' Applicant	No	4'x4' Applicant	3 Signs: 2'x3' City	2'x3' City	2'x3' City	Applicant/City
<b>Newspaper Ad for Public Hearing</b>	Yes	Yes	Yes	Yes	Yes	No	Yes	City
<b>City's Web Public Hearing Info</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	City
<b>Posting of Agendas</b> (on-line & at 3 public places)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	City
<b>Planning Commission Hearing Info Postcard</b> (15 days prior)	750' **	750'	*	750'	750'	N/A	N/A	City
<b>City Council Hearing Info Postcard</b> (15 days prior)	750' **	750'	*	750'	750'	N/A	N/A	City
<b>Other Legal Requirements</b> (certain projects)	See Statutory Requirements	See Statutory Requirements	See Statutory Requirements	▼	▼	▼	▼	Applicant/City

\* Text Amendment notification list, plus any stakeholders \*\* Plus additional notification list that includes utilities, schools, interested parties within the city, county and abutting cities and towns. \*\*\* Plus stakeholders or associated interested parties as determined by Coordinator ◇ Hearing postcard ▼ May be required, consult Coordinator





# 3-DIGIT INSPECTION TYPE CODES

## Scheduling Inspections

To schedule, cancel or review status on an inspection via the automated telephone system, call 480-312-5796. While in the system you may exit at any time by pressing \*\* or press 0 to speak to a representative.

On-Line scheduling can be done at [www.ScottsdaleAZ.gov/bldgresources/inspections](http://www.ScottsdaleAZ.gov/bldgresources/inspections). Refer to this website for the current 3-digit inspection codes.

Requires the key code printed on your permit receipt.

## Inspection Types for Building Permits

- 001 Pool Rough (pre-gunite)
- 002 Pool Final (pre-plaster)
- 003 Exterior Footing
- 004 Stem Wall
- 005 Under-slab Soil & Waste
- 006 Interior Footing(s)
- 007 Under-slab Water
- 008 Building Water Supply
- 009 Building Sewer
- 010 Underground Electric
- 011 Masonry Grout
- 012 Bond Beam
- 013 Temporary C of O – Off-Site
- 014 Roof Deck – Strap & Sheer
- 015 Rough Plumbing
- 016 Rough Electric
- 017 Rough Mechanical
- 018 Rough Frame
- 019 Gypsum Wallboard
- 020 Exterior Foam & Lath
- 021 Natural Gas Line
- 022 Propane (LP) Gas Line

- 023 Temporary Power Pole
- 024 Temporary Electric / Permanent Position
- 025 Temporary C of O - Building
- 026 Final Building
- 027 Final Electric
- 028 Final Mechanical
- 029 Final Plumbing
- 030 Final Fire
- 031 Final C of O – On-Site
- 032 Temporary C of O – On-Site
- 033 Lowest Floor Certification
- 035 Miscellaneous Footings
- 036 Temporary C of O – Fire
- 037 Backflow Preventor
- 038 Fence Footing
- 039 Fence Final
- 040 Retaining Wall Footing
- 041 Retaining Wall Final
- 042 Pre-Site Inspection
- 043 Final C of O – Off-Site
- 045 Temporary C of O – Survey
- 050 Work in Progress  
(call 480-312-5750)
- 051 Fire Underground Rough Test
- 052 Fire Underground Final Test
- 056 Grease Interceptor/Trap  
(Commercial)







# DEDICATION DESCRIPTIONS

TYPE OF DEDICATION	DESCRIPTION
<p><b>Additional Signatures and Acknowledgments</b></p>	<p>Attach copies of this sheet to the back of any dedication form when there are more than two grantors. The blanks at the top of the page are for the name and date of the form to which this sheet is being attached.</p>
<p><b>Confirmation of Dedication</b></p>	<ol style="list-style-type: none"> <li>1. A person who signs this document gives up his ownership rights to stop the city from using the dedication. For example, if a bank forecloses a mortgage that exists before the city receives a dedication; the foreclosure destroys the city's dedication, unless the bank signs this form.</li> <li>2. Form can be used with any dedication document. Eliminates the need for specific confirmation forms, such as Confirmation of Natural Area Open Space and Confirmation of Right-of-Way Dedication.</li> <li>3. Can be signed by any person who has an adverse interest in the land being dedicated. Eliminates the need for separate confirmation forms by lenders, tenants, etc.</li> <li>4. Instructions for completing the form: <ul style="list-style-type: none"> <li>• The first blank (labeled "Beneficiary") is for the name and organizational data of the person who has the adverse ownership.</li> <li>• The second blank is for the recording number of the document that created the adverse interest.</li> <li>• The third blank is for the name of the city dedication document that he is confirming (such as "Public Trail Easement").</li> <li>• The fourth blank is for the recording number of the city's dedication document that he is confirming.</li> </ul> </li> <li>5. This document should be used at the same time as the dedication. It can also be used to cure a problem if the city discovers a lender, etc., who did not confirm the dedication. If used at the same time as the dedication, then insert the words "recorded herewith" in the fourth blank, cross out the "WHEN RECORDED RETURN TO" line at the top and the address immediately below it, and then attach this document to the back of the dedication and record with the dedication as a single document. Otherwise, insert the recording number for the dedication in the fourth blank and record the confirmation of dedication separately.</li> </ol>
<p><b>Deed of Right-of-Way Dedication</b></p>	<p>Allows the city to use the property for:</p> <ul style="list-style-type: none"> <li>• Public street purposes</li> <li>• Motorized and non-motorized traffic</li> <li>• Public Utilities</li> </ul> <p>Used to create ordinary street right-of-way.</p>



# DEDICATION DESCRIPTIONS

TYPE OF DEDICATION	DESCRIPTION
<p><b>Drainage and Flood Control Easement and Provision for Maintenance</b></p>	<p>Allows the city to use the property for:</p> <ul style="list-style-type: none"> <li>• Diverting water onto the property</li> <li>• Drainage facilities</li> </ul> <p>Does not give the city the right to install or operate or go on the property for:</p> <ul style="list-style-type: none"> <li>• Utilities</li> <li>• Pedestrian or vehicular use (except related to drainage uses)</li> <li>• Any use by the public</li> </ul>
<p><b>Natural Area Open Space Easement, including Restored Desert</b></p>	<p>Allows the city to stop any construction on or other disturbance of the land or natural desert plants.</p> <p>Does not give the city the right to operate or go on the property for:</p> <ul style="list-style-type: none"> <li>• Public pedestrian and vehicular access</li> <li>• Any reason except as necessary to enforce the dedication</li> </ul>
<p><b>Private Access Easement</b></p>	<p>The word “private” in the name of the document makes it clear that it is not creating a public street right-of-way.</p> <p>Allows the person named as grantee to use the property for a private street or driveway across one privately owned parcel serving another privately owned parcel.</p> <p>Does not allow:</p> <ul style="list-style-type: none"> <li>• Access for the city or the public</li> <li>• Access for any city vehicles (including fire trucks or garbage trucks)</li> <li>• Public utilities</li> </ul>
<p><b>Public Ingress/Egress Easement</b></p>	<p>Allows the city to use the property for public pedestrian and vehicular access.</p> <p>Does not give the city the right to install or operate or go on the property for:</p> <ul style="list-style-type: none"> <li>• Drainage uses except as necessary for pedestrian and vehicular access</li> <li>• Utilities</li> </ul> <p>Similar to a regular street right-of-way, except grantor still owns the land, and public use is limited to surface transportation (such as it does not allow utilities).</p>
<p><b>Public Trail Easement</b></p>	<p>Allows the city to use the property for:</p> <ul style="list-style-type: none"> <li>• Public non-motorized access</li> <li>• Pedestrian and emergency and service vehicle access</li> </ul> <p>Does not give the city the right to install or operate or go on the property for:</p> <ul style="list-style-type: none"> <li>• Drainage facilities</li> <li>• Motor vehicle ways</li> <li>• Public Utilities</li> </ul>



# DEDICATION DESCRIPTIONS

TYPE OF DEDICATION	DESCRIPTION
<p><b>Public Utility Easement</b></p>	<p>Allows the city to use the property for public utilities.</p> <p>Does not give the city the right to install or operate or go on the property for purposes other than public utility related uses.</p> <p>Does not give any public utility company any right to use the land. The dedication is only to the City of Scottsdale. The City can share its rights with public utility companies, but public utility company can only use easement with formal written permission from the City of Scottsdale (franchises, encroachment permits, etc.). These same rules apply to private utilities in normal street right-of-way.</p>
<p><b>Scenic Corridor Easement</b></p>	<p>Allows the city to prevent the owner from obstructing the view with any construction on or other disturbance of the land or natural desert plants.</p> <p>Does not allow the city to go on the property for any purpose other than to preserve the scenic corridor.</p>
<p><b>Sewer Line Easement</b></p>	<p>Allows the city to use the property for public sewer lines.</p> <p>Does not give the city the right to install or operate or go on the property for purposes other than public sewer line related uses.</p>
<p><b>Sight Distance Easement</b></p>	<p>Allows the city to prevent the owner from obstructing the view with any obstruction as per city code.</p> <p>Does not allow the city to go on the property for any purpose other than to preserve the sight distance.</p>
<p><b>Water Line Easements</b></p>	<p>Allows the city to use the property for public waterlines.</p> <p>Does not give the city the right to install or operate or go on the property for purposes other than public waterline related use.</p>





# MAP OF DEDICATION EXAMPLE

## MAP OF DEDICATION EXAMPLE

### DEDICATION

KNOW ALL MEN BY THESE PRESENTS:

That US Properties, LLC, an Arizona Limited Liability Company, and Arizona Properties, LLC, an Arizona limited liability company, as owners of the property situated in the South Half of the Southwest Quarter of Section 14, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, as shown and mapped hereon, hereby publishes this Map of Dedication for "Highpoint Ridge". Said map sets forth and gives the dimensions of the fee road right-of-way and easements on the above described premises. The easements are dedicated for the purposes stated hereon.

US Properties, LLC, an Arizona Limited Liability Company, and Arizona Properties, LLC, an Arizona limited liability company, do hereby dedicate to the City of Scottsdale, an Arizona municipal corporation:

1. The public streets in fee as shown hereon. Maintenance of the public streets shall be the Adjacent Property Owner's responsibility until such time the streets are improved to City of Scottsdale standards and accepted by the City of Scottsdale.
2. A perpetual, non-exclusive Drainage Easement (D.E.) for the purposes of construction, operation, replacement, and repair of levies, dikes, channels, and other works of drainage or flood control in and over a portion of the areas designated as such hereon an easement upon, over, and across real property described hereon. Maintenance shall be the responsibility of the individual owner of the lot or tract where the easement is located hereon.
3. A perpetual, non-exclusive Scenic Corridor Easement (S.C.E.) upon, over, and across the parcel of land shown hereon. The purpose is to preserve the property as a scenic corridor free of any obstructions to the view of persons looking across the Property. Without limitation, Grantor shall not allow or suffer to exist upon the Property any buildings, walls, trees, obstructions, screens, or other structures or things exceeding a height determined by the Grantee above original grade.
4. A perpetual, non-exclusive Public Trail Access Easement (P.T.A.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is for all forms of non-motorized transportation together with motorized emergency, law enforcement, and service vehicles, and for construction, operation, use, maintenance, repair, modification, and replacement from time to time of improvements related thereto.
5. A perpetual, non-exclusive Public Utility Easement (P.U.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for electricity, water, wastewater, telecommunications and all other manner of utilities, and for construction, operation, use, maintenance, repair, modification and replacement from time to time of improvements related thereto.
6. A perpetual, non-exclusive Water Line Easement (W.L.E. or W.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for underground water pipes, above ground appurtenances and for construction, operation, use, maintenance, repair, modification and replacement from time to time of pipes and manholes, valves, access vaults, and facilities related thereto.
7. A perpetual, non-exclusive Sewer Line Easement (S.L.E. or S.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for underground sewer pipes and wastewater facilities, and for the construction, operation, use, maintenance, repair, modification and replacement from time to time of pipes, manholes, access vaults and other improvements related thereto.



# MAP OF DEDICATION EXAMPLE

**MAP OF DEDICATION EXAMPLE**

- 8. The public streets in fee as shown hereon. Maintenance of the public streets shall be the Adjacent Property Owner's responsibility until such time the streets are improved to City of Scottsdale standards and accepted by the City of Scottsdale.
- 9. A perpetual, non-exclusive Drainage Easement (D.E.) for the purposes of construction, operation, replacement, and repair of levies, dikes, channels, and other works of drainage or flood control in and over a portion of the areas designated as such hereon an easement upon, over, and across real property described hereon. Maintenance shall be the responsibility of the individual owner of the lot or tract where the easement is located hereon.
- 10. A perpetual, non-exclusive Scenic Corridor Easement (S.C.E.) upon, over, and across the parcel of land shown hereon. The purpose is to preserve the property as a scenic corridor free of any obstructions to the view of persons looking across the Property. Without limitation, Grantor shall not allow or suffer to exist upon the Property any buildings, walls, trees, obstructions, screens, or other structures or things exceeding a height determined by the Grantee above original grade.
- 11. A perpetual, Sewer Line Easement (S.L.E. or S.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for underground sewer pipes and wastewater facilities, and for the construction, operation, use, maintenance, repair, modification and replacement from time to time of pipes, manholes, access vaults and other improvements related thereto.

The owner warrants that this plat is in compliance with City of Scottsdale's Land Divisions Ordinance, and the Design Standards and Policies Manual specifications.

Owner warrants to the City of Scottsdale that it is the sole owner of the property on this plat, and that every lender, easement holder or other person having any interest in the property adverse to or inconsistent with the dedications, conveyances or other property interests created or transferred by this plat has consented to or joined in this plat, as evidenced by the instruments which are recorded in the Maricopa County Recorder's Office or which the owner will record not later than the date on which this plat is recorded.

The person executing this document on behalf of a corporation, trust or other organization warrants his or her authority to do so and that all persons necessary to bind Grantor have joined in this document. This document runs in favor of the Grantee's successors and assigns.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Grantor: \_\_\_\_\_

For: \_\_\_\_\_

**ACKNOWLEDGEMENT**

STATE OF ARIZONA             )  
    ) S.S.  
 COUNTY OF MARICOPA        )

THIS DOCUMENT WAS ACKNOWLEDGED BEFORE ME THIS \_\_\_\_\_ DAY OF \_\_\_\_\_,

BY \_\_\_\_\_ FOR AND ON BEHALF OF \_\_\_\_\_.

\_\_\_\_\_  
Notary Public

My commission expires: \_\_\_\_\_



# MAP OF DEDICATION EXAMPLE

<b>RATIFICATION EXAMPLE</b>	
<p>As beneficiary under that certain deed of trust recorded in the County Recorder's Office, Maricopa County, Arizona, in Recorder's Number (MCR#) _____, the undersigned hereby ratifies, approves and confirmation is given to said dedications as stated in this plat as to the interest of the undersigned. The person signing for Beneficiary warrants and represents they have power and authority to do so.</p>	
<p>By: _____ _____</p> <p>Title or Position</p> <p>_____</p> <p>Date</p>	<p>By: _____</p> <p>Individual, Partnership, or Financial Institution, as beneficiary</p> <p>_____</p> <p>Date</p>
<b>ACKNOWLEDGMENT</b>	
<p>STATE OF ARIZONA            )   ) S.S. COUNTY OF MARICOPA    )</p> <p>THIS DOCUMENT WAS ACKNOWLEDGED BEFORE ME _____ THIS DAY OF _____</p> <p>BY _____ FOR AND ON BEHALF OF _____</p> <p style="text-align: right;">_____ Notary Public</p> <p style="text-align: right;">My commission expires: _____</p>	

<b>CITY OF SCOTTSDALE</b>	
<b>APPROVAL BLOCK FOR MAP OF DEDICATION</b>	
<p>This map has been reviewed for compliance with the City of Scottsdale's Design Standards and Policy Manual specifications</p>	
<p>By _____ Chief Development Officer</p>	<p>_____</p> <p>Date</p>
<p>By _____ Project Coordinator</p>	<p>_____</p> <p>Date</p>





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# IMPROVEMENT PLAN REQUIREMENTS

This section identifies requirements for preparing improvement plans and documents for submittal to and approval by the city. It includes cover sheet and plan sheet information, specifics for digital submittals, various approval blocks and special plan requirements.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685

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City of Scottsdale [www.scottsdaleaz.gov](http://www.scottsdaleaz.gov)

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# IMPROVEMENT PLAN REQUIREMENTS

## SUBMITTAL REQUIREMENTS

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Prepare all improvement plans and documents for submittal for city approval according to the following standards.

### A. Sheet Size

Prepare plans on 24 inch x 36 inch sheets with a minimum 2-inch left border and minimum ½ inch border on other sides.

### B. Scale

Requirements for scale depend on the type of submittal. See [Section 4-1.901](#) for grading and drainage plan requirements. Plan and profile sheets shall use a horizontal scale of 1 inch = 20 feet and a vertical scale of 1 inch = 2 feet, unless otherwise approved by Plan Review staff prior to the first submittal of final plans.

### C. Lettering

Use a minimum lettering and numbering size of 3/16 inch for manually drafted plans. Use 1/8 inch (12-point font) size letters, numbers and symbols for mechanically drafted plans. All lettering, numbering and line work must be uniform and legible.

### D. Plan Review Submittals

1. Submit blue line prints or copies of plans.
2. Present plan layout, graphics and call-outs in a clear and an uncluttered manner acceptable to engineering and planning staffs.
3. Provide cross-referencing between all plan sheets that have details, detail call-outs, notes, cross-sections, etc.
4. Orient north at the top or right side of each sheet. Provide a north arrow and bar scale.

### E. Reproducibility

City staff will not accept plans they determine will not produce legible microfilm.

### F. Seal/Signature

Include appropriate professional State of Arizona seal, signature and date on each sheet. Copies of this information are acceptable on the improvement plans submitted during the review cycles to the One Stop Shop. When original plans are submitted for approval at the end of plan review, the originals shall bear the registrant's seal with a wet signature and date. Except for capital improvement plans, a registered landscape architect is not required to prepare and seal landscape and irrigation plans.

**G. Plan Approval Submittal**

Submit original plan sheets on 4-mil Mylar with the appropriate professional State of Arizona seal with registrant’s wet signature and date. If the improvement plans require reapproval, the original cover sheet on 4-mil Mylar with the original Civil Approval/Signature Block must be submitted with the Civil Reapproval Block added for signatures. See [Section 1-2.300](#) for appropriate signature approval blocks. The reapproval submittal must also include the revised plan sheets on 4-mil Mylar with the appropriate professional State of Arizona seal with registrant’s wet signature and date. Vellum may be used as the medium for submittal of original landscape and irrigation plans.

**1-2.200**

**DIGITAL SUBMITTAL & REVIEW**

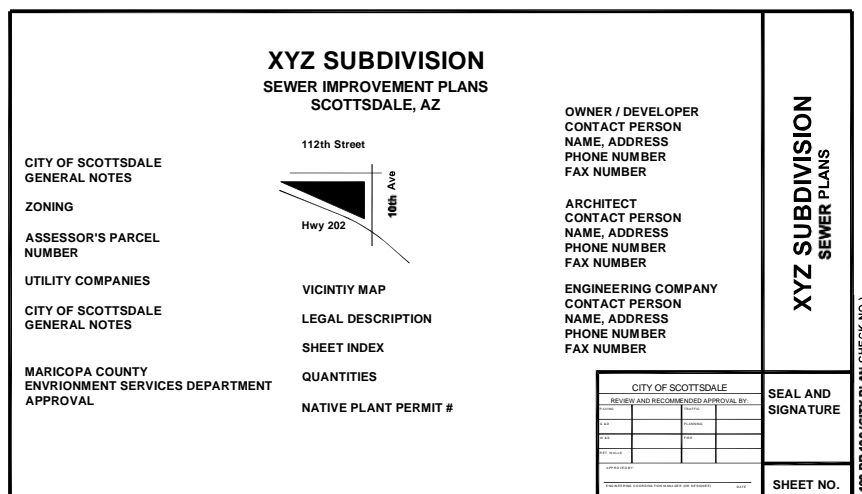
**A. Digital Submittal**

To find out if a project qualifies for digital submittal and review, contact a digital submittal specialist at 480-312-2500 and check the city’s website for updates at [www.ScottsdaleAZ.gov/BldgResources/Digital.asp](http://www.ScottsdaleAZ.gov/BldgResources/Digital.asp).

1. Autodesk Design Review (.dwf) is the standard software for submittal and reviewing plans. For information on how to use DWF Composer, Design Review, DWF Viewer, or DWF Writer, go to [usa.autodesk.com](http://usa.autodesk.com).
2. Supported Supplemental Material types are Adobe PDF, Microsoft Word and Excel (Office 2000 compatible).
3. File and layer naming conventions need to follow the requirements as outlined below.
4. Digital Signature Acceptance – per the Board of Technical Registration, RA-30-304 G. Use of Seals: An electronic signature, as an option to a permanently legible signature, in accordance with A.R.S. Title 41 and Title 44, is acceptable for all professional documents. The registrant will provide adequate security regarding the use of the seal and signature. To view the code and rules go to [www.btr.state.az.us](http://www.btr.state.az.us).

**1-2.300**

**COVER SHEET FORMAT & INFORMATION**



**FIGURE 1.2-1 TYPICAL COVER SHEET**

The following information depicted in Figure 1.2-1 must be included on the cover sheet.

1. Title - Include the project name and the plan set content.

2. City Name - Below the title, include the city name "Scottsdale, AZ".
3. Vicinity Map - Locate the project relative to a minimum of 2 intersecting arterial streets.
4. Legal Description - Provide project property legal description. When a legal description is not feasible, list the township, range, section and location.
5. Benchmark
  - a. Use City of Scottsdale datum NAVD 1988, or if a local benchmark is used provide the equation used to conform to the City of Scottsdale datum/elevations. To access the City of Scottsdale horizontal and vertical datum, see <http://eservices.scottsdaleaz.gov/eServices/LandSurvey/Default.aspx>.
  - b. All improvement plans must contain a City of Scottsdale NAVD 88 Benchmark on the cover sheet with an elevation equation, as required.
  - c. All improvement plans must also contain a statement certifying the datum used for all elevations represented in the plans to be included on the plan cover sheet immediately below the benchmark and shall state one of the following as seen in Figure 1.2-2:

I hereby certify that all elevations represented on this plan are based on the elevation datum for the City of Scottsdale Benchmark provided above.

or

I hereby certify that all elevations represented on this plan are based on the elevation datum equation on the City of Scottsdale Benchmark, as provided above.

**FIGURE 1.2-2 BENCHMARK CERTIFICATION STATEMENTS**

- d. In addition, all plans that include an occupiable structure, residential or non-residential, are required to provide the Lowest Finish Floor elevation on the plans, including the Engineer's Certification. The format for the Lowest Floor elevation shall be **L.F. 88 = XXXX.YY feet**.  
 The completed elevation is stated (for example 2695.67, NOT 95.67 or 695.67), and shall be the basis on the NAVD 88 elevation datum, not an equated datum for the site.
6. Civil Plan Signature Blocks - Include Civil Approval Blocks shown below, as applicable.
  - a. When civil improvement plans do not include architectural improvements use the Civil Approval and Reapproval blocks shown in [Figure 1.2-3](#) and [Figure 1.2-4](#)

<b>CIVIL APPROVAL</b>			
Review & Recommended Approval by:			
Paving		Traffic	
G & D		Planning	
W & S		Fire	
Ret. Walls			
_____		_____	
Engineering Coordination Mgr. (or designee)		Date	

**FIGURE 1.2-3 CIVIL APPROVAL BLOCK**

CIVIL REAPPROVAL			
Reapproval #	Revised Sheet No.(s)	Description of Revision(s)	
Paving		Traffic	
G & D		Planning	
W & S		Fire	
Ret. Walls			
_____		_____	
Engineering Coordination Mgr. (or designee)		Date	

FIGURE 1.2-4 CIVIL REAPPROVAL BLOCK

- b. If civil improvement plans depict construction or installation of architectural improvements such as electrical, mechanical, plumbing, or structural elements such as a gated entry to be constructed per the civil plan, use the Civil Approval and Reapproval with Architectural Improvement blocks in [Figure 1.2-5](#) and [Figure 1.2-6](#).

CIVIL APPROVAL WITH ARCHITECTURAL IMPROVEMENTS					
Review & Recommended Approval by:					
Electrical		Paving		Traffic	
Mechanical		G & D		Planning	
Plumbing		W & S		Fire	
Structural		Ret. Walls			
_____		_____			
Engineering Coordination Mgr. (or designee)		Date			

FIGURE 1.2-5 CIVIL APPROVAL WITH ARCHITECTURAL IMPROVEMENTS BLOCK

CIVIL REAPPROVAL WITH ARCHITECTURAL IMPROVEMENTS					
Reapproval #	Revised Sheet No.(s)	Description of Revision(s)			
Electrical		Paving		Traffic	
Mechanical		G & D		Planning	
Plumbing		W & S		Fire	
Structural		Ret. Walls			
_____		_____			
Engineering Coordination Mgr. (or designee)		Date			

FIGURE 1.2-6 CIVIL REAPPROVAL WITH ARCHITECTURAL IMPROVEMENTS BLOCK

7. Landscape Plan Signature Blocks - Include the Landscape Maintenance Block shown in Figure 1.2-7:

<p>ALL LANDSCAPE AREAS AND MATERIALS, INCLUDING THOSE LOCATED IN PUBLIC RIGHTS-OF-WAY, SHALL BE MAINTAINED IN A HEALTHY, NEAT, CLEAN AND WEED-FREE CONDITION. ANSI A300 STANDARD PRACTICES FOR PRUNING, SUPPORT SYSTEMS, AND SAFETY SHALL BE USED FOR MAINTENANCE CRITERIA. THIS SHALL BE THE RESPONSIBILITY OF THE</p> <p>_____.</p> <p>(Property Owner / Developer / HOA)</p>
---

**FIGURE 1.2-7 LANDSCAPE MAINTENANCE BLOCK**

- a. If landscape and irrigation plans are not prepared by the same engineer/designer as the civil engineering drawings, include the Landscape Approval Blocks shown in Figures 1.2-8 and 1.2-9 on the cover sheet of the landscape and irrigation plans.

<b>LANDSCAPE PLAN APPROVAL</b>		
Case #	Approved by	Date
CONSTRUCTION AND INSTALLATION SHALL BE IN ACCORDANCE WITH THIS PLAN AND ALL DEVIATIONS WILL REQUIRE REAPPROVAL. THE CITY WILL NOT ISSUE A CERTIFICATE OF OCCUPANCY UNTIL INSPECTION SERVICES STAFF APPROVES THE LANDSCAPE INSTALLATION.		

**FIGURE 1.2-8 LANDSCAPE APPROVAL BLOCK**

<b>LANDSCAPE PLAN REAPPROVAL</b>		
Reapproval #	Revised Sheet #(s)	Description of Revision(s)
Case #	Approved by	Date
CONSTRUCTION AND INSTALLATION SHALL BE IN ACCORDANCE WITH THIS PLAN AND ALL DEVIATIONS WILL REQUIRE REAPPROVAL. THE CITY WILL NOT ISSUE A CERTIFICATE OF OCCUPANCY UNTIL INSPECTION SERVICES STAFF APPROVES THE LANDSCAPE INSTALLATION.		

**FIGURE 1.2-9 LANDSCAPE REAPPROVAL BLOCK**

8. No Conflict Signature Block/Coordinating with Utilities

The developer must coordinate with all utility companies that will provide service to the site by sending them a copy of the proposed improvement plans and a No Conflict Form for signature, see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms). Include the No Conflict Signature Block shown in [Figure 1.2-10](#) on the cover sheet of the improvement plans based on the information in the completed No Conflict Forms and submit with the first improvement plans submittal.

Submit a completed No Conflict Form for each affected utility company with the improvement plans submittal to the One Stop Shop, see [www.ScottsdaleAZ.gov/](http://www.ScottsdaleAZ.gov/)

[bldgresources/counterresources.asp](http://bldgresources/counterresources.asp). Final plans approval and permits will be issued only after receiving all completed No Conflict Forms.

NO CONFLICT SIGNATURE BLOCK				
Utility	Utility Company	Name of Company Representative	Telephone Number	Date Signed
Electric				
Telephone				
Natural Gas				
Cable TV				
Other				
Other				
Engineer's Certification I _____, as the Engineer of Record for this development, hereby certify that all utility companies listed above have been provided final improvement plans for review, and that all conflicts identified by the utilities have been resolved. In addition, "No Conflict" forms have been obtained from each utility company and are included in this submittal.  _____ Signature <span style="float: right;">_____</span> <span style="float: right;">Date</span>				

FIGURE 1.2-10 NO CONFLICT SIGNATURE BLOCK

9. FEMA Blocks and Information

- a. In accordance with the Federal Emergency Management Agency and city requirements the following information in Figure 1.2-11 must be included on the cover sheet of all plans in order to establish lowest finish floor elevations and flood proofing elevations for both residential and nonresidential structures.

Community Number	Panel # Panel Date	Suffix	Date of FIRM (Index Date)	FIRM Zone	Base Flood Elevation (in AO Zone use Depth)
045012					

FIGURE 1.2-11 FLOOD INSURANCE RATE MAP (FIRM) INFORMATION

- b. Include the Engineers FEMA Certification shown in [Figure 1.2-12](#).  
**Please Note:** Certification of data is a statement that the data is accurate to the best of the Certifier's knowledge. Certification of analysis is a statement that the analyses have been performed correctly and in accordance with sound engineering practices. Certification of structural works is a statement that works are designed in accordance with sound engineering practices to provide protection from the base flood. Certification of as-built conditions is a statement that the structure has been built according to the plans being certified, is in place, and is fully functioning (from the Code of Federal Rules – 44CFR 65.2).



The lowest floor elevation(s) and/or flood proofing elevation(s) on this plan are sufficiently high to provide protection from flooding caused by a 100-year storm, and are in accordance with Scottsdale Revised Code, Chapter 37 – Floodplain and Stormwater Regulation.

**FIGURE 1.2-12 ENGINEERS FEMA CERTIFICATION**

10. MCESD Approval

Prior to the city approving the final plans, Maricopa County Environmental Services Department (MCESD) is required to review and approve all public water and wastewater line extensions and construction of all water and wastewater related facilities within the city's service area. The developer must include a signature block with a completed signature and date of approval from MCESD. Relocation or realignment of an existing water or wastewater line to resolve a utility conflict does not require county approval.

11. As-Built Certification

Provide a statement that the surveyor of record for the project certifies that "record drawing" measurements as shown were made under the surveyor's supervision or as noted, and are correct to the best of the surveyor's knowledge and belief. Also, provide a signature line for the name of the registered land surveyor, the date and the registration number.

12. City Project and Case Numbers

List all applicable plan check numbers and case numbers in the border along right edge using a minimum of ¼ inch (24 point font) size lettering. Case numbers may include approvals for zoning (ZN), use permit (UP), development review (DR), preliminary plat (PP) and staff approvals (SA). List all applicable plan check numbers for the improvement plans, including other related plans, such as master plans, basis of design reports, stormwater storage waiver, etc.

13. Public Works Construction - Include General Notes for Public Works Construction shown in [Figure 1.2-13](#).

14. Sheet Index

15. Utility system ownerships

16. Other agency approvals as required

17. Contact Information - Provide engineer, architect, owner and developer company names, contacts, addresses and telephone and fax numbers.

18. Construction quantities (for work in public rights-of-way or easements).

19. Zoning - Identify current zoning of the property

20. Legend - Define symbols, non-standard abbreviations, etc.

21. "Blue Stake" Note - Required on all plans that include excavation of any type, see [Figure 1.2-13](#).

22. Key Map - Provide a key map on multi-sheet plans to relate plan sheets to project locations and type of improvements.

23. Storage Basin Volumes - State the volume provided and volume required for stormwater storage basin certification.

24. Native Plant Plan and Permit number.

<b>GENERAL NOTES FOR PUBLIC WORKS CONSTRUCTION</b>	
1.	All construction in the public rights-of-way or in easements granted for public use must conform to the latest Maricopa Association of Governments (MAG) Uniform Standard Specifications and Uniform Standard Details for Public Works Construction as amended by the latest version of the City of Scottsdale Supplemental Standard Specifications and Supplemental Standard Details. If there is a conflict, the city's Supplemental Standard Details will govern.
2.	The city only approves the scope, not the detail, of engineering designs; therefore, if construction quantities are shown on these plans, they are not verified by the city.
3.	The approval of plans is valid for six (6) months. If an encroachment permit for the construction has not been issued within six months, the plans must be resubmitted to the city for reapproval.
4.	A Public Works inspector will inspect all works within the City of Scottsdale rights-of-way and in easements. Notify Inspection Services 24 hours prior to beginning construction by calling 480-312-5750.
5.	Whenever excavation is necessary, call the Blue Stake Center, 602-263-1100, two working days before excavation begins. The Center will see that the location of the underground utility lines is identified for the project. Call "collect" if necessary.
6.	Encroachment permits are required for all work in public rights-of-way and easements granted for public purposes. An encroachment permit will be issued by the city only after the registrant has paid a base fee plus a fee for inspection services. Copies of all permits must be retained on-site and be available for inspection at all times. Failure to produce the required permits will result in immediate suspension of all work until the proper permit documentation is obtained.
7.	All excavation and grading that is not in the public rights-of-way or not in easements granted for public use must conform to Chapter 70, Excavation and Grading, of the latest edition of the Uniform Building Code prepared by the International Conference of Building Officials. A permit for this grading must be secured from the city for a fee established by the Uniform Building Code.

**FIGURE 1.2-13 GENERAL NOTES FOR PUBLIC WORKS CONSTRUCTION**

## 1-2.400

### AS-BUILTS

The registrant will provide the city with the original (4-mil) Mylar drawings or photographic (4-mil) Mylars required for the As-Builts of construction within all public rights-of-way or easements dedicated to the city.

## 1-2.500

### REPORTS & OTHER DOCUMENTS

Reports and other submitted documents must include the following:

1. Appropriate State of Arizona professional seal, signature and date;
2. 8 ½ inches x 11 inches format for exhibits. Larger size exhibits may be included, provided they are secured within the report or document. Any exhibits that are not bound in the document shall bear the appropriate State of Arizona professional seal, signature and date.

# DIRT HAUL/ENCROACHMENT PERMIT

1-2.600

1. Obtain a Haul Route/Encroachment Permit when estimated dirt hauls (dirt, demolition debris, etc.) of 5,000 cubic yards or more require use of the public rights-of-way.
2. Estimated dirt hauls of less than 5,000 cubic yards may require a "Haul Route / Encroachment Permit" as determined by the city at the time of grading plan review.
3. The Haul Route / Encroachment Permit must address:
  - a. Haul Routes (see Figure 1.2-14 as an example)
  - b. Travel times
  - c. Traffic control requirements (such as barricade plans and signage)
  - d. Dust control requirements
  - e. Restoration procedures
  - f. Safety procedures
  - g. Public notification
  - h. Possible additional requirements

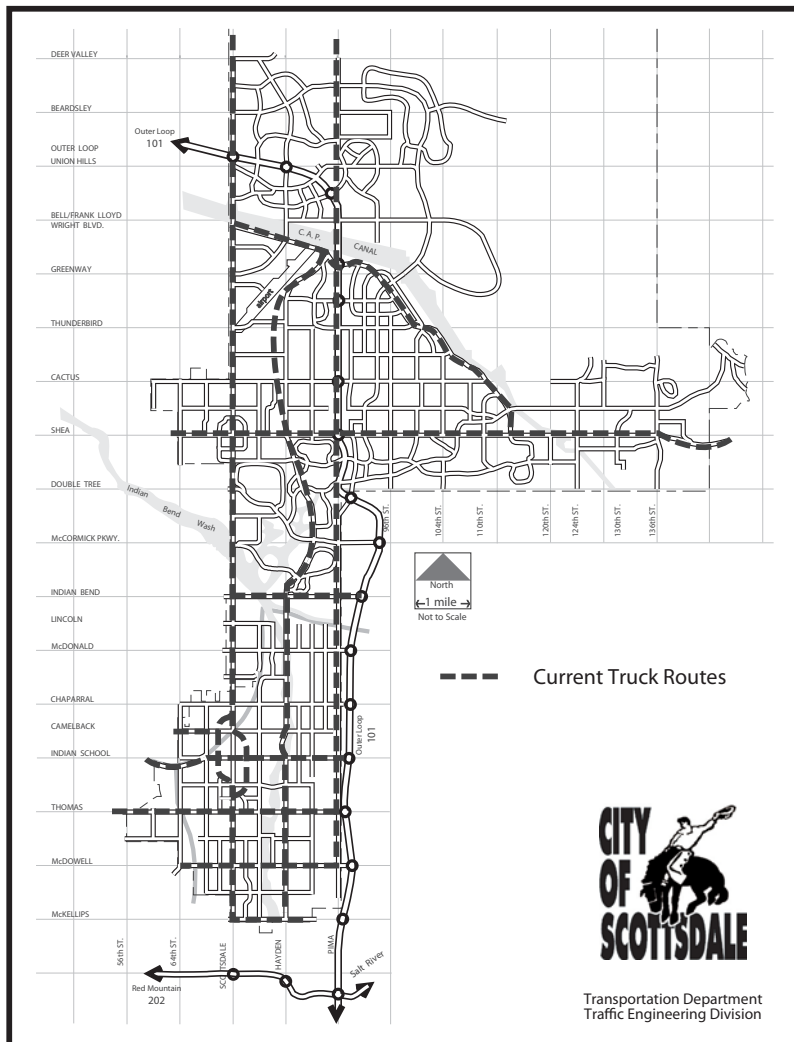


FIGURE 1.2-14 DIRT HAUL ROUTES



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# SITE PLANNING

# 2

This chapter describes design standards and procedures to guide the creation of a site plan, preliminary plat or other similar type of plan. It references architectural and streetscape guidelines necessary for achieving the preferred character for development in specific areas of the city. This chapter also provides specific guidance for preparing site plans and related designs within areas designated by the Environmentally Sensitive Lands Ordinance (ESLO).

## **2-1 GENERAL CONSIDERATIONS & REQUIREMENTS**

## **2-2 ENVIRONMENTALLY SENSITIVE LANDS**



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# **GENERAL CONSIDERATIONS & REQUIREMENTS**

This section describes master environmental design concept plans and master design concepts plans. It provides general guidance for most projects and conditions in the city, including design guidelines for specific areas and uses, site context considerations, on-site circulation and parking, emergency access and fire lane dimensions, drainage facilities, landscape, subdivision and neighborhood design, refuse collection, streetlights and outdoor lighting. These guidelines supplement ordinance provisions and provide basic approaches and preferred standards.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
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City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# GENERAL CONSIDERATIONS & REQUIREMENTS

## 2-1

### MASTER ENVIRONMENTAL DESIGN CONCEPTS PLANS

2-1.100

Most master planned developments since the early 1980s have been required to prepare master environmental design concepts plans (often referred to as MEDCPs). These cover a wide range of design guidelines and plans, from trails and paths to landscaping architectural themes and common amenities and facilities. All development applicants should determine if a MEDCP applies to their site, follow master plan guidelines, and guidelines in this document.

The Planning and Development Services General Manager's designee for the area of the city, and/or rezoning stipulations may also require a MEDCP to be completed prior to the submittal of the development application. Typically, the MEDCP requires the approval of the Development Review Board. The requirements for MEDCP are project specific and the Planning and Development Services General Manager's designee will determine the plans and design concepts that need to be included in the MEDCP Application. For a general overview of the MEDCP requirements, see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

### MASTER DESIGN CONCEPT PLANS

2-1.200

The Master Design Concept Plan (often referred to as MDCP) came about in the early 2000s with the advent of large scale redevelopment projects outside of the Environmental Sensitive Lands area of the city. These redevelopment plans have significantly more detail than the traditional master concept plans. The elements of the plans typically include landscaping, architectural themes, pedestrian plazas, pedestrian thoroughfares and relationships to the buildings, exterior lighting, pavement surfaces, trails and paths, and common amenities and facilities.

The Planning and Development Services General Manager's designee for the area of the city, and/or rezoning stipulations may also require a MDCP be completed prior to the submittal of the development application. Typically, the MDCP requires the approval of the Development Review Board. The requirements for MDCP are project specific and the Planning and Development Services General Manager's designee will determine the plans and design concepts that need to be included in the MDCP Application. For a general over view of the MDCP requirements, see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

## 2-1.300

**DEVELOPMENT PLANS**

Certain zoning districts within the City of Scottsdale require Development Plans (DP) to be submitted with an application for zoning map amendment. Generally, these districts include the Planned Unit Development (PUD), Special Campus (SC), Planned Commerce Park (PCP), and other districts that are not covered by Master Environmental Design Concepts Plans or the Master Design Concept Plan.

Specific to each zoning district, the DP covers a wide range of plans and reports that address a proposed development, and would be utilized, upon receiving approval and/or acceptance to regulate the implementation of the proposal within the specific development area. Generally, the DP may be required to include design guidelines architectural concepts and character, the relationship of the buildings within the proposed development and adjacent and/or abutting existing developments, pedestrian plazas, landscape improvements, pedestrian thoroughfares, exterior lighting, pavement surfaces, trails and paths, common amenities and facilities. The DP may also be required to include information regarding building height, residential density, non-residential intensity (gross floor area), environmental – including green building considerations, view shed considerations, a special impacts analysis (as determined by the Planning and Development Services General Manager or designee) and a computer generated model. Generally, an application that requires a DP will be require a Drainage Report, and may require a Transportation Impact & Mitigation Analysis (TIMA).

The requirements for a DP are project specific and the Planning and Development Services General Manager, or designee for the area of the city, will determine the plans and design concepts that need to be included in an application for the zoning map amendment. For a general over view of the DP content requirements, see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

## 2-1.400

**DESIGN GUIDELINES FOR ALL DEVELOPMENT SUBJECT TO THE DEVELOPMENT REVIEW BOARD'S REVIEW PROCESS**

Scottsdale has developed specific design standards for all development that is subject to the Development Review Board process. Unless specifically modified by the Development Review Board or City Council through stipulation(s), all development shall incorporate the following:

## 2-1.401

**GENERAL DESIGN STANDARDS**

1. All exterior mechanical, utility, and communications equipment shall be screened by the parapet or wall that matches the architectural characteristics, color, and finish of the building. Walls or parapet height for roof-mounted units shall be equal to, or exceed the height of the tallest unit. Wall heights for ground-mounted units shall be a minimum of 1-foot higher than the tallest unit.
2. All exterior conduit and raceways shall be painted to match the building.
3. No exterior roof ladders shall be allowed where they are visible to the public or from an off-site location.
4. Roof drainage systems shall be interior to the building, except that overflow scuppers are permitted. If overflow scuppers are provided, they shall be integrated with the architectural design. Areas that are rooftop drainage shall be designed and constructed to minimize erosion or staining of nearby building walls and directs water away from the building foundations.

5. Perimeter and site walls shall be constructed with 6 or 8 inch wide concrete masonry blocks, 8 inches wide brick, stone, concrete, or a similar solid and durable material to match the building. Stucco and paint the surface of concrete block walls to match the on-site buildings unless they are split-faced, grid or similar decorative types of block. Grade breaks shall be located at the top of the wall at piers or corners wherever possible. Include varied setbacks, alignments, and/or heights and/or piers or buttresses for walls over 200 feet long the horizontal and vertical alignment of the wall for visual interest.
6. Chain link fencing for recreational courts (i.e. tennis, basketball, volleyball, etc.) shall be vinyl coated. Vinyl coating of a chain link shall be black, dark brown, or dark green in the Environmentally Sensitive Land areas of the city.
7. 'Dooley' concrete block wall/fence materials shall not be allowed.
8. Barbed wire shall not be visible from adjacent properties.
9. Flagpoles shall be tapered, conical, one-piece poles. Exposed aluminum and/or galvanized finished poles shall be acid washed prior to installation, in order to provide a patina finish.
10. Exposed large rock and boulder faces that are scarred during construction shall be treated with desert varnish to the satisfaction of the Planning and Development Services Department's General Manager or designee.
11. Bicycle parking spaces and rack design shall be in conformance with City of Scottsdale Standard Detail No. 2285, unless otherwise approved in writing by the City of Scottsdale's Transportation Department's General Manager or designee.
12. Patio umbrellas shall be solid colors and shall not have any advertising in the form of signage or logos.
13. Outdoor, site, and building lighting shall comply with the sections under [Section 2-1.1200](#), Outdoor Lighting.

### SERVICE ENTRANCE SECTIONS

2-1.402

Service Entrance Sections (SES) shall be incorporated into the design of the building, either in a separate utility room, or the face of the SES shall be flush with the building face. An SES that is incorporated into the building, with the face of the SES flush with the building, shall not be located on the side of a building that is adjacent to a public right-of-way, roadway easement, or private streets.

### GRADING AND DRAINAGE

2-1.403

1. Land adjacent to walkways or curbs shall be graded so that it falls away from the walk or curb at a slope of at least eight percent (8%) but not more than twenty-five (25%) for a distance of at least ten (10) feet.
2. The maximum ratio between the width-to-depth of a retention basin shall be ten-to-one (10:1, run-to-rise), unless otherwise approved by the Planning and Development Services General Manager's designee.
3. The maximum slope for a landscaped bank on the edge of a detention basin shall be four-to-one (4:1, run-to-rise). Walled banks may be permitted subject to the separate wall design approved by the Development Review Board, and meeting the structural and safety standards of the Building Code.
4. Retention area located within the front open space (as defined by the Zoning Ordinance) shall not exceed 50% of the total front open space area.
5. Provide positive drainage away from curb and sidewalk.

## 2-1.500

**DESIGN GUIDELINES FOR SPECIFIC AREAS**

For Environmentally Sensitive Lands design guidelines, see [Section 2-2.000](#).

## 2-1.501

**CORRIDORS & STREETSCAPES**

Scottsdale has developed specific design guidelines for the dimensions, use and design elements of a number of natural open space and streetscape corridors. See [www.ScottsdaleAZ.gov/planning/corridorplans](http://www.ScottsdaleAZ.gov/planning/corridorplans). These guidelines should be addressed in addition to the specific criteria identified below.

**A. Open Space Corridors**

There are four main categories of open space corridors for which guidelines have been developed: scenic corridors, buffered setbacks, vista corridors, and desert scenic roadway setbacks. The locations are identified in the General Plan and/or have been required as a part of zoning stipulations.

1. **Scenic Corridors:** These are corridors along selected major streets where there is a desire by the community to retain views of nearby terrain features and retain the character of the natural desert setting.
  - a. Carefree Highway - Scottsdale Road to the city's western boundary – 2 miles.
  - b. Cave Creek Road - Pima Road to the city's northeast boundary – 3.5 miles.
  - c. Dynamite Boulevard - 56th Street to the city's eastern boundary – 10.5 miles.
  - d. Pima Road - North of the Loop 101 to Cave Creek Road – 11 miles.
  - e. Scottsdale Road - North from Frank Lloyd Wright to Carefree Highway – 11 miles.
  - f. Shea Boulevard - Pima Freeway to the city's eastern boundary – 9 miles.
2. **Buffered Setbacks:** These are corridors along significant streets where there is intent by the community to achieve a boulevard type of effect, recognizing the importance of the roadway in the local setting.
3. **Vista Corridors:** These are corridors along major washes and channels that are intended to provide local and community vistas of nearby terrain and the desert setting as well as provide access corridors to neighborhoods, parks and schools.
4. **Desert Scenic Roadways Setbacks:** All major mile and half-mile streets shall provide a 50 foot wide open space corridor along the edge of the street right-of-way.
5. Positive drainage shall be provided away from all walks.

**B. Streetscapes**

Specific design guidelines have been developed for a number of major streets. These generally focus on the design of landscaping and street furniture along the edges and medians of these streets. See [www.ScottsdaleAZ.gov/planning/corridorplans](http://www.ScottsdaleAZ.gov/planning/corridorplans) for design guidelines for:

- Frank Lloyd Wright Boulevard
- McDowell Road
- Via Linda
- Shea Boulevard
- Scottsdale Road
- Cactus Corridor

## 2-1.502

**DOWNTOWN DESIGN GUIDELINES**

Specific guidelines for buildings and streetscapes have been developed for the downtown area. The Guidelines list recommendations for site development, building form, architectural, and landscape character to assure that new development contributes to the Downtown urban design goals and is compatible with the character of existing Downtown districts.

The Downtown Urban Design and Architectural Guidelines apply to that area designated by the Downtown Plan and Zoning Ordinance. Generally, the area bounded by Chaparral Road to

the north, Earll Drive to the south, Miller Road to the east, and 68th Street to the west. Any development in this area should use these guidelines in addition to the other guidelines contained herein. See [Appendix 8-1A](#) for recommended plants downtown or go to [www.ScottsdaleAZ.gov/downtown](http://www.ScottsdaleAZ.gov/downtown).

## **AIRPORT & AIRPARK DEVELOPMENT**

**2-1.503**

Development within 20,000 feet from the airport requires airport staff review and comment. Staff reviews proposed development projects for any potential impacts resulting from object height, land use compatibility, aircraft noise and overflight disclosure, compliance with airport and airpark rules and regulations, and taxilane access restrictions.

A Scottsdale Airport-Vicinity Development Checklist will be provided during the development review pre-application process, and must be completed and submitted with the proposed project design submittal. See [www.ScottsdaleAZ.gov/airport/regulatorydocs](http://www.ScottsdaleAZ.gov/airport/regulatorydocs).

Scottsdale Airport Traffic Pattern Airspace Map and sample noise disclosure statement depicts where aircraft operations occur into and out of Scottsdale Airport, and describes the normal aircraft activity associated with Scottsdale Airport. See [www.ScottsdaleAZ.gov/Airport](http://www.ScottsdaleAZ.gov/Airport) and [www.ScottsdaleAZ.gov/Airport/Part150/](http://www.ScottsdaleAZ.gov/Airport/Part150/).

## **NORTH AREA CHARACTER ELEMENTS**

**2-1.504**

The following are standards and suggestions for the materials, colors and design of common infrastructure improvements that are to be constructed in the North Area (primarily north of the Bell Road alignment). The overall theme and intent is to establish an infrastructure and development setting that is compatible with the natural desert character of this area.

### **A. Concrete Applications**

- 1. Sidewalks, curbs and gutters, etc.:** concrete used in these applications shall be integrally colored. The preferred color mix shall be San Diego Buff (Davis Color # 5237 @ 2 lbs per 94lbs sack of cement). Pima Beige may also be used. Other colors are subject to the approval of the Planning and Development Services General Manager's designee.
- 2. Headwalls, shot-crete, and other such structural or drainage applications:** concrete for these applications shall be integrally colored (Adobe – Davis Color # 61078 @ 4 lbs per 94lbs sack of concrete or similar color mix subject to the approval of the Planning and Development Services General Manager's designee) and/or exposed aggregate.
- 3. Private driveways, walkways on retail and office sites, similar applications:** concrete used on private properties should be colored and/or treated concrete similar to that described above in A.1. Stamped or colored asphalt, or colored concrete, may be used for such applications, and if used then the finish should be dark earthtones. The use of plain, gray concrete is discouraged.
- 4. Exceptions to these standards:** are subject to the approval of the Planning and Development Services General Manager's designee where there is an extensive amount of existing sidewalks, curbs and gutters along a street segment, or the proposed improvement is a portion of a partially built multi-phased project.

**B. Other Structural Surfaces**

1. **Drainage structures, retaining walls, etc.:** Other materials such as native stone, split-faced and colored concrete block, rammed earth and stucco colored with an earth-tone that has a maximum LRV (Light Reflective Value) of 35 may also be used for such surfaces.
2. **Metal clad or structural metal surfaces:** Self-weathering steel (such as COR-TEN), galvanized steel treated with an oxidizing chemical (such as Desert Varnish), or similar materials may be used for such surfaces.

**C. Streetlights, Guardrails, Poles and Posts, etc.**

1. **Streetlights and traffic signal poles:** all such installations shall be painted with Western Reserve 8716N by Frazee Enamel (or approved equal), or made of bronze anodized aluminum.
2. **Guardrails, utility cabinets, and various poles, posts, and screening treatments:** Such installations shall be painted with Western Reserve 8716N by Frazee Enamel (or approved equal), or made of bronze anodized aluminum, self-weathered steel, rusted steel, fully weathered/oxidized copper. Traffic signal control boxes, an exception to this standard, may be screened by a metal enclosure or shade device, subject to the approval to the Transportation General Manager's designee.
3. **Wood:** In general, exposed wood should not be used in such applications. If it is to be used and is approved by the city, it shall be large dimension (such as 6 inches or larger in diameter) and shall be stained a dark color.

## 2-1.600

**DESIGN GUIDELINES FOR SPECIFIC USES**

Scottsdale has developed architectural and site planning guidelines for specific types of land uses, including: offices, gas stations and convenience stores, restaurants, parking structures, and commercial uses. These contain details and standards that apply to the specific use that are in addition to the other standards contained in the Zoning Ordinance, area plans, and this manual, see [www.ScottsdaleAZ.gov/design.asp](http://www.ScottsdaleAZ.gov/design.asp).

1. **Design Guidelines for Office Development:** This set of guidelines includes site planning and design, architecture, landscape design, lighting, and identification/signage, as they relate to office industrial, office warehouse, office aircraft hanger, and general office projects. They address the context of a site, responding to the natural setting and climate of the desert Southwest, and achieving quality design.
2. **Design Guidelines for Gas Station and Convenience Store Development:** This set of guidelines includes site design, architecture, fuel pump islands, landscape, lighting, and signage/corporate identification. Special focus is made on canopies over the fuel pump islands and lighting solutions for such high activity areas.
3. **Design Guidelines for Restaurant Development:** This set of guidelines includes site design, architecture, landscape design, lighting, and signage/corporate identification. Special emphasis is placed on relating to the local context, outdoor dining areas, and sensitivity to residential neighborhoods.
4. **Design Guidelines for Commercial Development:** These guidelines include site design, architecture, landscaping, lighting, and signage/corporate identification. Emphasis is placed on relating to the local context, parking areas, pedestrian access, and design appropriate to the setting and climate of the desert Southwest.

See the Sensitive Design Principles as a guide for the preparation of development proposals, available online at [www.ScottsdaleAZ.gov/planning/general/sensitivedesign](http://www.ScottsdaleAZ.gov/planning/general/sensitivedesign).



## **SITE CONTEXT**

### **2-1.700**

The following guidelines focus on the relationship of a proposed site plan to the natural terrain of the property, as well as the relationships this proposal will have with existing or planned uses adjacent to it. The goals are to fit development into the natural site with minimal intrusion, and to be sensitive to adjacent uses.

### **TERRAIN**

#### **2-1.701**

1. Site features, such as washes or native desert vegetation, should be kept in as natural state as possible.
2. Washes should be used as amenities for the site. Common recreational, patio, outdoor dining, and other such facilities should be oriented toward such natural features.
3. Major desert vegetation specimens should be kept in place wherever they are located, particularly if they are located in required setbacks, parking area, landscape islands, or other such open space areas.
4. On sites where there is significant change in the grade levels from the site to adjacent properties, the site design should accommodate the grading transition through design techniques such as landscaped terraces, landscaped slopes of 4:1 (run-to-rise) or gentler, or some similar gradual technique.
5. Retaining walls of over two (2) feet in height shall not be placed at the property line.
6. When the site has a non-residential use and the adjacent site is a residential use, required screening walls should either be placed along the edge of the parking/driveway areas if the developing site is higher than the adjacent site, or at the property line if the site is lower.

### **BUFFERING FOR ADJACENT LAND USES**

#### **2-1.702**

1. Site plans for non-residential uses that are next to residential uses, or for multi-family uses next to single-family uses, should incorporate the following buffering techniques:
  - a. Locate refuse containers either internally to the site or at least oriented toward the interior of the site;
  - b. Locate loading areas either away from the perimeter of the site or screened from the perimeter by a solid wall tall enough to shield the unloading operations and vehicles from off-site views;
  - c. Use landscaped open spaces to screen on-site buildings and activities; and
  - d. Locate outdoor dining areas and patios where the on-site buildings will screen them from views from the adjacent properties or where they are sufficiently screened by walls, landscape improvements, and significant distance, so that they have no discernible impact on adjacent properties.
2. Install landscape improvements that are substantial enough in size and density in order to achieve the desired buffering effect as soon as possible. These landscape improvements should:
  - a. Utilize two (2) inch minimum caliper or larger tree materials;
  - b. Utilize the mature size of the tree canopy to determine the spacing between trees if the landscaped areas is less than 10 feet wide, or provide one (1) tree for every 300 to 400 square feet for larger landscaped areas;
  - c. Not utilize earth berms or mounding unless the mound is at least forty (40) feet away from the perimeter of the property; and
  - d. Not include landscape lighting that illuminates the tree canopies.

## 2-1.800

## ON-SITE CIRCULATION & PARKING AREA DESIGN

The following guidelines focus on general and specific techniques to assure safe access, emergency access, and community benefits.

## 2-1.801

### MAJOR DRIVEWAYS

Major driveways provide direct access from the street and into a parking lot with more than fifty (50) spaces, and/or provide the driveway access across the front of a retail center. Such driveways should:

1. Be a minimum width of thirty (30) feet from face-of-curb to face-of-curb;
2. Prohibit designated customer loading areas that are utilized for landscaping, construction materials, and major appliances, etc., departments of retail stores, as well as loading areas used for general business activity;
3. Provide adequate vehicle stacking distances where they access public streets, and do not allow direct parking aisle access in close proximity to the street intersection;
4. Provide adequate site area that will allow fire equipment vehicles to turn-around. Refer to [Section 2-1.802](#);
5. Be located in coordination with adjacent bus stop locations, when appropriate (see [Section 5-6.000](#)) and have level landing, that is a minimum of four (4) feet wide, immediately behind the driveway, in order to allow for pedestrian mobility.

## 2-1.802

### EMERGENCY ACCESS AND FIRE LANES

For specific Fire Department requirements, including a Fire Plan Review checklist, see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms). After reviewing the plan for the proposed development, the Fire Department will determine the code required fire apparatus access. See the International Fire Code Chapter 5 and Appendix D for guidance. For complete Fire Code related issues, see [Chapter 11](#).

#### A. Emergency Access Provisions

Fire apparatus access may be provided from public access ways, approved private streets, residential driveways and/or on-site fire lanes. For additional requirements for public access ways, private streets and residential driveways see [Section 5-3.000](#).

#### B. Fire Lanes

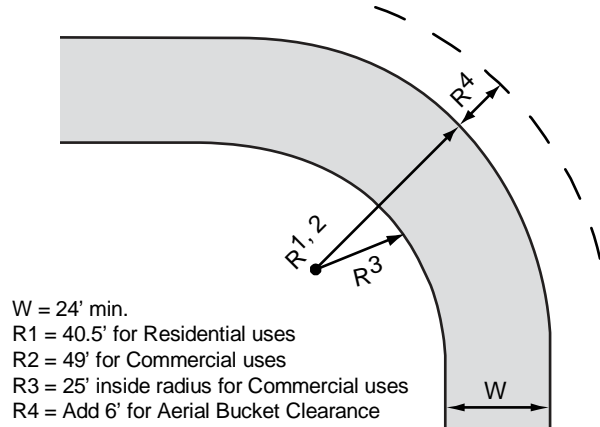
On-site access (Fire Lanes) for fire fighting and emergency vehicle use may be required in addition to the planned public access ways so an emergency vehicle can reach the interior of the development when normal access is blocked. For example, an additional access way may be required due to the number of structures, the square footage of structures, topography (grade), and/or washes and flood plains. See the International Fire Code Appendix D for guidance. Emergency access ways shall be secured by an easement. If any emergency access route is intended to be closed and locked, any lock placed on an emergency access gate must be approved by the Fire Department. See COS Standard Detail 2364 for construction and identification of emergency access ways. See [Figure 2.1-4](#) for minimum requirements for gated entrances for residential development.

The following criteria for the lanes shall apply:

1. Fire lane signage must comply with COS Standard Details, Series 2300.
2. The minimum width of a two-way fire lane is 24 feet. One-way lanes, such as divided entrances and drive thru by-pass lanes shall be 20; wide. For project specific information, contact Fire Plan Review. 480-312-7080. See International Fire Code Sections 503.2.1 and 503.2.2 for other lane width requirements.



3. The fire lane surface shall be suitable for all-weather use, with a minimum loading design of 83,000 lb. gross vehicle weight. Where not co-located with vehicular service or access lanes, surfaces other than asphalt such as concrete, paver stones, "grasscrete" and stabilized and compacted crushed granite should be considered.
4. The minimum vertical clearance for the passage of fire department apparatus is 13 feet 6 inches.
5. The minimum outside edge radius of the lane on a turn is 49 feet, with 55 feet outside radius required for aerial bucket clearance for commercial and multi-family uses. ASSHTO engineered elliptical radius design may be approved in certain circumstances where there are no barriers over 6 feet in height on the outer aerial bucket radius R3- for project specific information, contact Fire Plan Review 480-312-7080. 40.5 feet is the minimum for other residential uses. See Figure 2.1-1 below.



**FIGURE 2.1-1 FIRE LANE DIMENSIONS**

6. Fire lanes must be posted in accordance with the COS Standard Detail 2365.
7. See [Figure 2.1-2](#) for on-site fire access turnarounds for commercial and residential developments.
8. Provide a turn-around for emergency vehicles at the end of a dead-end parking aisle designated for emergency access (fire lane) if it exceeds 300 feet in length for fire sprinklered structures, 150 feet in length for non-sprinklered structures, as shown by the T-Types in [Figure 2.1-2](#).

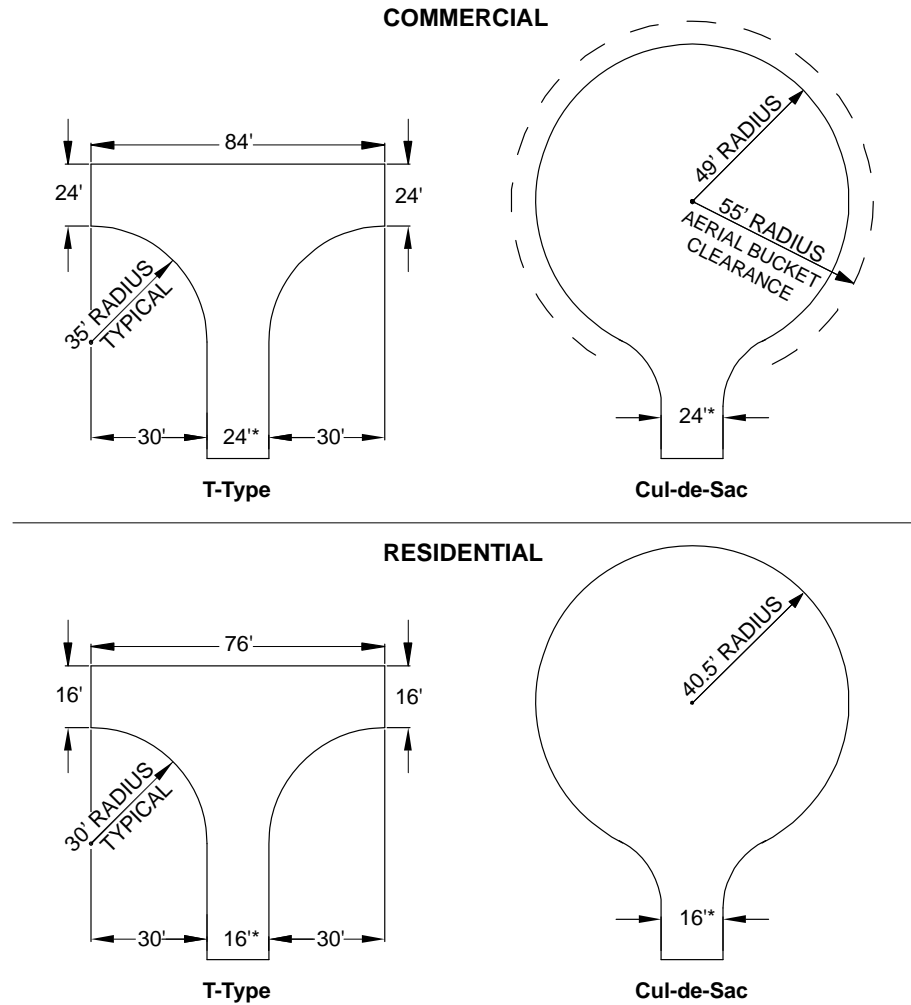


FIGURE 2.1-2 FIRE LANE FIRE ACCESS TURNAROUNDS

2-1.803

**DRIVE-THROUGH FACILITIES**

Where allowed, locate and design drive-through facilities according to the following criteria:

1. Unless there is no reasonable alternative, locate drive-through facilities on the rear of a building, facing away from the nearby street frontage(s), or on the side of the building. Drive-through facilities should not be located near any residential uses. Vehicular storage areas for drive-through facilities placed on the street side of a building, or any other location which is directly visible from adjacent properties, should be screened by walls, mounding, and/or dense landscaping at least four (4) feet in height;

2. Provide stacking distance for at least 6 vehicles (minimum of 140 feet) for each lane leading into a drive-through facility;
3. Outdoor speakers at drive-through facilities should not be audible across the property line of the building site. Outdoor speakers should not be placed within 300 feet of a property used for residential purposes; and
4. Vertical clearance must be a minimum of 98 inches for drive-through facilities. Drive-through facilities that include a passenger loading zone must have a vertical clearance of 114 inches.

**REFUSE COLLECTION**

**2-1.804**

The Solid Waste Management Director or their designee must approve of all solid waste collection methods for both commercial and residential services.

**A. Commercial Container Enclosure Location and Design**

Locate and design refuse collection facilities based on the following criteria:

1. Do not place trash enclosures between the on-site buildings and adjacent lower density residential uses unless there is no reasonable alternative. If this is done, orient the enclosure toward the interior of the property.
2. Place trash compactors, if located within 1,300 feet of a residential use, within a fully enclosed area with walls that are at least 2 feet higher than the compactor equipment.
3. Do not place trash enclosures next to drainage ways or basins, unless there is no reasonable alternative.
4. Do not place refuse enclosures at the end of a dead-end parking aisle.
5. Locate and position enclosures to facilitate collection without “backtracking.”
6. Locate enclosures to be easily accessible for collection by a simple route.
7. Locate enclosures such that collection vehicles must not back up more than thirty-five (35) feet.
8. Trash enclosures must comply with applicable COS Standard Details #2146-1, 2146-2, 2147-1 and 2147-2. No underground “vault-type” containers will be approved.
9. Gates across the front of a trash enclosure are generally discouraged. If desired, a trash enclosure with gates shall be designed to accommodate full ADA access.
10. See [Section 2-1.401](#) for General Design Standards.
11. All restaurants and bars must provide enclosures with grease containment areas as required below. The grease containment area must be physically separated from the refuse container portion of the enclosure.

**B. Required Number of Commercial Refuse Enclosures**

Commercial facilities must provide the following number and type of refuse enclosures:

Use	Required Number of Refuse Enclosures
Commercial Building Space (including galleries, retail, and office uses)	1 enclosure for each 20,000 square feet of building space or portion thereof per COS Standard Details #2146-1 or 2147-1
Apartments and Condominiums	1 enclosure for every 20 units or portion thereof per COS Standard Details #2146-1 or 2147-1
Restaurants and/or Bars	1 enclosure with Grease Containment Area per COS Standard Details #2146-2 or 2147-2

**C. Commercial Enclosure Positioning**

1. Provide adequate truck turning/backing movements for a design vehicle of turning radius R (minimum) = 45 feet, vehicle length of L = 40 feet.
2. Enclosures serviced on one side of a drive must be positioned at a 30-degree angle to the centerline of the drive.
3. Maximum distance from service exit to trash enclosure is 100 feet.
4. An area fourteen (14) feet x thirty (30) feet long shall be provided for approach to refuse enclosures, with slope constant with enclosure floor to facilitate container pick-up. The length of the approach slab is subject to modification based on enclosure location, drainage, and positioning concerns.

**D. Shared Refuse Agreements**

1. With the exception of bars and restaurants, shared refuse agreements will be considered as refuse solutions in the Downtown area.
2. All shared refuse agreements are subject to review and approval by both Planning and Development Services and Solid Waste Management.
3. A City of Scottsdale refuse enclosure must exist or be constructed as part of the shared refuse agreement and comply with applicable COS Standard Details #2146-1, 2146-2, 2147-1 and 2147-2.

**E. Residential Refuse and Recycling**

1. The developer or subdivider pays for residential refuse and recycling containers which become the property of the city. The city delivers containers at the initial occupant's request.
2. Dedicated storage areas for refuse and recycling containers must be provided. Containers must be screened from view.
3. Refuse and recycling containers must not be stored within garages or other enclosed liveable areas.
4. Refuse and recycling containers must be placed at curb for collection, and not in alleys, unless specifically approved in a written agreement.
5. Collection of refuse and recycling cannot be done on private driveways, hammerhead streets, or dead end streets. Containers must be brought out to an accessible location for service.
6. Residential subdivisions and developments with gated entrances must provide access at all times to Solid Waste Management for refuse and recycling collection services.
7. Residential collection is the preferred collection method for all dwelling units.

**2-1.805****MULTI-FAMILY GARAGES**

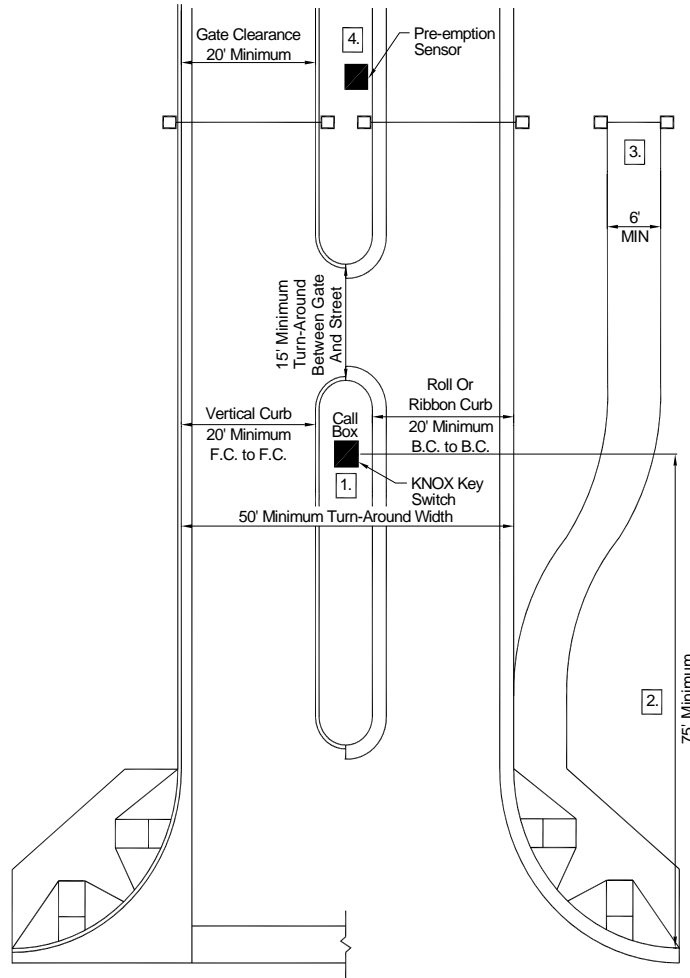
In R-4, R-4R, R-3, R-5 and S-R zoning districts where multi-family uses propose to have garages, the face of the garage door shall be set back from the curb, sidewalk or edge of the through travel lane either three (3) to six (6) feet, or at least eighteen (18) feet, while twenty (20) feet is preferable.

Multi-family garages designated to be adaptable for accessible parking shall be designed to accommodate the width and length of the accessible stall plus a 5 foot wide access aisle. The width of the accessible parking and aisle is determined by the zoning ordinance. The accessible aisle shall be unobstructed for its entire width and length. The accessible route should align with the access aisle to the unit.

Guest parking spaces shall be provided, clearly shown, and marked on the site plan.

**2-1.806****GATED ENTRANCES**

All gated entrances for residential subdivisions and residential development must conform to Figure 2.1-3 below. Additional queuing distance will be required for gated entrances at signalized intersections.



NOTES:

1. A KNOX key switch and pre-emption sensor shall be required on all electric entry control gates. A KNOX key switch shall be installed in a location on the gate control panel (Call Box) that is readily visible and accessible.
2. 75' minimum from back of curb on adjacent street to call box or gate (if remote control used)
3. A separate pedestrian and bicycle access shall be provided around the gated vehicular entrance. This may be gated.
4. The pre-emption sensor shall be at or behind the gate.

FIGURE 2.1-3 GATED ENTRANCES FOR RESIDENTIAL DEVELOPMENT

UTILITY CABINETS

2-1.807

Utility cabinets shall not be located within sight triangles associated with driveways and road intersections, obstruct a public access easement, path easement and/or a trail easement, or in a sidewalk. Along roads that are designated as scenic corridors or special buffers, utility cabinets should be placed along a side street instead of along the street with the designated special buffer and open space corridor. The utility cabinet doors (when open) shall not obstruct a public access easement, trail easement, or a sidewalk.

Wherever possible, utility cabinets should be screened by architectural metal fencing, walls that match nearby perimeter or screen walls, berming and/or dense landscaping. Utility cabinets specific for a development should be located on site behind the building and not visible from the public right-of-way, public access easement, roadway easement, or private street.

In addition to the above, in the downtown, wherever possible, utility cabinets shall be placed underground or integrated into the site and the architectural design of the development and screened. Screening of the utility cabinets shall be an intricate part of the building architecture, site design, and/or dense landscaping. In the downtown, the utility cabinets shall not be located within sight triangles associated with driveways and road intersections, obstruct canal (SPR) right-of-way, obstruct a public access easement and/or a trail easement, or in a sidewalk.

## 2-1.808

**PEDESTRIAN AND BICYCLE FACILITIES****A. Pedestrian Facilities**

1. Walkways that connect main building entrances to the sidewalks on adjacent streets should have a minimum clear width of six (6) feet - excluding any parking overhangs or other obstructions. The walkway should be continuous between the street and building, and be clearly recognizable by both pedestrians and drivers. Wider widths may be required by staff in locations where significant pedestrian traffic is anticipated and where wider sidewalk exists or is planned along the street.

In cases where a sidewalk width of six feet cannot be provided due to existing physical barriers or other constraints, a five (5) foot wide clear and continuous sidewalk width may be allowed if approved by the Planning and Development Services General Manager or designee.

2. Provide shade wherever possible for on-site walkways either through the use of tree canopies or structural canopies. Tree trunks and canopy supports should not encroach into the minimum six foot sidewalk width.
3. The minimum unobstructed width of walkways across the front of major retail centers or mixed-use buildings, especially in the Downtown area, should be 8 feet. In locations where street furniture, canopy supports, or other physical barriers encroach into the adjacent pedestrian facility, twelve (12) feet of walkway should be provided with a clear, continuous width of eight (8) feet provided across the frontage.

In cases where a sidewalk width of eight (8) feet cannot be provided along these frontages due to existing physical barriers or other constraints, a six (6) foot wide clear and continuous sidewalk width may be allowed if approved by the Planning and Development Services General Manager or designee.

**B. Bicycle Facilities**

1. Place bicycle parking facilities for public guests of a building near the main entrance to the building in a visible location. Do not place these in a manner that interferes with pedestrian access into the building.
2. Place bicycle parking facilities for employees near employee entrances. They should be well lit and should not interfere with access to the employee entrance. Provide shade wherever possible.

## 2-1.809

**PARKING AREAS****A. Accessible (Handicapped) Parking Spaces**

Accessible parking spaces shall be designed in accordance with City Ordinance Sec. 9.105. See [Section 12-1.000](#) Disability Access for detailed guidance.

**B. Parking Area Landscaping**

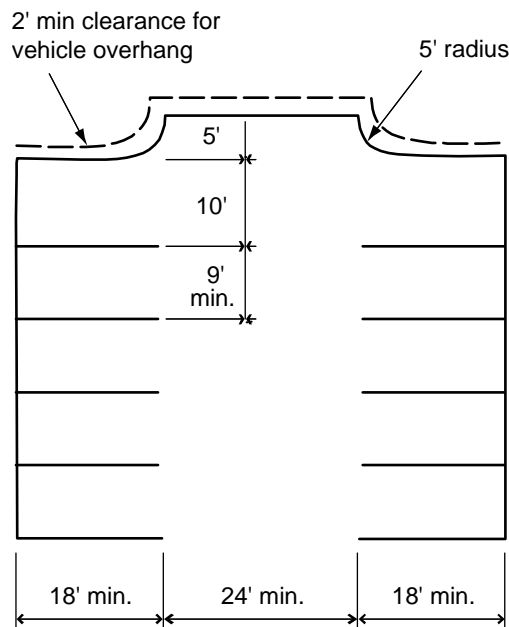
Incorporate elements in the design of parking areas that give the parking facility clarity of form and provide amenity to its users. Among the elements that should be included are:

1. Planters within a parking area that are at least 7 feet across as measured from the back of curbing,
2. Trees that are heat tolerant, have minimal dropping of pods and sap and have canopies that can have a canopy bottom at least 10 feet above the ground,

**C. Dead-End Parking Aisles**

See Figure 2.1-4 below and the following requirements for dead-end parking aisles.

1. Provide a 5-foot deep back-up area at the end of any dead-end parking aisles and a 5-foot curb radii leading into this pavement extension.
2. Provide 10 feet wide parking spaces at the end of a dead-end parking aisle.
3. The maximum dead-end parking aisle for designated emergency access length is 300 feet for fire sprinklered structures, 150 feet for non-sprinklered structures, unless a turn-around is provided for emergency access.
4. Refuse enclosures are not permitted on a dead-end aisle.



**FIGURE 2.1-4 DEAD-END PARKING AISLE DETAIL**

**D. Parking Surfacing**

All parking areas for commercial, office, industrial and multi-family uses shall be surfaced with asphaltic pavement, concrete or a similar material as approved by the Development Review Board. For uses such as churches, event centers, parks, trailheads, and other recreational uses the drive aisles shall be improved with a stable dust-free material. The parking stalls may be improved with a soil mix treated with a dust palliative. In such installations all parking areas shall be contained by concrete curbing. Single family residential and equestrian facilities shall use dust palliatives or other surfacing materials that minimize the generation of fine dust particulates.

**E. Dust Control Measures on Unpaved Surfaces**

The following section outlines dust control regulations present in the [Maricopa County Air Quality Department Rule 310.01](#) and Chapters 18, 19 and Appendix B Basic Zoning Ordinance Article VII Section 7-900 of the Scottsdale Revised Code.

This information is intended to assist owners/operators responsible for controlling dust on disturbed and/or unpaved surfaces. Note that other requirements apply to permitted construction or demolition activity. (Dust control permits are necessary for any activity that disturbs a surface area greater than 0.1 acres, or involves building demolition.)

**1. Exemption**

Dust free surfaces are exempt. A dust free surface is an area completely covered by concrete, asphalt, cement or sealed aggregate pavement; three (3) inches deep crushed rock completely contained in a permanent border; and/or another stabilization material approved by the city. All other surfaces are unpaved surfaces.

**2. Dust Control Measures**

Options fall into two categories: materials and methods. The “materials” list describes construction materials, elements, and techniques used to limit dust emissions. The “methods” list includes land use options, such as preventing access, limiting traffic, etc. Property owners and/or operators should review the following options and determine which material(s) and/or method(s) would be appropriate. Multiple options and combinations of options are often most effective. All dust control measures shall be maintained as appropriate to effectively control dust.

**a. Materials:**

- Watering
- Stabilization with gravel or decomposed granite
- Stabilization with recycled asphalt paving
- Stabilization with wood chips or other organic matter
- Dust suppressant/chemical stabilization application
- Standing vegetation
- Flat vegetative cover
- Grass
- Wind Fences
- Wind Screens
- Curbed perimeter
- Track out devices
- Paved access points
- Other

**b. Methods:**

- Increase frequency and/or intensity of watering if dust is not controlled
- Increase frequency/intensity of watering during high wind conditions
- Limit vehicle access
- Reduce vehicle speed
- Cease parking temporarily
- Other



**3. Dust control for ingress, egress, parking and maneuvering areas at residential and commercial developments (Sec. 46-17 Surfacing)**

1. Reduce/delineate the area used for ingress, egress, parking and maneuvering by:
  - a. Eliminating circular drives
  - b. Use of only one ingress/egress
  - c. Installing barriers such as boulders or logs to delineate driving areas
  - d. Installing shrubs, trees, berms or other effective landscape which would reduce the driving area
2. Reduce dust from areas that will be utilized by motorized vehicles on a regular basis by:
  - a. Applying and maintaining surface gravel or decomposed granite
  - b. Applying and maintaining dust palliatives, chemical stabilizers or similar dust control materials
  - c. Watering frequently
  - d. Applying and maintaining organic stabilizers
  - e. Installing and maintaining vegetative ground cover. Examples include native grasses, shrubs, trees, vines, or vegetative debris that is not subject to movement by wind.
  - f. Paving with asphalt, concrete, or other similar material including porous asphalt or concrete
  - g. Posting 5 mile per hour speed limit signage, and maintaining slow speeds
  - h. Using other

**4. Dust control for vacant lots and open areas where vehicle trespass has occurred (Sec. 18-9.2 and 19-14)**

1. Reduce the area available to motorized vehicles by:
  - a. Posting no trespassing signs
  - b. Installing barriers or curbs with City approval
  - c. Installing fences, gates, or posts with City approval
  - d. Creating landscape berms
  - e. Installing shrubs, trees, or other effective landscape which would prohibit access
2. Reduce dust from where motorized vehicle use has occurred by:
  - a. Applying and maintaining surface gravel or decomposed granite
  - b. Applying and maintaining dust palliatives, chemical stabilizers or similar dust control materials
  - c. Watering to form a soil crust
  - d. Applying and maintaining organic stabilizers
  - e. Installing and maintaining vegetative ground cover. Examples include native grasses, shrubs, trees, vines, or vegetative debris that is not subject to movement by wind.
  - f. Paving with asphalt, concrete, or other similar material including porous asphalt or concrete
  - g. Posting 5 mile per hour speed limit signage, and maintaining slow speeds
  - h. Using other methods as approved by Maricopa County and the City of Scottsdale

**5. Dust control for temporary parking on vacant lots and open areas, including for special events (Scottsdale Revised Code, Appendix B Basic Zoning Ordinance Article VII Section 7-900)**

Vacant lots and open areas that are used for temporary parking, including parking for special events shall comply with these requirements before, during and after the special event or land

use as temporary parking. After the vacant lot and/or open area has been used for parking, the property owner and/or operator shall permanently stabilize all portions of the lot where vehicle use disturbed the surface. The property owner and/or designee shall thereafter comply with the requirements of Sec. 2-1.709 E. 2. for dust control on vacant lots and open areas.

The owner and/or operator shall complete a dust control plan for temporary parking using the form provided by the city and/or following city guidance, and submit it along with the other requirements for a Special Event Permit or as a standalone requirement. The plan shall include primary and contingency dust control measures, a commitment to control and clean up track out onto paved surfaces, and measures to permanently stabilize the area disturbed by vehicle use after the vacant lot or open area has been used for temporary parking. Appropriate dust control measures, both materials and methods are listed in Sec. 2-1.709 E. 2. a. and b. Permanent stabilization must be accomplished using the dust control materials listed in Sec. 2-1.709 E. 2. a. Trackout control devices, approved by the city must be used at all ingress/egress points and traffic controlled at the site to use only designated ingress/egress points. Any trackout that extends 25 feet or more onto a paved surface must be cleaned up immediately, and all trackout of any length must be cleaned up at the end of the day. The intent of these requirements is to keep City of Scottsdale requirements equivalent to [Maricopa County Air Quality Department Rule 310.01 Sec. 302.5 and 302.6](#) related to vacant lots and open areas and parking.

These dust control methods are effective when appropriately applied although the effectiveness may vary based upon individual circumstances. Other dust control methods may be acceptable based on review and approval by Maricopa County Air Quality Department and the City of Scottsdale.

## 2-1.810

### DRIVEWAY GATES

Unless otherwise approved by the Transportation Department, gates at driveway entrances shall be placed at least 25 feet in back of the existing or planned back-of-curb of the adjacent street excluding gated residential development. Gated residential development must comply with [Figure 2.1-3](#).

## 2-1.900

### DRAINAGE FACILITIES

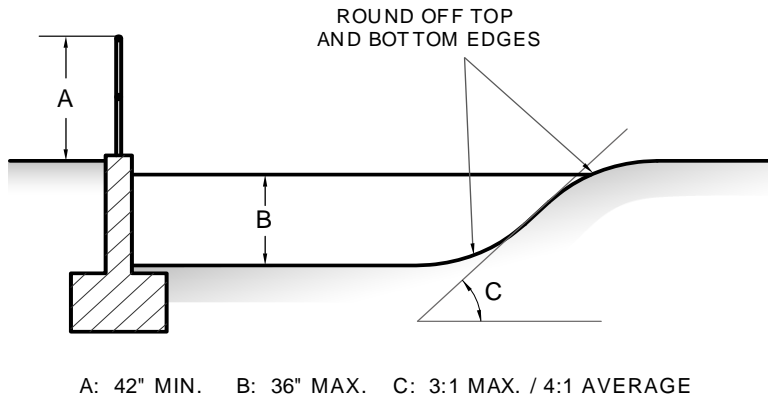
## 2-1.901

### DETENTION BASINS

Incorporate the following criteria in the design of drainage detention basins:

1. The maximum depth of water stored in the basin should be 3 feet, see Figure 2.1-5 below.
2. The maximum side slope of the basin is 4:1 unless otherwise approved by city staff.
3. Round and contour the bottom and top edges of the side slopes in order to achieve a gradual slope transition.
4. Use textured and/or dark surface treatments on the portion of the wall that could be inundated to minimize the visibility of staining typical to basins where retaining walls are used as an edge of a basin. Place safety railings or solid walls at least 42 inches tall on top of such walls.
5. Use only plant materials in basins that are capable of being inundated and surviving. Trees and woody shrubs are preferred; avoid succulents and herbaceous shrubs in basins. In areas where natural desert plants are being used, use plants that are typical to desert riparian areas, such as mesquite, blue palo verde, desert willow, wolfberry, desert hackberry, desert holly, jojoba and beloperone, etc.

6. Basins shall not occupy more than 50% of the frontage landscaped area unless specifically approved by the Development Review Board.
7. Do not place drainage basins on individual lots unless the following criteria are met:
  - a. The basin is directly accessible and visible from a street or alley.
  - b. The maintenance of the basin is designated to a property owners association.
  - c. The basin and its access are placed within a drainage and access easement.



**FIGURE 2.1-5 DETENTION BASINS**

8. Landscape installation shall conform to the most current City of Scottsdale supplement to MAG Section 430 and related details.
9. Natural growth habits shall be taken into consideration to minimize maintenance frequency and intensity.
10. Landscaping should not create hazards to public safety through either plant growth habit, structure, or location.
11. Trees should not be planted within 10 feet of an existing private wall, sign, light pole, or fire hydrant.

**SURFACE CHANNELS**

Site plans should incorporate the following criteria in the placement, design and use of surface drainage facilities:

1. Keep major natural vegetation specimens along washes in place wherever possible.
2. Place amenities for the on-site use, such as dining patios or recreation centers, next to drainage ways where feasible.
3. Landscape any engineered and constructed channels in a manner that helps to manage the storm flows and provides the channel as a visual amenity for the site and community. Concrete and rock surfaces should be kept to a minimum. If such materials are used, they should be formed and applied in a "natural" manner or designed to integrate with the on-site buildings.
4. Provide walkways and/or trails on large sites of 20 acres or more next to or within such drainage ways.
5. Any rock used in any drainage facility shall be native and/or crushed rock. Do not use river-run cobbles.

**2-1.902**

## 2-1.903

**NATIVE PLANTS IN DETENTION BASINS AND DRAINAGE CHANNELS**

The following is a guide in the use of native plants within detention basins and improved drainage channels:

1. Plants that can be placed on the bottom of a basin:
  - Velvet Mesquite (*Prosopis velutina*)
  - Four-wing Saltbush (*Atriplex canescens*)
  - Desert Hackberry (*Celtis pallida*)
  - Catclaw (*Acacia greggii*)\*
  - Scrub Oak (*Quercus turbinella*)\*
  - Chuparosa (*Justicia californica*)
  - Canyon Ragweed (*Ambrosia ambrosioides*)
2. Plants that may be placed on the sides of a basin:
  - (All plants listed above)
  - Ironwood (*Olneya tesota*)
  - Blue Palo Verde (*Cercidium floridum*)
  - Desert Willow (*Chilopsis linearis*)
  - Saguaro (*Carnegiea gigantea*)
  - Wolfberry (*Lycium Sp.*)
  - Desert Lavender (*Hyptis emoryi*)
  - Fairy Duster (*Calliandra eriophylla*)
  - Creosote (*Larrea tridentata*)
  - Jojoba (*Simmondsia chinensis*)\*
  - Hopbush (*Dodonaea viscosa*)\*
  - Mormon Tea (*Ephedra trifurca*)\*
  - Cheese Bush (*Hymenoclea monogyra*)
  - Deer-Vetch (*Lotus rigida*)\*
  - Sugar Sumac (*Rhus ovata*)\*
3. Plants that should not be used in any part of a basin:
  - Foothills Palo Verde (*Cercidium microphylla*)
  - Chollas and Pricklypears (*Opuntia Sp.*)
  - Barrel Cacti (*Ferocactus Sp.*)
  - Bursage (*Ambrosia deltoidea*)
  - Century plants (*Agave Sp.*)
  - Brittlebush (*Encelia farinosa*)
  - Buckwheat (*Eriogonum fasciculatum*)
  - Ocotillo (*Fouquieria splendens*)

(\*) - Plants that should be installed in locations above 1800 feet in elevation.

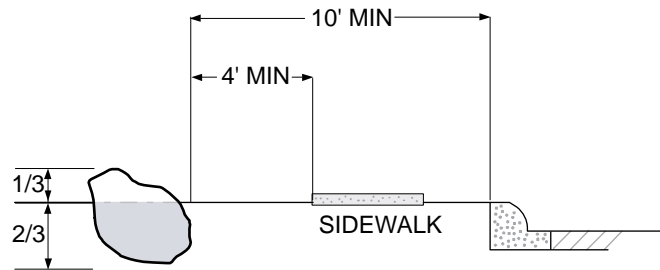
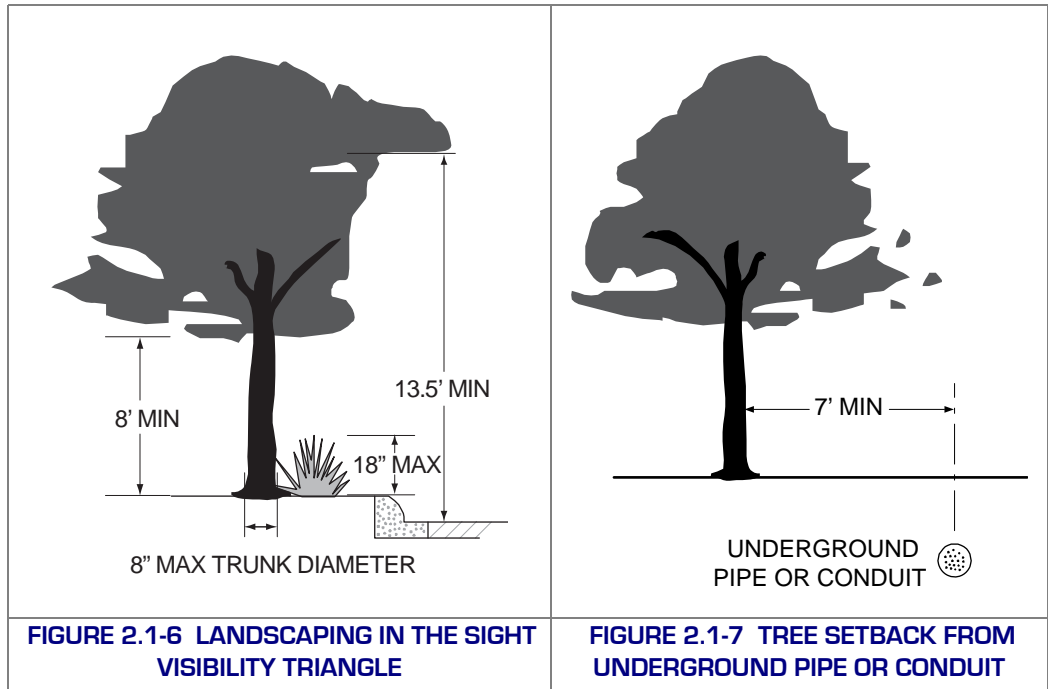
## LANDSCAPE DESIGN

### 2-1.1000

#### DESIGN STANDARDS

#### 2-1.1001

1. Unless approved by the Development Review Board, the palette of plants in a landscape design that adhere to the Arizona Department of Water Resources (ADWR) Low Water Use/Drought Tolerant plant list.
2. Any landscape design in Scottsdale shall comply with the provisions of the city's Water Conservation ordinance (Chapter 49; Article VII). In particular, landscaping plans shall follow the specific limitations regarding the use, design, location and installation of fountains, turf and water intensive landscaping.
3. The maximum distance between shrubs, trees, and groundcover limits within a project shall not exceed 7 feet, as measured between trees, shrubs and groundcover limits.
4. Plants and trees which are not protected by the Scottsdale Revised Code native plant provisions, but which are necessary for on-site revegetation, are suitable for transplanting, or are necessarily uprooted for road building or similar construction, as determined by city staff, shall be stockpiled during construction and shall be replanted in on-site landscape areas by the developer before the final site inspection. Plant and tree placement shall consider the natural culture of that type of plant or tree.
5. The maximum height of any shrubs, ornamental plants, boulders, walls or other such materials within a designated Sight Visibility Triangle shall not exceed 18 inches. For plants, this shall be the natural height of the plant. Any trees that are to be placed in the Sight Visibility Triangle shall have a canopy that is kept 8 feet above the curb height and a maximum mature trunk diameter of 8 inches. If the tree canopy overhangs the roadway, then the canopy must be a minimum of 13.5 feet above the road, see [Figure 2.1-6](#). See the landscaping requirements for intersection sight distances and traffic safety triangles in [Section 5-3.119](#), paragraphs D and E, especially [Figure 5.3-26](#) and [Figure 5.3-27](#).
6. Do not place trees and boulders within a Public Utility Easement (PUE), Emergency Vehicle Access Easement or their equivalent.
7. Place trees, saguaros or in-line walls at least 7 feet back from any underground public water or sewer lines or power line conduit, see [Figure 2.1-7](#).
8. The following plants shall not be used in any landscaping installation or revegetation program:
  - Desert Broom (*Baccharis Sarothroides*)
  - Red Bromegrass (*Bromus Rubens*)
  - Buffel Grass (*Pennisetum Ciliare*)
  - Salt Cedar (*Tamarix Spp.*)
  - Fountkin Grass (*Pennisetum Setaceum*)
  - Mexican Palo Verde (*Parkinsonia Aculeata*)



**FIGURE 2.1-8 BOULDER PLACEMENT**

9. Install boulders with 2/3 of their volume below the ground and place them at least 10 feet away from any curb and at least 4 feet from any walkway, see Figure 2.1-8 above. (Boulders shall not be installed in medians or rights-of-way that will be maintained by the City of Scottsdale unless separate approval from the City of Scottsdale’s Risk Management Division and Parks Department).
10. Install decomposed granite, if used as a ground cover, to a minimum depth of 2 inches on sites outside of ESLO areas.
11. Use indigenous rock for any rip rap applications (river-run rock is not allowed).
12. Place trees so that their mature canopies shall not overhang the vehicular lanes in a street or across property lines. Place them so as to not block monument or tower signs.
13. Do not plant thorny shrubs and cacti where their mature canopy would be closer than 4 feet from any walkways or parking area curbing.
14. Do not plant shrubs and trees within the 2 feet overhang at the head of a parking stall.
15. Provide base planting landscaping areas adjacent to the building on all sides of buildings in a suburban or rural type of context, except where there are designated loading areas. Unless otherwise approved by the Design Review Board, the minimum width of any such area shall be 8 feet excluding any pedestrian walkways. Include trees and shrubs in these

areas that provide strategic shading of the windows and doors, reinforce the architectural elements of the building, and provide comfort and interest to pedestrians.

16. City maintained landscape installation shall conform to the most current City of Scottsdale supplement to MAG Section 430 and related details.
  - Natural growth habits shall be taken into consideration to minimize maintenance frequency and intensity.
  - Landscaping must not create hazards to public safety through either plant growth habit, structure, or location.
17. City maintained trees should not be planted within 10' of an existing sign or light pole.

### IRRIGATION

### 2-1.1002

1. Provide an automatic irrigation system for all landscaped areas. This system shall include a back flow preventor and be designed to minimize overflow and seepage outside of the landscaped area.
2. Completely screen backflow preventors using a screening wall, cage or dense plant materials. Place them next to the water meter in accordance with Water Resources Department requirements. All back flow preventors shall be designed and installed per the COS/MAG details.
3. Do not connect water features to the irrigation system. Water features shall have a separately dedicated line either from the meter or from a building. A backflow preventor shall be provided between the building and/or meter per the same details as noted above.
4. City of Scottsdale Development's irrigation installation shall conform to the most current City of Scottsdale supplement to MAG specifications and details.
5. See [Section 2-1.1202](#) for landscape lighting.

## SUBDIVISION & NEIGHBORHOOD DESIGN

## 2-1.1100

This section focuses on standards and approaches that achieve good subdivision design in the context of Scottsdale and its settings and neighborhoods. It applies to all major and minor subdivisions as well as any other form of land division. These criteria are preferred approaches, but alternative approaches that achieve equivalent protection of existing neighborhoods and the native desert setting may be proposed and accepted.

Before the Development Review Board application, the developer shall stake the alignments for all internal streets and driveways subject to inspection by Planning and Development Services Department's staff to confirm that the proposed alignments result in the least environmental and hydrological impact. The Planning and Development Services project coordinator may approve the use of rectified aerial photographs in-lieu of on-site staking.

### STREET DESIGN

### 2-1.1101

Street location and arrangement shall conform to the following general principles:

1. Whenever a proposed subdivision embraces any part of a street shown on a street plan adopted by the city, the subdivision shall be platted in conformance with the adopted street plan.
2. Street layout shall provide for the continuation of streets shown on any adopted street plan as the city staff may designate.
3. The city staff may require the owner to extend certain proposed streets to the boundary of the proposed subdivision to provide future connections with adjoining land.
4. Local streets shall be arranged to discourage their use by through traffic.



5. Where a proposed subdivision abuts or contains an existing or proposed arterial street, the city staff may require frontage streets or reverse frontage with vehicular non-access easements along the arterial street, or other treatment to protect residential properties from the nuisance and hazard of high volume traffic, and to preserve the traffic function of the arterial street.
6. Where a subdivision abuts or contains the right-of-way of a railroad, a limited-access highway or an irrigation canal, or abuts a commercial or industrial land use, the city staff may recommend location of a street approximately parallel to and on each side of such right-of-way at a distance suitable for appropriate use of the intervening land. Such distance shall be determined with due regard for approach grades, drainage, bridges or future grade separations.
7. Half streets are discouraged except where necessary to provide right-of-way required by an adopted street plan, to complete a street pattern already begun, or to ensure reasonable development of adjoining parcels. Where a platted half street abuts a proposed subdivision and the half street furnishes the sole access to residential lots, the remaining half shall be platted within the street.
8. Where there are existing streets adjacent to the subdivision, subdivision streets shall be improved to the intercepting paving line of such existing streets.
9. All streets (including private streets) shall be designed and constructed in conformance with the DS&PM.
10. Alleys shall be designed and constructed in conformance with the following right-of-way width standards:
  - a. Sixteen (16) feet if single-family residential on both sides;
  - b. Twenty (20) feet if abutting commercial, multiple-family residential or industrial districts.
11. Alley intersections and sharp changes in alignment shall be avoided, but where necessary corners shall be cut off fifteen (15) feet on each side to permit safe vehicular movement. Dead-end alleys are prohibited.
12. Dead-end streets serving more than four (4) lots shall be graded and surfaced to provide a turning circle to conform to standards in the DS&PM.

**2-1.1102****BLOCK DESIGN**

1. Where a new subdivision is being placed in an infill location, the block size, dimensions and orientation should generally match those of the surrounding area. If in some cases it is advisable to terminate any existing street connection, it may be necessary to continue a pedestrian walkway across the block in order to maintain current pedestrian accessibility.
2. In general, block lengths should be kept to a maximum length of 800 feet. Block lengths greater than 1,200 feet shall be subject to the specific approval of the Planning and Development Services General Manager or designee.
3. Where block lengths exceed 660 feet cross-block pedestrian connections may be required. This is most important if there is a nearby school, park, recreational amenity or similar destination. Such connections shall be placed within a tract that has a minimum width of 20 feet for single use paths or walks and 30 feet for multiple use corridors or where the terrain is difficult.
4. In general, lots located at the end of a block should not face the short side of the block (in other words, do not create corner lots that abut key lots).
5. In ESL areas these criteria may be waived where there are major terrain constraints and large natural areas that are being preserved.



6. Street and lot designs shall be arranged so that they work with the constraints of the natural topography to achieve desirable lots with viable building envelopes, streets with reasonable gradients, and adequate, manageable drainage facilities.

## **PERIMETERS OF DEVELOPMENTS**

**2-1.1103**

### **A. Along Major Streets**

The following criteria applies to perimeters that front streets classified as collectors, arterials or parkways:

1. Residential lots shall not be placed with such streets as their sole point of access. A one (1) foot wide Vehicular Non-access Easement (VNE) shall be placed along such frontages. An exception may be considered where the lot sizes are equal to or greater than 35,000 square feet. In such cases, lots may be allowed to access a local or minor collector, provided that they are required to provide shared driveways, circular driveways, or a similar driveway configuration that does not lead to a vehicle backing on to the street.
2. Wherever possible lots should not be oriented with rear yards facing the major street. The following techniques should be considered:
  - a. Place lots so that their side yards abut the street. Cul-de-sac turn-arounds should extend to the right-of-way of the major street.
  - b. Place the front yards toward the major street, using a frontage road approach for access to the lots.
  - c. Place a large (at least 100 feet wide) landscape/open space tract between the lots and the major street.
3. Landscaped buffers are common along the perimeter of subdivisions where they front on to major streets. To assure there is adequate room for meaningful landscaping in such situations, the width of the landscape tract along the major street frontage should be as follows:
  - a. Major Arterial Street Frontage: 15 feet wide tract
  - b. Minor Arterial Street Frontage: 12 feet wide tract
  - c. Major Collector Street Frontage: 15 feet wide tract
  - d. Minor Collector Street Frontage: 15 feet wide tract
  - e. Local Collector Street Frontage: 10 feet wide tract
  - f. Residential Street Frontage: 10 feet wide tract
  - g. Commercial Street Frontage: 15 feet wide tract
4. Where single family residential lots in a subdivision have double frontage with 1 of the fronts facing an arterial or collector street, a vehicular non-access easement and a tract equal in width to the landscaped buffer described in 2-1.802.1.c. above shall be provided.

### **B. Along Non-Residential Uses**

1. Where a residential subdivision abuts a non-residential use, the following lot layout techniques should be considered:
  - a. Provide a landscaped or open space buffer of at least 25 feet in width and place the lots so they 'side' on to this buffer.
  - b. Place the fronts of the lots toward the non-residential use, using a local street as a physical separation.
  - c. Any combination of techniques that avoid having active rear yard areas and bedroom areas in the residences exposed to the adjacent use.
  - d. If there is a substantial open space separation (at least 100 feet in width) it may be acceptable to have rear yard areas directed toward the non-residential use.

- e. Wherever possible, functions such as detention basins, recreational facilities, common storage areas, and other such uses should be used to provide buffering from adjacent non-residential uses.

### **C. Along Existing Residential Uses**

1. To the greatest extent possible the lots in a new subdivision should mirror the layout of an existing adjacent subdivision (rear yards adjacent to rear yards, side yards adjacent to side yards, etc.).
2. Where feasible, lot dimensions and setbacks in a new subdivision should match those of the adjacent existing subdivision for those lots that abut the adjacent subdivision, particularly if there is little or no separation between the lots of the two subdivisions.
3. Grade changes from the off-site grades along the perimeter of a new subdivision should be minimized. In particular, the lots in the new subdivision should not be more than 18 inches above the abutting lots in the existing subdivision. If greater grade change is desired, there should be a buffer or a gradual grade transition on the new subdivision in order to minimize the change at the property line.

### **D. Along Vacant Properties**

1. Grade breaks at the edge of a subdivision should be kept to less than 2 feet wherever possible. If this is not possible then these lots should be made deeper so that the transition is not so abrupt.

## **2-1.1104**

## **SUBDIVISION ENTRIES**

### **A. Entry Street Design**

1. Entry streets into a subdivision should not terminate into a "T" intersection with lots facing down the entry street. This termination should end at an open space, a recreational facility, or into a cul-de-sac.
2. Where an entry street for a subdivision is relatively short (less than 600 feet), there should not be any lots directly accessing the entry street.

### **B. Connections**

1. In order to minimize congestion at entries into a subdivision as well as the street that the subdivision is accessed off of, there should be an entry street for every 75-100 homes in the subdivision. It is understood that this may not be feasible in ESL areas due to the terrain.
2. Wherever possible, entry streets for a subdivision should align with streets on the other side of the road that they intersect with.
3. Where a subdivision is adjacent to vacant lots, un-subdivided lots or a street from an adjacent subdivision, the new subdivision should provide equal rights-of-way in order to complete the street or should extend street rights-of-way to the adjacent parcels unless it can be proven that another viable access route is available to them.
4. Pedestrian connections to adjacent properties or streets should be provided where there are nearby schools, parks or other such pedestrian destinations.

### **C. Gated Streets**

1. Gated streets should only be used where there are sufficient lots available to support future maintenance and reconstruction of the street. In general, avoid gated subdivisions of less than 20 lots.
2. All subdivision or neighborhoods that have private streets shall be accessed through a controlled access gate.

## LOT DESIGN

## 2-1.1105

1. Since corner lots have two frontages they are more limited than other lots in providing usable private outdoor space. To compensate for this, it is recommended that corner lots be wider than the other typical lots in the subdivision, as follows:
  - a. Lot sizes of 4,500 – 6,500 sq. ft.: 5 feet wider
  - b. Lot sizes of 6,600 – 12,000 sq. ft.: 7 feet wider
  - c. Lot sizes of 12,000 – 24,000 sq. ft.: 10 feet wider
  - d. Lot sizes of 25,000 – 45,000 sq. ft.: 15 feet wider
2. It is recommended that corner lots should not be placed next to key lots unless there is no other reasonable option in the design of the subdivision.
3. Through or double frontage lots are discouraged. If lots are to be laid out with rear yards facing a street, it is recommended that landscape tracts be established along the street with widths as recommended in [Section 2-1.1103](#) paragraph 3.
4. If unusual (multi-sided, non-rectangular, etc.) lot designs are proposed, the preliminary and final plats should indicate the locations of all setbacks and yards on the lot, subject to the approval of Project Review staff.
5. Unless there is no other reasonable solution, the access to the buildable portion of a lot should not cross a wash or drainage way.
6. All residential lots shall have frontage on and access to a public street or private street in conformance with city code. All non-residential lots shall have frontage on and/or access to a public street or private street in conformance with city code.
7. Common driveways serving two adjacent lots may be advisable where the access to the lots crosses a minor or major wash, there are significant rock formations and boulders, or there are steep (over 10%) slopes. The route of the common driveway shall be included in an access easement shown on the plat. If this driveway crosses a wash, the driveway should be improved beyond the crossing at the time the master subdivision improvements (streets, infrastructure, etc.) are improved.
8. Flag lots should not be used regularly in the layout of subdivisions. However, where there are major washes, rock formations or steeper slopes that would cause a street extension to achieve frontage to each lot to result in significant cuts and fills, flag lots can be used to reduce the physical impact of providing access and utilities to lots in sensitive areas.
9. All residential subdivisions in the ESLO area shall establish a construction envelope at the time of preliminary plat approval.

## OUTDOOR LIGHTING

## 2-1.1200

### AMBIENT LIGHTING ZONES

### 2-1.1201

In its recent update of lighting standards and design approaches, the International Illumination Society (IES) developed a concept of Ambient Lighting Zones to provide appropriate lighting levels based on the context of an area. This recognizes that urban areas with a great deal of pedestrian activity need different lighting levels than areas of very large lots and passive expanses of open space. [Figure 2.1-9](#) represents where such ambient lighting zones apply in the city. The design of outdoor lighting should use these lighting zones in conjunction with the most recent IES lighting design manuals, see [www.ScottsdaleAZ.gov/design](http://www.ScottsdaleAZ.gov/design).

**E-1 – Intrinsically Dark Areas:** These are predominantly passive open space areas or very low density residential neighborhoods (Typically the desert preserve areas and it may include lots that are 3 acres and larger). There is little nighttime activity and few outdoor lighting sources.

**E-2 – Estate/Rural Areas:** These are low-density areas (typically ½ to 2 acre lots) or there are substantial areas of passive open space interlaced within the pattern of development. Pedestrian activity is minimal but there are occasional retail/service and community service facilities that have nominal amounts of local activity. Lighting levels are generally low; there is often an expectation in the neighborhoods that the lighting levels remain low.

**E-3 – Suburban Areas:** These are the typical suburban areas that have moderate to higher residential densities along with a mix of campus or open style retail, service, employment, and public facilities. Lighting levels in general are moderate, although in some areas such as those around retail centers or schools the need for higher lighting levels may exist.

**E-4 – Urban/Pedestrian Activity Areas:** In these areas there are typically dense land uses, often with little setback from streets, and there is a rich mix of different uses. Retail and cultural uses tend to generate higher levels of pedestrian activity, resulting in the need for higher levels of lighting.

Use these general lighting design principles for outdoor lighting:

1. Consider and reflect the nature of the adjacent land uses in all lighting designs. In particular, maintain the existing ambient lighting level of adjacent residential areas.
2. Focus outdoor lighting on identified tasks instead of providing a wash of lighting across a site or building. Emphasize lighting for pedestrian access and activity areas such as building entrances, walkways, and outdoor gathering facilities.
3. Provide gradual transitions from well lit to unlit areas.
4. Special uses, such as sports facilities or outdoor displays will require specific lighting approaches.
5. In general, the lighting source should not be visible from off of the property.

2-1.1202

### **CITY WIDE EXTERIOR LIGHTING DESIGN GUIDELINES FOR ALL DEVELOPMENT SUBJECT TO THE DEVELOPMENT REVIEW BOARD'S REVIEW PROCESS**

Scottsdale has developed specific lighting design standards for all development that are subject to the Development Review Board's review process. Unless specifically modified by the Development Review Board or City Council through stipulation(s), all development shall incorporate the following:

#### **A. General Lighting Design Standards**

1. All exterior luminaires shall meet all IESNA requirements for full cutoff, and shall be aimed downward and away from property line except for sign, landscape (if approved by the Development Review Board), bollard, path and parking lot canopy luminaires.
2. All luminaires shall be recessed or shielded so the light source is not directly visible from property line.
3. Wall mounted luminaires, adjacent to residential zoning districts and/or ESL areas of the city, shall contain house-side shields and be mounted on a minimum 4-inch long bracket that is mounted perpendicular to the wall.
4. The individual luminaire lamp shall not exceed 250 watts, except for sports court and sports field lights.
5. All High Intensity Discharge lamps in the Environmentally Sensitive Lands (ESL) areas of the city shall be high pressure sodium lamps.
6. All exterior bollard luminaires shall meet all IESNA requirements for cutoff, and shall have non-reflective exterior louvers. The louvers shall be positioned to screen the lamp source from view.

7. All bollard lamps shall be coated/diffuse lamps. Path luminaires within a subdivision shall be cutoff and shall utilize an incandescent, halogen incandescent, or compact fluorescent lamps source.
8. The maximum height from finished grade to the bottom of the any exterior luminaire shall not exceed twenty (20) feet, except in the ESL areas of the city, parking lots adjacent to residential zoning districts, sports court, sports field lights, churches adjacent to residential zoning districts, and/or as specified by the Zoning Ordinance.
9. In the ESL areas of the city, parking lots adjacent to residential zoning districts, churches adjacent to residential zoning districts, and/or as specified by the Zoning Ordinance, the maximum height from finished grade to the bottom of the any exterior luminaire shall not exceed sixteen (16) feet.
10. In the ESL areas of the City, no lighting shall be permitted in NAOS easements, vista corridor easements, scenic corridors, buffered setbacks, and/or desert scenic roadways setbacks.
11. All exterior light poles, pole fixtures, and yokes, including bollards shall be a flat black or dark bronze.
12. Subject to the approval of the Planning and Development Services General Manager, or designee, the maintained average horizontal illuminance at grade, within 10-feet of the primary customer storefront entries shall not exceed the maintained average horizontal illuminance level at grade of five (5) foot-candles. The maintained maximum horizontal illuminance level at grade along the storefront entries shall not exceed fifteen (15) foot-candles. The foot-candle reading shall include any spill light from the store's interior.
13. Any lighting system for sports court or sports field facilities are required to obtain a separate approval from the Development Review Board.

### **B. Carport Lights**

Carport light fixtures shall be recessed within the canopy, shall not project below the fascia, and the light source shall be not directly visible from the property line.

### **C. Gas Station, Convenience Store, and Automated Teller Machines Lighting**

All Gas Station, Convenience Store, and Automated Teller Machines (ATM) drive-thru and walk-up locations shall not exceed the illuminance levels specified within the Gas Station and Convenience Store Development Design Guidelines and ATM Lighting Guidelines.

### **D. Landscape Lighting**

All landscape lighting shall be included as part of the Development Review Board application; if approved by the Development Review Board, all landscape lighting shall comply with the following:

1. Landscaping lighting shall only be utilized to accent plant material.
2. Any landscape lighting that is directed upward shall utilize extension visor shields to limit the view of the lamp source, and shall be aimed away from property line.
3. Any landscape lighting hanging in vegetation, shall contain recessed lamps, and be directed downward and away from property line.
4. The landscape light fixture lamp shall be an incandescent or halogen incandescent source, and shall not exceed fifty (50) watts in non-ESL areas, or twenty (20) watts in ESL area.

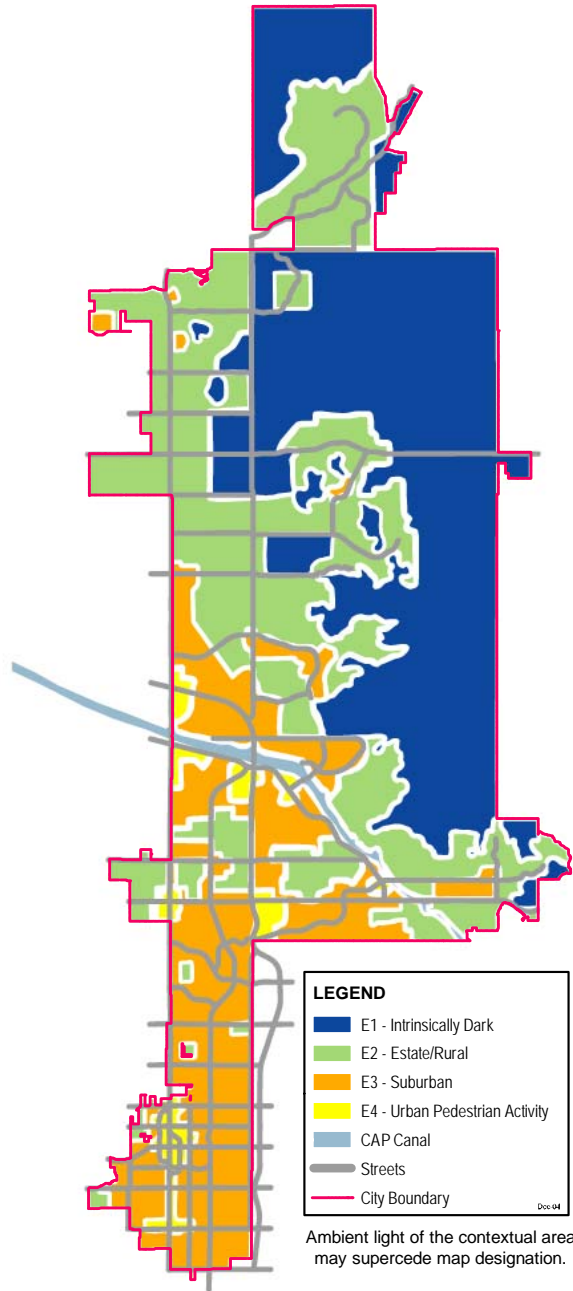


FIGURE 2.1-9 AMBIENT LIGHTING ZONES

2-1.1203

**STREET LIGHTING**

**A. City Process for Providing Streetlights**

Unless otherwise provided in the General Plan or other city-adopted land use plans, all development within the city must provide streetlights per city ordinance and the Design Standards and Policies Manual. Residents living on public streets in areas without streetlights may petition the city to form a Streetlight Improvement District. Once a district is approved, fees are assessed by the Maricopa County Assessor’s Office. City staff will act as a resource for residents in forming a Streetlight Improvement District. However, residents are encouraged to seek advice of private counsel to assist in forming a Streetlight Improvement District.



**B. Process for New Land Divisions to Form a Streetlight Improvement District**

1. Land owner files a Streetlight Improvement Petition to form a Streetlight Improvement District, see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).
2. Land owner obtains streetlight layout from appropriate utility company which is reviewed by city staff.
3. City staff prepares and presents Resolutions proposing formation of a Streetlight Improvement District to City Council (simultaneously if land owner is 100% property owner).
  - Resolution of Intention
  - Resolution Ordering Work
4. City staff sends approved Streetlight Improvement District request to Maricopa County Assessor for assessment.

**C. Process for Residents to Obtain New or Additional Streetlights**

1. Residents file a Streetlight Improvement Petition to form a Streetlight Improvement District, see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).
2. City staff reviews Petition to determine property ownership for compliance with state statute (51% must be in favor of forming district).
3. Residents obtain streetlight layout from appropriate utility company which is reviewed by city staff.
4. City staff prepares and presents Resolution of Intention to City Council to begin process of forming Streetlight Improvement District.
5. If Resolution of Intention is approved by City Council, it is posted per state statute for 15 day protest period.
6. If no protest is filed, city staff takes Resolution Ordering Work to City Council for approval and finalizing district formation.
7. If Resolution Ordering Work is approved by City Council, city staff sends request to Maricopa County Assessor for assessment.
8. If substantial protest is received, the district will not be formed.

**D. Street Light Design**

Street lighting design in the City of Scottsdale should follow the latest edition of the IES "Roadway Lighting" manual (RP-8). [Figure 2.1-9](#) identifies four different lighting level areas within the city use as a basis of design approach. The four street lighting approaches are:

**No Street Lights** – In this area there are large expanses of open spaces or low residential densities with few other uses that would generate any pedestrian activity. Streetlights will be provided at signalized intersections.

**Partial Lighting** – This area includes those with significant natural areas and land slopes of 3% or greater and those with 1 acre parcels that are pocketed into suburban areas. Where the residential density is less than 1.5 dwellings per acre, streetlights will be placed at intersections along collector or larger streets. Where the densities are higher, streetlights will be placed at all street intersections (see RP-8 Section 3:13).

**Suburban Street Lighting** - These are the typical medium density residential, commercial, and employment areas. For residential areas, the maintained illuminance values should be based on RP-8 Table 2.b column R4. For the Airpark and other business areas, the same column should be used with the "Intermediate" land use area classification.

**Pedestrian Activity Lighting** – These areas are where there are relatively high-density land uses, higher levels of transit service, and a mix of uses that generate strong pedestrian activity. The maintained illuminance values for such areas should be based on RP-8 Table 2.b column R4 and using the "Commercial" land use area classification.

Consider these general design principles in street lighting design:

1. Where street lighting levels change along a street corridor, the design should consider RP-8 Section 3:16, "Transition Lighting."
2. Light walkways and separated bikeways using the maintained illuminance levels identified in RP-8 Table 4.

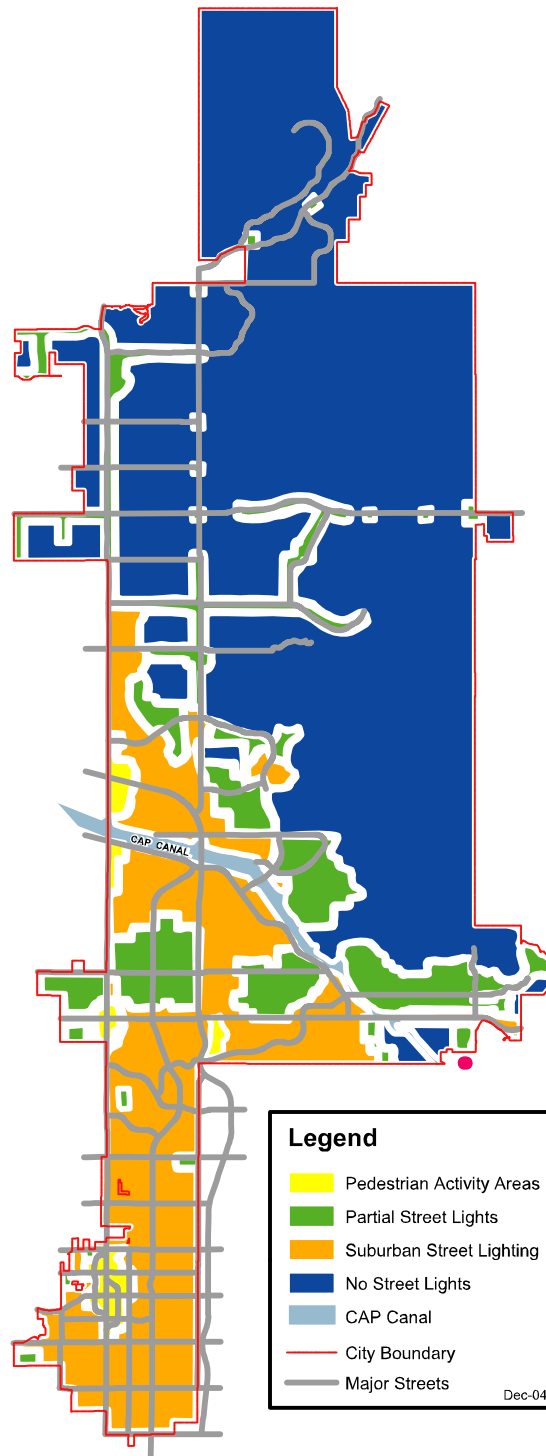


FIGURE 2.1-10 STREETLIGHT POLICY MAP







# STREETLIGHT IMPROVEMENT DISTRICT

## STREETLIGHT IMPROVEMENT DISTRICT PETITION

**TO THE MAYOR AND COUNCIL OF THE CITY OF SCOTTSDALE:**

We, the undersigned, are all or a majority of the real property owners (exclusive of mortgagees and other lienholders) within the district named below. We petition the City Council of the City of Scottsdale, Maricopa County, Arizona, to establish a street lighting improvement district under ARS Sections 48-571 to 48-622, and any amendments, and specifically ARS Sections 48-616 and 48-617, to purchase electricity for lighting the public streets and/or parks within the district. This petition includes a charge for maintaining the lighting facilities.

We petition the City Council, after verifying our ownership and making a finding of that fact, to adopt (1) a resolution of intention to order the proposed improvements under ARS Section 48-576, and (2) a resolution to order the construction of improvements under ARS Section 48-581, without publicizing and posting the resolution of intention under ARS Section 48-578.

If we are only a majority of the real property owners in the district, we petition the City Council to (1) adopt a resolution of intention to order the proposed improvements under ARS Section 48-576, (2) publish and post it under ARS Section 48-578, and (3) unless protests received under ARS Section 48-579 are sufficient to bar further proceedings, proceed with constructing the improvements petitioned for.

The name of the proposed street and/or park lighting improvement district shall be:

\_\_\_\_\_

PETITIONERS: Please print and sign your name

PETITIONERS NAME	ADDRESS	SIGNATURE



# Appendix 2-1A STREETLIGHT IMPROVEMENT DISTRICT

PETITIONERS NAME	ADDRESS	SIGNATURE

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# ENVIRONMENTALLY SENSITIVE LANDS

This section specifies site design considerations, standards and criteria for the area covered by the Environmentally Sensitive Lands Ordinance (ESLO). It addresses utility location, grading and drainage issues, roadway improvements and site work guidelines for protecting the unique topography, vegetation and geology within the ESL area.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# ENVIRONMENTALLY SENSITIVE LANDS

## GENERAL INFORMATION

For more information and related resources see [www.ScottsdaleAZ.gov/codes/eslo](http://www.ScottsdaleAZ.gov/codes/eslo).

### A. History/Background

The Environmentally Sensitive Lands Ordinance (ESLO) is a set of zoning regulations adopted by the City Council in 1991 (amended in 2001, 2003 and 2004) to guide development throughout the 134 square miles of desert and mountain areas of northern Scottsdale. In addition to being governed by different versions of the ESL ordinance, some projects and subdivisions are governed by the Hillside Ordinance that was established in 1977.

These areas are generally located north and east of the Central Arizona Project canal (see Figure 2.2-1).

To verify if a parcel is located in the ESL overlay area, and to confirm the landform category, see the Digital Map Center at [www.eservices.ScottsdaleAZ.gov/dmc](http://www.eservices.ScottsdaleAZ.gov/dmc).

To verify which version of the ESL or if the Hillside Ordinance applies to a property or to acquire a copy of the applicable ordinance, contact the Records Department or Planning Division staff.

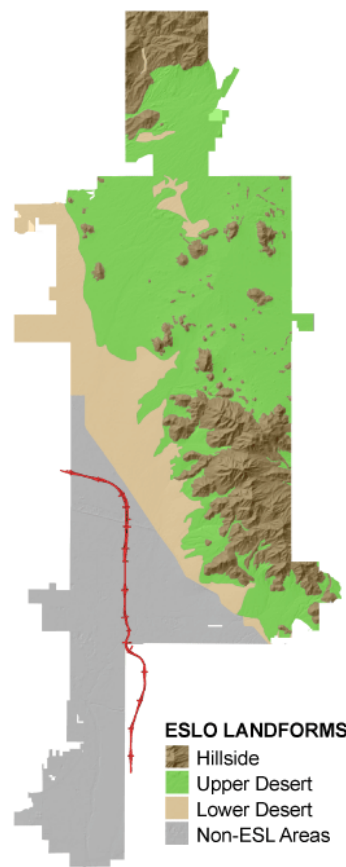


FIGURE 2.2-1 ESLO AREA / LANDFORMS MAP

**B. Purpose**

The intent and purpose of ESLO is to identify and protect environmentally sensitive lands in the city and to promote public health and safety by controlling development on these lands. The ordinance requires that a percentage of each property be permanently preserved as Natural Area Open Space and that specific environmental features be protected, including vegetation, washes, mountain ridges and peaks, to assure appropriate development. For specific language concerning the ESLO, see the Zoning Ordinance, Section 6.1010, at [www.ScottsdaleAZ.gov/codes/eslo](http://www.ScottsdaleAZ.gov/codes/eslo).

**C. Goals**

The Environmentally Sensitive Lands Ordinance was established to:

1. Protect the public and property from the special hazards that can be found in this desert setting.
2. Encourage the protection of unique and sensitive natural features in the Upper Sonoran Desert, including but not limited to mountains and hills, large rock formations, native landscape, archeological and historical sites and significant washes.
3. Minimize the costs to build and maintain the public infrastructure needed to sustain the use of the land.
4. Encourage development that blends with the character and nature of this special desert setting.

This ordinance is not intended to deny the reasonable use of land, but to guide its use in ways that are sustainable and recognize the unique opportunities this setting provides.

**D. Community Benefit**

ESLO has a direct impact on the residents of Scottsdale by determining the location and design of residential, commercial, industrial and institutional development in almost two-thirds of the city. Application of ESLO and its predecessor the Hillside Ordinance, has resulted in the preservation of over 9,000 acres of Sonoran Desert open space while protecting residents from potential flooding, erosion and detrimental visual impacts.

**2-2.100****UTILITIES**

In general, locate and design utility facilities and corridors to minimize degradation of key natural desert features being conserved by ESLO. This section provides guidelines that support the goals of ESLO while also allowing for the reasonable and necessary installation of infrastructure serving the land uses in the area. See [Section 6-1.100](#) and [Section 7-1.000](#) for specific guidelines for water distribution and wastewater collection lines.

Use the following general principles in the design and construction of utility facilities in ESL areas:

1. Install utility corridors that do not result in slope movement or surface subsidence.
2. Prevent increased erosion along utility corridors.
3. Avoid utility crossings that obstruct or constrict washes.
4. Replace vegetation removed for utility construction or maintenance with appropriate native desert plants.
5. Avoid placing utility corridors requiring frequent maintenance through significant riparian, vista or habitat corridors.
6. Place all utility facilities underground or screen them from public view.

## WATER DISTRIBUTION LINES

2-2.101

### A. Location

To minimize their impact in ESL areas, locate all public water distribution lines within private and public street rights-of-way. Location of water system lines in other areas requires Water Resources Department approval. Water lines that must be located outside of public rights-of-way will require a waterline easement or placement within a tract, where applicable.

Place water lines within the paved street section rights-of-way and locate water meters adjacent to driveways to reduce impact to sensitive ESL landforms.

### B. Easements

The minimum width of easements within tracts where lot size is less than 22,000 square feet is 20 feet. Place the entire easement on one side of a property line.

All walls crossing easements must be constructed of wood, wire or removable type fencing. Revegetation or landscaping within the easement must not restrict access.

### C. Crossings of Drainage Ways

Water lines should not cross drainage ways unless the crossing is associated with a roadway or driveway. Where crossings are required, locate the water line as close to perpendicular to the flow path of the wash as possible.

### D. Water Storage Facilities

1. Locate water storage facilities, such as water tanks and reservoirs, underground and/or in such a way to reduce impacts to the surrounding environment.
2. Paint any above grade tank surface to match surrounding native stone, rock or soil color.
3. Tanks are prohibited on slopes greater than 3:1 unless approved by the Planning and Development Services and Water Resources General Managers or their designees.

## WASTEWATER COLLECTION LINES

2-2.102

### A. Location

To minimize their impact in ESL areas, locate all public sewer collection lines, including public sewer force mains, within private and public street rights-of-way. Wastewater lines that must be located outside of public rights-of-way require a sewer line easement, or be placed within a tract (where lot size is less than 22,000 square feet).

Sewer lines are allowed to cross the centerline and be located within the paved street section but should not cross the curb line. Locate manholes to keep manhole covers out of the tire paths on the roadway.

### B. Easements

The minimum width of easements is 20 feet. Place the entire easement on one side of a property line.

All walls crossing easements must be constructed of wood, wire or removable type fencing. Revegetation or landscaping within the easement must not restrict access.

### C. Drainage Ways

Do not locate wastewater lines within the area along drainage ways inundated by a 100-year storm flow, unless specifically approved by Planning and Development Services and Water Resources. Exceptions will be based upon specific design analyses that demonstrate there will be no mixing of flows and no other viable solution is available. If a wastewater line must be located alongside a drainage way, do not clear existing natural riparian vegetation during construction.

Do not cross drainage ways with wastewater lines unless there is no other reasonable alternative alignment. Where possible, place such crossings in association with the location of roadways or driveways and/or perpendicular to the flow path of the drainage way.



**2-2.103 PUBLIC LIFT STATIONS**

In ESL areas, wastewater pumping stations and pressurized collection systems may be used with Water Resources Department approval.

Protect wastewater pumping stations from inundation by stormwater runoff. Locate such stations so that adequate access is available. Contact the Water Resources Department prior to design of wastewater systems in ESL areas.

**2-2.104 INDIVIDUAL SEWAGE EJECTOR SYSTEMS**

If sewer service cannot be provided by gravity flow, install an individual ejector pump to transport wastewater from a residence. The private ejector pump shall meet all State and County Health Department and Local Building Code requirements.

The property owner shall maintain private ejector pumps. Each ejector pump shall serve only 1 lot and may not extend past the property line without Water Resources Department approval. Septic system facilities, including leach fields, shall not be located within designated Natural Area Open Space easements.

**2-2.105 ON-SITE WASTEWATER TREATMENT**

In ESL areas where connection to a public sanitary sewer collector is not available, an individual sewage disposal system will be considered. On-site wastewater disposal systems are subject to authorization by the Water Resources Department prior to approval from the Maricopa County Department of Environmental Services.

Locate such facilities per Maricopa County requirements. Landscape or restore all areas cleared for such facilities to a native desert condition.

**2-2.106 MISCELLANEOUS UTILITIES****A. Location**

Locate utility lines within private streets and public rights-of-way to minimize impact on sensitive ESL areas. Note that the paved street section is reserved for water and sewer lines, enabling utilities to be placed within the balance of the rights-of-way. Utility locations in the ESL areas will be restricted due to grading limitations.

When circumstances dictate that utility lines be placed outside of a public/private rights-of-way, establish a Public Utility Easement or tract (where lot size is less than 22,000 square feet).

Construction of underground utilities can exert considerable adverse impact to adjacent lands. Therefore, revegetation of all disturbed areas is required after installation and any subsequent maintenance activities.

Avoid locating utility lines in drainage ways and channels whenever possible. When such locations are necessary, construction plans shall specify how to protect the facility from runoff flows.

**B. Design of Utility Cabinets**

All utility cabinets within ESL areas shall be painted Frazee Western Reserve, or be constructed of self-weathering steel. All lands surrounding utility cabinets that have been disturbed by the installation of the cabinets and related utilities shall be restored to a natural desert condition with native plant materials.

All utility cabinets shall be screened in one of the following ways:

1. Placed in vaults below the ground level.
2. Enclosed within a self-weathered steel enclosure fence that incorporates a three dimensional design.
3. Enclosed within a wall that incorporates native stonework, rammed earth, or exposed aggregate and colored concrete.

4. Berms landscaped with native desert plants and shaped to blend into the natural terrain.
5. Dense landscaping with desert trees and large shrubs.

**C. Easements**

Do not place Public Utility Easements along the edge of rights-of-way unless required by the specific design for installing utilities in that location. Keep the installation of utilities within the rights-of-way.

Utility easements along side or rear lot lines must be entirely within a lot (that is not split with part on 1 lot and the remaining portion on an adjacent lot) and must be at least 12 feet wide. Utility easements along the front of lots and tracts must be at least 8 feet wide.

## **DRAINAGE PLANNING**

**2-2.200**

The analysis of hydrologic and hydraulic hazards within this region must consider impacts to all downstream areas. Failure to consider these impacts may result in hazardous diversions of flow, increases in peak discharge flow rates and disruption of the transport equilibrium. Any of these phenomena could increase the flooding and erosion potential to downstream properties and create a liability.

1. Design drainage facilities to maintain the natural runoff and channel characteristics.
2. Do not adversely impact drainage patterns, including the location and configuration of watershed boundaries.
3. Maintain the stability of natural drainage channels, particularly the channel banks, as much as is possible.
4. Do not increase the natural volume of existing channel flows.
5. Maintain the natural sedimentation characteristics of an existing drainage way.
6. Do not restrict or obstruct natural habitat condition or movement with improvements to existing channels.
7. Maintain the natural vegetation density and diversity of existing channels.
8. Preserve the viewshed characteristics of large washes and vista corridors.
9. Design detention basins to blend into the natural contours and undulations of the site and the local natural terrain.
10. Locate detention basins within a subdivision in separate tracts, not on individual lots. Exceptions may be made by the Zoning Administrator or designee if the following conditions are met:
  - a. The basins will be maintained by a property owners association or its equivalent;
  - b. Appropriately sized drainage and maintenance access easements are provided; and
  - c. The basin is accessible from a street.

### **IMPROVEMENTS TO NATURAL WASHES**

**2-2.201**

Design any improvements to natural washes to compliment the natural function and appearance of the site. It is preferable to leave the washes in an undisturbed state and use sufficient building setbacks to preclude the need for artificial bank protection.

Avoid any disruption of the natural geometry and bed-profile of washes in ESL to the greatest extent feasible. This includes any unnatural diversion of water into or from these washes. Such diversion could upset the system equilibrium and induce accelerated bank erosion and long-term degradation of the channel bed.

**A. Incised Natural Washes**

Virtually all washes in the Hillside landform and many of the washes in the Upper Desert landform are well incised. As such, they generally have capacity equal to or exceeding that necessary to contain the projected storm flows.

The steep slopes in the Hillside landform and the relatively steep slopes in the Upper Desert landform promote very high velocity flows. This creates a potential for bank erosion and bed scour.

Due to bedrock outcrops and relatively large diameter sediment particles found in these washes, bed scour may be arrested by channel armoring, particularly in association with road crossings. This phenomenon will be evaluated on a case-by-case basis.

Avoid the use of structures that might form an artificial grade control. Consider clear span bridges for crossings where multiple barrel culverts impede flow due to the amount of sediment transport or debris that is likely during major storm events.

Include the entire top-of-bank to top-of-bank dimension that exists naturally in addition to the area normally required to contain the 100-year storm within drainage easements along incised washes.

**B. Over-bank Flow and Braided Washes**

In portions of the Upper Desert landform and across most of the Lower Desert landform, washes do not have natural channels with adequate capacity to contain major storm flows. In major storms, flows will fill the visible channel, inundate adjacent lands and divert into other braided channel courses and/or become sheet flow not confined to any particular drainage way.

Modifying or restructuring the natural drainage way may be needed to protect structures and public infrastructure. To maintain control of flood flows along such drainage ways, provide reinforced channel banks by using reinforced embankments, flood walls, raised pads for buildings or other such methods.

Reconstructing or relocating a natural channel will only be considered when there is no other reasonable approach available. Relocated wash channels shall be designed and constructed in a manner that restores the wash to a natural condition with revegetation of native desert plants typical to local washes and contours that blend into the natural topography. Placing channels into underground drain pipes shall not be used unless there is no other possible solution for managing the storm flows. Any modification of washes that have a 100-year flow of 50 cfs or greater will require a modification approved by the Zoning Administrator as described in ESLO, see [www.ScottsdaleAZ.gov/codes/eslo](http://www.ScottsdaleAZ.gov/codes/eslo).

**C. Residential Development**

1. Design residential street systems to avoid diverting or blocking historical drainage patterns.
2. Contour and align streets so water is directed into the historical drainage course on the site.
3. During the construction phase of residential development, minimize erosion on disturbed ground surfaces (utility alignments, street cuts, etc.).
4. Disperse on-site flows from improved portions of residential properties to minimize off-site erosion or direct flows into a defined drainage course to minimize erosion and maintain flow characteristics of the drainage way.

**D. Utility Installations**

1. Complete the installation of underground utilities to avoid conditions that could lead to the alteration of historical drainage patterns.
2. Keep utility crossings of drainage ways to the minimum extent feasible.

3. Wherever possible, place utility crossings in conjunction with road crossings and diagonal to the flow path of the drainage way.
4. Place utility crossings in natural or man-made channels below the maximum expected scour depth of such channels, in addition to the usual depth of cover.
5. Do not place utility corridors alongside drainage ways within the area that could be inundated in a 100-year storm flow or through the native riparian vegetation along the drainage way.

#### **E. Culverts and Grade Crossings**

1. Account for potential clogging due to sediment and debris in the design of culvert capacities.
2. Construct headwalls and wingwalls at culvert entrances. In addition, an erosion resistant apron may be necessary when analysis indicates the need. Consult the Federal Highway Administration's manuals that address the design of such facilities.
3. Consider the possibility of flow over the roadway in the design of culverted roadway crossings and provide erosion resistant bank protection on both the upstream and downstream side-slopes as needed.
4. Where "wet" crossings of washes are approved (by Planning and Development Services Department and Community Facilities General Managers or their designees), a concrete road surface may be necessary for that portion of the street inundated during a 25-year storm. Concrete cutoff walls shall be designed and constructed on both the upstream and downstream sides of the roadway. All "wet" crossings shall be posted.

## **ROADWAY**

### **2-2.300**

This section focuses on minimum design guidelines for roadway improvements within the ESL areas.

Alternative design solutions shall be considered if appropriate technical analysis and documentation can demonstrate compatibility with the environmental management objectives for ESL areas.

Roadways can impact environmentally sensitive lands not only during construction, but also over the life of their use. Determine ways to mitigate such impacts as obstructing natural drainage channels, introducing road surface pollutants and disrupting habitat conditions during the planning stages of the project proposal. This section provides guidance for ways to effectively mitigate some of these impacts.

Some of the goals to meet in the design and construction of roads in the ESL area are:

1. No slope movement or surface subsidence from construction shall occur outside of the approved construction limits for the road project.
2. Do not obstruct the capacity and function of drainage channels.
3. Avoid creating artificial sub-basins with road construction and layouts unless specifically approved as a part of a subdivision plat.
4. Maintain water quality by avoiding introducing surface run-off pollutants from road surfaces.
5. Maintain connections between significant riparian habitats or vista corridors with the roadway layout.
6. Replace native vegetation removed for roadway construction to the greatest extent possible.

2-2.301

**GENERAL DESIGN FACTORS**

In ESL areas, the location of a roadway (horizontally, vertically and in cross-section) should be compatible with the surrounding environment. The following factors should be considered in addition to design specifications for ESL roadways listed in [Section 5-3.000](#) and [Appendix 5-3B](#).

**A. Location**

Locate the roadway to minimize impacts to the natural environment, see [Figure 2.2-2](#).

**B. Alignment and Profile**

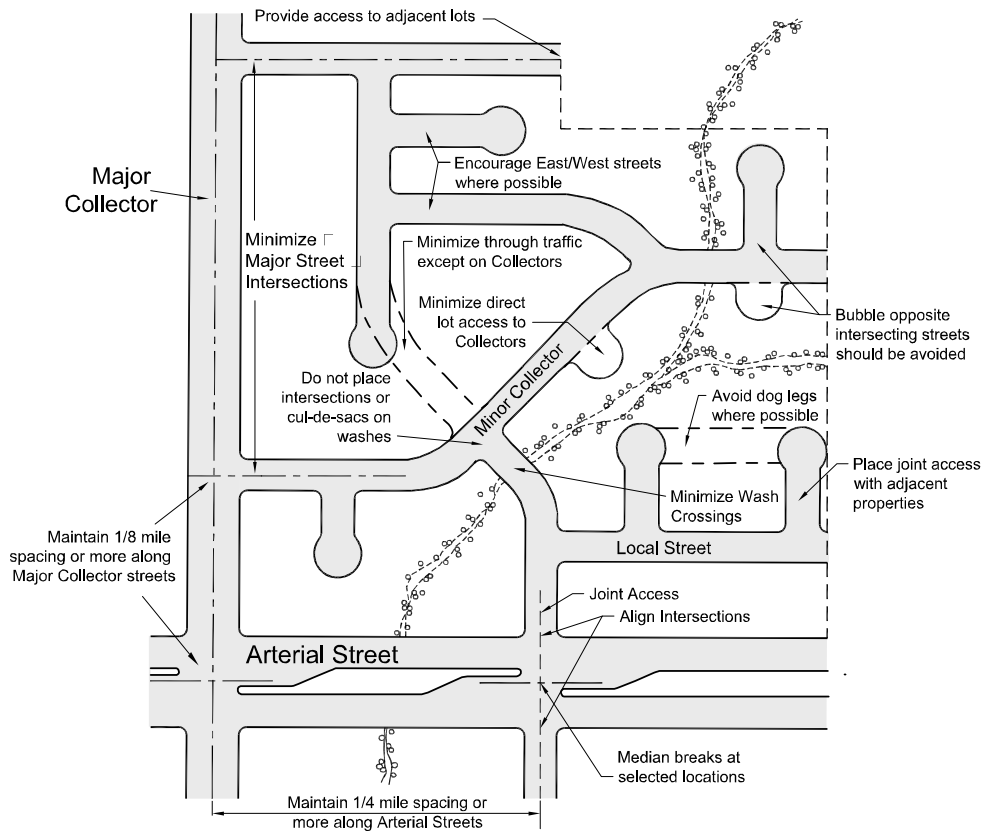
Follow the topography of the area with the roadway design to minimize excavation and embankment scars. Curvilinear horizontal alignments and gently rolling profiles consistent with the natural topography minimize unnecessary disturbance to the existing environment.

**C. Natural Features**

Avoid significant natural features, such as stands of vegetation and rock outcroppings, when suitable alternative alignments are available.

**D. Structures**

Consider impacts on vegetation, topography, wildlife movements and the viewshed in the design and location of roadway structures.



**FIGURE 2.2-2 SUBDIVISION STREET PLANNING**

2-2.302

**SPECIAL CONSIDERATIONS FOR ROAD CROSS-SECTIONS**

**A. Street Rights-of-way**

Additional rights-of-way may be required for cut or fill slopes, bike paths, horse trails, traffic control devices, fire hydrants or other public facilities located adjacent to streets. Where cut or

fill slopes extend beyond the rights-of-way, a permanent easement may be provided in lieu of increasing the width of the rights-of-way.

**B. Shoulders**

All roads within ESL areas should have improved shoulders. Construct shoulders with clean native topsoil that is free from roots, debris, heavy clay and large stones or rocks. Compact all shoulders to a minimum of 90 percent of maximum density.

**C. Cross Slopes**

In ESL areas it may be necessary to use roadway cross slopes to control drainage. The slope of shoulders should match the pavement cross slope.

**D. Utility Locations**

In general, place utilities within the improved area of the pavements and adjacent shoulders. If it is necessary to place utilities outside the bounds in a Public Utility Easement (PUE) of the road improvements, minimize the amount of grading, loss of native desert vegetation and impacts to the natural drainage character.

**ROAD GRADING**

This section establishes criteria for cut and fill slopes, slope stabilization, erosion controls and restoration of scarred areas due to roadway grading. All roadway improvement plans and street design must be done under the supervision of a registered Civil Engineer.

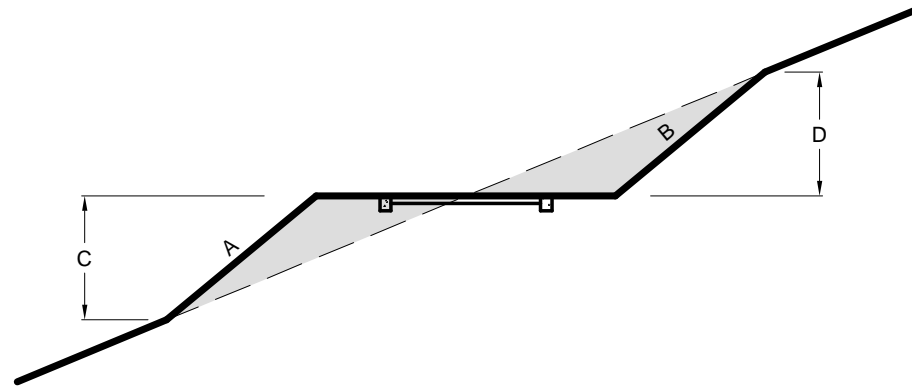
**A. Side Slopes**

1. Consider stability, maintenance and appearance of cut and fill slopes during construction. Use geotechnical reports for safe slope gradients.
2. The maximum slope gradient for fill slopes within the rights-of-way is 4:1 (horizontal to vertical) and for cut slopes is 3:1, unless otherwise approved by the Planning and Development Services and Transportation General Managers or their designees.
3. In areas where the engineer anticipates unstable soils or potential erosion, flatter slopes or specific mitigation techniques may be accepted. Design measures to mitigate unstable slope conditions and potential erosion problems must be identified in the geotechnical report.
4. Steeper slopes are allowable provided that geotechnical conditions are properly analyzed and a stable embankment is detailed on the construction plans. Fill slopes steeper than 4:1 require the use of guardrails.
5. The maximum height of cuts and fills for roadway improvements is 8 feet in the Upper and Lower Desert Landforms and 12 feet in the Hillside Landform, as measured vertically from the pavement surface to the natural grade at the toe or top of the constructed slope, see [Figure 2.2-3](#).
6. When retaining walls are used, the exposed height should be the height of the retaining wall plus the vertical height of the retaining slope. In addition, these maximum heights will limit length as shown below.

Slope Height	Maximum Length
0-4 feet	None
6 feet	375 feet
8 feet	300 feet
10 feet	225 feet
12 feet	150 feet

**2-2.303**

7. Maintain an average height of 6 feet in the Upper and Lower Desert Landform and 8 feet in the Hillside Landform areas for any continuous slope. Determine the average slope height by using individual slope heights measured at 50-foot intervals.
8. Where there is a combination of cut and fill slopes at any 1 station along the roadway, do not exceed a combined slope height of 12 feet in Upper and Lower Desert areas and 16 feet in Hillside areas.



- A: 4:1 SLOPE (3:1 WITH GUARD RAILS)      C: 12' MAX. / 8' AVERAGE FOR EACH 50' LENGTH  
 B: 2:1 SLOPE      D: 12' MAX. / 8' AVERAGE FOR EACH 50' LENGTH  
 C+D: 16' MAX.

**FIGURE 2.2-3 HILLSIDE LANDFORM ROAD CUTS**

9. Heights exceeding the above criteria may be allowed by the Development Review Board or Zoning Administrator provided the applicant demonstrates that objectives of ESLO are met.
10. Round all slopes to blend into the existing terrain to produce a contoured transition from the slope face to the natural ground.
11. Planning and Development Services staff may require mitigation techniques for cuts and fills greater than 8 feet be presented to the Development Review Board for approval. Slopes and fills must be engineered in accordance with the recommendations of the geotechnical report.

### **B. Retaining Walls**

Retaining walls may be used to reduce the horizontal and vertical distances required to construct cut and fill slopes.

1. All retaining walls, regardless of height, shall comply with the city building code and also conform to the following requirements. The heights and types of retaining walls may be subject to Development Review Board approval as determined by the Planning and Development Services General Manager or designee, based upon the visibility and magnitude of the proposed structure.
2. Acceptable types of retaining walls include stone gravity, structural masonry and reinforced concrete. Do not use other types, such as metal cribbing walls and rock gabion walls, unless approved by the city.
3. Consider terraced walls in place of 1 wall for instances requiring retaining walls in excess of 6 feet. The minimum dimension of the landscaped level located between the lower and upper terrace walls shall be at least equal to the visible height of the lower wall, but not less than 4 feet. See [Figure 2.2-8](#).
4. In general, match the finish material and color of retaining walls with the surrounding natural stone, rock or soil color.



5. Plans for retaining walls greater in height than 3 feet must be signed and sealed by a registered Civil Engineer or Structural Engineer in the State of Arizona.

**C. Drainage Controls**

1. Design all drainage facilities to carry surface waters to their historical outfall.
2. Do not pond water above cut or fill slopes.
3. Construct and maintain erosion controls (temporary or permanent) to prevent erosion of all slopes and graded areas.
4. Provide surface drainage interceptors at the top of cut and fill slopes where surface runoff will create erosion problems.
5. Subsurface drainage facilities may be required for stability and protection of affected areas due to ground water seepage.

**D. Slope Restoration**

Restoration and stabilization of all exposed slopes created by grading shall be completed within 90 calendar days after rough grading of the roadway. Restoration shall consist of revegetation with native species of a type and mix consistent with local natural conditions and/or artificial weathering of rock faces. A revegetation plan including plant species, locations, sizes and methods of transplanting must be submitted for review and approval.

**STREET INTERSECTIONS****2-2.304**

Do not place street intersections within the alignment and floodplain of major or minor washes, on or within boulder clusters or other such sensitive environmental features.

**STREET LIGHTING****2-2.305**

Do not use street lighting within the Hillside landform, see [Section 2-1.1102](#).

**A. In the Upper Desert Landform**

Where the average residential density is less than 1.5 dwellings per acre or the surrounding land use is some form of open space, use street lighting only at intersections with major and minor collector streets. Where the residential density is higher or there are non-residential uses, provide street lighting at all intersections. Finish street lighting equipment to match the surrounding environment.

**B. In the Lower Desert Landform**

Where the average residential density is less than 1.5 dwellings per acre or the surrounding land use is some form of open space, use street lighting only at intersections with collector or larger streets. In all other areas use street lighting based upon the latest IES recommended standards that are based upon the land use and context of the street, see [Section 2-1.1102](#).

**SIDEWALKS****2-2.306****A. In the Hillside Landform**

Sidewalks are not required within the Hillside Landform.

**B. In the Upper Desert Landform**

1. Sidewalks are not be required where the residential density is less than 1.5 dwellings per acre or the adjacent land use is an open space area of at least 40 acres, except along arterial or larger streets.
2. Sidewalks are required in all other areas.
3. Sidewalks on one side only of a street may be permitted by the Planning and Development Services General Manager or designee if the street is accessed only on one side, the street is a cul-de-sac less than 400 feet in length or the local land slopes generally average 10 percent or more.



**C. In the Lower Desert Landform**

In areas where the average residential density is less than 1.5 dwellings per acre sidewalks are required along major collector or larger streets. Sidewalks are required in all other locations.

**D. Other Considerations**

Shoulders may be used as pedestrian ways provided safety is not compromised. In these cases, wider shoulders may be used in place of a concrete sidewalk.

**2-2.307****BIKEWAYS**

Scottsdale policy requires bikeways on all arterial and major collector roads, see [Section 5-7.000](#). However, this requirement is waived in the Hillside landform.

**2-2.308****DRIVEWAYS****A. Residential Developments**

In general, limit driveways in ESL areas to 1 per residence. However, additional and circular driveways will be permitted provided they do not adversely disrupt the surrounding natural desert environment.

1. The minimum driveway width for driveways less than 200 feet long is:
  - a. 16 feet in the Upper and Lower Desert Landforms and
  - b. 12 feet for driveways in the Hillside Landform.
2. The maximum linear grade of a driveway shall be 18 percent and the average grade for the length of the driveway shall be 12 percent.
3. To minimize crossings of drainage ways, shorten the length of cul-de-sacs in steeper terrain and protect boulder clusters or formations, a single driveway may serve more than one residence but not more than four residences provided that:
  - a. The maximum length is 400 feet, unless specifically approved by the Planning and Development Services General Manager or designee,
  - b. The minimum width is 24 feet in the Upper and Lower Desert Landform and
  - c. The minimum width is 18 feet in the Hillside Landform.
4. Driveways greater in length than 150 feet or with grades steeper than 12 percent in Hillside areas are subject to prior approval by the Planning and Development Services General Manager or designee, as well as from the city's Fire Department. Design such driveways based upon the following criteria and [Figure 2.2-4](#). Also see the Fire Code at [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes):
  - a. Where the driveway gradient is 0 to 12 percent:
    - The driveway surface shall be all-weather,
    - The minimum driveway width shall be 16 feet if it is longer than 200 feet and
    - A turn-around is required if the driveway length exceeds 200 feet.
  - b. Where the driveway gradient is from 12.1 to 15 percent:
    - The driveway shall have a hard surface,
    - A turn-around is required if the driveway length exceeds 200 feet,
    - The minimum width shall be 16 feet if the driveway is longer than 200 feet (a 12 foot wide hard surface with 2 foot wide compacted shoulders on each side may be used) and,

- c. Where the driveway gradient is from 15.1 to 18 percent:
  - The driveway shall have a hard surface,
  - A turn-around is required if the length of the driveway exceeds 200 feet,
  - The minimum width shall be 16 feet if the driveway is longer than 200 feet (a 12 feet wide hard surface with 2 foot wide compacted shoulders on each side may be used) and,

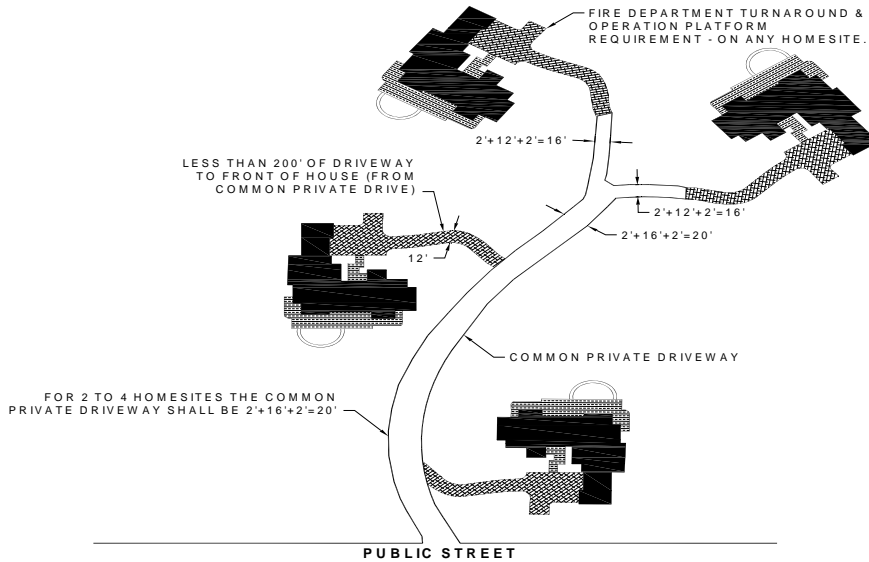


FIGURE 2.2-4 PRIVATE DRIVEWAY DESIGN FOR EMERGENCY ACCESS

- 5. Design driveways and parking areas for adequate vehicle maneuvering and turn around for a Single Unit Truck (SU) as defined by AASHTO.
- 6. Provide a fire Operational Platform adjacent to the main building whenever the driveway exceeds 12 percent in grade or is longer than 200 feet. The minimum dimensions for this platform are 20 by 30 feet and the maximum cross slope is 5 percent, see [Figure 2.2-5](#).

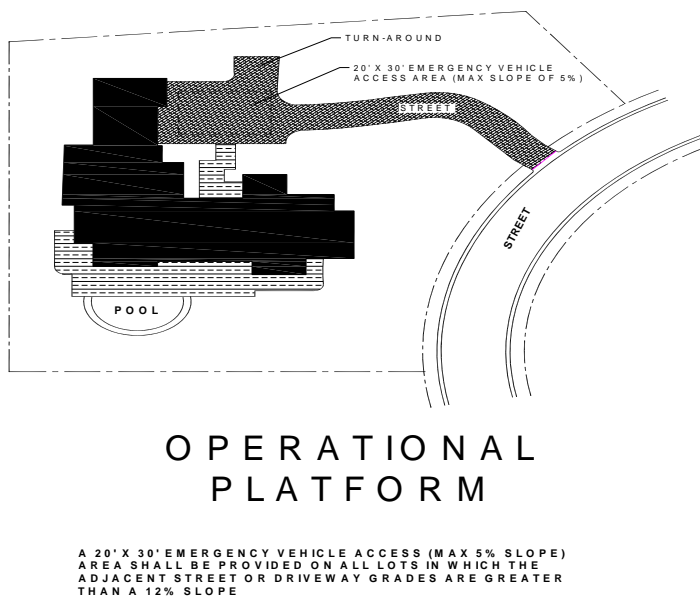


FIGURE 2.2-5 OPERATIONAL PLATFORM FOR FIRE ACCESS

7. Where required, the turn-around shall be either a circular drive with a minimum radius of 40 feet 6 inches or a T-type hammer head with 16 feet by 76 feet dimensions, see [Figure 2.1-2](#).
8. A turn-out is required along extended driveways at 300 foot intervals. The turn-out shall be at least 20 feet wide for a distance of at least 45 feet, see [Figure 2.2-6](#).

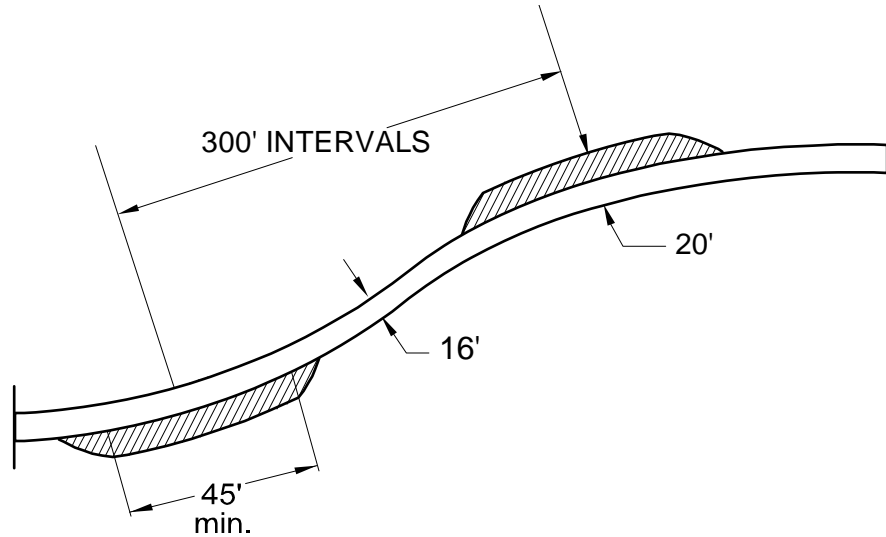


FIGURE 2.2-6 FIRE TURN-OUT FOR EXTENDED DRIVEWAYS

**B. Locations**

Locate driveways in the Hillside Landform a minimum of 100 feet away from the rights-of-way line of an intersecting street and a minimum of 25 feet from a side property line. In special cases the Planning & Development Services General Manager or designee may make exceptions to this standard. See [Figure 2.2-7](#).

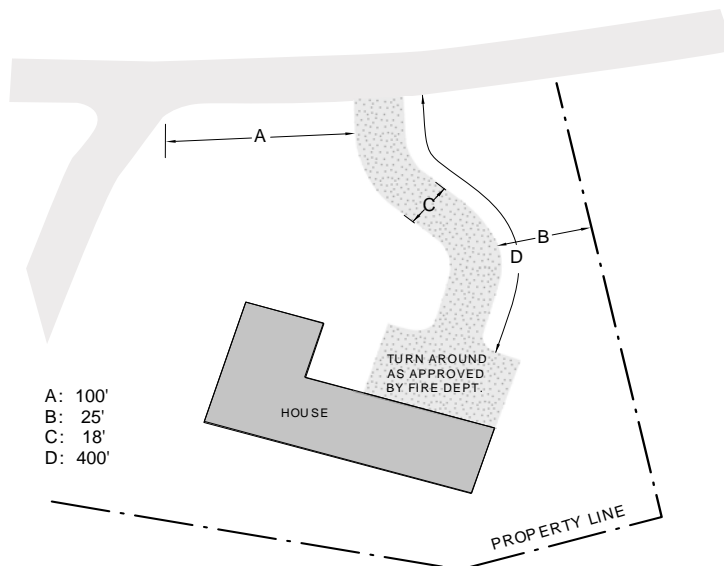


FIGURE 2.2-7 DRIVEWAYS ON HILLSIDE LANDFORM

### C. Surfacing

Pave driveway aprons with asphalt, Portland Cement concrete or concrete pavers. Other types of stabilized surfaces, such as cemented native granite or approved equal, may be allowed where it can be demonstrated that there would be no erosion off of the surface and the construction will allow for the loading of emergency vehicles. Where sidewalks are used, design and build the driveway apron according to MAG standards.

## SITE WORK

## 2-2.400

The intent of these guidelines is to promote creative design and innovative methods for site development within the ESL overlay area. Modified grading guidelines may be allowed where it can be demonstrated that they achieve the goals and purposes of ESLO. Grading includes initial clearing, grubbing, excavating and placement of fill associated with any form of development.

This section establishes guidelines for grading which are intended to:

- Regulate the development of potentially hazardous terrain;
- Preserve the general visual character of graded sites; and
- Preserve native vegetation and wildlife habitat.

Consider the following key elements during the design and implementation of all grading activities.

1. Conserve the natural environmental features and functions of the site;
2. Design and construct grading to be compatible with the surrounding natural desert land;
3. Use construction techniques that result in no slope movement or subsidence and the stabilization of hillsides, slopes or other areas subject to erosion or mass movement,
4. Preserve the natural capacity of drainage courses and protect natural drainage ways, including the native vegetation associated with them.
5. Control dust pollution and surface water runoff and related erosion during construction operations.
6. Maintain the stability of underlying geological conditions wherever development is proposed, unless specific mitigation measures are proposed to assure safe development of the land.
7. Do not alter drainage basin boundaries.
8. Do not create any obstructions within any drainage channels.
9. Do not increase the movement of sediment in volume or velocity as a result of any modifications to natural channels.
10. Do not obstruct scenic, riparian or vista corridors. Preserve or restore them to a natural desert condition.
11. Minimize topsoil and vegetation removal.
12. Design and finish graded cuts and fills that are visible from adjacent properties in a manner that matches the surrounding native soils and rocks.
13. Leave significant natural boulders and rock formations intact and minimize any damage.

### APPLICABLE PROJECTS

### 2-2.401

A grading permit is required of all development projects, private or public, for ESL areas, except as exempted herein. Categories for general grading that require a grading permit include but are not limited to the following:

1. Residential development for a single lot of any size.

2. Residential or mixed-use development that requires a subdivision plat or development plan.
3. All other nonresidential types of development.
4. The clearing, brushing or grubbing of any area where grading for any purpose is to be done.
5. Temporary off-site stockpiling of fill material.
6. Driveways and parking areas where the graded area will be greater than 500 square feet.
7. Recreational facilities such as golf courses, parks and ball fields.
8. Educational institutions and schools (public or private).
9. Public service facilities such as fire stations, police stations and libraries.
10. Public infrastructure facilities such as water storage tanks, flood control structures and wastewater treatment facilities.

**2-2.402****EXEMPTIONS**

The following activities are not required to have a grading permit:

1. Resurfacing or maintenance of an existing paved surface.
2. Excavation below finished grade when the excavation is for the construction of a basement, foundation, wall or swimming pool if authorized by a building or zoning construction permit.
3. Exploratory excavation performed under the direction of a registered soil engineer or geologist, provided all excavation is properly backfilled.
4. Archaeological exploration of an archaeological site recognized by the State.
5. Removal of native vegetation when being performed under an existing de-vegetation permit.
6. Underground utility installations under a graded or paved roadway surface.
7. Grading for maintenance purposes of an existing private road, access or driveway, provided that it existed prior to the adoption of ESLO or that it was established in conformance with this section.
8. Land uses which are exempt under statutory regulations.

**2-2.403****GEOTECHNICAL INVESTIGATIONS**

Most grading activities in ESL areas require some level of geotechnical investigation and analysis, the level of which shall be left to the discretion of the city and the engineer based upon the known conditions on the site. Such studies are required where there are known or likely occurrences of unstable slopes, exposed or shallow bedrock, on-site materials that may bear radon elements, soils with high shrink/swell potential or the presence of caliche hardpan. Exceptions to this requirement may include the construction at single-family residences where the improvements are not occupied structures or are not attached to any rock materials.

**2-2.404****MAXIMUM GRADING AREA**

1. Grading is allowed to occur only within an approved construction envelope.
2. The maximum grading area for any parcel is based on Natural Area Open Space (NAOS) requirements. Grading is not permitted within designated undisturbed NAOS areas. When utility trenches cannot be reasonably provided without crossing designated natural or open space areas, such trenching activities may be allowed provided all disturbed areas are revegetated to a natural condition.
3. The actual graded area for any parcel must be less than or equal to the developable area of a parcel as specified in ESLO. If a conflict arises, the terms and conditions of the ESLO shall govern.

4. Site grading that impacts special features is prohibited; these areas are identified on ESLO Special Features Map or the High Priority NAOS Locations map, see [www.ScottsdaleAZ.gov/codes/eslo](http://www.ScottsdaleAZ.gov/codes/eslo). Plan site work to avoid cutting off significant riparian and habitat corridors. Buffer areas should be provided around developed sites. The design of final grading must consider view shed impacts.
5. Grading is prohibited where geologic hazards are identified, unless a specific exemption to this guideline has been approved by the Planning and Development Services General Manager or designee, as the result of the recommendation of the geotechnical investigation. Such areas may include but are not limited to boulder rolling, rockfalls, slope collapse and talus slopes.

The Planning & Development Services General Manager or designee may approve modifications to these grading limits for special conditions such as unique soil or geologic conditions.

## GRADING DESIGN GUIDELINES

### 2-2.405

### A. Cut and Fill Slopes

#### 1. Maximum Slope Gradient

- a. Use geotechnical reports to provide recommendations for safe slope gradients for exposed cuts or fill materials. Unstable slope conditions and potential erosion problems must also be identified within the geotechnical report as well as adequate design measures to mitigate these conditions.
- b. Typically, safe slope gradients in ESL areas range between 4:1 to 2:1 (horizontal: vertical). For exposed cut slopes the structural nature and strike and dip of the native soil or rock material being cut into governs the appropriate slope gradient. For exposed fill slopes the appropriate slope is based on the natural angle of repose based upon the structure of the fill material.
- c. Where applicable, incorporate revegetation techniques within the slope design. In general, the steepest slope for revegetation or landscaping is 3:1.
- d. Conform slopes adjacent to roadways to the requirements in [Section 2-2.303](#).

#### 2. Heights

- a. In general, do not exceed 8 feet for the height of cuts and fills in ESL areas, as measured vertically from the finished grade to the natural grade.
- b. Exceptions to this guideline are subject to the approval by a Planning and Development Services General Manager's designee where a cut surface will be entirely hidden by a building.
- c. Planning and Development Services General Manager's designee may allow cut and fill heights greater than 8 feet where it can be demonstrated that ESLO objectives are met.
- d. Planning and Development Services General Manager's designee may require cuts and fills greater than 8 feet to be subject to Development Review Board approval.
- e. Any cut or fill on a property subject to the ESL regulations with a vertical dimension greater than 8 feet shall require a specific Staff Approval. For properties subject to the Hillside Ordinance, a specific Staff Approval shall be required where there is an exposed fill greater than 4 feet in vertical dimension or cuts greater than 8 feet in vertical dimension.

#### 3. Slope Shaping

- a. Round all man-made slopes at the edges to blend into the existing terrain adjacent to the new slope to produce a contoured transition from the slope face to the natural ground.

- b. Incorporate undulating slopes in all man-made slopes greater than 500 square feet in area to reflect the natural undulations occurring in the adjacent desert.

#### 4. Slope Revegetation

- a. Restore all exposed slopes created by grading to a natural condition and stabilize them to minimize erosion and slope collapse or wasting.
- b. Restoration shall include revegetation with native species as found on similar natural slopes in the area.
- c. Treat cuts into rock or caliche with artificial weathering techniques.
- d. Irrigate all revegetated areas for at least 3 years or until the vegetation has become established.
- e. Do not use imported decomposed-granite soil-cover/mulch in revegetated areas or in any place within NAOS areas.

#### 5. Setbacks

Building walls and other structures shall be set back from the top/toe of slopes far enough to assure stability and prevent damage from erosion. The engineer/architect shall specify the setback on the plans. Larger setbacks may be enforced in order to meet the intent of ESLO.

#### 6. Drainage Considerations

- a. Construct and maintain erosion controls (temporary or permanent) to prevent erosion of all slopes and graded areas.
- b. Design building sites to carry surface waters away from buildings at a minimum grade of 2 percent for a minimum distance of 10 feet from any buildings.
- c. Provide surface drainage interceptors at the top of all cut and fill slopes where surface runoff will create erosion problems.
- d. Do not pond water above cut or fill slopes.
- e. Subsurface drainage facilities may be required for stability and protection of affected areas due to ground water seepage.

#### 7. Building Height

Establish all building pads and finish floor elevations so that the maximum allowable building height does not exceed the building height outline limit as specified in ESLO.

### B. Terraces and Retaining Walls

The use of retaining walls is an effective means to minimize grading, reduce the height of cut or fill slopes and stabilize slopes. The heights and types of retaining walls may be subject to Development Review Board approval, as determined by a Project Coordination Manager. All retaining walls, regardless of height, shall comply with the city Building Code and also conform to the following requirements.

#### 1. Terraces

- a. Terracing may be employed where deemed necessary by the engineer or where desired in order to reduce the amount of area to be graded.
- b. In order to minimize the impacts of the grading on a project, terracing may be required by Planning and Development Services staff.
- c. In general, the minimum width of terraces shall be at least 4 feet wide or equal to the height of the lower retaining wall if it is taller than 4 feet, in order to allow for the future maintenance of the retaining wall and allow for landscaping materials that will screen the visibility of the walls.

#### 2. Types of Walls

- a. Acceptable types of retaining walls are stone or concrete gravity, structural masonry and reinforced concrete.



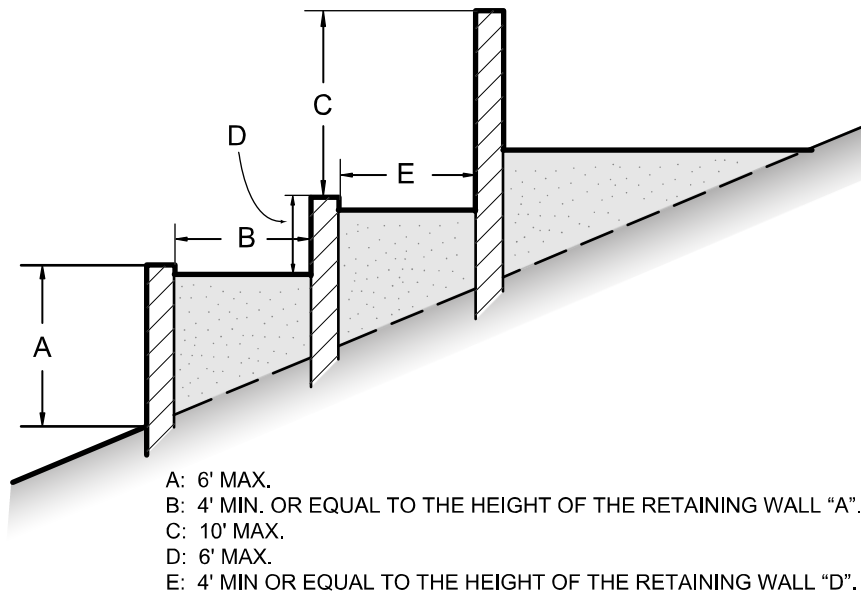
- b. Other types such as metal cribbing walls or rock gabion walls are not permitted unless approved by Planning and Development Services General Manager or designee or the Development Review Board.
- c. The finish material and color of retaining walls should match the surrounding natural desert stone, rock or soil color.

**3. Alignments of Walls**

- a. Use undulating or angular alignments for all terrace walls greater than 50 feet in length.

**4. Heights**

- a. Do not exceed 6 feet for the exposed height of any single retaining wall in ESL areas, as measured vertically from the inside ground level to the outside ground level as shown in [Figure 2.2-8](#).
- b. Use terracing where the vertical height to be contained by the retaining wall exceeds 6 feet of fill material or 8 feet of cut, as shown in [Figure 2.2-8](#).
- c. Meet structural stability for overturning, slope sliding and drainage considerations for all walls, regardless of height.
- d. The maximum face height of a wall that combines a retaining wall and a solid wall shall be 10 feet. The maximum height of the wall above the retaining wall structure as measured from the retained ground level shall meet the normal zoning wall height standard.
- e. The maximum face height of a combination of retaining wall and view fence shall be 12 feet. The maximum height of the wall/view fence above the retaining wall shall meet the usual zoning wall height standard.



**FIGURE 2.2-8 RETAINING WALL DIMENSIONS**

**C. Site Restoration**

**1. Required Restoration**

Revegetate all disturbed areas. All revegetation shall be done with native species in a comparable density and pattern to that which exists upon the undisturbed adjacent areas unless otherwise approved by staff.



**2. Slope Protection**

On slopes where erosion may be a problem or the slope materials and/or gradient will not readily support soil binding plants, hold the plant material in place by anchored straw mulch, erosion control fabric or an equivalent material.

**3. Plant Materials for Slope Restoration**

Where the slope restoration includes the use of revegetation of native desert plants, use those plants that occupy similar natural desert slopes in steepness and orientation in the area.

**4. Timing of Slope Restoration**

Complete all site restoration for any type of development within 90 days of the completion of work or prior to the issuance of a certificate of occupancy, whichever occurs first.

**D. Construction of Fills or Embankments****1. Fill Materials**

Comply with the design engineer's recommendations for fill material and preparation of areas that are to receive fill. At a minimum, fill material should not contain any organic material, building materials, plastics, metals, hazardous wastes or refuse debris. Do not bury or place rocks, pieces of concrete or asphalt pavement or other irreducible material with a maximum dimension greater than 8 inches in any fill unless their placement has been specified and inspected by the engineer.

Place and compact all fills in accordance with the engineer's specifications.

**2. Expansive Soils**

The design engineer must insure that there will be no adverse impacts created by expansive soils. Should the engineer's investigation reveal the presence of expansive soils, the grading plans and specifications shall address how these soils will be handled.

**3. Excess Material**

Haul excess material to an appropriate off-site disposal area that has been approved by the Planning and Development Services Department. The disposal area must be outside of any Hillside landform area. An off-site hauling permit may be required from the city.

**4. Dust Control**

Apply approved dust control methods during all grading and until revegetation or site restoration is complete. Prior to the start of grading activities, a dust control permit must be obtained from the Maricopa County Health Department.

**2-2.500****SITE DESIGN GUIDELINES**

Consider the following key elements in site design for any proposed development for the protection of the unique visual quality and the native desert environment in the ESL area:

1. Preserve view corridors along significant public transportation routes.
2. Minimize scarring of the natural topography.
3. Preserve existing vegetation as much as is feasible.
4. Preserve drainage ways as view and wildlife corridors, thus providing open space connections throughout proposed development areas.
5. Protect significant visual features such as peaks, ridge lines, rock outcrops, boulder fields and significant stands of vegetation wherever feasible.

**2-2.501****GENERAL DESIGN GUIDELINES**

The following guidelines apply to all areas that are visible from public viewpoints or nearby development, which shall be designed and sited to blend into the landscape.

**A. Site Development - Buildings, Structures, Walls and Fences**

1. Blend all exterior finish surfaces with the color and texture of the surrounding stone, rock or soil color.
2. Do not use reflective building materials. Recessed window and entry openings and deeper roof overhangs are encouraged.
3. Preserve the ridge line silhouette of significant topographic features by locating all improvements below the ridge line and using a finished height that does not protrude into the silhouette as viewed from nearby public roads.
4. Match and blend buildings and surrounding improvements with the form of the landscape. Use stepped floor elevations to avoid massive building forms and wall surfaces that contrast with the surrounding terrain.
5. Use exterior lighting fixtures that are recessed or shielded so that the light source is not visible from a public viewpoint or other development in the immediate area. Direct building mounted lighting downward.
6. Screen all exterior mechanical equipment with material complementary to both the structure and the surrounding environment.

**B. Walls and Fences****1. Perimeter Walls**

- a. In general, perimeter walls are not a preferred approach to providing privacy and minimizing the impacts of nearby roads. Consider using walls around individual building envelopes, mounding that blends into the terrain and other such treatments. If perimeter walls are used, set them back 25 feet from a perimeter street rights-of-way or a property line.
- b. Use undulating, notched or similar non-linear alignments for perimeter walls. They should move around significant natural desert vegetation leaving substantial room for these plants to survive (3 feet out from the canopy of desert trees and at least half the height of saguaros).
- c. Use designs and materials for perimeter walls that reflect the form, materials, texture and colors of the natural desert setting.
- d. NAOS does not include the area within 5 feet on either side of a perimeter wall, although this area may be considered as revegetated NAOS.
- e. Maintain continuity of Natural Area Open Space; do not separate adjacent NAOS areas with perimeter walls.
- f. Do not cross minor or major watercourses with perimeter walls.
- g. Install openings in perimeter walls at least 3 feet in width and height at intervals no greater than 200 feet to allow wildlife movement.

**2. Individual On-Site Walls**

- a. For lots 30,000 square feet or greater, set back walls at least 15 feet from the property line.
- b. Where on-site walls are placed adjacent to NAOS areas at least 50 percent of the wall surface shall be a view fence.
- c. Do not cross or enclose minor or major watercourses with on-site walls.

**3. Fences**

- a. Fences may cross drainage ways as long as they do not impede storm flows, collect debris in storm flows or block the passage of wildlife.

#### 4. Walls Along Vista Corridors

- a. Walls located immediately adjacent to a Vista Corridor easement are limited to a height of 3 feet. Set back taller walls parallel to Vista Corridor easements an additional 4 feet for each foot of wall height above 3 feet.
- b. Where channel capacity is sufficient to contain the 100-year storm flow, place walls along the edge of Vista Corridor easements a minimum of 2 feet back of the grade break at the top of the natural channel of the wash.

#### 5. Sound-buffer Walls Along Roads

Sound walls are not allowed where there is a Scenic Corridor Easement along a roadway and are generally discouraged in other locations. Naturally contoured and landscaped berms may be permitted subject to the specific approval of the Development Review Board. Exceptions to this may be considered along roads with 4 or more lanes where the adjacent subdivision has no Scenic Corridor Easement. The design of any wall in such a case shall be subject to specific approval by the Development Review Board. The wall design shall incorporate rustic and dark materials, provide openings and breaks for washes and adjacent NAOS areas, and shall include variations in vertical and horizontal alignment.

### C. Ancillary Improvements

#### 1. Corral Areas

Do not place corral areas over or across minor or major watercourses, boulder clusters or rock formations. Also, do not place them on areas with slopes in excess of 15 percent.

#### 2. Tennis Courts

Do not build tennis courts on terrain with slopes in excess of 15 percent. On slopes of 3 percent or more cut tennis courts into the slope rather than placing them upon fill material. The screen fencing should be a dark color, preferably black or dark brown.

#### 3. Parking Areas

On slopes of 5 percent or more divide parking areas into sections generally with no more than 50 spaces. Use landscaped islands to transition the grade breaks across parking areas. Direct parking area run-off into detention basins, as applicable. The maximum height of light poles in parking areas is 16 feet.

### D. Other Site Design Considerations

#### 1. See [Section 2-1.1200](#), Outdoor Lighting, for light standards within ESLO areas.

The maximum mounting heights for outdoor building, parking lot, landscaping and security lights is 16 feet in the Upper Desert and Hillside landforms.

#### 2. Firebreaks

Maintain a Defensible Space firebreak within 30 feet of any occupied structure. A firebreak shall consist of a maintained area where the typical herbaceous and grass plant materials that grow annually are kept clear. This does not include the removal of any native perennial plant materials, except those that might overhang structures. In lieu of the removal of certain plants, fire-rated walls and/or exterior fire sprinklers may be considered. Cantilevered, bridged or similar types of structures may be allowed subject to the approval of the city's Fire Department. Native trees may be trimmed within this Defensible Space. In addition, gutters and eaves should be kept clear of debris; flammable materials should not be stored or stacked; and a hose connection should be provided near where building walls are adjacent to NAOS areas. Consult the city's Invasive Plants brochure, [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant) and wildland fire prevention information, [www.ScottsdaleAZ.gov/codes/fireord.asp](http://www.ScottsdaleAZ.gov/codes/fireord.asp) for assistance in identifying and eradicating these plants.

#### 3. NAOS Setbacks

NAOS easement may be located adjacent to site walls, driveways, parking area or similar construction as long as the first 5 feet of NAOS out from the improvement is revegetated, as

provided in the ordinance. The NAOS easement shall be placed at least 5 feet away from a roofed structure, with the next 5 feet out from the structure being revegetated area, see below.

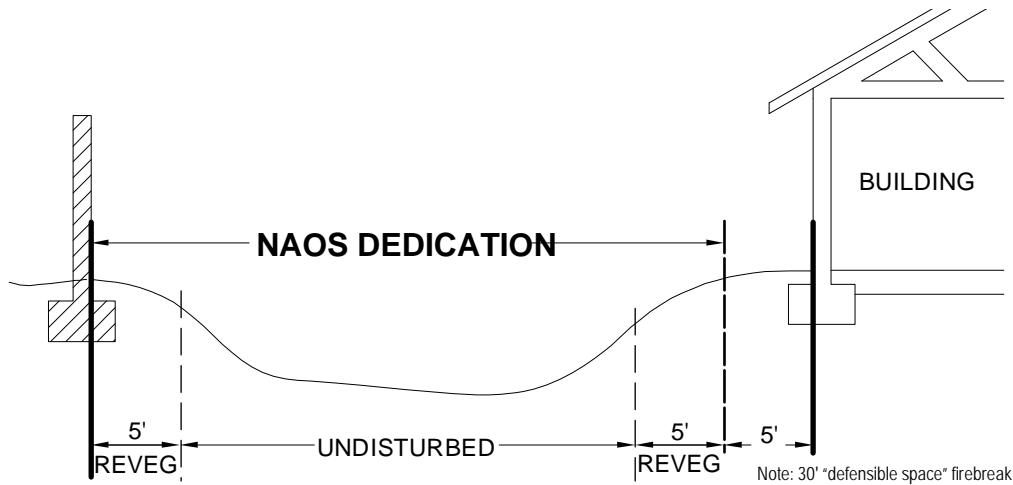


FIGURE 2.2-9 NAOS LOCATION GUIDE

4. Landscaping

- a. The palette of plants that can be used for areas that are not enclosed or trees that exceed a mature height of 20 feet are listed on the city’s Indigenous Plants for Environmentally Sensitive Lands publication. The use of any other plant materials in such situations shall be subject to the specific approval of the Zoning Administrator or designee, see [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant).
- b. Use hydro-seed applications in revegetated areas only as a supplement to the use of container or relocated plant specimens. The seed mix in terms of plant types and ratios shall be based upon the native mix and density that occurs on the site.
- c. Design and install swimming pool filtration systems in such a manner that no flows shall enter any NAOS areas or drainage ways.
- d. Landscape lighting is not allowed within NAOS areas.

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# LAND DIVISIONS



This chapter describes the city's processes for all types of land divisions: master planned properties, subdivisions, minor subdivisions, condominiums, perimeter exceptions and all changes to these divisions after they are recorded.

The developer of each land division is expected to construct the public improvements necessary to serve the lots created by the land division, and to assure construction of the public improvements.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# LAND DIVISIONS

# 3-1

## GENERAL INFORMATION

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## 3-1.000

All master planned properties, subdivisions, minor subdivisions, condominiums, perimeter exceptions and amended plats are processed, reviewed and approved through the steps described in [Section 1-1.000](#). The main purpose of these platting processes is to accomplish the land division and associated dedications necessary for orderly development. See Land Divisions Ordinance, Chapter 48, [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

These land division products enable parcels, lots, rights-of-way, easements, tracts and other pertinent information to be dedicated and graphically depicted on plats. These plats convey many types of rights, responsibilities and conditions and become part of the public record through recordation in the Maricopa County Recorder's office. See [Section 1-1.403](#) paragraph H., and [www.recorder.maricopa.gov](http://www.recorder.maricopa.gov).

Standard public improvements such as streets, drainage facilities, water and sewer are required for each land division. Additional public improvements, such as sidewalks, gutters, streetlights, trails, irrigation, parking, recreation areas and amenities are expected where the land division warrants the enhanced level of services. Each land division application will be reviewed against criteria to achieve the optimum services for the lots proposed.

## LAND DIVISION TYPES

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## 3-1.100

Land divisions are categorized as master planned properties, subdivisions, minor subdivisions, condominiums, perimeter exceptions and amended plats.

## MASTER PLANNED PROPERTY

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## 3-1.200

A property owner wanting to develop a large complex property which involves multiple ownerships, subdivisions, minor subdivisions, condominiums and perimeter exceptions must file a development master plan, all elements of a development master plan and a master planned property plat.

The development master plan is the general document illustrating the entire property subject to master planning. The development master plan is comprised of several elements, such as circulation, open space, drainage, infrastructure, landscaping and other elements as described below. A development master plan will be followed by a master planned property plat which, when recorded, will establish the parcels and public dedications necessary to accommodate the approved development master plan.

A master planned property development is subject to city staff approval and may require Development Review Board/City Council approval, depending on the complexity of the proposed development.

## 3-1.201

**DEVELOPMENT MASTER PLAN**

1. **When a development master plan is required:** The city staff shall use the following guidelines in establishing the need for a development master plan:
  - a. The parcel is sufficiently large to comprise an entire neighborhood;
  - b. The parcel is only a portion of a larger landholding of the subdivider; or
  - c. The parcel is part of a larger land area (which may not be under the subdivider's control), the development of which is complicated by unusual topographic, utility, land use, land ownership or other conditions.
2. **What is shown on a development master plan:** A development master plan shall be prepared to scale and accuracy commensurate with its purpose and shall include:
  - a. General street pattern with particular attention to collector streets and future circulation throughout the neighborhood.
  - b. General location and size of school sites, parks or other public areas.
  - c. Location of shopping centers, multifamily residential or other proposed land uses.
  - d. Methods proposed for sewage disposal, water supply and storm drainage.

## 3-1.202

**DEVELOPMENT MASTER PLAN ELEMENTS**

A development master plan has several elements. A general list of these elements is provided below. Not all elements are required for every development master plan. City staff will determine which elements are required to process the plan.

Each element is explained in two parts:

- Performance Standards outline the goals of each element;
- Plan Details specify what is to be shown on each plan.

The details should illustrate how the goals will be met. Some plans may be combined as long as the information on the plan is clear.

**A. Master Development Plan**

1. **Performance Standards.** The master development plan shall clearly show achievement of the following goals:
  - a. Related uses shall be located in close proximity. Larger separations and/or buffers shall be used when one activity may have an adverse impact on the health, safety and welfare of the users of an adjacent activity, either within or adjacent to the development.
  - b. Uses shall be located where they will be most compatible and have the least negative impacts on the surrounding uses. The massing of buildings shall be designed to provide outdoor pedestrian areas, adequate light and air circulation, few obstructions to important views and a similar scale to adjacent uses.
  - c. Scenic views and environmental features shall be incorporated into the plan. The plan shall preserve and capitalize on the physical amenities of the location. Physical amenities include: natural features which, if disturbed, may cause hazards or stress to life and property, e.g., floodplains; vegetation performing beneficial microclimatic functions such as abating noise and glare, entrapping dust and reducing energy costs; and land or water resource areas such as washes, groundwater recharge zones, prime wildlife habitats and areas with high scenic or aesthetic value.



- d. The master development plan shall reflect the character of the surrounding area so that the development is reasonably compatible with adjacent property. Techniques to achieve reasonable compatibility may include: using building materials or an architectural style that relates to adjacent buildings; using a building scale or massing near the perimeter of the project that is similar to adjacent buildings; and using perimeter open space buffers.
2. **Plan Details.** The master development plan shall include detailed information on the following:
    - a. Site dimensions and the size of all proposed parcels.
    - b. Building and structure locations and the uses proposed for each building and structure (including building envelopes).
    - c. Setbacks between buildings and other structures and setbacks from district boundaries.
    - d. Projected building heights, building footprints, square footage of buildings for each building or structure.
    - e. Total gross square footage on the site broken into the gross square feet for each use proposed.
    - f. Total floor area ratio (FAR) for the district and for each proposed parcel.
    - g. Such other information as is determined by the city staff to be necessary to process the master plan.
  3. **Additional Submittal Requirement.** In a Planned Commerce Park (PCP) district, the applicant shall submit a three dimensional model, photomontage or perspective drawings depicting the relationship between proposed buildings and existing buildings within three hundred (300) feet of the proposed PCP district boundaries.

## B. Circulation Master Plan

1. **Performance Standards.** The circulation master plan shall clearly show achievement of the following goals:
  - a. In no case shall the development result in traffic levels of service (LOS) less than D on any streets or intersections impacted by the development at all locations specified by the city staff.
  - b. The construction of the circulation facilities, including traffic signals, shall be concurrent with the creation of traffic demands by the development and with the maintenance of planned traffic operational conditions and proper safety.
2. **Plan Details.** The circulation master plan shall include detailed information on the following:
  - a. A traffic impact study to determine the need for internal and external street and circulation improvements. The study shall be conducted by a qualified traffic consultant and shall comply with the current policy for traffic studies available from city staff.
  - b. Programs for pedestrian circulation and when applicable, a program for internal transit.
  - c. The locations, typical dimensions and design capacity for all external and internal streets and major driveways, bus bays, transit routes, bikeways, trails, pedestrian paths, intersection signalization, grade separations, park-and-ride lots and other such facility improvements.
  - d. Any plans for phasing improvements or any plans for interim improvements necessitated by the construction timetable for expressways or other major planned circulation improvements.
  - e. Such other information city staff determines is necessary to process the master plan.

### C. Phasing Master Plan

1. **Performance Standards.** The phasing master plan shall clearly show achievement of the following goals:
  - a. The development shall proceed along with provisions for adequate capacity in the infrastructure systems.
  - b. The development of ancillary commercial or other types of uses shall occur on a percentage based on the needs of the primary uses.
  - c. Internal and external improvements shall be timed to be available before or concurrently with the phased development. The phasing master plan shall be consistent with the phasing described in traffic studies, infrastructure plans and other required studies.
  - d. Each phase of the development shall be in compliance with the applicable district requirements including open space, parking, landscaping and lot coverage.
2. **Plan Details.** The phasing master plan shall include detailed information on the following:
  - a. Location and conceptual size of the land uses.
  - b. The phasing and capacity needs of the local infrastructure necessary to serve each sequence.
  - c. A timetable for required dedications shall be submitted.
  - d. Such other information city staff determines is necessary to process the master plan.

### D. Open Space Master Plan

1. **Performance Standards.** The open space master plan shall clearly show how the applicable goals will be achieved:
  - a. Open spaces identified on the General Plan such as scenic corridors, vista corridors, major buffers, etc. shall be incorporated and shall be coordinated with open space identified on adjacent parcels.
  - b. The defined open spaces along roadways, pedestrian walkways or between buildings shall capitalize on mountain views or other scenic views.
  - c. The choice of open space locations should consider the vertical and horizontal dimensions of structures in meeting the objective of creating usable open space areas in a campus-style environment.
  - d. In general, the plan should avoid allocating very generous quantities of open space to one parcel or building while providing little or no open space for other parcels or buildings.
2. **Plan Details.** The open space master plan shall include detailed information on the following:
  - a. Typical locations, dimensions, functions and types of characteristics for general open space areas.
  - b. A detailed description of the relationship of open space areas to proposed parcels or buildings. Calculations should demonstrate that the open space in proximity to individual buildings is adequate for that portion of the site.
  - c. Such other information city staff determines is necessary to process the master plan.

### E. Parking Master Plan

1. **Performance Standards.** The parking master plan shall clearly demonstrate the achievement of the purpose articulated in sections and sub-section of Section 9.104.F of the Zoning Ordinance.

- 2. Plan Details.** A site plan shall be provided that is in accordance with the Commercial and Multi-Family Planning Architectural Review Checklist requirements, [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).
- a. The site data table shall include the total parking required calculations and the total parking provided.
  - b. A separate data table shall be provided on the site plan that includes the required parking calculations for each parcel and the provided parking on each parcel in the Master Development Plan.
  - c. Provide the following note on the site plan:

The Zoning Ordinance development standards and Land Divisions Ordinance requirements for the (**input the development name**) development and platted under the name (**input plat name**) shall comply with the Development Review Board approval, case (**input case number**) and the Development Agreement approved by the City of Scottsdale's City Council with a Maricopa County Recorder number, MCR: (**input MCR number**). Any proposed modification to this development shall require subsequent review(s) and approval(s) as determined by the City of Scottsdale's Planning and Development Services' General Manager or designee.

## F. Drainage Master Plan

- 1. Performance Standards.** The drainage master plan shall clearly show achievement of the following goals:
  - a. The drainage master plan shall comply with the Floodplain and Stormwater Regulation, see Scottsdale Revised Code, Chapter 37, [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes), [Section 4-1.000](#) and current administrative guidelines.
  - b. The development shall provide drainage facilities which protect the site and adjacent sites from excessive storm flows and associated erosion and sedimentation. Whenever a community-wide drainage solution is deemed desirable by the Floodplain Administrator, the drainage master plan for the development shall provide for participation in a community drainage facility. The plan shall comply with city approved drainage plans for the area.
- 2. Plan Details.** The drainage master plan shall include detailed information on the following:
  - a. A plan which graphically depicts the location and capacity of all retention, detention or other drainage facilities and the proposed design character for the drainage facilities.
  - b. A narrative technical report which shall demonstrate that everything shown on the plan complies with the performance standards and current administrative guidelines.
  - c. Such other information city staff determines is necessary to process the master plan.
- 3. Additional Submittal Requirements.** The applicant shall assure that both the plan and report elements of the drainage master plan shall be prepared by a registered civil engineer licensed to practice in the State of Arizona.

## G. Infrastructure Master Plan

- 1. Performance Standards.** The infrastructure master plan shall clearly show achievement of the following goals:
  - a. The development shall provide sufficient water, wastewater and utility systems capacity to serve the demands of the development.
  - b. The systems shall be consistent and compatible with the master plans of the city and current administrative guidelines.
  - c. The infrastructure master plan shall be consistent with city policies to conserve water, to recharge the groundwater supply and to reuse wastewater.

2. **Plan Details.** The infrastructure master plan for water, wastewater and utility systems shall include detailed information on the following:
  - a. A plan which graphically depicts the locations and sizes for each system, supported by a narrative technical report which shall demonstrate that everything shown on the plan complies with the performance standards and current administrative guidelines.
  - b. Such other information as is determined by the city staff to be necessary to process the master plan.
3. **Additional Submittal Requirements.** The applicant shall assure that both the plan and report elements of the infrastructure master plan shall be prepared by a registered civil engineer licensed to practice in the State of Arizona.

## H. Landscaping and Buffers Master Plan

1. **Performance Standards.** The landscaping and buffers master plan shall clearly show achievement of the following goals:
  - a. Landscaping shall provide a lush setting, which includes the timely maturity of plant materials, strong consideration of water conservation and the needs for shade and/or functional landscaping of the different uses, facilities or spaces.
  - b. Landscaping shall be compatible with applicable city's streetscape and character plans, current administrative guidelines and themes and character of neighboring developments.
  - c. Open space as defined in Section 3.100 of the Zoning Ordinance, [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes), shall be maintained which shows sensitivity to the specific existing characteristics and features of adjacent environmental and existing neighborhood conditions or as indicated on the General Plan. Open space buffers shall apply to buildings and above-ground parking deck structures.
2. **Plan Details.** The landscaping and buffers master plan shall include detailed information on the following:
  - a. Typical locations, dimensions and treatments for any washes, retention areas or utility corridors.
  - b. The uses, typical locations and dimensions of any common recreation, pedestrian or service open space areas.
  - c. The type of buffer being used, the location of the buffer zone, any setback and height limits and the location of adjacent land use categories.
  - d. A streetscape and general character landscape theme.
  - e. Maintenance provisions for all landscaping materials installed as part of the development.
  - f. Such other information city staff determines is necessary to process the master plan.

## I. Master Design Guidelines

1. **Performance Standards.** The master design guidelines shall clearly show achievement of the following:
  - a. Mixed-use development that integrates various uses and facilities.
  - b. Adherence to the city's various character plans.
  - c. Aesthetically-oriented design standards to create a definitive character for structures, site plans and streetscapes.
2. **Plan Details.** The master design guidelines shall include detailed information on the following:
  - a. Typical architectural design themes, styles, unifying elements and materials.

- b. Typical design treatments and materials for details such as windows, entries, roofs, parapets and building forms.
- c. Typical development walkway designs and treatments.
- d. Such other information city staff determines is necessary to process the master plan.

**J. Master Sign Program**

- 1. **Performance Standard.** The master sign program shall clearly show achievement of the goals articulated in Article VIII of the Zoning Ordinance, [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).
- 2. **Plan Details.** The master sign program shall include detailed information on the following:
  - a. The master sign program shall be consistent with the current city guidelines.
  - b. Such other information city staff determines is necessary to process the master plan.

**MASTER PLANNED PROPERTY PLAT REQUIREMENTS**

3-1.203

A Master Planned Property Plat is required to meet all the Plat Minimum Standards per [Appendix 3-1A](#) and Master Planned Property Plat Dedication Example per [Appendix 3-1B](#).

**SUBDIVISIONS**

3-1.300

A property owner wanting to create a subdivision per the Land Divisions Ordinance must file for review and approval of a preliminary and final plat. The preliminary plat is subject to Development Review Board approval. After the preliminary plat is approved, improvement plans and the final plat must be submitted and are subject to approval through final plan review.

The final plat must substantially conform to the preliminary plat approved by the Development Review Board and conform to all engineering conditions and requirements of this chapter.

The final plat is subject to City Council approval. Once approved by City Council, the final plat will be recorded with Maricopa County Recorder’s Office, see [Section 1-1.403](#) paragraph H, to complete the process.

**PRELIMINARY PLATS**

3-1.301

A preliminary plat shows the approximate location of the street system, the approximate size and configuration of each lot and tract and other information needed by the city to evaluate the proposed subdivision. See [Chapter 2](#) for site planning standards and considerations. Application submittal requirements beyond the general requirements listed below are determined in the pre-application meeting. For a preliminary plat checklist see [www.scottsdaleaz.gov/Assets/documents/bldgresources/formalsubmtlforms/PP\\_appl\\_list.pdf](http://www.scottsdaleaz.gov/Assets/documents/bldgresources/formalsubmtlforms/PP_appl_list.pdf).

Plat requirements may result from Zoning Ordinance requirements, such as the Planned Residential Development (PRD) and/or the Environmentally Sensitive Lands (ESL) sections, or from specific zoning stipulations, see [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes). The applicant is responsible for meeting all requirements.

The preliminary plat must contain the following information:

**SITE PLAN**

- 1. The topography of the area to be subdivided under pre-development conditions. The portrayal of the topography must extend at least 150 feet outside the boundaries of the proposed subdivision. Use contour lines with the contour intervals listed below:
  - a. Outside ESL areas: 1-foot interval.
  - b. Within ESL areas: 2-foot intervals or at appropriate intervals as determined by the Planning and Development Services General Manager’s designee.
  - c. Within Hillside District (HD) areas: 2-foot intervals.

- d. Within Hillside Conservation areas: 10-foot intervals.
2. The location and size of all existing easements, rights-of-way and man-made structures or facilities within the boundary of the proposed subdivision and within 150 feet outside the boundaries of the proposed subdivision.
3. All lots, tracts, easements and public rights-of-way planned within the subdivision. Number all lots sequentially and identify all tracts by letter; provide dimensions to indicate the sizes of all lots and tracts. Show required setback lines and proposed construction envelopes (if used or required).
4. Statements describing the existing zoning, gross subdivision area in acres, number of lots, minimum lot size and average lot size. Designate all areas within the plat boundaries not occupied by lots or public streets as tracts. The plat will state that the property owners association, as owner, is responsible for operation, maintenance, and liability of the tracts. A table is required on the plat showing all lot and tract areas. Each tract, lot, easement and public right-of-way must have a note indicating its approximate area, the planned use and improvement, and the agency responsible for maintenance.
5. Private streets will be dedicated within tracts. A note on the plat will state that the property owners association is responsible for operation, maintenance, and liability of the tracts, including maintenance of all appurtenances, i.e. streetlights, signs, landscape, etc.
6. Propose street names based on MAG adopted convention and policy, subject to city staff approval.
7. If the subdivision has or requires a property owners association, indicate this on the plat with an appropriate statement as it relates to the responsibilities and requirements as outlined in the CC & Rs – such as the ownership and maintenance of all tracts.
8. Show proposed locations of multi-use public path/trail easements within the plat boundaries and the connections to existing and proposed path/trail easements. These locations must conform to the city's approved master plan.
9. Corner lots:
  - a. Should be large enough to build a house comparable to others within the subdivision.
  - b. Shall have an 8-foot public utility easement adjacent to the property line in the front yard as well as the yard facing the side street. Mailboxes, fences and walls and other above ground non-utility structures should be located outside these easements.
  - c. May need to be larger if they have drainage easements or are located: (i) on adverse terrain, (ii) where substantial cuts or fills occur or (iii) along subdivision perimeters with street frontage.
  - d. Shall conform to Section 2-1.905 and the Zoning Ordinance.
10. A native plant submittal for all property containing protected native plant material as identified in SRC Section 46-105. See Section 7.500 of the Zoning Ordinance.
11. Show Natural Area Open Space (NAOS) as required in the Zoning Ordinance for projects subject to ESL sections. All exempted hillside ordinance projects shall provide NAOS as required in former Section 6.806.A.1 of the Zoning Ordinance.
  - a. NAOS shall be dedicated as an easement.
  - b. NAOS may be dedicated on the final plat; dedicated at the time of custom lot site plan development; or a combination of both.
  - c. NAOS dedicated as an easement within a common area tract must be maintained by a property owners association.
12. If the developer intends to have one recorded plat for the entire subdivision, but plans to construct the improvements in phases, the improvement plans for the entire subdivision are subject to city approval before construction may be phased. The improvement plans



for each phase shall indicate any temporary cul-de-sacs, infrastructure lines and valves, etc., and are subject to city approval.

#### **DRAINAGE**

13. Show the street drainage pattern and direction by arrows and indicate those points where concentrated flow is added or removed from the street.
14. Indicate by arrows the location, direction and amount of flow of all natural washes and existing or planned man-made drainage channels which flow through, are adjacent to or begin within the proposed subdivision.
15. Identify areas to be used for surface drainage, storm drainage retention or detention. Sufficient dimensions and other information must be provided to describe the size of the area, the approximate depth and the slope of the sides. These areas will be identified as tracts, which will be owned and maintained by a property owners association. The developer will dedicate drainage easements over these tracts to the City.
16. Indicate surface drainage easements which are not in tracts. These easements shall be dedicated to the City, but shall be maintained by the property owner(s).
17. Submit supporting hydrologic and hydraulic calculations with the preliminary plat to demonstrate that the easement or tract set aside for drainage is of sufficient width to carry the peak 100-year flow without endangering life or property outside the easement or tract.

#### **UTILITIES**

18. Show the proposed layout of water and sewer lines for the subdivision. Indicate the size of the lines and direction of flow.
19. Provide utility easements at least 8-feet wide along the street frontage of lots and tracts.

#### **FINAL PLATS**

A final plat must be in substantial conformance with the approved preliminary plat and all applicable City Codes and Ordinances. The applicant is responsible to obtain and fulfill any and all City Codes and Ordinance requirements whether or not they are referenced or stated in this manual. The final plat is subject to City Council approval and must be recorded in Maricopa County Recorder's Office, see [Section 1-1.403](#). Submit the final plat prepared and sealed by a registered Land Surveyor as per Plat Minimum Standards [Appendix 3-1A](#), and the Final Plat Dedication Example [Appendix 3-1C](#), for review by city staff and City Council.

The owner is responsible for preparing, constructing and financing all public improvements associated with the final plat. The owner must have an engineer registered in the State of Arizona prepare a complete set of engineering plans for constructing required improvements. Such plans shall be based on the approved preliminary plat, zoning case, DRB and staff approval stipulations. Engineering plans shall be subject to approval by the city prior to recordation of the final plat.

### **MINOR SUBDIVISIONS**

The minor subdivision procedure generally applies to proposals to divide property into five or fewer lots. This development procedure replaces the lot split procedure. The standard subdivision procedure will be required for proposals containing complications that cannot be adequately addressed in the minor subdivision procedure and for proposals including a new street.

Minor subdivision plats are subject to General Manager or designee approval. Minor subdivision plats are forwarded to the General Manager for approval after improvement plans and the plat are approved by city staff.

**3-1.302****3-1.400**

Proposals for residential minor subdivisions are required to construct all applicable public improvements. In some limited cases, however, proposals for residential minor subdivisions may require fewer public improvements than a standard subdivision.

Proposals for non-residential minor subdivisions are required to construct all applicable public improvements and are subject to additional site plan review by the Development Review Board.

The minor subdivision plat must conform to all requirements as described in the Plat Minimum Standards, [Appendix 3-1A](#), and the Minor Subdivision Dedication Example, [Appendix 3-1D](#).

### 3-1.401

## MINOR SUBDIVISIONS REQUIREMENTS

1. If a new street is created, the project must use the standard subdivision procedure.
2. All residential lots created must meet the development standards or amended development standards of the applicable zoning district.
3. The improvement plans must address any staff-imposed stipulations.
4. All non-residential lots created must meet the Development Review Board's approved development standards.
5. Minor subdivisions will be required to develop under the standards of the Environmentally Sensitive Lands Ordinance as well as the Character Districts when applicable.
6. Major terrain features and washes with a flow of 50cfs or greater shall remain in their natural state and not be altered, disturbed or diverted unless a wash modification is approved.
7. All internal streets will either be public right-of-way or private tracts. If the streets are private tracts, the entrance to the minor subdivision must have controlled access. No easements will be accepted for streets or access.
8. Before a building permit is issued on any lot in a minor subdivision with private tracts, the applicant must supply satisfactory evidence to the city that: (i) water, sewer and all other required public improvements are provided, (ii) tracts are clearly identified and their purposes specifically noted, (iii) tracts are owned in common by all the lot-owners in the minor subdivision, (iv) lot-owners have authority to collect funds for maintenance of the tracts and (v) lot-owners will maintain the tracts. This evidence may be supplied by Schedule B to a title insurance policy issued on the first lot sold, identifying CC&R's recorded against the minor subdivision. The title insurance policy cannot be more than thirty (30) days old at the time of its submittal.
9. Staff will require the applicant to provide on-site and off-site public improvements or payment in lieu of those improvements.
10. The applicant for a minor subdivision must post a bond or provide other assurance to insure the construction of public improvements, subject to approval by the Planning and Development Services General Manager.
11. If facilities are shared in a non residential minor subdivision, a shared facilities agreement with all owners of affected lots addressing parking, open space, retention, maintenance, building volume and access is required.

### 3-1.402

## IMPROVEMENT PLANS AND FINAL PLAT

After the city staff's notification that the applicant may proceed, the applicant is then ready to submit improvement plans and a proposed final plat. The improvement plans and final plat must be in conformance with each other. The final plat must conform to all requirements as described in the Plat Minimum Standards, [Appendix 3-1A](#).

The owner is responsible for preparing, constructing and financing all public improvements associated with the final plat. The owner must have an engineer registered in the State of



Arizona prepare a complete set of engineering plans for constructing required improvements. The owner must have a Land Surveyor registered in the State of Arizona prepare the final plat. Such plans shall be based on the staff approval stipulations. Recordation of the final plat is subject to city approval of engineering plans and plat.

## **LIMITATIONS**

**3-1.403**

1. The approval for a minor subdivision will be allowed once for a maximum of five lots and no further minor subdivisions of the property will be allowed.
2. Any re-subdivision of a minor subdivision will result in the standard subdivision procedure for all the lots in the minor subdivision. If any public improvement requirements were waived or reduced in the original minor subdivision, they must be constructed if the subdivision is approved.
3. Anyone attempting to avoid compliance with the state and/or local subdivision laws and regulations will be reported to the Arizona State Department of Real Estate. Examples of transactions that will induce close scrutiny include:
  - a. Family members, interrelated partnerships, trusts, corporations or other entities acting in concert to divide property, in a piecemeal manner to avoid the application of state and/or local subdivision laws and regulations, especially in a period of less than 5 years.
  - b. Any other activity that results in multiple divisions of the same or adjacent property, especially in a period of less than 5 years.

## **WAIVER REQUEST**

**3-1.404**

If the applicant desires to submit a request to waive the construction of certain public improvements, the waiver request shall be submitted after preliminary plat approval of the minor subdivision and prior to submittal of the improvement plans and the proposed final plat.

The waiver request must include: (i) reasons why providing public improvements imposes undue hardship on the applicant, (ii) evidence that granting the waiver will not unduly burden existing public improvements or future public improvement requirements and (iii) reasonable alternatives to providing standard public improvements. By state law, the applicant must provide dust-controlled access and minimum drainage facilities.

A waiver request will be evaluated using the following criteria:

- a. Proximity relative to existing development and public improvement
- b. Applicable city-adopted general and local plans
- c. Number and size of lots
- d. Physical and topographical restraints/constraints
- e. Drainage constraints

The waiver determination shall be completed by city staff prior to the applicant submitting improvement plans and the proposed final plat.

## **CONDOMINIUM PLATS**

**3-1.500**

Condominium plats must conform to all city codes and ordinances, Development Review Board and city staff stipulations and Arizona State Department of Real Estate requirements. The applicant is responsible for obtaining and fulfilling all of these requirements whether or not they are referenced or stated in this manual.

New condominium plats are subject to Development Review Board approval. Conversions of existing sites to condominiums are subject to staff approval and may require additional Development Review Board review.

Condominium plats create a system of individual fee ownership suites/units in a multi-suite/ multi-unit structure, combined with joint ownership of common areas of the structure and land. Condominiums plats must conform to all city and state codes and requirements.

**3-1.501****CONDOMINIUM PLAT PROCESS - NEW CONDOMINIUM**

Condominium plats are processed in conjunction with a Development Review Board site plan review procedure.

**3-1.502****CONDOMINIUM PLAT PROCESS - CONVERSION OR CHANGE TO A CONDOMINIUM**

A condominium plat may also be used to: (i) convert an existing structure (apartment building, commercial center, etc.) to a condominium or (ii) to change an existing condominium. Both a (i) conversion of an existing structure to a condominium and (ii) change to an existing condominium, are subject to city staff review to determine conformance with current requirements for all public improvements, such as parking, drainage, utilities, emergency vehicle access, etc. City staff may determine that additional Development Review Board review is required.

**3-1.503****GUIDELINES FOR REVIEW PROCESS**

City staff will use the following guidelines, as examples, to determine whether a conversion of an existing structure to a condominium or changes to an existing condominium require Development Review Board review. Minor changes are subject to city staff review only. Major changes are more likely to require Development Review Board review. City staff will:

1. Compare the proposed changes to any previously approved plan and analyze current compliance with the approved plan.
2. Review the submission to determine the extent of any exterior changes to the structure.
3. Review the existing access and parking requirements with those that are proposed.
4. Review the existing drainage facilities and requirements with those that are proposed.
5. Review the existing emergency and service vehicle access requirements with those that are proposed.
6. Review the existing intersection and sight distance for vehicles requirements and those that are proposed.

**3-1.504****CONDOMINIUM PLAT SUBMITTAL REQUIREMENTS**

The requirements for a Condominium Plat are the same as the requirements for a final plat, see [Appendix 3-1A](#) and the Condominium Dedication Example [Appendix 3-1E](#) with the following additions:

1. Identify each individual unit by number and all tracts for common areas by letter. Provide bearings, distances, dimensions and curve data necessary for the complete description of each individual unit or tract. Any area not occupied by an individual unit is common area.
2. Ensure all suite and unit numbers conform to MAG standards: commercial, 3-digit suite numbers; residential, 4-digit unit numbers. Example for commercial: 1st floor 101, 2nd floor 201, 3rd floor 301.
3. Verify that each building, suite and unit has a unique identifier, such a Building 1, Unit 1001, or Building A, Suite 101.
4. Submit a certificate of correction for existing projects where the suites/units do not conform to MAG standards. The engineer of record shall submit the certificate to the city with a signature line for city approval.
5. Tie floor elevations for each residential unit to the city's vertical control data. Tie horizontal residential unit boundaries to the project's property lines by bearing and distance.

6. Include the following note on the condominium plat for private streets. This note is not necessary for private drives provided by easement, or CC&Rs.

The streets are private streets, maintained by the property owners association. Usually, after this plat is recorded, the City of Scottsdale will not accept dedication of the streets to the public to relieve the property owners association of street maintenance responsibilities.

7. Include the following note on all condominium conversion plats:

The suites, units and buildings of this condominium conversion have not been reviewed by the city for compliance with current building code standards.

8. If a common area is used as a public utility easement, exclude from said easement the areas that will be used for swimming pools, saunas or other permanent structures (other than individual units). Blanket easements are generally unacceptable because they overlap areas which permit construction that may conflict with the easement.
9. Include a dedication block, a ratification block and acknowledgement, as shown in [Appendix 3-1E](#).

## PERIMETER EXCEPTION

## 3-1.600

This land division allows property to be developed based on the development standards being applied to the property defined by its perimeter, rather than the development standards that would be applicable to the individual lots, tracts and parcels. Perimeter exception requires both City Council and Development Review Board approval. A perimeter exception plat must conform to all requirements as described in the Plat Minimum Standards, [Appendix 3-1A](#), and the Perimeter Dedication Exception Example, [Appendix 3-1F](#). A perimeter exception plat shall only be applicable to properties with the following characteristics:

- Multiple buildings with mixed uses,
- Multiple ownerships, possible vertical as well as horizontal spaces,
- Projects of sufficient size and economic impact to warrant complications in processing.

The perimeter exception development agreement:

1. Must contain a statement that identifies the perimeter of the property as defining its development standards, instead of the development standards that would be applicable to the lots, tracts and parcels into which property may be divided. In particular, the development agreement must identify the setbacks applicable to the perimeter as well as all other development standards.
2. Must contain or incorporate by reference a shared facilities agreement that includes the following elements clearly described and designated to the satisfaction of city staff:
  - a. Which facilities are shared
  - b. Which property owners/entities share which facilities
  - c. That property owners/entities are organized in a perpetual property owners association
  - d. That the property owners association has authority to collect funds to maintain shared facilities
  - e. That the property owners association has authority to maintain shared facilities
  - f. That the property owners association is responsible to the city for the shared facilities

**3-1.700****CHANGES TO RECORDED LAND DIVISION**

Changes to recorded plats are subject to the city's approval. The city staff will meet with the applicant to review the extent and effect of the changes and advise the applicant which procedure is appropriate to make the changes.

An owner/developer may want to make changes to an approved, recorded land division. Different kinds of changes require different kinds of procedures. The nature and complexity of the change will dictate which procedure applies and is generally related to the number, size, location, zoning, recordation and history of the affected lots. The general parameters of each kind of change are set forth below. However, each change is unique in its effects, so the general rules may not apply in every case. The city staff will determine the effect of each change based on the general parameters. The owner/developer may appeal the city staff's decision of which procedure applies as set forth in the Land Divisions Ordinance.

The change may be subject to revisions in applicable ordinances, codes, plans, regulations and policies enacted since the original plat was recorded.

**3-1.701****COMPLETE REVISION (MAJOR CHANGES)**

Staff will determine that a complete revision is required if one of the following considerations is evident:

**A. All Land Divisions**

1. Time limits have expired on previous stages in the land division procedure.
2. Public streets are proposed to become private streets, or private streets are proposed to become public streets.
3. The change to the land division substantially changes the existing character of all or part of the original land division. For example, if the new lots are substantially different in size and/or configuration, and/or the new construction is substantially different in size, design and/or cost from the original land division, a change of character is taking place.
4. The change affects the perimeter of the land division.
5. The changes are so significant that the original land division is no longer viable from planning and economic considerations.

**B. Subdivisions**

Major changes are proposed to zoning, lot size, number of lots, tracts, or common area tracts or facilities. Any change that is so significant that the final plat can no longer be considered in substantial conformance to the approved preliminary plat, as determined by city staff, requires a complete revision. A complete revision includes all the procedures to obtain approval of a preliminary plat and a final plat.

**C. Minor Subdivisions**

Major changes are proposed to zoning, lot size, number of lots, tracts, or common area tracts or facilities, so that the changes no longer conform to the General Manager's approval of the minor subdivision. The complete revision would start with a new pre-application and conference.

**D. Condominiums**

Major changes are proposed to zoning, property boundaries, number of units/suites, tracts, common areas or common facilities, so that the changes no longer conform to the original city staff or Development Review Board approval.

## PARTIAL REVISION

3-1.702

Staff will determine if a partial revision is required based on the following considerations:

- 1. In certain land divisions:** Some moderate changes previously known as lot ties, or lot line adjustments, could require a partial revision of a plat. For example, a lot line adjustment in a non-residential zone to correct an encroachment may have enough effect on other properties that a partial revision of a plat is the appropriate procedure.
- 2. In subdivisions:** When proposed changes involve items such as the following, but continue to be in substantial conformance with the approved preliminary plat, a partial revision of the plat is appropriate: number of lots (one or two), minimal lot lines and minimal roadway alignment changes, abandonment of public rights-of-way, vacation of easement, rededication of easements or rights-of-way, minimal changes to common area facilities or tracts, or third party involvement (lien holders, financial institutions, property owners associations). This kind of partial revision of a plat is subject to City Council approval.
- 3. In minor subdivisions:** When the proposed changes involve items such as the following, but continue to be in substantial conformance to the General Manager's approval of the plat, a partial revision of the plat is appropriate: lot lines (up to six feet) of any lot, minimal changes to common area facilities or tracts or third party involvement.
- 4. In condominiums:** When the proposed changes involve items such as the following, but continue to be in substantial conformance to the city staff or Development Review Board approval, a partial revision of the plat is appropriate: moderate revisions to a limited portion of a condominium plat such as adding or making minor changes to demising lines, parking spaces and common areas.

## CERTIFICATE OF CORRECTION (MINOR CHANGES)

3-1.703

This method is used when no more than a maximum of three minor changes are proposed. These corrections should be no more than 2 feet to one or two lot lines. They may include changes to bearing or distance changes, minor corrections to language of dedication, notes, project name, street name or legal description. Some minor changes previously known as lot ties or lot line adjustments could be addressed by a certificate of correction. For example, an insignificant lot line movement to avoid a slight setback violation could be resolved by a certificate of correction. Whenever possible, the original surveyor should prepare the certificate of correction. This will require signatures by all affected property owners and the applicable property owners associations.

The city will require the engineer/surveyor of record to prepare and record a Certificate of Correction to correct any suite/unit number inaccuracies to conform to MAG or COS Standards.

## LAND ASSEMBLAGE

3-1.704

When two or more existing lots or tracts of land are combined into fewer lots or tracts the process requires both city approval and plan review. To apply, submit a Land Assemblage application and fee to the One Stop Shop, [www.ScottsdaleAZ.gov/bldgresources/counterresources](http://www.ScottsdaleAZ.gov/bldgresources/counterresources). Forms, checklists and submittal requirements can be found online at [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms) or by calling Current Planning at 480-312-7000.

### A. Review Process

The Planning and Development Services Department staff will review the application to determine whether the proposed land assemblage meets the appropriate criteria for staff approval. The application is reviewed for compliance with city code, zoning, building code, archeology, engineering and transportation requirements.

The land assemblage approval process involves the following steps:

1. If the application meets the criteria for staff approval without further information, staff will advise the applicant of required stipulations, issue a staff approval and provide a plan submittal check list to submit the land assemblage plat.
2. If the application requires further information, the project coordinator will advise the applicant to provide specific additional information.
3. If the application does not meet the criteria for staff approval, the project coordinator will inform the applicant of possible alternate methods of approval for the proposed project.
4. Final plan review of the land assemblage plat will check for compliance with any stipulations and plat standard requirements, see [Appendix 3-1A](#).
5. A land assemblage plat final step is recorded by the city at the Maricopa County Recorder's Office.

### **B. Evaluation Process**

The Planning & Development Services Department staff will review the proposed land assemblage application to determine whether it can be approved by staff based on the following criteria:

1. Access to the assembled lot(s) remains in substantially the same location as before the assemblage.
2. Utility service to the assembled lot(s) remains in substantially the same location as before the assemblage.
3. Application for the land assemblage is not made in consideration of the amount or location of NAOS on the property or surrounding lots.
4. Use of the assembled lot(s) is likely to preclude further subdivision or assemblage of the lots.
5. The impact of the land assemblage on surrounding lots is minimal.
6. The impact of the land assemblage on the character of any underlying or surrounding subdivision is minimal.

## **3-1.800**

## **PUBLIC IMPROVEMENTS**

The owner is responsible for planning, constructing and financing all public improvements associated with land divisions (dividing, assembling and platting property) and land development. These public improvements must be completed and accepted before the city will issue a certificate of occupancy. The owner must have an engineer registered in the State of Arizona prepare a complete set of improvement plans for constructing required improvements. Such plans shall be based on the approved preliminary plat, zoning case, DRB and/or staff approval stipulations. The owner must prepare these plans in conjunction and in conformance with the land division plat. Improvement plans shall be subject to city approval prior to recordation of the land division. See [Section 1-2.100](#) for submittal requirements.

### **3-1.801**

### **REQUIRED PUBLIC IMPROVEMENTS**

#### **A. Water Supply**

The owner shall provide each lot with safe, pure and potable water in sufficient volume and pressure for domestic use and fire protection, in accordance with city standards, see [Section 6-1.000](#). The owner shall install fire hydrants in accordance with current city standards at locations designated by the city. These requirements are key elements that must be completed before any building permit for a structure is issued.



**B. Public Sewer**

The owner shall install sewage disposal facilities to serve each lot, see [Section 7-1.000](#) and SRC Chapter 49, and be subject to the following:

1. The owner shall install public sanitary sewers in areas which are reasonably accessible to an existing sewer system and shall be constructed to plans, profiles and specifications approved by the Maricopa County Environmental Services Department and the city.
2. In areas where public sanitary sewers are not reasonably accessible, but where the future servicing/owning agency agrees to effect temporary disposal of sewage, the subdivider shall plan and construct dry sewers within and for the subdivision for connection with a future public system.
3. Individual systems may be constructed only in areas not reasonably accessible to a public sewer system and then only when the following conditions are met to the satisfaction of the Maricopa County Environmental Services Department:
  - a. Adequate soil absorptivity.
  - b. Construction complies with approved standards.
  - c. Location of septic tank and seepage pits or leach lines or disposal beds in relation to property lines and buildings and water supply wells and lines are acceptable. Location shall be such that efficient and economical connection can be made to a future public sewer.

**C. Stormwater**

The owner shall provide facilities for stormwater disposal. The type, extent, locations and capacity of drainage facilities shall be in accordance with city standards, see [Section 4-1.000](#).

**D. Streets and Alleys**

The owner shall grade and construct all streets and alleys within the land division to cross sections, grades and standards approved by the city, see [Section 5-1.000](#).

**E. Curbing**

Where streets are to be paved, the owner shall install curb in accordance with approved city standards, see [Section 5-3.000](#).

**F. Sidewalks**

Concrete sidewalks are required on both sides of streets and must be constructed to a width, line and grade in accordance with approved city standards, see [Section 5-1.000](#) and [Section 12-1.000](#). Where density of development is low or where for other reasons the installation of sidewalks is not considered necessary, city staff may recommend that the requirement of one (1) or both sidewalks be waived.

**G. Street Names and Signs**

The owner shall propose street names subject to city staff approval and based on MAG adopted convention and policy. The owner shall place street name signs at all street intersections in conformance with city standards. Street name signs in subdivisions must conform to the COS Supplement to MAG Uniform Standard Specifications for Public Works.

**H. Streetlights**

The owner shall design and install streetlights in accordance with city standards, see [Section 2-1.1203](#).

**I. Monuments**

The owner shall install permanent monuments in accordance with city standards at all corners, angle points and point of curves and at all street intersections.

**J. Lot Corners**

The owner shall set iron pipe or round reinforced steel bars not less than one-half inch in diameter at all corners, angle points and points of curve for each lot within the subdivision.

**K. Electric, Telephone and Dry Utility Lines**

1. The owner shall install underground electric lines (except those of greater than twelve thousand five hundred (12,500) KVA capacity) and telephone, cable TV and telecommunication lines necessary to serve the land division, as well as any such existing lines along the frontage or contained within the property. The City Council may find undergrounding impractical due to subsurface soil conditions.
2. The owner shall be responsible for compliance with the requirements of this section and shall make the necessary arrangements with each of the public utility companies involved for the installation of underground facilities. Letters from each of the public utility companies indicating that the arrangements have been made shall be submitted to the city at the time the final subdivision plat is filed.

**L. Refuse Containers.**

The Solid Waste Management Director must approve of all solid waste collection methods for both commercial and residential services. The developer or subdivider must pay for residential refuse and recycling containers. The city will deliver containers at the initial occupant's request.

**3-1.802****PROPORTIONATE SHARE**

1. The on-site and off-site public improvements shall be proportional to the relative impact of the proposed development and shall be in character with existing and anticipated development adjacent to the proposed development.
2. The following factors will be considered in determining what public improvements are proportional:
  - a. Proximity of the proposed development to existing development and existing public improvements
  - b. Applicable city-adopted general and local plans
  - c. Number and size of proposed lots
  - d. Physical and topographical restraints/constraints
  - e. Drainage constraints
3. Additional bases for determining the engineering standards for proportional public improvements are existing city code requirements and policies, including but not limited to:
  - a. Minimum public improvement requirements for single family dwellings for public health and safety
  - b. Minimum water and sewer requirements for public health and safety
  - c. Street improvements in Chapter 47 of the Scottsdale Revised Code
  - d. Minimum design standards as set forth in this manual



## ASSURANCE OF CONSTRUCTION

### 3-1.900

Assurance of construction is required for all public improvements associated with land divisions (dividing, assembling and platting property) and land development. An assurance of construction is a financial security that guarantees completion of designated public improvements according to approved plans and is a precondition for final approval of site plans, obtaining a construction permit or recordation of a final plat. The owner is responsible for providing the assurance of construction to the city.

If the owner defaults on constructing improvements, the city may choose, among other options, to construct, maintain or remove the improvements in whole or in part; bring action to enforce the owner's obligations; or otherwise mitigate the owner's failure to complete the public improvements.

### ASSURANCE PROCESS

#### 3-1.901

The form of assurance will be established during final plan review. The owner shall select the means of assurance, subject to staff approval, and submit the Engineer's Estimate of Construction Costs for review and approval.

At the time of final plan approval, the owner must submit the Covenant to Construct Public Improvements with the executed bond, letter of credit, or cash deposit.

### TYPES OF ASSURANCE

#### 3-1.902

The types of assurances acceptable to the city are outlined below. The owner must use the appropriate city forms when providing assurance of construction. For COS forms see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

#### A. Corporate Surety Bond

The corporate surety bond involves an agreement between the owner and a bond company to guarantee to the city that improvements will be made by the owner as planned and within a specified time frame. The surety must be a corporation authorized to transact surety business in the State of Arizona. The surety must have an AM Best rating of at least A+ VII, or be on the latest US Treasury Department Listing of Approved Sureties.

The owner provides the Public Improvement Construction Bond form to the city in an amount equal to the cost of the required improvements as identified on the Engineer's Estimate of Construction Costs form.

#### B. Cash Deposits

The owner provides the Public Improvement Cash Deposit Agreement to the city with either cash or a cashier's check in the amount equal to the cost of the required improvements identified on the Engineer's Estimate of Construction Costs.

#### C. Letter of Credit

The owner acquires a letter from a bank that complies with the city's Standards for Letter of Credit. The letter must specify the amount equal to cost of the proposed improvements as identified on the Engineer's Estimate of Construction Costs.





## Appendix 3-1A PLAT MINIMUM STANDARDS

### PLAT MINIMUM STANDARDS

Real property plat submittals must comply with applicable policies and standards. This includes but is not restricted to the Arizona Boundary Survey Minimum Standards and the statutes governing the Arizona State Board of Technical Registration as found at [www.btr.state.az.us](http://www.btr.state.az.us).

All submittals requiring or making reference to elevation data must use or relate to the City of Scottsdale reference datum, which is the North America Vertical Datum of 1988 (NAVD 88). Horizontal & Vertical datum web site: <http://eservices.scottsdaleaz.gov/landsurvey/>.

### PLATS

All platting (mapping) to create new or different parcels, tracts, lots, units of land for the purpose of sale, lease, or public use must be done in accordance with the minimum standards set forth in the laws of the United States, Arizona, Maricopa County, and the City of Scottsdale.

Critical review of land survey product submittals will be based on published rules and minimum standards set forth by the above referenced agencies.

#### LAND SURVEYING STANDARDS

The land surveyor must comply with the following requirements:

1. The Public Land Survey System, established by the General Land Office and currently administered by the Bureau of Land Management, when performing any land boundary survey.
2. The Arizona Revised Statutes regarding land surveying and mapping, together with the "Minimum Standards for Arizona Land Boundary Surveys" (effective February 2002 by the State of Arizona Board of Technical Registration or as subsequently revised), administered by the Board of Technical Registration.
3. The Maricopa County Recorder requirements for recording standards.
4. The City of Scottsdale's minimum standards for platting, with proper research, field examination, measurements, analysis, calculation and presentation.

#### SUBMITTAL REQUIREMENTS

The applicant must submit:

1. Survey field notes, raw data, and coordinate files (electronically) from the actual field survey conducted by the surveyor submitting the plat.
2. The closure and area calculations for the subject property, and lots, tracts and parcels resulting from a land division and any easements being created or of record.
3. A commitment for title insurance as required in paragraph G of [Section 1-1.403](#).
4. A fee simple warranty deed for all parcels to be deeded to the City of Scottsdale for public purposes.
5. For projects requiring dedication of NAOS, a detailed worksheet and graphic depicting the required and provided amounts of NAOS being dedicated for the subdivision.
6. A separate document at the time of final plat submittal identifying how NAOS will be secured prior to and during construction to ensure that those areas will remain undisturbed.
7. Certified copies of resolutions showing who is authorized to sign a dedication on behalf of a lender or other interested person who must ratify the dedication.



## Appendix 3-1A PLAT MINIMUM STANDARDS

### PLAT MINIMUM STANDARDS

#### PLAT REQUIREMENTS

The plat must contain the following information:

1. All monuments controlling the boundary of the subject property.
2. Basis of bearings, and all measured and recorded distances.
3. The subject property boundary line should be the heaviest solid line. The boundary is defined in title report legal description. Include easements in the gross subject property area.
4. All previous land divisions with case and recording numbers.
5. All easements that appear in title report, citing width, dimensions (bearings and distances), and recorded instrument number.
6. Any easements that may appear on the Patent Deed in Small Tract Act areas. Also known as "GLO Easements" and do not always appear in title report. See [Section 1-1.304](#) paragraph E.
7. Plat name (title caption), right-of-way lines, courses, lengths, width of all public streets, alleys, crosswalks and utility easements; points of tangency and central angles of all curvilinear streets and alleys; radii of all rounded street line intersections.
8. Location and description of cardinal points to which all dimensions, angles, bearings and similar data on the plat shall be referenced; each of two (2) corners of the subdivision shall be tied by course and distance to separate survey monuments approved by the city staff.
9. Location of all physical encroachments upon the boundaries of the subject property.
10. Any excepted parcel within the plat boundaries.
11. All drainage ways, as designated by the city, which shall be dedicated to the city.
12. All existing improvements that are affected by zoning district restrictions with distances from any property line.
13. Building permit numbers of existing structures for condominium conversion.
14. Existing septic tank and disposal site, and the proposed distance from any property line and structures.
15. Existing well.
16. Legal access to property.
17. All adjacent property including, names of property owners, assessor parcel numbers, roadways with names and recording information.
18. Area, in square feet, and dimensions of each new lot with lot number.
19. Vicinity map.
20. Complete legal description as appears in the current title report for subject property.
21. List of all previous plats, maps, and any other documents used as a reference for the plat preparation.
22. Existing roadway names.
23. North arrow and scale.
24. Significant land features.
25. A dedication statement that includes:
  - a. Statement of location by section, township and range.
  - b. Dedication of all tracts, parcels, streets, alleys, drainage ways, pedestrian ways and easements for public use.
  - c. Dedication to the city of an easement over the private streets for (i) public utilities and (ii) emergency and service vehicles access.
  - d. Dedication by all owners, persons interested in the property as buyers under contract or lessees under a lease, and by the spouses of the owners and such persons.
  - e. Notarization of the signatures of all persons above, by a notary public or other authorized officer.



# Appendix 3-1A PLAT MINIMUM STANDARDS

## PLAT MINIMUM STANDARDS

- f. Ratification by any lender or other interested person who holds a deed of trust, mortgage or property interest agreement that encumbers the subject property. The ratification must include the book and page where the lien is recorded, and the date of the lien.
  - g. Warranty that: Owner warrants to the City of Scottsdale that it is the sole owner of the property on this plat, and that every lender, easement holder or other person having an interest in the property adverse to or inconsistent with the dedications, conveyances or other property interests created or transferred by this plat has consented to or joined in this plat, as shown by the instruments recorded or that will be recorded in the Maricopa County Recorder's Office no later than the date this plat is recorded.
26. Location and all dimensions of all lots, tracts, parcels, streets and easements planned within the subdivision. Number all lots sequentially and identify all tracts by letter.
  27. A table showing the square footage for all lots.
  28. The approved street names.
  29. Private streets as separate tracts. Easements for private streets are unacceptable.
  30. The following note for plats with private streets:

The streets are private streets, to be owned and maintained by the property owners association. Normally, after this plat is recorded, the City of Scottsdale will not accept dedication of the streets to the public to relieve the property owners association of street maintenance responsibilities unless all street improvements and rights-of-way meet current applicable city standards.

31. Private streets require controlled access to the public street system.
32. Sight distance triangles must be clear of landscaping, signs or other visibility obstructions between 2 feet and 7 feet in height and 6 inches maximum width or diameter.
33. Approval block for final plat as shown in Appendix 3-1C.
34. Land Surveyor's Certification block: see below

## LAND SURVEYOR'S CERTIFICATION

THIS IS TO CERTIFY that

1. I am a land surveyor registered to practice in Arizona;
2. this plat was made under my direction;
3. this plat meets the "Minimum Standards for Arizona Land Boundary Surveys";
4. the survey and division of the subject property described and platted hereon were made during the month of \_\_\_\_\_, 20\_\_\_\_;
5. the survey is true and complete as shown;
6. monuments shown actually exist or will be set before recordation;
7. their positions are correctly shown; and
8. said monuments are sufficient to enable the survey to be retraced.

\_\_\_\_\_  
Name

Registered Land Surveyor # \_\_\_\_\_





## Appendix 3-1A PLAT MINIMUM STANDARDS

### COVER SHEET

The cover sheet shall show:

1. Owner/Developer name, address, phone number
2. Engineer/Surveyor name, address, phone number
3. Existing zoning, number of acres
4. Sheet number/index
5. Owner Signature Block and Acknowledgement
6. Registered land surveyor seal
7. Legend
8. All case numbers for plan checks, zoning cases, development reviews, and use permits, along the right hand border

Required cover sheet notes:

1. If in a City of Scottsdale water service area:

This development is on the City of Scottsdale Water system, which has a certification of assured water supply.

2. If not a City of Scottsdale water service area:

A certificate of assured water supply has been submitted to the City of Scottsdale for this development.

3. When the subject property lies within a 2-mile vicinity of the Scottsdale Airport the following note is required. (link to airport map).

This property lies within close proximity to the Scottsdale Airport ("the Airport"), which is located between Frank Lloyd Wright Boulevard on the north, Pima Road on the east, Thunderbird Road on the south and Scottsdale Road on the west. The Airport is a general aviation reliever/commercial service airport for Scottsdale /Phoenix area.

### PLAN SHEETS

All sheets shall show:

1. In block form in the lower right-hand corner of the plat the following information:
  - The name, address, and telephone number of the individual or agency that prepared the plat
  - Name of the subdivision, condominium or map of dedication
  - Date prepared and job number
  - Scale
  - Sheet \_\_\_ of \_\_\_ sheets"
2. Land surveyor's seal



# Appendix 3-1B MASTER PLANNED PROPERTY PLAT DEDICATION EXAMPLE

## MASTER PLANNED PROPERTY PLAT DEDICATION EXAMPLE

### DEDICATION

KNOW ALL MEN BY THESE PRESENTS:

That Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner has divided the real property situated in a portion of the West Half of Section 6, Township 4 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, as shown and platted hereon. This Master Planned Property Plat establishes the parcels, tracts, right-of-ways and easements of said property under the name "Pinnacle Master Planned Property Plat". Said plat sets forth the location and gives the dimensions of the parcels, tracts, streets and easements constituting the same. Each parcel, tract, and street shall be known by the number, letter, or name given each respectively on said plat. The public and private street/easement dedications are as described below.

Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner, does hereby dedicate to the Pinnacle Property Owners Association:

1. Tracts A, B, C, D, E, F, and G shall be owned and maintained by the Pinnacle Property Homeowners Association.
2. The private streets shown hereon as Tract "A" are declared as private access ways for the exclusive use of the members of the Pinnacle Property Owners Association and their assigns, and are not dedicated to the public for its use except as expressly stated hereon.

Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner, does hereby dedicate to the City of Scottsdale, an Arizona municipal corporation:

3. The public streets in fee as shown hereon. Maintenance of the public streets shall be the Adjacent Property Owner's responsibility until such time the streets are improved to City of Scottsdale standards and accepted by the City of Scottsdale.
4. A perpetual Scenic Corridor Easement (S.C.E.) upon, over, and across the parcel of land shown hereon. The purpose is to preserve the property as a scenic corridor free of any obstructions to the view of persons looking across the Property. Without limitation, Grantor shall not allow or suffer to exist upon the Property any buildings, walls, trees, obstructions, screens, or other structures or things exceeding a height determined by the Grantee above original grade.
5. A perpetual Drainage Easement (D.E.) for the purposes of construction, operation, replacement, and repair of levies, dikes, channels, and other works of drainage or flood control in and over a portion of the areas designated as such hereon an easement upon, over, and across real property described hereon. Maintenance shall be the responsibility of the individual owner of the lot or tract where the easement is located hereon.
6. A perpetual Sight Distance Easement (S.D.E.) upon, over, and across the parcel of land shown hereon. The purpose is to preserve the Property as a traffic safety visibility area free of any obstructions to the view of persons looking across the property. Without limitation, Grantor shall not allow or suffer to exist upon the property any buildings, walls, trees, obstructions, screens, or other structures or things exceeding a height determined by the Grantee above original natural grade.
7. A perpetual Public Utility Easement (P.U.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is for electricity, water, wastewater, telecommunications, and all other manner of utilities, and for construction, operation, use, maintenance, repair, modification, and replacement from time to time of improvements related thereto.
8. A perpetual Emergency and Service-Type Access Easement (E.S.V.A.E.) upon, over, and across the parcel of land shown as Tract "A" hereon. The purpose of the easement is for providing access for emergency and service-type vehicles, including refuse collection vehicles.



Appendix 3-1B

# MASTER PLANNED PROPERTY PLAT DEDICATION EXAMPLE

**MASTER PLANNED PROPERTY PLAT DEDICATION EXAMPLE**

9. A perpetual Vehicle Non Access Easement (V.N.A.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is to prohibit vehicular access.
10. A perpetual Public Trail Access Easement (P.T.A.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is for all forms of non-motorized transportation together with motorized emergency, law enforcement, and service vehicles, and for construction, operation, use, maintenance, repair, modification, and replacement from time to time of improvements related thereto.
11. Natural Area Open Space (“N.A.O.S.”) easements are hereby dedicated to the City of Scottsdale upon, over, and across the areas for the purpose of the preservation of said land in its natural state and no grading, grubbing, excavating, or construction of any structure or development of any kind shall be permitted on or within said easement except as allowed under City of Scottsdale ordinances.

The owner warrants that this plat is in compliance with City of Scottsdale’s Land Divisions Ordinance, and the Design Standards and Policies Manual specifications.

Owner warrants to the City of Scottsdale that it is the sole owner of the property on this plat, and that every lender, easement holder or other person having any interest in the property adverse to or inconsistent with the dedications, conveyances or other property interests created or transferred by this plat has consented to or joined in this plat, as evidenced by the instruments which are recorded in the Maricopa County Recorder’s Office or which the owner will record not later than the date on which this plat is recorded.

The person executing this document on behalf of a corporation, trust or other organization warrants his or her authority to do so and that all persons necessary to bind Grantor have joined in this document. This document runs in favor of the Grantee’s successors and assigns.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Grantor: \_\_\_\_\_

For: \_\_\_\_\_

**ACKNOWLEDGMENT**

STATE OF ARIZONA                )  
   ) S.S.  
 COUNTY OF MARICOPA         )

This document was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

By \_\_\_\_\_ for and on behalf of \_\_\_\_\_

Notary Public: \_\_\_\_\_

My commission expires: \_\_\_\_\_





# Appendix 3-1B

# MASTER PLANNED PROPERTY PLAT DEDICATION EXAMPLE

### RATIFICATION EXAMPLE

As beneficiary under that certain deed of trust recorded in the County Recorder's Office, Maricopa County, Arizona, in Recorder's Number (MCR#) \_\_\_\_\_, the undersigned hereby ratifies, approves and confirmation is given to said dedications as stated in this plat as to the interest of the undersigned. The person signing for Beneficiary warrants and represents they have power and authority to do so.

By:

\_\_\_\_\_

Individual, Partnership, or Financial Institution, as beneficiary

\_\_\_\_\_

Title or Position

\_\_\_\_\_

Date

### ACKNOWLEDGMENT

STATE OF ARIZONA            )  
   ) S.S.  
COUNTY OF MARICOPA        )

This document was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

By \_\_\_\_\_ for and on behalf of \_\_\_\_\_.

Notary Public: \_\_\_\_\_

My commission expires: \_\_\_\_\_

### CITY OF SCOTTSDALE MASTER PLANNED PROPERTY PLAT APPROVAL BLOCK

This plat has been reviewed for compliance with the City of Scottsdale's Design Standards and Policy Manual specifications.

By \_\_\_\_\_

Chief Development Officer

\_\_\_\_\_

Date

This subdivision has been reviewed for compliance with the development standards of the City Of Scottsdale's Development Review Board (DRB) Case No. \_\_\_\_\_, and Zoning Case(s) No. \_\_\_\_\_, and all case related stipulations.

By \_\_\_\_\_

Project Coordinator

\_\_\_\_\_

Date



# Appendix 3-1B MASTER PLANNED PROPERTY PLAT DEDICATION EXAMPLE

CITY OF SCOTTSDALE ALTERNATIVE MASTER PLANNED PROPERTY APPROVAL BLOCK FOR ZONING RELATED PLAT	
Approved by the Council of the City of Scottsdale, Arizona this the day of _____, 20____, by _____. Mayor	
ATTEST By: _____ City Clerk	
This plat has been reviewed for compliance with the City of Scottsdale's Design Standards and Policy Manual specifications. By _____ Date _____ Chief Development Officer	
This subdivision has been reviewed for compliance with the development standards of the City Of Scottsdale's Development Review Board (DRB) Case No. _____, and Zoning Case(s) No. _____, and all case related stipulations. By _____ Date _____ Project Coordinator	



## Appendix 3-1C FINAL PLAT DEDICATION EXAMPLE

### FINAL PLAT DEDICATION EXAMPLE

#### DEDICATION

KNOW ALL MEN BY THESE PRESENTS:

That Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner, has subdivided under the name "Pinnacle Property" a portion of the West Half of Section 6, Township 4 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, as shown and platted hereon, hereby publishes this Final Plat for "Pinnacle Property". Said plat sets forth the location and gives the dimensions of the lots, tracts, streets and easements constituting the same. Each lot, tract, and street shall be known by the number, letter, or name given each respectively on said plat. The public streets are dedicated to the city in fee. The easements are dedicated for the purposes stated hereon.

Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner, does hereby grant to the Pinnacle Property Homeowners Association:

1. Tracts A, B, C, D, E, F, and G shall be owned and maintained by the Pinnacle Property Homeowners Association.
2. The private streets shown hereon as Tract "A" are declared as private access ways for the exclusive use of the members of the Scottsdale XYZ Homeowners Association and their assigns, and are not dedicated to the public for its use except as expressly stated hereon.

Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner, does hereby dedicate to the City of Scottsdale, an Arizona municipal corporation:

3. The public streets in fee as shown hereon. Maintenance of the public streets shall be the Adjacent Property Owner's responsibility until such time the streets are improved to City of Scottsdale standards and accepted by the City of Scottsdale.
4. A perpetual, Scenic Corridor Easement (S.C.E.) upon, over, and across the parcel of land shown hereon. The purpose is to preserve the property as a scenic corridor free of any obstructions to the view of persons looking across the Property. Without limitation, Grantor shall not allow or suffer to exist upon the Property any buildings, walls, trees, obstructions, screens, or other structures or things exceeding a height determined by the Grantee above original grade.
5. A perpetual, Drainage Easement (D.E.) for the purposes of construction, operation, replacement, and repair of levies, dikes, channels, and other works of drainage or flood control in and over a portion of the areas designated as such hereon an easement upon, over, and across real property described hereon. Maintenance shall be the responsibility of the individual owner of the lot or tract where the easement is located hereon.
6. A perpetual, Sight Distance Easement (S.D.E.) upon, over, and across the parcel of land shown hereon. The purpose is to preserve the Property as a traffic safety visibility area free of any obstructions to the view of persons looking across the property. Without limitation, Grantor shall not allow or suffer to exist upon the property any buildings, walls, trees, obstructions, screens, or other structures or things exceeding a height determined by the Grantee above original natural grade.
7. A perpetual, Public Utility Easement (P.U.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is for electricity, water, wastewater, telecommunications, and all other manner of utilities, and for construction, operation, use, maintenance, repair, modification, and replacement from time to time of improvements related thereto.
8. A perpetual, Emergency and Service-Type Access Easement (E.S.V.A.E.) upon, over, and across the parcel of land shown as Tract "A" hereon. The purpose of the easement is for providing access for emergency and service-type vehicles, including refuse collection vehicles.
9. A perpetual, Vehicle Non Access Easement (V.N.A.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is to prohibit vehicular access.



# FINAL PLAT DEDICATION EXAMPLE

## FINAL PLAT DEDICATION EXAMPLE

- 10. A perpetual Public Trail Access Easement (P.T.A.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is for all forms of non-motorized transportation together with motorized emergency, law enforcement, and service vehicles, and for construction, operation, use, maintenance, repair, modification, and replacement from time to time of improvements related thereto.
- 11. Natural Area Open Space ("N.A.O.S.") easements are hereby dedicated to the City of Scottsdale upon, over, and across the areas for the purpose of the preservation of said land in its natural state and no grading, grubbing, excavating, or construction of any structure or development of any kind shall be permitted on or within said easement except as allowed under City of Scottsdale ordinances.
- 12. A perpetual, Water Line Easement (W.L.E. or W.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for underground water pipes, above ground appurtenances and for construction, operation, use, maintenance, repair, modification and replacement from time to time of pipes and manholes, valves, access vaults, and facilities related thereto.
- 13. A perpetual, Sewer Line Easement (S.L.E. or S.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for underground sewer pipes and wastewater facilities, and for the construction, operation, use, maintenance, repair, modification and replacement from time to time of pipes, manholes, access vaults and other improvements related thereto.

The owner warrants that this plat is in compliance with City of Scottsdale's Land Divisions Ordinance, and the Design Standards and Policies Manual specifications.

Owner warrants to the City of Scottsdale that it is the sole owner of the property on this plat, and that every lender, easement holder or other person having any interest in the property adverse to or inconsistent with the dedications, conveyances or other property interests created or transferred by this plat has consented to or joined in this plat, as evidenced by the instruments which are recorded in the Maricopa County Recorder's Office or which the owner will record not later than the date on which this plat is recorded.

The person executing this document on behalf of a corporation, trust or other organization warrants his or her authority to do so and that all persons necessary to bind Grantor have joined in this document. This document runs in favor of the Grantee's successors and assigns.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Grantor: \_\_\_\_\_

For: \_\_\_\_\_

## ACKNOWLEDGMENT

STATE OF ARIZONA            )  
   ) S.S.  
 COUNTY OF MARICOPA        )

This document was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_

By \_\_\_\_\_ for and on behalf of \_\_\_\_\_

Notary Public: \_\_\_\_\_

My commission expires: \_\_\_\_\_



FINAL PLAT DEDICATION EXAMPLE

RATIFICATION EXAMPLE

As beneficiary under that certain deed of trust recorded in the County Recorder's Office, Maricopa County, Arizona, in Recorder's Number (MCR#) \_\_\_\_\_, the undersigned hereby ratifies, approves and confirmation is given to said dedications as stated in this plat as to the interest of the undersigned. The person signing for Beneficiary warrants and represents they have power and authority to do so.

By:

\_\_\_\_\_

Individual, Partnership, or Financial Institution, as beneficiary

\_\_\_\_\_

Title or Position

Date

ACKNOWLEDGMENT

STATE OF ARIZONA )
) S.S.
COUNTY OF MARICOPA )

This document was acknowledged before me this the \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_,

By \_\_\_\_\_ for and on behalf of \_\_\_\_\_

Notary Public: \_\_\_\_\_

My commission expires: \_\_\_\_\_

CITY OF SCOTTSDALE
FINAL PLAT APPROVAL BLOCK

Approved by the Council of the City of Scottsdale, Arizona this the \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_,
by \_\_\_\_\_

Mayor

ATTEST By: \_\_\_\_\_

City Clerk

This plat has been reviewed for compliance with the City of Scottsdale's Design Standards and Policy Manual specifications.

By \_\_\_\_\_ Date
Chief Development Officer

This subdivision has been reviewed for compliance with the development standards of the City Of Scottsdale's Development Review Board (DRB) Case No. \_\_\_\_\_, and Zoning Case(s) No. \_\_\_\_\_, and all case related stipulations.

By \_\_\_\_\_ Date
Project Coordinator





# Appendix 3-1D MINOR SUBDIVISION DEDICATION EXAMPLE

## MINOR SUBDIVISION DEDICATION EXAMPLE

### DEDICATION

KNOW ALL MEN BY THESE PRESENTS:

That Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner, has subdivided under the name "Pinnacle Property" a portion of the West Half of Section 6, Township 4 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, as shown and platted hereon, hereby publishes this Minor Subdivision Final Plat for "Pinnacle Property". Said plat sets forth the location and gives the dimensions of the lots, tracts, streets and easements constituting the same. Each lot, tract, and street shall be known by the number, letter, or name given each respectively on said plat. The public and private street/easement dedications are as described below:

Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner, does hereby grant to the Pinnacle Property Homeowners Association:

1. Tracts A, B, C, D, E, F, and G shall be owned and maintained by the Pinnacle Property Homeowners Association.
2. The private streets shown hereon as Tract "A" are declared as private access ways for the exclusive use of the members of the Pinnacle Property Owners Association and their assigns, and are not dedicated to the public for its use except as expressly stated hereon.

Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner, does hereby dedicate to the City of Scottsdale, an Arizona municipal corporation:

1. The public streets in fee as shown hereon. Maintenance of the public streets shall be the Adjacent Property Owner's responsibility until such time the streets are improved to City of Scottsdale standards and accepted by the City of Scottsdale.
2. A perpetual Scenic Corridor Easement (S.C.E.) upon, over, and across the parcel of land shown hereon. The purpose is to preserve the property as a scenic corridor free of any obstructions to the view of persons looking across the Property. Without limitation, Grantor shall not allow or suffer to exist upon the Property any buildings, walls, trees, obstructions, screens, or other structures or things exceeding a height determined by the Grantee above original grade.
3. A perpetual Drainage Easement (D.E.) for the purposes of construction, operation, replacement, and repair of levies, dikes, channels, and other works of drainage or flood control in and over a portion of the areas designated as such hereon an easement upon, over, and across real property described hereon. Maintenance shall be the responsibility of the individual owner of the lot or tract where the easement is located hereon.
4. A perpetual Sight Distance Easement (S.D.E.) upon, over, and across the parcel of land shown hereon. The purpose is to preserve the Property as a traffic safety visibility area free of any obstructions to the view of persons looking across the property. Without limitation, Grantor shall not allow or suffer to exist upon the property any buildings, walls, trees, obstructions, screens, or other structures or things exceeding a height determined by the Grantee above original natural grade.
5. A perpetual Public Utility Easement (P.U.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is for electricity, water, wastewater, telecommunications, and all other manner of utilities, and for construction, operation, use, maintenance, repair, modification, and replacement from time to time of improvements related thereto.
6. A perpetual Emergency and Service-Type Access Easement (E.S.V.A.E.) upon, over, and across the parcel of land shown as Tract "A" hereon. The purpose of the easement is for providing access for emergency and service-type vehicles, including refuse collection vehicles.
7. A perpetual Vehicle Non Access Easement (V.N.A.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is to prohibit vehicular access.



# Appendix 3-1D MINOR SUBDIVISION DEDICATION EXAMPLE

## MINOR SUBDIVISION DEDICATION EXAMPLE

8. A perpetual Public Trail Access Easement (P.T.A.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is for all forms of non-motorized transportation together with motorized emergency, law enforcement, and service vehicles, and for construction, operation, use, maintenance, repair, modification, and replacement from time to time of improvements related thereto.
9. Natural Area Open Space ("N.A.O.S.") easements are hereby dedicated to the City of Scottsdale upon, over, and across the areas for the purpose of the preservation of said land in its natural state and no grading, grubbing, excavating, or construction of any structure or development of any kind shall be permitted on or within said easement except as allowed under City of Scottsdale ordinances.
10. A perpetual, Water Line Easement (W.L.E. or W.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for underground water pipes, above ground appurtenances and for construction, operation, use, maintenance, repair, modification and replacement from time to time of pipes and manholes, valves, access vaults, and facilities related thereto.
11. A perpetual, Sewer Line Easement (S.L.E. or S.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for underground sewer pipes and wastewater facilities, and for the construction, operation, use, maintenance, repair, modification and replacement from time to time of pipes, manholes, access vaults and other improvements related thereto.

The owner warrants that this plat is in compliance with City of Scottsdale's Land Divisions Ordinance, and the Design Standards and Policies Manual specifications.

Owner warrants to the City of Scottsdale that it is the sole owner of the property on this plat, and that every lender, easement holder or other person having any interest in the property adverse to or inconsistent with the dedications, conveyances or other property interests created or transferred by this plat has consented to or joined in this plat, as evidenced by the instruments which are recorded in the Maricopa County Recorder's Office or which the owner will record not later than the date on which this plat is recorded.

The person executing this document on behalf of a corporation, trust or other organization warrants his or her authority to do so and that all persons necessary to bind Grantor have joined in this document. This document runs in favor of the Grantee's successors and assigns.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Grantor: \_\_\_\_\_

For: \_\_\_\_\_





# Appendix 3-1D MINOR SUBDIVISION DEDICATION EXAMPLE

ACKNOWLEDGMENT	
STATE OF ARIZONA	)
	) S.S.
COUNTY OF MARICOPA	)
<p>This document was acknowledged before me this _____ day of _____, 20_____,            by _____ for and on behalf of _____.</p> <p style="text-align: center;">Notary Public: _____</p> <p style="text-align: center;">My commission expires: _____</p>	

RATIFICATION EXAMPLE	
<p>As beneficiary under that certain deed of trust recorded in the County Recorder's Office, Maricopa County, Arizona, in Recorder's Number (MCR#)_____, the undersigned hereby ratifies, approves and confirmation is given to said dedications as stated in this plat as to the interest of the undersigned. The person signing for Beneficiary warrants and represents they have power and authority to do so.</p>	
<p>By:</p> <p>_____</p> <p>Individual, Partnership, or Financial Institution, as beneficiary</p> <p>_____</p> <p>Title or Position <span style="float: right;">Date</span></p>	

ACKNOWLEDGMENT	
STATE OF ARIZONA	)
	) S.S.
COUNTY OF MARICOPA	)
<p>This document was acknowledged before me this _____ day of _____, 20_____,            by _____ for and on behalf of _____.</p> <p style="text-align: center;">Notary Public: _____</p> <p style="text-align: center;">My commission expires: _____</p>	



# Appendix 3-1D MINOR SUBDIVISION DEDICATION EXAMPLE

CITY OF SCOTTSDALE MINOR SUBDIVISION APPROVAL BLOCK	
Approved by the General Manager of the City of Scottsdale, Arizona this the _____ day of _____, 20____.	
By _____	_____
General Manager	Date
STATE OF ARIZONA )	)
COUNTY OF MARICOPA )	) S.S.
This document was acknowledged before me this _____ day of _____, 20____,	
By _____ for and on behalf of _____.	
Notary Public: _____	
My commission expires: _____	
This plat has been reviewed for compliance with the City of Scottsdale's Design Standards and Policy Manual specifications.	
By _____	_____
Chief Development Officer	Date
This subdivision has been reviewed for compliance with the development standards of the City Of Scottsdale's Development Review Board (DRB) Case No. _____, and Staff Approval Case(s) No. _____, and all case related stipulations.	
By _____	_____
Project Coordinator	Date



## Appendix 3-1E CONDOMINIUM DEDICATION EXAMPLE

### CONDOMINIUM DEDICATION EXAMPLE

#### DEDICATION

#### KNOW ALL MEN BY THESE PRESENTS:

That Properties, LLC, an Arizona Limited Liability Company, as owner, has subdivided under the name of “The Pinnacle, A Condominium” a condominium plat being a part of the Northeast Quarter of Section 27, Township 2 North, Range 4 East of the Gila and Salt River Meridian, Maricopa County, Arizona, as shown and platted hereon, hereby declares that said condominium plat sets forth the location and dimensions of the buildings, units, common elements, and easements, and that each will be known by the letter, number or name given on said plat.

Tract “A” is to be operated and maintained by The Pinnacle Condominium Association, and all other common areas, limited common areas and common elements will be operated and maintained as set forth and defined in the condominium declaration to be recorded simultaneously with the condominium plat.

Properties, L.L.C., an Arizona Limited Liability Company, as owner does hereby grant to the City of Scottsdale, an Arizona municipal corporation:

1. A perpetual, Emergency and Service-Type Vehicles Access Easement (E.S.V.A.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is to provide access and includes Refuse Collection Vehicles.
2. A perpetual, Drainage Easement (D.E.) for the purposes of construction, operation, replacement, and repair of levies, dikes, channels, and other works of drainage or flood control in and over a portion of the areas designated as such hereon an easement upon, over, and across real property described hereon.
3. A perpetual, Water Line Easement (W.L.E. or W.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for underground water pipes, above ground appurtenances and for construction, operation, use, maintenance, repair, modification and replacement from time to time of pipes and manholes, valves, access vaults, and facilities related thereto.
4. A perpetual, Sewer Line Easement (S.L.E. or S.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for underground sewer pipes and wastewater facilities, and for the construction, operation, use, maintenance, repair, modification and replacement from time to time of pipes, manholes, access vaults and other improvements related thereto.
5. A perpetual, Sight Distance Easement (S.D.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is to preserve the area as shown hereon as a safety visibility area free of any obstructions to the view of persons looking across the said easement shown hereon. Without limitation, Grantor shall not allow or suffer to exist upon the Property any buildings, walls, trees, obstructions, screens or other structures of things exceeding a height determined by Grantee.
6. A perpetual, Non-Vehicular Access Easement (N.V.A.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is for prohibiting vehicular access. Construction of any structure or development of any kind shall not be permitted on or within said easement except as allowed under City of Scottsdale ordinances.



# Appendix 3-1E

## CONDOMINIUM DEDICATION EXAMPLE

### CONDOMINIUM DEDICATION EXAMPLE

The owner warrants that this plat is in compliance with City of Scottsdale's Land Divisions Ordinance, and the Design Standards and Policies Manual specifications.

Owner warrants to the City of Scottsdale that it is the sole owner of the property on this plat, and that every lender, easement holder or other person having any interest in the property adverse to or inconsistent with the dedications, conveyances or other property interests created or transferred by this plat has consented to or joined in this plat, as evidenced by the instruments which are recorded in the Maricopa County Recorder's Office or which the owner will record not later than the date on which this plat is recorded.

The person executing this document on behalf of a corporation, trust or other organization warrants his or her authority to do so and that all persons necessary to bind Grantor have joined in this document. This document runs in favor of the Grantee's successors and assigns.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Grantor: \_\_\_\_\_

For: \_\_\_\_\_

### ACKNOWLEDGMENT

STATE OF ARIZONA            )  
   ) S.S.  
 COUNTY OF MARICOPA     )

This document was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

By \_\_\_\_\_ for and on behalf of \_\_\_\_\_

Notary Public: \_\_\_\_\_

My commission expires: \_\_\_\_\_



# Appendix 3-1E CONDOMINIUM DEDICATION EXAMPLE

RATIFICATION EXAMPLE	
<p>As beneficiary under that certain deed of trust recorded in the County Recorder's Office, Maricopa County, Arizona, in Recorder's Number (MCR#), _____ the undersigned hereby ratifies, approves and confirmation is given to said dedications as stated in this plat as to the interest of the undersigned. The person signing for Beneficiary warrants and represents they have power and authority to do so.</p>	
By:	
_____	
Individual, Partnership, or Financial Institution, as beneficiary	
_____	
Title or Position	
_____	
Date	
ACKNOWLEDGMENT	
STATE OF ARIZONA                    )	)
	) S.S.
COUNTY OF MARICOPA            )	)
<p>This document was acknowledged before me this _____ day of _____, 20____, By _____ for and on behalf of _____.</p>	
Notary Public: _____	
My commission expires: _____	
CITY OF SCOTTSDALE CONDOMINIUM PLAT APPROVAL BLOCK	
<p>This plat has been reviewed for compliance with the City of Scottsdale's Design Standards and Policy Manual specifications.</p>	
By _____	_____
Chief Development Officer	Date
<p>This subdivision has been reviewed for compliance with the development standards of the City Of Scottsdale's Development Review Board (DRB) Case No. _____, and Zoning Case(s) No. _____, and all case related stipulations.</p>	
By _____	_____
Project Coordinator	Date





# Appendix 3-1F PERIMETER EXCEPTION PLAT DEDICATION EXAMPLE

## PERIMETER EXCEPTION PLAT DEDICATION EXAMPLE

### DEDICATION

KNOW ALL MEN BY THESE PRESENTS:

That Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner of the real property situated in a portion of the West Half of Section 6, Township 4 North, Range 5 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona, as shown and platted hereon. This plat establishes the lots, tracts, right-of-ways and easements of said property under the name "Pinnacle Perimeter Exception Plat". Said plat sets forth the location and gives the dimensions of the lots, tracts, streets and easements constituting the same. Each lot, tract, and street shall be known by the number, letter, or name given each respectively on said plat. The public and private dedications are as described below.

Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner, does hereby dedicate to the Pinnacle Property Owners Association:

1. Tracts A, B, C, D, E, F, and G shall be owned and maintained by the Pinnacle Property Homeowners Association.

Scottsdale XYZ, L.L.C., an Arizona Limited Liability Company, as owner, does hereby dedicate to the City of Scottsdale, an Arizona municipal corporation:

2. The public streets in fee as shown hereon. Maintenance of the public streets shall be the Adjacent Property Owner's responsibility until such time the streets are improved to City of Scottsdale standards and accepted by the City of Scottsdale.
3. A perpetual Scenic Corridor Easement (S.C.E.) upon, over, and across the parcel of land shown hereon. The purpose is to preserve the property as a scenic corridor free of any obstructions to the view of persons looking across the Property. Without limitation, Grantor shall not allow or suffer to exist upon the Property any buildings, walls, trees, obstructions, screens, or other structures or things exceeding a height determined by the Grantee above original grade.
4. A perpetual Drainage Easement (D.E.) for the purposes of construction, operation, replacement, and repair of levies, dikes, channels, and other works of drainage or flood control in and over a portion of the areas designated as such hereon an easement upon, over, and across real property described hereon. Maintenance shall be the responsibility of the individual owner of the lot or tract where the easement is located hereon.
5. A perpetual Sight Distance Easement (S.D.E.) upon, over, and across the parcel of land shown hereon. The purpose is to preserve the Property as a traffic safety visibility area free of any obstructions to the view of persons looking across the property. Without limitation, Grantor shall not allow or suffer to exist upon the property any buildings, walls, trees, obstructions, screens, or other structures or things exceeding a height determined by the Grantee above original natural grade.
6. A perpetual Public Utility Easement (P.U.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is for electricity, water, wastewater, telecommunications, and all other manner of utilities, and for construction, operation, use, maintenance, repair, modification, and replacement from time to time of improvements related thereto.
7. A perpetual Emergency and Service-Type Access Easement (E.S.V.A.E.) upon, over, and across the parcel of land shown as Tract "A" hereon. The purpose of the easement is for providing access for emergency and service-type vehicles, including refuse collection vehicles.
8. A perpetual Vehicle Non Access Easement (V.N.A.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is to prohibit vehicular access.



# Appendix 3-1F PERIMETER EXCEPTION PLAT DEDICATION EXAMPLE

## PERIMETER EXCEPTION PLAT DEDICATION EXAMPLE

9. A perpetual Public Trail Access Easement (P.T.A.E.) upon, over, and across the parcel of land shown hereon. The purpose of the easement is for all forms of non-motorized transportation together with motorized emergency, law enforcement, and service vehicles, and for construction, operation, use, maintenance, repair, modification, and replacement from time to time of improvements related thereto.
10. Natural Area Open Space ("N.A.O.S.") easements are hereby dedicated to the City of Scottsdale upon, over, and across the areas for the purpose of the preservation of said land in its natural state and no grading, grubbing, excavating, or construction of any structure or development of any kind shall be permitted on or within said easement except as allowed under City of Scottsdale ordinances.
11. A perpetual, Water Line Easement (W.L.E. or W.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for underground water pipes, above ground appurtenances and for construction, operation, use, maintenance, repair, modification and replacement from time to time of pipes and manholes, valves, access vaults, and facilities related thereto.
12. A perpetual, Sewer Line Easement (S.L.E. or S.E.) upon, over, under and across the parcel of land shown hereon. The purpose of the easement is for underground sewer pipes and wastewater facilities, and for the construction, operation, use, maintenance, repair, modification and replacement from time to time of pipes, manholes, access vaults and other improvements related thereto.

The owner warrants that this plat is in compliance with City of Scottsdale's Land Divisions Ordinance, and the Design Standards and Policies Manual specifications. This plat is subject to the City of Scottsdale Development Agreement approved by City Council on \_\_\_\_\_ date.

Owner warrants to the City of Scottsdale that it is the sole owner of the property on this plat, and that every lender, easement holder or other person having any interest in the property adverse to or inconsistent with the dedications, conveyances or other property interests created or transferred by this plat has consented to or joined in this plat, as evidenced by the instruments which are recorded in the Maricopa County Recorder's Office or which the owner will record not later than the date on which this plat is recorded.

The person executing this document on behalf of a corporation, trust or other organization warrants his or her authority to do so and that all persons necessary to bind Grantor have joined in this document. This document runs in favor of the Grantee's successors and assigns.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Grantor: \_\_\_\_\_

For: \_\_\_\_\_





# Appendix 3-1F PERIMETER EXCEPTION PLAT DEDICATION EXAMPLE

ACKNOWLEDGMENT	
STATE OF ARIZONA	)
	) S.S.
COUNTY OF MARICOPA	)
<p>This document was acknowledged before me this _____ day of _____, 20_____,            by _____ for and on behalf of _____.</p> <p style="text-align: center;">Notary Public: _____</p> <p style="text-align: center;">My commission expires: _____</p>	

RATIFICATION EXAMPLE	
<p>As beneficiary under that certain deed of trust recorded in the County Recorder's Office, Maricopa County, Arizona, in Recorder's Number (MCR#) _____, the undersigned hereby ratifies, approves and confirmation is given to said dedications as stated in this plat as to the interest of the undersigned. The person signing for Beneficiary warrants and represents they have power and authority to do so.</p>	
<p>By: _____</p> <p>Individual, Partnership, or Financial Institution, as beneficiary</p> <p>_____</p>	
Title or Position	Date

ACKNOWLEDGMENT	
STATE OF ARIZONA	)
	) S.S.
COUNTY OF MARICOPA	)
<p>This document was acknowledged before me this _____ day of _____, 20_____,            by _____ for and on behalf of _____.</p> <p style="text-align: center;">Notary Public: _____</p> <p style="text-align: center;">My commission expires: _____</p>	



# Appendix 3-1F PERIMETER EXCEPTION PLAT DEDICATION EXAMPLE

CITY OF SCOTTSDALE PERIMETER EXCEPTION PLAT APPROVAL BLOCK	
Approved by the Council of the City of Scottsdale, Arizona this the _____ day of _____, 20____, by _____ Mayor.	
ATTEST by: _____ City Clerk	
This plat has been reviewed for compliance with the City of Scottsdale's Design Standards and Policy Manual specifications. By _____ Date _____ Chief Development Officer	
This plat has been reviewed for compliance with the development standards of the City Of Scottsdale's Development Review Board (DRB) Case No. _____, and Zoning Case(s) No. _____, and all case related stipulations. Any material change to the Development Agreement, the DRB approval, and the development standards of the above referenced zoning district and any associated zoning action etc., to the property of this plat will require review by city staff to assure Development Agreement, DRB and Zoning compliance, and may result in additional city approvals as determined by city staff. By _____ Date _____ Project Coordinator	

# GRADING & DRAINAGE



This chapter provides guidance for complying with specific federal, state, county, and city regulations applicable to floodplain management, water quality, and stormwater management. It presents guidance for preparing drainage reports and grading and drainage plans using the Flood Control District of Maricopa County's design standards and methodologies.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# GRADING & DRAINAGE

# 4-1

## GENERAL INFORMATION

## 4-1.000

This chapter provides guidance for complying with various federal, state, county and city regulations applicable to land development issues of floodplain management, water quality and stormwater management. Examples of these regulations include the National Flood Insurance Act, the federal Clean Water Act (CWA), state and county statutes and the Scottsdale Revised Code, specifically Chapter 37, otherwise known as the Floodplain and Stormwater Regulation, see [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes). Other agency permits or certifications may be necessary to obtain prior to receiving permits from the city and those requirements, timeframes and processes should be considered.

Specific guidance is presented for preparing drainage reports and grading and drainage plans using design standards and methodologies developed by the Flood Control District of Maricopa County. See [www.fcd.maricopa.gov](http://www.fcd.maricopa.gov) for their Drainage Design Manuals.

## FEMA REQUIREMENTS

## 4-1.100

As a participant in the National Flood Insurance Program (NFIP) that is administered by the Federal Emergency Management Agency (FEMA), Scottsdale must require the following:

1. Lowest floor elevations shall be referenced to the City of Scottsdale's datum, NAVD 88. The nomenclature for referencing lowest floor elevations shall be LF88= "Elevation". If benchmarks or topographic information is not on this datum, then a datum equation shall be shown on the plans to equate the plan information to the city's datum.
2. All habitable structures must be designed such that they will not be flooded during any storm event, up to and including the 100-year event in accordance with Scottsdale Revised Code.
3. Construction documents that establish the lowest floor elevation for a habitable structure shall include a completed FEMA information block, see [Section 1-2.100](#).
4. Habitable structures located in an area designated as a special flood hazard zone on the Flood Insurance Rate Map (FIRM) as mapped by FEMA must include an Engineer's Certification statement.
5. A FEMA Finish Floor Certificate must be completed for all habitable structures prior to the issuance of a Certificate of Occupancy, see [Section 1-2.100](#).

## SPECIAL FLOOD HAZARD ZONES

## 4-1.101

Portions of the City of Scottsdale fall within areas that have been designated special flood hazard areas, as mapped by FEMA. These special flood hazard zones are zone designations that begin with an "A" and require particular attention when being analyzed and designed for development. This includes alluvial fan flood hazard areas which are designated by the symbol "AO" on the FIRMs.

Special requirements for developing on an alluvial fan must be followed. In general, there are two methods for developing on an alluvial fan-developing with and without a map revision as described below.

### **A. Developing Without a Map Revision**

Developing without a map revision involves developing in the mapped AO Zone flood hazard area while leaving the FEMA designation unchanged. This method is a reasonable approach for low-density developments, small properties and individual residences. It allows property development without the construction of major flood control measures. Although this method does not require approval from FEMA, it does require review and approval by the City for compliance with FEMA requirements. Since this method does not change the flood zone designation of the property, flood insurance requirements remain. Development requirements are listed below.

1. Proposed building sites (single family residence or subdivision) must be reasonably safe from runoff produced by the 100-year storm event.
2. Residential structures shall have the lowest floor (including basement or sunken room) elevated above the highest adjacent grade by at least as much as the depth number specified in feet on the FIRM. If no depth is specified on the FIRM, a minimum of 2 feet above the highest adjacent grade is required.
3. Site design and grading shall include adequate drainage paths around structures to guide floodwaters away from proposed structures. Structures shall not be placed in low spots or block active channels or flow paths on the fan.
4. The proposed development must address all potential flood hazard impacts created by the project within the flood hazard area (other areas of the fan), including adjacent and downstream areas beyond the mapped AO Zone.
5. Any property located below the apex of an alluvial fan, where the fan has not been structurally contained from the apex to said property, must protect its upstream perimeter with structural flood control measures. At a minimum, these measures must be designed to withstand the entire flow originating from the apex, plus tributary flows, based on existing watershed conditions for the 100-year event. This methodology assumes runoff from the upstream watershed will not increase in the future.
6. Flow rates used to design perimeter flood control measures below the apex of an alluvial fan may be adjusted as demonstrated by sound engineering analyses, if the actual flow rate reaching the perimeter is different from that at the apex. Specific approval is required to utilize a flow rate less than the full apex flow.

### **B. Developing With a Map Revision**

Developing with a map revision involves removing the property from the AO Zone. Removal of a property from the AO Zone requires that a map revision of the FIRM be obtained from FEMA. The only basis for securing a map revision, according to FEMA, requires the construction of "major, structural, flood control measures." The design and construction of these measures must be supported by sound engineering methodology and must demonstrate the effective elimination of the alluvial fan flood hazards and must meet specific FEMA design requirements. Map revisions on alluvial fans based only on fill are not accepted by FEMA. Map revisions may require participation by multiple landowners. A property that has been removed from an AO Zone is not subject to flood insurance requirements unless specifically required by the lender. Map Revision Requirements are as follows:

1. FEMA requires a thorough engineering analysis which quantifies the peak discharge, volume of water, debris characteristics and sediment loads produced by the runoff from a 100-year storm. This must be done at the alluvial fan apex under current and potential adverse (such as fully developed) watershed conditions. It must be shown that the proposed flood control measures will effectively eliminate alluvial fan flood hazards from the fan area.

2. The minimum FEMA freeboard requirement for flood control structures on an alluvial fan is 3 to 4 feet depending on the proximity to bridges, etc. A lesser freeboard may be possible; however, FEMA does not accept a freeboard of less than 2 feet. The City of Scottsdale requires that the engineering analysis demonstrate adequate freeboard and meet FEMA requirements.
3. FEMA requires that the City of Scottsdale assume ultimate responsibility for all operation and maintenance activities for major, structural, flood control measures. Responsibility for operation and maintenance activities is generally delegated to homeowners associations or other private property owners or associations. Other methods such as contracting through the Flood Control District of Maricopa County (FCDMC) require legal agreements adopted by City Council.
4. The proposed development must address all potential flood hazard impacts created by the project within the flood hazard area (other areas of the fan), including adjacent and downstream areas beyond the mapped AO Zone.

## **SECTION 404 PERMITS**

### **4-1.200**

Scottsdale is a participant in the National Flood Insurance Program. The Code of Federal Regulations requires that if a community chooses to participate in the National Flood Insurance Program, it must assure that developments within its boundaries comply with Section 404 of the federal Clean Water Act (CWA).

### **REGULATED ACTIVITIES**

### **4-1.201**

- A. The US Army Corps of Engineers (Corps) and the US Environmental Protection Agency jointly administer Section 404 of the CWA. The CWA regulates the discharge of dredged or fill material into washes, rivers, streams, lakes, certain man-made canals and other waters of the United States including wetlands. Examples of activities that might be regulated under this program include:
  - Stream crossings
  - Dam construction and flow regulation
  - Water diversion for canals, irrigation systems and stock tanks
  - Streambed modification and stabilization, and
  - Building subdivisions, master planned communities, highways and airports.
- B. In addition, the US Fish and Wildlife Service, Arizona Department of Environmental Quality (ADEQ), Arizona Game & Fish Department and Arizona Department of Water Resources have important advisory roles. In order to allow time for permit processing and coordinating with their timeframes, contact the Corps early in the project planning stage for information about permits, and submittal and notification requirements.

See [www.spl.usace.army.mil](http://www.spl.usace.army.mil) and click on Regulatory, then Permit Process and Technical Information, and finally within Arizona State for specific information.
- C. Individual permits may be required for projects with potentially significant impacts and require public notice. Nationwide permits (currently 44 activity-specific permits) may be authorized for activities with minimal environmental impact and undergo a streamlined process.
- D. Section 404 permit activities may not jeopardize the continued existence of a threatened or endangered species or its critical habitat. Consult with the Corps or the US Fish and Wildlife Service for guidance concerning the Cactus Ferruginous Pygmy Owl and other threatened and endangered species within Scottsdale.

**4-1.202****COMPLIANCE REQUIREMENTS**

Applicants must complete the City of Scottsdale Section 404 Certification Form as assurance that a development project complies with Section 404 of the CWA. For this form see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

An applicant must submit a completed form with improvement plans to Project Review staff prior to receiving any development permits. To prevent delays in obtaining development permits, submit applications to the Corps for a Section 404 permit as early as possible and allow for the necessary processing time.

**4-1.203****SECTION 401 CERTIFICATION**

While the Corps issues the Section 404 permit, Section 401 of the CWA requires ADEQ to certify (possibly with additional conditions) that the draft permit complies with effluent limits, state water quality standards, and appropriate requirements of state law. The goal of the program is that no discharge of dredged or fill material be permitted if either a practicable alternative exists that is less damaging to the aquatic environment, or if the nation's waters would be significantly degraded.

ADEQ has authority under Section 401 of the CWA to grant, deny or waive water quality certification for both individual and nationwide Section 404 permits. The Corps cannot issue a permit, individual or general, where ADEQ has not approved or waived certification or where ADEQ has denied certification. For more information contact ADEQ or visit [www.azdeq.gov/environ/water/permits/dredgea.html](http://www.azdeq.gov/environ/water/permits/dredgea.html).

**4-1.300****STORMWATER QUALITY****4-1.301****CONSTRUCTION GENERAL PERMIT**

Before any construction activities that will disturb one or more acres begin, these activities must be authorized by ADEQ under the Arizona Pollutant Discharge Elimination System (AZPDES) Construction General Permit. The City of Scottsdale also requires evidence of compliance before issuing development permits.

Stormwater runoff from construction sites can include pollutants such as phosphorous, nitrogen, pesticides, petroleum derivatives, construction chemicals, solid wastes and sediment that adversely affect water quality. Compliance under this permit will help prevent these pollutants from entering washes, lakes and other surface waters and the city's storm drain system.

**4-1.302****HOW TO OBTAIN COVERAGE**

The operator of a construction site is responsible for obtaining coverage from ADEQ under the AZPDES permit. The operator can be the owner, developer, general contractor or individual contractor responsible for operational control. When this responsibility is shared all operators must apply for coverage.

To gain coverage operators of construction sites must:

- Submit a Notice of Intent (NOI) to ADEQ for authorization;
- Prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) and keep a copy on site;
- Include 2 copies of the NOI and SWPPP with improvement plan submittal to the City of Scottsdale.

The city will review stormwater management plans and is authorized to enforce stormwater management requirements and inspect and respond to complaints of violations.



- Send a Notice of Termination (NOT) to ADEQ and the City of Scottsdale once construction is completed as defined in the general permit.

Contact ADEQ at (602) 771-4449 for specific permit requirements or see their website [www.azdeq.gov/environ/water/permits/stormwater.html](http://www.azdeq.gov/environ/water/permits/stormwater.html) for NOI and NOT forms and guidance for preparing the SWPPP. Forms are also available from the City of Scottsdale's One Stop Shop [www.ScottsdaleAZ.gov/bldgresources/counterresources/](http://www.ScottsdaleAZ.gov/bldgresources/counterresources/).

## **STORMWATER MANAGEMENT**

### **4-1.400**

### **METHODOLOGY**

#### **4-1.401**

The City of Scottsdale utilizes design standards and methodologies as described in the Drainage Design Manuals for Maricopa County which include Volume I Hydrology, Volume II Hydraulics and Volume III Erosion (except as noted in the Flood Control District of Maricopa County). The manuals may be obtained from the Flood Control District, see [www.fcd.maricopa.gov](http://www.fcd.maricopa.gov). Scottsdale standards and policies shall prevail for any discrepancy between the Flood Control District's manuals and City of Scottsdale Design Standards and Policies. Engineers should discuss any such discrepancy with the appropriate city staff for resolution prior to submitting reports and plans for review.

The city's stormwater storage requirements are contained in Chapter 37-42(I), "Floodplain and Stormwater Regulation" of the Scottsdale Revised Code, see [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

### **STORMWATER STORAGE**

#### **4-1.402**

Stormwater storage facilities are designed as detention facilities. Retention facilities are a rarely acceptable alternative and will only be allowed with prior written consent from city staff.

In-line detention basins and the use of drywells is generally discouraged and requires express written consent from the City of Scottsdale. All other alternatives for managing the disposal of stormwater shall be investigated prior to consideration of the use of drywells.

#### **A. Stormwater Storage Basin Design**

##### **1. Design Volume**

City Code requires that "As a minimum, all development will make provisions to store runoff from rainfall events up to and including the 100-year, two hour duration event." This storage requirement applies to the total disturbed area within the development to the centerline of adjacent streets and alleys, and includes all easements, tracts and other rights-of-way. The disturbed area includes any man-made change, such as but not limited to, construction, mining, excavation, filling, grading or paving. The volume of storage provided on-site must equal the total runoff volume generated from all of the disturbed area within the site for fully developed conditions. Pre-development versus post development comparisons are not acceptable in computing required storage volumes.

The storage requirement is not applicable to undisturbed, natural areas and such areas on a site may be excluded from the area used in the storage requirement calculation.

##### **2. Certified Volume**

The property owner will provide the city with certified, as-built dimensions of the basins, and the actual volume of storage provided. This must be based on as-built topographic surveys performed by an engineer or land surveyor licensed in the State of Arizona. These as-built volumes must reflect permanent, finished landscaping in place. The as-built volume must meet or exceed the required design volume. A Letter of Certification prepared by an Engineer licensed in the State of Arizona must be submitted to the city stating that the provided volume meets or exceeds the required design volume, and that

the facility is constructed to perform as designed. The volume of storage provided must equal or exceed the approved design volume before the city will issue a Letter of Acceptance.

### **B. Storage Facilities**

1. Off-site washes should not be routed into or through on-site stormwater storage basins. Basins located on-stream interrupt the natural flow regime of the wash and can create a continual debris and sediment maintenance problem.
2. Storage basins should be designed with a positive gravity drain system whenever possible. City Code Section 37-42 (l)(3) identifies other acceptable methods of draining, see [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes). Dry wells may only be used as a last resort.
3. Basin side slopes shall not exceed a 4:1 (4 foot horizontal to 1 foot vertical) ratio.
4. The depth of water in a basin shall not exceed 3 feet, as calculated using the volume from the 100-year, 2-hour storm event.
5. Storage basins shall have an emergency spillway to safely direct overflow into a recognized watercourse.
6. Above ground storage basins contained by an earthen dam or levee are prohibited unless the fill is part of an approved street or road design.
7. Storage facilities on individual residential lots are generally prohibited and only allowed in specific circumstances that must be approved in advance by city staff.
8. On-lot storage is only permitted when unobstructed physical, legal and visual access are provided.
9. A drainage easement contiguous to public rights-of-way shall be dedicated such that it provides legal access to and fully encompasses the physical limits of the basin for the purpose of inspecting, maintaining or reconstructing the basin in the event the owner fails to do so.
10. Storage water shall be designed to drain to a recognized watercourse. Water may not generally be discharged onto a city street, gutter or alley. Specific, prior written approval from the city is required to discharge water into a street, alley or gutter.
11. All storage facilities shall be designed such that the stored runoff shall be discharged completely from the facility within 36 hours following the storm event. This city ordinance requirement is related to Maricopa County Health Department Standards.
12. Drain time should be maximized to ensure the effectiveness of the basin. Drain time should generally be from 12 to 24 hours. Discharge from the basin may be regulated with an orifice plate, with a minimum diameter of 6 inches, over the entrance of the outlet pipe as long as the outlet pipe meets the minimum size pipe requirements.

## **4-1.403**

### **UNDERGROUND STORMWATER STORAGE POLICY**

#### **A. Policy**

This policy supplements Scottsdale Code requirements for all stormwater storage. Underground stormwater storage involves constructing underground tanks, pipes, or vaults that accept stormwater runoff by means of inlets and storm drain pipes. The city approves underground storage only after rigorous analysis of storage system location, specifications, access, operation and maintenance, liability, and signage.

#### **B. Projects Qualifying for Underground Stormwater Storage**

Project must meet the following criteria:

1. Project must be located within an industrial, commercial, non-residential or multi-family development; no underground stormwater storage will be approved for single family residential developments.

2. Project must have a viable property maintenance organizer or other maintenance mechanism to assume continued maintenance of the underground stormwater storage system and protect the public interest.

**C. General Criteria for Underground Stormwater Storage System Design**

1. Underground stormwater storage systems must demonstrate protection of public health, safety, and welfare as established by city codes and policies.
2. All underground stormwater storage elements must meet industry standards or stricter standards.
3. Storage system must not be located under building or parking garages.
4. The owner must dedicate a drainage easement to the city which incorporates the storage system and any additional area needed to allow for maintenance. A 5-foot setback from the property line must be provided to enable access for inspection and maintenance.
5. Design access must address:
  - a. Water quality, and incorporate water quality protection measures to protect underground and surface water resources to meet applicable water quality standards.
  - b. Consequences of a complete storage system failure (i.e., no storage), with particular attention to the possibility of structure or street flooding.
  - c. Vector control within storage system.
  - d. Redundancy in case of failure, sediment accumulation, or stormwater events that are greater than 1% event.
  - e. Initial suspended sediment load removal ("first flush").
  - f. At least a 75 year life of entire system, including the lining and coating of the underground storage tank.
  - g. Drainage by gravity. Pumped systems will only be considered if no other reasonable alternative exists.

**D. Specific Criteria for Underground Stormwater Storage Design**

1. Outfall—underground storage systems must have some sort of outfall, such as gravity drains or pumps.
2. Pipes—underground storage system pipes must have a smooth interior floor.
3. Installation—excavation, bedding, and backfill procedures and materials must be in accordance with MAG standards.
4. Access—a minimum of two access points must be provided for each underground storage system to enable inspections and removal of accumulated sediment and debris. Access must be in accordance with MAG standards.

**E. Criteria for Operations, Maintenance and Liability**

1. Operations and maintenance generally—owner must provide:
  - a. Maintenance staff with expertise in operation, inspecting, and maintaining an underground stormwater storage system;
  - b. An Operations and Maintenance Manual on site for the system that includes: (i) a schedule for inspections and maintenance, and (ii) provisions for emergency operations due to power failure, pump failure, and clogged outlet structures;
  - c. A log of the inspections and required maintenance services.
2. Inspections and maintenance required—In addition to maintenance required by the Scottsdale Code and other applicable requirements, owner shall:
  - a. Inspect system after each storm event of 0.6 inch or more, and semiannually, preferably prior to summer and winter rains.

- b. Remove accumulated trash and debris from inlet and outlet structures as needed to ensure free flow of stormwater.
  - c. Check accumulated trash and debris from inlet and outlet structures as needed to ensure free flow of stormwater.
  - d. Inspect all other elements of the drainage system (pipes, geotextiles, and stone) and repair/replace elements as needed for the storage system to operate at peak efficiency.
3. Signage—Before receiving a certificate of occupancy, owner must install signs at each end of the underground storage tank that read “Notice—Underground Stormwater Storage Tank.” The size, color, and locations of signs are subject to city staff approval.
  4. Liability—Owner assumes all liability for the design, construction, maintenance and failure of the underground stormwater storage system in perpetuity and hold the city harmless from any such liability. A signed and notarized document to this effect must be recorded by Maricopa County.

#### 4-1.404

### STREET DRAINAGE

#### A. 100-Year Access

All properties as a condition of development, must be accessible during the 100-year frequency storm event. Access is considered to exist if it is demonstrated that at least one access road, consisting of a structural roadway section such as asphalt, concrete or compacted aggregate has a depth of flow no greater than 1 foot during the peak flow for the 100-year frequency event. See [Figure 4.1-2](#) for allowable limits of inundation for specific street sections.

#### B. Valley Gutters

Valley gutters are permitted on local streets for the purpose of transporting runoff when a storm drain system is not required. Valley gutters are generally not acceptable for use on collector or arterial streets. In unusual cases, valley gutters may be necessary in order to convey runoff across a collector street. In such situations, the valley gutter shall be a minimum of 8 feet in width in order to lessen the impact on traffic.

#### C. Roadside Ditches

Ditches must intercept and safely convey flow to the nearest recognized watercourse. If more than normal sheet flow runoff from the road cross section or cut slope is intercepted or accumulated in the roadside ditches before it can be safely discharged, then the ditches need to actually be sized. If velocities exceed 4 to 5 feet per second, then appropriate erosion or scour protection must be provided. Ditches are necessary to prevent runoff and debris from washing onto the roadway and causing erosion of roadway areas adjacent to the edge of pavement or curbing and prevent roadway runoff from flowing into front yards, driveways, garages and homes.

See Figure 4.1-1 for a typical cross section for roadside ditches for use on non-raised curb street or straight cross slope.

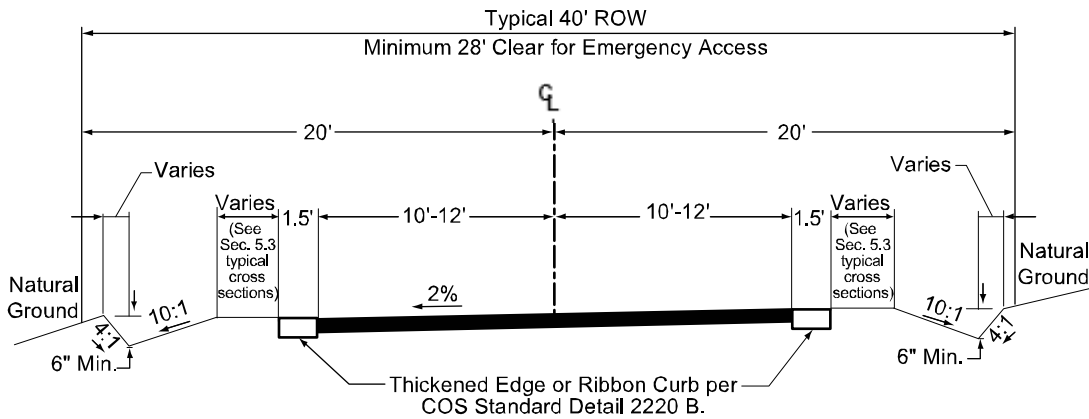


FIGURE 4.1-1 TYPICAL CROSS SECTION OF ROADSIDE DITCHES

**CHANNEL DRAINAGE**

4-1.405

**A. Channel Lining**

The design flow capacity of a wash or channel may not be reduced by the placement of channel lining or erosion protection, or landscaping material including revegetation. Channel sections shall be designed such that the final finish grade is the surface of any channel lining or erosion protection and channel flow capacity shall be calculated with appropriate reductions for any landscaping or revegetation within the limits of inundation for the 100-year event.

**B. Culvert Sizing**

1. The minimum pipe size of culverts and storm drain laterals shall be 18 inches in diameter. In a situation where debris may be expected, consult with City staff for applicable debris criteria.
2. Private culverts should be sized to manage the 100-year runoff, but should not be less than 15 inches in diameter when possible. Culvert installations that do not have 100-year peak flow capacity must be designed to adequately convey the balance of runoff by channel or other means to the appropriate watercourse.
3. If a culvert invert is placed more than 0.5 feet below the natural wash flowline, the capacity of the culvert must be considered to be reduced by the cross sectional area below this depth.
4. Stormwater runoff can not be conveyed under residential structures.
5. Manholes will be required at all horizontal and vertical changes in culvert alignment.

HYDRAULIC DESIGN CRITERIA			
Drainage Feature	Peak Frequencies		
	10 Year	25/50 Year	100 Year
Street with Curb & Gutter	Contain runoff within street curbs. For collector and arterial streets maintain one 12 foot dry driving lane in each direction.	N/A	Contain runoff below the building's finished floor. <i>Runoff to be confined to road rights-of-way or to drainage easements.</i> <i>d<sub>max</sub>=8 inches above the street.</i>
Street without Curb & Gutter (Dirt Roads, Ribbon Curbs)	Contain runoff within roadside channels with water surface elevation below roadway pavement's subgrade.	N/A	Same as Street with Curb and Gutter.
Street with Storm Drain System	Add pipes or roadside channels if 10-year runoff exceeds street capacity.	N/A	Use storm drain systems if 100-year runoff inundates building's first floor. <i>Catch basins, scuppers, etc. to be provided to remove water so as not to exceed d<sub>max</sub> =8 inches.</i>
Cross Road Culvert or Bridge for Major Collector & Arterial Streets	N/A	<i>Runoff to be conveyed by culvert or bridge under road with no flow overtopping the road for a 50 year event.</i>	<i>Runoff to be conveyed by culvert and by flow over the road with maximum 6-inch flow depth over the road.</i>
Cross Road Culvert or Bridge for Local and Minor Collector Streets, Local Residential and Commercial/Industrial Streets	<i>Runoff to be conveyed by culvert or bridge under road with no flow overtopping the road.</i>	<i>For a 25-year frequency storm runoff to be conveyed by culvert or bridge and by flow over the road with maximum 6-inch flow depth over the road.</i>	Maximum depth over road 12 inches.
Any street or watercourse crossing that provides the only access to residential area.	N/A	N/A	<i>All lots and structures must be accessible by at least 1 route with the depth of flow no greater than 1 foot during the 100-year runoff event.</i>
FEMA Floodplain Channel (1)	N/A	N/A	100-year peak discharge
Open Channel for Off-site Flow through Development	N/A	N/A	100-year peak discharge
Detention / Retention Storage Basin	N/A	N/A	100-year 2-hour storm for determining on-site retention volume

FIGURE 4.1-2 HYDRAULIC DESIGN CRITERIA

## 4-1.406

**MULTIPLE FREQUENCY EVENTS**

Stormwater runoff shall be managed for all storm events. This includes management and peak attenuation of minor storm events in addition to the 100-year event. Runoff from events greater than the 100-year event must be directed to recognized watercourses and away from structures. (See Figure 4.1-2.)



## 50 CFS WASHES - ESL AREAS

The Environmentally Sensitive Lands Ordinance (ESLO) directly impacts the location and design of residential, commercial, industrial and institutional development in two-thirds of the city. It identifies and protects environmentally sensitive lands (ESL) and promotes public health and safety by controlling development on these lands. The ordinance requires that a percentage of each property be permanently preserved as natural area open space (NAOS) and that specific environmental features, including vegetation, washes, mountain ridges and peaks be protected from inappropriate development. The City Council adopted changes to ESLO, effective in May 2004, which defined natural washes as the highest priority for dedicating NAOS and created a review process for modifying significant washes.

See [Section 2-2.000](#) and [www.ScottsdaleAZ.gov/code](http://www.ScottsdaleAZ.gov/code) for ESLO requirements.

### A. Protecting 50 cfs Washes

With the 2004 ESLO revision, natural wash preservation became the highest priority for site plan development. Site plan designs should accommodate natural washes in their native locations and conditions. The goal is to minimize modifications of the flow and natural features of significant washes.

Significant washes are defined as having a 100-year storm flow of 50 cfs or more. Washes of this type typically have concentrations of mature and dense vegetation along their banks. In some cases it will be necessary to modify the existing character of a wash to accommodate reasonable improvement of a property and protect lives and property. Applicants must submit an ESLO Wash Modification Form when proposing to alter a wash of 50 cfs or greater flow. The modification may be granted by the Zoning Administrator if both the drainage facilities design solution is approved and the purpose of the ESL overlay district is achieved. Note that the city cannot require dedication of more NAOS than is currently required by this ordinance. For the ESLO Wash Modification Form see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

Walls are not allowed to cross major or minor washes, as defined in ESLO, unless specifically approved by the City Council. Wash corridors should provide for unimpeded flows of stormwater and the movement of native wildlife.

### B. ESL Resources

Maps showing the locations of known washes, steep slopes, boulder formations and existing NAOS areas are available as resources to assure reasonable continuity of natural areas and protection of more significant and sensitive natural features. Maps are available at the ESLO web site, see [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes) and select ESLO & NAOS Maps.

The goal of the ESL Ordinance is to leave washes in place and in natural condition where it is practical to do so. When necessary, modifications to natural watercourses and all walls and fences crossing natural watercourses will be designed in accordance with the standards and policies specified in Chapter 37 of the Scottsdale Revised Code - Floodplain and Stormwater regulation and guidance from this manual, see [Section 2-2.000](#).

Wash Modifications will only be granted if the applicant complies with all the following:

1. Proposed modifications result in an equal or enhanced quality of open space, and
2. Modification of a watercourse must include restoration of the watercourse with vegetation of the same type and of the same density as existed prior to the modification, and
3. If the wash is being redirected or otherwise modified, the wash must enter and exit the site at the historic locations and the result of the modifications shall not impact drainage considerations for adjacent properties, and
4. If the wash is being diverted into a structural solution (for example, underground pipe), the change must not impact the drainage conditions on adjacent properties and shall not reduce the integrity of any upstream or downstream corridor as meaningful open space and,

5. Applications must include a description of alternative watercourse management and engineering techniques considered for the site.

## 4-1.500

## EROSION HAZARD MANAGEMENT

### 4-1.501

### METHODOLOGY

The City of Scottsdale utilizes, as a minimum, design standards and methodologies as described in the Arizona Department of Water Resources erosion hazard guidelines and those prescribed in the FCDMC Hydraulics Manual. These apply to:

1. Structures that could fail or incur significant damage as a result of erosion or damage.
2. Proposed structures that, if built, could result in adverse impacts to adjacent properties.
3. Watercourses that do not have identified erosion hazard zones.
4. Watercourses within existing or proposed subdivisions, including residential and non-residential.
5. Watercourses identified by the City as having significant potential flood hazards.
6. Watercourses with drainage areas equal to or greater than 30 acres or a 100-year peak discharge estimate of more than 50 cfs, as estimated using the procedures in the FCDMC Hydrology and Hydraulics volumes.

Erosion hazard zones consistent with ADWR may be required for all properties under development where watercourses will be left in an undisturbed state. The city may require further analysis (Level II or III as defined by ADWR) under certain geomorphic conditions where staff is concerned that erosion limits may exceed those estimated by a Level I analysis. The city may require a slope stability analysis for some cases. In distributary flow watercourses the stability of flow divergence point and washes should be determined prior to the approval of a proposed structure.

Proposed modifications should not disturb the natural divergence location(s), especially if adjacent parcels may be adversely impacted.

Erosion hazard guidelines should be applied to all divergent watercourses adjacent to the proposed structure.

Proposed development should limit vegetation removal and concentration of flow to a minimum.

Flows will not be concentrated beyond the technical shallow swale around a structure. These swales should daylight and broaden to the original sheet flow condition on the downstream side of proposed structures. Erosion protection may be required.

The subdivision drainage design should focus on limiting the concentration of flows to the absolute minimum condition. Where flows are concentrated appropriate scour protection should be applied to the channelized reach. Concentrated flows shall be returned to the natural sheet flow condition prior to exiting the property.

## 4-1.600

## STORMWATER WAIVERS

### 4-1.601

### WAIVER OF STORMWATER STORAGE REQUIREMENTS

In accordance with the Floodplain and Stormwater Regulation, stormwater storage requirements may be waived if a project meets one or more of the specific criteria listed below. Meeting the waiver criteria does not mean a waiver will automatically be granted. The potential for cumulative effects must be considered and must also be in the best interest of the public. A



waiver approval does not relieve the developer of liability if the project causes increased flood damage on any other property.

## WAIVER REQUIREMENTS

### 4-1.602

Stormwater storage requirements may be waived if specific criteria are met and if approved by the Floodplain Administrator, Stormwater Management Division staff, or the Engineering Coordination Manager. If a waiver request is approved, an in-lieu fee or in-kind contribution will be assessed. Specific criteria for considering a stormwater storage waiver are:

1. The runoff for the project has been included in a storage facility at another location. The applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.
2. The development is adjacent to a watercourse or channel that an engineering analysis shows is naturally capable or designed and constructed to handle the additional runoff without increasing the potential for flood damage to the subject property or to any other property.
3. The development is on a parcel less than 1/2 acre in size in an area where the engineering analysis demonstrates there is no significant increase in potential for flood damage due to its development.
4. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO). The applicant must demonstrate there is no increased potential for flood damage to the subject property or to any other property. Such conflicts with ESLO may include:
  - a. Total land requirements for storage basin, easements, setbacks and NAOS prevent building allowable footprint per zoning.
  - b. Topography prevents building storage basin.
  - c. Creating a storage facility requires wash modification.
  - d. Instances where the Zoning Administrator cannot allow a modification to ESL requirements. See [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).
5. The project is located within the Downtown Fee Reduction Area as described and approved by City Council Resolution #6238. The applicant must demonstrate there is no increased potential for flood damage to any property. Even if the project is located in the Downtown area, if the project creates additional potential for increased flood damage, the developer must provide alternative mitigation methods to prevent the damage. See [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).
6. The project is located within a watershed that drains directly to the Salt River Pima-Maricopa Indian Community (SRPMIC). The project must provide the pre-development peak discharge flow to the SRPMIC, and attenuate flows over and above pre-development.

## WAIVER PROCESS

### 4-1.603

To obtain a waiver the developer must submit for review a **Request for Stormwater Storage Waiver Form** (and complete its **In-Lieu Fee and In-Kind Contributions Calculations Sheet**) and a signed engineering report or other satisfactory documentation that the project meets one of the six criteria. After staff review is complete, the applicant will receive a copy of the processed Waiver Form which will indicate that additional information is needed, or that the waiver is approved or denied. For the Request for Stormwater Storage Waiver Form and its In-Lieu Fee and In-Kind Contributions Calculations Sheet, see [www.ScottsdaleAZ.gov/Assets/documents/bldgresources/stormwaterwaiver.pdf](http://www.ScottsdaleAZ.gov/Assets/documents/bldgresources/stormwaterwaiver.pdf).

Final improvement plans will not be accepted for review without a copy of the approved Waiver Form unless the project is designed to provide the full ordinance storage volume.

The completed Waiver Form, including the In-Lieu Fee and In-Kind Contributions Calculations sheet, must be included in the final drainage report when submitted for city approval. Forms can be downloaded from [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

#### 4-1.604

### IN-LIEU FEES

To obtain a stormwater storage waiver, the Floodplain and Stormwater Regulation requires the development to contribute to the cost of drainage works. In-lieu contributions will be applied to the construction of drainage improvements throughout the city.

The developer shall calculate the in-lieu contribution as shown on the Request for Stormwater Storage form. The In-Lieu Fee and In-Kind Contributions calculations sheet must be included with the Request for Stormwater Storage Waiver Form when submitted to the city for review and approval. See [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms). The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated fee. The Floodplain Administrator or designee must approve in-lieu fees and in-kind contributions.

#### 4-1.700

### DRAINAGE EASEMENTS

#### 4-1.701

#### EASEMENT DEDICATION

##### A. Conditions Requiring Dedication of Drainage Easement

In accordance with the Floodplain and Drainage Ordinance, drainage easements are required for all natural and man-made drainage ways with a 100-year, 6-hour peak flow of 50 cfs or greater in ESL areas, and for all natural and man-made drainage ways with a 100-year, 6-hour peak flow of 25 cfs or greater in non-ESL areas. In addition, all drainage facilities including structures and storage basins must be incorporated into a drainage easement. Easement dedication and confirmation forms are available at [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

##### B. Extent of Drainage Easement Dedication

A Drainage Easement shall be dedicated to the limits of inundation of stormwater from the 100-year, 6 hour storm event for all natural and man-made drainage ways described above, including structures and storage basins. Drainage Easement dedications shall encompass all physical structures including sufficient area to access and maintain the drainage facility. Drainage Easements shall either be contiguous to roadway rights-of-way, or an additional easement for the purposes of access, inspection and maintenance of the basin shall be dedicated to the City of Scottsdale regardless of maintenance responsibilities for the basin or facility.

#### 4-1.702

#### RELEASE OF DRAINAGE EASEMENT

##### A. Requirements for Releasing a Drainage Easement

Release, including modification, of an existing drainage easement is possible only if one of the following circumstances can be documented:

1. Upstream flows have been physically cutoff or diminished;
2. More detailed or accurate topographic mapping and/or aerial photography show the original dedication to be incorrectly located; or,
3. The original hydrology is outdated or in error.

## B. Release of Easement Process

The Application to Release Existing Drainage Easement Form must be completed, along with a comprehensive drainage report that justifies the release as described above. See [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

# DRAINAGE REPORT

4-1.800

This guidance outlines requirements and provides guidance for preparing Drainage Reports to submit to the City of Scottsdale. For a Sample Outline for Drainage Reports see [Appendix 4-1A](#). The city also strongly encourages the use of Drainage Design Management System for Windows (DDMSW) available at no cost through the FCDMC.

This section is based on recommended procedures, data and basic assumptions used by engineers or designers, including but not limited to: publications of the Flood Control District of Maricopa County as referenced in [Section 4-1.401](#); regulatory requirements and this manual. If additional or alternative methods or data are believed more appropriate, city staff should be consulted and prior approval received before proceeding. When methods or data not described in this manual are used, the drainage report must include sufficient information to enable the city staff to fully evaluate the applicability of the methods and data. Hydrology and hydraulic calculations shall be performed using HEC-1, HEC-HMS or HEC-RAS programs. If the engineer wishes to use an alternate program for hydrologic or hydraulic modeling of drainage systems, prior approval by city staff is required. For a Sample Outline for Drainage Reports see [Appendix 4-1A](#).

## GOALS AND OBJECTIVES

4-1.801

At a minimum, drainage reports should meet the following basic goals and objectives:

1. Reflect requirements of the city floodplain and drainage ordinance and other applicable county, state and federal regulations
2. Use the best and most current data available
3. Provide safe, reasonable and reliable results
4. Are not unnecessarily complex or confusing
5. Provide results that are consistent with adjacent jurisdictions
6. Are technically and legally defensible
7. Provide a clear narrative of the methods used, parameters selected in the analysis and the conclusions drawn

## ACTIVITIES REQUIRING A DRAINAGE REPORT

4-1.802

An applicant is required to submit a drainage report when requesting one or more of the following:

1. General Plan Amendment or re-zoning
2. Subdivision plat approval (preliminary and final) and minor subdivision plat approval
3. Development Review Board case approval
4. Permit to construct rights-of-way improvements
5. Permit to construct any structure.

**\*Note:** A drainage report is not needed if the structure is a single family residential structure without a basement in flood hazard zone x, and is not located in the vicinity of a watercourse where the flow of rainfall runoff might be hazardous to the structure or its occupants, as determined by the City of Scottsdale.

6. Grading permit, unless the Floodplain Administrator waives the requirement
7. Modification or release of a dedicated drainage easement

**4-1.803****APPLICATION AND LIMITATIONS**

The city does not warrant or guarantee the reliability of the hydrologic methods, techniques and/or parameter values described herein. The user of this manual is expected to validate the reasonableness of the estimated values by applying alternative methods or other appropriate means. See [Appendix 4-1C](#), Warning and Disclaimer of Liability.

It is not the intent, nor purpose of this manual to inhibit sound innovative design or the use of new techniques. Therefore, where special conditions or needs exist, other methods and procedures may be used with prior city approval and appropriate documentation to support the validity of the methods.

**4-1.804****DRAINAGE REPORT PREPARATION****A. Requirements for a Drainage Report**

A drainage report must:

1. Analyze existing and proposed conditions and document the effect that a proposed project would have upon stormwater runoff;
2. Provide data to insure that the project will be safe from flooding;
3. Provide data supporting the design of drainage and flood control facilities.
4. Consider runoff from storms with a return frequency up to and including the 100-year event. Storm events more frequent than the 100-year 6-hour event must be managed in addition to the 100-year 6-hour event. Development shall not increase peak discharge rates above the historic peak discharge rate for any frequency event up to and including the 100-year 6-hour event. The complexity of the report depends upon the nature of the project and the site on which the project will occur.
5. Be prepared by or under the direct supervision of an engineer licensed to practice in the State of Arizona, and shall bear the seal, signature and date as required by the Arizona State Board of Technical Registration. The related design and improvement plans must conform to the requirements of the City of Scottsdale's current Floodplain and Stormwater Regulation, applicable sections of this manual and other county, state and federal regulations.

**B. The Purpose of a Drainage Report**

The purpose of a drainage report is to document that stormwater runoff has been considered in the planning of a project and that the public and its property will be protected from damage by runoff and flooding to the extent of the 100-year flood event. This applies to all properties adjacent to, or potentially impacted by, a development in addition to the property to be developed.

**C. Elements of a Drainage Report**

Each drainage report shall include a detailed narrative, topographic maps, site specific photographs and aerial photographs that describe the location and condition of the property to be developed (on-site) including upstream watersheds and downstream conditions and/or constraints that affect the property. For specific items to be included (as applicable) in all drainage report types, including a Master Drainage Plan see [Appendix 4-1A](#), Outline for Drainage Reports. For a checklist of Master Drainage Plan Submittal Requirements see [Appendix 4-1B](#).

**D. On-Site Conditions**

This section of the report should include the following basic information about the property, as applicable:

1. Narrative description of existing drainage patterns, natural and constructed watercourses, open channels, storm drains, storage basins and any other drainage structures or

improvements; and a map depicting the existing conditions, including all of the aforementioned items, plus the 100-year floodplain for all washes with either a capacity or 100-year flow rate of 25 cfs or greater, or if in ESL areas, 50 cfs or greater.

2. Description of the existing ground cover conditions and how the identification of the Green-Ampt soil characteristics were identified for the property. Provide the NRCS soil mapping excerpts.
3. Description of any existing development located on the property and how it affects drainage.
4. Justification for the selection of parameters used in analysis of on-site conditions.

### **E. Off-Site Watershed Conditions**

Watersheds from which stormwater enters or affects the property to be developed must be delineated on topographic maps. These maps should be prepared at a scale that clearly identifies drainage areas such that watershed boundaries can be accurately drawn. Contour lines shall be shown on the maps, the interval of which should be appropriate for the slope and complexity of the terrain. Recent aerial photographs are available at Digital Map Center, see <http://eservices.ScottsdaleAZ.gov/dmc/>, or from the city's Records Department. Current aerial photograph(s) that show the off-site watershed areas and adjacent properties, relative to the project site, must be included in each drainage report.

This section of the report should include the following basic information, as applicable:

1. Existing upstream and downstream drainage patterns and a description of how existing developments on adjacent properties affect drainage on the project area;
2. A description of the ground cover conditions assumed and how the Green Ampt soil classes were determined for the off-site watersheds;
3. A description of fully developed off-site conditions in accordance with the approved Land Use Element of the General Plan for Scottsdale, with a discussion of any potential adverse affects on this or other projects.
4. A description of any proposed projects or developments, which have approved designs and that will affect this property. Research approved drainage plans and reports for private or capital improvement projects that may impact drainage on the property.
5. Describe any other unusual conditions, which would significantly affect drainage on the property.
6. Justification of the selection of parameters used in analysis of off-site conditions.

### **F. Proposed Drainage Plan**

Describe how the proposed project will manage stormwater runoff and the sequence of infrastructure installation and any planned phasing of the project.

#### **1. Depicting Pre- and Post-Project Topography**

Prior to development, existing topographic conditions influence the flows of stormwater runoff from off-site watersheds as well as runoff originating on the property. Topographic changes resulting from development will impact these drainage characteristics, including the time of concentration. The drainage report must include sufficient pre- and post-project topographic information to demonstrate these impacts. This information shall be depicted on contour maps that show adjacent properties, including off-site watersheds, in addition to the property being developed, to provide context for the potential impact of development. Information about adjacent property, such as significant differences in elevation, walls, drainage structures, buildings (including lowest floor elevations), etc., must be included.

#### **2. Pre- and Post-Project Stormwater Runoff**

The amount and characteristics of the stormwater runoff exiting the property both prior to and after development shall be depicted for the 2-year, 10-year and 100-year storm events. If, as a result of development, drainage flows will be reduced by facilities such as stormwater storage basins, the effect of these facilities on flows exiting the property should be described and



depicted on appropriate maps. Construction of roads, parking areas, roofs, channels and other development features results in the increase of runoff volumes, peak discharge rate and reduces times of concentration.

### 3. Basis of Design for Drainage and Flood Control Facilities

Summarize the design criteria used; provide a description of the facility, its purpose and the design approach used. Details, sketches, data and calculations that support the design and the criteria for the selection of materials and the location should be included in an appendix.

### 4. Basis for Selection of Lowest Floor Elevations

Lowest floor elevations must provide protection from flooding. The basis for the selection of a floor elevation or the design of protection for the interior of the building, must be clearly presented. Supporting documentation should be included in an appendix.

## G. Conclusions

### 1. Overall Project

Provide conclusions based on the completion of the project in its entirety, for projects that are not constructed in phases, or upon the completion of all phases within a project.

### 2. Description of the Provisions for Project Phasing

Describe the phasing of parcels and the timing of the installation of drainage facilities. Any project, particularly a large one, may have interim stormwater runoff, flooding and erosion problems that would not exist after project completion. The report must indicate how the phasing will occur, what interim drainage problems are anticipated, and what interim measures will be taken to protect against them.

## 4-1.805

### MASTER DRAINAGE PLAN REQUIREMENTS

[Appendix 4-1B](#) is provided as a checklist to assist in submitting a complete and successful Master Drainage Plan to the city. The items on this list are required as part of the submittal of a Master Drainage Plan in addition to the requirements of [Section 4-1.804](#). Submittals shall include 2 copies of the Master Drainage Plan Report for the initial and subsequent reviews, 6 copies for final approval.

## 4-1.806

### METHODS FOR ESTIMATING PEAK DISCHARGE

Two methods are defined for the determination of peak discharges: the Rational Method and rainfall-runoff modeling using the U.S. Army Corps of Engineers' HEC-1 Flood Hydrograph Package. For watersheds less than 160 acres, the Rational Method is acceptable. For watersheds that are non-uniform, irregular in shape or larger than 160 acres, or if routing of flows is necessary, HEC-1 modeling is required. Prior approval by city staff is required for the use of other methods.

#### A. Watershed Conditions

Watershed conditions that produce the greatest peak flow rate shall be used to size drainage facilities or to determine lowest floor elevations of a structure to protect from flooding. A watershed that is fully developed in accordance with the city's General Plan Land Use Element will usually produce the greatest peak flow rate, but other interim conditions such as the current state or development of the watershed in accordance with existing zoning may produce a greater peak flow rate and must be considered.

#### B. Split-Flow Conditions

Split-flow channel conditions exist in northern parts of Scottsdale and must be taken into consideration. These splits in the alluvial channels usually include highly erosive soils and are generally unstable and therefore unpredictable. In setting finished floor elevations relative to upstream splits, it should be assumed that 100% of the flow could go either direction in any

given flood event. For infrastructure design, the estimate of the actual split based on a hydraulic analysis of the current channel cross sections must include a minimum safety factor of 30 percent of the total flow. If the designer feels that there are extenuating factors affecting the stability of the split, the safety factor should be increased accordingly. The report should include a description of all assumptions made regarding watershed conditions used to calculate the peak flow rates.

**C. The Rational Method**

The Rational Method is limited to use on small, uniform, regularly shaped watersheds less than or equal to 160 acres in size. The methodology is provided in the Drainage Design Manual for Maricopa County, Hydrology.

**1. Precipitation**

Precipitation input is rainfall intensity, “I,” and can be obtained directly from NOAA 14 at [http://hdsc.nws.noaa.gov/hdsc/pfds/sa/az\\_pfds.html](http://hdsc.nws.noaa.gov/hdsc/pfds/sa/az_pfds.html) or from Figure 4.1-3. The time of concentration, “T<sub>c</sub>,” is all that is required to determine “I” from this figure.(source: NOAA 14)



RAINFALL INTENSITY-DURATION-FREQUENCY RELATION FOR MARICOPA COUNTY, ARIZONA

FIGURE 4.1-3 RAINFALL INTENSITY (I) VALUES FOR USE IN RATIONAL METHOD

## 2. Time of Concentration

Time of concentration “T<sub>c</sub>” is the total time of travel from the most hydraulically remote part of the watershed to the concentration point of interest. The calculation of “T<sub>c</sub>” must follow FCDMC Hydrology Manual procedures.

**\*Note: Do not add a standard set amount of time to the estimated “T<sub>c</sub>” for lot runoff delay (such as 5 or 10 minutes).** Natural land slopes are too variable in Scottsdale to add a set amount of time for lot runoff.

## 3. Runoff Coefficients

Use [Figure 4.1-4](#) or equivalent to obtain the runoff coefficients or “C” values. Composite “C” values for the appropriate zoning category or weighted average values calculated for the specific site are both acceptable approaches.

RUNOFF COEFFICIENTS - “C” VALUE			
Land Use	Storm Frequency		
	2-25 Year	50 Year	100 Year
Composite Area-wide Values			
<b>Commercial &amp; Industrial Areas</b>	0.80	0.83	0.86
<b>Residential Areas-Single Family (average lot size)</b>			
R1-1-1901	0.33	0.50	0.53
R1-130	0.35	0.51	0.59
R1-70	0.37	0.52	0.60
R1-43	0.38	0.55	0.61
R1-35 (35,000 square feet/lot)	0.40	0.56	0.62
R1-18 (18,000 square feet/lot)	0.43	0.58	0.64
R1-10 (10,000 square feet/lot)	0.47	0.62	0.67
R1-7 (7,000 square feet/lot)	0.51	0.64	0.94
<b>Townhouses (R-2, R-4)</b>	0.63	0.74	0.94
<b>Apartments &amp; Condominiums (R-3, R-5)</b>	0.76	0.83	0.94
<b>Specific Surface Type Values</b>			
Paved streets, parking lots (concrete or asphalt), roofs, drive-ways, etc.	0.90	0.93	0.95
Lawns, golf courses, & parks (grassed areas)	0.20	0.25	0.30
Undisturbed natural desert or desert landscaping (no impervious weed barrier)	0.37	0.42	0.45
Desert landscaping (with impervious weed barrier)	0.63	0.73	0.83
Mountain terrain – slopes greater than 10%	0.60	0.70	0.80
Agricultural areas (flood-irrigated fields)	0.16	0.18	0.20

**FIGURE 4.1-4 RUNOFF COEFFICIENTS FOR USE WITH RATIONAL METHOD**



## D. The Army Corps of Engineers' HEC-1 Computer Model

HEC-1 procedures are applicable for any watershed area over 160 acres and up to 100 square miles in size. HEC-1 is required for analyzing drainage areas over 160 acres in size. Minimum required submittals when using HEC-1 are:

- A printout of the input data
- A schematic (routing) diagram of the stream network
- The runoff summary output table which includes drainage basin name, area, 100-year flow and 10-year flow values
- Electronic input file(s) on CD
- Supporting Documentation and Source Material for parameter selection
- HEC-1 models shall be submitted without warnings or error messages.
- Adjustments to the modeling parameters made to address warnings and error messages will have a narrative section to detail the impact of the adjustments on the output.

### 1. Precipitation

Precipitation values for HEC-1 modeling shall be determined using the Drainage Design Manual for Maricopa County, Hydrology, specifically PD and JD records for point rainfall and area reduction factors. Capital Projects shall use the ADOT manual and methodology when specified. Precipitation values are to be obtained from the Isopluvial maps for the specific frequency desired, see [Appendix 4-1D](#).

### 2. Infiltration

Infiltration or soil losses will be determined using Green and Ampt (G&A) procedures per FCDMC Hydrology Manual. Use the most recent published NRCS soil survey maps of the area to determine the hydrologic soil group or surface soil texture for the G&A procedures. Use USDA Natural Resources Conservation Services (previously the Soil Conservation Services) maps, Soil Survey of Aguila-Carefree Area, Parts of Maricopa and Pinal Counties, or the Soil Survey of Eastern Maricopa and Northern Pinal Counties, Arizona depending on what part of the city the project is located.

### 3. Hydrograph Generation

Small basin or sub-watershed hydrographs can be generated using the Clark unit hydrograph procedure or S-graph method as described in the FCDMC Hydrology Manual.

### 4. Time Of Concentration ("Tc")

Use the estimated time of travel from the most hydraulically remote part of the watershed to the concentration point. The Drainage Design Manual for Maricopa County, Hydrology is recommended for obtaining Tc.

### 5. Channel Routing

Channel routing should use the Normal Depth (Modified Puls), eight point routing procedure as described in the FCDMC Hydrology Manual.

**CAUTION:** For the 1990 version of the HEC-1 program, do not use the kinematic wave method with the multi-ratio JR cards because the hydrographs do not combine properly. For the 1988 version, do not use JD cards with the Green-Ampt method as errors will result. HEC-1 versions prior to the 1988 version will not be accepted.

## E. Pre-Versus Post-Development Discharge Analysis Procedures

The following HEC-1 analysis procedures must be used when it is necessary to establish a comparison of pre-development to post-development discharge (runoff) conditions.

1. The HEC-1 modeling procedures described in [Section 4-1.806](#) must be followed.
2. Reflect fully developed conditions by:

- a. Increasing the percent impervious on the L card to reflect the amount of impervious surfaces that will exist under fully developed conditions
- b. Recalculate the time of concentration (**T<sub>c</sub>**) based on the proposed drainage system, after full development. Normally there should be a reduction in **T<sub>c</sub>** after development
- c. The existing condition model must be sub-divided, as necessary, to create concentration points which will match the sub-watershed areas above each proposed storage facility under fully developed conditions
- d. Each separate storage facility proposed must be modeled as it will physically exist under fully developed conditions with appropriate routing and combining operations through each basin and through the entire watershed. The modeling of storage capacity provided, as one hypothetical reservoir at the outlet with all the upstream storage arbitrarily combined at this one location, is not acceptable
- e. As a minimum, the 2, 10 and 100-year frequency events shall be analyzed
- f. Comparison of discharge values for existing and post development conditions must be made at concentration points just downstream from each proposed storage facility; other critical locations such as road crossings; and at points where flows exit the proposed development.

## 4-1.807

**CALCULATION OF RUNOFF VOLUMES**

The only accepted method for determining the required stormwater storage volume is the standard formula described below. HEC-1 modeling can be used for storage basin design and analysis, or if a pre-versus post volume difference is needed. City ordinance requires on-site storage of runoff from the 100-year, 2-hour frequency event.

**A. Standard Formula for Runoff Volumes**

<b><math>V_r = (P/12) AC</math></b>	
$V_r$	= Required storage volume in acre-feet.
$P$	= Precipitation amount = The depth of the 100-year 2-hour rainfall, from figure in <a href="#">Appendix 4-1D</a> at the site.
$A$	= Area in acres; the developed portion of the entire site in acres, to the centerline of adjacent streets, on which any man made change is planned, including, but not limited to: construction, excavation, filling, grading, paving, or mining.
$C$	= Runoff coefficient; Rational Method values from <a href="#">Figure 4.1-4</a> .

**B. HEC-1 Computer Modeling**

The HEC-1 model or similar computer program is not to be used to determine the ordinance required 100-year, 2-hour stormwater storage runoff volumes. The HEC-1 program may be used for the purpose of analyzing storage basin routing or for pre versus post analysis (a six-hour storm; procedures described in [Section 4-1.806](#) paragraphs D and E must be used). Use modified Puls level pool routing option in HEC-1 for hydrograph routing through storage basins and lakes. For permanent lakes assume no available storage below the normal water surface elevation.

**CAUTION:** Do not use the built-in orifice equation in the HEC-1 model because errors can result. It is necessary to build a stage discharge table and input to the model.

## 4-1.808

**METHODS FOR ESTIMATING WATER SURFACE ELEVATIONS AND INUNDATION LIMITS**

The engineer may use any standard method for the determination of water surface elevations. Only the U.S. Army Corps of Engineers' HEC-2, Water Surface Profiles program and the HEC-RAS, River Analysis System are supported by the City. Prior approval by city staff is required for the use of other methods.

**A. The Army Corps of Engineers' HEC- 2 and HEC-RAS Computer Models**

Minimum required submittals when using HEC-2 and HEC-RAS are:

1. A printout of the input data
2. A plan of the stream network with cross section locations and stationing. Include flow obstructions, ineffective flow areas modeled and other appropriate parameters at a sufficient scale to support the modeling. Overlay the cross sections on the topographic workmap.
3. A detailed output summary table that includes flow rates, velocities, water surface elevations, bank stations, n-values, ineffective flow stations, flow obstruction stations and other relevant parameters.
4. Cross section profiles.
5. Electronic input file(s) on CD
6. Supporting Documentation and Source Material for parameter selection
7. Models should be submitted without warnings or error messages unless prior approval is obtained to allow warnings messages. A detailed narrative is required to validate warning messages.
8. Adjustments to the modeling parameters made to address warnings and error messages will have a narrative section to detail the impact of the adjustments on the output.

**GRADING AND DRAINAGE PLANS****4-1.900**

Review [Section 1-2.100](#) for basic plan requirements that apply to all construction plans prepared for submission to the city. The following is a listing of informational and formatting requirements for the preparation of grading and drainage plans. Most grading and drainage related design requirements are contained in other portions of this chapter. Additionally, site layout and other design related requirements that may impact the overall design of grading and drainage related improvements for a project are described in other chapters of this manual.

**GRADING AND DRAINAGE PLAN REQUIREMENTS****4-1.901**

The following requirements apply to all grading and drainage plans prepared for submission to the City of Scottsdale.

1. The plan must encompass the entire development or site and a minimum of 50 feet outside. The plan must show and clearly label all existing utilities and improvements, topographic features and show topography within the site and 50 feet outside as discussed above.
2. For most projects, the plan scale should be 1 inch = 40 feet. For projects that will utilize a high level of detail for grading improvements, a scale of 1 inch = 30 feet, 1 inch = 20 feet, or 1 inch = 10 feet may be used. The use of a scale smaller than 1 inch = 40 feet shall be approved by plan review staff prior to the first submittal of final plans. In all cases plans shall be clearly readable in the opinion of final plan review staff for a 50% reduced copy of the plans.
3. Existing topography shall be in the form of 1-foot contours. The 5-foot contour line shall be darkened and/or utilize a different line type than the remaining 1-foot contour lines for readability of the plan.
4. Spot elevations may be used in lieu of 1-foot contours for sites that do not have enough relief for the use of 1-foot contours. The use of spot elevations in lieu of 1-foot contours shall be approved by plan review staff prior to the first submittal of final plans.

5. For adjacent properties, the plan must show property lines and label assessor's parcel numbers. The plan must also provide city case and plan check numbers for adjacent development that has occurred in the last 5 years.
6. The plan must show and clearly label all existing and proposed easements or rights-of-way. For existing easement or rights-of-way, the Maricopa County Recorder's number should be provided. For easements, the easement type should be labeled. A partial listing of easements that may need to be shown is as follows: drainage, water, sewer, emergency and service vehicle access, vista corridor, sight visibility, public utility, sidewalk and natural area open space. Existing street rights-of-way and street improvements shall be dimensioned as per MAG Standard Detail 112.
7. For proposed easements, the easement type should be labeled and the limits of the easement clearly delineated on the plan. For easements or portions of easements with a constant width, the width of the easement should be dimensioned.
8. If an adjacent project is planned or approved but not constructed, an outline of the proposed improvements and, if applicable, proposed property lines shall be shown on the plan.
9. The plan must show all proposed and existing property lines within the site.
10. The plans must show the 100-year 6-hour flow rate for all washes or swales entering and exiting the boundary of the site and must also provide intermediate values of the 100-year flow rate within the site at least 1 time per sheet per wash, at confluences and at points of interest such as culverts, storm drains, utility crossings, channel improvements, etc. The 100-year flow rate should be shown with a directional arrow in the following format:  
 $Q_{100} = xx \text{ cfs}$
11. The limits of 100-year floodplains should be delineated and labeled on the plan for all plans containing washes with 100-year flow rates of 50 cfs or greater.
12. For washes with 100-year flow rates of 500 cfs or greater, 100-year water surface elevations within the limits of 100-year floodplains should be shown and labeled on the plans.
13. Existing walls should be shown and labeled on the plans with top of wall elevations provided.
14. For proposed site, privacy, or retaining walls, the top and base of wall elevations should be provided on the plans. Elevations should be provided at ends, changes in elevation, or as needed to provide a reasonable level of definition of the elevations of the walls.
15. For developments with detention basins, the basin should be clearly labeled and the volume required and volume provided for the basin(s) be shown on the basin in the format  $VR = XXX \text{ ft}^3$  for volume required and  $VP = XXX \text{ ft}^3$  for volume provided.
16. A legend should be provided for all line types, symbols and abbreviations used on the plan for both existing and proposed conditions.
17. Substantial cut and fill areas should be labeled with a directional arrow with the slope expressed as horizontal to vertical in the format H:V.
18. For culverts and storm drainage, the location of the culvert and storm drain should be shown on the plans with number, material and, size of pipes and upstream and downstream invert elevation labels. Culverts and storm drains should provide a cross reference to the sheet containing the profile for the structure.
19. For plans where buildings are proposed, the outline of the building should be shown on the grading and drainage plan.
20. For plans where habitable structures are proposed, the lowest finish floor elevation should be provided within the outline of the building. Scottsdale requires that lowest finish floor elevations for habitable structures be provided based on City of Scottsdale (NAVD 88) datum for certification purposes. To accomplish this, the lowest finish floor elevations shall be provided to nearest hundredth of a foot in the format

LF<sub>88</sub> = X,XXX.XX. If plan datum is not based on NAVD 88 datum, the lowest floor elevation based on plan datum may also be provided.

21. For road wet crossings, calculate flow velocity for sediment erosion. Erosion control measures must be evaluated for scour protection and be documented.

## **ADDITIONAL REQUIREMENTS BY PLAN TYPE**

## **4-1.902**

The following requirements are in addition to the above requirements depending on the type of plan or development. Some requirements may apply to other plan types depending on the nature of the project and improvements.

### **A. Commercial and Multifamily**

1. The location, orientation and an outline of refuse enclosures, including approach slabs, shall be clearly shown on the plans.
2. Details of driveways, conforming to COS standard details, must be provided on the plans. In addition to the information contained in the city standard details for driveways, existing gutter grades at tie in, longitudinal slopes, the location of grade breaks, sidewalk ramps, curb return radii, existing curb and asphalt removal and asphalt replacement, shall be provided.
3. Horizontal control for proposed buildings, drive aisles, parking space dimensions and any other substantial improvements should be provided on either the grading and drainage plan or separate plan sheets.
4. High and low points for driveway paving should be labeled with elevations.
5. Building setback lines should be shown and clearly labeled on the plan.
6. Traffic and parking striping should be shown on the plans.

### **B. Residential Subdivisions**

1. Provide lot numbers.
2. Label tract names and street names from the final plat.
3. Dimension and label street and tract or rights-of-way widths and show street centerline with stationing from paving plans.
4. Provide longitudinal and cross slope for streets.
5. Provide 100-year flow rates at curb cuts and catch basins.
6. For small washes or swales through lots on custom residential subdivisions, the flow path should be shown on the plans.
7. Label high and low points within streets with elevation.
8. Show building setback lines for production subdivisions
9. Provide top of curb elevations at the intersection of lot lines with the tract or rights-of-way lines.

### **C. Custom Single Family Residential**

Requirements for single-family development can be found at [www.ScottsdaleAZ.gov/bldgresources/SFRProcess](http://www.ScottsdaleAZ.gov/bldgresources/SFRProcess) or contact Plan Review at 480-312-7080.

## 4-1.1000

# PRELIMINARY GRADING PERMITS

The grading and drainage related aspects of the project must be approvable in order to be considered for a preliminary grading permit. Specific requirements are:

1. The second plan review of the improvement plans must be completed prior to application for a preliminary permit.
2. All substantial grading and drainage related issues associated with a project have been resolved to the satisfaction of the engineering reviewer.
3. The project owner must submit a letter to the city requesting the preliminary permit, acknowledging that the city will not be responsible for subsequent changes to the project, and an explicit commitment to bring the project into compliance with the final approved plans.
4. A preliminary grading permit for a subdivision requires City Council approval of the final plat for the project. This requirement may be waived if approval is obtained from the Planning and Development Services General Manager. Preliminary grading permits may be issued prior to staff's approval of a Map of Dedication (MOD) for projects with an MOD.
5. A Native Plant Permit must be issued prior to the issuance of a preliminary grading permit. The Native Plant Permit number shall be placed on the improvement plans submitted for the preliminary grading permit.
6. A Haul Route Permit must be obtained, if applicable, prior to issuance of the preliminary grading permit.
7. The application for a Stormwater Storage Waiver must be approved, if applicable.
8. The completed No Conflict signature box must be placed on the cover sheet, signed and dated and all applicable No Conflict letters submitted.
9. A copy of the AZPDES Notice of Intent (NOI) must be provided, as applicable.
10. A completed Section 404 Certification form shall be provided; and if applicable, a copy of the permit from the US Army Corps of Engineers.
11. Any other project specific requirements necessary for the City to issue a final grading permit.

The submittal requirements for the preliminary grading permit application are:

- 3 full size sets of grading plans (24 inches x 36 inches),
- The permit request letter and
- Any other necessary information listed in the requirements.

Review and approval by Engineering, Planning and Fire, as applicable, is required. The review for preliminary permit is an expedited review; as such, the applicant must pay expedited review fees based on the hourly rate. The decision to approve a preliminary grading permit is at the discretion of the engineering reviewer based on the requirements listed above and on the nature of the project in general. The expedited review rate must be paid even if the preliminary grading permit is not approved.

## 4-1.1100

# STOCKPILE PLANS

Temporary on-site stockpiles may be used to temporarily store excess soil from construction operations for a development. A staff approval for the stockpile must be obtained from current planning. The stockpile submittal consists of a request letter and a grading and drainage plan showing the stockpile. The stockpile submittal is logged into the One Stop Shop and assigned a separate plan check number.



### A. Request Letter Requirements

The letter written to Plan Review staff and signed by the applicant will state a length of duration the stockpile is to remain in place and the method that will be used to control dust.

### B. Stockpile Grading and Drainage Plan Requirements

1. Plans should be prepared in accordance with the general requirements for a grading and drainage plan.
2. A Native Plant Permit is required for the area to be used for stockpile and must be issued prior to the issuance of the Stockpile Permit. See [Section 10-1.100](#) for the process and requirements for obtaining a native plant permit. The Native Plant Permit number shall be placed on the Stockpile plans submitted for the preliminary grading permit.
3. The location of the stockpile must be shown in plan view. The stockpile may not be located on, or within, any public utility, easement, or rights-of-way.
4. At least 1 cross-section through the stockpile shall be provided. The cross-section should show and label the sideslopes and the maximum height of the stockpile.
5. The total volume of the stockpile must be provided on the plan.
6. All NAOS areas shall be clearly defined and labeled.
7. Plans should address drainage runoff from the stockpile and upstream watersheds. This may be accomplished by various means, including stockpile location, design and grading of the stockpile, or by the use of temporary stormwater storage.



# Appendix 4-1A DRAINAGE REPORT OUTLINE

<p><b>Title Page:</b> Project Name; Location; Type of Drainage Report (Preliminary, Master Plan, Final, etc.); and Engineer’s Seal, Signature, and Date.</p>
<p><b>Table of Contents:</b> Engineer’s Seal, Signature, and Date.</p>
<p><b>1. Introduction</b></p> <ul style="list-style-type: none"> <li>• Project Name, Location, Size, and Brief Description;</li> <li>• Type of Report (Preliminary, Master Plan, and Final, etc.); and</li> <li>• Purpose and Objectives.</li> </ul>
<p><b>2. Description of Existing Drainage Conditions and Characteristics</b></p> <ul style="list-style-type: none"> <li>• On-site drainage:</li> <li>• Existing drainage network, patterns, and watershed and floodplain boundaries.</li> <li>• Off-site watershed:</li> <li>• Existing conditions and the drainage network entering and existing the project site.</li> <li>• Context relative to adjacent projects and improvements;</li> <li>• Flood Hazard Zones on the property, FIRM maps.</li> <li>• Site-specific photographs to support parameter selection.</li> </ul>
<p><b>3. Proposed Drainage Plan</b></p> <ul style="list-style-type: none"> <li>• General description of proposed drainage system and components; including conveyance of off-site flows;</li> <li>• Future conditions; including development of adjacent properties;</li> <li>• Stormwater storage requirements:               <ul style="list-style-type: none"> <li>- Volume required, volume provided, and basin locations.</li> </ul> </li> <li>• Pre- and post- runoff characteristics at concentration points exiting the property;</li> <li>• Proposed drainage structures or special drainage facilities:               <ul style="list-style-type: none"> <li>- Include design criteria and probable effect on the existing upstream and downstream drainage system.</li> </ul> </li> <li>• Project Phasing:               <ul style="list-style-type: none"> <li>- Improvements to be constructed with each phase, impact of phased construction, and required interim improvements. Development requirements must be met independently for each phase.</li> </ul> </li> </ul>
<p><b>4. Special Conditions</b> Project Stipulations, 401 and 404 Permits, AZPDES.</p>
<p><b>5. Data Analysis Methods</b></p> <ul style="list-style-type: none"> <li>• Hydrologic procedures, parameter selection and assumptions.</li> <li>• Hydraulic procedures, methods, parameter selection and assumptions.</li> <li>• Stormwater storage calculation methods and assumptions.</li> </ul>
<p><b>6. Conclusions</b></p> <ul style="list-style-type: none"> <li>• Overall Project</li> <li>• Project Phasing</li> </ul>
<p><b>7. Warning and Disclaimer of Liability</b></p> <ul style="list-style-type: none"> <li>• Each drainage report must include a completed Warning and Disclaimer of Liability.</li> </ul>
<p><b>8. References</b></p>





## Appendix 4-1A DRAINAGE REPORT OUTLINE

**Appendices** - Hydrologic and Hydraulic Data and Calculations, and a signed Warning and Disclaimer of Liability

**Electronic Input Files** - HEC-1, HEC-HMS, and HEC-2 or HEC-RAS, on Compact Disk (CD), working copy of non-standard software. A PDF file of the drainage report must also be provided that includes all exhibits, plates, figures, etc.

### **Exhibits**

- Vicinity Map
- Existing Conditions
- Topographic Map of Off-Site Watershed;
- Topographic Map of Existing On-site conditions with current 1-foot (minimum) contour mapping based on a current topographic survey.
- Current aerial photo, 800 scale or larger, showing site in context.
- Proposed On-site Drainage Plan
- Scale appropriate to type of drainage report and size of the project.



# Appendix 4-1B MASTER DRAINAGE PLAN OUTLINE

The items on this list are required as part of the submittal of a Master Drainage Plan in addition to the requirements of [Section 4-1.804](#).

**Title Page:** Project Name; Location; Type of Report (Master Plan); and Engineer's Seal, Signature, and Date.

**Table of Contents:** Engineer's Seal, Signature, and Date.

## 1. Introduction

- Project Name, Location, and Size
- Project Description, including scope of project
- Vicinity Map
- Purpose and Objectives
- Special Conditions; include Project Stipulations, 401 and 404 Permits, AZPDES.

## 2. Description of Existing On-Site Drainage Conditions and Characteristics

- 400 Scale Aerial Photograph, clearly identifying project location, 30 inches x 30 inches
- Topographic Map, 100 scale, one foot contour interval, 24 inches x 36 inches
- Show Q100 year peak discharge rates at key concentration points
- Identify watershed boundaries
- Delineate floodplain boundaries of washes with Q100 year peak discharge rates of 250 cfs or greater
- Describe existing onsite drainage characteristics.
- Provide Site-specific photographs to support parameter selection.

## 3. Description of Existing Off-Site Drainage Conditions and Characteristics

- 800 Scale Aerial photos, city 800 scale.
- Topographic Map, two (2) foot contour interval, 24 inches x 36 inches
- Show Q100 year peak discharge rates at key concentration points entering and exiting the project site
- Describe existing drainage conditions and characteristics, including the drainage network entering and exiting the project site; the impact of planned development, and the potential impact of future development
- Describe relation to existing Master Plans and adjacent drainage plans.
- Depict Flood Hazard Zones on the property

## 4. Proposed Master Drainage Plan

- 100 Scale proposed on-site drainage plan, one foot contour interval, 24 inches x 36 inches; include location and description of proposed drainage system, facilities, and components, including conveyance of off-site flows and probable effect on the existing upstream and downstream drainage system
- Show and describe major drainage structures or special drainage facilities needed.
- Site development plan, 24 inches x 36 inches
- Show Q100 year peak discharge rates for pre- and post-development conditions at key concentration points



# Appendix 4-1B MASTER DRAINAGE PLAN OUTLINE

The items on this list are required as part of the submittal of a Master Drainage Plan in addition to the requirements of [Section 4-1.804](#).

#### 4. Proposed Master Drainage Plan (continued)

- Describe ordinance stormwater requirements, volume required, volume provided, and location.
- Project Phasing:
  - Improvements to be constructed with each phase, impact of phased construction, and required interim improvements. Development requirements must be met independently for each phase.

#### 5. Data Analysis Methods

- Hydrologic procedures, parameter selection and assumptions.
- Hydraulic procedures, methods, parameter selection and assumptions.
- Stormwater storage calculation methods and assumptions.

#### 6. Appendix

- Data and Calculations (as applicable)
- Peak flow calculations (Rational Method or HEC-1 printouts)
- Channel design calculations including toe-down protection and drop structure design.
- Culvert design calculations
- Floodplain calculations (Manning's HEC-RAS printouts)
- Storage volume calculations
- Retention/detention basin inflow outflow analysis and design calculations
- Street Capacity Calculations
- Curb Opening, Catch Basin Calculations
- Storm Drain Calculations
- Sediment and Scour Calculations
- Rip-Rap Sizing
- Erosion/ Sediment Control Plan
- Soils and or Geologic Analyses
- Basis for setting finished floor elevations:
  - In relation to designated floodplains or adjacent washes
  - In relation to natural or adjacent ground elevation if in a Special Flood Hazard Zone or not in floodplain



# WARNING & DISCLAIMER OF LIABILITY

The Drainage and Floodplain Regulations and Ordinances of the City of Scottsdale are intended to “minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding caused by the surface runoff of rainfall” (Scottsdale Revised Code §37-16).

As defined in S.R.C. §37-17, a flood plain or “*Special flood hazard* area means an area having flood and/or flood related erosion hazards as shown on a FHBM or FIRM as zone A, AO, A1-30, AE, A99, AH, or E, and those areas identified as such by the floodplain administrator, delineated in accordance with subsection 37-18(b) and adopted by the floodplain board.” It is possible that a property could be inundated by greater frequency flood events or by a flood greater in magnitude than a 100-year flood. Additionally, much of the Scottsdale area is a dynamic flood area; that is, the floodplains may shift from one location to another, over time, due to natural processes.

### **WARNING AND DISCLAIMER OF LIABILITY PURSUANT TO S.R.C §37-22**

“The degree of flood protection provided by the requirements in this article is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Floods larger than the base flood can and will occur on rare occasions. Floodwater heights may be increased by man-made or natural causes. This article (Chapter 37, Article II) shall not create liability on the part of the city, any officer or employee thereof, or the federal government for any flood damages that result from reliance on this article or any administrative decision lawfully made thereunder.”

Compliance with Drainage and Floodplain Regulations and Ordinances does not insure complete protection from flooding. The Floodplain Regulations and Ordinances meet established local and federal standards for floodplain management, but neither this review nor the Regulations and Ordinances take into account such flood related problems as natural erosion, streambed meander or man-made obstructions and diversions, all of which may have an adverse affect in the event of a flood. You are advised to consult your own engineer or other expert regarding these considerations.

I have read and understand the above. If I am an agent for an owner I have made the owner aware of and explained this disclaimer.

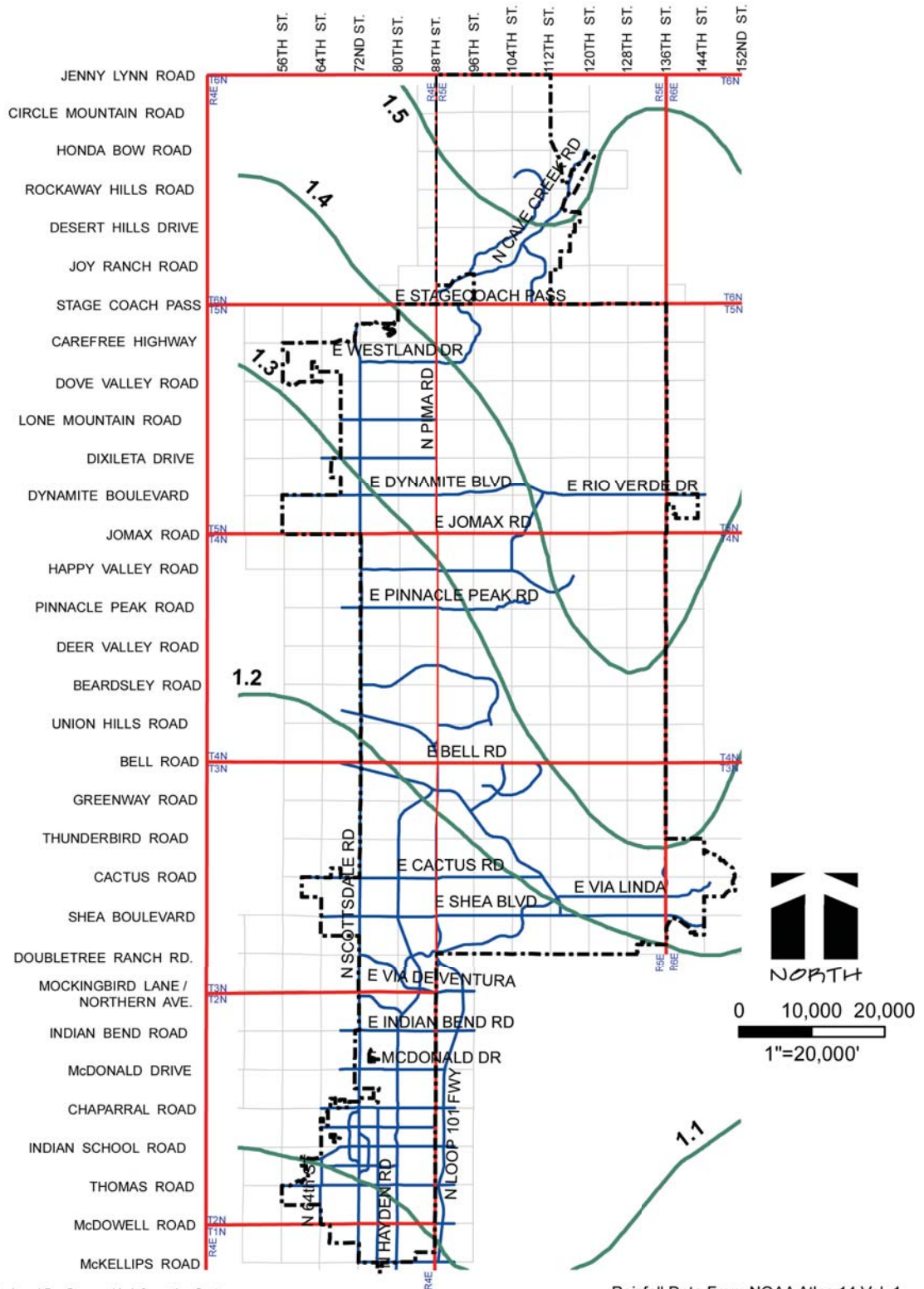
\_\_\_\_\_   
 Plan Check No.

\_\_\_\_\_   
 Owner or Agent

\_\_\_\_\_   
 Date



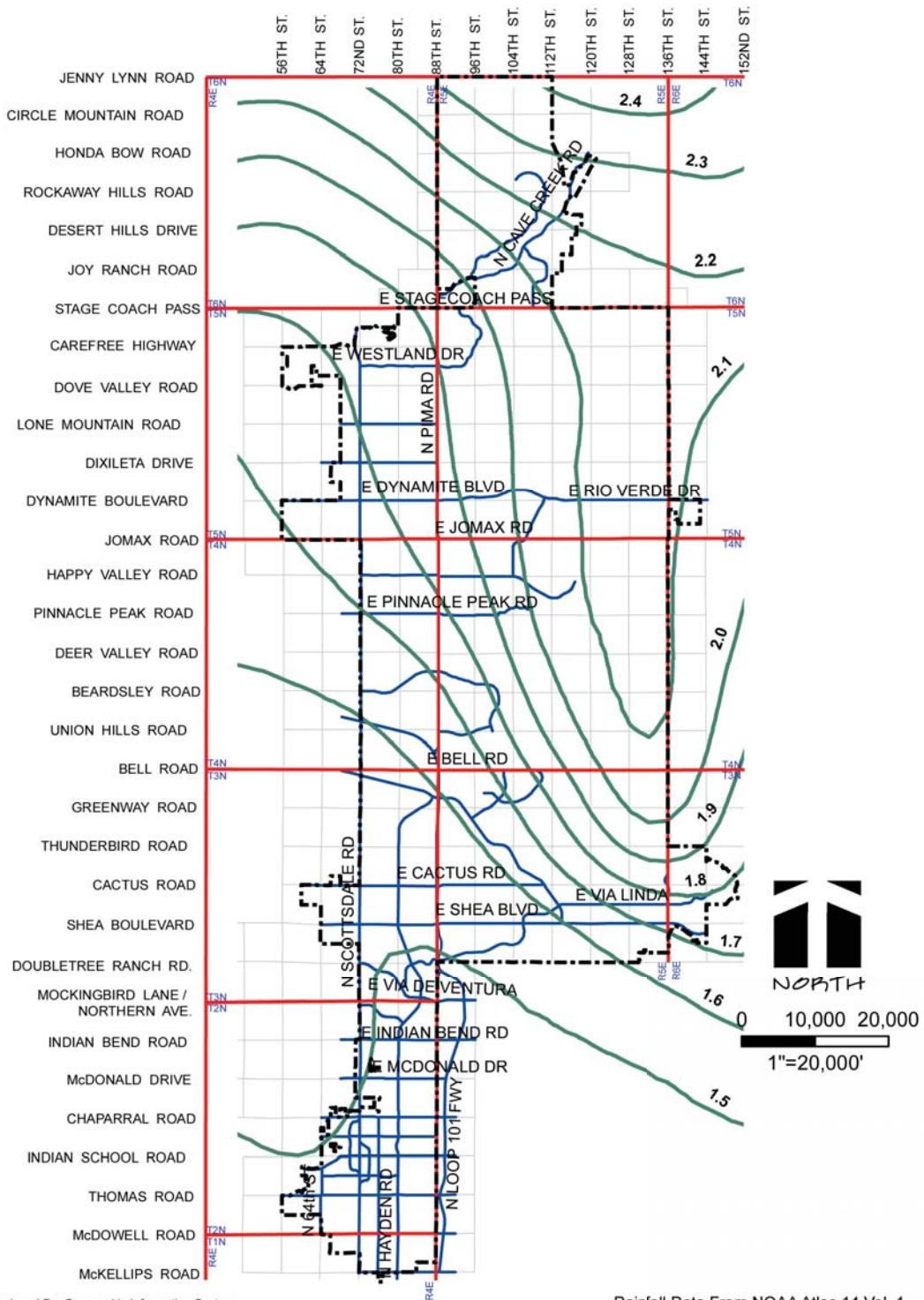
## 2 Year 6 Hour Precipitation in Inches



Map Produced By: Geographic Information Systems  
04/03/2009

Rairfall Data From NOAA Atlas 14 Vol. 1

## 2 Year 24 Hour Precipitation in Inches

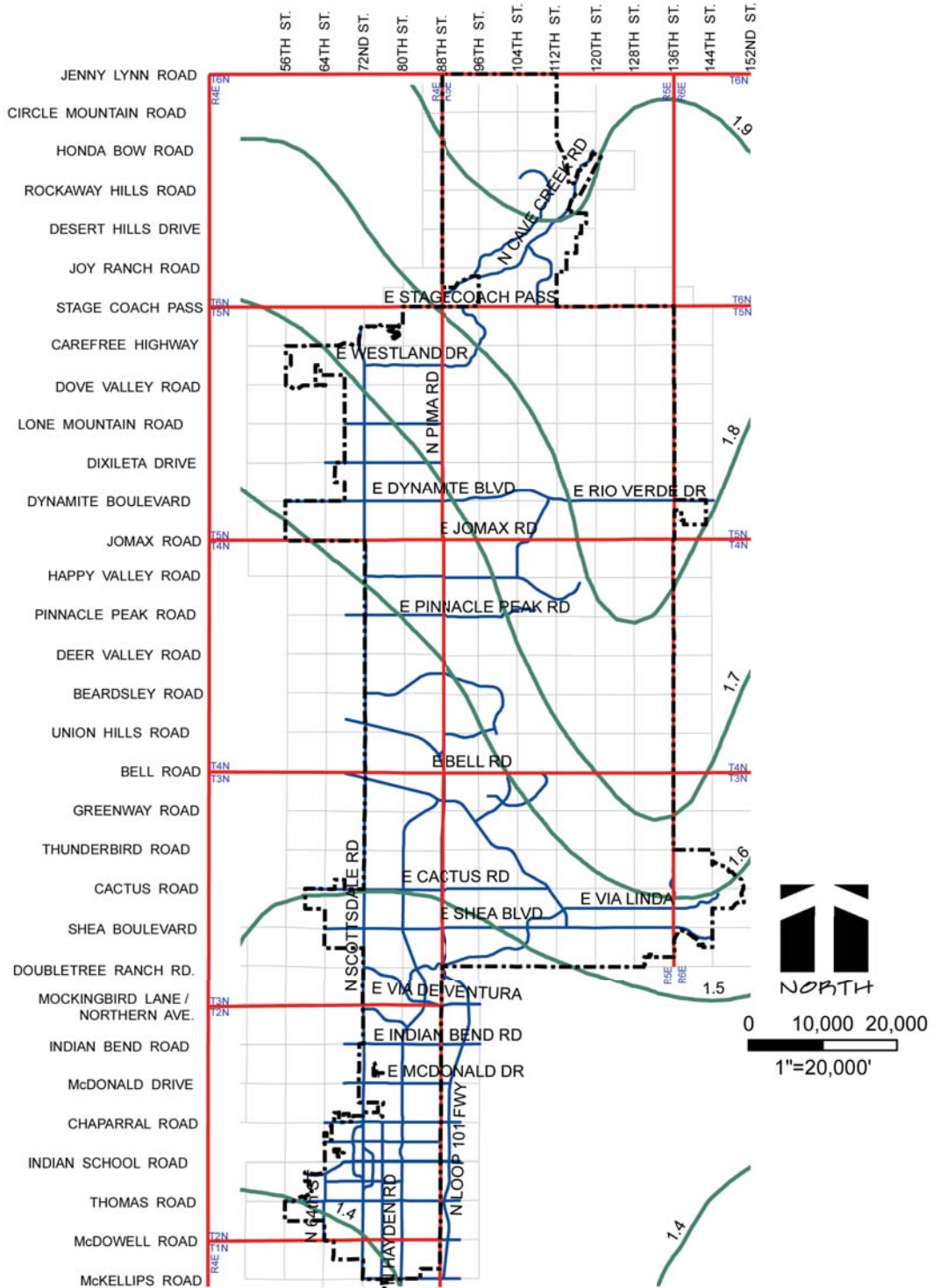


Map Produced By: Geographic Information Systems  
04/03/2009

Rainfall Data From NOAA Atlas 14 Vol. 1



## 5 Year 6 Hour Precipitation in Inches

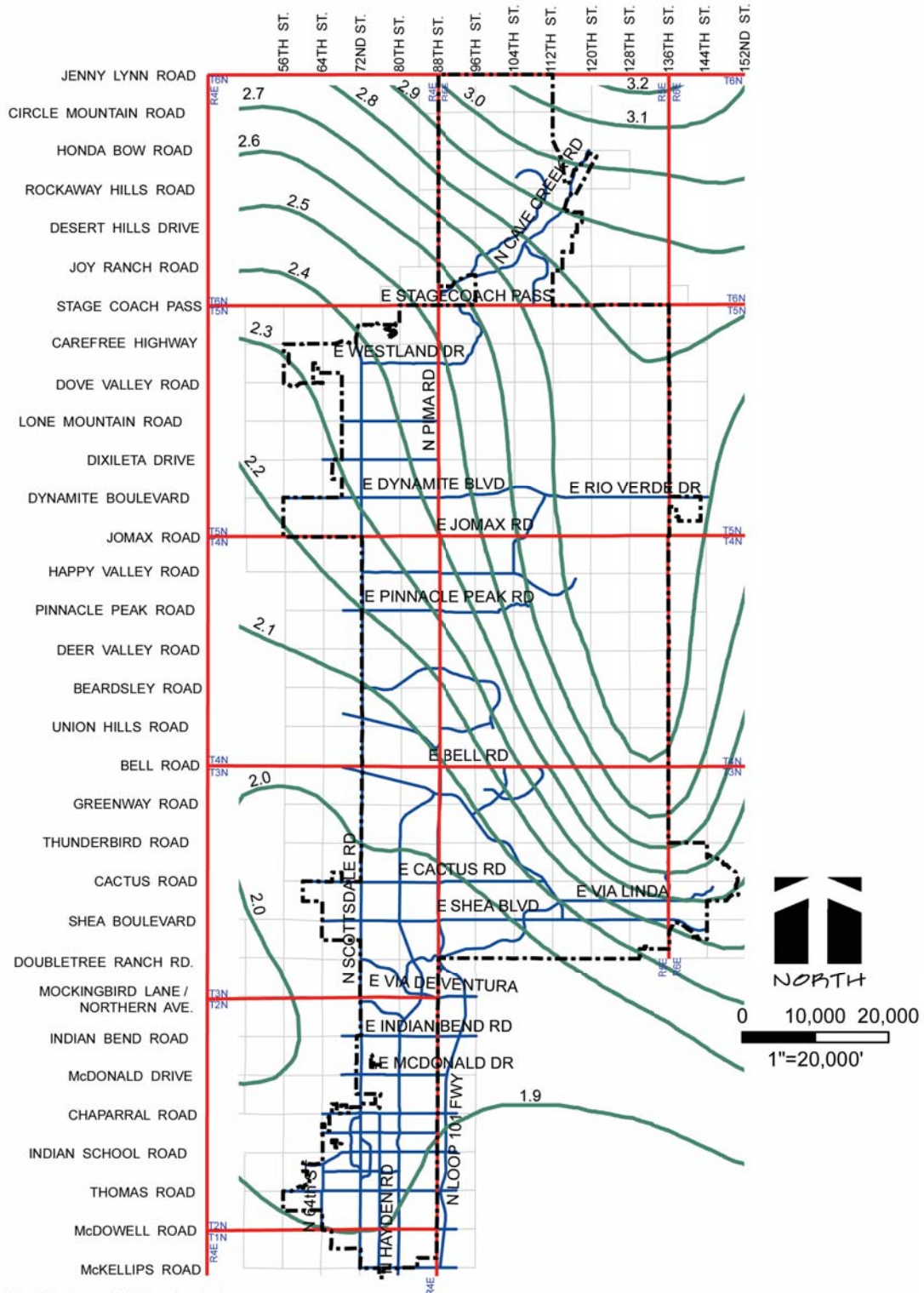


Map Produced By: Geographic Information Systems  
04/03/2009

Rainfall Data From NOAA Atlas 14 Vol. 1



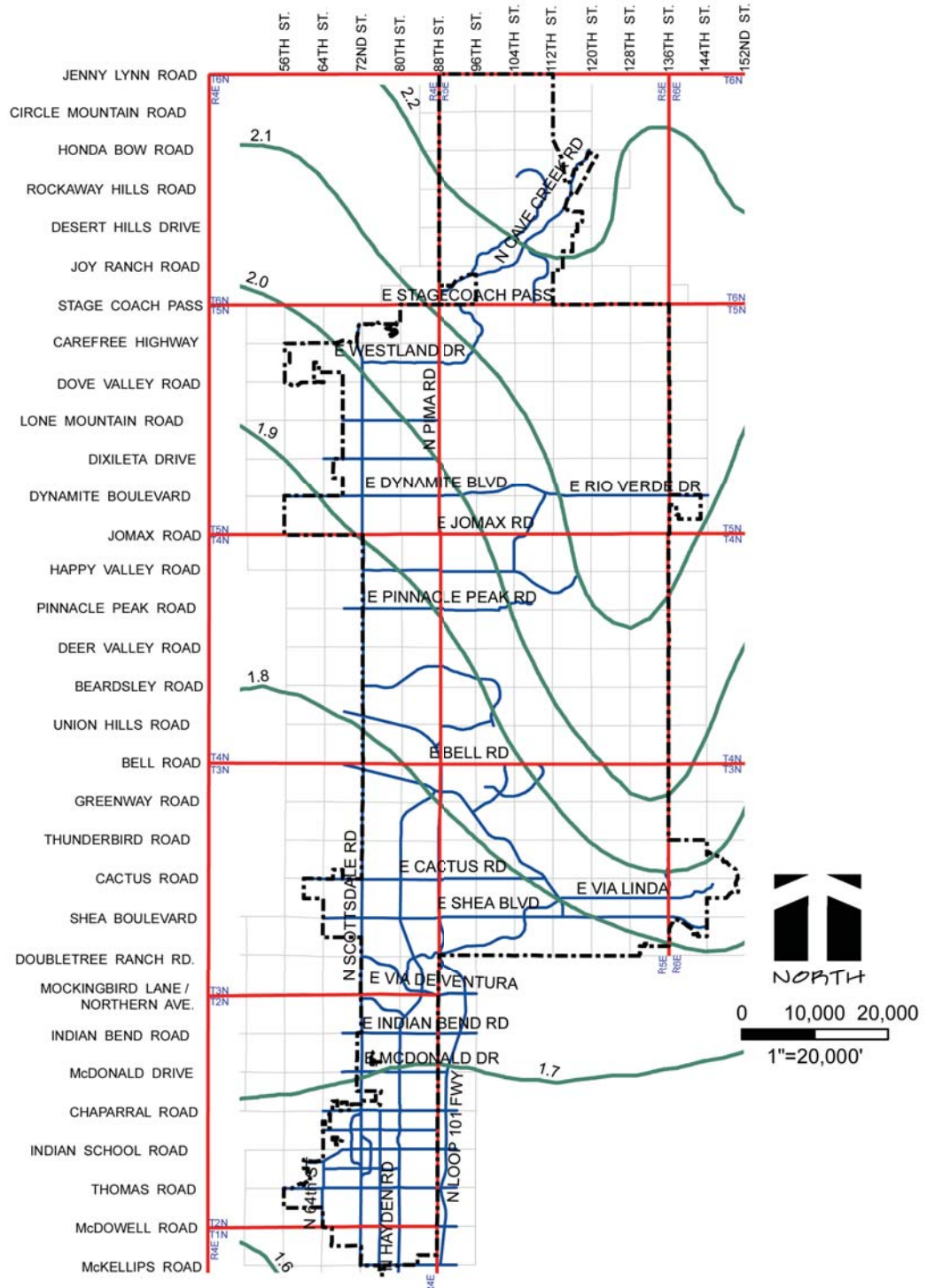
## 5 Year 24 Hour Precipitation in Inches



Map Produced By: Geographic Information Systems  
04/03/2009

Rainfall Data From NOAA Atlas 14 Vol. 1

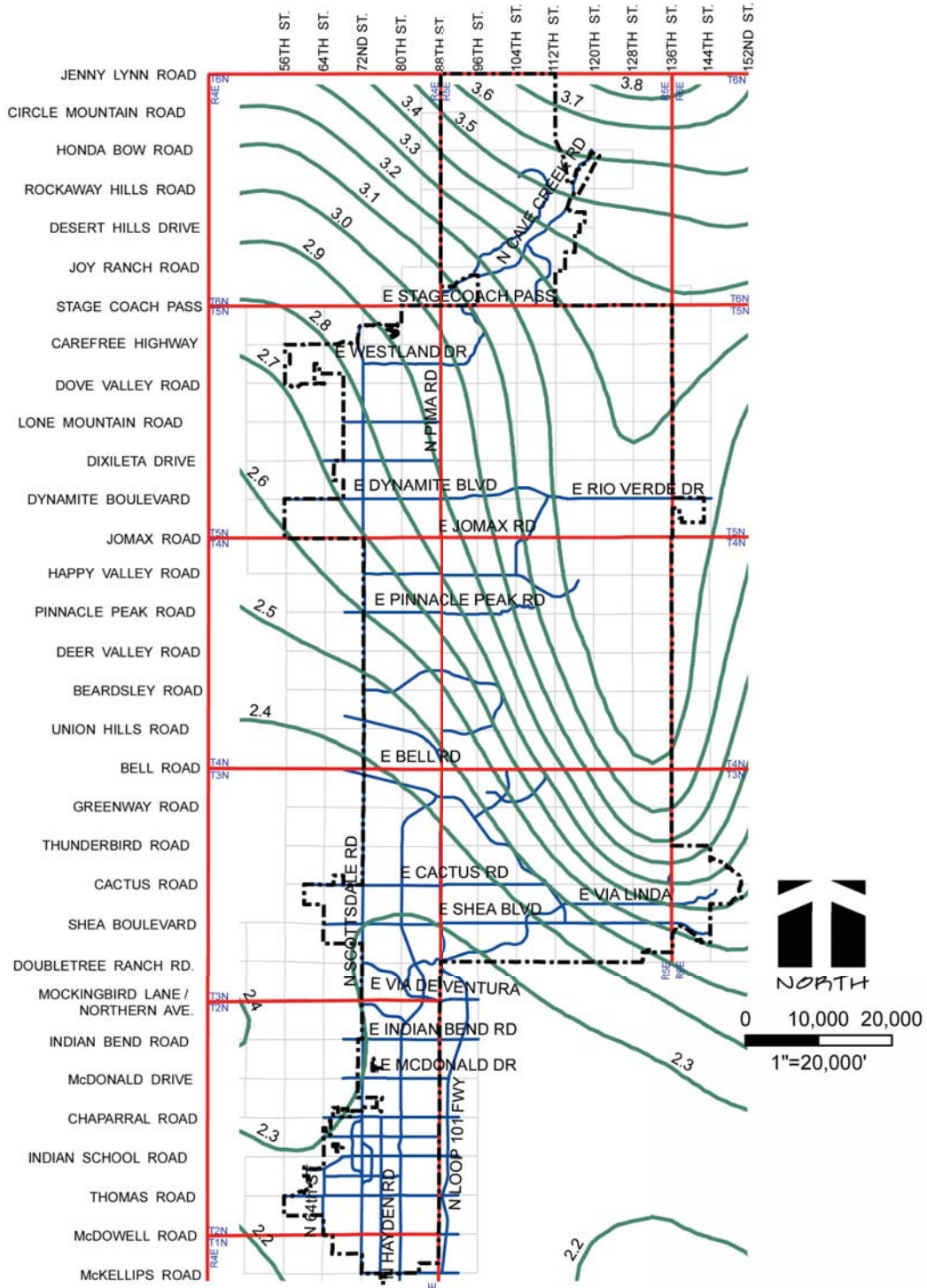
## 10 Year 6 Hour Precipitation in Inches



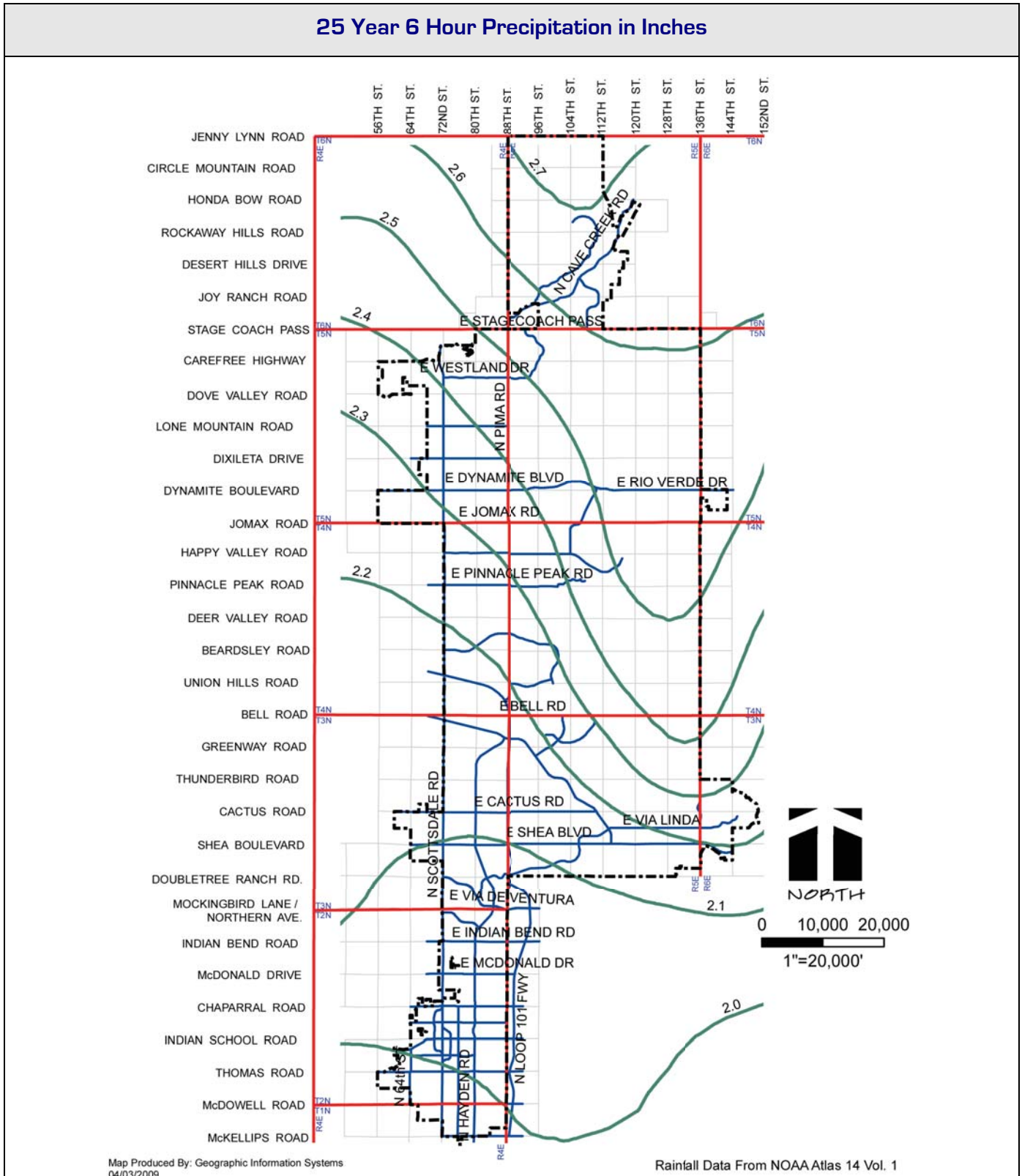
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04/03/2009

Rainfall Data From NOAA Atlas 14 Vol. 1

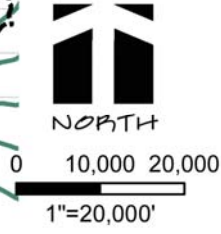
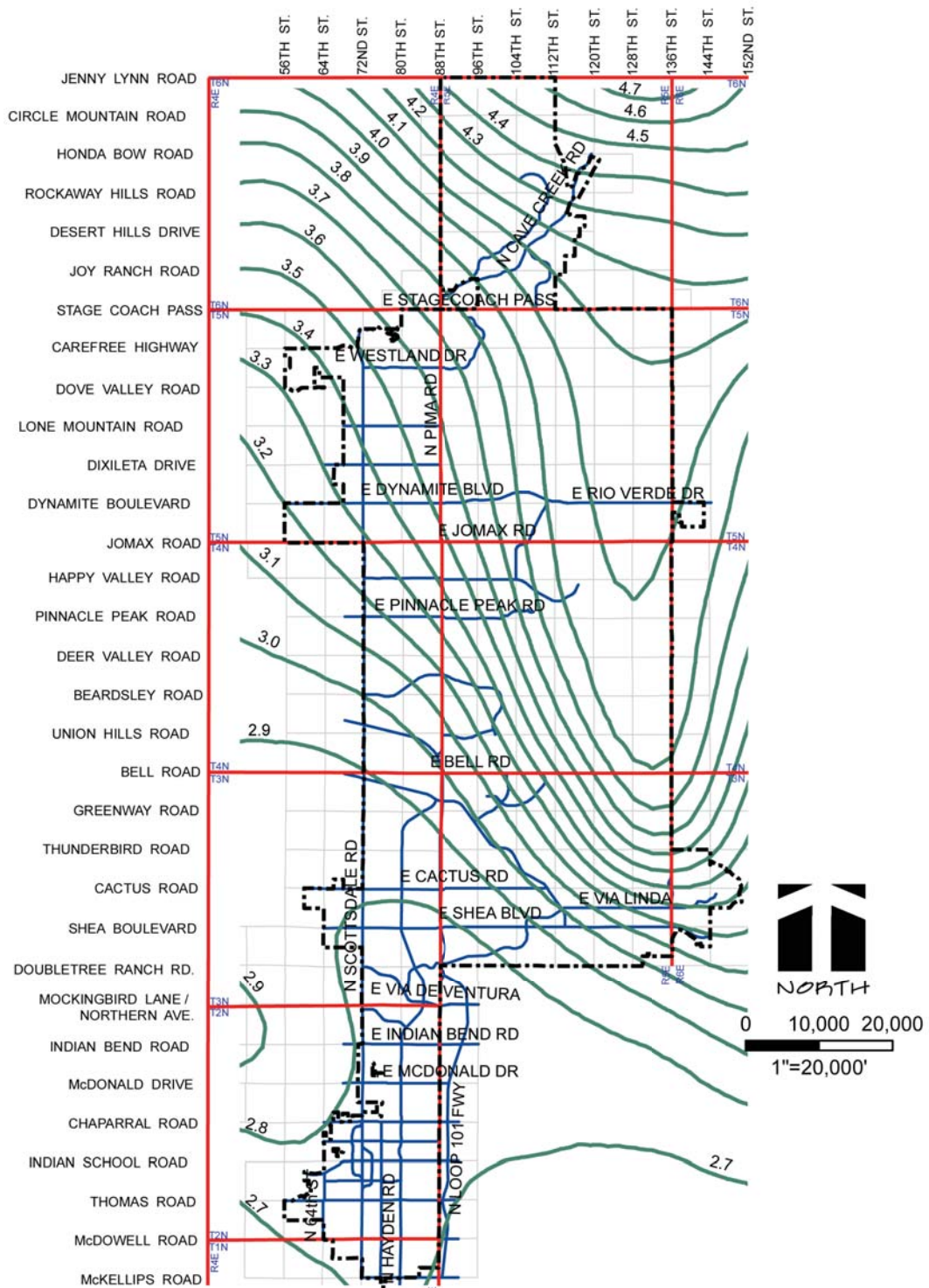
## 10 Year 24 Hour Precipitation in Inches







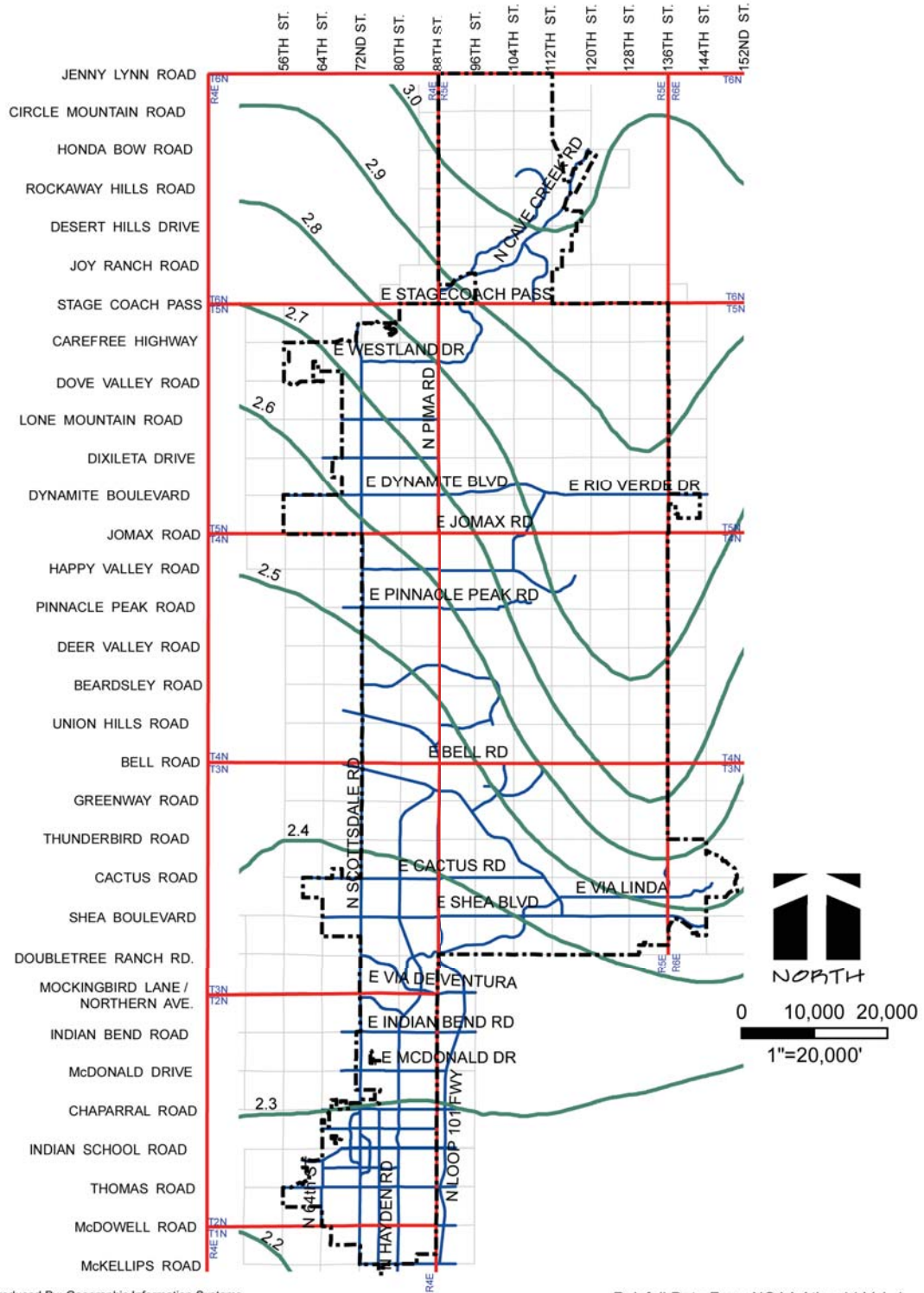
## 25 Year 24 Hour Precipitation in Inches



Map Produced By: Geographic Information Systems  
04/03/2009

Rainfall Data From NOAA Atlas 14 Vol. 1

## 50 Year 6 Hour Precipitation in Inches

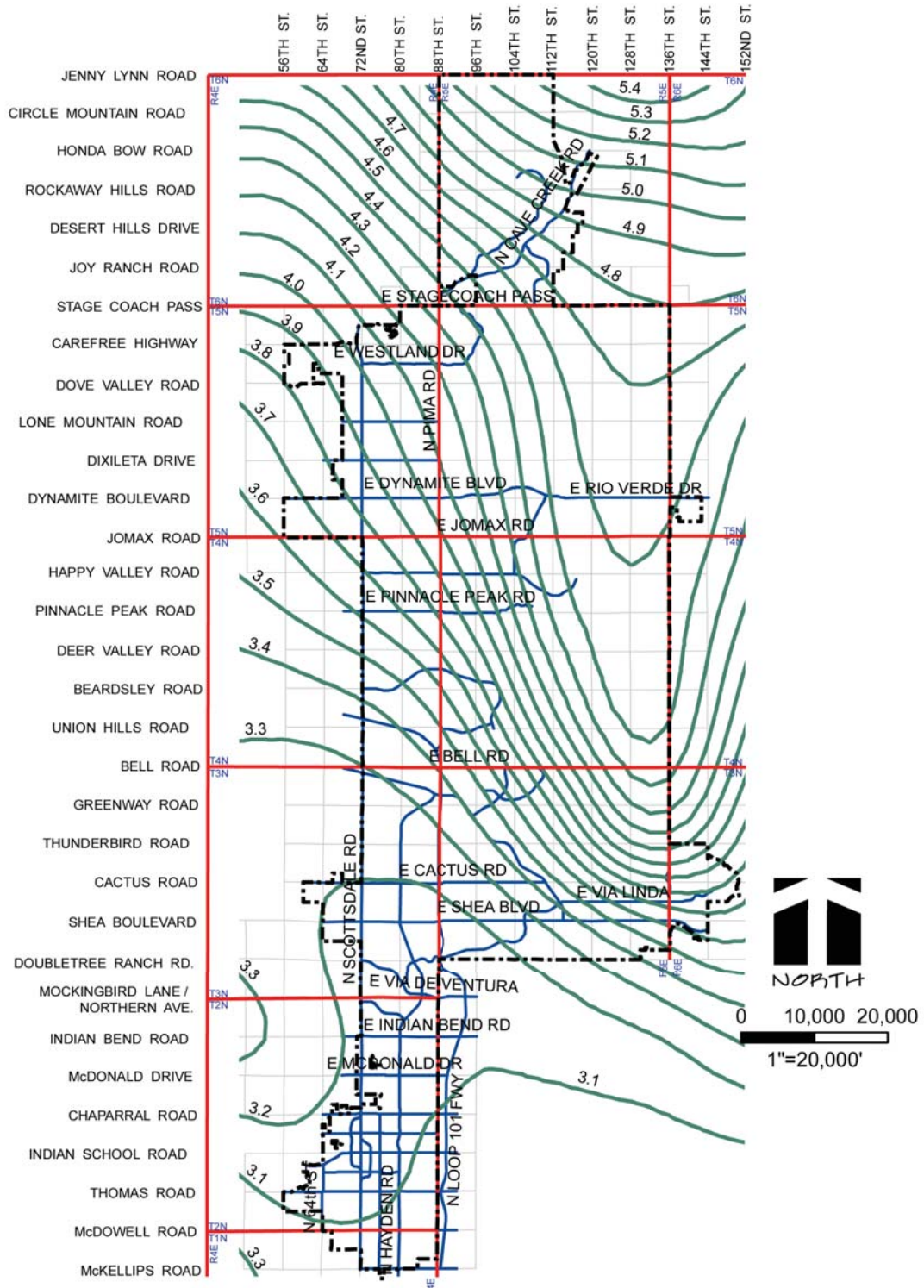


Map Produced By: Geographic Information Systems  
04/03/2009

Rainfall Data From NOAA Atlas 14 Vol. 1



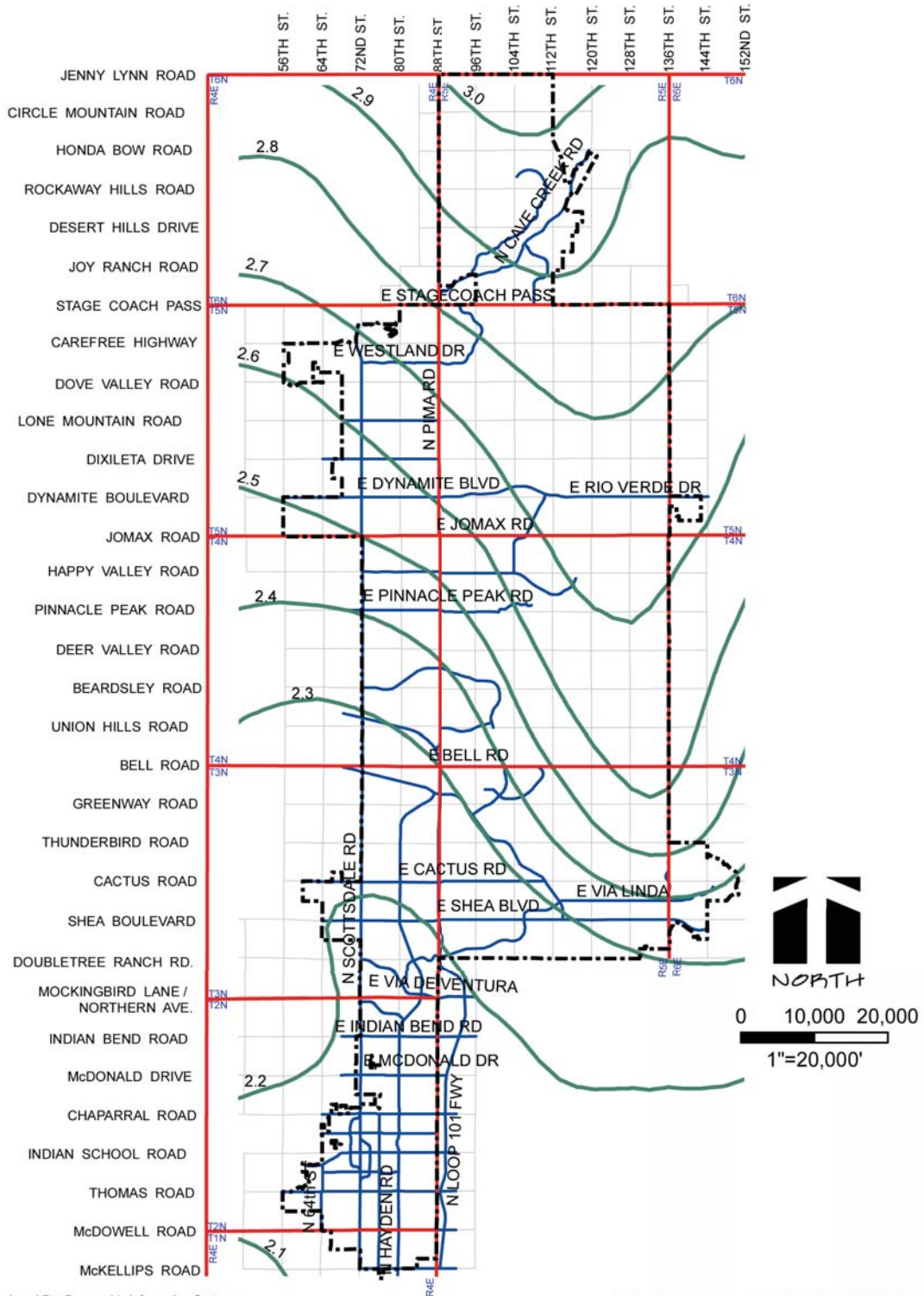
## 50 Year 24 Hour Precipitation in Inches



Map Produced By: Geographic Information Systems  
04/03/2009

Rainfall Data From NOAA Atlas 14 Vol. 1

## 100 Year 2 Hour Precipitation in Inches

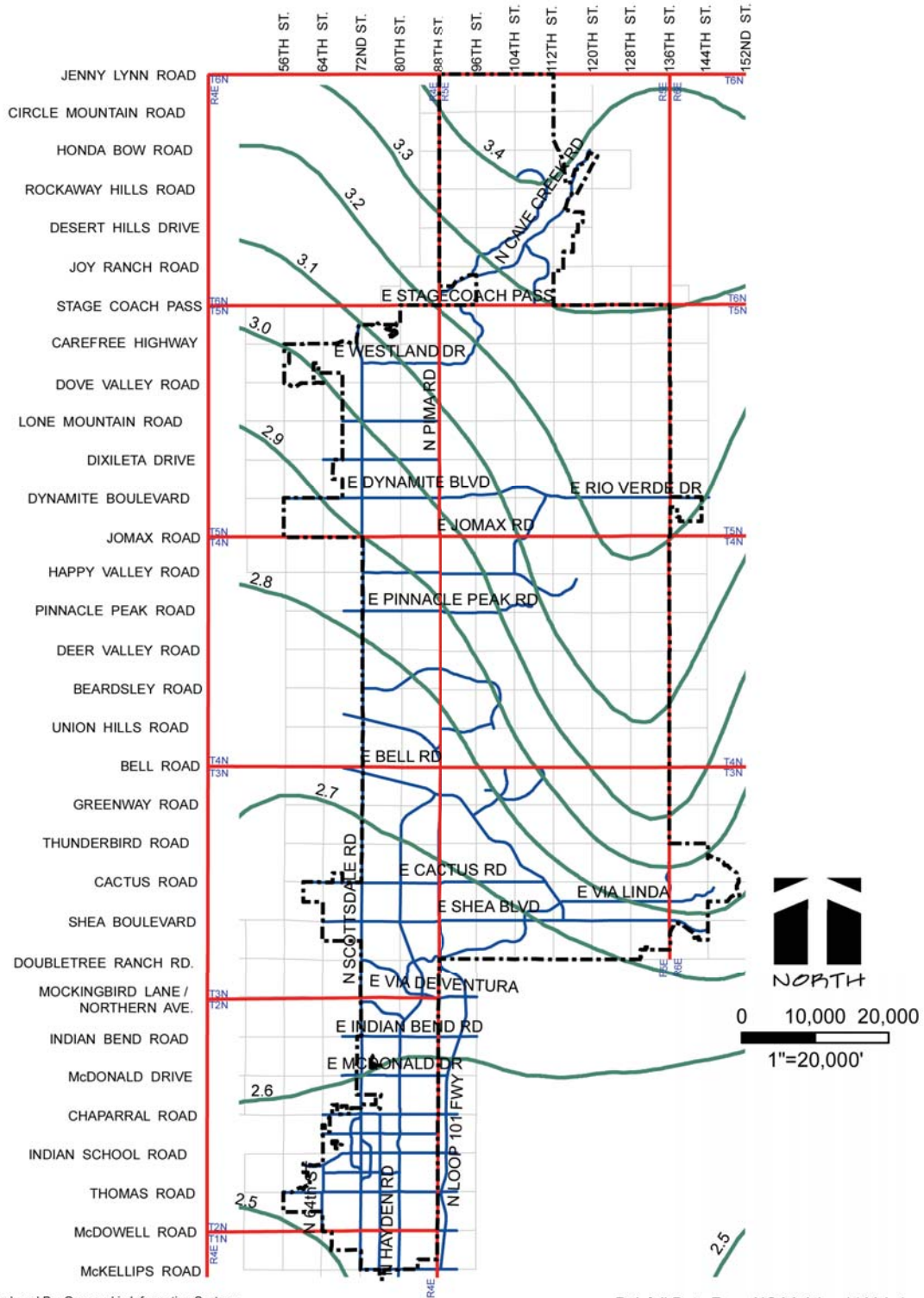


Map Produced By: Geographic Information Systems  
04/03/2009

Rainfall Data From NOAA Atlas 14 Vol. 1



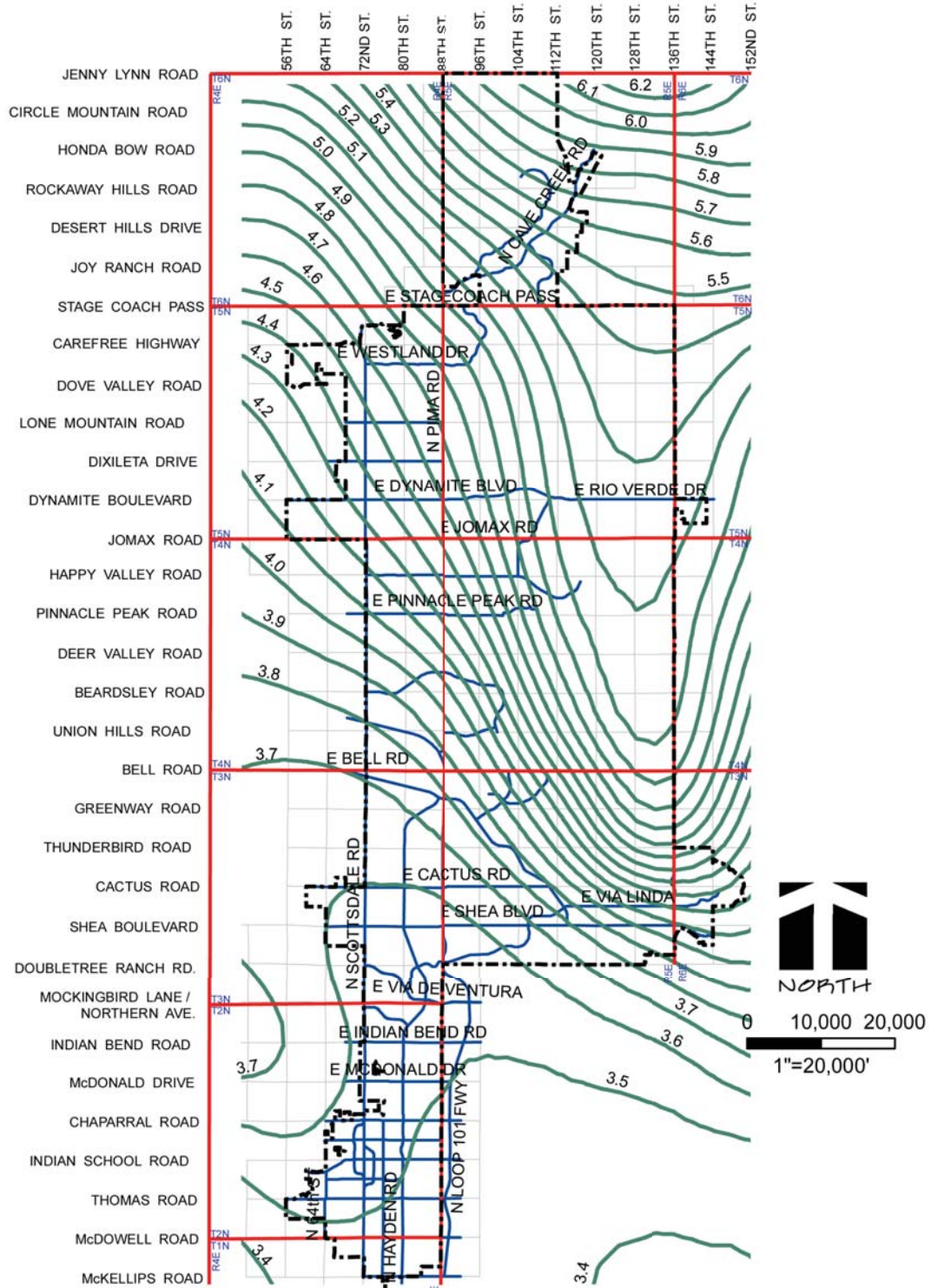
## 100 Year 6 Hour Precipitation in Inches



Map Produced By: Geographic Information Systems  
04/03/2009

Rainfall Data From NOAA Atlas 14 Vol. 1

## 100 Year 24 Hour Precipitation in Inches



Map Produced By: Geographic Information Systems  
04/03/2009

Rainfall Data From NOAA Atlas 14 Vol. 1

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# TRANSPORTATION



This chapter provides minimum design criteria for planning, designing, and preparing final plans for modifying and constructing transportation facilities within the city. It addresses traffic impact analysis, rights-of-way considerations, street geometrics, traffic signal design, signs and markings, transit amenities, bikeways, pedestrian facilities, neighborhood traffic management, and flexible pavement design.

**5-1 TRANSPORTATION IMPACT STUDIES (TIMA)**

**5-2 RIGHTS-OF-WAY MANAGEMENT**

**5-3 GEOMETRICS**

**5-4 TRAFFIC SIGNAL DESIGN**

**5-5 SIGNS & MARKINGS**

**5-6 TRANSIT**

**5-7 BIKEWAYS**

**5-8 PEDESTRIAN FACILITIES**

**5-9 NEIGHBORHOOD TRAFFIC MANAGEMENT**

**5-10 FLEXIBLE PAVEMENT**



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# TRANSPORTATION IMPACT STUDIES

A Transportation Impact & Mitigation Analysis (TIMA) may be required for General Plan Amendments, rezoning, and use permit applications. This section presents the analysis process and requirements for completing a traffic impact and mitigation analysis to determine needed modifications to the existing and planned transportation system as a result of proposed development.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
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Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
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Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
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Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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## GENERAL INFORMATION

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**5-1.000**

### **A. Major Issues Addressed in Transportation Analysis**

The Transportation Impact and Mitigation Analysis (TIMA) document will address such issues as:

1. The current transportation system and operational characteristics in the site vicinity,
2. The interface between the on-site circulation system and the adjacent circulation system,
3. The intensity and character of the development,
4. Trip generation,
5. Distribution and assignment estimates, and
6. Impacts of the development on the existing and planned transportation systems.

### **B. Study Timing**

A TIMA may be required for general plan amendment, rezoning, and use permit applications. The need for, and extent of, the study shall be based on the criteria described in this guide and any analysis provided in previous applications. All studies shall be submitted in final form prior to scheduling a development proposal for public hearing.

### **C. Study Preparation Process**

The study preparation process should include open discussions between the applicant, study consultant, and City of Scottsdale staff. Therefore, project discussion should begin when the application for the development is initiated, not after a development plan is finalized and a traffic study completed. This will ensure that the objectives of both the land owner/developer and the city can be met.

After a pre-application meeting, issues and process will be determined and discussed at a joint meeting with staff members from the city's Planning and Transportation Departments. Members from these departments, representing a "Development Review Team" will determine if any at-large issues are affected by the proposal. The Transportation Department staff and the Project Coordination Manager will establish a timetable and oversee the TIMA document preparation process. A meeting will be arranged to review the scope of the work and the proposed timetable for completion.

After the TIMA document is completed, it will be submitted to the city for review. The document will be reviewed for completeness and compliance with TIMA Guidelines within 5 working days. This completeness review will only determine if all required information and analysis has been provided. It will not assess the quality of the submitted report or its findings. If the document is determined to be complete, a meeting will be scheduled to review the report and findings with the applicant. Transportation staff will conduct a thorough review of the document and prepare a summary report of the findings. This summary and a copy of the TIMA document will be included in the staff report for the case. Minor revisions may be required before the project will be scheduled for the requested hearing.



## 5-1.100

**INITIATING IMPACT & MITIGATION ANALYSIS****A. Pre-application Meeting**

The procedures outlined herein present the minimum information required to determine what level of traffic analysis is required. The purpose of the pre-application conference is to provide guidance and direction to the applicant concerning the nature and extent of the analysis. Failure by the applicant to provide these items may result in delay in initiating the TIMA process. At a minimum, the following items must be provided for review:

1. Vicinity map
2. Current aerial map
3. Summary of existing building or development on the site – examples: existing building area and land use, current zoning, approved site plan, previous zoning history, etc.
4. Preliminary summary of proposed development by land use – examples: building area, number of employees, leasable tenant space, acreage, etc.
5. Proposed site plan
6. Market analysis, if available.

**B. Warrants for Studies**

Proposed projects will fall into one of three categories for purposes of transportation impact and mitigation analysis. The first category is proposed projects that are deemed to have insignificant traffic impacts. The second category is projects that have localized impacts to the city's transportation system. The third category is proposed developments that have significant impacts to the transportation system that may extend beyond the vicinity of the site. For those situations where it is questionable as to which category is appropriate, the Traffic Engineering Director will make the final determination. The Traffic Engineering Director also has the authority to waive the requirement for a traffic impact analysis for unusual situations that fall outside of the following guidelines or where the analysis is deemed to be unnecessary based on previous studies or current traffic conditions.

“Existing, allowed land use” will be interpreted as development that is allowed under the city's current zoning and General Plan designation. Development may be restricted to previously approved site plans and development programs where prescribed by zoning stipulations. For those situations where it is questionable as to what level of development is allowed on the site, the Zoning Administrator will make the final determination.

## 5-1.101

**CATEGORY 1**

If a proposed development is anticipated to generate less daily trips than it would under the existing allowed land use, and generates less than 100 vehicle trips per hour in the “peak period on the adjacent street system”, a transportation impact and mitigation analysis is not necessary. The following sizes of different land use classifications are deemed to generate less than 100 trips in the peak hour and therefore do not require any analysis.:

- < 100 residential dwelling units,
- < 6,000 gross square feet retail,
- < 25,000 gross square feet office,
- < 100,000 gross square feet industrial/employment
- < 160 hotel / motel / resort rooms,
- < 30,000 gross square feet medical office

For a development application that falls under this category, the applicant will be required to submit the following:

1. Site plan
2. Adjacent street volumes
3. Accident history
4. Trip generation comparison to the existing land use

## **CATEGORY 2**

If a proposed development is anticipated to generate more daily trips than it would under the existing, allowed land use, and generates less than 100 vehicle trips per hour in the “peak period on the adjacent street system,” then a Category 2 study is required to determine the extent of the transportation impacts of the proposed development.

For a development application that falls under this category, the traffic analysis will include the following:

1. Site plan
2. Adjacent street volumes
3. Accident history
4. Trip generation comparison to the existing land use
5. Level of service analysis of roadway segments and intersections adjacent to the site

The following considerations are some of the development and transportation system characteristics that will be evaluated in determining the extent of the study area and the need for additional or expanded analysis such as a traffic signal warrant analysis.

- Current traffic volumes and level of service on the adjacent streets
- Driveway location and volume
- Collision data on adjacent street segments and at nearby intersections
- Special conditions and circumstances particular to the development or the transportation system

## **CATEGORY 3**

If a proposed development is anticipated to generate more daily trips than it would under the existing, allowed land use, and generates more than 100 vehicle trips per hour in the “peak period on the adjacent street system, then a Category 3 study is required to determine the extent of the transportation impacts of the proposed development.

For a development application that falls under this category, the traffic analysis will include the following:

1. Site plan
2. Adjacent street volumes
3. Accident history
4. Trip generation comparison to the existing land use
5. Level of service analysis of roadway segments and intersections adjacent to the site
6. Level of service analysis of major roadway segments and intersections in the vicinity of the site

The following considerations are some of the development and transportation system characteristics that will be evaluated in determining the extent of the study area and the need for additional analysis, such as neighborhood traffic mitigation.

1. Current traffic volumes and level of service on the adjacent streets
2. Driveway location and volume

**5-1.102****5-1.103**

3. Proximity to and potential impact upon nearby residential areas
4. Collision data on adjacent street segments and at nearby intersections
5. Special conditions and circumstances particular to the development or the transportation system

## 5-1.200

## EXTENT OF STUDIES

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### 5-1.201

### CATEGORY 2 STUDY

This study will include the following:

1. A site plan with proposed access points;
2. An area map showing the surrounding transportation system, including the locations of the signalized intersections within 2 miles of the nearest signalized intersection on adjacent streets in all directions;
3. Most recent accident rates and rankings on adjacent roadway segments and intersections within the study area;
4. Current traffic volumes on the street system within the study area;
5. Trip generation;
6. Trip distribution;
7. Traffic assignment;
8. Existing levels of service on adjacent roadways, including signalized intersections within the study area; and
9. Horizon-year levels of service with and without the proposed development.

The Category 2 study need not be a detailed analysis of the present and future conditions. No elaborate data collection effort or extensive computer modeling is usually necessary for such a study. Its purpose is to provide an analysis of existing and anticipated traffic conditions on the adjacent transportation system and identify potential concerns that may need additional analysis.

### 5-1.202

### CATEGORY 3 STUDY

A complete TIMA analysis will be required for any proposed development that is anticipated to generate more than 100 trips in the peak hour of the adjacent street. The type and extent of analysis required for a complete TIMA analysis will depend on the development under consideration and its potential impact on the study area transportation network. Large developments with regional impacts will require extensive analysis and sophisticated computer modeling applications; smaller developments might only require manual trip distribution and assignment techniques. The city will determine the extent of the Category 3 study.

## 5-1.300

## STUDY AREA

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The study area for a Category 2 study will be the roadway segments and intersections located adjacent to the site. Major intersections within 1 mile of the site may be included in the study area based upon the guidelines noted above.

The study area for a Category 3 study will be the intersections, and connecting roadway segments, within 2 miles of the site or the nearest signalized intersection that satisfy either of the following traffic conditions:

- Intersections with entering volumes that currently exceed 40,000 vehicles per day, or
- Intersections with approach volumes in the design year that are increased by 5% or more, as a result of the traffic generated from the proposed development.

## CONTEXT & FRAMEWORK

### 5-1.400

#### EXISTING CONDITIONS

#### 5-1.401

The reports for either a Category 2 or Category 3 study will provide current approach volumes for 24 hours of a typical weekday, and turning movement volumes in 15 minute intervals for the time periods of 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m., for all intersections of streets that are classified as major collector (rural, suburban, or urban), minor arterial (rural, suburban, or urban), major arterial (rural, suburban, or urban), or freeway in the study area. 24 hour typical weekday volumes should also be provided for adjacent roadway segments. The results of a level-of-service analysis, for the peak, fifteen-minute periods in the morning and in the evening for the existing conditions, will be included in the report. The report will also list the accident rate, frequency, and severity for all intersections and roadway segments in the study area for the most recent available year.

#### HORIZON YEAR(S)

#### 5-1.402

For a Category 2 study, the traffic analysis will be based on traffic conditions for the build-out or completion year of the development. In some cases, staff may require an additional horizon year if there are significant changes anticipated to the surrounding infrastructure or traffic volumes.

For a Category 3 study, the traffic analysis will be based on traffic conditions for the build-out or completion year of the development, and a minimum 5-year projection from the anticipated build-out date, which may be rounded up to the closest 5-year increment (2015, 2020, and 2025, etc.) If the project is a large, multi-phased development, the initial horizon year will be the date that corresponds to the opening of the first major phase of development. In some cases staff may require an additional horizon year for multi-phase projects or projects with significant changes anticipated to the surrounding infrastructure or traffic volumes.

The study will provide morning and evening peak hour approach and turning movement volumes for each intersection in the study area for the required horizon years. Level-of-service analyses for these peak hour conditions, without the site traffic and with the site traffic, will be included in the report.

#### PEAK TRAFFIC HOURS(S)

#### 5-1.403

The report will analyze the peak traffic periods on the adjacent street system during the morning and evening, peak, 15-minute periods. The report will also analyze the peak traffic periods for the development, should these periods occur at different times or on different days from the peak periods of the adjacent street system.

#### BACKGROUND STUDY AREA DATA

#### 5-1.404

The City of Scottsdale Traffic Engineering Division prepares a traffic volume and accident data report for every even-numbered year. This information will be available to the traffic-engineering consultant. The consultant will use the most recently available data, at a minimum. If data from earlier years is deemed pertinent, the consultant may utilize it to supplement the most recent data.

The City of Scottsdale Traffic Engineering Division periodically obtains traffic volume information at various locations. This information will be available to the consultant. The consultant may not use traffic volume data older than 15 months as current information. However, it may be utilized for supplemental purposes. If traffic volume data more recent than 15 months is not available, then the developer is responsible for obtaining the information directly.

The City of Scottsdale Transportation Planning Division prepares traffic volume projections for 5-year increments. This information will be available to the consultant. However, the information will need to be reviewed by the consultant for applicability to the TIMA. Adjustment and recalculation may be necessary. In the event that the proposed development is very large

in terms of anticipated traffic generation or in terms of deviation from the Scottsdale General Plan, comprehensive traffic projection modeling may be necessary.

**5-1.405****REVIEW OF ANTICIPATED OFF-SITE CHANGES**

The Transportation Department will provide copies of TIMAs prepared for previous proposed developments that may be pertinent to a current analysis. The city will also provide other transportation related reports that may be of assistance. The consultant will be responsible for reviewing these reports and incorporating their data, conclusions, and recommendations where appropriate.

The consultant will be responsible for obtaining copies of the current Circulation Element of the General Plan for the City of Scottsdale, and adhering to the policies and guidelines it contains.

**5-1.406****FIELD RECONNAISSANCE AND DATA COLLECTION**

If current traffic volume data is not available, the consultant will be responsible for obtaining traffic volume data in accordance with the requirements of the study, as stated previously. The consultant must also obtain speed limit information and analyze sight distance availability and requirements. The Transportation Planning Division will provide information regarding bicycle and transit facilities in the vicinity of the site of the proposed development. The consultant will be responsible for incorporating the needs of these facilities into the analysis and report.

**5-1.500****NON-SITE TRAFFIC FORECASTS****A. Components of Non-Site Traffic**

Estimates of non-site traffic are required for a complete analysis of horizon-year conditions. These estimates represent the “base” conditions, that is, without the site development.

**B. Methodology**

There are two principle methods of projecting off-site traffic that are acceptable: use of area-wide modeled data and trends or growth rates. Each method has its appropriate use depending on the availability of data and the size of the proposed development.

In most cases, modeled data will be available from the Transportation Department. In those cases where this data is not available, the city will determine if the data needs to be produced for an adequate analysis, or if a trends analysis will suffice.

**C. Analysis of Future Conditions**

Future traffic demand estimates are developed by adding the estimated site generated traffic, all approved (or potential) development in the area, and current traffic volumes adjusted for general growth in the area. The consultant will determine the levels of service in the study area based on the non-site traffic for the horizon year.

**5-1.600****SITE TRAFFIC GENERATION****5-1.601****GENERAL PROCEDURE**

The potential traffic impacts of a planned development are forecast for the projected conditions in the horizon year(s) of the project. The first step in the process is trip generation.

The trip generation process provides an estimate of the number of trips that will be generated due to the new development. Generally, the trip generation process consists of applying trip rates or equations for different types and sizes of land use development to the proposed land

uses in the development to determine the total number of new trips added to the system. Trip generation will be calculated for the a.m. and p.m. peak hours and the daily period.

## SOURCES

### 5-1.602

The sources from which trip generation rates are taken are extremely important in assuring an accurate estimate of the impacts of a proposed development. In general, whatever the source, it is important to establish that the trip rate for a given land use is representative of the proposed development land use. Such items as size, location, services, and number of studies should be considered before using any data source.

### A. State and Local Data Sources

In most cases, assuming a similar number of studies, local trip generation rates will be more accurate for predicting the trip generation of the development proposal. If such data is available, it should be reviewed with city staff to determine its applicability to the site.

### B. National Data Sources

Several national data sources are available. The most widely used is Trip Generation, published by the Institute of Transportation Engineers (ITE). Other sources include: NCHRP Report 187, Transportation Research Board, 1978 and Development and Application of Trip Generation Rates, Federal Highway Administration, 1985.

National sources can be used as starting points in estimating the amount of traffic that may be generated by a specific building or land use. Whenever possible, or when the number of studies on which the rate is based is limited, these national rates should be adjusted to reflect local conditions. National sources should not be used without the application of sound judgment.

### C. Collection of Additional Data

If it is determined that a local rate is most appropriate, but existing local data samples are limited, the consultant will be required to collect additional local data to provide a credible sample size on which to base the trip generation estimate. Local trip generation data should be collected at sites that exhibit similar characteristics to the development being studied and that are self-contained, with adequate parking not shared by other activities. The consultant should follow the guidelines contained in Trip Generation Handbook: An ITE Recommended Practice, ITE, 2000.

## SELECTION OF TRIP GENERATION RATES OR EQUATIONS

### 5-1.603

As described in Trip Generation Handbook, the following step-by-step procedure must be used for determining whether the equation or the rate should be used:

1. Calculate and compare the forecasted trips using both the regression equation and the trip rate. Generally, if the forecasted trips calculated from the two methods are within 5% of each other, use the method that most closely represents the data points in the range of the independent variable being used. If the difference is greater than 5%, go to step 2.
2. Use the equation when there are at least 20 data points that are distributed over the range of values typically found for the independent variable, when there are few erratic data points, and when the y-intercept for the equation is 0 or near. If these conditions are not met, go to step 3.
3. Compare the lines representing the equation and the rate to determine which best fits the data points at the size of the independent variable in question. Use the equation or the rate whose line best fits the data points at the size of the independent variable in question. If neither line fits the data points, or if both fit equally well, go to step 4.
4. Review the standard deviation of the rate and the R<sup>2</sup> value of the equation. These measures provide information about how well the lines, in general, fit the data points. A



low standard deviation (less than 110% of the average rate) is good. A high R<sup>2</sup> value (more than 0.75 for the equation) is good. Use the equation or the rate, depending on how well its measure satisfies these standards. If a decision still cannot be made, go to step 5.

5. Since at this point, there is no logical and valid basis for choosing between the rate and the equation, the user must choose the method to use based only on their best judgment, or collect an acceptable set of local data from which a local rate or equation can be derived.

#### **A. Use of Average, Minimum, and Maximum Rates**

Most trip generation data sources report the average rate based on a group of studies for land use. Sometimes maximum and minimum observed rates and some statistical measure of the spread of data between the extremes are also provided. When comparing average rates from different data sources, be sure to check the consistencies and differences in how the averages were computed.

When using average trip rates, all applicable adjustments must be made for variations in the independent variable. In addition, trips should be estimated for the average rate plus 1 standard deviation, to determine how the results of the analysis would be affected.

#### **B. Use of Equations**

As described above, careful consideration must be given to the use of rates versus equations. In most instances, equations provide a better correlation with actual data than do average rates. In any event, the selection and reasons for using either equations or rates should be documented in the report.

#### **C. Choosing the Independent Variable**

The choice of the independent variable can be one of the most important decisions in estimating trip generation. The selected variable should be easily projected with reasonable accuracy. When information is available for more than one independent variable, the predictive accuracy of both the independent variable and the trip generation rate or equation must be considered. However, it is also important to check the sample size for each given independent variable. In the case of two variables with a similar correlation, the variable with the larger sample should be used. Trip rates or equations based on small sample sizes should be used with caution.

In the planning stage, some variables, such as employment and parking, are estimated on the basis of other variables, such as gross square feet of building space. When little is known about the size of the generator except the proposed use of the land to be developed, common development densities can be used to obtain a preliminary estimate of the independent variable. The City of Scottsdale Zoning Ordinance should be checked to determine the appropriate density parameters, see [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

Floor area is one of the most commonly used independent variables. There are, however, different ways to compute floor area, and there are different definitions. These must be consistent when determining a trip generation rate and they should correspond to accepted floor area definitions. For office buildings, these include gross floor area, gross leasable area, and net leasable area. Care should be taken to exclude areas such as large atriums, which do not by themselves generate trips. Gross leasable area is commonly used for shopping centers.

### **5-1.604**

#### **CHOOSING THE APPROPRIATE TIME PERIODS**

The range of average rates for different time periods will be examined to determine when the generator peaks in traffic flow and to define the relationship between the peak generation and the peaking characteristics of the adjacent street system.



When the peak hour of the generator does not correspond to either the a.m. or p.m. peak hours of the adjacent street system, that additional time period must be analyzed to determine site-specific design requirements (such as auxiliary lane storage lengths).

### **DAILY AND SEASONAL VARIATIONS**

**5-1.605**

Trip generation estimates for the average weekday are appropriate analyses for most, but not all, land uses. For some land uses, more trips are generated on Friday or Saturday than on the average weekday. Those days, rather than the average weekday, may be the most appropriate design or analysis period for those uses.

Seasonal variations are also important for some land uses. As a prime example, shopping centers should be analyzed for the period between Thanksgiving and Christmas, which is traditionally the busiest shopping season. For recreational and hotel land uses the consultant must provide an analysis that adjusts the background traffic to replicate the appropriate peak season of the generator. Seasonal adjustment factors are available from the Transportation Department.

### **DRIVEWAY TRAFFIC VS. TRAFFIC ADDED TO ADJACENT STREETS**

**5-1.606**

It is usually assumed that all trips entering and exiting a new development are new trips that were not made to or through the area prior to the development being completed. However, for some non-residential developments, a portion of these trips may be “captured” from trips already being made to other existing developments on the adjacent street system, or they may be merely passing by on the way from one place to another. The driveway volume for a new development may, therefore, be significantly different from the amount of traffic added to the adjacent street system. For example, retail establishments, restaurants, banks, service stations, and convenience markets attract people from the passing stream of traffic; these are known as pass-by trips.

ITE’s Trip Generation Handbook contains discussions and references on the issue of pass-by trips. Because of the limited data available, adjustments for pass-by trips should be applied carefully. If pass-by trips are a major consideration, studies and interviews at similar land uses must be conducted or referenced.

### **MULTI-USE PROJECTS**

**5-1.607**

Most trip generation rates and equations have been gathered at and apply to isolated single-use developments. When multiple uses are combined into one development, simply adding the single-use estimates together can result in a total trip generation estimate that is too high.

While trip rates and equations are available for shopping centers, little data exists for other multi-use projects such as downtowns, suburban mixed-use centers, or planned unit developments. Some national publications, such as NCHRP Reports, may provide data that can be useful in some cases.

Multi-use projects are another case in which any adjustments should be applied carefully because of the limited amount of data available. If this is a major consideration for the proposed development, an analysis should be performed to determine the amount of trips that would be external for single uses, but which would be internal in a proposed mixed-use development. Trip Generation Handbook provides some information on this subject.

### **SPECIAL OR UNUSUAL GENERATORS**

**5-1.608**

Occasionally, a development proposal will consist of special or unusual land uses for which typical trip generation rates or equations are not available, or simply do not apply. Judgment must be applied to identify a land use or combination of land uses that best represent the trip-making characteristics of the site. The reasoning and data used by the consultant in developing a trip generation estimate for a special or unusual generator must be justified and explained in the report.

## 5-1.700

# SITE TRAFFIC DISTRIBUTION & ASSIGNMENT

### 5-1.701

## DISTRIBUTION METHODS

The directions from which traffic will access the site can vary depending on many factors, including:

1. The type of proposed development and the area from which it will attract traffic,
2. The presence or absence of competing developments within the same market area,
3. The size of the proposed development, and
4. The conditions on the surrounding street system.

The influence area of the development needs to be identified for the site. Ideally, the influence area should contain approximately 80% of the trip ends that will be attracted to the site. If a market study is available, it should be used in establishing the influence area. Otherwise, an influence area should be established based on a reasonable documented estimate.

The three most common methods for estimating trip distribution are by analogy, model, and surrogate data. In most cases, a surrogate data method can be utilized for developing the trip distribution. Utilizing this procedure involves using socioeconomic and demographic data to establish population or employment land use distributions around the site. In most cases, population can be used as the basis for estimating distribution of office, retail, and entertainment trips; employment is a reasonable surrogate for residential trips, and other trips can be similarly distributed using logical surrogates. For horizon years, land use estimates based on the city's General Plan should be utilized.

For some very large-scale developments, a trip distribution model should be utilized to estimate site trip distribution. The gravity model portion of the city's traffic forecasting model is available for this purpose.

### 5-1.702

## TRIP ASSIGNMENT AND PASS-BY TRIPS

After trip distribution is completed, trip assignment is used to determine the amount of traffic that will use certain roadway links within the influence area. The product of the trip assignment process is the total project-generated trips, by direction and turning movement.

Trip assignment should be made considering logical routings, available roadway capacities, left turns at critical intersections, and travel times. The assignment should also reflect the horizon year(s), roadway, and land use conditions at that time.

As discussed in [Section 5-1.600](#), many land uses do not generate only vehicle trips that are entirely new to the roadway network. A portion of their trips may simply be diverted from trips already on adjacent or nearby streets. Because of limited data and research in the area of pass-by trips, a thorough analysis is required if pass-by trips are to be accounted for in the study. The following procedure will be used:

1. For the peak hour being analyzed, determine the percentage of pass-by trips as part of the total trip generation. The basis for this estimate should be documented. Split the total trip generation number into a new trip amount and a pass-by trip amount.
2. In addition to estimating a normal trip distribution (for new trips), estimate a trip distribution for pass-by trips (giving strong consideration to the commuting work trip).
3. Perform two separate trip assignments, based on the two distributions. One assignment applies to pass-by trips; the other assignment applies to new trips. Care must be taken, as the pass-by trip assignment is more complicated. Pass-by assignment percentages should not automatically be applied to 2-way traffic, since an outbound pass-by trip may use a different route than an inbound pass-by trip. Also, due to the diversion concept, pass-by trip assignment involves subtracting trips from some existing traffic movements and assigning the trips to other movements.

4. Combine the numerical pass-by and new trip assignments. Remember the subtraction required on some vehicle movements because of diversion. Proceed to the analysis process.
5. Check the results for reasonableness. If pass-by trips diverted from a thoroughfare represent more than 15% of the traffic volume on the street, they should be re-evaluated.

### REDEVELOPMENT PROJECTS

### 5-1.703

Since the purpose of the impact study is to evaluate a development proposal's impact on the transportation system, redevelopment projects require some special analysis. In the case of redevelopment projects, existing site-generated trips should be subtracted from existing and horizon year off-site traffic. The traffic generated by the proposed development is then added to the adjusted off-site traffic according to the above procedures to determine the impacts on the transportation system.

The consultant will establish the existing site generated trips through the collection of driveway counts. If the redevelopment area is substantial, or for some other reason does not lend itself to the collection of driveway counts for this purpose, trip generation rates may be applied to establish the existing site generated trips.

## ANALYSIS

## 5-1.800

This section describes the analytical techniques used to derive the study findings, conclusion, and recommendations. As new methodologies are developed and validated, they may be considered by the city or the consultant for applicability to the study requirements.

Capacity analysis must be performed at each of the major street and site access intersection locations (signalized and unsignalized), as well as transportation links, located within the study area. In some cases, there may be a need to analyze additional critical intersections or segments located outside the basic study area.

In addition to capacity analysis, several other transportation service-related factors shall be considered, including:

- Safety
- Circulation patterns
- Traffic control needs
- Transit needs or impacts
- Transportation system management
- Neighborhood impacts
- On-site parking adequacy and off-site parking facilities if any are to be used for site generated parking
- Pedestrian and bicycle circulation
- Service and delivery vehicle access and circulation

### TOTAL TRAFFIC ESTIMATE

### 5-1.801

For each analysis period being studied, a projected total traffic volume must be estimated for each segment of the roadway system being analyzed. These projected total traffic volumes (consisting of site and non-site traffic) will be used in the capacity analyses. The traffic impact report must clearly depict the total traffic estimate and its components. Projected daily traffic volumes must be determined for all major streets within the study area as well.

**5-1.802****GUIDELINES**

Once the total traffic volume estimate has been established, capacity analyses will be performed. In some cases, the projected demand may be unrealistically higher than the capacity available on the existing or proposed transportation system components. In those cases where improvements are not feasible, an adjustment may be necessary in the site and/or background traffic to reflect realistic traffic diversion caused by capacity restraint. In such cases, the traffic components on all adjusted segments must be added again to obtain a more realistic total traffic projection. The original traffic estimates and specific reference to trip diversion shall be included in the report.

**5-1.803****IDENTIFICATION OF IMPACTS, NEEDS & COMMON DEFICIENCIES**

The analysis is intended to show the relationship between the operations and geometry and to assess deficiencies, as well as to identify alternatives for further consideration. This requires the identification of impacts, needs, and deficiencies.

The analysis of internal circulation, parking, off-site circulation, and capacity analyses will provide the basis for identifying transportation deficiencies and needs related to the proposed development. The analyses shall be conducted for conditions both with and without the proposed project in order to establish the incremental impacts of the project and the incremental needs it generates.

**5-1.804****LEVEL OF SERVICE AND CAPACITY ANALYSIS**

The evaluation of traffic operating conditions is referred to as level of service (LOS). The assessment of LOS is based on the quantitative effect of factors, such as speed and volume of traffic, geometric features of the roadway or intersection, traffic interruptions and delay, and freedom to maneuver.

**A. Signalized Intersections**

Signalized intersection level of service will be determined utilizing the methods contained in the Highway Capacity Manual (HCM), 2000 or most recent edition. Two methods (operational and planning) are provided for the analysis of signalized.

The operational analysis requires detailed information on all prevailing traffic, roadway, and signalization characteristics. It provides for a full analysis of capacity and level of service and can be used to evaluate alternative traffic demands, geometric designs, signal plans, or all three. Because of the detailed data requirements, the operational analysis should be used only for the evaluation of existing conditions or for the analysis of projects with a horizon year of less than 5 years in the future. When critical variables are missing, it may be necessary to conduct a planning analysis. However, default values may be used for some of the variables without seriously compromising computations. Caution should nonetheless be used when applying such values and it must be used. The input data needs, with values that have been determined to be most appropriate for the City of Scottsdale, are listed in [Figure 5.1-1](#).

TYPE OF CONDITION	PARAMETER	SYMBOL	DEFAULT
<b>Geometric Conditions</b>	Area Type	CBD, Other	No default
	Number of Lanes	N	No default
	Average Lane Width, ft.	W	No default
	Grade,%	%G	0%
	Existence of Exclusive LT or RT lanes	None	No default
	Length of Storage Bay, LT or RT Lane	L <sub>s</sub>	No default
	Parking Conditions	Yes, No	No parking
<b>Traffic Conditions</b>	Volumes by Movement, vph	V	No default
	Ideal Saturation Flow Rate by Mov't, pcphgpl	S <sub>o</sub>	2,000 pcphgpl (through lanes)
			1,800 pcphgpl (turn lanes)
	Peak Hour Factor	PHF	0.92
	Percent Heavy Vehicles	%HV	2%
	Conflicting Pedestrian Flow Rate, peds/hr	PEDS	None: 0 peds/hr
			Low: 50 peds/hr
			Mod: 200 peds/hr
			High: 400 peds/hr
	Local Buses Stopping in Intersection	NB	0/hr
Parking Activity, pkg maneuvers/hr	N <sub>m</sub>	20/hr (pkg exists)	
Arrival Type (1-6)	AT	3 if isolated	
		4 if coordinated	
Proportion of Vehicles Arriving on Green	P		
<b>Signalization Conditions</b>	Cycle length, sec	C	60-120 seconds
	Green Time, sec	G	No default
	Yellow Change Interval	Y	3.0 seconds
	All-Red Clearance Interval	AR	1.0 second
	Actuated or Pre-timed Operation	A or P	Actuated
	Pedestrian Push-Button?	Yes, No	Yes
	Minimum Pedestrian Green	G <sub>p</sub>	No default
	Phase Plan	None	No default

\*For specific signal timing information, contact the Scottsdale Traffic Management Center (THM) at 480-312-4325.

**FIGURE 5.1-1 LEVEL OF SERVICE DEFAULT DATA**

One of the most critical traffic characteristics that must be quantified to complete an operational analysis is the quality of the progression. The arrival type is best observed in the field, but could be approximated by examining time-space diagrams for the street in question. The arrival type should be determined as accurately as possible because it will have a significant impact on delay estimates and LOS determination.

The planning analysis only addresses capacity because it is not necessary or practical to perform detailed calculations of delay given the accuracy of the data that are generally available for planning purposes. The planning method generates two important products: (a) a projection of the status of the intersection with respect to its capacity, and (b) an approximation of a signal timing plan. Combining this approximation with appropriate values for other

parameters used in the operational analysis, it is possible to extend the planning analysis into the level of the operational analysis.

The data requirements for the planning method are much less rigorous. Still, it is necessary to answer the following three questions in order to perform the analysis:

1. Will parking be allowed?
2. Will the signal be coordinated with the upstream signal on this approach?
3. How will left turns be accommodated?

If the answers are not known to any of these questions, then the analysis should be completed and compared for each alternate condition, and a recommendation made as to the most desirable design conditions.

### **B. Unsignalized Intersections**

Unsignalized intersection level of service will be determined utilizing the methods contained in the Highway Capacity Manual (HCM), 2000 or most recent edition. Procedures have been developed to analyze both 2-way stop controlled intersections and all-way stop controlled intersections. Each of these analysis methods is further divided into analysis of 4-way intersections and T-intersections.

### **C. Arterials**

In most cases, the capacity of an arterial street is dictated by the signalized intersections operating along its length. The analysis procedures described in the HCM rely on the results of the analysis methods above as a part of the input. Planning applications may use the entire arterial methodology, in a straightforward but somewhat simplified way, by computing stopped delay using certain default values as outlined in the signalized intersection analysis section. A reasonable estimation of the intended signal timing and quality of progression is vital to this process.

### **D. Capacity Analysis Software**

Software that accurately replicates the HCM computations may be used in lieu of manual computations. Assumptions should be verified, as well as checking default values. The consultant must verify that the city has access to the software that it intends to use, so that city staff may properly verify inputs and results.

## **5-1.805**

## **SAFETY**

### **A. Vehicles**

The initial review of existing data within the study area shall include the accident experience for the past 3 years. This review should identify locations where roadways serving the site must be analyzed, and measures to alleviate accident hazards must be considered. Accident rates vary, but any intersection with more than one accident per million entering vehicles is worthy of additional analysis. Accident records can be obtained from the Transportation Department.

### **B. Pedestrians and Bicycles**

The site plan should be reviewed to ensure that the internal circulation system and external access points are designed for pedestrian safety and to minimize vehicle/pedestrian conflicts. Locations for transit stops and their associated pedestrian flows to building access points require thorough assessment to ensure safety. Similarly, pedestrian flows to and from parking facilities need careful consideration during site planning, which often requires detailed information on the project's use and layout.

These considerations should also be addressed for projects expected to generate significant bicycle traffic.



## FORMULATION OF MITIGATION ALTERNATIVES

5-1.806

When the analyses indicate that a particular location is projected to operate at an acceptable level of service, no improvements are required. If, however, deficiencies are recognized, then improvements in access, geometry, or operations must be investigated. When reasonable improvements cannot sufficiently accommodate projected traffic, more detailed assessments of project size, land use, or development phasing may be required.

Many major projects necessitate improvements to the area's roadway infrastructure, both internally and externally. The nature of these improvements and their timing must be related to the anticipated phasing of the development, as well as the changes within the study area as a whole.

For redevelopment projects, mitigation alternatives will include transportation demand management measures, including, but not limited to transit, bicycle, and pedestrian improvements.

## SITE ACCESS & OFF-SITE IMPROVEMENTS

5-1.900

To develop recommendations for site access and off-site roadway improvements requires that judgments be applied to a number of alternative solutions or recommendations.

### ESTABLISHMENT OF GOALS

5-1.901

Study recommendations and conclusions are intended to provide safe and efficient movement of traffic to and from, within and past, the proposed development, while minimizing the impact to non-site trips.

The following levels of service are required after the completion of each phase of the development, as well as completion of the entire project:

1. All intersections and arterials must operate at LOS D (or better) during the peak traffic hour of the roadway system. All intersection approaches, and intersection turning movements should operate at LOS D (or better) and must operate at LOS E (or better) during the peak traffic hour of the roadway system. When the planning analysis is performed, the requirement will be that all intersections operate at "near capacity" or "under capacity."
2. In areas where current levels of service, or future levels of service without the development, are E or worse, the delay or v/c ratio may not be significantly increased by the development traffic.

### RECOMMENDATIONS

5-1.902

During the final phase of the study, all analyses are reviewed and re-assessed to best respond to the actual transportation needs of the project and the adjacent area. Results must be placed in logical perspective and sequence.

In high-growth areas, particularly when large developments are being analyzed, it is important to determine the impact of individual phases of the development. This procedure becomes necessary in situations requiring assessments to fund improvements. In such cases, the following analyses should be completed:

1. Levels of service under existing conditions.
2. Levels of service for future horizon dates, with anticipated non-site generated traffic growth. Committed improvements should be included for each horizon year in the analyses. Additional improvements necessary to attain LOS D for base conditions should be identified.
3. Levels of service including site generated traffic for horizon years, both with and without proposed additional improvements to local and regional roadways beyond those identified in step 2.



**A. Network Improvements**

Network improvements recognize that individual developments and increasing traffic volumes are part of the long-term growth of an area. Roadway improvements associated strictly with any given development may not necessarily address the long-term needs of the rest of the region on a systematic basis, and thus not address overall transportation system needs. Therefore, a section of the traffic impact study will address compatibility with the existing and planned infrastructure.

**B. Localized Improvements**

Localized improvements consist of modification, expansion, and in some cases addition of roadway facilities in the immediate vicinity of the proposed development. The scope of these improvements will be consistent with the LOS criteria established above. They will address specific site and through traffic needs, and will be compatible with the city's long-term improvement plans.

**C. Program Improvements**

If adequate transportation improvements cannot be reasonably recommended, consideration should be given to reducing trip generation during problem periods by reducing the project magnitude or altering the land use mix.

**5-1.903****IMPLEMENTATION SCHEDULE**

It is important to view recommendations for improvements within appropriate time perspectives. Recommendations should be sensitive to the following issues:

1. Timing of short-term and long-term network improvements that are already planned, scheduled, and/or funded.
2. Time schedules of adjacent developments.
3. Size and timing of individual phases of development.
4. Rights-of-way needs and availability of additional rights-of-way within appropriate time frames.
5. City priorities for transportation improvements and funding.
6. Cost-effectiveness of implementing improvements at a given stage of development.
7. Necessary lead-time for additional design and construction.

**5-1.1000****ON-SITE CIRCULATION**

An integral part of an overall traffic impact study relates to basic site planning principles. It is extremely important that off-site roadway improvements be fully integrated with on-site recommendations.

**5-1.1001****APPROACH TO SITE PLANNING**

Internal design will have a direct affect on the adequacy of site access points. The identification of access points between the site and the external roadway system, and subsequent recommendations concerning the design of those access points, is directly related to both the directional distribution of site traffic and the internal circulation system configuration. It is clear that driveway traffic volumes of varying sizes need to be accommodated on the site in terms of both providing sufficient capacity and queuing space, and of distributing automobiles to and from parking spaces, pick-up/drop-off points, and drive-through lanes. An integrated system should deliver vehicles from the external roadway system in a manner that is easily understood by drivers, maximizes efficiency, accommodates anticipated traffic patterns, and ensures public safety. Pedestrian linkages should conveniently

and safely connect transit stops and parking facilities with building entrances. Similar linkages should be provided between buildings.

It must be understood that simply providing access to a site by means of curb cuts does not necessarily mean that access to the development has been adequately addressed. The quality of access as it relates to the internal site circulation and design will have a direct relationship on the quality of traffic flow in and around the site development, as well as a direct impact on public safety.

## ON-SITE PLANNING PRINCIPLES

### 5-1.1002

### A. Access Points

Requirements for access to the public street system are detailed in [Section 2-1.700](#) and [Section 5-3.200](#). The guidelines should be followed as closely as possible. Exceptions will only be granted when there are demonstrable extenuating circumstances.

Joint access (the sharing of a driveway by two or more properties) is desirable; particularly where property frontages are short and driveway volumes will be low. Such driveways should be located on joint property lines or be accessible via cross-access easements on the private property being served by the joint driveway.

### B. Vehicular Queuing Storage

Adequate internal and external vehicle queuing storage is essential to providing safe and efficient access and circulation. Queuing analyses must be included to demonstrate the adequacy of the proposed storage lanes.

Drive-in and drive-through establishments should be provided with adequate queue storage capacity to accommodate normal peak queues. Since many of these businesses have major daily or seasonal variations in activity, peaking characteristics should be carefully evaluated.

### C. Internal Vehicular Circulation

Internal circulation is the means by which vehicular traffic is delivered between entry points and parking areas, pick-up/drop-off points, and service areas. Internal circulation roadways should permit access between all areas. These roads should be designed to safely and efficiently deliver vehicles and pedestrians to their respective destinations.

### D. Service and Delivery Vehicles

Service and delivery vehicles require separate criteria for movement to and from the site. Of particular interest is that adequate turning paths are provided for large service vehicles to allow entry and exit without encroaching upon opposing lanes or curbed areas. In addition, sufficient storage areas must be provided so that service vehicles do not hinder the use of parking and circulation routes for other visitors to the site.

### E. Pedestrian, Transit, Bicycles, and Accessible Facilities

The overall site plans should also consider public transportation, pedestrians, bicyclists and those with disabilities. Adequate facilities for parking bicycles should be included. Transit facilities, car pool parking, and shuttle bus staging areas should be provided as appropriate for the development. Where provided, these facilities should be located adjacent to service drive and entrance locations, at key locations along circulation drives, or at major pedestrian focal points along the external roadway system.

Pedestrian connections between these facilities and the site's buildings must be integrated into the overall project design and provide maximum accessibility through the use of sidewalk ramps, etc. These connections must also be provided to the public sidewalk and path or trail systems surrounding the site. See [Section 5-6.000](#) Transit, [Section 5-7.000](#) Bikeways, [Section 5-8.000](#) Pedestrian Facilities, and [Section 5-9.000](#) Neighborhood Traffic Management.

## 5-1.1100

# TIMA REPORT

### 5-1.1101

## PURPOSE AND END USES

The purpose of the impact and mitigation analysis is to identify and measure the effects of a proposed development on the surrounding transportation system, and determine appropriate measures necessary to mitigate those impacts. The developer will be able to utilize the report to evaluate their development proposal and site plan. The city will also utilize the report in reviewing the attributes of proposed developments in conjunction with requests for annexation, land subdivision, zoning changes, building permits, or other development reviews.

### 5-1.1102

## PRESENTATION

The study report will include at a minimum:

1. Study purpose and objectives;
2. A description of the site and study area;
3. Existing conditions in the area of the development;
4. Anticipated nearby development;
5. Trip generation;
6. Trip distribution;
7. Modal split;
8. Traffic assignment resulting from the development;
9. Projected future traffic volumes;
10. An assessment of the change in roadway operating conditions resulting from the development traffic; and
11. Recommendations for site access and transportation improvements needed to maintain traffic flow to, from, within, and past the site at an acceptable and safe level of service.

If the assumptions made in the analysis are based on published sources, then those sources should be specifically referenced. If other, less readily available sources are used, a more detailed explanation must be provided and a copy of the relevant information provided in an appendix.

Please follow the sample report outline provided below and the instructions provided by the Transportation Department staff and/or the Project Coordination Manager when completing the analysis and report. Incomplete reports will be returned to the consultant for revisions or completion prior to a full review of the analysis.

### 5-1.1103

## CERTIFICATION

A professional engineer registered in the State of Arizona must seal the report. If this certification is not provided, the report must be clearly stamped "DRAFT" or "PRELIMINARY."

### 5-1.1104

## SAMPLE REPORT OUTLINE

The outline structure shown in [Figure 5.1-2](#) provides a framework for the Transportation Impact and Mitigation Analysis report. Some studies will be easily documented using this outline; however, additional sections may be warranted because of specific issues to be addressed and/or the results of the study. Likewise, inapplicable sections listed in the outline may be omitted from the report.

<b>TIMA REPORT OUTLINE</b>	
<p><b>I. Introduction to Summary</b></p> <ul style="list-style-type: none"> <li>A. Purpose of Report and Study Objectives</li> <li>B. Executive Summary                             <ul style="list-style-type: none"> <li>1. Site locations and study area</li> <li>2. Development description</li> <li>3. Principal findings</li> <li>4. Conclusions</li> <li>5. Recommendations</li> </ul> </li> </ul> <p><b>II. Proposed Development</b></p> <ul style="list-style-type: none"> <li>A. Off-site development</li> <li>B. Description of on-site development                             <ul style="list-style-type: none"> <li>1. Lane use and intensity</li> <li>2. Location</li> <li>3. Site plan</li> <li>4. Zoning</li> <li>5. Phasing and timing</li> </ul> </li> </ul> <p><b>III. Area Conditions</b></p> <ul style="list-style-type: none"> <li>A. Study Area                             <ul style="list-style-type: none"> <li>1. Area of influence</li> <li>2. Area of significant traffic impact</li> </ul> </li> <li>B. Study Area Land Use                             <ul style="list-style-type: none"> <li>1. Existing land uses</li> <li>2. Existing zoning</li> <li>3. Anticipated future development</li> </ul> </li> <li>C. Site Accessibility                             <ul style="list-style-type: none"> <li>1. Area roadway system                                     <ul style="list-style-type: none"> <li>a. existing</li> <li>b. future</li> </ul> </li> <li>2. Traffic volumes and conditions</li> <li>3. Transit service</li> <li>4. Existing relevant transportation system management</li> </ul> </li> </ul> <p><b>IV. Projected Traffic</b></p> <ul style="list-style-type: none"> <li>A. Site traffic (each horizon year)                             <ul style="list-style-type: none"> <li>1. Trip generation</li> <li>2. Trip distribution</li> <li>3. Modal split</li> <li>4. Trip assignment</li> </ul> </li> <li>B. Through Traffic (each horizon year)                             <ul style="list-style-type: none"> <li>1. Method of projections</li> <li>2. Non-site traffic for anticipated development in study areas</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>a. Method of projections</li> <li>b. Trip generation</li> <li>c. Trip distribution</li> <li>d. Modal split</li> <li>e. Trip assignment</li> <li>3. Through traffic</li> <li>4. Estimated volumes</li> <li>C. Total Traffic (each horizon year)</li> </ul> <p><b>V. Traffic Analysis</b></p> <ul style="list-style-type: none"> <li>A. Site Access</li> <li>B. Capacity and Level of Service</li> <li>C. Traffic Safety</li> <li>D. Traffic Signals</li> <li>E. Site Circulation and Parking</li> </ul> <p><b>VI. Improvement Analysis</b></p> <ul style="list-style-type: none"> <li>A. Improvements to accommodate base traffic</li> <li>B. Additional improvements to accommodate site traffic</li> <li>C. Alternative improvements</li> <li>D. Status of improvements already funded, programmed, or planned</li> <li>E. Evaluation</li> </ul> <p><b>VII. Findings</b></p> <ul style="list-style-type: none"> <li>A. Site accessibility</li> <li>B. Traffic impacts</li> <li>C. Need for improvements</li> <li>D. Compliance with applicable City of Scottsdale codes</li> </ul> <p><b>VIII. Recommendations</b></p> <ul style="list-style-type: none"> <li>A. Site access/circulation plan</li> <li>B. Roadway improvements                             <ul style="list-style-type: none"> <li>1. On-site</li> <li>2. Off-site</li> <li>3. Phasing</li> </ul> </li> <li>C. Transportation System Management Actions                             <ul style="list-style-type: none"> <li>1. On-site</li> <li>2. On-site operational</li> <li>3. Off-site</li> </ul> </li> <li>D. Other</li> </ul> <p><b>Conclusions</b></p>

FIGURE 5.1-2 TIMA REPORT OUTLINE



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# RIGHTS-OF-WAY MANAGEMENT

This section specifies the requirements for securing an encroachment permit for encroaching in the City of Scottsdale's public rights-of-way (ROW) and public utility easements. It outlines responsibilities and requirements for permits, utility construction plans, construction considerations, and as-builts.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# RIGHTS-OF-WAY MANAGEMENT

## 5-2

### GENERAL INFORMATION

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5-2.000

#### PERMIT REQUIREMENTS

5-2.001

Scottsdale requires an encroachment permit according to Chapter 47 of the Scottsdale Revised Code, see [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

The city administers all planning, permitting and construction processes in accordance with the following documents:

- **Maricopa Association of Governments (MAG) Uniform Standard Specifications**  
[www.mag.maricopa.gov/](http://www.mag.maricopa.gov/)
- **City of Scottsdale Supplement to the MAG Uniform Standard Specifications**  
[www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp)
- **Arizona Utility Coordinating Committee (AUCC) Public Improvement Project Guide including the Joint Trench Use Model and Western Underground Trench Formula**  
[www.ci.phoenix.az.us/AGENCY/PHXEASD/cpage.html](http://www.ci.phoenix.az.us/AGENCY/PHXEASD/cpage.html)
- **City of Phoenix Barricade Manual and the Manual on Uniform Traffic Control Devices** [www.mutcd.fhwa.dot.gov/](http://www.mutcd.fhwa.dot.gov/)

#### PURPOSE OF A PERMIT

5-2.002

Permits are necessary to assure that all work done in the rights-of-way (ROW) is:

1. Completed in the proper location with adequate spacing;
2. Built with acceptable materials and in accordance with current specifications;
3. Installed in a safe and expeditious manner.

And that:

4. Final completion is assured and acceptable;
5. All infrastructure is protected;
6. Unnecessary traffic delays or congestion to the traveling public is limited;
7. All landscaping is restored; and
8. Liability issues are properly addressed.

Engineered construction drawings (plans) must be submitted for review. The objective is to make optimal utilization of the space available in the public ROW and public utility easements; assure compliance with all city ordinances, policies and standards; assure coordination with other ROW users, agencies and city project activities; and reduce risk and/or inconvenience to the traveling public. After the application is submitted, the city may add special conditions or stipulations to the permit, which are important for the applicant to review for compliance.

Permits are reviewed in scope by the city and these permits do not relieve a permittee from any of the stated standards in the Permit Requirement section above and/or any federal, state,

city or industry accepted practice. It is the permittee's responsibility to ensure compliance with all of the above stated requirements. Plans that have been reviewed by the city do not relieve a permittee of this requirement unless the deviation from these standards is clearly specified on the plans and permit and the permittee has received; beyond the standard city permit approval, an additional, written approval from the city. This additional approval does not waive any other stated requirements on the plans or stipulations to the plans.

## 5-2.003

**LICENSE AND OTHER REQUIREMENTS****A. Telecommunications Facilities (Pending Telecom Ordinance)**

All telecommunications providers who desire to construct, install, operate or maintain telecommunications facilities in the public highways must first obtain a Telecommunications License from the City of Scottsdale as stated in Chapter 47, Article VI of the Scottsdale Revised Code, except in cases where state law forbids establishment of a license requirement. Licensing information is available by calling the Telecommunications Policy Coordinator at 480-312-4138.

**B. Cable TV**

All cable television and telecommunications providers who provide cable television services, programs or signals must obtain a Cable TV License from the City of Scottsdale as stated in Chapter 7 of the Scottsdale Revised Code. Licensing information is available by calling the Telecommunications Policy Coordinator at 480-312-4138.

**C. Wireless Communications**

All providers who provide wireless communications infrastructure must file a pre-application with the Planning & Development Services Department to determine the approval process prior to obtaining a ROW encroachment permit.

For more call 480-312-2500 or go to [www.ScottsdaleAZ.gov/bldgresources/devprocess](http://www.ScottsdaleAZ.gov/bldgresources/devprocess). An application checklist is available at [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

**D. All Other Aboveground Improvements**

Installation of any aboveground improvements requires a pre-application, filed with the Planning & Development Services Department, to determine the approval process prior to obtaining a ROW encroachment permit.

For more call 480-312-2500 or go to [www.ScottsdaleAZ.gov/bldgresources/devprocess](http://www.ScottsdaleAZ.gov/bldgresources/devprocess).

## 5-2.100

**PERMITS**

The ROW encroachment permit application is submitted to the One Stop Shop. Encroachment permit applications for public and private utility work will be submitted to the Inspection Services and Land Survey office at 9191 E. San Salvador. Include with the application a minimum of 3 sets of construction drawings, details, notes, Traffic Control Plan, Barricade Plan, project schedule, insurance certificates, plating plan, a communication plan and any other necessary information. In reference to projects proposed on Primary Roads, it is strongly encouraged that a provider submits project plans and the Traffic Control Plan as far in advance of the project as is reasonably possible, prior to application for an encroachment permit. However, the plans, Traffic Control Plan and a permit application may be submitted simultaneously.

Upon receiving the application and appropriate drawings, details and notes, etc., city staff will log the request into the city's automated permit system and route the documents for technical review. This review includes, but is not limited to, checking for compliance with construction standards, approving alignments, verifying that the work is in the public rights-of-way or public

utility easement, determining if other work is occurring at the same time or at the same site, verifying that all joint trench opportunities have been incorporated into the design, checking for conflicts, reviewing traffic impacts, reviewing the Barricade Plan and verifying that all city requirements have been met and incorporated into the plans.

Upon completion of the review, the permit application will be either issued to the applicant or returned for further modifications. Permits are issued for a specified timeframe based on the estimated length of the project construction. If additions or corrections are required to the plans or permit application, the applicant will be notified and asked to make corrections and resubmit to the city.

## **PERMIT TYPES**

**5-2.101**

### **A. General ROW Encroachment Permit**

A permit is required for all encroachment in, on, above, over, under or through the city's rights-of-way, including all public utility easements. The Rights-of-Way Encroachment Permit application forms are available at the City of Scottsdale's One Stop Shop. The General ROW Permit Application must be submitted to the One Stop Shop.

### **B. Public and Private Utility Permit**

A permit is required for all utility work, public and private, that occurs within the city's ROW or within public utility easements. A Utility Company Right of Way Permit Application is available at the City of Scottsdale's One Stop Shop or the Inspections and Survey Services office, and online at [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms). The Public and Private Utility Permit Application must be submitted to the Inspections and Survey Services office.

### **C. Emergency Encroachment Permit**

For emergency repairs involving loss of service, call Inspection Services at 480-312-5750 to state the type of emergency, the location, the number of lanes closed, a contact name, estimated time to complete the repairs and a cell phone number. In addition, fax the barricade plan to Inspection Services at 480-312-5704 within 24 hours.

*NOTE: The installation of new service is not an emergency.*

The appropriate construction project signage needs to be posted by the permittee as outlined in [Section 5-2.307](#).

This permit is available online at [eservices.ScottsdaleAZ.gov/planreview](http://eservices.ScottsdaleAZ.gov/planreview).

### **D. Annual Maintenance Encroachment Permit**

A permittee who owns an improvement in the city's ROW or a subcontractor may apply for an annual maintenance encroachment permit at the One Stop Shop. The annual maintenance encroachment permit must be renewed every year; permitted activities include entering manholes, cabinets or other above/below ground improvements, but do not include any pavement or concrete cutting. The maintenance encroachment permit number must be shown on the insurance certificate.

## **PERMIT FEES**

**5-2.102**

Fees for all permits will be charged per city policy. Permittees must demonstrate proof of insurance as required in [Section 5-2.104](#). Permit fees and other construction costs are collected in accordance with the fee schedule in Chapter 47 of the Scottsdale Revised Code (except as superseded by a franchise or license agreement) when each permit is issued. On joint trench projects, the surcharge fee will be apportioned to the participating utilities. See [www.ScottsdaleAZ.gov/bldgresources/fees](http://www.ScottsdaleAZ.gov/bldgresources/fees).

**5-2.103****PERMIT DURATION**

The permit application needs to identify the anticipated length of construction (start and stop dates) in calendar days. The city may require additional construction scheduling information on a case-by-case basis. The actual construction start date is subject to city approval. The permit is activated by calling Inspection Services at 480-312-5750 a minimum of 72 hours prior to the start of construction and obtaining city approval of a barricade plan (if needed) prior to commencing work.

In the event a permittee has not begun construction within the approved timeframe, then the project may be subject to additional planning and coordination efforts. If the permittee does not expeditiously complete construction in the approved timeframe, then enforcement action may be taken. Failure to expeditiously complete the project within the permitted timeframe may result in denial of future permits until the project is completed to the city's satisfaction.

**5-2.104****INSURANCE REQUIREMENTS**

Before the city will issue any permits, the contractor must provide a Certificate of Insurance with agreed to limits of liability and which lists the city as additionally insured.

**A. Permittee Liability**

The permittee is responsible for all liability imposed by law for damages arising out of or related to work performance or failure by the permittee, permittee's agents, contractors and all tiers of subcontractors under the permit. If any liability claim is made against the city, its officers or employees, the permittee will defend, indemnify, and hold the city harmless from any such claim.

**B. Insurance Limits**

No applicant is entitled to an encroachment permit unless a current Certificate of Insurance has been filed and maintained with the city, certifying that the permittee carries public liability and property damage insurance issued by an insurance carrier authorized to do business in the state. This insures the applicant and the city and its agents against loss by reason of injuries to or death of persons or damages to property arising out of or related to work performed by the applicant, its agents or employees while performing any work under the permit. Such insurance is primary and provides coverage for liability assumed by the applicant under subsection (a) of this section and needs to be provided by the permittee in the following minimum amounts:

1. General Liability Insurance - \$1,000,000 each occurrence, \$2,000,000 Products and Completed Operations Aggregate and \$2,000,000 General Aggregate.
2. Vehicle Liability Insurance - \$1,000,000 Combined Single Limit
3. Worker's Compensation Insurance - As required by Arizona law
4. The city Risk Management Director may set higher or lower limits of liability insurance depending on risk exposures.

**C. Effective Timeframe of Insurance**

Failure by the applicant to provide the city with the required insurance certificate and failure by the city to demand the filing by permittee of such a certificate before such a permit is issued, does not waive the permittee's obligation to provide the insurance.

The required insurance certificate must remain in effect and be kept on file with the city until all work to be performed by the permittee (under the permit) has been completed. Where an encroachment involves a permanent obstruction, the required insurance certificate requirements remain in effect until the construction is removed.

The insurance certificate provides that coverage cannot expire or be canceled without providing the city 10 days written notice of such action.

### TRAFFIC CONTROL PLANS

### 5-2.105

The purpose of a Traffic Control Plan is to proactively plan for, coordinate and minimize the impacts of encroachment and construction in the ROW. The Traffic Control Plan is designed to help the City of Scottsdale understand what traffic impacts will occur during a construction project. The Traffic Control Plan is intended to identify the phasing of large projects, including lane restrictions, closures, plating or any restriction that could delay the traveling public.

1. A Traffic Control Plan needs to be submitted prior to (with plans) or accompanied by the permit application for all proposed work in or on Primary Roads, see [Figure 5.2-1](#). The Traffic Control Plan is subject to all city review processes and must be reviewed and subject to approval by the city prior to permit issuance. Additional information and stipulations may be required on a case-by-case basis. The required Traffic Control Plan is in addition to the submission of a Barricade Plan prior to the start of construction, see [Section 5-2.306](#).
2. The Traffic Control Plan will:
  - a. Provide the estimated start date, preferably within 15 days of actual construction.
  - b. Provide the duration of construction.
  - c. Provide hours that traffic restrictions will be in place (24 hour, off-peak mid-day and off-peak night, etc.).
  - d. Identify the length of the project and location details, including lane closures and type of work.
  - e. Describe any construction phasing that will occur during the project, specifically how the barricading configuration will change during the duration of the project and how it will be accomplished in the project schedule.
  - f. Provide a map of the affected area of construction, showing existing lane striping, proposed work zone, existing speed limit and detail all driveway, alleys, transit facilities, median breaks or other locations where traffic may enter/exit or be in conflict with the project work zone.

### UTILITY CONSTRUCTION PLAN

### 5-2.200

All Utility and Telecommunications Construction Plans must comply with [Section 1-2.100](#) and [Section 9-1.000](#). Additional plan details may be required on a case-by-case basis.

### CONSTRUCTION REQUIREMENTS

### 5-2.300

#### WORK HOURS IN THE RIGHTS-OF-WAYS

#### 5-2.301

Generally, no interference with traffic flow on Primary Roads is permitted during the hours of 7 to 9 a.m. or from 4 to 6 p.m. unless prior authorization is obtained in writing by the Traffic Engineering Director or designee, see [Figure 5.2-1](#). Specific work hours may be stipulated by the city on the project's Barricade Plan. Night work must have prior authorization from the city and may be required by the Traffic Engineering Director or designee. In addition, certain areas of the city may have seasonal or special event restrictions for construction work, as designated by the city on a case-by-case basis. Contact the Traffic Engineering Division at 480-312-7696 for updated seasonal or special event restrictions.

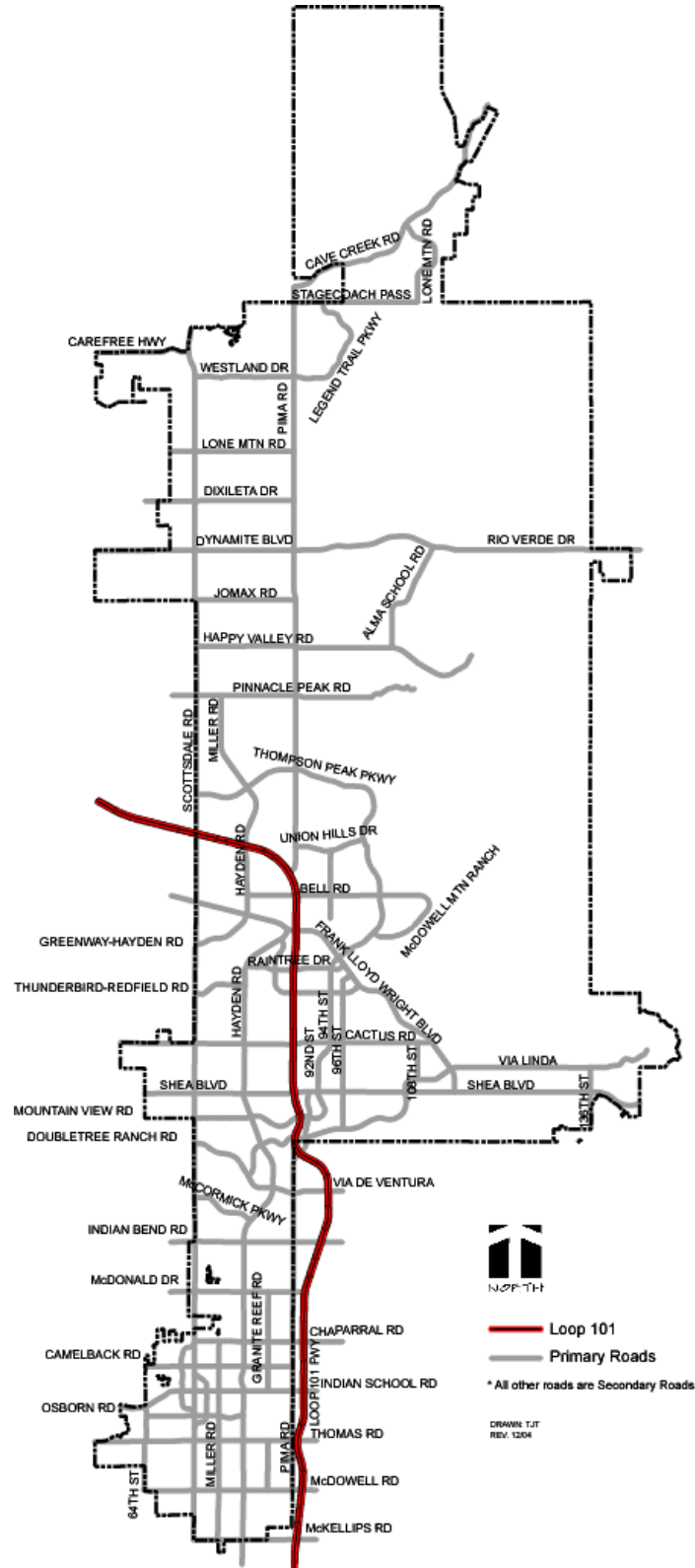


FIGURE 5.2-1 PRIMARY ROADS



## JOINT TRENCHING POLICY

Work in the rights-of-way has significantly increased over the past several years causing disruption to the traveling public, continual pavement cuts often in the same location and conflicting with other facilities within the rights-of-way. For these reasons, the city has increased its management of work in the rights-of-way, enacting a joint trench process for projects being done on Primary Roads. This policy is designed to:

1. Minimize the public's inconvenience with minimal lane closures;
2. Decrease multiple pavement cuts that detract from the life of the street;
3. Allow for proper space allocation within a limited rights-of-way area;
4. Aesthetically address multiple users' needs with properly placed facilities, manholes and cabinets, etc.

### A. Criteria

The City of Scottsdale requires a permittee to joint trench a project if the project is located on a Primary Road and the trench is 1,000 feet or longer. Joint trenching may also be required by the city on a case-by-case basis when a permittee's trench is 1,000 feet or less or on a Secondary road. The requirement for joint trenching on a Primary or Secondary Road is defined to include the entire ROW, not just curb-to-curb.

All requests for an exception to the joint trench requirement for any project must be submitted in writing to the city and will be reviewed and approved by city staff on a case-by-case basis.

### B. Procedure

1. Preliminary planning and design should be done by the permittee in accordance with the Arizona Utility Coordinating Committee's Joint Trench Use Model. See [www.ci.phoenix.az.us/AGENCY/PHXEASD/cpage.html](http://www.ci.phoenix.az.us/AGENCY/PHXEASD/cpage.html) for the joint trench use model and notification form.
2. The permittee must contact potential joint trench participants, as listed on file with the City of Scottsdale. Call 480-312-4138 to obtain a current participant list.
3. The permittee as the lead provider, must send a notice to each potential participant, either by fax, email or U.S. mail, of the joint trench opportunity, and provide proof of notice to the city.
4. The permittee must also post a joint trench opportunity notice on the city's web site. See [www.ci.phoenix.az.us/AGENCY/PHXEASD/cpage.html](http://www.ci.phoenix.az.us/AGENCY/PHXEASD/cpage.html) for the AUCC Joint Trench Notification Form.
5. If participation is requested by another provider, then the permittee must give a minimum 2 weeks timeframe for interested companies to supply the permittee with their needs so they can be included in the permittee's working drawing.
6. As part of the project plan set, the permittee must provide a trench cross-section and a plan that depicts the details of the proposed work, including the trench, manholes, driveways, utility cabinets/facilities locations and other appurtenances. The plan must show that all location conflicts have been resolved.
7. The permittee then submits 3 copies of the plan set, along with a permit application and a Traffic Control Plan to the city's One Stop Shop for staff review and approval.
8. Upon city approval of the plan, the permittee obtains the permits and schedules an on-site pre-construction meeting with the city's utility inspector to review the proposed work, timing of work and any approved barricade plans prior to commencing any work. This is critical to ensure the positive progress of work being done in ROW.



**C. Participants**

Participants in the joint trenching include public utility and telecommunication providers (both current and future licensees).

**D. Failure to Participate**

Permits involving asphalt cuts and joint trench locations will only be issued once during a 2-4 year timeframe in any given location. Providers need to plan accordingly. Under extreme circumstances, the city may, at its sole discretion, waive the stated timeframe requirements. A franchise agreement or license is required to use the rights-of-way. Companies not possessing a license must do so by contacting the city's Telecommunications Policy Coordinator at 480-312-4138.

**5-2.303****POTHOLING (VACUUM EXCAVATION)**

A permit is required for all utility location work. All potholing will be done in accordance with COS Standard Details to the MAG Uniform Standard Specifications, Details 2200 and 2201, located on the city's web site at: [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

**5-2.304****STREET BORING REQUIREMENTS**

All utilities or other facilities crossing existing city streets, regardless of the age of the street, must be bored or punched unless permission to open cut has been given in writing by the city Traffic Engineering Director or designee. The burden of proof will lie with the permittee to show that boring is not a feasible requirement. The permittee must specify the boring method on the construction plans, such as "directional boring." This requirement is used to assess appropriate boring methods. Certain types of boring, such as use of water jets are not allowed. The permittee must also indicate on the construction plans the anticipated impact on and restoration of existing facilities. The proposed method is approved by the city on a case-by-case basis during plan review. If field conditions are such that boring has been demonstrated to city Inspections to be infeasible, then the permittee may be permitted to open cut.

**5-2.305****UNDERGROUNDING REQUIREMENT**

All new public utility, cable TV, telecommunications fiber optic, cellular, dark fiber or similar facility must be installed underground. If new facilities are proposed in an area that has existing overhead lines, the new facilities will be required to go underground and any permittees with existing overhead facilities may participate in reinstalling these facilities underground when a joint trench opportunity is provided. When major upgrades are planned, utility and telecommunications providers may underground existing facilities currently on existing poles.

Installation of new facilities or major enhancements to existing facilities need to be installed underground unless it can be demonstrated that the public's general health, safety and welfare are affected by the underground installation or that the provider lacks the ability to install the facilities underground. The fact that an underground installation is more costly than an overhead installation is not, in and of itself, a health or safety issue.

All above ground appurtenances need to be designed and installed with attention to minimizing the number of appurtenances, maximizing joint locations, combining with existing boxes and sharing facilities. All locations will meet industry standards for sight distance locations, all industry safety requirements and the aesthetic requirements of the city. The issuance of a permit in violation of any of the requirements will not void the permittee's responsibility, unless the substandard installation is clearly noticed and approved separately from the normal permit requirement.

**BARRICADE PLAN****5-2.306**

1. Work in/on residential streets typically does not need a Barricade Plan, but, unless otherwise exempted by law, all signs, barricades and other necessary traffic control devices need to be placed in accordance with the city of Phoenix Barricade Manual, <http://phoenix.gov/streets/07barman.pdf>, and the Manual on Uniform Traffic Control Devices (MUTCD), [www.mutcd.fhwa.dot.gov/](http://www.mutcd.fhwa.dot.gov/).
2. Where a Barricade Plan is required, it must be submitted with a Barricade Plan application form to Inspection Services a minimum of 3 work days before any proposed partial or complete closure of a street, alley, sidewalk, bus stop, trail, or other public way, by faxing the Barricade Plan to 480-312-5704.
3. Work cannot be initiated on the portion of the project requiring barricading until Barricade Plan approval has been obtained in writing from both Inspection Services and Traffic Engineering divisions.
4. The Barricade Plan must be prepared by a person certified by the American Traffic Safety Services Association (ATSSA).
5. The Barricade Plan must include the following information:
  - a. Streets names, alleys and major driveway intersections to be barricaded
  - b. Sidewalks, trails and multi-use paths to be barricaded.
  - c. Bus bays and any bus stop infrastructure to be barricaded.
  - d. Sign and barricade types to be used by code or graphic depiction
  - e. Sign and barricade location and spacing, including Variable Message Signs, relocated traffic control signs, and project identification signs
  - f. Taper and tangent length
  - g. Graphic depiction of vehicle travel lanes and bike lanes.
  - h. Detour plans
  - i. North arrow
  - j. The hours of operation for the project
  - k. The construction duration and schedule
  - l. Barricade plan preparer, barricade company and contractor contact information.
6. Except during emergencies, pedestrian service/safety needs to be fully preserved at crosswalks (marked/ unmarked) and other facilities used by pedestrians. The Barricade Plan must incorporate these six fundamental principles for successfully accommodating pedestrians through work zones:
  - a. Traffic and pedestrian safety must be an integral and high-priority element in every project, from planning through design and construction.
  - b. Pedestrian and traffic movements should be inhibited as little as practical and planned to reduce exposure to potential hazards.
  - c. Pedestrians and motorists should be guided in a clear and positive manner while approaching, traversing and leaving work sites.
  - d. Routine inspection of traffic control devices must be performed.
  - e. Personnel must be adequately trained in the proper management of pedestrian and traffic control, so they are qualified to make work zone safety decisions in the selection, placement and maintenance of traffic control devices.
  - f. Pedestrian paths through the work zones should replicate as nearly as possible the elements of the existing path and comply with the ADA.
7. The Barricade Plan must be in substantial conformance with the Phoenix Traffic Barricade Manual.
8. Traffic control devices shown in the Barricade Plan must be installed and/or removed by persons certified by Phoenix through successful completion of its temporary traffic control

training program. An employee working for a company certified by Phoenix is deemed certified. Scottsdale accepts the Phoenix temporary traffic control training program certification as set forth in the Phoenix 2007 Traffic Barricade Manual, as amended.

9. Traffic control devices may be placed only when work is about to begin, is underway, or another justifiable reason exists to protect the public health, safety or welfare.
10. A copy of the approved Barricade Plan must be available at the jobsite at all times when work is occurring, including placing and removing barricades. The barricade company is responsible for having the Barricade Plan on site when its workers are placing or removing the traffic control devices.
11. Where a major change to a Barricade Plan is required, it must be submitted on a Barricade Plan change form to Inspection Services a minimum of 3 work days prior to any proposed change, by faxing the Barricade Plan to 480-312-5704.

### 5-2.307

## CONSTRUCTION SIGNS

The permittee is required to post information signs at the work site identifying the name of the utility authorizing the work. The purpose of the sign is to identify the permittee authorizing the work and the contractor performing the work. This signage is still required even when marked company vehicles are present at the work site. Required sign information also includes a phone number where a person can call and receive information about the job and leave a message. The permittee must respond to all phone messages within 24 hours. In addition, all permittees must return regular traffic control signs back to their original place and replace any signs damaged during construction. General signage requirements are listed below. Specific project signage may be required by the city on a case-by-case basis.

### A. Primary Roads

Projects on Primary Roads, as identified in [Figure 5.2-1](#) that are either greater than 1 mile in length or have a construction timeframe of 30 calendar days or longer, must utilize the following signage, and as shown in [Figure 5.2-2](#):

1. Variable Message Board (VMB) sign at each end of the project indicating:
  - a. Location of construction, including cross streets names.
  - b. Direction of travel restricted.
  - c. Dates and duration.
  - d. Alternate route suggested.
2. Stationary Signs at each end of the project indicating:
  - a. Names of authorizing company and permittee.
  - b. Phone number for job information and as means to get a response to phone calls/ message.
  - c. Estimated start and completion dates for project.
  - d. Project description.
  - e. Conform to the following format:
    - At least 4 foot x 4 foot size sign, with a minimum of 4 inch to 6 inch letters (black legends/orange background).
    - Type style is to be block, sans serif, medium width stroke, no more than 50 percent condensed, and not extra bold, not italics letters for better readability (For example: Helvetica medium typestyle).
    - Sign should have an inset border with rounded corners.



FIGURE 5.2-2 WORK ZONE PROJECT SIGNAGE

**B. Other Primary and All Secondary Roads**

All projects not meeting the criteria listed above in [Section 5-2.307](#) paragraph A must post two stationary signs that conform to [Section 5-2.307](#) paragraph A2, or as directed by Traffic Engineering.

**COMMUNITY NOTIFICATION**

5-2.308

In addition to the above signage requirements, community notification will be required where there will be significant traffic, ingress/egress, construction or noise impacts on a particular area. Community notification may take different forms depending upon the particular permitted project or work. Some possible methods of notification could include: additional signage, door hangers, community newsletters, press releases and should try to include one method of auditory/electronic delivery such as community meetings, phone message lines and web site information. The city reserves the sole right to determine the appropriate community notification requirements for all permitted projects on a case-by-case basis.

**INSPECTIONS**

5-2.309

All above ground and underground facilities and equipment placed in the ROW, and all construction work done in the ROW is subject to periodic and final inspection for compliance, with all permit requirements, as well as all applicable city, state and federal laws. Permittee must notify Inspection Services at 480-391-5750 at least 72 hours prior to beginning permitted construction work in the ROW. Requests for city inspections must be made 24 hours in advance of required inspections.

**PAVEMENT CUTS**

5-2.310

As outlined in Chapter 47 of the Scottsdale Revised Code, [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes), no excavation is permitted in newly paved, resurfaced or sealed public streets for the following time frames:

- Construction or reconstruction of a structural section: 4 years.
- Surfacing, resurfacing or sealing of an existing structural section: 2 years.

In the event of emergency, these periods may be waived by the city.

**STRIPING/MARKINGS REQUIREMENTS**

5-2.311

All striping and markings requirements, placement and removal must comply with:

- The Maricopa Association of Governments (MAG) Uniform Standard Specifications, [www.mag.maricopa.gov/](http://www.mag.maricopa.gov/), and
- The Manual on Uniform Traffic Control Devices (MUTCD), [www.mutcd.fhwa.dot.gov/](http://www.mutcd.fhwa.dot.gov/).

**5-2.312****TRANSIT FACILITIES/AMENITIES**

If the project affects a bus stop, the permittee must create a temporary bus stop, with comparable amenities, if feasible, as close to the affected stop as possible and in a safe location. An accessible route of travel must also be provided. Permittee must also return all transit facilities and amenities to their original location and condition or replace them if damaged during construction. Permittees must, as part of their traffic control plan, address how buses (which are generally 108 inches wide, plus mirrors) will maneuver through the site and whether a detour is necessary. In addition, the permittee needs to provide a minimum 2-week notice to the city's transit office so that the city can provide information about detours, access and projected construction timeframe. If the construction is an emergency, the city's transit office needs to be notified immediately 480-312-7696.

**5-2.313****ABANDONED FACILITIES OR FACILITIES REMAINING AFTER EXPIRATION OF ENCROACHMENT PERMIT**

If at any time a permittee wishes to cease using and abandon facilities within the ROW, or if the permittee has not applied for and received an extension or renewal of the original permit from the city before an encroachment permit has expired, the permittee must provide for the disposition of its facilities within the ROW as outlined below.

If a permittee desires to abandon its facilities within the ROW, they must submit an abandonment request to Inspection Services Utility Permit Coordinator. The abandonment request may designate one of three alternatives (as defined below). The city then approves the request by issuing an abandonment plan. In issuing an abandonment plan, the city considers and attempts to accommodate the permittee's preference; however, the city retains the sole choice to designate one of the following three options:

1. Require the permittee to remove all structures, cable, equipment or facilities; or
2. Permit the city to accept ownership, in which case, the title to such structures, cable, equipment or other facilities vests in the city; or
3. Require the permittee to leave the facilities in place. If the facilities are abandoned in place, the permittee must record the facilities as "Abandoned in Place" and permanently maintain such records. Facilities that are Abandoned in Place will not need to be removed by the permittee. However, the permittee, by abandoning facilities in place, expressly permits the removal of such facilities by any future party at the sole discretion of the city.

If the abandonment plan requires the removal of facilities from the ROW, and the permittee fails to remove its structures, cable, equipment or other facilities within 180 days of notification by the city, then the city will serve written notice of failure to comply. Furthermore, if the permittee fails to rectify the removal within 10 days from the date the notice was received, the city may rectify the default as outlined below:

Upon removal of the structures, cable or other facilities, the city may submit in writing the cost incurred. Upon the permittee's receipt of notice of such amount, it shall immediately become a lien against the permittee's company, and shall remain a lien in favor of the city until the amount is paid in full, together with interest at the annual rate of 10 percent.

In the event no abandonment request is submitted to the city, the city has complete discretion to determine the disposition of all structures, cable, equipment or other facilities left within the ROW. Any costs and expenses incurred immediately becomes a lien against the permittee's company, and will remain a lien in favor of the city until the amount is paid in full by the permittee, together with interest at the annual rate of 10 percent.

The right and remedy will not be exclusive, and the city has all the rights and remedies available to it in accordance with the laws of the State of Arizona and the City of Scottsdale. The establishment of a lien does not preclude the city from establishing additional liens upon subsequent failure or failures to remove any improvement.

Abandonment of any and all above ground facilities and appurtenances are also subject to all of the requirements stated above.

### ALLEYS

### 5-2.314

If construction or work is planned in an alley, prior to commencing work, the permittee needs to contact Sanitation at 480-312- 5600 to obtain the days of sanitation pickup for that alley. Those days are to be listed on the plan along with a plan note that construction is prohibited on those days; exceptions may be made on a case-by-case basis by the Sanitation Director or designee. A Barricade Plan must be submitted to Inspection Services (where submitted, to whom/what location) at least 72 hours prior to commencing work for any work to be done in an alley.

### AS-BUILTS

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### 5-2.400

The city requires submittal of as-built plans for all facilities constructed or installed within public ROW or within easements that are owned by the city. The permittee, who constructs facilities (not owned by the city) in the public ROW or within the easement, is required to maintain the facility as-builts and provide them to the city. The preferred as-built format is digital in either MicroStation or ArcView SHP format. The digital as-builts must conform to the Maricopa Association of Governments Computer Aided Drafting (CAD) standards and must reference the City of Scottsdale encroachment permit number, see [Section 1-2.200](#). It is preferred that digital as-builts utilize the City of Scottsdale's base maps (streets, rights-of-way and parcels) as the foundation for the drawings.





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# GEOMETRICS

This section identifies the geometric requirements for each street classification within the city.

It includes guidance for sight distance, access, sidewalks, roundabouts, bridges, retaining walls and structural clearances, side slopes, partial street improvements, pavement transitions, frontage roads, subdivision streets and Environmentally Sensitive Lands (ESL) street standards.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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## **GENERAL INFORMATION**

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**5-3.000**

### **USE OF NATIONAL STANDARDS**

**5-3.001**

See the American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, and AASHTO's Roadside Design Guide for clear zones, roadside obstacles, barriers and curb use.

All traffic control devices must comply with the Manual on Uniform Traffic Control Devices (MUTCD) prepared by the U.S. Department of Transportation as well as [Section 5-4.000](#) and [Section 5-5.000](#) of this manual. See the Transportation Research Board's Access Management Manual, Section 3.103 for access control guidelines.

Other references include the guide for the Planning, Design and Operation of Pedestrian Facilities (AASHTO, July 2004), the Guidelines and Recommendations To Accommodate Older Drivers and Pedestrians (FHWA, 2001), and the Highway Decision Handbook for Older Drivers and Pedestrians (FHWA, 2001).

### **STREET TYPES**

**5-3.002**

#### **A. Freeways**

Freeways will be designed to safely handle very large volumes of through traffic. Direct access will be limited to widely spaced interchanges. Design, construction and operations will be provided by the Arizona Department of Transportation.

#### **B. Arterial Streets**

Arterial streets with raised medians provide regional continuity and carry large volumes of traffic between areas of the city and through the city. Full access to abutting commercial and multifamily land uses is limited to the greatest extent possible to facilitate movement of traffic. Pedestrian and bicycle crossings should be grade separated when feasible.

#### **C. Collector Streets**

Collector streets provide traffic movement between arterial and local streets, with some direct access to abutting commercial and multifamily land uses. Center left-turn lanes are provided to allow for greater access. Driveway access should be evenly spaced.

#### **D. Local Streets**

Local streets provide direct access to abutting land uses, provide access to the collector street system and accommodate low traffic volumes. Local streets should be designed to discourage high travel speeds.

Deciding the location of local collector, residential, commercial and industrial streets are usually done during the development site planning process. Planning for local streets is

influenced by the plans for adjacent developments that have recently been approved. The Plan Review staff will review each preliminary proposal for development and will specify any changes needed to conform to previously planned and approved street alignments. Plan Review will also specify the classification for each street involved in the plan.

### 5-3.003

## STREET CLASSIFICATIONS

The six street classifications are based upon the type and level of use for which streets are intended; see the specified figures in [Section 5-3.100](#) for design criteria. Special cross sections and design criteria apply for streets located within the Hillside or Upper Desert/Lower Desert areas of the ESL; [Figure 2.2-1](#) depicts the areas within the city where these criteria apply.

## 5-3.100

## DESIGN STANDARDS

[Appendix 5-3A](#) and [Appendix 5-3B](#) list most of the design standards data necessary for the design of streets within the City of Scottsdale. Subsequent paragraphs in this booklet discuss these standards and provide other criteria that could not be included in the table.

### 5-3.101

## MAJOR ARTERIALS

### A. Rural Character

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 35,000 - 55,000 vpd
- Design Speed: 55 m.p.h. Posted Speed: 45 m.p.h.
- Maximum Grade: 6.0%
- Minimum Grade: 0.4%

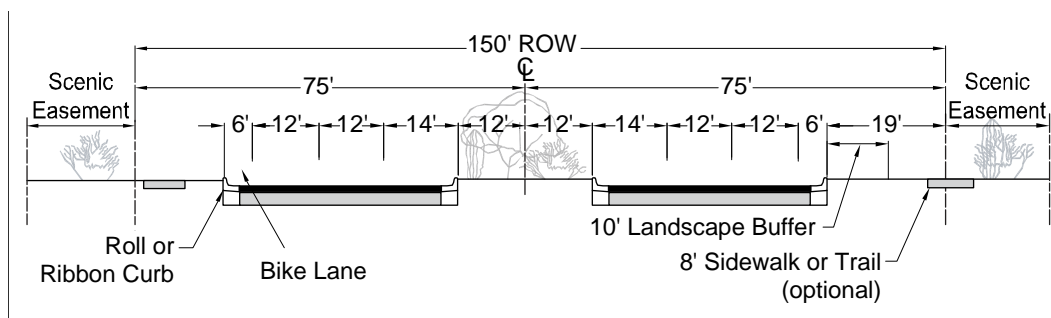


FIGURE 5.3-1 MAJOR ARTERIALS - RURAL CHARACTER

### B. Suburban Character

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 35,000 - 55,000 vpd
- Design Speed: 55 m.p.h. Posted Speed: 45 m.p.h.
- Maximum Grade: 6.0%
- Minimum Grade: 0.4%

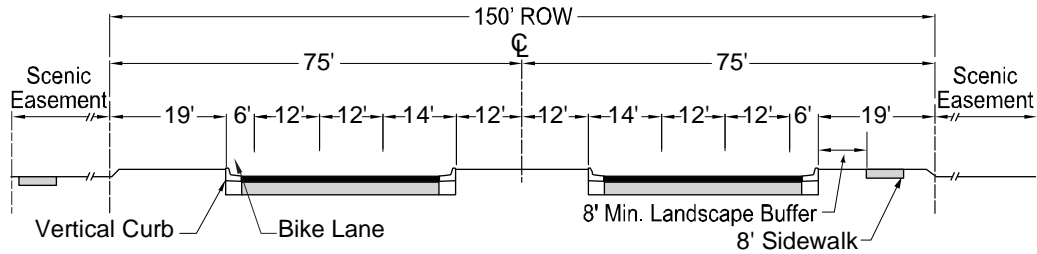


FIGURE 5.3-2 MAJOR ARTERIALS - SUBURBAN CHARACTER

**C. Urban Character**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 35,000 - 55,000 vpd
- Design Speed: 55 m.p.h. Posted Speed: 45 m.p.h.
- Maximum Grade: 6.0%
- Minimum Grade: 0.4%

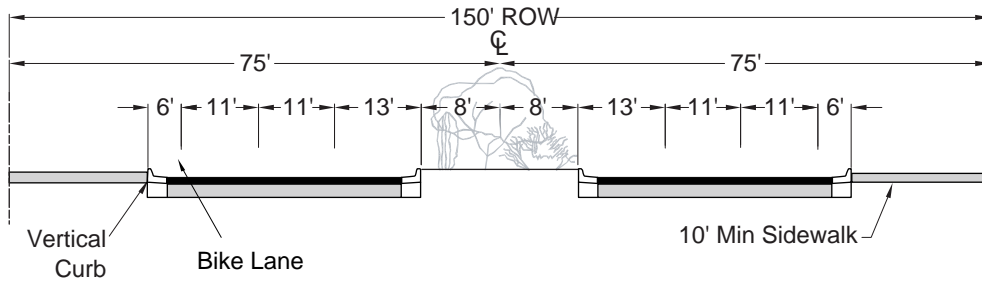


FIGURE 5.3-3 MAJOR ARTERIALS - URBAN CHARACTER

**MINOR ARTERIALS**

**A. Rural/ESL Character**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 25,000 - 35,000 vpd
- Design Speed: 45 m.p.h.
- Maximum Grade: 6.0%
- Minimum Grade: 0.4%

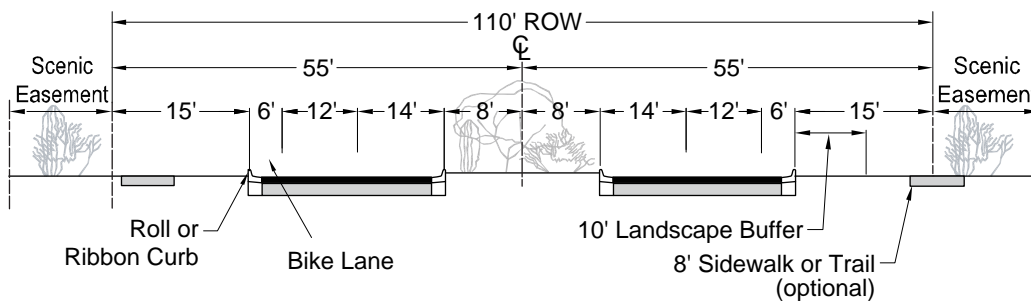
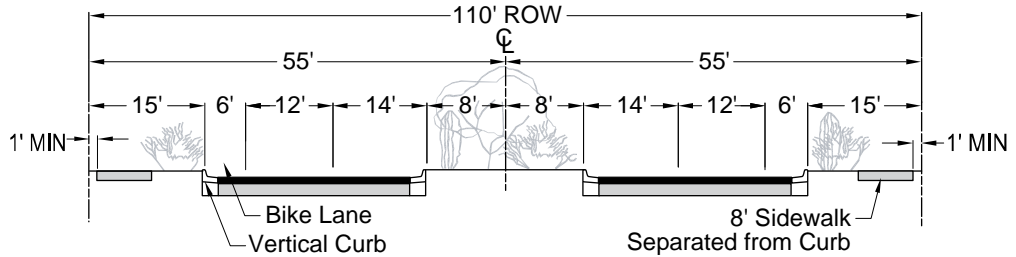


FIGURE 5.3-4 MINOR ARTERIALS - RURAL/ESL CHARACTER

5-3.102

**B. Suburban Character**

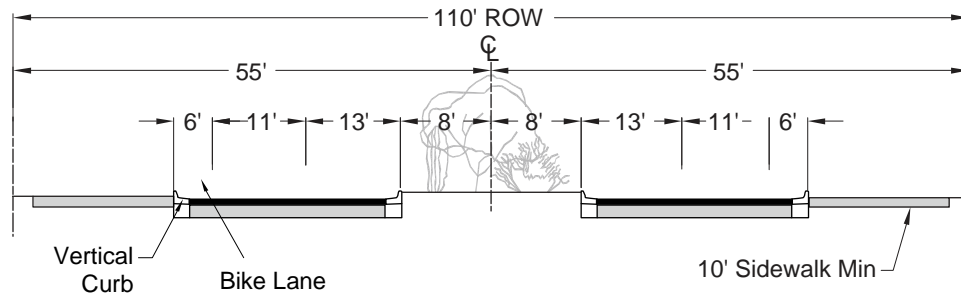
- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 25,000 - 35,000 vpd
- Design Speed: 45 m.p.h.
- Maximum Grade: 6.0%
- Minimum Grade: 0.4%



**FIGURE 5.3-5 MINOR ARTERIALS – SUBURBAN CHARACTER**

**C. Urban Character**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 25,000 - 35,000 vpd
- Design Speed: 45 m.p.h.
- Maximum Grade: 6.0%
- Minimum Grade: 0.4%



**FIGURE 5.3-6 MINOR ARTERIALS – URBAN CHARACTER**

**5-3.103**

**COUPLETS**

- Couplet to be constructed in accordance with the Downtown Urban Design Guidelines
- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 25,000 - 35,000 vpd
- Design Speed: 45 m.p.h.
- Maximum Grade: 6.0%
- Minimum Grade: 0.4%

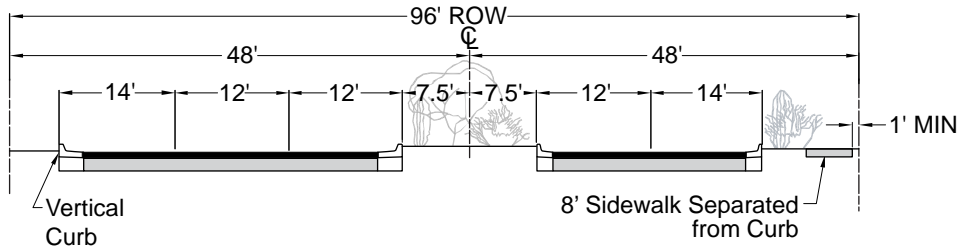


FIGURE 5.3-7 COUPLET STREETS

**MAJOR COLLECTORS**

5-3.104

**A. Rural/ESL Character**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 15,000 - 30,000 vpd
- Design Speed: 45 m.p.h.
- Maximum Grade: .0%
- Minimum Grade: 0.4%

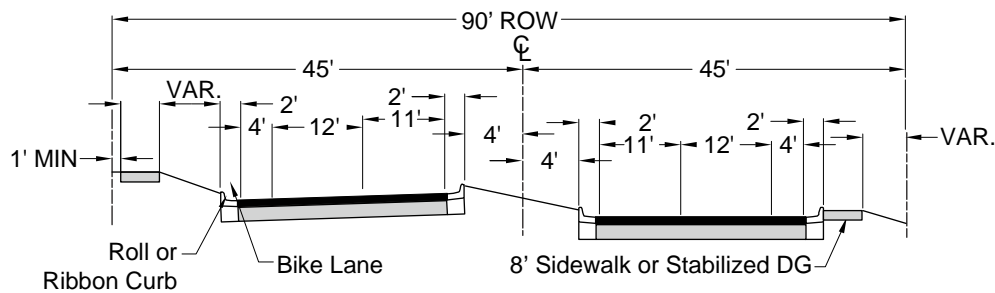


FIGURE 5.3-8 MAJOR COLLECTORS - RURAL/ESL CHARACTER

**B. Suburban Character**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 15,000 - 30,000 vpd
- Design Speed: 45 m.p.h.
- Maximum Grade: 9.0%
- Minimum Grade: 0.4%

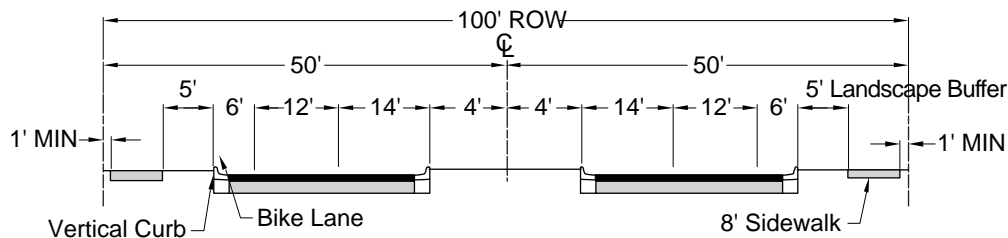


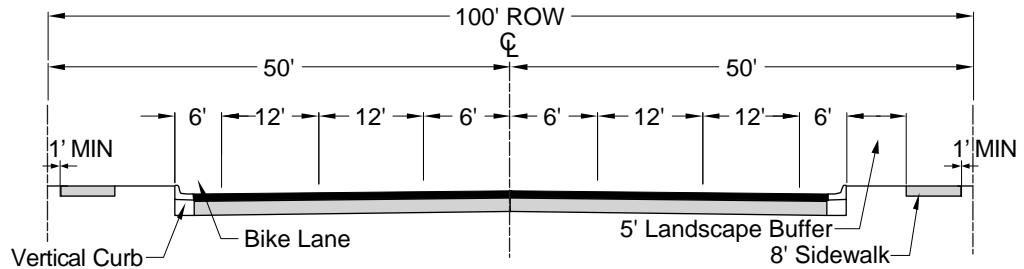
FIGURE 5.3-9 MAJOR COLLECTORS - SUBURBAN CHARACTER

**C. Urban Character**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.



- Cross-sections may vary to fit surrounding topography.
- ADT: 15,000 - 30,000 vpd
- Design Speed: 45 m.p.h.
- Maximum Grade: 5.0%
- Minimum Grade: 0.4%



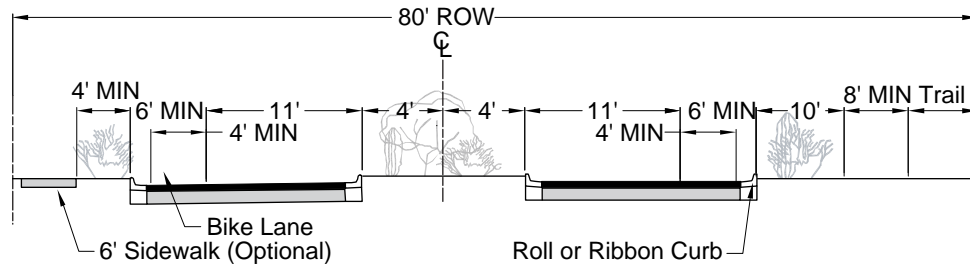
**FIGURE 5.3-10 MAJOR COLLECTORS – URBAN CHARACTER**

**5-3.105**

**MINOR COLLECTORS**

**A. Rural/ESL Character with Trails**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 5,000 - 15,000 vpd
- Design Speed: 35 m.p.h.
- Maximum Grade: 12.0%
- Minimum Grade: 0.4%



**FIGURE 5.3-11 MINOR COLLECTORS – RURAL/ESL WITH TRAILS**

**B. Rural/ESL Character**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 5,000 - 15,000 vpd
- Design Speed: 35 m.p.h.
- Maximum Grade: 12.0%
- Minimum Grade: 0.4%

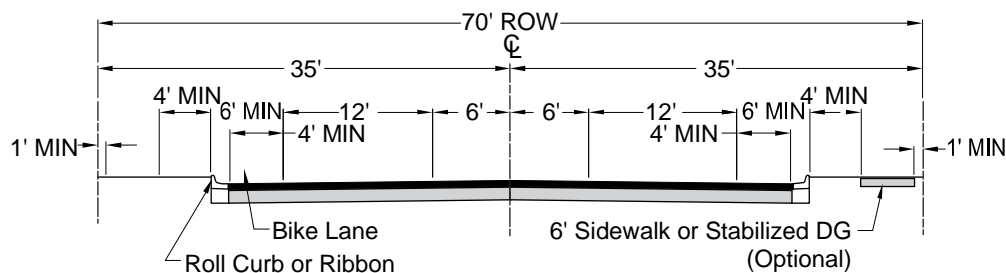


FIGURE 5.3-12 MINOR COLLECTORS – RURAL/ESL CHARACTER

**C. Suburban Character**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 5,000 - 15,000 vpd
- Design Speed: 35 m.p.h.
- Maximum Grade: 9.0%
- Minimum Grade: 0.4%

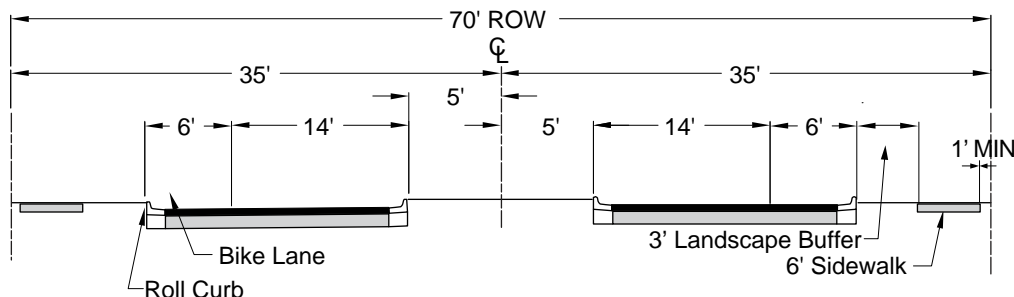


FIGURE 5.3-13 MINOR COLLECTORS – SUBURBAN CHARACTER

**D. Urban Character**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 5,000 - 15,000 vpd
- Design Speed: 35 m.p.h.
- Maximum Grade: 9.0%
- Minimum Grade: 0.4%

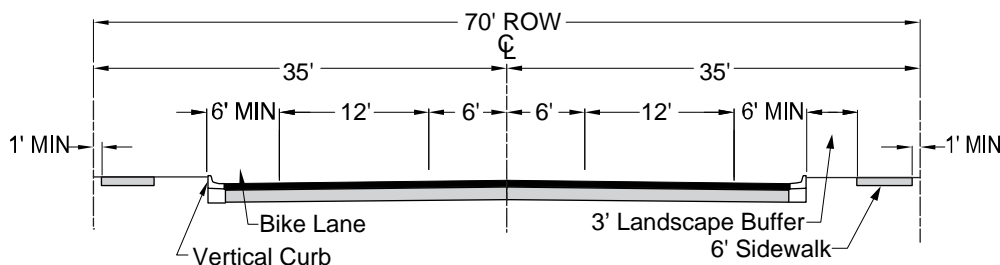


FIGURE 5.3-14 MINOR COLLECTORS – URBAN CHARACTER

## 5-3.106

## LOCAL COLLECTORS

## A. Rural/ESL Character with Trails

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 1,500 - 5,000 vpd
- Design Speed: 30 m.p.h.
- Maximum Grade: 12.0%
- Minimum Grade: 0.4%

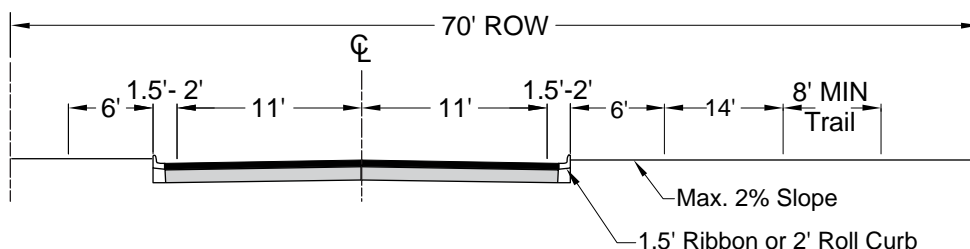


FIGURE 5.3-15 LOCAL COLLECTORS – RURAL/ESL WITH TRAILS

## B. Rural/ESL Character

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 1,500 - 5,000 vpd
- Design Speed: 30 m.p.h.
- Maximum Grade: 12.0%
- Minimum Grade: 0.4%

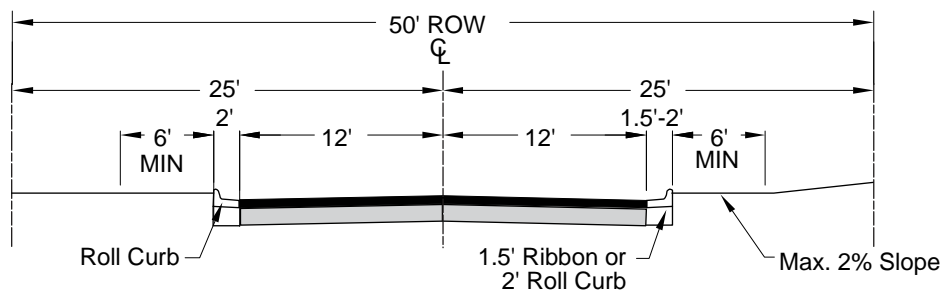


FIGURE 5.3-16 LOCAL COLLECTORS – RURAL/ESL CHARACTER

## C. Suburban Character

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 1,500 - 5,000 vpd
- Design Speed: 30 m.p.h.
- Maximum Grade: 9.0%
- Minimum Grade: 0.4%

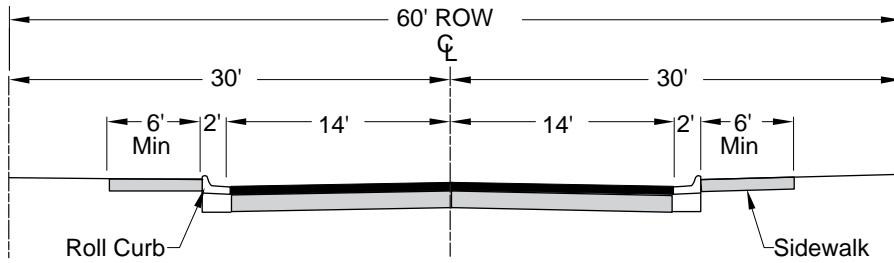


FIGURE 5.3-17 LOCAL COLLECTORS - SUBURBAN CHARACTER

**LOCAL RESIDENTIAL**

5-3.107

**A. Rural/ESL Character with Trails**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 1,500 vpd Max.
- Design Speed: 20 m.p.h.
- Maximum Grade: 19.0%
- Minimum Grade: 0.4%

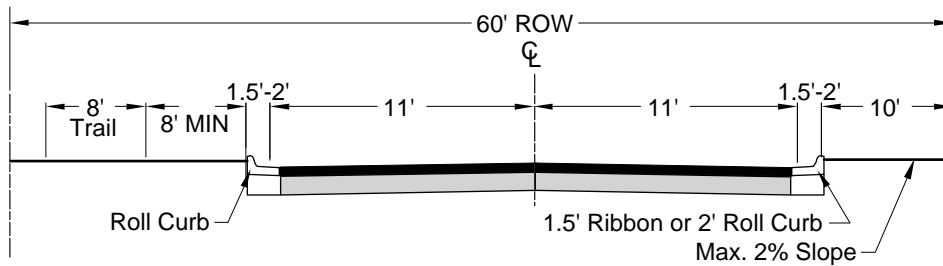


FIGURE 5.3-18 LOCAL RESIDENTIAL - RURAL/ESL WITH TRAILS

**B. Rural/ESL Character**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 1,500 vpd Max.
- Design Speed: 20 m.p.h.
- Maximum Grade: 19.0%
- Minimum Grade: 0.4%

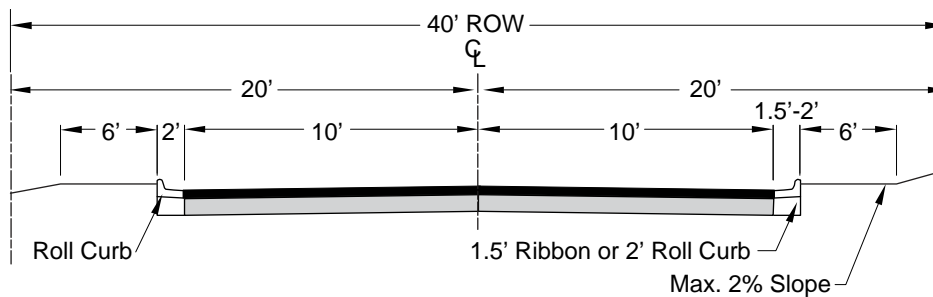
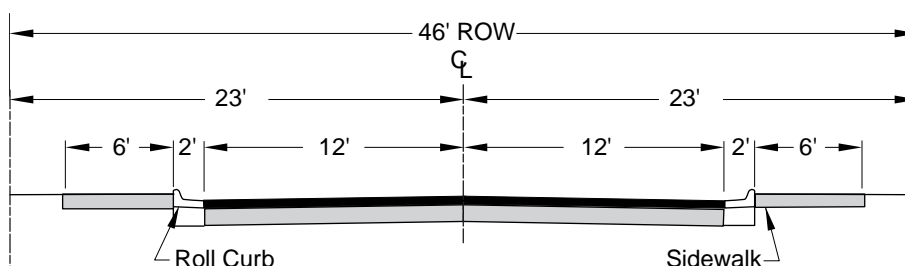


FIGURE 5.3-19 LOCAL RESIDENTIAL - RURAL/ESL CHARACTER

**C. Suburban Character**

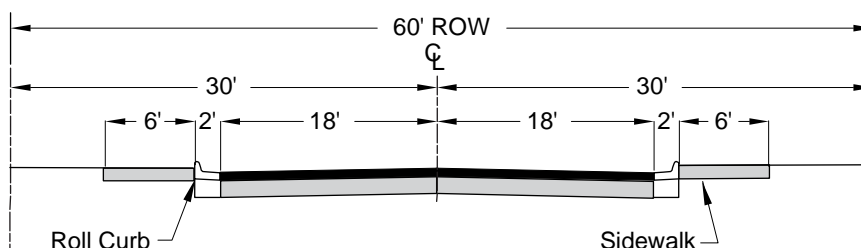
- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 1,500 vpd Max.
- Design Speed: 20 m.p.h.
- Maximum Grade: 9.0%
- Minimum Grade: 0.4%



**FIGURE 5.3-20 LOCAL RESIDENTIAL - SUBURBAN CHARACTER**

**5-3.108****LOCAL COMMERCIAL / INDUSTRIAL**

- Auxiliary turn lanes may be required at intersections with additional ROW requirements.
- Cross-sections may vary to fit surrounding topography.
- ADT: 1,500 - 5,000 vpd
- Design Speed: 20 m.p.h.
- Maximum Grade: 15.0%
- Minimum Grade: 0.4%



**FIGURE 5.3-21 LOCAL COMMERCIAL / INDUSTRIAL**

**5-3.109****PRIVATE STREET REQUIREMENTS**

All private streets shall be constructed to full public street standards, except equivalent construction materials or wider cross-sections may be approved by the Transportation Department. No internal private streets shall be incorporated into the city's public street system at a future date unless they are constructed, inspected, maintained and approved in conformance with the city's public street standards and approved by the City Council. Before issuance of any certificate of occupancy for the site, the developer shall post access points to private streets to identify that vehicles are entering a private street system.

**5-3.110****STREET RIGHTS-OF-WAY REQUIREMENTS**

Rights-of-way requirements are based on the space needed for the street to meet ultimate development requirements, see [Section 5-2.000](#) and [Section 5-3.100](#). Rights-of-way provides space for utilities, cut or fill slopes, sidewalks, bicycle paths, trails, traffic control devices and information signs, fire hydrants, landscaping, transit facilities and other public facilities that

must be located adjacent to street pavements. Additional rights-of-way may be required at major intersections to provide for turn lanes.

Rights-of-way widths in excess of the standard widths may be required in special circumstances such as where:

- Cut or fill slopes cannot be confined within the standard width;
- Minimum sight distance lines on horizontal curves are not within the standards;
- Minimum sight distances at intersections are not within the standards;
- Auxiliary lanes are to be provided.

**PAVEMENT CROSS-SECTION SLOPES**

**5-3.111**

**A. Typical Street Cross-Sections**

Undivided streets should have a normal crown that is a two-way cross-slope with the cross-section high point on the street centerline. Divided streets should have cross-slope on each pavement section. The high point of each slope on each pavement section must occur on the edge of the pavement nearest to the median. Unusual conditions may cause cross-slope requirements to vary, but normally, the desirable cross-slope is 2%, with a maximum cross-slope of 3%. Any deviation from the desirable cross-slope is subject to review by the Transportation Department.

**B. Cross-Sections in Street Dip Sections**

While dip sections are discouraged, where storm drainage runoff flows must cross the street, dip sections are needed. The pavements through the dip section should have a 1-way slope (no crown), curbing and medians must not be raised, and cut-off walls must be installed in accordance with City of Scottsdale standard details. Transitions back to normal street cross-slopes will be needed at both ends of the dip section.

**5-3.112**

**MEDIANS**

**A. Median Widths**

Median widths are measured from back-of-median curb to back-of-median curb. Where there is no curb, width is measured from the centers of the continuous, painted median stripes. Median widths are specified in [Appendix 5-3A](#) and [Appendix 5-3B](#). In special circumstances, the Transportation Department may approve other widths.

**B. Paved Medians**

A median 4 feet wide or less should be paved. The paved surface should be crowned and have the same cross-slope as the street pavement. Typical median paving materials are Portland cement concrete or concrete pavers.

**C. Unpaved and Landscaped Medians**

Medians that are five feet or more in width are normally not paved. The grading of the unpaved areas should be as shown below in Figure 5.3-22. If a median is to be landscaped, it shall be at least 4 feet wide. In the vicinity of intersections, landscaping and other median features must not restrict sight distance for left turning vehicles on the through street or for vehicles entering from the side street. See [Appendix 5-3A](#), [Appendix 5-3B](#), [Section 5-3.117](#) and [Section 5-3.119](#) for specific sight distance criteria.

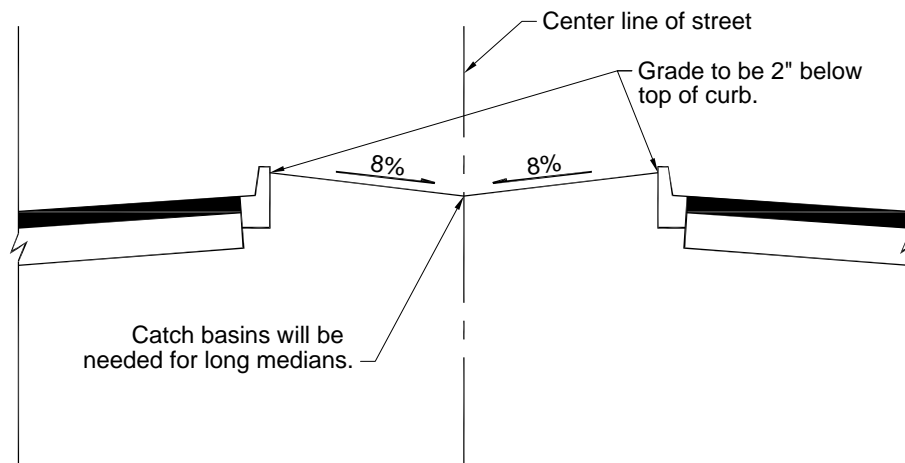


FIGURE 5.3-22 MEDIAN GRADING

## 5-3.113

**CURBS****A. Vertical Curbs**

Vertical curbs are generally required for all streets in urban and suburban areas except local residential streets, see [Appendix 5-3A](#) and [Appendix 5-3B](#). Vertical curbs may be used in place of roll curbs on local streets if desirable for drainage considerations. Vertical curbs may be used on high speed roadways where the posted speed will be 45 m.p.h. or less. Vertical curbs provide positive access control, a refuge for pedestrians in the median and protection of signs.

Vertical curbs with gutter are to be constructed in accordance with City of Scottsdale Supplemental Standard Details for Public Works Construction, matching the adjacent pavement slope to the gutter cross slope direction. The curb height shown on the standard detail is 6 inches, but the following variations may be used where appropriate.

1. Where fire lane or public maintenance vehicle access to abutting property must be provided over the curb, use City of Scottsdale mountable curb and gutter.
2. If special drainage requirements make a higher curb necessary, the curb may be increased to 8 inches maximum and the gutter may be increased to 24-inches wide.

**B. Roll Curb**

A roll curb is preferred for local residential and local collector streets to provide direct lot access and for drainage considerations, especially on streets with adjacent sidewalk. Roll curbs may be used on major and minor collector streets where an adequate clear zone is provided. They are to be constructed in accordance with MAG Standard Details. Roll curbs are not an acceptable substitute for curb ramps.

**C. Ribbon Curb, Maricopa Edge**

Ribbon curb may be used in lieu of roll curb for local residential streets in low-density, large lot areas, typically where lot size is greater than 20,000 square feet. Type A Maricopa Edge may also be used for local residential streets in similar rural conditions with approval from the Transportation Department. When ribbon curb or Maricopa Edge is used, drainage runoff from the road should not drain along the road but will be directed to roadside drainage ditches. For design criteria for roadside ditches see [Section 4-1.404](#), and [Figure 4.1-1](#) for a typical cross section.



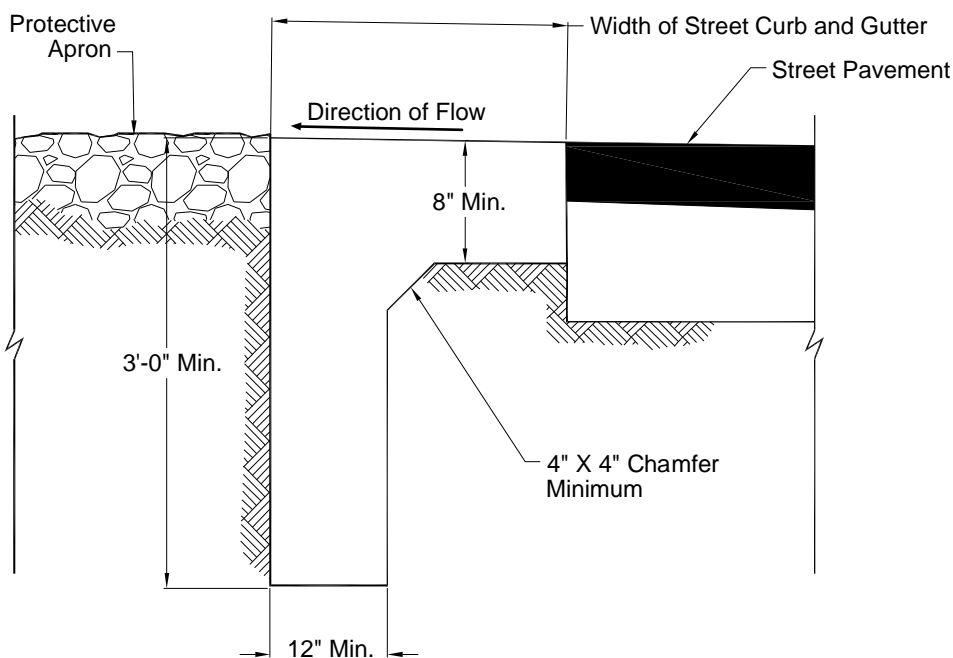
Ribbon curb or Maricopa Edge should also be used on the outside lanes of arterial streets in rural areas (speed limit 45 m.p.h. or greater, access point average equals 500 feet or greater) with a shoulder and an adequate clear zone provided.

**D. Median Curb**

In locations where raised medians are constructed, vertical curb should generally be utilized. Roll curb may be used around medians on low speed, low volume streets, typically associated with traffic calming projects, or where needed to maintain adequate width for emergency vehicles.

**E. Cut-Off Walls**

In locations where dip sections are permitted to allow drainage flows to cross roadways, cut-off walls conforming to City of Scottsdale standard details must be installed on both the upstream and downstream sides of the roadway. Cut-off walls must be at least 3 feet deep and have a top that is flush with the pavement surface. The exposed portion of the cut-off wall will have the appearance of a ribbon curb, with the same width as the street's regular curb and gutter, see [Figure 5.3-23](#). The cut-off walls must extend across the flow path in the dip section to protect the pavement structure during runoff flows from a 100-year storm. Transitions will be needed between the regular curb and the cut-off wall at each end of the dip section.



**FIGURE 5.3-23 CUT-OFF WALLS**

**F. Curb Returns**

Vertical curb should be used through the curb return from PC to PT regardless of whether the tangent curb sections are vertical or roll curb. All curb returns must be provided with sidewalk from PC to PT of the same width as that provided for the sidewalk behind the tangent curb sections. If no sidewalk is provided behind the tangent curb sections, the curb return sidewalk should be at least 6 feet wide.

**1. Curb Return Radii**

The radii for curb returns measured to the back of curb will be 25 feet for local street intersections - those that involve either a local collector street or local residential street. The radii for curb returns measured to the back of curb shall be 30 feet for all other major street intersections. Smaller radii may be approved by the Transportation Department in urban areas with higher pedestrian activity.

## 2. Sidewalk Ramp at Curb Return

Dual sidewalk ramps will be constructed at all curb returns (on all street classifications) in accordance with MAG Standard Details No. 2232\* and 2233\*. Truncated domes will be installed on all sidewalk ramps per ADA guidelines and COS Standard Detail No. 2231\*. If a traffic signal exists or is planned, the ramp and apron must provide access to the pedestrian push button. These standards apply to both public and private streets, see [Section 5-4.104 Pedestrian Signals](#) for more information.

\*Note: For COS and MAG Standard Details [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

### 5-3.114

## SELECTION OF A DESIGN SPEED

The design of geometric features such as horizontal and vertical curves will depend upon the design speed selected for the street. The choice of the design speed is primarily determined by the street classification. The design speed is the maximum speed for the safe operation of a vehicle. Design speeds for the various classifications of streets are identified on [Appendix 5-3A](#) and [Appendix 5-3B](#); the use of design speeds other than those shown may be approved through the master plan process. The Transportation Department must approve all other exceptions.

### 5-3.115

## SUPERELEVATION IN CURVES

Superelevation is discouraged on horizontal curves in the portion of the city outside the Environmentally Sensitive Lands area.

### A. 0.02 foot/foot Superelevation Rate

A superelevation rate of 0.02 foot/foot may be used when the standard radius cannot be provided due to circumstances beyond the control of the engineer, and the roadway alignment cannot be changed (as determined by city staff).

### B. Superelevation Rate Greater than 0.02 ft./ft.

A superelevation rate greater than 0.02 ft./ft. may not be used except when approved by the Transportation Department. In no case shall a superelevation exceed 0.06 ft./ft.

### C. Transition for Superelevation

The length of superelevation transition is based on the superelevation rate and the width of rotation. The axis of rotation is generally the pavement centerline. The transition lengths for a superelevation rate of 0.02 ft./ft. are provided in [Appendix 5-3A](#) and [Appendix 5-3B](#). For other superelevation rates, see the AASHTO's Policy on Geometric Design.

In designing the beginning or ending of a horizontal curve, 1/3 of the transition is on the curve and 2/3 of the transition is on the tangent pavement section.

### D. Drainage on Superelevated Curves

Whenever superelevation is allowed on a divided street, a storm drainage system must be provided to collect the runoff along the median curb. Nuisance water from the higher traveled area is not allowed to cross the lower traveled area.

### 5-3.116

## HORIZONTAL CURVES

Horizontal alignments need to provide safe and continuous operation of motor vehicles at a uniform design speed for substantial lengths of street. A horizontal curve is required when the angle of change in horizontal alignment is equal to or greater than five degrees. The nature of the surrounding development and topography, and the street classification will establish the factors that determine the radius of a curve.

## A. Minimum Radii of Curvature

The minimum radius of curvature is determined by the design speed or by the stopping sight distance.

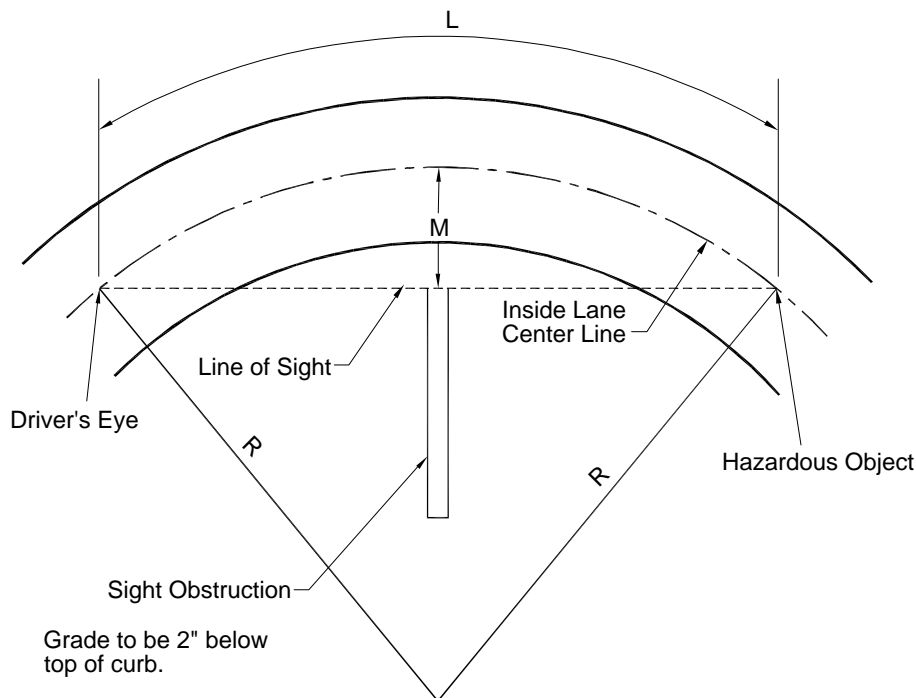
### 1. Minimum Radii Based on Design Speed

[Appendix 5-3A](#) and [Appendix 5-3B](#) contain the minimum radius of curvature for each street classification with and without a superelevation rate of 0.02 ft./ft. Wherever possible, the radii used in design needs to be larger. If stopping sight distance conditions require a larger radius than that shown in these appendices, then that larger radius becomes the minimum radius for the curve.

### 2. Consideration of Stopping Sight Distance

When walls, buildings, bridge piers, cut slopes, vegetation, or other obstructions are near the roadway on the inside of a curve, they can block a driver's view of the road ahead. If they are too close, the driver will not have sufficient distance along the curved roadway to stop when a hazardous condition comes into view. For design, the driver's eye is 3.5 feet above the center of the inside lane (the driving lane closest to the inside of the curve) and a hazardous condition is an object 2.0 feet high in the center of the inside lane, or per currently accepted AASHTO standards. The clear distance, "M" is measured from the center of the inside lane to the view obstruction.

Figure 5.3-24 depicts these relationships and provides a table of minimum stopping sight distances for various design speeds.



If the stopping sight distance, S, and the radius to the center of the inside lane, R, are known, the distance, M, is found by the following equation:

$$M = R[1 - \cos(28.65 S/R)]$$

If the radius, R, and the distance, M, are tentatively selected, then the length, L, of the arc in the middle of the inside lane may be found by the following equation:

$$L = (R/28.65) \arccos[(R-M)/R]$$

If the length, L, is less than the stopping sight distance for the desired speed, either the radius, R, or the distance, M, must be increased.

Design Speed MPH	20	25	30	30	30	45	50	50	60	65
Stopping Sight Distance, S, (ft.)	125	150	200	225	300	365	440	500	590	640

FIGURE 5.3-24 VIEW OBSTRUCTIONS AND HORIZONTAL CURVES

### B. Reduced Design Speeds on Curves

The reduction of a street design speed on a curve should be avoided; however, where physical restrictions prohibit increasing the radius of the curve or the clear distance, “M” the design speed for the curved section may be reduced. In such circumstances, appropriate signage in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) is required. The difference between the design speed for the roadway approaching the curve and the design speed for the curve cannot be greater than 10 miles per hour. The design speed for a curved roadway section must not be reduced if the reduction occurs at the end of a long tangent or at any location where high approach speeds may be expected.

### C. Compound Curves

Compound curves should be avoided; however, if site conditions make the use of compound curves unavoidable, the shorter radius needs to be at least 2/3 the length of the longer radius. Compound curves are not permitted when design speeds require the shorter radius to be greater than 1,000 feet.

**D. Tangent Sections Between Curves in the Same Direction**

On 2-lane roads, tangent sections are needed between two curves in the same direction. If the pavement cross-sections throughout the curves do not have superelevation then the minimum lengths for tangent sections are listed in [Appendix 5-3A](#) and [Appendix 5-3B](#).

If superelevation is provided in the curved portions of the roadway, then the superelevation transition lengths indicated will determine the tangent lengths.

**E. Tangent Sections Between Reverse Curves**

Generally a tangent section must be provided between two curves that curve in the opposite direction. Minimum lengths for tangent sections between reverse curves without superelevation are provided in [Appendix 5-3A](#) and [Appendix 5-3B](#). If the curve radii are at least 50% greater than the radii required by the design speed, a tangent section may not be required depending on grades, topography and vegetation. If superelevation is provided for the curves, then the superelevation transition lengths indicated will determine the minimum length of tangent sections between reverse curves.

**F. Tangent Sections Approaching Intersections**

A tangent section must be provided between a street intersection and a curve unless otherwise approved by the Transportation Department. The minimum tangent length is shown in [Appendix 5-3A](#) and [Appendix 5-3B](#) and shall be measured from the end of the curve to the edge of the intersecting roadway.

**VERTICAL ALIGNMENT**

A vertical curve is required when grade changes are equal to or greater than 1.5%. All sections of a street's vertical alignment must meet passing and stopping sight distance requirements for the design speed established for the street. For specific details, see the AASHTO's Policy on Geometric Design.

**A. Longitudinal Street Grades**

For arterial streets, the maximum longitudinal grade is 6%. For non-ESL/Rural collector and local streets, the maximum grade is 9%. The minimum longitudinal street grade for all streets is 0.4%. Wherever possible, longitudinal street grades greater than or equal to the minimum grade are to be provided. Where necessary, grades less than 0.4% may be used with approval from the Municipal Services Department. Grades that exceed the maximum longitudinal grades allowed may be used with approval from the Transportation, Municipal Services, and Fire Departments.

**B. Vertical Curves**

Properly designed vertical curves should provide adequate sight distance, safety and effective drainage.

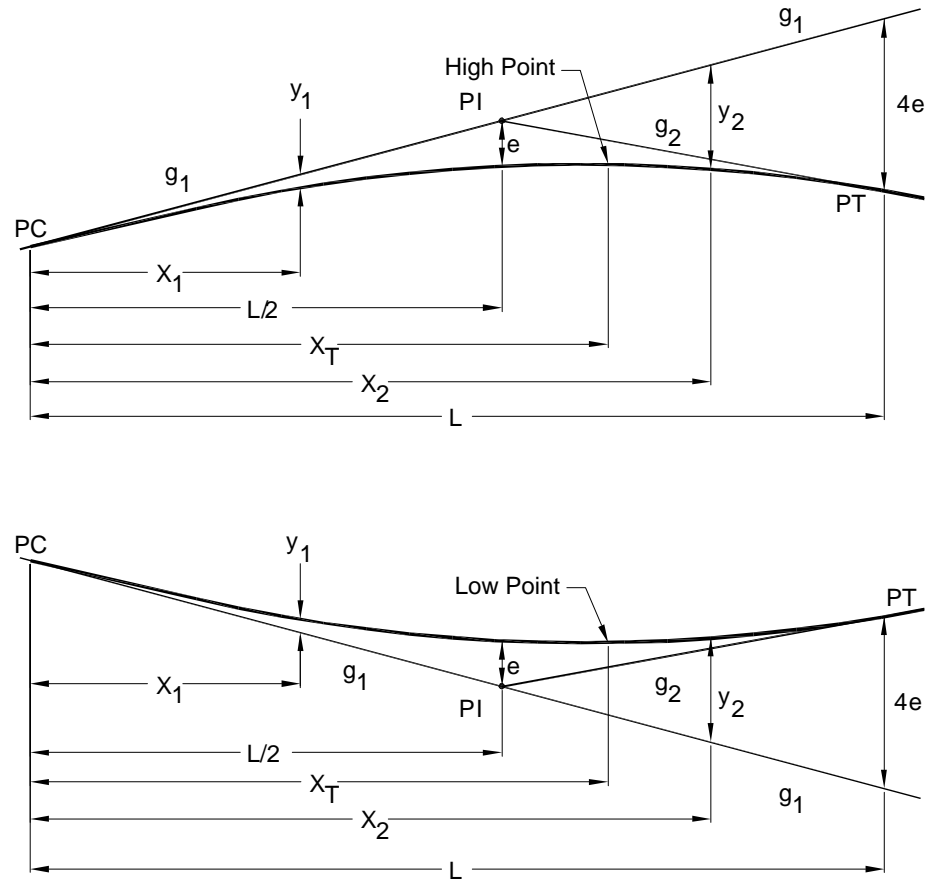
**1. Type of Curve**

A parabolic vertical curve is to be used. [Figure 5.3-25](#) provides all necessary mathematical relations for computing a vertical curve, either crests or sags.

The following equations are for parabolic vertical curves. The grades  $g_1$  and  $g_2$  must be used with their algebraic signs (+ or -). If  $g_1$  and  $g_2$  are expressed as percentages, L and X must be expressed in stations. If  $g_1$  and  $g_2$  are expressed as feet per foot, L and X must be expressed in feet. These symbols are defined by the above diagrams.

$A = g_2 - g_1$ $D = g_1 - g_2$ $e = LG/8$ $y = 4e(X/L)^2 = (A/2L)X^2$
--

5-3.117



**FIGURE 5.3-25 VERTICAL CURVE RELATIONSHIPS**

The equation below provides the location,  $X_T$ , of the curve turning point -- the high point or low point on the curve. This equation is only applicable when  $g_1$  and  $g_2$  are not of the same sign, algebraically.

$$X_T = (g_1 L) / (g_1 - g_2)$$

## 2. Sight Distance Requirements

Sight distance is the continuous length of street ahead visible to the driver. For vertical alignment design, two sight distances are considered: passing sight distance and stopping sight distance. Stopping sight distance is the minimum sight distance to be provided at all points on multi-lane streets and on 2-lane streets when passing sight distance is not economically obtainable as approved by city staff. Stopping sight distance needs to be provided in the vicinity of intersections. [Appendix 5-3A](#) and [Appendix 5-3B](#) list the minimum passing and stopping sight distances for the various street classifications and design speeds.

### a. Stopping Sight Distance

The minimum stopping sight distance is the distance required by the driver of a vehicle, traveling at a given speed, to bring the vehicle to a stop after an object on the road becomes visible. Stopping sight distance is measured from the driver's eyes, 3.5 feet above the pavement surface, to an object 2.0 feet high on the roadway, or per currently accepted AASHTO standards.

**b. Passing Sight Distance**

Passing sight is the minimum sight distance that must be available to enable the driver of one vehicle to pass another vehicle safely, without interfering with the speed of an oncoming vehicle. The sight distance available for passing at any one place is the distance at which a driver, whose eyes are 3.5 feet above the roadway surface, can see the top 0.8 feet of an object 4.35 feet high on the road (corresponding to an object height of 3.5 feet high), or per currently accepted AASHTO standards.

**3. Minimum Vertical Curve Lengths**

Minimum vertical curve lengths are determined by sight distance requirements for a given design speed.

**a. Crest Vertical Curve Lengths**

Minimum crest curve lengths are determined by either the stopping sight distance or the passing sight distance, whichever provides the greatest curve length.

**b. Minimum Crest Vertical Curve Length Determined by Stopping Sight Distance**

The following equations are to be used to determine the minimum crest vertical curve lengths based upon stopping distance requirements, or per currently accepted AASHTO standards:

**When  $S_s < L$ ,  $L = (AS_s^2)/2158$**   
**When  $S_s > L$ ,  $L = (2S_s) - (2158/A)$**

L = Length of curve in feet.  
 $S_s$  = Stopping sight distance in feet for a given design speed.  
 A = Algebraic grade difference in percent.

**c. Minimum Crest Vertical Curve Length Determined by Passing Sight Distance**

The following equations are to be used to determine the minimum crest vertical curve lengths based upon sight distance requirements:

**When  $S_p < L$ ,  $L = (AS_p^2)/2800$**   
**When  $S_p > L$ ,  $L = (2S_p) - (2800/A)$**

$S_p$  = Passing sight distance in feet for a given design speed.  
 L = Length of curve in feet.  
 A = Algebraic grade difference in percent.

**4. Sag Vertical Curve Lengths**

Minimum sag vertical curve lengths are determined by either the stopping sight distance or comfort factors. The longer of the two possible minimum curve lengths will be used.



**a. Minimum Sag Vertical Curve Length Determined by Stopping Sight Distance**

The following equations are to be used to determine the minimum sag vertical curve length based upon stopping sight distance requirements:

$$\text{When } S_s < L, L = (AS_s^2)/(400 + 3.5S_s)$$

$$\text{When } S_s > L, L = (2S_s) - \{(400 + 3.5S_s)/A\}$$

$S_s$  = Stopping sight distance in feet for a given design speed.

$L$  = Length of curve in feet.

$A$  = Algebraic grade difference in percent.

**b. Minimum Sag Vertical Curve Length Determined by Comfort Factors**

The following equation is to be used to determine the minimum sag vertical curve length based upon comfort factors:

$$L = (AV^2)/46.5$$

$L$  = Curve length in feet.

$A$  = Algebraic grade difference in percent.

$V$  = Design speed in miles per hour.

**5-3.118****COMBINED HORIZONTAL AND VERTICAL CURVES**

When horizontal and vertical curves are combined, the horizontal curve needs to lead and follow the vertical curve, and not be introduced near the top or bottom of a crest vertical curve or bottom of a sag vertical curve. For additional information on this topic, see the AASHTO's Policy on Geometric Design.

**5-3.119****INTERSECTIONS**

Although all intersections share certain common elements, they are not subject to generalized treatment. To minimize conflicts and provide for anticipated traffic movements, each intersection must be evaluated based on individual characteristics and designed based on the following factors:

1. Traffic factors such as capacities, turning movements, vehicle size and operating characteristics, vehicle speed, pedestrian and bicycle movements, transit operations and accident history.
2. Physical factors such as topography, existing conditions, channelization requirements and available sight distance.
3. Human factors such as driving habits, reaction to surprises, decision and reaction time, and natural paths of movement.

**A. Intersection Spacing**

Intersections along major streets should be kept to a minimum. Along arterial streets, the minimum intersection spacing should be 1/4 mile (1320 feet). Along collector streets (major collectors and minor collectors), the minimum spacing should be 1/8 mile (660 feet). Along local streets (local residential and local collectors), the minimum spacing should be 250 feet. New intersections on major streets should be located to align with planned median openings. New intersections on minor streets should be located to avoid creating conflicting turning movements with existing intersections or driveways.

## B. Angle of Intersection

A right-angle intersection provides the shortest crossing distance for intersecting traffic streams. It also provides the most favorable condition for drivers to judge the relative position and speed of intersecting vehicles. Where special conditions exist, intersection angles may diverge from a right-angle by a maximum of 2 degrees (up to 4 degrees with approval of the Transportation Department) on arterial streets and major collector streets; and by a maximum of 4 degrees (up to 15 degrees with approval of the Transportation Department) on minor and local collector streets, couplets and local streets.

## C. Alignment and Profile

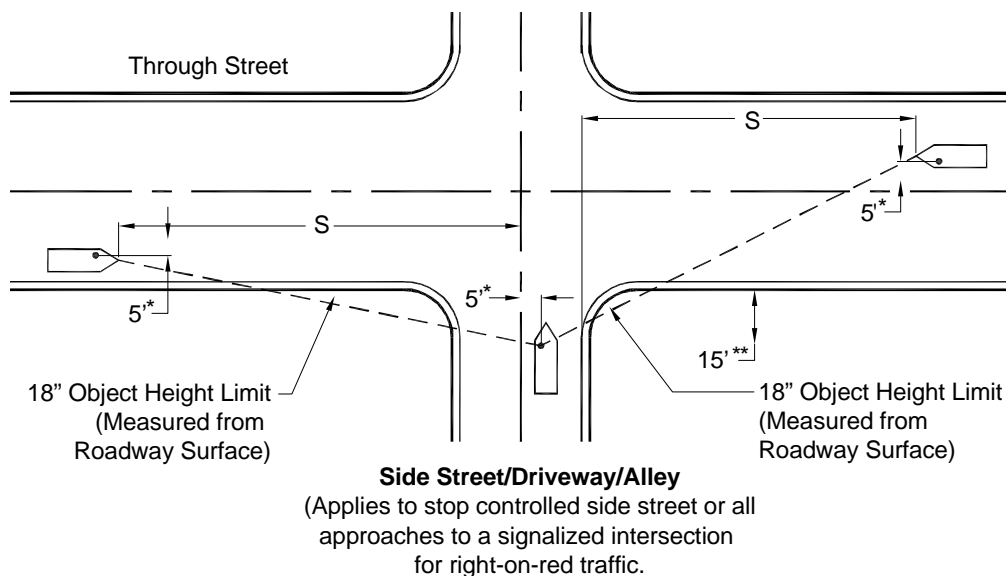
Intersections occurring on horizontal or crest vertical curves are undesirable. When there is latitude in the selection of intersection locations, vertical or horizontal curvature should be avoided. A line or grade change is frequently warranted when major intersections are involved. If a curve is unavoidable, it should be as flat as site conditions permit. Where the grade of the through roadway is steep, flattening through the intersection is desirable as a safety measure.

The maximum profile grade through an intersection is 6 percent for arterials and collector streets and 8 percent for local streets. The intersecting streets' profiles and cross slopes need to be coordinated with one another to ensure a safe and comfortable driving surface. Typically this may mean extending grades through the intersection for approximately 75 feet to 150 feet. Short vertical curves may be necessary in lieu of grade breaks.

## D. Intersection and Driveway Sight Distance

In order to provide the opportunity for vehicles at an intersection to safely cross or make left or right turns onto a through street, **adequate sight distance must be provided**. Sight distance must also be provided for left turning traffic turning from the main street as described in AASHTO Intersection Sight Distance Case F. If opposing left turn lanes are present, the opposing left turns must be off-set in a positive way to allow for sight distance when opposing vehicles are present. See [Figure 5.3-28](#) and [Figure 5.3-29](#) for options. Sight distance should be based on the design speed for the roadway. Design speeds for new roadways should conform to those identified in [Section 5-3.100](#) and [Appendix 5-3A](#) and [Appendix 5-3B](#). Typically design speeds are 10 m.p.h. higher than the anticipated posted speed limit. The sight distance requirements outlined below are required for all private and public street intersections and at all intersections of driveways onto public or private streets. Internal driveway intersections on private property are excluded from these requirements.

[Figure 5.3-26](#) depicts the technique used to determine the driver's eye location and an approaching vehicle; a line is then drawn to connect these 2 points. Continuous unobstructed line of sight must be provided along this line and throughout the approach to the intersection, providing an unobstructed sight triangle to the side street driver. Sight lines are to be drawn on roadway and landscaping plans to represent the areas that must be free of all objects and topography in excess of 18 inches above the roadway surface, however, certain vegetation will be allowed. Vegetation placed within the sight triangle will be of a low variety that remains below 18 inches when mature. Trees can be considered within the triangle as long as the canopies are above 8 feet, they are a single trunk variety, and they are not spaced in a configuration that creates a "picket fence" effect.



\* 5 feet measured to nearest lane line or centerline.

\*\*15 feet measured from face-of-curb or edge-of-travelway.

S = Intersection sight distance in feet on drivers left and right for right turns, left turns and through traffic.  
(See *2004 AASHTO Geometric Design of Highways and Streets* for additional sight distance requirements.)

(See [Appendix 5-3A](#), [Appendix 5-3B](#) and [Appendix 5-3C](#) for distance S.)

#### FIGURE 5.3-26 INTERSECTION & DRIVEWAY DEPARTURE SIGHT DISTANCE REQUIREMENTS

##### 1. Right-Angle Intersections

Right-angle intersections are those whose legs meet at an angle of 88 to 90 degrees. For these right-angle intersections the sight distances shown in [Appendix 5-3A](#), [Appendix 5-3B](#) and [Appendix 5-3C](#) are to be used with [Figure 5.3-26](#) to calculate the sight triangle. Appendices 5-3A and 5-3B present the intersection sight distances for all street classifications which were determined assuming passenger car traffic. [Appendix 5-3C](#) presents the sight distance requirements for varying roadway widths and design speeds for passenger cars, single unit trucks and combination trucks. If high volumes of truck traffic are anticipated, sight distances given in [Appendix 5-3C](#) will be used. Sight distances for vehicles turning left from the main street should also be considered and calculated based on the *AASHTO Geometric Design of Highways and Streets*.

##### 2. Skewed Intersections

For skewed intersections where the intersection angles are less than 88 degrees, sight distances must be calculated in accordance with the procedures described in *AASHTO's Geometric Design of Highways and Streets*. Skewed intersection design must include appropriate design for pedestrian crossings and the location of curb ramps.

##### 3. Intersections Within or Near a Curve

Sight distance measurements, identified as S in [Figure 5.3-26](#), need to follow the curved street alignment when the intersection is within or near a horizontal curve.

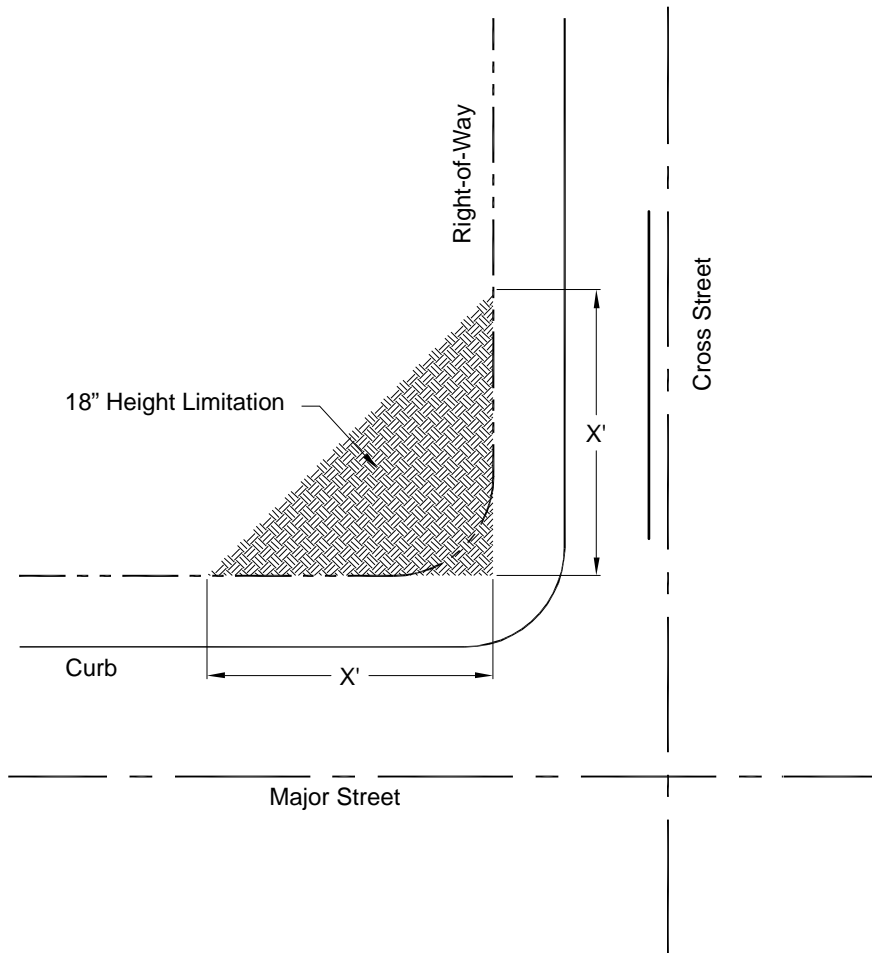
##### 4. Traffic Safety Triangles

Traffic Safety Triangles should be used as a means to limit the height of structures, vegetation and other improvements on corner properties immediately adjacent to intersections. **Safety triangles are not to be used as a substitute for intersection sight distance!** Safety triangles provide additional visibility around corners for all intersection approaches and should be applied to the design of perimeter walls and

landscape features. Items within the safety triangle cannot be higher than 18" measured from the roadway surface. [Figure 5.3-27](#) depicts the method used to determine the safety triangle location. The sight distance requirements contained in both [Figure 5.3-26](#) and [Figure 5.3-27](#) are applied at all corner lots.

**5. Right-of-Way at Corners**

A minimum of 25-foot radius rights-of-way shall be dedicated at street intersections to provide room for traffic control and sight distance.



Major Street Classification	X (in feet)
Parkway, Expressway, Arterials, Major Collector	25
Minor Collector	35
* Local Streets	35 / 60 / 70

\* If the standard right-of-way (46 ft. local residential, 60 ft. local collector) is not available, the safety triangle (X) shall measure 60 ft. on local residential streets and 70 ft. on local collector streets from the centerlines of the streets.

**FIGURE 5.3-27 TRAFFIC SAFETY TRIANGLE ON CORNER PROPERTY**

**E. Auxiliary Lanes**

An exclusive turning lane permits separation of conflicting traffic movements and removes turning vehicles from the flow of through traffic. [Figure 5.3-28](#) and [Figure 5.3-29](#) depict the

design standards for auxiliary lanes. These standards apply for right and left turn lanes at street intersections and for deceleration lanes at mid-block driveways. The requirement for an auxiliary lane may necessitate additional rights-of-way. Modifications to the storage and transition lengths may be allowed by the Transportation Department where the conditions do not allow the full design standard to be met.

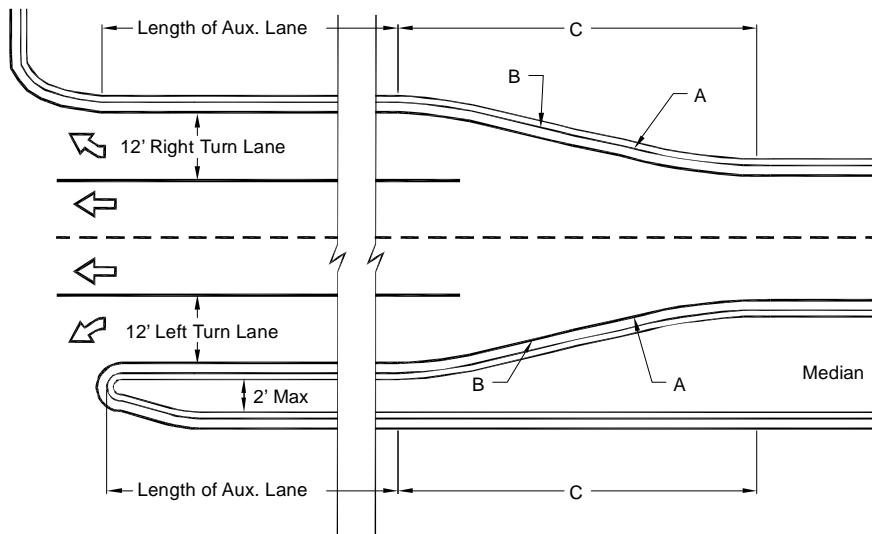
#### **1. Right-Turn Lanes**

Right-turn lanes are required at all street intersections on major arterials. Right-turn lanes may be required by the Transportation Department on minor arterial and collector street intersections. The lane lengths should be determined based on the anticipated turning volume and whether there is signalized or unsignalized traffic control. The standard vehicle storage length for a right-turn lane is 150 feet, with a 100-foot minimum length. The taper prior to the storage area shall be accomplished as indicated on [Figure 5.3-28 and 29](#).

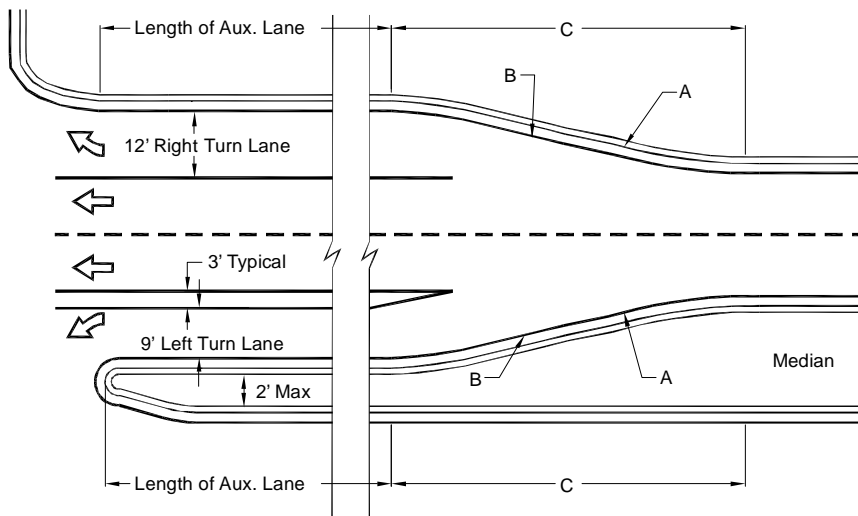
#### **2. Left-Turn Lanes**

Left-turn lanes are required at all street intersections on major collectors and arterials. Left-turn lanes may also be required at street intersections on minor collectors based on the projected left-turn volume and conflicting through volume. The lane lengths should be determined based on the anticipated turning volume and whether there is signalized or unsignalized traffic control. For left turn lanes at signalized intersections, dual turn lanes should be considered when the turn volume exceeds 300 vehicles per hour, the opposing through volume exceeds 1,000 vehicles per hour, or the delay to left turning vehicles exceeds 45 seconds. Sight distance must be considered and calculated for these movements based on the AASHTO Policy on Geometric Design in order to determine the allowance of permitted left turns. Guidance for the length of taper, determination of the gap and storage length of the lane can be found in Section 430 of the ADOT Traffic Engineering Policies, Guidelines and Procedures Manual.

**OPTION 1**



**OPTION 2**

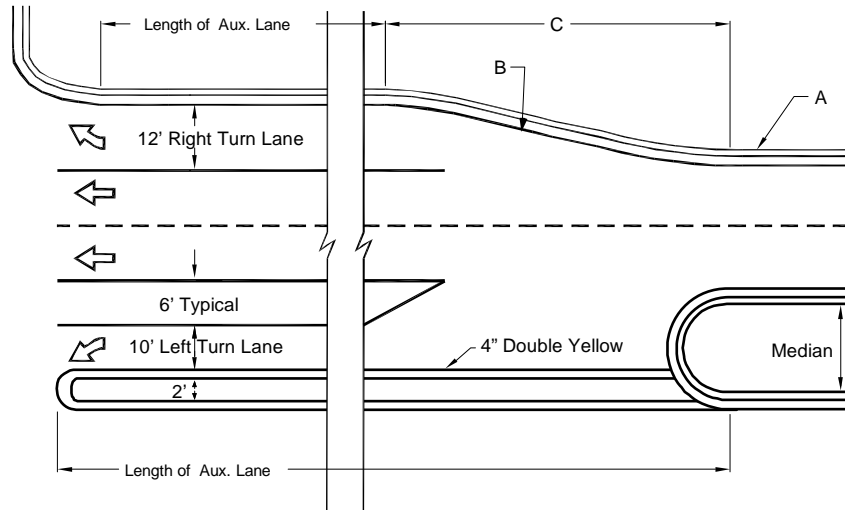


Note: See COS Standard Detail No. 2225 for radius and dimensions noted as A, B, and C.

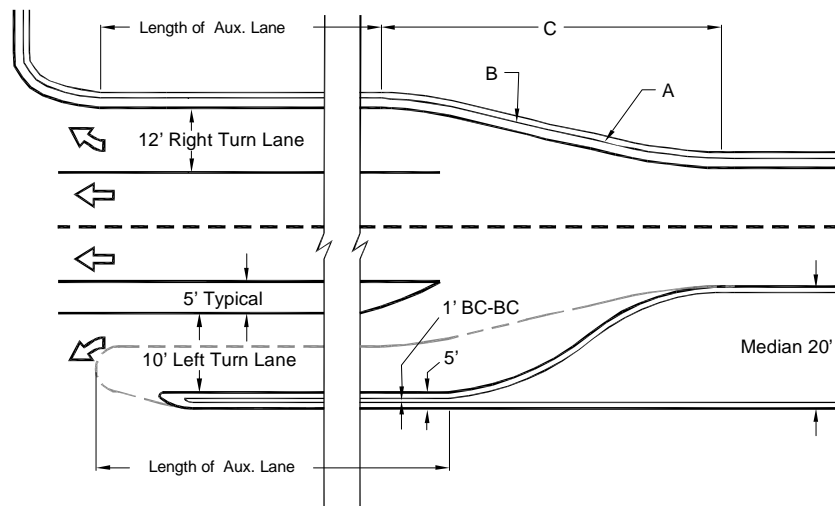
[www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp)

**FIGURE 5.3-28 AUXILIARY LANES - OPTIONS 1 & 2**

**OPTION 3**



**OPTION 4**



Note: See COS Standard Detail No. 2225 for radius and dimensions noted as A, B, and C.  
[www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

**FIGURE 5.3-29 AUXILIARY LANES - OPTIONS 3 & 4**

**F. Median Design**

Raised medians are required on arterial streets and some major collector streets to separate traffic flows, channelize left turns and reduce conflicts. On most collector streets, flush or painted medians provide space between the through traffic lanes for left turning vehicles. Standard median widths are listed for each street classification in [Appendix 5-3A](#) and [Appendix 5-3B](#) and as shown in [Figure 5.3-30](#) through [Figure 5.3-34](#). Variations to these standards may be approved through the master plan process or by the Transportation department.



**1. Raised Medians**

Raised medians, where required, must be provided in accordance with the applicable City of Scottsdale standard details, with the appropriate median width as noted above.

a. Spacing and Location of Median Openings

If a street has a raised median, it is not possible to provide an opening in the median for every street intersection or driveway location. Full median openings should occur at not less than 1/4 mile intervals (1320 feet) on major arterial streets. Partial median openings, which allow only left turns off the major street, are acceptable at 1/8 mile spacing (660 feet). On minor arterials, full median breaks should be no closer than 1/8 mile intervals with preferable 1/4 mile spacing. In built up areas, where reasonable alternate access is not available, median openings may be provided at smaller intervals with the approval of the Transportation Department.

b. Configuration of Median Openings

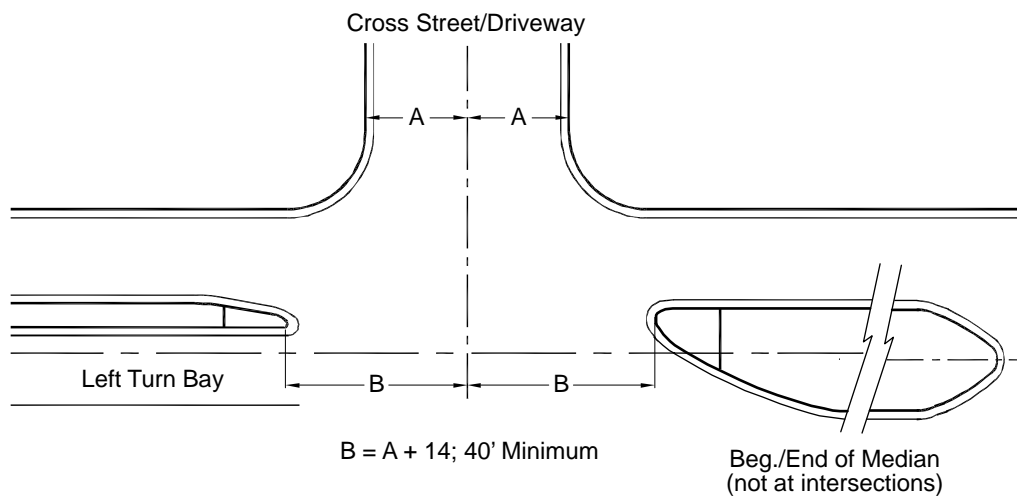
If the street intersection legs intersect at an angle of 88 to 90 degrees, the configuration of the median opening will be determined by the information shown below on Figure 5.3-30. If the streets intersect at an angle less than 88 degrees, the median opening configuration will have to be determined to the satisfaction of the Transportation department.

c. Cross-Slope

The cross-slope in the median opening is limited to 0.02 ft./ft. Median openings on curves with superelevation exceeding 0.02 feet/foot will not be permitted.

**2. Flush Medians**

Flush, painted medians are required on major and minor collector streets without raised medians. Median widths for these streets are listed in [Appendix 5-3A](#) and [Appendix 5-3B](#).

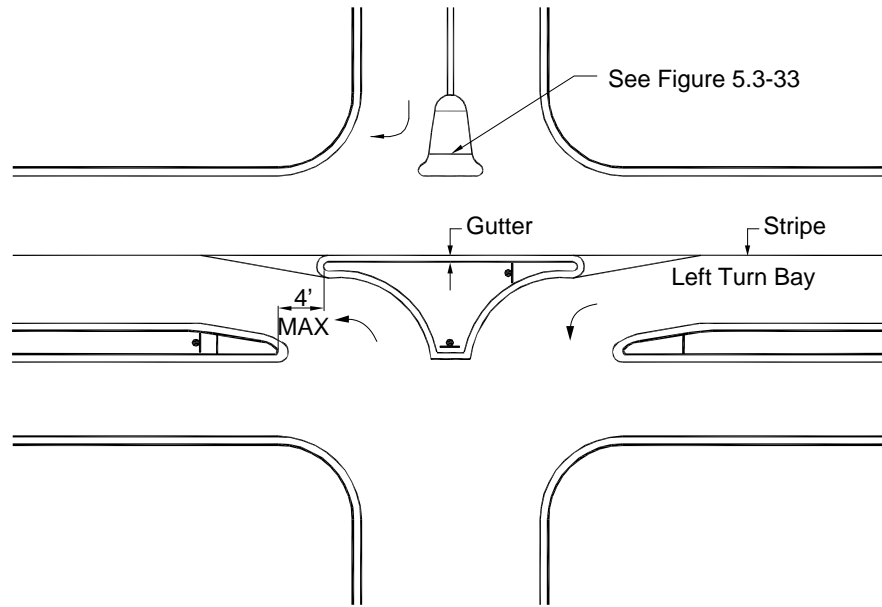


Notes:

1. This sketch is for a three leg intersection. If the intersection has four legs, the right side will also have an auxiliary lane for left turns, and the median on the right side will have the same configuration as the one on the left side rotated 180 degrees.

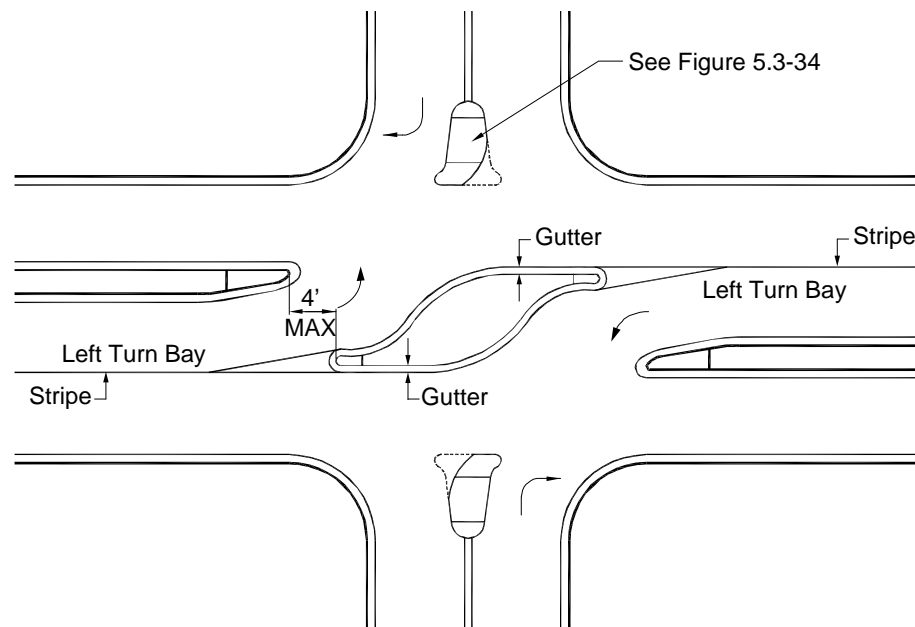
2. See COS Standard Details for median dimensions.

**FIGURE 5.3-30 MEDIAN OPENINGS FOR INTERSECTIONS**



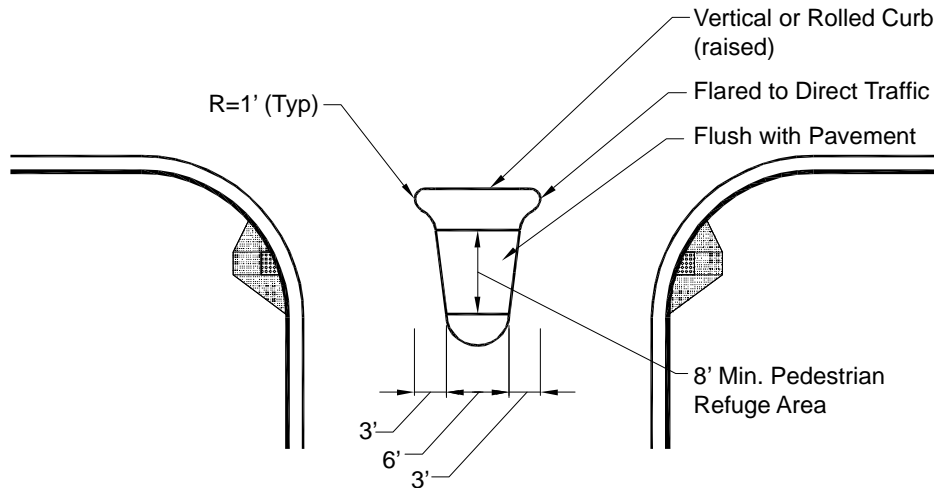
Note: Curbs may be vertical, rolled or painted to match existing roadway design or construction.

**FIGURE 5.3-31 LEFT IN / LEFT OUT MEDIAN OPENINGS FOR INTERSECTIONS**



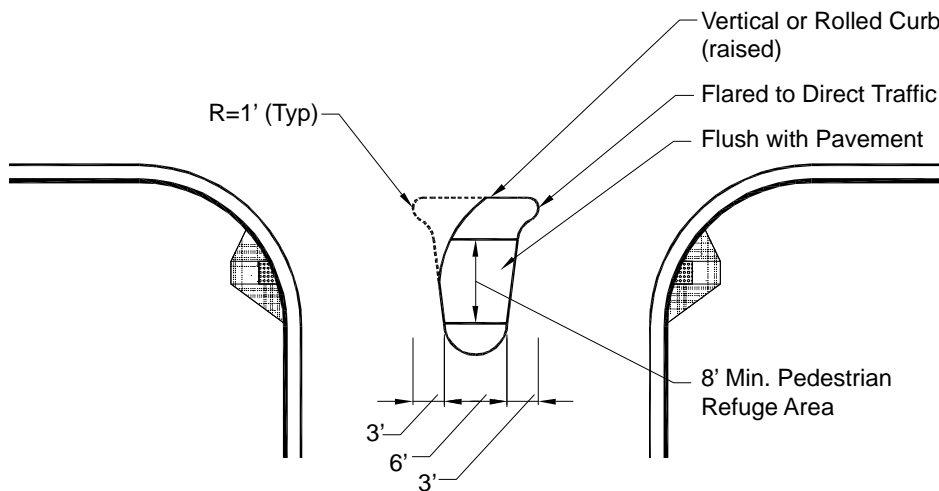
Note: Curbs may be vertical, rolled or painted to match existing roadway design or construction.

**FIGURE 5.3-32 LEFT IN / LEFT IN MEDIAN OPENINGS FOR INTERSECTIONS**



Note: Area of entire island must be a minimum of 30'.

**FIGURE 5.3-33 RIGHT IN / RIGHT OUT MEDIAN WITH PEDESTRIAN REFUGE**



Note: Area of entire island must be a minimum of 30'.

**FIGURE 5.3-34 LEFT IN / RIGHT OUT MEDIAN WITH PEDESTRIAN REFUGE**

**G. Traffic Control**

Traffic control at all new intersections should initially be stop controlled on the minor street. Any higher means of traffic control, 4-way stop, or a traffic signal will require approval by Traffic Engineering based on an approved engineering study. Guidelines for 4-way stop and traffic signal controlled intersections are outlined below. Intersections of local residential streets within subdivisions are assumed to be stop controlled and will typically not need signage.

**1. Four-Way Stop Controlled Intersections**

Four-way (or multi-way) stop controlled intersections are allowed only when based on an engineering study approved by the Traffic Engineering based on the criteria contained in the MUTCD. Four-way stop control is generally utilized for the intersections of two similar classification streets where volumes are approximately equal or at intersections where there is a safety concern (such as limited sight distance).

## 2. Traffic Signal Controlled Intersections

### a. Traffic Signal Warrants

New traffic signal controlled intersections are allowed only when based on an engineering study approved by Traffic Engineering using MUTCD criteria. Traffic signals warrants are generally based on existing traffic volumes, not projected traffic volumes. Contributions for future traffic signal construction are required for developments that are located at major intersections where traffic signal control is anticipated. Payment toward future construction should not be interpreted to mean a traffic signal is warranted. New intersections where a traffic signal is anticipated will require a preliminary traffic signal design to determine the proper location for the installation of underground conduit and pull boxes.

### b. Traffic Signal Spacing

Traffic signals should be spaced no closer than 1/2 mile on major arterials and minor arterials, with 1 mile spacing desirable. Traffic signals should be spaced no closer than 1/4 mile on collector streets, with 1/2 mile spacing desirable. Closer spacing will interfere with traffic progression and signal coordination. Any deviation from these standards requires approval from the Transportation Department based on an approved study that indicates no significant deterioration in traffic progression.

## H. Intersections with an Unpaved Leg

If an intersection has a leg that is unpaved, the paving needs to extend to the end of the normal curb return location on the unpaved leg (at a minimum) with a desired length of 50 from the edge of the roadway.

## I. Valley Gutters at Street Intersections

Valley gutters may only be used across minor and local collector streets and local residential streets. Exceptions must be approved by the Transportation Department. Valley gutters should be constructed in accordance with City of Scottsdale standard details.

## 5-3.200

## STREET ACCESS & DRIVEWAYS

Driveway types are determined by land use type and street classification, as shown below in Figure 5.3-35. The standards for these driveway types are illustrated in [Figure 5.3-37](#) through [Figure 5.3-43](#). Refer to [Figure 5.3-36](#) for driveway grade standards. Pedestrian ramps shown in [Figure 5.3-38](#) through [Figure 5.3-43](#) are illustrative only and should be designed and constructed per COS Supplement to MAG Details.

Land Use	Street Classification	Driveway Type*	Location**
Single Family	Local Residential / Local Collector	S-1	All
Multifamily	Local Residential / Local Collector	M-1	All
	Minor Collector	M-2 / CH-1	All
	Major Collector	M-2 / CH-1	All
	Minor Arterial / Major Arterial	M-2 / CH-1	Right-In, Right-Out
		CH-2, CH-3	Full Access
Commercial	Local Commercial	CL-1	All
	Minor Collector / Major Collector	CH-1	All
	Minor Arterial / Major Arterial	CH-1	Right-In, Right Out
		CH-2, CH-3	Full Access
Industrial	Local Industrial	CL-1	All
	Minor Collector / Major Collector	CH-1	All
	Minor Arterial / Major Arterial	CH-1	Right-In, Right-Out
		CH-2, CH-3	Full Access

\* See City of Scottsdale Standard Details and [Figure 5.3-37](#) through [Figure 5.3-43](#).

\*\* Right-In, Right Out driveways on arterial streets are where left-turns out of the driveway are prohibited by a median or an island. Full access driveways on arterial streets align with an approved median opening. Modifications to these standards are allowed by approval of city staff.

**FIGURE 5.3-35 DRIVEWAY TYPES**

### DRIVEWAY SPACING

Minimum driveway spacing will generally conform to the following standards. This minimum spacing applies to proposed site driveway separation as well as separation from existing or planned driveways on adjacent parcels.

Street Type	Minimum Distance Driveway Spacing
Local Residential/Local Collector	50 feet
Local Industrial/Local Commercial	165 feet
Minor Collector	165 feet
Major Collector	250 feet
Minor Arterial	330 feet
Major Arterial	500 feet

For sites that have frontage on two streets, primary access should be onto the minor street frontage. A maximum of two driveway openings is permitted to a particular site or parcel from the abutting street(s). The Transportation Department may permit additional driveway entrances when projected travel demands indicate it is in the interests of good traffic operation, and when adequate street frontage exists to maintain the above guidelines.

Where new development adjoins other similarly zoned property or compatible land uses, a cross access easement may be required to permit vehicular movement between the parcels and reduce the number of access points required onto the adjacent public street. This may be required regardless of the development status of the adjoining property, unless the cross access is determined to be unfeasible by city staff.

### 5-3.201

**5-3.202****DRIVEWAY LOCATION LIMITATIONS**

A new access driveway will not be allowed (measured to the driveway centerline):

1. Within 30 feet of any commercial property line, except when it is a joint-use driveway serving two abutting commercial properties and access agreements have been exchanged between, and recorded by, the two abutting property owners;
2. When the total width of all driveways serving a property exceeds 50% of the curb line frontage;
3. Within 50 feet of the rights-of-way line of an intersecting non-arterial street;
4. Within 100 feet of the rights-of-way line of an intersecting arterial street;
5. Within 100 feet of an approved median opening location on an arterial street;
6. Less than the minimum spacing as established under [Section 5-3.201](#);
7. When adequate sight distance cannot be provided to vehicles on the driveway attempting to access the street, see [Figure 5.3-26](#), [Appendix 5-3A](#) and [Appendix 5-3B](#).

**5-3.203****PROTECTION OF ACCESS**

For proper control of driveway access, a vehicular non-access easement (V.N.E.) is to be granted to the city, except at approved access points, along all collector and arterial streets when abutting property develops.

**5-3.204****RESIDENTIAL DEVELOPMENT DRIVEWAYS****A. Single Family Residential Development**

Driveways serving single-family residential units should be S-1 type driveways as shown in [Figure 5.3-37](#). Only one driveway per lot street frontage is allowed except where the street frontage is of sufficient length to maintain a separation of 50 feet between driveways. The minimum driveway length is 18 feet, measured from the face of the garage opening to the back of sidewalk or the back of curb if no sidewalk is provided. See [Section 2-2.308](#) for additional discussion on driveways.

**B. Multifamily Residential Development**

Driveways serving multifamily residential units should be CL and CH type driveways, as shown in [Figure 5.3-38](#) through [Figure 5.3-41](#). Type CL-1 and CL-2 are low-volume driveways to be used on local streets. Type CH-1, -2 and -3 are high volume driveways to be used on collector and arterial streets. The minimum driveway length is 50 feet, measured from the entrance to the off-street parking area to the back of sidewalk, or to the back of curb if no sidewalk is provided.

**C. Limitations on Residential Access**

Residential properties that have frontage on a local street, an arterial, or collector street are limited to local street access.

In some instances, residential parcels fronting only on arterial or collector streets may be given access if alternate public access is not available. When such access is allowed, the driveway must be circular or it must have a turn-around area to ensure there is no need for backing onto the street.

**5-3.205****COMMERCIAL AND INDUSTRIAL DEVELOPMENT DRIVEWAYS**

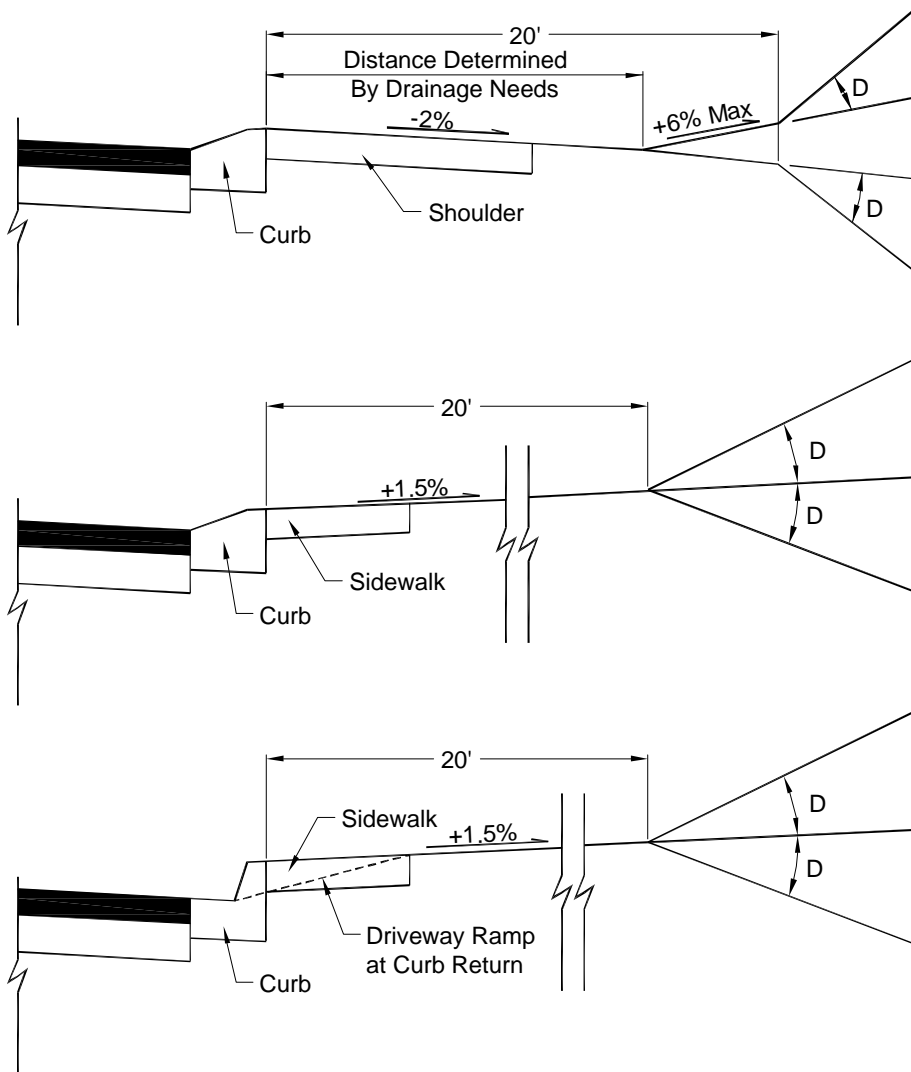
Driveways for commercial and industrial development are shown on [Figure 5.3-38](#) through [Figure 5.3-43](#). The minimum length for a commercial or industrial driveway is 50 feet, measured from the entrance to the off-street parking area to the back of sidewalk or the back of curb if no sidewalk is provided. Driveway designs need to include a level path of travel across the driveway for pedestrians in conformance with ADA requirements.

**A. Commercial Driveways**

The “CL” and “CH” type driveways are designed to serve commercial properties. A “CL” type driveway is used for low-volume driveways on low volume streets. A “CH” type driveway is used for driveways on arterials, major collectors and high volume minor collectors, or at other locations when required by the Transportation Department. The CH-2 and CH-3 driveways are used at all access driveways opposite median openings.

**B. Industrial Driveways**

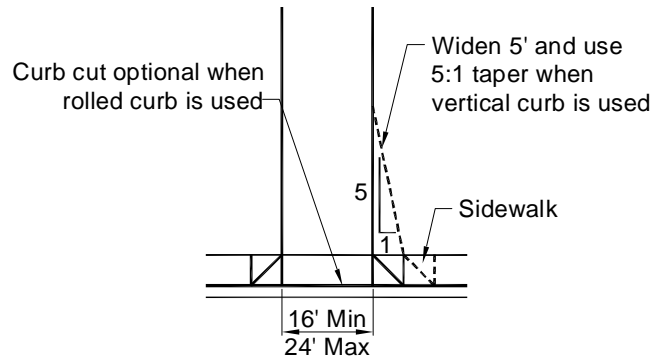
The CL-1 and CH-1 type driveways are typically used to serve industrial properties. Normally industrial access is not permitted on arterial or major collector streets; however, if such access is allowed, commercial driveway standards apply.



A.D.T. For Driveway		Grade Difference, D	
		Desirable	Maximum
Low Volume	1-500	6%	10%
Medium Volume	500-1500	3%	10%
High Volume	1500 or More	0%	10%

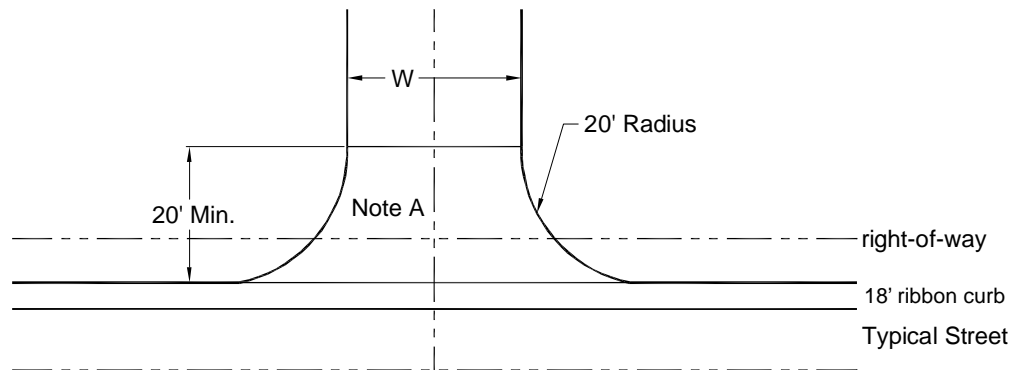
**FIGURE 5.3-36 DRIVEWAY GRADE STANDARDS**





**Suburban Single Family Unit**

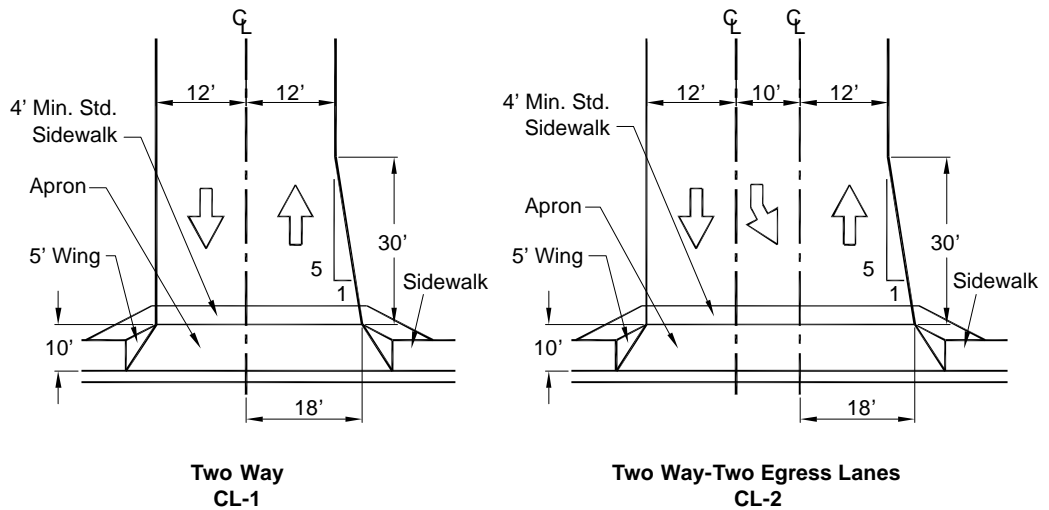
NOTE: See COS Standard Details for more specific information.



**Rural/ESL Single Family Unit**

- W=16' for driveway serving one lot
- W=24' for driveway serving two lots
- Note A: Pavement section-2" A.C/6" A.B.C. Minimum

**FIGURE 5.3-37 TYPE S-1 DRIVEWAY STANDARDS**



**FIGURE 5.3-38 TYPE CL TWO WAY DRIVEWAYS**

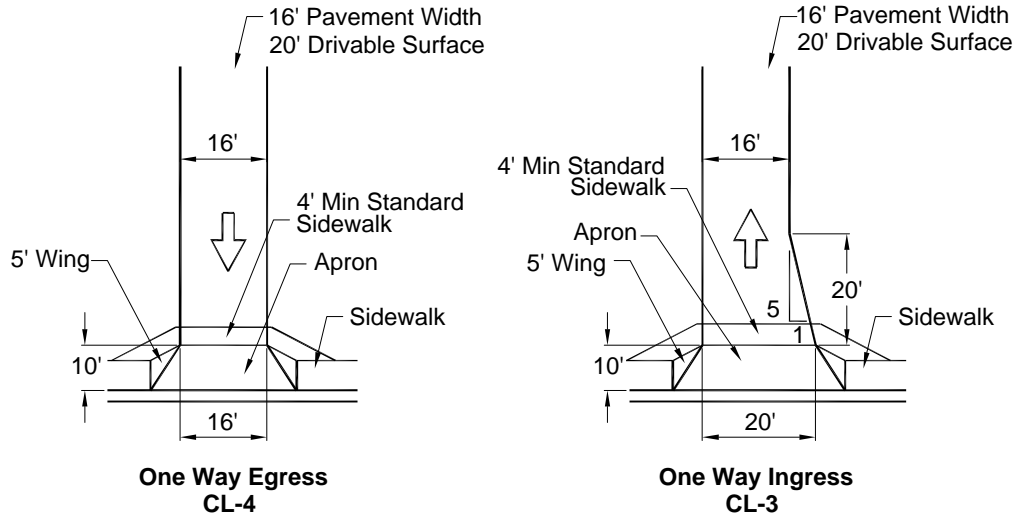


FIGURE 5.3-39 TYPE CL ONE WAY DRIVEWAYS

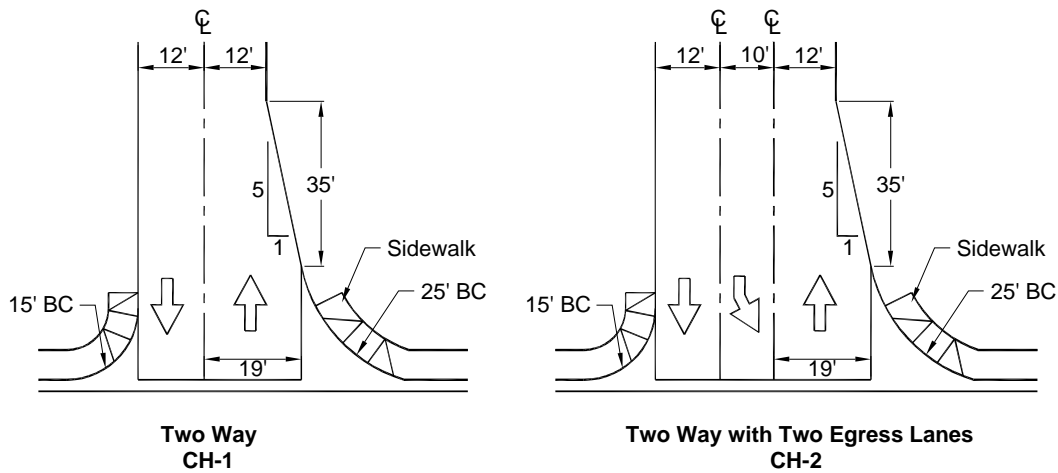
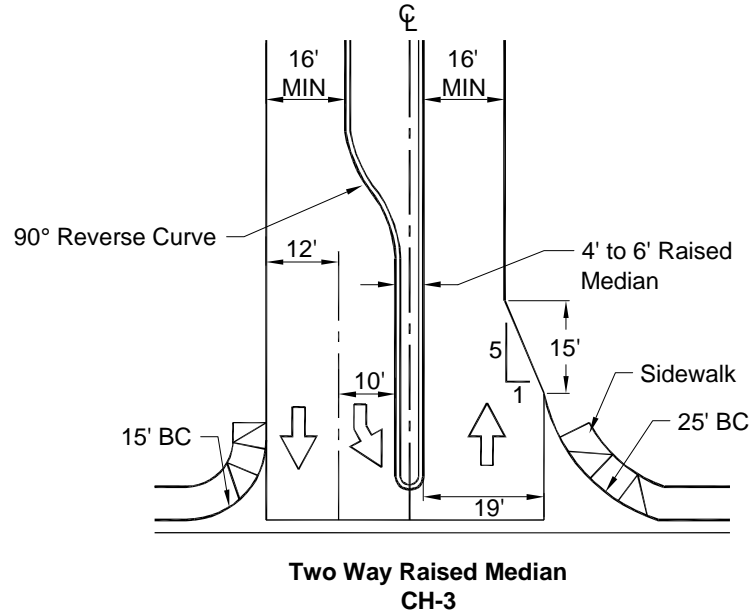


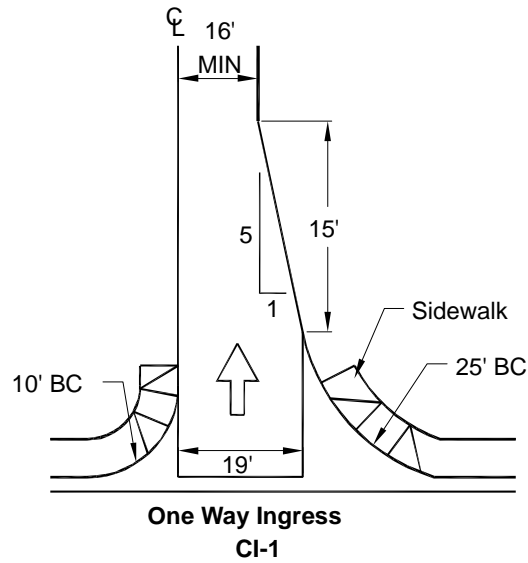
FIGURE 5.3-40 TYPE CH TWO WAY DRIVEWAYS\*

\*Note: Pedestrian ramps in this figure are illustrative only and should be designed and constructed per COS Supplement to MAG Details.



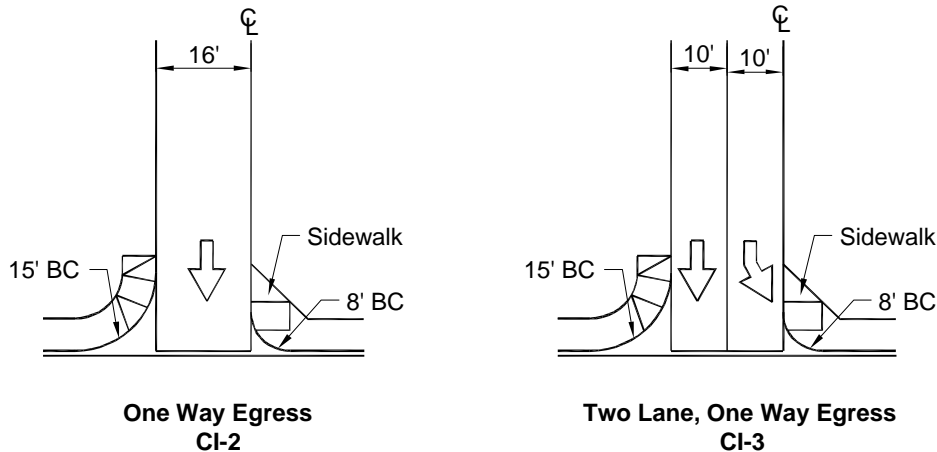
\*Note: Pedestrian ramps in this figure are illustrative only and should be designed and constructed per COS Supplement to MAG Details.

**FIGURE 5.3-41 TYPE CH TWO WAY DRIVEWAYS WITH RAISED MEDIAN\***



\*Note: Pedestrian ramps in this figure are illustrative only and should be designed and constructed per COS Supplement to MAG Details.

**FIGURE 5.3-42 TYPE CI ONE WAY INGRESS DRIVEWAYS\***



\*Note: Pedestrian ramps in this figure are illustrative only and should be designed and constructed per COS Supplement to MAG Details.

**FIGURE 5.3-43 TYPE CI ONE WAY EGRESS DRIVEWAYS\***

## DECELERATION LANES

5-3.206

Figure 5.3-28 and Figure 5.3-29 depict the design standards for auxiliary lanes. These standards apply for right and left turn lanes at street intersections and for deceleration lanes at mid-block driveways. The requirement for an auxiliary lane may necessitate additional rights-of-way. The standard storage length for a deceleration lane is 150 feet, with a 100-foot minimum length. Modifications to the design standard are allowed by the Transportation Department where the conditions do not allow the full taper or storage length.

Deceleration lanes are required at all new driveways on major arterials and at new commercial/retail driveways minor arterials. Deceleration lanes for driveways may also be required on collector streets and for non-commercial/retail driveways on minor arterials. The lane length should be based on the distance needed to allow the vehicle to exit the through lane and slow to a 15 m.p.h. travel speed. To determine the need for a deceleration lane on streets classified as a minor arterial or collector, see the following criteria:

- At least 5,000 vehicles per day are expected to use the street;
- The 85<sup>th</sup> percentile traffic speed on the street is at least 35 m.p.h.; or 45 m.p.h. for a 2 lane (1 lane each direction) roadway;
- At least 30 vehicles will make right turns into the driveway during a 1-hour period.

## SIDEWALKS

5-3.300

### A. Sidewalk Standards

Sidewalks adjacent to all city streets are required to meet the standard cross sections contained in Figure 5.3-1 through Figure 5.3-21 and the Streets Master Plan except as noted below.

Walkways that connect main building entrances to the sidewalks on adjacent streets should have a minimum clear width of six (6) feet - excluding any parking overhangs or other obstructions. The walkway should be continuous between the street and building, and clearly recognizable by both pedestrians and drivers. Wider widths may be required by staff in

locations where significant pedestrian traffic is anticipated and where wider sidewalk exists or is planned along the street.

In cases where a sidewalk width of six feet cannot be provided due to existing physical barriers or other constraints, a five (5) foot wide clear and continuous sidewalk width may be allowed if approved by the Planning and Development Services General Manager or designee.

Sidewalk separation is required along all streets except local streets (local residential, local collector, local commercial/industrial). Sidewalks may be located at the back of curb in urban area where additional sidewalk width is provided. See [Section 5-8.000](#) Pedestrian Facilities for more detail regarding sidewalk design and requirements.

### **B. Sidewalk Locations**

All new sidewalks constructed adjacent to public and private streets shall be separated from the back of curb unless right-of-way or other constraints make this impossible. The minimum separation from the back of curb should be four feet. Wherever possible, the sidewalk should be located adjacent to the right-of-way line (with a one foot clearance). Sidewalk may be located within adjacent easements, such as scenic corridors or public access, where available. The sidewalk width shall be constructed at the back of curb, except adjacent to local streets (local residential, local collector and local commercial/industrial). In no circumstances shall sidewalk be located within the clear zone for arterials streets without vertical curb.

### **C. Sidewalk Exemptions**

Sidewalks will be provided on all streets except under any of the following conditions:

1. Along local residential and local collector streets in rural, low density areas – lot widths are 150 feet or more, or parcels are 20,000 square feet or more on both sides – where improved shoulders are provided along both sides of the street.
2. Along the side of a street where a multiuse path is required. The multiuse path will also serve as a sidewalk.
3. In the outer separation between an arterial and a frontage road.
4. With the approval of the Development Review Board in an area that has been substantially developed without sidewalks and a required sidewalk would create a spot location.
5. In conformance with a street cross section that has been approved as part of a master circulation plan.

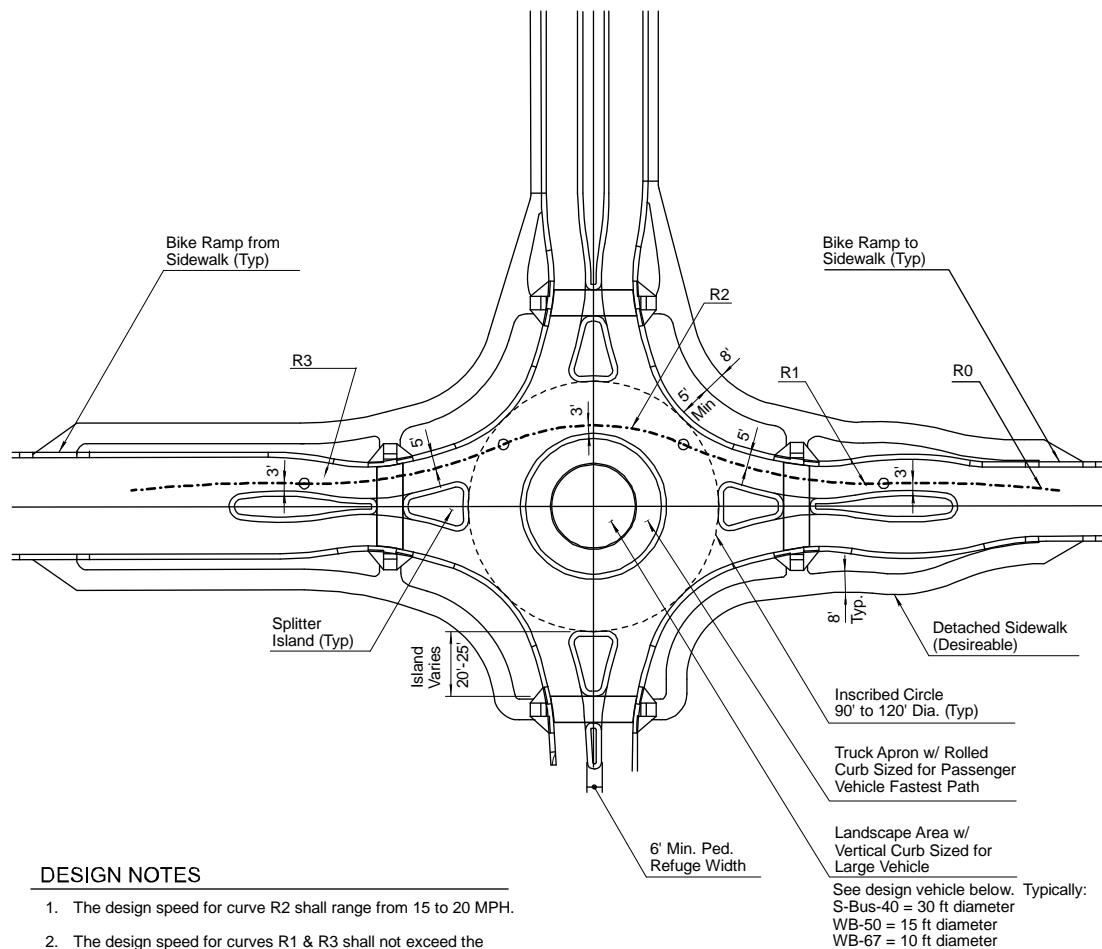
## **5-3.400**

## **ROUNDBABOUTS**

### **A. Roundabout Intersections**

Roundabouts can reduce accidents and improve traffic flow at intersections. The city considers the use of roundabouts on a case by case basis. Roundabouts are typically used as an alternative to traffic signals or 4-way stop control. All city roundabout designs will follow the most current guidelines for roundabouts, including proper treatment of pedestrian crossings, bicycle lanes and signage. See [Figure 5.3-44](#) for Roundabout Design, [Figure 5.3-45](#) for Signing and Markings, and [Figure 5.3-46](#) and [Figure 5.3-47](#) for sight distance and design guidance.

The FHWA Roundabout Guideline defines six types of modern roundabout: Mini, Urban compact, Urban single, Urban double, Rural single and Rural double. See the Federal Highway Administration's Roundabouts: An Informational Guide (Publication No. FHWA-RD-00-67) and their Manual on Uniform Traffic Control Devices for further information.



**DESIGN NOTES**

1. The design speed for curve R2 shall range from 15 to 20 MPH.
2. The design speed for curves R1 & R3 shall not exceed the design speed of curve R2 by more than 12 MPH.
3. The design speed for curve R0 shall not exceed the design speed of curves R1 & R3 by more than 12 MPH.
4. The existing posted speed limit shall not exceed the design speed of curve R0 by more than 12 MPH.

**LEGEND:**

Fastest Path - - - - -

**FIGURE 5.3-44 ROUNDABOUT DESIGN**

**1. Main Design Considerations**

- a. Design all legs to yield to traffic in center
- b. Provide channelized approaches/splitter islands for all legs
- c. Design geometry to slow speeds to less than 30 m.p.h.
- d. Discourage pedestrian crossing to the center island
- e. Provide pedestrian refuge in splitter islands

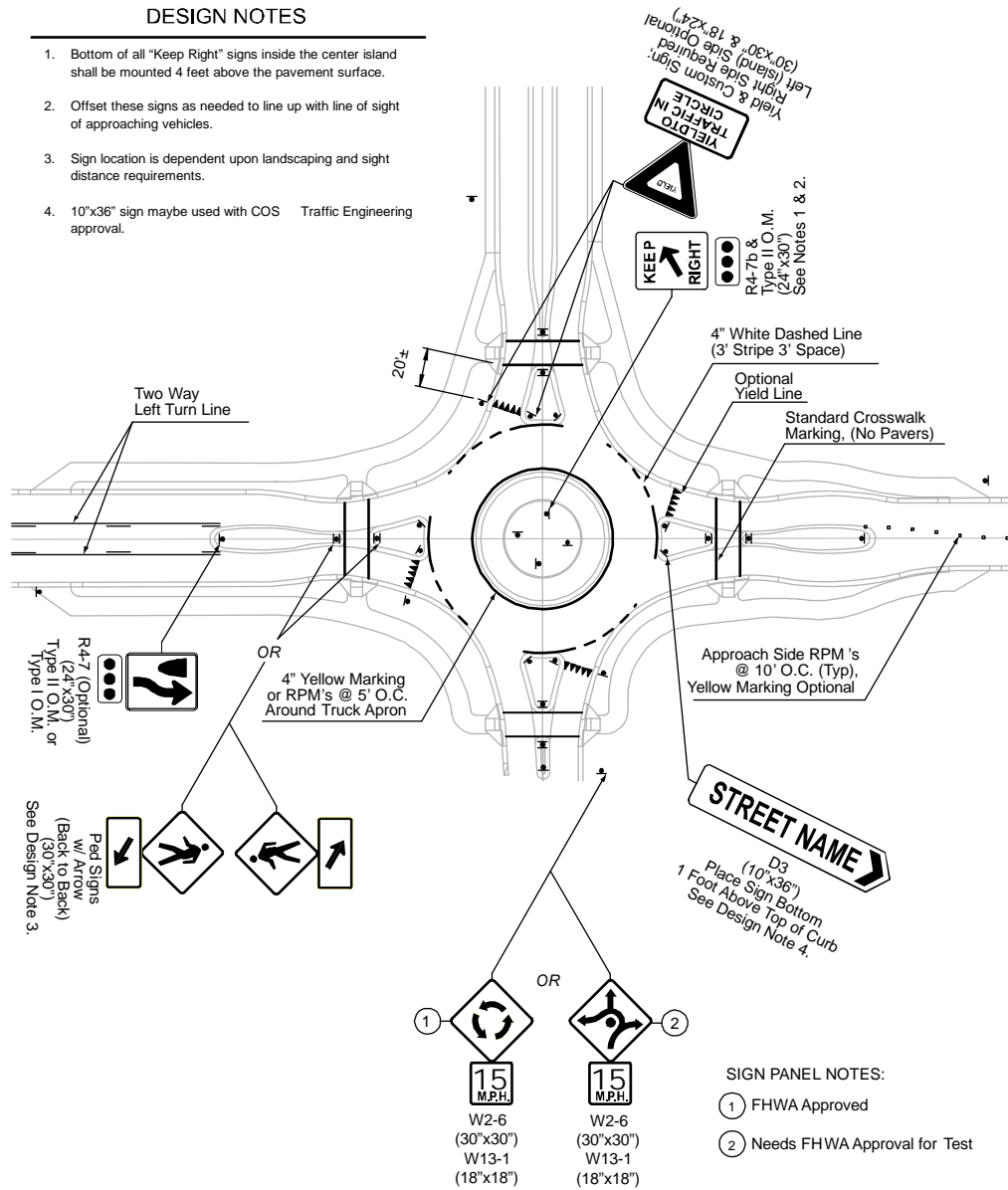
**2. Other Typical Design Guidance**

- a. Design Vehicle:
  - Local or minor collector intersections with less than 5,000 vehicles per day shall accommodate an S-Bus 40 (which will accommodate fire trucks, sanitation trucks and most large residential trailers) for all turning movements and should accommodate a WB-50 for through movements to prevent errant vehicles from getting stuck.
  - Minor collectors and up with over 5,000 vehicles per day shall accommodate a WB-50 (which will accommodate fire trucks, sanitation trucks and most trailers) for all

- turning movements and should accommodate a WB-67 for through movements to prevent errant vehicles from getting stuck.
- b. Truck Apron (rolled curb/exterior designed for passenger car path, vertical curb interior designed for truck path).
  - c. Slow vehicles prior to the circle using curve to produce fastest path radii R1, R2, R3, see [Figure 5.3-44](#).
  - d. R2 fastest path of 15 to 20 m.p.h.
  - e. R1 should be within 12 m.p.h. of R2 and posted or 85th percentile speed. If R1 is not within 12 m.p.h. of posted or percentile consider an "R0" prior to R1.
  - f. Use splitter islands (rolled curb typical).
  - g. Splitter island (6 foot minimum at pedestrian refuge; 7 foot preferred) and tangent to inner circle. Pull sidewalk away from curb near circle to encourage crossing at splitter crossing.
  - h. Allow bikes to merge with vehicular traffic or exit to sidewalk/path or trail as available.
  - i. Provide a directional curb ramp for bikes where the splitter island starts (or before the R1) so they have the option of using sidewalk or mixing with the vehicles.
  - j. Single lane circulating roadway is typically 14 to 18 feet wide.
  - k. Single lane inscribed circle is typically 90 to 120 feet in diameter.
  - l. Geometric layout should be checked with AutoTurn or by similar method.
  - m. Intersection circle and splitter islands should follow the forgiving roadway design principles as described in the AASHTO Roadside Design Guide and should avoid structural elements that could likely be in the path of an errant driver.

Further guidance can be found in the draft versions of the proposed 2009 MUTCD published by the FHWA.





**FIGURE 5.3-45 ROUNDABOUT SIGNING & MARKINGS**

**B. Typical Signage**

- a. All-Way Yield
- b. Supplement Yield with regulatory "Yield to Traffic in Circle"
- c. Offset regulator "Keep Right" signs in center island to line up with driver.
- d. Consider pedestrian crossing signs in splitter/median.
- e. Object marker and optional keep right at beginning of splitter/median
- f. Advance roundabout warning sign with advisory speed plaque

**C. Typical Lighting (minor collector or greater)**

- a. Minimum 2 lights for single lane approaches
- b. Minimum 4 lights for major collector or greater

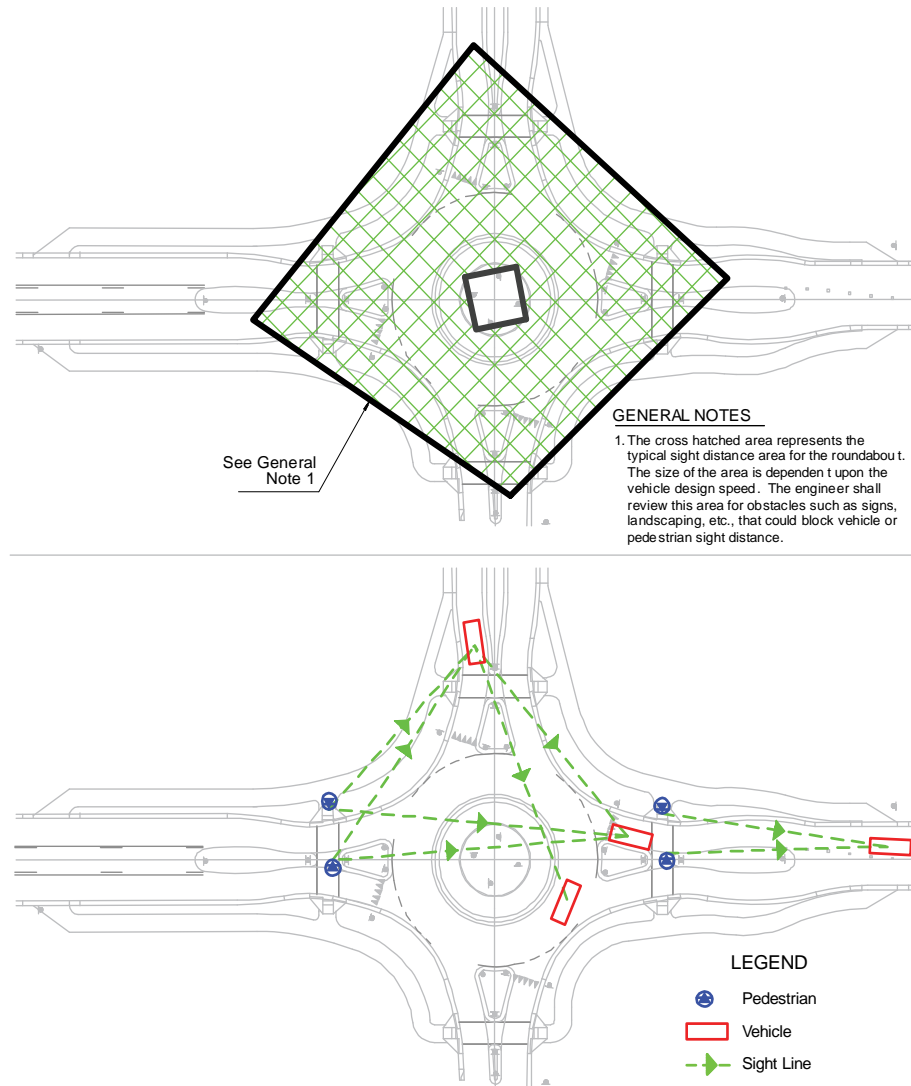


FIGURE 5.3-46 ROUNDABOUT SIGHT DISTANCE



FIGURE 5.3-47 ROUNDABOUT STANDARD CONCEPT DESIGN

# BRIDGES, RETAINING WALLS & STRUCTURAL CLEARANCES

## 5-3.500

## BRIDGES

## 5-3.501

### A. Bridge Roadbed Width

The clear width of all bridges, including grade separation structures, needs to equal the full width of the physical improvements consisting of sidewalk, street, median and curb and gutter.

### B. Approach Guardrail

If a vehicular railing or safety-shaped barrier is within the clear zone as defined by AASHTO Roadside Design Guide, approach guardrails are to be installed on all approach ends in accordance with AASHTO guidelines and the below paragraph, E. Railings.

### C. Cross Slope

The crown is normally centered on the bridge except for 1-way bridges, where a straight cross slope in one direction is used. The cross slope needs to be the same as for the approach pavement.

### D. Median

On multi-lane divided highways, a bridge median that is 26 feet wide or less needs to be decked. The decking of all medians greater than 6 feet wide needs to be grated to allow natural light into the structure. Exceptions must be submitted to the Transportation Department for approval.

### E. Railings

The length of the railing should be calculated as part of the design process. The railings to be used are the State of Arizona or State of California Department of Transportation standard design railings. There are four types of railings as described below.

#### 1. Vehicular Barrier Railings

The primary function of these railings is to retain and redirect errant vehicles.

#### 2. Combination Vehicular and Pedestrian Railings

These railings perform the dual function of retaining both vehicles and pedestrians on the bridge. They consist of two parts:

- a. A concrete barrier railing with a sidewalk, and
- b. A metal hand railing or fence-type railing (must be ADA compliant).

#### 3. Pedestrian Railings

These railings prevent pedestrians from accidentally falling from the structure and, in the case of the fence-type railing, prevent objects from being thrown to the roadway below the bridge (must be ADA compliant).

#### 4. Bridge Approach Railings

Approach railings are required at the ends of bridge railings exposed to approach traffic. On divided highways, with separate 1-way traffic structures, they need to be placed to the left and right of approach traffic.

- a. On 2-way roadbeds with a clear width less than 60 feet across the structure, approach railings need to be placed on both ends of the structure.
- b. When the clear width is 60 feet or more, approach railings need to be placed only to the right of approach traffic.
- c. Several types of approach railings are available, including Metal Beam Guardrail, Bridge Approach Guardrail (Types I and II) and Safety-Shape Barriers. The type of approach railing selected should match the rail to be used on the bridge. When long

runs of guardrail (such as embankment guardrail) precede the bridge, the guardrail should connect to the bridge railing to serve the approach railing function.

- d. Approach railings need to be flared or attenuation devices provided at their exposed end. (For detailed information see the AASHTO publication, Roadside Design Guide.)
- e. Approach railing end treatments that use energy absorbing terminals should be flared by 2 feet for design speeds of 45 m.p.h or above.

### 5-3.502

## RETAINING WALLS

### A. Types and Uses

Recommended types of retaining walls include reinforced concrete and structural masonry. Heavy timber construction is not encouraged except when approved by the Transportation Department General Manager. The walls need to include integral attachments for railings and weep drainage where applicable.

### B. Aesthetic Considerations

In general, the materials and design of retaining walls need to match or blend with the adjacent natural features, landscaping and/or buildings. The surface of the retaining wall should have a low light reflectance. Suggested surface treatments include exposed aggregate, stucco or mortar wash and native stone, or other surfaces as approved by the Development Review Board.

The height of retaining walls within city rights-of-way cannot exceed 6 feet except when approved by the Transportation Department General Manager. If approved to retain above 6 feet, terracing is encouraged and the length of the alignment of the retaining walls should be foreshortened by vertical grooves, periodic offsets and height changes, or other configurations as approved by the Development Review Board. See [Section 2-1.100](#) for more information.

### C. Safety Railings

A safety railing is required on or adjacent to vertical faces such as retaining walls, wing-walls and abutments, etc., and where the vertical fall is 2 feet or more. The safety railing needs to be constructed per City of Scottsdale standard details and placed on top of the vertical face structure of the vertical drop.

### 5-3.503

## STRUCTURAL CLEARANCES

### A. Horizontal Clearance

1. Clear roadside design is recommended for all arterials and collectors whenever practical. Where the roadway is curbed, the clearance between curb face to edge of the object should be a minimum of 1.5 feet. A clearance of 3 feet should be provided near the turning radii at intersections and driveways to provide clearance for the overhang of trucks. For further guidance, refer to the AASHTO Roadside Design Guide.
2. The horizontal clearance to bridge piers, abutments, headwalls and retaining walls on all streets can be no less than 10 feet from the edge of the traveled way and may require protection depending on the roadway design speed.
3. Drainage structures (pipes, box culverts, etc.) are to be extended to a distance of 10 feet from the edge of the travel way. A lesser clearance may only be allowed when rights-of-way limitations make the desired clearance unreasonable and appropriate traffic barriers are installed in accordance with the AASHTO Roadside Design Guide.

### B. Vertical Clearance

Minimum vertical clearance shall be 16.5 feet over the entire width of the traveled way of an arterial street or major collector street. On other streets, the minimum shall be 14.5 feet. The Transportation Department General Manager must approve exceptions.

## SIDE SLOPES

5-3.600

### A. Side Slope Standards

Side slopes should be designed for functional effectiveness, ease of maintenance and pleasing appearance. For areas greater than 10 feet back of curb, slopes of 4:1 or flatter will be provided. Steeper slopes may be approved in areas more than 30 feet back-of-curb when soils are not highly susceptible to erosion, or when a cut is not more than 4 feet. Consult the AASHTO publication, Roadside Design Guide for further details. The Development Review Board must review cuts or fills greater than 4 feet. See [Section 2-1.100](#) for more information.

### B. Slope Rounding

The top of all cut slopes needs to be rounded where the material is other than solid rock. A layer of earth overlaying a rock cut also will be rounded. The top and bottoms of all fill slopes for, or adjacent to, a traveled way, sidewalk, or bicycle path also need to be rounded. See [Section 1-2](#) for more information.

## PARTIAL STREET IMPROVEMENT

5-3.700

A full street cross-section is required for interior streets of a development and a complete half-street cross-section for perimeter streets. However, if the street is a major arterial, 4 of the 6 lanes of the full street, or 2 of the 3 lanes of the half-street, may be required subject to rights-of-way availability. Determining if the unimproved lanes will be on the outer edge of the cross-section or adjacent to the median location will be made on a case-by-case basis and approved by the Transportation Department.

## CONSTRUCTION OF HALF-STREETS

5-3.800

### A. Design of Cross-Section for Half-Streets

Half-street construction consists of a minimum 24-foot wide pavement section for major streets (major collector classification or higher) and a 20-foot wide pavement section for minor streets (minor collector classification or lower). For half-street construction, the engineer needs to design the full cross-section of the street. The plans need to include, in dashed lines, the half-street, which will be constructed in the future. The half street construction needs to provide adequate transitions and tapers to the adjoining roadways.

### B. Joining Existing Street Pavement

The half-street must be designed to match existing construction as much as possible unless doing so is likely to create an unsatisfactory condition. If changes are needed to correct conditions on an existing half-street to properly construct the other half of the street, the solutions must be developed with Transportation Department staff on a case-by-case basis. The plans for the new half-street must contain sufficient information on the profile and cross-sections of the existing street to demonstrate that the new construction will match the old construction and result in a full street with proper cross-sections.

### C. Culverts Under Half-Streets

A culvert to be provided in conjunction with half-street construction must extend a minimum of 10 feet beyond the edge of the traveled way into the area where the other half of the street will be constructed in the future (subject to rights-of-way availability). The 10-foot distance is measured perpendicular to the street alignment. The culvert capacity, flow line slope and alignment must be based upon the ultimate design requirements for the culvert if it were to be built under the full cross-section where it could be considerably longer. The culvert ends shall

be protected in accordance with the AASHTO Roadside Design Guide. Temporary installation of culvert safety end section may be considered for an interim condition.

## 5-3.900

# PAVEMENT TRANSITIONS

When development causes the widening of a portion of the pavement of an existing road, pavement transitions are required at each end of the widened portion. Design of the various features of the transition between pavements of different widths should be consistent with the design standards of the superior facility. The transitions should be made on a tangent section whenever possible. Locations with horizontal and vertical sight distance restrictions should be avoided. Whenever feasible, the entire transition should be visible to the driver of a vehicle approaching the narrower section. Intersections at grade within the transition area should be avoided.

### A. Transition to a Wider Pavement Section

A transition from a narrower cross-section to a wider cross-section needs to be a length that is 5 times the street design speed in miles per hour. See Figure 5.3-48.

### B. Transition to a Narrower Pavement Section

For streets with speeds greater than 45 mph, a transition from a wider cross-section to a narrower cross-section needs to be a length equal to the difference of the two widths in feet times the street design speed in miles per hour, or the 85th percentile speed in miles per hour, whichever is greater. For streets with speed equal to or less than 45 mph, the transition should be equal to the difference of the two widths, times the square of the design speed divided by 60. Figure 5.3-48 illustrates this requirement.



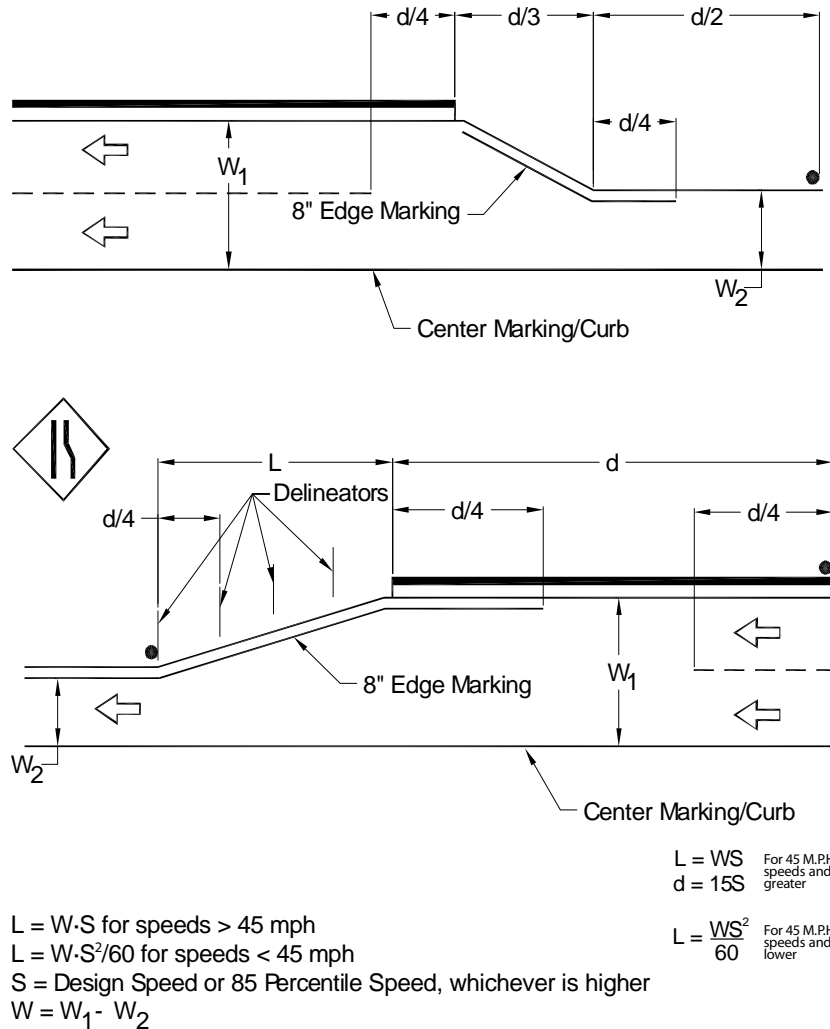


FIGURE 5.3-48 PAVEMENT WIDTH TRANSITIONS

## FRONTAGE ROADS

5-3.1000

Generally there are two types of frontage roads, those along freeways that provide commercial access and those along arterials that provide residential access. The city does not typically have jurisdiction over freeway frontage roads.

### A. Freeway Frontage Road Access

Any proposed freeway frontage roads, or access to existing or planned frontage roads, should be coordinated with the city's Transportation Department and the Arizona Department of Transportation. The city must be consulted to ensure the frontage road, or access to such, does not have a detrimental impact on the adjacent city street system.

### B. City Street Frontage Roads

New frontage roads for residential access are not encouraged and must be approved by the Transportation Department. Frontage road geometrics are to be based upon specific project requirements, but generally should not be less than 20 feet in width. Connections to the intersecting side street need to be out of the intersection influence area as outlined in the Access Management Manual.



## 5-3.1100

## SUBDIVISION STREET PLANNING

Subdivision street plans should produce the minimum number of intersections and wash crossings and discourage through traffic. Figure 5.3-49 illustrates a number of concepts associated with desired subdivision street design. The following paragraphs describe certain other concepts and requirements.

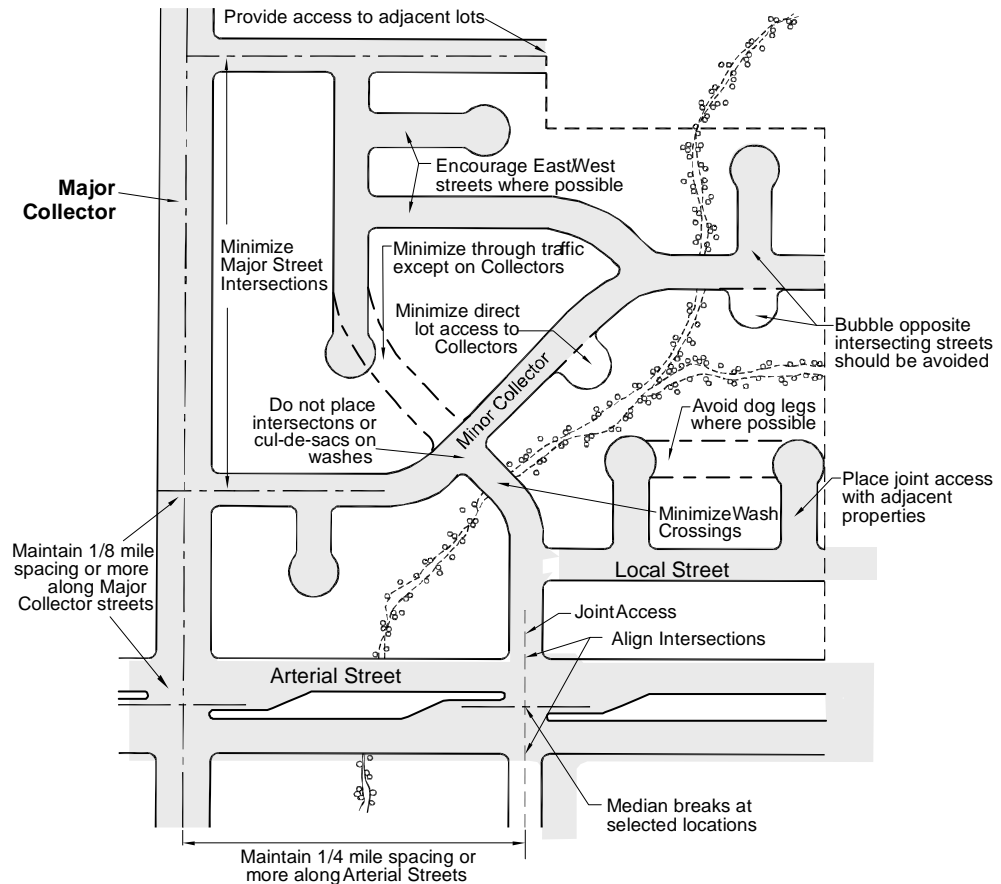


FIGURE 5.3-49 SUBDIVISION STREET PLANNING

### A. Existing and Proposed Streets

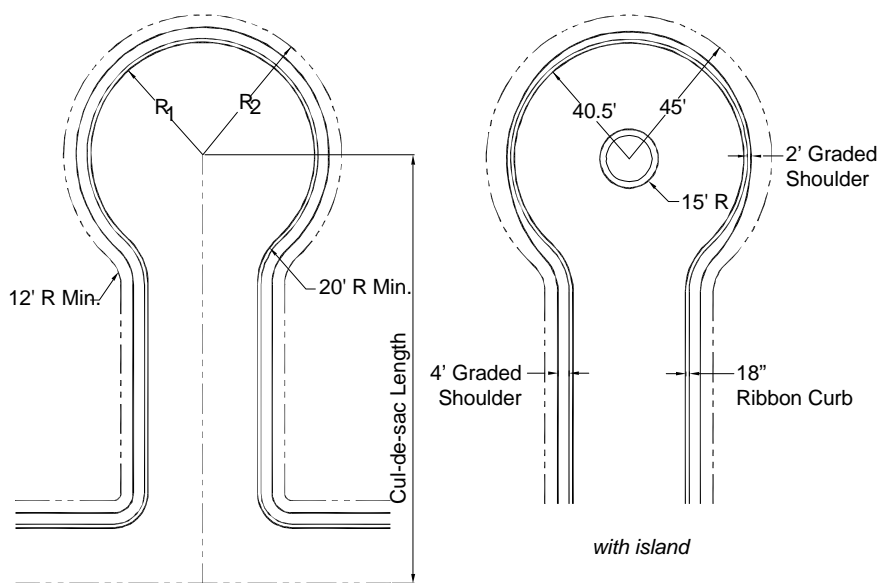
Existing streets and proposed streets of the Mobility Element of the General Plan, the Streets Master Plan, or any applicable Master Circulation Plan or Area Plan should be incorporated into the design of new subdivisions. Exceptions must be approved by the Transportation Department and may require the approval of the Transportation Commission.

### B. Street Abandonment

An existing public street may be abandoned if it is not a street indicated in the Mobility Element of the General Plan or an Area Plan, and if it will not eliminate reasonable access to existing adjacent properties. The abandonment should alleviate a significant traffic problem and not create a new problem. If a street abandonment is approved, the abandonment must occur prior to submitting a final plat to the City Council.

### C. Cul-de-Sac Street Lengths

A cul-de-sac street is a street that serves more than one property owner and has only one direct access to the public street system. The following requirements apply to both public and private streets. The length of a cul-de-sac is measured between the centerline of an intersecting street and the radius point of the cul-de-sac, as shown below in Figure 5.3-50; the minimum length of a cul-de-sac is two times radius R1, as illustrated. A cul-de-sac street cannot be longer than 1,500 feet and it cannot serve more than 25 single-family dwelling units; in these situations a secondary access may be required or the street may need to be upgraded to a collector level classification.



Classification of Cul-de-sac	Bubble Radii (ft.)	
	R1 (B.C.)	R2 (P.L.)
Local Residential	40.5	50
Local Commercial/Multi-family Residential	60.5	70
Local Industrial	60.5	70

- Minimum Length = 2R
- Maximum Length = 1500 ft.
- ADT = 250 vpd maximum
- Maximum number of units served = 25
- Cul-de-sac radii are the same for private streets

**FIGURE 5.3-50 CUL-DE-SAC STREET LENGTH**

### D. Dead-End Streets

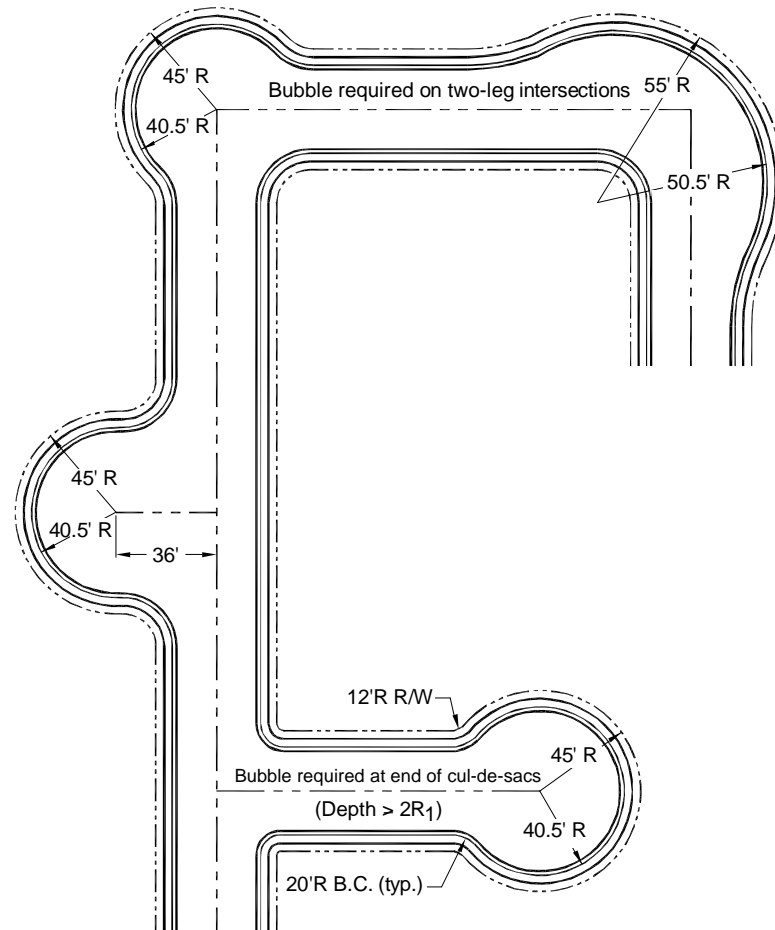
Dead-end streets are required where a street connection is necessary to serve adjacent properties that will develop at a future date. When a dead-end street is required, a temporary cul-de-sac needs to be provided. A dead-end street may not exceed 300 feet in length without an approved turn-around.

### E. Bubbles

Bubbles are areas on the roadway expanded to provide a turn-around and additional access or lot frontage on minor collector and local streets. Bubbles are required at intersections where each street extends in only 1 direction from the intersection. Bubbles are permitted between

intersections to improve accessibility to odd-shaped sites, or on minor collector streets where direct access is not permitted. The bubble radii for local residential streets are shown on [Figure 5.3-50](#). Radii for cul-de-sac bubbles for other street classifications are shown below in [Figure 5.3-51](#).

The use of bubbles (except for on a cul-de-sac) on other than local residential streets must be approved by the Transportation Department. Radii appropriate for these bubbles will be established as part of that approval.



The bubble radii shown on this figure are for local residential streets. Radii for cul-de-sac bubbles for other street classifications are shown on [Figure 5.3-50](#). The use of bubbles (except for a cul-de-sac) on other than local residential streets must be approved by the Transportation Department. Radii appropriate for these bubbles will be established as part of that approval.

**FIGURE 5.3-51 BUBBLES FOR STREETS**

## F. Alleys

Alleys are discouraged and are subject to Transportation Department approval; however, alleys may be required where other alleys exist or where the extension of an existing alley or alley system is necessary. Dead-end alleys will not be permitted.

### 1. Alley Widths

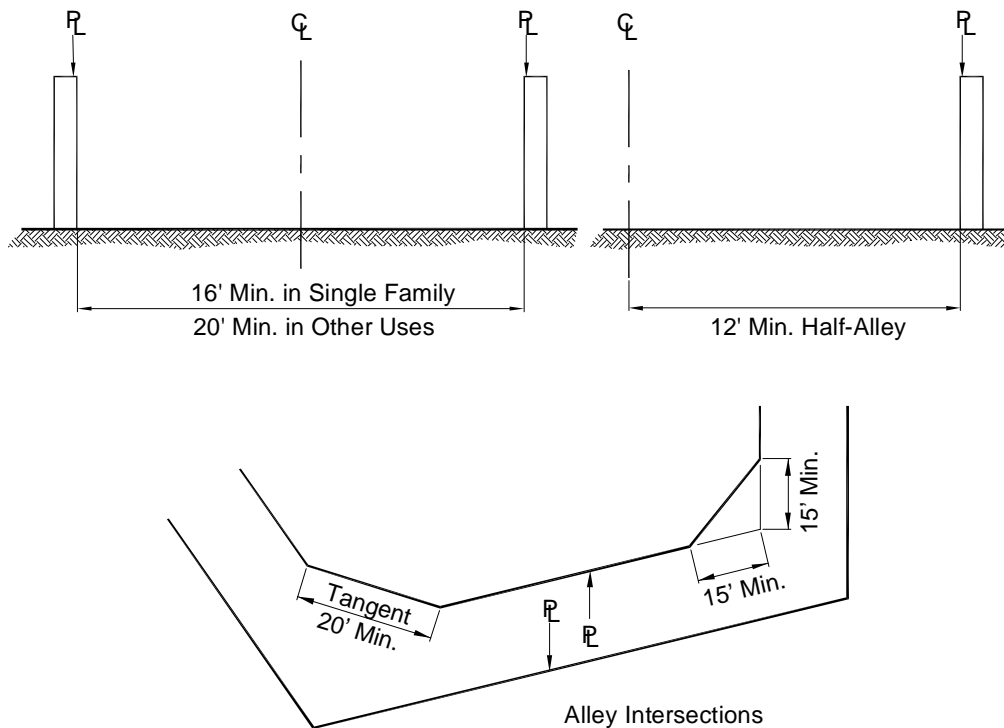
Residential alleys abutting single-family uses need to be 16 feet in width. For other abutting uses, the alley provision is 20 feet in width.

**2. Alley Intersections**

Alley intersections and sharp changes in alignment should be avoided. When intersections or alignment changes are allowed, the inside corners need to be cut off on each side to provide a tangent section between the two sides at least 20 feet long, as shown in Figure 5.3-52 below.

**3. Alley Paving**

All alleys are to be fully paved with at least 2.5 inches of asphaltic concrete over 6 inches of ABC.



**FIGURE 5.3-52 ALLEY WIDTHS AND INTERSECTIONS**

**G. Offset Intersections**

Street jogs with centerline offsets less than 250 feet are not permitted along arterial and major collector streets, or on minor collector and local commercial and industrial streets where interlocking left turns will occur. Offsets as small as 125 feet are allowed on local residential streets and on minor collector and local commercial and industrial streets where interlocking left turns will not occur.

**H. Intersecting Tangents**

A tangent section of roadway is desirable prior to an intersection on a curvilinear street. Minor street intersections with major streets need to have a minimum tangent outside the intersecting rights-of-way. See [Appendix 5-3A](#) and [Appendix 5-3B](#) for design criteria.

**SPECIAL STANDARDS**

A development may desire a special set of standards that differs from the city standards contained in this document. This request is typically made for master planned communities as part of their associated master circulation plan. In such a case, a qualified traffic engineer, registered in the State of Arizona, must prepare a preliminary and final traffic design report

and secure city approval of the reports before plans incorporating the special standards can be submitted for review and approval.

#### **A. Preliminary Design Report**

A preliminary design report needs to be submitted prior to or at the time of preliminary plat submittal. At a minimum, the preliminary report must address the following subjects:

- Vehicle Trip Generation
- Traffic Control Device Requirements
- Pedestrian, Bicycle and Equestrian Requirements
- Auxiliary and Additional Lane Requirements
- Special Features and their Influence
- ADA Access
- Design Speeds
- Roadway Classification
- Parking Requirements
- Transit Facility Requirements
- Pavement Design

Where possible the Preliminary Design Report should include a discussion of the elements required in the Final Design Report so that the city may comment and suggest changes prior to submission of the Final Design Report.

#### **B. Final Design Report**

A final design report needs to be submitted prior to or concurrently with the improvement plan submittal. The report must include a refinement of the preliminary design report and address the following subjects as a minimum:

- Horizontal and Vertical Alignment
- Intersection Location
- Traffic Control Devices
- Treatment of Special Features

#### **C. City Review and Approval of Special Standards**

The following factors will be considered by the city in its review of the report:

- Relationship of the proposed standards to national, state and city standards
- Similarity of the proposed standards to standards utilized in other communities
- Comparison of the proposed standards with alternatives
- Sensitivity of the proposed standards to safety, environmental and law enforcement concerns

## 5-3.1300

## ESL STREET STANDARDS

Streets that are constructed within the area designated as Environmentally Sensitive Lands (ESL) should be designed to minimize the impact on the adjacent topography and landscape. The following standards have been developed specifically for streets that are constructed within the ESL land areas and vary from design standards for the non-ESL streets that are contained in the previous sections of this document. Additional information is contained in [Appendix 5-3B](#) and [Section 2-2.100](#), Environmentally Sensitive Lands; [Figure 2.2-1](#) depicts the areas within the city where these criteria apply.

#### **A. Design Vehicle**

For ESL areas, the basic design vehicle for all non-arterial streets is the Single Unit Truck as defined by AASHTO.

**B. Horizontal Curves**

Tangent sections between horizontal curves (compound or reverse) are not required for local residential streets in the ESL areas.

**C. Street Grades**

Longitudinal street grades within the ESL areas may range from 0.4 percent to 12 percent. In general, the maximum street grade should be 5 percent for major collectors, 10 percent for minor collectors and 12 percent for local residential streets. In areas with steep slopes and no alternative access provisions, steeper grades may be approved as shown in Figure 5.3-53. Lengths of flatter grades should break up steeper grades in order to provide a recovery area for emergency and service vehicles. Steeper grades may be approved in areas where it can be shown they would be less disruptive to the surrounding area and emergency and service vehicle access can be maintained. The city will not approve exceptions for any federally-funded projects.

Street Classification	Maximum Grade
Major Collector	9%
Minor Collector	12%
Local Collector	12%
Local Residential	15%

Gradient	Maximum Grade Length
7 – 9%	1400 ft.
9 – 12%	700 ft.
12 – 15%	350 ft.

**FIGURE 5.3-53 STREET GRADES AND LENGTHS**

**D. Cross Slope**

Cross slope should not exceed 4 percent. In ESL areas it may be necessary to use roadway cross slope to control drainage. Shoulder slopes should match the pavement cross slope.

**E. Street Intersections**

Right-angle intersections, those that intersect at an angle of 90 degrees, are the most desirable. They provide the shortest crossing distance and the best driver sight distance. Intersection angles that diverge by five degrees or more from 90 degrees are not allowed on minor collector or higher classified streets without approval from the Transportation Department. Local streets may have an angle divergence up to 15 percent at street intersections. If an intersection occurs along a curve, the side street centerline must be radial (no divergence) to the curve of the through street.

The minimum intersection spacing along local collector and local residential streets should be a minimum distance of 165 feet.







# DESIGN SPECIFICATIONS FOR STANDARD URBAN AND SUBURBAN STREETS

Street Design Element*	Major Arterial	Minor Arterial & Couplet	Major Collector	Minor Collector	Local Collector	Local Residential	Local Commercial/Industrial
Full right-of-way width †	150	110	100	70	60	46	60
Type of Curb - <u>V</u> erticle, <u>R</u> olled †	V	V	V	V or R	R	R	V
Design speed (m.p.h.)	55 (45 m.p.h. posted)	45	45	35	30	20	20
Length of transition for 2% superelevation	320	210	210	135	150	150	150
Minimum radius of horizontal curve without superelevation	1800	1800	1100	650	450	200	200
Minimum radius of horizontal curve without superelevation <b>(Federally-funded projects)</b>	10,000	8000	8000	5000	3500	1600	1600
Minimum radius of horizontal curve with 2% superelevation	1350	1350	850	500	350	150	150
Minimum radius of horizontal curve with 2% superelevation <b>(Federally-funded projects)</b>	6500	5000	5000	3000	2500	1200	1200
Minimum length of tangent between reverse curves	300	300	250	200	150	100	100
Minimum length of tangent between curves in same direction	660	660	500	400	300	250	250
Minimum horizontal curve length	500	500	500	400	250	100	100
Stopping sight distance	500	500	365	250	200	125	125
Stopping sight distance <b>(Federally-funded projects)</b>	495	360	360	250	200	115	115
Passing sight distance	1990	1990	1650	1300	1100	800	800
Passing sight distance <b>(Federally-funded projects)</b>	1985	1625	1625	1280	1190	800	800
<b>S</b> Intersection sight distance on drivers left and right turns, left turns, and through traffic**	770	730	595	415	355	280	295
Min. tangent length approaching intersection (measured from edge of roadway)	300	300	250	200	150	100	100

\*Unit of measure in feet unless otherwise noted.

†These first four design elements may vary for modified cross section, such as the Urban Character streets, with approval from the Transportation Department.

‡Measured from back-of-curb to back-of-curb.

\*\*If high volumes of truck traffic are anticipated, sight distances given in [Appendix 5-3C](#) will be used.





# DESIGN SPECIFICATIONS FOR STANDARD RURAL / ESL STREETS

Street Design Element*	Major Arterial	Minor Arterial	Major Collector	Minor Collector	Local Collector	Local Residential
Full right-of-way width†	150	110	90	70	50	40
Type of Curb - <u>M</u> ountable, <u>R</u> olled, or <u>R</u> ibbon‡	M, Ro, or Ri	M, Ro, or Ri	M or Ro	Ro	Ro or Ri	Ro or Ri
Design speed (m.p.h.)	55 (45 m.p.h. posted)	45	45	35	30	20
Length of transition for 2% superelevation	320	210	210	135	150	150
Minimum radius of horizontal curve without superelevation	1800	1800	980	475	250	100
Minimum radius of horizontal curve without superelevation (Federally-funded projects)	10,000	8000	8000	5000	3500	1600
Minimum radius of horizontal curve with 2% superelevation	1350	1350	760	385	255	85
Minimum radius of horizontal curve with 2% superelevation (Federally-funded projects)	6500	5000	5000	3000	2500	1200
Minimum length of tangent between reverse curves	300	300	250	200	150	None
Minimum length of tangent between curves in same direction	660	660	500	400	300	None
Minimum horizontal curve length	500	500	500	400	250	100
Stopping sight distance	500	500	365	250	200	125
Stopping sight distance (Federally-funded projects)	495	360	360	250	200	115
Passing sight distance	1990	1990	1650	1300	1100	800
Passing sight distance (Federally-funded projects)	1985	1625	1625	1280	1190	800
<b>S</b> Intersection sight distance on drivers left and right turns, left turns, and through traffic**	770	730	595	415	335	280
Min. tangent length approaching intersection (measured from edge of roadway)	300	300	250	200	150	100

\*Unit of measure in feet unless otherwise noted.

†These first four design elements may vary for modified cross section, such as the Urban Character streets, with approval from the Transportation Department.

‡Measured from back-of-curb to back-of-curb.

\*\* If high volumes of truck traffic are anticipated, sight distances given in [Appendix 5-3C](#) will be used.





# INTERSECTION & DRIVEWAY SIGHT DISTANCE REQUIREMENTS

## Six Lane Roadway

Design Speed	Sight Distance (S)					
	Passenger Car (ft)		Single Unit Truck (ft)		Combination Truck (ft)	
	TH	LT	TH	LT	TH	LT
25	350	350	470	455	540	530
30	420	420	560	545	650	635
35	490	490	655	635	760	740
40	560	560	780	725	865	845
45	630	630	840	815	975	950
50	700	700	935	905	1080	1055
55	770	770	1030	995	1190	1160

## Three Lane Roadway

Design Speed	Sight Distance (S)					
	Passenger Car (ft)		Single Unit Truck (ft)		Combination Truck (ft)	
	TH	LT	TH	LT	TH	LT
25	260	295	340	375	415	450
30	310	355	410	450	495	540
35	360	415	475	525	580	630
40	415	470	545	600	660	720
45	465	530	610	675	745	810
50	515	590	680	750	825	900
55	570	650	745	825	910	990

## Four Lane Roadway

Design Speed	Sight Distance (S)					
	Passenger Car (ft)		Single Unit Truck (ft)		Combination Truck (ft)	
	TH	LT	TH	LT	TH	LT
25	315	335	415	430	490	500
30	375	400	500	515	590	600
35	440	465	585	600	685	700
40	500	530	665	685	785	800
45	565	565	750	770	880	900
50	625	665	835	855	980	1000
55	690	730	915	940	1075	1100

## Two Lane Roadway

Design Speed	Sight Distance (S)					
	Passenger Car (ft)		Single Unit Truck (ft)		Combination Truck (ft)	
	TH	LT	TH	LT	TH	LT
25	240	280	315	350	390	425
30	290	335	375	420	465	510
35	335	390	440	490	540	595
40	385	445	500	560	620	880
45	430	500	565	630	695	765
50	480	555	625	700	775	845
55	530	610	690	770	850	930

**Notes:**

- TH=Through Movement, LT = Turn Movement
- Design speed by roadway classification is shown in [Appendix 5-3A](#) and [Appendix 5-3B](#). Typically design speed is equal to the speed limit +10 mph.
- Refer to the 2004 AASHTO Geometric Design of Highways and Streets for additional information.



# TRAFFIC SIGNAL DESIGN

This section presents the process and criteria for preparing traffic signal plans for the city. It identifies traffic signal design criteria, plan content, and equipment requirements and specifications.





## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# TRAFFIC SIGNAL DESIGN

## GENERAL INFORMATION

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### A. Scottsdale Traffic Signal Policies

The following policies have been adopted by the City of Scottsdale (COS) City Council. Requests to deviate from these policies must be submitted in writing to the Scottsdale Traffic Engineering Division for consideration.

1. Install warranted traffic signals to maintain 1/2 mile signal spacing on expressways, parkways and major and minor arterials. Spacing must be consistent with the city's traffic control system plan.
2. Install warranted traffic signals to maintain 1/4 mile spacing on major collectors. Spacing must be consistent with the city's traffic control system plan.
3. Install warranted left-turn arrows based upon established City of Scottsdale criteria.
4. Require a complete traffic signal plan when a new traffic signal is to be constructed, or when an existing signal or any part of an existing signal is to be modified in any way.
5. Require any traffic signal construction, private or public, to be constructed by one certified IMSA Level II Signal Technician and one IMSA Level I Signal Technician.

### B. Reference Documents

The current version of the following publications, adopted by Arizona Department of Transportation (ADOT), is to be used in conjunction with the design criteria in this document.

- Manual on Uniform Traffic Control Devices For Streets and Highways - USDOT, FHWA
- Standard Specifications for Road and Bridge Construction and General Specifications for Traffic Signals and Highway Lighting - Construction Specifications, ADOT
- Traffic Signals and Lighting and Signing and Marking - Standard Drawings, ADOT
- Traffic Control Design Guidelines - ADOT
- Manual of Signs Approved for Use on State Highway System - ADOT
- Traffic Engineering Policies, Guide and Procedure Manual - ADOT
- Informational Guide for Roadway Lighting - AASHTO
- Guide to Standardized Highway Lighting Pole Hardware - AASHTO
- Uniform Standard Specifications for Public Works Construction - MAG
- Uniform Standard Details for Public Works Construction - MAG
- COS Supplement to MAG Uniform Standard Specifications for Public Works Construction
- COS Supplement to MAG Uniform Standard Details for Public Works Construction
- COS Traffic Signal Special Requirements

### C. Other References

- United States Access Board Revised Draft Guidelines for Accessible Public Rights-of-Way, [www.access-board.gov/prowac/draft.htm](http://www.access-board.gov/prowac/draft.htm)

- United States Access Board Interfacing Accessible Pedestrian Signals (APS) with Traffic Signal Control Equipment [www.access-board.gov/research/APS/report.htm#\\_Toc38768660](http://www.access-board.gov/research/APS/report.htm#_Toc38768660)
- NCHRP Accessible Pedestrian Signals: Synthesis and Guide to Best Practice, [www.walkinginfo.org/aps/pdf/APS-Synthesis.pdf](http://www.walkinginfo.org/aps/pdf/APS-Synthesis.pdf)
- walkinginfo.org: Pedestrian and Bicycle Information Center, [www.walkinginfo.org](http://www.walkinginfo.org)

#### D. Pre-Design Conference with Traffic Engineering Division

Prior to beginning traffic signal design, a pre-design conference may be requested by either Traffic Engineering or the design consultant.

#### E. Pre-Construction Conference with Traffic Signal Division

Prior to start of work, the contractor must contact City of Scottsdale Traffic Signals at 480-312-5635 to arrange a pre-construction conference.

## 5-4.100

### TRAFFIC SIGNAL DESIGN CRITERIA

Refer to [www.ScottsdaleAZ.gov/design/trafficsignalspecs](http://www.ScottsdaleAZ.gov/design/trafficsignalspecs).

All equipment and materials specified must be listed on the COS Qualified Products List (QPL) as shown in [Appendix 5-4B](#). Items not on the Scottsdale QPL must be submitted for approval to Traffic Operations Division, 30 working days prior to signal construction, for information call 480-312-5620.

Scottsdale Intelligent Transportation Systems (ITS) designs are not listed in guidelines. However, reference to ITS special provisions, plans or details may be called out on the signal plans for coordination requirements. To obtain ITS details and special provisions, the applicant must submit a separate plan and special provisions document to the Scottsdale Traffic Engineering Department, Traffic Management Center. For information call 480-312-7777.

## 5-4.101

### SPECIFICATIONS/PROVISIONS

The COS “Boiler Plate” construction specifications need to be used. Traffic Engineering and/or the designer will determine the need for project-specific construction special provisions. Notes may be added to the construction plans if the designer feels that it is necessary to deviate from these listed requirements.

## 5-4.102

### SIGNAL STRUCTURES

1. Poles and foundations need to adhere to ADOT’s Traffic Signals and Lighting– Standard Drawings, ADOT Standard Specifications for Road and Bridge Construction and must meet the COS QPL.
2. A sufficient pedestrian landing meeting the MAG Supplement and Americans with Disabilities Act (ADA) requirements must be provided. See [Section 5-4.104](#) for details.
3. The preferred configuration of poles is one pole per corner, located at the center of the curb return, at the back edge of the sidewalk. Situations requiring multiple poles per corner or poles (traffic signal or pedestrian) within medians should be discussed with Traffic Engineering.
4. Traffic signal installations along the east and west couplet require trombone style poles and mast arms.
5. Combination poles, bracket arms, mast arms, bases and foundation entrance conduit need to be included on the traffic signal plan.

**SIGNALS**

1. All design elements must comply with Manual on Uniform Traffic Control Devices (MUTCD) standards unless directed otherwise by Traffic Engineering.
2. Twelve-inch signal faces are required for all through indications and for all left-turn indications. Eight-inch signal faces shall not be used. Refer to [Figure 5.4-1](#).
3. Typically, a minimum of 4 heads is required for control of a through movement (2 overhead mount and 2, side-mounts – left and right). Typically, a minimum of 2 heads is required for control of other movements. The overhead indications need to be centered on the lane lines to increase sight distance.
4. Typically, a minimum of 2 heads is required to control a left-turn movement. One head shall be overhead-mounted on the mast arm containing the heads that control the corresponding through movement (or median mounted if the median width is greater than 6 feet) and the other head shall be side-mounted or pole-mounted on the far-side left corner facing the corresponding through movement.
5. One mast-arm mounted signal head is required for freeway off-ramp terminals.
6. All indications shall be wide-angle LED type lamps and meet ITE specifications for LED traffic signal indications. All pedestrian indications shall also be LED type lamps. LEDs shall be model 430-1315 or approved equivalent.

**Wattage is as follows:**

12-inch red ball = 15 watts	12-inch yellow ball = 15 watts	12-inch green ball = 11 watts
12-inch red arrow = 9 watts	12-inch yellow arrow = 9 watts	12-inch green arrow = 11 watts
16-inch pedestrian man/hand signal module = 11 watts		

Questions regarding indication type should be directed to COS Traffic Operations Division at 480-312-5620.

7. Fiber optic indications shall not be used unless directed otherwise by Traffic Engineering. All ITS elements, existing or new, will require a meeting with Traffic Engineering to discuss design requirements and special provisions.
8. Either aluminum or polycarbonate signal heads may be used with glass lenses only.
9. Heads and mounting brackets shall be black.
10. Back plates and tunnel visors shall be installed on all signal faces and need to be black.
11. Base-mount mounting height of 4 and 5 section heads should be adjusted to avoid conflict with mast arm. The aiming of the head cannot conflict with the mast arm or mast arm connection. These side-mount heads should be mounted on the backside of the pole, at a 45-degree angle and at a height of 115 inches.
12. A maximum of 3 heads may be installed on a mast arm that is 40 feet in length or less. A maximum of 4 heads may be installed on a mast arm that is 45 feet in length or longer. (A mast arm that is 40 feet in length or less needs to include a minimum of three tenons. A mast arm that is 45 feet in length or greater needs to include a minimum of four tenons.) All mast arms tenons shall be installed at 12 foot intervals, with the outboard (left) tenon at 14 feet from the first inboard tenon.
13. Traffic Engineering must approve the use and placement of right-turn arrow heads. Right-turn heads shall be 4-section “G” heads.
14. ADOT type eleven (XI) mounting hardware will not be used in Scottsdale signal designs, see [Figure 5.4-2](#). Modified 4-section “G” heads shall be used instead of 5-section “Q” heads for all locations where permitted/protected left turn phasing is designed, see [Figure 5.4-1](#).

- All hardware shall be mounted on pole "backside at 45 degrees" or per COS Traffic Signal Inspector requirements.

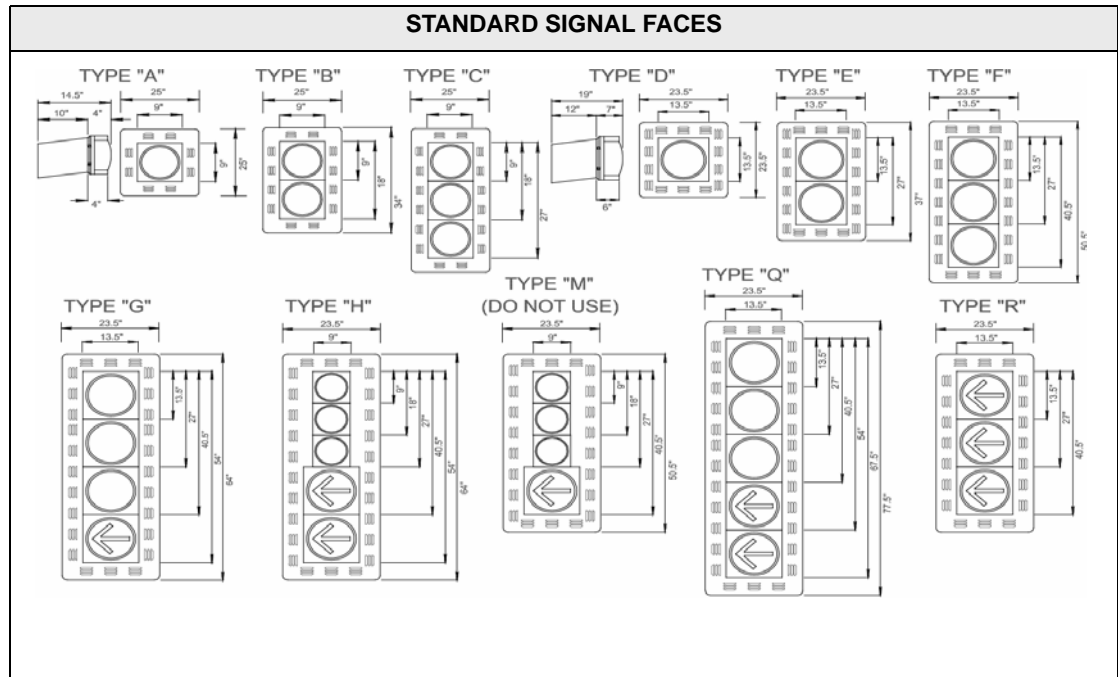


FIGURE 5.4-1 STANDARD SIGNAL FACES

MOUNTING ASSEMBLIES					
Type	Plan Symbol	Ref.	Type	Plan Symbol	Ref.
I II		ADOT T.S. 9-1	VII		Traffic Signal
					Pedestrian Signal
III		ADOT T.S. 9-2	VIII		Traffic Signal
IV		ADOT T.S. 9-2			Pedestrian Signal
V		ADOT T.S. 9-3	X		Traffic Signal
					Pedestrian Signal
VI		ADOT T.S. 9-4	XI		Traffic Signal
					Pedestrian Signal
			do not use		Illum. Message
					Type VI Control Cab

FIGURE 5.4-2 MOUNTING ASSEMBLIES PLAN SYMBOLS

### PEDESTRIAN SIGNALS

5-4.104

1. Pedestrian signals should be installed at ALL intersections unless directed otherwise by the Traffic Engineering Division.
2. Pedestrian push buttons should be installed for ALL directions unless directed otherwise by the Traffic Engineering Division.
3. Pedestrian push buttons shall meet ADA requirements.
  - Provide a concrete slab immediately adjacent to the pole and directly under the pedestrian signal button, where sidewalk is present.
  - The slab shall have no more than a 2% slope in any direction.
  - Mount pedestrian signal button at 42" to center of button.
  - Pedestrian signal buttons shall meet the ADA Requirements with 2" buttons.
4. Use the ADOT pedestrian push-button post when necessary in accordance with the MUTCD. Follow the same guidelines as above.
5. Pedestrian signals must be 16-inch LED "Man/Hand" indication and have bottom hinges.
6. The required pedestrian push button placard design, as shown below in Figure 5.4-3, needs to be included in the design. Contact Traffic Operations Division at 480-312-5620 for details.



FIGURE 5.4-3 PEDESTRIAN PUSH BUTTON PLACARD

### 5-4.105

## CONTROLLER

1. The Controller shall be a 170E system unless otherwise directed by the Traffic Engineering Division.
2. The Controller input rack needs to be wired as shown in the MAG Supplement, COS Standard Detail 2140.

### 5-4.106

## CONTROLLER CABINET

The controller cabinet must be model 330 with extender base and access panel, unless otherwise directed by the Traffic Engineering Division. Intersections with ITS cameras may require an additional communications cabinet or a combined 332 cabinet. Traffic Engineering Division must review and approve all cabinets prior to installation.

Typically, the cabinet shall be located on the same corner as the power cabinet, usually on the corner closest to the power source as specified by the power provider. To the extent possible, the cabinet should be shielded and protected from the threat of errant vehicles. The cabinet should be positioned to allow a technician working within the cabinet a clear view of the intersection under control.

The cabinet foundation dimensions need to be 30 inch x 30 inch, project 6 to 8 inches above the adjacent (ultimate) ground elevation and extend 32 to 36 inches below the adjacent (ultimate) ground elevation. See COS Standard Detail 2139 for Traffic Signal Controller Cabinet Base Extender. A Tech Pad needs to be installed in front of the cabinet with the dimensions of 30 inch x 36 inch x 4 inch. Installation of an 8 feet x 5/8 inch copper ground rod shall be installed in the cabinet using 1 inch PVC conduit.

### A. Electric Service Cabinet

1. The electric service cabinet shall be MEYERS model MEUG16-100TB (dual) or approved equivalent unless otherwise directed by the Traffic Engineering Division. The electric service cabinet must include the following: lightning arrest (ground rod), photocell receptacle rated for 20 amps or more, sub-breakers and test/auto switch. Photo cell shall be oriented in the North direction.
2. Install a #7 pull box adjacent to the electric service cabinet. Also, install a power run from the pull box to the cabinet. Power run design shall be per utility company requirements.
3. When the power source is an overhead power drop, use a 2-inch galvanized conduit above ground and through the first underground sweep. Power run design shall be per utility company requirements.
4. The cabinet foundation should have dimensions of 30 inch x 30 inch and project 6 to 8 inches above the adjacent (ultimate) ground elevation. Extend the cabinet foundation 32



to 36 inches below the adjacent (ultimate) ground elevation. Install a tech pad in front of the cabinet with dimensions of 30 inch x 36 inch x 4 inch. Locate the service cabinet no closer than 10 feet from the traffic signal control cabinet (edge-to-edge).

5. Mount a permanently affixed metal address tag on the front side of the electrical service cabinet with 3" lettering that faces the road.

## **B. Loop Detectors**

1. All loop detectors shall be wire-in-duct type wire. (Orange Jacketed Detect-a-Duct or approved equivalent, #14 stranded inside a ¼ inch PVC tubing and must meet IMSA 51-5.)
2. Center all loop detectors in the middle of the applicable traffic lane. Loops must be sufficiently dimensioned on the plans. Extend loop detectors 5 feet into the crosswalk unless directed otherwise by the Traffic Engineering Division.
3. Use a rectangular loop with 3 turns (6 feet x 40 feet) for all through lanes.
4. Use a quadrapole loop with 2 outside turns and 4 inside turns (6 feet x 40 feet) in all exclusive left-turn lanes. (Wire in middle cut shall run the same direction.)
5. Do not install loop detectors in exclusive right-turn lanes unless directed by the Traffic Engineering Division.
6. Locate permanent count detector loops only as specified by the Traffic Engineering Division. Count detector loops shall consist of a minimum 4 turns (6 feet x 6 feet).
7. Pre-formed loop detectors (conforming to the latest ADOT specification) shall be used under decorative pavement, pavers, concrete or other special roadway surfaces or as directed by the Traffic Engineering Division. Do not splice lead-in cable between the loop and the cabinet.
8. The lead-in cable between the loop wire and controller shall meet IMSA 50-2, 14 AWG specification or approved equivalent. Lead-in shall be continuous back to controller.
9. Twist loop lead-in and splices in pull box a minimum 8-10 turns per foot and solder. Use only Griggs Loop Detector Sealant, 3-M Loop Sealant or approved equivalent.
10. Install loops prior to installing the final pavement lift (if part of a paving project).
11. Prior to city acceptance, the contractor must inspect and test loops, per ADOT test requirements, in the presence of the Traffic Inspector.
12. Contractor is responsible for layout of all loop detectors.

## **C. Conductors**

1. IMSA 19-1 stranded cable shall be used for all signal and pedestrian conductors. Two cables shall be installed in all street crossings and in the cabinet home run. Pole/mast arm runs require seven conductor and four conductor cables. Install the 7 conductor cables on the outboard mast arm mounted head and all side mount heads.
2. Signal conductor grounding wire shall be #8 green stranded for all main runs.
3. Belden 9418 or approved equivalent cable shall be used between telephone drop point and the controller.  
IMSA 50-2 or approved equivalent shall be used between detector- loop pull box and the controller shall be continuous back to control cabinet.
4. Opticom model 138 detector cable shall be used for emergency vehicle pre-emption. Do not splice 138 detector wire between pole connection and cabinet termination.
5. Re-pull completely with new wire and remove old wire if any existing conduit run is disturbed. The use of wire pulling lubricant is required in all conduits. Install pull strap in every conduit run.
6. Do not splice wires except in pull boxes. Twist wire splices prior to installing wire nuts. Dip all splices in 3M Scotch Kote or approved equivalent, a minimum of two times to eliminate any air bubbles. Fill 100% completely with sealer any wire nut. Solder all pull box loop

detector connections. Twist loop wire to first pull box a minimum of 8-10 turns per foot prior to soldering to lead-in cable.

7. All conductors shall run continuous from the signal indication to the pull box. Do not splice conductors and do not loop conductors through the side mount termination block.
8. Where cables loop through pullboxes, they shall be marked with white tape to designate cable or cable two or appropriate phasing tape for other conductors. Conductors and cables have a minimum of 36 inches of slack in all pullboxes.
9. All future conduits and mast arm tenons shall have a pull strap installed and be capped with a 2" cap to prevent contaminants from entering the mast arm.
10. The contractor shall use split bolt or #11 crimp for all neutral conductors in pull boxes.

#### **D. Conduits**

1. All conduits except telephone drops shall be 2 ½-inch with 2 conduits installed for all street crossings and pole runs. Conduit for telephone drops and loop stubouts shall be 2-inch; 2 additional 4 inch conduits or one 6-inch conduit are now required in pole foundations to later incorporate the installation of Cell Tower conductors if approved by Traffic Engineering and Traffic Operations Division for installation.
2. Use galvanized conduit for exposed, above-ground runs through the first sweep below grade.
3. Place red warning tape in all conduit trenches, 12 inches below final grade, witnessed by the city's traffic signal inspector.
4. Use Schedule 40 PVC, except for service runs above ground.
5. Avoid installing conduit in the medians, unless otherwise directed by Traffic Engineering.
6. Install loop stubout conduit for all approaches regardless of the requirement for loops. Loop stubout conduit shall be 2-inch.
7. Traffic signal conduit sweep radius shall be a minimum of 12 inch and ITS conduit sweep radius shall be 36 inch minimum.

#### **E. Pull Boxes**

1. All pull boxes shall be fiber composite type and shall include minimum 8 inch extension on main pull box. All pull boxes require sump #57 rock, per ADOT standards.
2. Size all boxes in accordance with ADOT sized # 7 or ADOT sized # 5 as called for on the prints or as specified by the Traffic Signal Inspector. As a general rule, #5 boxes are to be used only for communication and end runs. All pull boxes shall be sized # 7, the main pull box shall be size #7 with minimum 8 inch extension.
3. Do not place pull boxes in traveled roadways. Conduit must be extended where necessary to relocate pull box to a non-traveled area. However, if the conduit cannot maintain a straight route, install a new conduit run.
4. When possible, locate pull boxes adjacent to sidewalks rather than in the sidewalk.
5. Communication and all other low-voltage cable shall be pulled continuously from service point back to controller cabinet, with no breaks or splices.
6. Mark all traffic signal pull boxes "Traffic Signal" on the lid.
7. Use pull boxes at all corners.

#### **F. Lighting**

Luminaries shall be provided on all signal poles unless there is a utility conflict or unless directed otherwise by the Traffic Engineering Division. Luminaire wire connections will only be made in pull boxes and not brought into the signal controller cabinet. All street lights will be

connected in the junction box with a 10 Amp in line fuse holder (non-locking type), see QLP for specifications.

### G. Emergency Vehicle Pre-Emption

1. Emergency vehicle pre-emption shall be used for all directions and at all locations, unless otherwise directed by the Traffic Engineering Division. Additional sensors may be necessary if approaches are offset or vision is obstructed. All receivers shall be 3-M model 721, dual sensor detectors.
2. Opticom model 138 detector cable shall be used for emergency vehicle pre-emption. Do not splice 138 detector wire between pole connection and cabinet termination.
3. Tape and color-code all Opticom detector cables.
4. Phase selector shall be 3-M Model 752.

### H. Phasing Standard

1. The Traffic Engineering Division will determine all intersection phasing. Left-turn phasing will operate as lag-left unless otherwise directed by Traffic Engineering. Typical phasing standards are shown in [Appendix 5-4A](#).
2. Corresponding permitted/protected left-turn phasing shall be wired together in the cabinet and operate simultaneously to avoid the left-turn trap.
3. The signal controller must be wired by an IMSA Level 2 certified signal electrician.

### I. Electrical Power

1. Contact the applicable power provider to determine source for traffic signal power and to coordinate applicable requirements.
2. Show the electrical service address on the signal plan. The address may be obtained from the COS (One Stop Shop) Records Department, 480-312-2500.
3. The contractor must obtain an electrical service permit (No Fee) from the COS One Stop Shop, [www.ScottsdaleAZ.gov/bldgresources/counterresources](http://www.ScottsdaleAZ.gov/bldgresources/counterresources).

### J. Traffic Signal System (Communications)

1. Interconnect all traffic signals to the COS Traffic Signal System by means of a 4-wire, conditioned telephone landline, unless directed otherwise by the Traffic Engineering Division. Contact Traffic Engineering Division at 480-312-2358 for circuit number and other applicable information.
2. Contact the applicable communications provider to determine location for telephone drop and to coordinate applicable requirements.
3. Install a separate 2-inch conduit from the point of phone service (phone drop) to the nearest pull box. Belden 9418 or approved equivalent, shall be used for the telephone run.
4. Show the telephone service address on the signal plan. The address may be obtained from the communications provider or from COS Records Office.

### K. Signing

All regulatory, warning and route marker signs shall be provided with the traffic signal installation and shall be in accordance with the Manual on Uniform Traffic Control Devices. Metro street name signs or LED lighted signs (see [Section 5-5.000](#)), as required, shall be installed on signal poles per COS standards. See COS Standard Detail 2134-3, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp). All wiring for LED signs shall be marked with brown tape.

**L. Striping**

All necessary striping shall be provided with the traffic signal installation and shall be in accordance with the Manual on Uniform Traffic Control Devices. Crosswalks shall be installed prior to the intersection being energized. See [Section 5-5.000](#), Signs and Markings for details.

**M. Removal and Salvage**

1. Keep all existing traffic signal equipment and streetlights in operation until new installations are operational.
2. Remove foundations to at least 36 inches below grade or as directed by the COS inspector.
3. Keep all traffic signal approaches that have vehicle detection in operation during construction. Construction staging to avoid existing detectors or the installation of temporary detectors will be required to maintain detection during construction.
4. In most cases, the Traffic Engineering Division will require temporary detection to be installed in intersections that are being reconstructed, if normal detection cannot be restored in a timely manner.
5. Keep existing Telco in operation during construction.

**5-4.200****CONSTRUCTION PLAN SUBMITTALS**

Traffic signal plans shall be submitted to the One Stop Shop and must comply with all requirements of this manual. Two sets of Mylar signal plans are required to receive final project approval. One set will be approved and returned to the submitter; one set will be forwarded to the Traffic Engineering Division.


A final signal plan shall be submitted in Microstation format, Ver. 8 and must be submitted to the Traffic Engineering Division no later than 10 working days after final approval. All intersections shall be as-built by the designer no later than 15 working days after the signal is turned on and submitted to Traffic Engineering Division in the same Microstation format. Any changes reflected on the plans shall be X'd out and new locations shown in bold.

**5-4.300****TRAFFIC SIGNAL PLAN CONTENTS****5-4.301****PLAN CONTENT**

Traffic signal plans shall be developed in accordance with the requirements of [Section 1-2.100](#), and conform to ADOT standard practices. As a general guide, the traffic signal plan layout shall be drawn at **1 inch = 20 feet scale**, and shall include the following items:

1. Locate and identify ALL existing and/or proposed improvements, above and below ground, within 200 feet of the intersection. INCLUDE ALL UTILITIES.
2. Locate and identify ALL existing and/or proposed pavement marking and signing, include turn-arrows for exclusive turn lanes.
3. Locate existing vegetation (trees, etc.), which could be in conflict with any proposed equipment locations or impact required signal visibility distances.
4. Provide a profile layout when vertical roadway alignment may impact traffic signal visibility requirements. (1 inch = 40 inches-scale for profile is acceptable.)
5. Provide bearings for each leg of the intersection when deflection is greater than 2 degrees. Provide roadway curve data if applicable.
6. Locate all traffic signal equipment (poles, controller cabinet, electric service cabinet and telephone drop, etc.) by station and offset dimension.

7. All traffic signal poles, conduits and equipment must be located within public rights-of-way or easement.
8. Controller and cabinet must be type 170ATC/HC11 system with type 330 cabinet, with extension base and access panel.
9. Electric service cabinet shall be MYERS, MEUG16-100TB (dual) or approved equivalent. UPS, if specified, shall be Tesco model 1400XL battery backup system with ambient temperature enclosure anodized aluminum.
10. Designer shall coordinate the location of electric service with SRP or APS and provide detail on the plan with appropriate notes.
11. Provide address for electric service cabinet, available through COS Records Department.
12. Locate telephone drop and run conduit with communication cable back to signal controller. Provide address for telephone service, available through COS Records Department.
13. Provide emergency vehicle signal pre-emption, using 3M Opticom optical detectors model 721 and model 138 detector cable or approved equivalent.
14. Provide phasing diagram for initial signal operation and ultimate 8-phase operation, unless directed otherwise by the Traffic Engineering Division. See [Figure 5.4-4](#) for layout.
15. Provide conductor schedule indicating conduit run number, conduit size, wire type/size, phase and any other pertinent information.
16. Details of any items not covered by standards.
17. All Q or R pole foundations shall have two 2-½ inch PVC conduits leading to adjacent pull box, and two 4 inch or one 6 inch conduit stubbed out of the foundation for future cell tower installation. All A, E and F foundations shall have one 2-½ inch PVC conduit. Verify with Traffic Engineering at 480-312-7641 before designing foundation conduits.
18. All plans must include a signal system number on the plan set. Contact 480-312-7777 to acquire the signal system number.
19. All plans must include the Traffic Signal Approval Block, as shown in [Figure 5.4-4](#).

Date	Revision			By	
Project Title					
Review By		Designed By		Drawn By	
Date	As-Built Date	Bid No.	Scale	Sheet OF	
Engineers Stamp		 <p style="text-align: center;"><b>TRANSPORTATION DEPARTMENT TRAFFIC ENGINEERING</b> 7447 E Indian School Road Scottsdale, AZ 85251</p>			
<b>TRAFFIC SIGNAL APPROVAL BLOCK</b>					
Engineering Coordination Manager (or designee)		Engineering Review		Traffic Engineering Director (or designee)	

**FIGURE 5.4-4 TRAFFIC SIGNAL APPROVAL BLOCK**

## 5-4.302

**GENERAL NOTES**

All traffic signal equipment and all construction in public rights-of-way or in easements granted for public use shall conform to:

- The Arizona Department of Transportation (ADOT) standard drawings and specifications,
- The Maricopa Association of Governments (MAG) Uniform Standard Specifications and Details for Public Works Construction,
- The COS Supplement to MAG Standard Specifications and Details for Public Works Construction, and
- The COS Traffic Signal requirements

Include the following General Notes ([Figure 5.4-5](#)) on all COS Traffic Signal Construction Plans. Also see [Section 1-2.100](#), for additional notes that may also be required.



<b>GENERAL CONSTRUCTION NOTES</b>	
1.	Traffic control shall conform to the City of Phoenix Traffic Barricade Manual and/or as directed by the city Public Works Inspector.
2.	Utility locations shown are based upon the best available information. The Contractor shall contact Blue Stake at 602-263-1100 before construction and verify actual utility locations.
3.	Traffic signal poles, mast arms and service cabinets shall be painted with 2 coats of white enamel paint meeting ADOT Specification Section #1002.
4.	All pull boxes shall be ADOT standard type #7 as previously noted. The main pull box shall be an ADOT #7Ext., with 18 inch drainage, consisting of #57 rock, per ADOT spec.
5.	A ground rod shall be installed within the customer side of the electrical service panel and in the control cabinet foundation and a #4 bare grounding conductor attached.
6.	Pavement replacement shall conform to COS Standard Detail 2200 and 2001. Sidewalk replacement shall conform to MAG Standard Detail 230.
7.	Metro Street Name Signs shall be installed on traffic signal mast arms per COS Supplement to MAG Specifications, Section 402.3.4 and COS Standard Detail 2134-3.
8.	Applicable signal and pedestrian indications shall be wide angle LED type lamps that meet ITE specifications for LED traffic signal indications in accordance with the COS Design Standards and Policies Manual.
9.	Emergency Vehicle Pre-Emption shall be field-adjusted to optimize reception. All detectors shall be model 721 only.
10.	All existing traffic control devices (including traffic detectors, Telco and stop signs) and street lights shall remain in operation until new installations are energized and operational. Any traffic detectors disturbed during construction shall be replaced with temporary detectors until the final detection system is in place and operational. Any removed COS equipment shall be salvaged and returned to the COS Traffic Signal Shop at 9191 E. San Salvador (Scottsdale). All salvaged equipment shall be dismantled.
11.	Questions concerning traffic signal design should be directed to the "Signal Designer, Address, Phone Number."
12.	The electrical service address is: XXXXXXXXXXXX.
13.	The Telephone drop address is: XXXXXXXXXXXX.
14.	At START of construction the contractor shall contact the COS Traffic Operations Division at 480-312-5620 to coordinate power authorization, cabinet set-up, inspection requirements and the pre-construction meeting. COS Traffic Signals shall be called 48 hours prior to all inspection points, as called for in the traffic signals special requirements as found in <a href="http://www.ScottsdaleAZ.gov/design/">www.ScottsdaleAZ.gov/design/</a> .
15.	At START of construction the contractor shall contact the electric power provider to confirm power location and to schedule inspection.
16.	At START of construction the contractor shall contact the telephone service provider to confirm telephone drop location and to schedule inspection.
17.	The controller input rack shall be wired as shown in COS Standard Detail 2140.
18.	All wires shall be color coded with tape as shown in COS Standard Detail 2141.
19.	All signal foundations shall be flat, not dished or blocked/out. Foundations shall be no lower than back of sidewalk and/or 6-½ inch above the edge of the road and shall not be grouted.
20.	All traffic signal poles, new, borrowed or existing, shall be brought to "like new" condition, including unused holes welded, pole painted, wire upgraded to IMSA cable.

**FIGURE 5.4-5 GENERAL CONSTRUCTION NOTES BLOCK**



5-4.303

**VEHICLE DETECTION DURING CONSTRUCTION**

For all construction projects in the City of Scottsdale with duration of 15 days or more, temporary vehicle detection will be required for all approaches at signalized intersections that currently have loop detection which will be disturbed by the construction. In addition, traffic signal communications (telephone or other) to the central signal computer and CCTV (if present) shall be maintained continuously during the course of the project. The contractor or sub-contractor through the life of the project shall maintain the detection zones and communications by ensuring full functionality 24 hours a day, 7 days a week.

The contractor shall be responsible for the ongoing operation of the detection equipment, which may require redeployment of detection zones as traffic barricading and lane use changes require. For more detailed information and specific requirements for all projects that meet this requirement, please see [www.ScottsdaleAZ.gov/design/trafficsignalspecs](http://www.ScottsdaleAZ.gov/design/trafficsignalspecs).

5-4.400

**STANDARD TRAFFIC SIGNAL CIRCUITRY**

**A. Phase Color Coding**

Each signal phase wire shall be coded with colored tape in the pull box as shown in COS Standard Detail No. 2141 and Figure 5.4-6 below through [Figure 5.4-8](#).

20 CONDUCTOR IMSA CABLE				
Cable #1	Cable #2	Conductor Cable		Signal Interval
		Basic Color	Tracer Stripe	
Phase 1	Ph 5 OR Overlap A	Red	Solid	Red
		Orange	Solid	Yellow
		Green	Solid	Green
Phase 2	Ph 6 OR Overlap B	Red	Black	Red
		Orange	Black	Yellow
		Green	Black	Green
Phase 3	Ph 7 OR Overlap C	Red	White	Red
		Blue	White	Yellow
		Green	White	Green
Phase 4	Ph 8 OR Overlap D	Red	Green	Red
		Orange	Red	Yellow
		Blue	Red	Green
Phase 1 or 2 PED*	Ph 5 Or 6 PED*	Blue	Solid	Walk
		Black	Solid	Don't Walk
Phase 1 or 2 PB*	Ph 5 Or 6 PB*	White	Red	Push Button
Ph 3 Or 4 PED*	Ph 7 Or 8 PED*	Blue	Black	Walk
		Black	White	Don't Walk
Ph 3 Or 4 PB*	Ph 7 Or 8 PB*	Black	Red	Push Button
All Phases	All Phases	White	Solid	P.B. Common
		Blue	Black	Spare

Cable #1 Shall Be Marked With An Individual Wrap Of White Tape. Cable #2 Shall Be Marked With Two Individual Wraps Of White Tape, Side By Side With A 1/2" Gap Between Wraps. Cables Shall Have 12" Of Black Insulation Jacket Extending Past Conduit Bell End. Individual Conductors In The Cable Shall Be Tagged As To Assigned Phase.

\* Refer To Engineering Timing Sheet To Determine PED Phases as 2, 4 or 1, 3, 5, 7 or 2, 4, 6, 8. All Wire Groups In Pull Boxes Must Be Tape Coded Per Scottsdale Directional Tape Color Code.

**FIGURE 5.4-6 IMSA CABLE 19-1, #14 AWG (STRANDED) 20 CONDUCTOR**

4 CONDUCTOR & 7 CONDUCTOR IMSA CABLE (STRANDED)			
<b>SIGNAL HEADS FOR 5 SECTION HEAD FUTURE OR INITIAL</b>		<b>SIGNAL HEADS INBOARD &amp; SIDE MOUNT</b>	
<b>7 Conductor Cable</b>		<b>4 Conductor Cable</b>	
Basic Color	Signal Interval	Basic Color	Signal Interval
Red	Red	Red	Red
Black	Yellow	Black	Yellow
Green	Green	Green	Green
Orange	Yellow Arrow	White	Veh. Common
Blue	Green Arrow		
White	Veh. Com		
White	Veh. Com		
<b>PEDESTRIAN HEADS</b>		<b>PUSH BUTTON</b>	
<b>4 Conductor Cable</b>		<b>4 Conductor Cable</b>	
Basic Color	Signal Interval	Basic Color	Push Button Station
Red	Don't Walk	Red	Push Button
Green	Walk	White	P.B. Common
White	Ped. Com.	Green	Spare
Black	Spare	Black	Spare
Cables Shall Be Tagged As To Assigned Phase, Per Scottsdale Directional Tape Color Code. Cable Shall Be Pulled To All Tenons On M/A. Any Unused Tenons Shall be Capped. Cables Shall Extend 18" Into Signal Head With 8" Of Black Insulation Jacket. Cables Shall Have 12" of Black Insulation Jacket Extending Past Conduit Bell End. Cables Shall Be Identified In Pull Boxes By Individual Wraps Of Colored Tape, Incrementing By One, Starting With Inboard Side Mount As #1.			

**FIGURE 5.4-7 IMSA CABLE 19-1, #14 AWG (STRANDED)  
4 & 7 CONDUCTOR (STRANDED)**

<b>THROUGHS</b>	<b>PEDESTRIAN CROSSINGS</b>
NB = Red EB = Green	SB = Yellow WB = Blue
Left Turn = Color + White Right Turn = Color + Black  <b>Example:</b> WBLT = Blue + White	Pedestrian Heads = Color + Purple <b>Examples:</b> NB = Red + Purple EB = Green + Purple
<b>PEDESTRIAN PUSH BUTTONS</b>	<b>OVERLAPS</b>
Color + Orange	Color + Brown

Telco is marked orange. All Tape Shall be 3M Scotch 35 Model or Super 33.

**FIGURE 5.4-8 DIRECTIONAL TAPE COLOR CODE**

**5-4.500****GENERAL REQUIREMENTS & SPECIFICATIONS**

All traffic signals and lighting equipment, in addition to meeting the requirements of this specification, shall conform to the current version of the following documents:

- Standard Specifications for Road and Bridge Construction - ADOT
- Traffic Signals and Lighting, Standard Drawings - ADOT
- Traffic Signal Control Equipment Specifications - CALTRANS
- Wire and Cable Specifications - International Municipal Signal Association
- Traffic Control Systems, Standards Publications – Nat. Electrical Manufacturers Assoc.
- Manual on Uniform Traffic Control Devices - USDOT/FHWA
- Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals - American Assoc. of State Highway and Transportation Officials
- COS Traffic Signal Special Requirements.

**5-4.501****LIGHTING SPECIFICATIONS**

Intersection lighting shall be: 120 volt, 250 watt, two door, 90-degree cutoff with filter, GE model M 250 or ITT model 25-5232DJ or approved equivalent per specifications. Luminaires shall include one solid-state photocell ALR model 2172 NP3 or approved equivalent for each luminaire. All wire to the installation shall be THHN/THWN or approved equal.

**5-4.502****ELECTRIC SERVICE CABINET**

Use approved alternate with lighting arrest installed. Photocell receptacle should be rated for 20 amps. Install Grounding Rod within the customer side of the electric service cabinet.

**5-4.600****TRAFFIC SIGNAL STRUCTURES****A. Qualified Products List (QPL)**

A Qualified Products List has been established for Scottsdale traffic signal structures, see [Appendix 5-4B](#). Qualified product contractors are not required to submit documentation for review by the city. Bids submitted without product documentation will be deemed non-responsive and WILL NOT BE OPENED.

All contractors submitting bids for traffic structures not on the QPL must provide documentation for city review in advance of their bid submittal. Submit the following for city's review:

1. Traffic signal structure drawings and specifications.
2. Traffic signal structure load calculations, signed and sealed by an engineer registered in the State of Arizona (based on the maximum city loading).
3. Documentation of all deviations from ADOT specifications.
4. A letter signed and stamped by a State of Arizona registered, professional engineer stating that the signal structure will safely support the maximum loading as described by the city.
5. Recommended foundation designs and specifications for all traffic signal structures, except the ADOT/Scottsdale traffic signal structures.

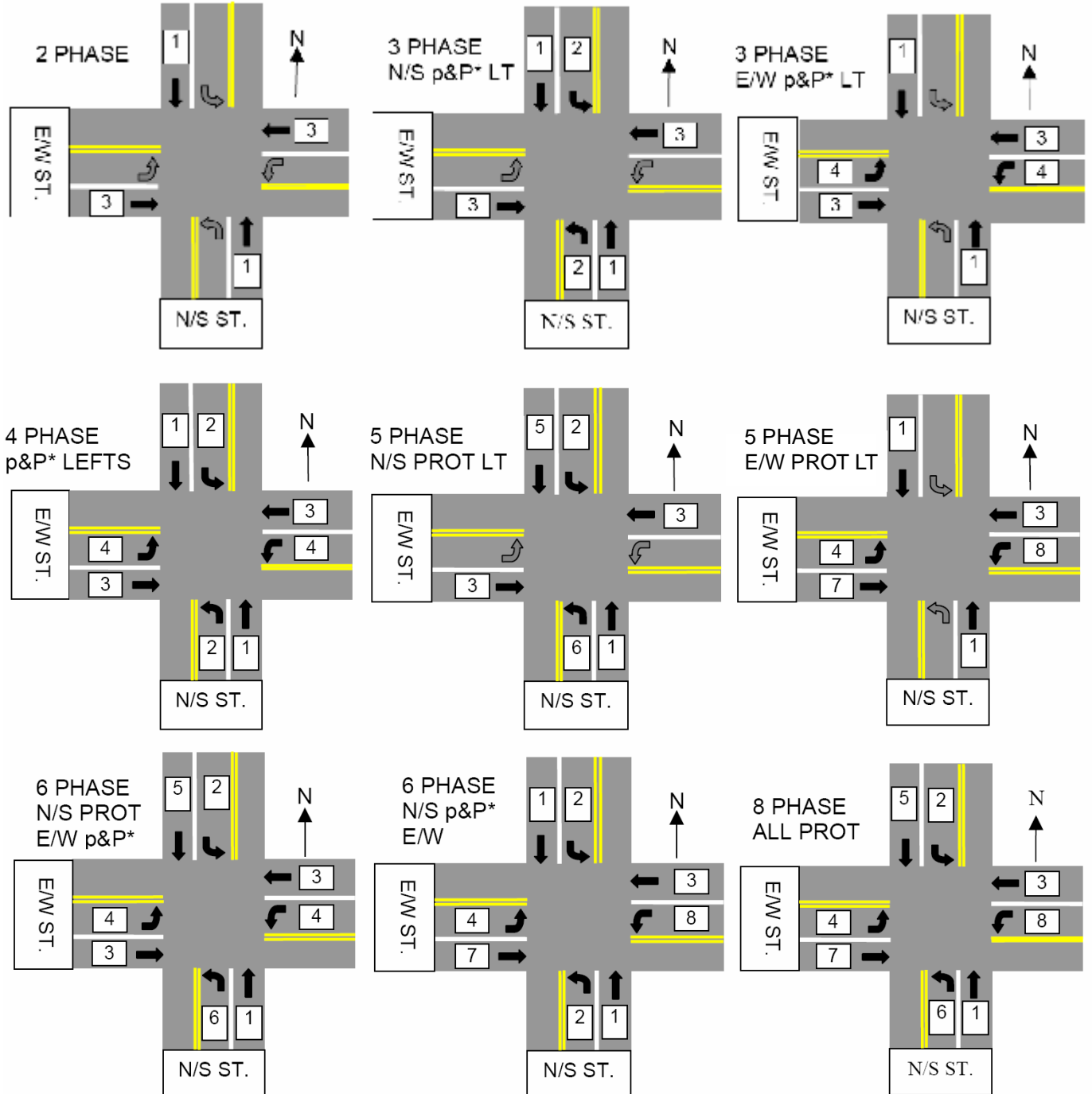
**B. Traffic Signal Structures ADOT/Scottsdale**

The base specification and warranty requirements for the ADOT/Scottsdale traffic signal structure shall be:

- Standard Specification for Road and Bridge Construction - ADOT (Current)
- Traffic Signals and Lighting, Standard Drawings - ADOT (Current)

# TYPICAL PHASING PLAN

All left turns are **LAGGING** unless otherwise specified due to special circumstances; exceptions approved on a case-by-case basis.



\* p&P = *permissive* / *PRO*Tected left turn operation.





# QUALIFIED PRODUCTS LIST

## Scottsdale Transportation Systems Department, Operations Division

<p><b>Type 170 System Cabinet:</b> Model 330 Cabinet Safetran Traffic Systems, Inc. McCain Traffic Supply</p> <p><b>Type 170 Controller Unit Software:</b> Wapiti Micro Systems Corp. W4IKS, current Rev. Wapiti Micro Systems Corp. Traffic View, current Rev.</p> <p><b>Model 204 Flashers – Category 1:</b> PDC – SSF-87 Solid State Devices 204K</p> <p><b>Traffic Signal Pre-emption Devices:</b> 3-M Model 721, Detector 3-M Model 752 Phase Selector 3-M Cable 138 3-M Model 792 Emitter. (Requires purchasing approval from Traffic Engineering to the Supplier)</p> <p><b>Model 242 Two Channel DC Isolators:</b> General Devices &amp; Instruments Model 242 PDC Model 242 Detector Systems</p> <p><b>Loop Lead-in Cable:</b> IMSA Model 50-2, #14 AWG</p> <p><b>Traffic Signal Conductor Cable:</b> IMSA 19-1 “14 AWG” stranded cable, in 20, 7 or 4 conductor.</p> <p><b>Model 721 Optical Detector:</b> 3-M Safety and Security System Division</p> <p><b>Model 195 Low Priority Emitter Assembly:</b> 3-M Safety and Security System</p>	<p><b>Type 170 Controller Units:</b> Safetran Traffic Systems, Inc. 170ATC-HC11 McCain Traffic System, Inc. 170ATC-HC11</p> <p><b>Model 200 Load Switch – Category 1:</b> PDC – SSS-87 Solid State Device 200K</p> <p><b>Model 204 Flashers – Category 2:</b> PDC – SSF-88-X Solid State Devices 204D</p> <p><b>Model 222 Detectors – Category 1:</b> 3M Canoga Model P422T Detector Systems Model 222D 3M Canoga Model C422 or C424</p> <p><b>Loop Wire:</b> IMSA 51-5 with orange jacket #14 AWG</p> <p><b>Photo Electric Cell:</b> ALR Model 2172 NP3</p> <p><b>Uninterruptible Power Supplies (UPS):</b> Tesco model 1400 XL battery with ambient temperature enclosure anodized aluminum</p> <p><b>Model 252 Two-Channel AC Isolators:</b> PDC Model ACI-88 Detector Systems</p> <p><b>Model 752 Phase Selector:</b> 3-M Safety and Security System Division</p> <p><b>Model 138 Optical Detector Cable:</b> 3M Safety and Security System Division</p>	<p><b>Telemetry Units:</b> General Devices, Inc. (G.D.I.), Model 400 modem, Rev. E</p> <p><b>Model 200 Load Switch – Category 2:</b> PDC – SSS-88 Solid State Device 200D</p> <p><b>Model 210 Conflict Monitor:</b> Eberle Design, Inc., Model 210E</p> <p><b>Model 222 Detectors – Category 2:</b> Detector Systems Model 222B Indicator Control Corp., Part #3DLD827B 3M Canoga Model C422 or C424</p> <p><b>Telephone Cable:</b> Beldon 9418</p> <p><b>Audio Crosswalk ADA Device:</b> Mallory VSB 110-1 (north/south) Mallory VSB 110-2 (east/west)</p> <p><b>Model 430 Relays:</b> Magnecraft Model W21 ACPX-2 Midtex 136-62T3A1 Traconex Model W21 ACPX-2</p> <p><b>Model 196 High Priority Emitter Assembly:</b> 3-M Safety and Security System Division Model 195 Low Priority Emitter Assembly: 3-M Safety and Security System</p> <p><b>Electric Service Cabinet, Models:</b> Meyers MUEG16-M100-A2 Milbank CP3B11115AWSP3 Pacific Utility Products USP-M100-112CTB</p>
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# QUALIFIED PRODUCTS LIST

**Scottsdale Transportation Systems Department, Operations Division**

The effective period this QPL is indeterminate. Manufacturers are required to notify the 170 Program Coordinator of any proposed changes affecting design or performance in the product that has been approved. This includes all components listed in manuals and all engineering changes.

Manufacturers not on the list who want their assemblies or units tested so as to be added to the QPL for future bids should submit a written request to the 170 Program Coordinator\*.

Failure to perform satisfactorily on purchase orders by failing to meet delivery schedules or maintain a high rate of acceptance will result in being removed from the QPL.

Scottsdale Traffic Operations Division  
Phone: 480-312-5620

City of Scottsdale  
Municipal Services Department  
9191 E. San Salvador  
Scottsdale, AZ 85258

Traffic Signal Structures:

ADOT/Scottsdale	
Valmont Industries, Inc.	Drawing #DB00181, no Rev.
Valmont Industries, Inc.	Drawing #DB00182, no Rev.

Couplet "Trombone" Type Pole	
Valmont Industries, Inc.	Drawing #DB00243

Type "R" Mod-Cell Tower Monopole	Drawing #DB00707
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American Pole Products Division	Drawing #01127 for "Q" and "R" type poles
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# SIGNS & MARKINGS



This section provides the procedures and criteria for designing traffic signs and pavement markings within the city. It presents standards for plan layout, signing, and striping.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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## GENERAL INFORMATION

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5-5.000

### USE OF NATIONAL STANDARDS

5-5.001

The following current publications are to be used in conjunction with the design criteria in this manual for traffic signs and markings design work.

- Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)- USDOT/ FHA, Current Revision.
- Signing and Marking - Standard Drawings - ADOT
- ADOT Traffic Control Design Guidelines - ADOT
- Manual of Approved Signs (MOAS) - ADOT
- Traffic Engineering Policies, Guidelines and Procedures - ADOT
- Supplement to MAG Uniform Standard Specifications for Public Works Construction - City of Scottsdale (COS)
- Supplemental Standard Details for Public Works Construction - COS
- Uniform Standard Specifications for Public Works Construction - MAG
- Uniform Standard Details for Public Works Construction - MAG
- Traffic Barricade Manual - City of Phoenix

## DESIGN STANDARDS

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5-5.100

Design is to be in accordance with the MUTCD unless modified by the city as noted. The requirements of the MUTCD apply to privately owned facilities where the public is able to travel without restrictions.

### SIGNING

5-5.101

1. All sign posts are to be telespar prepunched square steel tubing per COS Supplement to MAG Uniform Standard Specifications Detail No. 2131, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp). ASTM Type IV Sheeting (minimum) shall be used for all warning, regulatory and street name signs. All advance street name signs shall be proposed Type XI sheeting. All metro signs shall comply with the [COS Standard Detail No. 2134-4](#). School warning signs and accompanying placards must be ASTM proposed Type XI fluorescent yellow green sheeting.
2. Streetlight poles should be used for sign mounting when the light pole is within 50 feet of the proposed sign location.
3. "No Parking" signs shall only be used when the following site conditions exist.
  - a. When any right hand lane (curb lane) is 16 feet or wider, or if a paved shoulder area is present.
  - b. Where on-street parking could be expected to occur, such as commercial areas where businesses have direct frontage on the street.

When the above criteria exists “No Parking” signs (R8-3a 12 inch x 18 inch) with an arrow (single direction or bi-directional) below the “P” symbol on the sign to designate the direction of the restriction shall be installed approximately every 350-400 feet along the length of the project. No parking signs shall be installed approximately 5 feet from the back of curb at a 45 degree angle to the curb. Street light poles should be used for sign mounting when a light pole is within 50 feet of the proposed sign location.

4. Speed limit signs (R2-1) are to be installed at 4 per side per mile.
5. Stop signs (R1-1) are to be 30 inch x 30 inch minimum size.
6. Street name signs in subdivisions must conform to the City of Scottsdale Supplement to MAG Uniform Standard Specifications for Public Works, see [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).
7. Advance street name signs are to be installed at a height of 4 feet to the bottom of sign and placed so they are not obstructed by vegetation. Signs are to be installed in medians whenever possible, see [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).
8. Median nose signing is to be installed per COS Supplemental Detail No. 2133 [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp) as follows:
  - Type “A” is to be installed at signalized intersections and the first median nose in a succession of medians, or where the gap between medians exceeds 250 ft.
  - Type “B” is to be used at all other median nose locations.

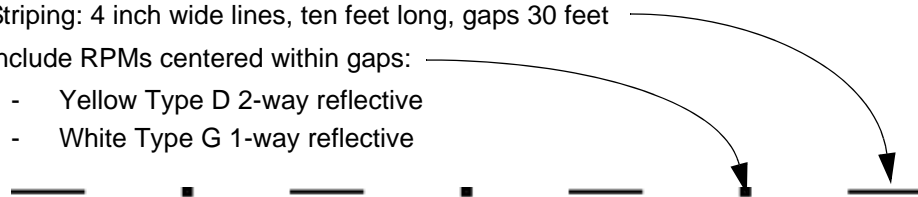
5-5.102

**STRIPING**

1. All permanent longitudinal pavement striping (centerlines, lane lines, bay lines) shall be 90 mil extruded thermoplastic. Reflective beads shall be applied in accordance with section 704 of ADOT’s Standard Specifications for Road and Bridge Construction. All permanent lateral pavement striping (stop lines, crosswalk lines) shall be 90 mil extruded thermoplastic. Reflective beads shall be applied as per Section 704 above.
2. All temporary pavement markings shall be reflective traffic paint.
3. All median noses shall be painted with reflectorized traffic paint and have Type D yellow RPMs per COS Supplemental Detail No. 2225 and 2226, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).
4. COS striping and marking standards are shown in [Figure 5.5-1](#) through [Figure 5.5-12](#).

**A. Skip Lines**

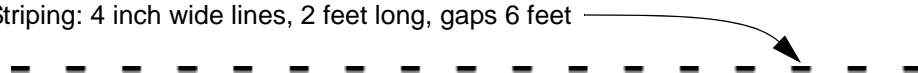
- Striping: 4 inch wide lines, ten feet long, gaps 30 feet
- Include RPMs centered within gaps:
  - Yellow Type D 2-way reflective
  - White Type G 1-way reflective



**FIGURE 5.5-1 SKIP LINES MARKINGS**

**B. Guide Lines**

- Striping: 4 inch wide lines, 2 feet long, gaps 6 feet



**FIGURE 5.5-2 GUIDE LINES MARKINGS**

**C. Lane Drop Lines**

- Striping: 8 inch wide lines, 2 feet long, gaps 4 feet



FIGURE 5.5-3 LANE DROP LINES

**D. Edge Lines**

- 4 inch wide White off the edge of pavement where curbs are omitted
- 8 inch wide White between travel lane and bike lane
- 8 inch wide White where asphalt tapers for a lane drop, etc.



FIGURE 5.5-4 EDGE LINES MARKINGS

**E. Two-Way Left Turn Lanes**

- All lines 4 inch wide Yellow, skip lines to follow typical skip dimensions
- Include RPMs centered within gaps: Yellow Type D 2-way reflective

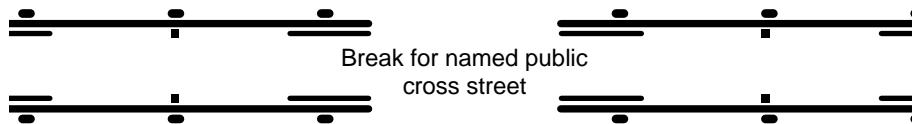


FIGURE 5.5-5 TWO WAY LEFT TURN LANE MARKINGS

**F. Left Turn Bay**

- Used at signalized intersections and major cross streets
- Arrow and "ONLY" to be painted in left turn bays which do not align with opposing left turn bays
- If bay line is longer than 150 feet, then a second arrow is placed at the top of the bay\*
- Use White RPMs type G 1-way reflective \*\*

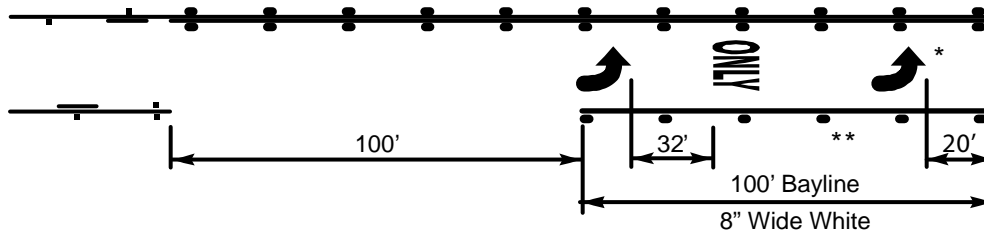


FIGURE 5.5-6 LEFT TURN BAY MARKINGS

**G. Right Turn Bay**

- 100 feet bay line, 8 inch wide White lines
- Minimum one R3-5(R), 24 inch x 30 inch
- Two R3-5(R)s if bay is 150 feet or more
- One arrow, 1 "ONLY" marking at beginning of bay
- If bay is 150 feet or more, second arrow to be installed at end of bay
- For turn bays at stop sign, R3-5(R) not to obstruct stop sign.

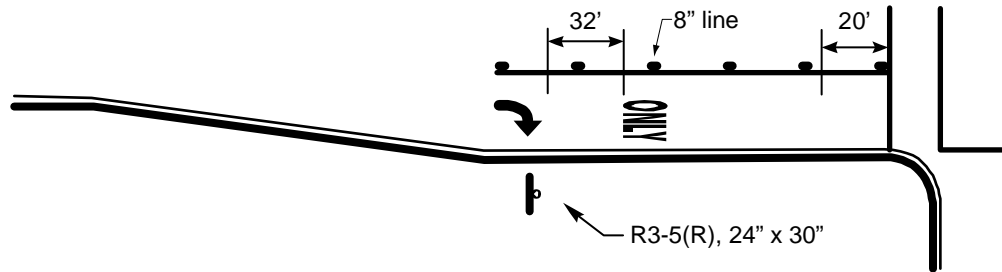


FIGURE 5.5-7 RIGHT TURN BAY MARKINGS

**H. Trap Lanes**

- 40 mph or less:

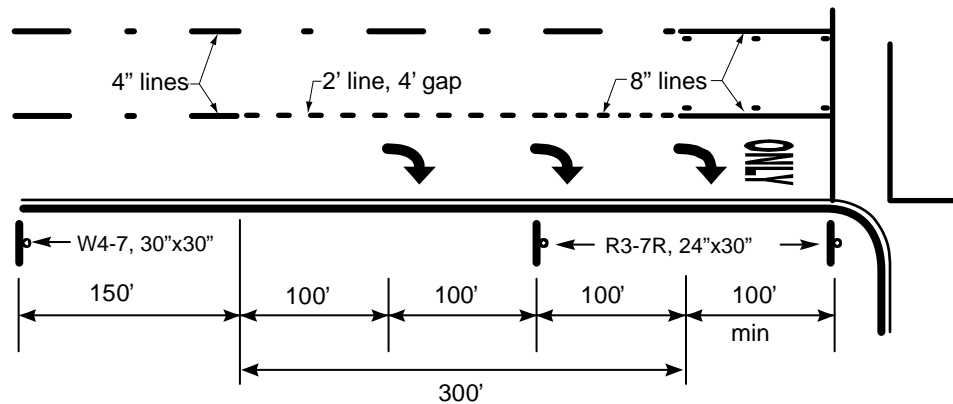


FIGURE 5.5-8 TRAP LANE MARKINGS - 40 MPH OR LESS

- 45 mph or greater:

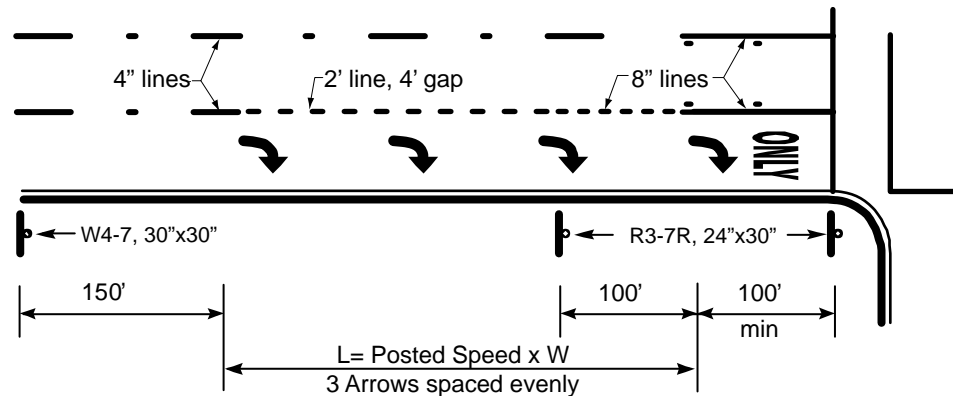
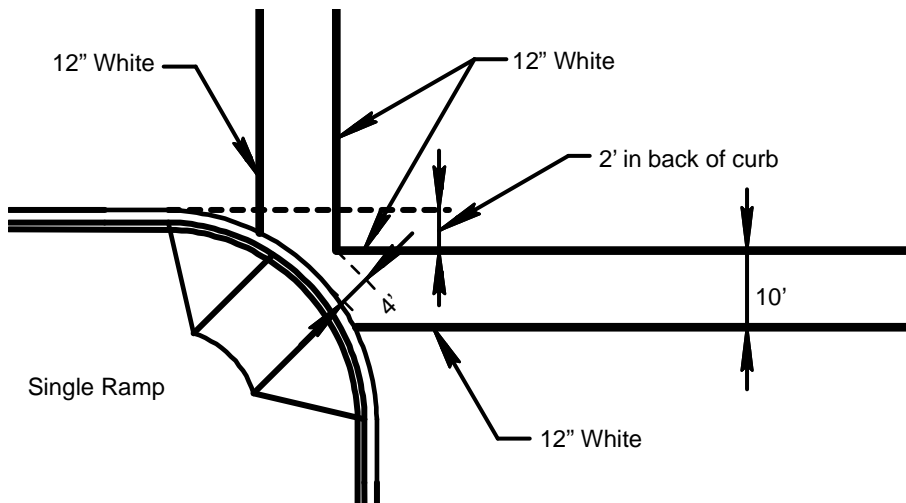


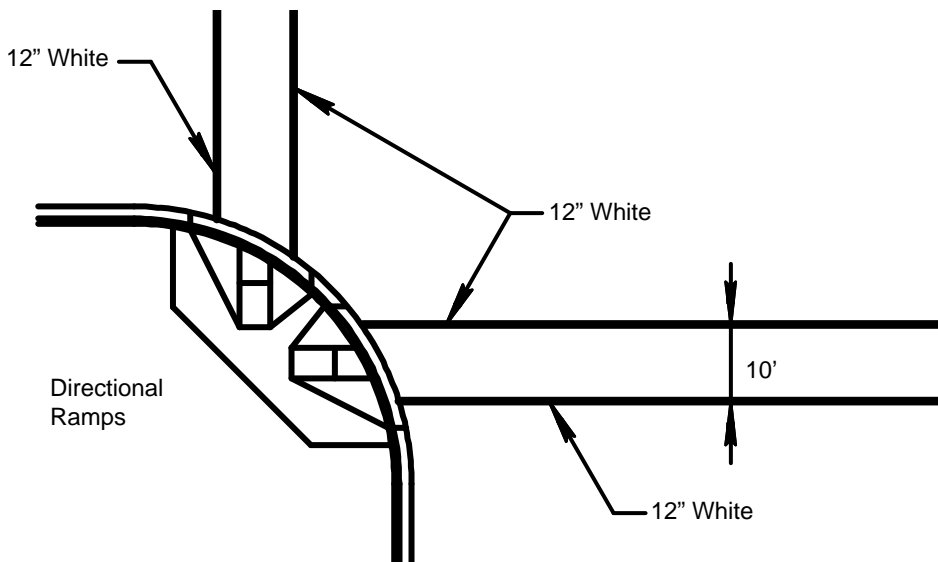
FIGURE 5.5-9 TRAP LANE MARKINGS - 45 MPH OR GREATER

**I. Crosswalks**

- Crosswalks are to be used at signalized intersections only, unless otherwise specified.



**FIGURE 5.5-10 SINGLE RAMP CROSSWALK MARKINGS**



**FIGURE 5.5-11 DIRECTIONAL RAMP CROSSWALK MARKINGS**

**J. Dual Left Turn Movement**

- Paint short skips through intersection
- Space RPMs to align with lane lines or centered in lanes (as shown).



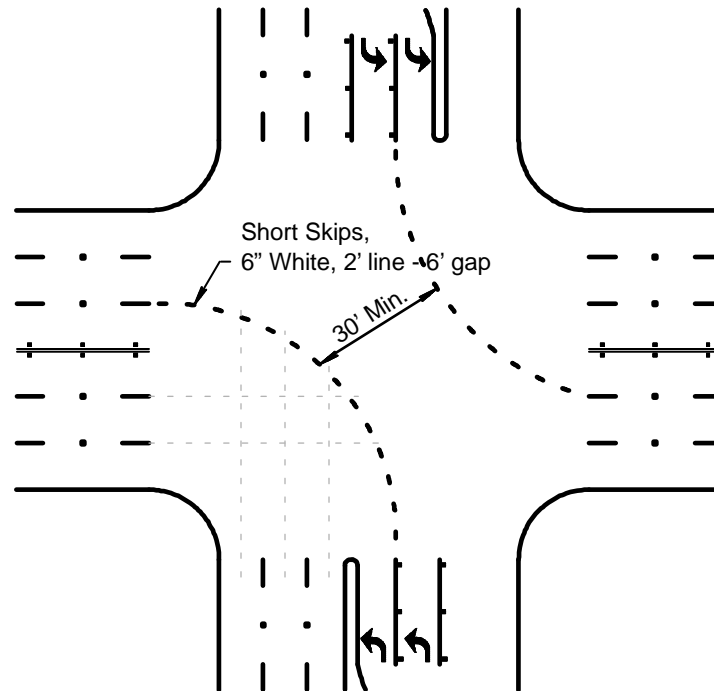


FIGURE 5.5-12 DUAL LEFT TURN INTERSECTION MARKINGS

**K. Roundabouts**

- See [Section 5-3.400](#)

**5-5.200****STANDARD PLAN LAYOUT****5-5.201****GENERAL REQUIREMENTS**

1. Signing and pavement marking design should be shown in the same plan view on the same plan sheet if practical.
2. Plan sheets are to be complete and to scale, no smaller than 1 inch = 40 feet unless otherwise approved by the city Traffic Engineering Division.
3. Entire length of project is to be shown in plan view. Typical Sections representative of striping and/or signing will not be accepted.
4. Signing and pavement marking plans need to include all existing signing and pavement markings for a minimum of 300 feet past the limits of construction (except those devices that are to be removed), and include adequate transitions and tapers to existing pavement markings to maintain traffic at the design speed.
5. The city requires a specific title and signature block to be placed in the lower right corner of each sheet, see [Figure 5.4-4](#) Traffic Signal Approval Block. The Consultant's title block is placed adjacent to the city block. The signature block includes the Traffic Engineering Director.
6. Rights-of-way lines are to be clearly identified.

### SIGNING

### 5-5.202

1. All signs should be graphically depicted in the direction of travel.
2. All signs shall be stationed and referenced to the appropriate MUTCD sign designation with size noted, see <http://mutcd.fhwa.dot.gov/Signs/index.htm>.
3. New and existing signs shall be visible to traffic for a value equal to 4 times (4x) the existing or proposed posted speed limit to provide adequate approach visibility.
4. Existing or proposed speed limit should be posted to provide adequate approach visibility. Existing or proposed roadway improvements, vegetation or structures shall not block traffic sign visibility.
5. All existing signs shall be identified to remain, be removed, or be relocated and shall be stationed and referenced to the appropriate MUTCD sign designation, see <http://mutcd.fhwa.dot.gov/Signs/index.htm>.
6. All existing advance or approach signing applicable to the project shall be field verified and referenced signs on the plan sheets, including location and/or station and proposed status of sign.

### STRIPING

### 5-5.203

1. All existing striping that is to remain shall be fully shown (as screened lines or lightly inked pen lines), identified by type and width, and completely dimensioned across roadway.
2. Raised pavement markers shall be graphically shown in plan view and referenced by construction notation.
3. All new striping shall be clearly identified noting color, line width, beginning station, ending station and intermediate stations at all directional changes.
4. Striping to be removed needs to be identified as such on the plans.
5. All striping shall be fully dimensioned across roadway and tied to a construction centerline or monument line at each side of an intersection.
6. All pavement arrows, legends and crosswalks, etc., shall be located by station or dimension lines.

## 5-5.204

**STANDARD PLAN SHEET NOTES**

These notes along with any additional project specific notes are to be placed on the lead signing and pavement marking plan sheet.

<b>STANDARD PLANS SHEET NOTES BLOCK</b>	
<ol style="list-style-type: none"> <li>1. All pavement markings, signing and work zone traffic control type and layout need to conform to the latest edition of the Manual on Uniform Traffic Control Devices, <a href="http://mutcd.fhwa.dot.gov/index.htm">http://mutcd.fhwa.dot.gov/index.htm</a>.</li> <li>2. Work zone traffic control needs to conform to the city of Phoenix Traffic Barricade Manual and/or as directed by the city Public Works Inspector or Traffic Engineering Division.</li> <li>3. Signs are to be installed on telespar prepunched square steel tubing posts per COS Standard Detail No. 2131, <a href="http://www.ScottsdaleAZ.gov/design/COSMAGSupp">www.ScottsdaleAZ.gov/design/COSMAGSupp</a>.</li> <li>4. Dimensions to signs need to include the sign post, or in the case of multiple posts, the plan view center of the sign.</li> <li>5. "No Parking" signs shall only be used when the following site conditions exist.               <ol style="list-style-type: none"> <li>a. When any right hand lane (curb lane) is 16 feet or wider, or if a paved shoulder area is present.</li> <li>b. Where on-street parking could be expected to occur, such as commercial areas where businesses have direct frontage on the street.</li> </ol> <p>When the above criteria exists "No Parking" signs (R8-3a 12 inch x 18 inch) with an arrow (single direction or bi-directional) below the "P" symbol on the sign to designate the direction of the restriction shall be installed approximately every 350-400 feet along the length of the project. No parking signs shall be installed approximately 5 feet from the back of curb at a 45 degree angle to the curb. Street light poles should be used for sign mounting when a light pole is within 50 feet of the proposed sign location.</p> </li> <li>6. All longitudinal striping (edge line, lane line and centerline) shall be .090" (90 mil) extruded thermoplastic, unless otherwise noted on the plans.</li> <li>7. All transverse striping (stop lines, crosswalk lines) shall be a minimum of .090" (90 mil) extruded thermoplastic, unless noted otherwise on the plans.</li> <li>8. All plan view striping dimensions are measured to the center of the line or center of the double line.</li> <li>9. All pavement symbols, arrows and legends shall be Type 1 permanent, high performance preformed pavement tape. (Tape must perform as 3M 380I-ES series or equivalent.)</li> <li>10. Raised pavement markers (RPMs) shall be used on all striped streets. RPMs shall be installed per COS Standard Detail No. 2132, <a href="http://www.ScottsdaleAZ.gov/design/COSMAGSupp">www.ScottsdaleAZ.gov/design/COSMAGSupp</a>, and ADOT Standard Drawing M-19, with a city approved bituminous adhesive.</li> <li>11. Blue Type F (2-way reflective) RPMs shall be used to indicate the location of all fire hydrants and remote fire department connections, per COS Standard Detail No. 2363, <a href="http://www.ScottsdaleAZ.gov/design/COSMAGSupp">www.ScottsdaleAZ.gov/design/COSMAGSupp</a>.</li> <li>12. All existing pavement markings that conflict with proposed markings shall be removed by sandblasting, hydroblasting or grinding prior to the installation of new pavement markings. Removals shall be to the satisfaction of the city Inspector.</li> <li>13. ASTM Type IV Sheeting (minimum) shall be used for all warning and regulatory and street name signs. All advance street name signs shall be proposed Type XI sheeting. School warning signs and accompanying placards must be ASTM proposed Type XI fluorescent yellow green sheeting. All metro signs shall comply with the <a href="#">COS Standard Detail No. 2134-4</a>.</li> <li>14. The contractor is responsible for layout of all pavement markings using control points spaced no more than 50 feet apart. Pavement marking layout shall be approved by Traffic Engineering prior to the application of the final product. All pavement marking drawings are schematic only. The contractor shall follow all dimensions, details and standards when installing pavement striping, marking and markers.</li> </ol>	

**FIGURE 5.5-13 STANDARD PLANS SHEET NOTES BLOCK**

# TRANSIT



This section documents transit facility guidelines for Scottsdale's public works projects and for developers working on projects that impact the transit system. This includes projects that create high-activity centers such as shopping malls or high-density living areas. Criteria are documented for locating bus stops and transit amenities such as bus benches and transit shelters. It includes street geometrics for bus bays, standard signage, submittal and review requirements, and a brief discussion on landscaping as it relates to transit amenities. The guidelines consider the needs of the transit user, bus operator, the general public, and neighbors adjacent to bus stops.



## DEPARTMENT RESOURCE INFORMATION

---

Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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## CRITERIA FOR BUS STOP LOCATIONS

5-6.000

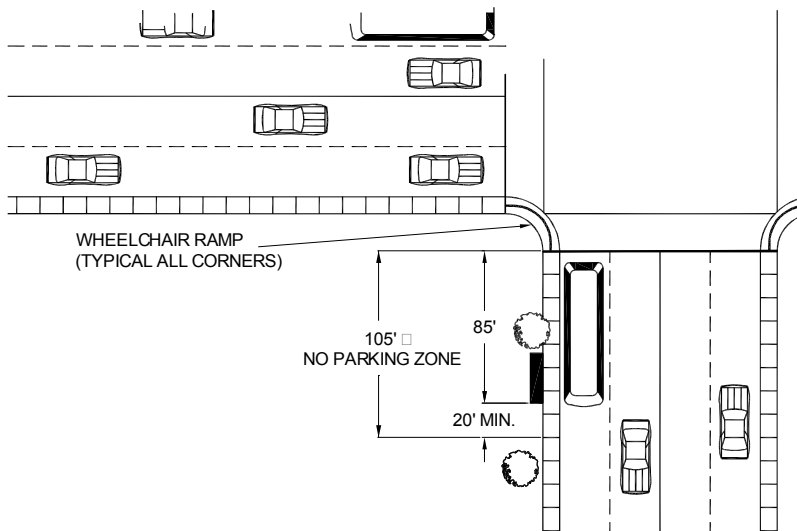
### BUS STOP SPECIFICATIONS

5-6.001

Frequency of bus stops is dictated by the distance bus patrons are willing to walk to board a bus. The minimum standard for bus stop locations in Scottsdale is at 1/4 mile intervals for residential areas and 1/8 mile intervals for major activity centers, as shown in Figure 5.6-1.

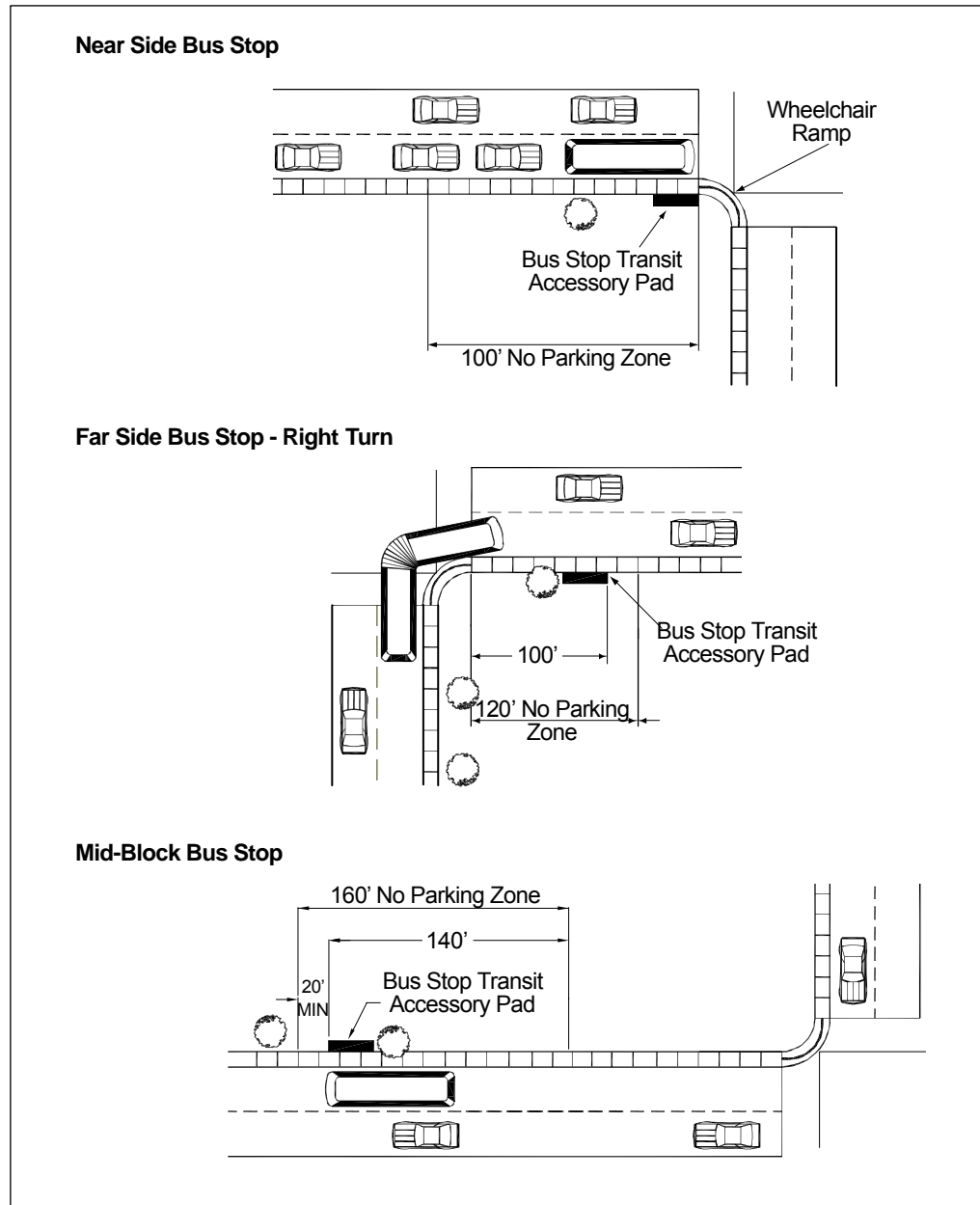
To provide the greatest convenience and safety for passengers, bus stops are generally located as close to intersections as possible. This minimizes walking distance for transferring passengers and encourages the use of crosswalks. Far side stops, those located immediately past an intersection, are optimal for the following reasons:

- Minimal interference with traffic flow
- Minimal interference with intersection sight distance
- Less likelihood of passengers crossing in front of a bus
- Less conflict for automobile right turns
- Less obstruction for vehicles entering the intersection from a side street
- More effective bus re-entry into the traffic stream



**FIGURE 5.6-1 STANDARD BUS STOP LOCATION**

The location of a transit stop is generally 85 feet, plus or minus 25 feet from the curb of an unsignalized intersection, and 105 feet plus or minus 25 feet from a signalized intersection. In some circumstances, due to the location of major generators, driveways, or unusual landscape issues, other locations can be submitted to the Transportation Department for consideration and approval. Some circumstances are illustrated in [Figure 5.6-2](#) and [Figure 5.6-3](#).



**FIGURE 5.6-2 SPECIAL CONDITIONS BUS STOP LOCATIONS**

Near side bus stops (those located immediately before an intersection) are considered when placement of far-side stops is not feasible or when that stop will be located near buildings with high volumes of transit riders. These types of stops may also be located where a high-volume bus transfer location would otherwise require a pedestrian crossing at a busy street.

On occasion, a mid-block bus stop may be utilized to provide access to a major generator, but it is generally discouraged due to the likelihood that pedestrians would cross streets mid-block rather than at intersections.



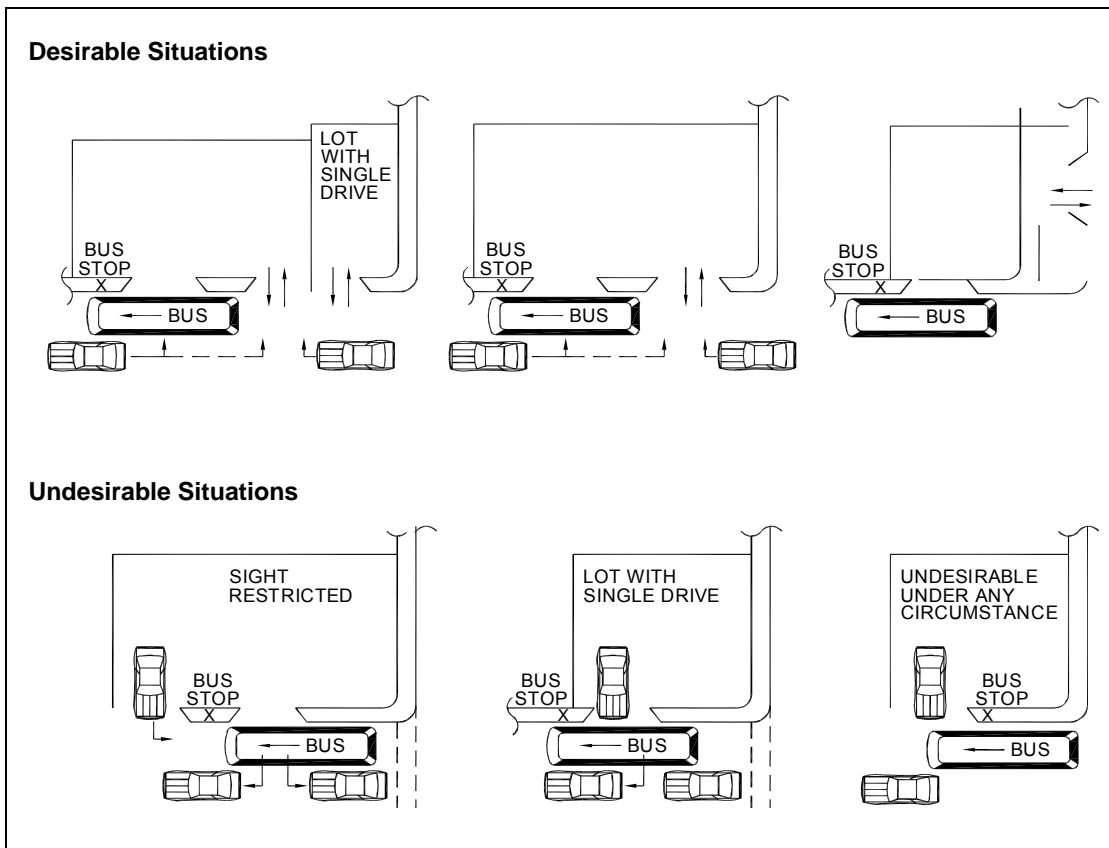


FIGURE 5.6-3 DRIVEWAY LOCATIONS NEAR BUS STOP

Where a development or subdivision is walled-off from the street, steps should be taken to allow easy pedestrian access. This could include a pedestrian access path linking various sections of the development to the bus stop or a system of offset walls around developments, which allow pedestrian passage.

**ACCESSIBILITY**

All transit facilities must comply with the applicable provisions of the Americans with Disabilities Act and associated guidelines, as updated, whenever technically feasible. At all transit stop locations where an accessible pedestrian route is available or where major improvements have been made to an existing inaccessible stop, the following elements shall be incorporated:

**Surface.** Bus stop boarding and alighting areas shall have a firm, stable and slip resistant surface.

**Dimensions.** Bus stop boarding and alighting areas shall provide a clear length of 10.0 feet minimum, measured perpendicular to the curb or vehicle street or highway edge, and a clear width of 10.0 feet minimum, measured parallel to the vehicle street or highway.

**Connection.** Bus stop boarding, alighting areas and bus shelters shall be connected to streets, sidewalks or pedestrian paths by an unobstructed pedestrian access route at least 4-foot wide.

**Grade.** Parallel to the street or highway, the grade of the bus stop boarding and alighting area shall be the same as the street or highway, to the maximum extent practicable. Perpendicular to the street or highway, the grade of the bus stop boarding and alighting area shall not be steeper than 2 percent.

5-6.002

**Bus Shelters.** Bus shelters shall provide a minimum clear space of 3 by 4 feet within the shelter. See MAG Standard Detail No 230 and COS Standard Detail No. 2232\* for related information, [www.ScottsdaleAZ.gov/design/COSMAGSupp/](http://www.ScottsdaleAZ.gov/design/COSMAGSupp/).

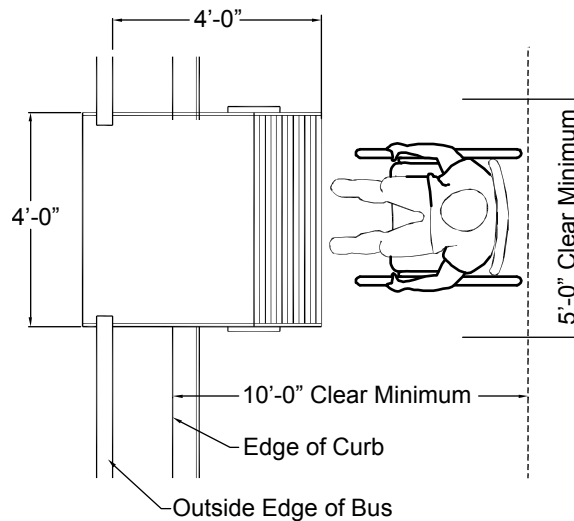


FIGURE 5.6-4 BUS STOP CLEARANCE ZONES

## 5-6.100

## TRANSIT AMENITIES

Comfortable and secure passenger waiting areas should be provided at as many bus stops as feasible. The waiting areas may include a varying range of improvements depending upon ridership and specific site needs. All transit stop furniture must be placed outside the standard sidewalk. A minimum 4 foot clearance is required between transit components, fire hydrants, switch boxes and mail boxes, etc. Below are typical transit amenities and conditions under which they should be employed. Advertising and placards are not allowed.

### 5-6.101

## BENCHES

Benches should be located at all bus stops. Several styles of benches have been approved for placement in Scottsdale depending on location. Specialty benches are used in downtown Scottsdale. See COS Standard Detail No. 2268 for slab requirements, [www.ScottsdaleAZ.gov/design/COSMAGSupp/](http://www.ScottsdaleAZ.gov/design/COSMAGSupp/). A standardized bench with matching trash receptacle is used in all other areas except for those bus stops affected by the Environmentally Sensitive Lands Ordinance (ESLO). Interested parties may contact the Transportation Department for the most recently approved standard. Transit amenities located within ESLO boundaries must conform to its guidelines, see [www.ScottsdaleAZ.gov/codes/ESLO](http://www.ScottsdaleAZ.gov/codes/ESLO). Additional styles may be acceptable but require city staff approval and may need Development Review Board approval.

Design of benches shall have backrests for support and spacers between the seats to discourage people from lying on the seats. Seats should be 17 to 19 inches above finished floor. A minimum of 6 linear feet of seating should be used. More seating is required at higher usage stops. Please contact the Transportation Department to determine if a location is a high usage stop. A clear space of 3 feet by 4 feet must be provided adjacent to the bench seating for wheelchair seating.

## SHELTERS

A shelter shall be provided at all bus stops. In a development, city staff may waive any requirement for passenger shelters if there is adequate exterior shading and architectural shelter.

Shelters should be arranged with considerations to the sun's angles. Coverage should allow for maximum shade during the peak use hours of the summer morning and afternoon. However, the shelter should also be oriented to allow the bus driver clear visibility of the passengers and to allow passengers a view of oncoming traffic.

Scottsdale has a standard shelter design; contact the Transportation Planning Division to obtain copies. See [Figure 5.6-5](#) for a typical foundation and [Figure 5.6-6](#) for a photograph of a typical shelter. The dimensions of the bus stop and the minimum for a Bus Stop Easement are 11 x 28 feet; this allows a 2 foot working area around the actual passenger shelter. Other shelter designs may be used if approved by city staff and possibly, the Development Review Board.

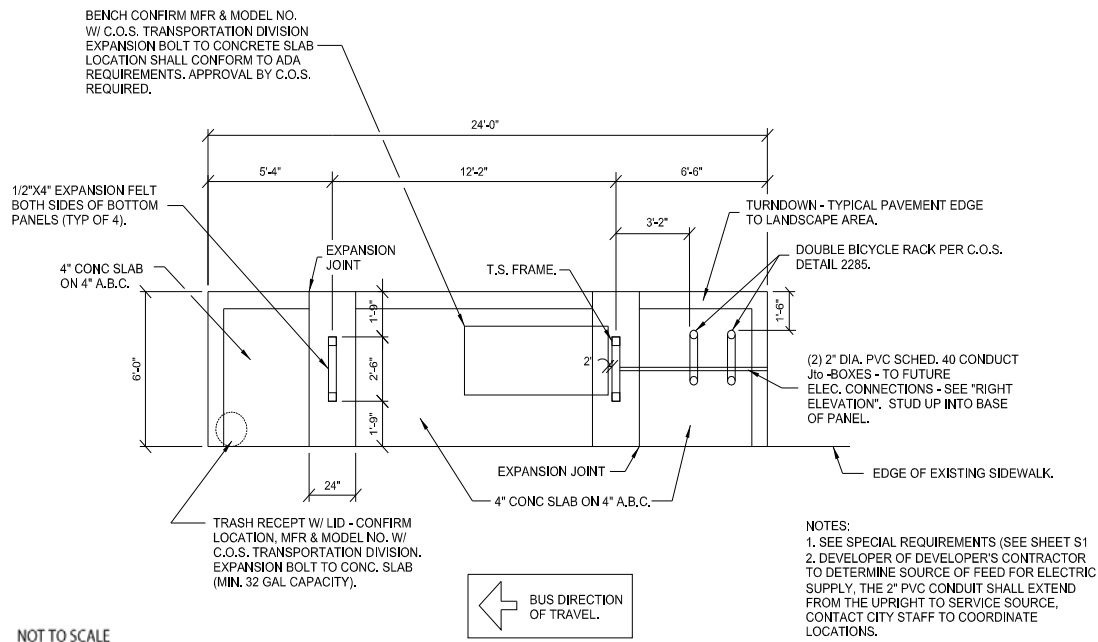


FIGURE 5.6-5 BUS SHELTER FOUNDATION PLAN

### A. Shelter Design

Shelter designs must meet the following criteria:

1. Minimum canopy of 65 square feet with a minimum width of 5.5 feet.
2. Minimum 7-foot clearance between underside of roof and sidewalk surface.
3. Waterproofed shelter canopy with provisions for drainage away from transit users.
4. Shaded seating areas.
5. Sight distance into and out of the shelter.
6. Minimum 6 inches of vertical clearance from the sidewalk to avoid trash and debris collection.
7. Fixed components to prevent unauthorized removal.
8. Materials that allow for air circulation and avoid hot air containment.
9. Materials finished to prevent overheating.

10. Insulated canopy materials that collect and radiate heat.
11. Materials, coatings and surfaces that are graffiti-resistant.
12. Components of the shelter that are readily replaceable.
13. Colors appropriate to the architectural character of the development and the transit system (per review and approval of Development Review Board).
14. Minimum 2-foot clearance between roof canopy and face of curb.
15. Arrangement of furniture that allows a 3 by 4 foot barrier-free access for wheelchair users.
16. Minimum 4 foot unobstructed pedestrian accessible route path into the shelter and connecting to streets, sidewalks or other pedestrian paths.

#### B. OTHER

1. Trash receptacle to provide a minimum capacity of 30 gallons.
2. Bus stop graphics to meet city requirements.
3. A minimum of two bike loops to be installed. Refer to [Section 5-7.000](#) Pathways and COS Standard Detail No. 2285, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).



FIGURE 5.6-6 TYPICAL BUS SHELTER

#### 5-6.103

#### BUS BAYS (PULLOUTS)

Bus bays enable buses to pull completely out of the traffic lane while loading and unloading passengers. Bus bays are recommended under the following conditions:

1. At or near transfer points,
2. When average peak period dwell time exceeds 30 seconds per bus.

Two types of bus bays are allowed: open-ended and closed. Closed bus bays are the preferred option. Generally, open-ended bays are used on far-side stops where space is limited. See COS Standard Details 2266-1, 2266-2 and 2267 for specific dimensions, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

# LANDSCAPING

## 5-6.200

Wherever possible provide shade trees and other protective landscaping. This landscaping could be considered part of the development's frontage landscape and could count towards any landscaping requirements that may apply. Considerations for selection and location of landscaping include:

1. Trees should be mature and have an adequate canopy to shade the seating area.
2. Low-water consumption trees and shrubs should be used.
3. Tree location should consider the solar orientation of the transit stop. Priority should be given to shading afternoon summer sun.
4. Transit landscaping should be compatible with other frontage landscaping.

Carefully locate all landscaping needs, so they do not obstruct the visibility of either the transit user or the bus operator. The developer/property owner is responsible for the maintenance of landscaping at bus stops.

# SIGNAGE

## 5-6.300

### BUS STOP SIGNS

### 5-6.301

A bus stop sign is an important passenger convenience and an operations and marketing tool for transit systems. It serves as a reference for passengers, bus operators, and as a point of identity for the transit system.

The bus stop sign is generally not a traffic sign (except as noted below) since it is not displayed to regulate or warn motorists.

A regional bus stop sign is currently in use throughout the Valley (see Figure 5.6-7 below). The sign is 18 inches wide x 24 inches high, reflectorized for nighttime visibility and is double-faced so that it can be seen from both directions. The upstream side of the sign contains "No Parking" information for motorists approaching the bus stop.

The standard regional sign identifies a location as a bus stop, includes the name and number of the bus route(s) being served, and displays the transit information telephone number.

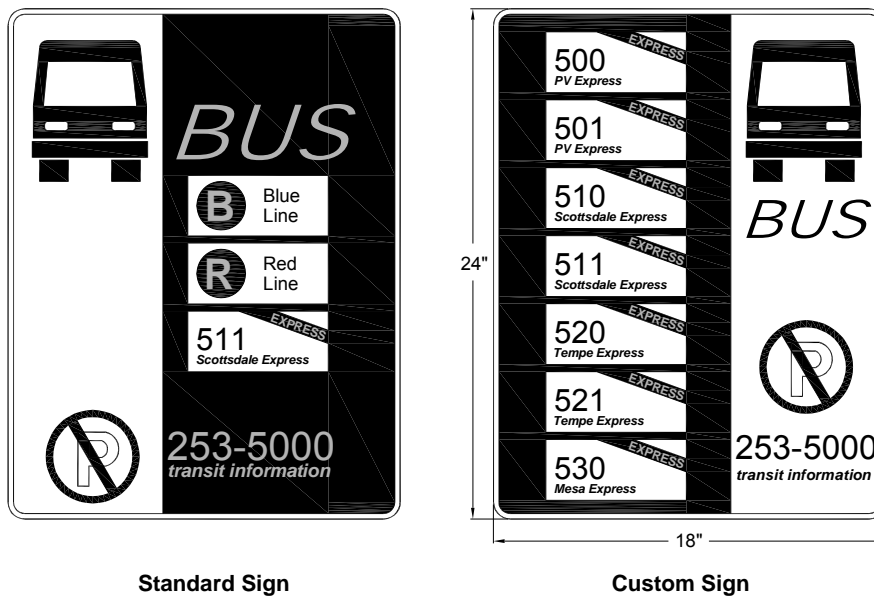


FIGURE 5.6-7 BUS STOP SIGNS

5-6.302

**SIGN PLACEMENT**

Bus stop signs must be placed at the location where people board at the front door of the bus. In cases where the bus stop sign is incorporated into the design of a transit shelter, the need for a separate sign may be eliminated.

Ideally, bus stop signs should be placed independently of all other signs to maintain the importance of the bus stop identity. Each sign should be installed with its own signpost, although non-wood light poles may be used if it is at the proper stop location and if the sign face is visible from both sides. **Do not** place signs on wood poles as it poses a hazard to linemen who climb the poles.

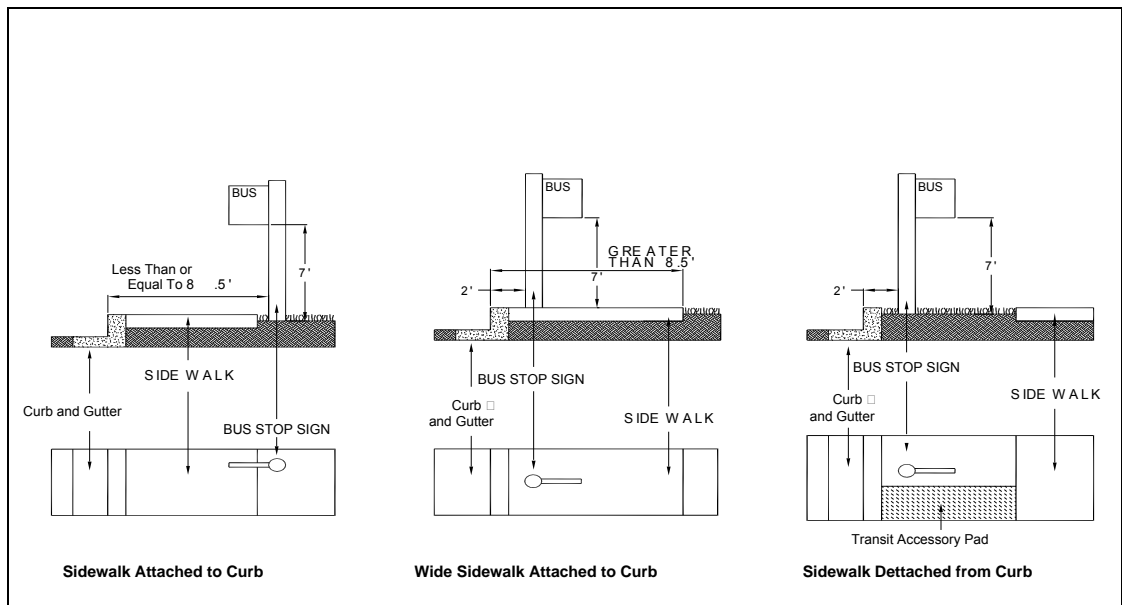
Bus stop signs should be installed on signposts or metal poles so that the sign is “flagged.” In other words, the sign should be attached to the post by its edge. This allows both sides of the sign to be viewed without obstruction. The bottom of the sign should be 7 feet above ground level, at least 2 feet from the curb face, and away from obstructions such as landscaping or other signs. The standard regional sign has been designed so that it may be mounted by its edge to a 2-inch post without obscuring the backside message. Where metal street light poles are at the proper location but too close to the curb, the signs may be flagged away from the street (see Figure 5.6-8 below).

Usually, the city will be responsible for the installation of bus stop signs. For more information, contact the Transportation Department.

5-6.303

**SIGN CLEARANCES**

Sign clearance dimensions vary by sidewalk / curb relationships, as shown in Figure 5.6-8.



**FIGURE 5.6-8 BUS STOP SIGN CLEARANCES**

5-6.304

**OTHER FACILITIES**

Other facilities, such as park and ride lots or transfers centers, may be planned at special locations, usually high activity centers or a focal point of several transit routes. These facilities, are unique and must be planned through discussion and negotiation between the city’s Transportation Department and the developer and/or adjacent property owners/users. In general, the same criteria (as well as transit industry standards) apply for turning radii, passenger loading platforms and parking space requirements, etc.



## BUS STOP MAINTENANCE

### 5-6.400

Well-maintained bus stops are crucial to the image of the transit system. The following applies regardless of who is responsible for the maintenance. Damaged furniture and trash build-up should be addressed immediately to ensure a positive environment for transit patrons and the general public.

Regular maintenance should include:

- Full wash down of shelter and accessories
- Removal of all dirt, graffiti and pasted material
- Squeegee wipe down of glass surfaces
- Removal and replacement of trash bag
- Litter pick up around stop or shelter/accessories to a distance of ten feet
- Manual or chemical removal of weeds
- Pruning of obstructing tree growth
- Touch up of paint scratches
- Maintain a stable, firm, slip resistant accessible route.

PLEASE NOTE: Safety problems should be repaired within 24 hours.  
Repairs that do not pose safety problems should be completed within 3 days.

## SUBMITTAL REQUIREMENTS & REVIEW PROCEDURES

### 5-6.500

The following facilities must be delineated on all site plans or the preliminary plat submitted to the city:

- |   |   |  |
|---|---|--|
| <ul style="list-style-type: none"> <li>• Bus bays</li> <li>• Bus stops</li> </ul> | <ul style="list-style-type: none"> <li>• Shelter sites</li> <li>• Major transfer centers</li> </ul> | <ul style="list-style-type: none"> <li>• Park-and-ride lots</li> </ul> |
|---|---|--|

Transit staff must approve the design and location of the above facilities during the project review process. Bus stop easements need to be completed during the project review process.

Developers may deposit funds in lieu of construction and installation of stipulated transit amenities. The amounts of funds to be deposited are determined during the project review process and are in force upon City Council approval of the project. Fees are to be paid at the One Stop Shop, in Bus Shelter Deposit Account, when other permit fees are paid.





# BIKEWAYS

This section provides design criteria for bicycle and multiuse paths within the city. It presents information for planning, facility design, traffic controls, bicycle parking, and bikeway maintenance.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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## GENERAL INFORMATION

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5-7.000

### COMPONENTS OF BIKEWAY SYSTEM

5-7.001

#### 1. Bike Lanes

Bike lanes are integral sections of a roadway that are marked for exclusive bicycle use and are always 1-way.

#### 2. Bike Routes

Bike routes may include shared streets, bike lanes or shared-use or multiuse paths, in any combination. Routes may be designated by signing or by placement on a map.

#### 3. Grade-Separated Crossings

Crossings are underpasses or overpasses that serve to isolate motorized and non-motorized traffic from each other at points of intersections.

#### 4. Shared-use or Multiuse Paths

Shared-use or multiuse paths are paved pathways set aside for the exclusive use of nonmotorized travel and are generally intended for 2-way traffic. Paths are typically separate from the road infrastructure.

#### 5. Shared-use or Multiuse Trails

Shared-use or multiuse trails are unpaved and designed to accommodate equestrians, pedestrians and bicyclists. See [Section 8-3.000](#) for trail information.

#### 6. Shared Streets

Shared streets are all streets that do not have bike lanes where bicycles and motor vehicles share the same roadway. This includes all public streets except those specifically posted to prohibit bicycles.

### DOCUMENTS AND REFERENCES

5-7.002

The following publications or their current revisions are to be used in conjunction with the design criteria in this manual when designing bicycle or shared-use or multiuse paths for the City of Scottsdale:

- American Association of State Highway & Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, 1999.
- City of Scottsdale Transportation Master Plan, 2008.
- COS Community Mobility Element of the General Plan, 2001.
- COS Zoning Ordinance, Section 9.100.
- Manual of Uniform Traffic Control Devices (MUTCD) Section IX, Traffic Controls for Bicycle Facilities.
- MAG Regional Bicycle Plan, 1999.
- MAG Regional Off-Street System Plan (ROSS), 2001.
- MAG Uniform Standard Specifications for Public Works Construction.
- COS Supplement to MAG Uniform Standard Specifications for Public Works Construction.

**5-7.100****PLANNING BIKEWAYS****5-7.101****LOCATIONS**

It is a goal of the Scottsdale bikeway system to provide facilities on a minimum of a:

- Half-mile grid south of Shea Blvd.
- One-mile grid between Shea Blvd. & the CAP Canal.
- Two-mile grid north of the CAP Canal.

Providing equal grids for both on- and off-street types of bikeways is encouraged, as it will accommodate the widest possible range of users, purposes and trip destinations. The COS Bicycle/Pedestrian Transportation Plan (1994) contains maps of planned on-street and off-street bikeways.

**5-7.102****FACILITY SELECTION: ON-STREET**

Bike lanes are the most desirable facility for any street with a classification of minor collector or higher. For these streets with higher volumes of traffic, the classification of a street will determine its cross-section, see [Section 5-3.100](#). Major arterials, minor arterials, major collectors, minor collectors and certain special neighborhood and rural streets have standard cross-sections that include bicycle lanes. Bike lanes would, therefore, be included on these streets whenever they are built or reconstructed.

For streets that provide a connection for local or regional bikeway systems, but where a full cross-section with bicycle lanes cannot be accommodated, the following measures should be considered, in order of desirability:

- Edge line stripe with route signs;
- Edge line stripe with no signs;
- Route signs with no edge stripe.

**5-7.103****FACILITY SELECTION: OFF STREET**

In planning for off-street shared-use or multiuse paths, the following hierarchy should apply, starting with the most desirable:

- Ten or 12 foot shared-use or multiuse path well separated from streets and in a natural setting;
- Ten or 12 foot pathway set off from the street by at least 10 feet of landscaping;
- Ten or 12 foot shared-use or multiuse path protected from the street with a traffic barrier & railing.

Connections between different types of facilities are very important to ensure an efficient and functional system. In places, shared-use or multiuse paths may be used to connect sections of roadways that would otherwise dead-end. However, it is critical not to attempt to substitute a path or a sidewalk where bike lanes are warranted. Bike lanes allow direct, higher-speed travel for cyclists, unimpeded by pedestrians. Bike lanes are also 1-way, going with the adjacent traffic. Since paths are typically 2-way, designing a path to connect with bike lanes and not have cyclists riding the wrong way (against traffic) in one of the bike lanes requires very careful study and design.

Opportunities to provide bicycle access may occur in conjunction with public or private development, greenbelts, canal banks, flood control projects, vista corridors or any place with available open space or rights-of-way. It is the intention of Scottsdale's bicycle planning efforts to remain flexible and open to new opportunities.

## **EASEMENTS, DEDICATIONS & ABANDONMENTS**

**5-7.104**

In the case of on-street facilities, the bike lane or route is typically located within the street rights-of-way (ROW). Sometimes on-street facilities may need to be connected with short sections of paved path. An example of this would be cul-de-sacs that have only one direct access to the public street system. Sometimes the cul-de-sac street can be connected to allow bicycle and foot access to reach adjacent streets, paths, trails or property.

If a private, gated community will cut off functional access for cyclists, means should be explored to maintain a public use easement, on the streets and through the gates, for pedestrians and cyclists.

For off-street paths, the applicant may obtain a ROW through development stipulations or purchase. Any easements or dedications for paths should include a clear statement of maintenance responsibilities for (1) the actual concrete path, (2) any adjacent landscaping or lighting and (3) for maintaining proper grades and drainage along the path. Dedication of rights-of-way or public use easements for paths must be noted in the stipulations and on the site plan. This should occur in the Project Review process for new developments.

If the applicant proposes changing the classification of an existing/planned street or abandon a street easement or ROW, current and potential pedestrian and cyclist connections shall be reviewed, see [Section 3-1.000](#). The proposed changes will be evaluated against the needs of the bicycle program. If needed, some means of bicycle and/or foot access such as a public use easement should be obtained.

## **FACILITY DESIGNS**

**5-7.200**

While every effort has been made to ensure the accuracy and completeness of these guidelines, the City of Scottsdale shall not be held responsible for any errors or omissions. It shall be the sole responsibility of the design engineer to ensure a proper design and the accuracy and completeness of construction documents containing his or her signature.

Any substitutions or exceptions must provide the same functions and be approved by the Transportation Department.

## **SHARED STREETS AND BIKE ROUTES**

**5-7.201**

It is assumed that cyclists will ride on all streets, unless such use is expressly prohibited and posted. Many neighborhood streets function quite well as bikeways with no additional signing or marking. If these streets are needed to complete some part of the bikeway system or to provide a connection for cyclists, the street may be designated by edge stripes, signs or on a map.

Since cyclists will tend to use the right side of the outside lane, this area should always be built and maintained to accommodate that use. Drainage grates should be designed and installed in a manner that will not trap wheels. Longitudinal cracks, potholes, rough paving, etc., should be eliminated.

## **BIKE LANES**

**5-7.202**

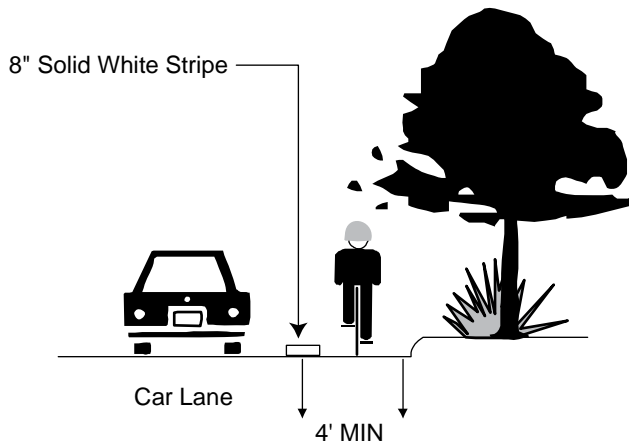
Streets such as major arterials, minor arterials, major collectors, minor collectors and certain neighborhood and rural streets have cross-sections that include bicycle lanes. These cross-sections are in [Section 5-3.100](#).

1. The recommended minimum width of a bike lane is 5 feet from the face of the curb. A minimum of 4 feet of asphalt is preferred. A minimum of 3 feet of asphalt is acceptable with approval of the Traffic Engineering Director. A solid 8 inch white stripe will be used to mark the bike lane. An alternative method is to combine the lane and gutter pan as one concrete strip. In these cases it is desirable to exceed the 4-foot minimum as measured to the face of the vertical curb, see [Figure 5.7-1](#) through [Figure 5.7-4](#).

2. Any grade separation structure should allow the full width of the physical improvements, including standard bike lanes. Also note that most surface streets, even without designated bike lanes or shoulders usually allow for some “shy distance” or permit an emergency move off the road. Bridges and underpasses with solid barriers alongside often become dangerous constriction points for bicycle travel. Therefore consideration should be given to maintaining extra width on bridges and in tunnels even if the street does not have bike lanes.
3. In rural areas, a paved shoulder can serve the function of a bike lane, in which case it should have a minimum of 5 feet of paving. A bicycle lane can also be delineated with striping between an area for parallel parking and a traffic lane. In this case the bicycle lane should be at least 5 feet, see [Figure 5.7-3](#).
4. Whenever a half-street is constructed, if the ultimate street classification has a cross-section with bike lanes, then the half-street construction should also provide a bike lane on each side.
5. Parking is not permitted in marked bicycle lanes.
6. Raised pavement markers or curbing should never be used to delineate bike lanes.
7. [Figure 5.7-1](#) through [Figure 5.7-4](#) give examples of bike lane configurations for various situations. These cross sections are compatible with [Section 5-3.000](#), Geometrics.
8. For additional information concerning bike lanes and routes not covered in this manual, please refer to the AASHTO Guide for the Development of Bicycle Facilities, 1999.

#### A. Curbed Street Where Parking is Prohibited

- 4 foot lane is exclusive of curb and gutter.

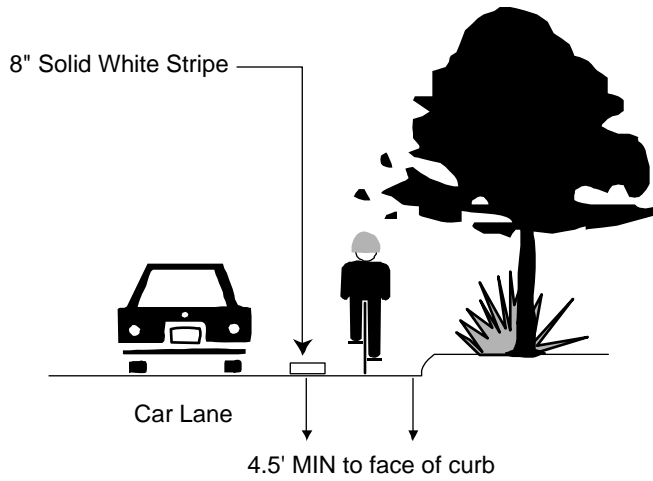


**FIGURE 5.7-1 BIKE LANE WHERE PARKING IS PROHIBITED**



**B. Wide Curb Lanes**

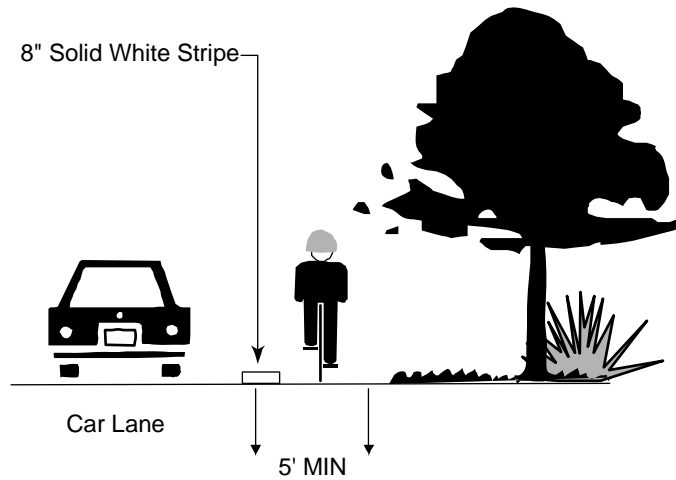
- Monolithic concrete curb, gutter and bike lane. No longitudinal joints.



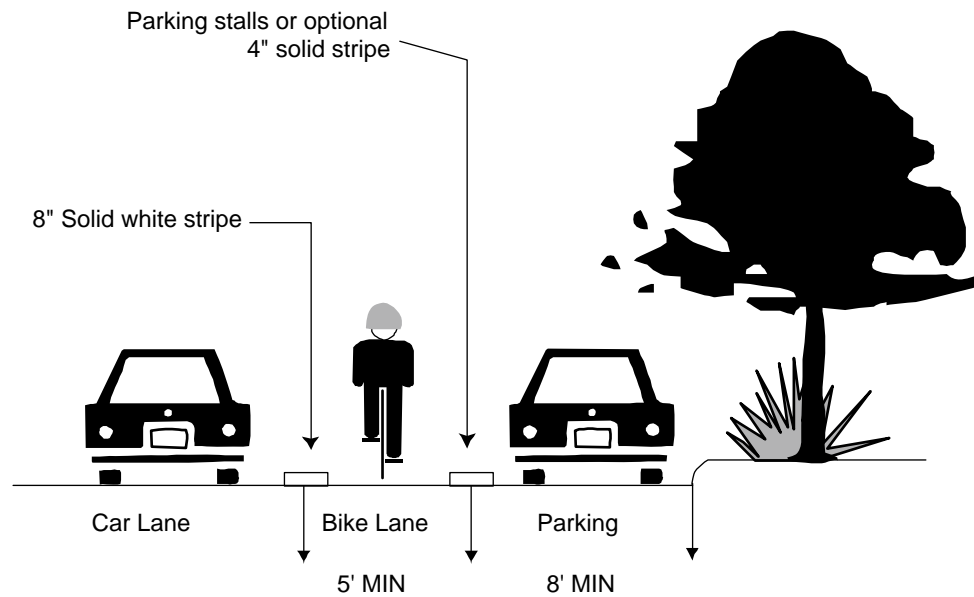
**FIGURE 5.7-2 BIKE LANE WITH WIDE CURB LANES**

**C. Street with Paved Shoulder**

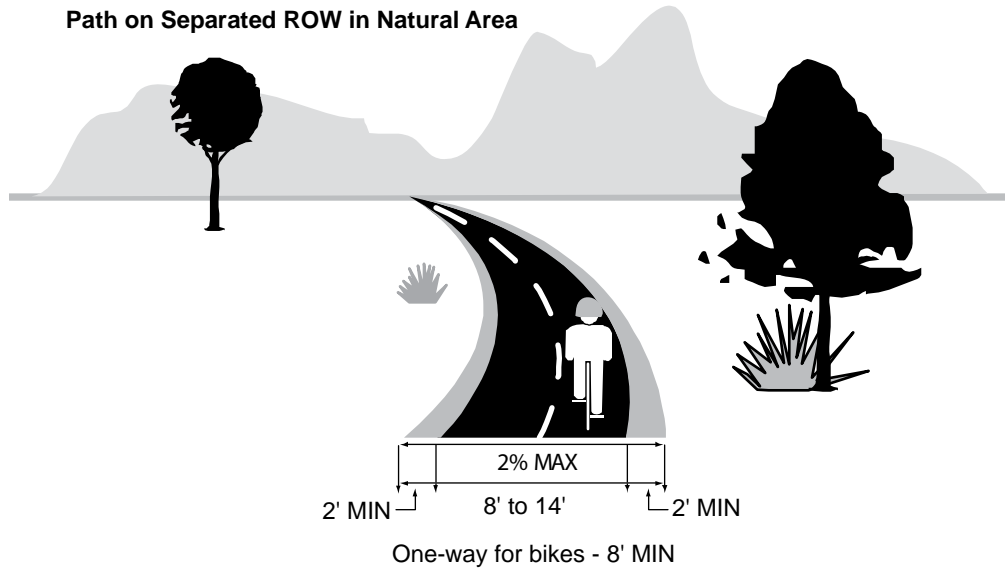
- Curb and gutter is not present. Shoulder functions as bike lane.



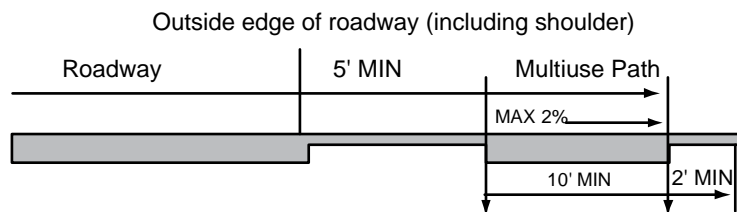
**FIGURE 5.7-3 BIKE LANE ON PAVED SHOULDER**

**D. Curbed Street with Parking****FIGURE 5.7-4 BIKE LANE WITH PARKING****5-7.203****SHARED-USE OR MULTIUSE PATHS**

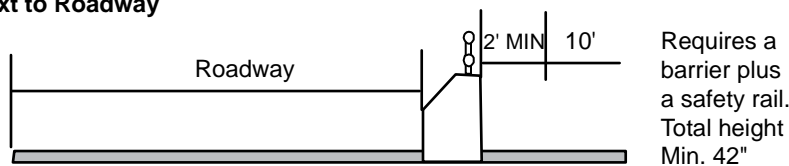
1. Operation and use of shared-use or multiuse paths are covered by COS Revised Code, Article IV, Chapter 17.
2. COS Standard Details Nos. 2281 - 2285 for shared-use or multiuse paths are available online at [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).
3. Placement of a shared-use or multiuse path may correspond/overlap with a trail underpass. Refer to the COS Trails Master Plan to verify trail underpass locations and design standards.
4. For additional information not covered in this manual, please refer to the AASHTO Guide for the Development of Bicycle Facilities, 1999. This guide provides technical information on minimum radii for curves, grades, sight distances and stopping sight distances under various conditions.



**Path Separate but Near Roadway**



**Path Next to Roadway**



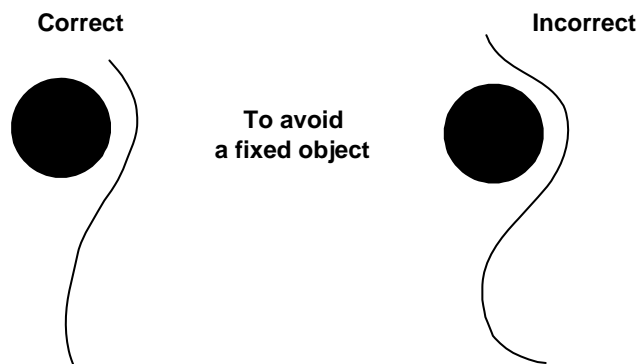
**FIGURE 5.7-5 SHARED-USE OR MULTIUSE PATH PERSPECTIVES**

**A. Shared-use or Multiuse Path Requirements**

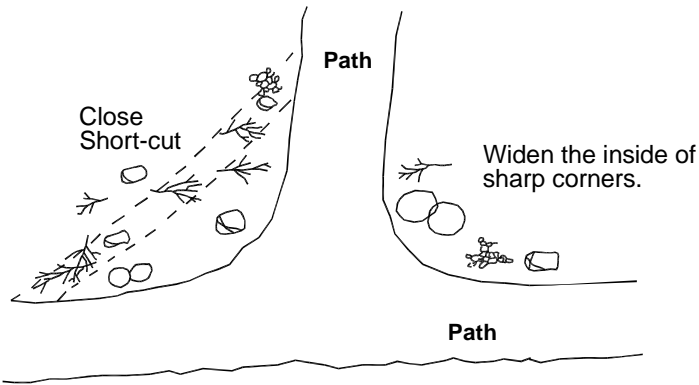
1. The path should have a minimum design speed of 20 mph.
2. The path should have a typical width of 10 feet with a 2-foot shoulder on each side.
3. There should be a width of 8 feet where paths can be paired so each can have 1-way travel, plus 2-foot shoulders.
4. There should be a width of 12 feet where heavy use is expected, especially with a high percentage of pedestrians/skaters.
5. There should be a medium broom finish on the surface. It is desirable to provide traction, but not to a degree that impedes skaters.
6. There should be material for the shoulders that can allow for recovery if a user runs off the path. Substances such as turf, decomposed granite, exposed aggregate or various ground covers are appropriate. No spiny/thorny plants.

7. Landscaping beyond the 2 foot shoulders shall not consist of vegetation that are spiny/ thorny or that have horizontal growth patterns which could encroach onto the path.
8. Irrigation systems will be installed in a manner that will not result in water spraying onto or across the path.
9. The area should be clear of fixed objects such as poles or tree trunks for another 3 feet beyond the shoulder.
10. Handrails for paths or bikeways should be minimum 42 inches in height and be flared at the ends.
11. There should be a vertical clearance of 8 feet over the path and shoulder areas, see [Figure 5.7-9](#).
12. Vertical clearance in tunnels should be 10 feet whenever possible, see [Figure 5.7-11](#).
13. Grades should be 5 percent or less. Where this is not feasible, refer to the AASHTO Guidelines. The Transportation Department will make the final decision. Maximum side slope is 2 percent.
14. Alignment should be as linear as possible; avoid compound curves, see [Figure 5.7-6](#). Excessive meandering reduces the effective width of the path and can create sight distance problems which may increase the possibility of users running off the path.
15. Adjacent grades should always direct water away from the path surface, such as using a small swale on the up-slope side.
16. Underpasses shall be designed to keep nuisance water off the path and allow the water to rapidly drain or be removed. One solution is a small channel constructed with a sloping side, built on one side of the tunnel. Sump pumps are needed in areas prone to flooding. See [Figure 5.7-11](#) and [Figure 5.7-12](#).
17. Underpasses should be lighted.
18. Path ramp design requires that the pan for any curb ramp shall be as wide as the path. The ramp should be aligned with the path and not require users to make sudden swerves or to be directed towards oncoming traffic. Refer to COS Standard Details.
19. Signage providing general location information should be located at a minimum of 1/4-mile intervals. Placement of these signs should be on or adjacent to the path. Contact the Transportation Department for specifics.

**Paths shall be constructed to be as linear as possible.  
Avoid compound curves.**

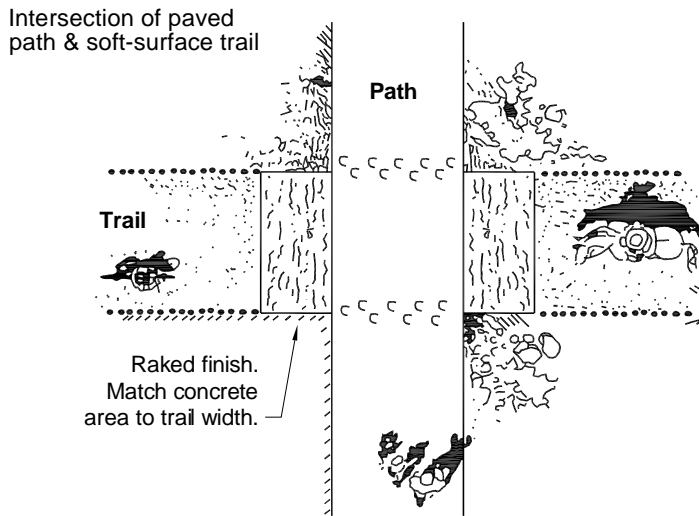


**FIGURE 5.7-6 AVOIDING FIXED OBJECTS**



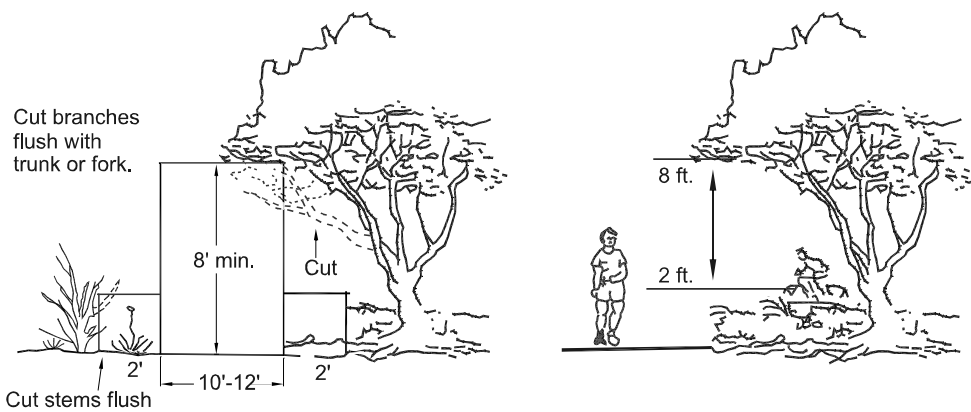
Use proper signage and wider inside curves.  
 Maintain landscape for sight distance.

**FIGURE 5.7-7 PATH - PATH INTERSECTIONS**



Use a concrete transition between trail and path to prevent dirt drag-out.

**FIGURE 5.7-8 PATH - TRAIL INTERSECTIONS**



**FIGURE 5.7-9 PATH VEGETATION CLEARANCE**

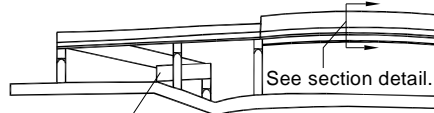
**B. Other Special Conditions**

Every attempt should be made to avoid having a shared-use or multiuse path directly adjacent to a street. If this is unavoidable, try to achieve a separation of at least 5 feet, with landscaping. If the path and street separation will be less than 5 feet, then a combination vehicular and bicycle railing and traffic barrier should be used. The top of the barrier and rail must be at least 42 inches. These railings perform the dual function of retaining both vehicles in the street and cyclists on the path, see [Figure 5.7-5](#). For path/street intersections, use grade-separated crossings (either over or underpasses) where feasible.

The majority of these crossings will be at-grade. However, certain design practices can greatly improve these at-grade crossings, whether or not they are mid-block, controlled intersections or driveway exits. Some practices found helpful in Scottsdale include making crossings of contrasting material, striping each side of the crossing, restricting median bullnoses from the path or elevating the path on a speed table. See [Figure 5.7-6](#), through [Figure 5.7-8](#) and [Figure 5.7-12](#) and COS Standard Detail No. 2281, see [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

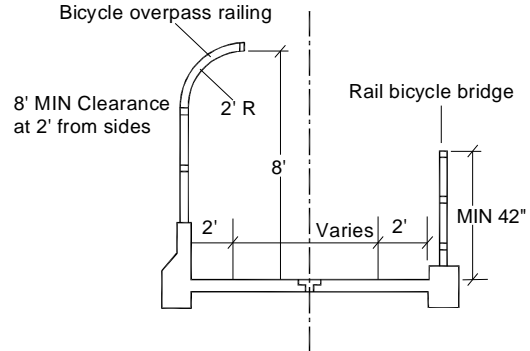
**Approach to Overpass**

See design standards for appropriate upgrades.

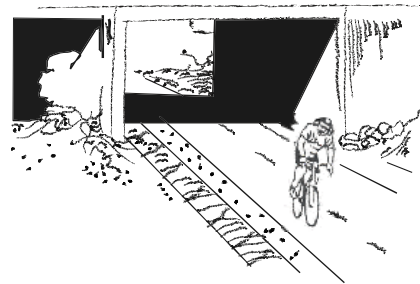
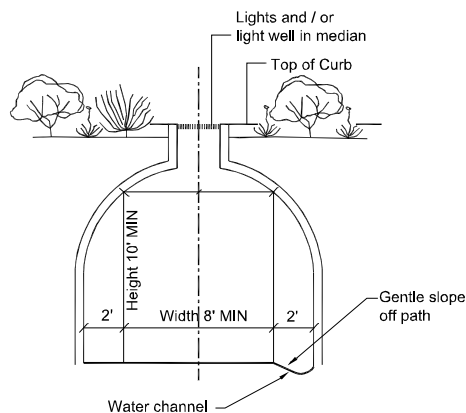


Check landing area for stopping sight distance requirements. Avoid direct entry into streets.

**Multiuse Path Bridge Section**



**FIGURE 5.7-10 SHARED USE OR MULTIUSE PATH – BRIDGES**



Path should not be reduced through the underpass.

**FIGURE 5.7-11 SHARED USE OR MULTIUSE PATH – TUNNELS**

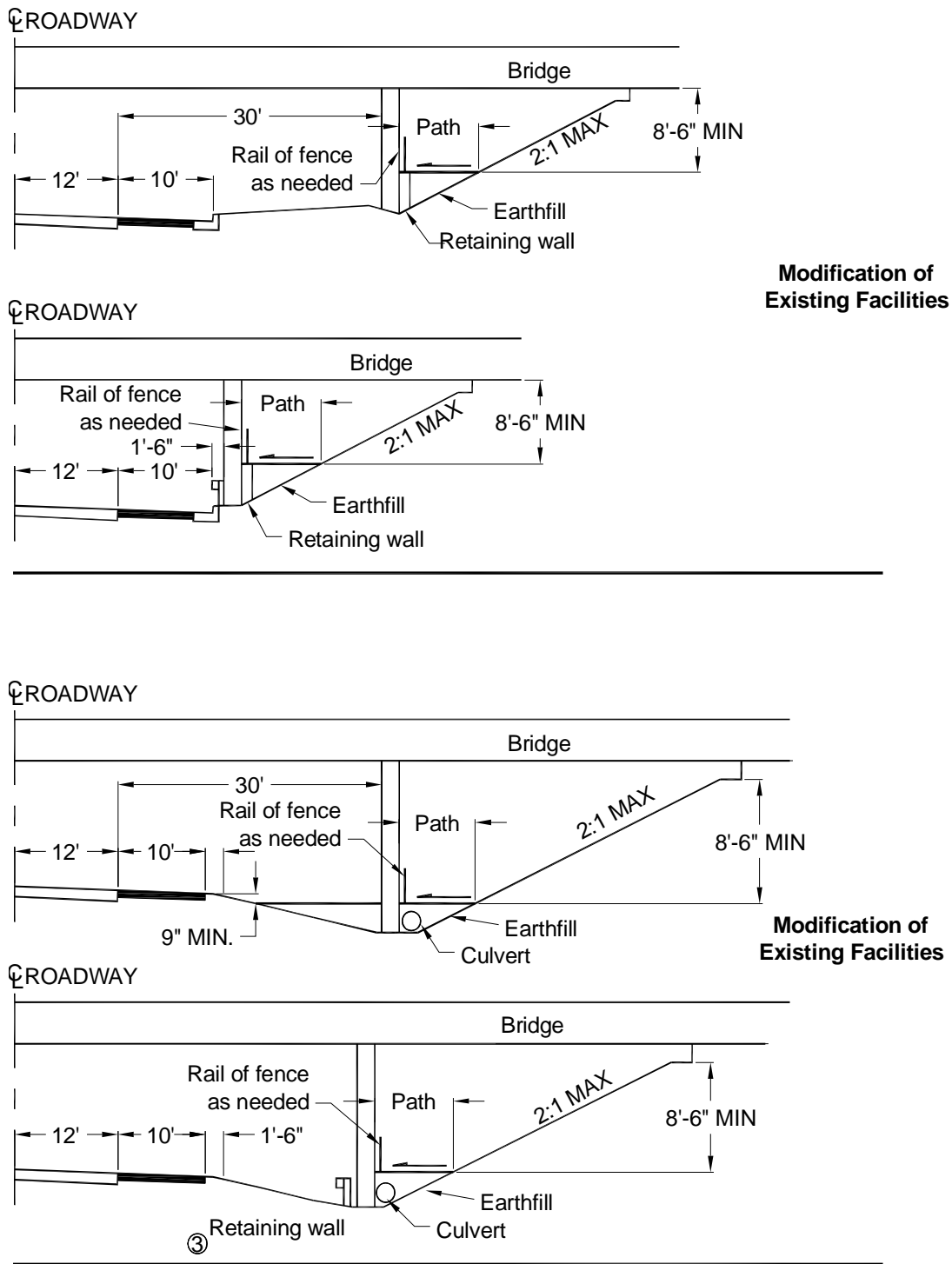


FIGURE 5.7-12 SHARED USE OR MULTIUSE PATHS UNDER BRIDGE STRUCTURES



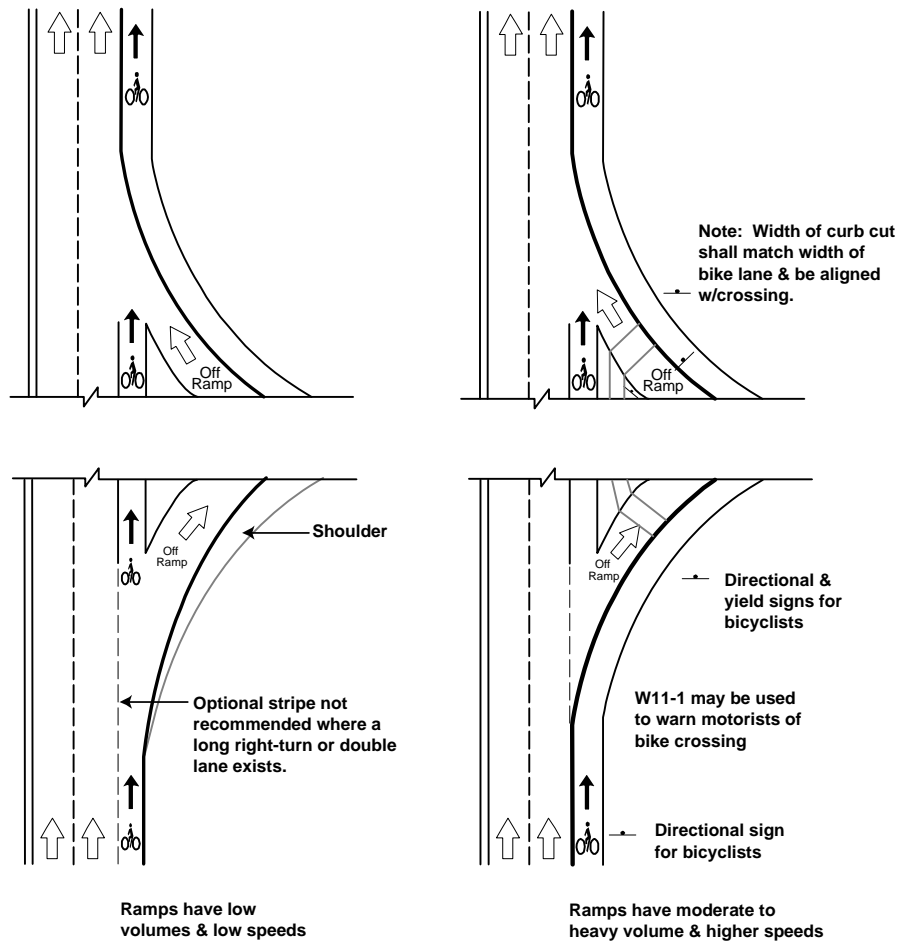


FIGURE 5.7-13 RAMP CROSSINGS

## 5-7.204

## RIDING SURFACES

Careful attention should be made to the choice of riding surface paving materials and other objects within the riding surface. Typical riding surface materials are either Portland Cement Concrete or Asphaltic Concrete Paving.

1. Portland cement concrete is desirable for paths with frequent contact with water. Paths constructed of Portland cement concrete will have a medium broom finish. The width of expansion joints should be minimized and the joints tooled with a small radius.
2. Asphalt concrete is desirable when dictated to complement aesthetics suitable to the surrounding area. Paths constructed of asphalt concrete pavement shall conform to Section 343 of the City of Scottsdale Supplement to MAG Specifications. Paving for bike lanes should meet MAG standard for surface smoothness of asphalt paving. Asphalt concrete shall include an epoxy-coated surface.

Rumble strips, raised pavement markers, or raised curbs should never be used to delineate bike lanes or shared-use or multiuse paths. They should also never be placed in bikeway crossings.

Obstructions within the riding surface should be minimized. Drainage grates within the riding surface should be avoided whenever possible. Any drainage grates that must be placed in the riding path shall have bicycle safe grating.

## TRAFFIC CONTROLS

### 5-7.300

#### SIGNS AND MARKINGS

#### 5-7.301

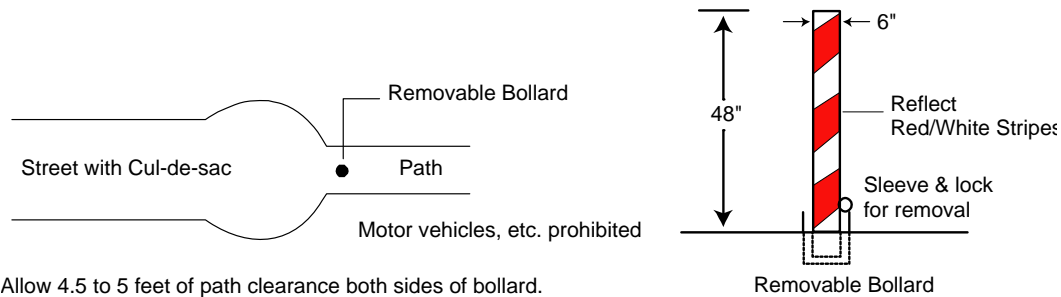
Traffic control devices for cyclists, whether they are for an on- or off-street system, must adhere to the same five basic requirements for motorists:

- Fulfill a need
- Command attention
- Convey a clear, simple meaning
- Command respect from users
- Give adequate time for a proper response

The use of colors should conform to code specifications for signs and markings:

- Yellow – General Warning,
- Red – Stop or Prohibition,
- Blue – Service Guidance,
- Brown – Recreation,
- Black – Regulation,
- White – Regulation.

See Figure [Figure 5.7-13](#) for an example.



**FIGURE 5.7-14 VEHICLE CONTROL PATH ENTRANCE (WHERE NEEDED)**

All regulatory, warning and route marker signs will be provided in accordance with the standards in the Manual on Uniform Traffic Control Devices, Section IX. In addition, the City of Scottsdale has developed signs for particular situations; see COS Standard Details Nos. 2281, 2282 and 2284, [www.ScottsdaleAZ.gov/design/COSMAGSupp/](http://www.ScottsdaleAZ.gov/design/COSMAGSupp/).

Signing and marking for bike lanes are shown in [Figure 5.7-1](#) through [Figure 5.7-4](#), [Figure 5.7-13](#) and [Figure 5.7-16](#). Shared-use or multiuse paths are shown in [Figure 5.7-13](#) and COS Standard Detail Nos. 2281, 2282 and 2284, [www.ScottsdaleAZ.gov/design/COSMAGSupp/](http://www.ScottsdaleAZ.gov/design/COSMAGSupp/). Other information is in the AASHTO Guidelines.

For bike lanes, pavement markings shall consist of a directional arrow and a bike/rider symbol. In urban areas, pavement markings shall be placed 50 to 75 feet after every major intersection or at ¼ mile intervals, whichever is less. In rural areas, the distance may change as judged appropriate by the COS Transportation Department.

Where a bike lane continues past the left side of a right-turn-only lane, a pair of pavement symbols shall be placed in that continuation.

On leaving an intersection, the lane stripe should start at the crosswalk or where the crosswalk would be. Approaching an intersection, with no right-turn lane, the stripe should be dashed 50 -75 feet before the intersection. See [Figure 5.7-15](#).

Paint and thermoplastic stripes or markings used for lanes, routes or paths should be reflective and highly non-slip.

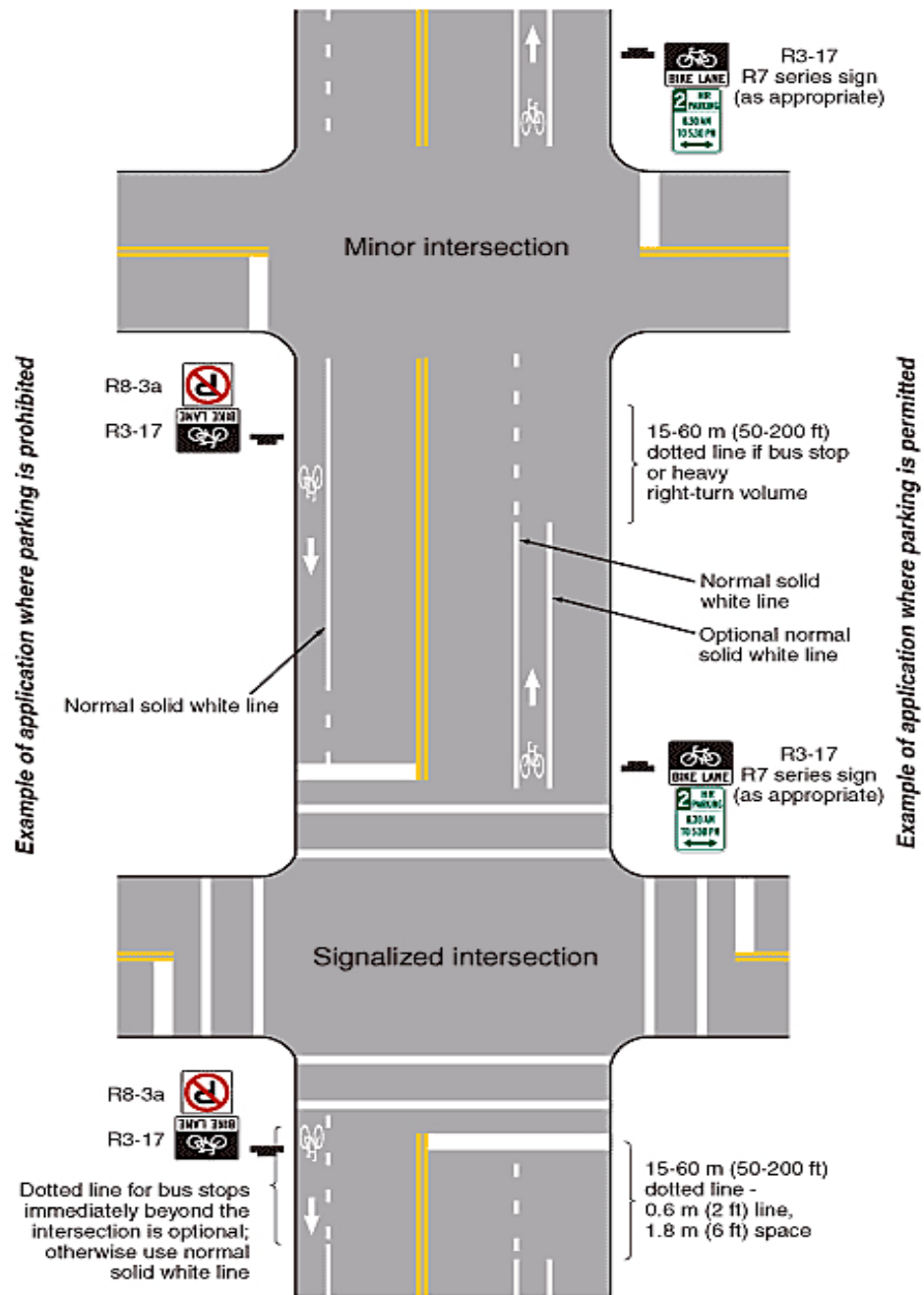


FIGURE 5.7-15 EXAMPLE OF PAVEMENT MARKINGS FOR BICYCLE LANES ON A TWO-WAY STREET

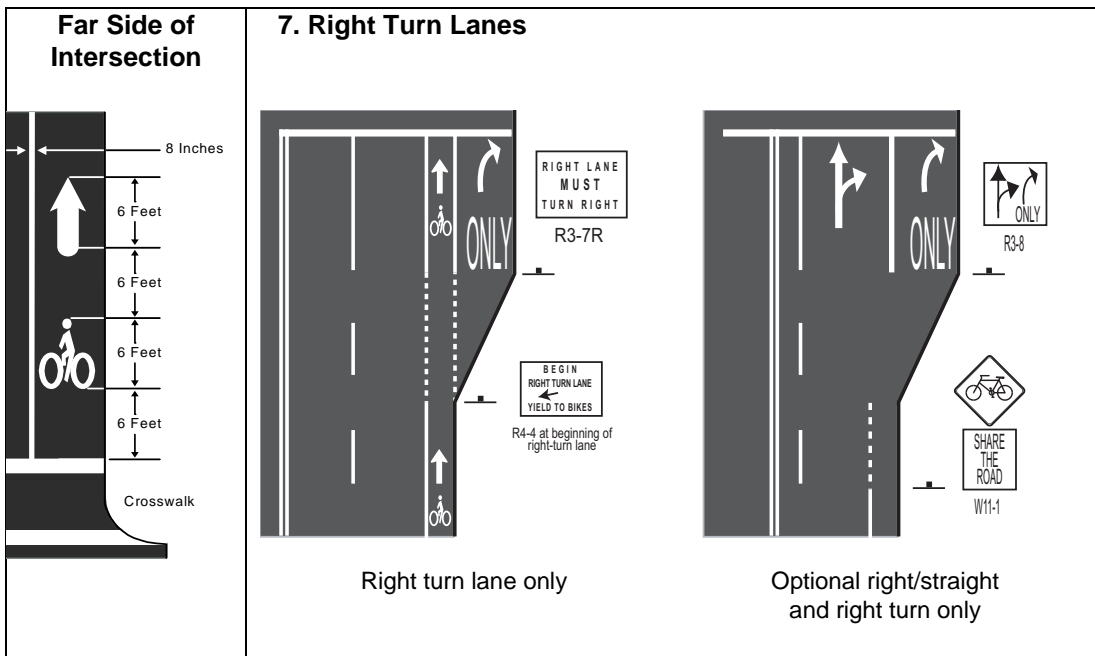


FIGURE 5.7-16 BIKE LANE MARKINGS

**DETOURS & CONSTRUCTION**

5-7.302

**A. Public Information**

Any signage, publication, map, web posting, public service announcement or other information concerning a construction closure, restriction or change always include expected effects on cyclist or pedestrian movements. This includes, but is not limited to, changes in the operation of sidewalks, shared-use or multiuse paths, bike lanes or any other bikeways.

Ideally, detours should be identified or built and well signed. Bikeway detours should only be used when the same type of facility can be provided, such as a bike lane directed to other lanes or shoulders or to a suitable shared street. Path detours should be directed to another path or suitable sidewalk, not to an on-street facility.

**B. Shared Streets, Bike Lanes and Shared-use or Multiuse Paths**

If a bike lane is closed, it shall be signed "Bike Lane Closed" and also signed "Bikes on Roadway" for the portion where cyclists will be forced to use the traffic lane. This applies to shoulders with high bicycle use, as well as cases where the work is confined to the bicycle lane.

If the traffic lanes are narrowed for construction detours, so that a car and bicycle cannot safely pass side-by-side; then cyclists and motorists should be directed as in the previous paragraph.

Special attention needs to be paid to work, such as utility, taking place only in the bike lane or shoulder area. Sometimes precautions are ignored because the vehicular traffic is not affected. However, proper signing and barricading, with lights for night warning, is still essential. Irregular surfaces, such as raised metal plates on shoulders or hoses laid across paths, can be especially hazardous and must always be well barricaded.

Signing and barricading should anticipate night use and speeds up to 25 mph. Barricades and signs should be posted at points where people are able to choose an alternate route.

Barricades, signs, etc., should not be placed or stored in bike lanes or on shoulders or paths.

Bike lanes/shoulders shall always be restored to an excellent paving condition. MAG Standard 321.5.4, Asphalt Base and Surface Course, should apply (when not in use).

## 5-7.400

### BICYCLE PARKING

The City of Scottsdale Zoning Ordinance, Section 9.103, specifies bicycle parking requirements, see [www.ScottsdaleAZ.gov/codes/zoning](http://www.ScottsdaleAZ.gov/codes/zoning).

Bicycle parking shall be located within 50 feet of the main entrance(s), in a convenient, highly visible location. Ideally, bicycle parking will be more convenient to destinations than motor vehicle parking. On a site with several businesses, bike parking should be dispersed to be convenient to individual entrances. A portion of the required parking may be located by an employee entrance.

The COS Standard Detail No. 2285 bike rack is designed to provide:

1. Secure support for the entire frame of the bike by allowing numerous contact points with the frame and one wheel, with those points being spread out both horizontally and vertically. These contact points are all in one plane. This helps prevent damage to paint, eliminates metal points that could stick out to cause damage or injury and the bicycle is prevented from sliding down or flopping over.
2. Accommodation of any size or type of bicycle with any type of luggage or equipment. The bicycle does not have to be lifted up or supported by a kickstand.
3. Ease of use and manner of use, is clear without instructions. A poor design, such as the "ribbon" or "wave" rack, allows bikes to be placed either perpendicular or parallel to the rack. Bikes parked parallel to the rack typically reduces the effective parking spaces to two bikes.
4. Secure locking with any type of lock or cable, including the "U" locks. If the front wheel is removed and repositioned, then it should be possible to lock the frame and both wheels to the rack. The rack should not require that the lock be fastened close to the bicycle chain.
5. The city rack may be painted and may be placed on concrete, turf or gravel. It may be used as singles, doubles or in rows. Each loop accommodates 2 bikes.

# PEDESTRIAN FACILITIES



This section provides resources for pedestrian facility planning and design. It provides guidance for pedestrian connections, safety, and information on accessibility, including curb ramps.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# PEDESTRIAN FACILITIES

## GENERAL INFORMATION

The City of Scottsdale (COS) is dedicated to improving the quality of life for its citizens by enhancing their mobility choices and enjoyment of the community. Pedestrians are an integral part of the transportation system because all people are pedestrians at one time or another. For example, a driver becomes a pedestrian upon leaving a vehicle. Public transportation users are pedestrians when they walk to a transit stop and again when walking to their final destination. Planning for the needs of pedestrians is an essential element of providing an efficiently functioning transportation system.

In general, people will choose to walk a ten minute trip or a quarter mile to a destination, and even longer, up to twenty minutes or a half mile, if the route is comfortable and safe or if the need is great. Site planning should consider walking distance of pedestrians from nearby transit routes or other adjacent locations, such as employment centers or residences. Like all transportation users, pedestrians seek direct, convenient travel routes.

Pedestrian facilities should provide accommodations for a wide array of users including but not limited to walkers, joggers, wheelchair users, strollers, in-line skaters, bicyclists and equestrians. These pedestrian facilities need to be universally accessible, safe, convenient, direct and designed to encourage use by this wide variety of potential users.

Minimizing curb cuts and consolidating driveways helps to maintain continuity of pedestrian routes and helps to ensure pedestrian comfort and safety. In addition, pedestrians like to be separated from moving traffic with a buffer, such as on-street parking, landscaping, or bicycle lanes. Walkways should be designed with sufficient capacity dependent on the anticipated level of use, intensity and speed of adjacent traffic, and the number of obstacles (such as utility poles, magazine stands, and street furniture) within the walkway. An effective walkway width (as usable for pedestrian travel) of at least 6 feet is required; a minimum effective walkway width of 8 feet or more is desirable in areas that will experience high pedestrian travel.

## REFERENCES

Developers, staff, and other interested parties are encouraged to reference the following two documents:

- Design Sidewalks and Trails for Access, Part 1 and Part 2, Best Practices Design Guide, Barbra McMillen, et. al, U.S. Department of Transportation, Federal Highway Administration, Publication No. FHWA-EP-01-027 HEPH/8-01 (10M) E, September 2001. Available from FHWA Report Center by e-mailing [report.center@fhwa.dot.gov](mailto:report.center@fhwa.dot.gov).
- Draft Guidelines for Accessible Public Rights-of-Way, Access Board, June 17, 2002. Available online at [www.access-board.gov](http://www.access-board.gov).

The Transportation Department is available to answer questions or to discuss applications to specific circumstances or designs.

## 5-8.100

## PEDESTRIAN FACILITIES

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### 5-8.101

### PEDESTRIAN FACILITIES

1. Walkways that connect main building entrances to the sidewalks on adjacent streets should have a minimum clear width of six (6) feet - excluding any parking overhangs or other obstructions. The walkway should be continuous between the street and building, and clearly recognizable by both pedestrians and drivers. Wider widths may be required by staff in locations where significant pedestrian traffic is anticipated and where wider sidewalk exists or is planned along the street.

In cases where a sidewalk width of six feet cannot be provided due to existing physical barriers or other constraints, a five (5) foot wide clear and continuous sidewalk width may be allowed if approved by the Planning and Development Services General Manager or designee.

2. Provide shade wherever possible for on-site walkways either through the use of tree canopies or structural canopies. Tree trunks and canopy supports should not encroach into the minimum six foot sidewalk width.
3. The minimum unobstructed width of walkways across the front of major retail centers or mixed-use buildings, especially in the Downtown area, should be 8 feet. In locations where street furniture, canopy supports, or other physical barriers encroach into the adjacent pedestrian facility, twelve (12) feet of walkway should be provided with a clear, continuous width of eight (8) feet provided across the frontage.

In cases where a sidewalk width of eight (8) feet cannot be provided along these frontages due to existing physical barriers or other constraints, a six (6) foot wide clear and continuous sidewalk width may be allowed if approved by the Planning and Development Services General Manager or designee.

## 5-8.200

## MULTIPLE PEDESTRIAN CONNECTIONS

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In an effort to improve mobility and reduce congestion, multiple pedestrian options may be desirable. For example, if three potential alternatives or alignments are available to connect pedestrian destinations, often two or all three may be chosen if it is likely to improve access, increase pedestrian use, and reduce vehicular trips. The need for multiple options will be dependent upon the cost, benefit, and convenience of the alternatives available as determined by the Transportation Department and the Planning and Development Services General manager or designee.

## 5-8.300

## PEDESTRIAN SAFETY

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Pedestrian facilities should provide short direct access by connecting through cul-de-sacs, parks, shopping centers, dead-end streets, drainage easements, and other locations that will facilitate and encourage non-motorized travel for short trips. Pedestrian facilities should include a wide variety of choices for pedestrians to improve their safety, especially when crossing vehicular roadways. These improvements may include grade-separated crossings of high speed, high volume vehicular corridors (especially in planned or existing drainage corridors); pedestrian refuges; and signalized pedestrian push buttons on warranted signals. In addition, detectable warning devices (truncated domes) should be installed at locations where it is likely that pedestrians could enter into a vehicular area, such as at pedestrian curb ramps and raised pedestrian crossings. In order to improve safety and encourage use, sidewalks and multiuse paths should be placed away from the back of curb a minimum of 4 feet, with 8 feet desired, and sometimes greater distances based on available rights-of-way or

easement. On roadways with transit routes, the sidewalk should be brought closer to the roadway to allow boarding and deboarding at transit stops.

## **CURB RAMPS**

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### **5-8.400**

Curb ramps shall be placed wherever a pedestrian access route crosses a sidewalk/street transition; at intersections, medians and alleys; and where a public sidewalk ends and pedestrian travel continues on the roadway. Curb ramps shall be wholly contained within the crosswalk markings, if they exist. Curb ramps should be flush with the street surface without "lips". Alterations in retrofit development areas shall follow guidelines for new construction unless technically infeasible as determined by the Transportation Department.

The city, to improve pedestrian access and safety, prefers the use of directional ramps at all intersections. Per the COS Details, directional ramps are preferred and should be installed at all intersections where there is room for both the ramps and the required 4-foot landing area. Where there is not room for the full directional ramp treatment, diagonal ramps with a minimum 8-foot width and 4-foot landing are acceptable; however, if there is not room for the landing, a blended transition ramp should be used. Detectable warning devices (truncated domes) should be installed in conjunction with these ramps.



# NEIGHBORHOOD TRAFFIC MANAGEMENT

This section identifies the process and criteria for reviewing and resolving neighborhood traffic concerns. It identifies goals for this program and options for resolving conflicts.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
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City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# NEIGHBORHOOD TRAFFIC MANAGEMENT

## 5-9

### GENERAL INFORMATION

5-9.000

Continued growth in Scottsdale and the region has increased Scottsdale residents' concerns regarding traffic, specifically in neighborhoods. To promote safe and pleasant conditions for residents including motorists, bicyclists, pedestrians, schoolchildren, and other users on neighborhood streets, Scottsdale's Transportation Department has created a Neighborhood Traffic Management Program (NTMP).

One component of the quality of life expected by Scottsdale residents is the safe, efficient, and economical movement of people and goods. The goal of the NTMP is to use the three "Es" (Education, Enforcement, and Engineering) to address the transportation concerns of residents who are negatively impacted by vehicular traffic in their neighborhood.

### APPLICATION

5-9.001

Application of the NTMP shall be limited to local, paved, public streets that:

- Have or are planned to have no more than one travel lane in each direction, and
- Function primarily to connect an origin or destination to an arterial (local residential & some minor collectors).

### REFERENCES

5-9.002

- MAG Standard Drawings - Maricopa Association of Governments (MAG)
- COS Supplement to MAG - City of Scottsdale (COS)
- DS&PM [Section 5-3.400](#), Roundabout Intersections
- Traffic Calming: State of the Practice - Institute of Transportation Engineers
- Manual on Uniform Traffic Control Devices - Federal Highway Administration
- A Policy on the Design of Highways and Streets - American Association of State Highway and Transportation Officials
- Roundabouts: An Informational Guide - Federal Highway Administration

### GOALS

5-9.100

The City of Scottsdale has developed its Neighborhood Traffic Management Program (NTMP) with the following goals:

1. Minimize negative impacts of traffic in neighborhoods through ongoing monitoring and improvement of the overall transportation system.
2. Work to ensure that proposed land uses, and their associated travel demands, do not negatively impact surrounding/adjacent residential neighborhoods.



3. Protect Scottsdale's residential neighborhoods from "unwanted" vehicle traffic. "Unwanted" vehicle traffic is defined as any one of the following:
  - Traffic operating at excessive speeds
  - Vehicles with an origin and destination outside the neighborhood
  - An excessive volume of traffic on a residential local or collector street
4. Balance the often-conflicting needs of calming traffic and maintaining emergency response capability. Emergency vehicle access must be preserved.
5. Address resident traffic concerns while minimizing any negative affects to other citizens and neighborhoods.
6. Encourage and enhance bicycle, pedestrian, and other non-motorized travel modes.
7. Accommodate direct bicycle, pedestrian, and other non-motorized access through drainage channels, dead ends, walls, cul-de-sacs, open space, and other barriers to reach neighborhood destinations such as homes, schools, parks, libraries, retail centers, civic spaces, and trip generators. Generally, an easement is required to accomplish these purposes.
8. The NTMP is not designed to address dangerous intersections, mitigate noise, or to redesign the overall transportation/street classification system, as these concerns should be addressed separately.
9. Achieve broad-based citizen participation, which is an essential element in the development of an effective Neighborhood Traffic Management Program.

More information is available online at [www.ScottsdaleAZ.gov/safety/speed/](http://www.ScottsdaleAZ.gov/safety/speed/).

## 5-9.200

## PROCEDURES

Traffic calming requests will be initially forwarded through the Speed Awareness Program (SAP) within the Citizen and Neighborhood Resources Department (CNR). The SAP coordinator will forward traffic calming requests that need further attention to Traffic Engineering for review.

Traffic Engineering will then make recommendations as to the issues, potential remedies, and procedures.

All traffic calming requests related to development activity will be reviewed by Transportation Department as part of the development review process. Developers are not to make proposals directly to residents without consulting Traffic Engineering staff. Traffic Engineering staff will review and make recommendations that may include:

- Design mitigation
- A formal Traffic Impact Mitigation Analysis (TIMA) process – see [Section 5-1.100](#)
- Neighborhood meetings
- Review by Transportation Commission

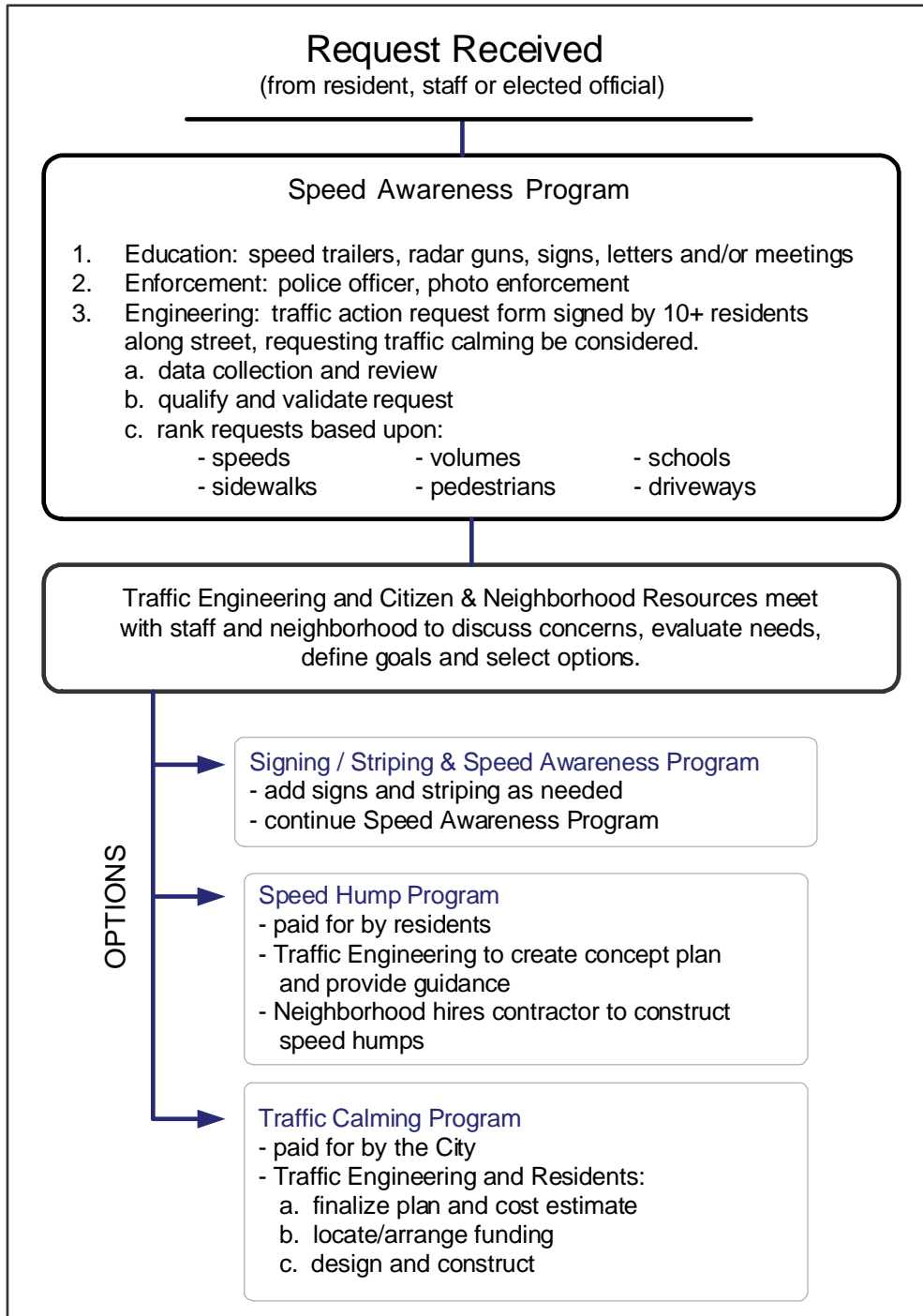


FIGURE 5.9-1 NEIGHBORHOOD TRAFFIC MANAGEMENT PROGRAM FLOWCHART



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# FLEXIBLE PAVEMENT

This section describes procedures for designing structural sections of flexible pavements constructed within the city's public rights-of-way. Developers of private property normally do this construction as a condition of development as stipulated by the city.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
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Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# FLEXIBLE PAVEMENT

# 5-10

## ASPHALTIC CONCRETE

### 5-10.100

### DEPTH AND MIX REQUIREMENTS

### 5-10.101

The asphalt concrete portion of a flexible pavement shall have a minimum depth, number of courses, and mix design called for by street classification in Figure 5.10-1. The mix design references are taken from the East Valley Asphalt Committee Design Standards and from Section 710 of the MAG Specifications and the City of Scottsdale (COS) Supplements to MAG and city of Phoenix Asphaltic Concrete Design Specifications. Mix designs and course thicknesses other than those specified in Figure 5.10-1 may not be used unless approval to do so is provided by the Chief Development Officer or appointed designee. Minimum lift thicknesses are also outlined in Table 710-1 of the COS Supplements to MAG Specifications. The mix design and course thicknesses are to be clearly indicated on paving plans for public rights-of-way improvements.

STREET CLASSIFICATION	MIN. DEPTH	TYPE OF MIX (From MAG TABLE 710-1)		
		Asphalt Base - 1st Lift	Asphalt Base - 2nd Lift	Rubberized Asphalt Surface Course**
Local Residential Minor Collector Local Commercial Local Industrial	3"	2" of R-1/5"		1" of 1/2" gap graded rubberized asphalt **
Major Collector	5"	2-1/2" of A-3/4"	1-1/2" of A-1/2"	1" of 1/2" gap graded rubberized asphalt **
Minor Arterial Major Arterial	6-1/2"	3" of A-3/4"	2-1/2" of A-3/4"	1" of 1/2" gap graded rubberized asphalt**

*\*\*Reference city of Phoenix specifications*

**FIGURE 5.10-1 MINIMUM ASPHALT CONCRETE DEPTH REQUIREMENTS**

### USE OF RECYCLED ASPHALT CONCRETE

### 5-10.102

Recycled asphalt concrete may not be used in the construction of asphalt concrete pavements.

## 5-10.200

## SOIL TESTING REQUIREMENTS

---

### 5-10.201

### SUBGRADE SAMPLING LOCATIONS

There should be at least one sample taken at the depth of the planned subgrade for each type of soil found on the project site. There should also be at least one sample for each type of soil used as fill material on which a roadway is to be built. The engineer responsible for the pavement design should take samples in locations that will provide an accurate representation of the subgrade lying beneath the pavement.

### 5-10.202

### TYPE OF TESTS

The following tests are required for design procedures indicated and must be performed in accordance with the American Society for Testing Materials (ASTM) procedures.

1. To use the base course design standards and policies for minor streets described in [Section 5-10.300](#), the following tests are required:
  - a. Sieve analysis is needed to determine the percent passing #200 sieve.
  - b. Atterberg-Limits tests for each sample (this determines the liquid limit and plastic limit to establish the plasticity index.)
2. To use the base course design procedures for major streets described in [Section 5-10.400](#), or to use the structural section design procedures described in [Section 5-10.500](#), R-value testing is required.
  - a. R-value determination shall be made for exudation pressure of 3000 psi. Each pavement thickness design must be based on the R-values determined by the tests, and for each length of pavement to be constructed with a constant thickness design, the lowest R-value within that length of pavement will be used. If the engineer elects not to run R-value tests on every subgrade sample, the design report must indicate the basis on which the engineer selected the samples for the R-value tests.
3. Swelling tests are needed if the soil type indicates the presence of soils tending to swell significantly with added moisture.

### 5-10.203

### PAVEMENT DESIGN REPORT

A pavement design report is required for each development or project in which paving in the public rights-of-way will be done. This report must be submitted with the paving plans (or be a part of them) and must describe the soil test results and design choices.

The report must include the following:

1. A map of the project area showing identification and location of each sample taken.
2. A description of the soil conditions.
3. A listing of the test results on each sample.
4. A statement of conclusions applicable to the pavement design.

## 5-10.300

## BASE COURSE FOR MINOR STREETS

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### 5-10.301

### BASE COURSE DESIGN CHARTS

The two design charts for the base courses of minor streets are shown in the following two figures:

1. [Figure 5.10-2](#) is a chart for the design of base courses for Local Residential Streets.

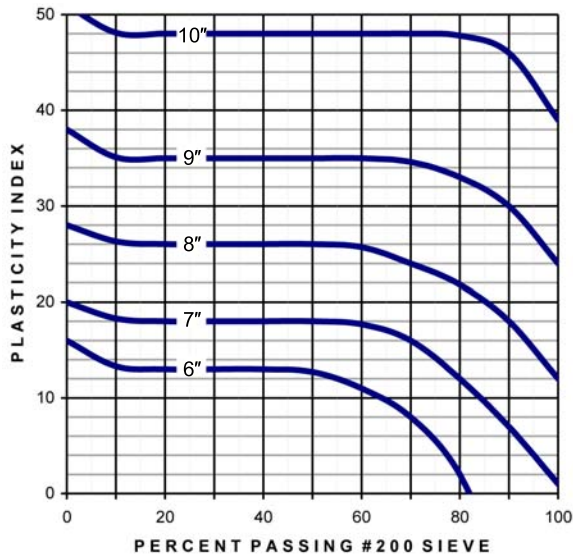


FIGURE 5.10-2 MINIMUM DEPTH OF BASE COURSE FOR RESIDENTIAL STREETS

2. Figure 5.10-3 is a chart for the design of base courses for:

- Minor Collector Streets
- Local Commercial Streets
- Local Industrial Streets

Note: The top 4 inches of the base course shall be Aggregate Base Course (ABC) and the balance shall be ABC or select material.

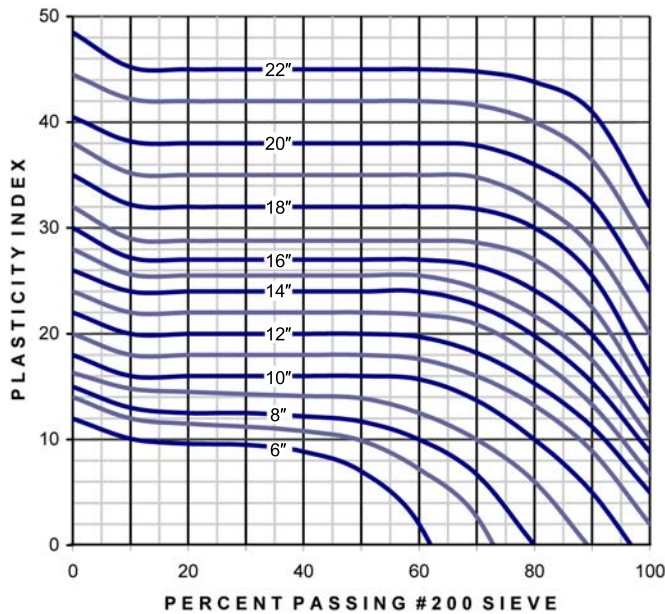


FIGURE 5.10-3 BASE COURSE FOR LOCAL & MINOR COLLECTORS, LOCAL COMMERCIAL, & LOCAL INDUSTRIAL STREETS



## 5-10.302

**BASE COURSE SELECTION PROCEDURE**

Determine a minimum base course depth by cross-referencing the plasticity index to the percent of soil passing the #200 sieve (determined by the subgrade soils tests).

**Example:**

If building a minor collector street on subgrade soil with a Plasticity Index of 12, and 60% of the soil passes the #200 sieve, the base course depth will be 9 inches ([Figure 5.10-3](#)). A local residential street on the same subgrade soil will have a base course of 7 inches ([Figure 5.10-2](#)). Referring to [Figure 5.10-1](#), we find that at least 3 inches of R-3/4" asphalt concrete will be placed over either of these two bases.

## 5-10.303

**SUBSTITUTION OF ASPHALT CONCRETE**

If the total structural section depth determined with the use of [Figure 5.10-1](#) through [Figure 5.10-3](#) is undesirable, a deeper asphalt concrete section can be used in lieu of some or all of the aggregate base material at a rate of 1 inch of asphalt concrete for 3 inches of aggregate base material. The design for a minor collector street described in the example above could be changed to a 3-1/2-inch-deep asphalt concrete course over a 6-inch-deep base course. This reduces the structural section from 11-1/2 inches to 9-1/2 inches.

## 5-10.400

**BASE COURSE FOR MAJOR STREETS**

## 5-10.401

**BASE COURSE DESIGN CHART**

The base course depths listed in Figure 5.10-4 below are arranged in accordance with the street classifications and the R-values determined in the subgrade testing. The depths are determined by the procedures used for design of structural sections described in [Section 5-10.500](#). For a given street classification, the street with the heaviest current and projected traffic loading was used to determine the range of base course depths for all streets of that classification; therefore, the base course depths listed in this chart will provide conservative pavement designs.

Street Classification	R-Values										
	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50+
Major Collector	26	24	22	20	18	16	14	12	11	10	9
Minor Arterial Major Arterials	29	27	25	23	20	18	16	14	12	10	9

**FIGURE 5.10-4 MINIMUM DEPTH OF BASE COURSE**

## 5-10.402

**BASE COURSE SELECTION PROCEDURE**

A base course depth is selected for a major street by finding the depth in inches for the appropriate street classification under the proper R-value range.

**Example:**

If a major collector street were built on subgrade soil with an R-value of 38, the base course would be 12 inches deep. According to [Figure 5.10-1](#), at least 5 inches of asphalt concrete must be laid over the base course.

## SUBSTITUTION OF ASPHALT CONCRETE

5-10.403

If the total structural section depth determined with the use of [Figure 5.10-1](#) and [Figure 5.10-4](#) is undesirable, a deeper asphalt concrete section can be used in lieu of some or all of the aggregate base material at the rate of 1 inch of asphalt concrete for 3 inches of aggregate base material.

## DESIGN OF STRUCTURAL SECTIONS

5-10.500

### MODIFIED AASHTO DESIGN PROCEDURES FOR EXPRESSWAYS

5-10.501

The American Association of State Highway and Transportation Officials (AASHTO) published a guide for the design of pavement structures in 1961 and a revised guide in 1972. The Arizona Department of Transportation (ADOT) modified the procedures provided in the AASHTO design guide to meet requirements for the State of Arizona. The city of Phoenix uses the ADOT modified procedures and has selected certain design coefficients appropriate to the Phoenix metropolitan area. The City of Scottsdale also uses the ADOT-modified procedures with the city of Phoenix coefficients.

#### A. Assumptions

ADOT uses its own adoption of the procedures outlined in the “AASHTO Guide for Design of Pavement Structures” published in 1961 and revised in 1972. The following assumptions must be made:

1. The soil support capacity of the subgrade soils can be predicted adequately by testing to determine R-values.
2. The R-values can be effectively related to a soil-bearing capacity rating scale called the soil support value (SS).
3. A suitable pavement depth is determined by a procedure that considers the soil support value in conjunction with projected traffics loading, environmental conditions, and weighted structural values for the various components of the pavement structure.

### DESIGN PARAMETERS

5-10.502

#### 1. Soil Support Value

The soil support value represents the bearing capacity of the subgrade soil. It is determined by a relationship established between its scale and the R-value scale, as shown in [Figure 5.10-5](#). This relationship is not uniform throughout the country. ADOT has established the relationship determined by the following equation.

$SS = 0.094R + 1.75$ <p>SS = Soil Support Value R = R-Value</p>
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#### 2. Serviceability Index

Serviceability Index is a number that represents the surface condition of roadway in terms of ride-ability, cracking, patching, and rutting at some point in its design life. It is used in the design equation to represent the theoretical loss of serviceability over the 20-year design period. **The Initial Serviceability Index is 5.0.** The Terminal Serviceability Index varies, depending upon the level of service desired. **Scottsdale uses a Terminal Serviceability Index of 2.5.**

R-Value	Soil Support Value	R-Value	Soil Support Value	R-Value	Soil Support Value
0	1.750	30	4.570	60	7.390
1	1.844	31	4.664	61	7.484
2	1.938	32	4.758	62	7.578
3	2.032	33	4.852	63	7.672
4	2.126	34	4.946	64	7.766
5	2.220	35	5.040	65	7.880
6	2.314	36	5.134	66	7.954
7	2.408	37	5.226	67	8.048
8	2.502	38	5.322	68	8.142
9	2.596	39	5.416	69	8.236
10	2.690	40	5.510	70	8.330
11	2.784	41	5.604	71	8.424
12	2.878	42	5.698	72	8.518
13	2.972	43	5.792	73	8.612
14	3.066	44	5.886	74	8.706
15	3.160	45	5.980	75	8.800
16	3.254	46	6.074	76	8.894
17	3.348	47	6.168	77	8.958
18	3.442	48	6.262	78	9.082
19	3.536	49	6.358	79	9.176
20	3.630	50	6.450	80	9.270
21	3.724	51	6.544	81	9.364
22	3.818	52	6.638	82	9.458
23	3.912	53	6.732	83	9.552
24	4.006	54	6.826	84	9.646
25	4.100	55	6.920	85	9.740
26	4.194	56	7.014	86	9.834
27	4.288	57	7.108	87	9.928
28	4.382	58	7.202	88+	10.000
29	4.476	59	7.296		

**FIGURE 5.10-5 ADOT MATERIAL SERVICES  
R-VALUE & SOIL SUPPORT VALUE RELATIONSHIPS**

### 3. The Structural Number

The Structural Number is derived from an analysis of traffic, subgrade soil conditions, and environmental conditions, and is used in conjunction with structural layer coefficients (related to the type of material used in each layer) to calculate the thickness of a flexible pavement structure consisting of various flexible layers.

The following is the equation for the structural number developed from data accumulated by AASHTO:

$$SN = -1 \left[ \frac{(10504)(W_t^{0.10684})(R^{0.10684})}{10^{0.039714(SS-3)}(10^{0.10684}(Gt/B))} \right]$$

SN = Structural Number  
 W<sub>t</sub> = Total 18,000 pound, single-axle loads  
 R = Regional Factor=1.0  
 SS = Soil Support Value

$$B = 0.40 + \frac{(0.081 \cdot 19^{3.23})}{(SN+1)^{5.19}}$$

$$Gt = \frac{(P_o - P_t)}{(P_o - 1.5)}$$

P<sub>o</sub> = Initial Serviceability Index = 5.0  
 P<sub>t</sub> = Terminal Serviceability Index = 2.5

Since "SN" appears on both sides of the equation, the solution can be most rapidly done by nomograph. Figure 5.10-6 is a nomograph developed by ADOT for this purpose, with a **Terminal Serviceability Index of 2.5** and a **Regional Factor of 1.0**.

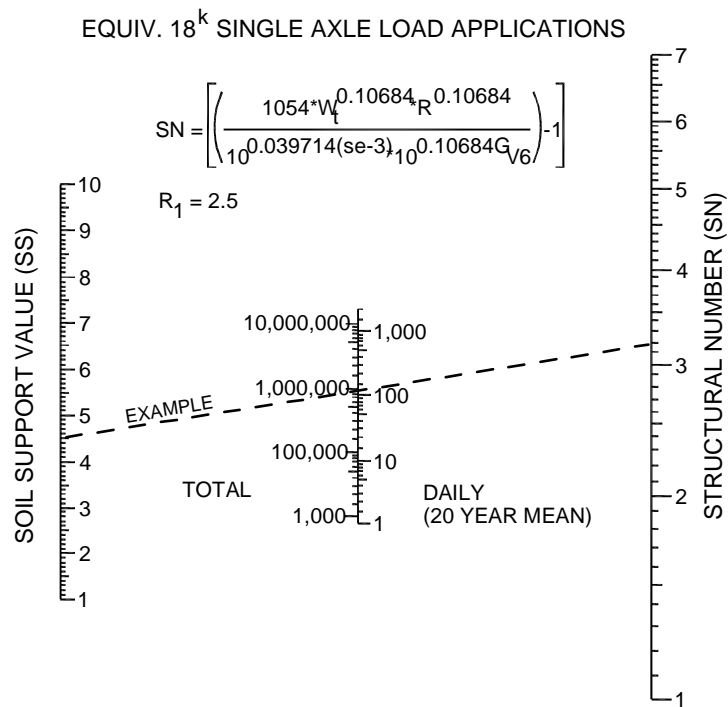


FIGURE 5.10-6 FLEXIBLE PAVEMENTS, 20-YEAR TRAFFIC ANALYSIS

**Example:**

Soil Support Value = 4.5  
 Equivalent 18<sup>k</sup> single axle load app. daily (20 year mean) = 140

**SN = 3.2**

## 5-10.503

**PROJECTED TRAFFIC LOADING**

The Projected Traffic Loading is an equivalent daily application of 18,000-pound (18K) single-axle loads. All vehicle use data during a 20-year period of time must be converted to equivalent 18K single-axle load applications to use with [Figure 5.10-6](#). The load applications can be expressed either as a daily 20-year mean or as the total of the load applications applied over a 20-year mean, times 365, times 20. The data required consists of the following:

- Current Average Daily Trips (ADT) (traffic flowing in both directions)
- The 20th year ADT (traffic flowing in both directions)
- Percentage of each type of vehicle classification

The steps described below will provide the vehicle load information used in [Figure 5.10-6](#).

**1. Average ADT in One Direction**

Determine the average of the current ADT and the terminal year ADT, then divide by 2 to arrive at an average ADT in one direction. Express this quantity in terms of thousands of vehicles.

*Example:*

Current ADT = 19,500 vehicles

Terminal ADT = 33,000 vehicles

$$[(19.5+33.0) / 2] (0.5) = 13.125$$

**2. Equivalent Single Axle Loads**

Calculate the 18K equivalent single-axle load applications using the vehicle distribution percentages determined by a traffic survey and the 18K single-axle load for each type of vehicle listed in [Figure 5.10-7](#).

Notation	Type of Vehicle	18k Single-Axle Equiv. Per 1000 Vehicles
C	Passenger cars	0.8
B	Buses	250.0
2P	Light 4-tire trucks	1.2
2S	Heavy 4-tire trucks	5.8
2D	2-axle, 6-tire trucks	163.2
3D	3-axle trucks	598.7
2S1	2-axle tractor, 1-axle semi-trailer	408.2
2S2	2-axle tractor, 2-axle semi-trailer	956.5
3S2	3-axle tractor, 2-axle semi-trailer	514.3
2-2	2-axle truck, 2-axle semi-trailer	304.3
3-2	3-axle truck, 2-axle full trailer	936.8
3-3	3-axle truck, 3-axle full trailer	936.8
2S1-2	2-axle tractor, 1-axle semi-trailer, 2-axle full trailer	846.7
3S1-2	3-axle tractor, 1-axle semi-trailer, 2-axle full trailer	958.0

**FIGURE 5.10-7 18K SINGLE-AXLE EQUIVALENT LOADS BY TYPE OF VEHICLE**

**Example:**

If commercial vehicles make up 23.9% of all vehicles using the roadway, heavy four-tire trucks (Type 2S) make up 18.3% of all commercial vehicles, and the Type 2S 18K single-axle equivalent per 1,000 vehicles is 5.8, as indicated in [Figure 5.10-7](#), then the load application for this type of vehicle per 1,000 vehicles is:

$$(0.239)(0.183)(5.8) = 0.254$$

**3. 20-Year Mean**

The sum of all such loads is the equivalent 18K single-axle load per 1,000 vehicles traveling the road. This sum must be multiplied by the average ADT for traffic in one direction calculated above in Step 1. The result of this multiplication is the number of daily, 20-year mean, equivalent 18K single-axle loads produced by traffic moving in one direction.

**4. Lane Load**

For streets with more than one lane in each direction, multiply the load calculated in Step 3 above by the following appropriate factor to calculate the design lane load:

- a. If the street is to have 2 lanes in each direction, multiply the number of equivalent 18K single-axle loads by 0.90 to arrive at a design lane equivalent 18K single-axle loading.
- b. If the street is to have 3 lanes in each direction, multiply the number of equivalent 18K single-axle loads by 0.70 to arrive at a design lane equivalent 18K single-axle loading.

The calculations described above provide the number of daily equivalent 18K single-axle (20-year mean) loads to be used in [Figure 5.10-6](#).

**REGIONAL FACTOR**

The Regional Factor is used to adjust the Structural Number for climatic and environmental conditions different from those of the AASHTO road test site. The Regional Factor is 1.0. The nomograph shown on [Figure 5.10-6](#) is an abbreviated form of the nomograph prepared by ADOT; no adjustment of the Structural Number for regional conditions is needed.

**STRUCTURAL COEFFICIENTS**

The components of the pavement structure are assigned structural coefficients to be used with the structural number in developing the design of pavement section. The coefficients shown below were developed by the city of Phoenix from experience, tests, and correlation with information in ADOT design manuals and MAG Specifications.

Local Pavement Component	ADOT Range	Local Coefficient
Asphaltic Concrete (plant mix)	0.34 to 0.46	0.39
Bituminous Treated Base	0.30 to 0.35	0.31
Cement Treated Base*	0.15 to 0.29	0.23
Aggregate Base	0.08 to 0.14	0.12
Select Material	0.05 to 0.12	0.11

\*The Cement Treated Base coefficient is for plant mix. If a road mix is used, the percentage of cement to be used must be increased by 0.5%.

**FIGURE 5.10-8 STRUCTURAL COEFFICIENTS**

5-10.504

5-10.505

## 5-10.506

## THE DESIGN PROCEDURE

1. Determine the Structural Number (SN) for the pavement to be designed, using the following method:
  - a. Determine the R-values by testing and select an R-value for the design, using the formula found in [Section 5-10.502\(1\)](#).
  - b. Calculate the equivalent 18K single-axle load application for the length of the street for which the pavement design is required, using the calculation described in [Section 5-10.503](#).
  - c. Using the Soil Support Value obtained in Step 1-a above, plot that value on the Soil Support Value Scale in [Figure 5.10-6](#).
  - d. Using the equivalent 18K single-axle, 20-year load total or the daily, 20-year mean traffic loading data obtained in Step 1-b above, plot the traffic load on the appropriate scale on [Figure 5.10-6](#).
  - e. Draw a straight line from the point plotted on the Soil Support Value Scale of [Figure 5.10-6](#) through the point plotted on the equivalent 18K single-axle load scale until it intersects the Structural Number Scale. Use the Structural Number that can be read at its intersection for the pavement design.
2. Use the Structural Number to calculate the thickness of the structural components with the following equation:

$$C1D1 + C2C2 + C3D3...CNDN = SN$$

$C1, C2, C3$  = Structural Coefficient (from [Section 5-10.505](#))

$D1, D2, D3...=$  Thickness of Component

**Example:**

From [Section 5-10.505](#), we find that the structural coefficients are 0.39 for the asphaltic concrete, 0.12 for the ABC and 0.11 for the select material. The calculation of the thickness of the select material (SM) is accomplished in the following manner:

$$C1D1 + C2D2 + C3D3 = SN$$

$$(0.39)(5) + (0.12)(4) + (0.11)(SM) = 3.2$$

Solving for SM and rounding off to the nearest inch:

$$SM = 7.0 \text{ inches}$$

## Chapter 6

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# WATER



This chapter provides ordinance, policy, and standards establishing design criteria for constructing and modifying water systems to be owned and operated by the city. It provides guidance on agreements, design report preparation, transmission and distribution systems, fire protection and final plans preparation.





## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# WATER

# 6-1

## GENERAL INFORMATION

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## 6-1.000

### A. Ordinance Requirements

Developers shall install at their expense, all improvements necessary to provide water service to their development. This will include pump stations, reservoirs, transmission mains, pressure reducing valves or other facilities, and the payment of all required development fees. See Scottsdale Revised Code, Section 49-73.

There is a program for extension of the city's water system to newly developed areas and subdivisions inside the city's service area where city water service is desired and available. See Scottsdale Revised Code, Section 49-212.

The City Code can be found on-line at [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

### B. Design Policy

A civil engineer registered in the State of Arizona shall analyze all proposed development that is determined by the city to have an impact on the water distribution system. The effects of peak and fire flow demands will be examined to ensure proper sizing and layout of proposed water system facilities.

### C. Diligence

It is strongly advised that developers and property owners verify the need for any water extensions necessary to provide service to a site and comply with the extension/frontage requirements of the city's Code.

Available Resources:

1. Records counter – obtain existing utility maps and as-built drawings.
2. City Code – generally Chapters 47 through 49 available at [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).
3. City's website – Home Improvement Center at [www.ScottsdaleAZ.gov/bldgresources/MyHome](http://www.ScottsdaleAZ.gov/bldgresources/MyHome).
4. A city civil plans examiner and/or a city water resources engineer can confirm the need for any required extension or condition for water service.

Information obtained from the city will be good for a six month period.

## ENVIRONMENTAL QUALITY REQUIREMENTS

## 6-1.001

Maricopa County Environmental Services Department (MCESD) is required to review and approve all public water main extensions and construction of water related facilities within the city's service area, prior to the city approving the final plans. Relocation or realignment of an existing water line to resolve a utility conflict does not require County approval.

Engineering Bulletin No. 10, "Guidelines for the Construction of Water Systems" published by the Arizona Department of Environmental Quality and Arizona Administrative Code, "Title 18 - Environmental Quality", contain specific requirements for submittals, approvals and notifications when extension of a public water line is proposed. Some of the provisions of these documents are outlined below. It is the responsibility of the developer and the engineer to read and comply with the applicable requirements of these documents.

1. Prior to city approval of final plans, the developer will submit a cover sheet for the final plans with a completed signature and date of approval from MCESD.
2. Before commencing construction, the contractor or developer will provide documentation to the city public works inspector that a Certificate of Approval to Construct and/or Provisional Verification of General Permit Conformance has been approved by MCESD. The Public Water Supply Number Signature Form will be signed by the Water Resources Engineer accepting the design report. See [Section 6-1.104](#) for city water system information.  
Contact MCESD at 602-506-6666.
3. Before building permits are issued, the developer will submit to the city public works inspector a Certificate of Approval of Construction and/or Verification of General Permit Conformance signed by MCESD for the water line extension.
4. Prior to Inspection Services issuing a Letter of Acceptance, the developer must deliver to the Public Works Inspector an acceptable set of full-size 4 mil as-built Mylars of the improvements.

## 6-1.002

### PRIVATE WATER COMPANIES

Portions of Scottsdale's municipal area are provided water service by private water companies. [Figure 6.1-1](#) delineates those areas.

Proposed private water lines located within the city's rights-of-ways or easements will require an agreement between the city and the private water company delineating liability and maintenance responsibilities. Water line design and materials shall comply with the requirements for city water lines.

Private water companies should review and approve the construction of, and modification to, water systems within their franchise areas. The developer will submit to Plan Review Services written documentation that the private water company has approved facilities shown on the final plans before the city grants approval.

The city cannot provide water service within private water company franchise areas, and will not review private water system plans unless requested by the water system owner, or the work will occur within the city's rights-of-way or easement. In cases where the city is requested to review private water systems, the applicable review fees must be paid. A note will be placed on the final plans stating that the operation and maintenance of franchise lines is not the responsibility of the city.

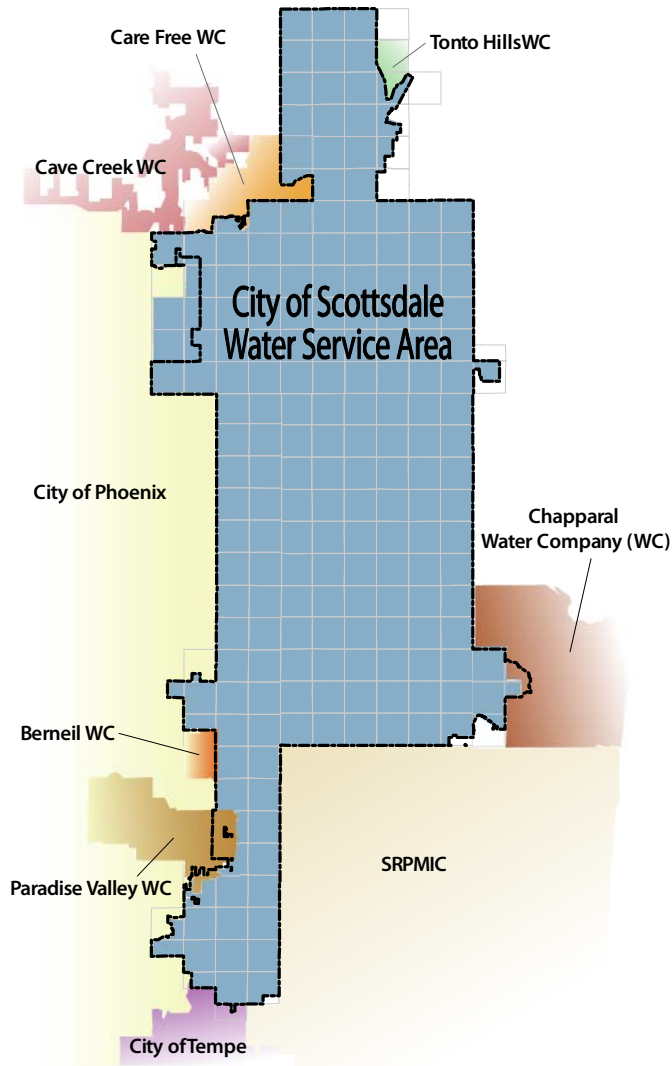


FIGURE 6.1-1 WATER SERVICE AREAS

## AGREEMENTS

## 6-1.100

Developers and property owners who install improvements to the public water system may be eligible to request a credit, oversizing, or payback agreement with the city allowing for partial reimbursement of costs to design and construct those improvements.

### A. Ordinance Requirements

Developers who construct water system improvements may receive credit for such construction, see Scottsdale Revised Code, Section 49-74.2\*. The city has specific reimbursement agreements for developers or property owners that allow them to collect line payback charges and compensation for the cost of oversizing water lines, see Scottsdale Revised Code Section 49-212 and \*[www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

### CREDIT AGREEMENTS

## 6-1.101

Credit agreements are established to compensate a developer for installing system infrastructure that has been identified in the city's Capital Improvement Plan and/or included in

the most recent Development Fees Report. Credit agreements are set up through the Water Resources Department and are to be identified in the developer's master plan.

**6-1.102****OVERSIZE AGREEMENTS**

Oversizing Agreements will allow the city to compensate developers for the cost to install a water line larger than what is minimally required to serve the development. This typically occurs where water extensions are proposed on 1 and 1/2 (section and mid-section line) streets, or areas with projected future growth. All oversizing projects involving city funds must have an oversizing agreement and must meet all city requirements. The city can only participate in the cost of oversizing provided there are sufficient funds in the capital improvements budget and the amount does not exceed the limitations set forth by the Arizona Revised Statutes, Title 34, Article 2, Paragraph 201.D. If sufficient funds do not exist, the oversized lines will be installed at the developer's cost. For more information on oversizing agreements contact the Water Resources Department at 480-312-5685.

**6-1.103****PAYBACK AGREEMENTS**

Developers may request a line extension payback agreement when they construct local distribution lines across frontages of parcels not currently receiving water service from the city. Line extension payback agreements are set up through the Water Resources Department. For questions or details on procedures to initiate an agreement, contact the Water Resources Department. The Extension Participation Program (see [www.ScottsdaleAZ.gov/bldgresources/counterresources/waterfeepacket/ExtensionParticipation](http://www.ScottsdaleAZ.gov/bldgresources/counterresources/waterfeepacket/ExtensionParticipation)) may be available to single family property owners required to extend public water lines to their lot for service.

**6-1.104****WATER SERVICE AGREEMENTS**

The County's Water Service Agreement form should be completed by the engineer and submitted with the final plans to the One Stop Shop. Plan Review staff sign the water and wastewater service agreement and Solid Waste Management Division staff sign the refuse service. It is the owner's responsibility to obtain these signatures from the respective city divisions. The agreements will not be signed prior to the city approving the final plans. Following is the specific information regarding the Scottsdale municipal water system and the appropriate identification numbers:

- Potable water system # 07- 098
- System Name: City of Scottsdale Water Campus
- Address: 8787 E. Hualapai Dr., Scottsdale, AZ 85255

**6-1.200****DESIGN AND NEED REPORTS**

Water master plans and basis of design reports shall provide an analysis of the impact that a development will have on the city's water system. These reports are reviewed and accepted by the Water Resources Department, then utilized by Plan Review Services to verify the infrastructure to be constructed. Accepted design reports are retained in the city's Records Division and are made available to developers and engineers upon request. Water and Sewer Need Reports shall estimate the actual yearly demand for each non-residential development and will be used as a basis for calculating development fees.

**A. Design Policy**

A civil engineer registered in the State of Arizona must analyze all proposed development that is determined by the Water Resources Department to have an impact on the water system. The effects of average day flow, peak hour flow and max day plus fire flow will be examined to ensure proper sizing and layout of the proposed water system.

A water master plan or a water basis of design report may be required for each development within the city when an extension of the public water line is necessary. Water Resources staff will determine which report is appropriate for a given development and convey this requirement to the city's project coordinator for inclusion in the case's stipulations. Reports shall be separately submitted for review to the One Stop Shop, directed to the attention of the Water Resources Department. The reports must be accepted by the Water Resources Department prior to the submittal of final plans for review by Plan Review Services, unless otherwise agreed to by Plan Review Services.

### **WATER MASTER PLAN**

**6-1.201**

A Water Master Plan is required when a change in the existing zoning or land use is proposed, phased construction is proposed, or conditions are present where the Water Resources Department determines one is necessary.

The objectives of a master plan are to demonstrate that the proposed water system complies with both the most recent update of the city's Integrated Water Master Plan and the city's design criteria and development policies for each phase of the project. It should also establish a skeletal system for the phased development of a master planned project.

### **WATER BASIS OF DESIGN REPORT**

**6-1.202**

Most projects within the city will require a basis of design report. The objectives of a basis of design report are to verify the water demand, available system flows and pressures and proposed hydraulics of a development, or to demonstrate conformance for each phase of a master planned development with the accepted master plan for that development.

### **WATER AND SEWER NEED REPORT**

**6-1.203**

Non-residential water and sewer development fees are based on average annual water and sewer demand. The developer calculates development fees by preparing a Water & Sewer Need Report. The city requires the developer to submit Water & Sewer Need Reports when submitting construction documents for plan review and permits. The developer may not assign or delegate these legal obligations to the tenant. The city must approve final plans and Water & Sewer Need Reports before development fees are paid. Development fees must be paid to obtain building permits and water meters.

Instruction and forms for the non-residential water fee packet are available at [www.ScottsdaleAZ.gov/bldgresources/counterresources/waterfeepacket](http://www.ScottsdaleAZ.gov/bldgresources/counterresources/waterfeepacket).

### **GENERAL MASTER PLAN AND DESIGN REPORT REQUIREMENTS**

**6-1.204**

All reports submitted to the city for review shall be prepared in accordance with the guidelines listed below.

#### **A. General Format**

1. The report should be on letter-sized paper (8 1/2 x 11).
2. All reports will have a table of contents.
3. Maps and other supporting materials larger than folded ledger size paper (11 x 17) should be placed into sleeves as an appendix to the report.
4. A civil engineer licensed to practice in the State of Arizona must seal each report.

#### **B. Report Covers**

1. Covers should consist of hard stock paper or better.
2. The project name shall be located on the cover.
3. The name, address and phone number of the developer/owner and engineer shall be stated on the cover.

4. The original submittal and any subsequent revision dates shall be located on the cover.

### **C. Vicinity Map**

Identify the project's location with respect to major cross streets.

## **6-1.205**

## **DESIGN REPORT CONTENT**

### **A. Introduction**

Summarize the proposed development.

1. Include a legal description based on sectional breakdown or reference within a platted development.
2. Describe the existing and proposed site zoning and land uses.
3. Include reference to elements of the city's General Plan and identify any designated character area or studies that will affect the project's design.

### **B. Design Documentation**

Note the design compliance with the latest revision of this manual and all other applicable design standards and codes.

1. Include a discussion of which design procedures, policies and methodologies will be incorporated into the design engineering of the water system.
2. List the title and version of any software used in the design analysis.

### **C. Existing Conditions**

1. State the existing zoning and land use.
2. Describe the existing, topography, vegetation and landform features.
3. Include the location and description of existing utilities in the vicinity.
4. Reference any existing master plans or design reports applicable to adjacent development.
5. Indicate the results of certified flow testing of the existing water system.

### **D. Proposed Conditions**

1. Include a site plan that indicates the layout of the proposed development.
2. Describe the proposed connection(s) to the city's water system. Show looping and/or extension of water lines into the site. Indicate locations of all zoned boundary lines.
3. Provide a second sourcing for all water supply systems when necessary to meet the requirements of the Fire Department.
4. Reference which water zone the site is within and address all required fire flows and system pressures.
5. Address any maintenance responsibilities of the proposed water system.

### **E. Computations**

1. Base generated water demands upon the unit demands listed in Figure 6.1-2.
2. Verify any variance from the stated design flows with the Water Resources Department.
3. Use H2ONET, WATERCAD, or EPANET software for any computer modeling of water flows and pressures. Other software products may be authorized by the Water Resources Department.
4. Analyze the water system for average day, maximum day, peak hour and maximum day with fire demand.



5. Show in calculations that the minimum water pressure requirements are met at the highest proposed finish floor elevation (with and without fire flow).

<b>AVERAGE DAY WATER DEMANDS</b>				
<b>Land Use</b>	<b>Inside Use</b>	<b>Outside Use</b>	<b>Total Use</b>	
<b>Residential Demand per Dwelling Unit:</b>				
< 2 DU/ac	208.9	276.7	485.6	per unit
2 – 2.9 DU/ac	193.7	276.7	470.4	per unit
3 – 7.9 DU/ac	175.9	72.3	248.2	per unit
8 – 11.9 DU/ac	155.3	72.3	227.6	per unit
12 – 22 DU/ac	155.3	72.3	227.6	per unit
High Density Condominium	155.3	30	185.3	per unit
Resort Hotel (includes site amenities)	401.7	44.6	446.3	per room
<b>Service and Employment:</b>				
Restaurant	1.2	0.1	1.3	per sq.ft.
Commercial/Retail	0.7	0.1	0.8	per sq.ft.
Commercial High Rise	0.5	0.1	0.6	per sq.ft.
Office	0.5	0.1	0.6	per sq.ft.
Institutional	670	670	1340	per acre
Industrial	873	154	1027	per acre
Research and Development	1092	192	1284	per acre
<b>Special Use Areas:</b>				
Natural Area Open Space	0	0	0	per acre
Developed Open Space – Parks	0	1786	1786	per acre
Developed Open Space – Golf Course	0	4285	4285	per acre

**FIGURE 6.1-2 AVERAGE DAY WATER DEMANDS IN GALLONS PER DAY**

6. Pipes and nodes - ID, demand, pressure, elevation, hydraulic grades, length, status, diameter, velocity, headloss / 1000 ft.
7. Reservoirs and pumps - ID, elevation, hydraulic grade, inflow, outflow.
8. PRVs - ID, elevation, upstream and downstream hydraulic grade.
9. Include diagrams clearly showing all water pipe and node references.
10. Pay particular attention to water demand factors used for restaurants or specialty developments.
11. Use scour analysis where surface flows exceed 500 cubic feet per second (cfs).

**F. Summary**

1. Provide a summary of the proposed water improvements stating that all the city's design standards and policies have been met or indicate any variance or exception. Note why the developer is requesting any variance or exception.
2. Include a brief project schedule indicating the proposed start and completion of the developments improvements.



### G. Supporting Maps

Include a scaled site plan showing all existing and proposed utility lines and surface improvements.

1. Graphics should screen the development's background, present existing utilities as dashed lines and proposed utilities as bold solid lines.
2. Screen existing topography into the background. At 2 foot intervals, clearly label all existing and proposed contour intervals. Show sufficient information to evaluate pipe cover.
3. Show, dimension and label clearly all property lines, rights-of-way, tract and easement lines.
4. Show any water zone boundary lines corresponding to the topography, as it exists and any major ridge lines within the development.

### H. Miscellaneous

Requests for more specific information regarding report requirements and the water distribution system may be obtained by contacting the Water Resources Department at 480-312-5685.

## 6-1.206

### WATER MASTER PLAN REPORT CONTENT

When required by the city, a water master plan report will be prepared in accordance with this manual by a professional engineer registered in and licensed to practice in the State of Arizona. The master plan report shall address, but not be limited to the following:

1. The water master plan report will specify the terms and requirements for water service to the development.
2. All development project owners will be responsible for determining their specific water system needs and include the projections for future surrounding developments to ensure there is no strain on the system.
3. A computer water network model, using H2ONET, WATERCAD, or EPANET, will be used for the analysis of pressure and flow within the distribution system, verifying that adequate pressures and flows will be available within the development. In addition, if certified flow tests performed on the system to which the project is to be connected do not show that sufficient capacity exists, the computer model will be used to determine the required on-site and off-site facilities, such as pump stations and pipelines, necessary to serve the project. If the proposed development requires a change in zoning that increases density or proposes a water system different from the city's Integrated Water Master Plan, then additional off-site calculations will be required. All model data shall include the following:
  - a. Demands will be calculated according to densities shown in [Figure 6.1-2](#), Average Day Water Demands in Gallons Per Day.
  - b. The system will be capable of providing maximum day demands plus fire flow.
  - c. Verification of the ability to provide peak hour demands will be provided.
  - d. Verification that the minimum required pressure throughout the water distribution system is achieved at the highest finished floor elevation and the minimum residual pressure is maintained under fire flow conditions
  - e. Pipes and nodes - ID, demand, pressure, elevation, hydraulic grades, length, status, diameter, velocity, headloss / 1000 ft.
  - f. Reservoirs and pumps - ID, elevation, hydraulic grade, inflow, outflow.
  - g. PRVs - ID, elevation, upstream and downstream hydraulic grade.
  - h. Sufficient supply for demand must be provided without the use of dedicated fire pumps or back-up pumps. Calculations that include both domestic demand plus fire flow may use fire pumps as a portion of the supply.

- i. A computer disk containing all calculations will be submitted along with the master plan report.
4. Each Master Plan map must show the following:
  - a. All proposed on-site and off-site facilities including, but not limited to, pump stations, transmission and distribution mains and reservoirs.
  - b. Proposed street locations, parcel boundaries and proposed lots within each parcel.
  - c. Labeled contour lines at 2 foot intervals or sufficient information to evaluate network node elevations.
  - d. Pressure zone boundaries (see [Figure 6.1-3](#)), pressure reducing valves (PRVs) and corresponding zone valves.
  - e. Size and pressure settings for all PRVs.
5. Include a vicinity map showing existing and proposed streets to a distance of 1 mile from the exterior boundaries of the project.
6. Include a construction schedule in a table format for all water related construction required to serve the development. The schedule will address each phase or parcel and how the phase relates to an orderly extension of the water system.
7. Demonstrate compliance with the adopted city's Integrated Water Master Plan encompassing the respective area.

Master planned developments that design a distribution system that will be phased will provide a synopsis of the phasing to the Water Resources Department upon acceptance of the Water Master Plan.

For specific information regarding water plan requirements and/or the city's current Integrated Water Master Plan, contact the Water Resources Department.

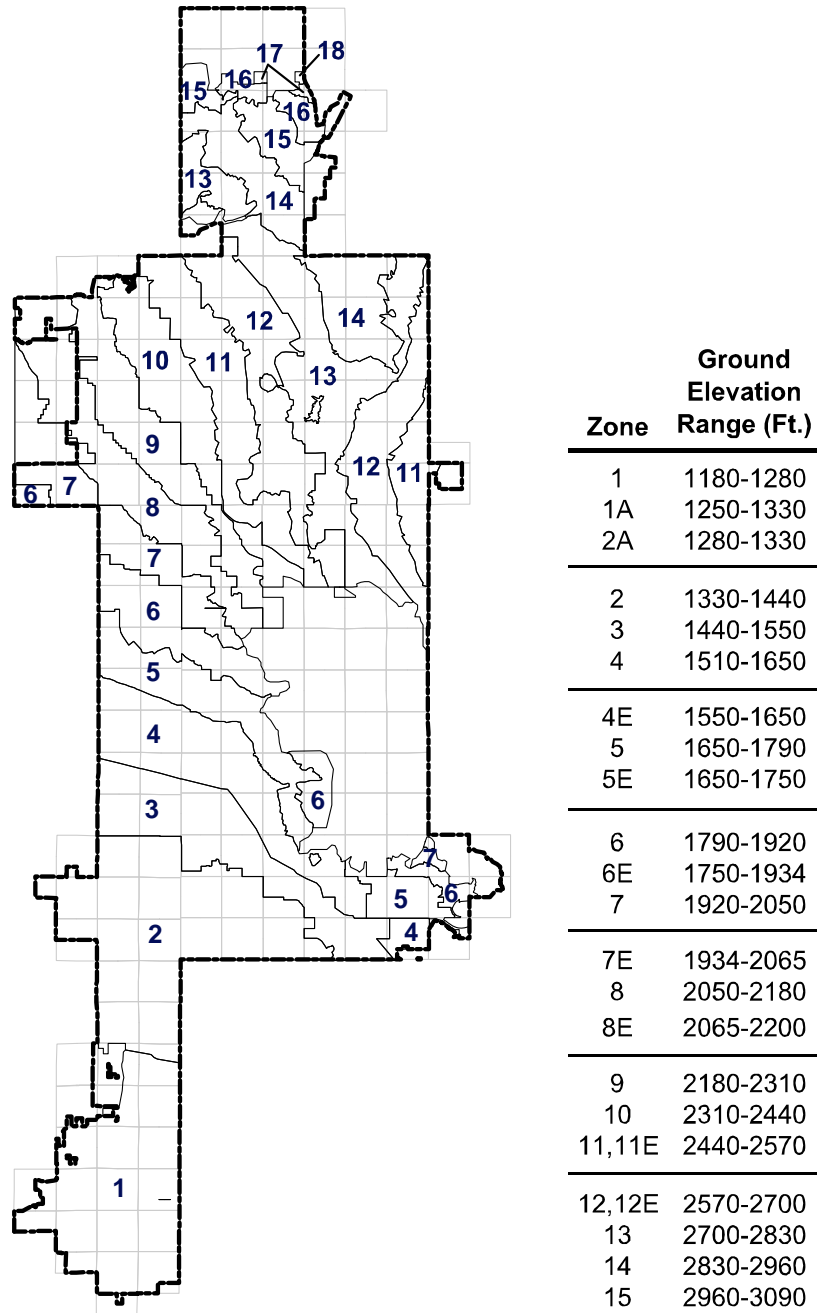


FIGURE 6.1-3 PRESSURE ZONE MAP

## 6-1.300

## WATER FACILITIES

Water facilities (wells, reservoirs and booster pump stations) are typically designed and constructed by the city through its capital improvement program. Developers needing to construct water facilities should contact the Water Resources Department and request a meeting. The developer should be prepared to address how the proposed system will conform to the Integrated Water Master Plan. The city will address design issues, the review process for facilities and any potential city cost participation.

### A. Design Policy

Unless otherwise agreed to in writing by the city's Rights-of-Way Agent, water facilities will be located on a tract or lot dedicated to the city (conveyed by a general warranty deed) and accompanied by a title policy in favor of the city.

### WELLS

The Water Resources Department will be notified of any proposed well drilling. Under the Arizona Groundwater Management Code, the Arizona Department of Water Resources (ADWR) regulates all groundwater wells in Arizona. Before drilling and installing a well, a Notice of Intent to Drill and an Application for a Drilling Permit must be obtained from and filed with, ADWR. The well must subsequently be registered with ADWR. Forms and additional information are available from ADWR's Operations Division, 602-417-2400 and online at [www.azwater.gov/dwr/](http://www.azwater.gov/dwr/).

6-1.301

### RESERVOIRS

Storage facilities must provide emergency fire protection and be designed to maximize the efficient use of water production wells and pumping facilities. Therefore, storage in each designated service area will exceed each of the following criteria:

- Three hours fire flow reserve plus 25% of the maximum day demand.
- One average day demand.

6-1.302

### BOOSTER PUMP STATIONS

Booster pumps will be designed as required to maintain adequate pressure for domestic and fire protection water supply. The city's current pump system design criteria, details and specifications are available through the Water Operations Division and [www.ScottsdaleAZ.gov/bldgresources/counterresources/waterfeepacket](http://www.ScottsdaleAZ.gov/bldgresources/counterresources/waterfeepacket). All stations shall provide at a minimum, chlorination equipment, variable frequency drive pumps, backup power supply and telemetry compatible with the Water Resources Department current system. Designers shall see Engineering Bulletin No. 10 by the Arizona Department of Environmental Quality for additional design criteria.

6-1.303

A preliminary design report must be prepared and submitted to the One Stop Shop for review and acceptance by the Water Resources Department prior to submittal of final plans for review. This report shall outline the type of equipment and controls proposed for the station along with the proposed hydraulics. A final design report prepared by a registered civil engineer licensed in the State of Arizona must accompany the construction drawings and specifications.

## TRANSMISSION & DISTRIBUTION SYSTEMS

6-1.400

### A. Ordinance Requirements

Individual properties that are not within 660 feet of the public water distribution system have the option to extend the public water system, drill a separate well for each individual property, or haul water. See Scottsdale Revised Code, Section 49-75\*.

Water mains shall be extended to provide water service upon development of a property if an approved source is within 660 feet of the nearest property line of the development. See Scottsdale Revised Code, Section 49-75\*.

The city requires water mains to be installed along the entire length of the property line frontage of that property being developed. The property line frontage is defined as that portion of a parcel of property that abuts a street, easement, or public rights-of-way. If a parcel to be

developed has more than one frontage, improvements shall be installed along all frontages. See Scottsdale Revised Code, Section 49-212, \*[www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

### B. Design Policy

The city may require the extension of water lines along a frontage, or through a subdivided parcel, to the boundary where future extension of the water line is possible, providing a point of service to adjacent properties, or as determined necessary by the city. Reconstruction of residential or commercial structures requires compliance with all current ordinances and design guidelines relating to water line extensions, main sizing, and service lines.

Each lot will have safe, reliable, and potable water in sufficient volume and pressure for domestic use and fire protection. This shall be verified by the engineer, in part, by performing a flow and pressure test of that part of the potable system to be extended or connected to. The flows and pressure must meet minimum requirements for domestic and fire flow per [Section 6-1.501](#). The engineer shall place a statement verifying this on the cover sheet of the final plans.

The city's water distribution system operates on a grid system. Minimum line size requirements for this grid are as follows, unless otherwise approved by the Water Resources Department:

1. Mile and half-mile alignments must be minimum of 12 inch.
2. Quarter mile alignments must be minimum of 8 inch.
3. Water lines located in the city's county service area must be a minimum of 8 inch unless otherwise approved by the Water Resources Department.
4. All other alignments must be minimum of 6 inch.

The grid system and frontage requirements may be reevaluated through a master planning process where density, topography and other environmental features are considered. Upon acceptance of a master plan for the reevaluated area by the Water Resources Department, detailed design reports for each developing parcel within the master planned area are required. Acceptance of the detailed design report, complying with the accepted master plan, provides a variance from the normal grid and water line frontage requirements.

The city maintains several pressure zones and care must be taken to identify boundary conditions when designing near a zone line. See [Figure 6.1-3](#) for water pressure zone boundaries. Static water pressure tests will be taken on a fire hydrant located on each leg of the existing water system where connections are proposed. See [Section 6-1.405](#).

### C. Design Standards

The engineer should be familiar with the MAG Uniform Standard Specifications for Public Works Construction\* and the COS Supplement to MAG Uniform Standard Specifications for Public Works Construction\*, including all applicable Standard Details\*. These documents contain construction related specifications and details that impact the design of water systems including trenching, bedding, backfill and pavement replacement, etc.

\*Note: For COS and MAG Standard Details see [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

## 6-1.401

### MATERIALS

1. Water distribution lines are 6 inch through 12 inch in diameter and shall be ductile iron pipe (DIP) with a minimum pressure class of 350.
2. The city does not allow 10 inch, 14 inch, or 18 inch water lines for new construction.
3. Water transmission lines are 16 inch and larger, and may be DIP, mortar lined steel, steel cylinder pretensioned pipe, or an approved equal by the Water Resources Department. The pressure class will be verified with the Water Resources Department.
4. The use of AWWA C-900 PVC is prohibited in the Scottsdale water system.

5. Fire line services 3 inches and larger shall be constructed of ductile iron pipe, class 350. Fire line services smaller than 3 inches shall be constructed of type K, soft copper.
6. Design calculations for wall thickness will be required in cases where pipelines could be subjected to heavy external loads. These include, but are not limited to, pipelines crossing under storm drain lines greater than 36 inches in diameter, pipelines in the roadway alignment that would be exposed to heavy construction vehicle loads prior to paving, and installations exceeding the pipe manufacturer's maximum depth of bury.
7. All ductile iron water lines are to be specified with polyethylene wrapping. Designs specifying the installation of other acceptable metallic pipe materials will require soil testing in accordance with procedures of the American Ductile Iron Pipe Research Association. Such tests shall be submitted to the city with the final plans submittal to determine if cathodic protection is required in the design.
8. Polyethylene locating tape (color coded blue) will be placed above all public water lines.

## SYSTEM LAYOUT

## 6-1.402

- A. To provide appropriate water pressure, water circulation and redundancy, all new water mains must be designed in a looped configuration, providing a minimum of two sources that can be isolated by a gate valve, except as provided for in [Section 6-1.403](#) for maximum dead-end line length and size requirements.
1. In general, water distribution lines will be on the north and east side of the street, 2 feet behind the curb, sidewalk, roadway, or as otherwise approved by the Water Resources Department. Water transmission lines will be located under the roadway section unless otherwise approved by the Water Resources Department. The Water Resources Department will only replace standard black asphalt and grey concrete when repairing water lines. Any water lines located under colored concrete, pavers, or other specialty paving (except at crosswalks) shall require prior approval from the Water Resources Department. If water lines are allowed under other types of pavement (decorative pavement), the developer will be required to sign, and the city will record, an indemnification agreement. The city's plan reviewer will provide the agreement form. For subdivided properties, a note shall be placed on the plat stating that any decorative pavement disrupted as a result of maintenance to the city's water and/or sewer system shall be the responsibility of the property owners to repair or replace.
2. All water lines will be aligned parallel to property lines or street center lines and shall not cross and recross the center line, except in cases justifiable to the city. Water lines shall not be located within 10 feet of a building or retaining wall without providing additional protection. Additional protection shall include placing the water line in a sleeve or modifying the footing to prevent damage in the event of a water line break.
3. Design joint deflection shall not exceed 4 degrees for water lines 12 inches and smaller in diameter and 2½ degrees for water lines greater than 12 inches in diameter. Curved water lines are permissible where the individual joint deflection does not exceed the above criteria.
4. For purposes of horizontal separation, storm drains and non-potable water lines shall be treated as sewer lines.
5. Developments with numerous curved streets will be discussed with the Water Resources Department to decide whether the city will consider a design report with water and sewer layouts in accordance with the following criteria:
  - a. Water and sewer mains will be placed under the paved section of the roadway within the area from back of curb to back of curb.
  - b. All water mains must maintain 3 feet horizontal clearance to dry utilities.



- c. The water main and sewer main will run parallel to each other with 9 feet of separation to the pipes' centerline in order to maintain 6 feet of clearance at manholes. Lines may cross the street centerline.
- d. Deflections in the water line shall be designed to nominal fitting angles within standard tolerances and will occur at the same locations where the sewer line is deflected.

See [Section 7-1.402](#) for related sewer criteria. The above criteria will be consistently and uniformly applied throughout each phase, parcel, or unit of a development.

- B. Water lines in commercial, multi-family and industrial developments should be located under driveway areas, and provided with an easement or tract where permanent 20 foot minimum access for maintenance purposes is maintained. In developments where other dry utilities, or private sewers are to occupy the same driveway, Plan Review Services may accept a 16 foot wide public water line easement.
  1. Dry utilities and private sewer will not be allowed to run parallel within the easement. Water lines shall not be located within 10 feet of a building unless protection is provided to prevent structural damage in the event of a break in the line.
  2. Hydrants, meters, blow-offs and valves shall not be located in washes, detention areas, retention areas, driveways, or sidewalks. Hydrants must have depth of burial of 3.5 feet.
  3. Hydrants that require adjustment as a result of improvements will be adjusted using a "Gradelok" or approved equal when vertical adjustment is in excess of 6 inches. See COS MAG Supplement, Section 610.8, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).
  4. Existing water line stubs adjacent to a development that are not used will be abandoned and plugged at the main by the contractor.

### 6-1.403

#### DEAD-END LINES

Terminal water lines in the city will comply with the following requirements:

1. The maximum length for a dead-end water distribution line, 8 inch diameter to 12 inch diameter, will be 1,200 feet in length.
2. Dead-end lines 1,000 feet or less may be 6 inches minimum in diameter provided adequate pressure and fire flow rates are maintained.
3. Dead-end lines for water transmission lines 16 inches and larger, exceeding 1,200 feet in length must be approved by the Water Resources Department.

Capped dead-end lines will be fitted with a flushing device as per MAG Standard Detail No. 390, Type "B", [www.mag.maricopa.gov/pdf/cms.resource/2007-English-Drawings-All.pdf](http://www.mag.maricopa.gov/pdf/cms.resource/2007-English-Drawings-All.pdf); or COS Standard Detail No. 2383, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp) or a fire hydrant to allow periodic flushing of the lines. Flushing devices shall not be located in washes, detention areas, retention areas, sidewalks, driveways, or paved areas..

Valves on dead-end lines that may be extended shall be provided with two full pipe lengths between the valve and the plug for lines 12 inches and larger, and 1 full pipe length for lines smaller than 12 inches.

### 6-1.404

#### DESIGN FLOWS

The ultimate design flow within the city's water transmission and distribution system will be based on the city's current Integrated Water Master Plan. Water demand for each development will be calculated using the average day demands, as shown in [Figure 6.1-2](#), to ensure that the existing distribution supply is sufficient. Designs will include all necessary improvements, including booster pumping stations, reservoirs, lines and appurtenances to meet the system's ultimate demand.

1. Hydraulic calculations will demonstrate that the system will provide both peak-hour demand and maximum-day demand including fire flow. The peaking factors are 2 times

the average day for maximum day, and 3 1/2 times the average day for peak hour. These factors shall be appropriately increased for restaurants and high-demand water users.

2. The maximum allowable pipe headloss for transmission lines is 8 feet per 1,000 (8' / 1,000'); for distribution lines it is 10 feet per 1,000 feet (10 ft / 1,000 ft).
3. Design flows for all distribution systems will be based upon flow and pressure of the existing system as documented by the engineer. See [Section 6-1.405](#).
4. Prior to acceptance by the city, all platted subdivisions will conduct an additional flow test at the lowest and highest elevation available in which the development is constructed.
5. Developments that cross pressure zone boundaries must conduct a flow test within each pressure zone as outlined above. The results of this test, along with a copy of the final plans, shall be submitted to Inspection Services for review and acceptance.

## FIRE HYDRANT FLOW TEST REQUIREMENTS

6-1.405

Pressure and available flow information for existing water lines must be obtained by having a flow test performed on the system. Flow tests are required for all commercial projects, multi-family residential projects and public extensions of the city's water distribution system. A private fire protection company will perform the tests and certify the results. An encroachment permit issued by the One Stop Shop is required for a flow test and the Inspection Services Division will be notified a minimum of 48 hours before performing the flow test. The permit is also available on-line through the city's website at [www.ScottsdaleAZ.gov/bldgresources/counterresources](http://www.ScottsdaleAZ.gov/bldgresources/counterresources). See [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms) for the flow test design form. The certified form must be included in all master plans or design reports submitted to the One Stop Shop, or submitted along with the final plans to Plan Review Services should a design report not be necessary. Flow tests will be conducted during periods of high water use, such as 6:00 am to 8:00 am.

## PRESSURE REQUIREMENTS

6-1.406

Pressure extremes in water systems result in the potential for contaminants to enter the network. Low pressures in the water system may allow polluted fluids to be forced into the system, and high pressures may cause ruptures or breaks in the network.

The static pressure in the distribution system should not exceed 120 pounds per square inch (psi), and the system shall be designed to maintain a minimum residual pressure of 50 psi at the highest, finished, floor level to be served by system pressure under normal daily operating conditions. The system will be designed to maintain 30 psi minimum pressure under design fire flow requirements, see [Section 6-1.501](#). The 30 psi minimum pressure design requirement provides a 10 psi safety factor to account for aging infrastructure and flexibility in locating pressure zone boundaries.

All distribution water mains, appurtenances and service lines will be designed for a minimum normal internal working pressure of 150 psi plus allowance for water hammer. Working pressures for transmission lines will be verified with the Water Resources Department.

Water hammer may produce momentary pressures greatly in excess of normal static pressures, thus increasing the probability of water main failure. Suitable provisions must be made to protect the system from water hammer pressures. The occurrence and severity of water hammer can be reduced by using slow-closing valves, pressure-release valves, surge tanks, variable frequency drives, soft start motor controllers and air chambers. In cases where pressures exceed 120 psi or water hammer conditions are developed, all elements of the system will be designed accordingly.

## PRESSURE REDUCING VALVES (PRVS)

6-1.407

Approximate pressure zone boundaries and their respective elevations are shown in [Figure 6.1-3](#). PRVs will be required when necessary to maintain pressure zones within the distribution system. Distribution systems will not be designed to operate at pressures in



excess of 120 psi. PRVs shall be designed in accordance with COS Standard Detail No's. 2342-1 and 2342-2, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp) and the city's Design Standards Development for Pressure Reducing Valves and Air Relief Valves, [www.ScottsdaleAZ.gov/bldgresources/counterresources/waterfeepacket](http://www.ScottsdaleAZ.gov/bldgresources/counterresources/waterfeepacket). A minimum of one PRV in each pressure zone will be designed with a high-pressure relief valve.

Vaults will be located outside of paved areas generally adjacent to the back of curb or sidewalk. PRVs will be located within the rights-of-way, an easement, or an easement within a private street tract, and will be provided with unobstructed vehicular access. Curbs adjacent to PRV vaults will be roll or mountable type. Site grading will route storm water and discharge water from relief valves away from the vault. Site design will consider the impacts of discharge water on downstream improvements. The location of pressure relief risers will be shown on the final plans.

The engineer will specify on final plans, the size of the main line and bypass pressure reducing valve, the upstream system pressure, and the design downstream pressure setting. Where multiple PRVs supply a pressure zone, the engineer may request the Water Resources Department to consider eliminating the bypass valve on redundant installations.

The city operates its system from wells and pumps that commonly have pressures exceeding 80 psi. Changes in demand, supply and the operation of the distribution system also vary the pressure within the system. Therefore, the city requires all metered services to have a pressure-regulating valve installed on the private service line. Existing structures, that are required to obtain a plumbing permit for home improvements, are required to install a pressure regulating valve if one is not present. A written variance request may be submitted to the Water Resources Department for their review and concurrence, or denial.

#### 6-1.408

### FITTINGS

No water line will be deflected either vertically or horizontally, in excess of that recommended by the manufacturer of the pipe or coupling or as stated in [Section 6-1.402](#), without the appropriate use of bends or offsets. Fittings may be required where more than 2 pipe lengths are deflected. The Water Operations Division will not approve deflections exceeding 4 degrees.

A minimum distance between fittings will be specified on the final plans for constructability. The engineer is responsible for verifying the minimum distance necessary for the type and diameter of pipe and related fittings specified for the project. Fittings cut into ACP or PVC pipe within 6-feet of another fitting or joint will require the short section of pipe to be removed and replaced with DIP.

Existing tees, tapping sleeves and related appurtenances that are not utilized by a development shall be removed by the contractor. A minimum 3-foot section of pipe shall be removed, with no more than 6-feet remaining to the nearest joint. The removed pipe shall be replaced with DIP.

#### 6-1.409

### SHUTOFF VALVE LOCATIONS

Shutoff valves will be installed on water mains at locations within the distribution system that allow sections of the system to be taken out of service for repairs or maintenance without significantly curtailing service in other areas. Special consideration should be given to the number of fire hydrants taken out of service. A sufficient number of valves should be provided on water mains so that inconvenience and sanitary hazards will be minimized during repairs. Valves will be located such that closing no more than 4 valves can isolate any section of the system.

Maximum spacing of water distribution main isolation valves shall be as follows:

- In commercial, multi-family, and industrial areas, valve spacing will not exceed 500 foot intervals.

- In single-family residential and other areas, valve spacing cannot exceed 800 foot intervals, or 1 per block, whichever is less.

Maximum spacing of water transmission main isolation valves will be as follows:

- At every mile section line, install a cross with a valve on each leg of the cross.
  - Valves spacing between mile section lines will not exceed 1,320 feet.
1. Any design not complying with the above spacing requirements must be approved in writing by the Water Resources Department.
  2. Install all tees with a valve on the lateral line, so that the lateral can be taken out of service without interrupting the supply to other locations. At intersections of distribution mains, the required number of valves will normally be one less than the number of radiating mains. The unvalved branch is usually the line that principally supplies flow to the intersection. Install shutoff valves for new construction at the point of curvature of curb returns at street intersections, and aligned with a property line or lot line at mid-block locations.
  3. Provide valves to allow for isolation of lines crossing washes with a capacity exceeding 500 cfs, major and minor arterial roads, bridges, and locations where lines have been vertically deflected to cross other infrastructure.
  4. Provide a valve on each hydrant branch and flange it to the tee.
  5. Do not install valves in sidewalks, curbs, crosswalks, multi-use paths, driveways or bicycle lanes.
  6. Ensure that all valves 12 inches or smaller are resilient wedge type. Valves 16 inches or larger shall be low torque resilient wedge or butterfly type. All valves 16 inches or larger shall have bypasses per COS Standard Detail No. 2361\* unless otherwise approved by the Water Resources Department. The valve operators on butterfly valves 16 inches or larger in diameter shall installed entirely with a manhole for repair or replacement. Configure entrances to manholes so that the internal valve parts can be serviced. Manholes on water appurtenances shall be the hinged type frame and cover in accordance with COS MAG Supplement, Section 610.8.
  7. Pressure rating on all valves will be equal to or greater than the pressure rating of adjacent pipe.
  8. All valves require valve boxes installed per MAG Standard Detail No. 391-1, Type "C"\*, with locking lids.
  9. All valve frame and cover adjustments will be per COS Standard Detail No. 2270\*.

\*Note: For COS and MAG Standard Details [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

## AIR RELEASE VALVES

6-1.410

- A.** Air release valves will be installed at all changes in slope of water lines 8 inches or larger in diameter, as follows:
1. When water line changes from a positive slope to a zero slope, or a negative slope in the primary direction of flow;
  2. When water line changes from a zero slope to a negative slope in a primary direction of flow;
  3. For vertical alignment changes to cross under or over another facility, such as utility, drainage washes, etc. See COS Standard Detail No. 2370\*, and [Section 6-1.415](#).
  4. Air release valves may be omitted if service taps or fire hydrant laterals are located to allow for the elimination of air.

5. Slopes less than or equal to 0.002 ft/ft shall be treated as zero slopes. In the absence of any changes in slope, air release valves will be installed not more than 2,640 feet apart.
6. All air release valves will be a combination air/vacuum release type per COS Standard Detail No. 2348\*.
  - B.** Air release valves will be installed in 6 inch water lines under the following circumstances:
    1. The high point of the line if no lateral line, fire hydrant, or water service connection is proposed at that location to adequately remove trapped air.
    2. For vertical alignment changes to cross under or over another facility, such as utility, drainage washes, etc. See COS Standard Detail No. 2370\*, and [Section 6-1.415](#), Vertical Separation and Vertical Alignment.
 

\*Note: For COS and MAG Standard Details [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).
  - C.** Air release valves on lines 12 inches and smaller can generally be located in a manhole over the water line. Air release valves on lines 16 inches and larger may need to be located in an above-grade enclosure adjacent to the roadway where applicable. Locations for all valves and vent pipes must be shown on the final plans and will be within the rights-of-way, private street tract, or easement.

**6-1.411****THRUST RESTRAINT**

Thrust on pipelines occurs wherever bends or lateral branches exist. Thrust blocks will not be allowed for new construction on the city's water system unless approved in writing by the Water Resources Department. Thrust restraint will be provided by:

1. Welded joints in steel pipelines.
2. Mechanical joints in concrete and ductile iron pipelines.
3. Locking gasket and ring systems acceptable to the Water Operations Division.

The determination of whether or not a given section of pipeline needs restrained joints, or other means of anchorage, shall be made by the engineer and reviewed by Plan Review Services. Design all thrust restraint for 1-1/2 times the static line pressure or 200 psi, whichever is greater.

MAG Standard Detail No. 303-1 and 303-2\* include acceptable means of joint restraint. The engineer should pay attention to the water pressures and soil bearing pressures assumed by the standard details. Where joint restraint is not proposed, per MAG Standard Detail No. 303-1\* and 303-2\*, the engineer will submit joint restraint calculations with the final plans for review and comment. All restrained pipe lengths must be specified on the final plans or referenced to a standard detail.

\*Note: For COS and MAG Standard Details [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

**6-1.412****ELECTRONIC MARKERS**

Final plans will call out where electronic markers are to be located, indicating all horizontal changes in direction. Valve locations permit adequate identification of pipeline location (typically at crosses and tees) and thus do not require electronic markers. An electronic marker must be placed at the center of all fittings at a depth of 3 feet below finish grade per COS Standard Detail No. 239\*.

Long, straight reaches of transmission mains will be marked every 1,320 feet with an electronic marker.

**6-1.413****PIPE COVER**

Cover or depth of bury for water mains will be measured from the proposed finished grade as follows:

1. For lines 12 inches in diameter, allow a minimum cover of 48 inches over the top of pipe.
2. For lines larger than 12 inches in diameter, allow a minimum cover of 60 inches over the top of pipe.
3. For all lines within industrial zoned areas or under major roadways (collector, arterial, couplet, or parkway/expressway), allow a minimum of 60 inches over the top of the pipe.
4. In all other locations, for lines smaller than 12 inches in diameter, allow a minimum cover of 36 inches to the top of pipe unless otherwise approved by the Water Resources Department.

If a water line is installed within an area to be filled at a later time, adequate pipe protection must be provided. This may include temporary berms or constructing the water line to a minimum cover below the existing grade. The engineer should notify the Water Resources Department of such occurrences and address them in the design report or master plan.

Concrete encasement of new water lines is prohibited unless approved by the Water Resources Department.

Caution should be taken in design and construction to protect all water supplies from wastewater contamination.

When more than 3 feet of existing polyvinyl chloride (PVC) or asbestos cement pipe (ACP) water lines are exposed during construction and the bedding is disturbed, the water line must be replaced with ductile iron pipe (minimum Class 350) with mechanical joints or flanged joints to 3-feet past the sides of the exposed crossing trench. See MAG Standard Detail No. 403-3\*.

**WASH CROSSINGS**

All wash crossings will be constructed using restrained joint ductile iron pipe. Bury requirements to place water lines under washes or channels shall be based upon the 100-year peak design discharge (Q100) in the channel or wash. The additional depth of bury is in addition to the normal cover requirements described in [Section 6-1.413](#).

100 year flow rate	Additional depth of bury
1 to 49 cfs	1 foot
50 to 99 cfs	2 feet
100 to 499 cfs	3 feet
more than 499 cfs	Scour depth based on scour analysis

Scour depth will be estimated using Arizona State Standard Attachment (SSA) 5-96, Guideline 2, Level I, as published by the Arizona Department of Water Resources. The engineer will estimate the depth of scour and design the top of pipe to conform to [Section 6-1.413](#). The engineer shall submit the scour analysis with the final plans.

All pipelines that must be located within the scour zone, or with less than the minimum required depth of bury as indicated above, must be protected by installing a cut-off wall per COS Standard Detail No. 2228\*, downstream of the pipeline to stabilize the scour depth. Plan Review Services will review protection requirements under these instances on a case-by-case basis. Cut-off walls will be structurally designed to the scour conditions calculated.

**VERTICAL SEPARATIONS AND VERTICAL REALIGNMENTS**

1. Vertical separation of water and sanitary sewer lines must be in compliance with COS Standard Detail No. 2401\*. Where conditions prevent adequate horizontal and vertical separation:
  - a. both the proposed water and sewer lines shall be constructed of ductile iron pipe (minimum Class 350) or,

**6-1.414**

**6-1.415**

- b. where the existing water line is other than restrained ductile iron, the water line shall be replaced with restrained ductile iron pipe per MAG Standard Detail No. 404-2\*, and/or,
  - c. where the existing sewer line is other than restrained ductile iron, the sewer line shall be encased in concrete per MAG Standard Detail No. 404-3\* or replaced between manholes with ductile iron pipe (minimum Class 350) with a cured-in-place liner.
2. Separation of water from electrical or gas lines will conform to COS Standard Detail No. 2372\*.
  3. Water lines crossing over culverts and storm drains must maintain both a minimum of 12 inches vertical separation and the minimum depth of bury. If the design cannot provide these clearances, a vertical realignment is necessary.
  4. For minimum clearance under culverts, storm drains, and other utilities, see COS Standard Detail No. 2370 and 2372\*. The vertical realignment shall be constructed of ductile iron pipe and shall not be deflected or swept. Air release valves and isolation valves will be installed as per the following:
    - a. Install isolation valves on each side of the vertical realignment to minimize disruption of service should the crossing need to be isolated for maintenance or repair. Plan Review Services may consider the location of adjacent valves, fire hydrants, and water service lines to help minimize valves at vertical realignments.
    - b. For dead-end water lines, place the required air release and isolation valves on both sides of the vertical realignment.

\*Note: For COS and MAG Standard Details [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

- c. For looped applications, install air release valves at a location calculated by the engineer to release any air trapped in the system.
- d. Do not place tees, fire hydrants, service lines, and other appurtenances within any portion of the vertical realignment unless approved in writing by Water Resources.
- e. Give special attention to vertical realignments on existing waterlines in order to avoid disruption to the distribution system. Prior to connection, vertical realignments over 25 feet in length will be constructed a minimum of 3 feet offset from the existing line and tested per MAG Uniform Standard Specifications for Public Works Construction and COS Supplement to MAG Uniform Standard Specifications for Public Works Construction. Use separate horizontal or vertical bends to change pipe alignment. Do not rotate fittings to accomplish combined vertical and horizontal deflections.

## 6-1.416

### SERVICE LINES AND METERS

The water service line and meter will be sized based upon the total daily demands for the development and the recommended maximum capacity shown in the table in [Figure 6.1-4](#).

1. That portion of the water service from the water main up to, and including the meter is public and will be maintained by the city. That portion of the water service from the meter into the site is private and will be maintained by the property owner. Design of the private on-site portion of the water service will comply with the current Plumbing Code and shall include a pressure regulating valve.
2. Water service lines shall be 1 inch minimum unless prior approval is obtained from the Water Resources Department.
3. Due to the city's water billing rate structure, meter sizes will not exceed the size of the service line (such as a 1-1/2 inch meter will not be allowed on 1 inch service). Extra attention is recommended when sizing services for custom home lots where demands occasionally necessitate meter sizes exceeding 1 inch.

4. Service lines are necessary to meet domestic, fire, and irrigation demands. Residential fire sprinkler and irrigation demand is usually supplied through the domestic service line and meter. Commercial developments typically will use separate meters for building and landscape service and provide separate lines for fire protection.
5. Each service line requires a separate tap to the public main. Connection of 2 or more meters in a manifold configuration is prohibited.
6. Installation of metered 1 inch to 2 inch water services will be in accordance with COS Standard Detail No. 2330. Installation of 3 inch to 6 inch metered services require a tee and shutoff valve, or tapping sleeve and valve on the public main per MAG Standard Detail No. 340 and 391-1, Type "C"\*, and a meter vault in accordance with COS Standard Detail No. 2345\*.

\*Note: For COS and MAG Standard Details [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

7. Final plans will show locations of service lines and meters to each unit referenced with stations and dimensions, or offsets, from the street centerline or monument line. Service lines and meter boxes will be located within a public rights-of-way easement within a private street tract, or a utility easement. Meters are to be accessible to city workers and be located as close as possible to the water main.
8. Plans shall accurately show meter vaults to scale paying particular attention to access covers and vaults for meters 3 inches and larger. Meters shall be located to avoid crossing back through the right-of-way or easement with a service line. Do not place water service lines and meters in driveways, sidewalks, washes, or detention basins.
9. Water service lines on lots smaller than 1/2 acre will be located within 3 feet of the property line adjacent to adjoining parcel's water service line. Water service on lots 1/2 acre and larger will be located within the lower 1/3 of the property frontage to the water main, avoiding Natural Area Open Space (NAOS) and adjacent to the sewer service where practical.
10. Water services will be designed perpendicular to the main where possible. Lines shall be continuous from the main to the meter with no bends or welded joints. Water service lines will have 6 feet minimum horizontal separation from sanitary sewer service lines.
11. No service connections or fire protection systems will be made directly to water lines 14 inches or larger in diameter, or to water lines designed solely to transmit water from one pressure zone to another pressure zone.
12. All galvanized iron and polyethylene water service lines in sizes 3/4 inch through 2 inch, which are exposed during construction, will be replaced in their entirety with Type "K" copper tubing. Copper service lines smaller than 1 inch exposed during construction shall be replaced in their entirety with 1 inch Type "K" copper tubing. This includes the replacement of iron service saddles with bronze saddles and replacement of both the corporation stop and meter stop in all cases.
13. Existing water and fire lines not used by a development shall be noted on the plans to be abandoned at the main by the contractor.



Disc Meter Size	Safe Max. Capacity (gal./min.)	Safe Max. Capacity (gal./day)	Recommended Max. Capacity (gal./min.)	Recommended Max. Capacity (gal./day)
1/2	15	21,600	8	10,800
5/8	20	28,800	10	14,400
3/4	30	43,200	15	21,600
1	50	72,000	25	36,000
1 1/2	100	144,000	50	72,000
2	160	230,400	80	115,200
Compound Meter Size	Safe Max. Capacity (gal./min.)	Safe Max. Capacity (gal./day)	Recommended Max. Capacity (gal./min.)	Recommended Max. Capacity (gal./day)
3	320	460,800	160	230,400
4	500	720,000	250	360,000
6	1,000	1,440,000	500	720,000
Turbine Meter Size	Safe Max. Capacity (gal./min.)	Safe Max. Capacity (gal./day)	Recommended Max. Capacity (gal./min.)	Recommended Max. Capacity (gal./day)
3	350	504,000	180	259,200
4	1,000	1,440,000	500	720,000
6	2,000	2,880,000	1,000	1,440,000

FIGURE 6.1-4 METER CAPACITIES

## 6-1.417

**BACKFLOW PREVENTION & CROSS CONNECTION CONTROL**

All metered services within the city, other than single family residential, require the installation of an approved backflow prevention device immediately adjacent to the meter on private property unless approved otherwise by the Water Resources Department. To determine the type of backflow protection required for a specific use, see Scottsdale Revised Code, Chapter 49, Division 3 Backflow Prevention and Cross Connection Control. The back flow prevention valve and the service line will be of equal size, unless the engineer submits calculations with final plans demonstrating that losses through a smaller device do not adversely effect water pressure to the building.

For installation requirements see the current version of the COS Standard Detail No. 2351 through 2356, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp). The backflow prevention device is to be owned and maintained by the property owner.

1. All backflow prevention devices shall be shown to scale and stationed on the plans. The location of backflow preventers and the adjacent meter shall take into consideration opportunities to screen with landscaping or consolidate into common areas providing utility service to a building. Generally, backflow preventers shall not be located at:
  - a. Entrances to buildings unless appropriately screened.
  - b. At locations where they interfere with opening car doors.
  - c. Areas of high visibility
2. Every effort must be made to locate the water meter and vault in an area that can accommodate a properly installed backflow assembly.

3. When the location of a backflow preventer cannot be accommodated adjacent to the meter, the designer shall:
  - a. Request permission from the Water Resources Department to separate the meter from the backflow preventer.
  - b. Backfill the water line between the meter box and the backflow preventer with 1-sack controlled low strength material (CLSM) per MAG, Section 728. CLSM shall be placed to the full width of the trench and to 6 inches above top of pipe.
  - c. Note on the plans that inspection of the water piping connecting the meter to the backflow preventer be inspected by a city backflow prevention specialist prior to CLSM and backfill.
4. Backflow prevention devices larger than 2 inches require location to be scaled and stationed on the final plans.

Fire lines require backflow prevention at either the vertical riser, or at the property line when permitted. See [Section 6-1.504](#), for additional information.

The city requires backflow prevention on temporary construction meters for all extensions of the water system per COS Standard Detail No. 2346, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp). For additional information, contact the Water Operations Division backflow prevention specialist.

Projects within 1700 feet of a canal or open body of water require a reduced pressure principal backflow assembly per AWWA. For project specific information, contact 480-312-8732.

## SAMPLING STATIONS

6-1.418

Water sampling stations are generally required in all new residential subdivisions consisting of twenty or more platted lots. Developers are required to contact the Water Quality Division prior to the preliminary plat submittal. The sampling stations are to be located within the rights-of-way, private street tract, or utility easement at mid-street, 3 feet behind the sidewalk, along a property line extension.

Construction will be per COS Standard Detail No. 2349, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp). One sampling station will be required for every 300 dwelling units or less. A large development constructed in phases will be required to install the sampling station on the first phase and each subsequent phase when the dwelling units for all phases constructed exceed 300 units. Manufacturer of these sampling stations shall be "Koraleen," or approved equal, with a stainless steel ball valve.

## TRACT AND EASEMENT REQUIREMENTS

6-1.419

Water lines outside of a public rights-of-way or a private street tract must be placed in a minimum 20 foot wide easement located within a dedicated tract (portion of a utility tract, drainage tract or open space tract) unless approved otherwise by the Water Resources Department. Horizontally, a minimum of 6 feet is required between the water line and the edge of the easement. The tract/easement shall be accessible from public rights-of-way. The easement will be free of obstructions, will not be located in a fenced area, and will be accessible at all times to city service equipment such as trucks, backhoes, etc. Areas in question shall be approved in writing by the Water Resources Department. In situations where encroachment into the easement with structural improvements such as screen walls and paving cannot be avoided, Plan Review Services will request an indemnity agreement from the property owner.

1. No water line will be installed in an easement, outside of a tract dedicated to the city, unless the Water Resources Department has approved in writing the placement of the line in an easement, and the property owner has granted the necessary easement to the city.
2. Water line easements, outside of paved areas, shall have a 10 foot wide hardened path with a cross-sectional slope not greater than 10% and a longitudinal slope greater than



20%. The hardened path shall consist of native soil compacted to 95% to a depth of 1 foot from the existing or design surface, whichever is lower. Any revegetation within the easement will consist of low growing shrubs or plant material acceptable to the Water Operations Division. Trees may be located along the edge of the easement but not within 7 feet of the water line as measured to the trunk of the tree.

3. If access across a wash is not practical, the Water Resources Department may approve turn around areas at each side of the wash. Hammerhead turnaround configurations are acceptable allowing for turning movements of a full size pick up truck.
4. A copy of any written approval from the Water Resources Department shall be submitted with the final plans.

### 6-1.420

## EASEMENT ABANDONMENT REQUIREMENTS

When a property owner or developer believes a water line easement or portion thereof, is no longer required by the city, an abandonment may be requested by completing and filing an application through the city's One Stop Shop, [www.ScottsdaleAZ.gov/bldgresources/counterresources](http://www.ScottsdaleAZ.gov/bldgresources/counterresources).

After completing and filing the application, the property owner or developer will send a letter requesting abandonment of the easement, along with the reason, to the Water Resources Department with the following exhibits attached:

1. A detailed map highlighting the easement to be abandoned and locations of existing water and sewer lines shown in reference to the easement.
2. If existing water and/or sewer lines are to be abandoned, a detailed civil plan prepared by a professional engineer licensed in the State of Arizona must be supplied describing the method of abandonment and any necessary relocations of the water and/or sewer lines.

The Water Resources Department will issue a letter recommending approval or denial of the abandonment request and any stipulations that may be required in conjunction with the abandonment.

This letter will be attached to an Application for Release of Easement and will be submitted by the applicant to the One Stop Shop for subsequent processing by Development Services.

Failure to comply with the above process will result in a denial of the request. Where replacement rights are requested by the city, the city will not relinquish existing rights until the replacement rights have been granted.

### 6-1.500

## FIRE PROTECTION

It is the intent of the COS Fire Department to establish requirements consistent with nationally recognized practices for safeguarding life and property from hazards of fire and explosion arising from the storage, handling and use of hazardous substances, materials and devices, and from conditions hazardous to life and property arising from the use or occupancy of buildings or premises. For complete Fire Department related issues, see [Chapter 11](#).

### A. Ordinance Requirements

For information related to the current adopted plumbing and fire codes see the Scottsdale Revised Code, [www.ScottsdaleAZ.gov/codes/fireord](http://www.ScottsdaleAZ.gov/codes/fireord). For Fire Code Adoptions see Chapter 36, and Chapter 31 for Building and other related code adoptions.

### B. Design Policy

If the property is to be supplied with domestic service and with fire flows from a storage tank or facility, the engineer must provide a report indicating that sufficient volumes exist, as required

by the Fire Department, and are available to meet the calculated fire demands as defined by the engineer.

Particular attention will be given to the fire hydrant locations on final plans for infrastructure where future building locations are not identified. Final building location and elevation may necessitate the addition of another water line, fire hydrant, and/or fire pump to serve that structure after the city has accepted the system. Compliance with the fire hydrant spacing and pressure requirements are the responsibility of the party requesting a building permit, as they are a condition of that property's development.

## **FIRE FLOW REQUIREMENTS**

Water distribution facilities shall be sized to deliver a minimum fire flow of:

1. 1,500 gallons per minute (gpm) minimum for commercial, industrial and multi-family residential properties.
2. 1,000 gpm minimum for single-family residential properties located in the county.
3. 500 gpm minimum to one and two family residential properties with interior fire sprinkler systems.
4. Larger structures (over 6,000 gpm and non-sprinklered per Appendix B of the International Fire Code) may require fire flow above 1,500 gallons per minute depending on construction type. Verify fire flow requirements with the Fire Department.
5. 2,500 gpm minimum for high rise structures to account for potential fire fighting activities.

The 1,500 and 500 gpm fire flow requirements are stated in Scottsdale Revised Code, Section 36 - 41 for fully sprinkled developments. The 1,000 gpm fire flow requirement is stated in the International Fire Code and does not assume a fully sprinkled development.

## **HYDRANT LOCATIONS**

The spacing of fire hydrants is to be measured along the street or roadway in which a fire hose would be laid. Generally, this spacing is measured along the curb line and shall be inclusive of the distance along a private driveway to the proposed structure.

The Fire Department will stipulate fire hydrant locations during the site planning process or on the final plans review. The following standards shall be used as a guide:

1. The spacing of the fire hydrants in developments consisting of lots with detached single-family residences on each lot must be no more than 1,200 feet on center when street grade is less than 9%, and no greater than 600 feet on center when street grade is greater than 9%. When a cul-de-sac is greater than 600 feet in length, an additional fire hydrant must be installed. A residential structure must be located within 600 feet of a fire hydrant as measured along the streets and driveways. Additional hydrants and attention to the spacing may be required to meet the distances above for large lots including, but not limited to, those areas zoned R1-18 (18,000 square feet) or greater.
2. The spacing of fire hydrants in commercial and industrial areas and in attached multi-family residential developments, such as apartments and condominiums, must be no greater than 700 feet. This spacing applies to interior, on-site fire lane locations for hydrants, as well as to locations along public rights-of-way or private street tracts. A structure in this category must be located within 600 feet of a fire hydrant as measured along the accessible fire routes.
3. The spacing of the fire hydrants in the county must be no more than 660 feet. No structures shall be located more than 330 feet from a fire hydrant, as measured along the rights-of-way, private street tract or utility easement.
4. A 6 inch fire hydrant lateral shall not be tapped for fire sprinkler supply lines.
5. Auxiliary fire hydrant valves must be connected to the main water line by a flanged tee.

For more information contact Fire Department Plan Review at 480-312-7080, or visit the COS Fire & Life Safety webpage, [www.ScottsdaleAZ.gov/bldgresources/planreview](http://www.ScottsdaleAZ.gov/bldgresources/planreview).

**6-1.501****6-1.502**

**6-1.503****PAVEMENT MARKERS**

Two-way, reflective blue, raised pavement markers must be provided to identify the location of fire hydrants and remote fire department connections in accordance with COS Standard Detail No. 2363\*. These markers are readily available from businesses providing highway marker materials.

**6-1.504****FIRE LINES AND BUILDING SPRINKLER LINES**

1. Determine the location of on-site fire lines and taps by the site relationship of the fire department connection, riser location, emergency access and fire hydrant locations.
2. Projects within 1700 feet of a canal or open body of water will require a Reduced Pressure Principal Backflow Assembly in accordance with AWWA and located per the Water Resources Department. For specific project information, contact 480-312-8732.
3. Determine the size of fire lines from the flow test data provided by the engineer for design of the project. Fire systems must include a city approved backflow prevention device. An approved, vertically mounted backflow prevention device located on the building riser is preferred by the Fire Department.
4. Show all fire lines on the civil site final plans.
5. Do not connect fire lines to transmission mains that are 14 inches or larger.
6. Installation of 1½ to 2 inch fire service lines use a saddle connection per COS Standard Detail No. 2362-1\*, and installation of 3 inch and larger fire service lines use a tee and valve per COS Standard Detail No. 2362-2\*. Meters are not required on services used solely for fire sprinkler systems.

\*Note: For COS and MAG Standard Details [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

7. Fire service lines shall be installed perpendicular or radial to the main line within the right-of-way or easement.
8. All on-site fire line construction shall comply with the MAG Standard Specifications and Details\* and the COS Supplements\* thereto.

\*Note: For COS and MAG Standard Details [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

**6-1.505****BUILDING SPRINKLER SYSTEM REQUIREMENTS**

The following are structures that require building sprinkler systems:

1. All new commercial or industrial buildings (including basements).
2. All multi-family residential structures (apartments, condominiums and time-share developments, etc.).
3. All parking area structures (underground or aboveground).
4. All single-family residences constructed after January 1, 1986.

**6-1.506****SPRINKLER SYSTEM DESIGN**

Base building sprinkler system design on a certified flow test. A copy of the flow test shall be submitted with the improvement plans or shop drawings for city review. The drawings will be of uniform size (24 inch by 36 inch, or 30 inch by 42 inch) and drawn to scale. One set of the approved civil water final plans need to accompany these submittals. Also include on the working drawings any applicable City of Scottsdale and International Fire Code construction notes. The building sprinkler contractor shall submit 3 sets of shop drawings and a minimum of one set of calculations and supporting documents to the One Stop Shop for review by the Fire Department.

Include the following note on the final plans:

Installation will be per approved final plans. Any deviation from approved final plans will require written permission of the authority having jurisdiction.

The professional registrant in charge or fire code official may require a technical opinion and report prepared by a qualified party, and/or a professional registrant activities report containing all professional registrant duties as assigned by the State Board of Technical Registration with seal and signature of an Arizona Registrant, who is qualified in fire sprinkler design to accompany the plan submittal.

The professional registrant in charge is responsible to coordinate deferred submittals, professional registrant activities, technical assistance reports, modifications, alternative materials and methods, and to determine that the deferred submittal documents are in general conformance to the design of the building.

Inspections will be per National Fire Protection Association Standards (NFPA) 24 and as required by the Fire Department.

## **FIRE DEPARTMENT CONNECTION**

**6-1.507**

If a remote Fire Department connection for a sprinkler system is required, it must be installed between 4 and 8 feet from the back of curb of a public or private roadway, on-site driveway or sidewalk. The location of the sprinkler system connection must be unobstructed and readily accessible to the Fire Department. See the standard details in COS Interpretations and Applications of NFPA 13, 13R, 13D current adopted edition and COS Standard Detail No. 2367\*. This connection must also be within an appropriate distance of a fire hydrant as determined by the Fire Department, see [www.ScottsdaleAZ.gov/codes/fireord](http://www.ScottsdaleAZ.gov/codes/fireord).

Fire Department connections, whether remote or wall mounted, need to be identified and coordinated on the improvement plans and on the building plans site plan for relationship to fire lanes and fire hydrants. All Fire Department connections must be appropriately clear of glazing and other hazards and protected from vehicular damage. See Scottsdale Revised Code. [www.ScottsdaleAZ.gov/code/fireord](http://www.ScottsdaleAZ.gov/code/fireord).

Pavement markers for Fire Department sprinkler system connections must be provided as shown in COS Standard Detail No. 2363\*. For COS and MAG Standard Details, see [\\*www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

## **AUXILIARY STORAGE TANKS**

**6-1.508**

Water pressures and discharge flow required by the Fire Department will be for a minimum of 2 hours for commercial projects. A fire pump package installation may be required when the building's construction type, occupancy fire load commodities' classification, volumetric building areas, building height and individual square footage areas per floor level produce a pressurized fire flow demand in excess of the water transmission mains capabilities.

For residential sprinkler requirements, see the Scottsdale Interpretations and Applications of NFPA 13, 13R, 13D current adopted edition and [www.ScottsdaleAZ.gov/codes/fireord](http://www.ScottsdaleAZ.gov/codes/fireord).

**6-1.600****FINAL PLANS PREPARATION**

General requirements for the preparation of final plans in the City of Scottsdale are described in the Construction Plan Submittal Requirements in [Section 1-2.100](#). The following information is required, in addition to the items noted in [Section 1-1.000](#).

**A. Ordinance Requirements**

Upon development of the property for which city water service is desired and available, the developer will submit a plan for the water system prepared by a professional engineer licensed in the State of Arizona.

**B. Design Policy**

Any variance to these standards will require written approval from Water Resources.

**6-1.601****GENERAL REQUIREMENTS**

All extensions of the distribution system require pressure and flow testing. Include the results of the testing on the final plans cover sheet.

When a water line is to be connected to an existing system, the following note shall be placed on the final plans:

Contractor shall verify the location of the existing water line and type of material before proceeding with trenching.

**6-1.602****SPECIFIC WATER PLAN REQUIREMENTS**

For transmission and distribution lines, submit the following for city approval:

1. For permitting purposes, include on the cover sheet of the final plans quantities for all items of work within the public rights-of-way, private street tract and public easements. The engineer will submit an estimate of probable cost for pressure reducing valve assemblies to establish those permit inspection fees.
2. Station water lines along the centerline of the street or the pipe. Profile all water lines 12 inches and larger with line gradients and elevations. Show in profile the finish ground elevations over the water line where the water line is constructed outside of paving, or show in profile the finish pavement design elevations where the water line is constructed under paving.
3. Where water lines cross sewer lines, storm drains or drainage culverts show the relationship in both plan and profile with minimum clearances dimensioned. Identify all pipes, valves and appurtenances, etc.
4. Identify water line service locations with a meter station and offset. Show meters to scale.
5. Drawings shall show all utility locations, sizes, easements, rights-of-way and other structural features of the water line. Note pressure reducing valve settings and sizes on the plan.
6. Note and show in plan view easements within tracts, including docket and page numbers or recorder's number.

All construction documents will be prepared by a registered professional civil engineer licensed in the State of Arizona under the provisions of ARS 32:141-145. Booster Pump Stations and Reservoirs require separate plans submittals.

**6-1.603****REVIEWS AND APPROVALS**

All final plans that include connection to or extension of the city's water system, or on a system that is to be dedicated to the city, must be submitted to the One Stop Shop for review and approval. Plan review fees must be paid at the time of plan submittal.

No final plans will be submitted to the city unless accompanied by a copy of the fire flow test results, or, when stipulated, the accepted basis of design report. Master plans or design reports must be submitted separately through the One Stop Shop for review by the Water Resources Department.

Maricopa County Environmental Services Department approval is required, prior to approval of final plans by Plan Review Services, when extension of the public water system is proposed. No permits for public water line construction will be issued until the owner or developer has provided the necessary easements and rights-of-way. The instruments of dedication must be approved and submitted to the city for recording at the Maricopa County Recorder's Office.

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# WASTEWATER



This chapter provides ordinance, policy, and standards establishing design criteria for constructing and modifying water systems to be owned and operated by the city. It provides guidance on agreements, design report preparation, transmission and distribution systems, fire protection and final plans preparation.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# WASTEWATER

# 7-1

## GENERAL INFORMATION

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## 7-1.000

### A. Ordinance Requirements

Developers are required to install at their expense, all improvements necessary to provide wastewater service to their development. This includes any sanitary sewer lines, lift stations, force mains or other facilities, and the payment of all required development fees. See the Scottsdale Revised Code, Section 49-73, [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

Developers must also adhere to the city's requirements for extension of the city's wastewater system to newly developed areas and subdivisions inside the city's service area. See Section 49-212, [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

A civil engineer registered in the State of Arizona is required to analyze the wastewater generation from a proposed development and determine its impact on the city's wastewater collection system. This analysis is typically required from the development to a point on the downstream system where the engineer can certify compliance with a master plan previously accepted by the city. The city is responsible for analysis of sanitary sewer lines shown in the city's Wastewater System Master Plan.

### B. Diligence

It is strongly advised that developers and property owners verify the need for any sewer extensions necessary to provide service to a site and comply with the extension/frontage requirements of the City's Code.

Available Resources:

1. Records Counter; obtain existing utility maps and as-built drawings.
2. Scottsdale Revised Code; (generally Chapters 47 through 49), [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).
3. City of Scottsdale, Home Improvement Center, [www.ScottsdaleAZ.gov/bldgresources/MyHome](http://www.ScottsdaleAZ.gov/bldgresources/MyHome).
4. A city civil plans examiner and/or a city water resources engineer can confirm the need for any required extension or condition for sewer service.

Information obtained from the city will be good for a six month period.

## EPA REGULATIONS

## 7-1.001

The US Environmental Protection Agency (EPA) requires the city to develop and implement a program to control discharges that might harm the Publicly Owned Treatment Works (POTW). The program establishes local discharge limits for non-residential users and provides a permitting process based on the users' discharges and types of businesses. Details of the program and requirements are found in the Scottsdale Revised Code: Article IV of Chapter 49; Water, Sewers and Sewage Disposal. Specific information may be obtained by calling the Water Resources Department at 480-312-5685.

## 7-1.002

**ADEQ REQUIREMENTS****A. Design Policy**

Maricopa County Environmental Services Department (MCESD) is required to review and approve all public sanitary sewer line extensions and construction of wastewater-related facilities within the city's service area, prior to the city approving the final plans.

Engineering Bulletin No. 10, "Guidelines for the Construction of Water Systems" published by the Arizona Department of Environmental Quality (ADEQ) and Arizona Administrative Code, "Title18 - Environmental Quality," contain specific requirements for submittals, approvals and notifications when extension of a public sanitary sewer line is proposed. Some of the provisions are outlined below. The developer is responsible for reading and complying with all regulations and requirements.

1. Before Plan Review approves final plans, the developer will submit a cover sheet for the improvement plans with a completed signature and date of approval from the MCESD. The city's Water Resources engineer accepting the sewer design report will provide a letter to comply with the requirements of Arizona Administrative Code Section R18-9-E301.
2. Before commencing construction, the contractor or developer will provide documentation to the city public works inspector that a Certificate of Approval to Construct and/or Provisional Verification of General Permit Conformance has been approved by MCESD. Contact MCESD at 602-506-6666 with any questions.
3. Before building permits are issued, the developer will submit to the city public works inspector a Certificate of Approval of Construction and/or Verification of General Permit Conformance signed by MCESD.
4. Before Inspection Services issues a Letter of Acceptance, the developer will deliver to the city's Public Works Inspector an acceptable set of full-size 4-mil as-built mylars of the improvements.

## 7-1.003

**PRIVATE WASTEWATER COMPANIES**

Portions of Scottsdale's municipal service area are served by private wastewater companies. [Figure 7.1-1](#) delineates these areas.

Placing private sanitary sewer lines within city rights-of-way (ROW) will require an agreement between the private wastewater company and the city.

The private company should review modifications or construction of wastewater systems within their franchise areas. When submitting final plans, the developer must provide written documentation that the private wastewater company has reviewed and approved the sanitary sewer lines within its jurisdiction.

The city cannot provide wastewater service within private wastewater company franchise areas and will not review private wastewater systems unless requested by the owner or for work that is to occur within the city's ROW. In cases where the city is requested to review private wastewater systems, the applicable review fees must be paid. A note must be placed on the drawings stating operation and maintenance responsibilities.

## 7-1.100

**AGREEMENTS**

Developers and property owners who install improvements to the public wastewater system may be eligible to request a credit, oversize or payback agreement with the city allowing for partial reimbursement of costs to design and construct those improvements.

**A. Ordinance Requirements**

Developers who construct wastewater system improvements may receive credit for such construction, see Scottsdale Revised Code, Section 49-74.2. The city has specific programs to provide for reimbursement agreements with developers or property owners and for the collection of line payback charges and for the oversizing of wastewater lines, see Scottsdale Revised Code, Section 49-212.

**CREDIT AGREEMENTS**

Credit agreements are established to compensate a developer for installing system infrastructure that has been identified in the city's Capital Improvement Plan (CIP) and/or included in the most recent Development Fees Report. Credit agreements are set up through the Water Resources Department and are to be identified in the developer's master plan.

**7-1.101**

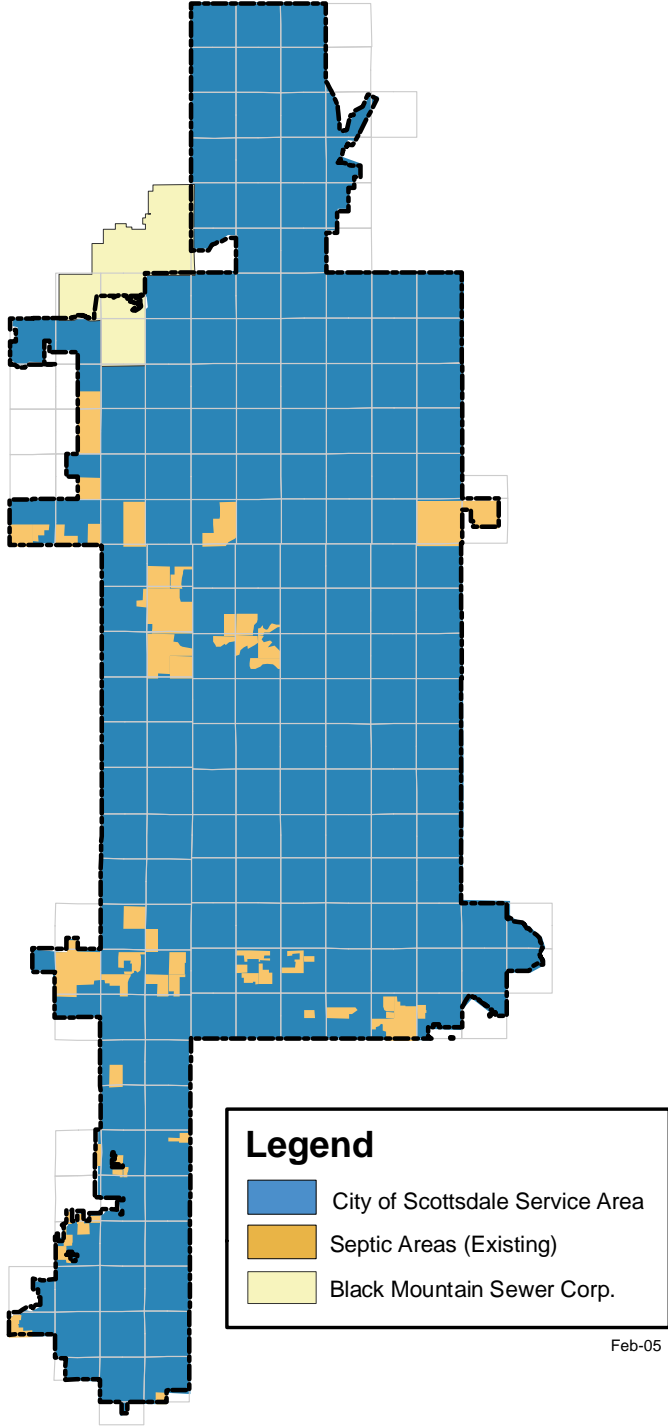


FIGURE 7.1-1 WASTEWATER SERVICE AREAS

7-1.102

**OVERSIZE AGREEMENTS**

Oversizing Agreements allow the city to compensate developers for the cost to install a sanitary sewer line larger than what is minimally required to serve the development. Oversizing is requested by the Water Resources Department when a larger line is necessary to meet the needs of additional properties upstream of a development. All oversizing projects involving city funds must have an oversizing agreement and must meet all the city

requirements. The city can only participate in the cost of oversizing when there are sufficient funds in the CIP budget and the amount does not exceed the limitations set forth by the Arizona Revised Statutes, Title 34, Article 2, Paragraph 201.D. If sufficient funds do not exist, the oversized lines will be installed at the developer's cost. Oversizing agreements are set up through the Water Resources Department.

## **PAYBACK AGREEMENTS**

**7-1.103**

Developers may request a Payback Agreement when constructing sanitary sewer lines across frontages of parcels not currently receiving wastewater service from the city. When a designated parcel requests wastewater service, a pro-rated cost of the sanitary sewer line is collected by the city and returned to the developer. Line extension payback agreements are set up through the Water Resources Department. For questions or details on procedures to initiate an agreement, contact the Water Resources Department. The Extension Participation Program (see [www.ScottsdaleAZ.gov/bldgresources/counterresources/waterfeepacket/ExtensionParticipation](http://www.ScottsdaleAZ.gov/bldgresources/counterresources/waterfeepacket/ExtensionParticipation)) may be available to single family property owners required to public extended public sewer lines to their lot for service.

## **WASTEWATER SERVICE AGREEMENT**

**7-1.104**

The county's Sewer Service Agreement is to be completed by the engineer and submitted with the final plans to the One Stop Shop. Plan Review will sign the water and wastewater portions of the agreement and Solid Waste Management staff will sign for the refuse service. It is the owner's responsibility to obtain these signatures from the respective city divisions. The agreements will not be signed prior to the city approving the final plans. Following is specific information regarding the city's municipal wastewater system and the appropriate identification numbers:

- Water Campus – Wastewater Treatment # 37-024
- Gainey Ranch – Wastewater Treatment # 37-160
- System Name: City of Scottsdale Water Campus
- Address: 8787 E. Hualapai Dr., Scottsdale, AZ 85255

The following identification number relates directly to that portion of the city's wastewater system that is not treated at the Water Campus or Gainey Ranch. This area is generally south of Doubletree at Scottsdale Road, south of Via Linda at Pima Road and excludes the Hayden corridor to Frank Lloyd Wright Blvd:

- General sanitary sewer collection system # 37-011

The city's Wastewater System Master Plan is helpful in determining the appropriate system identification facility number.

## **DESIGN REPORTS**

**7-1.200**

Wastewater master plans and basis of design reports provide an analysis of the impact that a development will have on the city's wastewater system. These reports are reviewed and accepted by the Water Resources Department and then utilized by Plan Review to verify the infrastructure to be constructed. Accepted design reports are retained in the Records Division and are made available to developers and engineers upon request.

### **A. Design Policy**

Analysis of all proposed development, determined by the city to have an impact on the wastewater system, needs to be performed by a civil engineer registered in the State of Arizona. The analysis needs to include the effects of peak flow to ensure proper sizing and layout of the proposed wastewater system facilities.

A wastewater master plan or a wastewater basis of design report may be required for each development within the city when an extension of the system is necessary or the proposed development will produce more than 10,000 gallons of wastewater per day. Water Resources staff will determine which report is appropriate for a given development and convey this requirement to the city's project coordinator for inclusion in the case's stipulations. Reports will be separately submitted for review to the One Stop Shop, directed to the attention of the Water Resources Department. The reports must be accepted by the Water Resources Department prior to the submittal of final plans for review by Plan Review, unless otherwise agreed to by Plan Review staff.

### 7-1.201 **WASTEWATER MASTER PLAN**

A wastewater master plan is required when a change in the existing zoning or land use is proposed, phased construction is proposed or when the Water Resources Department determines. The Wastewater System Master Plan must show compliance with the city's design criteria and development policies for each phase of the project and to establish a skeletal system for the phased development of a master planned project.

### 7-1.202 **WASTEWATER BASIS OF DESIGN REPORT**

Most projects within the city will require a Basis of Design Report. The objectives of a basis of design report are to determine the development's wastewater demand, analyze the hydraulics of the proposed sanitary sewer system to a point evaluated by the city's Wastewater System Master Plan and demonstrate conformance for each phase of the development with the accepted master plan for that development.

### 7-1.203 **GENERAL REPORT REQUIREMENTS**

All reports submitted to the city for review must be prepared in accordance with the guidelines listed below.

#### **A. General format**

1. The report should be on letter-sized paper (8 ½ x 11).
2. All reports will have a table of contents.
3. Maps and other supporting materials larger than folded ledger size paper (11 x 17) should be placed into sleeves providing an appendix to the report.
4. A civil engineer licensed to practice in the State of Arizona must seal each report.

#### **B. Report cover**

1. Covers should consist of cardstock paper or better.
2. The project name should be located on the cover.
3. The names, addresses and phone numbers of the developer/owner and engineer should be stated on the cover.
4. The original submittal and any subsequent revision dates should be located on the cover.

#### **C. Vicinity map**

Identify the project's location with respect to major cross streets.

### 7-1.204 **WASTEWATER BASIS OF DESIGN REPORT CONTENT**

#### **A. Introduction**

Summarize the proposed development:

1. Include a legal description based on sectional breakdown or reference within a platted development.
2. Describe the existing and proposed site zoning and land uses.

3. Include reference to elements of the city's General Plan and identify any designated character area or studies that will affect the project's design.

**B. Design Documentation**

Note compliance with this manual and all other applicable standards and codes on the Design Report.

1. Include a discussion of which design procedures, policies and methodologies will be incorporated into the design engineering of the wastewater system.
2. List the title and version of any software used in the design analysis.

**C. Existing Conditions**

1. State the existing zoning and land use.
2. Describe the existing, topography, vegetation and landform features.
3. Include the location and description of existing utilities in the vicinity.
4. Reference any existing master plans or design reports applicable to adjacent development.
5. Indicate the results of any certified flow testing of the existing system.

**D. Proposed Conditions**

1. Include a site plan that indicates the layout of the proposed development.
2. Describe the proposed connection(s) to the city's wastewater system. Show extension of sanitary sewer lines into the site.
3. Address maintenance responsibilities of the proposed wastewater system.

**E. Computations**

1. Base wastewater flows on the design flows in this manual.
2. Verify any variance from the stated design flows with the Water Resources Department.
3. Give particular attention to wastewater peaking factors used for restaurants or specialty developments.
4. Use scour analysis where surface runoff exceeds 500 cubic feet per second (cfs) over a sanitary sewer pipe.
5. Pipe data - ID, upstream and downstream nodes, invert elevations, pipe material, slope, length, diameter, Manning's n-value, peak flow, flow depth, flow depth/diameter ratio, actual flow velocity, full flow design capacity and average pipe cover.

**F. Design Documentation.**

1. Common spreadsheet formats shall be compatible with MS<sup>®</sup> Excel.

**G. Summary**

1. Provide a summary of the proposed wastewater improvements stating that all city design standards and policies have been met or indicate any variance or exception. Note why the developer is requesting any variance or exception.
2. Include a brief project schedule indicating the proposed start and completion of the development's improvements.

**H. Supporting Maps**

Include a scaled site plan showing all existing and proposed utility lines and surface improvements.

1. Graphics should screen the development's background, present existing utilities as dashed lines and proposed utilities as bold solid lines.



2. Screen existing topography into the background. Clearly label, at 2-foot intervals, all existing and proposed contour intervals. Show sufficient information to evaluate pipe cover.
3. Show, dimension and label clearly all property lines, rights-of-way, tract and easement lines.

#### **I. Miscellaneous**

Requests for more specific information regarding report requirements and the wastewater system may be obtained by contacting the Water Resources Department.

### **7-1.205**

#### **WASTEWATER MASTER PLAN REPORT CONTENT**

1. The Wastewater Master Plan Report will specify the terms and requirements for wastewater service to the development.
2. All development projects will be responsible for determining their specific wastewater discharge and will include flow from any upstream developments to ensure the system is designed properly.
3. If the proposed development requires a change in zoning, which increases density or proposes a wastewater system different from the city's existing Wastewater System Master Plan, then additional off-site calculations will be required.
4. Flows will be calculated according to this section.
5. A computer disk containing all calculations will be submitted along with the Master Plan report.
6. Each Master Plan map must show the following:
  - a. All proposed on-site and off-site facilities including, but not limited to, lift stations, trunk lines and collection lines.
  - b. Proposed street locations, parcel boundaries and proposed lots within each parcel.
  - c. Contour lines at 2-foot intervals showing the elevation of the land surface.
  - d. A separate area location map showing existing and proposed streets, as well as existing parcels surrounding the project to a distance of 1 mile from the exterior boundaries of the project. Assessor's maps can provide the information required to prepare these composite maps.
  - e. A scale that is sufficient to show all required information clearly.
7. All sanitary sewer lines that cross golf courses or other open areas must do so within established roads. If dedicated roads are not practical, then the crossing must be within a 20-foot-wide accessible easement within a tract. No walls may cross these easements.
8. The Wastewater Master Plan must show compliance to construct sanitary sewer lines, if not already in place, across all dedicated frontages of the development where future extension is possible.
9. A construction schedule will be included in a table format for all wastewater related construction required to serve the development. The schedule will have each phase or parcel as column headings and each construction project or system component as rights-of-way (ROW) headings. A mark in each box will specify when each constructed item will be required for each phase of the development.
10. The master plan report must comply with the adopted city Wastewater System Master Plan encompassing the respective area.
11. Those Master Planned Developments that design a wastewater collection system that will be phased will provide a description of the phasing.

For specific information regarding wastewater plan requirements and/or the city's current Wastewater Integrated Master Plan, contact the Water Resources Department.



## WASTEWATER FACILITIES

7-1.300

Lift stations and force mains are typically designed and constructed by the city through its Capital Improvement Program. Developers needing to construct these facilities must contact the Water Resources Department and request a meeting. The developer should be prepared to address how the proposed system will conform to the city's Wastewater System Master Plan. The city will address design issues, the city's review process for wastewater facilities and any potential city cost participation.

### A. Ordinance Requirements

When wastewater service is not available, a septic system or alternative system acceptable to the Water Resources Department may be allowed with the approval of both the City of Scottsdale and the Maricopa County Environmental Services Department, Section 49-116.

### B. Design Policy

Maricopa County Environmental Services Department and the city discourage the development of privately owned packaged treatment facilities designed to serve two or more lots.

Where lift stations are necessary, the engineer will meet with the Water Resources Department to discuss design requirements, ownership and maintenance responsibilities.

## SEPTIC SYSTEMS / ON-SITE TREATMENT FACILITIES

7-1.301

The property owner is responsible for the design, construction, operation and maintenance of septic systems / on-site wastewater treatment facilities. The city will not accept any type of on-site system for operation and maintenance.

All on-site wastewater treatment facilities will be designed and constructed compliant with the applicable requirements of the Maricopa County Environmental Services Department. Final plans submitted to the One Stop Shop will include the county's permit number for the on-site system.

## WASTEWATER LIFT STATIONS

7-1.302

Water Operations maintains a separate document outlining the design, specifications and materials required for a city owned and maintained wastewater lift station. This document may be viewed at [www.ScottsdaleAZ.gov/bldgresources/counterresources/WaterFeePacket](http://www.ScottsdaleAZ.gov/bldgresources/counterresources/WaterFeePacket). Contact the Water Resources Department for additional information.

### A. Site Selection

In selecting a site for a sewage lift station, consider accessibility, drainage patterns, visual impact, function and design constraints.

Consider the potential for flooding when selecting a pump station location. The station's equipment must be protected from damage and remain operable during a 100-year flood.

Unless otherwise agreed to in writing by the city's Rights-of-Way Agent, each tract or lot dedicated to the city will be conveyed by a general warranty deed and accompanied by a title policy in favor of the city, both to the satisfaction of the city.

### B. Lift Station Design

Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control," contains minimum requirements for a wastewater lift station. Additional requirements specific to the city must be obtained from the Water Resources Department before beginning design. At a minimum, telemetry, dual pumps, backup power supply, three-phase power, odor control and perimeter walls will be required. The site will also be large enough to contain all the equipment and service equipment for repairs.

Prior to the preparation of construction drawings, a preliminary design report will be prepared and submitted to the One Stop Shop for Water Resources Department review. The preliminary report will outline the type of equipment and controls proposed for the station. A final design report prepared by a registered professional engineer, licensed in the State of Arizona, must accompany all pump station design drawings and specifications submitted to the city for review.

**7-1.303****FORCE MAINS**

Force mains will be located within a rights-of-way, private street tract or utility easement. The line must be located under pavement where possible.

**A. Velocity Requirements**

The flow velocity in the force main must be between 4 and 6 feet per second (fps).

**B. Materials of Construction**

All pipe material used in design of the force mains must have established ASTM, ANSI, AWWA or NSF standards of manufacture or seals of approval and shall be designated as pressure sanitary sewer pipe. Force mains must be identified as such with marking tape 1 foot above the pipe. A cured-in-place liner shall be provided for all installations of ductile iron pipe.

**C. Air Release Valves**

Air release valves designed for sewage must be provided on force mains at all peaks in elevation see COS Standard Detail No. 2405, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

**D. Cleanouts**

Lines 6-inches and larger shall provide two-way cleanouts shall be provided every 1,300 feet apart or 1-way cleanouts every 650 feet. Single cleanouts must be provided at all horizontal bends oriented in line with the downstream pipe. Lines 4-inches and smaller shall provide two-way cleanouts every 600 feet apart or 1-way cleanouts every 300 feet. 90-degree changes in direction are to be accomplished using two 45-degree bends with a 2-way cleanout located between the bends. See COS Standard Detail No. 2403, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

**E. Force Mains**

Force mains shall be constructed using mechanically restrained joints at the following locations:

1. All locations where a vertical realignment is required;
2. Drainage wash crossings;
3. Air release assemblies;
4. Clean-out assemblies.

**F. Line Separations**

1. Where a force main crosses a water main or transmission line, protection must be provided as per ADEQ Engineering Bulletin No. 10 and the Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control." See COS Standard Detail No. 2402 for details regarding discharge into a manhole from a force main.
2. The minimum separation between the force mains and water lines should be 2 feet wall-to-wall vertically and 6 feet horizontally under all conditions. Where a force main crosses above or less than 6 feet below a water line, the force main shall be encased in at least 6 inches of concrete for 10 feet on either side of the water line or constructed using mechanically restrained joint ductile iron pipe. Fittings should not fall within the encasement.

The engineer must evaluate the potential for odor to develop from a force main downstream of the receiving manhole. One-way valves on building service lines shall be specified where

there is potential for gasses to strip from the waste stream. The valves should be located at or near the building cleanout and include provisions for access and maintenance by the property owner.

## COLLECTION SYSTEM

## 7-1.400

This section describes the minimum requirements for extending the public wastewater collection system.

### A. Ordinance Requirements

When a public sanitary sewer line is located within 660 feet of the boundary of the subject property, extend the line to provide service to the property, Section 49-224. A separate private on-site wastewater treatment system shall be constructed for each lot only when a public wastewater system is not available, Section 49-116.

Sanitary sewer lines are required along the entire length of property line frontage whenever future upstream extension of the wastewater system is possible. The property line frontage is that portion of the property that abuts a street, public utility easement or public rights-of-way. If a parcel to be developed has more than one property line frontage, the city may require a sanitary sewer line be installed along the entire length of all frontages, Section 49-219.

1. Developers must install, at their expense, all on-site and off-site improvements necessary to serve their developments. This expense includes all required development fees, Section 49-73.
2. On-site sanitary sewer lines to commercial shopping center developments must be privately owned, operated and maintained. Multi-family developments may elect to install public or private sanitary sewers, Section 49-118.
3. When required by the city, users who discharge non-residential wastewater must install monitoring manholes, Section 49-96. Users discharging industrial wastes must install monitoring manholes and provide written notice to the Water Resources Department, Section 49-161.

### B. Design Policy

Reconstruction of residential or commercial structures requires compliance with all current ordinances and design guidelines relating to sewer line extensions.

Sanitary sewer lines will not be privately owned if future connections to those lines would be necessary to serve adjacent parcels.

For planned developments and subdivisions where an existing sanitary sewer is not available, a dry sanitary sewer line must be installed conforming to all the design requirements for a public sanitary sewer line. Use a permanent marking system to locate the capped ends of service line stubs on a dry system. Also, design interim on-site wastewater treatment systems for future connection to the dry system when sanitary sewer service becomes available.

Wastewater systems must be designed to serve the ultimate population density expected in the tributary area. Make sure the design is in conformance with the current city approved Wastewater System Master Plan and takes into consideration future connections. Where a wastewater collection system extension is possible upstream of a subdivision, extend the sanitary sewer through the subdivision to the platted boundary to a point of connection that will provide wastewater service to adjacent properties.

### C. Design Standards

The engineer should be familiar with the Maricopa Association of Government's Uniform Standard Specifications for Public Works Construction and the COS Supplement to MAG Uniform Standard Specifications for Public Works Construction, including all applicable

Standard Details. These documents contain construction related specifications and details that impact the design of water systems including trenching, bedding, backfill and pavement replacement, etc.

Private wastewater systems must be designed in compliance with Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control".

### 7-1.401

## MATERIALS

In selecting pipe material for sanitary sewer lines, give consideration to chemical characteristics of wastewater, especially industrial wastes. Consider velocity; the possibility of septicity; external and internal pipeline forces and preventing infiltration, abrasion and similar type problems.

Use sanitary sewer lines that are vitrified clay pipe (VCP); polyvinyl chloride (PVC) SDR35, up to 15 inches in diameter; PVC (meeting ASTM F679 - T1) between 18 and 27 inches in diameter; or ductile iron pipe (DIP) with approved cured-in-place linings. AWA C-900 or C-905 pipe may be permitted in areas where mechanically restrained joint pipe is permissible for PVC installations and shall include the appropriate marking tape. Submit in writing to the Water Resources Department any requests for consideration of alternative materials.

Note: Do not change pipe material between manholes.

Where standard strength pipe is not structurally sufficient due to external loading, or 4 feet of pipe cover cannot be maintained, submit a written request with supporting calculations to the Water Resources Department for permission to use extra-strength pipe, special bedding specifications, or alternative construction methods. The Water Resources Department must accept the request in writing prior to Plan Review approval of the final plans.

Ensure that all types of pipe material used in design have established ASTM, ANSI, AWWA or NSF standards of manufacture or seals of approval, and are designated for use with wastewater.

### 7-1.402

## SYSTEM LAYOUT

Generally, sanitary sewer lines constructed along a street grid should be aligned parallel to, and south or west of the street centerline. Lines should not cross the street centerline except in cases where curvilinear roadway alignments are encountered.

Public sanitary sewer lines within commercial, industrial or multi-family developments must be located within drive aisles a minimum of 6 feet from any structure. Public sanitary sewer lines will be located within tracts and/or public utility easements. No private utilities are allowed longitudinally within a public utility easement.

If the horizontal direction, slope, material or size of the sanitary sewer line changes, a manhole must be constructed. The horizontal angle formed between the two lines cannot be less than 90 degrees. In sanitary sewer lines that are 12 inches or larger, angles formed must be between 120 and 150 degrees to the downstream pipe for odor control purposes.

Note: Curvilinear sanitary sewer lines will not be allowed. Wastewater flows that have not been accepted by the city shall not pass through collection systems.

Developments with numerous curved streets will be discussed with the Water Resources Department to decide whether the city will consider a design report with water and sewer layouts in accordance with the following criteria:

1. Water and sanitary sewer lines will be placed under the paved section of the roadway within the area, from back-of-curb to back-of-curb.
2. Sanitary sewer lines must maintain a minimum of 6-foot horizontal clearance to dry utilities per COS Standard Detail No. 2401.
3. Sanitary sewer manholes are to be located at the approximate center of the drive lane.

4. The water line and sanitary sewer line will run parallel to each other, with 9 feet of separation to the pipes' centerline in order to maintain 6 feet of clearance at manholes.
5. Deflections in the sanitary sewer line shall be designed to nominal fitting angles within standard tolerances and will occur at the same locations where the water line is deflected.

See [Section 6-1.302](#) for related water system criteria.

## DESIGN FLOWS

7-1.403

### A. Residential

Sanitary sewer lines 8 to 12 inches in diameter will be designed using 100 gallons per capita per day (gpcpd) and a peaking factor of 4.

Sanitary sewer lines larger than 12 inches in diameter will be designed using 105 gpcpd and a peaking factor developed from "Harmon's Formula":

$$Q_{max} = Q_{avg} [1 + 14 / (4 + P^{1/2})]$$

*P = Population / 1,000*

Residential densities are to assume 2.5 persons per dwelling unit, apartment or town home.

### B. Commercial and Industrial

Wastewater flows for uses other than those listed below shall be based upon known regional or accepted engineering reference sources approved by the Water Resources Department.

AVERAGE DAY SEWER DEMANDS		
Land Use	Demand	Peaking Factor
Commercial/Retail	0.5 per sq. ft.	3
Office	0.4 per sq. ft.	3
Restaurant	1.2 per sq. ft.	6
High Density Condominium	140 per room	4.5
Resort Hotel (includes site amenities)	380 per room	4.5
School: without cafeteria	30 per student	6
School: with cafeteria	50 per student	6
Cultural	0.1 per sq. ft.	3

**FIGURE 7.1-2 AVERAGE DAY SEWER DEMAND IN GALLONS**

## HYDRAULIC DESIGN

7-1.404

No public sanitary sewer lines will be less than 8 inches in diameter unless permission is received in writing from the Water Resources Department.

Sanitary sewer lines should be designed and constructed to give mean full flow velocities of not less than 2.5 fps, based upon Manning's Formula, using an "n" value of 0.013.

Conversely, to prevent abrasion and erosion of the pipe material, the maximum velocity will be limited to 10 fps at estimated peak flow. Where velocities exceed this maximum figure, the engineer will be required to submit a hydraulic analysis along with construction recommendations to the Water Resources Department for consideration. In no case will velocities greater than 15 fps be allowed.

Actual velocities will be analyzed under peak flow conditions for each reach of pipe.

Generally, the sanitary sewer system will be designed to achieve uniform flow velocities through consistent slopes. Abrupt changes in slope should be evaluated for hydraulic jump. The depth to diameter (d/D) ratio for gravity sanitary sewer pipes 12 inches in diameter and less should be no greater than 0.65 in the ultimate peak flow condition. The d/D ratio for gravity drains greater than 12 inches diameter should be no greater than 0.70 for the ultimate peak flow condition.

Mitigation of hydrogen sulfide will be analyzed in the design report and be provided for in the design of the system.

### 7-1.405

## MANHOLES AND CLEAN OUTS

Manholes in city streets should be located near the center of the inside traffic lane, rather than on or near the line separating traffic lanes. Manholes should not be located in bike trails, equestrian trails, sidewalks, crosswalks or wash crossings. Manholes are required at all changes of grade, pipe size, pipe material or alignment and at distances not to exceed those shown below:

Pipe Diameter (inches)	Maximum Manhole Spacing (feet)
8 – 15	500
18 – 30	600
36 – 60	800
Over 60	1,300

FIGURE 7.1-3 MANHOLE SPACING

### A. Manhole Base

Manhole bases are to be cast in place. The flow channel through the manhole should be steel trowel finished to conform in shape and slope to that of the sanitary sewer pipe. The manhole shelf should be brush or broom finished, with a slope of 1 inch per foot. The manhole bottom should be filleted to prevent solids depositions and channeled to ensure satisfactory flow to the lower invert.

### B. Manhole Sections and Cones

All manhole sections and cones should be the precast concrete as detailed in the MAG Standard Detail No. 420, deleting the manhole steps and/or cast in anchors for steps, see [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp). If a manhole is more than 10-feet deep or the line is 15-inches in diameter or larger, the manhole shall be 5-feet in diameter. Manhole depth shall be defined as the distance from the design rim elevation to the lowest invert elevation.

### C. Manhole Covers

Manhole covers are to be per MAG Standard Detail No. 424 and COS Standard Detail No. 2421, see [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

### D. Manhole Linings

Manholes will be lined or coated at the junction of a force main, when constructed on sanitary sewer lines 15 inches in diameter or larger or in other design situations where corrosive conditions are anticipated. Manholes receiving wastewater from force mains and ejector lines must be lined. Manholes requiring linings or coatings shall be noted on the final plans.

### E. Intersecting Lines within Manholes

Manholes are required for all lines intersecting at angles other than 180 degrees, a change in slope, a change in pipe size or a change in pipe material. The manhole must have a minimum



0.10-foot drop across the trough unless otherwise approved by the Water Resources Department. Where pipe size changes through a manhole, the top invert of the upstream pipe(s) will be equal to or higher than the top invert of the downstream pipe. In large trunk lines, inverts at junctions should be designed to maintain the energy gradient across the junction and prevent backflow.

#### **F. Drop Manholes**

The difference in invert elevations between inflow and outflow lines shall not exceed one pipe diameter, unless a drop connection is installed. Drop connections shall be in accordance with MAG Standard Detail No. 426\*, modified as follows:

- For drops up to and including 5 feet, use Type “A” drop connections.
- For drops greater than 5 feet, use Type “B” drop connections.

The manhole bottom should be filleted to prevent solid deposition.

#### **G. Manholes at Washes and Drainage Areas**

Manholes must be protected from storm drainage and flooding conditions. Sanitary sewer lines will not be allowed in washes or drainage areas unless otherwise approved in writing by the Water Resources Department.

When approved by the city, manholes located within washes or drainage areas are to have bolted watertight covers to prevent inflow and the rim elevation should be a minimum of 18 inches above adjacent finish grade, see COS Standard Detail No. 2420\*. Design watertight manhole bases, barrels and grade rings and provide structural protection against scour from a 100-year storm flow. This protection may require encasing the entire manhole using sono-tube form material or constructing a monolithic manhole. The manhole should be designed by the engineer to meet the amount of protection as calculated by the flow conditions of the wash. The engineer is responsible to provide a manhole design eliminating infiltration in wash areas.

#### **H. Cleanouts**

Cleanouts per MAG Standard Detail No. 441\*, may be used in place of manholes at the ends of laterals that cannot be extended and are less than 150 feet in length. Cleanouts are required to allow for maintenance and inspection of the lines. When a sewer line can be extended by others along the same alignment and grade, a cleanout may be permissible beyond 150 feet in length up to a maximum distance of 300 feet.

Service connections are not allowed at the ends of cleanouts. Service connections should be provided off the sanitary sewer line a minimum of 2 feet downstream of the cleanout.

\*Note: For COS and MAG Standard Details, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

### **MONITORING VAULTS AND MANHOLES**

7-1.406

#### **A. Monitoring Vaults**

The Water Quality Division has sole discretion when to require a developer to install a monitoring vault for testing wastewater flow and composition. Generally, properties in industrial land use/zoned areas with a projected wastewater discharge of 25,000 gallons per day will be required to install a monitoring vault per COS Standard Detail No. 2460\*.

\*Note: For COS and MAG Standard Details, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

#### **B. Monitoring Manholes**

The Water Quality Division has sole discretion when to require a developer to install a monitoring manhole. Generally, commercial properties with potential mixed uses, restaurants and developments that will use chemicals or solvents are required to install monitoring manholes.

Monitoring manholes will be constructed per MAG Standard Detail No. 420\*, with a straight channel and no taps or bends for 10 feet upstream or downstream or as approved by the

Water Resources Department. Design details for monitoring manholes on sanitary sewer lines, 6 inches or larger with a peak flow greater than 40 gallons per minute (gpm), must be approved by the Water Resources Department.

Monitoring vaults and manholes will be located in a minimum 20-foot-wide easement that extends from the manhole to the existing public wastewater system and be designed for access at all times to monitoring crews and vehicles.

## 7-1.407

### PIPE COVER AND SEPARATIONS

Sanitary sewer pipe will be installed at a depth sufficient to ensure gravity drainage of wastewater from each service line and should anticipate the lowest potential finish floor elevation for each building pad.

Pipe design should ensure gravity drainage from the ultimate drainage area and will allow for future extensions of service to adjacent parcels.

In no case will sanitary sewer lines be installed with less than 4 feet of cover over the top of the pipe, unless otherwise approved by the Water Resources Department.

All sanitary sewer lines will be designed to absorb superimposed live loads and backfill overburden without damage to the pipe material and without adversely affecting the hydraulic characteristics of the pipe. The engineer will specify minimum depths of cover to be provided during the construction of roadways or other facilities affecting cover over the line.

#### A. Separation of Water and Sanitary Sewer lines

Caution should be taken in the design and construction of the sanitary sewer lines to protect all water supplies from wastewater contamination. To minimize the potential of contamination, the engineer must design the horizontal and vertical separation of water and sanitary sewer lines in accordance with Engineering Bulletin No. 10, "Guidelines for the Construction of Water Systems" published by the Arizona Department of Environmental Quality and the Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control".

The minimum horizontal distance from a water line to a sanitary sewer line will be 6 feet, wall-to-wall. The minimum vertical clearance of a water line crossing under or over a sanitary sewer line will be 2 feet.

Where conditions prevent adequate vertical separation or where a water line must cross under a sanitary sewer line:

1. Both the water and sewer line will be constructed for ductile iron pipe with restrained joints, or,
2. Where the existing water line is other than restrained ductile iron, the water lines shall be replaced with restrained ductile iron pipe per MAG Standard Detail No. 404-2, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp), and/or
3. where the existing or proposed sewer line is other than restrained ductile iron, the sewer line shall be encased in concrete per MAG Standard Detail No. 404-3, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

#### B. Separation from Structures

Sanitary sewer lines will have a minimum of 6 feet of horizontal clearance from any structural footing or substantial improvement. Design will consider any structural load imposed on the pipe.

The Water Resources Department may consider an indemnity agreement where no alternative sewer alignment is possible and surface improvements, including decorative paving or screen walls, are to be located within 6 feet of the sanitary sewer line. If an indemnity



agreement is acceptable to the Water Resources Department, boilerplate language for an indemnity agreement will be provided with final plans review.

**C. Separation from Other Utilities**

For information about separation from other utilities see COS Standard Detail No. 2401, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

**D. Separation from Storm Drains and Culverts**

Sanitary sewer lines crossing less than 2 feet below a storm drain, culvert or under large structures, such as box culverts and bridges, will require the additional protection of either ductile iron pipe, restrained joint C-900/905 or encasement. Sanitary sewer lines crossing over storm drains and culverts must be a minimum of 1 foot above and be adequately protected.

**WASH CROSSINGS**

All wash crossings will be constructed using restrained joint ductile iron pipe or PVC pipe encased in accordance with MAG Standard Detail No. 402. Bury requirements to place sanitary sewer lines under washes or channels will be based upon the 100-year peak design discharge (Q100) in the channel or wash. The minimum depth of bury below the design flow line of the channel or wash.

7-1.408

100-year flow rate	Minimum depth of bury
1 to 49 cfs	5 feet
50 to 99 cfs	6 feet
100 to 499 cfs	7 feet
Greater than 499 cfs	Scour depth based on scour analysis required

**FIGURE 7.1-4 WASH CROSSINGS – MINIMUM DEPTH OF BURY**

Wash crossings with a 100-year flow above 500 cfs will have the scour depth estimated using Arizona State Standard Attachment SSA 5-96, Guideline 2, Level I, as published by the Arizona Department of Water Resources. The engineer will estimate the depth of scour and design the top of pipe to be 3 feet below the estimated scour depth. The engineer will provide a detailed analysis of the scour depth with final plans for review and approval.

All pipelines that must be located within the scour zone or will not meet the minimum required depth of bury, as indicated above, will be protected by installing a cut-off wall downstream of the pipeline to stabilize the scour depth to a minimum of 3 feet above the pipeline. The engineer will design the cut-off wall and include details on the improvement plans. Plan Review will review pipe protection and scour stabilization requirements on a case-by-case basis.

**GRAVITY SANITARY SEWER SERVICE CONNECTIONS**

7-1.409

The engineer will make every effort to use existing sanitary sewer lines that have been stubbed out to a property by previous construction. Where the use of stubbed out lines are not feasible, the existing line will be abandoned and capped at the sanitary sewer main. If the existing service line is connected to a manhole, the trough of the manhole will be rebuilt to conform to the active lines.

**A. Minimum Diameters for Service Lines**

- Residential: 4 inch

- Multi-family: 6 inch
- Commercial: 6 inch

### **B. Installation**

All service line connections will be installed perpendicular to the sanitary sewer line in accordance with MAG Standard Detail No. 440-3, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp) and extended to the back of the public utility easement and marked. Within the rights-of-way or easement, no bends in the service line will be allowed.

### **C. Location**

1. All proposed service line connections will be shown on the final plans with stations and dimensions or offsets, from street centerline. Typical separation dimensions from the water service lines shall be shown. Each lot or building must be provided with its own individual service line unless otherwise approved in writing by the Water Resources Department.
2. The service line location should be coordinated to avoid conflicts with other utilities, with driveway locations and should be located within the downstream 1/3 of the fronting sanitary sewer line length.
3. Because water lines are located behind the curb in many locations, conflicts with sanitary sewer service lines are possible. Sanitary sewer lines should be designed to allow for the sanitary sewer service lines to pass under water lines with 12 inches of vertical clearance to minimize potential health hazards.
4. When it is not possible to maintain sufficient vertical clearance or the sanitary sewer service line will pass over the water main, the sanitary sewer service line must be encased in concrete of 6 inches minimum thickness to 6 feet from each side of the crossing or ductile iron pipe must be used for the same distance. See MAG Standard Detail No. 404-2, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

### **D. Service Line Connection to Large Diameter Sanitary Sewer Lines**

Sanitary sewer lines 15 inches in diameter or larger, may be tapped only with a manhole. Service lines into manholes may be angled, but the flow line of the service line should not be more than 4 inches below the crown of the sanitary sewer line.

### **E. Service Line Connections into Manholes on Small Diameter Sewer Lines**

No more than 4 service lines may be made into any manhole on a sanitary sewer line 14 inches in diameter or smaller, without written approval from the city. Sanitary sewer service line inverts will be not be more than 1 service line pipe diameter above the crown of the downstream sanitary sewer line in the manhole.

### **F. Service Line Connections at Cleanouts**

Sanitary sewer service connections will be located a minimum of 2 feet downstream of the cleanout structure.

### **G. Maintenance**

The property owner receiving wastewater service is responsible for maintenance of the sanitary sewer service line including the wye connection to the public main.

### **H. Backwater Valves**

A backwater valve shall be provided on service connections to major sewer lines, at manholes where there is potential for the migration of sewer gas into the service line, and at locations where the finish floor is not 12-inches higher than the upstream manhole. Backwater valves shall be located on private property and shall be accessible for maintenance by the property owner.

## PRESSURIZED SANITARY SEWER SERVICE CONNECTIONS

7-1.410

Pressurized sanitary sewer ejector systems will be owned, operated and maintained by the property owner. The property owner's civil engineer is responsible for the design and hydraulic analysis of the pressurized system.

### A. Connection of Individual Ejector to Adjacent Gravity Sanitary Sewer Line

The sanitary sewer service line constructed within the rights-of-way will be per MAG Standard Detail No. 440-3, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp). The pressurized line will connect into the gravity service line outside of the rights-of-way and if applicable, the adjacent public utility easement. Connection to the gravity service line will be at a cleanout connection.

### B. Connection of Individual Ejector(s) Downstream of a Property

The city does not support extending private pressurized ejector lines across the frontages of adjacent lots or properties. The developer or property owner will request a meeting with the Water Resources Department to discuss available options. One potential option is for the developer or owner to design and construct a segment of a public gravity collection system within the public rights-of-way or private street tract and a lift station at the low terminus of the segment.

Water Resources approves the extension of individual private ejector lines across the frontages of adjacent properties in the following places:

1. Private manholes receiving wastewater from ejector lines (the first downstream public manhole shall be coated or lined to prevent corrosion).
2. Individual ejector lines from parcels shall be run within a private sewer easement, adjacent to any public rights-of-way and utility easement. Spare conduits shall be provided and clearly labeled on a plan detail, in the event a line becomes plugged or damaged.
3. Where individual ejector lines exceed 600 feet in length or have retention times exceeding 3 hours, the engineer will evaluate the potential for odor problems. The city will not accept odor-absorbing materials in basket containment, placed within manholes. Odor management will be incorporated through the use of biofiltration processes.

## GREASE, OIL AND SAND INTERCEPTORS

7-1.411

Grease, oil and sand interceptors will be provided for laundries, restaurants, automobile service facilities, car washes and other similar facilities. The engineer will contact the Water Quality Division to determine if an interceptor is required and which type of interceptor is best suited for the proper handling of liquid wastes. Interceptors will be installed and maintained by the owner and made accessible to the city.

Each business, restaurant or establishment shall discharge to a separate interceptor.

Each interceptor shall be shown to scale, stationed on the plans.

The civil engineer shall coordinate with the mechanical engineer to assure the following are considered in the design of grease interceptors:

1. Design is compliant to the plumbing code as adopted by the city.
2. Tanks size is appropriate to the maximum projected flow from the establishment and anticipates a 30 to 90 day maintenance schedule.
3. Potential to develop odors.
4. Separation from pedestrian areas or corridors.
5. Avoid locating grease interceptor in parking garages, streets and under public parking spaces.
6. Ease of cleanup after maintenance and pumping.
7. Kitchen garbage grinders should be avoided, but if installed must be routed through the interceptor.

8. Dishwashers equipped with booster heaters and or using water in excess of 140 degrees F shall not pass through an interceptor with less than 1,000 gallon capacity.
9. Grease traps shall only be installed for ice cream shops, small coffee shops or sandwich shops (contact Water Treatment for authorization of grease traps).

For more detail contact the Water Quality Division, [www.ScottsdaleAZ.gov/water/Quality](http://www.ScottsdaleAZ.gov/water/Quality).

### 7-1.412

## TRACT AND EASEMENT REQUIREMENTS

All public sanitary sewer lines located outside the public rights-of-way or a private street tract must be placed within a minimum 20-foot easement located within a dedicated tract (portion of a utility tract, drainage tract or open space tract), unless approved otherwise by the Water Resources Department. The sanitary sewer line shall be located a minimum of 6 feet from the edge of the easement. The easement will be accessible from a public rights-of-way, will be free of obstructions, will not be located within a fenced area and will be accessible at all times to city service equipment such as trucks, backhoes, etc. Areas in question will be approved in writing by the Water Resources Department.

Sanitary sewer line easements, located outside of paved areas, will have a 10-foot-wide hardened path with a cross-sectional slope not greater than 10 percent. The hardened path will consist of native soil compacted to 95 percent to a depth of 1 foot from the existing or design surface, whichever is lower. Any revegetation within the easement will consist of low growing shrubs or plant material acceptable to the Water Operations Division. Trees may be located along the edge of the easement but not within 7 feet of the sanitary sewer line as measured to the trunk of the tree.

Locating a public sanitary sewer line on private property within a public utility easement but without dedicating a tract will require written permission from the Water Resources Department.

A copy of any written approval from the Water Resources Department shall be submitted with the final plans.

### 7-1.413

## EASEMENT ABANDONMENT REQUIREMENTS

When a property owner or developer believes a sanitary sewer line easement or portion thereof, is no longer required by the city, an abandonment may be requested by completing and filing an application through the city's One Stop Shop.

After completing and filing the application, the property owner or developer will send a letter requesting abandonment of the easement, along with the reason, to the Water Resources Department with the following exhibits attached:

1. A detailed map highlighting the easement to be abandoned and locations of existing water and sewer lines shown in reference to the easement.
2. If existing water and/or sewer lines are to be abandoned, a detailed civil plan prepared by a professional engineer licensed in the State of Arizona must be supplied describing the method of abandonment and any necessary relocations of the water and/or sewer lines.
3. The Water Resources Department will issue a letter recommending approval or denial of the abandonment request and any stipulations that may be required in conjunction with the abandonment.
4. This letter will be attached to an Application for Release of Easement and will be submitted by the applicant to the One Stop Shop for subsequent processing by Development Services.

Failure to comply with the above process will result in a denial of the request. Where replacement rights are requested by the city, the city will not relinquish existing rights until the replacement rights have been granted.

## PRIVATE SANITARY SEWER LINES

7-1.414

Private sanitary sewer lines must meet the Maricopa County Environmental Services Department and the City of Scottsdale Building Inspection Services requirements for approval. Privately owned and maintained sanitary sewer lines shall not be located in the street rights-of-way or a in a public utility easement.

Wastewater collection systems within commercial properties will be designed as private system per the Uniform Plumbing Code and Arizona Administrative Code, Title 18, Chapter 9, "Water Pollution Control".

## ALTERNATIVE SANITARY SEWER SYSTEMS

7-1.415

Developers or property owners may request that the Water Resources Department consider the design of alternative wastewater systems upon their engineer's determination that conventional gravity or forced sanitary sewer systems cannot provide adequate service to the development. Contact the Water Resources Department for information regarding alternative sewer designs.

If an alternative wastewater system is acceptable to the Water Resources Department, the design concept will then be coordinated with the Maricopa County Environmental Services Department for their input.

## FINAL PLANS PREPARATION

7-1.500

Construction Plan Submittal Requirements for the preparation of final plans in the city are described in [Section 1-1.100](#). This section supplements the requirements of Chapter 1.

### A. Ordinance Requirements

Upon development of property for which city wastewater service is desired and available, the developer shall submit a plan for the wastewater system prepared by a professional engineer licensed in the State of Arizona (Section 49-122).

### B. Design Policy

Any variance to these standards will require written permission from the Water Resources Department.

### C. Design Standards

Any project specific notes that apply to construction on the city's wastewater system are required on each set of final plans that include improvements to the city's wastewater system or a wastewater system that is to be dedicated to the city.

## SPECIFIC SEWER PLAN REQUIREMENTS

7-1.501

The following paragraphs highlight requirements for the preparation of wastewater final plans that are to be submitted to the city for approval.

1. All sanitary sewer lines will be shown in both plan and profile and pipe material called out.
2. Each manhole will have a unique identifier and be labeled in both plan and profile.
3. Sanitary sewer line stationing will be along the centerline of the pipe.
4. Concrete encasement will be shown in both plan and profile. The beginning and ending stations of the encasement shall be called out.

5. If a line is to be connected to an existing system, the following note should be placed on the final plans:

Contractor shall verify the location of the existing sanitary sewer line before proceeding with trenching.

6. Both slope and elevation must be shown on all proposed sanitary sewer lines stubbed out for future extension.
7. Where sanitary sewer lines cross water lines, storm drains or drainage culverts, the clearances will be shown in profile.
8. For permitting purposes, quantities for all items of work within the public rights-of-way and public utility easements will be included on the cover sheet of the final plans.
9. Sanitary sewer service line invert elevations will be called out for all final plans. All service line connections shall be shown on the final plans with the ends of any capped service lines located by station, offset or dimension.
10. The drawings will show all utility locations, sizes, easements, rights-of-way and other structural features affecting the sanitary sewer line.
11. Lift station plans will show all invert elevations, structural elevations, existing and finished grades, control setting elevations, structural design of the wet well and dry well, valves and piping, surge control devices, pump suction and discharge details and any other details necessary to provide construction of the design.
12. Plans and profiles of force mains will show size, invert and grade elevations, material, existing and proposed utility locations and any other necessary details.
13. Private and dry sanitary sewer lines will be noted as such on the final plans set. The responsibility for operation and maintenance of private sewer systems will be stated on the final plans.
14. Easements within tracts will be shown and labeled in plan view. Existing County recording numbers shall be shown on the final plans.
15. Final plans must comply with any design review or preliminary plat stipulations and any accepted wastewater basis of design report.

All plan documents for sanitary sewer lines and/or wastewater treatment works will be prepared by a registered civil professional engineer licensed in State of Arizona under the provisions of ARS 32:141-145.

Additional requirements for the preparation of final plans in the city are presented in [Section 1-2.100](#).

## 7-1.502

### REVIEWS AND APPROVALS

All final plans that include work on the city's wastewater system or on a system which is to be dedicated to the city, must be submitted to the One Stop Shop for review. Plan Review fees must be paid at the time of plan submittal.

No final plans will be submitted unless accompanied by a copy of the accepted basis of design report, when one is stipulated for the project. If master plans or basis of design reports are being submitted as part of a development review board or preliminary plat package, they should also be submitted separately through the One Stop Shop for review by the Water Resources Department.

Maricopa County Environmental Services Department approval is required prior to approval of final plans by Plan Review. No permits for improvements to the public wastewater system will be issued until the owner or developer has provided all necessary easements and rights-of-way. These instruments of dedication must be approved and submitted to the city for recording at the Maricopa County Recorder's Office.

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# STREETSCAPES, PARKS & TRAILS



This chapter provides guidance for design and approval of landscaped areas within streetscape corridors, developing park master plans and individual park designs and creating non-paved, non-motorized and shared use trails throughout the city.

## 8-1 LANDSCAPED MEDIANS/ROWS

## 8-2 PARKS

## 8-3 NON-PAVED TRAILS





## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# LANDSCAPED MEDIANS/ROWS

This section is intended to aid designers in developing hardscape, landscape, irrigation and general aesthetic improvements for areas within the city's streetscape corridors. It recommends plants for special character areas, provides landscape, irrigation, design, and sight distance guidelines and requirements for inspections and as-built submittals.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
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Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# LANDSCAPED MEDIANS/ROWS

# 8-1

## GENERAL INFORMATION

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## 8-1.000

### A. Median & Streetscape Character Areas

There are different median design standards for each character area within the city; contact the City of Scottsdale's Plan Review office to determine which character area designation to use for each specific project. Streetscape information is available at [www.ScottsdaleAZ.gov/planning/corridorplans](http://www.ScottsdaleAZ.gov/planning/corridorplans).

Medians within Commercial Cores as identified in the General Plan will be allowed a higher percentage of plant coverage with the plant materials for the character area in which they are located.

### B. Downtown and Urban Character

The Downtown and Urban Character classification is given to the areas of the city in which pedestrian comfort is a primary consideration. When designing these areas concentrate on elements such as arcaded walkways, shade, decorative paving, and landscaping so that a comfortable setting can be created for this use-intensive area.

1. Balance the use of plant material with decorative paving (stamped concrete, exposed aggregate, and pavers, etc.) to minimize the exposure of decomposed granite.
2. Median landscaping in the Downtown couplet system must conform to specifications in [Appendix 8-1A](#) and the Downtown Urban Design and Architectural Guidelines, see [\\*www.ScottsdaleAZ.gov/planning/policycards/pc\\_downtowndesign](http://www.ScottsdaleAZ.gov/planning/policycards/pc_downtowndesign).
3. Plant palette and quantities must also conform to the Downtown Urban Design and Architectural Guidelines\* and [Appendix 8-1A](#).

Downtown guidelines can be found online at [www.ScottsdaleAZ.gov/downtown](http://www.ScottsdaleAZ.gov/downtown).

### C. Suburban Character

The suburban character applies to areas of the city where compatibility should be achieved between pedestrians and transportation routes within a medium density development pattern. Using trees that are native and/or desert adapted and which achieve a broad, dense canopy is encouraged for the main theme of the streetscape. Separating pedestrians from vehicular traffic can be accomplished through landscape areas and sidewalk alignment.

1. Use decomposed granite, exposed aggregate, and grouted riprap in place of decorative paving.
2. Plant palette should begin to incorporate more arid-type materials or desert adapted, as shown in [Section 8-1.100](#).

#### D. Transitional Arid Character

For areas of the city where the development pattern is medium to low, and the streetscape serves as a buffer between traffic and adjacent land uses, the transitional arid character classification is applied. Landscape materials should include native plants or plants compatible with a desert environment. Special care should be given to protect existing vegetation and natural features that can be incorporated into the design.

1. Handset riprap and decomposed granite are to be the primary inorganic materials.
2. Plant palette shall consist of indigenous and desert-compatible materials, see [Section 8-1.100](#).

#### E. Natural Character

A goal of the natural streetscape designation is to keep the streetscape compatible with the natural desert. For this reason, the applicant should select plants that are native to the Upper Sonoran desert and match densities to the existing and adjacent desert environment. The design elements for the Natural Character area are governed in part by the city's Environmentally Sensitive Lands Ordinance (ESLO). See this ordinance for specific requirements on plant and materials selection, [www.ScottsdaleAZ.gov/codes/eslo](http://www.ScottsdaleAZ.gov/codes/eslo).

1. Native stone and indigenous decomposed granite are to be primary inorganic materials.
2. Plant palette is to consist of indigenous materials only, and shall conform to the native distribution patterns, densities and maturity, see [Section 10-1.100](#).

#### F. Blending of Abutting Character Areas

Where two different character areas adjoin, a blending of the two categories should occur to prevent a marked difference between opposing sides of streets. These guidelines apply to all landscaped areas within the public rights-of-way. Areas between the rights-of-way and building setback lines are encouraged to use the guidelines as well. Transitional areas which abut Environmentally Sensitive Lands (or the Natural Character) should primarily use native plants in order to strengthen the tie to the natural desert and to prevent the spread of invasive, non-native species into natural areas.

## 8-1.100

## RECOMMENDED PLANTS

### 8-1.101

### DOWNTOWN AND URBAN CHARACTER

See [Appendix 8-1A](#) for Downtown Area recommended plants; other plants will be considered on an individual basis. The Downtown Guidelines contain recommended plants to be used in the Urban Character Area, [www.ScottsdaleAZ.gov/downtown](http://www.ScottsdaleAZ.gov/downtown).

## SUBURBAN CHARACTER

## 8-1.102

## A. TREES

BOTANICAL NAME	COMMON NAME
<i>Acacia berlandieri</i>	Guajillo/Plains Acacia
<i>Acacia farnesiana/smallii</i>	Sweet Acacia
<i>Acacia rigidula</i>	Blackbrush Acacia
<i>Acacia salicina</i>	Willow Acacia/Australian Willow
<i>Acacia stenophylla</i>	Shoestring Acacia
<i>Albizia julibrizzin</i>	Silk Tree/Mimosa
<i>Bauhinia lunarioides</i>	Anacacho/Orchid Tree
<i>Caesalpinia cacalaco 'Smoothie tm'</i>	Cascalote
<i>Caesalpinia mexicana</i>	Mexican Bird of Paradise
<i>Chilopsis lenearis</i>	Desert Willow
<i>Chitalpa tashkentensis</i>	Chitalpa
<i>Cordia boissieri</i>	Texas Olive
<i>Dalbergia sisso</i>	Sisso
<i>Ebenopsis ebano</i>	Texas Ebony
<i>Eucalyptus camaldulensis</i>	Red Gum
<i>Eucalyptus microtheca</i>	Coolibah
<i>Eucalyptus papuana</i>	Ghost Gum
<i>Eucalyptus salmonophloia</i>	Salmon Gum
<i>Eucalyptus salubris</i>	Gimlet
<i>Eucalyptus sargentii</i>	Salt River Mallet
<i>Eucalyptus spathulata</i>	Narrow Leaf Gimlet
<i>Fraxinus velutina</i>	Ash
<i>Geijera parviflora</i>	Wilga/Australian Willow
<i>Lysiloma thornberi</i>	Desert Fern
<i>Olea 'Swan Hill tm'</i>	Olive
<i>Parkinsonia hybrid 'Desert Museum'</i>	Palo Verde
<i>Parkinsonia praecox</i>	Palo Brea
<i>Parkinsonia floridum</i>	Blue Palo Verde
<i>Parkinsonia microphyllum</i>	Foothills Palo Verde
<i>Pistacia chinensis</i>	Pistache
<i>Pistacia hybrid 'Red Push'</i>	Pistache
<i>Plantanus mexicana</i>	Mexican Sycamor
<i>Plantanus wrightii</i>	Arizona Sycamor
<i>Prosopis chilensis</i>	Chilean Mesquite
<i>Prosopis glandulosa</i>	Native Honey Mesquite
<i>Prosopis glandulosa 'Maverick tm'</i>	Mesquite
<i>Prosopis glandulosa hybrid 'Phoenix tm'</i>	Mesquite
<i>Prosopis juliflora</i>	Arizona Native Mesquite
<i>Prosopis pubescens</i>	Screwbean Mesquite
<i>Prosopis velutina</i>	Velvet Mesquite
<i>Quercus polymorpha</i>	Monterrey Oak

<i>Quercus buckleyi</i>	Texas Red Oak
<i>Quercus emoryi</i>	Live Oak
<i>Quercus engelmannii</i>	Engelman Oak
<i>Quercus fusiformis</i>	Texas Live Oak
<i>Quercus muhlenbergia</i>	Chestnut Oak
<i>Quercus virginiana</i>	Southern Live Oak
<i>Tipuana tipu</i>	Tipu Tree
<i>Ulmus parviflora</i>	Chinese Elm
<i>Vitex agnus-castus</i>	Chaste Tree

**B. SHRUBS**

BOTANICAL NAME	COMMON NAME
<i>Agave desmettiana</i>	Agave
<i>Agave gemniflora</i>	Twin Flower Agave
<i>Agave parryi v. truncata</i>	Artichoke Agave
<i>Agave vilmoriniana</i>	Octopus Agave
<i>Aloe barbadensis</i>	Aloe Vera/Medicinal Aloe
<i>Aloe X 'Blue Elf'</i>	Aloe
<i>Aloe striata</i>	Coral Aloe
<i>Anisacanthus quadrifidus</i>	Flame Anisacanthus
<i>Baccharis centennial</i>	Desert Broom
<i>Baccharis Hybrid 'Thompson tm'</i>	Desert Broom
<i>Baileya multiradiata</i>	Desert Marigold
<i>Buddleja marrubifolia</i>	Wooly Butterfly Bush
<i>Buddleja davidii</i>	Butterfly Bush/Summer Lilac
<i>Caesalpinia gilliesii</i>	Yellow Bird of Paradise
<i>Caesalpinia mexicana</i>	Mexican Bird of Paradise
<i>Caesalpinia pulcherrima</i>	Red Bird of Paradise
<i>Calliandra californica</i>	Red Fairy Duster
<i>Calliandra eriophylla</i>	Pink Fairy Duster
<i>Caryopteris clandonensis</i>	Bluemist
<i>Convolvulus cnerorum</i>	Bush Morning Glory
<i>Cordia parvifolia</i>	Little Leaf Cordia
<i>Cuphea llavea</i>	Bat-Faced Cuphea
<i>Dalea frutescens var 'Sierra Negra tm'</i>	Black Dalea
<i>Dasyliirion texanum</i>	Desert Spoon
<i>Dicliptera resupinata</i>	Dicliptera
<i>Dodonaea viscosa</i>	Hopbush
<i>Euphorbia rigida</i>	Gopher Plant
<i>Euphorbia antisiphilitica</i>	Candelilla
<i>Encelia farinose</i>	Brittle Brush Bush
<i>Eremophila hygrophana</i>	Emu Bush
<i>Eremophila maculate</i>	Valentine Bush
<i>Hamelia patens</i>	Mexican Firecracker
<i>Hesperaloe parviflora, red</i>	Red Yucca
<i>Hesperaloe parviflora, yellow</i>	Yellow Yucca

<i>Hesperaloe funifera</i>	Giant Hesperaloe
<i>Hesperaloe nocturna</i>	Night Flowering Hesperaloe
<i>Hyptis emoryi</i>	Desert Lavender
<i>Justicia californica</i>	Chuparosa
<i>Justicia spicigera</i>	Mexican Honeysuckle
<i>Lantana species</i>	Gold, Yellow, Red, Purple Trailing
<i>Leucophyllum candidum</i>	Violet Texas Ranger
<i>Leucophyllum compacta</i>	Texas Ranger Sage
<i>Leucophyllum frutescens 'Green Cloud tm'</i>	Texas Ranger Sage
<i>Leucophyllum laevigatum</i>	Chihuahuan Sage
<i>Leucophyllum langmaniae</i>	Rio Bravo Sage
<i>Leucophyllum pruinatum</i>	Bubblegum Sage
<i>Leucophyllum revolutum</i>	Houdini Sage
<i>Leucophyllum zygophyllum</i>	Cimmaron Dwarf Sage
<i>Manfreda maculosa</i>	Texas Tube Rose
<i>Oenothera caespitosa</i>	White Evening Primrose
<i>Parthenocissus, variety 'Hacienda Creeper tm'</i>	Virginia Creeper
<i>Pedilanthus macrocarpus</i>	Slipper Plant
<i>Penstemon baccharifolius</i>	Rock Penstemon
<i>Penstemon eatonii</i>	Firecracker Penstemon
<i>Penstemon parryi</i>	Parry's Penstemon
<i>Penstemon superbus</i>	Coral Penstemon
<i>Penstemon triflorus</i>	Hill Country Penstemon
<i>Podranea ricosoleana</i>	Pink Trumpet Vine
<i>Portulacaria afra</i>	Elephant Food
<i>Ruellia peninsularis</i>	Desert Ruellia
<i>Russelia equisetiformis</i>	Coral Fountain
<i>Salvia clevelandii</i>	Chaparral Sage
<i>Salvia farinacea</i>	Mealy Cup Sage
<i>Salvia greggii</i>	Autumn Sage
<i>Salvia leucantha</i>	Mexican Bush Sage
<i>Salvia X 'Trident tm'</i>	Salvia
<i>Simmondsia chinensis</i>	Jojoba
<i>Sophora secundiflora</i>	Texas Mountain Laurel
<i>Sphaeralcea ambigua</i>	Globe Mallow
<i>Tecoma stans</i>	Yellow Bells
<i>Tetranneuris acaulis</i>	Angelita Daisy
<i>Thymophylla pentachaeta</i>	Golden Dogbane
<i>Vauquelinia californica</i>	Arizona Rosewood
<i>Verbena goodingii</i>	Gooding Verbena
<i>Zephyranthes species</i>	Rain Lily
<i>Zinnia grandiflora</i>	Prarie Zinnia



## 8-1.103

**TRANSITIONAL ARID CHARACTER**

The following native and desert compatible plants, trees and shrubs are recommended for Transitional Arid Character areas within the city.

**A. TREES**

BOTANICAL NAME	COMMON NAME
<i>Acacia aneura</i>	Mulga
<i>Acacia berlandieri</i>	Guajillo/Plains Acacia
<i>Acacia farnesiana/smallii</i>	Sweet Acacia
<i>Acacia rigidula</i>	Blackbrush Acacia
<i>Acacia salicina</i>	Willow Acacia/Australian Willow
<i>Acacia schaffneri</i>	Twisted Acacia
<i>Acacia willardiana</i>	Palo Blanco
<i>Acacia stenophylla</i>	Shoestring Acacia
<i>Caesalpinia cacalaco 'Smoothie tm'</i>	Cascalote
<i>Caesalpinia mexicana</i>	Mexican Bird of Paradise
<i>Chilopsis lenearis</i>	Desert Willow
<i>Cordia boissieri</i>	Texas Olive
<i>Ebenopsis ebano</i>	Texas Ebony
<i>Ebenopsis mexicana</i>	Texas Ebony
<i>Ehretia anacua</i>	Anacua/Sandpaper Tree
<i>Eucalyptus camaldulensis</i>	Red Gum
<i>Eucalyptus erythrocorys</i>	Red Cap Gum
<i>Eucalyptus microtheca</i>	Coolibah
<i>Eucalyptus salmonophloia</i>	Salmon Gum
<i>Eucalyptus fromanii</i>	Forman's Mallee
<i>Eysenhardtia orthocarpa</i>	Kidneywood
<i>Geijera parviflora</i>	Wilga/Australian Willow
<i>Havardia pallens</i>	Tenaza
<i>Lysiloma thornberi</i>	Desert Fern
<i>Olneya tesota</i>	Ironwood
<i>Parkinsonia hybrid 'Desert Museum'</i>	Palo Verde
<i>Parkinsonia praecox</i>	Palo Brea
<i>Parkinsonia floridum</i>	Blue Palo Verde
<i>Parkinsonia microphyllum</i>	Foothills Palo Verde
<i>Prosopis chilensis</i>	Chilean Mesquite
<i>Prosopis glandulosa</i>	Native Honey Mesquite
<i>Prosopis glandulosa 'Maverick tm'</i>	Mesquite
<i>Prosopis glandulosa hybrid 'Phoenix tm'</i>	Mesquite
<i>Prosopis juliflora</i>	Arizona Native Mesquite

<i>Prosopis pubescens</i>	Screwbean Mesquite
<i>Prosopis velutina</i>	Velvet Mesquite

**B. SHRUBS**

BOTANICAL NAME	COMMON NAME
<i>Acacia cultriformis</i>	Knife Acacia
<i>Agave bracteosa</i>	Squid Agave
<i>Ambrosia ambrosioides</i>	Giant Bursage
<i>Ambrosia deltoidea</i>	Triangle Leaf Bursage
<i>Ambrosia dumosa</i>	White Bursage
<i>Asclepias subulata</i>	Desert Milkweed
<i>Baccharis centennial</i>	Desert Broom
<i>Baccharis Hybrid 'Thompson tm'</i>	Desert Broom
<i>Baileya multiradiata</i>	Desert Marigold
<i>Buddleja marrubifolia</i>	Wooly Butterfly Bush
<i>Buddleja davidii</i>	Butterfly Bush/Summer Lilac
<i>Caesalpinia mexicana</i>	Mexican Bird of Paradise
<i>Caesalpinia pulcherrima</i>	Red Bird of Paradise
<i>Calliandra californica</i>	Red Fairy Duster
<i>Calliandra eriophylla</i>	Pink Fairy Duster
<i>Celtis pallida</i>	Desert Hackberry
<i>Chrysactinia mexicana</i>	Damianita
<i>Cordia parvifolia</i>	Little Leaf Cordia
<i>Conoclinium greggi</i>	Gregg's Mistflower
<i>Dalea capitata</i>	Lemon Dalea
<i>Dalea greggi</i>	Trailing Indigo Bush
<i>Dasyllirion texanum</i>	Desert Spoon
<i>Encelia farinose</i>	Brittle Brush Bush
<i>Ericameria laricifolia</i>	Turpentine Bush
<i>Eriogonum fasciculatum</i>	Flattop Buckwheat
<i>Guaiacum coluteri</i>	Guayacan
<i>Larrea tridentate</i>	Creosote Bush
<i>Leucophyllum candidum</i>	Violet Texas Ranger
<i>Leucophyllum compacta</i>	Texas Ranger Sage
<i>Leucophyllum frutescens 'Green Cloud tm'</i>	Texas Ranger Sage
<i>Leucophyllum laevigatum</i>	Chihuahuan Sage
<i>Leucophyllum langmaniae</i>	Rio Bravo Sage
<i>Leucophyllum pruinose</i>	Bubblegum Sage
<i>Leucophyllum revolutum</i>	Houdini Sage
<i>Leucophyllum zygophyllum</i>	Cimmaron Dwarf Sage
<i>Lycium andersonii</i>	Desert Wolfberry
<i>Malpighia emarginata</i>	Barbados Cherry
<i>Hesperaloe parviflora, red</i>	Red Yucca

<i>Hesperaloe parviflora, yellow</i>	Yellow Yucca
<i>Hesperaloe funifera</i>	Giant Hesperaloe
<i>Hesperaloe nocturna</i>	Night Flowering Hesperaloe
<i>Hyptis emoryi</i>	Desert Lavender
<i>Justicia californica</i>	Chuparosa
<i>Justicia spicigera</i>	Mexican Honeysuckle
<i>Nolina nelsoni</i>	Blue Beargrass Tree
<i>Nolina texana</i>	Beargrass
<i>Nolina matapensis</i>	Sonoran Tree Beargrass
<i>Ocotillo</i>	Ocotillo
<i>Oenothera caespitosa</i>	White Evening Primrose
<i>Opuntia basilaris</i>	Beavertail Prickly Pear
<i>Opuntia ficus indica</i>	Indian Fig
<i>Opuntia santa-rita</i>	Purple Prickly Pear
<i>Penstemon baccharifolius</i>	Rock Penstemon
<i>Penstemon eatonii</i>	Firecracker Penstemon
<i>Penstemon parryi</i>	Parry's Penstemon
<i>Penstemon superbus</i>	Coral Penstemon
<i>Penstemon triflorus</i>	Hill Country Penstemon
<i>Podranea ricasoleana</i>	Pink Trumpet Vine
<i>Russelia equisetiformis</i>	Coral Fountain
<i>Salvia clevelandii</i>	Chaparral Sage
<i>Salvia farinacea</i>	Mealy Cup Sage
<i>Salvia greggii</i>	Autumn Sage
<i>Salvia leucantha</i>	Mexican Bush Sage
<i>Salvia X 'Trident tm'</i>	Salvia
<i>Simmondsia chinensis</i>	Jojoba
<i>Sophora secundiflora</i>	Texas Mountain Laurel
<i>Sphaeralcea ambigua</i>	Globe Mallow
<i>Tetraneris acaulis</i>	Angelita Daisy
<i>Thymophylla pentachaeta</i>	Golden Dogbane
<i>Vauquelinia californica</i>	Arizona Rosewood
<i>Viguiera parishii</i>	Goldeneye
<i>Yucca baccata</i>	Banana Yucca
<i>Yucca elata</i>	Soaptree Yucca
<i>Yucca carnerosana</i>	Spanish Dagger
<i>Yucca pallida</i>	Pale Leaf Yucca
<i>Yucca rupicola</i>	Twisted Leaf Yucca
<i>Zinnia grandiflora</i>	Prarie Zinnia

## LANDSCAPE GUIDELINES

### 8-1.200

All streetscape designs must meet the following minimum requirements based upon the city's ordinances. See COS Supplement to MAG Section 430 and related details for more specific information, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

### MAINTENANCE RESPONSIBILITY

### 8-1.201

The purpose of these maintenance requirements is to keep city rights-of-way attractive, sustainable, safe, and clear for their designated and normal transportation uses. Maintenance of landscape medians and rights-of-ways will be the responsibility of the developer, property owner, or a homeowners association for a given period of time (usually 3 years). Prior to the City accepting maintenance responsibility of irrigation systems more than 5 years old, the owners shall upgrade the systems as necessary to comply with current City standards. For a Capital Improvement Project this period of time will be for 90 days after final inspection. This period will begin and end following inspections and acceptance of installation by a representative of Inspection Services and Capital Projects or an owner's representative from Parks Department. It is the developer's responsibility to set up the inspections.

If a developer, property owner or homeowners association transfers maintenance of landscape medians and rights-of-way after acceptance, then the developer, property owner or homeowners association must upgrade the irrigation systems to current city standards as outlined in the most current DSPM before the transfer. The property owner's responsibility to maintain the right-of-way from the back of the curb remains as set forth in the city code.

Maintenance responsibility includes:

1. Pruning and maintaining all plants, shrubs, bushes, trees and ground cover to (i) keep all plants behind sidewalks and curbs, and (ii) prevent sign obstructions and sight distance hazards. Pruning shall be done in conformance with the standards of ANSI A300 and Arizona Certified Landscape Professionals.
2. Weeding--by hand or with herbicides labeled "Caution" only. Herbicide application shall be performed by a certified applicator registered with the State of Arizona Office of Pest Management.
3. Removing dead plants and replacing them with low water use plants of a similar size and type. The replacement plants shall be selected from the Arizona Department of Water Resources list of low water use plants.
4. Removing litter and debris, which includes, without limitation, fallen leaves, trimmings, wind blown material, trash, cigarette butts, downed or broken tree limbs, and small dead animals (i.e., under 25 pounds).
5. Sweeping.
6. Removing all landscape maintenance equipment.

Maintenance must be conducted under the proper permits. See [Section 5-2.000 Rights-of-Way Management](#).

The maintenance duration/responsibility of medians and rights-of-ways are to be stated on the final landscape plans submittal. Figure 8.1-1 below shows the standard landscape maintenance block. Any deviation from this standard requires city approval and shall be defined in a separately recorded document.

ALL LANDSCAPED AREAS AND MATERIALS, INCLUDING THOSE LOCATED IN THE PUBLIC RIGHT-OF-WAY (INCLUDING MEDIANS), SHALL BE MAINTAINED IN A HEALTHY, NEAT, CLEAN, LITTER AND WEED-FREE CONDITION. IN ADDITION TO THE STANDARDS IN THE SCOTTSDALE DESIGN STANDARDS AND POLICIES MANUAL, ANSI A300 STANDARD PRACTICES FOR PRUNING, SUPPORT SYSTEMS, AND SAFETY SHALL BE USED FOR MAINTENANCE CRITERIA. THIS SHALL BE THE RESPONSIBILITY OF THE

(Property Owner, Developer or Homeowner's Association)

**FIGURE 8.1-1 STANDARD LANDSCAPE MAINTENANCE BLOCK**

### 8-1.202

#### **MEDIAN WIDTHS**

Median specifications can be found in [Section 5-3.112](#).

1. Median width is measured from back of median curb to back of median curb (inside to inside). The minimum width for a median is 4 feet. Within the city's Hillside Area, 8 feet is the minimum requirement.
2. Medians less than 4 feet in width will either be stamped concrete, exposed concrete or pavers; no plant material will be allowed.

### 8-1.203

#### **PLACEMENT OF TREES AND SHRUBS**

For landscape and planting details of trees, cacti, shrubs and groundcovers, see COS Supplement Details Nos. 2620, 2621, 2622 & 2623, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

Trees should be located so that the expected mature tree canopy does not ultimately extend into the street rights-of-way as shown in [Figure 8.1-2](#) and [Figure 8.1-3](#). Consider the mature tree height and placement of trees to minimize potentially adverse effects on above-ground utilities or signage. Select a tree genus or species with rapid vertical growth, columnar shape, or which develops a canopy rapidly when planting trees less than 10 feet from back of curb. Tree density must be no less than 25 feet on center along pedestrian corridors.

Trees should not be planted within 10 feet of an existing private wall, sign or light pole. Separation distances between walls and trees for infill projects will be determined by staff on a case-by-case basis.

Natural growth habits shall be taken into consideration to minimize maintenance frequency and intensity.

Landscaping clearance shall be provided to prevent conflict with signs, lighting, fire equipment or median crossings.

Landscaping must not create hazards to public safety though either plant growth habit, structure, or location.

There shall be a physical separation (concrete curbing or steel edging) provided between public and private landscaping/irrigation systems.

For Saguaro relocation procedures, see [Section 10-1.300](#).

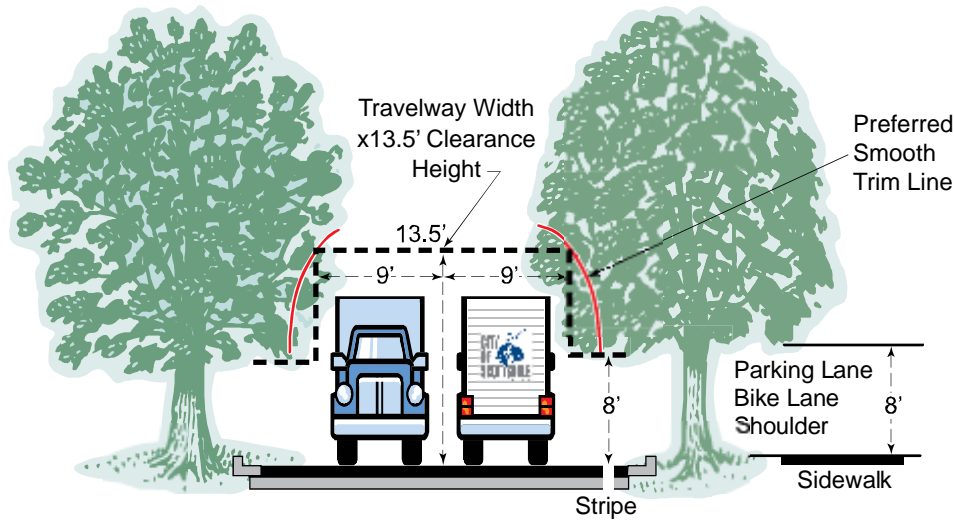


FIGURE 8.1-2 RESIDENTIAL ROADWAY CLEARANCES (30 MPH OR LESS)

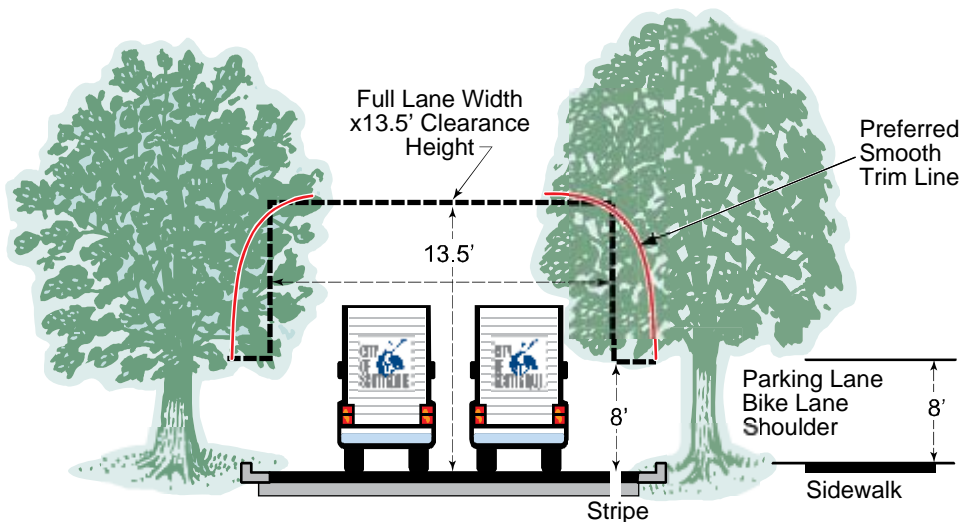


FIGURE 8.1-3 ARTERIAL OR COLLECTOR ROADWAY CLEARANCES (35 MPH OR GREATER)

**TREE QUANTITIES AND SIZES**

Trees should be provided at the rate of 1 tree per each 35 lineal feet of median length. The minimum size is 15 gallon with 50 percent to be provided as mature trees or larger (as defined in Article III of the Zoning Ordinance). Salvaged trees must meet ANSI A300 (Part 1) Pruning Standards and ANSI A300 (Part 6) Transplanting Standards with a minimum of 2 1/2" trunk caliper.

**GRADING**

1. Mounding should not be used in the areas designated as Downtown and Urban Character zones. Care should be taken when designing landscaping within the sight distance triangles. Mounds within sight distance easements must not exceed a height of 18 inches

8-1.204

8-1.205

as measured above the final grade elevation. All mounding should blend with the adjacent existing terrain.

2. The maximum slope of any mounding shall be 4:1 (25%).
3. The finished landscape grade with decomposed granite should be smooth, uniform, and a minimum of 2 inches below the top of curb.

**8-1.206****DECOMPOSED GRANITE**

1. Size must be ½ inch screened Desert Gold or of a matching color to that of adjacent landscaped areas. The decomposed granite color must match native earth tones.
2. For installation and details for public works construction, see COS Standard Detail No. 2620-1, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).
3. A sample will be submitted to a representative from Parks Department for approval prior to the contractor ordering and bringing it onto the site. Color shall match what exists in the area.
4. Decomposed granite will be distributed uniformly to a depth of 2 inches covering the entire landscape area.

**8-1.207****BOULDERS**

Boulders are not acceptable for City of Scottsdale landscaped medians and rights-of-way, unless otherwise approved by Risk Management. Call 480-312-5082 for more information.

**8-1.208****PLANT SELECTION**

All plant materials used in a median are required to come from the Arizona Department of Water Resources low water use plant list for the Phoenix Active Management Area. The selected plant materials are also to be consistent with the appropriate character areas described in [Section 8-1.100](#).

Public rights-of-way that are located in the Environmentally Sensitive Lands (ESL) Upper Desert and Hillside landforms must be landscaped with plants from the City of Scottsdale's Indigenous Plants for Environmentally Sensitive Lands list and [www.ScottsdaleAZ.gov/codes/nativeplant/ESLO](http://www.ScottsdaleAZ.gov/codes/nativeplant/ESLO). This list is available in the city's One Stop Shop. See the Scottsdale Revised Code Section 49-78 and 49-79, Scottsdale Landscape Ordinance and the ESLO for additional specific plant selection requirements, [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

**8-1.209****HYDROSEEDING & NAOS RESTORATION**

Seed mix shall be composed of native species as defined in the Environmentally Sensitive Lands Ordinance, [www.ScottsdaleAZ.gov/codes/eslo](http://www.ScottsdaleAZ.gov/codes/eslo).

**8-1.300****IRRIGATION GUIDELINES**

See the City of Scottsdale's most current supplement to MAG Section 440 and related details for more specific information.

**A. Approved Irrigation System Types**

Centralized control or solar powered.

**B. Controllers**



Place controllers in the center of the median, a minimum of 50 feet before the beginning of the turn bay.

Approved controllers are Motorola Irrinet/Scorpio or Leit/DIG X Services. Contact COS Irrigation Department for Motorola Irrinet/Scorpio controller and antenna locations.

Turf irrigation shall be controlled by Motorola Irrinet/Scorpio controllers.

**C. Power Source**

1. The contractor is responsible for initiating account and service connection.
2. If the power source cannot be placed within the median or the rights-of-way, a utility easement must be provided. This location is to be indicated and noted on the final irrigation plans and also inside of the controller cabinet.

**D. Water Source**

1. Show both the water source and location of the proposed tap on the final irrigation plans.
2. Contact Water Resources at 480-312-5650 for information on tapping into city waterlines.
3. Plans must indicate existing and design operating water pressure requirements.
4. The water meter should be located within a median wherever possible.

**E. Remote Control Electric Valves**

1. Valves are to be of brass construction, and a minimum size of 1 inch.
2. An approved valve is Rainbird series GB.
3. Full Port brass ball valves must be installed immediately upstream of all control valves.
4. All direct buried control valve wiring shall be a minimum 14 gauge.
5. Master valves are to be installed on all irrigation mainlines.

**F. Back Flow Prevention Devices**

1. Only reduced pressure assemblies will be used.
2. All backflow prevention devices will have a security enclosure.
3. A certified tester, recognized by the City of Scottsdale, must test backflow prevention devices before the city will accept responsibility for maintaining the system.

**GENERAL IRRIGATION DESIGN CRITERIA**

1. The irrigation system is to be located entirely within the median. Sleeving from median-to-median is acceptable.
2. The contractor is responsible for initiating the account and having the water meter set.
3. Trees and shrubs shall be valved separately.
4. The entire irrigation system must be independent of other users. For example, landscape dedicated to the City of Scottsdale for maintenance must have separate power and water meters from other irrigation systems.
5. Plans must indicate valve flow rates, designation (tree, shrubs, turf, etc.) and station number.

**8-1.301****FINAL PLAN SUBMITTAL**

Final submittal for irrigation and landscape plans must show related details.

**8-1.302**

## 8-1.400

### SIGHT DISTANCE

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Any plant material installed in a questionable area (such as safety triangles, sight lines) will be identified by traffic engineering and removed by the contractor. Sight distance must be considered for vehicles entering and exiting adjacent properties, as well as for vehicles using abutting roadways.

#### A. Sight Distances & Safety Triangle

1. To determine sight distances, use the criteria specified in [Section 5-3.119](#).
2. The sight line, as shown in [Figure 5.3-26](#), shall be clearly indicated and delineated on the final landscape plan submittal.

#### B. Planting within the Sight Triangle

1. Shrubs planted within the sight triangle are to have a mature height of not more than 18 inches. Height will be from edge of pavement, and total height will include the height of any mounding.
2. Trees planted within the safety triangle are to have a canopy pruned to a height of 8 feet or greater upon installation. Height will be from edge of pavement, and total height will include the height of any mounding.

## 8-1.500

### ALTERATIONS & AS-BUILTS

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If field conditions require relocating a water meter, backflow prevention device, controller, valve, or any other major component of the irrigation system as shown on approved plans, contact Inspection Services at 480-312-5750 prior to any installation.

The contractor must provide an accurate set of as-built Mylar drawings and CAD format per [Section 5-2.400](#) to the Parks Department representative prior to the final acceptance of a system.

## 8-1.600

### SPECIFIC AREA DESIGN GUIDELINES

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In circumstances where a special theme is desired, the city may designate specific design standards to be implemented on select streets. Contact the One Stop Shop at 480-312-2500 for more information.

## 8-1.700

### SCOTTSDALE GATEWAYS

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Scottsdale shares common boundaries with several municipalities. When entering Scottsdale from a neighboring community, it is helpful for residents and visitors to have a sense of arrival into the city. Through the use of a city limits identification system, those entering the city should be able to readily recognize their entrance into Scottsdale. The Gateways Map shows the locations of city entrance points. See the city's General Plan Environmental Design Element, [www.ScottsdaleAZ.gov/generalplan](http://www.ScottsdaleAZ.gov/generalplan).

## MEDIAN INSPECTIONS

## 8-1.800

1. City staff will arrange a pre-construction meeting with the contractor to review approved plans, MAG requirements, testing, maintenance responsibility, etc.
2. City staff will inspect the following items before and during construction for compliance with city approved plans and city addendums to MAG:
  - Water meter and backflow preventer and master valve location
  - Controller type and location
  - Remote control valve type, location and operation
  - Source of power (inside enclosure)
  - Type of pipe and trench depth
  - Laterals and trench depth
  - Emitters and flush pits
  - Sleeves under asphalt
  - Pressure check system
  - Backflow preventer and enclosure (Notify City of Scottsdale Cross Connection Control for inspection and testing)
  - Plant palette and location
  - Planting depth
  - Tree staking
  - Sight distance triangles
  - Pre-emergent
  - Decomposed granite
3. Irrigation and Median Maintenance staff will perform a walk-through with the contractor after completion of work to begin warranty period (3 years typical).
4. City staff will issue a Maintenance Period Notification letter to permittee (encroachment permit) to start warranty period.
5. Irrigation and Median Maintenance staff will perform a final walk through with the permittee at the end of the warranty period.
6. City staff will issue the Final Letter of Acceptance to permittee to end the warranty period and begin city maintenance of median.





# Appendix 8-1A

## RECOMMENDED PLANTS FOR DOWNTOWN

*Plants listed on Arizona Department of Water Resources lists of native, drought tolerant and low water-use plants, trees and shrubs.									
BOTANICAL NAME	LOW WATER USE*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
<b>OLD TOWN</b>									
<b>GROUNDCOVERS, VINES &amp; OTHER</b>									
<i>Agave murpheyi</i>	✓	Murphy's Agave		☺	☺	☺			
<i>Aloe</i>	✓	Blue Elf		☺	☺	☺	☺		
<i>Aloe mawei</i>	✓	Dawe's Aloe		☺	☺	☺	☺		
<i>Antigonon leptopus</i>	✓	Coral Vine/Queen's Wreath				☺	☺		
<i>Baileya multiradiata</i>	✓	Desert Marigold	☺	☺	☺			☺	
<i>Cereus hildemannianus</i>	✓	Night Blooming Cereus	☺	☺	☺				
<i>Dyssodia pentachaeta</i>		Golden Fleece		☺	☺	☺	☺	☺	
<i>Hymenoxys acaulis</i>		Anjelita Daisy		☺	☺	☺	☺	☺	☺
<i>Lantana montevidensis</i>	✓	Trailing Lantana	☺	☺	☺	☺	☺	☺	
<i>Podranea ricasoliana</i>	✓	Pink Trumpet Vine				☺	☺		
<i>Stenocereus thurberi</i>	✓	Organ Pipe Cactus	☺	☺	☺				
<i>Yucca aloifolia</i>	✓	Spanish Bayonet			☺	☺	☺		
<i>Yucca baccata</i>	✓	Banana Yucca	☺	☺				☺	
<b>SHRUBS</b>									
<i>Encelia farinosa</i>	✓	Brittlebush	☺	☺	☺			☺	
<i>Guaiacum coulteri</i>	✓	Guayacan	☺	☺	☺	☺		☺	
<i>Lantana camara</i>	✓	Lantana, Shrub Verbena	☺	☺	☺	☺	☺	☺	
<i>Leucophyllum frutescens</i>	✓	Texas Sage	☺	☺	☺				
<i>Maytenus phyllanthoides</i>	✓	Mangle Dulce	☺	☺	☺			☺	
<i>Muhlenbergia rigens</i>		Deer Grass		☺	☺			☺	
<i>Salvia clevelandii</i>	✓	Cleveland Sage	☺	☺	☺			☺	
<i>Simmondsia chinensis</i>	✓	Jojoba	☺	☺	☺	☺		☺	
<i>Tecoma stans</i>	✓	Yellow Bells		☺	☺	☺	☺		
<b>SMALL TREES</b>									
<i>Acacia willardiana</i>	✓	Palo Blanco			☺	☺	☺		
<i>Bauhinia blakeana</i>		Orchid Tree				☺	☺		
<i>Caesalpinia mexicana</i>	✓	Mexican Bird Of Paradise		☺	☺	☺	☺		
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		☺	☺	☺	☺		
<i>Chamaerops humilis</i>	✓	Med. Fan Palm				☺	☺		
<i>Eucalyptus erythrocorys</i>	✓	Red Cap Gum		☺	☺	☺			
<i>Lysiloma thornberi</i>	✓	Fern Of The Desert		☺	☺	☺		☺	
<i>Sophora secundiflora</i>	✓	Texas Mountain Laurel		☺	☺	☺	☺		



# RECOMMENDED PLANTS FOR DOWNTOWN

\*Plants listed on Arizona Department of Water Resources lists of native, drought tolerant and low water-use plants, trees and shrubs.

BOTANICAL NAME	LOW WATER USE*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
<b>OLD TOWN</b> continued									
<b>SMALL TREES</b>									
<i>Eucalyptus erythrocorys</i>	✓	Red Cap Gum		☺	☺	☺			
<i>Lysiloma thornberi</i>	✓	Fern Of The Desert		☺	☺	☺		☺	
<i>Sophora secundiflora</i>	✓	Texas Mountain Laurel		☺	☺	☺	☺		
<b>MEDIUM TREES</b>									
<i>Acacia smalli</i>	✓	Sweet Acacia	☺	☺		☺		☺	
<i>Acacia stenophylla</i>	✓	Shoestring Acacia		☺	☺				
<i>Cercidium parkinsonia Hybrid</i>	✓	Desert Museum		☺				☺	
<i>Chorisa speciosa</i>	✓	Floss Silk Tree				☺	☺		
<i>Eucalyptus spatulata</i>	✓	Narrow-Leaf Gimlet	☺	☺	☺	☺			
<i>Eucalyptus torquata</i>	✓	Coral Gum			☺	☺	☺		
<i>Geijera parviflora</i>	✓	Australian Willow			☺	☺	☺		
<b>LARGE TREES</b>									
<i>Jacaranda mimosifolia</i>	✓	Jacaranda			☺	☺	☺		
<i>Ulmus parvifolia</i>	✓	Evergreen Elm	☺	☺	☺	☺		☺	
<i>Washingtonia robusta</i>	✓	Mex. Fan Palm	☺						
<b>MAIN STREET</b>									
<b>GROUNDCOVERS, VINES &amp; OTHER</b>									
<i>Agave murpheyi</i>	✓	Murphy's Agave		☺	☺	☺			
<i>Agave weberii</i>	✓	Weber's Agave	☺	☺					
<i>Aloe</i>	✓	Blue Elf		☺	☺	☺	☺		
<i>Aloe dawei</i>	✓	Dawe's Aloe		☺	☺	☺	☺		
<i>Antigonon leptopus</i>	✓	Coral Vine/Queen's Wreath				☺	☺		
<i>Dasyllirion wheeleri</i>	✓	Desert Spoon	☺	☺					
<i>Gazania hybrids</i>	✓	Harlequin Hybrids		☺	☺	☺			
<i>Lantana montevidensis</i>	✓	Trailing Lantana	☺	☺	☺	☺	☺	☺	
<i>Opuntia basilaris</i>	✓	Beaver Tail Prickly Pear	☺	☺	☺				
<i>Opuntia santa-rita</i>	✓	Purple Prickly Pear	☺	☺	☺				
<i>Podranea ricasoliana</i>	✓	Pink Trumpet Vine				☺	☺		
<i>Yucca recurvata</i>	✓				☺	☺	☺		



# Appendix 8-1A

## RECOMMENDED PLANTS FOR DOWNTOWN

\*Plants listed on Arizona Department of Water Resources lists of native, drought tolerant and low water-use plants, trees and shrubs.

BOTANICAL NAME	LOW WATER USE*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
<b>MAIN STREET continued</b>									
<b>SHRUBS</b>									
<i>Asclepias subulata</i>	✓	Desert Milkweed		☺	☺	☺			
<i>Caesalpinia mexicana</i>	✓	Mexican Bird of Paradise	☺	☺	☺				
<i>Dalea frutescens</i>	✓	Black Dalea	☺	☺		☺			
<i>Dalea pulchra</i>	✓	Bush Dalea	☺	☺				☺	
<i>Encelia farinosa</i>	✓	Brittlebush	☺	☺	☺			☺	
<i>Guaiacum coulteri</i>	✓	Guayacan	☺	☺	☺	☺		☺	
<i>Justica candicans</i>	✓	Red Justicia	☺	☺	☺	☺	☺	☺	
<i>Lantana</i>	✓	Red/Pink Forms		☺	☺				
<i>Maytenus phyllanthoides</i>	✓	Mangle Dulce	☺	☺	☺			☺	
<i>Ruellia brittoniana</i>	✓	Ruellia 'Katie' Pink/White Forms		☺	☺	☺			
<i>Salvia clevelandii</i>	✓	Cleveland Sage	☺	☺	☺			☺	
<i>Simmondsia chinensis</i>	✓	Jojoba	☺	☺	☺	☺		☺	
<i>Tecoma stans</i>	✓	Yellow Bells		☺	☺	☺	☺		
<b>SMALL TREES</b>									
<i>Caesalpinia mexicana</i>	✓	Mexican Bird of Paradise		☺	☺	☺	☺		
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		☺	☺	☺	☺		
<i>Chamaerops humilis</i>	✓	Med. Fan Palm				☺	☺		
<i>Eucalyptus erythrocorys</i>	✓	Red Cap Gum		☺	☺	☺			
<i>Lysiloma thornberi</i>	✓	Fern of the Desert		☺	☺	☺		☺	
<i>Sophora secundiflora</i>	✓	Texas Mountain Laurel		☺	☺	☺	☺		
<b>MEDIUM TREES</b>									
<i>Acacia smalli</i>	✓	Sweet Acacia	☺	☺		☺		☺	
<i>Cercidium Parkinsonia Hybrid</i>	✓	Desert Museum		☺				☺	
<i>Chorisa speciosa</i>	✓	Floss Silk Tree				☺	☺		
<i>Eucalyptus spatulata</i>	✓	Narrow Leaf Gimlet	☺	☺	☺	☺			
<i>Eucalyptus torquata</i>	✓	Coral Gum			☺	☺	☺		
<i>Geijera parviflora</i>	✓	Australian Willow			☺	☺	☺		
<b>LARGE TREES</b>									
<i>Jacaranda mimosifolia</i>		Jacaranda			☺	☺	☺		
<i>Ulmus parvifolia</i>	✓	Evergreen Elm	☺	☺	☺	☺		☺	
<i>Washingtonia robusta</i>	✓	Mexican Fan Palm	☺						





# Appendix 8-1A

## RECOMMENDED PLANTS FOR DOWNTOWN

*Plants listed on Arizona Department of Water Resources lists of native, drought tolerant and low water-use plants, trees and shrubs.									
BOTANICAL NAME	LOW WATER USE*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
<b>FIFTH AVENUE</b>									
<b>GROUNDCOVERS, VINES &amp; OTHER</b>									
<i>Aloe ferox</i>	✓	Cape Aloe		☺	☺	☺	☺		
<i>Aloe marlothii</i>	✓	Aloe Berger		☺	☺	☺	☺		
<i>Antigonon leptopus</i>	✓	Coral Vine/Queen's Wreath				☺	☺		
<i>Aquilegia chrysantha</i>		Golden Columbine		☺	☺	☺			
<i>Dasyllirion wheeleri</i>	✓	Desert Spoon	☺	☺					
<i>Gazania hybrids</i>	✓	Harlequin Hybrids		☺	☺	☺			
<i>Lantana montevidensis</i>	✓	Trailing Lantana	☺	☺	☺	☺	☺	☺	
<i>Podranea ricasoliana</i>	✓	Pink Trumpet Vine				☺	☺		
<i>Wedelia trilobata</i>	✓	Yellow Dot		☺	☺				
<i>Yucca elephantipes</i>		Spineless Yucca	☺	☺	☺			☺	
<i>Yucca recurvata</i>	✓				☺	☺	☺		
<b>SHRUBS</b>									
<i>Bougainvillea</i>	✓	Bush Types		☺	☺	☺	☺		
<i>Cordia parviflora</i>	✓	Little Leaf Cordia		☺	☺		☺		
<i>Dalea capitata</i>	✓	Golden Dalea		☺	☺	☺	☺		☺
<i>Guaiacum coulteri</i>	✓	Guayacan	☺	☺	☺	☺		☺	
<i>Lantana</i>	✓	Red/Pink Forms		☺	☺				
<i>Maytenus phyllanthoides</i>	✓	Mangle Dulce	☺	☺	☺			☺	
<i>Mulhenbergia capillaris</i>	✓	Pink Mulhy/Gulf Mulhy	☺	☺	☺	☺		☺	
<i>Muhlenbergia emersleyi</i>	✓	Bull Grass	☺	☺	☺	☺		☺	
<i>Muhlenbergia rigens</i>		Deer Grass		☺	☺			☺	
<i>Salvia clevelandii</i>	✓	Cleveland Sage	☺	☺	☺			☺	
<i>Senna phyllodemia</i>	✓	Silver-Leaf Cassia		☺	☺	☺			
<i>Simmondsia chinensis</i>	✓	Jobba	☺	☺	☺	☺		☺	
<i>Tecoma stans</i>	✓	Yellow Bells		☺	☺	☺	☺		
<b>SMALL TREES</b>									
<i>Acacia willardiana</i>	✓	Palo Blanco			☺	☺	☺		
<i>Bauhinia blakeana</i>		Orchid Tree				☺	☺		
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		☺	☺	☺	☺		
<i>Chamaerops humilis</i>	✓	Med. Fan Palm				☺	☺		
<i>Lysiloma thornberi</i>	✓	Fern Of The Desert		☺	☺	☺		☺	
<i>Sophora secundiflora</i>	✓	Texas Mountain Laurel		☺	☺	☺	☺		



# RECOMMENDED PLANTS FOR DOWNTOWN

\*Plants listed on Arizona Department of Water Resources lists of native, drought tolerant and low water-use plants, trees and shrubs.

BOTANICAL NAME	LOW WATER USE*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
<b>FIFTH AVENUE</b> continued									
<b>MEDIUM TREES</b>									
<i>Cercidium Parkinsonia Hybrid</i>	✓	Desert Museum		☺				☺	
<i>Chorisa speciosa</i>	✓	Floss Silk Tree				☺	☺		
<i>Eucalyptus spatulata</i>	✓	Narrow-Leaf Gimlet	☺	☺	☺	☺			
<i>Eucalyptus torquata</i>	✓	Coral Gum			☺	☺	☺		
<i>Geijera parviflora</i>	✓	Australian Willow			☺	☺	☺		
<b>LARGE TREES</b>									
<i>Dalbergia sisso</i>	✓	Sissoo Tree	☺	☺	☺			☺	
<i>Eucalyotus citriodora</i>	✓	Lemon Scented Gum	☺	☺	☺	☺		☺	
<i>Eucalyptus salmonoploia</i>	✓	Salmon Gum	☺	☺	☺				
<i>Jacaranda mimosifolia</i>		Jacaranda			☺	☺	☺		
<i>Ulmus parvifolia</i>	✓	Evergreen Elm	☺	☺	☺	☺		☺	
<i>Washingtonia robusta</i>	✓	Mex. Fan Palm	☺						
<b>MARSHALL WAY</b>									
<b>GROUNDCOVERS, VINES &amp; OTHER</b>									
<i>Aloe ferox</i>	✓	Cape Aloe		☺	☺	☺	☺		
<i>Aloe marlothii</i>	✓	A. Berger		☺	☺	☺	☺		
<i>Antigonon leptopus</i>	✓	Coral Vine/Queen's Wreath				☺	☺		
<i>Dasyilirion wheeleri</i>	✓	Desert Spoon	☺	☺					
<i>Gazania hybrids</i>	✓	Harlequin Hybrids		☺	☺	☺			
<i>Lantana montevidensis</i>	✓	Trailing Lantana	☺	☺	☺	☺	☺	☺	
<i>Podranea ricasoliana</i>	✓	Pink Trumpet Vine				☺	☺		
<i>Yucca recurvata</i>	✓				☺	☺	☺		
<b>SHRUBS</b>									
<i>Bougainvillea</i>	✓	Bush Types		☺	☺	☺	☺		
<i>Convolvulus cneorum</i>	✓	Bush Morning Glory	☺	☺	☺	☺	☺	☺	
<i>Eremophila maculata</i>	✓	Emu Bush-Valentine		☺	☺	☺			
<i>Guaiacum coulteri</i>	✓	Guayacan	☺	☺	☺	☺		☺	
<i>Justica sonorae</i>	✓	Sonoran Honeysuckle		☺	☺	☺			
<i>Maytenus phyllanthoides</i>	✓	Mangle Dulce	☺	☺	☺			☺	
<i>Poliomintha maderensis</i>		Mexican Oregano, Lavender Spice		☺	☺				



# RECOMMENDED PLANTS FOR DOWNTOWN

*Plants listed on Arizona Department of Water Resources lists of native, drought tolerant and low water-use plants, trees and shrubs.									
BOTANICAL NAME	LOW WATER USE*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
<b>MARSHALL WAY continued</b>									
<b>SHRUBS continued</b>									
<i>Salvia clevelandii</i>	✓	Cleveland Sage	☺	☺	☺			☺	
<i>Simmondsia chinensis</i>	✓	Jojoba	☺	☺	☺	☺		☺	
<i>Tecoma stans</i>	✓	Yellow Bells		☺	☺	☺	☺		
<b>SMALL TREES</b>									
<i>Acacia willardiana</i>	✓	Palo Blanco			☺	☺	☺		
<i>Bauhinia blakeana</i>		Orchid Tree				☺	☺		
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		☺	☺	☺	☺		
<i>Chamaerops humilis</i>	✓	Med. Fan Palm				☺	☺		
<i>Lysiloma thornberi</i>	✓	Fern Of The Desert		☺	☺	☺		☺	
<i>Sophora secundiflora</i>	✓	Texas Mountain Laurel		☺	☺	☺	☺		
<b>MEDIUM TREES</b>									
<i>Cercidium parkinsonia hybrid</i>	✓	Desert Museum		☺				☺	
<i>Chorisa speciosa</i>	✓	Floss Silk Tree				☺	☺		
<i>Eucalyptus spatulata</i>	✓	Narrow-Leaf Gimlet	☺	☺	☺	☺			
<i>Eucalyptus torquata</i>	✓	Coral Gum			☺	☺	☺		
<i>Geijera parviflora</i>	✓	Australian Willow			☺	☺	☺		
<b>LARGE TREES</b>									
<i>Dalbergia sisso</i>	✓	Sissoo Tree	☺	☺	☺			☺	
<i>Eucalyotus citriodora</i>	✓	Lemon Scented Gum	☺	☺	☺	☺		☺	
<i>Eucalyptus salmonoploia</i>	✓	Salmon Gum	☺	☺	☺				
<i>Jacaranda mimosifolia</i>		Jacaranda			☺	☺	☺		
<i>Ulmus parvifolia</i>	✓	Evergreen Elm	☺	☺	☺	☺		☺	
<i>Washingtonia robusta</i>	✓	Mexican Fan Palm	☺						
<b>DRINKWATER BOULEVARD</b>									
<b>GROUNDCOVERS, VINES &amp; OTHER</b>									
<i>Dasyilirion longissima</i>	✓	Mexican Grass Tree	☺	☺					
<i>Hesperaloe parvilora</i>	✓	Red Yucca	☺	☺	☺	☺		☺	
<i>Lotus berthelotii</i>	✓	Parrot's Beak	☺	☺	☺	☺			
<i>Nolina matapensis</i>	✓	Tree Bear Grass	☺	☺					
<i>Oenothera berlandieri</i>	✓	Mexican Evening Primrose	☺	☺	☺	☺	☺	☺	
<i>Penstemon spp.</i>	✓	Bearded Tongue	☺	☺	☺			☺	



# RECOMMENDED PLANTS FOR DOWNTOWN

\*Plants listed on Arizona Department of Water Resources lists of native, drought tolerant and low water-use plants, trees and shrubs.

BOTANICAL NAME	LOW WATER USE*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
<b>DRINKWATER BOULEVARD</b> continued									
<b>GROUNDCOVERS, VINES &amp; OTHER</b> continued									
<i>Verbena rigida</i>	✓	Sandpaper Rigida	☺	☺	☺				
<i>Yucca rupicola</i>	✓	Twisted Yucca	☺	☺	☺			☺	
<b>SHRUBS</b>									
<i>Bougainvillea</i>	✓	Bush Types		☺	☺	☺	☺		
<i>Caesalpinia pulcherimma</i>	✓	Red Bird Of Paradise	☺	☺	☺	☺		☺	
<i>Cordia parviflora</i>	✓	Little-Leaf Cordia		☺	☺		☺		
<i>Dalea pulchra</i>	✓	Bush Dalea	☺	☺				☺	
<i>Lantana camara</i>	✓	Lantana, Shrub Verbena	☺	☺	☺	☺	☺	☺	
<i>Leucophyllum langmaniae</i>	✓	Cinnamon Sage	☺	☺	☺			☺	
<i>Ruellia peninsularis</i>	✓	Baja Ruellia	☺	☺	☺	☺		☺	
<i>Salvia leucantha</i>	✓	Purple Mexican Bush Sage			☺	☺	☺		
<i>Tecoma</i>	✓	Organ Jubilee		☺	☺	☺	☺		
<b>SMALL TREES</b> (none)									
<b>MEDIUM TREES</b>									
<i>Prosopis alba</i>	✓	Argentine Mesquite	☺	☺	☺			☺	
<i>Prosopis chilensis</i>	✓	Chilean Mesquite	☺	☺	☺			☺	
<i>Prosopis glandulosa</i>	✓	Honey Mesquite	☺	☺	☺			☺	
<b>LARGE TREES</b>									
<i>Eucalyotus citriodora</i>	✓	Lemon Scented Gum	☺	☺	☺	☺		☺	
<i>Eucalyptus papuana</i>	✓	Ghost Gum	☺	☺	☺			☺	
<i>Eucalyptus salmonoploia</i>	✓	Salmon Gum	☺	☺	☺				
<i>Phoenix dactylifera</i>	✓	Date Palm	☺						
<i>Washingtonia filifera</i>	✓	California Fan Palm	☺						
<b>GOLDWATER BOULEVARD</b>									
<b>GROUNDCOVERS, VINES &amp; OTHER</b>									
<i>Baileya multiradiata</i>	✓	Desert Marigold	☺	☺	☺			☺	
<i>Dasyliiron acrotriche</i>	✓	Green Desert Spoon	☺	☺					
<i>Hesperaloe parviflora</i>	✓	Red Yucca	☺	☺	☺	☺		☺	
<i>Yucca aloifolia</i>	✓	Spanish Bayonet			☺	☺	☺		
<i>Yucca baccata</i>	✓	Banana Yucca	☺	☺				☺	



# RECOMMENDED PLANTS FOR DOWNTOWN

\*Plants listed on Arizona Department of Water Resources lists of native, drought tolerant and low water-use plants, trees and shrubs.

BOTANICAL NAME	LOW WATER USE*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
<b>GOLDWATER BOULEVARD</b> continued									
<b>SHRUBS</b>									
<i>Caesalpinia pulcherimma</i>	✓	Red Bird Of Paradise	☺	☺	☺	☺		☺	
<i>Calliandra californica</i>	✓	Baja Fairy Duster	☺	☺	☺	☺		☺	
<i>Lantana camara</i>	✓	Lantana, Shrub Verbena	☺	☺	☺	☺	☺	☺	
<i>Leucophyllum langmaniae</i>	✓	Cinnamon Sage	☺	☺	☺			☺	
<i>Ruellia peninsularis</i>	✓	Baja Ruellia	☺	☺	☺	☺		☺	
<i>Salvia leucantha</i>	✓	Purple Mexican Bush Sage			☺	☺	☺		
<i>Tecoma</i>	✓	Organ Jubilee		☺	☺	☺	☺		
<b>SMALL TREES</b> (none)									
<b>MEDIUM TREES</b>									
<i>Prosopis alba</i>	✓	Argentine Mesquite	☺	☺	☺			☺	
<i>Prosopis chilensis</i>	✓	Chilean Mesquite	☺	☺	☺			☺	
<i>Prosopis glandulosa</i>	✓	Honey Mesquite	☺	☺	☺			☺	
<b>LARGE TREES</b>									
<i>Eucalyptus microtheca</i>	✓	Coolibah	☺	☺				☺	
<i>Eucalyptus papuana</i>	✓	Ghost Gum	☺	☺	☺			☺	
<i>Phoenix dactylifera</i>	✓	Date Palm	☺						
<i>Washingtonia filifera</i>	✓	California Fan Palm	☺						
<b>CAMELBACK ROAD</b>									
<b>GROUNDCOVERS, VINES &amp; OTHER</b>									
<i>Dalea greggii</i>	✓	Trailing Indigo Bush	☺	☺	☺			☺	
<i>Dasyliirion longissima</i>	✓	Mexican Grass Tree	☺	☺					
<i>Hesperaloe parviflora</i>	✓	Red Yucca	☺	☺	☺	☺		☺	
<i>Lantana montevidensis</i>	✓	Trailing Lantana	☺	☺	☺	☺	☺	☺	
<i>Lotus berthelotii</i>	✓	Parrot's Beak	☺	☺	☺	☺			
<i>Nolina matapensis</i>	✓	Tree Bear Grass	☺	☺					
<i>Oenothera berlandieri</i>	✓	Mexican Evening Primrose	☺	☺	☺	☺	☺	☺	
<i>Penstemon spp.</i>	✓	Bearded Tongue	☺	☺	☺			☺	
<i>Verbena rigida</i>	✓	Sandpaper Rigida	☺	☺	☺				
<i>Yucca rupicola</i>	✓	Twisted Yucca	☺	☺	☺			☺	



# Appendix 8-1A

## RECOMMENDED PLANTS FOR DOWNTOWN

*Plants listed on Arizona Department of Water Resources lists of native, drought tolerant and low water-use plants, trees and shrubs.									
BOTANICAL NAME	LOW WATER USE*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
<b>CAMELBACK ROAD continued</b>									
<b>SHRUBS</b>									
<i>Calliandra californica</i>	✓	Baja Fairy Duster	☺	☺	☺	☺		☺	
<i>Dalea pulchra</i>	✓	Bush Dalea	☺	☺				☺	
<i>Leucophyllum candidum</i>	✓	Violet Silverleaf	☺	☺	☺				
<i>Tecoma stans</i>	✓	Yellow Bells		☺	☺	☺	☺		
<b>SMALL TREES</b>									
<i>Bauhinia lunarioides</i> or <i>Bauhinia congesta</i>	✓	Chihuahuan Orchid Shrub		☺	☺	☺	☺		
<i>Eucalyptus erythrocorys</i>	✓	Red Cap Gum		☺	☺	☺			
<b>MEDIUM TREES</b>									
<i>Acacia smalli</i>	✓	Sweet Acacia	☺	☺		☺		☺	
<i>Cercidium praecox</i> or <i>Parkinsonia praecox</i>	✓	Palo Brea	☺	☺	☺			☺	
<i>Eucalyptus spatulata</i>	✓	Narrow-Leaf Gimlet	☺	☺	☺	☺			
<i>Eucalyptus torquata</i>	✓	Coral Gum			☺	☺	☺		
<i>Prosopis alba</i>	✓	Argentine Mesquite	☺	☺	☺			☺	
<i>Prosopis chilensis</i>	✓	Chilean Mesquite	☺	☺	☺			☺	
<i>Prosopis glandulosa</i>	✓	Honey Mesquite	☺	☺	☺			☺	
<b>LARGE TREES</b>									
<i>Eucalyptus microtheca</i>	✓	Coolibah	☺	☺				☺	
<i>Jacaranda mimosifolia</i>		Jacaranda			☺	☺	☺		
<i>Phoenix dactylifera</i>	✓	Date Palm	☺						
<i>Washingtonia robusta</i>	✓	Mex. Fan Palm	☺						
<b>SCOTTSDALE ROAD</b>									
<b>GROUNDCOVERS, VINES &amp; OTHER</b>									
<i>Dasyllirion longissima</i>	✓	Mexican Grass Tree	☺	☺					
<i>Hesperaloe parviflora</i>	✓	Red Yucca	☺	☺	☺	☺		☺	
<i>Lotus berthelotii</i>	✓	Parrot's Beak	☺	☺	☺	☺			
<i>Nolina matapensis</i>	✓	Tree Bear Grass	☺	☺					
<i>Penstemon spp.</i>	✓	Bearded Tongue	☺	☺	☺			☺	
<i>Verbena rigida</i>	✓	Sandpaper Rigida	☺	☺	☺				
<i>Yucca rupicola</i>	✓	Twisted Yucca	☺	☺	☺			☺	



# Appendix 8-1A

## RECOMMENDED PLANTS FOR DOWNTOWN

*Plants listed on Arizona Department of Water Resources lists of native, drought tolerant and low water-use plants, trees and shrubs.									
BOTANICAL NAME	LOW WATER USE*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
<b>SCOTTSDALE ROAD continued</b>									
<b>SHRUBS</b>									
<i>Guaiacum coulteri</i>	✓	Guayacan	☺	☺	☺	☺		☺	
<i>Leucophyllum candidum</i>	✓	Violet Silverleaf	☺	☺	☺				
<b>SMALL TREES</b>									
<i>Bauhinia lunarioides</i> or <i>Bauhinia congesta</i>	✓	Chihuahuan Orchid Shrub		☺	☺	☺	☺		
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		☺	☺	☺	☺		
<b>MEDIUM TREES</b>									
<i>Acacia smallii</i>	✓	Sweet Acacia	☺	☺		☺		☺	
<i>Cercidium Parkinsonia Hybrid</i>	✓	Desert Museum		☺				☺	
<i>Cercidium praecox</i> or <i>Parkinsonia praecox</i>	✓	Palo Brea	☺	☺	☺			☺	
<i>Prosopis alba</i>	✓	Argentine Mesquite	☺	☺	☺			☺	
<i>Prosopis chilensis</i>	✓	Chilean Mesquite	☺	☺	☺			☺	
<i>Prosopis glandulosa</i>	✓	Honey Mesquite	☺	☺	☺			☺	
<b>LARGE TREES</b>									
<i>Eucalyptus microtheca</i>	✓	Coolibah	☺	☺				☺	
<i>Eucalyptus papuana</i>	✓	Ghost Gum	☺	☺	☺			☺	
<i>Washingtonia robusta</i>	✓	Mexican Fan Palm	☺						
<b>INDIAN SCHOOL ROAD</b>									
<b>GROUNDCOVERS, VINES &amp; OTHER</b>									
<i>Baileya multiradiata</i>	✓	Desert Marigold	☺	☺	☺			☺	
<i>Dalea greggii</i>	✓	Trailing Indigo Bush	☺	☺	☺			☺	
<i>Dasyliiron acrotriche</i>	✓	Green Desert Spoon	☺	☺					
<i>Hesperaloe parviflora</i>	✓	Red Yucca	☺	☺	☺	☺		☺	
<i>Penstemon spp.</i>	✓	Bearded Tongue	☺	☺	☺			☺	
<i>Yucca aloifolia</i>	✓	Spanish Bayonet			☺	☺	☺		
<i>Yucca baccata</i>	✓	Banana Yucca	☺	☺				☺	
<b>SHRUBS</b>									
<i>Cordia parviflora</i>	✓	Little-Leaf Cordia		☺	☺		☺		
<i>Leucophyllum candidum</i>	✓	Violet Silverleaf	☺	☺	☺				
<i>Ruellia peninsularis</i>	✓	Baja Ruellia	☺	☺	☺	☺		☺	
<i>Salvia leucantha</i>	✓	Purple Mexican Bush Sage			☺	☺	☺		
<i>Tecoma stans</i>	✓	Yellow Bells		☺	☺	☺	☺		
<i>Tecoma</i>	✓	Organ Jubilee		☺	☺	☺	☺		





# RECOMMENDED PLANTS FOR DOWNTOWN

*Plants listed on Arizona Department of Water Resources lists of native, drought tolerant and low water-use plants, trees and shrubs.									
BOTANICAL NAME	LOW WATER USE*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
<b>INDIAN SCHOOL ROAD</b> continued									
<b>SMALL TREES</b>									
<i>Acacia ridigula</i>	✓	Blackbrush Acacia	☺	☺				☺	
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		☺	☺	☺	☺		
<i>Lysiloma thornberi</i>	✓	Fern Of The Desert		☺	☺	☺		☺	
<b>MEDIUM TREES</b>									
<i>Acacia smalli</i>	✓	Sweet Acacia	☺	☺		☺		☺	
<i>Cercidium praecox</i> or <i>Parkinsonia praecox</i>	✓	Palo Brea	☺	☺	☺			☺	
<i>Eucalyptus spatulata</i>	✓	Narrow-Leaf Gimlet	☺	☺	☺	☺			
<i>Eucalyptus torquata</i>	✓	Coral Gum			☺	☺	☺		
<i>Prosopis alba</i>	✓	Argentine Mesquite	☺	☺	☺			☺	
<i>Prosopis chilensis</i>	✓	Chilean Mesquite	☺	☺	☺			☺	
<i>Prosopis glandulosa</i>	✓	Honey Mesquite	☺	☺	☺			☺	
<b>LARGE TREES</b>									
<i>Dalbergia sisso</i>	✓	Sissoo Tree	☺	☺	☺			☺	
<i>Eucalyptus papuana</i>	✓	Ghost Gum	☺	☺	☺			☺	
<i>Washingtonia filifera</i>	✓	California Fan Palm	☺						
<i>Washingtonia robusta</i>	✓	Mexican Fan Palm	☺						



# PARKS



This section provides guidance for developing park master plans, identifies their review and approval process, and provides requirements for park designs. The design review of each park is done on an individual basis. These design standards and policies help assure that Scottsdale's parks and recreation facilities provide quality and safe experiences for its citizens.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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## GENERAL INFORMATION

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8-2.000

### A. Neighborhood Parks

Neighborhood Parks provide primary park services and facilities which are easily accessible and available to local residents. They are typically between 7 and 20 acres, not intended for large group use, and serve from 1 block up to an entire neighborhood. Neighborhood parks are preferably located adjacent to elementary schools or neighborhood centers.

### B. Community Parks

Community Parks provide a full range of centralized recreational activities for major portions of the city with capabilities of accommodating large group reservations. Generally, these parks feature a community center building designed to meet multi-generational recreation needs. They are typically between 20 and 80 acres, serving several neighborhoods or approximately 10,000 to 25,000 people. Community parks are preferably located in the center of several neighborhoods, adjacent to a middle school or high school where possible.

### C. Specialty and Regional Parks

Specialty and Regional Parks provide specialized facilities and preserve significant unique features of the community, including environmentally sensitive areas. The size of these parks will vary as will the specific number of people served by these parks; however, the parks should be oriented to serve the entire community and beyond. Park locations will also vary depending on the dynamics of the park, such as park theme or mountain park.

## PARK LOCATIONS

8-2.001

### A. The General Plan

The Public Facility Element of the General Plan for Scottsdale provides the basis for identifying locations for the parks, see [www.ScottsdaleAZ.gov/generalplan](http://www.ScottsdaleAZ.gov/generalplan). A copy of the Public Facility Element is available at the One Stop Shop.

### B. Community Services Facilities Master Plan

The Community Services Facilities Master Plan assists in defining park policy, delineates future park needs by acreage and facilities, and locates parks based on demographics. The Master Plan specifies standards to guide park development in Scottsdale. A copy of the Community Services Facilities Master Plan can be obtained on the City of Scottsdale internet site at: [www.ScottsdaleAZ.gov/Assets/documents/departments/d35d115pnnullParksAndRec.pdf](http://www.ScottsdaleAZ.gov/Assets/documents/departments/d35d115pnnullParksAndRec.pdf).

**8-2.100****PARK MASTER PLANS**

A master plan is developed for each park and the Public Facility Element of the General Plan, in conjunction with the Community Services Facilities Master Plan, helps guide the planning of facilities for each park.

**8-2.101****MUNICIPAL USE MASTER PLAN APPROVAL PROCESS**

1. Planning Consultant/Parks & Recreation Team
  - Prepares alternative development concepts
  - Conducts public input meetings with neighborhood and community
  - Develops a preliminary master development plan for presentation
2. Parks & Recreation Commission
  - Conducts a public hearing to review and recommend on the preliminary park master plan
3. Planning Consultant/Parks & Recreation Team
  - Prepares Final Park Master Plan from Parks & Recreation Commission recommendation
  - Makes application for municipal use permit to Planning Commission
4. Parks & Recreation Commission
  - Reviews the final park master plan and recommends action (approval or otherwise) to the Planning Commission and the City Council
5. Planning Commission
  - Reviews the municipal use permit and recommends action (approval or otherwise) to City Council, based on the recommended Final Park Master Plan
6. City Council
  - Reviews and approves, or rejects, the Final Park Master Plan and municipal use permit
7. Approved Park Master Plan

**8-2.200****PARK DESIGN**

Park designs must be approved by the Development Review Board before any development occurs on the park site (after City Council Master Plan approval). Whenever possible, parks should be located adjacent to school sites to create a fluid joint use between the park and school facilities.

**8-2.201****WALKWAYS**

1. Designated multiuse paths will be a minimum of 12 feet in width. See [Section 5-7.000](#) and [Section 5-8.000](#) for shared-use paths and bikeways.
2. Sidewalks utilized specifically for pedestrians will be a minimum of 8 feet in width.
3. All multiuse paths will be located a safe distance away from active courts or fields.
4. Where concrete is used, it will be MAG "A" spec, 5 inch slump 3,000 psi, 6 inch deep or 4 inch deep with 6 inch turndowns. Curb ramps will be constructed in accordance with MAG Details.

5. Where concrete or asphalt is not used, walkways will be surfaced with stabilized decomposed granite.
6. Sidewalk slopes and cross slopes will comply with ADA standards, unless technically infeasible.
7. All walkways leading to, into, and throughout sporting areas will be ADA compliant unless to do so would fundamentally alter the nature of the facility/activity.

**DRINKING FOUNTAINS****8-2.202**

1. Ensure drinking fountains meet ADA guidelines by having a wheelchair accessible fountain installed at 34 inches AFF, (measured to the deck), and a standard height drinking fountain installed at 40 inches AFF. Do not construct drinking fountains with ferrous metals whether protected by galvanization, paint, or otherwise. Drinking fountains within 100 feet of playgrounds will have assessable sand traps installed on the drains. It is more desirable to install drinking fountains on a building than installing free-standing units. Locate chillers within 24 inches of the drinking fountains, and no recirculating pumps are allowed. Use copper water piping for the drinking fountains, and insulate chilled water tubing.
2. Install chilled drinking fountain(s) near the playground, but preferably not closer than 25 feet due to problems encountered with sand. In addition to the above, install a child-height drinking fountain at 28 inches AFF.

**PLAYGROUNDS****8-2.203**

1. Playgrounds must meet or exceed all current U.S. Consumer Products Safety Commission (CPSC), American Society of Test/Measurement (ASTM), Americans with Disabilities Act (ADA) and International Play Equipment Manufacturers Association (IPEMA) standards.
2. Upon completion/installation of new playground equipment, the installation will be inspected by a third party National Playground Safety Inspector (NPSI).
3. Ensure that playground equipment/play opportunities are available for preschool children (2 - 5 years old) and school-age children (5 - 12 years old).
4. Metal playground slides are unacceptable.
5. Install and/or use appropriate playground elements, equipment and materials to meet ADA access standards for accessible playgrounds.
6. Make sure that playground surface safety zones consist of double washed premium sand, with a minimum depth of 12 inches.
7. Make certain that there is some type of shade protection either from adjacent ramadas, (16 feet x 16 feet minimum) and/or non-deciduous trees on the perimeter of the playground (30 inch box).

**SOFTBALL/BASEBALL FIELDS****8-2.204**

1. Ensure that all fields are lighted to meet all current Illuminating Engineering Society (IES) standards, and utilize effective shielding systems to reduce spill light off play areas, such as the MUSCO Control Link Central series.
2. Construct infields with an approved non-toxic organic binder, red color mix material especially prepared for ballfields. Material will be a minimum of 4 inches in compacted depth. Bind by crushed aggregate screenings down to 1/4 inch or 3/8 inch fine particles.
3. Fill home plate and mounds with a minimum of 2 inches of fine grey brick clay incorporated at a uniform rate with established infield red mix. Infields and outfield turf areas will consist of a Tif Hybrid Bermuda Grass.

4. When grading playing fields, adhere to Sports Fields Manual for Design and Construction standards and requirements for design and construction.
5. Finish grade for sports fields must be no greater than 1% in slope.
6. Outfield warning tracks are not to be included in ballfield designs.

8-2.205

**SPORTS FIELD LIGHTING**

Lighting shall be the following:

- Energy efficient and cost effective to operate.
- Proactively monitored to detect fixture outages.
- Installed with remote on/off controls.
- Designed such that the light levels and the entire system is guaranteed for a period of 25 years.
- Designed so playing surfaces will have guaranteed average constant light level and uniformity as follows:

Area of Lighting	Average Constant Light Levels	Max. to Min. Uniformity Ratio
Infield	50 foot-candles	2.0 to 1.0
Outfield	30 foot-candles	2.5 to 1.0
Soccer/Football	30 foot-candles	2.5 to 1.0

Life cycle costs for the lighting system shall be calculated and include luminaries energy consumption, cost of maintenance, spot re-lamping, Group re-lamping all luminaires and total 25 year Life Cycle operating Cost.

Lighting system will not produce excessive spill light or glare. Maximum vertical foot-candles for each field shall be determined per project with the primary goal to have levels as low as possible so as not to negatively impact neighbors with excessive spill light or glare. No luminaires will be aimed less than 25 degrees below horizontal. All luminaires will have both internal and external shielding for glare and spill light control.

All poles will include a factory installed mounting bracket for security lights 20ft up the pole and infield poles will have a factory provided electrical outlet enclosure mounted on the lower portions of the pole.

Pole heights will vary depending on field size and location. Poles in general will be between 60ft to 80ft. General Pole locations are as follows for different fields.



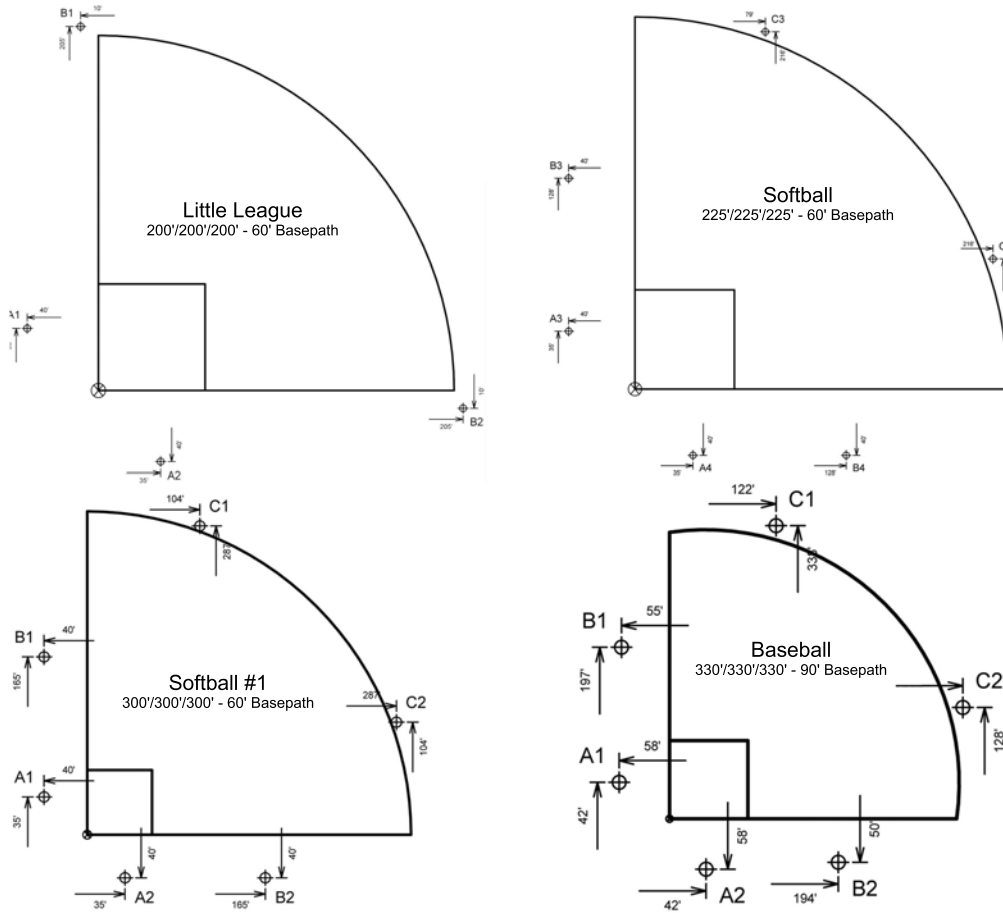


Figure 8.2-1 Little League, Softball, and Baseball Pole Locations

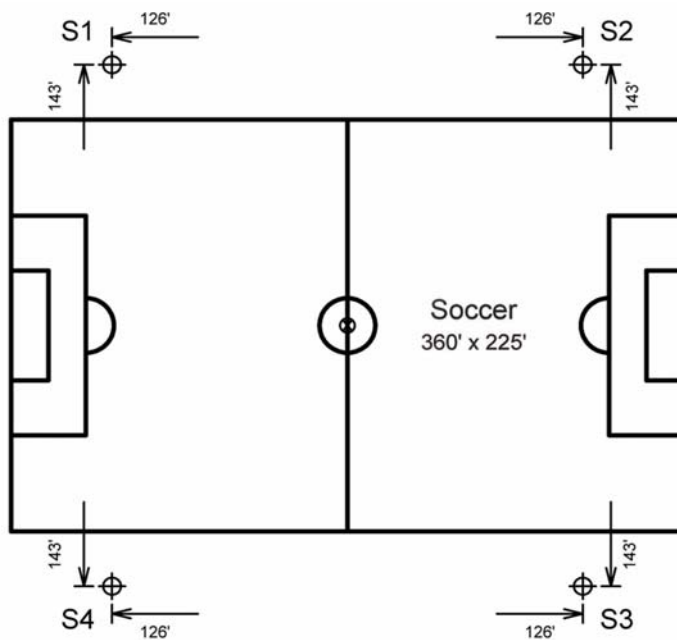


Figure 8.2-2 Soccer Pole Locations

Lighting system shall consist of the following:

- Galvanized steel poles and cross arm assembly
- Pre-stressed concrete base embedded in concrete backfill.
- All luminaires shall be constructed with a die-cast aluminum housing to protect the luminaire reflector system.
- Manufacturer will remote all ballasts and supporting electrical equipment in aluminum enclosures mounted approximately 10' above grade. The enclosures shall include ballast, capacitor and fusing for each luminaire. Safety disconnect per circuit for each pole structure will be located in the enclosure.
- Wire harness complete with an abrasion protection sleeve, strain relief and plug-in connections.
- Controls and Monitoring Cabinet to provide on-off control and monitoring of the lighting system constructed of NEMA Type 4 aluminum. Communication method shall be provided by manufacturer. Cabinet shall contain custom configured contactor modules for 30, 60, and 100 amps, labeled to match field diagrams and electrical design. Manual Off-On-Auto selector switches shall be provided.
- All components shall be designed and manufactured as a system. All luminaires, wire harnesses, ballast and other enclosures shall be factory assembled, aimed, wired and tested.
- All exposed components shall be constructed of corrosion resistant material and/or coated to help prevent corrosion. All exposed steel shall be hot dip galvanized per ASTM A123. All exposed hardware and fasteners shall be stainless steel of at least 18-8 grade, passivated and polymer coated to prevent possible galvanic corrosion to adjoining metals. All exposed aluminum shall be powder coated with high performance polyester. All exterior reflective inserts shall be anodized, coated with a clear, high gloss, durable fluorocarbon, and protected from direct environmental exposure to prevent reflective degradation or corrosion. All wiring shall be enclosed within the cross arms, pole, or electrical components enclosure.
- Lightning Protection: All structures shall be equipped with lightning protection meeting NFPA 780 standards and be properly grounded.
- All system components shall be UL Listed for the appropriate application.

### 8-2.206

## COURT FACILITIES

1. Make sure that all court facilities are lighted to meet all current IES standards. Tennis courts should also meet United States Tennis Association (USTA) standards.
2. Ensure that all tennis courts meet USTA standards. Concrete courts should be considered due to extended life in a desert environment.
3. Sand Volleyball courts should consist of Double Washed Mortar Premium Grade at a depth of 12 inches.
4. For wetting courts, provide water in the net standards with a Hunter series head in each standard. Also, use domestic water as a source instead of water from the irrigation system. Make sure that all water piping is type L copper. And finally, control the water with a system timer that allows for watering times up to 15 minutes, and locks out the controls for a minimum of 30 minutes between activations. Activation will be by a 24 volt momentary contact switch mounted on a net standard or other pole.

### 8-2.207

## IRRIGATION GUIDELINES

See the City of Scottsdale's current supplement to MAG Section 440 and related details for more specific information.

- Irrigation backflow preventers to be installed inside approved enclosure.
- Approved controllers are Motorola Irrinet/Scorpio. Contact COS Irrigation Department for Motorola Irrinet/Scorpio controller and antenna locations.

- Pushbuttons to be installed on controller cabinets to activate ballfield dust control valves.
- Ballfields to have irrigation installed for dust control.
- Master valve/flow meters (Hydrometers) to be installed on all irrigation mainlines.
- Drip irrigation systems shall be installed using rigid pvc piping.
- Valves are to be of brass construction and a minimum size of 1"
- Trees and shrubs are to be valved separately
- Plans must indicate existing and design operating water pressure requirements.
- Plans must indicate valve flow rates, designation (tree, shrub, turf, etc.) and station number.
- Plans must include City details for all irrigation system components to be installed.
- Drip irrigation to be installed for all trees in turf areas for supplemental watering.
- Top, bottom and middle of sloped turf areas 4:1 or greater shall be irrigated/valved separately.
- Drip irrigation for trees in turf areas shall be irrigated on a separate valve from trees in decomposed granite areas.

For a suggested Baseball Field Irrigation Design refer to [Appendix 8-2A](#).

For a suggested Softball Field Irrigation Design refer to [Appendix 8-2B](#).

For a suggested Soccer Field Irrigation Design refer to [Appendix 8-2C](#).

For a suggested Little League Field Irrigation Design refer to [Appendix 8-2D](#).

## LANDSCAPING

8-2.208

For landscaping, use low-water use, drought-tolerant species that adhere to ADWR plant list. Plant material must be approved by Parks Department staff prior to installation. See the City of Scottsdale's most current supplement to MAG, Section 430, and related details for more specific information, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp). Refer to Sections [8-1.102](#) and [8-1.103](#) for suggested plant material to be used in parks per character area (Suburban and Transitional).

- Tree type to conform to the character area in which the park is located.
- Decomposed granite is to be 1/2" screened Desert Gold unless otherwise approved by COS Parks and Recreation Division.
- Trees shall not be planted within 10' of an existing private wall, sign, or light pole.
- Landscape plans must provide COS planting details.
- Site distance standards shall be used for park entries. Refer to Section 5-3.188, 8-1.400 and Figure 5.3-26.
- Natural growth habits shall be taken into consideration to minimize maintenance frequency and intensity.
- Salvaged trees must meet ANSI A300 (Part 1) pruning standards and ANSI A300 (Part 6) transplanting standards with a minimum 2-1/2" trunk caliper.
- Landscape clearances shall be provided to prevent conflict with signs, light poles, fire hydrants or median crossings.
- Landscaping must not create hazards to public safety through either plant growth habit, structure or location.
- Skateboard protection shall be provided on all seat wall caps and benches.
- There shall be a physical separation (concrete curbing or steel edging) provided between public and private landscaping/irrigation systems.

## CONSTRUCTION MATERIAL

1. Use steel, metal, aluminum, recycled material or approved equal for park fixtures and ramadas. Wood will not be permitted. Roofing material needs to be 20 year guaranteed metal, standing seam with Kynar finish.
2. Between turf and landscaped areas, install headers consisting of concrete, brick, ultraviolet-treated vinyl, or metal.
3. Windscreen material to be double leno polypropelent, 85% shade open mesh. Color is to be dark green.
4. Wabash Manufacturing trash receptacles are to be installed or approved equal.

### 8-2.210

## SIGNAGE

1. Place the standard park sign at the main entrance of every neighborhood and community park. The park sign mold can be obtained from Recreation or the Parks Department
2. Specialty parks may deviate from standard park signage with the approval from both Recreation and Parks Department. A marquee that meets the city's Sign Ordinance may be acceptable upon the approval of both Recreation and Parks Department and obtaining a city sign permit.
3. Certify that all signage meets the Scottsdale Sign Ordinance, and ADA signage specifications. Ordinance information can be obtained at the One Stop Shop and [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

### 8-2.211

## PARKING

1. Ensure that all parking meets ADA Guidelines and the City of Scottsdale's parking requirements stipulated in the Parks Master Plan and city zoning requirements. Preferred parking spaces utilize Universal Parking dimension specified in [Section 12-1.000](#).
2. Ensure that parking lots lights meet all current IES standards.
3. Plant non-deciduous trees (24 inch boxes minimum) adjacent to parking lots to provide shading. An acceptable ratio is 1 tree per every 15 parking stalls.

### 8-2.212

## PUBLIC POOLS

All public pool facilities must meet or exceed Maricopa County Environmental Health Code Section 1 General Provisions Regulation 1 - 15 for Pool and Facility Design, also all State of Arizona or City of Scottsdale codes or regulations. All pool main drains must comply with the Virginia Graeme Baker (VGB) Pool and Spa Safety Act ANSI/ASME A112.19.8-2007.

See current City of Scottsdale Aquatic Maintenance Supplement for specific details. Supplement may be obtained from COS Aquatic Maintenance Coordinator (480-312-4005).

1. Mechanical Room Controller Device (MRCD) to be by the BECKS Manufacture Model SYSTEM 7.
2. Commercial High Rate Sand Filters: EKO 3 Manufactured by NEMATO with an integrated automatic backwash control system.
3. Chlorine Gas CL2 Equipment by Capital Controls.
4. Emergency Vapor Scrubber Systems (EVSS) by Siemens Water Technologies.

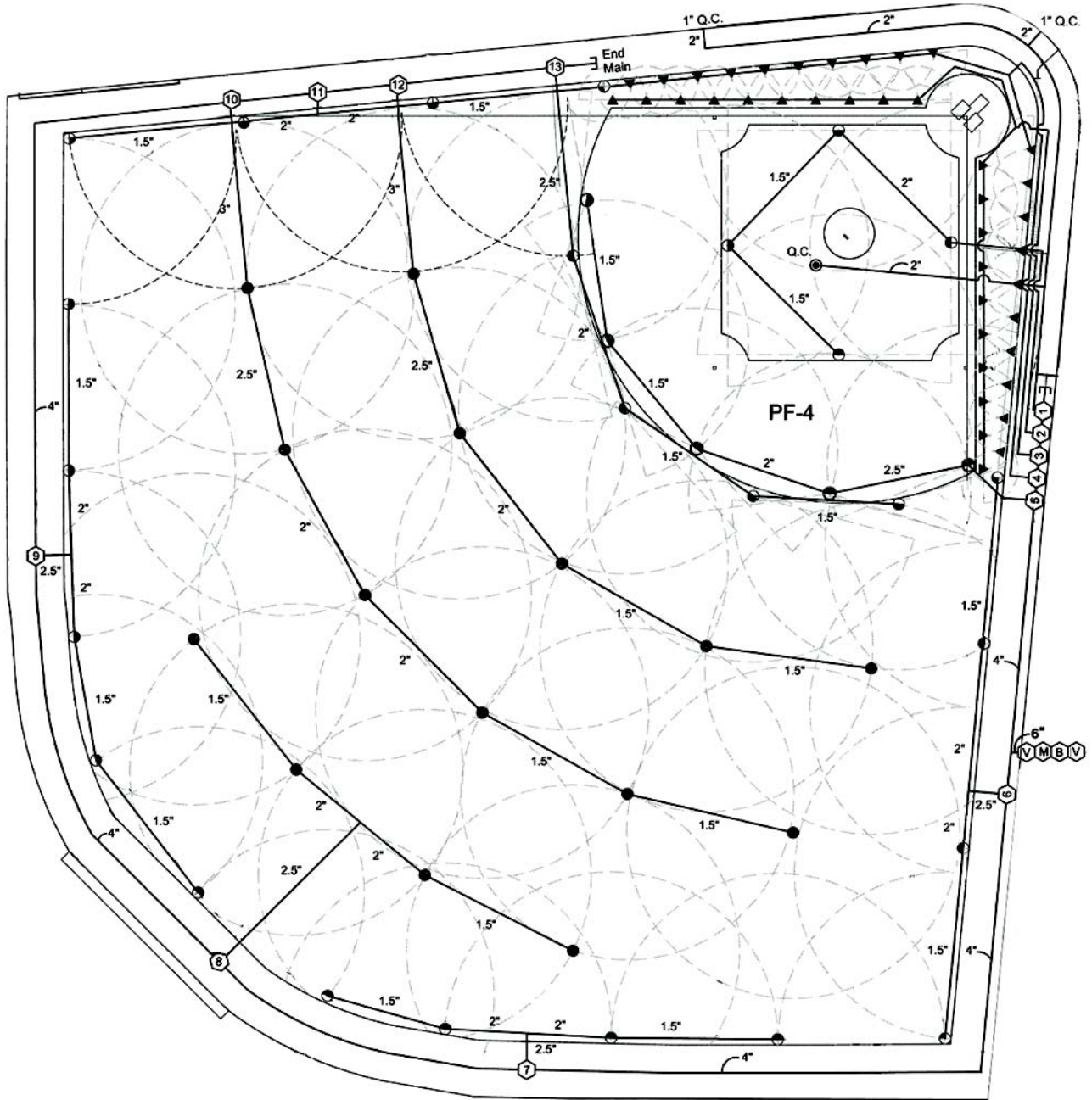
### 8-2.213

## DECORATIVE FOUNTAINS/WATER FEATURES

The City of Scottsdale will not incorporate any additional Decorative Fountains or Water Features into its future projects in the interest of water conservation and safety concerns.

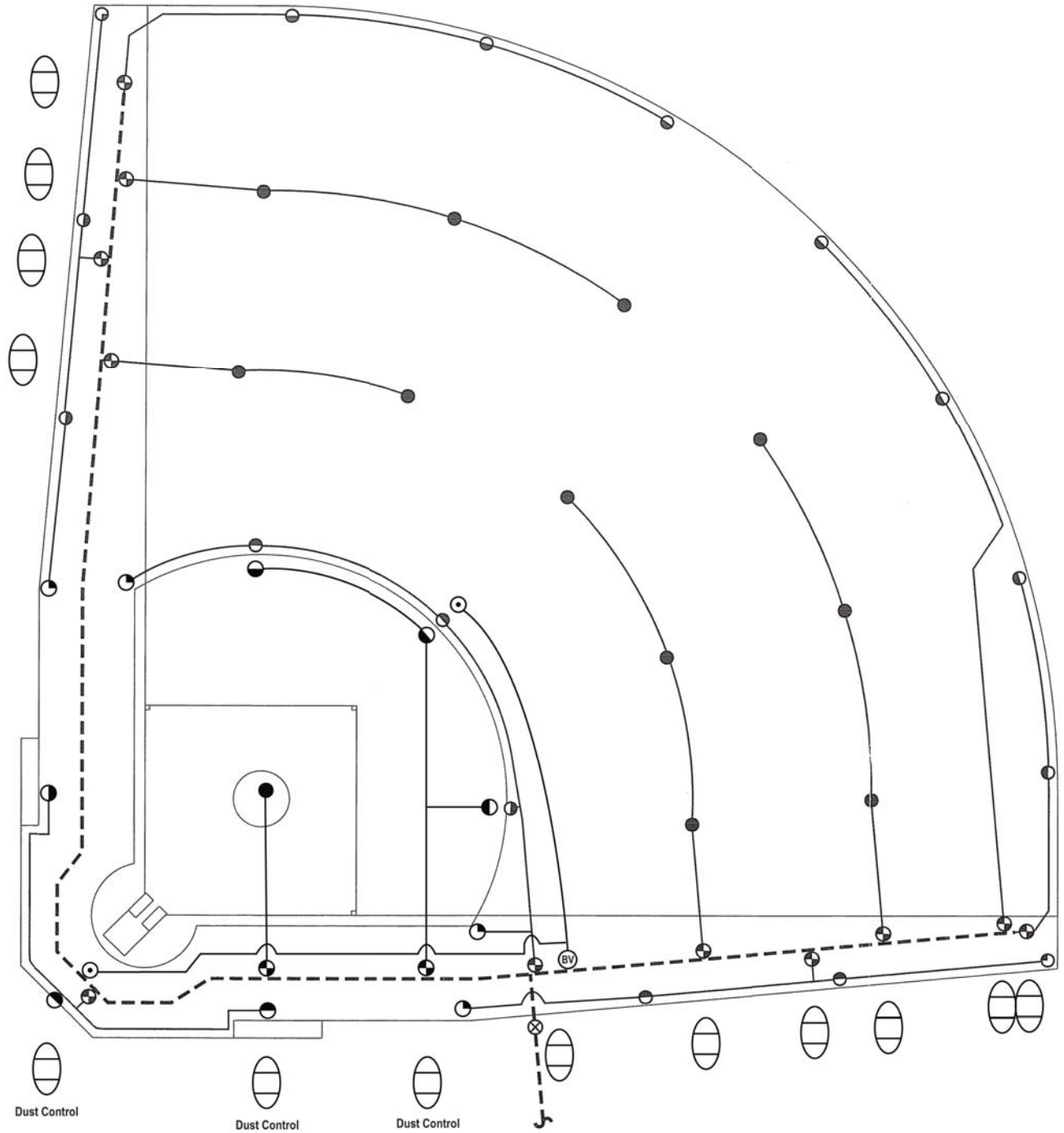
However, if a fountain/water feature is approved for a project, City of Scottsdale Aquatic Maintenance will provide a set of mechanical guidelines to the designer.

See current City of Scottsdale Aquatic Maintenance Fountain/Water Feature Supplement for specific details. Supplement may be obtained from COS Aquatic Maintenance Coordinator (480-312-4005)





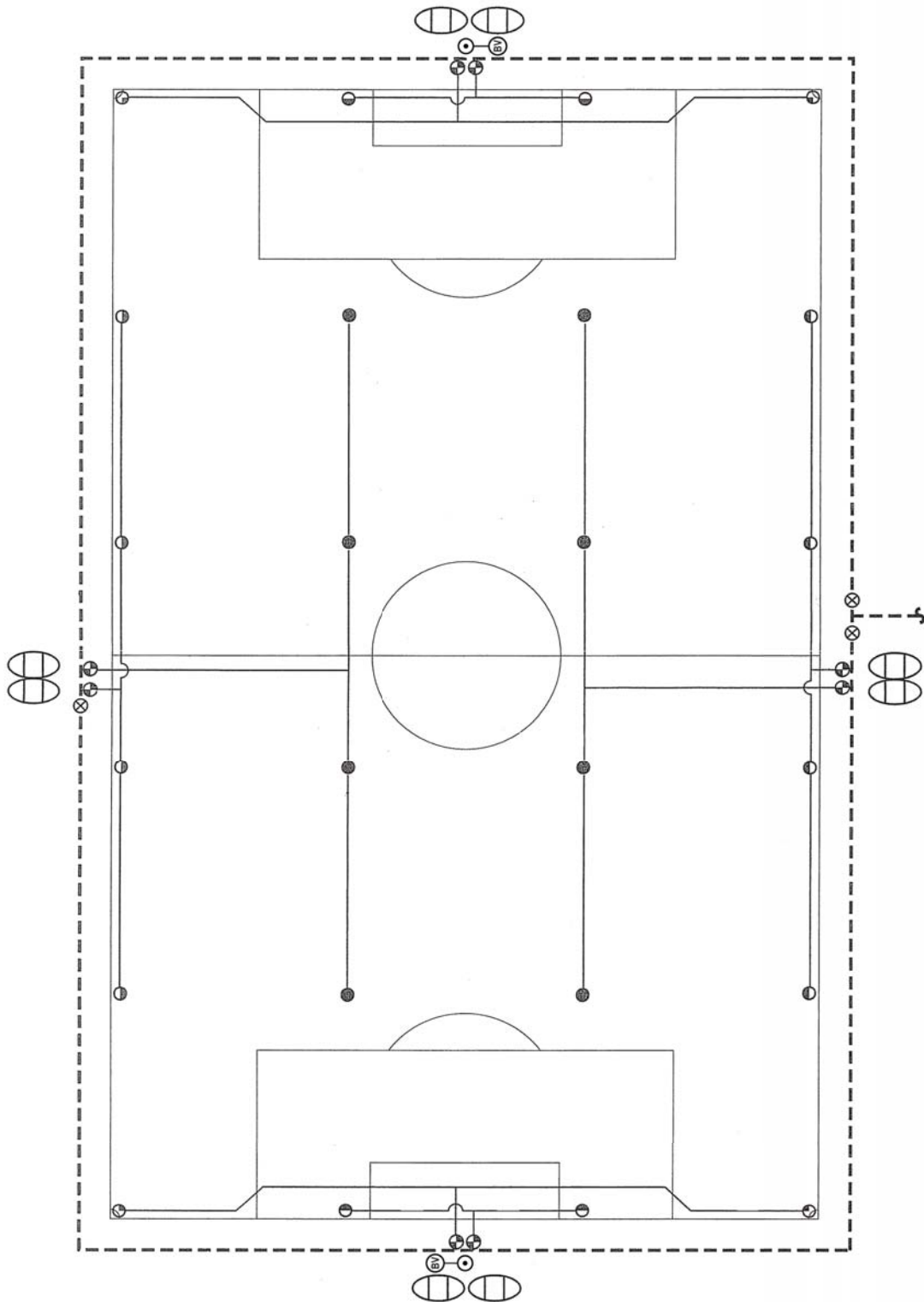
# SOFTBALL FIELD IRRIGATION DESIGN





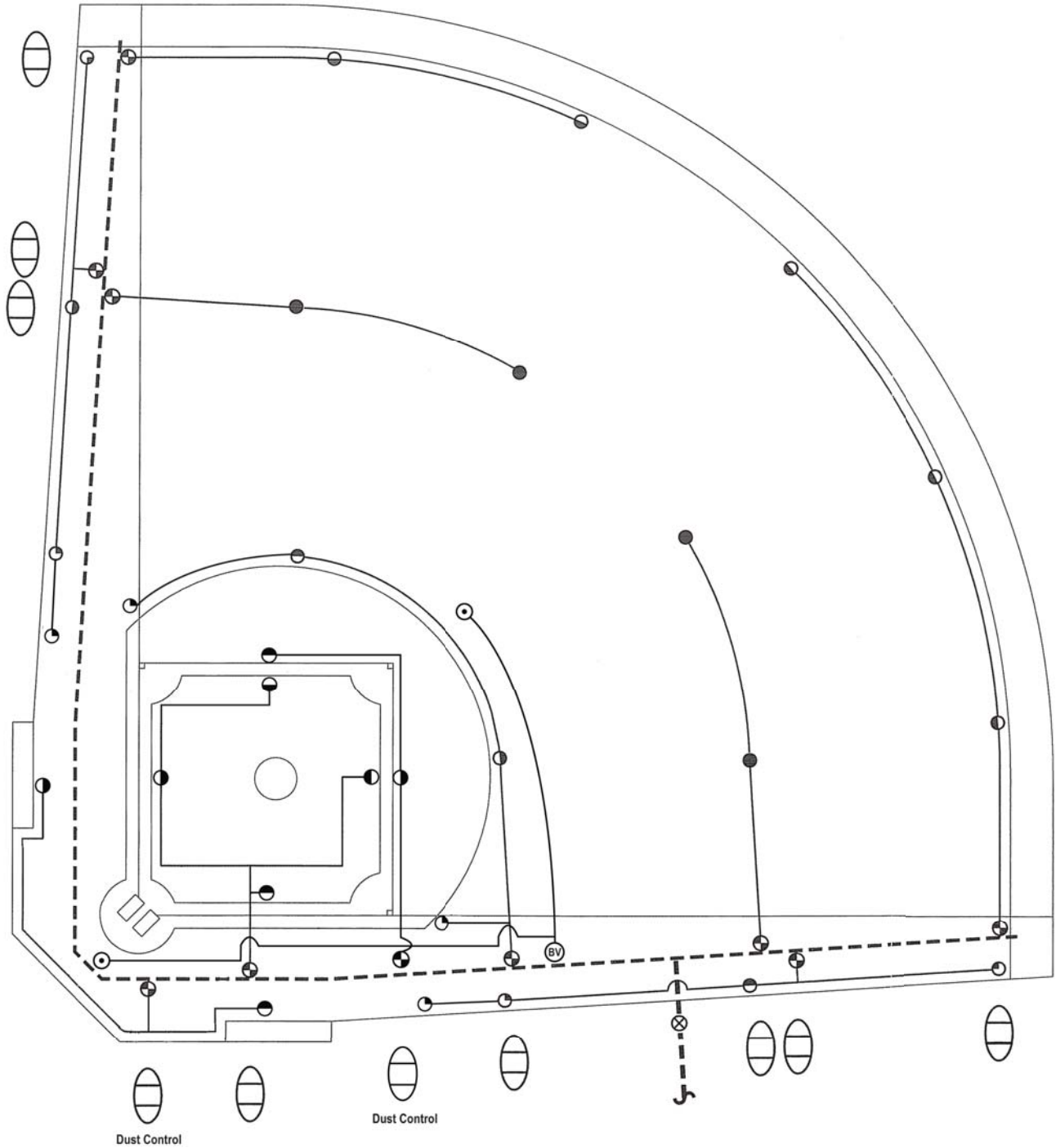


# SOCCER FIELD IRRIGATION DESIGN





# LITTLE LEAGUE FIELD IRRIGATION DESIGN





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# NON-PAVED TRAILS



This section addresses the planning, design, maintenance and construction of trails within the city. The term “trails” refers to non-paved, non-motorized, shared use trails, which are legally accessible by the general public.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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## GENERAL INFORMATION

8-3.000

The City of Scottsdale's goal is to develop and maintain a citywide interconnecting network of trails to provide valuable recreation and transportation opportunities for city residents and visitors. Trails function as transportation links between schools, residential areas, parks, places of employment, shopping areas and other areas of interest. Trails also provide hikers, walkers, joggers, equestrians, mountain bicyclists, and people with disabilities opportunities to improve health and fitness, spend time with family and friends, enjoy the natural environment and escape the stress of everyday life.

Several trails plans must be consulted for identifying trail alignments within the city. The Trail Master Plan approved by the City Council in February 2004 identifies trail locations citywide, see [www.ScottsdaleAZ.gov/trails/plan/](http://www.ScottsdaleAZ.gov/trails/plan/). Additional detailed plans provide guidance for developing trails specifically within the McDowell Sonoran Preserve, see [www.ScottsdaleAZ.gov/preserve](http://www.ScottsdaleAZ.gov/preserve).

In 2008, the Ad Hoc Citizen Trails Task Force began meeting at Council's direction to update existing trail classifications and design guidelines. Their recommendations were approved by Council in March 2009 and are reflected in this document.

## REFERENCES

8-3.001

The following publications or their current revisions are to be used in conjunction with the design criteria in this manual when designing unpaved trails for the City of Scottsdale:

- Public Rights-of-Way Access Advisory Committee's Accessible Public Rights of Way Planning and Design for Alterations (2001) and Access Board's Outdoor Developed Areas (1999).
- 2007 Proposed Architectural Barriers Act Accessibility Guidelines for Outdoor Developed Areas, at [www.access-board.gov/outdoor/nprm/](http://www.access-board.gov/outdoor/nprm/). Accessibility Guidelines for Trails. Regulatory Assessment Accessibility Guidelines for Outdoor Developed Areas.
- Forest Service Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds (2008).
- Rails-to-Trails Conservancy Trails for the Twenty-First Century (2006).
- USDOT Designing Trails and Sidewalks for Access Parts 1 and 2 (2001).
- USFS Trail Construction and Maintenance Notebook (2007), at [www.fhwa.dot.gov/environment/fspubs/07232806/index.htm](http://www.fhwa.dot.gov/environment/fspubs/07232806/index.htm).

## 8-3.002

**TRAIL CLASSIFICATIONS****A. Primary Trails**

The management objective for Primary Trails is to provide both transportation and recreation links between residential areas, schools, businesses, parks, places of employment and other areas of significant community activity. Primary Trails will typically experience the highest use levels. User groups include hikers, equestrians and bicyclists. Motorized vehicles are only permitted for maintenance and emergency purposes. The trail surface may be comprised of either native soil or decomposed granite. Urban Trails have the greatest width of all trail classifications and therefore accommodate leisurely side-by-side travel and easy passing for multiple user types. These trails are typically located within areas of relatively level topography.

**B. Secondary Trails**

The management objective for Secondary Trails is to provide secondary transportation and recreation links through areas such as washes, scenic and vista corridors, and other desert open space areas. Secondary Trails typically experience a lower level of use than Primary Trails. User groups include hikers, equestrians and bicyclists. Motorized vehicles are only permitted for maintenance and emergency purposes and where trail widths allow. Secondary Trails are narrower than Primary Trails; therefore, occasional single file travel by users may be required. These trails are typically located within areas of level to moderate topography.

**C. Neighborhood Local Trails**

The management objective for Neighborhood Local Trails is to provide access in and around neighborhood areas and provide connections to Primary and Secondary Trails. These trails typically act as “feeder” trails to the more regional trail network and may provide close-to-home recreational opportunities. User groups include hikers, equestrians and bicyclists. Motorized vehicles are only permitted for maintenance and emergency purposes, and where trail widths allow.

**D. Minimally Improved/Rugged Trails**

The management objective for Minimally Improved/Rugged Trails is to provide a minimally improved non-paved trail for recreation use designed for equestrian, hiker, runner and mountain bike placed as far away from traffic as possible. To be constructed in areas where there are other accessible trail options available or where the construction of an accessible trail will substantially alter the character of the surrounding area, will impact culturally significant areas, or is difficult to construct because of the terrain such as washes. Motorized vehicles are only permitted for maintenance and emergency purposes and where trail widths allow.

**E. Preserve Primary Trails**

The management objective for Preserve Primary Trails is to provide safe and enjoyable trail recreation opportunities within preserved open space areas of the city, while having a minimum impact on the surrounding environment. These trails typically provide connections between major trail access points and Preserve Secondary Trails. User groups include hikers, equestrians and bicyclists. Certain user groups may be prohibited if deemed appropriate, see [Section 8-3.101](#). Motorized vehicles with a wheelbase of less than 48 inches may be used for maintenance and emergency purposes only. These trails are typically located within areas of moderate to slightly more rugged topography. The installation of erosion control structures may be necessary along trail sections with steeper longitudinal slopes. Trail widths may occasionally be too narrow to allow side-by-side travel by users.



## F. Preserve Secondary Trails

The management objective for Preserve Secondary Trails is to provide safe and enjoyable trail recreation opportunities within preserved open space areas of the city, while having a minimum impact on the surrounding environment. These trails typically serve as secondary routes emanating as spurs from Preserve Primary Trails. Certain user groups may be prohibited if deemed appropriate, see [Section 8-3.101](#). Use may be limited to foot traffic only, as widths and grades may not permit the safe use by equestrians and mountain bicyclists. Motorized vehicles, excluding helicopters, may be unable to operate for maintenance or emergency purposes due to the narrow tread width. Preserve Secondary Trails traverse areas with rugged topography; therefore, longitudinal grades are steeper, more difficult and require erosion-control structures. The trail tread is narrower than Preserve Primary Trails, thus requiring single file travel by users.

## G. Interpretive Trails

The management objective for Interpretive Trails is to provide educational opportunities along a common theme. Education and interpretation can occur in a variety of forms including, but not limited to, signage and brochures. Use by equestrians and bicyclists are prohibited. Motorized vehicles are only permitted for maintenance and emergency purposes, and where trail widths allow. These trails are generally established in areas of gentle topography; therefore, longitudinal grades are easy to moderate. The trail tread should be wide enough to accommodate some side-by-side travel and 2-way traffic. Barrier-Free standards may be achieved with additional improvements.

## H. Barrier-Free Trails

The management objective of Barrier-Free Trails is to provide trail opportunities for persons with physical disabilities including mobility, visual and hearing impairments. The design of Barrier-Free Trails should provide access to viewpoints, activity areas and other points of interest, and should meet the standards of the ADA. Equestrians and bicyclists are not permitted on Barrier-Free Trails. Motorized vehicles (excluding electric wheelchairs and other types of mobility aids) are permitted only for maintenance and emergency purposes. Caution must be exercised when using vehicles to avoid damaging hardened surfaces. These trails are generally established in areas that are flat with very gentle topography and level longitudinal grades. The trail tread is wide enough to accommodate side-by-side travel and 2-way traffic, and is composed of a hardened or stabilized surface.

# TRAIL DESIGN

## 8-3.100

The city's objective is to design, construct and maintain trails that:

1. Provide safe, nonmotorized transportation links, and/or close-to-home recreation opportunities
2. Provide legal public access to destination points and other areas of interest
3. Blend with the surrounding environment
4. Minimize impacts on the natural environment
5. Minimize impacts on adjacent landowners
6. Require minimum levels of maintenance

## DESIGN CONSIDERATIONS

## 8-3.101

### A. Human Factors

Trails must be planned and constructed with the needs of the trail user in mind. Trail users tend to desire routes that access and connect areas of significant community activity such as

schools, businesses, shopping areas and parks, as well as other areas of interest such as viewpoints, water sources, natural areas, desert preserves, scenic and vista corridors, and interesting geologic features. Visual qualities are important to trail users, therefore trails should be designed to blend with the surrounding environment. Views from the trail to the surrounding environment should also be considered. Trail users enjoy changes in scenery, thus the increasing demand for loop trails and trail networks that allow the user to return to the starting point without traveling the same trail twice. Loop trails also provide the comfort of knowing that the trail will return to the starting point, thus reducing the chance of anyone becoming lost. Trail users tend to favor the easiest, most obvious route. If the designated trail is not the easiest and most obvious, trail users will begin to create new, unauthorized trails.

### **B. Coinciding Easements**

Trails are frequently located within common tracts and easements dedicated for other purposes such as drainage, flood control, public utility, natural area open space, and scenic and vista corridors. In situations where these common tracts and easements are wider than that needed for a trail easement, it may be advantageous to dedicate the same area of these coinciding common tracts and easements for the purposes of public trail use. This will increase the flexibility to properly lay out, design and construct public trails, and will allow the trail to be positioned away from undesirable areas such as low-flow wash channels, areas of extreme topography, dense vegetation, critical animal habitats and adjacent properties. This will also allow future realignment of the trail, should such a realignment become necessary. In cases where a separate trail easement is delineated within other easements or common tracts, it is extremely important that the alignment of the trail easement be reviewed on the ground to assure suitability.

### **C. Trail Viewshed**

The line of sight from a trail to the surrounding landscape and from the surrounding landscape to a trail are important design considerations. Views from the trail to the surrounding landscape improve the quality of the trail users' experience; therefore, trails should be designed to provide users varying views of the surrounding area. However, obscuring views of the trail from the surrounding landscape is also important, since adjacent landowners may not want to view the trail from their properties.

### **D. Native Plants**

The design, construction and maintenance of trails within the City of Scottsdale must take into account the Native Plant Ordinance, Section 7.500 of the city's Zoning Ordinance, see [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant). Trails should be aligned to avoid disturbance of, and have a minimum effect on the following plant species: whitethorn acacia, catclaw acacia, crucifixion thorn, hackberry, blue palo verde, foothill palo verde, desert willow, juniper, ironwood, cottonwood, mesquite, scrub oak, sugar sumac, Arizona rosewood, saguaro, barrel cacti, ocotillo and soaptree yucca.

### **E. Sensitive Wildlife Habitat**

Trail design and construction within natural desert park and preserve areas should be evaluated in terms of the effect that the trail will have on sensitive wildlife habitats. The Arizona Game and Fish Department should be consulted during the trail design process to assure that the trail will not have a negative impact on such resources. The best means of preventing negative impacts on wildlife is to simply avoid sensitive areas. Seasonal trail closures may be necessary in some situations.

## F. Archaeological and Cultural Resources

Trail design and construction should be evaluated in terms of the effect the trail will have on archaeological and cultural resources. Such activities should be done in accordance with the City of Scottsdale Archeological Ordinance, [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

Potential options to prevent and mitigate damage to these resources include:

1. Altering the trail alignment to avoid archaeological and cultural resources.
2. Protecting the resources by utilizing methods to obscure them from view.
3. Mitigating the cultural resource, which involves removal and thorough documentation of the items by a professional archaeologist. The documentation of the resource may then be interpreted as part of the trail opportunity.

## G. Design for Shared-Use

Trails within the city are open to all nonmotorized uses unless otherwise stated. Decisions to prohibit any nonmotorized use from trails must be based on coordinated planning efforts involving appropriate user groups and city staff. Characteristics that should be considered as part of this process include, but are not limited to, longitudinal and cross slopes, surface materials, line of sight, amount of use, sensitivity of surrounding environment, soil types and native plant and animal habitats.

The following means of preventing potential user conflicts are based on methods identified in "Conflict on Multiple Use Trails" (Moore, 1994), and should be considered when planning, designing, constructing and maintaining shared-use trails:

1. Separate user types at trailheads and along the first, most crowded, stretches of trail.
2. Provide adequate sight distances.
3. Build trails wide enough to accommodate expected levels and types of use.
4. Build and maintain trails wide enough for safe passing and/or provide periodic turnouts.
5. Design trails to control speeds where necessary by varying the trail surface and avoiding long, straight downhill stretches.
6. Provide adequate trailhead facilities for all user types.

## TRAIL LOCATIONS

Location work must begin early in the trail design process and be completed prior to construction. The amount and level of work that is required varies depending on the type of trail being designed and the terrain on which the trail is being constructed. The necessary steps to properly layout the trail include the following: Reconnaissance, Grade, Drainage and Staking/Flagging, see Paragraphs A through D below.

### A. Reconnaissance

The reconnaissance process includes the identification and evaluation of alternative routes, which leads to final selection of the best possible route to meet the established objectives. Application of sound principles of trail location, alignment and grade will minimize future operation and maintenance problems.

The first step is to examine the most recent topographic maps and aerial photos of the area to identify significant landforms, drainage patterns and vegetation. The next step, for which there is no substitute, is to walk the area and examine potential routes. Conduct a systematic study of the area by walking various routes and viewing the area from different vantage points. Control points, which are features that are favorable for or inhibit trail construction, should be identified through this process. The control points will help to identify the best possible route, with the understanding that situations may exist where trails must pass through negative control points.

8-3.102

**Control points that are favorable for trail construction:**

- Existing road crossings (underpasses, overpasses and intersections with traffic lights or stop signs)
- Natural wash crossings
- Ridgelines
- Hillside benches
- Areas of light vegetation
- Scenic vistas
- Areas of well drained soils
- Good trailhead access

**Control points that inhibit trail construction and should be avoided:**

- Wet areas and poorly drained flat areas
- Sensitive wildlife habitats
- Wash bottoms
- Areas adjacent to sources of excessive noise, such as airports
- Areas adjacent to plants that are poisonous to horses such as oleanders
- Steep rocky slopes
- Unstable or fragile soils
- Abrupt elevation changes
- Bluffs, ledges and cliffs except where featured as scenic resources
- Frequent wash crossings
- Locations requiring bridges or culverts
- Areas of heavy or fragile vegetation
- Areas requiring switchbacks
- Excessively long, straight sections
- Areas of archeological/cultural sensitivity
- Lightning-prone areas
- Unsafe or uncontrolled road crossings
- Known habitats of threatened or endangered plant or animal species

**B. Grade**

The degree to which a trail rises or falls over a linear distance is an important factor in determining the length of the trail, level of difficulty, appropriate user types and drainage and maintenance requirements. Occasional fluctuations in the trail grade should be considered to provide variation for trail users and to facilitate proper drainage. Frequent or drastic changes in grade should be avoided. The grade line between control points can be plotted on paper to determine if switchbacks or other special features will be needed to sustain a certain grade. On moderate to steep side slopes a periodic reverse in the grade should be included to create dips for drainage purposes. When grade dips are included in initial trail construction, the need for waterbars is eliminated.

**C. Drainage**

Proper drainage of surface water is the most important factor in design, construction and maintenance of trails. Surface erosion resulting from improper drainage will have a detrimental impact on the trail surface, causing damage to the natural environment and increasing maintenance requirements. The potential for erosion depends on three factors: soil type, velocity of water on the trail and the distance water travels down the trail. Alteration of any of these factors can reduce the potential for erosion. Proper outslping of the trail tread and the installation of grade dips or water bars will help decrease the potential for erosion of the trail surface. If distances allow, grade dips are preferred over waterbars. Existing drainage patterns of the surrounding area, such as concentrated drainage channels, must be maintained. Attempts to alter the existing drainage patterns will have a negative effect on the natural environment and will most likely result in severe damage to the trail.

**D. Staking/Flagging**

Stakes or flags act as a guide so that the alignment, grade and distances can be easily followed during construction. A clinometer, topographic map, compass, measuring tape and

notebook are all necessary tools. Proper location of the flag line is easily accomplished with three people acting as surveyor, rod holder and recorder. Stakes or flags should be located along the trail centerline with the location of dips, walls and other special structures indicated with color-coded flagging. The trail alignment should pass through control points that are favorable for trail construction and avoid control points which will inhibit trail construction. Normally, trail alignments follow the contours of the land and consist of a series of gently sweeping curves. Long straight segments with sharp angular turns should be avoided.

## **TRAIL CLASSIFICATIONS**

## **8-3.200**

City of Scottsdale staff may allow deviations from the following guidelines under special conditions with the approval of the Transportation Planning Director.

### **8-3.201**

### **PRIMARY TRAILS**

#### **A. Grade**

Maximum sustained grade should not exceed 5 percent. A maximum grade of 8 percent may be used for short distances not to exceed 200 linear feet.

#### **B. Tread**

The desired tread width for Primary trails is 12 feet with a minimum acceptable width of 10 feet. The trail tread should be comprised of native soils in undisturbed desert areas and decomposed granite in areas that have been graded, landscaped, or will otherwise remain significantly unnatural. Compaction of a native soil tread surface may be necessary to prevent damage from use and to increase resistance to erosion. If decomposed granite is used it must be ¼ inch minus, Madison Gold or similar, wetted and compacted to a 4 inch depth. A soil stabilizer may be added to the decomposed granite according to manufacturers' specifications. The trail tread must be smooth and free of all obstacles. The trail tread must be delineated from the surrounding terrain. For example, utilizing decomposed granite of a different size or color in the surrounding landscape will help distinguish the trail tread. The location of landscape plants, fences and other physical barriers can also be used to delineate the trail.

#### **C. Vegetation Clearance**

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance, see [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread, 12 feet is desired. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. In areas where new landscaping is to be installed, trees, cacti and other spiny plants must be planted at least 5 feet from the trail tread.

**D. Drainage**

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures such as water bars or grade dips may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail, causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off both sides of the trail and prevent pooling.

**E. Easement Widths and Setback from Street**

Primary Trails may be contained in a minimum 30-foot-wide trail or nonmotorized public access easement or in ROW. In situations where a trail easement overlaps with common tracts or easements dedicated for other purposes, it may be beneficial to dedicate the entire width for public trail purposes. For more detail see [Section 8-3.101](#). Trails along streets should be placed the maximum distance possible from the back of curb. The preferred separation is 50 feet with a minimum separation of 25 feet.

**8-3.202****SECONDARY TRAILS****A. Grade**

Maximum sustained grade should not exceed 5 percent. A maximum grade of 8 percent may be used for short distances not to exceed 200 linear feet.

**B. Tread**

The desired tread width for Secondary trails is 10 feet with a minimum acceptable width of 8 feet. The trail tread should be comprised of native soils in undisturbed desert areas and decomposed granite in areas that have been graded, landscaped, or will otherwise remain significantly unnatural. Compaction of a native soil tread surface may be necessary to prevent damage from use and to increase resistance to erosion. If decomposed granite is used, it must be ¼ inch minus, Madison Gold or similar, wetted and compacted to a 4 inch depth. A soil stabilizer may also be added to the decomposed granite according to manufacturers' specifications. The trail tread must be smooth and free of all obstacles. The trail tread must be delineated from the surrounding terrain. For example, utilizing decomposed granite of a different size or color in the surrounding landscape will help distinguish the trail tread. The location of landscape plants, fences and other physical barriers can also be used to delineate the trail.

**C. Vegetation Clearance**

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance, see [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread, 12 feet is desired. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a



smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. In areas where new landscaping is to be installed, trees, cacti and other spiny plants must be planted at least 5 feet from the trail tread.

#### **D. Drainage**

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures such as water bars or grade dips may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling.

#### **E. Easement Width and Setback from Street**

Secondary Trails may be contained in a minimum 25-foot-wide trail easement or in ROW. In situations where a trail easement overlaps with common tracts or easements dedicated for other purposes, it may be beneficial to dedicate the entire width for public trail purposes, see [Section 8-3.101](#) for more detail. Trails along streets should be placed the maximum distance possible from the back of curb. The desired separation for a Secondary trail is 25 feet with a minimum separation of 10 feet.

### **NEIGHBORHOOD/LOCAL TRAILS**

**8-3.203**

#### **A. Grade**

Maximum sustained grade should not exceed 5 percent. A maximum grade of 8 percent may be used for short distances not to exceed 200 linear feet.

#### **B. Tread**

The desired tread width for Neighborhood/Local trails is 8 feet with a minimum acceptable width of 6 feet. The trail tread should be comprised of native soils in undisturbed desert areas and decomposed granite in areas that have been graded, landscaped, or will otherwise remain significantly unnatural. Compaction of a native soil tread surface may be necessary to prevent damage from use and to increase resistance to erosion. If decomposed granite is used it must be ¼ inch minus, Madison Gold or similar, wetted and compacted to a 4 inch depth. A soil stabilizer may also be added to the decomposed granite according to manufacturers' specifications. The trail tread must be smooth and free of all obstacles. The trail tread must be delineated from the surrounding terrain. For example, utilizing decomposed granite of a different size or color in the surrounding landscape will help distinguish the trail tread. The location of landscape plants, fences and other physical barriers can also be used to delineate the trail.

#### **C. Vegetation Clearance**

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance, see [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and

brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. In areas where new landscaping is to be installed, trees, cacti and other spiny plants must be planted at least 5 feet from the trail tread.

#### **D. Drainage**

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures such as water bars or grade dips may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling.

#### **E. Easement Width and Setback from Street**

Neighborhood/Local Trails may be contained in a minimum 25-foot-wide trail easement or ROW. In situations where a trail easement overlaps with common tracts or easements dedicated for other purposes, it may be beneficial to dedicate the entire width for public trail purposes, see [Section 8-3.101](#) for more detail. Trails along streets should be placed the maximum distance possible from the back of curb. The desired separation is for a Neighborhood/Local trail is 10 feet.

### **8-3.204**

## **MINIMALLY IMPROVED/RUGGED TRAILS**

#### **A. Grade**

Grade will match existing terrain.

#### **B. Tread**

The desired tread width is 4 feet. The trail tread is made up of native soils. Compaction may be used to prevent damage from use and to increase resistance to erosion.

#### **C. Vegetation Clearance**

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance, see [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread, 12 feet is preferred. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. In areas where new landscaping is to be installed, trees, cacti and other spiny plants must be planted at least 5 feet from the trail tread.



#### D. Drainage

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures such as water bars or grade dips may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling.

#### E. Easement Widths and Setback from Street

Minimally Improved Trails must be contained in a minimum 25-foot-wide trail easement if located in a trail corridor identified in the Trails Plan as a Secondary, Local, or Neighborhood trail. Minimally Improved trails must be contained in a minimum 30-foot-wide trail easement if located in a trail corridor identified in the Trails Plan as a Primary trail. In situations where a trail easement overlaps with common tracts or easements dedicated for other purposes, it may be beneficial to dedicate the entire width for public trail purposes, see [Section 8-3.101](#) for more detail. Minimally Improved Trails must be located the maximum distance feasible from the edge of the street. The desired distance is 50 feet with the minimum distance 20 feet.

### PRESERVE PRIMARY TRAILS

#### 8-3.205

#### A. Grade

Maximum sustained grade should not exceed 15 percent. A maximum grade of 25 percent is allowed for wash crossings, grade dips and other trail segments to avoid impassable areas for a distance not to exceed 100 linear feet. Switchbacks may be utilized when surrounding terrain has a side slope of 20 to 45 percent. Switchbacks supported by retaining walls may be utilized when surrounding terrain has a side slope up to 55 percent.

#### B. Tread

Preserve Primary trail widths must be 2 feet with 12-foot cleared shoulders on each side of the trail tread. The trail surface should be native soil and must be smooth and free of major obstacles. All stumps and root balls within the tread surface must be completely removed.

#### C. Vegetation Clearance

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance, see [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. This distance may need to be increased on the uphill side of trails that traverse steep hillsides. This will prevent pieces of cacti from falling onto the trail tread and creating a safety hazard.

**D. Drainage**

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling.

**E. Easement Width**

Preserve Primary Trails are typically located within large open space areas controlled by the city. In situations where these trails must be located within easements, the easement width must be a minimum of 100 feet.

**8-3.206****PRESERVE SECONDARY TRAILS****A. Grade**

Maximum sustained grade should not exceed 20 percent. A maximum grade of 30 percent is allowed for wash crossings, grade dips and other trail segments to avoid impassable areas for a distance not to exceed 100 linear feet. Switchbacks may be utilized when surrounding terrain has a side slope of 20 to 45 percent. Switchbacks supported by retaining walls may be utilized when surrounding terrain has a side slope up to 55 percent.

**B. Tread**

Preserve Secondary trail widths must be 2 feet, with NO cleared shoulders. The trail surface should be native soil and must be smooth and free of major obstacles. All stumps and root balls within the tread surface must be completely removed.

**C. Vegetation Clearance**

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance, see [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. This distance may need to be increased on the uphill side of trails that traverse steep hillsides. This will prevent pieces of cacti from falling onto the trail tread and creating a safety hazard.

**D. Drainage**

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures may be required. The

cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling.

### **E. Easement Width**

Preserve Secondary Trails are typically located within large open space areas controlled by the city. In situations where these trails must be located within easements, the easement must be a minimum of 100 feet wide.

## **INTERPRETIVE TRAILS**

Interpretive Trails differ from other trails because their primary function is to provide educational opportunities for trail users. Education and interpretation can occur in a variety of forms including signage and/or brochures. This manual contains only general guidelines for the design and construction of Interpretive Trails.

### **8-3.207**

### **A. Grade**

Maximum sustained grade should not exceed 10 percent. A maximum grade of 15 percent is allowed for wash crossings, grade dips and other trail segments to avoid impassable areas for a distance not to exceed 100 linear feet. Switchbacks may be utilized when surrounding terrain has a side slope of 20 to 45 percent. Switchbacks supported by retaining walls may be utilized when surrounding terrain has a side slope up to 55 percent.

### **B. Tread**

Interpretive trail widths must be 4 feet to 6 feet. The trail tread should be comprised of native soils in undisturbed desert areas and decomposed granite in areas that have been graded, landscaped, or will otherwise remain significantly unnatural. Compaction of a native soil tread surface may be necessary to prevent damage from use and to increase resistance to erosion. If decomposed granite is used it must be ¼ inch minus, Madison Gold or similar, wetted and compacted to a 4 inch depth. A soil stabilizer may also be added to the decomposed granite according to manufacturers' specifications. The trail tread must be smooth and free of all obstacles. The trail tread must be delineated from the surrounding terrain. For example, utilizing decomposed granite of a different size or color in the surrounding landscape will help distinguish the trail tread. The location of landscape plants, fences and other physical barriers can also be used to delineate the trail.

### **C. Vegetation Clearance**

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance, see [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3 foot distance of the trail tread. Vertical clearance must be at least 8 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. This distance may need to be increased on the uphill side of trails that traverse steep hillsides. This will prevent pieces of cacti from falling onto the trail tread and creating a safety hazard.

### D. Drainage

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, as opposed to the side slope of a hill, the trail surface should be crowned to drain water off the trail and prevent pooling.

## 8-3.208

### BARRIER-FREE

Barrier-free Trails are designed to provide opportunities for persons with physical disabilities including mobility, visual and hearing impairments, and shall meet the standards of the ADA. This manual contains only general guidelines for the design and construction of Barrier-free Trails.

#### A. Grade

Barrier-free trails must be designed with the least possible longitudinal slope. Specific grade requirements shall comply with the ADA.

#### B. Tread

Barrier-free trail widths must be a minimum of 8 feet. There are many varieties of accessible surface materials available. Materials should be selected to achieve the maximum level of accessibility practicable according to the desired recreation experience and the natural setting. The chosen surface must be stable and firm. The material must match the surrounding environment. Specific surface requirements shall comply with the ADA.

#### C. Vegetation Clearance

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance, see [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 8 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. This distance may need to be increased on the uphill side of trails that traverse steep hillsides. This will prevent pieces of cacti from falling onto the trail tread and creating a safety hazard.

### D. Drainage

The trail surface must have a cross slope of 1 to 3 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water

channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling. The longitudinal slope of barrier-free trails must be kept to the minimum standard, which makes the installation of erosion control structures unnecessary.

### E. Additional Specifications

Support facilities for Barrier-free Trails and such as signage, restrooms, benches and parking areas must be constructed to meet accessibility standards.

## TRAIL CONSTRUCTION

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### 8-3.300

### TREAD CONSTRUCTION

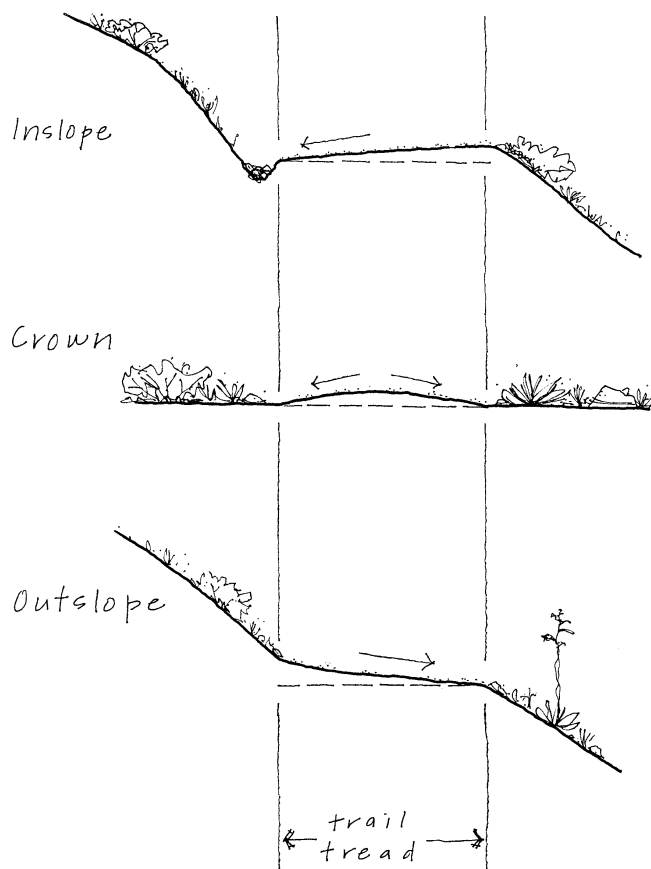
#### 8-3.301

#### A. Surface Materials

Trail surface materials must correspond to the specification for the appropriate trail classification under [Section 8-3.200](#).

#### B. Cross Slope

The cross slope, which is the slope of the tread surface perpendicular to the longitudinal slope, is a critical factor in the design, construction and maintenance of trails. The cross slope allows surface water to drain off the side of the trail rather than along the longitudinal slope. The three primary types of cross slopes are outslope, inslope and crowned. Outsloped and insloped trail surfaces typically occur on trails that traverse the side slope of a hill, and a crowned trail surface is typically found on trails that travel across relatively level ground, see [Figure 8.3-1](#).



**FIGURE 8.3-1 CROSS SLOPES**

### 1. Outslope

Outslope is the most common type of cross slope used on trails that traverse the side slopes of hills, and occurs when the trail surface slopes downward from the uphill to the downhill edge of the trail. Standard outslopes range from 3 to 5 percent, depending on the trail classification.

### 2. Inslope

Inslope is the most infrequent variety of cross slope used on trails that traverse the side slopes of hills, and occurs when the trail surface slopes downward from the downhill to the uphill edge of the trail. Insloped trails are discouraged and only recommended when used as a component of switchback turns. Inslopes must be used in conjunction with rock-lined swales that collect the water and channel it away from the trail. The improper use of an insloped trail surface will cause extreme erosion to the trail surface and the surrounding environment; therefore, should not be built without consulting the city Trails Coordinator.

### 3. Crowned

A crowned surface is most commonly used on trails that traverse relatively level ground. A crowned trail surface slopes downward from the centerline to each outside edge for the purpose of preventing surface water from pooling on the trail surface. The slopes from the centerline to each edge should be 5 percent.

### C. Backslope

The backslope is the area from which material is excavated on the uphill side of the trail tread. Backslopes range from steep to gentle depending on the side slope of the hill and the characteristics of the soil. As a general rule, the backslope cannot be steeper than the soil's

ability to remain in place under typical climatic conditions. Riprap on moderate backslopes and retaining walls on steeper backslopes may be needed to stabilize the backslope in areas with steep side slopes or unstable soils. The use of retaining walls to support the backslope will require excavating less material. See below Figure 8.3-2.

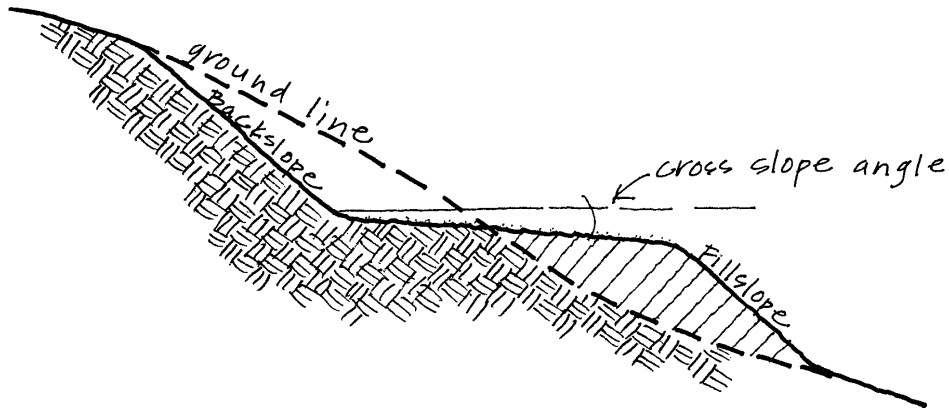


FIGURE 8.3-2 TYPICAL TRAIL PROFILE

#### D. Fillslope

Adding material to build up and support the downhill edge of the trail tread creates the fillslope. The material removed as part of the backslope or from nearby borrow pits is often used in the fillslope. Riprap on moderate fillslopes and retaining walls on steeper fillslopes may be needed to support the fillslope in areas with steep side slopes or loose soils. The fillslope should be revegetated following construction to regain its natural appearance and to reduce the potential for erosion, see above Figure 8.3-2.

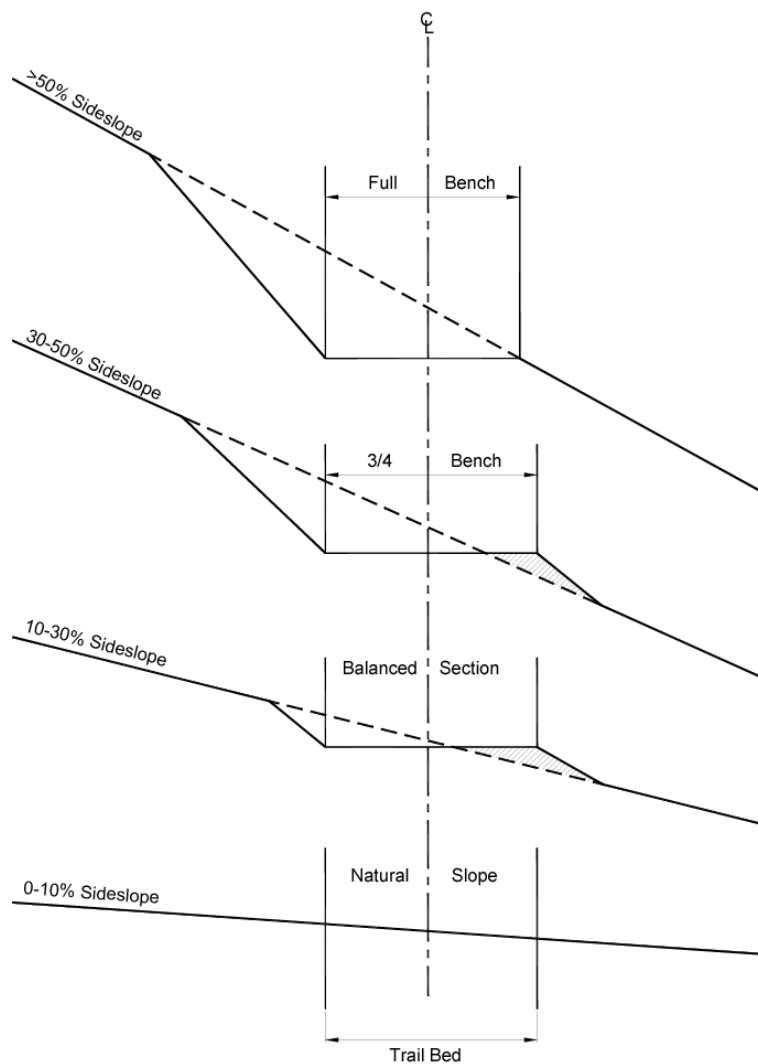
#### E. Typical Trail Cross-sections

See [Figure 8.3-3](#) for examples of trail construction for various side slopes.

##### 1. Full Bench

Full bench construction involves the greatest amount of soil removal, but provides the most stable trail surface. In this type of construction, soil is removed from the backslope and cast down the hill. The excavated material is not used as fill to support the trail tread. Instead, the entire trail tread is supported by solid mineral soil. Full bench construction is best suited for trails on steep side slopes greater than 50 percent because fill will erode easily.





**FIGURE 8.3-3 TYPICAL TRAIL CROSS SECTIONS**

## 2. 3/4 Bench

This type of trail construction should be used on side slopes of 30 to 50 percent. The soil excavated from the backslope should be used for the fillslope. The fillslope should represent the downhill  $\frac{1}{4}$  of the trail width. The fillslope should be revegetated to restore its natural condition and reduce the potential for erosion.

## 3. Balanced Section

Balanced section trail construction should be utilized on side slopes of 10 to 30 percent. The soil excavated from the backslope should be used for the fillslope. The fillslope should represent the downhill  $\frac{1}{2}$  of the trail width. The fillslope should be revegetated to restore its natural condition and reduce the potential for erosion.

## 4. Natural Slope

Natural slope construction is used when side slopes are less than 10 percent; it involves no cutting or filling, resulting in no backslope or fillslope.



## 8-3.302

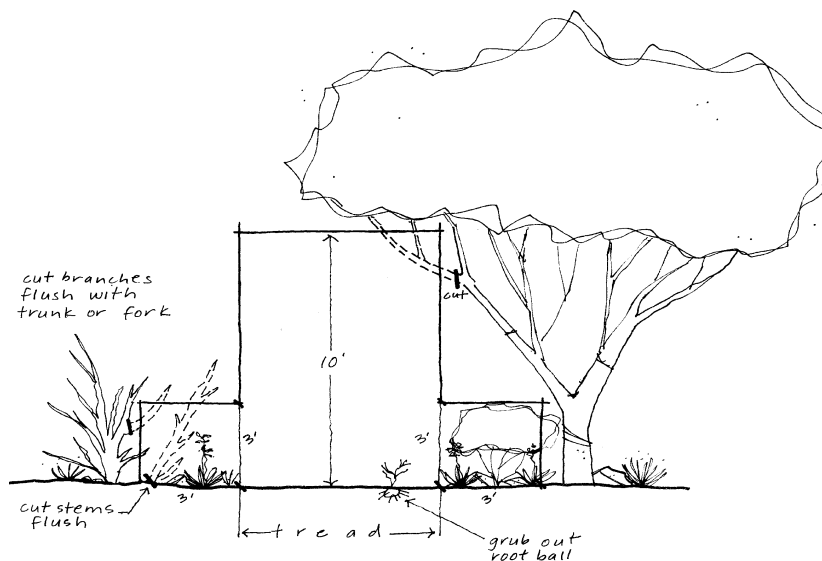
**VEGETATION CLEARANCE**

Vegetation clearance is the removal of vegetation within specified clearing limits, see [Section 8-3.200](#) for specifications for each trail classification. The primary goal is to provide the specified clearance while maintaining the maximum amount of vegetation and the natural characteristics of the area. Trails shall be aligned to prevent disturbance to plants identified in the Native Plant Ordinance, see [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant). The trail should be aligned to avoid large-scale removal of native plants not covered by the Native Plant Ordinance.

When branches must be removed, pruning shall comply with ANSI Standard #A300, otherwise known as the 3-cut pruning method:

- One partial cut from the underside of the branch 6 to 8 inches from the trunk,
- A second cut from the top of the branch above the first cut to remove the branch, and
- The third cut to remove the stub.

Be sure not to cut into the branch collar, as this will damage the tree and slow the healing process. Chemical sealants should not be applied to native trees. Cholla and prickly pear cacti should be trimmed at the segment joints. Plants that must be completely removed should be cut as close as possible to the ground surface and dispersed in areas not clearly visible from the trail, or completely removed from the site. See below. Figure 8.3-4



**FIGURE 8.3-4 VEGETATION CLEARANCE**

**SURFACE WATER CONTROL**

## 8-3.303

The proper control of surface water is a crucial element in trail design, construction and maintenance. Improper control will most likely have a negative effect on the surrounding environment and will result in damage to the trail that can be very expensive to repair. The need for surface water control structures depends on many different factors including, but not limited to soil type, longitudinal and cross slopes and existing drainage patterns. The most effective time to address surface water control issues is during initial trail design and construction.

### A. Grade Dips

Grade dips are short segments of trail with a grade opposite to the prevailing longitudinal grade of the trail. They are most effective when installed during new trail construction and sited to take advantage of natural drainage patterns. The low point of the dip must be outsloped at the maximum percentage permitted for the given trail classification to assure that water will flow off and away from the trail. A rock apron may need to be constructed where the water flows out of the dip to prevent excessive erosion. Grade dips are generally more effective than waterbars, require less maintenance, and are more suitable for equestrians and mountain bicyclists. See below Figure 8.3-5.

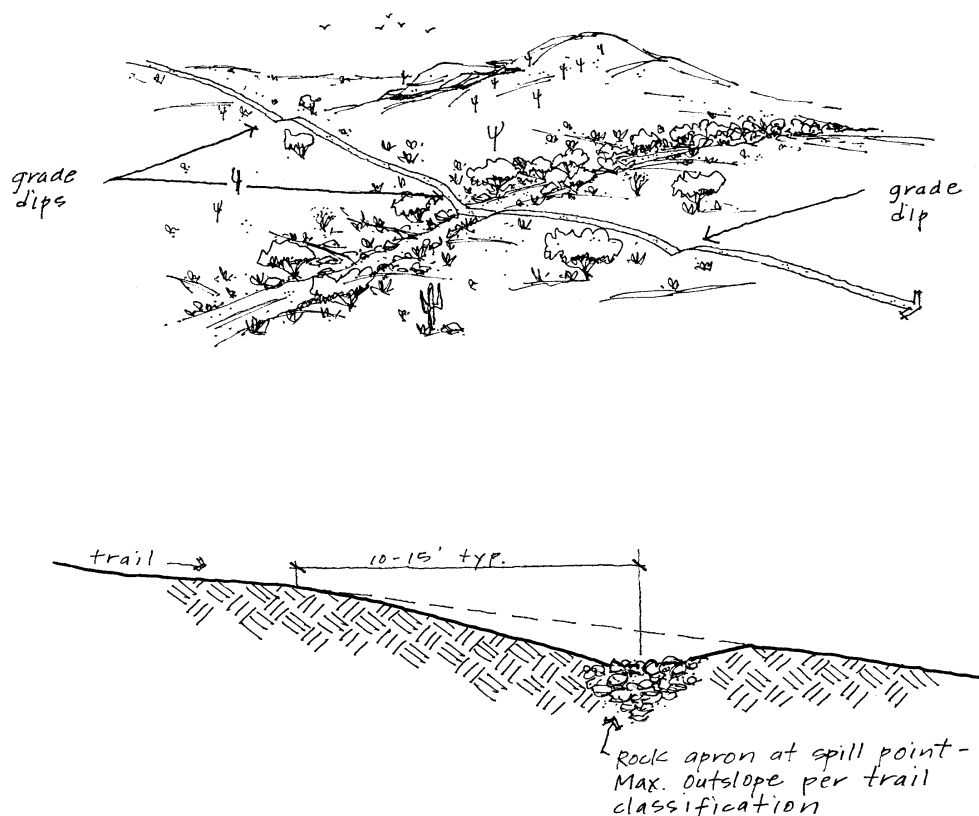


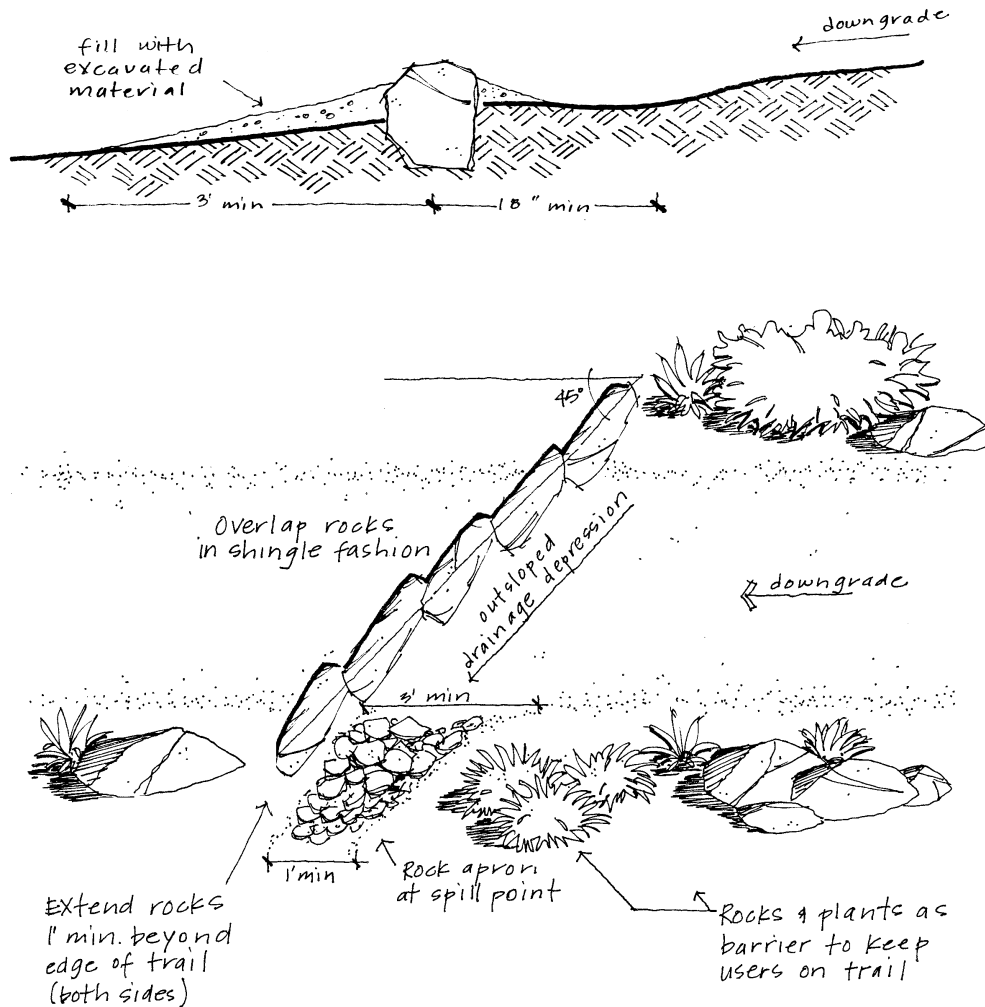
FIGURE 8.3-5 GRADE DIPS

### B. Waterbars

Waterbars are native rocks or logs embedded in the trail surface at a 45-degree angle to the longitudinal slope for the purpose of directing surface water off the trail. Waterbars should extend at least 1 foot beyond each edge of the trail tread to ensure that water is diverted completely. Use fill material to build up the downhill side of the waterbar. Construct a drain ditch leading off the edge of the trail to ensure that runoff flows away from the trail. The drain should be at least 1 foot wide and 8 inches deep. Rocks should be placed in the bottom of the drain ditch to lessen the amount of erosion. Place additional rocks, logs, brush, or other debris in locations that will prevent trail users from detouring around the waterbar. Waterbars are not the preferred drainage structures on trails with large amounts of equestrian and mountain bicycle use. Grade dips are more appropriate in such situations.

**1. Rock Waterbar**

This type of waterbar is constructed by embedding large rectangular shaped rocks into the trail tread at a 45-degree angle to a depth roughly half their height. Rocks must be large enough not to be knocked out by trail users and to effectively channel water off the trail. Rocks must be arranged in a shingle fashion, tightly overlapping each other towards the downhill side. Compact small rocks and fill around the base to ensure solid placement. See below Figure 8.3-6.



**FIGURE 8.3-6 ROCK WATERBAR**

**2. Log Waterbar**

A log waterbar is constructed by embedding solid, bark-free, rot-resistant timber into the trail surface at a 45-degree angle. Creosote-treated railroad ties or telephone poles are not acceptable for use as waterbars. Logs must have a minimum of an 8 inch diameter and be embedded halfway into the trail surface. Log waterbars must be secured with two 18 inch-

long, ½ inch-diameter pieces of rebar. Drill a 7/16 inch hole through the log, 8 inches from each end. Place the log in the desired location and drive the rebar through the holes into the trail surface until flush with the log surface. The Trails Planner must approve the use of log waterbars, see below Figure 8.3-7.

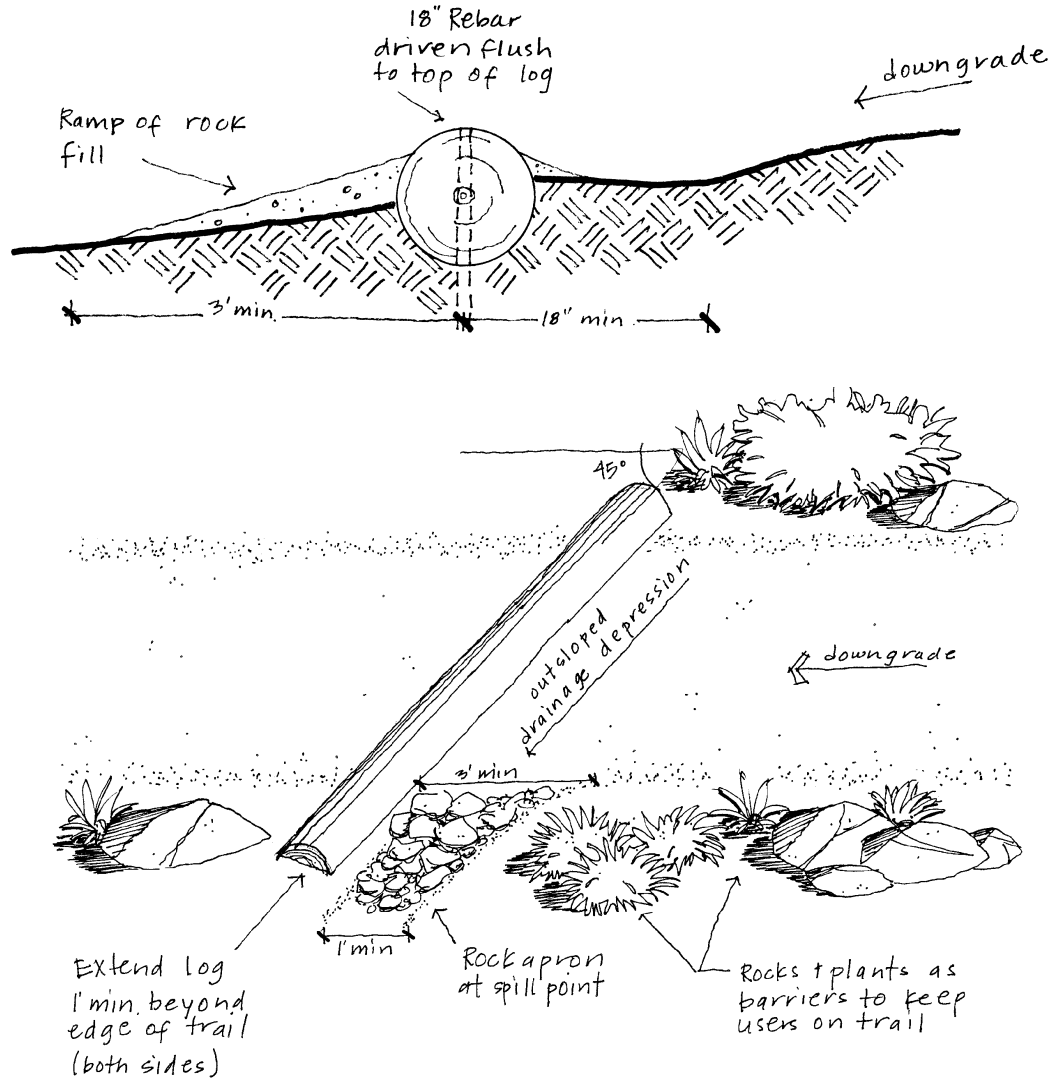


FIGURE 8.3-7 LOG WATERBAR

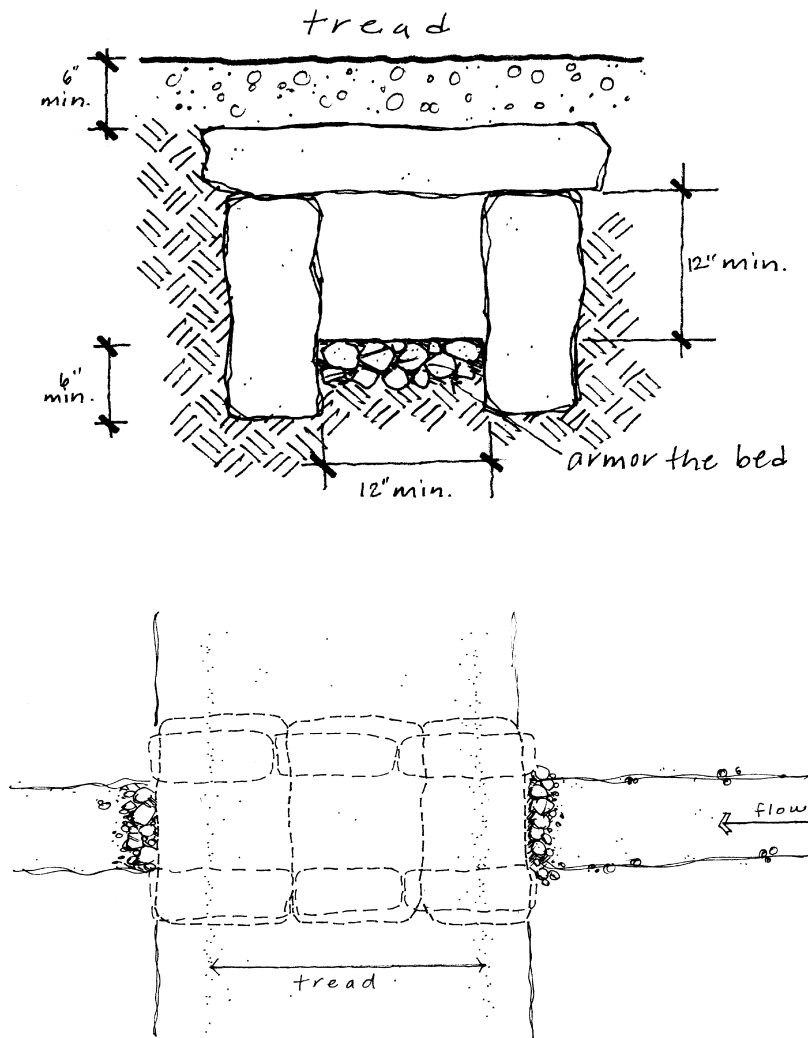
**C. Culverts**

In desert environments, most watercourses flow only seasonally, therefore culverts are usually not necessary. Culverts tend to be maintenance intensive and can detract from the aesthetics of the natural environment. Culverts should only be constructed where a gentle grade must be maintained such as with a Barrier-free Trail or where there is permanently flowing water. In all other situations, a wash crossing should be used, see [Section 8-3.304](#). Rock or pipe culverts must match the downstream gradient and have a diameter of at least 12 inches to accommodate necessary cleaning. Improperly constructed culverts will clog with debris

causing water to flow over and damage the trail tread. All rock used in the construction of culverts must be native.

**1. Rock Culvert**

The proper construction of rock culverts depends greatly on the proper selection and placement of rocks of sufficient size and shape. The bottom surface of the drainage must be armored with rocks to prevent erosion. Stone headwalls must be placed to armor the outside faces of the crossing. All rocks must be firmly placed similar to the construction of a retaining wall. See below Figure 8.3-8.



**FIGURE 8.3-8 ROCK CULVERT**

**2. Pipe Culvert**

Pipe diameter must be at least 12 inches. Embed the pipe in a stable foundation of gravel and soil, and backfill with compacted gravel and soil. Construct a headwall of firmly placed native stone to protect the outside faces of the tread crossing and cover the pipe so it cannot be viewed from the trail. The trail tread should be at least 6 inches higher than the top of the pipe. See [Figure 8.3-9](#).

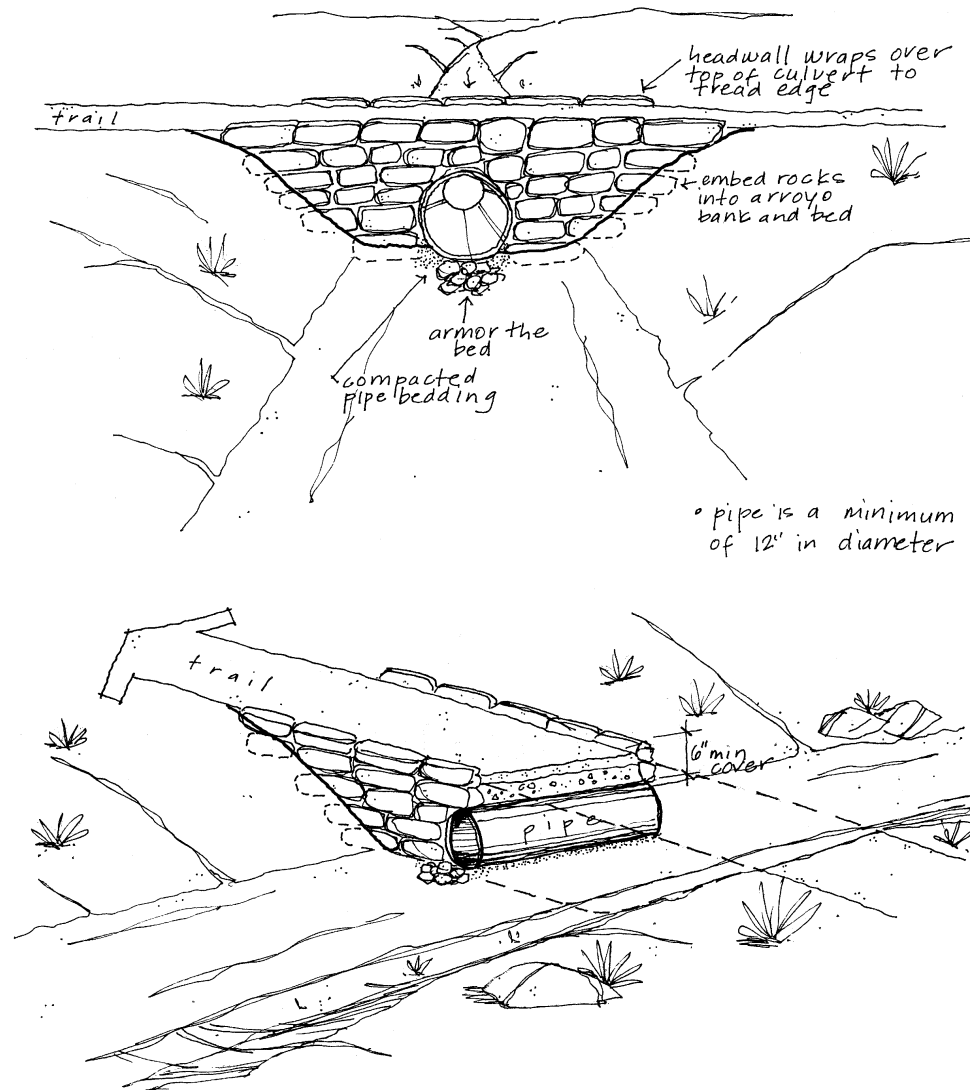


FIGURE 8.3-9 PIPE CULVERT

## 8-3.304

**SPECIAL STRUCTURES****A. Retaining Walls**

Retaining walls are stone structures used to stabilize trails on steep side slopes. A solid foundation is key to the strength and durability of a retaining wall. The foundation should be set in solid earth or rock, with the base sloped inward towards the hillside. Rock used in construction should be derived from the surrounding area. Ideal rocks are durable, weather resistant and free of structural defects. Large rocks should be used in the foundation, smaller rocks in the middle tiers and large rocks again for the upper tiers. Approximately 25 percent of the rocks used in the wall must be header stones.

A header stone is a rock placed with its longest dimension extending into the hillside, perpendicular to the face of the wall. All other rocks should be placed with their longest dimension parallel to the face of the wall. Thickness of the wall should be at least  $\frac{1}{2}$  its height, or 2 feet thick if the height is less than 5 feet. The outer face of the wall should slope inward towards the hillside at a rate of 3 inches per every 12 inches in height. Joints should be

staggered at least 6 inches horizontally. Each rock should contact the rock below in at least three places. Shims must not be used because they are prone to shifting. If cement is used to provide additional stability, it must be colored to match the native rock. Backfill the wall with small stones and cover with soil until the proper tread surface is established. See below Figure 8.3-10.

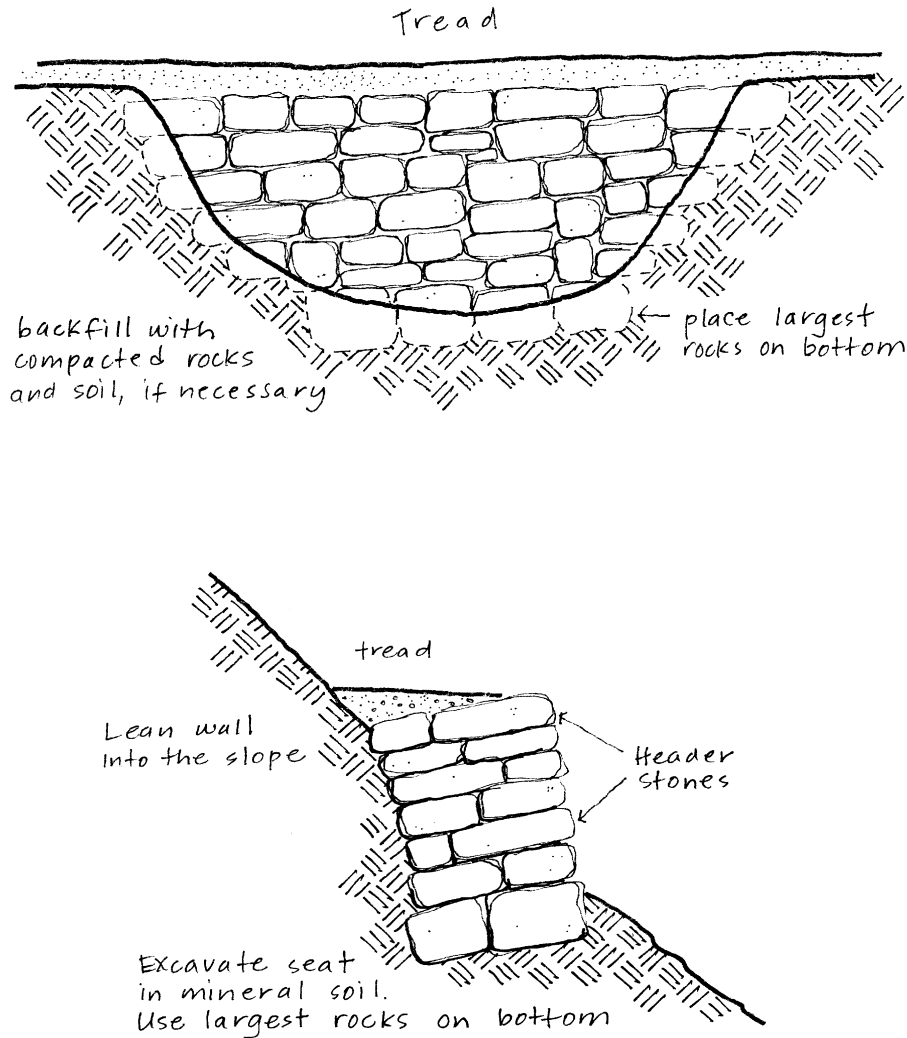


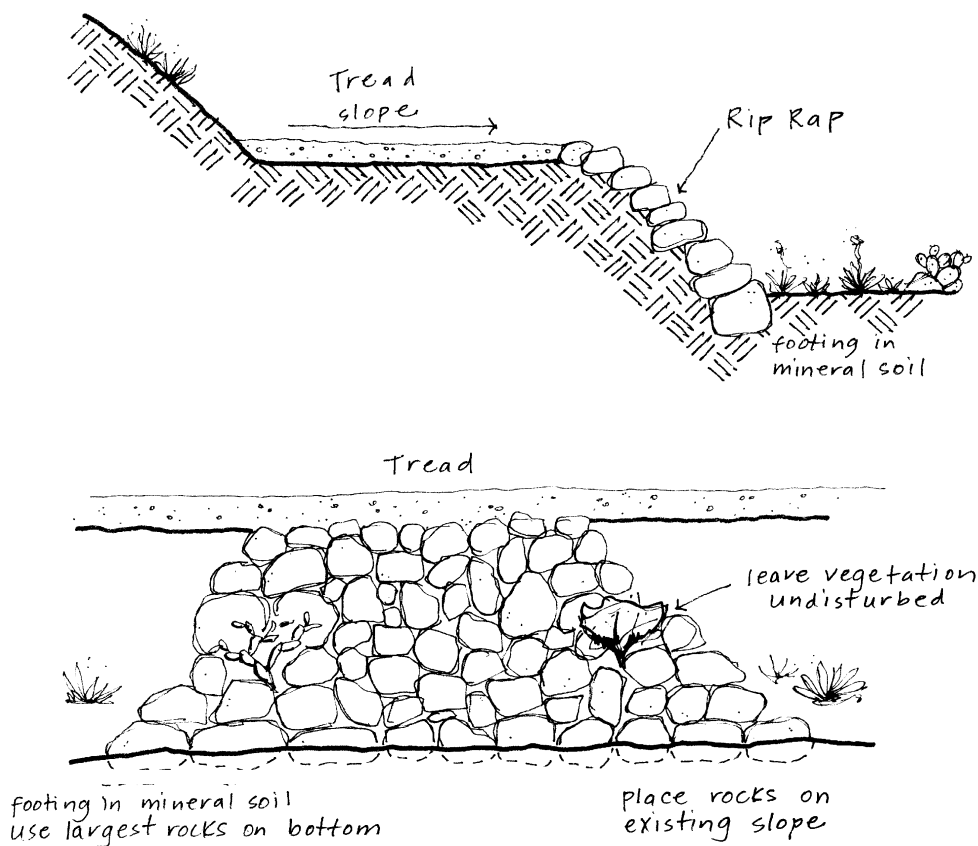
FIGURE 8.3-10 ROCK RETAINING WALLS

**B. Rip-Rap**

Unlike a retaining wall, riprap does not support the weight of the trail tread. Instead, riprap is used to stabilize steep slopes above and below the trail tread (backslope and fillslope, respectively). Begin by clearing a firm foundation at the downhill edge of the riprap. Set the largest rocks in the foundation. Place smaller rocks on the surface of the slope continuing up the slope to the desired location. Be sure that the riprap does not impede the flow of surface water off the trail tread. Riprap can also be used to protect drainage and leadoff ditches from



heavy erosion and to stabilize switchback turns. Riprap should be constructed of native rock. If cement is used to provide additional stability, it must be colored to match the native rock. See below Figure 8.3-11.



**FIGURE 8.3-11 RIP RAP**

### C. Wash Crossings

When trails cross washes, the greatest concern is protecting the trail from flowing water. The trail segments approaching the crossing and the location where the trail meets each edge of the wash must be stabilized with securely placed rocks. Trail segments approaching the wash should range from 5 to 15 percent for all trail classifications and cross at a 90 degree angle to the wash to prevent water from leaving the primary channel and flowing along the trail surface. The slopes adjacent to the trail may need to be stabilized with riprap. A row of large rocks should be embedded along the wash banks at the point of contact with the trail. Be sure that the flowing water will not undercut these rocks. See [Figure 8.3-12](#).



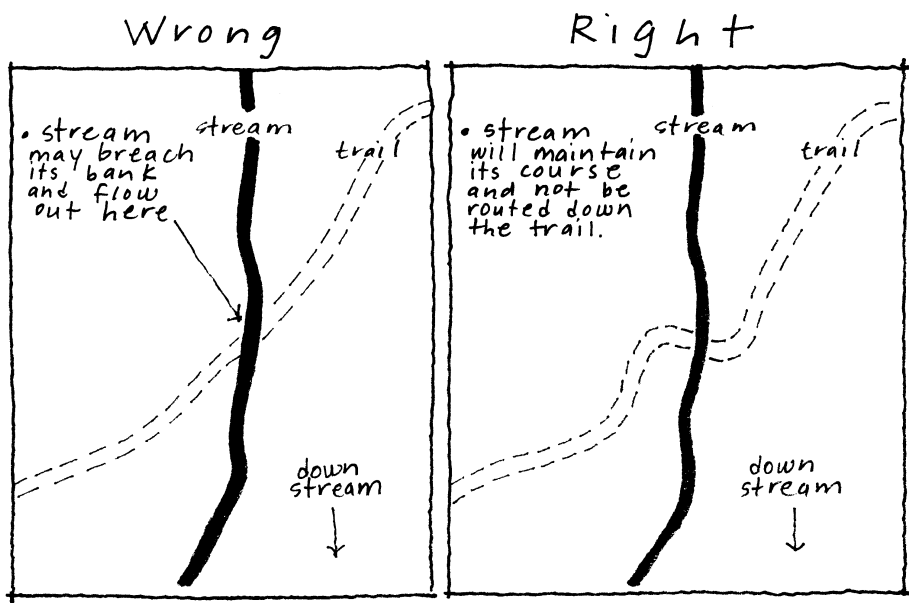
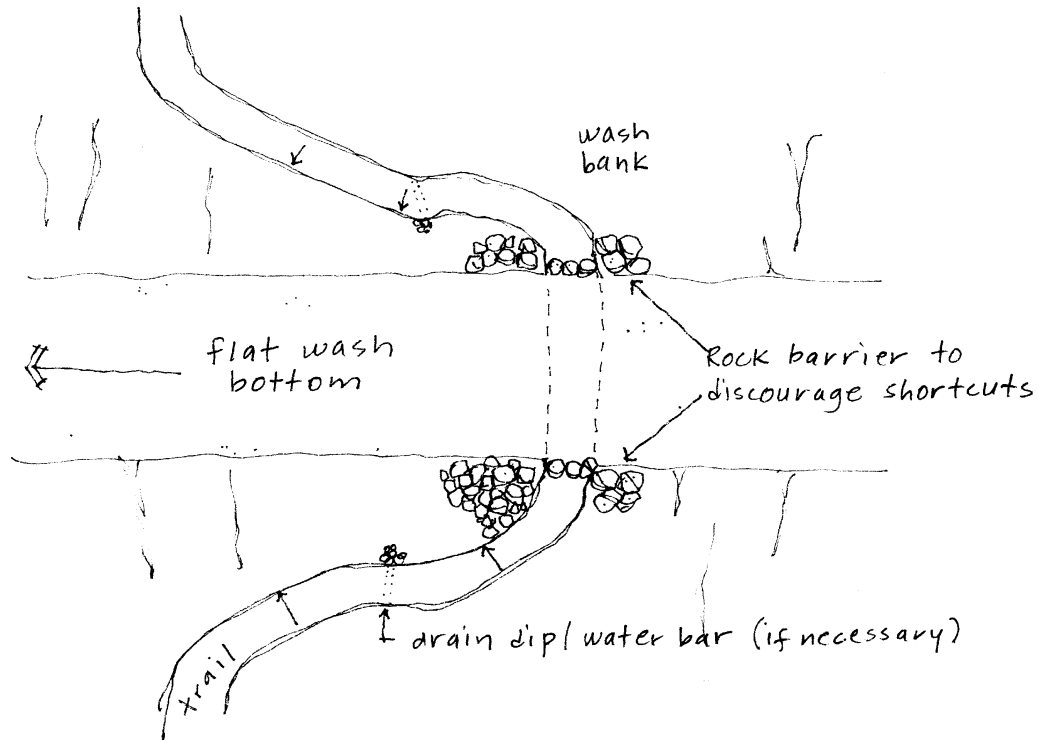


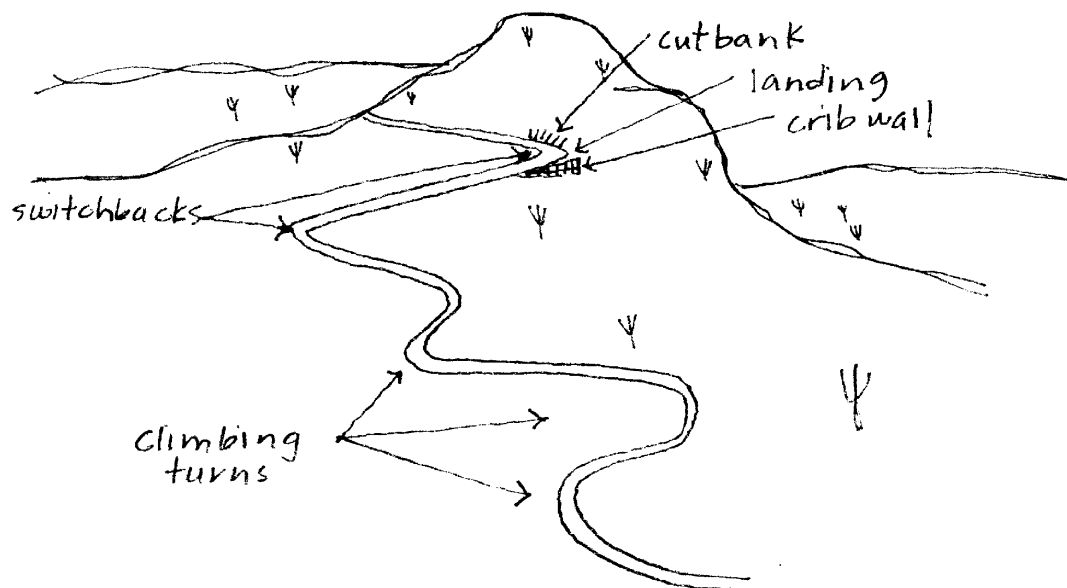
FIGURE 8.3-12 WASH CROSSING

**D. Switchback and Climbing Turns**

These two trail design elements are both used to change the direction of travel on a hillside and to gain elevation in a short distance. The difference between the is that climbing turns maintain a consistent longitudinal slope through the turn, while switchbacks have a near level

landing at the turning point. These structures can be very difficult to construct, therefore careful planning should be conducted to avoid using them. The city Trails Coordinator should be consulted in situations where switchbacks may be necessary.

Avoid “stacking” a set of many short switchbacks and/or climbing turns on a hillside. Longer trail segments between switchbacks and/or climbing turns are less visible and reduce short cutting by trail users. Understanding the psychology of the trail user is important in the design of these structures. The layout must convince users that the established trail is the easiest, most convenient route to ascend the slope. If users feel it is not, they will create short cuts, see below Figure 8.3-13.



**FIGURE 8.3-13 SWITCHBACK AND CLIMBING TURN CONCEPTS**

### 1. Switchback Turn

Switchback turns are typically used on side slopes of 20 to 45 percent, but can be used on slopes up to 55 percent with the use of retaining walls. These structures are extremely difficult and expensive to construct. Trail routes should be planned carefully to avoid areas of steep, impassible terrain that would require switchbacks.

The key to a good switchback is proper placement on the terrain. Naturally occurring level areas or platforms are prime locations. Survey the hillside that the trail must ascend, locate the natural platforms and then connect the trail to these points. Trail segments leading to and away from the switchback must maintain the maximum longitudinal slope permitted for that trail classification. Locating switchbacks in areas where there are obstructions such as rock outcroppings or trees that will prevent short cutting is also desirable. Obstructions such as rocks, logs, or other debris may also be strategically placed to keep users from leaving the trail.

Switchbacks consist of 2 approaches, a landing or turn platform, a drain for the upper approach and platform and guide structures. The upper approach and the upper half of the turn platform are excavated from the hillside. The lower approach and the lower half of the turn platform are constructed on fill. The construction of switchbacks on a full bench can be very labor intensive and expensive. The last 65 feet of each approach before reaching the turn platform should be as steep as the trail classification will allow. The last 10 feet of the

approaches should be smoothly transitioned into the grade of the turn platform. A flat grade approaching the turn platform must be avoided because it will cause trail users to short cut the switchback, see Figure 8.3-14 below.

As the upper approach descends toward the turn, a drain dip should be installed. Below this point, the tread and the upper half of the turn platform must be insloped towards a drain ditch. The ditch must be 1 foot deep and 1 foot wide and have a rock apron at the spill point.

The turn platform must not exceed a slope of 5 percent. The upper side is excavated from the hillside. The removed soil is then used to fill in the lower portion. Riprap or retaining walls may be required to provide stability to the backslope and fillslope. The turning radius must be no less than 8 feet to provide adequate turning area for equestrians and mountain bicyclists.

The lower portion of the turn platform and the lower approach should be outsloped. Riprap or a retaining wall may be needed along the inner portion of the switchback to maintain the backslope of the lower approach.

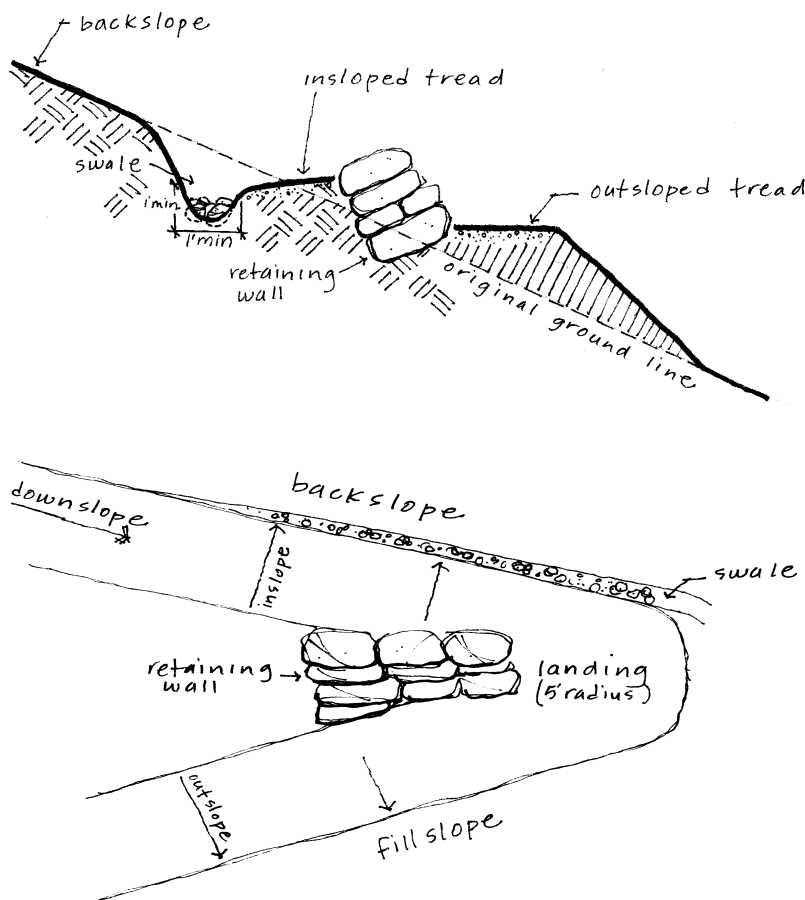
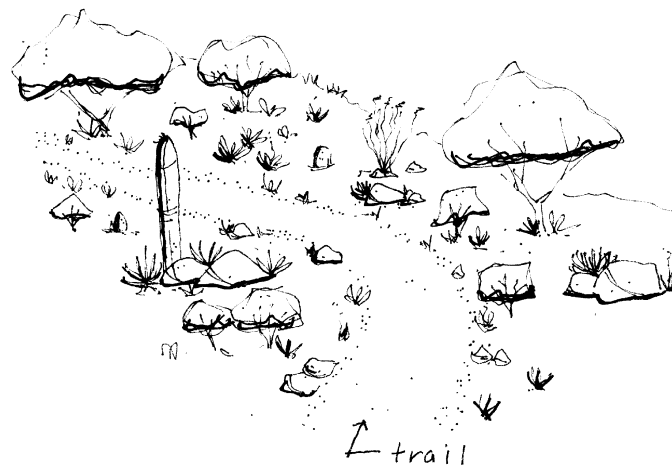


FIGURE 8.3-14 SWITCHBACK TURN

**2. Climbing Turns**

Climbing turns are similar to switchbacks because they are also used to reverse the direction of travel and gain elevation. Climbing turns differ however because they maintain a uniform longitudinal slope through the turn. There is no level turning platform. A climbing turn is built on the same slope as the hillside. Where the slope of the hillside turns, the climbing turn ascends at the same rate. Climbing turns must not be constructed on side slopes greater than 20 percent because they are prone to erosion. Climbing turns in appropriate terrain require very

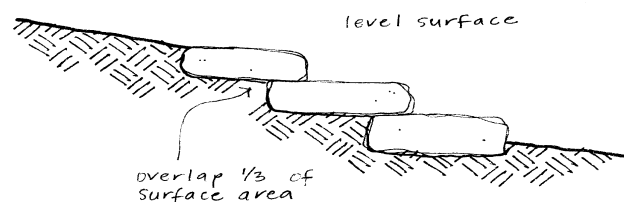
little work to construct. The approaches to the turn should be full bench construction. As the trail approaches the turn, the amount of excavation decreases. The turn itself requires no excavation other than the removal of the surface layer of leaf litter. See Figure 8.3-15 below.



**FIGURE 8.3-15 CLIMBING TURN**

### E. Steps

The use of steps should be avoided due to unsuitability for equestrians and mountain bicyclists and excessive maintenance requirements. Steps should only be used on hiker-only trails when elevation must be gained rapidly over a short distance and there is no other option. Steps must not be used on trails intended for use by equestrians or mountain bicyclists. Steps should be constructed of rock collected from the surrounding area. Rocks should be rectangular in shape, large enough to maintain their position (50 to 100 pounds each), and wide enough to span the width of the trail. Choose a location that will prevent trail users from traveling around the steps. Construction should begin with the lower steps and continue up the slope. Each step must be placed in an excavated seat and backfilled with small rocks and soil to assure stability. See Figure 8.3-16 below.



**FIGURE 8.3-16 ROCK STEPS**

### F. Trail Safety Barriers

Trail Safety Barriers must comply with COS Standard Detail No. 2682 available online at [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

#### 1. Location

The location of safety barriers should not restrict sight distances for roadway traffic or trail users. See [Figure 5.3-46](#) for roadway sight distance requirements. Special attention to the design and construction of barriers is particularly important near intersections. Safety barriers

must be installed between a trail and a roadway if the trail is located within an unsafe distance to the roadway, or if the trail shares an underpass or overpass with a roadway. Safety barriers must also be installed if the trail is elevated above an adjacent roadway and the side slope is greater than 6:1, or where trails are in close proximity to other steep drop-offs. All safety barriers must be at least 3 feet from the edge of the trail.

## **2. Design Criteria**

Appropriate safety barriers include fences, railings, or suitably thick vegetation. Other types of materials may be suitable subsequent to approval of the city Trails Coordinator. The materials and character of the barrier must be compatible with adjacent development, landscaping and topography. The minimum height should be 4 feet for structural barriers and 5 feet for vegetation barriers.

## **3. Trail Access Gates**

Trail Access Gates must comply with COS Standard Detail No's. 2680-1 and 2680-2, available online at [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

These gates are designed to restrict motorized access to trails except as permitted for maintenance and emergency purposes. The gate design must permit equestrian passage without requiring the rider to dismount. These gates should be located at trailheads, where trails cross major roads, and at other points where motorized vehicles are likely to attempt to access a trail.

# **ROAD CROSSINGS**

**8-3.305**

## **A. Overpasses**

An overpass is a structure spanning a roadway, canal and wash, etc. that functions exclusively as a crossing for a shared-use trail. There are many different varieties of overpasses that may be acceptable. The city Trails Planner must be involved in the planning and design process, and must approve all overpasses prior to construction. In general, minimum clearance is 10 feet both horizontally and vertically.

## **B. Bridges**

A bridge is a structure spanning a roadway, canal, wash, or other obstacle that serves as a crossing for a roadway as well as a shared-use trail. The city Trails Planner must be involved in the planning and design process, and must approve all bridge crossings prior to construction. The minimum width of a trail crossing a bridge is 8 feet and the minimum vertical clearance is 10 feet.

## **C. Underpasses**

These structures, used to provide passage for trail users under roadways, are typically constructed of pre-cast concrete box culverts. Other varieties of culverts are acceptable provided they meet the required dimensions and allow footing that is appropriate for all types of trail users. The width of a trail traveling through an underpass should not be less than 10 feet. Vertical clearance is an important concern, particularly for equestrian trail users. The minimum vertical clearance is 10 feet. Natural or vandal-resistant electric lighting should be installed for underpasses greater than 50 feet in length. Lighting shall achieve an average of 2-foot candles. Sight distances approaching and exiting the underpass must be adequate, so as not to create a safety hazard. Underpass design should not allow for the accumulation of nuisance water on the trail. If water does not drain from the underpass by gravity flow, a pump system must be provided to remove the water. The surface of the underpass should be slip resistant, such as broom finished concrete.

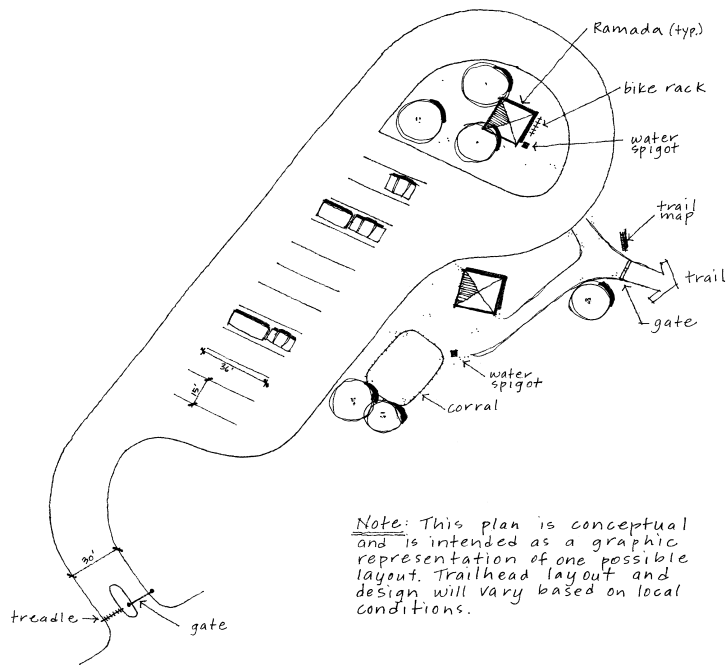
D. At-Grade Crossings

An at-grade crossing occurs where a trail passes across the surface of a roadway. Safety of trail users is the primary concern when planning at-grade trail crossings. Ideal locations for such crossings are at roadway intersections with light amounts of traffic that have existing stop signs, traffic lights, or designated pedestrian crossings. Crossings should be on level grades where both trail users and motorists have long sight distances. Sight distances vary depending on the roadway classification, see Figure 5.3-26 for more details. Additional safety precautions include installing pedestrian activated traffic signals, signs warning motorists of the trail crossing and signs warning the trail users of the road crossing.

8-3.400

TRAIL ACCESS FACILITIES

The design criteria for trail access facilities addressed in this manual are conceptual. The planning, design and construction of such facilities will be conducted on a case-by-case basis and will require various levels of city review and approval beyond the scope of this manual. Potential trailhead amenities include, but are not limited to, pull-through horse trailer parking spaces; regular vehicle parking spaces; potable drinking water; water troughs for horses; hitching posts or corrals; year-round natural shade areas; bike racks; informational, interpretive and directional signage; entrance gates; restrooms; shade ramadas; and picnic tables. See Figure 8.3-17 below.



Major Trailhead - Conceptual Plan

FIGURE 8.3-17 TRAIL ACCESS FACILITY CONCEPT

## 8-3.500

## 8-3.501

## 8-3.502

## TRAIL SIGNS AND MARKERS

### SIGN LOCATIONS

The proper location of signage is important in maintaining the safety of trail users, preserving the natural environment and promoting the presence of the trail. The number and location of signs should be carefully considered, as a lack of signage or poorly located signs can create hazardous situations for trail users. An overabundance of signs can also detract from the aesthetics of the trail and decrease the quality of the trail users' experience.

Trail signs are typically located at trail intersections, locations where trails cross roadways and any other areas where it may be difficult to follow the route of the trail. Trail signs should be placed 1.5 feet to 3 feet from the edge of the trail.

### SIGN SPECIFICATIONS

This standard applies specifically to trails classified as Urban or Rural. Additional standards may be developed for Backcountry Primary and Secondary trails pending review and approval from the city's Preserve Division, see Figure 8.3-18 below.

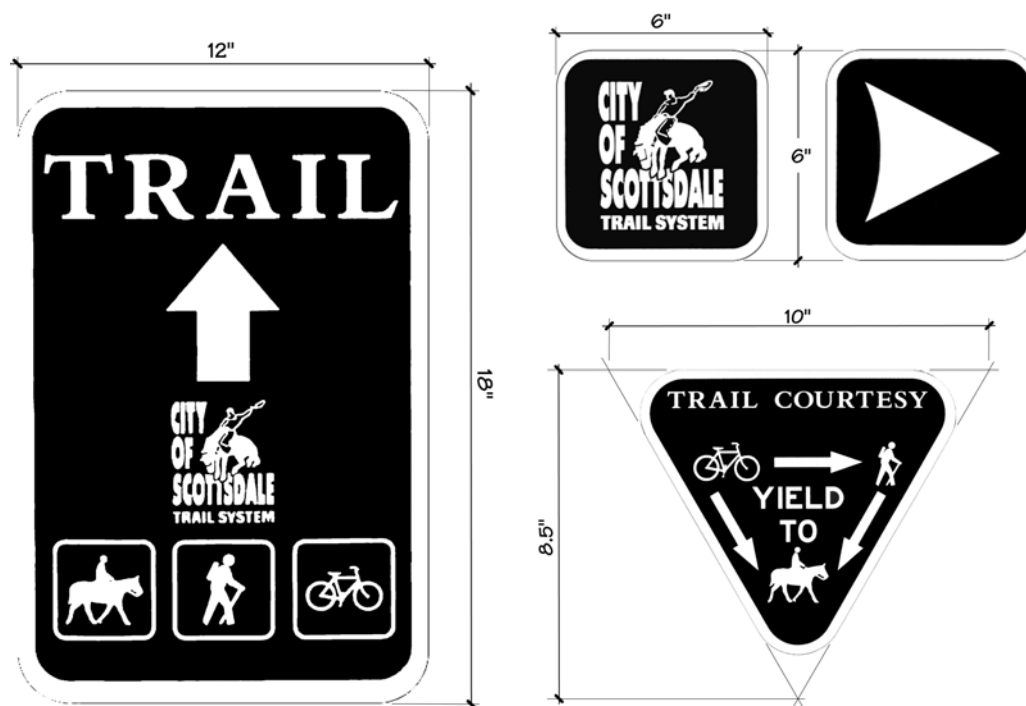


FIGURE 8.3-18 TRAIL SIGNS

#### A. Sign Specifications

##### 1. Blanks

Sign blanks must be 0.080-gauge aluminum. Thicker, 0.125 gauge aluminum should be used for signs prone to vandalism, such as the "No Motorized Vehicle" signs. Blanks must be covered with reflective sheeting of street transportation quality vinyl. There must be 2, pre-drilled, 3/8 inch holes. The holes must be centered horizontally with the center of each hole being 1/2 inch from the top and bottom edges. Corners must be rounded with a 1 inch to 1 1/2 inch radius, depending on the size of the sign.



**2. Lettering**

- Font must be Garamond or similar style.
- Point size should be relative to the size of the sign.

**3. Colors**

Background must be dark brown with reflective white lettering and symbols. There must be a ¼ inch to ½ inch, white reflective border. For regulatory signs such as the “No Motorized Vehicle” sign, there shall be a white reflective background with red lettering.

**4. Sign Mounting Hardware**

- 3/8 inch, vandal resistant, steel drive rivets.

**B. Post Specification**

Posts shall be constructed of 1-¾ inches x 1-¾ inches, 12-gauge, square steel tubing with 7/16 inch, pre-punched knockouts on 1 inch centers. Post lengths must be 6 feet. All steel posts shall be powder coated with color to match natural rust as closely as possible. The trails planner must approve color samples prior to fabrication.

**C. Sleeve and Anchor Specifications**

Sleeves and anchors shall be used in locations where it is possible for a vehicle to come into contact with the signpost, such as adjacent to a street. The use of the sleeve and anchor promote easy breaking-away of the sign post in the event of a collision and increase the ease at which the sign can be replaced.

**1. Anchors**

Anchors shall be 2 inches x 2 inches x 30 inches, 12-gauge galvanized square tubing with 7/16 inch, pre-punched knockouts on 1 inch centers.

**2. Sleeves**

- Sleeves shall be 2-¼ inches x 2-¼ inches x 12 inches, 12-gauge, galvanized square tubing, with
- 7/16 inch, pre-punched knockouts on 1 inch centers.

**3. Anchor Assembly Hardware**

- 3/8 inch, vandal resistant, steel drive rivets.

**4. Telescoping Properties**

The finish post, anchor and sleeve must be straight with a smooth uniform finish to allow each component to telescope with each consecutive larger or smaller piece.

**8-3.503****INSTALLATION**

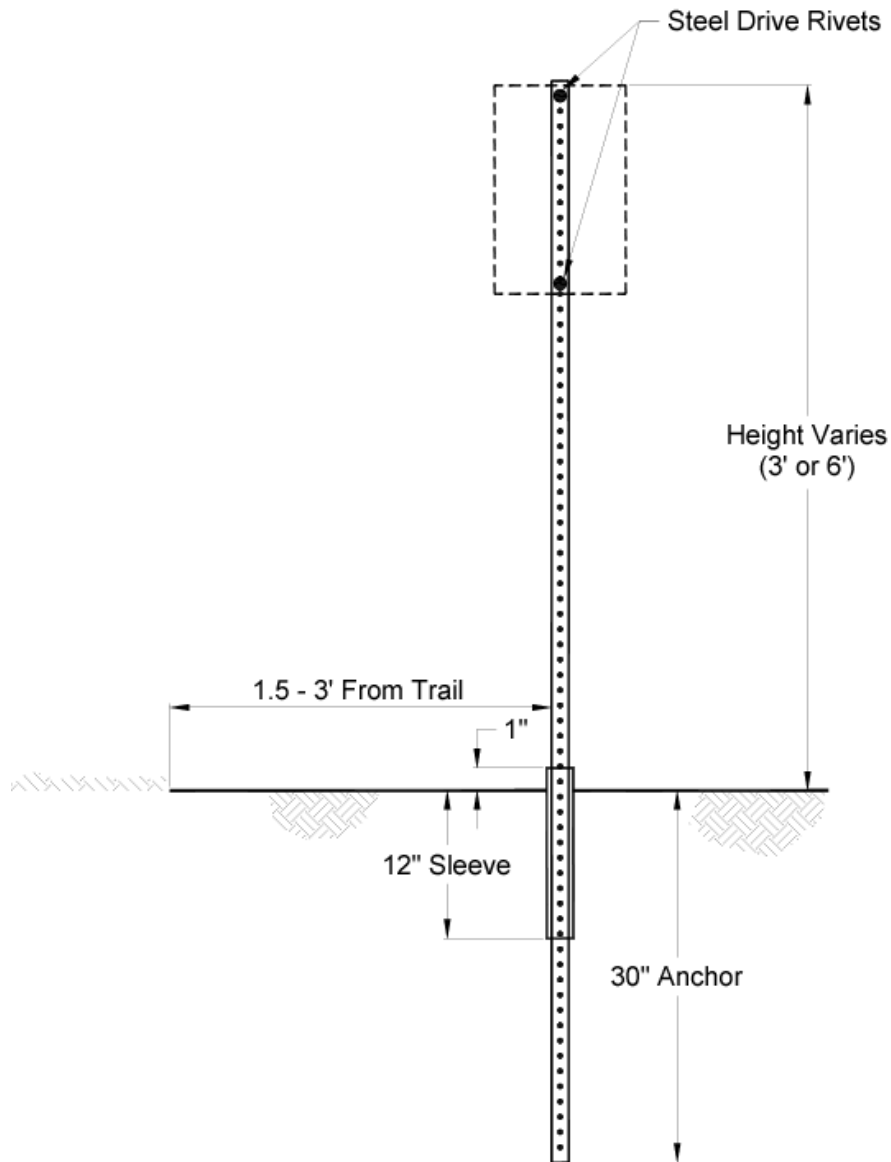
Signposts adjacent to streets are to be installed according to COS Standard Detail No. 2131, available online at [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp), and the Manual of Uniform Traffic Control Devices.

In non-roadside locations the signpost can be mounted directly into concrete. The finished height of the post should be 5.5 feet.

Various combinations of signs can be mounted on a single post to address the management needs of the particular area.

All signs are to be mounted to the posts with 3/8 inch, vandal resistant, steel drive rivets, see [Figure 8.3-19](#).





**FIGURE 8.3-19 TRAIL SIGN INSTALLATION**

### DEVELOPER-PROVIDED SIGN STANDARD

Developers may provide their own signage consistent in color and theme with the surrounding development. At a minimum, these signs must accommodate the triangular “Trail Courtesy” graphic, the “City of Scottsdale Trail System” logo, and the standard hiker, equestrian and mountain bicycle icons. These required signs may be installed on the same post as developer-provided signs, or the graphics may be incorporated directly into the developer-provided sign. The graphics for the signs may be obtained by contacting the city Trails Planner.

**8-3.504**

## 8-3.600

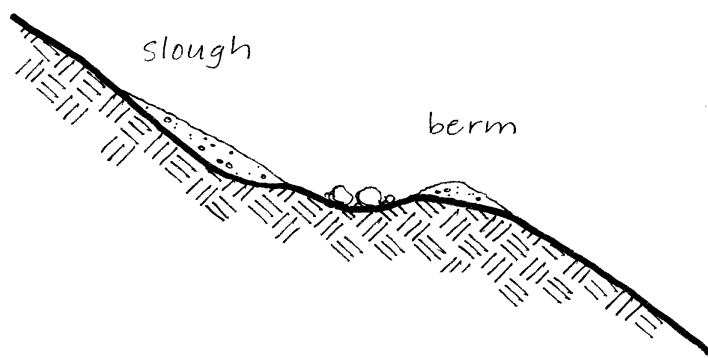
## TRAIL MAINTENANCE

**A. Slough and Berm Removal**

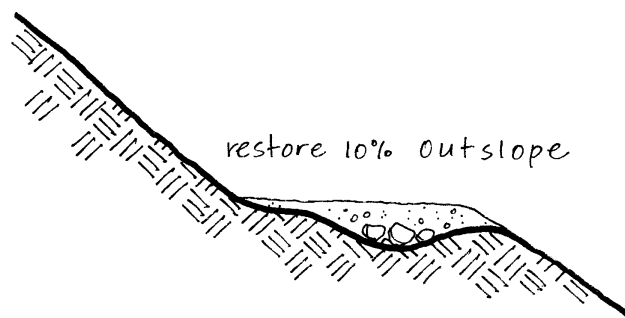
Slough (pronounced “sluff”) is material that has moved downhill from the backslope and been deposited along the uphill edge of the tread. This process causes trail users to travel along the outside edge of the trail. The tread eventually narrows and moves downhill from its original location resulting in an unsafe situation. The slough must be removed to reestablish the proper backslope. The excess material may be used to fill holes in the trail tread and re-establish the outslope, or to build up the downhill side of waterbars.

Berm is soil that has built up on the downhill edge of the trail tread. Berm prevents water from flowing off the side of the trail and allows water to channel down the trail causing erosion. A berm may also cause nuisance water to pool on the trail surface resulting in soil saturation. Saturated soil is damaged easily and forces trail users to detour around the area causing the trail to widen. Berms should never be constructed intentionally and should be eliminated whenever present. See Figure 8.3-20 below.

Before Reconstruction



After Reconstruction



**FIGURE 8.3-20 SLOUGH AND BERM REMOVAL**

## **B. Vegetation Clearance Maintenance**

All plants encroaching on the vegetation clearance limits for the particular trail classification must be cut back. Branches should be cut close to the main stem without cutting into the branch collar. Plants being removed must be cut flush with the ground and stumps must be removed to prevent safety hazards. All plants growing within the trail tread must be grubbed-out. Trails within landscaped areas may be sprayed with herbicide. All removed plant material must be scattered in a location not visible from the trail.

## **C. Tread Maintenance**

In addition to slough and berm removal, the remaining trail tread should be restored to its original design condition. All loose rocks, rock points, stumps and roots protruding from the trail surface should be removed. All holes should be filled to create a smooth, obstacle-free trail tread. Maintaining a proper outslope is critical to the long-term condition of the trail.

## **D. Drainage Maintenance**

Special attention should be directed to the maintenance of drainage structures. These structures are extremely important in protecting the trail from erosion. If they are not maintained properly, the trail will be prone to erosion and may become unsafe for public use and require extensive amounts of labor to repair. All repairs to drainage structures must restore them to their original standard construction specifications.

## **E. Special Structure Maintenance**

Structures such as waterbars, culverts, switchbacks, retaining walls, wash crossings, overpasses and bridges, etc. are rather expensive and labor intensive to construct. Proper maintenance will prolong the life of the structures and help prevent safety hazards. Structures should be inspected annually and maintenance performed as needed. All repairs to special structures must restore them to their original standard construction specifications.

## **F. Sign Maintenance**

Sign maintenance includes replacing missing or damaged signs and assuring the accuracy of the information on the signs, as conditions may change over time. All signs that are damaged, weathered, or for any other reason do not serve their intended purpose should be repaired or replaced according to the sign standards described in this manual.





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# **PUBLIC WORKS & FACILITIES**

This chapter provides requirements for preparing improvement and facilities construction plans and information for developing construction bid documents for submittal to Capital Project Management. It also specifies various building standards for city facilities.

## **9-1 INFRASTRUCTURE PLAN REQUIREMENTS**

## **9-2 FACILITIES PLAN REQUIREMENTS**

## **9-3 BUILDING STANDARDS**

## **9-4 CONSTRUCTION BID DOCUMENTS**



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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Section 9-1

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# **INFRASTRUCTURE PLAN REQUIREMENTS**

9-1

This section specifies the submittal and review process and requirements for public infrastructure projects, including guidance for preparing plan, profile and detail sheets.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
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Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# INFRASTRUCTURE PLAN REQUIREMENTS

# 9-1

## GENERAL INFORMATION

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9-1.000

### DESIGN STANDARDS AND GUIDES

9-1.001

#### A. Standard Specifications and Details

The following publications or their current revisions, as adopted by the City of Scottsdale, are to be used in conjunction with the infrastructure design criteria in this manual:

- MAG Uniform Standard Specifications and Details – Maricopa Association of Governments (MAG)
- COS MAG Supplemental Specifications and Details – City of Scottsdale (COS) [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp)
- Standard Specifications for Road and Bridge Construction – Arizona Department of Transportation (ADOT)
- ADOT Standard Drawings
- Other governmental/utility agency specifications and details as specified by city staff

#### B. Design Policies and Guidelines

The city's design policies and guidelines are based on the following:

- Project stipulations from the city's Development Review Board
- A Policy on Geometric Design of Highways and Streets – American Association of State Highway and Transportation Officials (AASHTO)
- Roadside Design Guide – AASHTO
- Manual on Uniform Traffic Control Devices (MUTCD) – FHWA
- Public Improvement Project Guide – Arizona Utility Coordination Committee
- ASTM/AASHTO Standard Specifications
- United States Access Board Revised Draft Guidelines for Accessible Public Rights-of-Way [www.access-board.gov/prowac/draft.htm](http://www.access-board.gov/prowac/draft.htm)
- Other design standards, policies and guides as specified by city staff

## SUBMITTAL REQUIREMENTS

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9-1.100

See [Appendix 9-1A](#) for Capital Projects plan review process. Infrastructure Plan submittals must comply with the following standards:

1. Prepare plans on standard 'ANSI D-size' 22 inch x 34 inch sheets and clearly reproduce them on print paper in a black line format. 24 inch x 36 inch may be used if first approved by Capital Project Management (CPM) staff.
2. The city will furnish, upon request, electronic files in MicroStation or AutoCad base drawings shown in the figures in this section. The consultant shall be responsible for the completion of the drawings as applicable to the project.

3. Place a standard city title block in the lower right-hand corner of each sheet, except the cover sheet. The engineering company's identification should be in the upper right-hand corner of the sheet.
4. The minimum lettering size is 3/16 inch for manually drafted or 1/8 inch for mechanically produced lettering and is legible when reduced 50 percent. Reproductions of drawings must be legible when microfilmed or reduced to 1/2 scale. Adhesive backed appliqué for lettering and/or shading will not be permitted without approval of CPM Plan Review.
5. On all sheets that have maps or plans, North shall be oriented to the top of the sheet or to the right. Show a North arrow and bar scale on each sheet. Project stationing shall increase from left to right on the sheet.
6. Keynote all construction notes. Group construction keynote referencing to a specific symbol (square symbols designate demolition and removals, diamond symbols designate relocations and circular shapes for construction items). Number notes uniquely such that one number represents a specific note that only occurs on the applicable plan sheets. Each construction note should be circumscribed by the appropriate symbol. Upon request, the city will provide a sample format for the consultant to follow.
7. All projects must comply with Section 404 of the Federal Clean Water Act. Before the city may issue development permits for a project, this 404 Certification Form must be completed and submitted with improvement plans to the CPM Design and Plan Review staff, see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms). Consultants are advised to apply to the Corps as early as possible for a Section 404 permit and allow for the necessary processing time to prevent delays in obtaining development permits from the city.
8. All projects must comply with the Scottsdale's Protection of Archaeological Resources Ordinance, see [www.ScottsdaleAZ.gov/historic\\_zoning/arch](http://www.ScottsdaleAZ.gov/historic_zoning/arch). To help identify, preserve and protect archaeological sites, an archaeological survey and report by a qualified archaeologist is required to be submitted for all public and private developments in Scottsdale. A qualified archaeologist is an individual or firm meeting the Arizona State Museum's standards and professional qualifications for an archaeologist. Please contact the Preservation Division 480-312-7013 or the Project Manager or Project Coordinator for more information on archaeology requirements, including which projects may be exempt from requiring the survey and report.
9. All projects submitted for review and/or further processing shall be complete and consist of plans, specifications, structural calculations, geotechnical report, drainage report, native plant information and other documentation as required for that project.
10. The engineer must submit for code review a minimum of 3 full size sets of plans, 2 sets of specifications, 1 set of structural calculations, drainage calculations and Geotechnical report when applicable. In addition, the engineer will provide additional plans, specifications and other documentation as required for internal user group review purposes. All plans and documents are to be submitted to the City of Scottsdale through CPM.
11. The engineer responsible for the design must seal all plans and documents submitted for review and mark them with the following: "For Review Purposes, Not to Be Used for Bidding or Construction". The registrant's signature is required on the plans and documents when the submittal reaches the level of 90 percent or better.
12. Provide an electronic copy of the final drawings and specifications utilizing the MicroStation and Microsoft Word formats, respectively. CAD drawings shall be saved in the version currently in use by the City (v8 as of May '07). At the Project Manager's request, a set of signed and sealed drawings in full-size PDF format on CD shall also be submitted.
13. All re-submittals must include the "Attachment A" or an equivalent form stating what corrective action has been taken on all redline comments, see [Appendix 9-1B](#).

14. After tentative approval of the final review package, the Engineer shall submit a complete set of Mylar originals for City approval and signatures. The drawing set shall have the note "Not for construction or bidding purposes" removed.
15. Any facilities portion of an Infrastructure project must comply with [Section 9-2.000](#).
16. All projects with landscape areas in public rights of ways and medians shall have landscape maintenance/signature block ([Figure 1.2-7](#)) contained on the coversheet and/or landscape plans.

## **PLAN SHEET NUMBERING & SEQUENCING**

## **9-1.200**

Sheets shall be identified by design discipline as designated below and consecutively whole numbered within each discipline. Additionally, final consecutive numbering of the entire set of plans shall be provided on each sheet.

The sheet numbering prefixes shown in Figure 9.1-1 below are commonly used. The consultant shall review the sheet sequencing and/or intended numbering with the city's project manager.

<b>PLAN SHEET NUMBERING &amp; SEQUENCING</b>		
<b>Plan Sheet Prefixes:</b>		
G = General	ITS = Intelligent Transportation System	
P = Paving	I = Irrigation	
SD = Storm Drain	L = Landscape	
SS = Sanitary Sewer	S = Structural	
W = Water	M = Miscellaneous Plans By Others	
TS = Traffic Signalization, Signing, Markings	RW = Rights-of-Way	
<b>Plan Sheets shall be sequenced as follows:</b>		
1	G1	City cover sheet
2	G2	Notes, legend and key map sheet
3	G3	Quantity summary sheet
4	P1...	Paving plans, profiles and details
5	SD1...	Storm drain plans, profiles and details
6	SD__ ...	Profiles for catch basins and connecting pipe
7	SS1...	Sanitary sewer plans, profiles and details
8	W1...	Water line plans, profiles and details
9	TS1...	Traffic signal plans, schedules and details, traffic signing, pavement markings
10	ITS1...	Intelligent Transportation System plans, profiles and details
11	I1...	Irrigation plans, profiles and detail sheets
12	L1...	Landscaping plans, notes, legend, abbreviation and detail sheets
13	S1...	Bridge and structural plans and details
14	M1...	Plan sheets by others: electric, telephone, gas, irrigation, cable television
15	RW1	Rights-of-Way Strip Map

**FIGURE 9.1-1 PLAN SHEET NUMBERING & SEQUENCING**

9-1.300

DETAILED SHEET INFORMATION

9-1.301

COVER SHEET

The city will furnish an electronic drawing file of the cover sheet upon request (see Figure 9.1-2 below). The Engineer shall add the following:

- Project title, CPM project number, bid call number
- Vicinity map with section, township, range and parcel numbers
- Sheet index
- Engineering company identification and engineer's seal
- Other agency approval blocks as applicable
- City benchmarks for project – a minimum 2 required on NAVD 1988 datum
- City assigned plan review, development review and native plant numbers assigned by Project Review when submitted

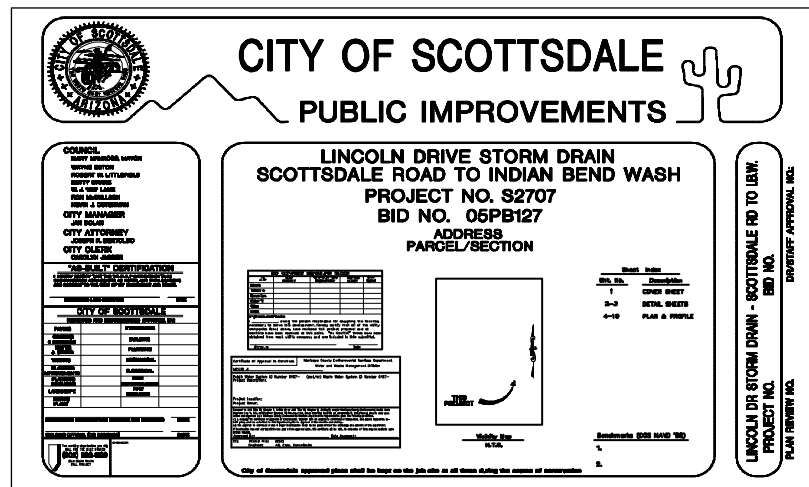


FIGURE 9.1-2 TYPICAL COVER SHEET

9-1.302

NOTES, LEGEND AND KEY MAP SHEETS

- Key Map - Show all intersections, rights-of-way and key to all plans with stations
- Legend of symbols used for existing and design elements
- List of abbreviations used in plan set (other than as shown in the MAG Specifications)
- Include the City of Scottsdale General Construction Notes For Capital Projects, see Figure 9.1-3 below and [Figure 9.1-4](#). Additional notes may be added as needed.

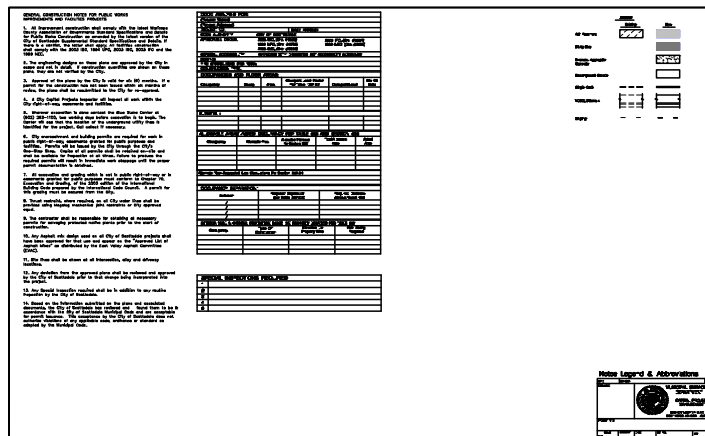


FIGURE 9.1-3 NOTES SHEET

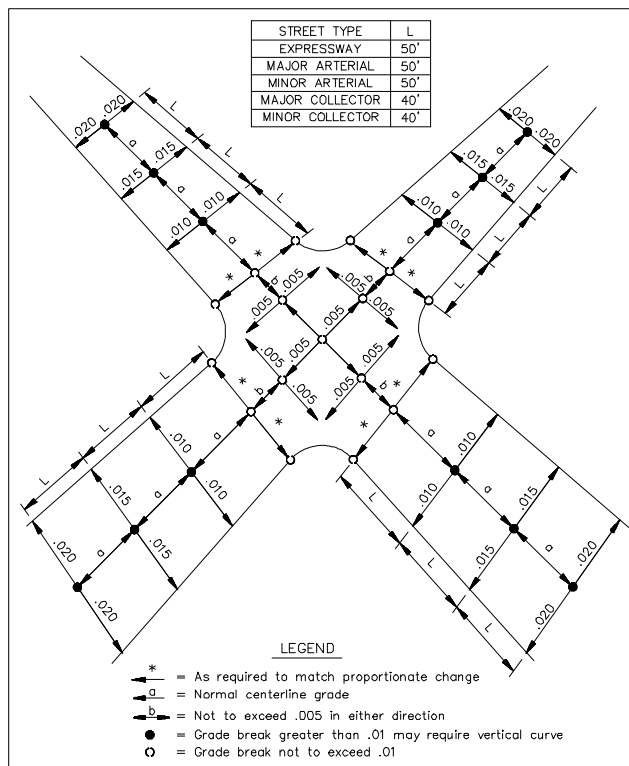
**GENERAL CONSTRUCTION NOTES FOR CAPITAL PROJECTS**

1. All improvement construction shall comply with the latest Maricopa County Association of Governments Standard Specifications and Details for Public Works Construction as amended by the latest version of the City of Scottsdale Supplemental Standard Specifications and Details and City of Scottsdale's Design Standards & Policies Manual (DS&PM). If there is a conflict, the latter shall apply. All facilities construction shall comply with the 2006 IBC, 2006 IPC, 2006 IMC, 2006 IFC and the 2005 NEC.
2. The engineering designs on these plans are approved by the City in scope and not in detail. If construction quantities are shown on these plans, they are not verified by the City.
3. Based on the information submitted on the plans and associated documents, the City has reviewed and found them to be in accordance with the City's Municipal Code and are acceptable for permit issuance. This acceptance by the City does not authorize violations of any applicable code, ordinance or standard as adopted by the Municipal Code.
4. Approval of the plans by the City is valid for six months. If a permit for the construction has not been issued within six months of review, the plans shall be resubmitted to the City for reapproval.
5. Any deviation from the approved plans shall be reviewed and approved by the City prior to that change being incorporated into the project.
6. A City Capital Projects Inspector will inspect all work within the City rights-of-way, easements and facilities.
7. Any Special Inspection required shall be in addition to any routine inspection by the City.
8. City encroachment and building permits are required for work in public rights-of-way, easements granted for public purposes and facilities. Permits will be issued by the City through the City's One Stop Shop. Copies of all permits shall be retained on-site and shall be available for inspection at all times. Failure to produce the required permits will result in immediate work stoppage until the proper permit documentation is obtained.
9. The contractor shall be responsible for obtaining all necessary permits for salvaging protected native plants prior to the start of construction.
10. Wherever excavation is done contact the Blue Stake Center at (602) 263-1100 two working days before excavation is to begin. The Center will see that the location of the underground utility lines is identified for the project.
11. All excavation and grading which is not in public rights-of-way or in easements granted for public purposes must conform to Section 1803 and Appendix J of the 2006 edition of the International Building Code prepared by the International Code Council. A permit for this grading must be secured from the City.
12. Thrust restraint, where required, on all City water lines shall be provided using Megalug mechanical joint restraints or City-approved equal.
13. Any asphalt mix design used on City projects shall have been approved for that use per Section 5-10 the City's DS&PM and appear on the "Approved List of Asphalt Mixes" as distributed by the East Valley Asphalt Committee (EVAC).
14. The Contractor shall be responsible to remove and replace, at no additional cost to the City, any and all pavement, sidewalk, curb and gutter, drainage structures, etc. outside the pay limit that are damaged due to their activities on the project. This includes, but is not limited to, the removal and replacement of newly cracked roadway infrastructure, the removal and replacement of existing cracked roadway infrastructure where the cracks have been enlarged due to the Contractor's operations, the removal and replacement of deformed roadway infrastructure. All sawcuts used for the removal of these items shall be perpendicular and parallel to the centerline controlling that item, or at the direction of the City's Capital Projects Inspector.
15. All Capital Improvement Projects shall meet the procedures and standards for the use of temporary/security fencing around the perimeter of construction sites, as defined in the City's Zoning Ordinance, Article VII, Section 7.700.



sections, beginning and ending taper points and monument lines of all intersecting streets shall be labeled and stationed. Survey markers shall be installed per MAG Standard Details.

2. Show centerline stationing on plan and profile. Stationing numbers should be chosen to prevent “negative” stationing. The project need not start with 0+00. On curved sections the stationing should be along the centerline of the curve and not the tangent lines.
3. Show curve data on the same sheet as the curve. Stationing shall run from South-to-North and from West-to-East.
4. On streets that are not centered on the monument line, the stationing shall be along the construction centerline, which shall also be the proposed crown line, unless superelevation or other conditions dictate otherwise. On such streets, the rights-of-way shall be measured from the monument line. The offset between the monument line and construction centerline shall be shown and all offsets shown for new construction shall be from the construction centerline.
5. Design on intersecting streets shall be done in accordance with the city furnished geometrics and guides, see [Section 5-3.000](#). Care must be taken to ensure a smooth grade in all directions through intersections. Special design work sheets are required to show profiles on the intersecting street to ensure smooth grades in both directions. These work sheets are to be included with the grade and alignment submittals, see Figure 9.1-6 below.



**FIGURE 9.1-6 INTERSECTION CROSS-SLOPES & CROWN RUN-OFF**

6. All curb radii shall be dimensioned on the plans to back of curb, Ramp Control Points, as per COS Standard Detail No. 2232 (for new construction) or 2233 (for retrofit construction), shall be clearly located and shown on the plans.



7. On all existing roadways and intersecting streets, the plans shall show dimensions from monument line to rights-of-way and to existing back-of-curb. Existing medians, sidewalks, curb ramps, etc. will be clearly dimensioned and labeled.
8. All new pavements should be fully dimensioned to the edge of pavement or back-of-curb and tied to horizontal control lines.

**9-1.403****TOPOGRAPHY AND NOTATION**

1. Show all subdivision names, block numbers, lot numbers, property splits, lot dimensions, addresses, names of major businesses, schools, fire stations and other public facilities.
2. Show final rights-of-way as a heavy ink line. Show original rights-of-way, where it differs from the new rights-of-way line, with a lighter weight line.
3. Show all existing alleys and easements with proper designations and dimensioning. Show all new easements required for the project, including temporary or permanent.
4. Show all underground utilities and appurtenances and their distances from the monument line and label size, type of material and type of utility. Utilities that are abandoned, or to be abandoned or removed should be indicated. Any utilities to be constructed prior to the project should be shown and so indicated. Underground electrical lines shall be denoted as direct burial cable or conduit-enclosed cable.
5. Show all buried fuel tanks. When the new rights-of-way is in an area where such tanks may exist, a special effort should be made to check for the possibility of their existence.
6. Show existing underground concrete pavements. Core borings should be utilized to determine the existence of such pavements when authorized by the city.
7. Show existing site conditions and topography to at least 10 feet beyond the new rights-of-way line or any required easements. Use standard MAG symbols where applicable. Show all information for buildings, canopies, asphalt aprons and overhangs within 30 feet of the new rights-of-way. Existing site information should be screened approximately 40 to 60 percent, to the satisfaction of CPM plan review.
8. Show all signs within the new rights-of-way and 20 feet beyond the rights-of-way. Electric signs shall be so noted and their source whether overhead or underground identified.
9. Show diameter and variety of trees and shrubs within 30 feet of the new rights-of-way and within temporary construction easements. The city will determine the disposition of all trees and shrubs. If slight changes in alignment could be made to save valuable trees or the sidewalk could be realigned by acquisition of additional rights-of-way, it should be brought to the attention of the city's project manager at the earliest time possible.
10. Show all utility poles. Differentiate between power poles with street lights and those without. Also show all traffic signal poles and their appurtenances.
11. Show all subdivision entrance structures and indicate any utility connections. When these interfere with new construction they should be relocated or reconstructed. At times it may be necessary to obtain rights-of-way for these structures.
12. As-built drawings or sufficient elevations must be obtained to indicate the direction of surface flow on all intersecting streets, frontage roads and ing lots. The direction is to be shown by a small arrow.
13. Where certain items such as monuments, water valves, water meters (sizes if relocation is indicated) etc., are shown on city utility maps or record drawings but are not located, they should be shown and labeled "not found" on the plans.
14. Show all existing sprinkler systems. Where new construction requires alterations, these sprinkler systems must be put back in operation by the contractor and shall be so noted on the paving plan sheets (or landscape plans).
15. Where new rights-of-way is required, the consultant must investigate if any disconnected water or sewer connections (stub-outs) are completed to the old rights-of-way line only.



Where this occurs, show the service connection (size and material) to be extended to the new rights-of-way line. Galvanized services are to be replaced in their entirety. The city will furnish a new meter if the old meter is faulty.

16. Show all existing safety curbs. Call for relocation of existing safety curbs and the addition of new safety curbs where required.

**PROFILES AND GRADES**

**9-1.404**

1. Construction benchmarks shall be a maximum of 1,000 feet apart and each sheet shall refer to the nearest benchmark. All benchmarks must be based on the COS datum and at least 2 benchmarks on a project shall be existing city monuments. Elevations of city benchmarks shall be furnished by Field Engineering upon request and are available online at <http://eservices.ScottsdaleAZ.gov/landsurvey/>. See [Section 3-1.000](#) for more information.

Some areas of the city have experienced considerable ground subsidence. Report variations from recorded city benchmarks to Field Engineering at 480-312-5750.

2. The proposed construction centerline profile shall show the profile of the existing surface at the construction centerline. The proposed curb and gutter profiles shall also show the existing surface line at the location of the new curb line. If the proposed curb and gutter are adjacent to the existing curb of a frontage road, the existing surface line shall be omitted and the top of the existing curb of the frontage road shall be shown.
3. Top of embankments at ditches and bottom of ditches shall not be shown to express existing surface lines. They may be shown in addition to existing surface lines if properly labeled.
4. Existing ground elevations along the rights-of-way lines should be indicated by tick marks along the left and right gutter profile lines at approximately 100-foot intervals.
5. If the ditch bottom or banks occur at the property line, the elevation to be shown in the profile for the property line shall be taken beyond the ditch on “average” ground and the offset noted.
6. Existing roadway profiles shall be extended to a minimum of 300 feet past the ends of the project to assure a smooth transition between the existing and new roadway.
7. Elevations must also be shown in the profile at all driveways, sidewalks, curb ramps and parking lots. Elevations of building floors within 30 feet of the property line shall also be shown in the profile and any other buildings that appear to be low compared to street grades. Sufficient elevations beyond the property line shall be recorded in the field notes at driveways that may require significant alterations beyond the property line.
8. Cross section sheets shall have a scale of 1 inch = 10 feet horizontal and vertical. 1 inch = 5 feet or 1 inch = 20 feet may be used where special conditions warrant their use. Cross sections shall be plotted at 25 foot intervals depicting the proposed street cross section, in areas where new curb and gutter is retrofitted into existing pavement and less than 1 lane of pavement adjacent to the curb is removed and replaced to insure smooth cross sectional transitions.
9. Sufficient elevations shall also be taken and recorded in the field notes of all parking areas, driveways and private property to be certain that the property ADA slopes and cross slopes are indicated.
10. Elevations of existing water valve nuts shall also be shown in the profile with the appropriate symbol. It is the responsibility of the consultant to uncover these valves, obtain the elevations and replace the cover and any excavated pavement.
11. Longitudinal and transverse grades shall be designed for proper drainage following the guidelines of COS design criteria, standards and ordinances, see [Figure 9.1-6](#). Proposed curb grades shall be set to drain all paved adjacent property. Where this is not possible, catch basins may be required beyond the rights-of-way lines, but only where permanent

rights-of-way or permanent drainage easements are obtained for the catch basin. In projects with flat longitudinal slopes, the grades shall be set to prevent sump conditions that may flood private property during large storms. Chapter 7 of the Scottsdale Revised Code stipulates specific requirements for depth of water in roadways and minimum numbers of clear lanes during storm runoff, see [www.ScottsdaleAZ.gov/codes/](http://www.ScottsdaleAZ.gov/codes/). The consultant shall obtain and design to these requirements.

12. Where possible, grades should be set to reduce high crowns where they exist. This will assist the flow of floodwaters and prevent backup into houses. Care should be used in lowering existing streets since excavation to construct pavements may uncover existing utilities and possibly change drainage patterns.
13. Any streets with horizontal curves sufficient to require superelevation should be designed in accordance with AASHTO guidelines. The consultant is advised to discuss this subject with the city prior to design of superelevation. Limitations on the use of super-elevations are described in COS design criteria and standards.

9-1.405

**STORM DRAIN PLAN, PROFILE AND DETAIL SHEET**

**A. Storm Drain Design Sheet**

Alternate storm drain piping materials should be summarized on a single sheet and shall reference types of materials, design dimensions, material strengths, bedding conditions and soils information, etc. See Figure 9.1-7 below for an example.

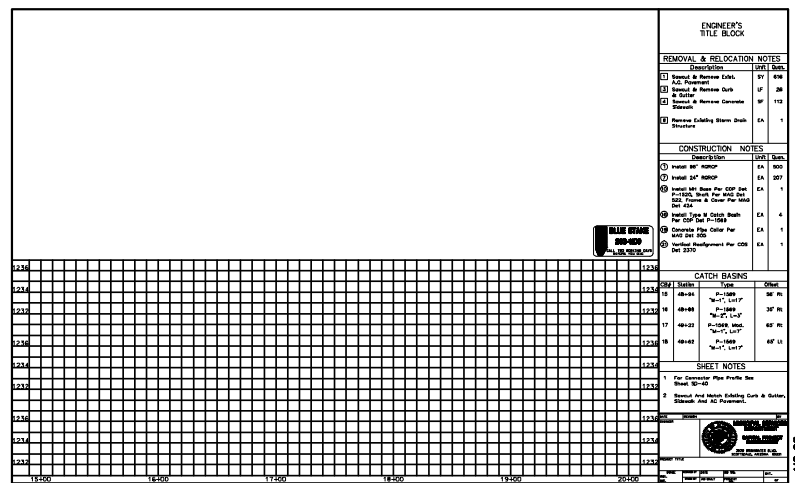


FIGURE 9.1-7 STORM DRAIN PLAN & PROFILE SHEET

**B. Sheet Orientation**

Sheets are to be oriented and have the same horizontal and vertical scale as the paving plans.

**C. Topography and Notation**

1. Storm drain drawings shall show all of the existing utilities and any new utilities proposed within a minimum of 30 feet of the centerline of the storm drain. It shall also show other existing topography as shown on the paving plans (or to within 30 feet of the drain centerline if not located within right-of-way) that is pertinent to drainage.
2. These drawings shall show, in plan, all proposed storm drain pipe, manholes, catch basins, connector pipes, pipe collars and other drainage appurtenances. These items should be listed referenced to standard details and plan sheet quantity noted in the right-hand column. Add reference to sheets where details or sections are shown.

3. Storm drain main lines, connector pipe and catch basins shall also be shown, in plan, on the paving sheets. A reference to the appropriate sheet number for the storm drain plans shall be shown on each paving plan sheet.
4. If the storm drain main exists and no separate storm drain plans are required, the catch basins and their lines shall be called out on the paving plans. Details of catch basin with connecting pipes shall be included with paving details.
5. Conflicts with existing utilities shall be noted in both plan and profile.

**D. Horizontal Alignment**

The most satisfactory alignment is determined by the location of existing facilities. Desired location is near the centerline of the existing or proposed street. Existing utilities crossed under at an angle less than 45 degrees may require special design considerations and should be avoided. Location of the storm drain should consider the interference of water main thrust blocks and the need to provide maintenance on either system.

**E. Profiles and Grades**

1. An overall system profile sheet shall be included with the set and shall show the pipe sizes, grades and locations of manholes and lateral connections. The hydraulic grade lines shall be shown along with the existing/proposed finish grade over the pipe. Crossing utilities including sanitary sewer lines, water lines greater than 12 inches, storm drain lines, and major electric and telephone feeds shall be indicated at their proper locations.
2. The storm drain pipe and manholes shall be shown in profile. The pipe size and the slope to 4 significant figures shall also be shown in the profile. The existing ground over the proposed pipe and the proposed grade shall be shown.
3. Design of storm drain systems shall be per COS design criteria and standards. The Consultant shall obtain the applicable criteria and standards and arrange for a consultation with the city Floodplain Administrator prior to starting design of the storm drain system. This is very important since the drainage areas to be considered in the design may vary.
4. Generally for maintenance reasons, the minimum pipe size required for the main is 24 inches and the lateral collector pipe shall be 18 inches. Smaller diameter pipes require staff approval and will be considered by the city if utility conflicts may be avoided and the pipe has sufficient capacity to carry the design flows.
5. All existing or proposed utilities crossing the new storm drain shall be shown in the profile at their proper as-built, field-verified, or potholed locations.
6. Prefabricated fittings shall be used for all new horizontal or vertical bends where feasible. Locations of bends or fittings shall be called out on plan and profile.

**PROFILES FOR CATCH BASINS AND CONNECTING PIPE**

**9-1.406**

**A. Sheet Orientation**

- These sheets are to be all cross-section sheets.
- Sheets should have the appropriate COS title blocks.
- Catch basins and their connecting lines shall be drawn facing North or facing East.

**B. Profiles and Grades**

1. Profiles should show the correct top of curb elevation at the catch basin and a cross section of the proposed catch basin. Invert elevations of the connector pipe shall be shown at the outlet from the catch basin and the inlet to the storm sewer as well as any grade breaks. Show the size of the pipe and the percent of slope (to 4 significant digits).

Also, show the catch basin type and size, the station and offset, and a cross reference to the storm drain plan and profile sheet where the catch basin is shown.

2. All existing utilities crossing the proposed pipe shall be shown at their proper location and elevation. Use as-built drawings to obtain the correct elevation. When elevations are available from as-built plans, the elevation should be called out on the profiles. Where no elevations are available, the utility shall be located from the best available information.
3. A note should be included on each sheet stating that the elevation is unknown, unless noted on the profile. Where elevations of existing utilities are not known and their existence could be in conflict with the proposed pipe or catch basin, to determine exact elevations and horizontal locations, the consultant must coordinate digging potholes with the respective utility company.
4. Utilities located in the field shall be shown in plan and profile at their correct location, and noted in profile with their exact elevation and the notation "potholed elevation".
5. Minimum vertical clearance between the proposed pipe and all existing utilities, other than Salt River Project (SRP) pipe, shall be per MAG Standard Specifications or the COS MAG Supplement see [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp). SRP requires a 2-foot horizontal clearance with underground utility lines, poles, fences, buildings, etc., and 1-foot vertical clearance with underground utilities. On special occasions they will permit 3 inches of horizontal clearance with catch basins.
6. Utilities that will require relocation shall be noted in the cross sections and shown at the existing and new locations.
7. All required pipe collars and pipe supports shall be called out on the cross section. Prefabricated tees shall be utilized whenever possible.

### 9-1.407

## IRRIGATION PLAN, PROFILE AND DETAIL SHEETS

### A. Sheet Orientation

Sheets shall have the same orientation as the paving plan sheets.

### B. Topography and Notation

Paving removal items shall be called out on the paving sheets, not on the irrigation sheets. When Salt River Project does its own construction, removals to be done by SRP forces shall be called out on the paving sheets and it shall be noted that they will be removed by SRP. Construction items for irrigation work shall be called out on the irrigation sheets. If SRP is required to complete its own construction, the construction items shall be listed and noted as such.

### C. Horizontal Alignment and Design

1. Private irrigation pipe, ditches and structures will be placed on private property using a temporary construction easement. The private irrigation pipelines may be placed under the proposed sidewalk if placing pipe on private property would result in the loss of existing trees or landscaping, or cutting of planters or buildings or concrete pavement parking areas, and if there is no conflict with SRP.
2. SRP irrigation pipe may be placed under the proposed sidewalk; however, their structures are to be placed on city rights-of-way, behind the sidewalk.
3. In locating private or SRP pipe, care should be used to allow space for utility poles, streetlights, or traffic signal pole bases along the property line, and sufficient horizontal clearance between any structures and the proposed pipe.
4. The consulting engineer, at the earliest opportunity, shall notify SRP, in writing, of the project and request a design schedule and estimated design cost. A copy of this request and the proposed schedule must be sent to the city. The consultant will provide SRP with

all available information on the location of other utilities, street grades and street alignment. The consultant shall cooperate with SRP so that the final design will meet their standards and be the most economical for the city.

5. At the same time they are submitted to the city for review, the consultant shall send a set of grade and alignment plans to SRP and request a determination of rights-of-way requirements for their facilities. It is essential in order to meet rights-of-way schedules that these rights-of-way requirements be submitted to the city as soon as possible.
6. A second set of grade and alignment plans shall be sent to SRP after approval by the city. Based on these plans, SRP can proceed with the design. SRP will prepare a red-line preliminary design and transmit it to the consultant. The consultant shall review the red-line preliminary design and return it, with comments, to SRP as soon as possible. SRP will then complete the final design.
7. If existing private or SRP irrigation pipes are to remain as is, the consultant shall investigate the type of pipe and its condition to ensure it is fit to remain. The consultant shall also investigate the elevation of the pipe to be sure enough cover will be provided over the pipe even during the time of construction. The consultant must meet with SRVWUA to determine what requirements should be met for the project.
8. On private irrigation lines and ditches, the consultant must obtain the delivery quantities and irrigation schedule from the Water Master. The consultant shall be completely responsible for the design of private irrigation systems. The determination of rights-of-way requirements at an early date is essential in maintaining the time schedule; submit these requirements to the city as soon as possible. Hydraulic computations on private irrigation shall be furnished to the city. All work involving private or SRP irrigation shall be coordinated with the city's project manager.
9. SRP typically constructs its own facilities, therefore, the consultant shall show SRP's design on the plan of the paving sheets and properly note which work shall be done by the city's contractor and which will be done by SRP. Mylar plans of SRP work are to be placed at the end of the construction plans for a permanent record.

**D. Profiles and Grades**

Profiles shown for irrigation pipes must show the proposed surface grades over the centerline of the pipe as well as the invert profile of the pipe and the top of the pipe. Top elevations must also be shown for all irrigation structures. Grades of pipe shall be established which will provide sufficient cover over the pipe as well as be hydraulically efficient.

**SANITARY SEWER PLAN, PROFILE AND DETAIL SHEETS**

**9-1.408**

**A. Sheet Orientation**

Sheets shall have the same orientation as described in the paving plans section.

**B. Topography and Notations**

1. Provide the same siting information as required for the paving plan base sheets for the sanitary sewer plan sheets.
2. If the sewer is located in an easement outside the rights-of-way, show all existing site conditions to 30 feet minimum along each side of the pipeline.

**C. Horizontal and Vertical Control**

1. Establish 1 construction benchmark for every 1000 feet minimum along the alignment of the pipeline. At least 2 city benchmarks should be referenced (NAVD 88).
2. Stationing shall be established along the pipeline, increasing from lower to higher invert elevations, and be referenced to street centerline or monument lines at manholes or angle points where possible. Where this is not possible, the use of bearings and distances along

the pipe centerline shall be utilized. The beginning and end point of the sanitary sewer line shall be tied to the nearest monument point.

#### **D. Soils Testing**

1. Prepare the geotechnical investigation as described in [Section 9-1.100](#).
2. Additionally, provide soils boring logs at a minimum spacing of 1320 feet along projects whose average trench depth exceeds 10 feet. Boring should extend to 24 inches below the proposed bottom of the trench and be of sufficient diameter to allow for laboratory testing and analysis. Locations of borings shall be identified on the plans. Soil boring logs shall be included on a geotechnical report along with a discussion of any particular bedding, shoring, excavating, or dewatering considerations.

#### **E. Profiles and Grades**

1. Profiles shall indicate the existing and design grade line over the pipe and shall include the "as-built," "field-verified," or "potholed" locations of all crossing utilities.
2. Vertical locations of storm drains and sanitary sewers should be interpolated from verifiable field elevations along accessible points. Locations of other pipes shall be taken from information on existing "as-built" drawings or actual field "pothole" datum.
3. When existing "as-built" plans of a water line greater than 12 inches diameter, a high pressure gas line greater than 4 inches diameter, and telephone or electrical conduits do not indicate a depth of bury, the engineer must coordinate with the utility company for a "pothole" location to be provided. When existing "as-built" plans of a water line, a gas line, or telephone or electrical conduits do not indicate a depth of bury, the engineer shall coordinate with the utility company to provide a "pothole" location.
4. Identify existing utilities by name, size and type of pipe in the profile. If existing or proposed pipes are greater than 21 inches (inside) diameter, show top and bottom invert grade line and an indication of pipe wall thickness in the profile. For pipes 21 inches or smaller (inside) diameter, indicate only top and bottom invert grade.
5. Necessary water relocations shall be per COS Standard Detail No. 2370, see [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp). Coordinate requirements for shut-off and air release/vacuum valving with the city Water Resources Department.
6. Show invert and rim elevations on all manholes and pipeline invert elevations on all ends of stubouts or at points of match sheet. Pipeline grades should be established to 4 decimal places.
7. Calculate invert elevations and lengths of pipe from center of manhole to center of manhole. Sections of pipe connected to manholes should be 5-foot maximum length to minimize the adverse affects of any settlement.

### **9-1.409**

#### **WATER LINE PLAN, PROFILE AND DETAIL SHEETS**

Sheet orientation, topography and notations, horizontal and vertical control, and soils testing should be similar to those criteria described for the previous section "Sanitary Sewer Plans, Profiles and Details".

#### **A. Profiles and Grades**

1. Profiles are required for all waterlines 12 inches and greater.
2. Profiles shall indicate the existing and design grade line over the pipe and shall include the "as-built," "field-verified," or "potholed" locations of all crossing utilities.
3. Vertical locations of storm drains and sanitary sewers shall be interpolated from verifiable field elevations along accessible points. Locations of other pipes shall be taken from information on existing "as-built" drawings or actual field "pothole" datum.



4. When existing “as-built” plans of a water line, a gas line, or telephone or electrical conduits do not indicate a depth of bury, the engineer shall coordinate with the utility company to provide a “pothole” location.
5. Identify existing utilities by name, size and type of pipe in the profile.
6. Existing water line relocations may be necessary and shall be per COS Standard Detail No. 2370. Minimum separations between water lines and electric/gas lines shall be per COS Standard Detail No. 2372, see [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).
7. Construct all fire line services and hydrant connections with DIP.
8. Water mains 12 inches in diameter shall have a minimum cover of 48 inches to finish grade; mains smaller than 12 inches in diameter shall have a minimum cover of 36 inches to finish grade; mains greater than 12 inches in diameter shall have a minimum cover of 60 inches to finish grade. Water mains in industrial areas or in major collectors and arterials shall have a minimum of 48 inches cover.
9. All bends, angle points, fittings shall be stationed. On water lines 12 inches or larger in diameter, show the design top of pipe elevation. Cut stakes shall be provided for the trenching of all water lines 12 inches or more in diameter.

## **TRAFFIC SIGNAL PLAN, SCHEDULE AND DETAIL SHEETS**

**9-1.410**

### **A. Plan Sheet**

See [Section 5-4.100](#) Traffic Signal Design, for specific information on plan sheet sets. Plan submittals and plan content are described in [Section 5-4.200](#) and [Section 5-4.300](#).

### **B. Notes and Schedules**

Develop these as necessary to show the conductor schedules, controller and pole schedules, phasing details, etc., and general notes with cross references to items shown on the plan sheet. See [Section 5-4.302](#) and [Figure 5.4-5](#) for further guidance.

## **TRAFFIC SIGNING AND PAVEMENT MARKINGS**

**9-1.411**

### **A. Sheet Format**

Use double plan at 1 inch = 40 feet scale, the same orientation as the paving plans.

### **B. Plans**

1. Signing and striping shall conform to ADOT Specifications and Standard Drawings and the Manual of Uniform Traffic Control Devices, unless shown otherwise in COS design criteria and standards, or as directed by the Traffic Engineering Program.
2. Existing striping shall be shown and dimensioned to a minimum of 300 feet beyond where it ties into the new work. All new work shall be appropriately dimensioned from lip-of-gutter to center-of-stripe, etc. Overall dimensioning shall be provided across pavement widths and rights-of-way. See [Section 5-4.000](#) for a list of applicable notes to place on plans.
3. All permanent pavement striping, including crosswalks, shall be hot sprayed 6 mil thermoplastic. Temporary pavement markings and island noses should be reflectorized traffic paint. Legends and arrows to conform to ADOT Specifications and Standard Drawings.
4. Raised pavement markers are generally required for all new COS paving projects.

## **LANDSCAPE AND LANDSCAPE IRRIGATION PLANS; INTEGRATED SIGN PLAN**

**9-1.412**

### A. Sheet Format

Landscaping and irrigation may be combined on the same plan for simpler projects, but generally require separate plan sheets. In either case, the orientation and scale shall be the same as for paving plans, using a double plan on each sheet. The landscaping plan shall also show all street signs to avoid landscaping conflicts that interfere with street sign placement. The standards for sight lines in C.2. below shall be considered for appropriate landscaping near street signs.

### B. Note and Legends Sheet

This sheet may be combined for the landscaping and irrigation plans. It shall contain general notes, landscaping notes, irrigation notes, list of plants and shrubs used (noting common and botanical names), list of irrigation components, legends of landscape and irrigation symbols, quantities, approval block, maintenance statement signature block per [Figure 1.2-7](#) and miscellaneous details. If the project goes before Development Review, the DR number and signature block per [Figure 1.2-7](#) shall be placed on the lower right-hand corner of each sheet.

### C. Plan Sheets

1. Landscape plans shall show individual shrubs and trees plus types and areas of various groundcovers, including grass, decomposed granite, pavers, exposed aggregate paving, etc., with quantities shown on the right-hand column. Identify restoration work behind new sidewalks, or in other areas disturbed by construction work. Existing items to be removed or transplanted shall be shown with special attention to native plants that are required to be salvaged. The city will furnish guidance and assistance in identifying plants to be salvaged or transplanted as well as selecting types of new plants that will conform to the city landscaping policy and to the requirements of the Arizona Department of Water Resources for the Phoenix Active Management Area.
2. Sight lines shall be shown on the landscaping plans and shall conform to COS criteria and standards. Design consideration should be given to placement of plants, size of plants at maturity, canopy widths and general maintenance. Planting density shall not exceed tree/shrub natural growth habits. Generally, shrubs should be kept a minimum of 4 feet away from the curb or sidewalk, and when within a sight line they should not exceed a maturity height of 18 inches above the curb.
3. Trees should be located so that the mature canopy will not overhang the curb or sidewalk line. Within a sight line, trees shall have a single trunk with a clear height of 8 feet to the canopy.
4. Irrigation plans shall provide detailed design from the service side of the meter. The irrigation service and meter size will be provided and noted on the civil plans.
5. Identify the detail and dimension, or station the locations and layout of the meter, backflow preventer, control valves, main and lateral lines, pressure regulator and emitters, etc. Diagrammatic layout plans will not be accepted by the city. The consultant shall clearly indicate with stations and dimension to the back of curb or sidewalk the proposed locations of the irrigation components. Valve flow rate, station number, size and description (tree, shrub, turf, etc.) shall be given for each valve.
6. Separate emitters shall be shown to each plant. Distribution tubing length shall not exceed 6 feet. Trees and shrubs are to be valved separately. Separate emitters shall be shown to each plant. Number of multi-port emitters for trees shall be per City of Scottsdale emitter layout detail number 2641-2. Emitter flow rate shall be provided on the plans.
7. Show the electrical source plus the controller location and all wiring, including conduits and sleeves.
8. Upon request, the city will provide the consultant a listing of products that may be listed for performance and quality control. The drawings need to reference "or approved equivalent" in all cases.



9. City of Scottsdale maintained landscape and irrigation improvements shall be designed based upon City of Scottsdale supplement to MAG specs and details along with other design criteria. City of Scottsdale landscape and irrigation details shall be provided in the plan sets.

**BRIDGE AND STRUCTURAL PLANS AND DETAILS**

**9-1.413**

At the city's option, bridges on canals may be designed as a separate contract to be bid separately from the roadway plans, since the bridge must be built during the annual canal dry-up. Bridges over washes may be included as part of the paving plans.

**A. Required Sheets**

The sheets required on a typical set of bridge plans, which are independent of the roadway plans, are shown in Figure 9.1-8.

<b>REQUIRED SHEETS FOR BRIDGE AND STRUCTURAL PLANS</b>	
1.	City cover sheet with information as shown under paragraph A.
2.	Typical section sheet to show sections of roadway work included.
3.	Notes and legend sheet with information shown under paragraph B with additional bridge and structural notes.
4.	Paving plans and profile sheet with additional information concerning bridge and structural details.
5.	Detour plan and profile, if required, showing all details required for the detour in plan and profile.
6.	Plan and profile for any water, sewer, or irrigation alterations to be included as part of the bridge contract.
7.	Bridge location plan showing the bridge in plan and profile and the bridge quantities.
8.	Soil boring log sheet showing all soils information obtained and the note concerning responsibility.
9.	Abutment Details.
10.	Pier Details.
11.	Deck Details.
12.	Miscellaneous details (approach ramps).
13.	Handrail and Guard Details.

*Note: Sheets 7 through 13 described above would be consecutively numbered S1, S2, etc. if incorporated into a roadway project.*

**FIGURE 9.1-8 REQUIRED SHEETS FOR BRIDGE & STRUCTURAL PLANS**

**B. Additional Requirements**

1. The consultant shall discuss the project with SRP at an early date in order to obtain their requirements when designing a bridge over a canal or when any SRP facilities are involved. Generally, the first step of a bridge design over an SRP canal will be to obtain a statement from SRP as to whether they consider the bridge a restriction in the canal. If they do consider it a restriction, it shall be necessary for the engineer to submit a hydraulic study to SRP to assure that construction of the new bridge or bridge widening will not adversely affect hydraulic characteristics in the canal. Upon approval of that study by SRP, the consultant shall proceed with preparation of preliminary plans. Following review and approval of such plans by the city and SRP, the consultant shall proceed to drafting final plans. Throughout all stages of project design, the consultant shall coordinate all work with SRP in order to minimize any possible conflicts. Bridges over SRP canal facilities must conform to prevailing SRP standards and requirements.
2. Consultant shall consider sight distance requirements when designing the roadway portion of the contract.
3. At an early date, the consultant shall coordinate with other utilities such as Qwest, SRP, APS, Southwest Gas, Cable TV and the COS Water and Wastewater Department in order to identify any necessary relocations of their facilities.

**9-1.414****PLAN SHEETS BY OTHERS**

1. Private electrical, gas, telephone and cable television facilities may need extension, upgrading, or relocation as a result of this project.
2. Where possible, reproducible copies of utility agency designs should be attached to the end of the plans that are set and labeled "For contractor reference and information only - work to be done by others".
3. There may be situations where the contractor is required to provide trenching and conduit installation for a utility company. Such work should be clearly described in the Special Provisions.

**9-1.415****RIGHT-OF-WAY PLANS****A. Strip Map**

Strip maps shall be at a scale (generally 1 inch = 100 feet) sufficient to differentiate the various easements, parcels and existing improvements. Format should be shown on a 24 inches x 36 inches sheet. Show each parcel abutting the project and indicate proposed and existing dimensioned rights-of-ways, easements, ownership and areas. See [Figure 9.1-9](#) for a sample ROW Strip Map Exhibit.

- Format: 24 inches x 36 inches per city
- Scale: 1 inch = 100 feet (or as required)
- Property addresses and occupants identified
- Property owners identified, including Tax Assessor's parcel numbers
- Existing easements and ROW identified
- New easements and ROW to be acquired identified

**B. Parcel Exhibits**

One exhibit per parcel is required. One exhibit per ownership may be submitted with approval from the COS Right-of-Way Agent. Prepare parcel exhibit maps on individual sheets and include a legend indicating the type of acquisition. The plan view should show the parcel boundary dimensioned to section corners (non-subdivided lots), adjacent rights-of-way centerline and any on-site improvements, along with all existing and proposed easements and

rights-of-ways clearly identified and dimensioned. The identification of existing rights-of-way and easements should include the appropriate county recording information. See [Figure 9.1-10](#) for a sample Parcel Exhibit.

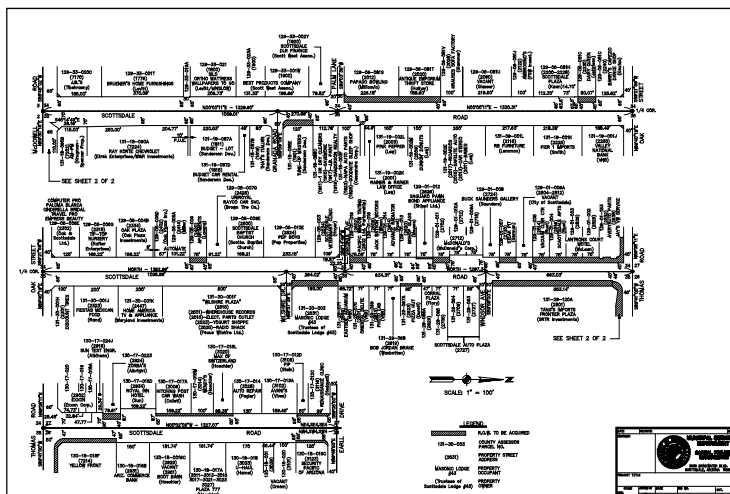
- Format: 8-1/2 inches x 11 inches
- Title block at lower right identifying the city's project, project number, tax parcel number and the property owner(s).
- North arrow and scale
- 1/4 section ties
- Property addresses and occupants identified
- Existing easements and ROW identified
- New easements and ROW to be acquired identified
- Individual areas noted
- Parcels dimensioned and bearings

**C. Parcel Descriptions**

The individual parcel descriptions for all new easements and/or rights-of-way shall be prepared by, or under the direct supervision of a land surveyor registered in the State of Arizona, and shall be sealed by the same. All parcel descriptions shall be typed on separate 8-1/2 inches x 11 inches formats and shall be consistent with APLS standards. See [Figure 9.1-11](#) for a sample Parcel Description.

The description should be typed in single space format and double spaced between its various parts as outlined below:

1. Caption
  - Brief introduction stating location of parcel, portion of a subdivision, aliquot portion of sectional breakdown, township and range.
2. Body
  - Tie true point of beginning to an established section corner, identifying its character
  - Metes and bounds courses
  - Identify boundary lines of joiners, citing Maricopa County Recorder's numbers and pages
3. Area of easement or ROW, stated to nearest square foot and 10,000th acre.



*Click images for a larger version*

FIGURE 9.1-9 SAMPLE ROW STRIP MAP

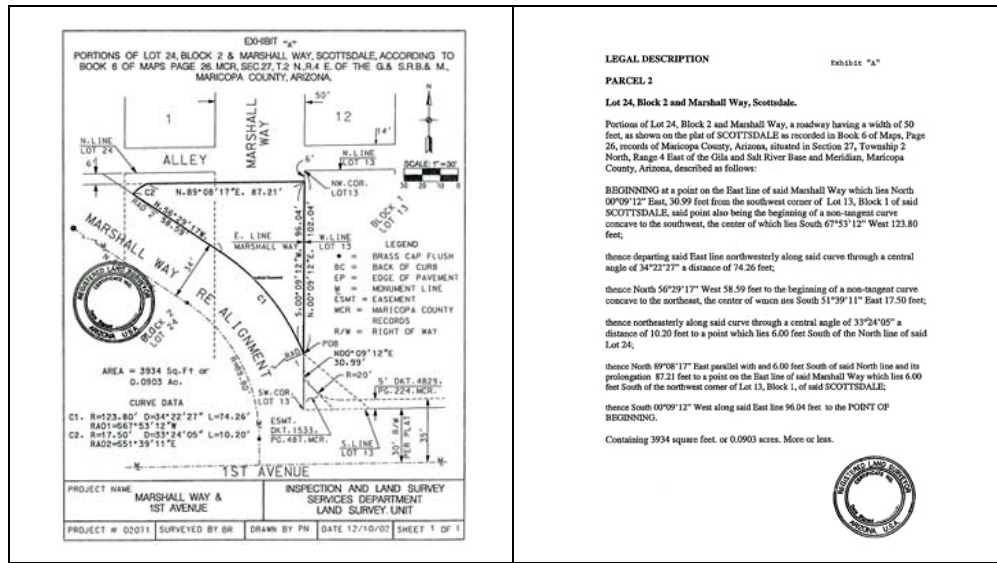


FIGURE 9.1-10 SAMPLE ROW PARCEL EXHIBIT

FIGURE 9.1-11 SAMPLE ROW PARCEL DESCRIPTION



# CAPITAL PROJECT PLAN REVIEW PROCESS

## Improvement and Facilities Projects

### A. Review Submittals

1. Infrastructure Projects
  - a. Concept Submittal / Preliminary Drainage Study
  - b. First Submittal (Grade & Alignment review)
  - c. Rights-of-Way Submittal
  - d. Second Submittal (Progress plans)
  - e. Third Submittal (Completed plans)
  - f. Approval Submittal (Sealed plans 100% complete)
2. Facilities Projects
  - a. Schematic/Program Design
  - b. Design Development
  - c. Construction Documents (90% Complete)
  - d. Final Construction Documents (Sealed Plans 100% complete)

### B. Develop Project Review Schedule

1. Establish project review schedule using division monthly report.
2. Verify project submittal dates with Project Manager.
3. Coordinate project review schedule with One Stop Shop Final Plan Review.
4. Update and review schedule monthly.

### C. Pre-Submittal Preparation (prior to a scheduled project submittal)

1. Verify submittal date with Project Manager.
2. Coordinate with COS staff members involved in the review process (see below) and establish timeframes for their participation:
  - a. Designated One Stop Shop Final Plan Review staff member: for project components deviating from design criteria or General Plan.
  - b. Floodplain Administrator or designee: for preliminary drainage study compliance with floodplain management policies.
  - c. Traffic Engineering Director or designee: for approval of traffic-related deviations from Master Plan, and reviewing signalization, striping, signing and counter loop locations.
  - d. Field Services: for review and input on landscaping and irrigation systems.
  - e. Field Services: for review and input on pavement, signing and striping designs.
  - f. Facilities Maintenance, Parks Department: for review and input on all city-maintained structures and/or equipment.
  - g. Water Resources: for projects with any facilities, main transmission, supply or trunk lines.
  - h. Rights-of-Way Agents and City's appraiser: for reviewing rights-of-way submittal.
  - i. Planning: for theme districts or roadway landscaping.



# CAPITAL PROJECT PLAN REVIEW PROCESS

## Improvement and Facilities Projects

### **D. Project Review Timeframe** (Usually 2 weeks from date of plan submittal to Project Manager)

1. Upon receipt of plans, confirm review dates with other involved COS staff, provide documents for their review, and apprise them of review completion deadline.
2. Obtain design criteria from Project Coordinator.
  - a. Scope of work from contract.
  - b. Minutes of meetings that contain design criteria determination.
3. Perform plan review for:
  - a. Compliance with Master Plan.
  - b. Compliance with plan format in accordance with the Project's Scope of Work.
  - c. Compliance with minimum technical requirements for particular submittal per City's criteria and applicable standard specifications and details.
  - d. Technical accuracy.
  - e. Constructability.
  - f. Value Engineering.
  - g. Right-of-way utilization.
  - h. Compliance with COS Codes.
4. Coordinate comments with those of City Departmental reviews.
  - a. Schedule a meeting to resolve any conflicts in review.
  - b. Arrange for any required departmental input on comments.
5. Complete CPM Review comment form and incorporate with One Stop Shop Final Plan Review's comments.
  - a. Add to CPM's redlines the outstanding comments from One Stop Shop Final Plan Review for a single presentation of City comments.
6. Return copy of comments to Project Manager.
  - a. Project Manager to schedule a review conference with the Consultant.
  - b. Coordinate with any COS staff to be present at review conference.

### **E. Post Review Activity**

1. Attend conference with consultant and Project Manager to resolve review issues.
2. File review documents.







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# FACILITIES PLAN REQUIREMENTS

This section outlines the submittal and review process and requirements for public facilities, including plan sheet numbering, sequence and content.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# FACILITIES PLAN REQUIREMENTS

## 9-2

## GENERAL INFORMATION

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9-2.000

### DESIGN STANDARDS AND GUIDES

9-2.001

#### A. Standards and Codes

The standards, codes, and amendments adopted by the City of Scottsdale can be viewed on the Planning & Community Development page of the city's website.

<http://www.scottsdaleaz.gov/codes.asp>

#### B. Design Policies and Guidelines

- Project stipulations from the Development Review Board
- Other general acceptable design standards, policies and guides

### GENERAL REQUIREMENTS

9-2.002

See [Appendix 9-1A](#) for the capital project plan review process.

1. Prepare plans on standard ANSI "D" Size (22 x 24 inches) sheets unless prior approval has been obtained from the City of Scottsdale to use the larger 24 x 36 inches sheets. All sheets must be clearly reproduced on print paper in black line format.
2. Upon request, the city will furnish the consultant with electronic files of base drawings shown in the figures at the end of this section. The consultant will be responsible for completing the drawings as applicable for the project.
3. Place a standard city title block in the lower right hand corner of each sheet. Also, show the architect's identification/logo along with that of any sub-consultant, along the right edge or upper right corner of the sheet.
4. Make the minimum lettering size 3/16 inch for manually drafted or 1/2 inch for mechanically produced lettering and ensure it is legible when reduced 50 percent. Reproduction of final drawings must be legible when microfilmed or reduced to 1/2 scale. Capital Projects Management (CPM) Plan Review determines the legibility of all drawings submitted. Adhesive backed appliques for lettering and shading will not be permitted without approval of CPM Plan Review.
5. On all sheets with maps or plans, orient north to the top of the sheet. A north arrow and scale must be on all applicable sheets.
6. Keynote all construction notes. Group construction keynotes referencing to a specific symbol (square symbols designate demolition and removals, diamond symbols designate relocations and circular shapes designate construction items).
7. The designer responsible for the design must seal all plans and documents submitted for review and mark them: "For Review Purposes, Not To Be Used For Bidding or

Construction.” Submitted plans and documents must also be signed by the registrant when the submittal reaches the level of 90 percent or better.

8. All projects must comply with Section 404 of the Federal Clean Water Act. Before the city may issue development permits for a project, the 404 Certification Form must be completed and submitted with improvement plans to the CPM Design and Plan Review staff, see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms). Consultants are advised to apply to the Corps as early as possible for a Section 404 permit and allow for the necessary processing time to prevent delays in obtaining development permits from the city.
9. All projects submitted for review and/or further processing must be complete and consist of plans, specifications, structural calculations, mechanical calculations, plumbing calculations, electrical calculations, geotechnical report, drainage report, native plant information and other documentation as required for that project.
10. For code review, the Architect shall submit a minimum of 4 full size sets of drawings on paper, 2 sets of specifications and 1 set of other documents as required. In addition, the designer shall provide additional plans, specification and other documents as required for internal user group review purposes. All plans and documents are to be submitted to the City of Scottsdale through CPM.
11. Provide an electronic copy of the final plans and specifications in MicroStation and Microsoft Word formats, respectively. CAD drawings shall be saved in the version currently in use by the City (v8 as of May '07). At the Project Manager's request, a set of signed and sealed drawings in full-size PDF format on CD shall also be submitted.
12. After tentative approval of the final review package, the Architect shall submit a complete set of full size (see Note 1 in Section 9-2.100) signed and sealed Mylar drawings for approval and signatures. The Mylar set shall have the note "Not for construction or bidding purposes" removed.
13. Any infrastructure portion of a facilities project must comply with [Section 9-1.100](#), particularly [Figure 9.1-4](#) General Construction Notes for Public Works Improvements & Facilities Projects.
14. All re-submittals must include the "Attachment A" or equivalent form stating what corrective action has been taken on all red-line comments (see [Appendix 9-1B](#)).

## 9-2.100

## PLAN SHEET NUMBERING & SEQUENCING

Sheets shall be identified by design discipline as designated below and consecutively numbered. Additionally, final consecutive numbering of the entire set of plans should be provided on each sheet. The sheet numbering prefixes shown in [Figure 9.2-1](#) are commonly used and the consultant shall review the sheet sequencing and/or intended numbering with the city's project manager.

PLAN SHEET NUMBERING & SEQUENCING		
Plan sheet prefixes:		
G = General C = Civil	L = Landscape A = Architectural	S = Structural M = Mechanical P = Plumbing E = Electrical
Plan sheets shall be sequenced as follows:		
1	G1	City cover sheet
2	G2	Notes, legend, approval blocks and notations
3	C1	Existing site survey
4	C2	Civil grading and drainage plans
5	C...	Civil site utility plans
6	L1	Landscaping and irrigation plans
7	A1	Architectural site plan
8	A2	Architectural plans, elevations, sections, details, schedules
9	S1	Structural general notes
10	S2	Structural plans
12	M1	Mechanical legends, notes, abbreviations
13	M2	Mechanical plans, details, schedules
14	P1	Plumbing plans, details and diagrams
15	E1	Electrical legends, notes, abbreviations
16	E2	Electrical site plan
17	E3	Electrical plans, schedules and details

FIGURE 9.2-1 PLAN SHEET NUMBERING & SEQUENCING

## DETAILED SHEET INFORMATION

9-2.200

### COVER SHEET

9-2.201

The city will furnish an electronic drawing file of the cover sheet upon request, see [Figure 9.1-2](#). The Engineer shall add the following:

1. Project title, CPM project number, bid call number
2. Vicinity map with section, township, range and parcel numbers
3. Sheet index
4. Engineering company identification and engineer's seal
5. Other agency approval blocks as applicable
6. City benchmarks for project – minimum 2 required on COS datum
7. Applicable city assigned plan review, development review and native plant numbers assigned by Project Review when submitted
8. Listing of applicable codes, City Ordinance and amendments

9-2.202

**NOTES, LEGEND AND KEY MAP SHEETS**

1. Key Map - Show all intersections, rights-of-way and key to all plans with stations
2. Legend of symbols used for existing and design elements
3. List of abbreviations used in plan set (other than as shown in the MAG Specifications)
4. Include [Figure 9.1-4](#), General Construction Notes for Public Works Improvements & Facilities Projects in addition to any special project notes generated.

# **BUILDING STANDARDS**

This section identifies desired products for plumbing, doors and hardware, building components, HVAC and electrical systems for constructing or altering existing city facilities.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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## GENERAL INFORMATION

9-3.000

New construction documents for new construction or alterations to existing facilities shall call for the use of items, components, materials, or types of systems outlined in this chapter and in accordance with the United States Green Building Code (USGBC). Specific brand names, manufacturers and model numbers are referenced for the purpose of indicating the quality, type, style and function that is desired. Where specific brand names are indicated, other products may be submitted for consideration as an approved alternate. Any alternate product for consideration shall meet the ADA standards for Controls and Operating Mechanisms and Space Allowance and Reach Ranges. Such submittals will be reviewed and may be approved as acceptable alternates. Specifications of products that have not received prior approval by the Facilities staff shall not be permitted.

### FACILITY TYPES

9-3.001

General Use Buildings	Vandal Resistant Facilities	Miscellaneous Structures
Office Buildings	Park Restroom Facilities	Bike Path Tunnels
Libraries	Public Transit Facilities	Bike Path Drinking Fountains
Recreation Centers	Park Ramadas	Bike Path Lighting and Controls
Solid Waste Transfer Stations	Parking Lot Shade Structures	
Water Reclamation Plants		
Maintenance & Warehouse Buildings		

FIGURE 9.3-1 FACILITY TYPES

## PLUMBING SYSTEMS

9-3.100

### A. Leed Certified Structures And Future Technologies

- a. All appliances or fixtures must be pre-approved by Facilities Management per resolution 6644 of the Scottsdale LEED policy.

### B. Piping

#### 1. Drains

- a. Cast iron soil pipe is to be ASTM 888-048 only.
- b. Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste and Vent (DWV) pipe is allowed when permissible by code.
- c. Connections between ABS pipe and Cast Iron pipe, fixtures or fittings must be made with approved transition couplings.

- d. Drains shall be installed at minimum 1/4 inch per foot fall.
- e. Cleanouts required at all sinks and urinals. Cleanouts not flush with wall shall be extended to wall from waste stack with combination wye and 1/8 bend or bends of equivalent sweep. At no time shall cleanouts be concealed.
- f. Pipe drain traps under sinks and lavatories shall be insulated.
- g. All building drains and sewers 3" and larger shall be video taped at substantial completion of building projects to show that no debris is present in the piping and that there are no low areas in the piping causing water accumulation.

## 2. Vents

- a. Cast iron soil pipe is to be ASTM 888-048 only for vent and soil.
- b. ABS DWV pipe is allowed, when permissible by code.
- c. Vandal resistant vent caps shall be installed in vandal resistant facilities.
- d. Air admittance valves are prohibited unless pre-approved.
- e. All substitutions must be pre-approved.

## 3. Sewer

- a. ABS/DWV schedule 40 pipe is allowed with approved drainage fittings.
- b. Standard dimension ratio (SDR) pipe 6 inches and above is allowed with approved drainage fittings.
- c. Yard clean out to have cast iron sewer traffic cover with concrete apron. 12 x 12 inches square and have a raised square head threaded plug on the pipe.
- d. Clean outs shall be located every 90 feet, horizontal length.
- e. Clean outs in concrete shall have nickel bronze covers.
- f. Provide 2 cleanouts outside of each building with opposing combination wye and 1/8 bends.
- g. Sewers shall be installed at minimum 1/4 inch per foot fall. Slopes of minimum 1/8 inch per foot may only be allowed if structural conditions prohibit 1/4 inch per foot slopes and must have permission of the Building official.
- h. All substitutions must be pre-approved.

## 4. Domestic Water

- a. Type "L" hard drawn copper shall be used above ground.
- b. Type "L" soft drawn or hard drawn copper may be used below ground outside of buildings.
- c. Type "K" soft drawn copper may be used below ground under buildings (only where necessary).
- d. Yard piping - Type "L" copper. 3/4-2 inches and larger shall be connected with Ford pack joints.
- e. PVC is not permissible for domestic water piping for City of Scottsdale facilities.
- f. Pressure regulators equipped with bypass and isolation valves with brass unions are required on all buildings.
- g. All branch lines shall be valved, including evaporative coolers and auxiliary equipment.
- h. Valves shall be full port ball valves through 2 inches. Valves 2-1/2 inches and larger shall be butterfly valves with worm gear operator.
- i. Underground valves up to 2 inches shall be brass with rectangular operating stem.
- j. All substitutions must be pre-approved.

## 5. Solder

- a. Solder shall be lead free.
- b. Flux shall be non-acid and joints shall be wiped clean.

- c. All substitutions must be pre-approved.

**6. HVAC Systems**

Where a single backflow preventor feeds 2 or more areas such as a cooling tower and a chilled water loop, dual checks with unions shall be installed on each to prevent water from one area flowing to another area. Prefer Watts #7, suffix U or equal.

**7. Fire Systems**

A double check valve is required in accordance with Scottsdale's Backflow Ordinance #2346 ([www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes)) unless entire system is of potable piping and fittings.

**C. Fixtures**

**1. Water Closets**

- a. Water closets shall be top spud, wall mount, blowout elongated bowl with flushometer valve and white solid plastic seat. Acceptable models are Kohler K-4450-C, Eljer Tacoma 111-0355 (3 bolt; 3.5), American Standard Instanto 2512.010 (3 bolt; 3.5), Kohler Stratton K-4450-C (3 bolt; 3.5), and Crane Rapidway 3460 (3 bolt; 3.5/1.6). Flush valves shall be battery operated auto-flush Zurn, Sloan or approved alternate. Floor mount tankless Eljer Preserve 111-4805 (1.6).
- b. Vandal resistant buildings (generally parks, holding cells, etc.) shall have wall hung stainless steel top spud water closets with white solid plastic seat and thru wall sleeve. Acceptable models are Acorn 1675-T-1-FV or pre-approved alternate. Flush valves shall be Zurn, Sloan or approved alternate.
- c. When tank types are required for reduced water piping size, they should be dual flush with a dimension of 4 inch trap way or greater; with 0.8/1.6 gallons per flush (gpf). Tank type toilets shall not to be used in vandal resistant buildings.
- d. Closets shall be hung on approved carriers. Cleanouts required at all sinks and urinals. Carriers shall be mounted to the concrete slab per the manufacturer's recommendations, including size and quantity of bolts.
- e. Wall hung water closets shall be set with felt gaskets.
- f. All substitutions must be pre-approved.

**2. Urinals**

- a. Urinals shall be wall hung, top spud and blowout type. Acceptable models are Eljer Correcto 161-1060, American Standard Lynbrook 6601.012, Crane Cromwell or Del Rio 7190/7390, Kohler Standwell 4972. Flush valves shall be installed as per code not less than a 6 inch minimum vacuum height with a 1-1/4 inch tail piece with a through wall sleeve, top spud only. Acceptable models are Zurn, Sloan, or approved alternate.
- b. Vandal resistant buildings shall have stainless steel straddle type blowout urinals. Blowout urinals shall be Acorn #1705-T-1-FV or pre-approved alternate. Flush valves shall be Zurn, Sloan or approved alternate.
- c. Flush valves shall be installed as per code not less than a 6 inch minimum vacuum height with a 1-1/4 inch tail piece.
- d. Where practical and after approval water-less urinals in compliance with the Americans with Disabilities Act (ADA) and Uniform Plumbing Code (UPC) shall be installed with water supply capped and available in wall cavity at a location near or at rough-in measurement pursuant to manufacturers recommendation for water supply.

- e. All substitutions must be pre-approved.

### 3. Lavatories

- a. Counter top lavatories shall be enameled cast iron.
- b. Wall hung lavatories in vandal resistant building shall be enameled cast iron. Acceptable models are Eljer Bucknell #052-0197, Kohler Hudson, K-2861.
- c. Lavatories shall be punched for 4-inch center set faucet.
- d. Faucets shall be Chicago 2200 CP or pre-approved alternate.
- e. Valves shall be Aquaflo E-Z Turn Ball Valve stops #V-101-A or approved alternate.
- f. Strainers shall be grid type strainers with offset traps, ADA compliant when required.
- g. All substitutions must be pre-approved.

### 4. Sinks

- a. Minimum 18-gauge stainless steel, kitchen sinks shall be 4 hole with 4th hole plugged if not used initially. Brass body basket strainer shall be Dearborn #16 or approved alternate. Sinks used in general use areas for employees or the public shall meet ADA guidelines. Sink shall have a 6-inch depth; with drain connections in the back of sink, mounted at 34 inches in a cabinet designed for wheelchair access. Acceptable models are Elkay Model ADAR-3321 2 bowl sink and Elkay model ADAR-2521-L single bowl sink. ADA sinks shall have an Elkay Model LK-35L strainer with elbow. Valves shall be Aquaflo E-Z Turn Ball Valve stops #V-101-A or approved alternate.
- b. Mop sinks – shall be floor type Fiat #897 or approved alternate. Faucets shall be Chicago #897 with integral stops, vacuum breaker and wall supports. Stainless steel splash shields shall be installed on all walls adjoining the mop sink.
- c. Multiple wash stations shall be installed as per manufacturer's recommendations and specifications.
- d. Bar sinks shall be Elkay Model with Moen 8901 faucet. Valves shall be Aquaflo E-Z Turn Ball Valve stops #V-101-A
- e. All substitutions must be pre-approved.

### 5. Drinking Fountains

- a. All drinking fountains shall be equipped with MDF model #450 SS; chilled and dual height. One shall be mounted at a spout height of 36 inches AFF, the other shall be within the range of 38 inches to 43 inches AFF, and shall incorporate all other ADA requirements. If the site is one where children may gather, such as parks, libraries and recreation centers, etc., a third fountain shall be mounted at 28 inches above ground to deck.
- b. Remote chillers shall be located within 3 feet of drinking fountains. Recirculating pump systems are not acceptable.
- c. The preferred method of providing outside drinking fountains is to mount drinking fountains on a wall immediately adjacent a plumbing chase with a chiller and sand trap in the chase. If the preferred method is not available, a freestanding unit shall be used.
- d. Freestanding outdoor drinking fountains shall be a triple chilled pedestal surface mount MDF Model #49318 SS with hose bib. Color shall be blue.
- e. All drinking fountains must be out of the pedestrian path of travel.
- f. All drinking fountains will be chilled and provided with sand traps.
- g. When required pet and horse water fountains shall be installed per city specifications. Pet fountains shall be MDF Model #300 SM/SS and blue in color.
- h. All substitutions must be pre-approved.

### 6. Faucets

- a. Lavatory – faucets shall be dual handle and Chicago 3300 CP.

- b. Kitchen – faucets shall be single handle cartridge type, Moen #7200.
- c. Bar sink – faucets shall be single handle cartridge type Moen #8901.
- d. Mop sink – faucets shall be chrome plated, wall mount, with integral stops, vacuum breaker and hose threads, Chicago #897
- e. Showers – faucets shall be pressure balanced with integral stops, Moen #8325 “Sani-Stream” of the vandal resistant type. Hand held shower valves shall be Moen #8345 “Sani-Stream” with brass quick disconnect coupler installed between vacuum breaker and hose.
- f. Vandal resistant shower heads will be provided: Sloan Actomatic AC-450.
- g. Hose bibbs shall be Woodford 24P - 3/4-inch.
- h. All substitutions must be pre-approved.

**7. Trim**

- a. Exposed traps shall be stainless steel trap for LEED with cleanout and chrome-plated brass slip joint nuts.
- b. All exposed tubular shall be 17-gauge, chrome-plated brass. All slip joint nuts shall be brass.
- c. Extensions of exposed tubular trap arms shall be made with solder joint extensions only and at no time will offsets be allowed.
- d. Angle stops shall be Aqua-flo EZ turn ball valves #V-101-A.
- e. Concealed traps and tubular may be constructed of ABS.
- f. Supply tubes shall be chrome plated nose formed type or flexible braided stainless only; corrugated supply tubes are not acceptable.
- g. Cleanout covers shall be stainless steel or chrome-plated bronze with stainless steel screws.
- h. Disposer shall be commercial grade 3/4 h.p. – ISE 3/4 Pro compact.
- i. All substitutions must be pre-approved.

**8. Pumps**

- a. Domestic hot water-circulating pumps shall be magnetic drive close-coupled pumps with stainless steel impeller Prefer Grundfos. Circulating pumps shall be installed with unions and isolation valves and controlled by an aquastat.
- b. Storm water sump pumps shall have separate receiving basin to catch solids. Myers or JCH fractional vortex type pump shall be wired to a waterproof controller with a COS-compatible signal system and have both local and Metasys alarm capability.
- c. Sewage ejectors shall be submersible Vortex type, with recessed impeller, packaged duplex systems configured with rail system in fiberglass tank, float switches, check valves and controls by same manufacturer. Myers, Tornado or JCH series are preferred.
- d. All substitutions must be pre-approved.

**9. Trap Primers**

- a. Trap primers shall be of type that is piped off of water closet flush valve tailpiece sleeve. Sloan F-72-A1 is the only acceptable model.
- b. An electric timer shall operate trap primers not located near a flush valve; Precision Plumbing Products Model MP-500-115V or MP-500-24V or equal are recommended. 24” access panel shall be provided where permissible.
- c. All substitutions must be pre-approved.

**10. Water Hammer Arrestors**

- a. Water hammer arrestors shall be provided at each battery of fixtures with flush valves and shall be of the pressure-charged typed, sized to the manufacturer's specifications and provided with an isolation valve. Approved Manufacturers are Watts, & J.R. Smith.
- b. Access doors for valves, trap primers and water hammer arrestors shall be stainless steel and shall have a screwdriver latch.
- c. All substitutions must be pre-approved.

#### 11. Floor Drains

- a. Floor drains shall have nickel bronze grate with Phillips screws (no vandal resistant screws).
- b. Floor drains shall have removable sediment bucket in vandal resistant areas where debris may accumulate.
- c. All floor drains shall be set to have less 1/4 inch transition with finished floor.
- d. Vicinity floor drains that accommodate equipment, such as cooling tower discharge shall be sized to receive maximum flow rate at any time, or while other equipment is under routine operation. Drains used for other equipment and new equipment added during remodeling shall comply with the aforesaid.
- e. All drains penetrations abandoned or newly installed during new construction or remodeling will be integrity tested for water tightness.
- f. All substitutions must be pre-approved.

#### 12. Backflow Preventors

- a. Backflow preventors shall be Watts 909 or Febco 825Y or 825YA.
- b. Backflow preventors shall have bronze strainers installed upstream.
- c. Install 1/4-inch flare fittings with flare caps in all test cocks.
- d. Backflow preventors shall be installed per COS Standard Detail, available at [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).
- e. Provide concrete slab with sleeves around backflow preventor pipes and protective lockable metal cage (Sentry preferable).
- f. Fire Systems require a double check valve in accordance with Scottsdale's Backflow Ordinance #2346 ([www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes)) unless entire system is of potable piping and fittings.
- g. Facilities housing critical City essential functions or public services (Police Departments, Fire Stations, Senior Centers, City Hall, Human Resources, major recreational amenities, etc.) shall have uninterrupted water service in place by the placement of side-by-side backflow preventors to allow for isolation.
- h. All substitutions must be pre-approved.

#### 13. Roof Drains

- a. Roof drains shall have overflow and primary drain as a single flashed unit, except when overflow is thru a scupper.
- b. Both primary roof drain and overflow shall have strainers.
- c. Both primary and overflow roof drains shall continue separately to point of termination.
- d. Roof drains shall terminate to daylight with a manufacturer's outlet fitting designed for and sized to properly drain with unrestricted flow. The piping shall slope at minimum 1/4 inch per foot and shall not be trapped.
- e. All substitutions must be pre-approved.

#### 14. Water Heaters

- a. Water heaters shall be installed as per manufacturer's recommendations.
- b. All unions shall be brass type.



- c. Expansion tanks and recirculation pumps shall be provided with isolation valves and unions located in a readily accessible area with a height no greater than 3 feet above grade.
- d. At no time are water heater installations permitted above ceilings, attics, crawl spaces, cabinetry or voids where continuous occupancy is confined.
- e. COS prefers Rheem/Rudd or other pre-approved alternate.
- f. All solar installations are required to have an electric water heater system back-up sized per UPC with bypass capability to permit a quick transition to and from.
- g. Instantaneous water heaters are allowed only with prior approval on make, size and location.
- h. All substitutions must be pre-approved.

#### 15. Gas Lines

- a. Qualified welders certified through the Arizona Corporation Commission shall perform all welding of gas lines. Proof of certification shall be provided prior to work commencing.
- b. Alterations to existing gas lines shall require a pressure test of the entire system.

## DOORS & HARDWARE SYSTEMS

### 9-3.200

#### A. Hollow Metal Steel Doors

1. General Requirements for Doors and Frames must comply with A250.6, A250.7, A250.8 and SDI-117.
2. Steel: Cold rolled steel shall comply with ASTM A 366. Galvanized steel shall comply with ASTM A 653 and A 924.
3. Primer Materials shall comply with Comply with ANSI A250.10 test procedures and acceptance criteria for prime painted steel surfaces for steel doors and frames.
4. Painted Finish Materials shall comply with ANSI A250.3 test procedures and acceptance criteria for factory-applied finish for steel doors and frames.
5. Door Color Paint Material shall be the manufacturer's standard finish and color.
6. Hardware Locations: Unless otherwise specified, conform to recommendations of Steel Door Institute or Door and Hardware Institute for location of locks, hinges, latches, push-pull plates and bars, exit devices, handle sets, closer reinforcements, roller latches and arm pulls. There shall be a minimum of 3 butt hinges on doors over 60 inches high and not over 90 inches high and a minimum of 4 butt hinges on doors over 90 inches high and not over 120 inches high.
7. Louvers: Where specified provide factory-installed insert type louvers with vision-proof inverted Y baffles, louver blades 18 gage, frames 18 gage welded steel construction.
8. Primer: Finish exposed surfaces of doors and frames. Clean and treat with 3-stage iron phosphate; provide 1 baked-on shop coat of EPA-compliant gray synthetic resin, rust-inhibitive alkyd enamel primer, which has been tested at a recognized independent testing laboratory in accordance with, and meeting acceptance criteria of, ANSI A250.10.
9. Factory finished paint shall be used where indicated: Such surfaces shall be chemically cleaned and treated, provided with a heavy coat of electrostatically-applied baked-on finish paint, providing good resistance in mar and abrasion tests and weather and chemical resistance.
10. Before beginning installation, verify that substrate conditions previously installed under other sections are acceptable for installation of doors and frames in accordance with manufacturer's installation instructions and technical bulletins. Verify door frame openings

are installed plumb, true and level. Select fasteners of adequate type, number and quality to perform intended functions.

11. Set frames plumb, square, aligned, without twist at correct elevation.
12. Install frames plumb, straight and true, rigidly secured in place and properly braced; comply with ANSI/DHI A115-IG \*\*NOTE TO SPECIFIER\*\* Coordinate subparagraphs below with manufacturer's installation instructions to avoid conflicts.
13. Comply with Door and Hardware Institute (DHI) installation standards. Comply with SDI-105 and SDI-124. Fire Doors and Frames: Install in accordance with NFPA 80, current edition, unless specified otherwise.
14. Frame Installation Tolerances: Tolerance for Plumbness is plus or minus 0.063 inch (1.6 mm) measured through a line intersecting corner of vertical members and the head to the floor. Tolerance for Squareness is plus or minus 0.063 inch (1.6 mm) measured through a line 90 degrees from 1 jamb at upper corner to opposite jamb. Tolerance for Alignment is plus or minus 0.063 inch (1.6 mm) measured on jambs, through a horizontal line parallel to plane of wall. Tolerance for Twist is plus or minus 0.063 inch (1.6 mm) measured at face corners of jambs, on parallel lines perpendicular to plane of wall.
15. Finish exposed field welds to present a smooth uniform surface; touch-up with rust inhibitive primer. Touch-up exposed surfaces scratched or marred during shipment, installation, or handling and field prime scratches or bare edges with a rust inhibitive primer. Before application of finish paint coat, ensure that surfaces are dry and free of dirt, oil and dust. Apply finish coat over intact film, complying with application instructions of finish coat manufacturer. Install glazing materials and silencers.

#### **B. Wood Doors**

1. Wood doors shall be Architectural Woodwork Institute (AWI) Custom Grade.
2. Wood doors shall be used for interior use only.
3. Wood doors shall be solid core.
4. Lights in wood doors shall be no closer than 5 inches to the edge (6 inches in fire rated doors. Openings for lights or louvers shall not be more than 40% of the surface area.
5. Finish work in the factory shall meet AWI Quality standards for custom standards.

#### **C. Store Front (Aluminum frame with glass)**

1. Shall be medium 6-inch style
2. 10-inch top and bottom rails
3. Welded inner joints
4. Closer, surface mounted – Model LCN 4041
5. Lockset shall be Best (brand name) 7-pin removable core system.

#### **D. Automatic Doors**

1. Swing type door – this type is acceptable for single doors with low to moderate pedestrian traffic. Mount control devices in an obvious location to the path of travel approximately 36 inches AFF.
2. Slider/Bypass – Typically specify Bi-parting with breakaway panels.
3. If building has emergency generator, automatic doors should be on generator back up.
4. Lockset to accept the city's BEST removable core system, and to have all metal internal parts.



## E. Overhead Doors

### 1. Door Sections

- a. Steel door sections will be 24-gauge hot dipped galvanized steel. Sections shall be 2 inches thick.
- b. Sections shall have an oven baked 2-coat white polyester paint on both exterior and interior surfaces.
- c. Double end stiles will be 18-gauge hot dipped galvanized steel and be pre-painted white to match sections. Stiles shall be riveted to the tongue and groove meeting rails and shall be bonded at 8 separate locations to the face of the section with a high impact/tensile strength adhesive.
- d. Each section shall be roll formed with the RITS "Reinforced Integral Truss System" design.
- e. The bottom section shall be reinforced with an aluminum bottom retainer that will support a reversing edge of the Miller edge type.

### 2. Track and Hardware

- a. Track shall be 3 inch galvanized steel with reverse angle mounts to be used on masonry/steel jambs, or continuous mount angle when used on wood jambs.
- b. Hinges shall be minimum 14-gauge steel.
- c. 3-inch door struts shall be added to each door for added stability.
- d. Horizontal tracks shall be reinforced with a 2-inch horizontal angle brace.
- e. Torsion springs shall be oil-tempered wire engineered and calibrated to meet a minimum of 100,000 cycles. The spring shaft shall be a minimum of 1-inch solid steel shaft with center coupler.
- f. Galvanized aircraft cable with a safety factor of 7-1 shall be used with the appropriate cable drums.
- g. Insulation shall be expanded polystyrene with an r-factor of 7.35 or greater and shall be covered with a 26-gauge steel back skin when application requires.
- h. Motor and hand chain shall be capable of being operated with a keyed switch for exterior access.
- i. Doors to commercial grade as manufactured by Overhead Door Corporation or equal.
- j. Electric operators will be draw bar type in standard lift applications where headspace above opening is less than 1 foot. Jackshaft operators shall be used when head space above door opening exceeds 1 foot.
- k. Extra bracing shall be required on top section for draw bar applications.
- l. Electric operators shall be gear reducer driven with adjustable slip clutch on gearbox output shaft. Gear reductions shall be 40 – 1.
- m. Electric Operators shall be 115 volt, single phase, 60 hertz, 1 horsepower induction motors.
- n. Mechanical operators for jack shaft operated doors shall employ a disconnect chain that will disengage the electric operator and a hand pull chain for raising and lowering the door in the event of a power outage or system failure.
- o. Mechanical override for trolley or bar type operators will employ a means of disconnect at the user level by utilizing a cable through eyebolts and placing the hand pull at user level.

## F. Door Hardware

### 1. Hanging Devices

All hinges provided shall be provided by one manufacturer. No exposed bearing raceways will be permitted. Hinge type, sizes and quantity per leaf shall be as per the manufacturer's recommendations listed in the front of their catalogue. Doors requiring anti-friction hinges, including but not limited to Fire Doors, doors with self closing devices, entrance doors, and doors with high usage, shall use a concealed bearing system. The concealed bearing system utilized shall surpass the ANSI/BHMA A156.1 "Standard For Butts & Hinges" Grade 1 test criteria for all hinge sizes and weights (standard & heavy duty). All Concealed Bearing hinges shall be covered in writing by a Limited Lifetime Warranty guaranteeing the building owner that the product will not fail during the operational life of the building provided the manufacturer's recommended installation instructions are followed.

#### a. Hinge

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Stanley	661HD Continuous Hinges (Heavy Duty Exterior Doors)	628
	CB199 x NRP (Heavy Duty Exterior Doors)	630
	CB168 (Heavy Duty Interior Doors)	652
	CB179 (Medium Duty Interior Doors)	652

#### b. Alternate

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Roton	780-112HD (Heavy Duty Exterior Alum.Frames/ Doors)	628
Hager	BB1199 x NRP (Heavy Duty Exterior doors)	630
	BB1168 (Heavy Duty Interior Doors)	652
	BB1279 (Medium Duty Interior Doors)	652

#### c. Electrified Hinge

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Stanley	CECB179-66	626

#### Securing Devices

##### Exterior Doors:

Mortise Type Locks and Latches shall be heavy-duty with hinged, anti-friction, 3/4 inch throw latchbolt with anti-friction piece made of self lubricating stainless steel. Functions and design as indicated on the hardware groups. Deadbolt functions shall be 1 inch projection made of hardened stainless steel. Both deadbolt and latchbolt are to extend into the case a minimum of 3/8 inch when fully extended. Furnish locksets and latchsets with sufficient curved strike lip to protect door trim. Provide locksets with 7-pin interchangeable core cylinders. All mortise cylinders shall have a concealed internal set screw for securing the cylinder to the lockset. The internal set screw will be accessible only by removing the core from the cylinder body. All mortise locksets and latchsets must conform to ANSI A156.13, Series 1000, Operational Grade 1 and be listed by UL. Lockset must fit ANSI A115.1 door preparation. Locksets and latchsets to have self-aligning, thru-bolted trim. Auxiliary deadlatch to be made of one piece stainless steel, permanently lubricated. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers which contain a hollow cavity are not acceptable. Spindle to be such that if forced it will twist first, then break, thus preventing forced entry. Levers to be operated with a roller bearing spindle hub mechanism.



c. Electrical Locks/Hardware

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Best	45HW7DEU-IDH-LMS Communications Rooms Electrically Controlled Door Monitoring Switch Request to Ext Switch Latch Monitoring Switch	***
	93KW7DEU15D626 BEST ELECTRIFIED CYLINDRICAL LOCK DEU (NO RQE)	
	HES9600 630 HES ELECTRIC STRIKE SHALLOW RIM	630
	1521 SDC DOUBLE MAG LOCK	313
	8802-42"-EL-M1 SECURITRON TOUCH SENSE BAR 4'0	313
	E996L VON DUPRIN 99 E LEVER TRIM	630
	RXS1 VON DUPRIN RX SWITCH	
	TSBC SECURITRON DOOR LOOP	

d. Power Supply

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Altronix	AX-600ULXPD8 12/24 VOLT DC 5 AMP	
	Maxim33D 12 and 24 VOLT Power Supply	

\*\*\*ELECTRIC HINGE REQUIRED (Refer to Hanging Device for part number required)

e. Auxiliary Locks

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Best	5L Series (Cabinets & Drawers)	626
	61B Series 722 L (Padlocks)	626

f. Key System

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Best	7 pin x Removable Core Cyl. Standard and/or Peaks	626

**Final decision as to Standard or Peaks to be determined by Glenn Zellmer.**

Provide construction cores and keys during the construction period.

Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished on the same keyway (or key section) as the Owner's permanent keying system. Permanent cores and keys (prepared according to the accepted keying schedule) will be furnished to the Owner.

Permanent keys and cores shall be stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."

Grand Masterkeys, Masterkeys and other Security keys shall be transmitted to the Owner by Registered Mail, return receipt requested to:

Glenn Zellmer, Maintenance Technician  
 City of Scottsdale  
 Facilities Maintenance  
 7525 E. 2nd Street  
 Scottsdale, AZ 85251

Furnish keys in the following quantities:

- 4 each Masterkeys
- 2 each Control keys for permanent system
- 2 each Change keys each keyed core
- 9 each Construction masterkeys
- 1 each Control keys

The Owner, or the Owner's agent, will install permanent cores and return the construction cores to the Hardware Distributor. All Construction cores and keys remain the property Hardware Distributor.

g. Security Access Control

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Hirsch	DS47L-HI Scramble Key Pad	
	MB-9 Exterior Mounting Box	
	M2N or M8N2 Controller	
	Snib2 Network Controller	
	AEB8 Hirsch alarm expansion board	
	REB8 Hirsch Relay expansion board	
	MP41 Hirsch mounting post gooseneck	
	UMK Hirsch universal mounting kit	
	MELM2/MELM2 Line Supervision	
	SR-1078W Sentrol Magentic Contact Wide Gap White	
	SR-2505AL Sentrol Industrial Magnetic Contact	
	DS16(0 OR 1) DS160/161 (Radionics/Bosch) REX motion w/ sounder & timer	
	712BNP 12Y7A Power Supply/back-up Batteries	
	Wire Twisted Shielded Plenum Cable	
	Supply and Installation by Best Access Systems (480) 443-0990	

h. Exit Device

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Von Duprin	98EOor CD98L (at single door)	626
	9827EO x CD9827NL or L (pairs of doors) or;	626
	9847EO x CD9847NL or L (pairs of doors)	626
	98EO x CD98NL or L with Key Rem.Mullion	626
	98L-F (at single door)	626
	9827EO-F x 9827L-F (pairs of doors)	626
	9847EO-F x 9847L-F (pairs of doors)	626
	98EO-F x 98L-F with Key Rem.Mullion	626

- City to verify type of device and mullion locations

## i. Coordinator

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Trimco	3094 (Storage & Utility rooms)	626

- Use coordinator only where required by fire code

## j. Flush Bolts

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Trimco	3810 (Automatic) (metal doors)	626
	3815 (Automatic) (wood doors)	626
	3915 (Manual) (metal doors) (Storage & Utility rooms)	626
	3913 (Manual) (wood doors) (Storage & Utility rooms)	626

- Use Auto Flush bolts only where required by fire code

**2. Closing Device**

## a. Closer

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
LCN	4041 All door frames to be reinforced • EDA arms on all exterior and hard traffic openings • CUSH arms where required	689

## b. Door Operator

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Horton	Series 7000 "Easy Access" Electric Operator x Push Plate Switch	

**3. Stops & Holders**

## a. Door Holder

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
ABH	45H Mortise Series x 15H Trim	630
	4000 Series (36" +) Overhead Concealed	626
	4400 Series (36" +) Overhead Surface	
Ives	WS45 (Wall auto. holder)	626
	FS40 (Floor) (allow for max swing of door) • Backing required at wall holders	626

## b. Door Stop

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Trimco	W1210/12 or 1270 (Interior Floor) • Allow for maximum swing of doors • Backing required at wall holders	626
	1220-5 Kick down door holder	626
	1209 (Exterior Use)	BLK
	1229A All single door Metal Frames to have three All double door Metal Frames to have two	

**4. Accessories**

a. Kick Plate

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Trimco	10" x 2" LDW x .050" Thick x KO050 (Single doors)	630
	10" x 1" LOW x .050" Thick x KO050 (Pair doors)	630

b. Mop Plate

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Trimco	5" x 2" LDW x .050" Thick x KO050 (Single doors)	630
	5" x 1" LDW x .050" Thick x KO050 (Pair doors)	630

c. Push/Pull Plate

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Trimco	1017-3 x 1001-3	630
Alternate	Kick, Mop. & Push/Pull plates-Match Ives products	
Donjo	Kick, Mop. & Push/Pull plates-Match Ives products	

d. Lock Protector

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Ives	LG13	626

e. Threshold

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Pemko	271A/272A or as detailed on plans	Mill Alum.
	• Architect to coordinate with project conditions	

f. Smoke Seal

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Pemko	S88xHSS2000 (1/4 x 3/8 Silicone bulb with adhesive tape)	Brown

g. Weather Seal

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Pemko	29310CP or as listed (at jambs-captured gasket raceway)	628

h. Door Bottoms

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Pemko	57AV or as listed	628

i. Astragal

<i>Manufacturer</i>	<i>Model/Series</i>	<i>Finish</i>
Pemko	357SP or as listed	630
	• Astragal by door manufacturer at HM door	

**5. Hardware Finishes**

- a. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock for color and texture.
- b. Provide finishes which match those established by Builders Hardware Manufacturers Association (BHMA).
- c. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case of lesser quality than specified for the applicable units of hardware by referenced standards.
- d. Provide protective lacquer coating on exposed hardware finishes or brass, bronze and aluminum, except as otherwise indicated. The suffix "-NL" shall be used with standard finish designations to indicate "no lacquer".
- e. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in "Materials and Finishes Standard 1301" by BHMA, including coordination with the traditional U.S finishes shown by certain manufacturers for their products.

**G. Automatic Traffic Control Rolling Gates**

1. Power operator shall utilize electric motor and hydraulic drive.
2. The gate shall utilize V-groove steel wheels that follow an inverted angle iron track set in a concrete footing.
3. Keypad to control access must be compatible with the city's Hirsch system.
4. Operator shall be sized to accommodate a gate weighing 50% more than the gate installed.
5. The motors shall start and stop the gate softly.
6. Controller shall be equipped with lockable remote release device which shall allow motor wheels to be disengaged without the need to open the motor enclosure cabinet.
7. Gate shall be equipped with safety devices to prevent closures while objects are in the path of travel.

**9-3.300****BUILDING COMPONENTS****A. Restroom Stall Partitions**

1. Bath partitions shall be solid plastic, stainless steel, solid phenolic, or solid color reinforced composite in office buildings. Stall doors shall be adjusted to so that they return to the closed position and shall have an ADA compliant pull handle and locking mechanism. Hinges on stall partition shall be of the continuous type or shall bolt firmly to the partition. Internal pin hinges in stall doors are not acceptable.
2. Bath partitions in park restrooms and in vandal resistant construction shall be 8 inches x 6 inches x 16 inches masonry units or equal construction with hollow metal partial doors and frames, with 1-inch deadbolt locks. The interior of the accessible stall door shall have a handle style door pull and one self closing hinge.
3. Partition elements and installation shall comply with the ADA guidelines.

**B. Restroom Accessories**

1. JRT Junior Toilet Paper Dispensers for Park restrooms shall be 14-gauge stainless steel with padlock hasp as manufactured by Vandal Stop Products or approved equal.



2. Soap dispensers shall be Nice Touch plastic soap dispensers #380143; white; for office/nicer public facilities.
3. Sanitary napkin machines shall be “Bobrick” model #B-2800, surface mount or #B-3500 recessed mount, with 25 cent coin mechanisms.
4. Toilet seat covers without lock; surface mount; Bobrick #B-221. In park restrooms and other vandal resistant construction seat cover dispensers shall be 14-gauge stainless steel with padlock hasp as manufactured by Vandal Stop products or approved equal.

**C. Ceiling Tile**

Lay in tile shall be Armstrong #2712 Dune Second look II 24 inches x 48 inches x 9/16 inches scored panels with angled tegular edge, scratch resistant. Concession stands, locker rooms, kitchens, evaporative cooled areas and other places of high moisture or cleanliness shall be Armstrong #1721 Clean Room Mylar washable, soil resistant 24 inches x 48 inches x 15/16 inch ceiling tile.

**D. Roofing**

1. Modified bitumen roofing system required for low slope roofing. Metal roofs are preferred for sloped roofing surfaces.
2. Approved manufacturers for low slope roofing are: Performance Roofing, Firestone, Johns-Mansville
3. Applicable components (based on Performance Roofing [Derbigum] product for reference):
  - a. Roofing Membrane shall be Performance Roof Systems specification 1R1G-FR Derbicolor system applied over the existing roofing. Adhere to the current Performance Roof Systems Specifications for application of the Derbicolor membrane and flashing assemblies.
  - b. Base Sheet shall be PRS Glass Base, an oxidized asphalt fiberglass base sheet that meets or exceeds ASTM D-4601 Type II specifications.
  - c. Membrane shall be Derbigum GP FR, a 180-mil fire resistant atactic polypropylene (APP) membrane reinforced with a fiberglass mat and a polyester scrim and surfaced with a factory applied mineral slate surface.
  - d. Cold Adhesive shall be “Permastic” asphalt based adhesive containing Rubberlux formulated for adhering polymer modified asphalt roofing membranes and membrane components. Permastic as listed by Underwriters Laboratories, Inc., must be applied by squeegee.
  - e. Cants shall be mineral fiber conforming to ASTM C726 or perlite conforming to ASTM C728. Sizes may vary.
  - f. Flashing Adhesive shall be “Perflash” asphalt based adhesive containing Rubberlux formulated for adhering polymer modified asphalt flashing membranes to vertical surfaces.
  - g. Primer for Sheet\_Metal shall be Regular asphalt primer per ASTM D41.
4. All roofing products shall have earned the ENERGY STAR by meeting the specifications for energy efficiency and reliability as determined by the U.S. Environmental Protection Agency. Refer to its website at [www.energystar.gov](http://www.energystar.gov) for complete specifications and an updated list of qualifying products.

**E. Fire Alarm Panels and Fire Detection Devices**

All fire alarm panels must be non-proprietary in nature. This means that the main panel and all associated devices have the capability of being maintained, repaired and programmed by any qualified fire system company without having to contact the original manufacturer to obtain proprietary access codes.

Fire alarm systems are required to be complete, coordinated and operational system, including, but not limited to, alarm initiating devices, alarm notification equipment, control panel, auxiliary control panels, annunciators, dialers and other communication devices necessary for monitoring by a remote central station and complete wiring. The fire alarm system shall comply with the requirements of National Fire Protection Association (NFPA) Standard No. 72 for protected premises signaling systems and applicable Underwriters Laboratories Inc. (UL) - USA standards. The systems shall be manufactured by an ISO 9001 certified company meeting the requirements of BS EN9001: ANSI/ASQC Q9001-1994. The FACP and peripheral devices shall be manufactured 100% by a single U.S. manufacturer.

When a fire alarm situation is detected by one or more of the alarm initiating devices, the following events shall immediately occur:

1. The alarm LED shall flash.
2. A local piezo electric signal in the control panel shall sound.
3. A backlit LCD display shall indicate all information associated with the fire alarm condition, include the type of alarm point and its location with the protected premises.
4. All associated system outputs - alarm notification appliances and relays shall be activated.

## F. Interior Finishes

Compliance with the following standards is required by the City of Scottsdale's Hazardous Waste Policy and Procedures guideline, which is an element of its Environmental Management Plan.

### 1. Interior Paints

- a. Paints formulated for on-site interior application as a solid protective, decorative, or functional adherent film shall meet the Green Seal Standards & Certification GS-11 as published by Green Seal, Inc., see [www.greenseal.org](http://www.greenseal.org).
- b. Anti-corrosive paints formulated and recommended for interior use in preventing the corrosion of ferrous metal substrates shall meet the Green Seal Standards & Certification GS-03 as published by Green Seal, Inc., see [www.greenseal.org](http://www.greenseal.org).

### 2. Floor Coverings: Carpets

- a. Carpet products shall meet The Carpet and Rug Institute (CRI) "Green Label" Testing Program Standards. They shall have a maximum emission factor of total Volatile Organic Compounds (VOC) of 0.5 mg/m<sup>2</sup> - hour, see [www.carpet-rug.com](http://www.carpet-rug.com).
- b. Carpet cushion products shall meet CRI "Green Label" Testing Program Standards. They shall have a maximum emission factor of total VOC of 1.0 mg/m<sup>2</sup> - hour, see [www.carpet-rug.com](http://www.carpet-rug.com).
- c. Carpet adhesive products shall meet the CRI "Green Label" Testing Program Standards. They shall have a maximum emission factor of total VOC of 10.0 mg/m<sup>2</sup> - hour, see [www.carpet-rug.com](http://www.carpet-rug.com).

### 3. Floor Coverings: Resilient

Resilient flooring products shall meet the Resilient Flooring Covering Institute's FloorScore certification program (see [www.rfci.com](http://www.rfci.com)). Products shall be tested and certified by the Scientific Certification Systems, SCS-EC-10-2004 Environmental Certification Program - Indoor Air Quality Performance, which uses the emission concentrations and VOCs listed under the California Section 01350 program. This program sets parameters for indoor air emission testing per ASTM Standard D5116-97.

## HVAC SYSTEMS

## 9-3.400

The provisions of these standards regulate the design of the mechanical systems. Emphasis shall be placed on system efficiency, energy and water conservation, economy of maintenance, and utility expense to minimize life-cycle costs.

It shall be the responsibility of the consulting engineer to secure all as-built drawings and to make field inspections as required, and to obtain all information needed for the work.

1. Provide complete mechanical systems including:
  - a. HVAC system
  - b. Fans, sheet metal work, registers, grilles and diffusers
  - c. Piping distribution system and insulation
  - d. Humidification systems
  - e. Temperature controls
  - f. Commissioning/Testing, adjusting and balancing
2. Modify, relocate and extend existing service to accommodate new work. Relocate existing components as required for new system.
3. Coordinate with Owner's room uses to provide adequate system for all contract area.
4. Coordinate location of mechanical systems to avoid interference with location of other systems, including piping and lighting fixtures.
5. Do not cut structural elements without prior written approval.

### A. General Requirements

1. All installations shall conform to all national and local codes as adopted by the city.
2. Provide "As Built" drawings on CD-rom discs, AutoCad format and hard copy.
3. All units shall have disconnects mounted within 6 feet of units.
4. All disconnects to be Heavy Duty Blade type.
5. All control wiring shall be routed and installed into EMT conduit.
6. All seal-tight conduit shall be metal core, with metal connectors
7. Flex duct limited to 6 feet, Foil backed
8. Insulate condensate lines 10' from indoor air handler, condensate lines shall be copper. Condensate lines shall have a union installed within 6 inches condensate outlet of unit.
9. No standing pilots
10. Use standard size and type filters as defined by Eco Air C-35 or other local A/C filter manufacturer.
11. 2 inch minimum thickness, pleated, filters only, with return air filter frame to ceiling mounted. Use filter grill type or equivalent and specified in submittal form.
12. Sight glasses on liquid lines of split direct exchange (DX) systems.
13. Refrigerant piping shall be brazed using filler material meeting AWS A5.8.
14. All control wiring will be run in electrical metallic tubing (EMT).
15. Split DX systems will have total refrigerant charge weighed and the number will be furnished to the HVAC crew.
16. Filter boxes shall not contain obstructions in filter tracks, screwhead, thread and rivet.
17. Only personnel with a universal certification for refrigerant recovery and handling shall be permitted to work on the refrigeration equipment for the city.
18. Have the abandoned in place materials removed before a job is started. All unused equipment related to the upgrade shall be removed.
19. After the service/install is completed contract shall "thoroughly clean area of debris that they caused."

20. 10% of funds shall be withheld by city until job is completed to satisfaction of city Inspector and Facilities Management Division.

### **B. Submittals**

1. Submit for approval product data, operating and maintenance data, balancing reports and record documents.
2. Submit signed and sealed shop drawings for review and as required per contract.
3. Prior to the completion of a project, a minimum of 2 sets of maintenance manuals, operating manuals, parts manuals, as-built and shop drawings of all equipment covered in this section shall be submitted to the city, with 1 set specifically to the HVAC team.

### **C. Quality Assurance**

1. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for 3 years. Use journeyman level installers with universal certification for proper refrigerant usage. Deliver, handle and store materials in accordance with manufacturer's instructions.
2. Arrangement of systems indicated on the drawings is diagrammatic, and indicates the minimum requirements for mechanical work. Site conditions shall determine the actual arrangement of systems. Take field measurements before fabrication. Be responsible for accuracy of dimensions and layout. Overhead ductwork shall be laid out to obtain maximum headroom.
3. All installations shall be designed for total system energy efficiency and conservation. HVAC systems should be designed based on a life cycle cost analysis. A comprehensive energy study shall be performed for all buildings 10,000 square feet or more, using computer simulation programs such as TRACE, DOE2, or others approved for use by the federal government. The computer simulation program shall be used to perform the energy analysis and evaluation of alternative building methods, materials, orientations, lighting and HVAC systems. A diversity factor will not be calculated into the sizing of HVAC equipment to eliminate the down sizing of the equipment.
4. All systems shall be designed so that they are easily adaptable to the future growth of the facility.
5. All design considerations shall comply with American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) standards.
6. Exterior design conditions:
  - a. Summer - 120 degree F Dry Bulb, 76 degree F Wet Bulb
  - b. Winter - 34 degree F Dry Bulb
7. Interior design condition:
  - a. Cooling - 72 degrees F Dry Bulb
  - b. Heating - 74 degrees F Dry Bulb
  - c. Evaporative cooling - 1 air change/2 minutes
8. No equipment, piping, hangers, ducting, or electrical will be abandoned in place. All unused equipment will be removed.
9. All systems shall be designed to provide optimal cooling and heating comfort levels in all zones at all times.
  - a. All zones shall operate independently (cool/heat) of each other.
10. The HVAC Facilities Coordinator or designee shall be involved in the commissioning of the HVAC system.

**D. Products/Materials**

1. Piping: Schedule 40 seamless black steel, American Society of Testing and Materials (ASTM) A 53, Grade A;
2. Type L copper pipe ASTM B68. PVC shall not be permitted for use.
3. Where a single backflow preventor feeds 2 or more areas such as a cooling tower and a chilled water loop, dual checks with unions shall be installed on each to prevent water from one area flowing to another area. Prefer Watts #7, suffix U or equal.

**E. Component Standards**

1. In large systems (10 tons or more), utilize several small units.
2. In larger systems (100 tons or more), when a single unit is called for, utilize high efficiency, multiple-compressor, water-cooled chiller.
3. Telephone and Emergency Equipment Requiring cooling 24 hours a day, shall have separate independent back-up cooling units, under energy management control.
4. All equipment shall be rated at Air Conditioning and Refrigeration Institute’s (ARI) conditions.
5. Unitary air conditioners and heat pumps shall be selected based on seasonal energy efficiency ratio (SEER) (units less than 5.4 tons) and energy efficiency ratio (EER) (units over 5.4 tons) ratings. SEER rating should be a minimum of 13.0 and EER rating should be a minimum of 12.
6. Chillers shall utilize HFC refrigerants. Chillers shall not exceed consumption of 0.56 kw/ton (100% full load in accordance with ARI standards).
7. All electric motors exceeding 1,000 operating hours annually shall be energy efficient and shall have minimum acceptable nominal efficiency for single speed motors as specified below. Energy efficiency rating must be made using testing methodology IEEE-112, Test Method B.

HP	Min. Rated EFF (%)
1 – 4	84.0%
5 – 9	89.5%
10 – 19	91.5%
20 – 49	92.8%
50 – 99	94.1%
100 – 124	94.5%
125 & Greater	95.0%

**F. Placement of Equipment**

1. To minimize safety hazards and to provide for ease of accessibility for maintenance and repair, major air conditioning and heating equipment components (compressors, air handlers, heaters, etc.), shall not be located in areas immediately above hard ceilings. If design suggests that major equipment be located in hard ceiling areas, approval of the HVAC team is required for location and panel type. In all cases, an adequate permanent work platform shall be provided for maintenance functions.
2. Roof-mounted equipment shall be curbed. Roof-mounted equipment shall not be located closer than 6 feet from roof edge. Safe access must be provided for all roof-mounted equipment.
3. Equipment shall not be placed in a space in such a manner that the maintenance, repair, removal of the equipment requires any alteration to the doorway, roof, ceiling, floor, wall or adjacent equipment.

4. Multi-storied facilities shall be designated with a minimum of 1 air handler per floor.
5. Central air distribution shall be accomplished by variable air volume systems with variable fan speed rather than constant volume systems for the same system static pressure. (This approach reduces energy use during part load conditions and takes advantage of each zone's operational characteristics).
6. Consider economizer cycle (free cooling) by using "plate & frame" heat exchanger for systems with cooling tower capacity exceeding 100 tons and energy management and temperature control system (EMTCS) for automated valve control.
7. Multi-zone package air conditioning equipment shall not be used- no exceptions.
8. When HVAC equipment is located on the roof, and roofs have multi levels or parapets over 2' in height, ladders must be installed. The installed ladders shall serve the purpose of safety moving from one level to another with materials or equipment. Platforms shall be located, at selected locations, next to parapets for the purpose of safely lifting materials or equipment up the side of the building.

#### **G. Air Distribution System**

1. Air shall be supplied to the occupied space by low-velocity ducts.
2. To minimize air circulation fan horsepower, ductwork shall be designed for the lowest practical total pressure drop.
3. All Fibrous glass duct systems shall be installed using NAIMA Standards.

#### **H. Small Buildings (Up to 25 tons)**

1. Utilize packaged and split heat pump and a/c systems with a SEER rating of 13.0 or higher with economizers.
2. Utilize gas-fired furnace.
3. All units shall be ground mounted when possible.
4. Sight glasses shall be installed on all split systems.
5. All units should have clear access and be installed so they may be maintained without the use of ladders.

#### **I. Medium Buildings (25-100 tons)**

1. Utilize air cooled high efficiency package chiller units.
2. Utilize reciprocating or Scroll compressors.
3. Utilize gas-fired boiler (heating) (Acceptable manufacturers are Parker, Cleaver-Brooks or Unilux.)
4. Fan powered variable air volume (VAV) boxes.
5. Four pipe system or Central air handling station with variable frequency drive (VFD) and hot water coil in fan powered VAV box.
6. All outdoor units shall be ground mounted when possible.
7. Sight glasses shall be installed on all split systems.
8. All units should have clear access and be installed so they may be maintained without the use of ladders.
9. Indoor heating and cooling closed loop systems shall use a bladder type expansion tank.
10. 2" taps with ball valves for chilled water closed loop systems for future access and cleaning.
11. Emergency taps with valves for chilled water and condenser water lines. Taps will be sized for the installation of temporary equipment to keep the HVAC system running during equipment failures.



**J. Large Building (100 tons and Greater)**

1. High efficiency chiller.
2. Screw or Centrifugal compressor shall have open drive motors using VFD
3. Gas fired boiler (heating).
4. Fan powered VAV boxes.
5. Four pipe system or Central air handling station with VFD and hot water coil in fan powered VAV box.
6. System shall be capable of using 100% outside air or plate and frame heat exchanger for economizer operation.
7. All units shall have clear access and be installed on the ground floor.
8. Efficiency - .65KW per ton-ARI Certified in the form of an Integrated Part Load Value (IPLV).
9. Indoor heating and cooling closed loop systems shall use a bladder type expansion tank.
10. 2" taps with ball valves for chilled water closed loop systems for future access and cleaning.
11. Emergency taps with valves for chilled water and condenser water lines. Taps will be sized for the installation of temporary equipment to keep the HVAC system running during equipment failures.

**K. Pumps**

1. Pumps shall be of the back pullout design, end suction, close coupled base mounted.
2. High EEF motors.
3. Isolation valves shall be included in discharge and suction line.

**L. Cooling Towers**

1. Non-sprinkled dual cell.
2. Plastic fill and metering devices.
3. Vertical discharge, propeller fan only.
4. Motor out of the air stream.
5. Tower shall incorporate a bypass system low ambient conditions.
6. VFD for periods of low load conditions.
7. All towers shall have ladders and safety railing for accessing top of tower.

**M. Water Treatment**

1. Indoor loop pot feed, engineered to size
2. Cooling tower outdoor open loop - solid state (Lakewood model 2175-RTC) controller.
3. Chemical pump and 55 gallon plastic drum with containment system.

**N. Energy Management Control System**

1. All buildings utilizing 50 tons or greater cooling systems shall be wired to and controlled by the city's existing energy management system (EMS).
  - In the event that a building 50 tons or less has specifications for an Energy Management Control System it shall conform to the City of Scottsdale Building Automation Systems Guidelines.
2. All buildings shall conform to the City of Scottsdale Building Automation System Guideline Specification, see [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

**O. Evaporative Coolers**

1. CELdek or GLASdek media shall be used in all coolers
2. Evaporative cooling units manufactured by United Metal Products or equal are shall be installed.
3. On low static applications with short duct drops into large open spaces axial fan style coolers shall be used. United Metal Products Fan-Air or equal.
4. On higher static applications standard "squirrel cage" blower wheel coolers shall be used. United Metal Products Cel-Air or equal
5. To prevent scale buildup a timed-based basin flushing system shall be installed in all coolers.
6. Evaporative coolers drains shall be piped with minimum Type "M" copper to floor sink or custodial sink.
7. Evaporative supply water lines shall be minimum Type L copper on roof mounted units
8. Evaporative supply water lines shall have a ball valve shut off at each units
9. Central pumping station required for projects with 12 evaporative coolers or more.

**P. Commercial Ice Machine**

1. Manitowoc ice machines are the only acceptable product.
2. Chillers to have hydrogen fluorine carbon HFC 134a refrigerant.
3. Remote mounted condensers on indoor applications.
4. No water-cooled condensers.

**Q. Exhaust Fans**

1. All exhaust fans 1/2 hp and under shall be direct drive and over 1/2 hp shall be belt driven.
2. All belt driven blowers shall have grease zerk fittings.

**9-3.500****ELECTRICAL SYSTEMS**

The provisions of these standards regulate the design of electrical systems. Emphasis shall be placed on system efficiency, energy conservation, economy of maintenance, and utility expense to minimize life-cycle costs.

It shall be the responsibility of the consulting engineer to secure all as-built drawings and to make field inspections as required, and to obtain all information needed for the work.

1. Provide completed electrical systems.
2. Modify, relocate and extend existing service to accommodate new work. Relocate existing components as required for new systems.
3. Structural elements shall not be cut without prior written approval.
4. All service sections (electric meter sections) shall be located outside the building served.

**A. General Electrical Requirements**

1. All installations shall conform to all national codes and City Amendments including National Electrical Code - NFPA 70, OSHA and NFPA 70E "Standard for Electrical Safety in the Workplace". Performing work on energized electrical equipment is prohibited, unless specifically allowed by NFPA 70E 2004.
2. Provide protective device coordination study and arc flash analysis. Place hazard/risk warning labels on all electrical distribution equipment, motor control centers and electric panels.



3. Outlet and switch devices shall be commercial grade and back wired / no solderless connections allowed at devices.
4. All convenience outlets shall be commercial grade back wired and 20 amp rated
5. All exterior and interior outlets when ground fault circuit interrupter (GFCI) protection is required shall be 20 amp rated.
6. When used for controlling interior and exterior lighting, devices shall be 120/277 volt 20 amp rated for inductive loads. These devices shall include snap switches, motion sensors, photo cells and clock contacts.
7. Circuit breakers at panels shall not be used as the sole device for switching of lighting loads except designated emergency and night lighting circuits.
8. When contactors are used for switching of parking lot lighting, exterior building lighting, site lighting and security lighting, they shall be photo cell controlled when dusk to dawn needs are required and digital clock with battery back up controlled when dual level lighting is required.
9. All interior and exterior lighting shall be high intensity discharge HID type utilizing T-8, PL, compact fluorescent, metal halide, high pressure sodium, or induction lamps.
10. When illumination of grounds and walkways is required, building exterior lighting in conjunction with pole lights shall be used.
11. Bollards, in ground up lights, quartz and low voltage lighting not allowed.
12. All pole lighting shall be mounted on concrete bases a minimum of 30 inches above grade.
13. Inline fuses shall be installed at hand holes in all poles for each fixture. Install tamper proof screws at each hand hole cover.
14. Concrete in ground J-boxes shall be installed at base of each pole for termination of conductors serving each pole. Do not pull all circuits through pole. All terminations shall be waterproof with sufficient clearance from cover and conduit stubs so as not to damage conductors. Duct seal conduits.
15. All conduits and boxes shall be concealed as much as possible, armored cable not allowed.
16. All exterior exposed conduits extending above grade and up to 8 feet shall be (a) galvanized rigid or (b) intermediate metal conduit secured with unistrut or 1-hole straps with back.
17. Exterior surface mounted boxes shall be steel or malleable iron and secured with machine screws / no ALUM or ALUM alloy boxes to be used.
18. All interior wiring shall be 600 volt THWN stranded.
19. All exterior wiring shall be 600 volt XHHW stranded.
20. All wiring shall be 600 volt stranded. Solid conductors prohibited.
21. Panels shall have hinged fronts and bolt in breakers.
22. Panels shall be surface mounted, if not provide at least four ¾ inch conduits for future use.
23. Transformers for power and lighting shall be K-rated.
24. Emergency power for emergency and exit lighting shall be separately derived, either by generator or as battery-powered fixtures. No inverters shall be installed in fixtures.
25. Exit lights shall be LED type.
26. When polyphase circuits share a neutral and serve computer and electronic equipment that neutral shall be oversized one time, for example, #12 conductors with #10 AWG neutral.
27. Stainless steel covers shall be on all interior devices/switches, receptacles, dimmers and fan speed controls.
28. All 120/208 panels serving computer or electronic loads shall be equipped with an isolated ground.

29. All junction boxes shall be identified with panel ID, circuit ID and circuit voltage.
30. All switch and outlet plates shall be labeled with CKT and PNL ID.
31. In all trenches with electrical conduits, install a red 3-inch warning tape with the inscription CAUTION BURIED ELECTRIC LINES BELOW 6 inches to 10 inches above conduits.
32. Maintain a clear 25-foot radius from pole base to any large landscape items, such as trees, shrubs, etc.
33. All contactors motor starters shall be NEMA not IEC.
34. All fluorescent lamps shall be cool white @ 3500 k. T 12 lamps prohibited.
35. All exterior lighting fixtures and lenses shall be vandal resistant.
36. Electrical panels shall be located in rooms designed exclusively for electrical equipment. Any storage is prohibited.
37. Electrical distribution and utilization will be designed to have the lowest possible fault current potential.
38. SES 400 amp and above shall be fused.
39. All fuses shall be of low peak type. Provide trip indicating fuses if available.
40. All anchors shall be reversible. There should be no plastic anchors on the exterior of the building.
41. All safety switches shall be heavy duty rated, blade type, solid neutral, with equipment grounding kit.
42. Liquid-tight flexible conduit shall be UL listed industrial steel core. Use listed metal fittings. Installed lengths shall not exceed six (6) feet.
43. Provide metal warning signage on doors to each electrical room. To read as follows:

Danger High Voltage  
Electrical Equipment Room  
NO STORAGE  
OSHA Article 1910.303

# CONSTRUCTION BID DOCUMENTS

This section provides specific requirements for construction bid documents for city public works projects. It gives direction for preparing construction drawings, discovering a project's special provisions, creating a bid schedule and estimating construction costs.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# CONSTRUCTION BID DOCUMENTS

## 9-4

### GENERAL INFORMATION

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9-4.000

The project's scope of work will contain specific requirements for the construction documents provided by the consultant. Generally, the consultant provides the following bidding documents to the City of Scottsdale. The Project Manager determines how many copies of each document are needed.

- Construction Plans
- Project Special Provisions
- Project Schedule of Bid Items
- Construction Cost Estimate

### CONSTRUCTION DRAWINGS

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9-4.100

Original drawings submitted to the city will remain the property of the city. All drawings will be on clear 4-mil Mylar with original ink, mechanically plotted, or photographically reproduced. Ammonia based sepias or electrostatic media will not be accepted by the city. All mechanically plotted drawings will be of such quality that the plotted medium does not peel or scratch off with reasonable handling. The consultant will guarantee the quality of the drawings and replace any drawings on which the lettering and/or line work peels, smudges, or is otherwise deemed to be unacceptable by the city. Such drawing replacement will be at no cost to the city.

The design engineer will provide the city with electronic files of the final construction drawings, special provisions, calculations, reports, schedule of bid items, and other documents as specified. Drawing formats will be in MicroStation, the latest version. The special provisions and schedule of bid items will be in Microsoft Word and/or Excel, the latest versions. Electronic files will be submitted on CD.

- Architects shall supply Facilities Management with a floor plan with door tags showing door and room numbers in dwg format for the City's locksmith's use. Dwg drawings shall be submitted to Facilities Management Department at least sixty (60) days prior to the completion of the project.
- Evacuation Routes - all new and remodeled facilities shall have evacuation routes posted in acrylic sign holders in strategic locations.

### SPECIAL PROVISIONS/TECHNICAL SPECIFICATIONS

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9-4.200

"Invitation To Bid" documents follow a specific format for all Capital Improvement Projects. They include city drafted boiler plates consisting of the notice inviting bids, information for bidders, general conditions, bid forms, contracts, bonding and insurance forms, etc. The project's special provisions will supplement the city's general conditions.

Upon request, the city will provide the consultant with a sample format of the project's special provisions, including a compilation of guideline special provisions. The consultant must thoroughly review the special provisions guideline, determine which portions are applicable for his/her specific project, and determine the need for supplementation.

The special provisions are updated as needed; therefore, the consultant should request a current version for each capital project design.

**9-4.300**

**BID SCHEDULE**

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The consultant will complete a standard schedule of bid items consistent with the city's required format, available online at [www.ScottsdaleAZ.gov/design/](http://www.ScottsdaleAZ.gov/design/).

Bid item numbers will be taken from a master list of items that is available from Capital Project Management (CPM) Plan Review. Project specific item numbers that are not listed will be coordinated with CPM Plan Review.

The master bid item list is frequently updated so the consultant should request a current version for each design project.

**9-4.400**

**CONSTRUCTION COST ESTIMATE**

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The engineer / architect will provide the city with a final detailed estimate of the probable cost of construction.

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# NATIVE PLANTS

# 10

This chapter identifies protected native plants within the city, describes the process for requesting a Native Plant Permit when relocating, removing, or destroying these plants and presents guidance for salvaging and transplanting saguaros.



## DEPARTMENT RESOURCE INFORMATION

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City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# NATIVE PLANTS

# 10-1

## PROTECTED NATIVE PLANTS

## 10-1.100

Specific native plants are protected as described in the city's Native Plant Ordinance. Photos of indigenous plants, including the protected native plants listed below, are available at: [www.ScottsdaleAZ.gov/codes/nativeplant](http://www.ScottsdaleAZ.gov/codes/nativeplant).

### A. TREES

BOTANICAL NAME	COMMON NAME
<i>Acacia constricta</i>	Whitethorn Acacia
<i>Acacia greggii</i>	Catclaw Acacia
<i>Berberis haematocarpa</i>	Red Barberry
<i>Canotia holocantha</i>	Crucifixion Thorn
<i>Celtis pallida</i>	Desert Hackberry
<i>Cercidium floridum</i> ( <i>Parkinsonia florida</i> )	Blue Palo Verde
<i>Cercidium microphyllum</i> ( <i>Parkinsonia microphyllum</i> )	Foothills Palo Verde
<i>Chilopsis linearis</i>	Desert Willow
<i>Juniperus monosperma</i>	1-Seeded Juniper
<i>Olneya tesota</i>	Ironwood
<i>Populus fremontii</i>	Cottonwood
<i>Prosopis spp.</i>	Mesquite
<i>Quercus spp.</i>	Scrub Oak
<i>Rhus ovata</i>	Sugar Sumac
<i>Vauquelinea californica</i>	Arizona Rosewood

### B. CACTI

Botanical Name	Common Name
<i>Carnegia gigantea</i>	Saguaro
<i>Ferocactus spp.</i>	Barrel
<i>Fouquieria splendens</i>	Ocotillo
<i>Peniocereus greggii</i>	Desert Night-Blooming Cereus
<i>Yucca elata</i>	Soaptree Yucca

## 10-1.200

**NATIVE PLANT PERMITS**

No protected plant material as defined in [Section 10-1.100](#) may be relocated, removed, or destroyed without a native plant permit. No native plant permit shall be issued unless an application is submitted in conjunction with an existing or proposed development for approval. The submittal is separate from any other native plant submittal required for a Zoning Case, a Development Review Board case, or a Preliminary Plat Case. For a native plant permit to be issued, the following items (identified as A through I below) must be submitted to the City of Scottsdale One Stop Shop. If the applicant takes no action to complete a submittal, it will be purged from the system after six months and fees will not be refunded.

## 10-1.201

**SUBMITTAL REQUIREMENTS****A. Native Plant Application Form**

A completed Native Plant Narrative and Application Form are required. See [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms) for these forms.

**B. Native Plant Program**

A complete Native Plant Program with the following information is required:

1. Submit three copies of a native plant plan on an aerial photograph with a project (or site plan) overlay. On the plan, show the location of all protected native plants (by tag number) within the construction boundaries, and an additional 50-foot buffer beyond the construction limits, or to the edge of the property.
  - a. The aerial site plan shall include the project name, a scale that is numeric and graphic (minimum scale is 1 inch = 50 feet), a north arrow, a vicinity map, the adjacent street names, and the name of the company performing the inventory.
2. Submit an inventory list, minimum 8.5 inch x 11 inch sheet, identifying the tag number, species (list both common and botanical names), size, general condition, and salvage status (remain in place, relocate, or remove) of each protected plant within the area of disturbance plus a 50-foot buffer. If a plant is noted as non-salvageable, the reason or reasons for the assessment must also be noted. A protected native plant includes trees with a 4-inch caliper trunk or larger, and cactus that are 3 feet tall or taller.
  - a. Measurements are to occur prior to any pruning or branch removal operations, and must take into account the entire base of the tree.
  - b. In order to measure the trunk of a tree, it must first be determined whether the tree is single-trunk or a multi-trunk.
  - c. A single trunk tree is a tree with a single trunk protruding above grade, attached to a single root ball. The diameter of single-trunk trees is measured at a point 12 inches above grade. If the tree starts to branch before that point, the measurement is taken at the point where the branching begins.
  - d. A multi-trunk tree is a tree with more than one trunk (2 of which are 3 inches or greater in diameter) protruding above grade from a single root ball and being separated by any portion of each. Multi-trunk trees are measured by the following method:
    - i. Square the diameter of each trunk
    - ii. Add the squared diameters of all the trunks together
    - iii. The square root of the total above is the working diameter for that tree.
  - e. A cactus is measured from the base at grade to the highest vertical point of the plant. The height of all arms is also included in the total. Ocotillo and Yucca are also measured in this way, except that the flower stalk of the Yucca is not included.
3. A salvage contractor must have prior methodology approval by city staff. A native plant inventory will not be accepted from a contractor whose methodology has not received

prior approval. Approval includes demonstrating a thorough knowledge of the native plant ordinance and boxing techniques. If the cactus salvage contractor is different than the tree salvage contractor, both methodology will need to be reviewed and approved. If the salvage contractor is different than the party responsible for the inventory, the salvage contractor must provide a letter either accepting the assessment by the party responsible for the inventory or provide documentation for any proposed adjustments to the inventory. Please contact the Current Planning Department at 480-312-7000 for information on obtaining approval to be placed on the list of native plant salvage contractors.

- a. Due to the large number of Saguaros that have expired after being transplanted, and the length of time for the decline of the plant to be identified, the city, in conjunction with the Desert Botanical Garden, has established baseline standards for Saguaro relocation, see [Section 10-1.300](#). Any deviation from an approved methodology or the Standards for Saguaro relocation requires prior city review and approval. Contact the Current Planning Department at 480-312-7000 for more information.
4. Submit a relocation program identifying the ultimate use and placement of salvaged plant material, including any proposals for plants to be removed from the project.
5. Submit a nursery location for the storage of salvaged plants.

### C. Letter of Authorization

Submit a letter of authorization from the property owner or authorized agent identifying a salvage contractor whose methodology has been previously approved by the city. For single-family home submittals, the name of the salvage contractor will be noted on the native plant portion of the planning submittal. Because the salvage contractor is listed on the native plant permit issued through the One Stop Shop; a different salvage contractor may not be employed once the native plant permit has been issued. If the owner wishes to employ a different salvage contractor, approvals must be granted and a revised permit will need to be issued. The name of the new contractor must appear on the native plant permit before salvage work commences.

### D. Notice of Intent to Clear Land

Submit a copy of the stamped Arizona Department of Agriculture "Notice of Intent to Clear Land" form. To obtain the form contact the Native Plant Section of the Arizona Department of Agriculture at 602-364-0935, or visit their website at [www.azda.gov/ESD/nativeplants.htm](http://www.azda.gov/ESD/nativeplants.htm).

### E. Notice of Tagging of Plants in the Field

Submit notice that all protected plants have been tagged in the field in conformance with Section 46-116 of the Scottsdale Revised Code.:

- White tag for plants remaining in place.
- Red tag for plants being relocated/removed.
- Blue tag for plants that are non salvageable.

The independently hired native plant salvage contractor will be responsible for tagging each plant accordingly. Plants with white tags or no tags will be protected for the duration of the project regardless of salvage status. Tags will be numbered to correspond to the inventory numbering. In addition, construction boundaries, NAOS (Natural Area Open Space), and other undisturbed areas need to be clearly staked in the field with plastic fencing, yellow nylon rope, or other means approved by a City Inspector. The City Inspector can be contacted by calling Inspection and Land Survey Services at 480-312-5750.

### F. Natural Area Open Space exhibit for site

Submit a copy of the NAOS exhibit for the site, showing locations of both natural and revegetated areas to be dedicated. All NAOS easements must be staked and roped in the field

at the time of the native plant field walk. The native plant field walk is done before any site disturbance and is conducted with the Planning Inspector.

### **G. Review Fee**

An initial fee is charged for the first hour in plan review. Additional review time will be charged per hour at the time the permit is issued. For single-family homes, this fee is included as part of the planning site plan review fee. City of Scottsdale fee information is available on-line at [www.ScottsdaleAZ.gov/bldgresources/counterresources](http://www.ScottsdaleAZ.gov/bldgresources/counterresources).

### **H. Prior Approvals**

If a project requires approval from the Development Review Board, the City Council, and/or the Board of Adjustment, the native plant permit will not be issued until the above mentioned approvals have been finalized. This prior-approval requirement includes single-family homes. The native plant permit for all single-family custom homes will be issued concurrent with the building permit. Please note that no native plant permit can be issued unless there is an approved development plan for the site.

### **I. Permit Fee**

At the time a permit is issued a fee will be due to the city. Fees vary by project, and consist of a base fee plus a per-plant charge for each native plant to be removed, relocated, or destroyed. An administrative fee will also be added to the cost of each permit.

## **10-1.202**

### **REVIEW CRITERIA**

In conformance with Section 7.503 of the Scottsdale Zoning Ordinance, native plant program approval is based on demonstration of the following items.

#### **A. Density / Intensity of Development**

The density/intensity of development for the approved land use is an important element in determining plant retention and salvage. The proposed Relocation Program needs to provide reasonable plant salvage, protection, and storage; and ensure consistency with existing neighborhood character.

#### **B. On-Site Natural Amenities**

The site plans are designed to protect and incorporate significant on-site natural amenities (such as aesthetic, unique, and historic, etc.). These relationships promote and enhance the character of the native environment rather than contrast with or domesticate it.

#### **C. Plant Inventory**

A vegetation inventory and analysis of all protected plants provides a clear comprehensive overview and listing of plant materials, their conditions, and their physical relationships on-site to aid the site planning and determination of plant salvageability.

#### **D. Revegetation and Natural Density**

A conceptual analysis and design of the site revegetation and/or landscaping ensures the character of the project is consistent with the natural density, distribution, and maturity of the vegetation on the adjacent properties.

#### **E. Excess Plants**

Salvaged plants are required to be stored on-site and replanted within landscaped and/or revegetated areas. If conceptual design analysis reveals an excess supply of salvageable

plants, the Relocation Program may propose alternative projects within the city where the salvaged plants may be relocated.

## **F. Incorporation of Plants in a Project**

Incorporation of plant material into site design takes into consideration the following:

### **1. Conditions where protected plants remain in place:**

- a. Along natural washes where exposed roots, erosive soils, and steep slopes often make relocating plants difficult.
- b. Where dense massing of plant materials provides an aesthetic setting, but individual plants may be unsalvageable.
- c. In boulder outcroppings where digging out the root ball would be impractical.
- d. Where unstable soils decrease the ability of the root ball to hold together.
- e. When large specimen material does not lend itself to relocation.
- f. When seasonal conditions reduce the salvageability rate to the point of making relocation undesirable.
- g. When plants occur in a unique grouping or form.
- h. When plants are located within designated scenic and vista corridors.
- i. Within land use buffers such as scenic corridor or NAOS easements.

### **2. Conditions where protected plants may be salvaged:**

- a. When retention of protected plant material is impractical due to reasonable construction, physical conditions are good, and plant material falls within the construction boundaries.

### **3. Conditions where protected plants may be removed from the site:**

- a. When the allowable site density is high and there are minimal areas for replacing plant material .
- b. When conditions yield more plant materials than can be relocated on the project.

In these cases it is anticipated that part of the native plant program will include making excess plant material available to other projects, preferably non-profit, within the city. For more information on potential benefactors, contact Current Planning at 480-312-7000. To remove any protected plant from a site, the persons removing the protected plants must submit, to the City Manager or their designee, a plan demonstrating that one or more of the conditions noted above exists, and that all State of Arizona requirements have been met.

### **4. Protected plant materials may be destroyed:**

- a. When the physical condition of a protected plant is poor due to disease, infestation, mutilation, age, or poor natural conditions; and is located within the construction boundaries.
- b. If a protected plant is involved in a safety issue and cannot be relocated, removed, or protected in place.

## **G. Additional Information**

In addition to the above criteria, other items that may be requested to ensure compliance with the Scottsdale Zoning Ordinance:

1. Topographic map with contours at a minimum of 5-foot intervals to show steep slopes.
2. Identification of natural features such as bedrock and boulder outcroppings.
3. General information on the soil types that exist on the site.
4. Drainage patterns of all washes carrying 50 cfs or greater.
5. Zoning of all adjacent properties.

6. Location of all dedications and easements both on the property and adjacent to it, including but not limited to NAOS easements, drainage easements, rights-of-way dedications, utility easements, etc.
7. Proposed site plan as it relates to all of the above, and including but not limited to the following:
  - a. Street alignments.
  - b. Driveways locations.
  - c. Areas to be revegetated.
  - d. Parking areas

#### **H. Native Plants Not Protected by Ordinance**

Scottsdale strongly encourages the salvage and reuse of plants that are not on the protected list, including small cactus and shrubs. Although this effort is voluntary, the city maintains a list of non-profit organizations and private companies who are interested in salvaging small, unprotected plants either for re-use on the same site or for purchase or donation for use in other landscape or restoration projects. Contact Current Planning at 480-312-7000 for a copy of this list. In most cases, the salvage of existing plant material is more cost effective, drought and animal resistant, and achieves a natural appearance in a shorter period of time.

### 10-1.203

#### **INSPECTIONS**

City staff will conduct the following inspections during the permit review process and the construction of the project.

##### **A. Field Walk**

The field walk is part of the first review of the Native Plant Program for commercial developments, plats, and miscellaneous projects. For single-family homes, the field walk is part of the Preliminary Site Inspection. The purpose of the field walk is to verify the accuracy of the native plant inventory and to identify other items that may allow for the greatest preservation of protected plant material.

##### **B. Preliminary Site Inspection**

A Preliminary Site Inspection (#42 Pre-Site Inspection) occurs once a Native Plant Permit is issued, but prior to any salvage activities. At the time of this inspection, the applicant must present the copy of the approved Native Plant Program stamped "Inspectors Copy," and a copy of the permit. A permit inspection card, also issued with the permit, is required to be posted on the site at all times.

##### **C. Nursery Inspection**

The nursery/maintenance inspection is done to assess the results of the native plant relocation process. It takes place approximately 3 months after the last of the salvageable plants have been placed in the nursery and before the issuance of the Certificate of Occupancy for the project. The plant identification number from the inventory list needs to be clearly marked on the box or plant. To schedule an inspection, call 480-312-5750.

##### **D. Native Plant Tracking Form**

The Native Plant Tracking Form tracks the overall success rates of salvaged protected plants. These numbers are quantified as part of the City of Scottsdale's Sustainability Indicators Project. The tracking form is submitted to the City Inspector. Any project that requires a native plant permit needs to submit a tracking form. The tracking form must be submitted within three months from the commencement of salvage operations or prior to the issuance of the Certificate of Occupancy for single family residential. The Native Plant Tracking Form is available online at [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).



**E. Final Inspection**

The final inspection is to verify the ultimate location of relocated plant material, and should be done in conjunction with City Inspection. To receive the Certificate of Occupancy, call 480-312-5750, or call the automated scheduling system, at 480-312-5796 and provide the corresponding permit number.

**ACTION ON APPLICATIONS**

After a Native Plant Permit application has been submitted, city staff may take one of three courses of action:

1. The application may be approved and the permit issued.
2. The application may be approved with conditions, and the permit issued.
3. The application may be denied, with conditions for approval.

Action taken on an application may be appealed to the Development Review Board in conformance with the procedures in Section 7.500 of the Scottsdale Zoning Ordinance. Submittals that are not acted upon within 6 months will be purged from the system and any fees paid are not refundable.

**10-1.204****SAGUARO SALVAGE & TRANSPLANTATION****10-1.300**

1. Dig around saguaro leaving a minimum of 2 feet of root out from the base and deep enough to allow for removal of a reasonable portion of the root ball.
2. Prune any shredded or damaged roots and dust with sulfur and streptomycin.
3. Planting hole should have 1 foot of loose native soil and be large enough to accommodate the larger lateral roots.
4. Saguaro should be re-planted at the same depth or no more than 6 inches deeper than its original position.
5. Mark original north orientation so saguaro may be re-planted in the same direction to reduce risk of sunburn.
6. Pack thoroughly, using a mixture of native soil and sandy soil to promote root growth and better drainage.
7. After transplant, allow 2-3 weeks for damaged roots to heal before first water.
8. Water, by drip irrigation, every 2 weeks during the first year and once a month during the second year after transplant. If planted alone or within a nursery, place four 1-gallon per hour emitters, evenly spaced 2 to 3 feet from base, and allow water to run for 8-15 hours per session.
9. If planted as a final location within landscaped areas, planting saguaro at least 4 feet from small shrubs or a tree is ideal.
10. If a moat system is approved by the city, a circular swale should be dug that is approximately 1 foot wide by 4 inches to 6 inches deep at center, and at a distance 3 to 4 feet out from the saguaro trunk. Water slowly and thoroughly twice a month for no less than 2 years.
11. Developer will ensure that maintenance shall be provided for a minimum of 2 years from the time of placement at its final location.
12. Saguaro is established once it responds to rainfall by expanding.
13. Variations from the above process will require approval from a City Inspector.

10-1.400

**NON-PROTECTED PLANTS AND TREES**

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Plants and trees which are not protected by the Scottsdale Revised Code native plant provisions, but which are necessary for on-site revegetation, are suitable for transplanting, or are necessarily uprooted for road building or similar construction, as determined by city staff, shall be stockpiled during construction and shall be replanted in on-site landscape areas by the developer before the final site inspection.



## Chapter 11

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# FIRE



This chapter describes how the building code, fire code, infrastructure system and site design policies are integrated into an effective fire protection design. It lists links to applicable code and trade organizations and to other chapters describing related design topics.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
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Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# FIRE

# 11-1

## GENERAL INFORMATION

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### 11-1.000

This section provides Fire & Life Safety information, guidelines and references specific to site planning and development. For updated information see the Fire & Life Safety website, [www.ScottsdaleAZ.gov/departments/](http://www.ScottsdaleAZ.gov/departments/) or call Fire Plan Review at 480-312-7080.

The following websites provide safety codes, standards and general information:

- American Fire Sprinkler Association [www.sprinklernet.org](http://www.sprinklernet.org)
- Arizona Automatic Fire Alarm Association [www.azafaa.org](http://www.azafaa.org)
- Home Fire Sprinkler Coalition [www.homefiresprinkler.org](http://www.homefiresprinkler.org)
- International Code Council [www.iccsafe.org](http://www.iccsafe.org)
- National Fire Protection Association [www.nfpa.org](http://www.nfpa.org)
- National Fire Sprinkler Association [www.nfsa.org](http://www.nfsa.org)
- Occupational Safety and Health Administration [www.osha.gov](http://www.osha.gov)
- Society of Fire Protection Engineers [www.sfpe.org](http://www.sfpe.org)

## OVERVIEW OF FIRE PROTECTION

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### 11-1.100

1. Adequate fire protection design must coordinate compliance with building and fire codes, site design policies and public infrastructure needs. The principal considerations for fire protection are addressed online in Codes, Ordinances and Regulatory Documents at [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes).

Examples of principal considerations for building design are:

- a. Fuel load.
  - b. Building structure size.
  - c. Structure construction methods.
  - d. Built-in fire protection such as: fire sprinklers, fire alarms, hose valves, etc.
  - e. Number of occupants.
  - f. Hazard level of the use of the structure.
2. Site planning considerations include:
    - a. Building access by fire trucks.
    - b. Site access from adjacent streets.
    - c. Water supply in terms of system pressure and volume capacity.
  3. Examples of how these considerations work together:
    - a. The required number of access points depends on the volume of the fuel load (number of structures, square footage of structures and/or hazard level).
    - b. Topography (Hillside, ESLO, washes, etc.).
    - c. Available water volume influences on fire protection planning (gallons per minute (GPM), pressure and hydrant systems, built in fire protection and operations).

- d. Remediation of site challenges to provide appropriate access, adequate water supply, or overcoming difficult topography may be accomplished by increasing the protection level of construction methods and materials.
- e. Remediation may also be accomplished using built-in fire protection such as increasing the protection level of fire sprinklers, hose valves, fire alarms, etc.
- f. Many remediation methods are available in the City Code, may require staff approval, or may require a variance. Consideration of remediation methods and consequences should start during or immediately following Pre-Application and should be concluded as much as possible prior to case approval. This will facilitate a successful and timely review and approval of building plans, improvement plans and deferred shop drawings.

## 11-1.200

### CASE APPLICATION

Review of applications for site development is a coordinated effort by Fire Plan Review and Planning and Development staff. Applications include: Pre-application, Zoning, Development Review, Preliminary Plat, Abandonment and Conditional Use Permits.

- For development process guidelines, see [Section 1-1.100](#).
- For preliminary site review minimum requirements, see [Section 1-1.200](#).

Site planning issues to be addressed are typically communicated to the applicant by Planning and Development Services staff or by Fire Plan Review staff. Appropriate fire apparatus access, turning radius, and fire hydrant placement are necessary considerations for site planning. A preliminary site plan review must include:

1. Turning radius templates
2. Building construction type
3. Square footage of each floor level
4. Identification of hazardous conditions and use/occupancy classifications

A new process is being formulated that will incorporate a Preliminary Fire Review Worksheet. This will be provided to the applicant at Pre-application, and will be completed as much as possible and returned with the formal application. This Worksheet is simple and should be considered a living document to progress in completion and complexity as the project moves through the planning process. Ultimately the information will be completed and provided in the Project Data/Code Summary in the building plan construction document plan set.

The applicant will receive a 30 day case review letter from the planning coordinator with a list of Fire Ordinance Requirements which become stipulations to the application. The requirements are based on the plans submitted with the application and are intended as a guide for the applicant's design team. These requirements are to be noted on the construction documents under a general Fire Department note block.

A marked-up site plan will accompany the requirements provided to the applicant which will identify the fire lanes, fire hydrants, Fire Department connection locations, etc. The applicant's design team shall utilize this information to prepare improvement plans.

For more information see the Master List of Construction Document Requirements, visit [www.ScottsdaleAZ.gov/bldgresources](http://www.ScottsdaleAZ.gov/bldgresources).

## 11-1.300

### PLAN REVIEW & PERMITTING

The Fire Plan Review staff participates in plan review & permitting for the built environment. For information about plan review & permitting see [Section 1-1.400](#) and [Section 1-2.100](#).

1. The Plan Review department is located at One Civic Center, 7447 E. Indian School Road, Suite 125, Scottsdale, AZ 85251.
2. For Permit Services visit the One Stop Shop in Suite 100 of the same building; or see [www.ScottsdaleAZ.gov/bldgresources/counterresources/](http://www.ScottsdaleAZ.gov/bldgresources/counterresources/).
3. For more information see Fire & Life Safety, see [www.ScottsdaleAZ.gov/departments/](http://www.ScottsdaleAZ.gov/departments/) or call Fire Plan Review at 480-312-7080.
4. For specific information about Plan Review & Permit requirements:
  - a. Plan Review & Permitting [Section 1-1.400](#)
  - b. Construction Plan Submittals [Section 1-1.403](#)
  - c. Improvement Plan Review Requirements [Section 1-2.100](#)
  - d. Digital Plan Submittals [Section 1-2.200](#)
  - e. Fire Protection Design [Section 6-1.500](#) through [Section 6-1.508](#)
  - f. Final Improvement Plans Preparation [Section 6-1.600](#)
  - g. Fire Code [www.ScottsdaleFD.com](http://www.ScottsdaleFD.com)
  - h. Forms, Checklists & Submittal Guides, select F for Fire. [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms)
  - i. Permit Services - One Stop Shop [www.ScottsdaleAZ.gov/bldgresources/counterresources/](http://www.ScottsdaleAZ.gov/bldgresources/counterresources/)

Fire & Life Safety also conducts Plan Review & Permitting for Special Events. For a Special Event application packet see [www.ScottsdaleFD.com](http://www.ScottsdaleFD.com).

For more information see Fire & Life Safety at [www.ScottsdaleAZ.gov/departments/](http://www.ScottsdaleAZ.gov/departments/) or call 480-312-1855.

## FIRE INSPECTIONS AND CERTIFICATE OF OCCUPANCY

11-1.301

1. For guidelines on these topics see [Section 1-1.500](#) and [Section 1-1.600](#).
2. For an Inspections Request form, [www.ScottsdaleFD.com](http://www.ScottsdaleFD.com).
3. For further information call Fire Inspections at 480-312-1855.

## EMERGENCY ACCESS & FIRE LANES

11-1.400

Technical information applicable to emergency access in commercial and residential development is referenced below. Considerations for commercial and residential site planning may include: appropriate access to structures including temporary construction access, fire lane position and widths, or fire apparatus turning radius.

Emergency access is required in accordance with the Fire Code, as amended, [www.ScottsdaleAZ.gov/codes/fireord](http://www.ScottsdaleAZ.gov/codes/fireord).

Fire Ordinance Requirements and a Fire Civil Submittal Checklist is located under Forms, Checklists & Submittal Guides at [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms).

### A. General

1. Knox Applications, call 480-312-7080 or 480-312-1855.
2. Access During Construction [Section 1-1.405](#)
3. Temporary Construction Fire Lane [Section 1-1.405](#)
4. Construction Access Sign [Section 1-1.405](#) and [Figure 11.1-1](#)
5. Vertical Curbs, Emergency Vehicles [Section 5-3.113](#)
6. Median Crossing for Emergency Vehicles [Section 5-3.113](#)
7. Traffic Signal Emergency Vehicle Pre-emption [Section 5-4.106](#)

**B. Commercial Site Planning**

1. International Fire Code (IFC) Ordinance, COS Standard Detail No.2365, [www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).
2. Fire Lane Dimensions [Figure 2.1-1](#)
3. Commercial On-Site Fire Access Turn-Arounds [Figure 2.1-2](#)
4. Emergency Access Provisions [Section 2-1.503](#)
5. Fire Lanes and Fire Lane Signage [Section 2-1.802](#)

**C. Residential Site Planning**

1. General Residential On-Site Fire Access Turn-Arounds [Figure 2.1-2](#).
1. Residential Gated Entrances [Section 2-1.900](#) and [Figure 2.1-4](#)
2. Residential Driveways greater than 300 feet [Section 2-2.308](#)
3. Hillside Residential Development [Section 2-2.308](#)
4. Hillside Residential Driveways [Figure 2.2-4](#)
5. Operations Platform [Section 2-2.308](#) and [Figure 2.2-5](#)
6. Fire Turn-out for Extended Driveways [Section 2-2.308](#) and [Figure 2.2-6](#)
7. Dead End Streets, Cul-de-sacs [Section 5-3.1100](#)
8. Neighborhood Traffic Management [Section 5-9.000](#)

**11-1.500****WATER SUPPLY**

References below are specific to water supply requirements for fire operations and fire hydrant layouts in residential and commercial developments.

1. Fire Hydrant Flow Test Permit [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms)
2. Fire Hydrant Flow Test Summary [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms)
3. Dead-End Lines [Section 6-1.403](#)
4. Thrust Restraint [Section 6-1.411](#)
5. Pipe Cover [Section 6-1.413](#)
6. Backflow Prevention & Cross Connection Control; General [Section 6-1.417](#)
7. Fire Hydrant locations, including layout, placement and number [Section 6-1.502](#)
8. Fire Lines [Section 6-1.504](#)
  - a. 1-1/2 - 2 inches fire line connection; MAG Standard Detail No. 2362-1\*
  - b. 3 inches and larger fire line connection; MAG Standard Detail No. 2362-2  
\*[www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp)

**11-1.600****FIRE PROTECTION**

References below are specific to Fire Protection and Water Supply.

1. General, Ordinance Requirements, Design Policy [Section 6-1.500](#)
2. Fire Flow Requirements [Section 6-1.501](#)
3. Hydrant Locations [Section 6-1.502](#)
4. Pavement Markers [Section 6-1.503](#)
5. Fire Sprinklers [Section 6-1.505](#)
6. Sprinkler System Design [Section 6-1.506](#)
  - a. Fire Sprinkler Riser Detail - Vertical Installation #1; MAG Standard Detail No. 2368\*
  - b. Fire Sprinkler Riser Detail - Vertical Installation #2; MAG Standard Detail No. 2369\*

7. Remote Fire Department Connection [Section 6-1.507](#)
  - a. Remote Siamese Connection Detail, MAG Standard Detail No. 2367\*
8. Auxiliary Storage Tanks [Section 6-1.508](#)
9. Fire Department Permit Applications, such as tents and other (bonfires, LPG exchange, special events, fireworks displays, etc) [www.ScottsdaleFD.com](http://www.ScottsdaleFD.com)
10. Fire Alarms [www.ScottsdaleAZ.gov/codes/fireord/](http://www.ScottsdaleAZ.gov/codes/fireord/)
11. Fire Hydrant Flow Test Summary [www.ScottsdaleAZ.gov/bldgresources/forms](http://www.ScottsdaleAZ.gov/bldgresources/forms)

## SIGNAGE

## 11-1.700

References below are specific to the signage requirements for the Fire Department. See MAG Standard Detail 2300 Series - Water Information \*[www.ScottsdaleAZ.gov/design/COSMAGSupp](http://www.ScottsdaleAZ.gov/design/COSMAGSupp).

1. Pavement Markers For Fire Hydrants; MAG Standard Detail No. 2363\*
2. Fire and Emergency Access and Delineation; MAG Standard Detail No. 2364\*
3. Fire Lane Sign; MAG Standard Detail No. 2365\*
4. Construction Access Sign [Section 1-1.405](#) and [Figure 11.1-1](#)

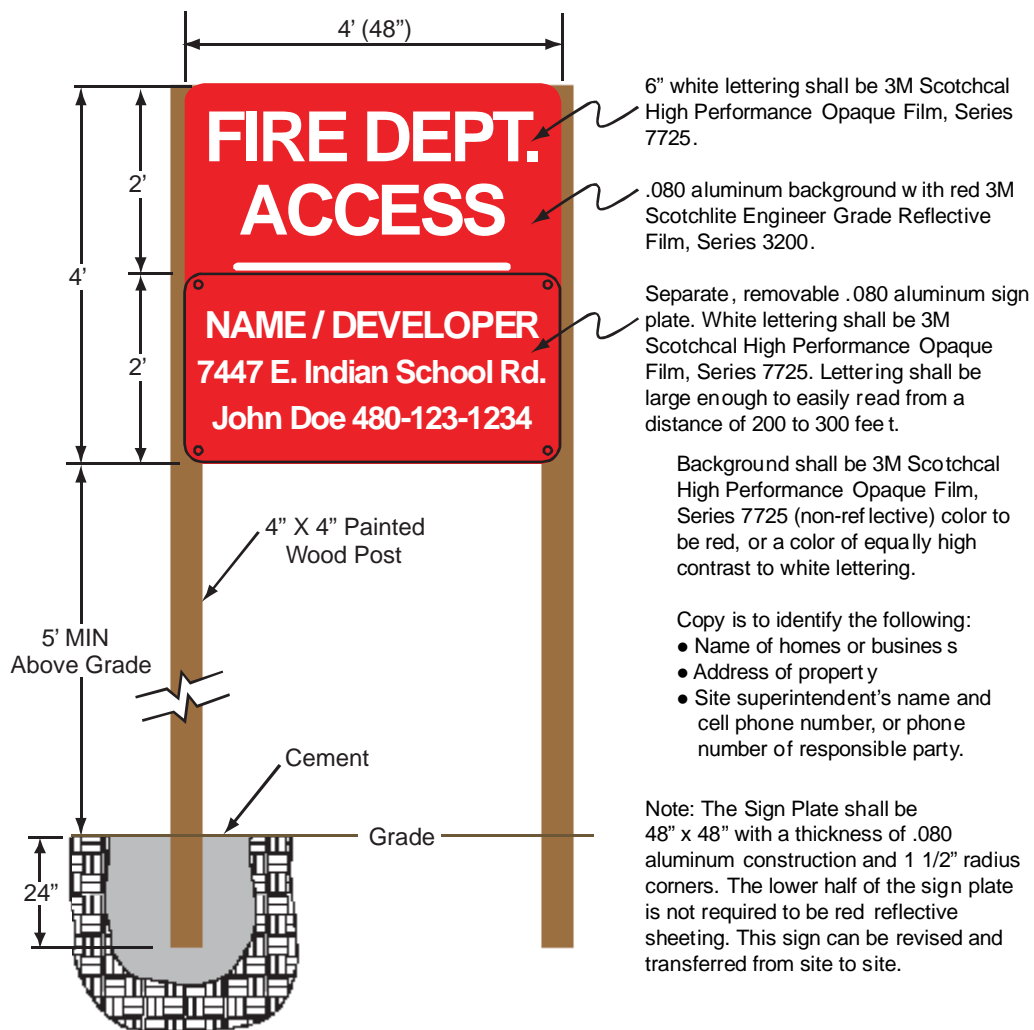


FIGURE 11.1-1 CONSTRUCTION ACCESS SIGN

**11-1.800****WILDLAND BOUNDARY**

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For information about Firebreaks see [Section 2-2.501](#) paragraph D.2. For Wildland Fire Prevention see [www.ScottsdaleAZ.gov/fire/](http://www.ScottsdaleAZ.gov/fire/).

**11-1.900****HIGH RISE CONSIDERATIONS**

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For Fire Flow Requirements information see [Section 6-1.501](#). For project specific information call Fire Plan Review at 480-312-7080.

Radio amplification testing for emergency services is required in basements, buildings exceeding 35' above grade, and other buildings where construction materials may hinder emergency radio signaling. Testing shall be conducted to verify if adequate radio signal strength is, or is not, available. Adequate signal strength shall be determined at or before the time of completion of rough framing or rough electrical. City emergency services shall be contacted prior to that stage to assist the developer's contractor or specialist in testing the structures for signal strength. If it is determined that the signal strength as listed in Scottsdale amendment to NEC 810 is not adequate, the owner shall provide a system of a radio amplification to meet these radio frequency strength requirements. No certificate of occupancy will be issued until final approval of the testing and/or inspection of the system. Refer to City of Scottsdale, Planning & Development Services Department, Interpretations and Applications of the Building Codes & Regulations #98-5.

**11-1.1000****DOWNTOWN**

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Renovation and/or reclassification of existing R-3 and IRC single family residential occupancies to Group B office business occupancies may be equipped with a light hazard commercial sprinkler system utilizing a four head flow calculation. The intent is to result in smaller fire line taps, supply lines, and riser sizing. See Fire Code, Interpretation and Applications.

Residential fire sprinkler retrofits in existing single family R-3 or IRC residences may be evaluated, at owners request, for the opportunity to maintain existing supplies and meter sizes.

For project specific information call Fire Plan Review at 480-312-7080 or see [www.ScottsdaleAZ.gov/codes/fireord](http://www.ScottsdaleAZ.gov/codes/fireord).



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# DISABILITY ACCESS

# 12

This new section provides general information and assistance for designing and constructing facilities within the city that provide access to people with various disabilities. It also provides links to specific accessibility guidelines and best practices and guidance for planning and construction, site access and signage and ROW considerations.



## DEPARTMENT RESOURCE INFORMATION

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Aviation/Airport	15000 N. Airport Dr.	480-312-2321
Advance Planning Services	7506 E. Indian School Rd.	480-312-7990
Capital Project Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Current Planning	7447 E. Indian School Rd., Suite 105	480-312-7000
Customer Service	7447 E. Indian School Rd., Suite 100	480-312-7800
Downtown Group	4248 N. Craftsman Ct.	480-312-7750
Facilities Management	9191 E. San Salvador Dr.	480-312-5999
Fire & Life Safety/ Inspections	8401 E. Indian School Rd.	480-312-1855
Fire Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Inspections & Land Survey	9191 E. San Salvador Dr.	480-312-5750
Parks Department	7340 Scottsdale Mall	480-312-2915
One Stop Shop/Permit Services	7447 E. Indian School Rd., Suite 100	480-312-2500
Plan Review	7447 E. Indian School Rd., Suite 125	480-312-7080
Records Division	7447 E. Indian School Rd., Suite 100	480-312-2356
Solid Wastewater Management	9191 E. San Salvador Dr.	480-312-5600
Stormwater Management	7447 E. Indian School Rd., Suite 205	480-312-7250
Street Operations	9191 E. San Salvador Dr.	480-312-5626
Transportation	7447 E. Indian School Rd., Suite 205	480-312-7696
Water Resources	9388 E. San Salvador Dr.	480-312-5685
City of Scottsdale	<a href="http://www.scottsdaleaz.gov">www.scottsdaleaz.gov</a>	

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# DISABILITY ACCESS

# 12-1

## GENERAL INFORMATION

## 12-1.000

This section provides general information and assistance in the design and construction of facilities within the City of Scottsdale (COS) to provide access to people with various disabilities. References to more specific information and details are provided. This section is under development.

Search for other information about disability access on the city web pages [www.ScottsdaleAZ.gov/accessible](http://www.ScottsdaleAZ.gov/accessible), or call the COS ADA Coordinator at 480-312-2246 for updated information.

## OVERVIEW OF ACCESSIBILITY GUIDELINES

## 12-1.100

The following standards and best practices should be used when designing and constructing accessible facilities. In most instances, adhering to federal accessibility standards assures conformance with City of Scottsdale codes (contact the ADA Coordinator at 480-312-2246 for parking space requirements and other exceptions).

### A. Americans with Disabilities (ADA) Accessibility Guidelines (ADAAG) (1991)

All Scottsdale city owned or operated facilities, or any place of “public accommodation” (open to the public) or commercial facility where new construction or a significant remodeling commenced after January 26, 1992, shall be built in accordance with ADAAG standards.

[www.access-board.gov/adaag/html/adaag.htm](http://www.access-board.gov/adaag/html/adaag.htm)

### B. HUD Fair Housing Accessibility (FHA) Guidelines (FHAG) (1991)

All “covered multifamily dwellings” designed and constructed for first occupancy after March 13, 1991 must be accessible to and usable by people with disabilities.

[www.fairhousingfirst.org/index.asp](http://www.fairhousingfirst.org/index.asp)

### C. International Building Code (IBC) (2006)

Chapter 11, Accessibility controls the design and construction of facilities for access by physically disabled persons. Accessibility requirements for the ADA and FHA are incorporated into the International Codes as the codes are updated. The City of Scottsdale has amended Chapter 11 as follows:

#### 1. 1101.2 Design:

Buildings and facilities shall be designed and constructed to be accessible in accordance with this code and ICC A117.1, and Arizona Revised Statutes (ARS) Section 41-1492.03 (the Arizonans with Disabilities Act), R 10-3-403 and R 10-3-404, which includes 28 CFR Part 35, and 28 CFR 36, and the Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG).

Section 1107 is amended to read as shown:

2. 1107.7 General Exceptions:

Where specifically permitted by Section 1107.5 or 1107.6, the required number of Type A and Type B units is permitted to be reduced in accordance with Sections 1107.7.1 through 1107.7.6.

3. 1107.7.6 Condominium Projects:

Type A units are required to be designed but not required to be constructed unless requested. When no Type A units are requested units shall be constructed as a Type B unit. [www.iccsafe.org/safety/accessibility/](http://www.iccsafe.org/safety/accessibility/) and <http://www.iccsafe.org/e/prodshow.html?prodid=3000S03>

**D. ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities (2003)**

This is a nationally recognized standard of technical requirements for making buildings accessible. Published since 1961, it is referenced by federal documents and state accessibility laws. The IBC also references the ICC/ANSI A117.1 in the 2006 building standards.

[www.iccsafe.org/safety/accessibility/](http://www.iccsafe.org/safety/accessibility/) and [www.iccsafe.org/e/prodshow.html?prodid=9033S03](http://www.iccsafe.org/e/prodshow.html?prodid=9033S03)

**E. Arizonans with Disabilities Act (AzDA) (ARS Section 41-1492.03)**

Arizona adopted the ADAAG as the State building standard with an effective date of January 26, 1993. [www.azada.gov/RightsInfo/PubAccom.asp](http://www.azada.gov/RightsInfo/PubAccom.asp)

**F. City of Scottsdale Revised Codes and Ordinances**

Chapter 31, Article III Building Code – adopts the AzDA, ADAAG, and IBC as the Scottsdale building code. [www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes)

Zoning Ordinance Article IX, 9.105. Mobility impaired accessible spaces – Stipulates slightly different accessible parking space requirements than federal requirements.

[www.ScottsdaleAZ.gov/codes](http://www.ScottsdaleAZ.gov/codes)

**G. U.S. Access Board Revised Draft Guidelines for Accessible Public Rights-of-Way**

This document provides guidance for public rights-of-way, such as public sidewalks, curb ramps, accessible routes, ground and floor surfaces, and bus stops and shelters. These guidelines are considered “best practices” in this field and recommended for use.

[www.access-board.gov/prowac/draft.htm#Text](http://www.access-board.gov/prowac/draft.htm#Text)

## 12-1.200

## PLANNING & CONSTRUCTION

Design professionals are encouraged to use the accessibility information in this manual and the links to resource documents in [Section 12-1.000](#). Should specialized situations occur, contact the ADA Coordinator, 480-312-2246, for compliance recommendations. Consultations regarding disability access can be provided at any stage of the process from design to inspections.

## 12-1.201

### ONGOING BARRIER-REMOVAL

The AZ Attorney General and U.S. Department of Justice offices expect existing public facilities to engage in ongoing “readily achievable” barrier-removal whether making any other alterations. For a discussion of “readily achievable”, see [www.ada.gov/adata1.pdf](http://www.ada.gov/adata1.pdf).

The ADA prioritizes barrier-removal in the following manner:

1. Enabling individuals with disabilities to enter the facility.
2. Providing access to those areas where goods and services are made available to the public.
3. Providing access to restrooms, if restrooms are provided for use by customers or clients.
4. Removing any remaining barriers, such as lowering telephones.

**ALTERATIONS****12-1.202**

When alterations are made to improve the function of a business, accommodate a change or growth in services, or as part of a general renovation, the requirements for barrier-removal at that time are greater because the alteration is part of a larger construction or replacement effort. Any changes made to a facility shall include improved access within that element and may cause need for further accessibility improvements.

Up to 20% of the total cost of an alteration project shall be used towards barrier-removal as long as barriers still exist.

**NEW CONSTRUCTION****12-1.203**

Use IBC [www.iccsafe.org/e/prodshow.html?prodid=3000S03](http://www.iccsafe.org/e/prodshow.html?prodid=3000S03), and/or ADAAG [www.access-board.gov/adaag/html/adaag.htm](http://www.access-board.gov/adaag/html/adaag.htm) to guide the design of new construction. Universal access for people with any ability level is easily accomplished when planned for from the inception of the project.

**PLAN REVIEW****12-1.204****A. References**

Identify on the plan cover sheet which accessibility standards were followed. For example: ADAAG 1991, IBC 2006.

## B. Accessibility Notes

The preferred method for identifying accessible elements in a plan is to provide a note such as is shown in the example below in Figure 2.4-1. Summarizing accessibility notes at the beginning of the plan document assists staff in identifying all of the accessible accessibility elements in the plan.

### EXAMPLE: ACCESSIBILITY NOTES

1. Accessible entrances to the building shall be identified by the international symbol of accessibility.
2. Exterior exits which are located adjacent to accessible areas and within 6 ft. of adjacent ground level shall be accessible.
3. Accessible ramps required by ANSI shall not have slopes exceed 1 ft. in 12 ft.
4. The surface of ramps and ground surfaces shall be roughened or shall be of slip resistant materials.
5. An accessible route of travel 3 ft. wide min. must be provided to all portions of the building, between the building and the public way. Accessible routes shall have a maximum slope of 1:20 and a maximum cross slope of 1:50.
6. Threshold must be 6 inches in height or less.
7. The primary entrance to the building must be accessible. All other required entrances must be accessible.
8. All accessible parking spaces shall have a slope not exceeding 1:50.
9. All accessible parking spaces shall be outlined on all four sides, have a contrasting color and the international wheelchair symbol on the ground within the space.
10. All accessible parking spaces shall have a sign (minimum 5 ft. above finish grade in front of the space) which includes the international symbol of accessibility.
11. Signs designating permanent rooms and spaces shall meet accessibility requirements.
12. All electrical receptacles and controls shall be 18 inches minimum and 48 inches maximum above finished floor.
13. All alarms shall be audible and visual, meeting accessibility requirements.
14. Accessible route shall be without steps or changes in level greater than 6 inches without an approved ramp.
15. Accessible routes shall serve as exits or connect to areas of rescue assistance.

FIGURE 12.1-1 ACCESSIBILITY NOTES EXAMPLE

## C. Site Plans

Site plans must include access symbols, such as a circle representing a 5 foot turning radius. The improvement plans shall include profiles at all driveways, sidewalks, curb ramps and parking lots. Sufficient elevations shall be provided on the plans of all parking areas, driveways and private property for review of proper ADA slopes and cross slopes, see [Section 9-1.404](#).

## D. Equivalent Facilitation

Nothing in these requirements prevents the use of designs, products, or technologies as alternatives to those prescribed, provided they result in substantially equivalent or greater accessibility and usability. When applying for a building variances which include an accessibility component, the variance must reviewed with the ADA Coordinator for equivalent facilitation.

## CONSTRUCTION ACTIVITY

12-1.205

Pedestrian access must be provided during construction, and in accordance with the Barricade Plan, see [Section 5-2.306](#). Specifically, pedestrian paths through work zones should replicate as close as possible the elements of the existing path and be accessible to people in wheelchairs.

When providing community notification of construction activity, consider including methods to alert residents with possible sensory impairments. Such methods include additional signage, door hangers, community newsletters, and press releases. Alternate methods for auditory/electronic delivery include community meetings, phone message lines, and web site information, see [Section 5-2.308](#).

If the project impacts an existing bus stop, the permittee must create a temporary bus stop, with comparable amenities, if feasible. The temporary bus stop should be as close as possible to the affected stop, be in a safe location, and be barrier-free, see [Section 5-2.312](#). The location of the temporary bus stop is subject to the Transportation Department General Manager or designee's approval.

## SITE ACCESS

12-1.300

### ACCESSIBLE ROUTE

12-1.301

At least one accessible route must be provided from the public right-of-way to, and throughout the site, that connects all facilities within the site. For specific ADA requirements for accessible routes, refer to [www.access-board.gov/adaag/html/adaag.htm#4.3](http://www.access-board.gov/adaag/html/adaag.htm#4.3).

### GROUND SURFACES

12-1.302

#### A. Surface Materials

ADA requires ground surfaces to be "firm, stable and slip resistant", and less than 1/4 inch level change or gap. Many pavers and stamped asphalt or concrete, particularly those that are domed-topped, do not meet these requirements.

Therefore, pavers should be used only as a decorative element on the outside edges of a pedestrian walkway, to maintain at least a 48 inch smooth, vibration-free concrete or asphalt walking surface. Where concrete or asphalt is not planned, walkways must be reviewed with staff regarding the appropriate use of approved pavers or stabilized decomposed granite, or approved equivalent.

#### B. Color & Contrast

Decorative colored concrete or other surface designs should be used with care. The adjacent placement of high-contrast colors and differing textures can be visually confusing to low-vision pedestrians if not used to enhance way-finding. Contact the ADA Coordinator at 480-312-2246 for specific considerations.

### SIDEWALK, WALKWAY & MULTIUSE PATH WIDTHS

The required and/or preferred widths of sidewalks, walkways and multiuse paths are described in [Section 2-1.808](#).

### CURB RAMPS

12-1.303

All curbing causing level changes within an accessible route shall have curb ramps conforming to the COS Standard Detail Nos. 2232 to 2235, [www.ScottsdaleAZ.gov/design/COSMAGSupp/](http://www.ScottsdaleAZ.gov/design/COSMAGSupp/), and shall be installed per [Section 5-8.400](#). Inspection curb ramps shall designate the ramp control point as indicated.

**12-1.304****DETECTABLE WARNINGS**

To guide from overuse, thereby diminishing their effectiveness, detectable warnings, in the form of truncated domes, shall only be used at curb ramps at vehicular intersections, or at signalized commercial driveways acting as a vehicular way, or other high-traffic areas as approved by COS staff. Example locations of curb ramps without detectable warnings might include parking lots and driveways.

Detectable warnings (truncated domes) shall be provided at street intersections in accordance with COS Standard Detail No. 2231, see [www.ScottsdaleAZ.gov/design/COSMAGSupp/](http://www.ScottsdaleAZ.gov/design/COSMAGSupp/). Product substitutions may be discussed with the Street Operations Manager, 480-312-5626. Detectable warnings in ESLO areas shall be "Western Reserve" in color, or approved equal. Detectable warning in the Environmentally Sensitive Land areas shall be a color equivalent to Dunn Edward Western Reserve

**12-1.305****DRIVEWAYS**

Driveway design shall use COS Standard Detail Nos. 2250 to 2258, to allow access for people with mobility disabilities, see [www.ScottsdaleAZ.gov/design/COSMAGSupp/](http://www.ScottsdaleAZ.gov/design/COSMAGSupp/).

Truncated domes shall not be used without prior staff approval.

**12-1.306****ACCESSIBLE (HANDICAPPED) PARKING SPACES**

Accessible parking spaces shall be provided and designed in accordance with this section of this document, which is based on City Zoning Ordinance, Appendix B, Sec. 9.105, [www.ScottsdaleAZ.gov/codes.asp](http://www.ScottsdaleAZ.gov/codes.asp), 1991 ADAAG 4.1.2(5) & 4.6, IBC 1106, ANSI and has been adopted by the Scottsdale City Council.

1. Required accessible parking spaces for people with disabilities shall be provided at a rate of four (4) percent of total required vehicular parking spaces.
2. Parking with no quantitative requirements shall be in accordance with the formula described in ADAAG 4.1.2(5).
3. Accessible patient parking at ourpatience facilities must equal no less than ten (10) percent of the required parking.
4. Facilities which specialize in treatment or services for persons with mobility improvements must provide accessible parking equaling no less than twenty (20) percent of the required parking for patient use.
5. Reductions in accessible parking space requirements for large uses may be permitted subject to the approval of the City Manager or designee.
6. Accessible parking must be distributed through each *type* of parking available.
7. All parking areas shall provide accessible routes from the accessible parking spaces to the principal use destination.
8. The accessible route shall not direct travel behind parked vehicles.
9. The minimum width of said accessible route shall be no less than three (3) feet.
10. All accessible spaces shall be Universal size spaces, designed to be eleven (11) feet wide, and shall have a five (5) foot wide access aisle with cross-hatching (no parking area) adjacent to the accessible stall.
11. Two accessible spaces may share the same access aisle.
12. Accessible van spaces shall be the spaces with the access aisle on the passenger side. A minimum of 1:8 accessible spaces shall be van spaces.
13. Accessible parking spaces and access aisles shall not exceed a slope of 1:50.
14. Any ramp from the access aisle to the sidewalk or other transition to the principal use shall not exceed a slope of 1:12, and shall not encroach into access aisle.



15. The verticle clearance for accessible parking spaces shall be no les than eight (8) feet two (2) inches.
  16. Each individual accessible parking space shall be signed with a reserved parking sign per COS Standard Detail No. 2124. The bottom of these signs shall be places at five (5) feet above ground level so as not to be obscured by parked vehicles.
  17. An additional "Van Accessible" sign shall be mounted below the reserved sign described in No. 16, where appropriate per No. 12.
  18. Each space shall be clearly marked with the accessibility symbol on the ground at the rear of the space. The preferred marking is a white symbol on a blue background.
- See the following [Figure 12.1-2](#) for an example of a preferred accessible parking space.

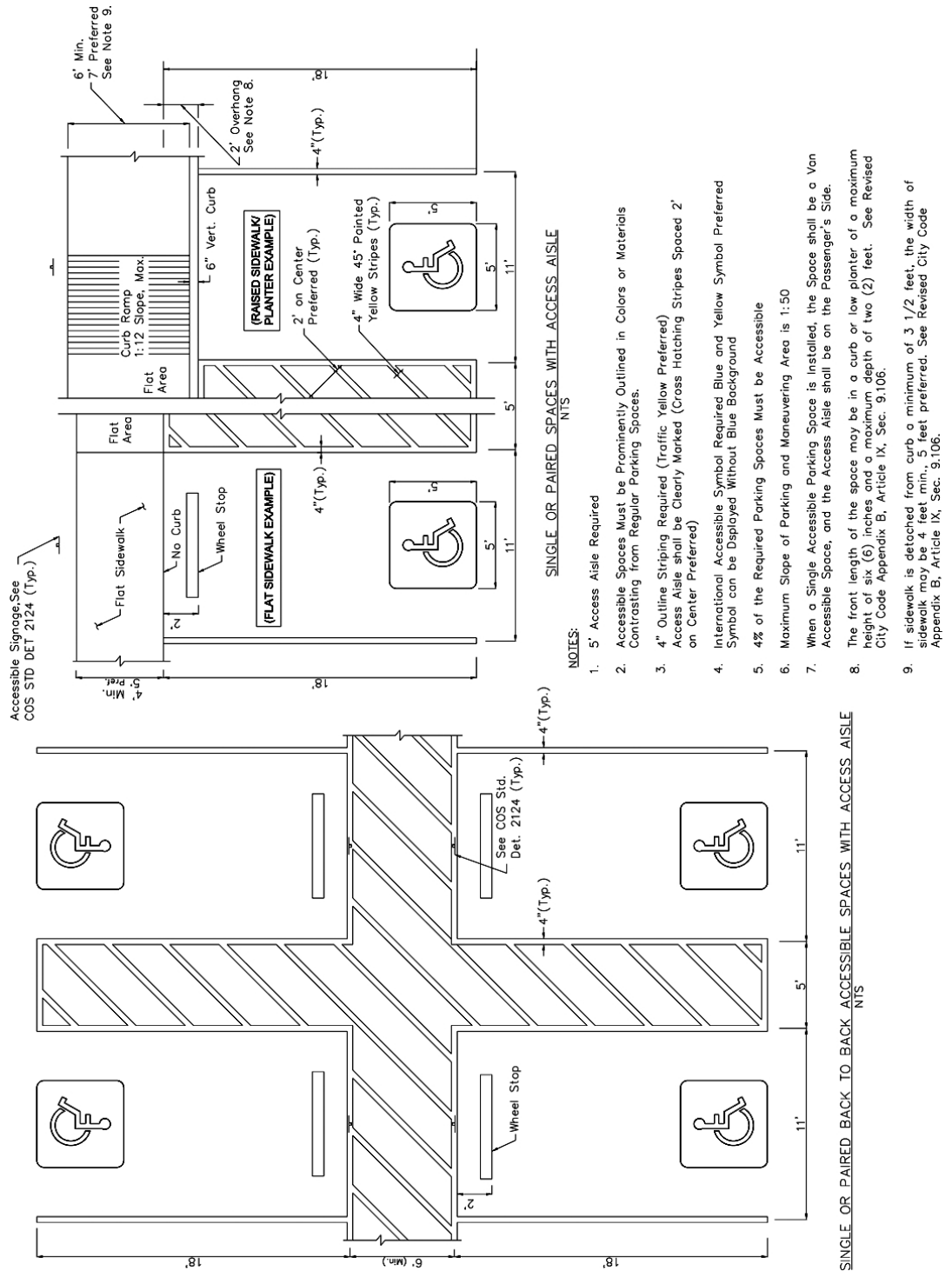


FIGURE 12.1-2 PREFERRED ACCESSIBLE PARKING SPACE

12-1.307

DRIVE-THROUGH FACILITIES

Vertical clearance must be a minimum of 98 inches for drive-through facilities. Drive-through facilities that include a passenger loading zone must have a vertical clearance of 114 inches, see [Section 2-1.803](#).

## BUILDING CONSTRUCTION

12-1.400

### COMMERCIAL FACILITIES

12-1.401

#### A. General Information

The City of Scottsdale requires commercial developers to comply with the Americans with Disabilities (ADA) Accessibility Guidelines (ADAAG) (1991), and the International Building Code (IBC) (2006) through the adoption of SRC Chapter 31, Article III Building Code.

#### B. Drinking Fountains

Ensure that drinking fountains installed meet ADA guidelines by having a wheelchair accessible fountain installed at 34 inches above finish floor (AFF), (measured to the deck), and a standard height drinking fountain installed at 40 inches AFF.

For facilities requesting a building code variance from the drinking fountain requirements, equal access must be provided for persons with disabilities via “equivalent facilitation”, as required by the ICB 2006, Sec. 2901. Contact the ADA Coordinator for more information.

#### C. Product Standards

Refer to the following sections for specifications for selecting and installing accessible features:

1. Plumbing Systems, [Section 9-3.100](#)
2. Doors & Hardware Systems, [Section 9-3.200](#)
3. Building Components, [Section 9-3.300](#)

Alternate products for consideration shall meet the ADAAG requirements for Controls and Operating Mechanisms and Space Allowance and Reach Ranges, see <http://www.access-board.gov/adaag/html/adaag.htm#4.2>.

### MULTIFAMILY RESIDENTIAL FACILITIES

12-1.402

The City of Scottsdale requires multifamily residential developers to comply with the HUD Fair Housing Accessibility (FHA) Guidelines (FHAG) (1991), by requiring compliance with the International Building Code (IBC) (2006), which is a “safe harbor” FHA building standards.

## RIGHTS-OF-WAY

12-1.500

### TRANSPORTATION PLANNING

12-1.501

Disability access is expected in all transportation, rights-of-way and transit elements within any development or redevelopment, see [Section 5-1.1002](#).

#### References

1. United States Access Board Revised Draft Guidelines for Accessible Public Rights-of-Way [www.access-board.gov/prowac/draft.htm](http://www.access-board.gov/prowac/draft.htm)
2. United States Access Board Interfacing Accessible Pedestrian Signals (APS) with Traffic Signal Control Equipment [www.access-board.gov/research/APS/report.htm#\\_Toc38768660](http://www.access-board.gov/research/APS/report.htm#_Toc38768660)
3. NCHRP Accessible Pedestrian Signals: Synthesis and Guide to Best Practice, [www.walkinginfo.org/aps/pdf/APS-Synthesis.pdf](http://www.walkinginfo.org/aps/pdf/APS-Synthesis.pdf)
4. Pedestrian and Bicycle Information Center, [www.walkinginfo.org](http://www.walkinginfo.org)

## 12-1.502

**GENERAL INFORMATION**

1. All major thoroughfares shall be accessible in accordance with the “best practices” listed above.
2. Accommodate direct disability access through drainage channels, dead ends, walls, cul-de-sacs, open space, and other barriers to reach neighborhood destinations such as homes, schools, parks, libraries, retail centers, civic spaces, and trip generators, see [Section 5-9.100](#).

## 12-1.503

**SITE ACCESS**

See the following sections of [Section 12-1.300](#) for requirements for rights-of-way development:

- a. Accessible Route, Section 2-4.301
- b. Ground Surfaces, Section 2-4.302
- c. Sidewalk, Walkway & Multi-use Path Widths, Section 2-4.303
- d. Curb Ramps, Section 2-4.304
- e. Detectable Warnings, Section 2-4.305
- f. Driveways, Section 2-4.306
- g. Accessible (Handicapped) Parking Space, Section 2-4.307
- h. Drive-Through Facilities, Section 2-4.308

## 12-1.504

**INTERSECTIONS AND CROSSWALKS**

[Section 5-3.119](#) discusses factors related to intersection design. These factors also impact the ease of street crossing for people with visual impairments.

Crosswalk surfaces should follow the guidelines in [Section 12-1.302](#).

## 12-1.505

**MEDIANS**

Medians constructed to act as a Pedestrian Refuge shall have detectable warnings on both sides of the median at the point of entry into the crosswalk. See COS Standard Detail No. 2295, [www.ScottsdaleAZ.gov/design/COSMAGSupp/](http://www.ScottsdaleAZ.gov/design/COSMAGSupp/).

## 12-1.506

**SIGNALS**

Information on accessible pedestrian signals is available in the Manual on Uniform Traffic Control Devices (MUTCD) <http://mutcd.fhwa.dot.gov/index.htm>.

**1. Audible Pedestrian Signals**

Audible pedestrian signals must be available to citizens upon request.

**2. Pedestrian Push Buttons** (See [Section 5-4.104](#))

- a. Provide a minimum 48 inch by 48 inch concrete slab immediately adjacent to the pole, and directly under the pedestrian signal button.
- b. The slab shall have no more than a 2% slope in any direction.
- c. Provide a minimum 36 inch accessible route to the pole slab, if necessary.
- d. Mount pedestrian signal button at 36 inches from ground to center of button.
- e. Pedestrian signal buttons shall be the large slap buttons.

## 12-1.507

**TRANSIT STOPS**

All developed or redeveloped transit stops must comply with applicable provisions of the ADA, and other “best practice” reference documents noted in [Section 12-1.100](#). All transit stop locations where an accessible pedestrian route is available or where major improvements have been made to an existing inaccessible stop shall incorporate the following elements referenced in [Section 5-6.000](#):

- a. Accessibility (Surface, Dimensions, Connection, Grade and Bus Shelters), Section 5-6.002
- b. Benches, Section 5-6.201
- c. Shelters, Section 5-6.202
- d. Bus Stop Signs, Section 5-6.401
- e. Sign Clearance, Section 5-6.403

Also see MAG Standard Detail No. 230 and COS Standard Detail No. 2232 for related information, [www.ScottsdaleAZ.gov/design/COSMAGSupp/](http://www.ScottsdaleAZ.gov/design/COSMAGSupp/).

## PARKS & TRAILS

## 12-1.508

All walkways leading to, into and throughout sporting and recreation areas must be ADA compliant unless to do so would fundamentally alter the nature of the facility/activity. In addition to those elements discussed in this chapter, see Park Design, [Section 8-2.200](#) for information concerning:

- a. Walkways, Section 8-2.201
- b. Drinking Fountains, Section 8-2.202
- c. Playgrounds, Section 8-2.203
- d. Signage, Section 8-2.209
- e. Parking, Section 8-2.210

