Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Meeting Notice and Agenda

Town Council

Thursday, April 13, 2017 | **3:30 PM** | **Council Chambers**

1. CALL TO ORDER / ROLL CALL

Notice is hereby given that members of the Town Council will attend either in person or by telephone conference call, pursuant to A.R.S. §38-431(4).

2. STUDY SESSION ITEMS

The Study Session is open to the public however the following items are scheduled for discussion only. The Town Council will be briefed by staff and other Town representatives. There will be no votes and no final action taken on discussion items. The Council may give direction to staff and request that items be scheduled for consideration and final action at a later date. The order of discussion items and the estimated time scheduled to hear each item are subject to change.

17-097 **FY 2018 Operating Budget**
120 Minutes

Staff Contact: Dawn Marie Buckland, 480.348.3555

17-120 **Storm Drainage Design Manual Revisions Summary and Update**
15 Minutes

Staff Contact: Jeremy Knapp, Engineering Services Analyst
480-348-3622

17-112 **Legislative Update**
10 Minutes

3. EXECUTIVE SESSION

17-110 **The Town Council may go into executive session at one or more times during the meeting as needed to confer with the Town Attorney for legal advice regarding any of the agenda items listed on the agenda as authorized by A.R.S. §38-431.03(A)(.3).**

4. BREAK

5. RECONVENE FOR REGULAR MEETING 6:00 PM

6. ROLL CALL

7. PLEDGE OF ALLEGIANCE*

8. PRESENTATIONS*

17-116 **Phoenix Symphony Day Proclamation Presentation**

Recommendation: Present a Proclamation Declaring Phoenix Symphony Day

Staff Contact: Natalie Montenegrino, 480-348-3690

9. CALL TO THE PUBLIC

Citizens may address the Council on any matter not on the agenda. In conformance with Open Meeting Laws, Council may not discuss or take action on this matter at this Council meeting, but may respond to criticism, ask that staff review a matter raised, or ask that it be placed on a future agenda. Those making comments shall limit their remarks to three (3) minutes. Please fill out a Speaker Request form prior to addressing the Council.

10. CONSENT AGENDA

All items on the Consent Agenda are considered by the Town Council to be routine and will be enacted by a single motion. There will be no separate discussion of these items. If a member of the Council or public desires discussion on any item it will be removed from the Consent Agenda and considered separately. Please fill out a Speaker Request form prior to the start of the meeting and indicate which item you would like to address.

17-115 **Minutes of Town Council Meeting March 23, 2017**

17-117 **Approval of Special Event Liquor License for Treasure House**

Recommendation: Approve and authorize the Town Manager to sign a Special Event Liquor License application for Treasure House for an event on Friday, May 5, 2017, subject to the following stipulations: only those people authorized by law be allowed to dispense and/or consume alcoholic beverages; consumption shall be limited to the premises as indicated in the application; and Section 10-7 Control of Excess Noise be observed.

Staff Contact: Duncan Miller, 480-348-3610

17-113 **Approval of Board of Adjustment Chair**

Recommendation: Approve Emily Kile to serve a one-year term as Chair of the Board of Adjustment

Staff Contact: Duncan Miller, 480-348-3610

17-114 **Approval of Planning Commission Chair**

Recommendation: Approve Daran Wastchak to serve a one-year term as Chair of the Planning Commission.

Staff Contact: Duncan Miller, 480-348-3610

11. PUBLIC HEARINGS

The Town Council may hear public comments and take action on any of these items. Citizens may address the Council regarding any or all of these items. Those making comments are limited to three (3) minutes. Speakers may not yield their time to others. Please fill out a Speaker Request form prior to the start of the meeting and indicate which item you would like to address.

12. ACTION ITEMS

The Town Council May Take Action on This Item. Citizens may address the Council regarding any or all of these items. Those making comments are limited to three (3) minutes. Speakers may not yield their time to others. Please fill out a Speaker Request form prior to the start of the meeting and indicate which item you would like to address.

17-129 **Approval of Resolution 2017-08 Declaring the Town's Storm Water Management Policy**

Recommendation: Approve Resolution 2017-17

Staff Contact: Kevin Burke, 480-348-3690

17-121 **Adoption of Ordinance 2017-01 updating the Town's Storm Drainage Design Manual; and Adoption of Resolution 2017-06 establishing said document a public record**

Recommendation: Adopt Ordinance 2017-01 updating the Town's Storm Drainage Design Manual; and Adopt Resolution 2017-06 establishing said document a public record

Staff Contact: Jeremy Knapp, 480-348-3622

17-122 **Adoption of Resolution Number 2017-07 Authorizing Membership in the Arizona Metropolitan Trust (AzMT) for Employee Medical, Dental, Vision, Life, Accidental Death and Short Term Disability Insurance**

Recommendation: Adopt Resolution Number 2017-07.

Staff Contact: Jinnett Hancock, 480-348-3520

13. FUTURE AGENDA ITEMS

The Town Council May Take Action on This Item. The Mayor or Town Manager will present the long range meeting agenda schedule and announce major topics for the following meeting. Any member of the Council may move to have the Town Manager add a new agenda item to a future agenda. Upon concurrence of three more Members, which may include the Mayor, the item shall be added to the list of future agenda items and scheduled by the Town Manager as a future agenda item within 60 days.

17-111 **Consideration of Requests for Future Agenda Items**

Recommendation: Review the current list of pending agenda topics.

Staff Contact: Kevin Burke, 480-348-3690

14. MAYOR / COUNCIL / MANAGER COMMENTS

The Mayor, Council or Town Manager may provide a summary of current events. In conformance with Open Meeting Laws, Council may not have discussion or take action at this Council meeting on any matter discussed during the summary.

15. STUDY SESSION ITEMS CONTINUED

17-128 **Lighting Code Revisions to Article 10 Height and Area Regulations, Section 1023 Outdoor Lighting and Illumination: Article 22 Hillside Development Regulations, Section 2208 Outdoor Lighting; Article 25 Signs, Section 2506 Lighting; and Special Use Permit Guidelines, Section 2 Lighting as contained in Ordinance # 2016-04.**

Staff Contact: Eva Cutro, 480-348-3522

16. ADJOURN

AGENDA IS SUBJECT TO CHANGE

**Notice is hereby given that pursuant to A.R.S. §1-602.A.9, subject to certain specified statutory exceptions, parents have a right to consent before the State or any of its political subdivisions make a video or audio recording of a minor child. Meetings of the Town Council are audio and/or video recorded, and, as a result, proceedings in which children are present may be subject to such recording. Parents in order to exercise their rights may either file written consent with the Town Clerk to such recording, or take personal action to ensure that their child or children are not present when a recording may be made. If a child is present at the time a recording is made, the Town will assume that the rights afforded parents pursuant to A.R.S. §1-602.A.9 have been waived.*

The Town of Paradise Valley endeavors to make all public meetings accessible to persons with disabilities. With 72 hours advance notice, special assistance can also be provided for disabled persons at public meetings. Please call 480-948-7411 (voice) or 480-483-1811 (TDD) to request accommodation to participate in the Town Council meeting.

Town of Paradise Valley

6401 E Lincoln Dr
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Action Report

File #: 17-097

TO: Mayor Collins and Town Council Members

FROM: Kevin Burke, Town Manager
Dawn Marie Buckland, Director of Administration & Govt Affairs

DATE: April 13, 2017

DEPARTMENT: Administration and Government Affairs Department

AGENDA TITLE:
FY 2018 Operating Budget

Council Goals
Long term balanced budget

SUMMARY STATEMENT:
The budget is a critical policy tool that communicates strategic direction and expectations for operations. In local government, the budget also establishes law. The Town has undertaken an extensive public process to clarify priorities, analyze revenue streams, and ensure that necessary public services are sustainable for the long term.

On March 9, 2017, Town Council and staff discussed an overview of the Town's upcoming budget and focused on the proposed Capital Improvement Program (CIP). The April 13, 2017 study session will serve to review the proposed operating budgets for each of the Town departments.

The tentative budget adoption, which sets the maximum level of appropriation for the upcoming fiscal year, is scheduled for May 11, 2017; the final budget adoption is scheduled for June 8, 2017.

ATTACHMENT(S):
FY 2018 Budget Reports
Presentation

April 6, 2017

Mayor & Council:

How we spend the public's money is our most important business. This document serves as the Manager's Recommended Budget for Fiscal Year 2018 (FY18) which runs from July 1, 2017 through June 30, 2018.

FY18 is a very optimistic budget year. The reopening of two landmark resorts in Paradise Valley along with the strengthening State economy and its related revenue sharing with the Town set the tone for a positive fiscal year. Therefore, the FY18 Budget takes an aggressive approach to improving financial and infrastructure conditions. The total Recommended Budget, including all enterprise funds and special revenue funds is $52 million. Within that Recommended Budget I am proud to report that the Sewer Fund is no longer operating in a structural deficit; the Fire Service fee is reduced by 10%; the Ritz Carlton related road improvements that are cost shared but managed by the Town are put into place; and, the long awaited Police Radio Tower is completed and made operational. These are monumental accomplishments that have been possible with leadership from the Mayor and Council and advanced with solid financial planning from staff.

Operating (General Fund and HURF)

Most of the Town's visible operations are contained in what is sometimes referred to as the Operating Fund which is really a combination of the General Fund and receipts from the Highway Users Revenue Fund (HURF). HURF revenues are principally from the State gas tax and vehicle registration fees. Total Operating Fund revenues for FY18 are projected at $29.7 million. This is a 7.8% increase or $2.1 million. The vast majority of that can be attributed to the new resorts with the balance coming from State shared income and sales tax.

Cottonwoods reopened as a Hyatt ANdAZ in December 2016 and Mountain Shadows reopened under the same name in March 2017. The sales tax and bed tax associated with these resorts starts to show up in Town revenue with the FY18 Budget. While these resorts will take a few years to reach full potential and provide a more steady revenue stream, their impact in FY18 is expected to be slightly under $2 million.

Most other revenue sources, such as building permits, court fees and fines, and HURF receipts remain flat.

On the expenditure side of the ledger, the first step in a three year plan to eliminate the unfunded liability in the Public Safety Personnel Retirement System (PSPRS or a.k.a. Police Pension) occurs in FY18. The Recommended Budget proposes a $6.1 million additional payment to PSPRS. $5 million is shown in the Police Department Budget and an additional million is in contingency to be used once we are certain funding is available at the end of the year. Paying this liability down in 3 years will save the Town of PV over $11 million. While the

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Town has had cash reserves to make such a payment in prior years, it did not possess the expenditure authority under the State constitution. With the passage of Proposition 499 in November of 2016, this financially responsible decision is now possible.

There are numerous other technological and operational improvements to the Police Department Budget. Those funded in the Police Department are offset by various reductions due to payroll changes. The remainder of those improvements are found as new expenditure requests within the Information Technology (IT) Budget. The Chief will outline a complete list of improvements during his April 13 presentation to Council.

The second largest expenditure change in department budgets is the $1.8 million increase in HURF. The Recommended Budget calls for the mill and overlay of pavement on Tatum Boulevard. Tatum pavement, particularly the noise reducing elements, is nearing the end of its life cycle. This is a major endeavor but represents a critical arterial in the Town's circulation system. This expenditure is not in the Capital Improvement Program (CIP) because it is considered maintenance of an existing road rather than an improvement to the road. The Recommended Budget is able to take on this critical maintenance function while continuing its ongoing pavement preservation efforts on neighborhood streets.

A third Operating Fund expenditure item I want to highlight is the Post Office. For several years staff has been fighting the postage meter and associated computer software. This has led to numerous unannounced closures and negative audits from the USPS. While financially it is better to stay with these private vendor postage meters, it is a disservice to our residents when they cannot rely upon the Post Office to be open during its advertised hours. The Recommended Budget proposes moving to the USPS hardware and software for postage metering. This results in two substantial financial changes. The current model carries an $87,000 subsidy from the USPS. Switching to the USPS software, the subsidy changes to a percentage of sales, but results in approximately $35,000 in revenue for a net loss of $52,000. Second, we must now show all purchases of postage for the meter as an expense in our budget. While this expense is reimbursed with the sale of postage, it increases the budget by approximately $350,000 and counts against the expenditure limitation of the Town. That being stated, these changes will result in a more dependable operation of the Post Office.

Lastly, I am recommending the addition of four regular positions to the total organizational headcount. This will increase the total number of positions from 87 to 91. Each position has its own reason for being recommended. Below is an explanation of each.

I am recommending a full time Court Clerk. With the addition of seven photo enforcement cameras in 2015, we have seen an increase in citations which require more personnel to process. We have been using part time temporary labor since that time. I suspect the work load will remain high enough to warrant this additional court clerk ongoing.

The second recommended position is a Building Inspector. With the construction industry back in full swing, we cannot continue to maintain our recession level staffing and deliver the expected level of service. With this addition, we will have two full time building inspectors.

The third position is in the Department of Administration and it will be responsible for procurement, risk management and grants. As I have noted in previous years, I am very concerned with the fact that procurement is decentralized to the employee making the purchase. These folks are hired as technical experts in their field and not experts in State and local procurement laws. They can be taught, but given the infrequency of these purchases by each individual, it is wasted training. Similarly, risk management is decentralized to department heads with the Town Attorney and Human Resource Manager providing support. This arrangement again creates vulnerabilities for the organization when those responsible do not have or fail to receive continuous training on rules and processes for a heavily regulated industry.

The fourth position recommended is the Evidence Technician in the Police Department. In 2015 the Interim Police Chief had a review of our evidence storage practices and management conducted. This review found numerous problems with our system and recommended a full time position dedicated to this function. A temporary Evidence Technician was funded in 2016 to help get this set up and manage the backlog. After evaluating the conditions, requirements and impact, it is recommended that the function become a regular full time position.

Overall, the Operating Fund expenditures total $32.6 million. This is $9.3 million more than FY17. Again, this is due to the $6.1 million pre-payment of the Police Pension liability; $1.8 million is associated with repaving Tatum, and $350,000 is associated with the Post Office. The remainder represents an increase to operations.

Enterprise Funds

The Town maintains three Enterprise Funds—Fire Service Fund, Alarm Service Fund, and Wastewater Funds. I am recommending strategic budget changes to each fund.

The Fire Service Fund will see a 10% decrease in in fees. This fund has achieved a healthy fund balance that will be used to purchase replacement vehicles in future years. Expenditures remain stable and consequently the Fund can afford a reduction in revenue.

The Mayor and Council have been discussing service model changes for the Alarm Service Fund over the past year and a half. While the final model has not been settled upon, in order to grant the decision makers maximum flexibility, I have appropriated the entire fund balance of over $400,000 in the FY18 Budget.

The Wastewater Service Fund has operated in a structural deficit for the past two years subsequent to the repayment of an inter-fund loan back to the General Fund in 2015. A painful, but fiscally responsible, rate change that took effect August 1, 2016, enables this fund to be self-sufficient, build reserves, and evaluate the condition of existing infrastructure. FY18 represents the second year of a five year plan to evaluate all of the pipes and manholes in the Town's sewer collection system. This has not been done for at least 15 years. This will provide critical data to understand the maintenance requirements of the system. It should also warn of any possible failure before they occur.

Capital Project Fund

The Capital Project Fund is the financial home to Capital Improvement Program (CIP) and perhaps experiences the greatest fluctuation in budget from year to year depending upon the projects scheduled. For FY18, this fund is over $15 million. This is due to the execution of some very visible and highly anticipated capital projects. At the top of this list is almost $10 million in street improvements associated with the Ritz Carlton development. Most of that is funded by the developer. The Town is leveraging those developer paid improvements to lower the cost of planned street improvements that are the responsibility of the Town. In summary, this project will reconstruct Lincoln, Mockingbird and Indian Bend around the Ritz development as well as extend median and sidewalk improvements on Mockingbird from Indian Bend to Northern.

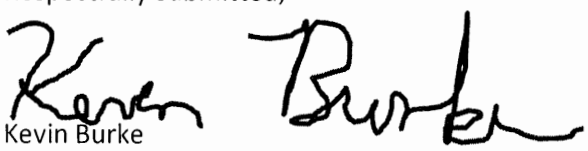
The next largest project is the burying of overhead utilities in the SRP Keim District. $1.2 million is appropriated, however, a third of that must be raised by the benefiting residents and SRP.

A smaller, but impactful CIP project is the $250,000 to replace the video detection system at Town traffic lights. These are the small white cameras you see on top of traffic light poles that read when and how many vehicles are waiting for the light to turn green. Most of these have reached the end of life and are creating false readings or no readings which in turn affect the amount of time a resident waits at a stop light. This is a new item in the CIP but moved immediately to the current year due to its impact.

Summary

The purpose of a Manager's Recommended Budget is to provide a solid foundation for financial decision making of the Mayor and Council. These recommendations are based upon a comprehensive understanding of the service and infrastructure goals of the Mayor and Council, the long term financial forecast and fiscal responsibilities of the municipality, and the day-to-day demands and experiences the staff sees when delivery these services. The FY18 Manager's Recommended Budget makes significant progress towards accomplishing long term goals of the Mayor and Council while maintaining fiscal responsibility. Departments will present the more specific changes during their budget presentations on Thursday, April 13 during the Work Session. Thanks you for your consideration.

Respectfully submitted,



Kevin Burke
Town Manager

Police Department - Administration Fund: 10-62	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-62-100: Salaries And Wages	$ 746,339	$ 610,000	$ 623,505	$ 636,040
10-62-105: Overtime	$ 21,617	$ 15,000	$ 15,000	$ 16,000
Total Salaries & Overtime	**$ 767,956**	**$ 625,000**	**$ 638,505**	**$ 652,040**
10-62-115: Employee Benefits-Fica	$ 57,912	$ 47,200	$ 49,151	$ 48,990
10-62-120: Employee Benefits-Retirement	$ 350,987	$ 342,000	$ 357,586	$ 340,772
10-62-125: Employee Benefits-Workers Comp	$ 41,372	$ 31,000	$ 32,611	$ 32,146
10-62-130: Employee Benefits-Med/Dental	$ 63,318	$ 62,000	$ 62,000	$ 58,511
10-62-132: Cancer Insurance	$ 250	$ 300	$ 300	$ 300
10-62-135: Employee Benefits-Disabil/Life	$ 5,924	$ 5,400	$ 5,655	$ 5,358
10-62-160: Employee Benefits-Clothing	$ 6,399	$ 5,200	$ 5,200	$ 5,200
10-62-161: Employee Benefit - Cell Phone	$ 6,900	$ 6,900	$ 6,900	$ 6,900
10-62-186: Employee Benefits - H S A	$ 27,733	$ 23,660	$ 23,660	$ 23,660
10-62-190: Housing Allowance	$ 1,000	$ 0	$ 12,000	$ 0
Total Employee Benefits	**$ 561,795**	**$ 523,660**	**$ 555,063**	**$ 521,837**
10-62-326: Maricopa Cnty Animal Control	$ 9,171	$ 9,446	$ 9,446	$ 9,476
10-62-330: General Professional Services	$ 2,716	$ 7,700	$ 7,700	$ 28,550
10-62-375: Temporary Labor	$ 0	$ 90,000	$ 0	$ 0
10-62-400: Badges & Uniforms Supplies	$ 13,655	$ 5,200	$ 5,200	$ 4,000
10-62-465: Office Supplies	$ 30,366	$ 25,000	$ 25,000	$ 25,000
10-62-466: Ammo, Range, Targets	$ 13,433	$ 11,000	$ 11,000	$ 16,000
10-62-485: Printing	$ 1,454	$ 2,000	$ 2,000	$ 1,500
10-62-495: Community Outreach Program	$ 15,253	$ 16,650	$ 16,650	$ 17,650
10-62-540: Liabiilty Insurnace	$ 26,122	$ 28,700	$ 29,276	$ 29,000
10-62-670: Meals	$ 4,477	$ 4,000	$ 4,000	$ 2,500
10-62-675: Dues	$ 5,266	$ 4,000	$ 4,000	$ 4,550
10-62-715: Lab Tests (Independent Labs)	$ 0	$ 500	$ 500	$ 3,500
10-62-720: Legal Advertising	$ 11	$ 100	$ 100	$ 100
10-62-725: Mileage-Miscellaneous Travel	$ 1,582	$ 1,500	$ 1,500	$ 1,500
10-62-730: Officer Awards Program	$ 941	$ 4,000	$ 4,000	$ 4,000
10-62-752: Postage	$ 700	$ 0	$ 0	$ 0
10-62-765: Recruiting & Employment	$ 9,810	$ 5,540	$ 5,540	$ 7,200
10-62-770: Staff Training	$ 46,678	$ 52,200	$ 52,200	$ 46,100
10-62-780: Police Prop.-Evidence Storage	$ 19,007	$ 24,000	$ 10,408	$ 24,000
10-62-790: Subscriptions & Publications	$ 10,897	$ 19,500	$ 19,500	$ 10,700
10-62-795: Security System & Camera M&R	$ 5,812	$ 4,000	$ 4,000	$ 0
10-62-815: Training Travel	$ 11,135	$ 3,500	$ 3,500	$ 10,000
10-62-840: Miscellaneous	$ 3,375	$ 39,000	$ 39,000	$ 50,700
10-62-842: Records Retention	$ 2,780	$ 3,000	$ 3,000	$ 3,300
10-62-866: Office Furniture & Fixtures	$ 2,057	$ 2,000	$ 2,000	$ 4,000
10-62-869: Equipment Repairs & Maint	$ 6,261	$ 2,000	$ 2,000	$ 2,500
10-62-873: Duty Weapons	$ 5,061	$ 25,000	$ 25,000	$ 13,000
10-62-960: Capital Lease - Interest	$ 8,014	$ 4,720	$ 4,720	$ 1,307
10-62-961: Capital Lease Principal	$ 91,309	$ 94,603	$ 94,603	$ 73,185
10-62-980: Administrative Allocation	$(67,150)	$(71,406)	$(71,406)	$(138,686)
10-62-996: Photo Enforcement Phone Line	$ 7,259	$ 6,700	$ 6,700	$ 8,000
10-62-997: Photo Enforcement Process Serv	$ 38,932	$ 43,000	$ 43,000	$ 43,000
10-62-999: Photo Enforcement Fees	$ 822,779	$ 670,000	$ 670,000	$ 670,000
Total Operating Expenses	**$ 1,149,160**	**$ 1,137,153**	**$ 1,034,137**	**$ 975,632**
Total Expenditures	**$ 2,478,911**	**$ 2,285,813**	**$ 2,227,705**	**$ 2,149,509**
Dollar Change			**$(58,108)**	**$(78,196)**
Percentage Change			**(2.54%)**	**-3.51%**

Police Department - Communication Fund: 10-64	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-64-100: Salaries And Wages	$ 263,445	$ 280,000	$ 305,908	$ 287,724
10-64-105: Overtime	$ 38,558	$ 18,000	$ 18,000	$ 18,000
Total Salaries & Overtime	**$ 302,003**	**$ 298,000**	**$ 323,908**	**$ 305,724**
10-64-115: Employee Benefits-Fica	$ 23,143	$ 24,000	$ 25,982	$ 23,382
10-64-120: Employee Benefits-Retirement	$ 34,400	$ 35,000	$ 38,996	$ 35,317
10-64-125: Employee Benefits-Workers Comp	$ 1,118	$ 1,200	$ 1,234	$ 1,133
10-64-130: Employee Benefits-Med/Dental	$ 22,177	$ 36,500	$ 36,500	$ 32,714
10-64-135: Employee Benefits-Disabil/Life	$ 1,765	$ 2,100	$ 2,359	$ 2,053
10-64-160: Employee Benefits-Clothing	$ 466	$ 3,000	$ 3,000	$ 3,000
10-64-161: Employee Benefit - Cell Phone	$ 1,380	$ 1,380	$ 1,380	$ 1,380
10-64-186: Employee Benefits - H S A	$ 15,120	$ 14,820	$ 14,820	$ 14,820
Total Employee Benefits	**$ 99,569**	**$ 118,000**	**$ 124,271**	**$ 113,799**
10-64-205: Cellular Phone Charges	$ 23,402	$ 13,000	$ 13,000	$ 13,000
10-64-206: Cell Phone Purchases	$ 316	$ 2,000	$ 2,000	$ 2,000
10-64-260: Maricopa Regional Network	$ 27,180	$ 98,000	$ 98,000	$ 28,000
10-64-261: Rwc Radio Fees	$ 0	$ 0	$ 0	$ 32,000
10-64-265: Pace	$ 5,008	$ 5,100	$ 5,100	$ 5,100
10-64-375: Temporary Labor	$ 7,288	$ 30,000	$ 30,000	$ 30,000
10-64-490: Radio/Telephone Batteries	$ 43	$ 2,000	$ 2,000	$ 2,000
10-64-540: Liability Insurance	$ 18,658	$ 20,500	$ 20,911	$ 21,000
10-64-575: Nice Logging Recorder Mainten	$ 491	$ 500	$ 500	$ 500
10-64-610: Radio Repairs	$ 20,425	$ 22,200	$ 22,200	$ 22,200
10-64-815: Training Travel	$ 276	$ 0	$ 0	$ 0
10-64-840: Miscellaneous	$ 91	$ 1,800	$ 1,800	$ 12,500
10-64-980: Administrative Allocation	$ 0	$ 0	$ 0	$(44,020)
Total Operating Expenses	**$ 103,178**	**$ 195,100**	**$ 195,511**	**$ 124,280**
10-64-869: Equipment	$ 0	$ 0	$ 0	$ 9,900
Total Capital	**$ 0**	**$ 0**	**$ 0**	**$ 9,900**
Total Expenditures	**$ 504,750**	**$ 611,100**	**$ 643,690**	**$ 553,703**
Dollar Change			**$32,590**	**$(89,987)**
Percentage Change			**5.33%**	**-13.98%**

Police Department - Patrol Fund: 10-66	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-66-100: Salaries And Wages	$ 1,754,447	$ 1,842,000	$ 1,888,957	$ 1,837,221
10-66-105: Overtime	$ 84,550	$ 75,000	$ 75,000	$ 125,000
Total Salaries & Overtime	**$ 1,838,996**	**$ 1,917,000**	**$ 1,963,957**	**$ 1,962,221**
10-66-115: Employee Benefits-Fica	$ 136,496	$ 146,000	$ 149,592	$ 147,291
10-66-120: Employee Benefits-Retirement	$ 2,489,165	$ 2,360,000	$ 2,393,213	$ 6,332,152
10-66-125: Employee Benefits-Workers Comp	$ 122,940	$ 135,000	$ 138,788	$ 132,417
10-66-130: Employee Benefits-Med/Dental	$ 205,310	$ 264,000	$ 264,000	$ 229,580
10-66-132: Cancer Insurance	$ 1,100	$ 1,800	$ 1,800	$ 1,800
10-66-135: Employee Benefits-Disabil/Life	$ 19,645	$ 22,500	$ 22,970	$ 22,426
10-66-160: Employee Benefits-Clothing	$ 44,721	$ 32,000	$ 32,000	$ 32,000
10-66-186: Employee Benefits - H S A	$ 79,981	$ 87,360	$ 87,360	$ 86,320
10-66-199: Workers' Compensation Ded	$ 6,265	$ 0	$ 0	$ 0
Total Employee Benefits	**$ 3,105,622**	**$ 3,048,660**	**$ 3,089,723**	**$ 6,983,986**
10-66-350: Jail Fees	$ 18,881	$ 34,391	$ 34,391	$ 20,000
10-66-400: Badges & Uniforms Supplies	$ 919	$ 0	$ 0	$ 0
10-66-430: First Aid Supplies	$ 11,768	$ 11,500	$ 11,500	$ 5,000
10-66-435: Gas & Oil	$ 62,974	$ 75,000	$ 75,000	$ 72,000
10-66-465: Patrol Supplies	$ 25,662	$ 24,241	$ 65,693	$ 10,050
10-66-495: Safety Equipment Supplies	$ 0	$ 500	$ 500	$ 500
10-66-540: Liability Insurance	$ 93,292	$ 102,500	$ 104,556	$ 104,000
10-66-545: Loss Control-Bio Haz Mat	$ 4,386	$ 2,500	$ 2,500	$ 1,500
10-66-565: Car Washes	$ 1,188	$ 2,000	$ 2,000	$ 1,000
10-66-610: Equipment Repairs & Maintenanc	$ 1,389	$ 2,000	$ 2,000	$ 2,000
10-66-725: Mileage-Miscellaneous Travel	$ 5	$ 0	$ 0	$ 0
10-66-800: Towing	$ 2,055	$ 1,500	$ 1,500	$ 1,500
10-66-840: Miscellaneous	$ 131	$ 0	$ 0	$ 150
10-66-860: Bullet Proof Vests	$ 1,247	$ 7,200	$ 7,200	$ 7,200
Total Operating Expenses	**$ 223,897**	**$ 263,332**	**$ 306,840**	**$ 224,900**
10-66-869: Equipment	$ 0	$ 0	$ 11,000	$ 0
10-66-870: Vehicles	$ 0	$ 0	$ 0	$ 295,300
10-66-872: Vehicle Changeover	$ 0	$ 0	$ 0	$ 9,500
Total Capital	**$ 0**	**$ 0**	**$ 11,000**	**$ 304,800**
Total Expenditures	**$ 5,168,515**	**$ 5,228,992**	**$ 5,371,520**	**$ 9,475,907**
Dollar Change			**$142,528**	**$ 4,104,387**
Percentage Change			**2.73%**	**76.41%**

Police Department - CIU Fund: 10-67	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-67-100: Salaries And Wages	$ 409,714	$ 450,000	$ 466,527	$ 402,369
10-67-102: Standby Pay	$ 0	$ 0	$ 0	$ 24,000
10-67-105: Overtime	$ 41,258	$ 25,000	$ 25,000	$ 25,000
Total Salaries & Overtime	**$ 450,972**	**$ 475,000**	**$ 491,527**	**$ 451,369**
10-67-115: Employee Benefits-Fica	$ 34,111	$ 34,000	$ 35,264	$ 32,157
10-67-120: Employee Benefits-Retirement	$ 252,314	$ 325,200	$ 336,889	$ 291,078
10-67-125: Employee Benefits-Workers Comp	$ 30,727	$ 32,000	$ 32,977	$ 28,933
10-67-130: Employee Benefits-Med/Dental	$ 51,699	$ 57,000	$ 57,000	$ 47,890
10-67-132: Cancer Insurance	$ 250	$ 375	$ 375	$ 375
10-67-135: Employee Benefits-Disabil/Life	$ 5,192	$ 4,800	$ 4,965	$ 4,790
10-67-160: Employee Benefits-Clothing	$ 4,888	$ 6,500	$ 6,500	$ 6,500
10-67-161: Employee Benefit - Cell Phone	$ 3,748	$ 1,380	$ 1,380	$ 1,380
10-67-186: Employee Benefits - H S A	$ 17,891	$ 15,860	$ 15,860	$ 18,460
Total Employee Benefits	**$ 400,821**	**$ 477,115**	**$ 491,210**	**$ 431,563**
10-67-375: Temporary Labor	$ 0	$ 0	$ 90,000	$ 90,000
10-67-540: Liability Insurance	$ 14,927	$ 16,400	$ 16,729	$ 21,000
10-67-705: Investigative Travel	$ 2,715	$ 5,000	$ 5,000	$ 5,000
10-67-715: Scottsdale Pd Crime Lab Fees	$ 25,000	$ 25,000	$ 25,000	$ 0
10-67-840: Miscellaneous	$ 124	$ 100	$ 100	$ 100
Total Operating Expenses	**$ 42,766**	**$ 46,500**	**$ 136,829**	**$ 116,100**
10-67-869: Equipment	$ 6,020	$ 62,000	$ 62,000	$ 29,600
Total Capital	**$ 6,020**	**$ 62,000**	**$ 62,000**	**$ 29,600**
Total Expenditures	**$ 900,579**	**$ 1,060,615**	**$ 1,181,566**	**$ 1,028,632**
Dollar Change			**$120,951**	**$(152,934)**
Percentage Change			**11.40%**	**-12.94%**

Alarm Fund - Fund: 50-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
50-40-235: Radio Service Fees	$ 8,835	$ 9,000	$ 9,000	$ 9,000
50-40-290: Software Maintenance Contract	$ 2,995	$ 4,500	$ 4,500	$ 4,500
50-40-330: General Professional Services	$ 0	$ 0	$ 0	$ 180,000
50-40-570: Computer Hardware Maintenance	$ 88	$ 4,000	$ 4,000	$ 4,000
50-40-863: Computer Hardware	$ 0	$ 0	$ 0	$ 268,000
50-40-980: Admin Fee Allocation	$ 88,800	$ 96,000	$ 96,000	$ 157,872
50-40-999: Operating Contingency	$ 0	$ 300,000	$ 300,000	$ 8,000
Total Operating Expenses	**$ 100,718**	**$ 413,500**	**$ 413,500**	**$ 631,372**
Total Expenditures	**$ 100,718**	**$ 413,500**	**$ 413,500**	**$ 631,372**
Dollar Change			**$0**	**$ 217,872**
Percentage Change				**52.69%**

Department of Administration - Information Technology Fund: 10-52	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-52-100: Salaries And Wages	$ 224,135	$ 222,000	$ 230,486	$ 229,279
10-52-105: Overtime	$ 889	$ 0	$ 0	$ 0
Total Salaries & Overtime	**$ 225,025**	**$ 222,000**	**$ 230,486**	**$ 229,279**
10-52-115: Employee Benefits-Fica	$ 16,910	$ 17,000	$ 17,649	$ 17,391
10-52-120: Employee Benefits-Retirement	$ 26,430	$ 25,800	$ 26,774	$ 26,776
10-52-125: Employee Benefits-Workers Comp	$ 834	$ 1,000	$ 1,031	$ 859
10-52-130: Employee Benefits-Med/Dental	$ 30,615	$ 32,800	$ 32,800	$ 29,660
10-52-135: Employee Benefits-Disabil/Life	$ 1,204	$ 1,700	$ 1,785	$ 1,638
10-52-161: Employee Benefit - Cell Phone	$ 2,760	$ 3,060	$ 3,060	$ 3,060
10-52-186: Employee Benefits - H S A	$ 12,015	$ 11,440	$ 11,440	$ 11,440
Total Employee Benefits	**$ 90,767**	**$ 92,800**	**$ 94,539**	**$ 90,824**
10-52-276: Photocopy Allocation	$ 2,065	$ 0	$ 0	$ 0
10-52-290: Software Maintenance Contract	$ 451,074	$ 708,150	$ 708,150	$ 705,500
10-52-305: It Support	$ 3,065	$ 19,100	$ 19,100	$ 18,800
10-52-330: General Professional Services	$ 74,451	$ 80,700	$ 80,700	$ 80,270
10-52-415: Computer Supplies	$ 265	$ 1,500	$ 1,500	$ 1,500
10-52-465: Office Supplies	$ 2,451	$ 2,000	$ 2,000	$ 2,000
10-52-485: Printing	$ 54	$ 0	$ 0	$ 0
10-52-540: Liability Insurance	$ 11,195	$ 12,300	$ 12,547	$ 12,500
10-52-570: Computer Hardware Maintenance	$ 1,313	$ 4,000	$ 4,000	$ 4,000
10-52-605: Photocopier Repairs & Maint	$ 6,595	$ 6,000	$ 6,000	$ 6,000
10-52-670: Meals	$ 430	$ 700	$ 700	$ 700
10-52-725: Mileage- Miscellaneous Travel	$ 0	$ 100	$ 100	$ 100
10-52-752: Postage	$ 14,033	$ 0	$ 0	$ 0
10-52-770: Staff Training	$ 11,737	$ 11,700	$ 11,700	$ 11,950
10-52-790: Subscriptions & Publications	$ 1,395	$ 1,000	$ 1,000	$ 1,000
10-52-815: Training Travel	$ 4,987	$ 4,000	$ 4,000	$ 4,000
10-52-840: Miscellaneous	$ 33	$ 100	$ 100	$ 100
10-52-863: Computer Hardware	$ 152,354	$ 163,455	$ 163,455	$ 327,930
10-52-864: Computer Software - New	$ 23,602	$ 71,250	$ 71,250	$ 66,675
10-52-980: Administrative Allocation	$(11,300)	$(11,391)	$(11,391)	$(61,579)
Total Operating Expenses	**$ 749,799**	**$ 1,074,664**	**$ 1,074,911**	**$ 1,181,446**
Total Expenditures	**$ 1,065,591**	**$ 1,389,464**	**$ 1,399,936**	**$ 1,501,549**
Dollar Change			**$10,472**	**$ 101,613**
Percentage Change			**.75%**	**7.26%**

Department of Administration - Finance Fund: 10-46	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-46-100: Salaries And Wages	$ 327,527	$ 320,000	$ 332,412	$ 332,578
10-46-105: Overtime	$ 14,873	$ 19,000	$ 19,000	$ 19,000
Total Salaries & Overtime	**$ 342,400**	**$ 339,000**	**$ 351,412**	**$ 351,578**
10-46-115: Employee Benefits-Fica	$ 26,412	$ 25,000	$ 25,949	$ 25,775
10-46-120: Employee Benefits-Retirement	$ 39,958	$ 40,000	$ 41,425	$ 40,707
10-46-125: Employee Benefits-Workers Comp	$ 1,202	$ 1,300	$ 1,346	$ 1,306
10-46-130: Employee Benefits-Med/Dental	$ 34,871	$ 37,000	$ 37,000	$ 40,034
10-46-135: Employee Benefits-Disabil/Life	$ 1,727	$ 2,200	$ 2,324	$ 2,167
10-46-161: Employee Benefit - Cell Phone	$ 1,720	$ 1,380	$ 1,380	$ 2,400
10-46-186: Employee Benefits - H S A	$ 16,035	$ 14,040	$ 14,040	$ 15,860
Total Employee Benefits	**$ 121,925**	**$ 120,920**	**$ 123,464**	**$ 128,249**
10-46-325: Financial Auditors	$ 29,195	$ 30,000	$ 30,000	$ 31,000
10-46-330: General Professional Services	$ 221,804	$ 195,500	$ 195,500	$ 301,400
10-46-336: Ef Credit Card Processing	$ 16,375	$ 13,000	$ 13,000	$ 16,300
10-46-339: Bank Service Charges	$ 48,497	$ 54,000	$ 54,000	$ 50,000
10-46-370: Payroll Process Service	$ 24,042	$ 25,500	$ 25,500	$ 29,100
10-46-375: Temporary Labor	$ 0	$ 0	$ 0	$ 100,000
10-46-415: Computer Supplies	$ 33	$ 0	$ 0	$ 0
10-46-465: Office Supplies	$ 3,417	$ 5,000	$ 5,000	$ 5,000
10-46-485: Printing-Ltrhd-Env.	$ 22,402	$ 26,000	$ 26,000	$ 26,000
10-46-540: Liability Insurance	$ 15,220	$ 16,400	$ 16,729	$ 21,000
10-46-670: Meals	$ 369	$ 1,500	$ 1,500	$ 1,500
10-46-675: Dues	$ 1,604	$ 2,400	$ 2,400	$ 2,400
10-46-725: Mileage-Miscellaneous Travel	$ 912	$ 1,500	$ 1,500	$ 1,500
10-46-770: Staff Training	$ 5,109	$ 6,800	$ 6,800	$ 9,500
10-46-790: Subscriptions & Publications	$ 915	$ 1,000	$ 1,000	$ 3,200
10-46-815: Training Travel	$ 9,774	$ 7,500	$ 7,500	$ 9,050
10-46-840: Miscellaneous	$ 107	$ 1,500	$ 1,500	$ 1,500
10-46-980: Administrative Allocation	$(178,650)	$(197,603)	$(197,603)	$(203,419)
Total Operating Expenses	**$ 221,126**	**$ 189,997**	**$ 190,326**	**$ 405,031**
Total Expenditures	**$ 685,450**	**$ 649,917**	**$ 665,202**	**$ 884,858**
Dollar Change			**$15,285**	**$ 219,656**
Percentage Change			**2.35%**	**33.02%**

Community Development - Building Division Fund: 10-47	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-47-100: Salaries And Wages	$ 334,698	$ 322,000	$ 333,446	$ 332,551
10-47-105: Overtime	$ 7,902	$ 1,500	$ 1,500	$ 4,000
Total Salaries & Overtime	**$ 342,600**	**$ 323,500**	**$ 334,946**	**$ 336,551**
10-47-115: Employee Benefits-Fica	$ 25,927	$ 25,000	$ 25,876	$ 25,507
10-47-120: Employee Benefits-Retirement	$ 39,467	$ 37,500	$ 38,814	$ 38,885
10-47-125: Employee Benefits-Workers Comp	$ 9,250	$ 8,900	$ 9,208	$ 9,096
10-47-130: Employee Benefits-Med/Dental	$ 37,302	$ 39,900	$ 39,900	$ 39,108
10-47-135: Employee Benefits-Disabil/Life	$ 2,135	$ 2,200	$ 2,314	$ 2,135
10-47-160: Employee Benefits-Clothing	$ 1,804	$ 1,520	$ 1,520	$ 1,520
10-47-161: Employee Benefit - Cell Phone	$ 4,080	$ 4,080	$ 4,080	$ 4,080
10-47-186: Employee Benefits - H S A	$ 15,860	$ 15,860	$ 15,860	$ 15,860
Total Employee Benefits	**$ 135,825**	**$ 134,960**	**$ 137,572**	**$ 136,191**
10-47-327: Emergency Management	$ 1,497	$ 5,000	$ 5,000	$ 6,200
10-47-330: General Professional Services	$ 27,299	$ 125,000	$ 20,000	$ 121,000
10-47-375: Temporary Labor	$ 0	$ 0	$ 105,000	$ 90,000
10-47-420: Expendable Tools	$ 0	$ 0	$ 0	$ 1,000
10-47-435: Gas & Oil	$ 4,725	$ 6,000	$ 6,000	$ 6,000
10-47-465: Office Supplies	$ 1,462	$ 2,000	$ 2,000	$ 2,000
10-47-485: Printing	$ 236	$ 2,150	$ 2,150	$ 2,000
10-47-540: Liability Insurance	$ 14,927	$ 16,400	$ 16,729	$ 21,000
10-47-565: Car Washes	$ 3	$ 100	$ 100	$ 0
10-47-670: Dinners @ Work Sessions, Etc	$ 0	$ 150	$ 150	$ 0
10-47-675: Dues	$ 680	$ 500	$ 500	$ 490
10-47-720: Legal Advertising	$ 18	$ 0	$ 0	$ 0
10-47-725: Mileage-Miscellaneous Travel	$ 552	$ 0	$ 0	$ 0
10-47-770: Staff Training	$ 1,660	$ 3,000	$ 3,000	$ 3,000
10-47-790: Subscriptions & Publications	$ 1,439	$ 600	$ 600	$ 600
10-47-815: Training Travel	$ 413	$ 1,300	$ 1,300	$ 1,300
10-47-840: Miscellaneous	$ 2,551	$ 3,100	$ 3,100	$ 35,800
Total Operating Expenses	**$ 57,460**	**$ 165,300**	**$ 165,629**	**$ 290,390**
Total Expenditures	**$ 535,885**	**$ 623,760**	**$ 638,147**	**$ 763,132**
Dollar Change			**$14,387**	**$ 124,985**
Percentage Change			**2.31%**	**19.59%**

Community Development - Planning Division Fund: 10-48	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-48-100: Salaries And Wages	$ 447,748	$ 439,000	$ 454,493	$ 452,286
10-48-105: Overtime	$ 4,556	$ 3,700	$ 3,700	$ 6,000
Total Salaries & Overtime	**$ 452,305**	**$ 442,700**	**$ 458,193**	**$ 458,286**
10-48-115: Employee Benefits-Fica	$ 33,467	$ 32,600	$ 33,785	$ 34,277
10-48-120: Employee Benefits-Retirement	$ 52,847	$ 50,800	$ 52,579	$ 52,862
10-48-125: Employee Benefits-Workers Comp	$ 1,652	$ 1,700	$ 1,756	$ 1,696
10-48-130: Employee Benefits-Med/Dental	$ 43,497	$ 41,000	$ 41,000	$ 40,467
10-48-135: Employee Benefits-Disabil/Life	$ 3,616	$ 3,100	$ 3,255	$ 2,915
10-48-160: Employee Benefits-Clothing	$ 0	$ 200	$ 200	$ 200
10-48-161: Employee Benefit - Cell Phone	$ 1,380	$ 1,380	$ 1,380	$ 1,380
10-48-186: Employee Benefits - H S A	$ 9,400	$ 12,200	$ 12,200	$ 14,820
Total Employee Benefits	**$ 145,859**	**$ 142,980**	**$ 146,155**	**$ 148,617**
10-48-330: General Professional Services	$ 1,470	$ 10,500	$ 10,500	$ 10,500
10-48-375: Temporary Help	$ 0	$ 0	$ 0	$ 2,500
10-48-402: Blueprints	$ 50	$ 0	$ 0	$ 0
10-48-465: Office Supplies	$ 2,010	$ 7,000	$ 7,000	$ 3,000
10-48-480: Blueprint Copier Supplies	$ 44	$ 0	$ 0	$ 0
10-48-485: Printing	$ 153	$ 3,600	$ 3,600	$ 300
10-48-540: Liability Insurance	$ 36,781	$ 24,600	$ 25,093	$ 25,000
10-48-670: Meals	$ 238	$ 650	$ 650	$ 500
10-48-675: Dues	$ 1,446	$ 1,800	$ 1,800	$ 2,000
10-48-685: Postage Machine, Rent, Supplie	$ 5,199	$ 5,000	$ 5,000	$ 0
10-48-720: Legal Advertising	$ 151	$ 2,000	$ 2,000	$ 2,000
10-48-725: Mileage-Miscellaneous Travel	$ 337	$ 200	$ 200	$ 600
10-48-750: Post Office	$ 16,707	$ 15,000	$ 15,000	$ 380,000
10-48-770: Staff Training	$ 1,884	$ 4,000	$ 4,000	$ 3,200
10-48-790: Subscriptions & Publications	$ 800	$ 200	$ 200	$ 200
10-48-815: Training Travel	$ 1,428	$ 4,500	$ 4,500	$ 6,700
10-48-840: Miscellaneous	$ 0	$ 100	$ 100	$ 100
10-48-845: Boards And Commission Expenses	$ 233	$ 1,000	$ 1,000	$ 1,000
10-48-863: Computer Hardware	$ 0	$ 500	$ 500	$ 0
10-48-866: Office Furniture & Fixtures	$ 0	$ 1,500	$ 1,500	$ 1,000
Total Operating Expenses	**$ 68,932**	**$ 82,150**	**$ 82,643**	**$ 438,600**
Total Expenditures	**$ 667,095**	**$ 667,830**	**$ 686,991**	**$ 1,045,503**
Dollar Change			**$19,161**	**$ 358,512**
Percentage Change			**2.87%**	**52.19%**

Public Works - Facilities Maintenance Fund: 10-41	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-41-100: Salaries And Wages	$ 125,449	$ 118,000	$ 122,972	$ 121,972
10-41-105: Overtime	$ 2,773	$ 1,600	$ 1,600	$ 1,600
Total Salaries & Overtime	**$ 128,222**	**$ 119,600**	**$ 124,572**	**$ 123,572**
10-41-115: Employee Benefits-Fica	$ 9,554	$ 9,000	$ 9,380	$ 9,333
10-41-120: Employee Benefits-Retirement	$ 15,078	$ 14,000	$ 14,571	$ 14,211
10-41-125: Employee Benefits-Workers Comp	$ 7,093	$ 7,700	$ 7,992	$ 6,876
10-41-130: Employee Benefits-Med/Dental	$ 15,569	$ 15,780	$ 15,780	$ 14,425
10-41-135: Employee Benefits-Disabil/Life	$ 925	$ 930	$ 980	$ 925
10-41-160: Employee Benefits-Clothing	$ 1,632	$ 1,310	$ 1,310	$ 1,310
10-41-162: Employee Benefit - Tool	$ 0	$ 1,000	$ 1,000	$ 1,000
10-41-186: Employee Benefits - H S A	$ 7,020	$ 7,020	$ 7,020	$ 7,020
10-41-199: Workers' Compensation Ded	$ 311	$ 0	$ 0	$ 0
Total Employee Benefits	**$ 57,181**	**$ 56,740**	**$ 58,033**	**$ 55,100**
10-41-205: Cellular Phone Charges	$ 945	$ 700	$ 700	$ 700
10-41-210: Water	$ 15,004	$ 20,600	$ 20,600	$ 20,565
10-41-214: Fire Service Fee	$ 3,564	$ 3,600	$ 3,600	$ 3,600
10-41-215: Electricity	$ 113,933	$ 129,000	$ 129,000	$ 128,948
10-41-217: Sewer Service Fees	$ 4,679	$ 6,900	$ 6,900	$ 6,900
10-41-220: Natural Gas	$ 2,606	$ 2,700	$ 2,700	$ 2,700
10-41-226: Kiva Field Electricity	$ 16,826	$ 15,100	$ 15,100	$ 15,100
10-41-330: General Professional Services	$ 13,783	$ 15,300	$ 15,300	$ 15,300
10-41-333: Janitorial Service	$ 68,773	$ 69,100	$ 69,100	$ 69,100
10-41-335: Independent Contractors	$ 5,570	$ 7,400	$ 7,400	$ 3,900
10-41-420: Expendable Tools	$ 353	$ 900	$ 900	$ 850
10-41-430: First Aid Supplies	$ 235	$ 200	$ 200	$ 200
10-41-435: Gas & Oil	$ 7,964	$ 1,000	$ 1,000	$ 1,000
10-41-445: Janitorial Supplies	$ 6,356	$ 8,600	$ 8,600	$ 8,600
10-41-455: Misc. Parts & Supplies	$ 398	$ 4,200	$ 4,200	$ 3,200
10-41-465: Office Supplies	$ 4,208	$ 2,000	$ 2,000	$ 2,000
10-41-520: Weed Control - Town Complex	$ 70	$ 2,500	$ 2,500	$ 3,000
10-41-540: Liability Insurance	$ 7,463	$ 8,200	$ 8,364	$ 8,200
10-41-560: Facilities Repairs & Maint.	$ 53,423	$ 41,200	$ 41,200	$ 41,200
10-41-580: Fire Hydrants Maintenance	$ 14,275	$ 0	$ 0	$ 0
10-41-590: Wash Maintenance	$ 1,431	$ 2,500	$ 2,500	$ 2,500
10-41-595: Landscape Maint. - Town Compl.	$ 5,339	$ 3,900	$ 3,900	$ 3,900
10-41-597: Kiva Field Electrical Maint	$ 0	$ 500	$ 500	$ 500
10-41-598: Kiva Field Maintenance	$ 7,774	$ 7,100	$ 7,100	$ 7,100
10-41-635: Pest Control	$ 2,322	$ 4,900	$ 4,900	$ 4,850
10-41-636: Berneil Wash Waste Removal	$ 196	$ 300	$ 300	$ 300
10-41-675: Dues	$ 75	$ 0	$ 0	$ 0
10-41-790: Subscriptions & Publications	$ 40	$ 0	$ 0	$ 0
10-41-980: Administrative Allocation	$ 0	$ 0	$ 0	$(18,200)
Total Operating Expenses	**$ 357,607**	**$ 358,400**	**$ 358,564**	**$ 336,013**
10-41-890: Capital	$ 65,535	$ 22,600	$ 22,600	$ 22,000
Total Capital	**$ 65,535**	**$ 22,600**	**$ 22,600**	**$ 22,000**
Total Expenditures	**$ 608,544**	**$ 557,340**	**$ 563,769**	**$ 536,685**
Dollar Change			**$6,429**	**$(27,084)**
Percentage Change			**1.15%**	**-4.80%**

Public Works - Engineering Fund: 10-49	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-49-100: Salaries And Wages	$ 320,076	$ 329,000	$ 337,935	$ 337,349
Total Salaries & Overtime	**$ 320,076**	**$ 329,000**	**$ 337,935**	**$ 337,349**
10-49-115: Employee Benefits-Fica	$ 22,369	$ 23,900	$ 24,584	$ 24,954
10-49-120: Employee Benefits-Retirement	$ 37,444	$ 38,000	$ 39,026	$ 39,113
10-49-125: Employee Benefits-Workers Comp	$ 8,134	$ 23,500	$ 23,955	$ 23,360
10-49-130: Employee Benefits-Med/Dental	$ 32,274	$ 40,200	$ 40,200	$ 41,252
10-49-135: Employee Benefits-Disabil/Life	$ 2,485	$ 2,300	$ 2,389	$ 2,298
10-49-160: Employee Benefits-Clothing	$ 0	$ 1,140	$ 1,140	$ 1,140
10-49-161: Employee Benefit - Cell Phone	$ 2,760	$ 2,760	$ 2,760	$ 2,760
10-49-186: Employee Benefits - H S A	$ 11,949	$ 14,040	$ 14,040	$ 15,860
Total Employee Benefits	**$ 117,415**	**$ 145,840**	**$ 148,094**	**$ 150,737**
10-49-205: Cellular Phone Charges	$ 365	$ 360	$ 360	$ 400
10-49-330: General Professional Services	$ 13,841	$ 50,000	$ 50,000	$ 60,000
10-49-335: Npa/Npdes Compliance	$ 5,000	$ 11,000	$ 11,000	$ 11,000
10-49-415: Computer Supplies	$ 60	$ 500	$ 500	$ 500
10-49-435: Gas & Oil	$ 717	$ 1,500	$ 1,500	$ 1,500
10-49-465: Office Supplies	$ 1,918	$ 1,400	$ 1,400	$ 1,400
10-49-485: Printing	$ 1,545	$ 2,600	$ 2,600	$ 2,600
10-49-540: Liability Insurance	$ 14,927	$ 16,400	$ 16,729	$ 16,400
10-49-675: Dues	$ 2,231	$ 1,700	$ 1,700	$ 1,700
10-49-720: Legal Advertising	$ 0	$ 0	$ 0	$ 200
10-49-770: Staff Training	$ 1,493	$ 6,000	$ 6,000	$ 6,000
10-49-790: Subscriptions & Publications	$ 102	$ 300	$ 300	$ 800
10-49-815: Training Travel	$ 88	$ 2,000	$ 2,000	$ 2,000
10-49-840: Miscellaneous	$ 0	$ 350	$ 350	$ 400
10-49-980: Administrative Allocation	$(58,700)	$(52,379)	$(52,379)	$(34,587)
Total Operating Expenses	**$ -16,413**	**$ 41,731**	**$ 42,060**	**$ 70,313**
Total Expenditures	**$ 421,078**	**$ 516,571**	**$ 528,089**	**$ 558,399**
Dollar Change			**$11,518**	**$ 30,310**
Percentage Change			**2.23%**	**5.74%**

Public Works - Fleet Fund: 10-51	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-51-100: Salaries And Wages	$ 63,613	$ 63,500	$ 66,020	$ 65,520
Total Salaries & Overtime	**$ 63,613**	**$ 63,500**	**$ 66,020**	**$ 65,520**
10-51-115: Employee Benefits-Fica	$ 4,615	$ 4,800	$ 4,993	$ 4,907
10-51-120: Employee Benefits-Retirement	$ 7,474	$ 7,300	$ 7,589	$ 7,535
10-51-125: Employee Benefits-Workers Comp	$ 2,753	$ 2,800	$ 2,908	$ 2,810
10-51-130: Employee Benefits-Med/Dental	$ 8,867	$ 9,600	$ 9,600	$ 10,280
10-51-135: Employee Benefits-Disabil/Life	$ 497	$ 500	$ 525	$ 500
10-51-160: Employee Benefits-Clothing	$ 1,180	$ 490	$ 490	$ 490
10-51-162: Employee Benefit - Tool	$ 0	$ 500	$ 500	$ 500
10-51-186: Employee Benefits - H S A	$ 4,420	$ 4,420	$ 4,420	$ 4,420
Total Employee Benefits	**$ 29,806**	**$ 30,410**	**$ 31,025**	**$ 31,442**
10-51-205: Cellular Phone Charges	$ 384	$ 360	$ 360	$ 360
10-51-420: Expendable Tools	$ 2,929	$ 4,000	$ 4,000	$ 2,110
10-51-435: Gas & Oil	$ 185	$ 300	$ 300	$ 260
10-51-465: Office Supplies	$ 85	$ 300	$ 300	$ 468
10-51-502: Shop Supplies	$ 7,190	$ 5,000	$ 5,000	$ 5,000
10-51-540: Liability Insurance	$ 3,732	$ 4,100	$ 4,182	$ 4,100
10-51-590: Equipment Repairs & Maintenanc	$ 139,221	$ 161,300	$ 161,300	$ 161,300
10-51-600: Shop Equipment Repair & Maint	$ 1,361	$ 3,600	$ 3,600	$ 3,600
10-51-634: Environmental Disposal Fees	$ 4,129	$ 3,400	$ 3,400	$ 3,004
10-51-675: Dues	$ 0	$ 800	$ 800	$ 800
10-51-770: Staff Training	$ 607	$ 1,100	$ 1,100	$ 418
10-51-790: Subscriptions & Publications	$ 1,837	$ 1,850	$ 1,850	$ 1,850
Total Operating Expenses	**$ 161,660**	**$ 186,110**	**$ 186,192**	**$ 183,270**
Total Expenditures	**$ 255,079**	**$ 280,020**	**$ 283,237**	**$ 280,232**
Dollar Change			**$3,217**	**$(3,005)**
Percentage Change			**1.15%**	**-1.06%**

Highway User Revenue Fund - Streets Fund: 20-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
20-40-100: Salaries And Wages	$ 562,022	$ 566,000	$ 583,399	$ 566,553
20-40-102: Standby Pay	$ 0	$ 0	$ 0	$ 28,000
20-40-105: Overtime	$ 2,751	$ 3,500	$ 3,500	$ 3,500
Total Salaries & Overtime	**$ 564,773**	**$ 569,500**	**$ 586,899**	**$ 598,053**
20-40-115: Employee Benefits-Fica	$ 41,823	$ 43,000	$ 44,331	$ 45,077
20-40-120: Employee Benefits-Retirement	$ 66,312	$ 65,800	$ 67,798	$ 58,051
20-40-125: Employee Benefits-Workers Comp	$ 54,512	$ 58,000	$ 59,709	$ 58,051
20-40-130: Employee Benefits-Med/Dental	$ 95,065	$ 100,400	$ 100,400	$ 79,044
20-40-135: Employee Benefits-Disabil/Life	$ 4,268	$ 4,200	$ 4,374	$ 4,186
20-40-160: Employee Benefits-Clothing	$ 5,662	$ 5,700	$ 5,700	$ 5,700
20-40-161: Employee Benefit - Cell Phone	$ 1,380	$ 1,380	$ 1,380	$ 1,380
20-40-186: Employee Benefits - H S A	$ 38,476	$ 36,140	$ 36,140	$ 32,500
20-40-199: Workers' Compensation Ded	$ 1,692	$ 0	$ 0	$ 0
Total Employee Benefits	**$ 309,190**	**$ 314,620**	**$ 319,832**	**$ 283,989**
20-40-205: Cellular Phones	$ 3,711	$ 4,100	$ 4,100	$ 4,100
20-40-210: Water	$ 50,878	$ 43,000	$ 43,000	$ 43,000
20-40-225: Electricity - Aps/Srp	$ 32,645	$ 32,000	$ 32,000	$ 30,000
20-40-227: Electricity - Landscape Median	$ 2,976	$ 1,300	$ 1,300	$ 3,000
20-40-330: General Professional Services	$ 35,517	$ 36,000	$ 36,000	$ 46,000
20-40-342: Stormwater Drainage Maintenanc	$ 49,784	$ 75,000	$ 75,000	$ 93,000
20-40-405: Beverages/Gaterade/Coffee	$ 861	$ 930	$ 930	$ 930
20-40-420: Expendable Tools	$ 2,189	$ 3,000	$ 3,000	$ 3,000
20-40-430: First Aid Supplies	$ 823	$ 1,000	$ 1,000	$ 1,000
20-40-435: Gas & Oil	$ 22,587	$ 30,000	$ 30,000	$ 30,000
20-40-455: Misc. Parts & Supplies	$ 2,414	$ 3,500	$ 3,500	$ 3,500
20-40-460: Misc. Rock & Fill	$ 17,128	$ 22,400	$ 22,400	$ 22,400
20-40-461: Misc Road & Drainage Repairs	$ 6,678	$ 7,500	$ 7,500	$ 7,500
20-40-464: Office Furnishings	$ 632	$ 2,000	$ 2,000	$ 0
20-40-465: Office Supplies	$ 2,282	$ 2,400	$ 2,400	$ 2,400
20-40-470: Street Striping	$ 24,984	$ 45,000	$ 45,000	$ 34,000
20-40-495: Safety Equipment Supplies	$ 908	$ 1,300	$ 1,300	$ 12,450
20-40-502: Street Shop Supplies	$ 2,232	$ 3,500	$ 3,500	$ 2,000
20-40-510: Street Signs & Materials	$ 6,976	$ 11,700	$ 11,700	$ 11,700
20-40-520: Weed Control Supplies	$ 6,485	$ 7,500	$ 7,500	$ 7,500
20-40-540: Liability Insurance	$ 37,317	$ 41,000	$ 41,822	$ 41,000
20-40-595: Landscape Islands/Right Of Way	$ 7,927	$ 9,700	$ 9,700	$ 9,700
20-40-605: Photocopier Repairs & Maint	$ 0	$ 1,200	$ 1,200	$ 1,200
20-40-615: Recreation Path Maintenance	$ 3,959	$ 12,000	$ 12,000	$ 12,000
20-40-621: Crack Seal Program	$ 896	$ 20,400	$ 20,400	$ 0
20-40-630: Traffic Signal Row Light Maint	$ 13,910	$ 9,600	$ 9,600	$ 16,600
20-40-634: Environmental Disposal Fees	$ 29,296	$ 28,700	$ 28,700	$ 28,700
20-40-636: Animal Pickups	$ 105	$ 1,500	$ 1,500	$ 1,200
20-40-675: Dues	$ 835	$ 1,300	$ 1,300	$ 1,200
20-40-765: Cdl Drug Testing Costs	$ 590	$ 1,200	$ 1,200	$ 1,200
20-40-770: Staff Training	$ 3,000	$ 3,800	$ 3,800	$ 3,800
20-40-790: Subscriptions & Publications	$ 0	$ 750	$ 750	$ 750
20-40-815: Training Travel	$ 1,515	$ 5,200	$ 5,200	$ 2,600
20-40-840: Miscellaneous	$ 27,922	$ 15,493	$ 15,493	$ 15,493
20-40-871: Street Preservation	$ 1,509,528	$ 1,540,000	$ 1,540,000	$ 3,317,000
Total Operating Expenses	**$ 1,909,488**	**$ 2,024,973**	**$ 2,025,795**	**$ 3,809,923**
20-40-869: Street Dept. Equipment	$ 2,554	$ 5,500	$ 5,500	$ 25,000
20-40-870: Vehicles	$ 0	$ 0	$ 0	$ 38,000
Total Capital	**$ 2,554**	**$ 5,500**	**$ 5,500**	**$ 63,000**

Highway User Revenue Fund - Streets Fund: 20-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
Total Expenditures	$ 2,786,005	$ 2,914,593	$ 2,938,026	$ 4,754,965
Dollar Change			$23,433	$ 1,816,939
Percentage Change			.80%	61.84%

Municipal Court - Fund: 10-50	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-50-100: Salaries And Wages	$ 287,747	$ 309,000	$ 328,216	$ 361,621
10-50-105: Overtime	$ 6,416	$ 7,500	$ 7,500	$ 8,000
Total Salaries & Overtime	**$ 294,162**	**$ 316,500**	**$ 335,716**	**$ 369,621**
10-50-115: Employee Benefits-Fica	$ 22,147	$ 24,200	$ 25,670	$ 24,663
10-50-120: Employee Benefits-Retirement	$ 34,187	$ 37,000	$ 39,206	$ 37,686
10-50-125: Employee Benefits-Workers Comp	$ 1,161	$ 1,100	$ 1,158	$ 1,108
10-50-130: Employee Benefits-Med/Dental	$ 34,644	$ 37,000	$ 37,000	$ 42,498
10-50-135: Employee Benefits-Disabil/Life	$ 1,929	$ 2,000	$ 2,192	$ 1,929
10-50-161: Employee Benefit - Cell Phone	$ 1,380	$ 1,380	$ 1,380	$ 1,380
10-50-186: Employee Benefits - H S A	$ 16,455	$ 15,860	$ 15,860	$ 17,680
Total Employee Benefits	**$ 111,903**	**$ 118,540**	**$ 122,466**	**$ 126,944**
10-50-330: General Professional Services	$ 76,741	$ 69,500	$ 69,500	$ 69,500
10-50-334: Armored Car Service	$ 4,955	$ 5,500	$ 5,500	$ 5,500
10-50-340: Indigent Legal Aid	$ 7,106	$ 8,500	$ 8,500	$ 8,500
10-50-341: Credit Card Expense	$ 15,620	$ 15,000	$ 15,000	$ 15,000
10-50-345: Interpreter	$ 2,253	$ 3,500	$ 3,500	$ 3,500
10-50-352: Court Credit Reporting	$ 2,015	$ 3,000	$ 3,000	$ 3,000
10-50-365: Messenger/Process Service	$ 311	$ 400	$ 400	$ 400
10-50-375: Temporary Labor	$ 57,271	$ 111,500	$ 111,500	$ 141,000
10-50-400: Court Robes	$ 0	$ 500	$ 500	$ 500
10-50-465: Office Supplies	$ 5,427	$ 7,800	$ 7,800	$ 7,800
10-50-485: Printing	$ 1,454	$ 1,000	$ 1,000	$ 1,000
10-50-540: Liability Insurance	$ 18,658	$ 20,500	$ 20,911	$ 25,000
10-50-670: Meals	$ 1,065	$ 1,300	$ 1,300	$ 1,300
10-50-675: Dues	$ 560	$ 800	$ 800	$ 800
10-50-710: Jury	$ 0	$ 1,000	$ 1,000	$ 1,000
10-50-725: Mileage-Miscellaneous Travel	$ 1,475	$ 650	$ 650	$ 350
10-50-770: Staff Training	$ 5,765	$ 7,900	$ 7,900	$ 7,725
10-50-790: Subscriptions & Publications	$ 502	$ 800	$ 800	$ 800
10-50-815: Training Travel	$ 9,200	$ 8,350	$ 8,350	$ 15,800
10-50-840: Miscellaneous	$ 700	$ 250	$ 250	$ 2,750
10-50-842: Records Retention	$ 6,445	$ 2,500	$ 2,500	$ 1,200
Total Operating Expenses	**$ 217,522**	**$ 270,250**	**$ 270,661**	**$ 312,425**
Total Expenditures	**$ 623,587**	**$ 705,290**	**$ 728,843**	**$ 808,990**
Dollar Change			**$23,553**	**$ 80,147**
Percentage Change			**3.34%**	**11.00%**

Town Attorney - Fund: 10-45	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-45-100: Salaries And Wages	$ 314,597	$ 302,000	$ 306,292	$ 306,011
Total Salaries & Overtime	**$ 314,597**	**$ 302,000**	**$ 306,292**	**$ 306,011**
10-45-115: Employee Benefits-Fica	$ 20,456	$ 19,300	$ 19,628	$ 20,235
10-45-120: Employee Benefits-Retirement	$ 37,422	$ 35,300	$ 35,793	$ 35,810
10-45-125: Employee Benefits-Workers Comp	$ 1,223	$ 1,100	$ 1,114	$ 1,110
10-45-130: Employee Benefits-Med/Dental	$ 23,928	$ 26,000	$ 26,000	$ 23,243
10-45-135: Employee Benefits-Disabil/Life	$ 1,678	$ 1,700	$ 1,743	$ 1,678
10-45-161: Employee Benefit - Cell Phone	$ 1,417	$ 1,380	$ 1,380	$ 1,380
10-45-165: Employee Benefit-Car Allowance	$ 2,081	$ 3,000	$ 3,000	$ 3,000
10-45-186: Employee Benefits - H S A	$ 9,620	$ 9,620	$ 9,620	$ 9,620
10-45-191: Deferred Compensation	$ 4,989	$ 7,500	$ 7,500	$ 7,500
Total Employee Benefits	**$ 102,813**	**$ 104,900**	**$ 105,778**	**$ 103,576**
10-45-330: General Professional Services	$ 0	$ 4,000	$ 4,000	$ 4,000
10-45-356: Legal-Outside - General Law	$ 125,483	$ 90,000	$ 90,000	$ 90,000
10-45-365: Messenger/Process Service	$ 508	$ 1,100	$ 1,100	$ 1,100
10-45-375: Temporary Labor	$ 46,876	$ 75,000	$ 75,000	$ 95,000
10-45-465: Office Supplies	$ 1,054	$ 2,000	$ 2,000	$ 2,000
10-45-485: Printing	$ 100	$ 100	$ 100	$ 100
10-45-540: Liability Insurance	$ 11,195	$ 12,300	$ 12,547	$ 12,400
10-45-670: Meals	$ 129	$ 200	$ 200	$ 300
10-45-675: Dues	$ 1,210	$ 1,800	$ 1,800	$ 2,360
10-45-725: Mileage-Miscellaneous Travel	$ 338	$ 500	$ 500	$ 500
10-45-770: Staff Training	$ 1,795	$ 2,100	$ 2,100	$ 2,700
10-45-775: Research	$ 8,534	$ 9,400	$ 9,400	$ 9,800
10-45-790: Subscriptions & Publications	$ 4,722	$ 3,800	$ 3,800	$ 1,375
10-45-815: Training Travel	$ 2,018	$ 2,500	$ 2,500	$ 3,200
10-45-840: Miscellaneous	$ 19	$ 200	$ 200	$ 200
10-45-841: Misc - Settlements	$ 60,319	$ 0	$ 0	$ 0
10-45-980: Administrative Allocation	$(53,000)	$(56,221)	$(56,221)	$(56,540)
Total Operating Expenses	**$ 211,301**	**$ 148,779**	**$ 149,026**	**$ 168,495**
Total Expenditures	**$ 628,711**	**$ 555,679**	**$ 561,096**	**$ 578,082**
Dollar Change			**$5,417**	**$ 16,986**
Percentage Change			**.97%**	**3.03%**

Mayor and Council - Fund: 10-43	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-43-125: Employee Benefits-Workers Comp	$ 1,120	$ 900	$ 900	$ 1,000
10-43-135: Employee Benefits-Disabil/Life	$ 144	$ 300	$ 300	$ 300
Total Employee Benefits	**$ 1,264**	**$ 1,200**	**$ 1,200**	**$ 1,300**
10-43-330: General Professional Services	$ 23,660	$ 36,000	$ 36,000	$ 2,500
10-43-333: Contribution Human Service Org	$ 37,000	$ 50,000	$ 50,000	$ 50,000
10-43-334: Psprs Board Expenses	$ 31,459	$ 10,000	$ 10,000	$ 25,000
10-43-465: Office Supplies	$ 88	$ 0	$ 0	$ 0
10-43-485: Printing	$ 2,090	$ 0	$ 0	$ 0
10-43-660: Council Recognition Events	$ 28,658	$ 30,000	$ 30,000	$ 31,000
10-43-670: Dinners @ Work Sessions, Etc	$ 5,970	$ 5,000	$ 5,000	$ 5,000
10-43-675: Dues	$ 14,040	$ 14,500	$ 14,500	$ 14,500
10-43-695: Flowers	$ 2,195	$ 3,000	$ 3,000	$ 2,500
10-43-735: Photographer	$ 0	$ 500	$ 500	$ 0
10-43-770: Staff Training	$ 4,437	$ 2,000	$ 2,000	$ 2,000
10-43-815: Training Travel	$ 0	$ 3,000	$ 3,000	$ 3,000
10-43-840: Miscellaneous	$ 1,118	$ 500	$ 500	$ 500
10-43-920: Historical Committee	$ 0	$ 500	$ 500	$ 500
10-43-922: Arts Commission	$ 1,778	$ 1,000	$ 1,000	$ 1,200
Total Operating Expenses	**$ 152,494**	**$ 156,000**	**$ 156,000**	**$ 137,700**
Total Expenditures	**$ 153,758**	**$ 157,200**	**$ 157,200**	**$ 139,000**
Dollar Change			**$0**	**$(18,200)**
Percentage Change				**-11.58%**

Tourism Promotion - Fund: 10-56	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-56-844: Ncaa Football National	$ 45,700	$ 0	$ 0	$ 0
10-56-845: Final Four	$ 0	$ 50,000	$ 50,000	$ 0
10-56-913: Tourism	$ 1,159,726	$ 1,275,037	$ 1,275,037	$ 1,311,919
10-56-915: Trolley	$ 0	$ 26,000	$ 26,000	$ 27,000
Total Operating Expenses	**$ 1,205,426**	**$ 1,351,037**	**$ 1,351,037**	**$ 1,338,919**
Total Expenditures	**$ 1,205,426**	**$ 1,351,037**	**$ 1,351,037**	**$ 1,338,919**
Dollar Change			**$0**	**$(12,118)**
Percentage Change				**-0.90%**

Town Manager - Fund: 10-44	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-44-100: Salaries And Wages	$ 460,074	$ 443,800	$ 453,794	$ 460,178
10-44-105: Overtime	$ 1,181	$ 500	$ 500	$ 500
Total Salaries & Overtime	**$ 461,254**	**$ 444,300**	**$ 454,294**	**$ 460,678**
10-44-115: Employee Benefits-Fica	$ 32,178	$ 30,000	$ 30,765	$ 31,525
10-44-120: Employee Benefits-Retirement	$ 55,402	$ 52,000	$ 53,147	$ 53,896
10-44-125: Employee Benefits-Workers Comp	$ 2,268	$ 1,700	$ 1,737	$ 1,729
10-44-130: Employee Benefits-Med/Dental	$ 34,250	$ 37,000	$ 37,000	$ 34,211
10-44-135: Employee Benefits-Disabil/Life	$ 2,618	$ 2,600	$ 2,700	$ 2,588
10-44-161: Employee Benefit - Cell Phone	$ 1,775	$ 3,780	$ 3,780	$ 3,780
10-44-165: Employee Benefit-Car Allowance	$ 3,850	$ 4,200	$ 4,200	$ 4,200
10-44-186: Employee Benefits - H S A	$ 14,040	$ 14,040	$ 14,040	$ 14,040
10-44-191: Deferred Compensation	$ 11,200	$ 10,000	$ 10,000	$ 10,000
Total Employee Benefits	**$ 157,581**	**$ 155,320**	**$ 157,369**	**$ 155,969**
10-44-205: Cellular Phone Charges	$ 942	$ 0	$ 0	$ 1,000
10-44-310: County Recorder	$ 1,866	$ 1,100	$ 1,100	$ 1,500
10-44-330: General Professional Services	$ 74,201	$ 71,000	$ 71,000	$ 45,000
10-44-356: Legal-Outside - General Law	$ 0	$ 10,000	$ 10,000	$ 10,000
10-44-380: Town-Wide Training	$ 2,500	$ 2,500	$ 2,500	$ 2,500
10-44-465: Office Supplies	$ 6,008	$ 5,500	$ 5,500	$ 5,500
10-44-485: Printing	$ 1,483	$ 4,000	$ 4,000	$ 4,000
10-44-540: Liability Insurance	$ 14,927	$ 16,500	$ 16,729	$ 16,500
10-44-660: Twn Mgr Special Perform Award	$ 5,197	$ 5,100	$ 5,100	$ 5,100
10-44-661: Employee Awards	$ 3,770	$ 4,000	$ 4,000	$ 4,000
10-44-662: Employee Programs	$ 6,904	$ 10,000	$ 10,000	$ 10,000
10-44-663: Employee Tuition Reimbursement	$ 0	$ 0	$ 0	$ 20,000
10-44-670: Meals	$ 1,282	$ 1,500	$ 1,500	$ 2,500
10-44-675: Dues	$ 1,208	$ 2,600	$ 2,600	$ 2,500
10-44-680: Elections	$ 0	$ 23,360	$ 23,360	$ 0
10-44-720: Legal Advertising	$ 2,314	$ 2,500	$ 2,500	$ 4,000
10-44-725: Mileage- Miscellaneous Travel	$ 205	$ 300	$ 300	$ 300
10-44-753: Postage Allocation	$ 0	$ 12,000	$ 12,000	$ 12,000
10-44-755: Potted Plants	$ 2,746	$ 3,000	$ 3,000	$ 3,000
10-44-765: Recruiting & Employment	$ 5,714	$ 6,000	$ 6,000	$ 7,000
10-44-770: Staff Training	$ 7,694	$ 6,650	$ 6,650	$ 6,650
10-44-790: Subscriptions & Publications	$ 1,028	$ 900	$ 900	$ 1,000
10-44-805: Town Bulletin Board	$ 3,792	$ 0	$ 0	$ 0
10-44-810: Town Reporter	$ 7,540	$ 11,000	$ 11,000	$ 11,000
10-44-815: Training Travel	$ 1,741	$ 5,800	$ 5,800	$ 5,800
10-44-840: Miscellaneous	$ 342	$ 500	$ 500	$ 500
Total Operating Expenses	**$ 153,403**	**$ 205,810**	**$ 206,039**	**$ 181,350**
Total Expenditures	**$ 772,239**	**$ 805,430**	**$ 817,702**	**$ 797,997**
Dollar Change			**$12,272**	**$(19,705)**
Percentage Change			**1.52%**	**-2.41%**

Contingencies - Operating Contingency Fund: 10-57	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
10-57-970: Operating Contingency	$ 0	$ 272,200	$ 226,285	$ 225,000
10-57-977: Payroll Merit Allowance	$ 0	$ 375,000	$ 37,809	$ 375,000
Total Operating Expenses	**$ 0**	**$ 647,200**	**$ 264,094**	**$ 600,000**
Total Expenditures	**$ 0**	**$ 647,200**	**$ 264,094**	**$ 600,000**
Dollar Change			**$(383,106)**	**$ 335,906**
Percentage Change			**(59.19%)**	**127.19%**

Contingency Fund - Fund: 29-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
29-40-970: Contingency	$ 0	$ 950,000	$ 950,000	$ 1,271,029
Total Operating Expenses	**$ 0**	**$ 950,000**	**$ 950,000**	**$ 1,271,029**
Total Expenditures	**$ 0**	**$ 950,000**	**$ 950,000**	**$ 1,271,029**
Dollar Change			**$0**	**$ 321,029**
Percentage Change				**33.79%**

Debt Service Fund - Fund: 40-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
40-40-960: Debt 2016 Principle Expenditur	$ 0	$ 0	$ 0	$ 155,000
40-40-961: Debt 2016 Interest Expenditure	$ 49,570	$ 0	$ 116,156	$ 133,172
Total Operating Expenses	**$ 49,570**	**$ 0**	**$ 116,156**	**$ 288,172**
Total Expenditures	**$ 49,570**	**$ 0**	**$ 116,156**	**$ 288,172**
Dollar Change			**$116,156**	**$ 172,016**

MPC Debt Service Fund - Fund: 91-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
91-40-840: Miscellaneous	$ 0	$ 116,200	$(116,200)	$ 0
91-40-957: Interest 2009 Mpc Debt	$ 113,292	$ 71,807	$ 71,807	$ 33,003
91-40-958: Principal 2009 Mpc Debt	$ 914,242	$ 927,990	$ 927,990	$ 780,199
Total Operating Expenses	**$ 1,027,534**	**$ 1,115,997**	**$ 999,707**	**$ 813,202**
Total Expenditures	**$ 1,027,534**	**$ 1,115,997**	**$ 999,707**	**$ 813,202**
Dollar Change			**$(116,290)**	**$(186,505)**
Percentage Change			**(10.42%)**	**-18.6%**

Wastewater Utility Fund - Fund: 55-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
55-40-215: Electricity	$ 2,841	$ 3,000	$ 3,000	$ 3,200
55-40-250: Bond Administration	$ 1,100	$ 1,000	$ 1,000	$ 1,200
55-40-310: County Recorder Sewer Liens	$ 0	$ 600	$ 600	$ 600
55-40-330: General Professional Services	$ 31,173	$ 25,000	$ 25,000	$ 25,000
55-40-337: Sewer Maintenance	$ 35,943	$ 75,000	$ 75,000	$ 50,000
55-40-840: Miscellaneous	$(591)	$ 0	$ 0	$ 0
55-40-850: Bad Debt Expenses	$ 3,300	$ 0	$ 0	$ 0
55-40-899: Depreciation	$ 250,718	$ 0	$ 0	$ 0
55-40-950: Amortize 2009 Bond Premium	$(15,419)	$ 0	$ 0	$ 0
55-40-960: Capital Lease - Interest	$ 12,930	$ 0	$ 0	$ 0
55-40-965: Interest 2009 Mpc Bond	$ 51,521	$ 32,655	$ 32,655	$ 15,009
55-40-966: Principal 2009 Mpc Bond	$ 0	$ 422,010	$ 422,010	$ 354,801
55-40-970: Scottsdale Service Fees	$ 1,682,216	$ 1,682,400	$ 1,682,400	$ 1,682,400
55-40-980: Admin Fee Allocation	$ 130,000	$ 132,000	$ 132,000	$ 134,000
55-40-999: Operating Contingency	$ 0	$ 43,044	$ 43,044	$ 45,000
Total Operating Expenses	**$ 2,185,733**	**$ 2,416,709**	**$ 2,416,709**	**$ 2,311,210**
Total Expenditures	**$ 2,185,733**	**$ 2,416,709**	**$ 2,416,709**	**$ 2,311,210**
Dollar Change			**$0**	**$(105,499)**
Percentage Change				**-4.37%**

Wastewater Impact Fee Fund - Fund: 57-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
57-40-330: General Professional Services	$ 0	$ 50,000	$ 50,000	$ 50,000
Total Operating Expenses	**$ 0**	**$ 50,000**	**$ 50,000**	**$ 50,000**
Total Expenditures	**$ 0**	**$ 50,000**	**$ 50,000**	**$ 50,000**
Dollar Change			**$0**	**$ 0**
Percentage Change				

Fire Service Fund - Fund: 53-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
53-40-210: Water	$ 4,360	$ 4,300	$ 4,300	$ 4,400
53-40-214: Fire Service Fee	$ 1,155	$ 1,200	$ 1,200	$ 1,200
53-40-215: Electricity	$ 28,464	$ 38,000	$ 38,000	$ 32,000
53-40-217: Sewer Service Fees	$ 1,518	$ 1,700	$ 1,700	$ 4,100
53-40-220: Natural Gas	$ 2,970	$ 3,000	$ 3,000	$ 3,100
53-40-330: General Professional Services	$ 1,864	$ 8,300	$ 8,300	$ 15,100
53-40-333: Janitorial Service	$ 0	$ 2,200	$ 2,200	$ 2,200
53-40-335: Phoenix Iga	$ 2,251,970	$ 2,424,737	$ 2,424,737	$ 2,509,603
53-40-342: Third Party Reimbursements	$ 119,445	$ 128,000	$ 128,000	$ 0
53-40-435: Gas & Oil	$ 14,628	$ 20,000	$ 20,000	$ 129,000
53-40-520: Weed Control	$ 0	$ 0	$ 0	$ 20,000
53-40-560: Facilities Repairs & Maint	$ 31,231	$ 11,000	$ 11,000	$ 35,000
53-40-580: Fire Hydrant Maintenance	$ 0	$ 13,000	$ 13,000	$ 16,800
53-40-595: Landscape Maint	$ 536	$ 0	$ 0	$ 0
53-40-634: Environmental Disposal Fee	$ 1,496	$ 1,500	$ 1,500	$ 1,500
53-40-635: Pest Control	$ 1,373	$ 1,400	$ 1,400	$ 1,400
53-40-840: Miscellaneous	$ 20,000	$ 20,000	$ 20,000	$ 20,000
53-40-850: Bad Debt Expense	$ 5,740	$ 10,000	$ 10,000	$ 10,000
53-40-899: Depreciation	$ 284,509	$ 0	$ 0	$ 0
53-40-980: Allocate Administrative Fees	$ 150,000	$ 161,000	$ 161,000	$ 166,000
53-40-999: Operating Contingency	$ 0	$ 50,817	$ 50,817	$ 60,000
Total Operating Expenses	**$ 2,921,260**	**$ 2,900,154**	**$ 2,900,154**	**$ 3,031,403**
Total Expenditures	**$ 2,921,260**	**$ 2,900,154**	**$ 2,900,154**	**$ 3,031,403**
Dollar Change			**$0**	**$ 131,249**
Percentage Change				**4.53%**

Court Enhancement Fund - Fund: 21-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
21-40-986: Miscellaneous	$ 101,547	$ 70,500	$ 70,500	$ 30,000
21-40-987: Interest Payment	$ 18,688	$ 16,438	$ 16,438	$ 14,188
21-40-988: Principal Payment	$ 0	$ 90,000	$ 90,000	$ 90,000
21-40-989: Land Lease Payment	$ 25,000	$ 25,000	$ 25,000	$ 25,000
Total Operating Expenses	**$ 145,234**	**$ 201,938**	**$ 201,938**	**$ 159,188**
Total Expenditures	**$ 145,234**	**$ 201,938**	**$ 201,938**	**$ 159,188**
Dollar Change			**$0**	**$(42,750)**
Percentage Change				**-21.17%**

JCEF - Fund: 23-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
23-40-985: Miscellaneous	$ 638	$ 2,500	$ 2,500	$ 2,500
Total Operating Expenses	**$ 638**	**$ 2,500**	**$ 2,500**	**$ 2,500**
Total Expenditures	**$ 638**	**$ 2,500**	**$ 2,500**	**$ 2,500**
Dollar Change			**$0**	**$ 0**
Percentage Change				

Donation Fund - Fund: 25-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
25-40-950: Dare Donation Expenditures	$ 974	$ 0	$ 0	$ 0
25-40-970: Police Dept Donation Expnd	$ 100	$ 5,000	$ 5,000	$ 5,000
25-40-974: Vintage Car Show Expenditures	$ 8,480	$ 10,000	$ 10,000	$ 10,000
25-40-975: Bil Keane Memorial Statue	$ 323	$ 0	$ 0	$ 0
Total Operating Expenses	**$ 9,877**	**$ 15,000**	**$ 15,000**	**$ 15,000**
Total Expenditures	**$ 9,877**	**$ 15,000**	**$ 15,000**	**$ 15,000**
Dollar Change			**$0**	**$ 0**
Percentage Change				

Grant Fund - Fund: 26-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
26-40-840: Miscellaneous	$ 0	$ 237,000	$ 237,000	$ 0
26-40-977: Bullet Proof Vest Grants	$ 2,222	$ 0	$ 0	$ 0
26-40-984: Ltaf Ii Grant (Hb 2565)	$ 35,864	$ 38,000	$ 38,000	$ 38,000
26-40-991: Misc Police Grants	$ 15,862	$ 0	$ 0	$ 50,000
Total Operating Expenses	**$ 53,948**	**$ 275,000**	**$ 275,000**	**$ 88,000**
Total Expenditures	**$ 53,948**	**$ 275,000**	**$ 275,000**	**$ 88,000**
Dollar Change			**$0**	**$(187,000)**
Percentage Change				**-68.00%**

Construction in Progress Fund - Fund: 30-40	2015-16 Prior Year Actual	2016-17 Adopted Budget	2016-17 Amended Budget	2017-18 Proposed Budget
30-40-330: Professional Services	$ 223,440	$ 400,000	$ 400,000	$ 43,000
30-40-933: Road Improvements	$ 349,047	$ 0	$ 0	$ 0
30-40-938: Undergrounding	$ 1,594	$ 503,366	$ 503,366	$ 1,224,385
30-40-942: Facility Improvements	$ 176,737	$ 100,000	$ 100,000	$ 670,000
30-40-943: Wastewater Projects	$ 39,034	$ 384,200	$ 384,200	$ 234,200
30-40-960: Mockingbird Lane	$ 743	$ 0	$ 0	$ 0
30-40-963: Traffic Signal Projects	$ 17,341	$ 0	$ 0	$ 250,000
30-40-965: 56Th St Improvements	$ 145,342	$ 0	$ 0	$ 0
30-40-967: Stormwater Projects	$ 0	$ 0	$ 0	$ 305,000
30-40-968: Street Projects	$ 36,251	$ 1,985,500	$ 1,985,500	$ 10,561,750
30-40-979: Sidewalk Projects	$ 429,887	$ 640,000	$ 640,000	$ 540,000
30-40-983: Fixed Lprs	$ 253,465	$ 0	$ 0	$ 0
30-40-990: Technology	$ 1,064,721	$ 4,427,000	$ 4,427,000	$ 1,358,000
30-40-999: Cip Project Contingencies 5%	$ 0	$ 422,003	$ 422,003	$ 760,000
Total Operating Expenses	**$ 2,737,601**	**$ 8,862,069**	**$ 8,862,069**	**$ 15,946,335**
Total Expenditures	**$ 2,737,601**	**$ 8,862,069**	**$ 8,862,069**	**$ 15,946,335**
Dollar Change			**$0**	**$ 7,084,266**
Percentage Change				**79.94%**

Town of Paradise Valley, Arizona

Capital Improvement Plan

2018 thru 2022

PROJECTS BY DEPARTMENT

Department	Project #	2018	2019	2020	2021	2022	Total
Facility Improvement							
Town Hall Remodel	*2017-01*	210,000	775,000	775,000			*1,760,000*
Police and PW Dept Backup Power	*2017-02*	300,000					*300,000*
Town Hall Chiller Replacement	*2019-02*			100,000			*100,000*
Police Department Remodel	*2019-10*	110,000	300,000	590,000			*1,000,000*
Public Works Remodel	*2020-08*	50,000	400,000				*450,000*
Town Hall Backup Power	*2021-04*				200,000		*200,000*
Facility Improvement Total		**670,000**	**1,475,000**	**1,465,000**	**200,000**		***3,810,000***
Master Plans/Studies							
Watershed Studies	*2016-06*		450,000				*450,000*
Iconic Visually Significant Corridors, etc.	*2016-08*	43,000					*43,000*
Master Plans/Studies Total		**43,000**	**450,000**				***493,000***
Sidewalks							
Lincoln Drive Sidewalks	*2017-05*	440,000	75,000	120,000			*635,000*
56th St. Sidewalks (Mockingbird to Doubletree)	*2018-06*	100,000					*100,000*
N. Tatum Rd. Sidewalks (Doubletree-Montain View)	*2020-06*			150,000			*150,000*
32nd St. Sidewalks (Stanford to Lincoln)	*2021-02*				300,000	2,850,000	*3,150,000*
Sidewalks Total		**540,000**	**75,000**	**270,000**	**300,000**	**2,850,000**	***4,035,000***
SRP Undergrounding							
SRP 44th Street & Keim Converson	*2016-01*	1,224,385					*1,224,385*
SRP Denton Lane Conversion	*2020-01*			50,000	527,100		*577,100*
SRP 40th Street & Lincoln Drive Conversion	*2022-01*					300,000	*300,000*
SRP Undergrounding Total		**1,224,385**		**50,000**	**527,100**	**300,000**	***2,101,485***
Stormwater							
Regional Stormwater Projects	*2018-20*	305,000	1,200,000	3,000,000	650,000	2,600,000	*7,755,000*
Stormwater Total		**305,000**	**1,200,000**	**3,000,000**	**650,000**	**2,600,000**	***7,755,000***
Streets							
Lincoln Dr. (Limits to Mockingbird) - Ritz Related	*2016-14.1*	2,941,750					*2,941,750*
Indian Bend (Limits to Mockingbird) - Ritz Related	*2016-14.2*	1,700,000					*1,700,000*
Mockingbird Lane Medians - Ritz Related	*2016-14.3*	5,320,000					*5,320,000*
Mockingbird Lane Improvements (S. of Lincoln Rd.)	*2018-03*	200,000					*200,000*
Doubletree (64th St. to Scottsdale)	*2018-04*	300,000	3,000,000				*3,300,000*
Pedestrian / Bicycle Improvements	*2018-07*	100,000	100,000	100,000	100,000	100,000	*500,000*
Lincoln@64th St. (Invergordon) Intersect. Realign	*2019-03*		150,000				*150,000*
64th St. Medians (McDonald to Chaparral Rd.)	*2019-04*			270,000	2,430,000		*2,700,000*
Denton Lane Cul De Sac	*2019-05*			150,000			*150,000*
Highlands Drive Cul De Sac	*2019-06*		250,000				*250,000*

Department	Project #	2018	2019	2020	2021	2022	Total
45th Street Curbs (McDonald to Valley Vista)	*2020-02*			100,000			*100,000*
Tatum Boulevard Retaining Walls	*2020-03*			400,000			*400,000*
Mockingbird Lane (56th St. to Invergordon Rd.)	*2020-04*				300,000	3,000,000	*3,300,000*
Mountain View Road Improvements (Tatum - 52nd St.)	*2020-05*			100,000	1,000,000		*1,100,000*
Mini Multi-Modal Transportation Site	*2021-01*				500,000		*500,000*
Streets Total		**10,561,750**	**3,500,000**	**1,120,000**	**4,330,000**	**3,100,000**	***22,611,750***
Technology							
Public Safety Communications Tower	*2013-02*	850,000					*850,000*
Network Switch Upgrade	*2016-10*	12,000					*12,000*
Implement Town-Wide Geographic Info. System (GIS)	*2017-04*	125,000					*125,000*
Telecommunications System Update	*2018-01*		320,000				*320,000*
CAD Enterprise Upgrade	*2018-08*	221,000					*221,000*
Town Hall Complex Fiber Connections	*2022-05*	150,000					*150,000*
Technology Total		**1,358,000**	**320,000**				***1,678,000***
Traffic Signals							
Traffic Signal (Video Detection) Upgrades	*2018-05*	250,000					*250,000*
Traffic Signals Total		**250,000**					***250,000***
Wastewater							
Sewer System Assesment	*2017-06*	234,200	234,200	234,200	234,200		*936,800*
Wastewater Total		**234,200**	**234,200**	**234,200**	**234,200**		***936,800***
GRAND TOTAL		**15,186,335**	**7,254,200**	**6,139,200**	**6,241,300**	**8,850,000**	***43,671,035***

TOWN OF PARADISE VALLEY

FY 2017-18 BUDGET

Study Session today:

- Key Question

What recommended items to the FY18 Budget do Mayor and Council want to change, add or require additional information?

Strengthening State Economy

A remarkable year for Paradise Valley…

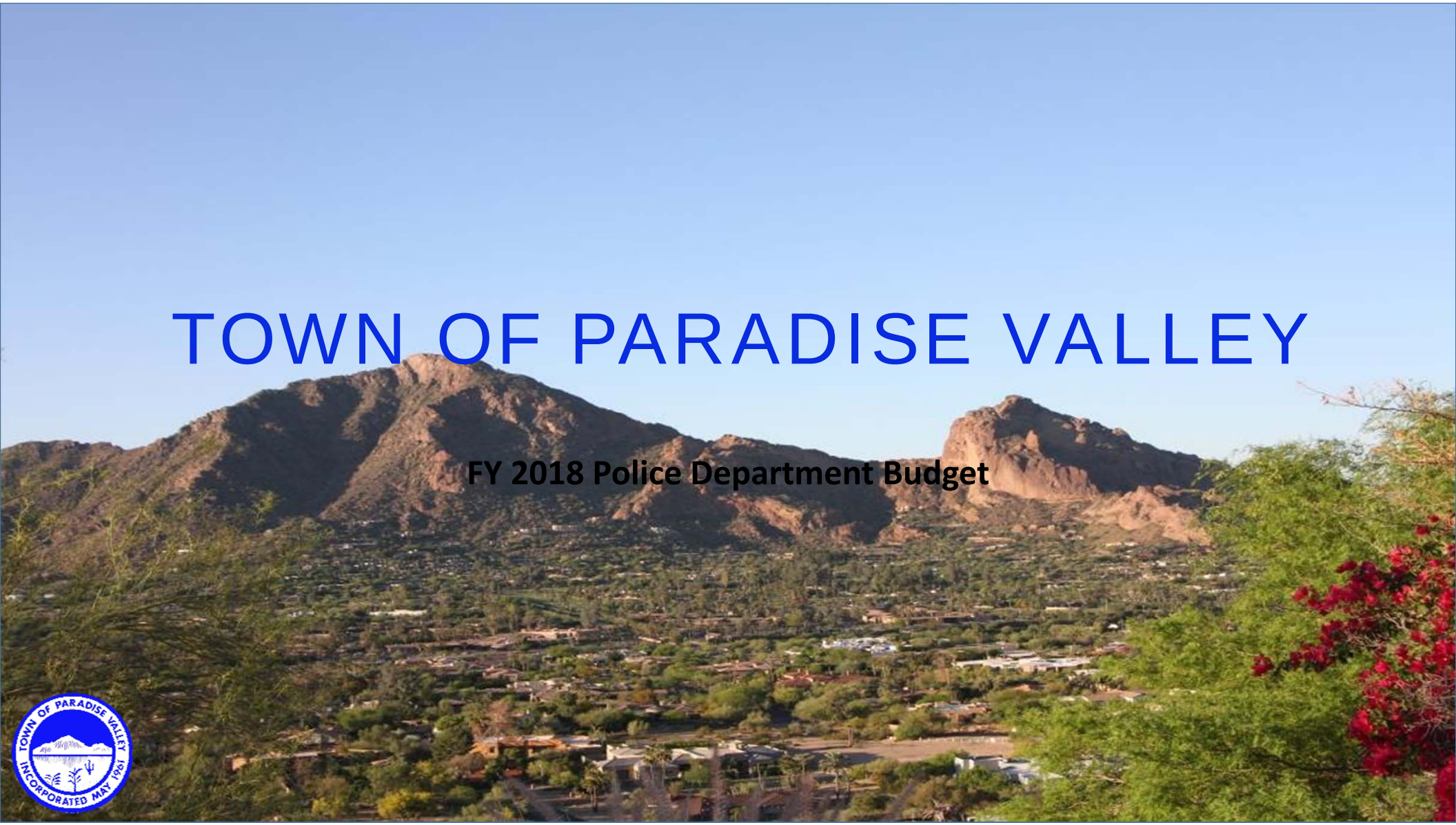
Source: PV Independent and East Valley Tribune

FY 2018 Budget Highlights

- Total all funds: $52 million
  - Ritz Carlton related road projects
  - Completion of the public safety radio tower
  - Significant pay down of police pension
- Sewer fund structurally balanced
- Fire service fee 10% reduction

Study Session today:

- Police Department
- Department of Administration and Government Affairs
- Community Development
- Public Works
- Court
- Attorney
- Mayor & Council and Tourism
- Town Manager



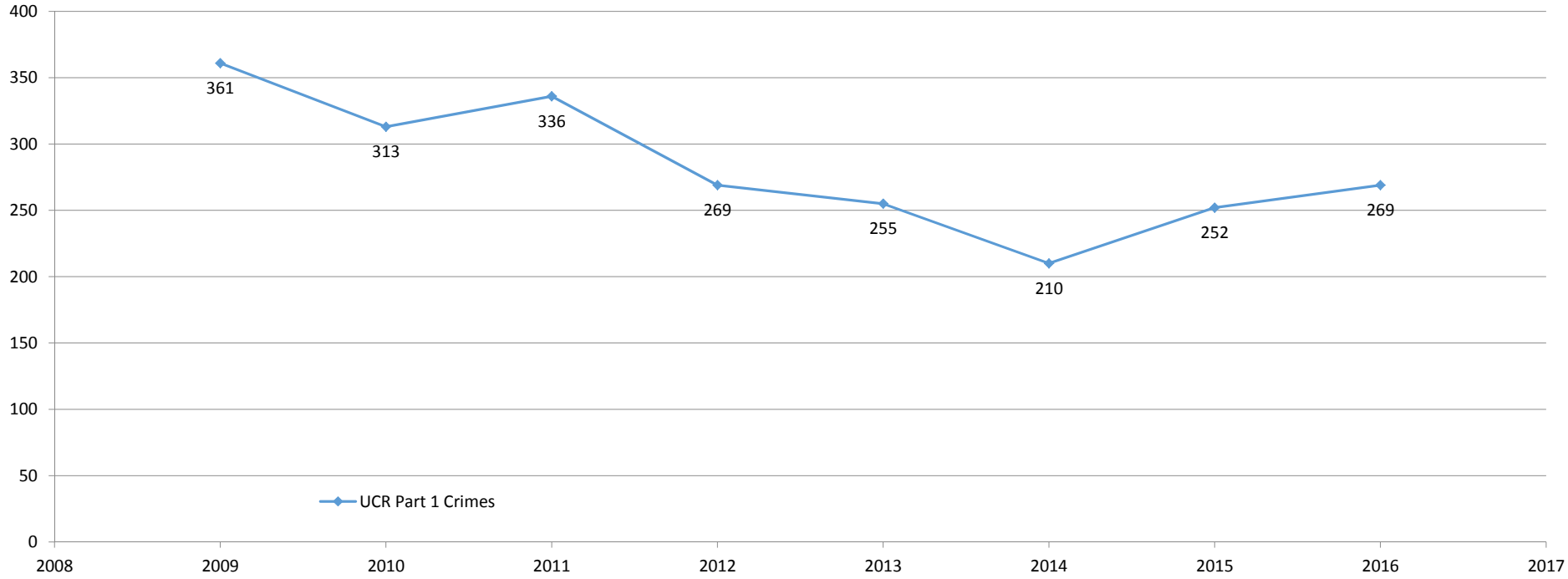
TOWN OF PARADISE VALLEY

FY 2018 Police Department Budget

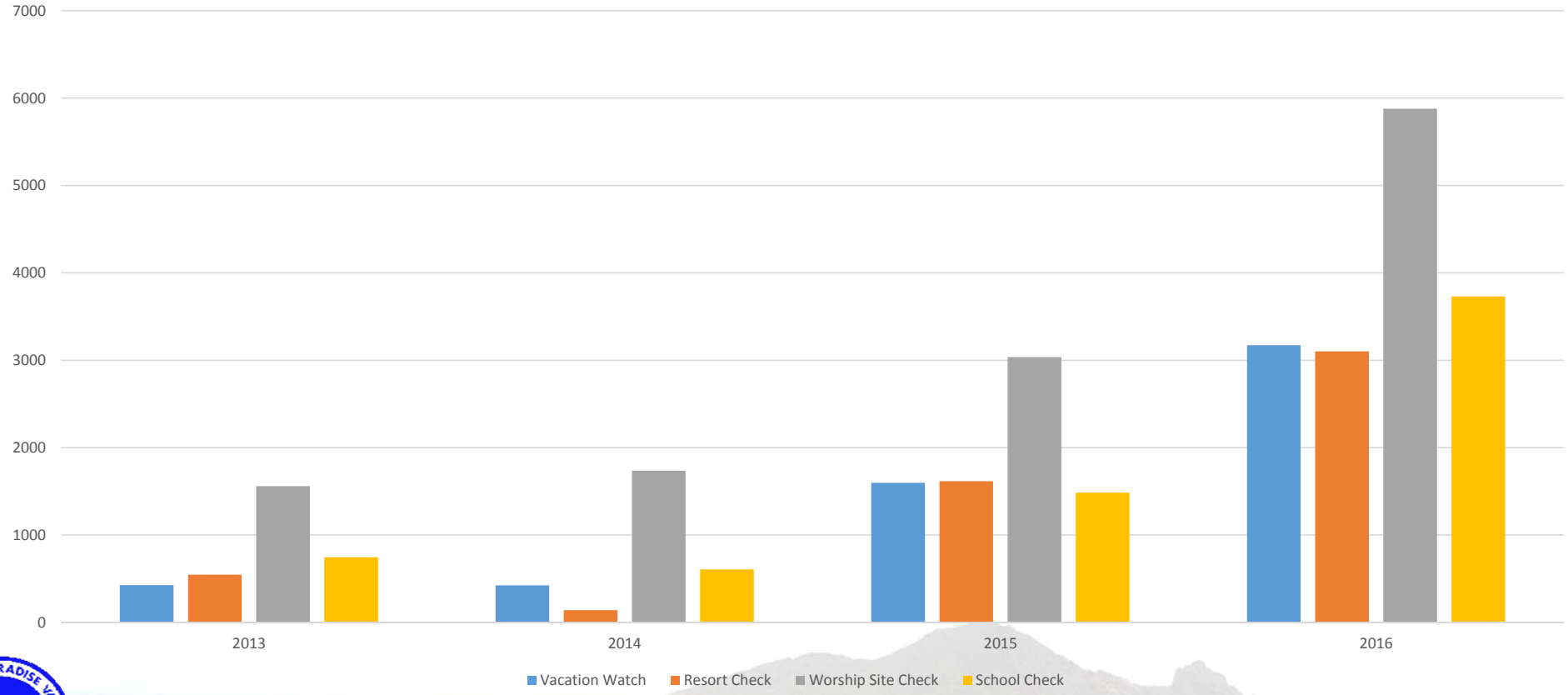
FY 2017 Accomplishments

- Named among Arizona's Safest Cities (February 2017)
- Nearly 20% reduction in burglary during 2016
- Nearly 40% Priority 1 response time reduction in two year period
- Over 150% increase in stolen property returned to property owners

UCR Part 1 Crimes



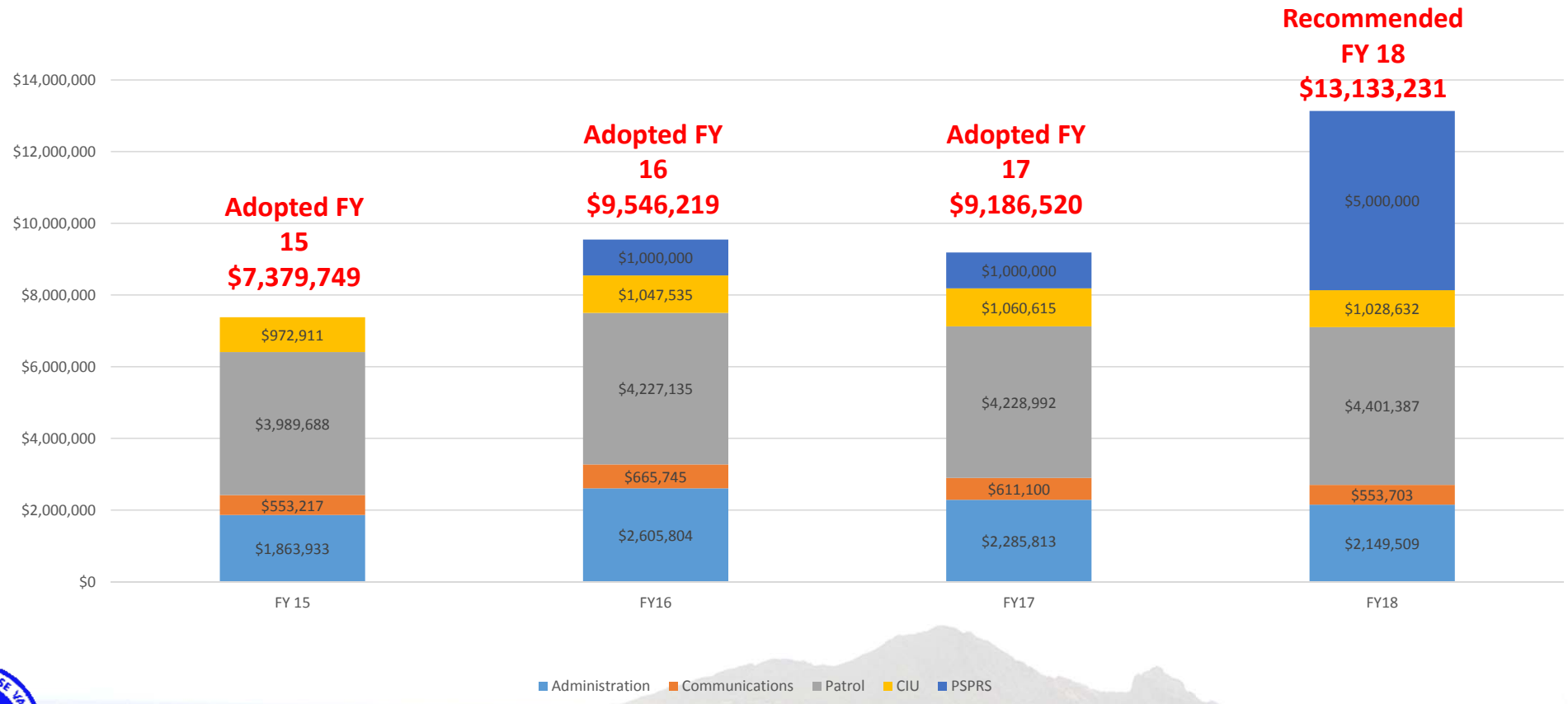
Proactive Activity



What are we trying to accomplish? Our Goals

- Goal 1: Reduce Crime and the Fear of Crime
- Goal 2: Encourage Community Empowerment
- Goal 3: Develop and Empower Department Personnel
- Goal 4: Incorporate Technology into the Department
- Goal 5: Review and Improve Work Product

Historical Budget Numbers



Administration Budget Highlights

- Increase in Professional Services of $21,550
  - Provide Cold Case Review
  - Provide Redaction Assistance for Public Records Requests
- Increase in Evidence Storage of $14,000
  - Replace evidence lockers with more secure model
- Interview Room recording system (2) $27,500
- Speed Trailer $16,000

Communication Budget Highlights

- Maintain one part time dispatcher $30,000
- Increase in Radio Service Contract of $12,500
- Increase in Equipment
  - Portable radio $6,500
  - Desktop remote set $1,400

Patrol Budget Highlights

- Increase in Overtime to staff to four officers at all times $125,000
- Four Patrol Vehicles, one admin vehicle and Police equipment inside $295,300
  - Replacing patrol cars with mileage over 150,000, or past problems

Investigation Budget Highlights

- Make the evidence technician position a permanent position $90,000
- No longer contracting with Scottsdale PD for crime lab services $25,000
  - Using DPS for lab services-Free service
  - “Rush” jobs can be funded with $5,000 request
- LPR Database software $5,000

How Requests further Goals?

- Goal 1: Reduce Crime and the Fear of Crime
  - Four officers on patrol at all times ($125,000)
    - Maintain full staffing
    - Cover vacation, training, sick and comp time with overtime when necessary
  - Interview room video recording solutions ($27,500)
    - One for jail, one for investigations
  - LPR Database software ($5,000)
    - Networks LPR information with national, state and local governments and private companies possessing the information

How Requests further Goals?

- Goal 2: Encourage Community Empowerment
  - Four officers on patrol at all times
  - Speed Trailer ($16,000)
    - 21 locations of speeders in neighborhoods
    - Currently on working radar trailer

How Requests further Goals?

- Goal 3: Develop and Empower Department — Personnel
  - Begin to address civilian staffing
    - One PT Dispatcher ($30k), one Evidence Technician ($90k)
  - Purchase replacement vehicles ($295,300)
  - Create some redundancy in dispatch equipment
    - Desktop remote handset ($1,400)
    - One portable radio ($6,500)

How Requests further Goals?

- Goal 4: Incorporate Technology into the Department
  - Increase in Radio service contract ($12,500)
  - Upgrade NWS CAD software ($211,000)-IT budget
  - Tablets ($112,000)
    - Replace a portion of tablets this year, remainder next year

How Requests further Goals?

- Goal 5: Review and Improve Work Product
  - Begin to address civilian staffing
    - One PT Dispatcher ($30k), one Evidence Technician ($90k)
  - Evidence property locker upgrade ($20,000)
  - Contract labor for Cold Case review ($10,000)
  - Contract labor for redaction of some video and reports ($15,000)

Adopted FY 17 vs. Recommended FY 18

- FY 18 Recommended shows 1.54% total increase from FY 17 Adopted
- FY 18 Recommended shows 0.13% reduction in personnel costs versus FY 17 Adopted
- FY 18 Recommended shows 14.8% increase in operating costs, with a total operating cost increase of $262,427
  - Vehicles in budget are $295,300

Questions?

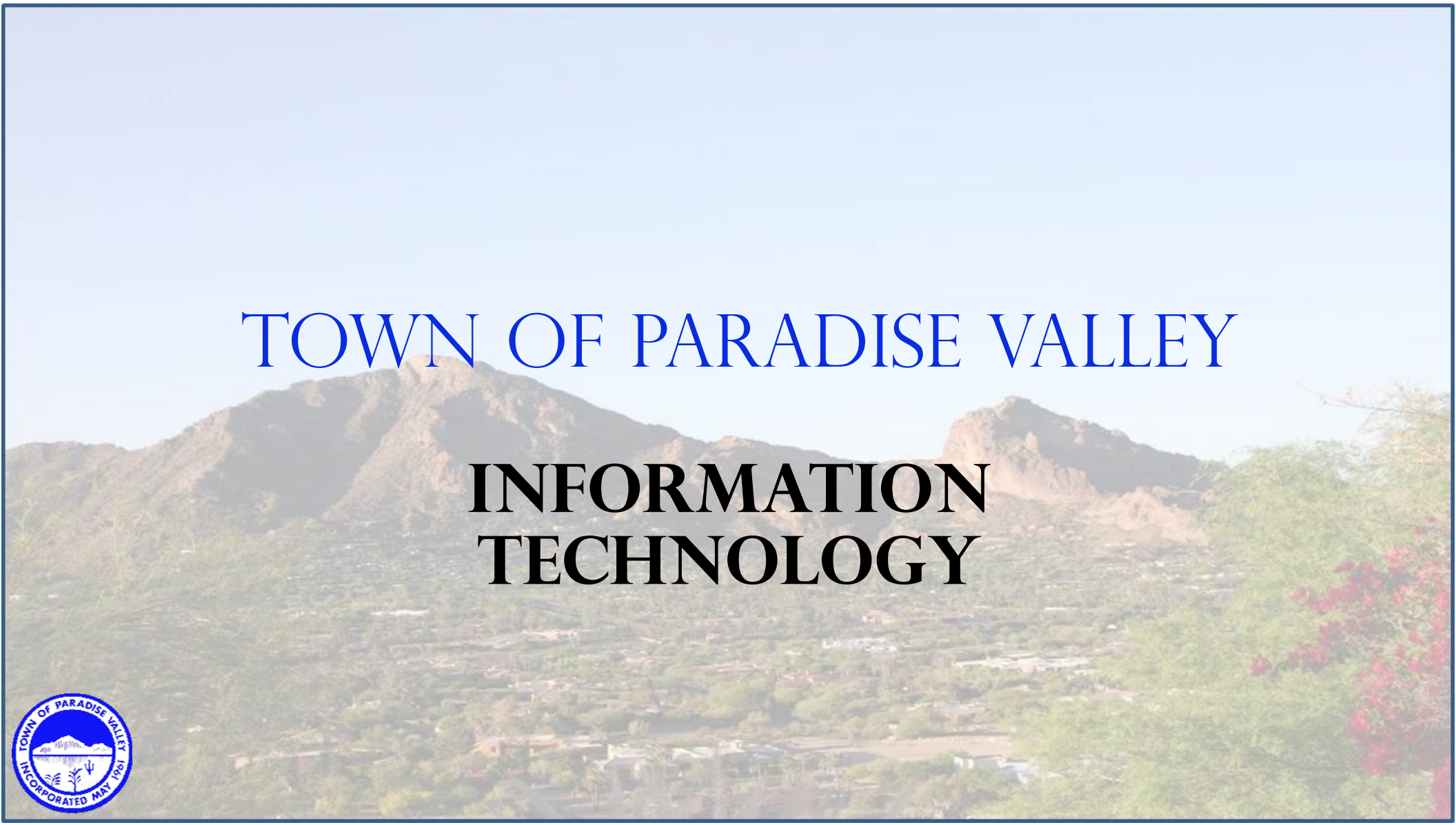
TOWN OF PARADISE VALLEY

ADMINISTRATION & GOVT AFFAIRS

FY 2017-18 BUDGET

Department Highlights

- Began implementing key elements of IT and GIS strategic plans
- Influenced outcomes of numerous legislative bills of interest to PV
  - Small cell deployment in Town Rights of Way - amended
  - Photo radar prohibition – failed
  - Elimination of construction sales tax – failed
- Established comprehensive internal procurement manual and forms
- Provided critical analysis and information for Council and voters to make an informed decision on expenditure limitation
- Conducted thorough cost of service analysis and fee study to update development fees and charges



TOWN OF PARADISE VALLEY

INFORMATION TECHNOLOGY

What Do IT Expenditures Provide?

- Technology services that foster credibility, trust, and confidence
- Facilitate proactive and responsible approach to identifying technology needs, addressing gaps and implementing solutions
- Ensures sustainability of technology to avoid costly “catch-up” scenarios
- Exceptional technology services support the missions and goals of all Town departments and services

Basis for Proposed IT Expenditures

- Ongoing commitments due to existing technology and services
- Hardware and software replacements due to age
- Solutions to technology gaps identified in several strategic plans
- Resourcing and support of Council Goals
- Renegotiation of existing agreements limited budget growth to 7%
  - Adopted FY 16-17 IT Budget: $1.4m
  - Proposed FY 17-18 IT Budget: $1.5m

IT Budget – Continuing/Existing

- Server and Workstation Replacements - $104,270 (+$9k)
- IT Staff Training - $15,000
- Town Network Internet Service - $45,000
- Laserfiche Annual Maintenance/Hosting Fee - $27,000
- Court: FullCourt Maintenance - $15,000
- CD: TVR/IVR Annual Maintenance/Hosting - $19,700 (+$10k)

IT Budget – Continuing/Existing (cont.)

- GIS: ESRI ArcView (GIS software support) - $30,000
- PD: Data Services for Fixed LPR Sites - $26,000 (-$20k)
- PD: Data Services for Mobile Technology - $25,000 (-$15k)
- PD: L3 Mobile Technology Agreement- $40,000 (-$8k)
- PD: New World Systems CAD/RMS Support - $142,000 (+$3k)
- PD: Fixed LPR Maintenance Agreement - $63,000 (-$65k)

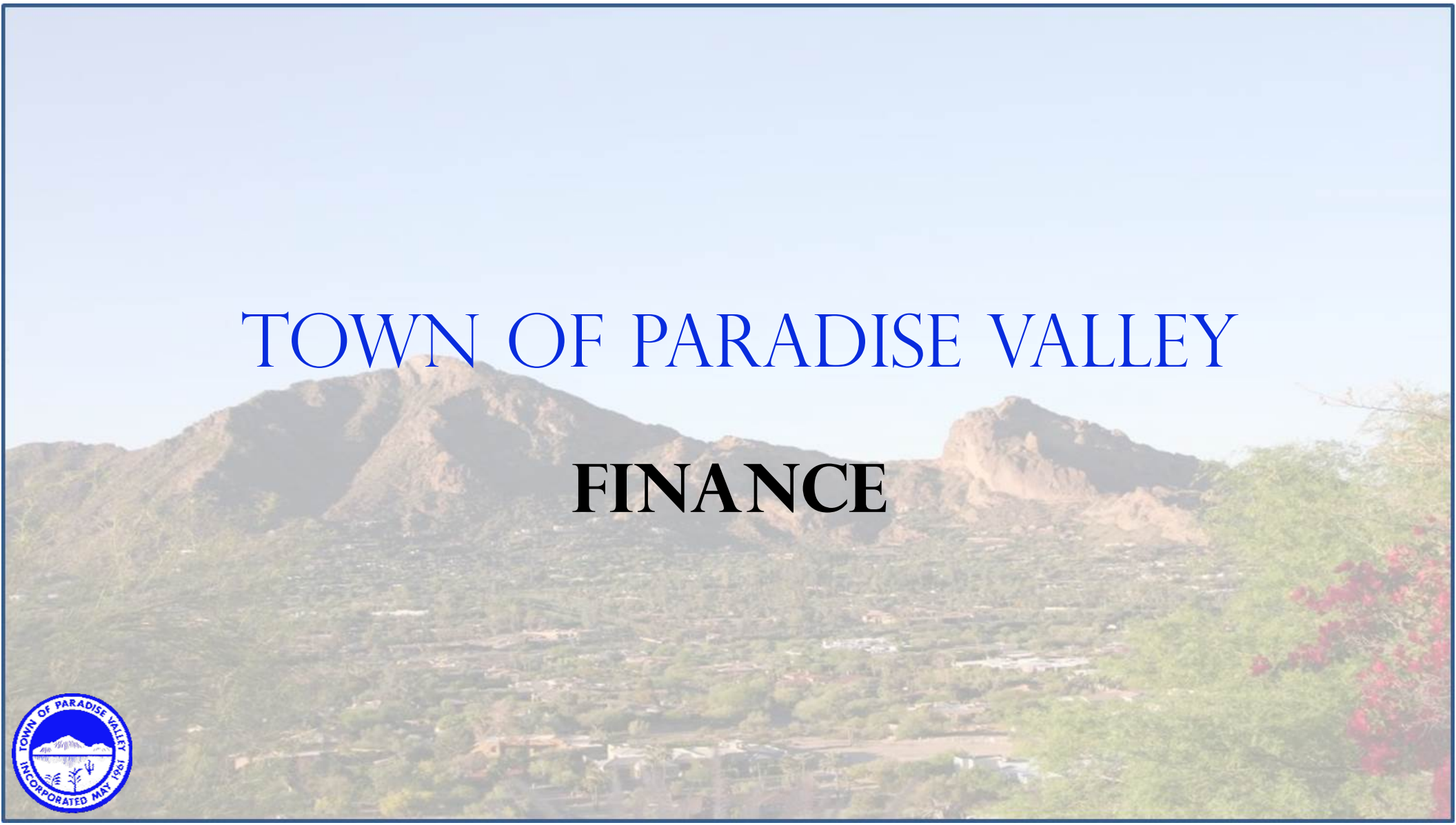
IT Budget – New Items

- Cisco networking devices support - $15,000
- Firewall support agreement - $35,000
- 24/7 Network Security Analyzer - $18,000
- Data storage upgrades - $34,310
- CD: Accela Automation Hosting/Support - $30,000
- CD: Plans/document scanner/printer - $26,250
- CD: In-field platform for new ComDev workflow - $37,000

IT Budget – New Items (cont.)

- Cyber Security Evaluation and Plan - $31,500
- Disaster Recovery Evaluation and Plan - $17,000
- IT Help Desk Contract Services - $17,270
- GIS: Contract Services - $14,500
- PD: Ruggedized Tablets for Officers - $112,000
- PD: CAD hardware upgrade - $84,000
- PD: CAD software upgrade - $137,000

Questions or Comments?



TOWN OF PARADISE VALLEY

FINANCE

What Do Finance Expenditures Provide?

- Financial stewardship over tax payer resources
- Long range financial planning
- Accounts payable/accounts receivable for essential public services
- Utility billing and customer service for wastewater, fire, and alarm services
- Payroll and salary & benefits coordination for Town personnel

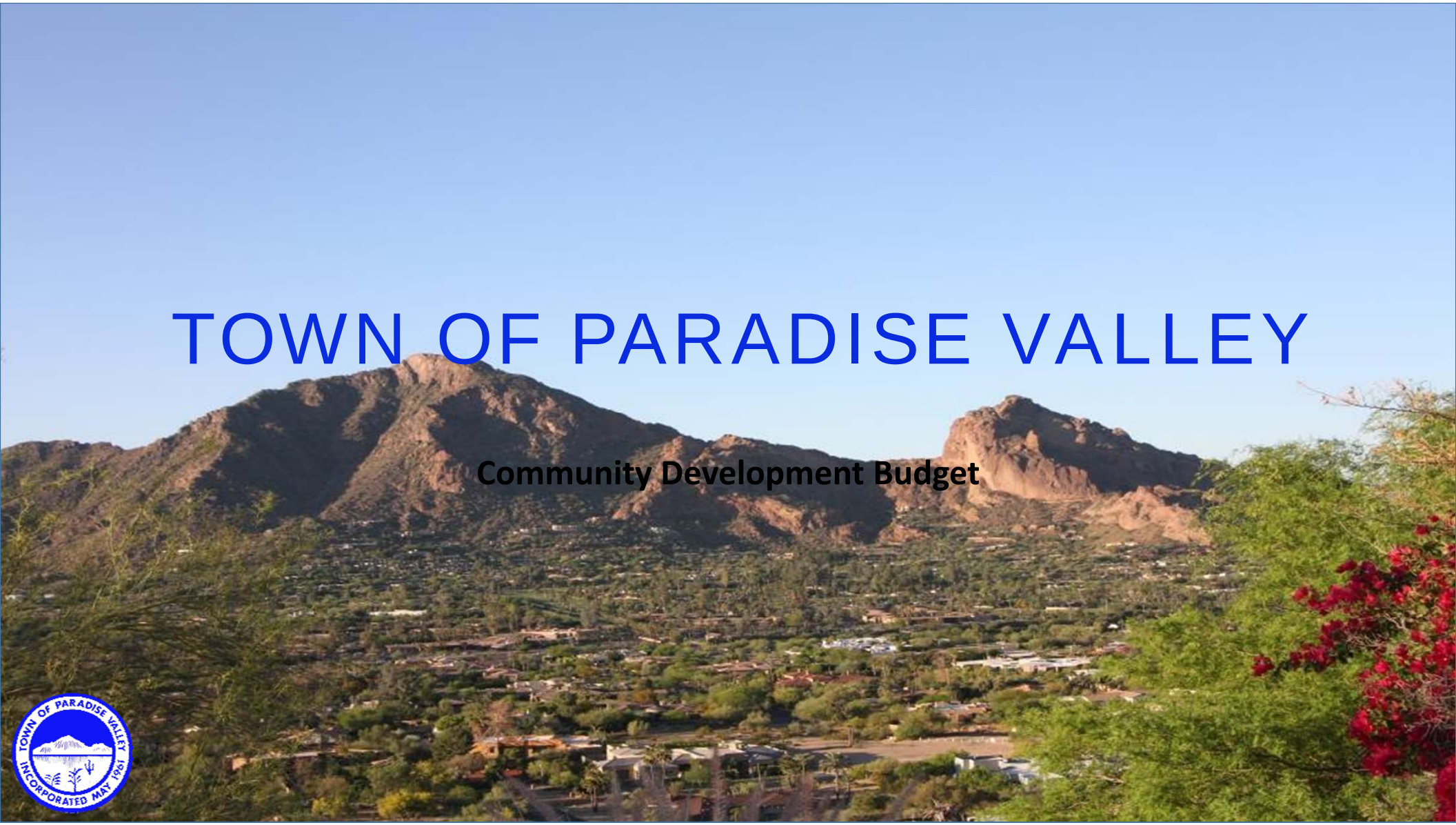
Basis for Proposed Finance Expenditures

- Continuation of existing financial services
- Addition of procurement/risk mgmt/grants expertise
- Ability to accept credit/debit cards in Community Development
- Implementation of secure, accurate, efficient payroll/human capital system
- Overall comparison:
  - Amended FY 16-17 Finance Budget: $665K
  - Proposed FY 17-18 Finance Budget: $885K

Finance Budget New Requests

- Procurement officer (also grants & risk mgmt) - $100,000
- Payroll and human capital management system - $50,000
- Additional credit card processing fees (Visa, Mastercard, Discover) - $25,000
- Third party credit card processing - $12,000
- Implementation of Laserfiche for Finance (AP, etc.) - $25,000
- Also reflects movement of $36K HighGround contract

Questions or Comments?



TOWN OF PARADISE VALLEY

Community Development Budget

Community Development

Eleven Employees

1. Building Division – plan review, building inspections, zoning complaints, fire prevention, emergency management, hillside development
2. Planning Division – General Plan, SUPs, plats, variances, Code interpretations, Commission and Board staff , technical assistance
3. Post Office – Postal needs

Building Division FY 16/17 accomplishments

- Plan Review and Inspection on the new ANdAZ resort to Certificate of Occupancy
- Plan Review and Inspection on the new Mountain Shadows resort to Certificate of Occupancy.
- Purchased and utilized an unmanned aerial vehicle (drone) for roof nailing inspections; trained police on its use for police matters.
- Hired and trained a new inspector.
- Emergency Management Continuity of Operations Plan finished.
- Purchased, customized, and trained on new permit tracking software.

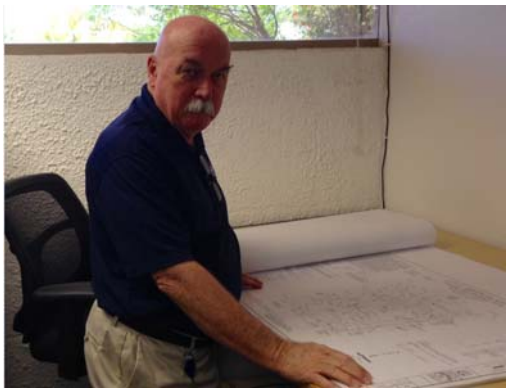
Over 900 code compliance complaints estimated researched and resolved

Over 10,000 building inspections anticipated be completed.

Over 500 fire plan reviews and inspections estimated to be done.

Building Division FY 17/18 Goals

- FY 17/18 Goals
  - Plan Review and Inspections on Ritz-Carlton resort hotel, residential, and commercial
  - Expand use of the drone for building and code enforcement
  - Update existing Emergency Operations Plan
  - Continue 15 day turn around on plan reviews,
  - Continue next day building inspections,



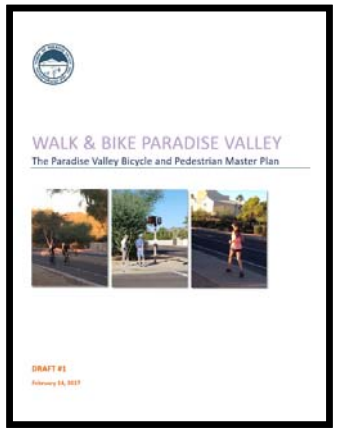
Building Division

$139,372 overall increase from last year

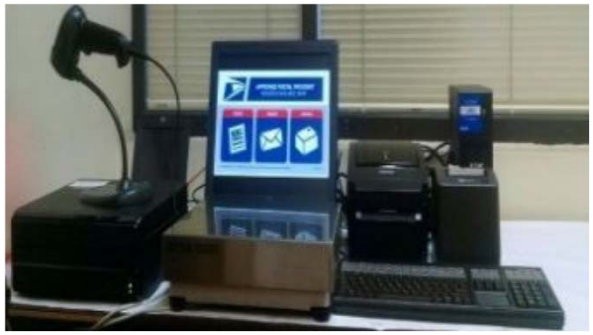
- New home permits up 38% and values up 39% from last year. Anticipated commercial construction and resort residential further increase demand for inspections and plan reviews in the coming year.
- Continue utilizing third party inspectors as needed
- Request to make the full time temporary inspector a regular employee and purchase a vehicle for that employee.
- Continue staff training, additional training for new inspector
- Replace existing police radio due to new technology

Planning Division Accomplishments 16/17

- Ritz-Carlton Master Plat and plats for A1, B, and C processed
- SUP revisions at Sanctuary, Paradise Valley United Methodist, and Phoenix Country Day School completed
- Purchased, customized, and trained on upgraded software
- Processed PWSFs at Camelback Inn and Camelback Golf Club
- Approximately 60 Hillside applications processed
- Quality of Life Initiatives studied
  - Bike/Ped Plan in draft
  - Visually Significant Corridors in second of four stages
  - Hillside drafted
  - Lighting drafted
  - Walls/Fences; Construction Noise; Property Maintenance (completed)



PCDS new gymnasium



Planning Division Goals 17/18

- Utilize technical experts when necessary for review of submittals and Code amendments
- Process plats and SUP amendments for Ritz-Carlton
- Complete Quality of Life Initiatives
- Upgrade Postal Equipment for better customer service and accurate audits
- Implement new Accela tracking software
- Continue processing General Plan, SUPs, plats, variances, Code interpretations, and providing technical assistance
- Address PWSF needs and legislative changes
- Take credit cards at counter

Planning Division

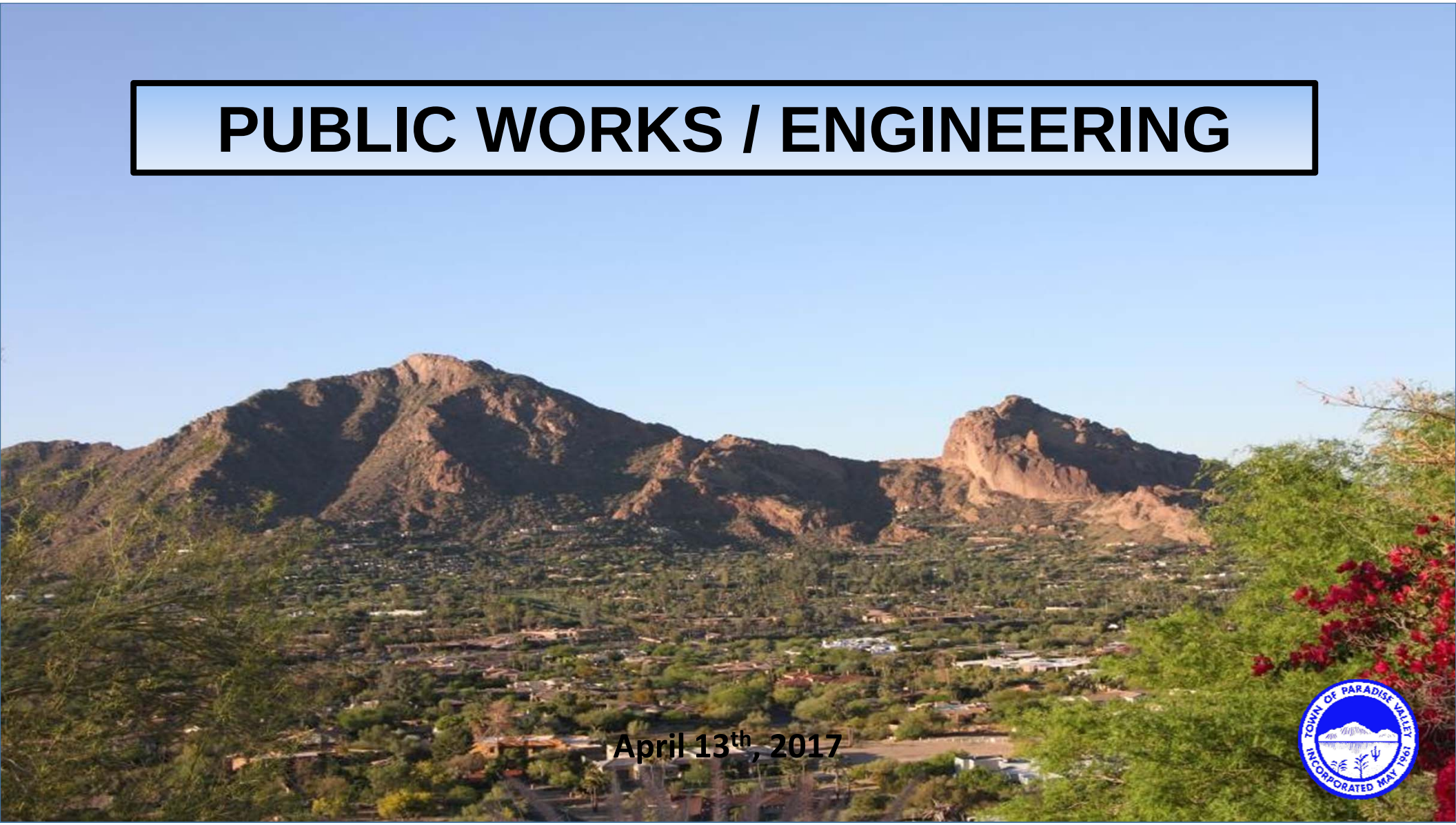
- $ 377,673 overall increase from last year
  - Establish ability to accept credit cards
  - Includes additional $380,000 for Post Office
    - Switching the Post Office from the current NeoPost equipment to the Post Office's new RSS equipment
    - Current Post Office equipment malfunctioning:
      - incorrect postage meters
      - random meters strips shooting out of the meter
      - inability to install the retail postage rate of 49 cents
    - The RSS system is tied into the Post Office:
      - rate changes are automatic
      - could process international mail (we currently cannot)
      - would not have to rent a meter
      - would have to pay for our stamp stock upfront
        - rather than selling and then reimbursing the Post Office

Community Development Budget

	2017	2018
Building Division	$623,260	$763,132
Planning Division & Post Office	$667,830	$1,045,503
Total	**$1,291,090**	**$1,808,635**

Questions?

PUBLIC WORKS / ENGINEERING



April 13th, 2017

Public Works / Engineering Budget

$3,604,020 Total Department Budget – FY16 - Actuals

$4,320,903 Total Department Budget – FY17 – Adopted

$6,130,281 Total Department Budget – FY18 – Recommended

$1,809,378 (42%) - Total Increase from FY17 to FY18

- $1,777,000 from Tatum paving

Agenda

Public Works / Engineering Budget

- Engineering
- Facility Maintenance
- Fleet Maintenance
- Street Maintenance

ENGINEERING

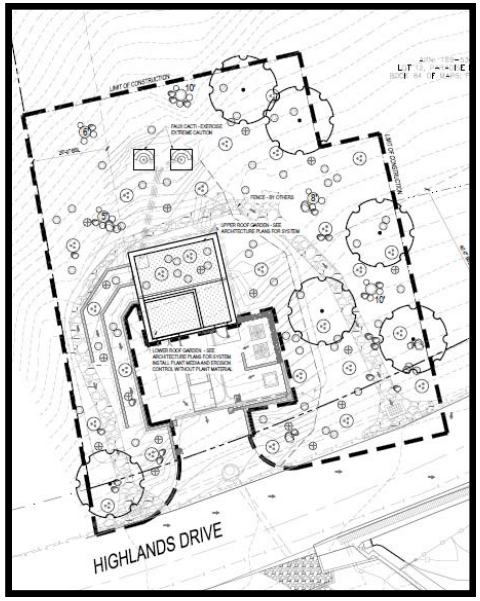
Engineering Accomplishments FY 16/17

- Marquee Signs
- 52nd Street Construction
- Removed sewer metering stations
- Funding and design for APS District 30
- Card readers
- Ritz Carlton roadways and sidewalks projects
- Phase 1 of compliance State MS4 Permit
- Cheney Watershed analysis

TOWN OF PARADISE VALLEY INCORPORATED MAY 1961

Engineering Objectives FY 17/18

- Phase 2 compliance State MS4 Permit
- Sewer system assessment with the City of Scottsdale
- Inspection services for resort development
- Ritz Carlton roadways and sidewalks projects
- SRP Keim District
- Police Communication Tower
- Updated video detection systems



Engineering Expenses

One-Time Expenditures

- None

Ongoing

- Storm Water Management Plan (SWMP) 3rd party review - $10,000
- Purchase updated code books - $500

FACILITY MAINTENANCE

Facility Maintenance Accomplishments FY16/17

- New multi zone air conditioning unit at the Public Safety building
- Successfully passed OSHA inspection
- New LED lights in Police Department parking lot
- Town space study project
- Provided timely maintenance and repairs to 68,000+ sq. ft. of Town owned facilities

Facility Maintenance Objectives FY 17/18

- Replace swamp coolers in fire station vehicle bays
- Replace swamp coolers in the Public Works Street shop
- Repair Town Hall chiller pipes and pump
- New a 2nd multi zone air conditioning unit at the Public Safety Building

Facility Maintenance Expenses

One-Time Expenditures

- Street Shop Swamp Cooler - $7,000
- Multi-zone Air Conditioning Unit for the Public Safety Building - $15,000

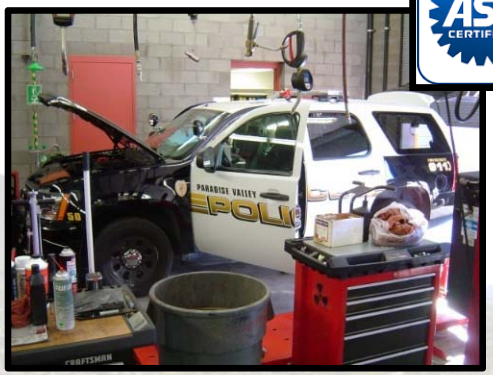
Ongoing Expenditures

- None

FLEET MAINTENANCE

Fleet Maintenance Accomplishments
FY 16/17

- Established a Fleet advisory committee
- Automotive Service Excellence (ASE) certification training
- Prepared vehicles and equipment for storm seasons
- Equipment maintenance training for staff
- Provided professional level of maintenance and repairs to Town equipment and vehicles



ASE CERTIFIED
AUTOMOTIVE SERVICE EXCELLENCE

TOWN OF PARADISE VALLEY
INCORPORATED MAY 1961

Fleet Maintenance Objectives FY 17/18

- Up-fit new Police Tahoes
- Identify vehicles and equipment to be sold at auction
- Replace outdated lights bars on vehicles and equipment with LED lights

Fleet Maintenance Expenses

One-Time Expenditures

- None

Ongoing Expenditures

- Increase in shop supply costs - $1,000

STREET MAINTENANCE

Street Maintenance Accomplishments
FY 16/17

- Added Madison Gold granite on the Tatum Blvd center median islands
- 502 new plants on Doubletree Ranch Rd and Invergordon center median islands
- Reflective object markers on the Tatum Blvd and Lincoln Dr center median islands
- Refurbished 4 stop bus stop shelters using Arizona Lottery funds (ALF)
- Annual resurfacing project (26.4 linear miles of roadway)

Street Maintenance Objectives FY 17/18

- Add granite to the center median islands on McDonald Dr, Invergordon Rd, and Northern Ave
- Annual street resurfacing projects in maintenance sections 2, 10, and 14
- Reflective object markers on McDonald Drive
- Complete the installation of federally-funded street signs
- Add more trees and plants to the center median islands Town-wide
- Resurface Tatum Blvd with and 1½" rubberized asphalt

Street Maintenance Expenses

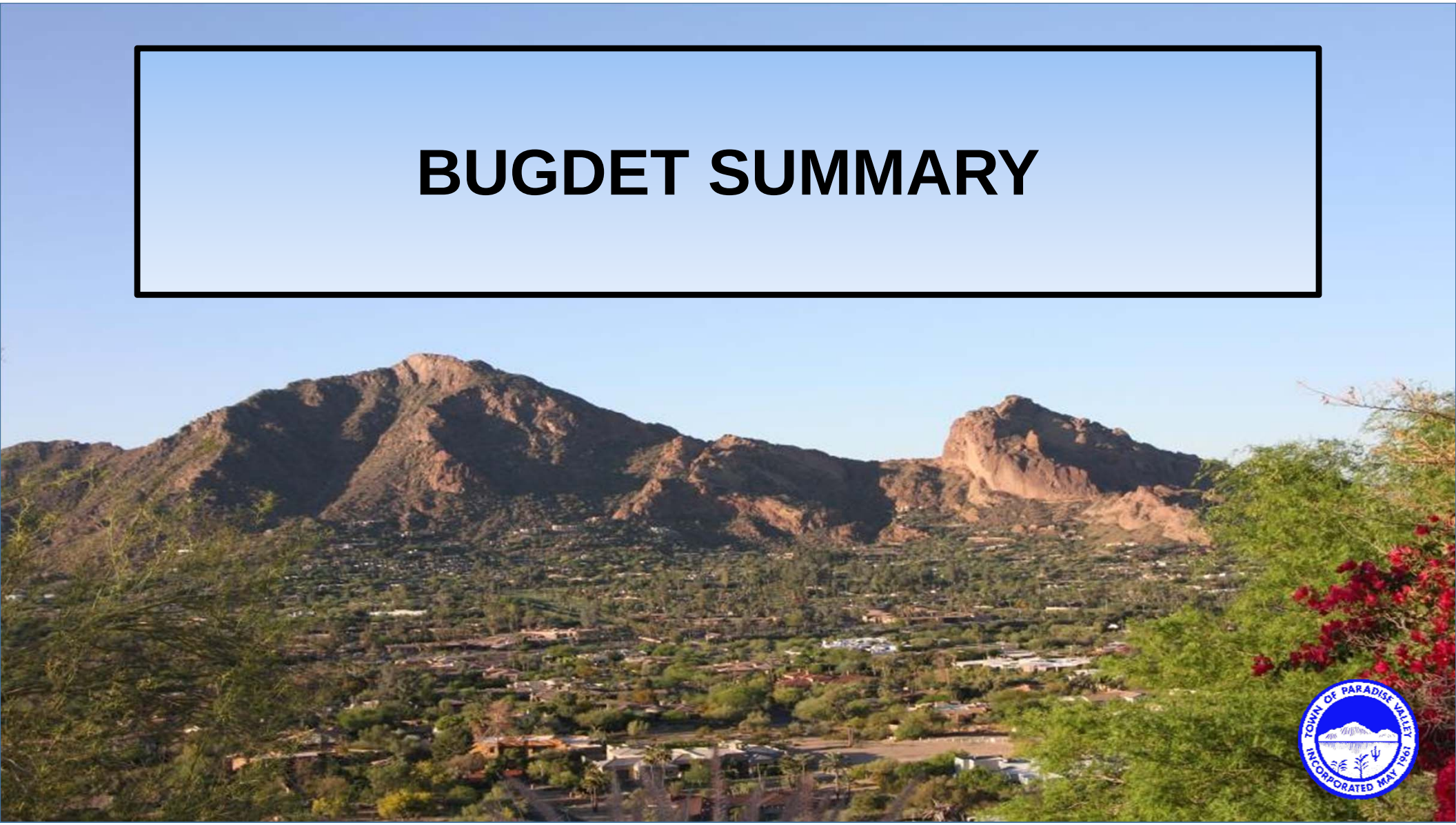
One-Time Expenditures

- Tatum Blvd full mill and asphalt overlay - $1,777,000
- Pick up truck (3/4 ton diesel) - $38,000
- Hydraulic Hammer/Hydraulic Thumb for Backhoe - $25,000

Ongoing

- Storm water drain cleaning and small drainage projects - $18,000

BUGDET SUMMARY



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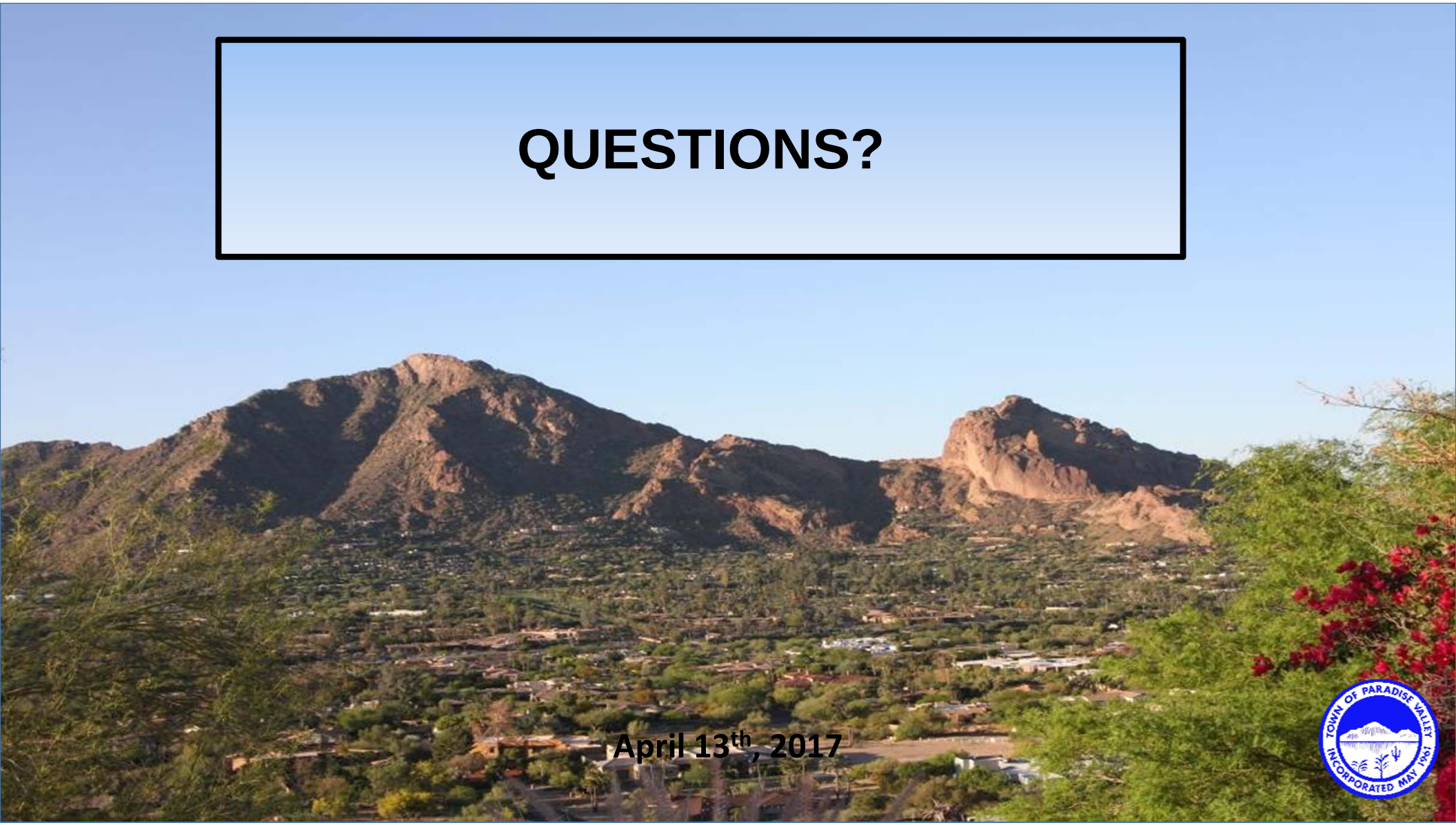
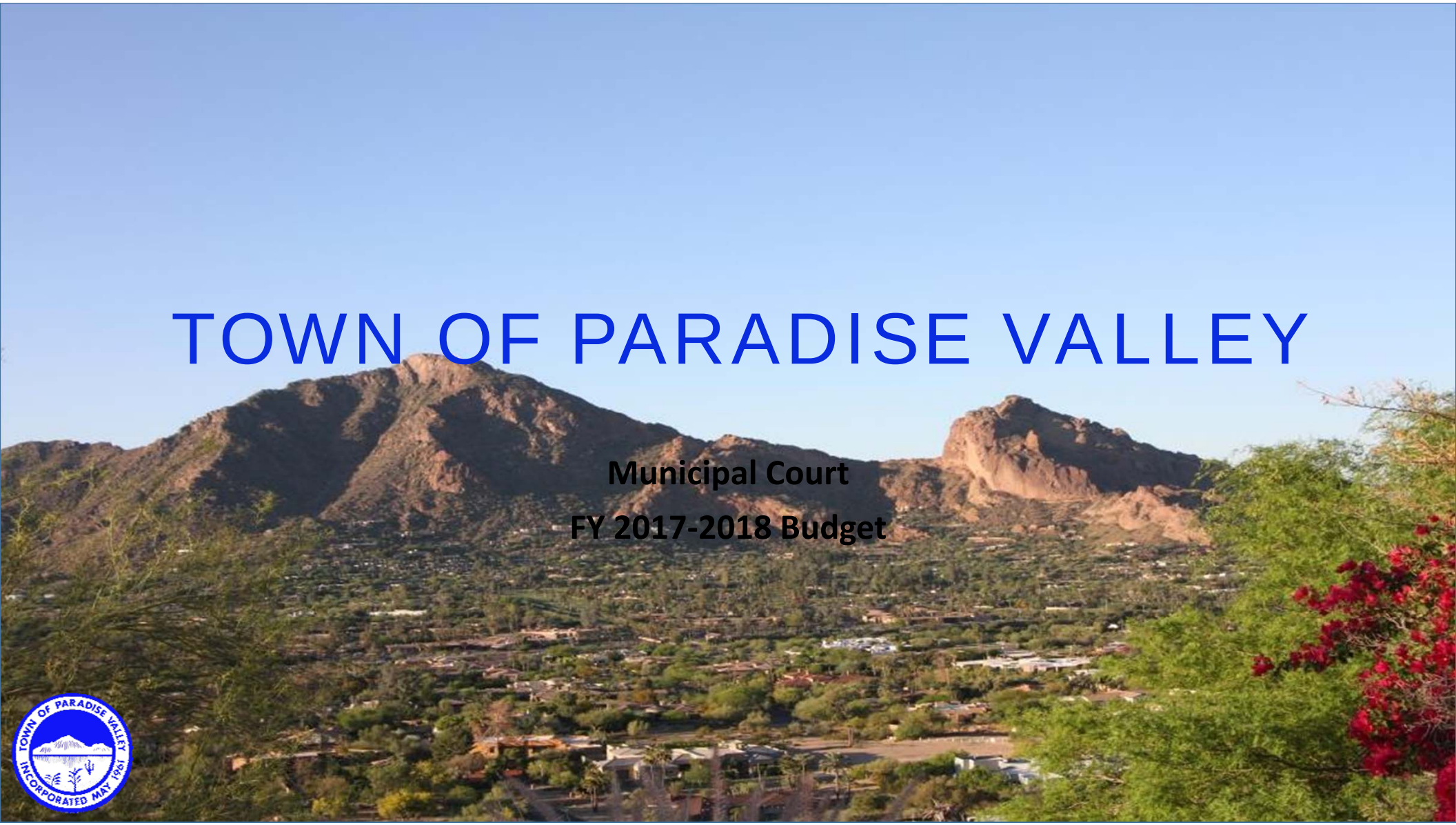
QUESTIONS?



April 13th, 2017



TOWN OF PARADISE VALLEY

Municipal Court

FY 2017-2018 Budget

Municipal Court

- 10th Largest Municipal Court in the State
- Highest Case Filings per Clerk
  - Over 8,000 cases per clerk
  - 1,282 is the average for Arizona Municipal Courts
- Lowest Cost per Case - $15.93
  - $100.23 is the average for Arizona Municipal Courts
- Rate of Return - $1 : $3.57
  - For every $1 expended on court operations, the court collected $3.57 in fines/fees/restitution
  - $1.14 is the average for Arizona Municipal Courts

Municipal Court

- Home Detention Program
  - 329 days of home detention in lieu of incarceration
  - Cost savings of $30,276 to the Town
- Tax Intercept Program
  - Collected $4,529.99 of outstanding debt
- Collection Agency Referrals
  - Collected $96,953.30 of outstanding debt deemed uncollectable

Municipal Court

- Partnerships
  - Maricopa County Regional Homeless Court
  - Tempe Municipal Court's Mental Health Court
  - East Valley Regional Veterans' Court

Municipal Court

CASE FILINGS	2013/2014	2014/2015	2015/2016	2016-2017 PROJECTED
Criminal Cases	191	225	137	272
Civil Cases	16,840	25,888	54,316	51,683
Protective Orders	28	15	19	15
Total	**17,059**	**26,128**	**54,472**	**51,970**

FY 14 → FY 15 53%

FY 15 → FY 16 108%

FY 16 → FY 17 -5%

FY 14 → FY 17 205%

Municipal Court Budget

	2016/2017	2017/2018
General Fund	$705,290	$808,990
Court Enhancement	$201,938	$159,188
Total	**$907,228**	**$968,178**

Changes to Budget:

- **General Fund -** $103,700 (15%) increase to general fund budget largely related to staffing requests.
- **Court Enhancement Fund -** $42,750 (-21%) decrease based on minimal one-time costs requested in FY18.

General Fund

Ongoing Cost - $80,900

- 1 Full Time Court Specialist - $72,000
  - Continue to employ 3 of the 5 part time positions from this fiscal year and 1 FTE

- Salary Adjustment - $8,900
  - To resolve salary inequities amongst Court Specialists

General Fund

One-Time Requests -$113,950

- 3 Part Time Temporary Employees - $69,000
  - Continue to employ 3 of the 5 temporary part time employees from current fiscal year
- Retirement Payout - $35,000
  - Potential retirement payout in June 2018
- Judicial Conference - $7,450
  - 3 day judicial conference in Tucson, AZ
  - Cost includes hotel and per diem for 10 judges
- Defibrillator - $2,500

Court Enhancement Fund

One-Time Requests - $30,000

- Courtroom Audio Recording System - $22,500
  - Replace hardware and software

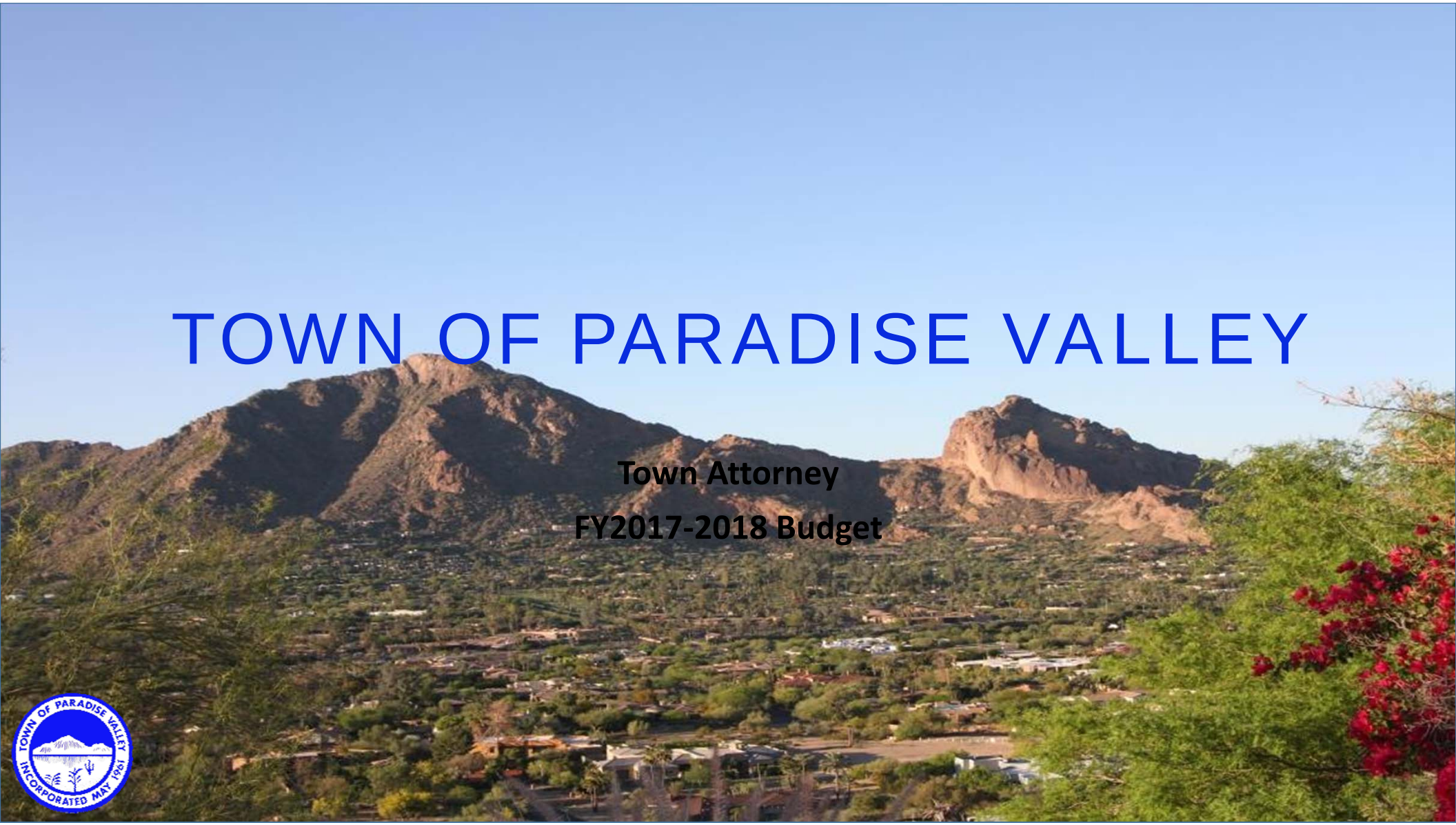
- Programmer/Report Writer - $7,500
  - Modify existing reports to be compliant with Supreme Court's new reporting requirements.

Court Enhancement Fund

Ongoing Expense - $129,188

- Court Building Principle Payment - $90,000
- Land Lease Payment - $25,000
- Interest Payment - $14,188

Questions?



TOWN OF PARADISE VALLEY

Town Attorney

FY2017-2018 Budget

TOWN ATTORNEY'S OFFICE BUDGET DISCUSSION

Town Attorney's Office currently has three full time employees; one part-time contract employee; and a prosecution contract

- Town Attorney
- Paralegal
- Legal Assistant
- Part-time Assistant Town Attorney (approx. 20 hrs/week)
- Contract Prosecutor (8 hrs/week)

TOWN ATTORNEY'S OFFICE MAJOR ACCOMPLISHMENTS

- Five Star/Ritz - DA implementation, road project contracts, CC&R review and revisions, deeded lands and easements completed, platting and other work items
- Mountain Shadows - DA implementation, CC&R's, drainage issues, platting and other follow-up work items
- Ordinance drafting – walls/fences, noise, lighting, hillside, PWSF, and procurement
- Ongoing Board of Adjustment variance and appeal issues
- Litigation Management/Ray Settlement/Storey Settlement
- Storm Water Management – Research re liability issues and legal advice re risks
- Procurement and Contracts – implement new forms and advise and assist in drafting of revised procurement manual
- Legislation and lobbying on small cell and other bills
- New Prosecution Initiatives –veterans court implementation and fire service obligation default judgments and judgment liens

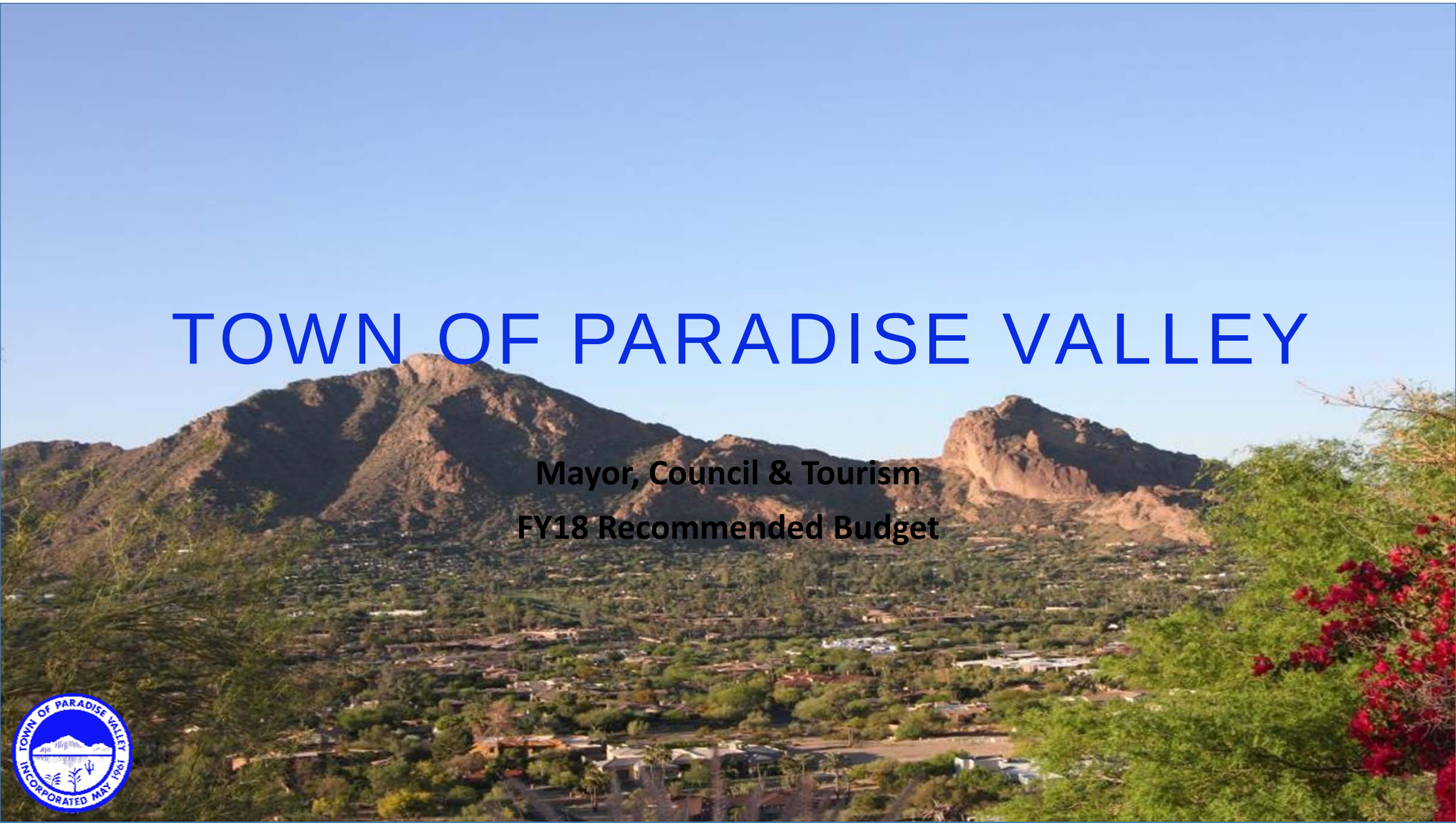
TOWN ATTORNEY'S OFFICE ANTICIPATED PROJECTS FOR FY18

- Quality of Life Initiatives; Implement Council Goals
- Research and Draft Town Code Provisions re Small Cell Wireless Facilities, Hillside Code, and other code sections as needed
- Five Star/Ritz – Continued DA implementation and related road projects and right-of-way acquisitions
- Mountain Shadows – Continued DA implementation, advise re in lieu fee collections and other follow-up items
- Contract renewals/bids re ambulance service, towing, and other matters
- Pending litigation matters completed/resolved

TOWN ATTORNEY'S OFFICE BUDGET DISCUSSION

- Assistant Town Attorney Position
  - Request the Assistant Town Attorney position be converted from a contract employee to a permanent part-time employee position and increase funding for a few additional hours for the position
  - Overall budget increase is less than 3.5%

ANY QUESTIONS?



TOWN OF PARADISE VALLEY

Mayor, Council & Tourism

FY18 Recommended Budget

Mayor & Council FY18 Budget

- FY17 Accomplishments
  - Started Construction on Public Safety Tower
  - Provided Support Services to Open Two Resorts
  - Developed Long Term Financial Plan Including Receiving Approval for ELR Change
  - Conducted Cheney Storm Water Analysis
  - Designed APS Underground of District 30
  - Contribution to Final Four Host Committee

Mayor & Council FY18 Budget

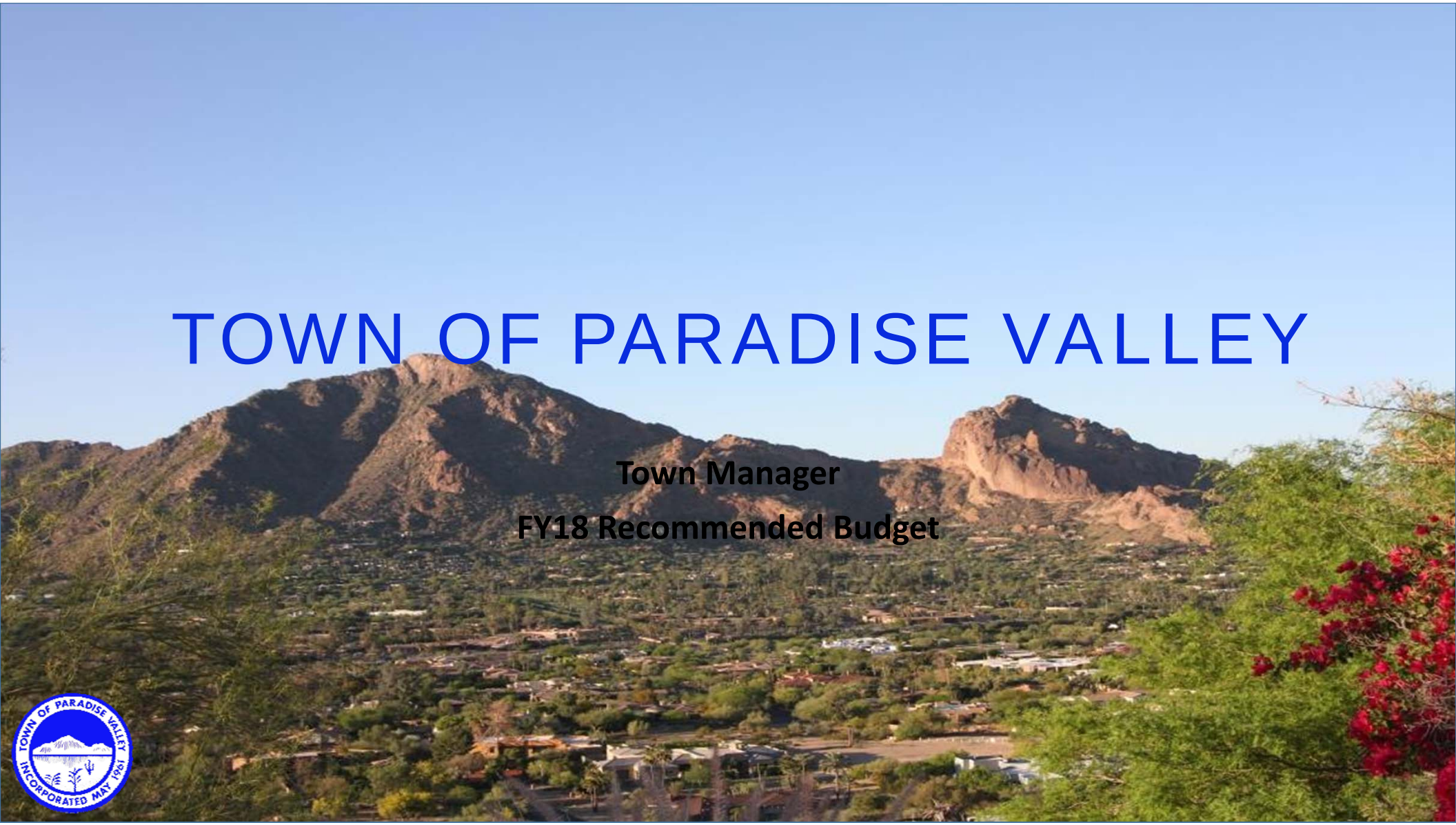
- FY18 Budget Goals
  - Advance Council Goals
  - Pay Down Police Pension
  - Complete Public Safety Radio Tower
  - Reduce Fire Service Fees
  - Operate Sewer Fund w/ no Structural Deficit

Mayor & Council FY 18 Budget

- Budget Requests
  - Increase Holiday Appreciation Dinner
    - $1,000 – ongoing; total would be $31,000
  - Budget Legal Fees for PSPRS Board
    - $25,000 – one-time; $20K in FY16; $10K in FY17
  - Transfer Lobbying Contract to Gov't Affairs
    - Reduction of $36,000

Tourism FY18 Budget

- Budget Requests
  - Increase Trolley Funding for Inflation
    - $1,000 – ongoing; $26,000 to $27,000; Could be eligible for ALF Funds
  - Reduce Funding for Special Events (i.e. Final Four)
    - ($50,000)
  - Increase in CVB Funding associated w/ Rev(40.9%)
    - $36,882 increase for a total of $1,311,919



TOWN OF PARADISE VALLEY

Town Manager

FY18 Recommended Budget

Town Manager FY18 Budget

- Accomplishments
  - Completed most of Mayor & Council Goals
  - Reviewed PSPRS Claims
  - Conducted Candidate Election
  - Coordinated the 2017 Holiday Party
  - Reviewed Health Insurance Benefits

Town Manger FY18 Budget

- Budget Goals
  - Improve Service Delivery Through Better Facilities
  - Advance Mayor & Council Goals
  - Protect Construction Sales Tax Revenue
  - Improve Post Office Reliability and Predictability
  - Be the Model for Pension Management

Town Manager FY18 Budget

- Budget Requests
  - Reduce Professional Services
    - Reduce $26,000 – Not Needed
  - Remainder of Budget is Status Quo

Questions

FY 2018 Budget Remaining Public Meetings

May 11, 2018	Tentative Budget Adoption
June 9, 2017	Final Budget Adoption

Questions

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-120

TO: Mayor Collins and Town Council Members

FROM: Kevin Burke, Town Manager
Brent Skoglund, Public Works Director
Jeremy Knapp, Engineering Services Analyst

DATE: April 13th, 2017

DEPARTMENT: Public Works and Engineering Department

480-348-3622

AGENDA TITLE:
Storm Drainage Design Manual Revisions Summary and Update

Council Goals
Storm Water - Identify the scope, scale and possible solution to recurring storm water management issues.

SUMMARY STATEMENT:
At the February 9th Town Council Meeting staff presented the proposed Storm Drainage Design Manual, highlighting some of the updates and changes. The discussion led to several Town Council questions which needed further input as well as Council request for public comment.

After the February 9th meeting, the Engineering Department began publicizing the draft document, advertising a public meeting, and soliciting public comment the week of February 20th. Staff utilized the town's website, e-mailed the notify me builders list, placed flyers at the Building and Engineering Departments counters, published a noticed in the March 8th Paradise Valley Independent, and placed ads on the TV screens at Town Hall. On March 21st, staff held a public meeting in the Community Room to present the draft and receive public input. A summary of the input was presented at the March 23rd Council Meeting.

At the March 23rd meeting staff addressed Council's questions regarding what new regulations were included in the document and the cost implications associated with complying. A recommended option was to adopt the manual as written which included four policy decisions they are:

1. Calculation for flatland retention for disturbed area
2. Hillside retention requirements on a tiered scale
3. First flush requirement for the first ½" of rainfall

4. Retention basin easement requirement

There are two policy decisions that required clarification, they include first flush retention requirements and retention basin easements.

First Flush:
The EPA delegates stormwater enforcement to the individual states. The Arizona Department of Environmental Quality is the state department that oversees municipal compliance with state regulations for stormwater quality. This is accomplished through permitting municipalities through the Municipal Separate Storm Sewer System or MS4. The basins for first flush are not a requirement of the MS4 permit, but are practice to be chosen by each municipality. As such, the town is not bound by the EPA's definition of first flush. The town's calculation for first flush requirement is based off the disturbed area of the proposed development and not the entire site.

While not bound by the state to include first flush requirements in the town's Storm Drainage Design Manual, staff believes that the practical implementation of first flush retention/detention will ultimately help the town accomplish other requirements of the MS4, such as illicit discharge detection and elimination.

After the discussion at the March 23rd meeting, staff has reviewed the first flush requirement as written in the draft and is recommending some changes be incorporated to further clarify the intent of the requirement and provide some flexibility due to the practical challenges of retaining the first flush on lots with topography or where driveways meet the town's roadways.

The previous text stated, in Section 3-2 B.2.a:

> *First flush volume shall be retained on all lots*

The revised text states, in Section 3-2 B.2.a:

> *Where detention is allowed, first flush volume shall be retained on all lots or within common retention areas, and a reasonable attempt shall be made to route all runoff from disturbed areas to first flush basin(s) subject to grading plan approval.*

Additionally, Section 3-4 B does allow for smaller basins and/or alternative stormwater controls, it they meet the approval of the Town Engineer, to retain/detain the first flush requirement.

Retention Basin Easements:
The proposed Storm Drainage Design Manual introduces a new requirement for an easement over retention basins to ensure that as property changes hands, new property owners are aware of the requirement to keep and maintain the basins on their property. The manual as written require an easement over the basin.

This study session item was intended to provide a 15 minute update on these issue prior to public input and consideration of adoption during the regular business meeting.

File #: 17-120

ATTACHMENT(S):
Storm Drainage Design Manual 4/5/2017
Comment Tracking and Resolution
PowerPoint Presentation

STORM DRAINAGE DESIGN MANUAL

TOWN OF PARADISE VALLEY

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STORM DRAINAGE DESIGN MANUAL

TOWN OF PARADISE VALLEY

6401 E LINCOLN DR
PARADISE VALLEY, AZ 85253

PH: 480-348-3692

FX: 480-443-3236

BY THE TEAM OF:

Dibble Engineering

Michael Baker INTERNATIONAL

LOGANSIMPSON

APRIL, 2017

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TABLE OF CONTENTS

FOREWORD

STORMWATER DRAINAGE DESIGN

This chapter provides guidance for complying with specific federal, state, county, and town regulations applicable to floodplain management, water quality, and stormwater management. It presents guidance for preparing drainage reports and grading and drainage plans using the design standards and methodologies adopted by the Town of Paradise Valley, the Flood Control District of Maricopa County, the Arizona Department of Water Resources, and the Federal Emergency Management Agency.

Natural wash through neighborhood in Paradise Valley

Fully charged drainage in Paradise Valley

Erosion in Paradise Valley

Stormwater management facilities integrated with natural landscape

OVERVIEW

1-1 GENERAL INFORMATION

A. This document, entitled the Paradise Valley Storm Drainage Design Manual (SDDM):

1. Administers Chapter 5, Article 5-10-3 and 5-11-1 to 27 of the Paradise Valley Town Code.
2. Provides guidance for complying with federal, state, county and town regulations applicable to floodplain management, water quality and stormwater management.
3. Outlines requirements for preparing drainage reports and grading and drainage plans.

B. This document is intended to provide guidance for designing meaningful flood protection, but such protection can be challenging because much of the natural grade has already been disturbed, existing development may constrain drainage options, or other reasons. In such cases, the Floodplain Admnistrator may require different or additional flood protections to:

1. Avoid any increased danger or damage to persons or property, and
2. Meet the general intent and purposes of the regulations.

1-2 GOVERNMENT AUTHORITIES

A. Federal authorities

1. Federal Emergency Management Agency (FEMA)
2. U.S. Environmental Protection Agency (EPA)
3. The U.S. Army Corps of Engineers (Corps)
4. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Services

B. State authorities

1. Arizona Department of Water Resources (ADWR)
2. Arizona Department of Environmental Quality (ADEQ)

C. Local authorities

1. Flood Control District of Maricopa County (FCDMC)
2. Maricopa County Department of Public Health
3. Town of Paradise Valley (PV)

D. Coordination

Applicants are responsible for coordinating with other interested parties, including utilities, federal and state agencies. Other agency permits may be necessary before applying for Town permits. Applicants should consider the time frames for obtaining those other permits.

1-3 STANDARDS

A. FEMA 44 CFR

http://ecfr.gpo.gov/cgi/t/text/text-idx?&c=ecfr&tpl=/ecfrbrowse/Title44/44tab_02.tpl

B. ADWR State Standards

http://www.azwater.gov/azdwr/SurfaceWater/FloodManagement/StateStandards.htm

C. Drainage Design Policies and Standards for Maricopa County

http://www.fcd.maricopa.gov/downloads/2016-Drainage-Policies-Standards-Manual.pdf

D. Paradise Valley Storm Drain Design Ordinance (1987)

http://paradisevalleyaz.gov/documentcenter/view/3953

1-4 RESOURCES

A. Federal

1. National Flood Insurance Act
   http://www.fema.gov/library/viewRecord.do?id=2216
2. Flood Insurance Rate Maps (FIRMs)
   http://www.fema.gov/hazard/map/firm.shtm
3. Clean Water Act (CWA)
   http://www.epa.gov/owow/watershed/wacademy/acad2000/cwa/
4. USDA Natural Resources Conservation Services (NRCS) soil survey maps
   http://www.nrcs.usda.gov/
5. National Oceanic and Atmospheric Administration (NOAA)
   http://www.nws.noaa.gov/oh/hdsc/currentpf.htm
6. US Environmental Protection Agency, Storm Water Management Model (SWMM)
   https://www.epa.gov/water-research/storm-water-management-model-swmm#description
7. US Environmental Protection Agency, Low Impact Development (LID)
   https://www.epa.gov/polluted-runoff-nonpoint-source-pollution/urban-runoff-low-impact-development

B. State

1. ADWR
   http://www.azwater.gov/azdwr/default.aspx
2. ADEQ
   www.azdeq.gov/environ/water/permits/stormwater.html

C. Local

1. Paradise Valley Town Code, in particular Chapters 5 and 8
   http://paradisevalleyaz.gov/DocumentCenter/Home/Index/30
2. Paradise Valley Document Center
   http://paradisevalleyaz.gov/documentcenter
3. Paradise Valley Area Maps
   http://paradisevalleyaz.gov/DocumentCenter/Index/16
4. Paradise Valley Record Request Form
   http://paradisevalleyaz.gov/documentcenter/view/137
5. Flood Control District of Maricopa County
   www.fcd.maricopa.gov
6. Maricopa County Health Department Standards
   http://www.maricopa.gov/clk_board/Ordinances/P14_Health_Code.pdf

FLOODPLAIN MANAGEMENT

2-1 GENERAL INFORMATION

A. The Town's design, construction and documentation requirements for development in Special Flood Hazard Areas (SFHAs) and pending SFHAs are in this manual. Unless otherwise approved by the Floodplain Administrator, each project must conform to the Town's requirements as referenced in Article 5-11.

B. All habitable structures must be designed so that they will not flood in a base flood as defined in 5-11-1.

2-2 PERMIT REQUIRED

A. Appropriate permits are required before construction or development begins within any SFHA, as mapped on the FIRMs. Applications for permits shall be made on Town forms and may include, but are not limited to, plans drawn to scale showing the nature, location, dimensions and elevation of the area of development, existing or proposed structures, fill, excavation, storage of materials, and drainage facilities. Specifically, the following information is required:

1. Proposed elevation in relation to North American Vertical Datum (NAVD 88) of the lowest floor (including basement) of all structures.
2. Proposed elevation in relation to NAVD 88 to which any non-residential structure will be floodproofed.
3. Certification by an Arizona licensed engineer that the floodproofing methods for any nonresidential structure meet the floodproofing requirements of the Town and FEMA.
4. Base floor elevation for all development within or contiguous to floodplains.
5. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development. See Section 6, Drainage Report and Plans.

2-3 SPECIAL FLOOD HAZARD AREAS

A. Portions of the Town fall within special flood hazard areas, as mapped on the FIRMs. Special flood hazard areas are flood zone designations that begin with an "A" and require particular attention when being analyzed and designed for development.

2-4 SUBSTANTIAL IMPROVEMENTS AND SUBSTANTIAL DAMAGE IN SFHAS

A. This section applies when a structure in an SFHA is not in compliance with current standards, and:

1. Improvements requiring a building permit are proposed; or
2. Repairs to damage, requiring a building permit, are proposed.

B. Upon application to the Community Development Department for a building permit, if it appears that this section is applicable to the project, the applicant shall submit an appropriate Substantial Improvement/Substantial Damage Worksheet, available from Town Engineer. The Substantial Improvement/Substantial Damage Worksheet is a screening tool to establish which projects exceed 60% or are less than 40% of the structure's existing market value before the improvements or repairs utilizing FEMA criteria.

C. If it appears that the project costs between 40% and 60% of the structure's existing market value, the applicant shall provide an appraisal of the value of the existing structure (excluding land value and other improvements to the property such as a swimming pool or accessory structures, before improvements and/or repairs), and a construction proposal signed by an Arizona licensed contractor.

D. An applicant may bypass the Substantial Improvement/Substantial Damage Worksheet, or challenge the Worksheet's calculation, by providing an appraisal of the value of the existing structure as described in C above and a signed construction proposal from an Arizona licensed contractor.

E. In case of substantial improvements or repairs to substantially damaged structures, defined as projects costing 50% or more of the value of the existing structure, the entire structure must be brought into compliance with the Town's floodplain management regulations.

For information refer to FEMA's guide to substantial damage and substantial improvements. http://www.fema.gov/library/viewRecord.do?id=1636

The Town's substantial improvement/substantial damage worksheets are available upon request from the Town Engineer.

Stormwater Management

3-1 GENERAL INFORMATION

A. Use the design standards and methodologies described in the Drainage Design Manual (DDM) for Maricopa County, Arizona, latest edition, which includes Volume I - Hydrology, Volume II - Hydraulics and Volume III - Erosion. The SDDM prevails in any conflict between the DDM for Maricopa County and the Town's SDDM whenever the latter is more restrictive. Design Engineer should discuss any conflict with the appropriate Town staff for resolution before submitting reports and plans for review.

3-2 STORMWATER STORAGE

A. Generally

1. Stormwater storage facilities are designed primarily as retention facilities. Other stormwater management facilities, such as detention basins, dry wells, pumps and injection wells, will only be allowed as approved by the Town Engineer.

2. All new developments shall make provisions to retain the runoff of a 100-year, 2-hour duration storm falling within the boundaries of the development unless the drainage can be conveyed directly to an existing major channel or natural drainageway, and the developer can demonstrate no adverse off-site impacts to the satisfaction of the Town Engineer.

3. Lot to Lot drainage within a new development is prohibited unless permanent drainage facilities are constructed in dedicated drainage easements or tracts that are maintained by the Town or a homeowners association (HOA).

4. Developments with HOAs may locate retention facilities in private dedicated drainage tracts. These tracts will be maintained by the homeowners association.

B. Stormwater Storage Volume

1. Design Volume

a. For all new development, the standard formula for determining the required stormwater storage runoff volume is shown below.

$$Vr = C(R/12)A$$

Vr = Required storage volume in cubic feet.

R = Precipitation amount = The depth in inches of the 100-year, 2-hour rainfall, from FCDMC Hydrology Manual Figure A.56 at the site.

A = Area (square feet) of entire project site, including:

(1) Easements, tracts and rights-of-way within the development, plus

(2) Where the development includes improvements to the rights-of-way on the perimeter of the property, the area of those improvements up to the ROW centerline.

C = Weighted average runoff coefficient over entire site, per the FCDMC Hydrology Manual tables 3.2 and 3.3

b. For single family residential lots (not hillside)

$$Vr = C(R/12)A$$

100% retention amount

c. For hillside lots (steeper than 10% slope)

$$Vr = \triangle C(R/12)A$$

100% of the pre-vs.-post calculated amount

d. Volume requirement may be prorated based on average slope steepness across the entire site as measured at its midpoint. General guidelines are:

- 10-20% slopes require 100% of the pre-vs.-post calculated retention volume
- 20-30% slopes require 50% of the pre-vs.-post calculated retention volume
- slopes steeper than 30% require 0% (no retention required).

The Town Engineer may waive requirement if proved otherwise, based on certain criteria, such as adverse impact and soil type.

e. The Town encourages the use of Low Impact Development (LID) techniques, as described in Chapter 6, to both reduce the amount of impervious surfaces constructed, and to provide required storage volume. LID techniques can be used to reduce the site composite runoff coefficient, thus reducing the overall storage requirement.

2. First Flush Volume

a. Where detention is allowed, first flush volume shall be retained on all lots or within common retention areas, and a reasonable attempt shall be made to route all runoff from disturbed areas to the first flush basin(s) subject to grading plan approval.

b. The first flush volume shall be calculated using the following formula:

$$Vf = CPA$$

Vf = the required first flush storage volume, in cubic feet;

C= the weighted average runoff coefficient for the disturbed area of the proposed development;

P= the required precipitation depth of 0.5 inches, converted to feet; and

A= the disturbed area of the proposed development, in square feet.

c. If retention of the first flush volume is provided, the stormwater storage facility must be fully evacuated within 36 hours. The maximum allowable infiltration rate shall be 50% of the in-situ tested rate of the as-constructed basin. Testing shall be conducted using double-ring infiltrometer methodology in accordance with FCDMC standards.

3. Certified Volume

a. Before acceptance, or before the issuance of a certificate of occupancy, the engineer of record/property owner must provide the Town with certified, as built dimensions of the facilities, and the actual volume of storage provided.

b. The actual volume of storage provided must:

i. Be based on as-built topographic surveys performed by an engineer or surveyor;
ii. Reflect permanent, finished landscaping in place;
iii. Meet or exceed the required volume;
iv. Be constructed to perform as designed; and
v. Be certified by an engineer.

c. The volume of storage provided must equal or exceed the approved design volume before the Town will issue a Certificate of Occupancy. See volume table in Appendix 6A.

C. Storage Facilities Design

1. All on-site water retention areas other than piped systems shall be entirely landscaped. Storage facilities shall be located to intercept the flows generated for each tributary area within the entire development, to the maximum extent practicable.

2. Storage facilities shall be set back at least 5 feet from adjacent properties, rights-of-way (ROW), public utility easements (PUE's) or other utility easements or as approved by the Town Engineer.

3. In-stream storage facilities are prohibited because they interrupt the natural flow of the wash and can create debris and sediment obstructions.

4. Retention/detention facilities should be designed with a positive gravity drain system whenever possible.

5. Basin side slopes shall not exceed a 4:1 (4 foot horizontal to 1 foot vertical) ratio.

6. The design depth of stored water in a facility shall not exceed 3 feet except as otherwise approved by the Town Engineer.

7. Ultimate outfall of basins must be one (1) foot below adjacent finished floor elevations.

8. Facilities shall have an emergency spillway to safely direct overflow into a recognized watercourse or to the historical outfall of the lot.

9. Above-ground storage facilities contained by an embankment are generally prohibited. If above-ground storage facilities are permitted, they must be designed and constructed according to generally accepted geotechnical and, if necessary, structural-engineering principles. Slope stability, piping, seepage, sliding, overturning and material integrity shall be considered.

10. Except as provided in 11 below, stormwater storage facilities for residential subdivisions shall be located in a tract.

11. Stormwater storage facilities for a residential subdivision may be located on a private lot if the owner:

    a. Provides a physical demarcation around the stormwater storage facility, to avoid interference with its purpose, in accordance with an approved plan, and dedicates unobstructed physical, legal and visual access from the right-of-way to the facility.

    b. Constructs and maintains an approved cistern for rainwater harvesting.

12. Detention basins and related facilities shall be designed to drain to a recognized watercourse, such as a established wash, or to the historical outfall of the lot. Unless otherwise approved by the Town Engineer, stormwater may not be discharged onto a street, alley, storm drain or gutter.

13. A stormwater storage facility shall not detain or retain standing water longer than thirty-six (36) hours unless the facility is designed and constructed to be a permanent body of water with appropriate health, safety, and water quality measures. Consistent with requirements specified in the DDM for Maricopa County, double-ring infiltrometer testing shall be required with a factor of safety of 2 to demonstrate adequate drawdown within 36 hours for all basins.

14. Drain time should be maximized to ensure the effectiveness of the facilities. Drain time should generally be from 12 to 24 hours. Discharge from the detention basin may be regulated with a hinged orifice plate, with a minimum diameter of 6 inches, over the entrance of the outlet pipe if the outlet pipe meets the minimum size requirements. Storage facilities shall be equipped with a baffle, or other approved method, to keep oil, grease and other floatables in the basin. Baffles, if utilized, shall extend 6 inches below the bleeder invert elevation.

15. Storage facilities shall be designed to allow for regular maintenance activities, such as providing access for inspection vegetation and soil management, and removal of sediment, debris and other obstructions.

16. Stormwater storage may occur in a private road, driveway or parking lot if the following conditions are met:

    a. At least the first 50% of the required storage volume is provided in a stormwater storage basin or underground storage tank, if approved;

    b. No more than 50% of the required storage volume is provided;

c. The depth of water does not exceed six inches; and

d. Interference with pedestrian traffic is minimized.

3-3 UNDERGROUND STORMWATER STORAGE POLICY

A. This policy supplements the Town 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 Town will only approve underground storage after rigorous analysis of storage system location, specifications, access, operation and maintenance, liability, and signage.

B. Projects qualifying for underground stormwater storage must meet the following criteria:

1. Projects located within a commercial, non-residential or multi-family development with a viable property maintenance organization or other maintenance mechanism to assume continued maintenance of the underground stormwater storage system and protect the public interest.

2. Single family residences with an underground storage easement instead of a drainage easement.

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 the Town Code and related policies.

2. All underground stormwater storage elements must meet industry standards or stricter standards.

3. Storage system must not be located under buildings or parking garages.

4. The owner must dedicate a drainage easement to the Town which meets the standards for all drainage easements.

5. Design must address:

a. Water quality protection measures to protect underground and surface water resources to meet applicable water quality standards.

b. Vector control within storage system.

c. Redundancy in case of storage system failure, with particular attention to the possibility of structure or street flooding, sediment accumulation, or storm events that are greater than the 100-year, 2-hour event.

d. Initial suspended sediment load removal.

e. At least a 75 year life of entire system, including the lining and coating of the underground storage tank.

f. Drainage by gravity. Pumped systems or drywells 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 to prevent debris from collecting in the pipe, reducing its effective volume.

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. Contractor or maintenance staff with experience in operating, 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 Town Code and other applicable requirements, owner shall:

   a. Inspect system after each storm event of 0.6 inch or more, and semiannually,preferably before summer and winter rains.

   b. Remove accumulated trash and debris from inlet and outlet structures as needed to ensure free flow of stormwater.

   c. 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, the 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 Town 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 Town harmless from any such liability. Before receiving a certificate of occupancy, the owner must record a signed and notarized document to this effect, in a form satisfactory to the Town Attorney, in the Maricopa County Recorder's Office.

3-4 STORMWATER STORAGE WAIVERS

A. Waiver of Stormwater Storage Requirements

A waiver approval does not relieve the developer of liability if flood damage occurs resulting from the waiver.

B. Waiver of First Flush

Generally, there is no waiver permitted for stormwater storage volume required to hold runoff from the first one-half inch of precipitation. However, the owner may provide a smaller basin and/or alternative stormwater controls, if it meets the approval of the Town Engineer.

C. Waiver Process

To apply for a waiver, the developer shall complete and submit with the final drainage report:

1. A Request for Stormwater Storage Waiver Form, including in-kind contributions calculations sheet, which may be obtained from the office of the Town Engineer, and

2. A certified engineering report stamped by a licensed Arizona engineer, along with documentation satisfactory to the Town Engineer that the project qualifies for a waiver.

The Town Engineer may request additional information and may deny the waiver, approve it, or approve it with conditions.

Unless the project is designed to provide full storage, the Town Engineer will not accept final improvement plans without a copy of the approved Waiver Form.

3-5 STREET DRAINAGE

A. Access

Generally, street improvements for new development shall provide access to properties during a base flood. To prove access, an engineer must demonstrate that at least one structural roadway section with asphalt, concrete or compacted aggregate has a depth of flow no greater than 1 foot during a base flood. Refer to Fig. 1.3-1, Street Hydraulic Design Criteria Chart, for limits of inundation for specific street sections.

B. General Design Standards

Streets may carry water from adjacent property and from local areas, but should not be used as major water carriers in lieu of natural washes or man-made channels. The design criteria below imply that water may flow deeper than a normal vertical curb height, for a short distance over sidewalk or other back-of-curb areas, but the flow is always confined to the right-of-way or drainage easements. Engineers should provide catch basins, scuppers, or similar facilities, together with necessary channels, at appropriate locations (particularly street sag areas) to remove water flowing in the streets to comply with MAG, DDM and the design criteria below.

HYDRAULIC DESIGN CRITERIA dmax = maximum depth at any point within the right-of-way			
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-wide dry driving lane in each direction.	N/A	Contain runoff below the building's lowest floor. Confine runoff to street rights-of-way or drainage easements. dmax = 8 inches.
Street without Curb & Gutter (Dirt Roads, Ribbon Curbs)	Contain longitudinal runoff within roadside channels with water surface elevation below pavement subgrade.	N/A	Contain runoff below the building's lowest floor. Confine runoff to street rights-of-way or drainage easements. dmax = 8 inches.
Street without Storm Drain System	Add pipes or roadside channels if runoff from 10-year flood exceeds street capacity, unless waived.	N/A	Add storm drain systems if a base flood inundates building's lowest floor. Provide catch basins, scuppers, etc. to remove water so dmax = 8 inches.
Cross Road Culvert or Bridge for Collector & Arterial Streets	N/A	Convey runoff by culvert or bridge under street with no flow overtopping the street for a 50-year flood.	Convey runoff by culvert and by flow over the street so dmax =6 inches.
Cross Road Culvert or Bridge for Collector Streets, and Local Streets	Convey runoff by culvert or bridge under street with no flow overtopping the street.	For a 25-year event, convey runoff by culvert or bridge and by flow over the street with so dmax = 6 inches.	dmax = 12 inches.
Any street or watercourse crossing that provides the only access to residential area.	N/A	N/A	Make all lots and structures accessible by at least 1 street with dmax = 12 inches for a base flood.
Local Streets with Low Volume Average Daily Trips	N/A		

FIGURE 3.1 STREET HYDRAULIC DESIGN CRITERIA CHART

C. Valley Gutters

Valley gutters are permitted on local streets to transport runoff when a storm drain system is not required. Valley gutters are generally not acceptable on collector or arterial streets. In unusual cases, valley gutters may be necessary to convey runoff across a collector street. In such situations, the valley gutter shall be a minimum of 8 feet wide to lessen the impact on traffic.

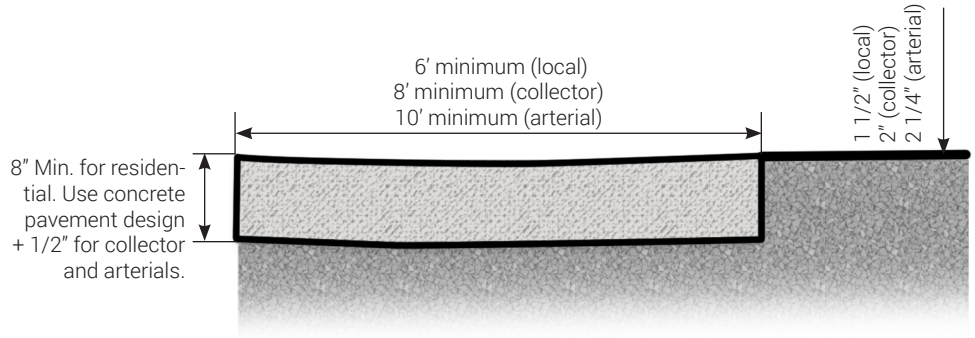

FIGURE 3.2 TYPICAL SECTION FOR VALLEY GUTTER

D. Roadside Swales

Unless waived by Town staff, swales must intercept and safely convey flow to the nearest recognized watercourse within the same watershed. If velocities exceed 5 feet per second, then the engineer must design the swale to provide erosion and scour protection. Swales are necessary to prevent:

1. Runoff and debris from washing onto the roadway,
2. Erosion of roadway areas adjacent to the edge of pavement or curbing, and
3. Roadway runoff from flowing into front yards, driveways, garages and homes. Refer to Figure 3.3 Typical Cross Section for Roadside Swales, on non-raised curb street or straight cross slope.

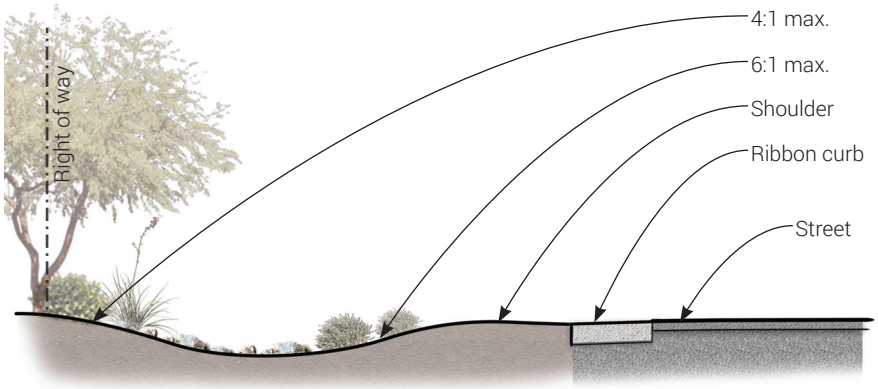

FIGURE 3.3 TYPICAL CROSS SECTION FOR ROADSIDE SWALES

E. Wet Crossings

1. For wet crossings of road, calculate flow velocity for sediment erosion. Erosion control measures for scour protection must be evaluated and documented.
2. Wet crossings shall be constructed of concrete paving or include continuous ribbon curb per MAG standard detail.

F. Pools and Spas

1. Pools and spas shall not be drained or backwashed into a street, storm drain or natural wash. The Town's two sanitary sewer providers, (City of Scottsdale and Phoenix) currently allow the disposal of pool or spa water into their collection systems. If discharging into a sanitary sewer, pool or spa water shall enter the sewer on private property by appropriate means, such as through a sanitary clean-out. Some other examples of appropriate locations to backwash a pool or spa may include onsite retention basin(s) with adequate volume, or an approved septic tank hauling service.

3-6 CHANNEL DRAINAGE

A. Channel Design

Man-made Channel: When man-made channels are required, the emphasis will be placed on a "natural" appearance and on safety. Native landscape lining will be allowed, with side slopes 6:1 or flatter, with specific Town approval. Full channel lining will be considered on a case by case basis.

1. Design shall be in accordance with the Drainage Design Manual for Maricopa County, Arizona Department of Water Resources; Delineation of Riverine Floodplains and Floodways in Arizona, State Standard Attachment SSA 2-96; the State Standard for Detention/Retention, SSA8-99; and the Watercourse Bank Stabilization, SSA 7-98; or the current version of the aforementioned. The developer is required to coordinate compliance with any requirements of the Army Corps of Engineers Section 404 Certification. The developer is required to coordinate all revisions to the FEMA flood insurance rate maps resulting from construction of bank protection.

2. Channel sections shall be designed so the final finish grade is the surface of any channel lining for erosion protection. Channel capacity shall be designed for increased capacity to accommodate any reduction that might occur from landscaping, vegetation and/or sediment accumulation, as shown in Fig. 3.4 Channel Lining Design Capacity.

FIGURE 3.4 CHANNEL LINING DESIGN CAPACITY

3. Maximum Velocities/Erosion Protection: In general the maximum velocity shall not exceed the scouring velocity of the soil (with natural cover). When the scour velocity is exceeded, additional erosion protection shall be provided. Bank/channel protection may consist of one or more of the following:

   a. Concrete or gunite lining, reinforced with 4 inch x 4 inch WWF-12GA.

   b. Natural stone grouted riprap 4-inch to 12-inch diameter stones - leave a minimum 1/4 diameter exposed.

   c. Natural Stone loose riprap 4-inch to 12-inch diameter stone.

   d. Gabion Baskets/Gabion Mattresses.

   e. Soil Cement.

3-7 CULVERTS AND STORM DRAINS

A. Culverts and bridges within the Town are generally within the public right-of-way for the road. Additional easement or right-of-way, beyond the normal street width may be required to facilitate the construction, operation and/or maintenance of the structure. Design plans for the structure shall include the proposed easement and/or right-of-way limits. Maintenance issues and access shall be considered in the structure design, and appropriate measures should be included to facilitate proper maintenance (i.e. access road if necessary, etc.).

B. The minimum pipe size of culverts and storm drain laterals in the public right of way shall be 18 inches in diameter. Where debris may be expected, follow the FCDMC requirements for preventing clogging.

C. Culverts and storm drain laterals on private property should be sized to manage the 100-year runoff event, but shall not be less than 12 inches in diameter. Culverts 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 or storage basin.

D. In special cases, if a culvert invert is placed below the natural wash flowline, the design capacity of the culvert shall be reduced by the cross-sectional area below grade level as approved by Town Engineer.

E. Stormwater runoff shall not be conveyed in a culvert or pipe under structures, except to drain a fully enclosed courtyard, where redundancy is required. Exceptions may be made where a lot is considered otherwise unbuildable, as approved by the Town Community Development Director or Town Engineer.

F. Manholes or junction structures are required at all horizontal and vertical changes in culvert alignment, pipe junctions, and changes in pipe diameter.

1. The hydraulic grade line in storm drains shall be no higher than six inches below the gutter line in a 10-year storm event.

2. Minimum drainage easement widths shall be calculated using the following formula:

Width = pipe outside diameter + 2 feet + 2x depth to invert

G. Storm drain inlets and outlets shall be designed to meet current Town and MAG standards. Structures shall be buried or otherwise blended with surrounding grade with colors and textures to match or complement adjacent structures as approved by the Town.

H. Headwalls shall extend a maximum of 18 inches above top of pipe with top of wall not to exceed finished grade of surrounding areas. Slope to top of headwall maximum 4:1. Where vertical drop is greater than 30 inches install guardrail meeting Town and MAG standards. Retaining walls shall be constructed of natural stone or poured-in-place concrete. Concrete walls shall be finished with integral color and form liner as approved by Town.

I. Fence and Wall Openings, Trash Racks and Railings shall be designed in accordance with Town and MAG standards. Steel fabrications shall consist of evenly spaced slats 8 inches on center max., smooth coved welds, primed and painted to match adjacent structures as approved by Town. Grates are required on private lots only and shall be cleaned and maintained by property owner.

J. Obstructions. Obstructions to drainage are fences, walls, berms, swales, retaining walls, patios, pools, decks, sheds, pens, corrals, water troughs, canals or any other construction that alters redirects, impedes or suspends drainage from its natural course. Obstructions can occur in landscaping which includes mounding, raised beds, edging, furrowing, gardens, water harvesting, planter boxes, or any other landscape method or construction that alters, redirects, impedes or suspends drainage from its natural course.

K. Ownership and Maintenance Requirements. As part of the initial layout design, the designer must consider and accommodate the future need of vehicular access for maintenance purposes. Preliminary design should minimize long-term maintenance requirements. It is essential that maintenance be considered during the planning, design and construction of drainage facilities. Maintenance is provided so that the facility is maximized. Common maintenance problems associated with drainage facilities includes growth of undesirable vegetation, debris accumulation, sedimentation, erosion, scour, soil piping, soil settlement, structural damage and failing to plan for maintenance access. Culverts and bridges are to be designed to avoid impacts to existing sediment transport conditions.

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Erosion Hazard management

4-1 GENERAL INFORMATION

A. The Town uses, as a minimum, the design standards and methodologies described in the ADWR Erosion Hazard Guidelines and FCDMC Hydraulics Manual. These apply to:

1. Structures that could fail or incur significant damage as a result of erosion.
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 land divisions.
5. Watercourses identified by the Town 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.

B. Erosion hazard zones consistent with ADWR may be required for all properties under development where watercourses will be left in an undisturbed state. The Town may require further analysis (ADWR Level II or III) under certain geomorphic conditions where staff is concerned that erosion limits may exceed those estimated by a Level I analysis. The Town may also require a slope stability analysis.

4-2 HILLSIDE DEVELOPMENT

A. Hillside Overlay Districts:

The Town of Paradise Valley has a hillside zoning ordinance (Article XXII) that restricts development on lots that have slopes greater than 10%. The Hillside Building Committee will review all applications for development in these areas.

B. Purpose and Need:

Hillside lots have special needs for stormwater management due to the higher runoff rates and difficulty establishing retention areas on site. This is exacerbated by construction of impervious surfaces that increase runoff intensity and volume during a storm event. These sites are also likely to be more visible from surrounding off-site areas. The purpose of these requirements is to preserve the character of the hillsides while accommodating responsible development and protecting people and property from potentially hazardous conditions unique to hillside development.

C. Storm Drainage on Hillside Lots:

The first priority of hillside development is to properly site buildings, structures and use areas to preserve natural drainageways on the site. This can be accomplished by clustering development while preserving connected natural washes and linear open spaces that convey and store stormwater. Development restrictions for hillside lots are identified in the Town's hillside zoning ordinance.

Development shall be accomplished in such a way to minimize changes to existing topography, including natural drainageways. Where excavation and filling is required for approved site improvements grades and vegetation shall be restored to meet the requirements of the Town Landscape Design Guidelines. Application of Low Impact Development (LID) approaches, as identified in Section 6, can reduce the amount of impervious surfaces in order to mimic predevelopment runoff conditions on the site. The Town may consider waivers to on site retention requirements only in such cases where approved LID practices, such as porous pavements, green roofs and/or reduced pavement areas are proposed that are equal to, or exceed, required on-site retention.

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Stormwater Quality

5-1 CONSTRUCTION GENERAL PERMITS

A. Arizona Department of Environmental Quality (ADEQ) administers the Construction General Permit under the Clean Water Act (CWA). The Town requires evidence that the development will comply with the ADEQ Construction General Permit, when applicable, before issuing development permits.

B. 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 with the Construction General Permit will help prevent these pollutants from entering washes, lakes, other surface waters and the Town's storm drain system.

5-2 HOW TO OBTAIN STATE AND TOWN APPROVAL

A. The operator of a construction site is responsible for applying for appropriate permits from ADEQ. The operator may be the owner, developer, general contractor or individual contractor responsible for operational control. When this responsibility is shared, all operators must apply for ADEQ approval. ADEQ will require a Notice of Intent (NOI) and Stormwater Pollution Prevention Plan (SWPPP). The Town requires submittal of the SWPPP for review prior to submittal to ADEQ.

B. After ADEQ approval, the operator must include 2 copies of the approved NOI and SWPPP with improvement plan submittal to the Town.

5-3 OPERATIONAL REQUIREMENTS

A. The operators must keep a copy of the SWPPP on site. In addition to ADEQ enforcement, the Town will enforce stormwater management requirements, through inspections, responding to complaints and other means.

5-4 COMPLETING CONSTRUCTION

A. Once construction is completed, as defined in the Construction General Permit, the operators must send a Notice of Termination (NOT) to ADEQ and the Town.

5-5 SECTION 404 PERMITS

A. The Town requires developments to comply with Section 404 of the CWA.

5-6 ACTIVITIES REGULATED UNDER SECTION 404

A. The US Army Corps of Engineers (Corps) and EPA 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:

1. Stream crossings;
2. Dam construction and flow regulation;
3. Water diversion for canals, irrigation systems and stock tanks;
4. Streambed modification and stabilization; and
5. Building subdivisions, master planned communities, nonresidential structures, highways and airports.

B. Projects that are determined by the Corps to have a minimal environmental impact, require compliance with nationwide permits in a streamlined process. Projects with potentially significant impacts may require individual permits and public notice.

C. Projects cannot jeopardize the continued existence of a threatened or endangered species or its

critical habitat. Developers should consult with the Corps or the US Fish and Wildlife Service for guidance concerning threatened and endangered species in the Town.

5-7 SECTION 401 CERTIFICATION

A. Before the Corps can issue a 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. No discharge of dredged or fill material is permitted if:

   1. A practicable alternative exists that is less damaging to the aquatic environment, or
   2. The nation's waters would be significantly degraded.

B. ADEQ may grant, deny or waive water quality certification for both individual and nationwide Section 404 permits.

5-8 COMPLIANCE REQUIREMENTS

The Town will not issue any development permit where Corps action is required but not yet taken. An applicant must comply with the requirements of Sections 401 and 404 of the CWA, as applicable, prior to commencing construction.

5-9 WASTE DISPOSAL SYSTEM LOCATIONS

A. Waste disposal system locations shall comply with Arizona Revised Statutes, Section 48-3609. Refer to

   http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/48/03609.htm&Title=48&DocType=ARS

B. Waste disposal system locations shall comply with Maricopa County standards. Refer to

   http://www.maricopa.gov/EnvSvc/AboutUs/pdf/C2S2.PDF

   and

   http://www.azsos.gov/public_services/title_18/18-09.pdf

Low Impact Development

6-1 General Information

Low Impact Development (LID) is a sustainable approach to stormwater management that utilizes the landscape to absorb storm runoff, reducing flows that can contribute to flooding and increase infrastructure costs. The goal of LID is to mimic and sustain a predevelopment hydrologic regime by applying techniques that are included in this chapter. LID strategies can divert, store and utilize stormwater runoff to support native and designed landscapes. They can be utilized to supplement, and sometimes reduce the need for, traditional methods for stormwater management. While traditional methods often channelize and pipe runoff away from development, LID utilizes this water close to its source, to support vegetation growth and reduce runoff volume.

LID is adaptable to a wide range of land use types and project scales. Low impact development can be particularly effective reducing increased runoff for hillside development. Breaking down developed areas into their constituent components – private property and public realm; buildings, paved areas and landscape – presents a way to organize potential actions to implement LID. These approaches are encouraged by the Town.

6-2 Potential Benefits

Increased stormwater runoff is directly related to the amount of impervious surfaces in a given area and to how land is developed and improved. Improvements in managing stormwater can have multiple benefits for cities and their residents and businesses. LID actions can be taken by governments, organizations and private interests. The benefits of LID have been published for many national and local examples, and are supported by the Environmental Protection Agency (EPA) in its Municipal Separate Storm Sewer System (MS4) requirements.

A. Direct benefits:
   1. Detains stormwater close to its source, potentially reducing runoff volume and velocity downstream.
   2. Collects sediment and reduces pollutants in storm-water runoff.
   3. Utilizes stormwater to support native vegetation and landscape improvements.

B. Indirect benefits:
   1. Reduces irrigation water requirements for landscape areas.
   2. Reduces impacts on existing stormwater infrastructure and the need for new channels and pipes.
   3. Is compatible with the protection and restoration of natural systems, which supports climate resiliency.
   4. Complements site improvements for human activities.
   5. Provides and sustains habitat for wildlife.
   6. Supports tree canopy growth for increased shade, which can significantly decrease urban heat-island effects.
   7. Adds value to property through efficient use of space and resources.
   8. Provides multiple-use opportunities, such as open space and landscaping, that improve a community's quality of life.

6-3 Applications

A. The LID tools identified in this chapter can be used to:
   1. Enhance the built environment by implementing LID projects that use ecologically friendly and aesthetically pleasing design solutions that provide multiple benefits for the community.
   2. Mitigate impacts on proposed development sites to produce the amount of impervious surface and reduce stormwater runoff potential.
   3. Provide means for hillside development that satisfies the Town's stormwater storage requirements.
   4. Review and assess current Town policies, codes, regulations and checklists to determine which updates are required to enable and encourage the implementation of LID techniques.
   5. Educate Town agencies, residents, businesses, and developers about the advantages and benefits of LID.

LID MATRIX

SOURCE

BUILT OR PROPOSED ORIGIN OF STORMWATER RUNOFF

	PUBLIC STREETS IN PARKING AREAS	HOMES AND BUILDINGS ROOF TOPS

ACTION

METHOD OF MANAGING STORMWATER RUNOFF

	CONVEY	STORE	INFILTRATE

TOOLS

MEANS TO ACCOMPLISH ACTIONS

TECHNICAL VARIATIONS

GREEN STREET	VEGETATED SWALE	BIORETENTION	POROUS PAVEMENT
Curb Cuts	Landscaped Channel	Vegetated Basin	Stabilized Aggregate
Ribbon Curb	Restored Wash	Bioretention Cell	Pervious Asphalt
Curb Cut with Sediment Capture			Pervious Concrete
Wheelstop Curb			Permeable Pavers
			

DRIVEWAYS AND PATIOS

LANDSCAPE AREAS

FILTER

EVAPO-TRANSPORATE

REUSE

GROUNDWATER INFILTRATION

Underdrains

Recharge

GREEN ROOF

Rooftop Garden

Downspout Disconnection

RAINWATER HARVESTING

Cisterns

Underground Storage

LANDSCAPE

Tree Preservation

Soil Amendment

Impervious Surface Reduction

Plant Selection

6-4 LID TOOLKIT

A. Source

The tools included in this document have been derived from, and include, pioneering work for southwest applications of LID by the cities of Mesa, Glendale and Tucson, and the Watershed Management Group. Tools have been identified that are appropriate for the low density, natural character landscape of Paradise Valley. The EPA has published several guides to LID that describe LID methods that have been implemented throughout the country.

This LID Toolkit provides a representative cross section of Best Management Practices (BMPs) that can be developed in Paradise Valley and throughout the region.*

B. Tools

As described in the LID matrix on the previous page each tool is categorized by its context within a site or system, and by which action(s) the tool is intended to perform with respect to the stormwater that is being managed.

These tools are compatible with development methods and building codes in Paradise Valley. Tools are appropriate in developed or developing areas and are consistent with current or proposed city policies.

C. Technical Variations

Many of the BMP techniques illustrated in the LID Toolkit have multiple variations and/or site specific adaptations. The arid region in which we live, requires special understanding and care when implementing these techniques. Within the appropriate site and project context, LID tools can be effectively deployed to achieve the Town's stormwater management goals.

Context and site specific issues that should be considered when applying the LID Toolkit to the stormwater management system include:

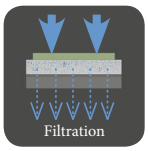
1. Knowledge of local codes and regulations (The Town of Paradise Valley will determine which practices are appropriate for each application).
2. Anticipating high intensity storms that may exceed the capacity of LID facilities.
3. Extended periods of drought require vegetation to have access to supplemental irrigation.
4. Periods of extreme heat requiring adapted and highly tolerant vegetation.
5. Extreme daily temperature fluctuations leading to expansion and contraction, affecting design requirements.
6. Opportunities and constraints associated with the type and use of local materials.
7. Dusts, sediment and debris accumulation between storms.

* LID Tools are not intended to address all requirements of local, state, federal, and other codes, regulations, and standards. Additional analysis will be required for each application.

Functions

Some LID tools provide a specific function related to stormwater. Most LID tools can perform several functions. The function intended by the designer is often a determining factor in the selection of which tool/technique to use in the design.

Flow Control
-the regulation of stormwater runoff flow rates.



Filtration
-the sequestration of sediment or pollutants from stormwater runoff through a porous medium.

Detention
-the temporary storage of stormwater runoff to allow for metered discharge that reduces peak flow rates.

Infiltration
-the vertical movement of stormwater runoff through soil, recharging groundwater.

Retention
-the storage of stormwater runoff on-site to allow for sedimentation of suspended solids.

Treatment
-processes that use plant materials, soils and bacterial colonies to metabolize contaminants in stormwater runoff.

Shade
-promotes vegetated shade

Recreation
-allows for recreational uses

Design
-encourages creative solutions to stormwater management

Heat Island
-reduces or mitigates heat island effects

Habitat
-provides wildlife habitat area

Aesthetics
-enhances attractiveness and beauty

Education
-provides learning opportunity

Infrastructure
-reduces impact on existing or future infrastructure

Benefits

LID can provide benefits that go well beyond stormwater management. By managing stormwater close to its source, they can nourish a healthy community landscape. This provides visual interest in the landscape, reduces water and energy use, improves water quality and reduces the cost of stormwater infrastructure. and contaminants downstream. These icons identify the multiple benefits associated with each LID practice.

Location

Some LID tools are specific to certain locations and types of development. Other tools can be used in multiple locations and be adapted to different development types. In order to be context sensitive, it is important to assess which locations and applications each tool is appropriate for during the design process. The locations and development types identified by the following icons are intended to be scalable. For example, a landscaped yard around a residence can be considered similar to the site area around a small business or school. Open space can describe a park, or a large landscaped area on the campus of an institution or corporate facility.

Street Buffer
-landscaped area between street and building

Pedestrian Path
-designed walkway for pedestrians

Street Median
-distinct island in middle of road designed to guide traffic

Driveway
-private vehicular accessway

Parking Island
-distinct island in parking area designed to guide traffic

Parking Lot
-designated area for parking

Residential Landscape
-unpaved and hardscape areas outside homes

Nonresi Landscape
-unpaved and hardscape areas outside non-residential buildings

Parks and Open Space
-large contiguous landscape areas for public or common use

Parking Shading
-trees or structures that provide shade

Nonresi Building
-buildings without residential uses

Residential Building
-buildings with residential uses

Green Street – Standard Curb Cut & Ribbon Curb

Description

A. Standard Curb Cut

Standard curb cuts are openings created in a curb to direct stormwater from an impervious surface, such as streets, parking lots, or hardscape areas, into a lower landscaped area (LID facility). The curb cut is a useful tool for retrofitting existing development with green infrastructure practices without major reconstruction. Since curb cut openings are perpendicular to the flow of stormwater on the street, they will usually collect only a portion of the water flowing along the gutter. If attenuating stormwater flows along the street is the goal, place multiple curb cuts at intervals along the street.

B. Ribbon Curb

Ribbon curbs allow, distributed stormwater runoff from impervious surfaces into landscaped areas and stormwater facilities. Stormwater flow is distributed more evenly which reduces the potential for erosion and clogging along a pavement edge.

Installation

A. Standard Curb Cut

1. Openings should be at least 18 inches wide, but up to 36 inches is preferred for ease of maintenance.
2. Locate curb cut openings at low points and space them based upon stormwater velocity and volume, and the capacity of the area behind curb for retention/detention infiltration and access to overflow systems.
3. The curb cut can either have vertical or angled sides. The design intent is to create a smooth transition from the paved surface to full curb height.
4. Curb cuts work well with relatively shallow stormwater facilities that do not have steep side slopes that might erode.
5. Set the elevation of the bottom of the curb cut to maximize flow into the landscape area.
6. A drop in grade should occur between the curb cut entry point and the finish grade of the landscape area to allow for passage of sediment.
7. Small amounts of hand placed rip-rap can be used on the LID facility side of the curb cut opening to reduce the potential for erosion in landscaped areas.

B. Ribbon Curb

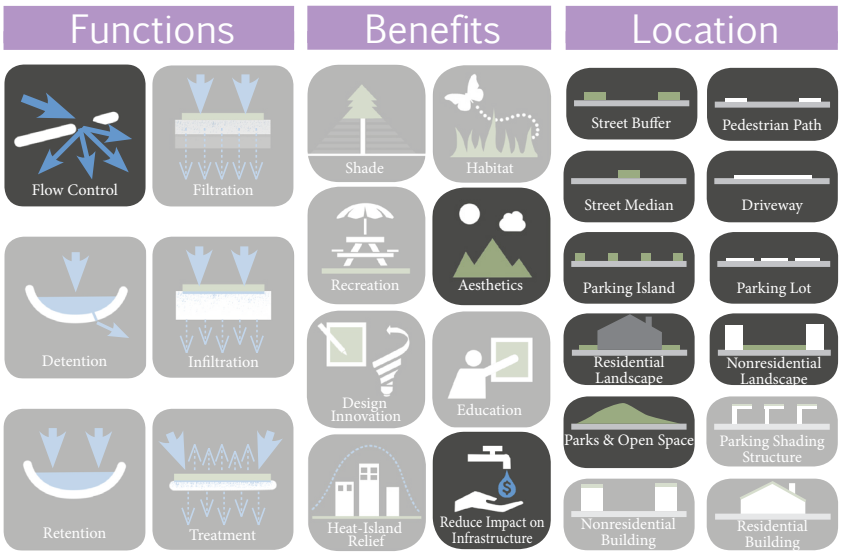
1. Top of concrete curb should be installed flush with the pavement surface, with allowances for subgrade compaction and future settlement, and should have the same cross-slope as the adjacent pavement.
2. A drop in grade should occur between the top of the flush curb and the finished grade of the landscaped area to allow for passage of sediment and debris to drop out.
3. Utilize temporary erosion control measures when seeding or planting adjacent areas to reduce the portential for erosion.
4. A wider surface area and contrasting color for the flush curb provides an important visual cue when used on roads, driveways and bicycle paths.
5. This tool will be considered on a case by case basis for street rights-of-way, per Paradise Valley and MAG standard curb details.

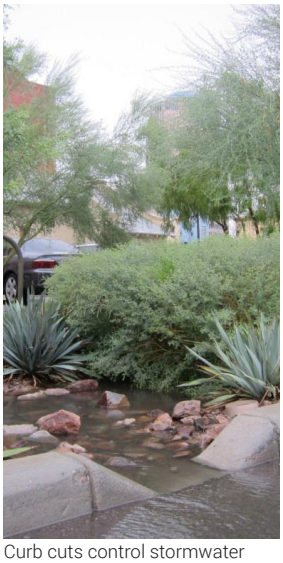
Maintenance

A. Standard Curb Cut: regularly clear curb cuts of any debris and sediment that prevents the free flow of stormwater into LID facility (1-2 times per year and after storm events). Periodically check rip rap areas for signs of erosion damage. Repair and reinforce as necessary (annually and after storm events).

B. Ribbon Curb: check the flush curb for signs of damage or settlement causing ponding or concentration of stormwater runoff. Check landscape edge condition for signs of rilling or erosion and repair or reinforce as needed (annually). Remove sediment and debris from landscape area, that may cause water to pond or backup.

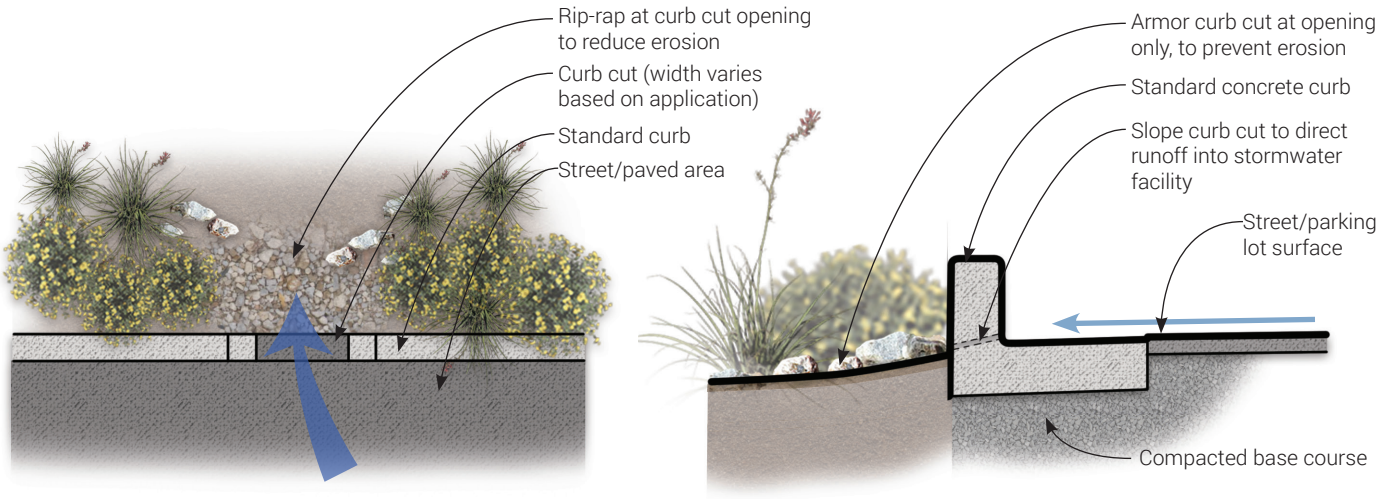
Source: http://flowstobay.org/files/greenstreets/pg132-136ch5.pdf





Curb cuts control stormwater flow from streets to LID facilities.

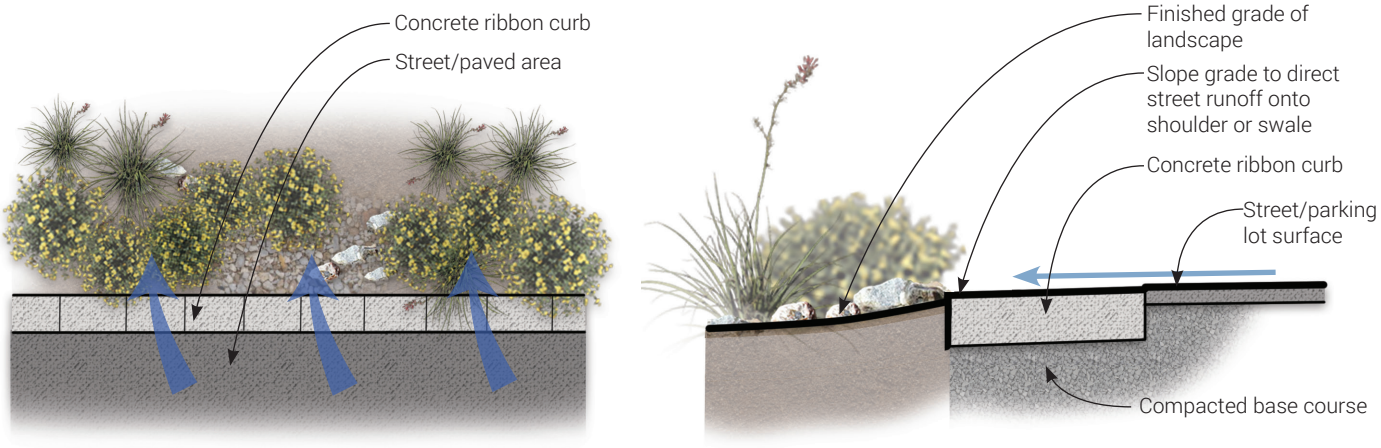
Ribbon curbs allow stormwater to sheet drain to landscape areas.



Curb Cut Plan

Curb Cut Section

Figure 6.1 - Standard Curb Cut



Ribbon Curb Plan

Ribbon Curb Section

Figure 6.2 - Ribbon Curb

Vegetated swale – swale & restored wash

Description

A. Vegetated Swale

Vegetated swales are stormwater runoff conveyance systems that provide an alternative to piped storm sewers. They can absorb low flows and direct runoff from heavy rains to storm sewer inlets or directly to surface waters. Vegetated swales improve water quality by enhancing infiltration of the first flush of stormwater runoff and promoting infiltration of storm flows they convey. Costs vary greatly depending on size, plant materials, and site considerations. Vegetated swales are generally less expensive when used in place of underground piping.

B. Restored Wash

The natural Sonoran Desert consists of washes that flood infrequently yet allow established native riparian plants to flourish. Wash restoration follows natural drainage patterns and supports a healthy naturalistic landscape palette, requiring little or no supplemental irrigation. Restored washes provide natural beauty, wildlife habitat and recreation opportunities that are valuable to city residents. Restoring washes recreates riparian systems while accommodating flood protection.

Installation

A. Vegetated Swale

1. Deep-rooted native plants are preferred to promote water infiltration and reduce erosion and maintenance requirements.
2. Evaluate site soil conditions. Ideally soil infiltration rates should be greater than one-half inch per hour. Soil Amendments may be needed to achieve ideal infiltration rates.
3. A meandering alignment is preferred where space allows, with side slopes that do not exceed 4:1, and slopes adjacent to walkways or accessible hardscape areas that do not exceed 6:1. In some contexts, a more linear alignment may be appropriate.
4. Refer to the adopted building codes for maximum depths allowed without a guardrail requirement. In any case, a vertical drop of more than 30 inches will require guardrail protection.
5. Current standards require that all swales that retain or detain stormwater shall completely drain within 36 hours.

B. Restored Wash

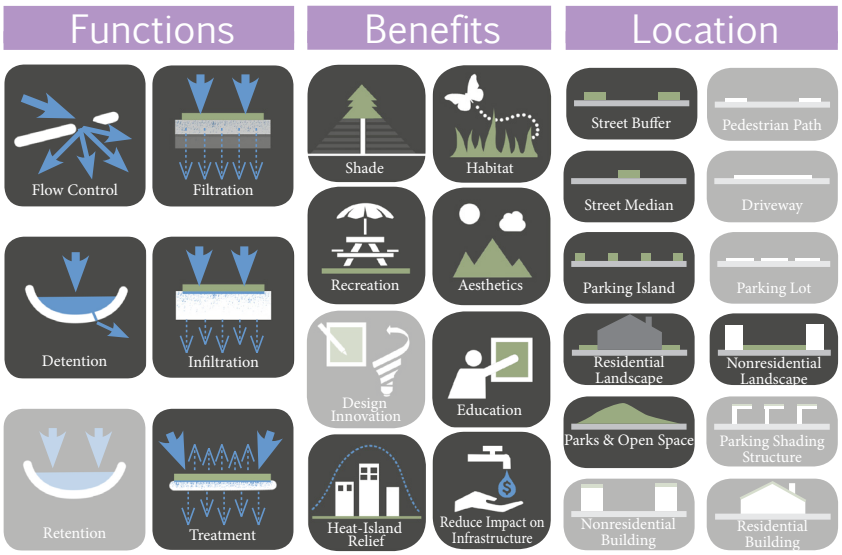
1. Channel alignments and side slopes must be designed in close coordination with civil engineers to ensure that they convey stormwater while minimizing erosion damage.
2. Employ erosion control and channel stabilization techniques that encourage upland and riparian vegetation to establish over time.
3. Provide access for regular inspection and maintenance efforts.

Maintenance

A. Vegetated Swale: vegetation in the swale will require regular maintenance such as removal of debris and dead branches, and occasional pruning. Supplemental irrigation may be required to maintain healthy landscape plants. Removal of sediment and regrading will be necessary to maintain the swale shape and volume over time. As with plant waste, sediment should be removed and disposed of properly. See also: http://paradisevalleyaz.gov/523/Wash-Maintenance

B. Restored Wash: restored washes have unique maintenance needs due to native and riparian vegetation and the potential for soil erosion. These areas must have a maintenance plan executed by experienced professionals.

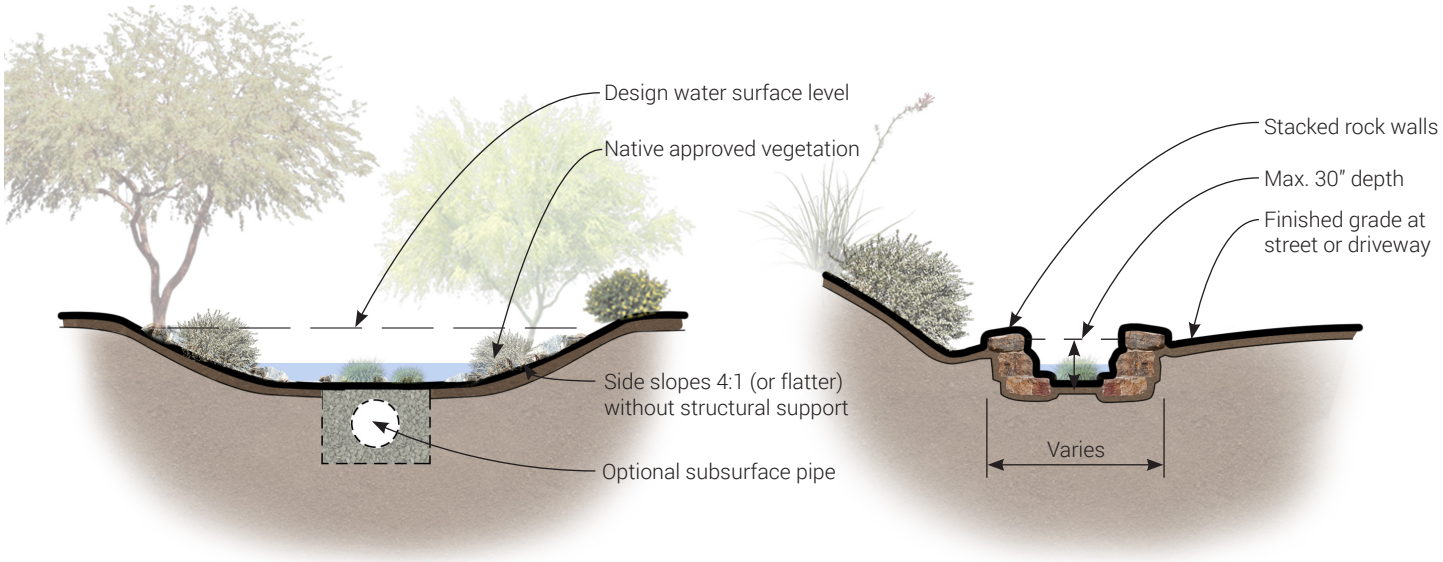
Source: http://www.bfenvironmental.com/pdfs/veggieSwale.pdf, http://watershedmg.org/tech-trainings/urban-streams http://webcms.pima.gov/cms/one.aspx?portalId=169&pageId=687544, http://www.streamdynamics.us/



Vegetated swales accept storm-water for conveyance, storage and infiltration.

Restored washes maintain hydrology, reducing infrastructure costs.

Plan



Section at Swale

Section at Channel

Figure 6.3 - Vegetated Swale

Bioretention – Vegetated Retention Basin & bioretention cell

Description

A. Vegetated Retention Basin: Bioretention basins are shallow depressions in the landscape that typically include plants and a mulch layer or ground cover. Porous soils allow stormwater to infiltrate and supply plants with needed water. In addition to increased groundwater recharge, bioretention basins can improve water quality during smaller, more frequent storm events. In addition to removing sediments coming off paved areas, pollutants can also be removed through absorption into plantings and evaporation. Bioretention basins often referred to as rain gardens, can be used in residential settings, to accept runoff from a roof or other impervious surface.

B. Bioretention Cell: Bioretention cells are shallow depressions with a designed soil mix and plants adapted to the local climate and soil conditions. These are used in more urban conditions and where subsoils are porous and allow infiltration into the subgrade. Bioretention cells capture and infiltrate stormwater into the ground below the cell and have an overflow that carries excess stormwater to a discharge point. Bioretention cells that include vegetation for stormwater absorption are called bioretention planters.

Installation

A. Vegetated Retention Basin:

1. Creative shaping and planting of bioretention basins can utilize soil excavated from the basin to accommodate sloping berms.
2. Adding hand placed stones where stormwater enters the basin from a curb cut, pipe or downspout can help dissipate concentrated flows and reduce erosion.
3. Vegetation should be selected based on local microclimate and soil conditions. Plants should be set in the ground so the surface soil is level with the bottom of the basin. Once the plants are installed, the area should be mulched to retain soil moisture and reduce erosion.
4. Basin side slopes should not exceed 4:1. Where adjacent to walkways or accessible hardscape areas they should not exceed 6:1.
5. An irregular or meandering shape may be most appropriate. More geometric configurations are appropriate in a more urban context.
6. Current standards require all basins that detain stormwater to completely drain within 36 hours.

B. Bioretention Cell:

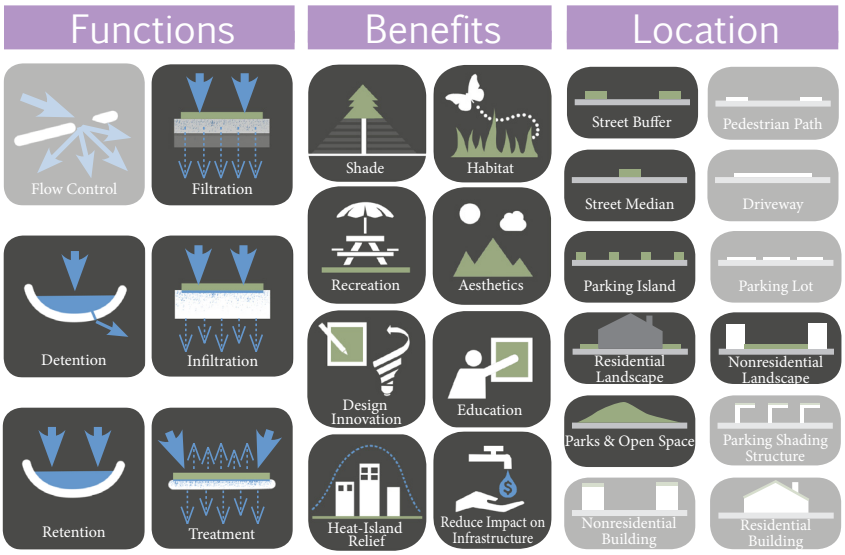
1. Bioretention cell bottoms should be relatively flat and not lined. The bottom surface should be loosened several inches deep prior to placing the bioretention soil mix. The cell bottom area should be designed based on the ability of the soil to freely drain into the subgrade.
2. Stormwater enters the bioretention cell by surface flow or pipe inlet. A sediment capture area can be designed to protect the bioretention cell by slowing incoming flows at the point of entry.
3. A minimum depth of specially graded soil is necessary for the proper function of a bioretention cell.
4. An appropriate surface mulch layer should be selected to reduce weed establishment, regulate soil moisture and temperature, and add organic matter to the soil.
5. Stormwater ponding above the cell provides storage for storm flows, settles out particulates such as sediment, and provides for uptake and filtering of pollutants within the cell.
6. Plants used must be drought tolerant, and suitable for occasional saturation.
7. Overflow for the bioretention cell should transport excess stormwater to an approved discharge point.

Maintenance

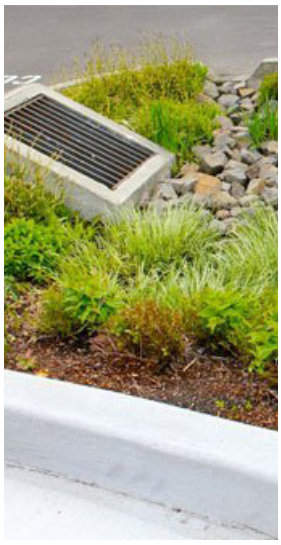
A. Vegetated Retention Basin: plantings should get adequate supplemental irrigation until fully established. Maintain landscaped areas including pruning shrubs to remove dead material and encourage new growth. The roots of healthy vegetation will improve the function of the basin. Regularly check for erosion, remove sediment and debris (vegetative litter as well as trash). Long-term maintenance activities include repairing erosion, continued weed control, removing weeds and invasive species, and controlling mosquitoes.

B. Bioretention Cell: Regularly check bioretention cells for blockages from debris and sediment. Remove sediment and debris and dispose of properly. Maintain landscape by replacing dead vegetation, pruning healthy vegetation and removing weeds regularly. Do not use herbicides in stormwater facilities. Bioretention soil may need to be replaced if soil percolation rates fall below the design flow capacity. Check percolation rates if bioretention cells have been contaminated by sediment inflows.

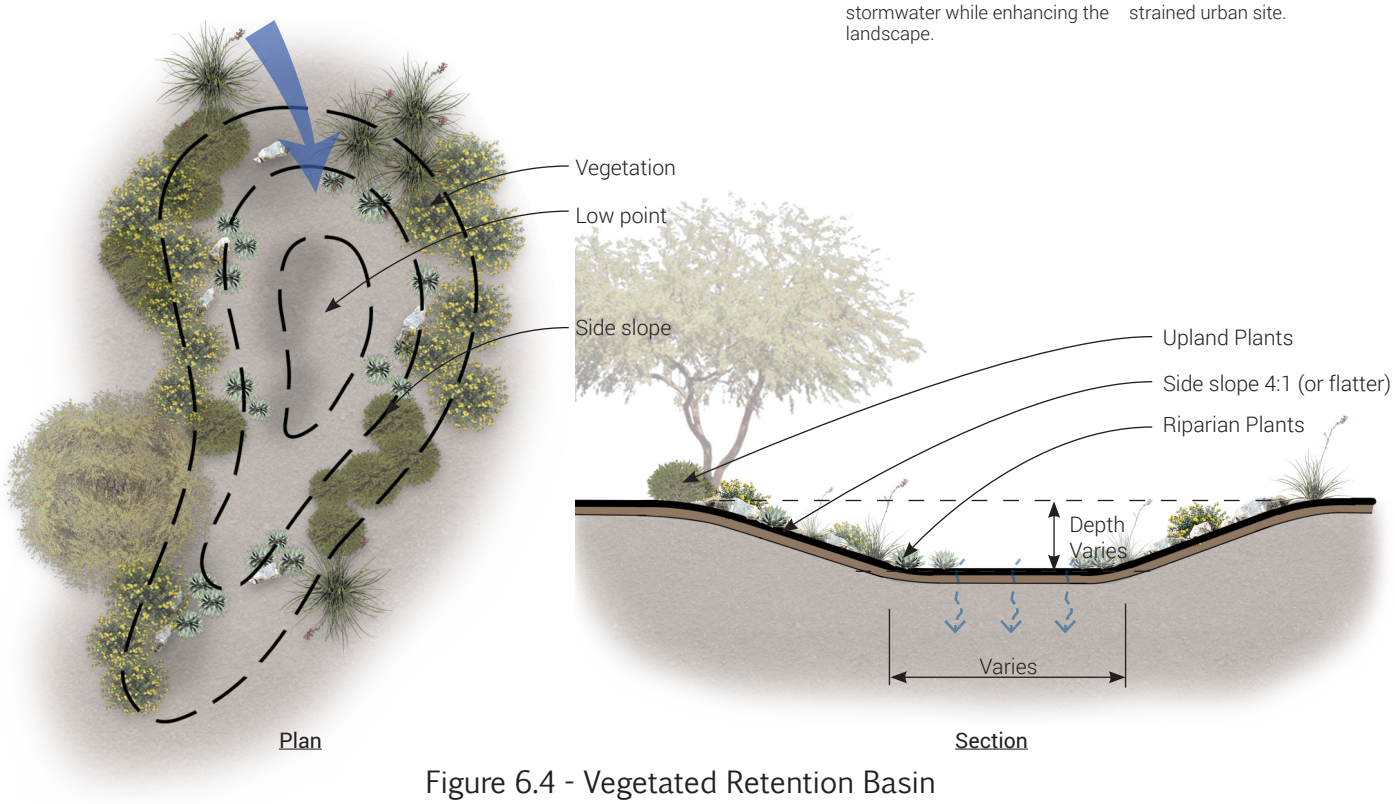
Source: http://buildgreen.ufl.edu/fact_sheet_bioretention_basins_rain_gardens.pdf, http://www.seattle.gov/DPD/Publications/CAM/cam532.pdf



Bioretention areas detain stormwater while enhancing the landscape.



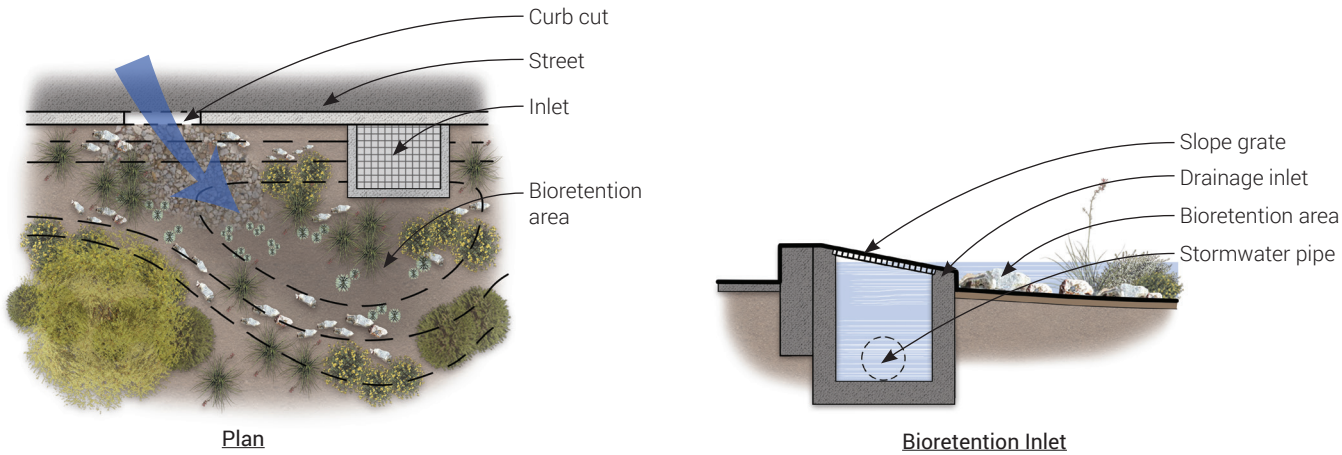
Bioretention cells fit into constrained urban site.



Plan

Section

Figure 6.4 - Vegetated Retention Basin



Plan

Bioretention Inlet

Figure 6.5 - Bioretention Cell

Permeable Paving – Permeable Pavers & Porous Concrete

Description

A. Permeable Pavers: Permeable pavers are comprised of precast concrete unit pavers designed to be set on a compacted base and highly permeable setting bed with joints filled with sand or fine gravel. Water enters the joints between the unit pavers and flows through an open-graded base, to infiltrate into the subgrade or be carried out into the storm system via underdrain piping. The void spaces in the subbase store water and infiltrate it back into the subgrade, or allow it to evaporate providing local air cooling. The sand joints provide surface permeability and helps filter stormwater sediments and pollutants.

B. Porous Concrete: Single size aggregate, also know as porous concrete, consists of a special mix design with void spaces that make it highly permeable. Aggregates are normally screened to provide particles that can fall within narrow limits to ensure porosity. About 30% to 40% of the material is void space, and its permeability is often measured in hundreds of inches per hour. Porous concrete reduces the velocity and volume of stormwater runoff delivered into storm sewer system and can reduce contaminants in runoff prior to its discharge to the storm sewer system

Installation

A. Permeable pavers:

1. A stable compacted subbase is essential for any flexible pavement such as porous pavers. The depth of rock and gravel must be capable of holding rainwater long enough for the soil underneath to absorb it.
2. Excavate to required subgrade depth, compact subsoil using a roller or vibratory compactor, and install geotextile fabric.
3. Prepare base material and compact using a roller or compactor. Install the crushed rock in separate layers and recompact. Install bedding layer and then paving stones with edge restraints.

B. Porous concrete:

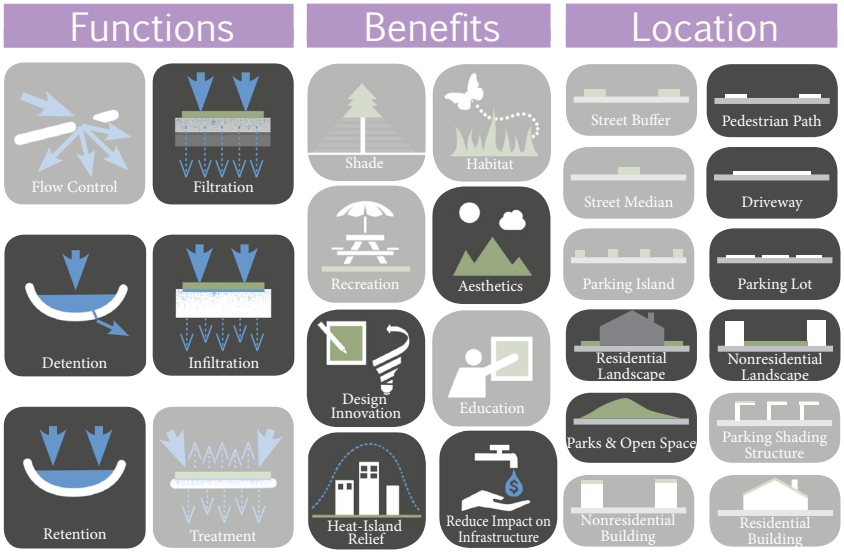
1. The porous concrete mix must be designed and installed by an experienced contractor. Poor materials and/or installation can result in a higher risk of failure.
2. The design for porous concrete consists of several layers, including a compacted sub-base, geotextile, a reservoir stone aggregate, and poured surfacing layer, formed with a screed finish.
3. Porous concrete is normally set flush with adjacent pavements or grades.
4. The subgrade reservoir should allow for drainage to the stormwater system through underdrain tile or piping, especially if the subgrade does not allow adequate infiltration. Underdrain tile or piping is sometimes necessary to achieve proper drainage.

Maintenance

A. Permeable pavers: inspect pavers regularly for settlement and broken pavers. Replace broken pavers immediately to prevent structural instability. Pavers can be removed individually and replaced during utility work. Do not pressure wash concrete unit pavers. Sweeping and vacuuming should be performed when paver areas are dry. Although a more expensive option for permeable pavement, concrete unit pavers are the most effective at reducing runoff and are often the most aesthetically pleasing option.

B. Porous concrete: Maintenance includes the regular vacuuming of surface areas to remove sediment and minimize clogging. With regular maintenance, porous concrete can have a service life of at least 20 years. Porous concrete should be checked periodically for settlement and cracking, and damaged areas repaired to match the original pavement design.

Source: http://www.icpi.org/permeable, http://www.wikihow.com/Install-Permeable-Pavers, http://www.perviouspavement.org/materials.html



Permeable paving is an attractive way to provide runoff reduction in paving and pedestrian areas.

Porous concrete can reduce runoff sustaining in sidewalks and plaza areas.

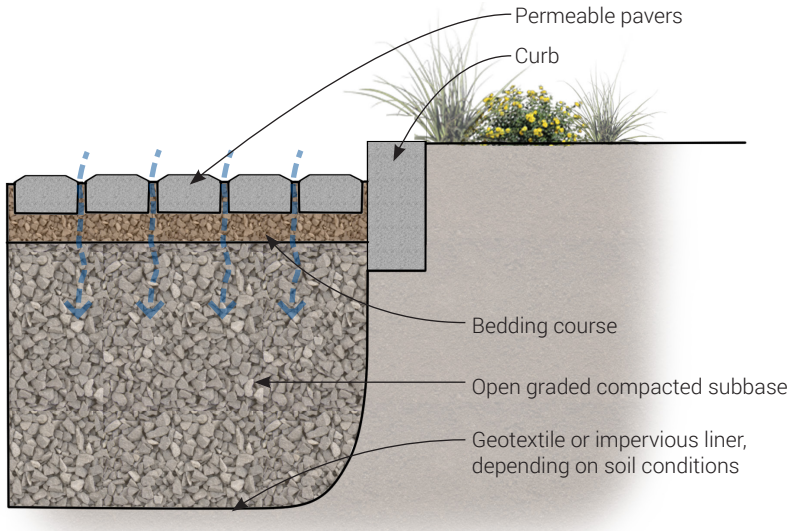


Figure 6.6 - Permeable pavers

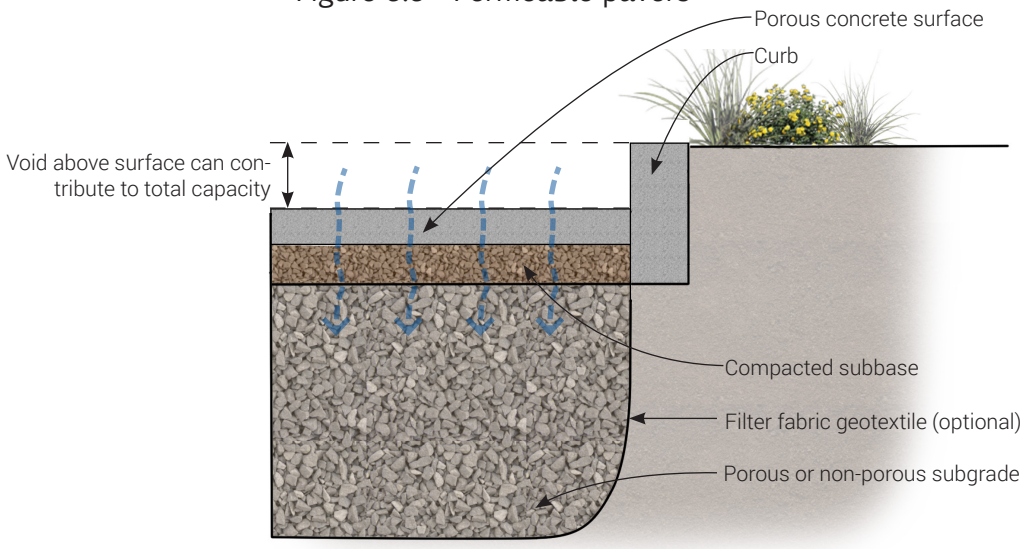


Figure 6.7 - Porous Concrete

GREEN ROOF – Rooftop Garden & downspout disconnection

Description

A. Rooftop garden

A green roof or Xeriscape living roof is when the roof of a building or structure is at least partially covered with a growing medium and vegetation planted over a waterproofing membrane. It may also include a root barrier, drainage mat and irrigation system. There are two types of green roofs: Extensive and Intensive. The difference is in the depth of soil and the ability to support simple groundcover planting (extensive) versus larger materials such as trees and shrubs (intensive). Green roofs provide stormwater storage and absorption, reduce runoff from buildings, and insulate buildings from solar gain and heat loss.

B. Downspout disconnection

Downspout disconnection is the practice of directing rainwater from the rooftop into a landscaped yard instead of into a piped system or into the street. Downspouts can direct stormwater to landscape areas where it is used to irrigate landscape plants, store or infiltrate into the ground.

Installation

A. Rooftop garden

1. The intended function of a green roof will have a significant effect on its design.
2. The height of the roof above grade, its exposure to wind, orientation to the sun and shading by surrounding buildings will all impact types of materials used and maintenance requirements. Views to and from the roof will also determine where elements are located for maximum effect.
3. Professionals must be consulted for the design and construction of the green roof. A qualified architect, structural engineer, landscape architect and facility maintenance personnel are critical to the success of a green roof project.
4. Access to a green roof site is crucial - not only for installation and maintenance, but also for delivery of materials, soil and plants.

B. Downspout disconnection

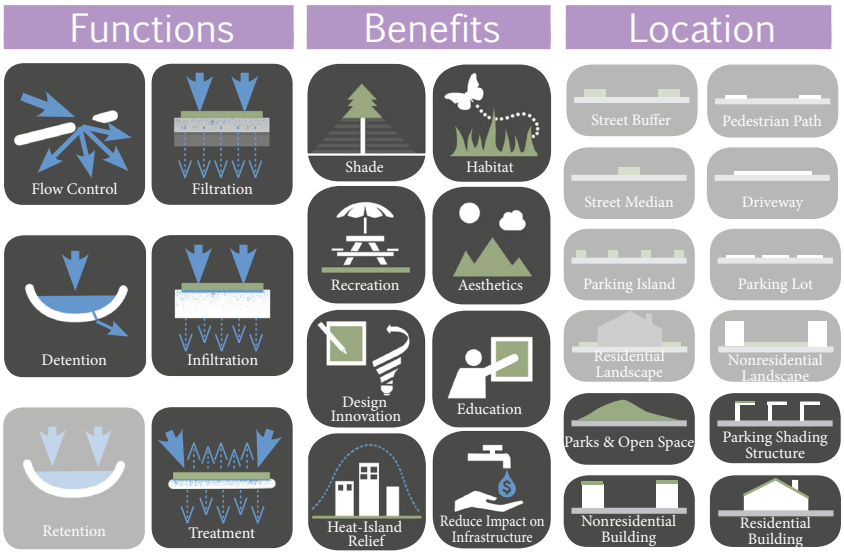
1. Direct downspout extensions away from building foundations or adjacent properties to avoid structural damage or nuisance flooding.
2. Firmly anchored splash blocks or hand placed rock can be installed to direct downspout drainage to landscaped areas.
3. Ensure that the offsite overflow is sufficiently lower than the building floor elevation to reduce the potential for building flooding.

Maintenance

A. Rooftop garden: only very hardy plants should be used in our desert environment and supplemented irrigation will be required. Depending on whether the green roof is extensive or intensive, required plant maintenance will range from two to three yearly inspections to check for weeds or damage, to weekly visits for irrigation, pruning, and replanting. Both plant maintenance and maintenance of the waterproofing membrane are required. To ensure continuity in the warranty and the maintenance requirements, the building architect, structural engineer and/or owner should specify and maintain everything up to and including the waterproof membrane. The greenroof designer and installer is only responsible for those items above the waterproof membrane, including soils, drainage and plantings.

B. Downspout disconnection: clean gutter at least twice a year, and more often if there are overhanging trees. Make sure gutters are pitched to direct water to downspouts. Caulk leaks and holes. Make sure roof flashing directs water into the gutters. Look for low spots or sagging areas along the gutter line and repair with spikes or place new hangers as needed. Check and clear elbows or bends in downspouts to prevent clogging. Each elbow or section of the downspout should funnel into the one below it. All parts should be securely fastened together. Maintain landscaping so that there is positive drainage away from all structures. Don't build up grade, soils, groundcover mulches, or other materials near the building that might inhibit positive drainage.

Source: http://www.cmhc-schl.gc.ca/en/inpr/bude/himu/coedar/upload/Design-Guidelines-for-Green-Roofs.pdf, Green Roof Service LLC, http://www.dwsd.org/downloads_n/announcements/general_announcements/downspout_disconnect_brochure.pdf, http://www.rwra.org/wp-content/uploads/2012/03/Owensboro-Downspout-Disconnect-Guidelines.pdf



Green roofs store and utilize stormwater to reduce runoff from building sites.

Disconnecting a downspout allows rainwater to supplement irrigation in the landscapes.

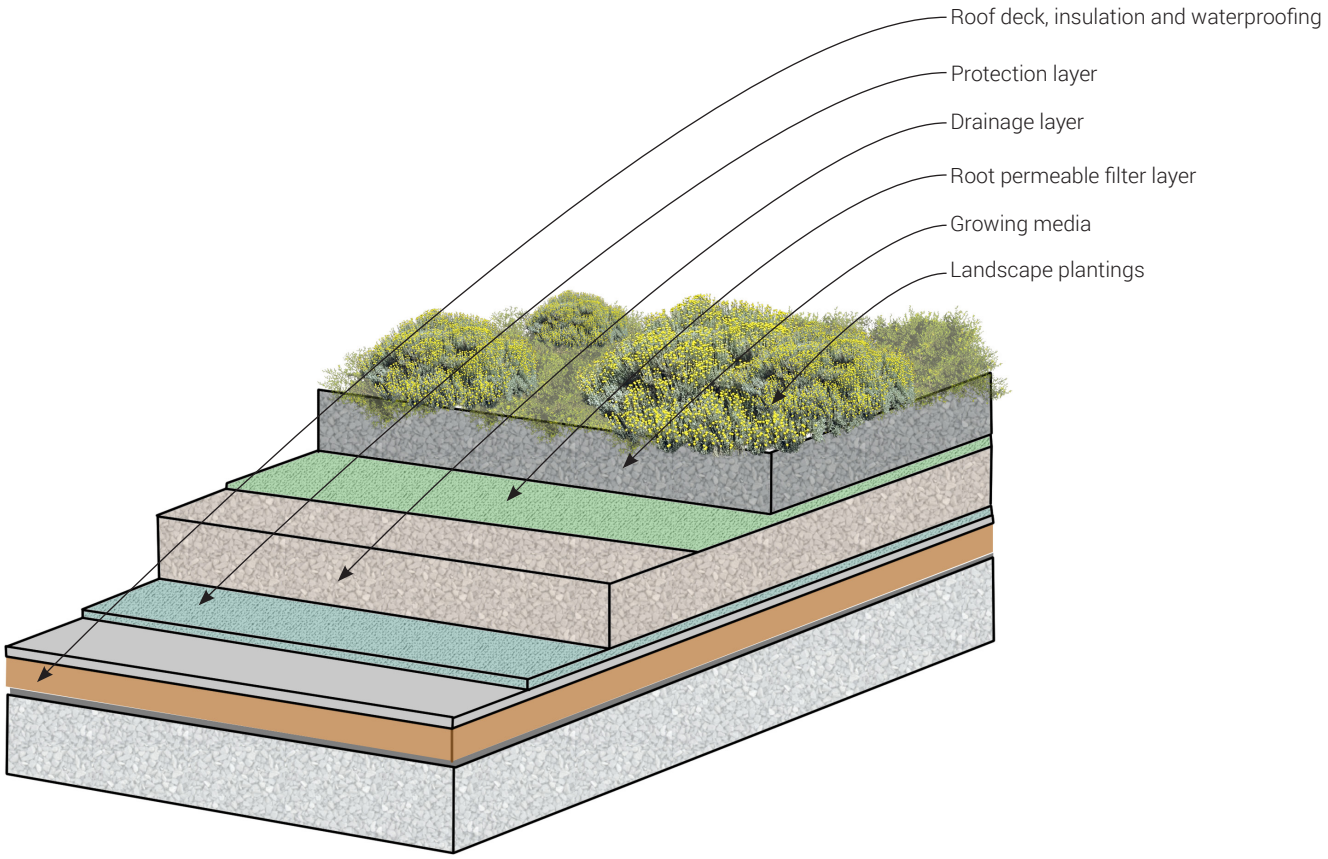
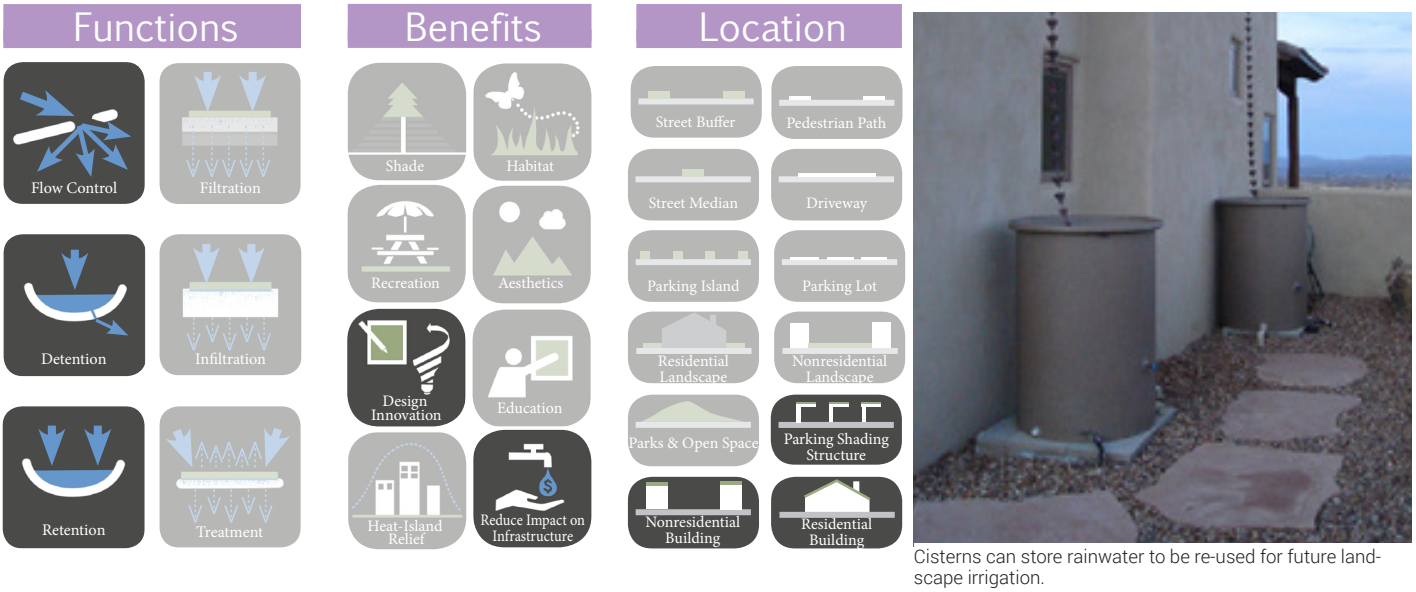


Figure 6.8 - Rooftop Garden

Rainwater Harvesting - Cisterns



Cisterns can store rainwater to be re-used for future landscape irrigation.

Description

A. A rainwater harvesting system captures stormwater runoff, often from a rooftop, and stores the water for later use. The storage capacity of a rainwater cistern depends on several factors, including the amount of rainfall available for use, the roof-catchment area available for collecting rainfall, the daily water requirements of the household and costs.

B. A rainwater harvesting system consists of four main components: a gutter system that collects runoff from the rooftop and directs it into the cistern, a cistern that stores runoff for later use, an overflow pipe that allows excess runoff to leave the cistern in a controlled manner, and an outlet pipe, sometimes connected to a pump, that draws water from the bottom of the cistern for irrigation use.

Installation

A. The most commonly available cisterns are made of plastic, fiberglass, or galvanized metal. Underground cisterns may be constructed of concrete or fiberglass. The size of the cistern can have the greatest impact on system cost and performance. Several factors must be considered, including contributing rooftop area, rainfall patterns and anticipated usage.

B. The primary constraint in selecting a cistern location is the position of the gutter downspouts. It is generally easiest and most cost effective to place the cistern near an existing downspout. When possible, locate the cistern near the site where water will be used.

C. A building, stone or gravel backfill or a poured concrete pad, may be required to provide structural support to an aboveground cistern.

D. Some type of overflow or bypass is required to release water when the cistern has reached its capacity.

E. To draw water from the cistern, some type of faucet or outlet pipe must be installed.

F. An existing gutter system can be easily modified to direct rainwater into a cistern.

G. Above-ground cisterns must meet all Town zoning requirements and receive all necessary permits.

Maintenance

A. Regularly check the gutters to make sure debris is not entering the rainwater harvesting system.

B. Inspect the screens annually to make sure debris is not collecting on the surface and that there are not holes allowing mosquitoes or other insects to enter the cistern.

C. Clean the inside of the cistern twice a year to prevent buildup of debris. Clean out debris twice a year, preferably prior to the beginning of each rainy season.

D. Maintain pumps or filters used in the rainwater harvesting system in accordance with manufacturer's recommendations.

Source: http://www.ces.ncsu.edu/depts/agecon/WECO/documents/WaterHarvestHome2008.pdf

Drainage Reports and Plans

7-1 Activities Requiring a Drainage Report and Grading Plans

A. An applicant may be required to submit a Drainage Report and Grading Plans when submitting any of the following applications. The specific nature of the plans and reports, and the requirements for submittal, will be determined by Town staff during the pre-application process.

1. Re-zoning
2. Special Use Permit
3. Development Plan
4. Preliminary and/or Final Subdivision Plat
5. Hillside Building Committee
6. Board of Adjustment
7. Final Plat, lot splits, lot line adjustment, lot combination and/or improvement plans
8. Right-of-way Permit
9. Building Permit with a grading component
10. Grading Permit
11. Modification or release of a dedicated drainage or retention easement

7-2 Types of Drainage Reports and Grading Plans

A. There are sequential levels of drainage reports and grading plans as development proposals range from broad and conceptual to project specific and detailed, as well as requirements for master-planned development proposals. Drainage reports and grading plans address stormwater flows and drainage issues that affect a proposed development, plus adjacent and nearby sites; and drainage solutions, in accordance with applicable ordinances and standards, to mitigate adverse effects resulting from the proposed development. Each drainage report and grading plan shall describe how the proposed development will manage stormwater runoff, the details of infrastructure to be constructed, the sequence of infrastructure installation, and any phasing of the project. Drainage reports and grading plans for single-family residences may vary from the sequence below, subject to town staff approval.

1. Conceptual Drainage Reports and Grading Plan. With re-zoning and special use permits, the applicant shall submit a Conceptual Drainage Report and Grading Plan that identifies the basic drainage conditions that apply to the site and possible stormwater management solutions that relate to the proposed development and unique condition of the site. In many cases, the Conceptual Drainage Report and Grading Plan will be included in a Development Plan (DP). The Conceptual Drainage Report and Grading Plan shall show how the drainage systems on the site will relate to and extend existing drainage systems serving adjacent and nearby properties. The Conceptual Drainage Report and Grading Plan shall establish the key elements for consideration in any future drainage reports and grading plans for the site, including applicable FEMA floodplain designations.

2. Preliminary Drainage Report and Grading Plan. With preliminary plat, subdivision, Master Plan and Hillside Building Committee or Board of Adjustment applications, the applicant shall submit a Preliminary Drainage Report and Grading Plan. While a Preliminary Drainage Report and Plan will not contain sufficient detail and accuracy to function as improvement plans, the Preliminary Drainage Report and Grading Plan must provide detailed design concepts, specifications for proposed drainage facilities, and management plans for operating and maintaining the drainage facilities. The Preliminary Drainage Report and Grading Plan presents the justification for final improvement plans and lowest floor elevations, the plan for connecting the proposed development to existing and planned drainage facilities on and adjacent to the site; pre- and post-project topography; and stormwater runoff calculations including off-site drainage that enters the site.

The Preliminary Drainage Report and Grading Plan shall also demonstrate consistency with any applicable Conceptual Drainage Report and Grading Plan and stipulations associated with approval.

3. Final Drainage Report and Grading Plans. With improvements plans for final plats, construction plans for public infrastructure, the modification of a drainage or retention easement, and construction plans for on-site development, the applicant shall submit a Final Drainage Report and Grading Plan. A Final Drainage Report and Grading Plan is intended for construction and therefore must be fully detailed; compliant with Town of Paradise Valley design standards and applicable regional, State and Federal statutes; and consistent with previously approved Preliminary Drainage Reports and Grading Plans and stipulations, if any.

4. Master Drainage Reports and Grading Plans. For multi-phased and complex development proposals, the Town may require the applicant to submit a Master Drainage Report and Grading Plan after a rezoning and intermediate/major special use permit amendment approval. A Master Drainage Report and Grading Plan provides the basis for constructing major common drainage improvements that serve an individual phase or property within the proposed development, the entire proposed development, or a portion of the regional drainage requirements. A Master Drainage Report and Grading Plan also establishes the drainage improvement requirements necessary for each phase of the development. A Master Drainage Report and Grading Plan shall be submitted before or with the first Preliminary Plat or Development Review case for the site.

7-3 STANDARDS

A. All drainage reports and grading plans should be prepared in conformance to the requirements in this chapter. Hydrology calculations may be performed using Drainage Design Management System for Windows (available at no cost through the FCDMC), HEC-1, HEC-HMS or the Rational Method. Hydraulic calculations may be performed using HEC-RAS. However, the Town encourages sound, innovative design and the use of new techniques where special conditions or needs exist. With prior Town staff approval, alternate methods, models and procedures may be used with appropriate supporting documentation.

B. Development shall not increase peak discharge rates above the historic peak discharge rates for 10-year and 100-year storm events.

C. Proposed grading shall be at least 0.5% to allow for positive drainage.

D. At a minimum, drainage reports should meet the following standards:

1. Reflect Town, County, State and Federal requirements
2. Use the best and most current data available
3. Provide a clear narrative of the methods used, parameters selected in the analysis and conclusions drawn
4. Be technically and legally defensible
5. Be well-organized and concise
6. Provide safe, reasonable and reliable results
7. Provide results that are consistent with adjacent jurisdictions

E. All drainage reports and grading plans shall conform to Town of Paradise Valley codes and standards.

7-4 LIMITATIONS

The Town does not guarantee the reliability of specific hydrologic methods, techniques and/or parameter values. The engineer is expected to validate the reasonableness of the estimated values and design the plan to keep the development and the Town relatively safe from flooding. The owner must submit the completed Warning and Disclaimer of Liability form, as available from the Town Engineer, with each grading and drainage plan.

7-5 GRADING AND DRAINAGE PLANS—METHODOLOGY AND CALCULATIONS

A. There are two methods to determine peak discharge:

1. The Rational Method (generally used for watersheds less than 160 acres that are regularly shaped and uniformly contoured). The methodology is provided in the FCDMC Hydrology Manual.
2. A rainfall runoff model using the Corps' HEC-1 or HEC-HMS Flood Hydrograph Package (generally used for watersheds that are larger than 160 acres, irregular in shape and contour, or if routing of flows is necessary).

B. Watershed Conditions

Watersheds are subject to change. Grading and drainage plans shall consider all watershed conditions that would result in the greatest peak discharge rate, to:

1. Size drainage facilities, and
2. Determine lowest floor elevations.

C. The Rational Methods

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.
2. Time of Concentration. Time of concentration "Tc" is the total time of travel from the most hydraulically remote part of the watershed to the concentration point of interest. The calculation of "Tc" must follow FCDMC Hydrology Manual procedures.
3. Runoff Coefficients. Use Runoff Coefficients for Use with Rational Method, as detailed in the Maricopa County Hydrology Manual, pages 3-5/3-6, to obtain the runoff coefficients or "C" values. Applying weighted average values calculated for the specific site is an acceptable approach.

D. HEC-1 or HEC-HMS Model

1. Minimum submittals.
   a. A printout of the input data
   b. A schematic (routing) diagram of the stream network
   c. The runoff summary output table, including drainage basin name, area, 100-year flow and 10-year flow values
   d. Electronic input file(s) on CD or DVD
   e. Supporting documentation and source material for parameter selection
   f. A narrative detailing the impact of adjustments to the modeling parameters made to address warnings and error messages
2. Precipitation. Determine precipitation values for modeling using the FCDMC Hydrology Manual, 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 addressed, see the FCDMC Hydrology Manual at

   http://www.fcd.maricopa.gov/downloads/manuals/Hydrology-Manual.pdf.
3. Infiltration. Determine infiltration or soil losses using Green and Ampt (G&A) procedures per FCDMC Hydrology Manual. Use the following, most recent, applicable USDA NRCS soil survey maps of the area to determine the hydrologic soil group or surface soil texture for the G&A procedures:

a. Aguila Carefree Area

b. Parts of Maricopa and Pinal Counties

c. Eastern Maricopa and Northern Pinal Counties

4. Hydrograph Generation. Generate small basin or sub watershed hydrographs using the Clark unit hydrograph procedure or S-graph method as described in the FCDMC Hydrology Manual.

5. Time of Concentration ("Tc"). Use the estimated time of travel from the most hydraulically remote part of the watershed to the concentration point. The FCDMC Hydrology Manual is recommended for obtaining Tc.

6. Channel Routing. Use the Normal Depth (Modified Puls), eight point routing procedure as described in the FCDMC Hydrology Manual for channel routing.

7. Existing and Proposed Discharge Analysis. Use the following analysis procedures when necessary to compare existing and proposed discharge (runoff)conditions. Reflect full development conditions by:

a. Increasing the percentage of impervious surfaces on the LG card to show the amount of impervious surface that will exist after full development.

b. Recalculating the time of concentration (Tc) based on the proposed drainage system, after full development.

c. Subdividing, as necessary, the existing condition model to create concentration points that match the sub-watershed areas above each proposed storage facility after full development.

d. Modeling each proposed storage facility as it will physically exist after full development, with appropriate routing and combining operations through each facility and through the entire watershed. Modeling storage capacity provided, as one hypothetical facility at the outlet with all upstream storage arbitrarily combined in the facility, is not acceptable.

e. Analyzing the 10-year and 100-year frequency events, at a minimum.

f. Comparing discharge values for existing and full development at concentration points just downstream from each proposed storage facility,other critical locations such as road crossings, and points where flows exit the development.

E. Calculation of Runoff Volumes

1. Standard Formula for Runoff Volumes The standard formula for determining the required stormwater storage runoff volume is in Section 3.2 above.

2. HEC-1 and HEC-HMS Computer Modeling. HEC-1 and HEC-HMS modeling may be used for storage basin design,routing and analysis. Use modified Puls level pool routing option in HEC-1 forhydrograph routing through storage basins and lakes. For permanent lakes,assume no available storage below the normal water surface elevation.

F. Methods for Estimating Water Surface Elevations and Inundation Limits

The engineer may use any standard method for determining water surface elevations. The Town prefers the U.S. Army Corps of Engineers' HEC-RAS, to determine inundation limits. If the applicant uses the U.S. Army Corps of Engineers' HEC-RAS Computer Models, the minimum required submittals for HEC-RAS are:

1. A printout and CD or DVD of the input and output data.

2. A plan of the contributing stream network and sub-basins with cross section locations and stationing, including 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 work map.

3. A detailed output summary table, including 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. Supporting documentation and source material for parameter selection.
6. A narrative to validate warning and error messages with details of the impact of adjustments to the modeling parameters on the output, if the Town staff allows warning or error messages.

7-6 GRADING AND DRAINAGE PLANS—ADDITIONAL REQUIREMENTS BY PLAN TYPE

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. Special Use and Multifamily Permits

The plan must show:

1. The location, orientation and an outline of refuse enclosures, including approach slabs.
2. Details of driveways conforming to town standard details, plus 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.
3. Horizontal control for proposed buildings, drive aisles, parking space dimensions and any other substantial improvements.
4. All drainage features such as catch basins, curbs and gutters, pipes, headwalls, basins, and drywells, along with flow arrows and appropriate elevations for each feature.
5. High and low points for driveway paving, with elevations.
6. Building setback lines.
7. Traffic and parking striping.
8. Access to underground parking areas.

B. Residential Subdivisions

The plan must show:

1. Lot numbers.
2. Tract names and street names from the final plat.
3. Street, tract and rights-of-way widths, and street centerlines from paving plans.
4. All drainage features such as catch basins, curbs and gutters, pipes, headwalls, basins, and drywells, along with flow arrows and appropriate elevations for each feature.
5. Street longitudinal and cross slopes.
6. 10-year and 100-year peak discharge rates at curb cuts and catch basins.
7. Flow path for small washes or swales through lots in custom residential subdivisions.
8. High and low points within streets, with elevations.
9. Building setback lines.
10. Top of curb elevations at the intersection of lot lines with the tract or rights-of-way lines.

C. Requirements for single-family development can be found at http://www.paradisevalleyaz.gov/DocumentCenter/Home/View/10.

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Drainage Easements

8-1 GENERAL INFORMATION

A. Drainage Easement Requirements

Refer to Town Code Section 6-3-8. Drainage easements are required for:

1. Watercourses with a 100-year, peak discharge rate of 50 cfs or greater.
2. Washes having historical banks, a bed and a cross sectional area of least 10 square feet.
3. All drainage and stormwater storage facilities.

Forms are available on the Town's website at http://paradisevalleyaz.gov/24/Permits-and-Handouts.

B. Extent of Drainage Easement Dedication

A drainage easement shall be dedicated to the Town to the limits of stormwater inundation from a base flood for the watercourses described above, plus drainage and stormwater storage facilities. Drainage easement dedications shall encompass all physical structures and sufficient area to access and maintain the facilities, including a setback from the property line. If the drainage easement is not contiguous to the right-of-way, a minimum 16-foot access easement, to maintain the drainage facility with mechanical equipment, shall also be dedicated, regardless of who maintains the drainage facility.

If a stormwater storage facility is fenced or barricaded, the access easement shall include a 20-foot setback between the fence or barricade around the perimeter of the facility. If a stormwater storage facility is not fenced or barricaded, the access easement shall include a 5-foot setback from the top of the bank around the perimeter of the facility.

Refer to Section 5-10-7 Paragraph C of the Town Code for easement requirements.

C. Maintaining a Drainage Easement

1. Unless otherwise indicated on the document dedicating the drainage easement or in a recorded agreement, the property owner is responsible for maintaining the drainage easement.
2. In addition to the requirements for maintaining a drainage easement in the Storm Drain Design Ordinance, the owner shall:
   a. Inspect the drainage facilities after each storm event of 0.6 inch or more, and semiannually, preferably before summer and winter rains.
   b. Remove accumulated trash and debris from inlet and outlet structures as needed for the free flow of stormwater.
   c. 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.

D. Releasing a Drainage Easement

1. A drainage easement may be released only if the applicant documents one of the following circumstances:
   a. Upstream flows have been physically cut off or diminished;
   b. More detailed or accurate topographic mapping and/or aerial photography show the original dedication is incorrectly located; or
   c. The original hydrology is outdated or in error.
2. The Town staff may determine that retaining the easement is in best interest of the Town, and may not grant the release. The Town staff may impose reasonable conditions before releasing a drainage easement. Once all conditions have been satisfied, as determined by Town Council, Town Council may grant the release.

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Grading Permits

9-1 GENERAL INFORMATION

A. A review of the improvement plans must be completed by Town staff before applying for a grading permit.

B. Before a grading permit is issued:

1. All substantial grading and drainage issues associated with a project must be resolved to the satisfaction of the Town Engineer.
2. The Town Council must have approved the final plat, or other entitlement if applicable, for the project. This requirement may be waived by the Town Engineer at the Applicant's own risk.
3. The owner must complete a Native Plant Preservation Plan. The Native Plant Preservation Plan shall be placed with the improvement plans submitted for the preliminary grading permit.
4. If applicable, the owner must obtain a Haul Permit.
5. If applicable, the owner must obtain a Stormwater Storage Waiver.
6. The completed No Conflict signature box must be placed on the cover sheet, signed and dated, and all applicable No Conflict letters submitted.
7. The owner must provide a copy of the approved AZPDES Notice of Intent (NOI) and SWPPP.
8. When applicable the owner must provide a completed Section 404 Certification form and a copy of a permit from the US Army Corps of Engineers.
9. The owner must submit 2 full size sets of grading plans (24 inches x 36 inches).
10. The owner must meet any other project specific requirements to issue a final grading permit.

C. A Grading Permit may only be issued upon approval by Town staff.

9-2 STOCKPILE PLANS

A. Upon Town staff approval, an applicant may temporarily store on-site excess soil from construction operations. To receive approval, the applicant must submit:

1. A letter signed by the applicant stating the duration of the stockpile and the methods used to control dust.
2. A plan prepared in conformance with grading and drainage plan requirements showing the stockpile location.
   a. The stockpile may not be located on, or within, any easements, rights-of-way or watercourses.
   b. The plan must provide at least one cross-section through the stockpile, labeling the side slopes and the maximum height of the stockpile, and show the total volume of the stockpile.
   c. The plan must show and label all proposed open space areas.
   d. The plan must manage drainage runoff from the stockpile and upstream watersheds by considering stockpile location, stockpile design and grading, and/or temporary stormwater storage.
3. A Native Plant Preservation Plan for the area to be used for stockpile. The Native Plant Preservation Plan shall be placed on the stockpile plan.

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DESIGN AND MAINTENANCE GUIDELINES

10-1 SITE CONTEXT

A. 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.

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. Refer to Town Zoning Code Chapters 22 and 24 for retaining wall and fence requirements.

10-2 NATURAL AREAS

A. Preservation:

Grading and design of landscape improvements will preserve and restore natural wash corridors that provide stormwater conveyance.

B. Aesthetic Standards:

All designed channels shall be formed to blend with the surrounding landscape, including contoured site grading for earthen channels and matching plant types and density.

C. Landscaping:

Utilize Sonoran Desert indigenous plant material wherever appropriate in landscaping associated with construction and maintenance of public property and easements for stormwater conveyance. Town Landscape Guidelines can be found at: http://www.paradisevalleyaz.gov/DocumentCenter/Home/View/37

D. Visual Character:

In order to create high quality and high performance landscapes that reflect the positive character of the Town, drainageways, wash corridors and other storm drainage facilities will be designed to provide visual and physical continuity through attractive, cohesive and diverse design elements consistent with the Town Landscape Guidelines.

E. Natural Wash Corridors:

Town rights-of-way and easements along natural wash corridors are important to maintain and preserve the natural environment and landscape features. Natural Wash Corridors shall include, whenever feasible, a landscape buffer area of at least 5 feet on each side, perpendicular from the top of the bank.

F. Maintenance:

Regular (annual) inspections are required by the property owner, to determine the condition of drainageways, including erosion, sedimentation, dead or unhealthy vegetation, potential for blockage and need for maintenance. Dead or dying plants shall be replaced immediately. Vegetation shall be pruned regularly to remove dead limbs and overgrowth.

Figure 10.1 - Typical Natural Wash Landscape

G. Access:

For Natural Washes, new development should provide, if possible, a minimum 10-feet wide accessible clear zone area for emergency and ordinary maintenance vehicle access. For access to minor drainageways and basins including roadside swales, ditches and sediment basins, allow for reasonable access for regular maintenance and emergency use. Access may be combined with trails.

10-3 DRAINAGE PLANNING

A. 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 retention and detention basins to blend into the natural contours and undulations of the site and the local natural terrain.
10. Locate retention and 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.

B. Retention Basins

1. The design depth of water stored in the basin shall not exceed 3 feet.
2. The maximum side slope of the basin is 4:1 unless otherwise approved by Town staff.
3. Round and contour the bottom and top edges of the side slopes in order to achieve a gradual slope transition.
4. Where retaining walls are utilized as part of a basin, use textured and/or dark surface treatments on the portion of the wall that could be inundated to minimize the visibility of water staining. Guardrails may be required at the top of such walls per the Town's adopted building code.
5. Use only plant materials in basins that are capable of surving while being inundated. 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 percent of the frontage landscaped area unless specifically approved by the Town.
7. Unless otherwise waived by the Town Engineer, drainage basins should not be placed on individual lots unless all of the following criteria are met:
   a. Basin is designed to retain pre-vs.-post volume per Section 3
   b. Basin is directly accessible and visible from a street or alley
   c. Maintenance of the basin is designated to a property owners association
   d. Basin and its access are placed within a drainage and access easement
8. Landscape installation shall conform to the most current Town 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.
12. 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

C. 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 on-site use, such as dining patios or pathways, 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 onsite buildings.
4. Any rock used in any drainage facility shall be native and/or crushed rock. Do not use river-run cobbles.

10-4 CONTEXT SENSITIVE DEVELOPMENT OF STORMWATER FACILITIES

A. Planning and Design:

Planning of drainage facilities should be based upon integrating natural waterways, designed channels and other storm drainage improvements into the development of a desirable setting where aesthetic enhancement is a primary motive. Storm drainage facilities that are designed to be sensitive to their site and community context can provide multiple benefits and encourage proper care and maintenance. Since drainageways and washes are normally continuously connected, they provide unique opportunities for linear open space and vista corridors, as well as landscape buffers, trail connections and wildlife linkages across the community.

B. Conveyance and Storage:

Wherever possible drainage corridors and stormwater storage basins should be combined with open space and neighborhood parks to create focal points and use areas for the community. Passive recreation activities such as hiking, jogging, and enjoyment of natural areas is highly compatible with the function of natural wash corridors and stage facilities. Avoid placing recreation facilities in the bottom of stormwater facilities to minimize risk of damage and harm. Amenities within the inundation area of a storm water facility shall be adequately secured to prevent them from becoming waterborne debris.

C. Aesthetic Design of Materials:

Concrete channels are generally not permitted in stormwater conveyances. Use of concrete structures shall be minimized and all structures shall be designed with colors and finishes appropriate to their context. Flat or sloped concrete surfaces shall be designed with a roughened surface to discourage inappropriate recreational use. Exposed concrete structures require the use of integral colored concrete with a formed finish as approved by the Town. Railings are highly discouraged, but where required shall be designed and finished to blend with the surrounding landscape as approved by the Town. Use of rip-rap for channel protection is discouraged.

10-5 IMPROVEMENTS TO NATURAL WASHES

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 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 areas 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 areas 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 watershed area 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.

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 Town Engineer), 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 with warning signs.

10-6 STREET GRADING

This section establishes criteria for cut and fill slopes, slope stabilization, erosion controls and restoration of scarred areas due to grading associated with street construction. All 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 right-of-way is 4:1 (horizontal to vertical) and for cut slopes is 3:1, unless otherwise approved by the Town engineer.
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 may require the use of guardrails.
5. The maximum height of cuts and fills for roadway improvements is 8 feet, as measured vertically from the pavement surface to the natural grade at the toe or top of the constructed slope.
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.
7. Maintain an average height of 6 feet 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.
9. Heights exceeding the above criteria may be allowed by the Town engineer provided the applicant demonstrates that objectives of the Storm Guidelines 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. Town staff may require mitigation techniques for cuts and fills greater than 8 feet. 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 Town building code and also conform to the following requirements. The heights and types of retaining walls shall be subject to Town engineer approval, 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 Town.
3. Consider terraced walls in place of a single wall for instances requiring retaining walls in excess of 6 feet in height. 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. Refer to chapter 22 and 24 of the Town Zoning Code for retaining wall and fence requirements.
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

10-7 PLANT MATERIALS

Protected Native Plants

A. Species

Specific native plants are protected as described in the Town's Native Plant Ordinance.

1. Trees over four (4) inches caliper of the following species:

BOTANICAL NAME	COMMON NAME
Acacia constricta	Whitethorn Acacia
Acacia greggii	Catclaw Acacia
Cercidium floridum (Parkinsonia florida)	Blue Palo Verde
Cercidium microphylum (Parkinsonia microphyllum)	Foothills Palo Verde
Olneya tesota	Ironwood
Prosopis spp.	Mesquite

2. Cacti

BOTANICAL NAME	COMMON NAME
Carnegia gigantea	Saguaro
Ferocactus spp.	Barrel
Fouquieria splendens	Ocotillo
Peniocereus greggii	Desert Night-Blooming Cereus

No protected plant material (as defined above) may be relocated, removed, or destroyed without approval of a Native Plant Preservation Plan. No native plant certification shall be issued unless an application is submitted in conjunction with an existing or proposed development for approval.

B. 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.
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.

Native Plants in Retention and Detention Basins and Drainage Channels

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

1. Plants that can be placed on the bottom of a basin:

BOTANICAL NAME	COMMON NAME
Prosopis velutina	Velvet Mesquite
Atriplex canescens	Four-wing Saltbush
Celtis pallida	Desert Hackberry
* Acacia greggii	Catclaw
Justicia californica	Chuparosa
Ambrosia ambrosioides	Canyon Ragweed

2. Plants that may be placed on the sides of a basin (including all plants listed above):

BOTANICAL NAME	COMMON NAME
Olneya tesota	Ironwood
Cercidium floridum	Blue Palo Verde
Chilopsis linearis	Desert Willow
Lycium Species.	Wolfberry
Hyptis emoryi	Desert Lavender
Calliandra eriophylla	Fairy Duster
Larrea tridentata	Creosote
* Simmondsia chinensis	Jojoba
* Dodonaea viscosa	Hopbush
* Ephedra trifurca	Mormon Tea
Hymenoclea monogyra	Cheese Bush
* Lotus rigida	Deer-Vetch

3. Plants that should not be used in any part of a basin:

BOTANICAL NAME	COMMON NAME
Cercidium microphylla	Foothills Palo Verde
Opuntia Species.	Chollas and Pricklypears
Ferocactus Species.	Barrel Cacti
Ambrosia deltoidea	Bursage
Agave Species.	Century plants
Encelia farinosa	Brittlebush
Eriogonum fasciculatum var. poliofolium	Buckwheat
Fouquieria splendens	Ocotillo

Slope Revegetation with Native Plants

1. Restore all exposed slopes created by grading to a natural condition and stabilize them to minimize erosion and slope collapse or wasting.
2. Restoration shall include revegetation with native species as found on similar natural slopes in the area.
3. Treat cuts into rock or caliche with artificial weathering techniques.
4. Irrigate all revegetated areas for at least 3 years or until the vegetation has become established.
5. Do not use imported decomposed-granite soil-cover/mulch in revegetated areas or in any place within open space areas.
6. 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.

10-8 LANDSCAPE MAINTENANCE

Most native and desert adapted plants need little or no water and fertilization once they are established. Fertilizer and pesticides should not be used in or around stormwater management areas as the materials can contaminate downstream water courses. Plants should be inspected annually to determine the need for pruning or replacement. Most desert native and adapted plants can maintain their natural form without much pruning. Prune plants properly as recommend by a certified arborist when at least one of the following conditions is present:

1. Need to remove dead diseased or weakened branches or plants
2. Keep flow channels and lines of sight clear for inspection and maintenance of channels and washes.
3. Need to control or direct growth

After major storm events, and at least annually, inspect grading, ground coverings/mulch, irrigation systems and other site improvements for signs of damage or erosion. Repair or restore immediately to minimize additional damage.

Refer to Paradise Valley Landscape Guidelines and the Town Code Section 5-8-4 for more information.

Appendix 6A

DRAINAGE REPORTS AND PLANS

A. For all Drainage Reports and Plans, provide as required for the level of detail for each type of drainage report and plan:
   1. Analysis based on:
      a. HEC-1, HEC-HMS, HEC-2 or HEC-RAS, Flowmaster, HY-8, Culvert Master and/or DDMSW; or
      b. Nonstandard software, if approved by town staff, and if working nonstandard software is provided.
   2. Two bound copies (3 ring, GBC or Coil wire, no staples), with card stock front and back covers.
   3. Information for the entire project site and off-site at least fifty feet from site.
   4. Topography, based on current surveys, as follows:
      a. For topography on site and 25 feet beyond the property line, as well as any area subject to a hydraulic model, show existing and proposed topography with minimum 1-foot contours, with 5-foot contour lines distinguished for readability. Exceptions may be considered on a case-by-case basis for substantial areas of undisturbed ground not subject to inundation in a base flood.
      b. For off-site topography necessary to delineate watershed boundaries, show existing topography with minimum 2-foot contours. Subject to town staff approval, show spot elevations in lieu of 1-foot contours for development that does not have enough relief to use 1-foot contours.
      c. All proposed contours must align with all existing contours.
      d. Showing how topography influences stormwater runoff from the development and off-site watersheds.
      e. Provide cross sections as necessary to adequately demonstrate how the proposed site grading will not adversely affect other property.
   5. Current color aerial photographs:
      a. On-site, minimum 400 scale aerial photos, clearly identifying project site.
      b. Off-site, minimum 800 scale aerial photos, showing project site in context.
   6. On-site photographs to support parameter selection.
   7. Drainage Plans: show 1-foot contours, 24” x 36”.
      a. Scales of Drainage Plans are shown below; alternate scales are subject to town staff approval.
      b. All plans shall label substantial cut and fill areas with a directional arrow, with the slope expressed as horizontal to vertical (H:V).
      c. All plans shall provide a legend for all line types, symbols and abbreviations used on the plan.

   d. All plans shall be clearly readable even if reduced by 50%, as determined by city staff.
8. Sufficient detail to allow thorough review.
9. Plan Check Number and/or Case Number on the right margin of cover and each page.
10. FEMA blocks, information and certification as required in Chapter 1.
11. Full size plans/maps, folded, contained in pockets and listed in the Table of Contents.
12. The Drainage Report and Plan, including all Chapters, Figures, Attachments, Plans, Maps and Appendices as a PDF file.
13. A compact disk (CD) or digital video disk (DVD) containing the entire Drainage Report and Plan, including all Chapters, Figures, Attachments, Plans, Maps and Appendices with data files of analysis required above, all in PDF format. The CD and DVD shall be labeled and include the engineer's name, firm name, project name, date, and Plan Check Number and/or Case Number. The CD or DVD shall be in a case and placed in the separate folder in the Drainage Report and Plan. This CD or DVD shall also contain all hydrologic and hydraulic input and output files such as HEC-1 and HEC-RAS.
14. Completed and signed Warning and Disclaimer of Liability. See App. 6B in this chapter.

B. For all Drainage Reports and Plans, provide:
   1. Title Page:
      a. Type of Report (Conceptual, Preliminary, Final or Master Plan).
      b. Project Name.
      c. Location.
      d. Plan Check Number and/or Case Number.
      e. Benchmark datum of NAVD 1988, or subject to town staff approval, a local benchmark with an elevation equation related to NAVD 1988, to nearest hundredth of a foot in the format LF88 = X,XXX.XX.
      f. Engineer's seal, signature, and date, in accordance with AZBTR requirements.
   2. Table of Contents:
      a. List of All Chapters, Figures, Attachments, Plans, Maps and Appendices.
      b. Engineer's seal, signature, and date.
   3. Introduction:
      a. Project Name, location, size and brief description (including scope of project).
      b. Vicinity map.
      c. Purpose and objectives of Drainage Plan.
      d. Executive summary of findings, conclusions and proposals.
      e. Special Conditions, if applicable, including project stipulations; erosion issues; 401 and 404 Permits; ADEQ Permits; AZPDES Permits; and stormwater storage waiver, wash modification and phasing proposals.

4. Data Analysis Methods: Provide a narrative of, pre- and post-development, for on-site and off-site conditions:
   a. Hydrologic procedures, parameter selection and assumptions.
   b. Hydraulic procedures, methods, parameter selection, design criteria and assumptions.
   c. Stormwater storage calculation methods and assumptions, including accounting for sediment.
   d. Basis for setting lowest floor elevations relative to designated floodplains and adjacent washes; or outside a floodplain, relative to highest adjacent grade.
5. Conclusions.
   a. Summarize the data analysis methods used.
   b. State how the conclusions are reached.
6. References and Appendices: Provide the following technical data to support the conclusions, based on the level of detail required for each type of grading report and plan described in section 6.2.
   a. Data and calculations
   b. Peak flow calculations (e.g. Rational Method or HEC-1 printouts)
   c. Channel design calculations including toe-down protection and drop structure design
   d. Culvert design calculations
   e. Floodplain calculations (e.g. Manning's and/or HEC-RAS printouts)
   f. Stormwater runoff calculations
   g. Storage volume calculations
   h. Retention/detention basin inflow outflow analysis and design calculations
   i. Street capacity calculations
   j. Curb opening, catch basin calculations
   k. Storm drain calculations
   l. Sediment and scour calculations
   m. Rip-rap sizing
   n. Erosion/sediment control plan
   o. Soils and or geologic analyses
   p. Hydrologic and hydraulic data and calculations
7. Different information and format:
   a. Town staff may require additional information, or information in a different form from that required above, to address unique situations or assist town staff in thorough review of the Drainage Report and Plan.

c. Additional information must conform to generally accepted engineering principles and practices to allow town staff to assess whether the Drainage Report and Plan meets town standards.

C. For Conceptual Drainage Reports and Plans, provide the documents required in A and B above with further specifications below:
   1. Plans to a minimum scale of 1" = 40'
   2. The Report must include the phasing information, including:
      a. Graphic of areas to be phased, with labels of phases.
      b. Justification for phasing.
   3. The Plan must show and label, on separate pages, (1) pre-development, on-site and off-site, and (2) post-development, on-site and off-site:
      a. Watershed and floodplain boundaries.
      b. FEMA floodplain designations.
      c. Dimensions and calculation of disturbed area.
      d. Flow lines and flow rates; with dashed lines for flow line of watercourse bottoms.
      e. Historical flow path entry and exit locations.
      f. 100-year peak discharge rates at key concentration points.
      g. Land use, building footprints, utilities and development conditions.
      h. Existing watershed and drainage characteristics, network and patterns.
      i. Location, description and purpose of existing and proposed drainage infrastructure; conveyance of off-site flows; connections to and probable effect on upstream and downstream drainage systems.
      j. Existing drainage easements and rights-of-way, with the Maricopa County Recorder's number.

D. For Preliminary Drainage Reports and Plans, provide the documents required in A., B. and C. above with further information and specifications below:
   1. Plans to a minimum scale of 1" = 30'.
   2. FIRMs.
   3. Proposed waiver of any stormwater storage requirement.
   4. Topographic plan resulting from proposed on-site grading.
   5. The Report must include the following descriptions and analysis:
      a. Existing land use in the watershed area, and proposed land use resulting from development.
      b. Explanation of parameters of analysis used.
      c. Basis of selection of lowest floor elevations.
      d. In AO Zones, the lowest floor elevations and highest adjacent grade (HAG), calculated as follows: Determine the Regulatory Flood Elevation (RFE) to set the LF88

for residential structures. The RFE = the HAG Elev + AO depth No.+ 1 foot of freeboard.

e. In local floodplains and special flood hazard areas, for all structures, show the lowest floor elevations, BFE, highest adjacent grade, and, in addition, for commercial structures, floodproofing elevations. If the lowest floor is below the base flood elevation, the design for protecting the interior of the structure. For calculating the BFE, see FEMA Publication 265: Managing Floodplain Development in Approximate Zone A Areas – A Guide for Obtaining and Developing Base (100-year) Flood Elevations at http://www.fema.gov/library/viewRecord.do?id=1526.
f. For all mechanical equipment and attendant utilities, in local floodplains and special flood hazard areas, show the lowest floor elevations, BFE, highest adjacent grade, and, in addition, for commercial structures, floodproofing elevations, if applicable.
g. Existing walls and provide top of wall elevations.
h. Wash cross-sections to show that the wash has adequate capacity and freeboard to convey runoff through the site.
i. Scour effects.
j. Proposed drainage infrastructure, including storage facilities design criteria, volume required (VR = XXX ft3), volume provided (VP = XXX ft3), and basin locations.
k. Management plans for operating and maintaining all drainage infrastructure.
l. Consistency with applicable ordinance requirements, standards, approved stipulations, General Plan (Land Use Element), Conceptual Drainage Report and Plan, Master Drainage Report and Plan, and other proposed developments affecting the site, including capital improvement projects.
m. Phasing information, including detailed graphic of areas to be phased, with labels of phases, and descriptions and analysis of all drainage Improvements to be constructed in each phase, timetables for each phase, impact of phased construction, and required interim drainage infrastructure. Each phase shall provide drainage infrastructure to serve that phase, and create no adverse impact off-site.

6. The Plan must show and label, pre- and post-development, on-site and off-site:
   a. Topographic or other physical discontinuities relative to adjacent properties.
   b. Existing and proposed property lines and, for existing properties, assessor's parcel numbers.
   c. Plan Check Number and/or Case Number for adjacent development that has occurred in the last 5 years.
   d. 100-year peak discharge rate at all entry and exit locations, and flow concentration points.

e. Runoff from a base flood, and consideration of storm events more frequent than the base flood. Development shall not increase peak discharge rates above the historic peak discharge rate for any event up to and including the base flood.
f. Modeling results of flow amounts, velocities and routes.
g. Location of proposed drainage infrastructure, including storage facilities (with volume required, volume provided and drain times), and related to adjacent properties, regional drainage plans and existing drainage infrastructure.
h. Wash cross-sections, including flow rate, water surface elevation, velocity and top width.
i. Size, capacity and nature of off-site drainage infrastructure entering and exiting the project site.
j. Impact of development on project site and future development within fifty feet of project site.
k. Proposed drainage easements, including easements over watercourses with a 100-year peak discharge rate of 25 cfs or greater, showing the limits of the easement.
l. Upon town staff request, spot elevations.

E. For Final Drainage Reports and Improvement Plans, provide the documents required in A, B, C and D above with further specifications below:
1. Plans to a minimum scale of 1" = 20' showing grade breaks and flow arrows.
2. One-foot topographic contours based on a current survey for the entire development site to 25 feet beyond the property line and for off-site areas where a hydraulic model is necessary.
3. Certification that all applicable local, state and federal permits have been obtained.
4. Notice of Intent, Stormwater Pollution Prevention Plan and ADEQ checklist, as approved by ADEQ, as applicable.
5. Proposed drainage easement agreements, including legal descriptions, title commitments and confirmation of easements signed by lienholders.
6. Certification:
   a. The plan relies on accurate figures and analysis.
   b. The plan meets all applicable requirements and standards.
   c. The plan reflects all elevations based on the city's benchmark of NAVD 1988, or subject to town staff approval, based on a local benchmark with an elevation equation related to NAVD 1988.
   d. The plan is consistent with approved stipulations and the Preliminary Drainage Report and Plan.
   e. All structures are safe from flooding.

f. The development shall have no adverse impact on-site or off-site.

7. The Report must include the following descriptions and analysis:
   a. Location of all on-site and off-site culverts, with number, material, size of pipes, and upstream and downstream invert elevation labels.
   b. How topographic changes from the project affect drainage characteristics, including time of concentration.
   c. Whether model was developed with subcritical, supercritical or mixed flow analysis.
   d. Methods to address any erosion issues consistent with DSPM requirements.
   e. Existing land use and Green Ampt soil characteristics for the site, including USDA NRCS soil survey maps.
   f. Phasing information, including detailed timetables for each phase, and demonstrated compliance with applicable stipulations.
   g. An appendix addressing town review comments, with cross-references to the revised Plan.
8. The Plan must meet standards for improvement plans, complete with detailed engineering and construction notes. The Plan must show and label, pre- and post-development, on-site and off-site:
   a. On-site drainage sub-basins.
   b. Limits of inundation for all watercourses with a 100-year peak discharge rate greater than 50 cfs.
   c. 10-year and 100-year peak discharge rates for all washes entering and exiting the site, with intermediate locations of 10-year and 100-year peak discharge rates within the site at least 1 time per sheet per wash, at confluences and points of interest such as culverts, storm drains, utility crossings, and channel improvements, shown with a directional arrow in the following format: Q10/Q100 = xx cfs.
   d. All existing and proposed walls, and top and base wall elevations at wall ends, changes in elevation, and as required by town staff.
   e. Utilities labeled by type.
   f. Easements labeled by type, such as drainage, water, sewer, access, public utility, sidewalk and natural area open space.
   g. Dimensions, capacities, materials, cross-sections and typical details of proposed drainage infrastructure.

F. For Master Drainage Reports and Plans, provide the documents required in A, B and C above with further specifications below:
   1. Plans to a minimum scale of 1” = 100’.

2. The Report must include the descriptions and analysis of all drainage Improvements to be constructed in each phase, the impact of phased construction, and required interim drainage infrastructure.
3. The Plan must show and label, pre- and post-development, on-site and off-site:
   a. Existing land use in the watershed area, and modified land use resulting from proposed development.
   b. Size, capacity and nature of off-site drainage infrastructure entering and exiting the project site.
   c. All drainage improvements to be constructed in each phase and required interim drainage infrastructure.

Appendix 6B

WARNING AND DISCLAIMER OF LIABILITY

The Town's Stormwater and Floodplain Management Ordinance is intended to minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding.

The Stormwater and Floodplain Management Ordinance identifies floodplains, floodways, flood fringes and special flood hazard areas. However, a property outside these areas could be inundated by floods. Also, much of the Town is a dynamic flood area; floodways, floodplains, flood fringes and special flood hazard areas may shift from one location to another, over time, due to natural processes.

WARNING AND DISCLAIMER OF LIABILITY

The flood protection provided by the Stormwater and Floodplain Management Ordinance 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 constructed or natural causes. The Stormwater and Floodplain Management Ordinance does not create liability on the part of the Town, any officer or employee thereof, or the federal, state or county government for any flood damages that result from reliance on the Ordinance or any administrative decision lawfully made thereunder.

Compliance with the Stormwater and Floodplain Management Ordinance does not ensure complete protection from flooding. Flood-related problems such as natural erosion, streambed meander, or constructed obstructions and diversions may occur and have an adverse effect 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.

_____	_____	_____
Plan Check #	Owner	Date

REVIEW COMMENT RESOLUTION

PARADISE VALLEY WATERSHED STUDIES

Designer: Dibble Engineering
Reviewed By: Town of Paradise Valley Staff

Disposition Codes:
A. Will Comply
B. Consultant to Evaluate
C. Client to Evaluate
D. No Further Action

Responses: April 7, 2017
Scope of Review: Storm Drainage Design Manual (Dated 2/1/17)

MASTER ITEM #	ITEM #	REVIEWED BY	SHEET/ PAGE	SECTION/ PARA.	REVIEW COMMENT	DISPOSITION INITIAL	DISPOSITION FINAL	RESPONSE
1	1	Mayor Collins	8	3.3.B.2	Appears the manual prohibits underground retention for single family residential, is this true?	B	A	Revised to state…"Single family residences with an underground storage easement instead of a drainage easement."
2	2	Vice Mayor Bien-Willner	41	8-1.A	Is there another mechanism for documenting retention basins in lieu of an easement?	B/C	D	An easement is the least "invasive" method for ensuring that drainage infrastructure on private property continues to function to protect downstream property owners. A deed restriction is essentially the same. Other methods such as quitclaim deeds involve taking ownership of property
3	3	Councilmbr. Pace	11	3-5.F.1	The manual only discusses what's prohibited in regards to backwashing pools, can we list possible alternatives?	B/C	A	The Town's two sanitary sewer providers (City's of Scottsdale and Phoenix) currently allow the disposal of pool or spa water into their collection systems, as such we are recommending changing town policy to align with the sewer provider practice. If discharging into a sanitary sewer, pool or spa water shall enter the sanitary sewer on private properrty by appropriate means, such as through a sanitary clean out. Some other examples of appropriate locations to backwash a pool or spa water may include an onsite retention basin with adequate volume, and a private water hauling service.
4	4	Councilmbr. Moore	1	1-1.A	Change the word entitled to titled in final draft	A	A	Will revise with final printing
5	5	Councilmbr. Moore	5	3-2.A.2	Remove the text "unless the drainage can be conveyed directly to an existing major channel or natural drainageway, and the developer can demonstrate no adverse off-site impacts to the satisfaction of the Town Engineer."	B/C	D	It is common practice within the valley to include such text, as in certain but rare occaisions this approach may be the most appropriate way to deal with onsite drainage. It is the responsibility of the developers engineer to ensure there will be no negative off-site impacts
6	1	J. Knapp	6	3-2.B.2.a	Is the town obligated by a federal or state requirement to require first flush retention or is it a policy decision each municipality can make on its own?	A	A	Revised to state…"Where detention is allowed, first flush volume shall be retained on all lots or within a common area, and a reasonable attempt shall be made to route all runoff from disturbed areas to the first flush basin(s) subject to grading plan approval."
7	2	J. Knapp	45	10-2.E	Remove the term visually significant corridors and the reference to guidelines being developed. . Maybe talk about how they are important landscapes to preserve naturally.	A	A	Revised to state..."Town rights-of-way and easements along natural wash corridors are important to maintain and preserve the natural environment and landscape features. Natural Wash Corridors shall include, whenever feasible, a landscape buffer area of at least 5 feet each side, perpendicular from the top of the bank."
8	3	J. Knapp	46	10-2.G	There are concerns regarding requiring a 10' wide clear zone along the wash. Revise to suggest during design incorporating a 10' wide access area to the wash for maintenance from the nearest driveway.	A	A	Revised to state..."For Natural Washes, new development should provide, if possible, a minimum 10-feet wide accessible clear zone area for emergency and ordinary maintenance vehicle access. For access to minor drainageways and basins including roadside swales, ditches and sediment basins, allow for reasonable access for regular maintenance and emergency use. Access may be combined with trails."
9	1	F. Fleet	5	3-2.A.1	Town code reference invalid	C	A	Stormwater storage facilities are designed primarily as retention facilities. Other stormwater management facilities, such as detention basins, dry wells, pumps and injection wells, will only be allowed as appoved by the Town Engineer.

REVIEW COMMENT RESOLUTION

PARADISE VALLEY WATERSHED STUDIES

Designer: Dibble Engineering
Reviewed By: Town of Paradise Valley Staff

Disposition Codes:
A. Will Comply
B. Consultant to Evaluate
C. Client to Evaluate
D. No Further Action

Responses: April 7, 2017
Scope of Review: Storm Drainage Design Manual (Dated 2/1/17)

MASTER ITEM #	ITEM #	REVIEWED BY	SHEET/ PAGE	SECTION/ PARA.	REVIEW COMMENT	DISPOSITION INITIAL	DISPOSITION FINAL	RESPONSE
10	2	F. Fleet	5	3-2.A.3	May want to wordsmith lot to lot drainage to be clear we aren't talking about existing offsite flows	A	A	Revise to state..."Lot to Lot drainage within a new development is prohibited unless permanent drainage facilities are constructed in dedicated drainage easements or tracts that are maintained by the Town or a homeowners association (HOA)."
11	4	F. Fleet	6	3-2.B.2.c	What's referenced by "safety factor of 2"?	B/C	A	Revise to state..."If retention of the first flush volume is provided, the stormwater storage facility must be fully evacuated within 36 hours. The maximum allowable infiltration rate shall be 50% of the in-situ tested rate of the as-constructed basin. Testing shall be conducted using double-ring infiltrometer methodology in accordance with FCDMC standards.
12	5	F. Fleet	8	3-3.C.5.b	Vector control?	B/C	D	No need to define "vector control"
13	6	F. Fleet	8	3-3.D.2	Why are we prohibiting corrugated pipe for underground storage?	B/C	A	Corrugated pipes commonly trap debris within the pipe voids, lowering the pipe capacity. They also allow water to stand in the voids which is a potential breeding ground for misquitos.
14	1	P. Peshkin			Involve Planning Dept. at the beginning when elevation is involved.	C	C	Planning Department is involved with every permit at the beginning now as a policy
15	2	P. Peshkin			Observe adjacent existing properties and provide/require drainage protection to protect those properties. Do not rely on calculations to determine "meeting engineering requirements". For example if Retention Basins are included in the plans and they will capture runoff meeting the engineering requirements, look at the location of the retention basins and identify that they will capture runoff that could injure and cause harm to adjacent existing properties. This should be the Town's responsibility especially when alerted ahead of time by the neighbors living in those adjacent properties, i.e. prior to construction starting.	B/C	C	The town is reliant on the professional judgement of the professional who signs and seals the grading and drainage plan. It is their responsibility to address these concerns.
16	7	P. Peshkin			Evaluate Velocity issues affected by: elevation, impervious area, enlarged structure footprint, slanted roofs, front landscaping runoff direction, etc. which affects the existing neighboring properties. This violates the increased FLOW not allowed code	B/C	C	The town is reliant on the professional judgement of the professional who signs and seals the grading and drainage plan. It is their responsibility to address these concerns.
17	8	P. Peshkin			Review locations of retention basins on the property. Should be constructed where storm runoff will cause harm to existing properties.	B/C	C	This is a case by case review of the proposed plan by town staff.
18	9	P. Peshkin			Require provisions to capture storm runoff in submitted plans:culverts, catch basins, spillways, equalizer pipes...	B/C	C	This is a case by case review of the proposed plan by town staff.
19	10	P. Peshkin			Poll neighboring properties when not in a Floodplain, and in Zone X (less than 1% chance of flooding) to ask their experience with flooding and stormwater drainage BEFORE requiring (per TPV)to elevate a home. When a home is not in a Floodplain, not in a Special Hazard Zone, they will get NO professional support from FEMA. The damaged property will also NOT have a valid FLOOD claim with Flood Insurance NFIP due to the FEMA definition of a flood. Perhaps a modified elevation could be considered if there has been no history of flooding.	B/C	C	While this may be a good practice, it is difficult to require a professional engineer to design projects based on anecdotal information.

REVIEW COMMENT RESOLUTION

PARADISE VALLEY WATERSHED STUDIES

Designer: Dibble Engineering
Reviewed By: Town of Paradise Valley Staff

Disposition Codes:
A. Will Comply
B. Consultant to Evaluate
C. Client to Evaluate
D. No Further Action

Responses: April 7, 2017
Scope of Review: Storm Drainage Design Manual (Dated 2/1/17)

MASTER ITEM #	ITEM #	REVIEWED BY	SHEET/ PAGE	SECTION/ PARA.	REVIEW COMMENT	DISPOSITION INITIAL	DISPOSITION FINAL	RESPONSE
20	11	P. Peshkin			When elevating a structure look at the design of the house and require a design that is compatible with the existing neighborhood and does not interfere with drainage. For example a split level design where the garage area/front area is lower (not interfering with runoff pattern) and the home in the front elevates to the main floor which is elevated in the back. This maintains the existing storm runoff design that historically works.	C	C	The town does not have flatland architectural standards to enforce this type of requirement.
21	12	P. Peshkin			Require monsoon protection at the beginning of construction and extra protection when a storm is predicted in Monsoon Season.	C	C	Town and state required Storm Water Pollution Prevention Plans address runoff of construction debris during construction.
22	13	P. Peshkin			Research origination of calculation comparisons submitted by the engineer when historical calculations DO NOT EXIST. Calculations were never required in 1973. Verify current calculations and not rely on data from 1987 since the land has constantly changed due to erosion, construction,walls, etc. and these calculations are NOT always accurate.	C	C	Town requires existing conditions to be documented when a new project is proposed. The existing conditions are those on the site as of just prior to initiating the project, not historical conditions.
23	14	P. Peshkin			Give more authority to the onsite inspectors to question construction that although it was approved per the plan, it is not compliant with the existing site, the engineer, architect, contractor, owner, etc. must be advised that the submitted plan has deficiencies and must be corrected. Currently the onsite inspector just verifies that what is on the plan is what is being built. A second layer of protection to the residents should be enforced. Also contact with the adjacent property owners/residents should be available and considered valuable information throughout the construction.	C	C	The town inspectors are resonsible to ensure the plans are built to the approved plans.
24	15	P. Peshkin			Keep ALL required G/D documents, AS BUILT plans and any other studies on file at a minimum, a digital file.	C	C	This is the policy of the town as of the early 2000's.
25	16	P. Peshkin			Do not encourage lawsuits/civil disputes between neighbors but rather have the town enforce the codes during the permitting process, onsite inspections, proactive/preventive alerts from neighbors, etc.	C	C	The town does not encourage lawsuits between neighbors.
26	17	P. Peshkin			Have the Town's Planning and Zoning Dept. be involved at the beginning of all construction when elevation is involved. An onsite visit with the neighboring residents should be required in situations where a larger footprint, elevation, change of natural water path, landscaping that does not respect the natural wash will complicate the development. A drainage review should be conducted.	C	C	The planning deparment is involved with all construction projects at the beginning.
27	18	P. Peshkin			Devise ways to protect existing residents in older properties when they do not own any property to correct a storm drainage challenge.	B/C	C	Town code requires individual residents to address storm water issues on their individual properties.
28	1	N. Prodanov	1	1-3	AS THESE CODES ARE SUBJECT TO UPDATES, THE LINKS MAY NOT WORK 3 YEARS FROM NOW. CONSIDER REMOVING.	B/C	D	Noted. Document can be updated as links change.
29	2	N. Prodanov	5	3-2.A.2	PLEASE CONFIRM INCREASE FROM THE CURRENTLY REQUIRED PRE- V. POST-DEVELOPMENT.	B	D	The proposed calculation more acurately reflects the actual impervious area of a development as opposed to the currently used Pre vs. Post. In some cases, more retention will be required, in others, it may not.
30	3	N. Prodanov	5	3-2.B.1.a	RUNOFF COEFFCIIENT IS LEFT FOR OPEN INTERPRETATION. PLEASE CONSIDER ADDING A REFERENCE.	A	A	Revised to state..."C = Weighted average runoff coefficient over entire site, per the FCDMC Hydrology Manual tables 3.2 and 3.3."
31	4	N. Prodanov	6	3-2.B.2.b	TYPICALLY C=1.0 FOR FIRST FLUSH CONDITIONS.	B	D	Preference is to use the weighted C value.

REVIEW COMMENT RESOLUTION

PARADISE VALLEY WATERSHED STUDIES

Designer: Dibble Engineering
Reviewed By: Town of Paradise Valley Staff

Disposition Codes:
A. Will Comply
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D. No Further Action

Responses: April 7, 2017
Scope of Review: Storm Drainage Design Manual (Dated 2/1/17)

MASTER ITEM #	ITEM #	REVIEWED BY	SHEET/ PAGE	SECTION/ PARA.	REVIEW COMMENT	DISPOSITION INITIAL	DISPOSITION FINAL	RESPONSE
32	5	N. Prodanov	6	3-2.B.3	ADD A TABLE TO THE PLAN VOLUME PROVIDED.	B/C	C	The calculation table, showing basins and area for certifying as built conditions is a good idea. "This is an in Town policy and will be added to Appendix 6A."
33	6	N. Prodanov	6	3-2.C.1	CONSIDER ADDING REQUIREMENT TO PROVIDE RETENTION FOR EACH CORRESPONDING TRIBUTARY AREA WITHIN THE DEVELOPMENT. IT DOES NOT MAKE SENSE TO HAVE RETENTION BASIN IF LIMITED RUNOFF COULD GET TO IT.	B/C	A	Added to 3-2.c.1
34	7	N. Prodanov	7	3-2.C.6	POOL BARRIER IS REQUIRED FOR OVER 18" DEEP BASIN. DRY WELL OR PERC TESTS WILL BE REQUIRED.	B	D	The building code ony requires fences for inground, above ground, and on-ground swimming pools, hot tubs, and spas that contain 18" of water or more. It does not require a pool barrier for retention.
35	8	N. Prodanov	35	7-1.A	REQUIRE DRAINAGE REPORTS TO BE SUBMITTED ON EACH SITE WITH OFFSITE FLOWS IMPACTING THE DEVELOPMENT. HISTORIC, CURRENT AND PROPOSED CONDITIONS TO BE DISCUSSED AND ANALYZED.	B/C	D	This section states which activities may trigger the need for a drainage report. The existence of offsite flows onto a parcel would not be a triggering event. Making improvements to the parcel would.
36	9	N. Prodanov	40	7-6	CONSIDER ADDING NARRATIVE FOR LOTS THAT ARE HAVE GRADES BELOW THE STREET LEVEL.THE OUTFALL SHALL BE 14" BELOW THE FFE OF THE HOUSE.DRIVEWAY ENTRANCE TO HAVE 6" RIDGE ABOVE THE ADJACENT STREET PAVEMENT.TOP OF WINDOW WELL SERVING BASEMENT TO BE 12" ABOVE FINISH GRADE.	B/C	D	The Town may want to add a statement requiring protection of structures with FFE's lower than adjacent roads. However, we do not recommend requiring specific standards such as the ones proposed. They could result in unanticipated challenges. This should be left to the design engineer to propose and the Town to review/approve.
37	10	N. Prodanov	41	8-1.B	THE TOWN REQUIRES FROM TOP OF BANK TO TOP OF BANK +5' FOR EROSION.	B/C	A	Noted. See comment 3 response. However, this comment is not necessarily for erosion purposes.
38	1	Dibble Team	6	3-2.B.2.a	Change First Flush requirements for all lots to say "or within common retention areas."	A	A	Revised
39	2	Dibble Team	7	3-2.C.4	Change "Retention" to be "Retention/Detention"	A	A	Revised
40	3	Dibble Team	7	3-2.C.10	Change "As provided in 10…" to be "As provided in 11…"	A	A	Revised
41	4	Dibble Team	7	3-2.C.11.a and b	Combine into one subheading	A	A	Revised
42	5	Dibble Team	24	A.2	Change "Retention" to be "Retention/Detention"	A	A	Revised
43	6	Dibble Team	46	10-2.G	1st sentence, change "are" to "area"	A	A	Revised
44	7	Dibble Team	46	10-3.A.9	Change "detention" to "retention and detention"	A	A	Revised
45	8	Dibble Team	46	10-3.A.10	Change "detention" to "retention and detention"	A	A	Revised
46	9	Dibble Team	53	Header	Change "Detention" to "Retention and detention"	A	A	Revised
47	10	Dibble Team	53	1st Para.	Change "detention" to "retention and detention"	A	A	Revised

STORM DRAINAGE DESIGN MANUAL UPDATE

April 13th, 2017

REQUESTED ACTION

- **Receive and discuss further information on three outstanding items:**
  1. **First Flush Requirement**
  2. **Retention Basin Easements**
  3. **Pool Backwash**

POLICY QUESTIONS

3. **First flush requirement for first ½" of rainfall**
   - **Currently not required**
   - **Proposed in manual that if retention is provided on site, first flush is required to be retained**
4. **Retention Basin Easements**
   - **Currently not required**
   - **Proposed in manual that an easement is required over retention basins to ensure the basin remains in place**

FIRST FLUSH REQUIREMENT

- **The EPA delegates stormwater enforcement to the individual states.**
- **The Arizona Department of Environmental Quality is the state department that oversees municipal compliance with state regulations for stormwater quality.**
- **The town's calculation for first flush requirement is based off the disturbed area of the proposed development and not the entire site.**
- **The practical implementation of first flush retention/detention will ultimately help the town accomplish other requirements of the MS4, such as illicit discharge detection and elimination.**

FIRST FLUSH REQUIREMENT

- **The EPA delegates stormwater enforcement to the individual states.**
- **The Arizona Department of Environmental Quality is the state department that oversees municipal compliance with state regulations for stormwater quality.**
- **The town's calculation for first flush requirement is based off the disturbed area of the proposed development and not the entire site.**
- **The practical implementation of first flush retention/detention will ultimately help the town accomplish other requirements of the MS4, such as illicit discharge detection and elimination.**

FIRST FLUSH REQUIREMENT

- **The previous text stated, in Section 3-2 B.2.a:**

  First flush volume shall be retained on all lots

- **The revised text states, in Section 3-2 B.2.a:**

  Where detention is allowed, first flush volume shall be retained on all lots or within common retention areas, and a reasonable attempt shall be made to route all runoff from disturbed areas to first flush basin(s) subject to grading plan approval.

- **Additionally, Section 3-4 B does allow for smaller basins and/or alternative stormwater controls, it they meet the approval of the Town Engineer, to retain/detain the first flush requirement.**

RETENTION BASIN EASEMENTS

- **Issue: Notifying owners in the change of possession of real property that a retention basin exists on the property and has to remain in its location and be maintained**
- **Recommended in Manual**
  - **Retention Basin Easement over retention basins on the property**

POOL BACKWASH

- **Recommend amending Section 15-2-12 of the Town Code which prohibits backwashing pools into the sanitary sewer**
- **Update section 3-5 F of the Manual to allow for pools to be drained into the sanitary sewer system if done so in the cleanout on private property**
- **Both City of Phoenix and City of Scottsdale permit this practice for their residents and were supportive of the town making this change**
- **Also added text to give examples of other ways to backwash a pool such as in a retention basin on site or using a septic hauler**

REQUESTED ACTION

Questions Before Adoption?

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-112

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-110

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-116

TO: **Mayor Collins and Town Council Members**

FROM: **Kevin Burke, Town Manager**
Natalie Montenegrino, Executive Assistant

DATE: **April 13, 2017**

DEPARTMENT: Town Manager

AGENDA TITLE:
Phoenix Symphony Day Proclamation Presentation

Council Goals or Statutory Requirements:

RECOMMENDATION:
Present a Proclamation Declaring Phoenix Symphony Day

SUMMARY STATEMENT:
Since a large percentage of the audience and patrons of the Phoenix Symphony are residents of Paradise Valley, some have opened their homes to performances by Phoenix Symphony musicians in intimate residential settings in a series called “Parties of Note.” On April 20, 2017, Phoenix Symphony musicians perform an outdoor concert titled “Music, Mountains and Memory” at a reception hosted by Paradise Valley residents Council Member Julie Pace and her husband David Selden, and Sheila and Mike Zuieback. To commemorate the occasion, Council Member Pace suggested proclaiming April 20 at Phoenix Symphony Day in Paradise Valley.

Jim Ward, CEO of the Phoenix Symphony will attend the April 13 Town Council meeting to accept the Phoenix Symphony Day proclamation from Mayor Collins.

BUDGETARY IMPACT:
None

ATTACHMENT(S):
Phoenix Symphony Day Proclamation

Office of the Mayor and Council

Proclamation

***WHEREAS**, the Phoenix Symphony is the largest performing arts organization in the Valley of the Sun and has contributed greatly to the quality of life and economic vitality for 70 years; and*

***WHEREAS**, the Phoenix Symphony has pioneered educational programs and memory care enhancement initiatives for the simulation and enrichment of people of all ages; and*

***WHEREAS**, since a large percentage of the audience and patrons of the Phoenix Symphony are residents of Paradise Valley, they have opened their homes to performances by Phoenix Symphony musicians to enjoy classical music in intimate residential settings in a series called "Parties of Note"; and*

***WHEREAS**, on April 20, 2017, Phoenix Symphony musicians will be performing an outdoor concert titled "Music, Mountains and Memory" at a reception, performance and dinner hosted by Paradise Valley residents Council Member Julie Pace and her husband David Selden, and Sheila and Mike Zuieback, under the watchful gaze of the Praying Monk in their Stone Canyon neighborhood.*

***NOW THEREFORE BE IT RESOLVED** that I, Michael Collins, Mayor of the Town of Paradise Valley, do hereby proclaim April 20, 2017 as*

Phoenix Symphony Day

in the Town of Paradise Valley, Arizona.

***IN WITNESS WHEREOF**, I have set my hand and caused to be affixed the seal of the Town of Paradise Valley this 13th day of April, 2017.*

Michael Collins, Mayor

Attest:

Duncan Miller, Town Clerk

Town of Paradise Valley
6401 East Lincoln Drive
Paradise Valley, Arizona
85253-4328

(480) 348-3690
(480) 951-3715 Fax
(480) 483-1811 TDD

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-115

TOWN
Of
PARADISE VALLEY

TOWN COUNCIL MEETING
6401 E. LINCOLN DRIVE
PARADISE VALLEY, ARIZONA 85253
MINUTES
Thursday, March 23, 2017

1. CALL TO ORDER / ROLL CALL

Mayor Collins called to order the Town Council Meeting for Thursday, March 9, 2017 at 4:00 p.m. in the Town Hall Boardroom.

COUNCIL MEMBERS PRESENT
Mayor Michael Collins
Vice Mayor Jerry Bien-Willner
Council Member Paul Dembow
Council Member Scott Moore
Council Member Julie Pace
Council Member David Sherf
Council Member Mark Stanton

STAFF MEMBERS PRESENT
Town Manager Kevin Burke
Town Attorney Andrew Miller
Town Clerk Duncan Miller
Police Chief Peter Wingert
Director of Administration and Government Affairs Dawn Marie Buckland
Public Works Director Brent Skoglund
Community Development Director Eva Cutro
Engineering Services Analyst Jeremy Knapp
Acting Town Engineer Woody Scoutten

2. STUDY SESSION ITEMS

17-100 Montessori Academy Art Exhibit

Mayor Collins and the Paradise Valley Arts Advisory Committee invited the Montessori Academy to display student artwork in the Town Hall Community Room for the month of March. Montessori Academy art teachers Abe Gil and Emily Piven and pupils were in attendance at the open house to present and discuss the art.

17-094 Stormwater Policy Discussion

Engineering Services Analyst Jeremy Knapp summarized the Town Council storm water management policy discussion from the February 9, 2017 Council meeting. The Council discussed a range of possible actions from continuing the status quo to significant financial investments in mitigating 100-year storm water events.

There was Council consensus to adopt a resolution promulgating the Council's position on storm water management. The resolution would include the following elements:

Storm Water Management Policy

The Town of Paradise Valley will:

1) provide storm water data and information available to it concerning the 100 year, 2 hour storm event to property owners;
2) participate in NFIP such that property owners have the ability to purchase federally backed flood insurance;
3) regulate development to mitigate the impacts of storm drainage;
4) budget for small (i.e. under the Capital Improvement Program financial threshold) flood control projects that benefit two or more Paradise Valley parcels and seek cost sharing opportunities for these or other storm water management projects; and,
5) consider cost-benefit analysis for all proposed projects.

17-095 Storm Drainage Design Manual Revisions Summary and Update

Mr. Knapp summarized the Council discussion and issues raised by the Council at the February 9th meeting when the drainage manual was discussed. He outlined two options for proceeding:

1. Adopt the manual as presented including the following three policy issues: using the disturbed area only for flatland retention calculations; hillside retention requirements on a tiered scale; and addition of first flush requirement for first ½" of rainfall.
2. Adopt the manual as presented without the three policy issues and maintain status quo on those items.

There was Council consensus to schedule the adoption of the Storm Drainage Design Manual for the next meeting with the following four policies included:

1. Use the disturbed area only for flatland retention calculations
2. Hillside retention requirements on a tiered scale
    - Lots with Slope 10-20% require 100% retention
    - Lots with Slope 20-30% require 50% retention
    - Lots with Slope above 30% require no retention
3. Addition of first flush requirement for first ½" of rainfall
    - if retention is provided on site, first flush is required to be retained
4. Retention basin easement requirements
    - easement is required over retention basins to ensure the basin remains in place

Mayor Collins recessed the meeting at 6:23 p.m.

3. EXECUTIVE SESSION

17-088 The Town Council may go into executive session at one or more times during the meeting as needed to confer with the Town Attorney for legal advice regarding any of the agenda items listed on the agenda as authorized by A.R.S. §38-431.03.A.3.

4. BREAK

5. RECONVENE FOR REGULAR MEETING

Mayor Collins reconvened the meeting at 6:30 PM

COUNCIL MEMBERS PRESENT
Mayor Michael Collins
Vice Mayor Jerry Bien-Willner
Council Member Paul Dembow
Council Member Scott Moore
Council Member Julie Pace
Council Member David Sherf
Council Member Mark Stanton

STAFF MEMBERS PRESENT
Town Manager Kevin Burke
Town Attorney Andrew Miller
Town Clerk Duncan Miller
Police Chief Peter Wingert
Public Works Director Brent Skoglund
Director of Administration and Government Affairs Dawn Marie Buckland
Community Development Director Eva Cutro
Senior Planner Paul Michaud

7. PLEDGE OF ALLEGIANCE*

Vice Mayor Bien-Willner led the Pledge of Allegiance.

8. PRESENTATIONS*

There were no presentations

9. CALL TO THE PUBLIC

Resident Dorothy Smith thanked Police Chief Peter Wingert for keeping the residents safe and for how well the Police Department communicates with the residents. She thanked Public Works Director Brent Skoglund for the well-maintained median island landscaping. She requested the Town Attorney to verify the statutory membership requirements for the Personnel Appeals Board.

10. CONSENT AGENDA

Mr. Burke summarized the Consent Agenda.

17-090 **Minutes of Town Council Special Meeting March 2, 2017**

17-091 **Minutes of Town Council Meeting March 9, 2017**

17-092 **Approval of Special Event Liquor License for The Phoenix Symphony**

Recommendation: Approve a Special Event Liquor License for The Phoenix Symphony for an event on Thursday, April 20, 2017, subject to the following stipulations: only those people authorized by law be allowed to dispense and/or consume alcoholic beverages; consumption shall be limited to the premises as indicated in the application; and Section 10-7 Control of Excess Noise be observed.

17-096 **Approve Appointments to Various Town Committees, Commissions, and Boards**

Recommendation: Make the following appointments to committees, commissions, and boards:

Advisory Committee on Public Safety April 1, 2017 – March 31, 2019
Victoria Bellomo-Rosacci
Larry Fink
Chuck Matthews
Paul Moore
Jay Ozer
Richard Post

Arts Advisory Committee April 1, 2017 – March 31, 2020
Carol Brecker
Georgann Byrd
Diana Georgelos
Barbara Terranova
Colleen Steinberg (April 1, 2017 – March 31, 2019)

Historical Advisory Committee April 1, 2017 – March 31, 2020
John Wintersteen

Personnel Appeals Board
Richard Coulston April 1, 2017 – March 31, 2020

A motion was made by Council Member Moore, seconded by Council Member Dembow, to approve the Consent Agenda. The motion carried by the following vote:

Aye: 7 - Mayor Collins
Vice Mayor Bien-Willner
Council Member Dembow
Council Member Moore
Council Member Pace
Council Member Sherf
Council Member Stanton

11. PUBLIC HEARINGS

There were no public hearings.

12. ACTION ITEMS

17-087 Consideration of a Proposed Lot Split Located at 6912 E Horseshoe Road

Senior Planner Paul Michaud presented a request by the Sharma Family Trust to divide a 2.4-acre parcel into two lots. The subdivided lots would be zoned R-43 and meet all zoning requirements. He summarized the right-of-way / road improvements, lot configuration, drainage, utilities, and fire protection issues. He stated that the Planning Commission voted unanimously to recommend approval.

There was Council discussion about the necessity to install a new fire hydrant and at what point it should be installed.

A motion was made by Council Member Moore, seconded by Council Member Pace, to approve the proposed lot split, subject to the following stipulations as amended:

1. The lot split plat must be recorded with the Maricopa County Recorder's Office, in substantial compliance with the survey plat prepared by Clouse Engineering, Inc., dated November 18, 2016.

2. Prior to the recordation of said lot split plat, the following shall be completed:

    a. The property owner or designee shall submit the required improvement plans for Town Engineer approval and provide a procedure and other forms of assurances necessary for the Town to be in a guaranteed position to complete the pavement widening and curbing adjoining the subject site in accordance with the local roadway standard, Option B, of the Town's General Plan.

    b. Except for the west, north, and east existing perimeter walls, the property owner shall secure the appropriate demolition permit(s) and related inspections to remove all the vertical structures as shown on the boundary survey prepared by Clouse Engineering, Inc., dated May 19, 2016.

    c. The property owner or designee shall dedicate the required public right-of-way (ROW) area, being the south 25 feet of the subject site, hereinafter the "ROW Area" by separate instrument (a deed) and shall show the area so deeded on said lot split plat. The deeded ROW Area shall be deeded free and clear of all liens and encumbrances and the property owner shall pay for appropriate title insurance and escrow/recording costs for the deeding of the ROW Area.

3. Prior to the issuance of a Certificate of Occupancy for a new single-family residence on said lot split plat, the following shall be completed:

    a. The improvements described in Stipulation 2 shall be completed.

b. The property owner or designee shall demonstrate that the fire sprinkler system is in compliance to the National Fire Protection Association standard 13D or the current equivalent code requirement.

c. The property owner or designee shall install a new fire hydrant on Horseshoe Road as specified by the Town Fire Marshal, generally near the southwest corner of Lot 1 of the Sharma Lot Split.

4. Within 60 days of approval of the plat, the applicant shall submit Mylars and an electronic version in a pdf format for the Town's permanent record.

5. If required, to install the new fire hydrant prior to the start of framing.

The motion carried by the following vote:

Aye: 7 - Mayor Collins
Vice Mayor Bien-Willner
Council Member Dembow
Council Member Moore
Council Member Pace
Council Member Sherf
Council Member Stanton

17-098 Adoption of the FY 2017 Building, Planning, Engineering, & Fire Prevention Fees

Director of Administration and Government Affairs Dawn Marie Buckland summarized the amendments to the Master Fee Schedule related to building, planning, engineering, and fire prevention fees. She stated that most fees were calculated using a full cost recovery model. Building permit fees will be calculated with a minimum value of $225/sf. Fees related to Board of Adjustment variances, appeals of administrative decisions, and administrative relief form zoning; and Planning Commission fees related to SUPs for schools, government buildings, and places of worship will be assessed at a rate of 50% of cost recovery.

There was no discussion.

A motion was made by Council Member Sherf, seconded by Council Member Moore, to Adopt Resolution 17-05 amending the Master Fee Schedule effective May 1, 2017 with results of the FY 2017 Building, Planning, Engineering, & Fire Prevention Fee study. The motion carried by the following vote:

Aye: 7 - Mayor Collins
Vice Mayor Bien-Willner
Council Member Dembow
Council Member Moore
Council Member Pace
Council Member Sherf
Council Member Stanton

Mayor Collins asked for unanimous consent to move up agenda items 13 and 14. There was no objection.

13. FUTURE AGENDA ITEMS

17-089 Consideration of Requests for Future Agenda Items

Mr. Burke summarized the items on the future agenda schedule.

Council Member Dembow suggested scheduling a discussion about appointments to the Municipal Court. He said there may be value in involving new residents on the Court.

14. MAYOR / COUNCIL / MANAGER COMMENTS

There were no reports.

Mayor Collins recessed the meeting at 6:57 p.m.

STUDY SESSION CONTINUED

Mayor Collins reconvened the meeting at 7:05 p.m.

17-101 Legislative Update

Ms. Buckland briefed the Council on pending legislation impacting the Town. This included HB2365 wireless facilities in the right-of-way, HB2521 construction sales taxes, HB2525 photo radar, SB1063 public safety pensions, and SB 1214 local government small cell permitting.

There was discussion about proactively contacting those legislators who have concerns with photo enforcement over the summer. It was suggested that by sharing information and resolving any misunderstandings future attempts to pre-empt local authority over traffic law enforcement could be avoided.

EXECUTIVE SESSION

The Town Council may go into executive session at one or more times during the meeting as needed to confer with the Town Attorney for legal advice regarding any of the agenda items listed on the agenda as authorized by A.R.S. §38-431.03.A.3.

A motion was made by Mayor Collins, seconded by Council Member Sherf, to go into executive session. The motion carried by the following vote:

Aye: 7 - Mayor Collins
Vice Mayor Bien-Willner
Council Member Dembow
Council Member Moore
Council Member Pace
Council Member Sherf
Council Member Stanton

ACTION ITEMS CONTINUED

Mayor Collins reconvened the meeting in the Boardroom at 7:25 p.m.

17-099 Interview of Applicants and Appointments to the Board of Adjustment and Hillside Building Committee

The Mayor and Council interviewed Quinn Williams for appointment to the Board of Adjustment and Scott Tonn for appointment to the Hillside Building Committee.

The Council discussed the applicants interviewed on March 9 and March 23 for appointment to the Board of Adjustment and Hillside Building Committee.

A motion was made by Mayor Collins, seconded by Vice Mayor Bien-Willner, to appoint Hope Ozer, Jon Newman, and Quinn Williams to three year terms on the Board of Adjustment. The motion carried by the following vote:

Aye: 7 - Mayor Collins
Vice Mayor Bien-Willner
Council Member Dembow
Council Member Moore
Council Member Pace
Council Member Sherf
Council Member Stanton

A motion was made by Mayor Collins and seconded by Vice Mayor Bien-Willner to appoint Scott Tonn to a two your term on the Hillside Building Committee. The motion carried by the following vote:

Aye: 7 - Mayor Collins
Vice Mayor Bien-Willner
Council Member Dembow
Council Member Moore
Council Member Pace
Council Member Sherf
Council Member Stanton

16. ADJOURN

Mayor Collins announced that the next meeting would be held on April 13, 2017.

A motion was made by Council Member Pace, seconded by Vice Mayor Bien-Willner, to adjourn. The motion carried by the following vote:

Aye: 7 - Mayor Collins
Vice Mayor Bien-Willner
Council Member Dembow
Council Member Moore
Council Member Pace
Council Member Sherf
Council Member Stanton

Mayor Collins adjourned the meeting at 8:42 PM.

TOWN OF PARADISE VALLEY

SUBMITTED BY:

_____
Duncan Miller, Town Clerk

STATE OF ARIZONA)
:ss.
COUNTY OF MARICOPA)

CERTIFICATION

I, Duncan Miller, Town Clerk of the Town of Paradise Valley, Arizona hereby certify that the following is a full, true, and correct copy of the minutes of the regular meeting of the Paradise Valley Town Council held on Thursday, March 23, 2017.

I further certify that said Municipal Corporation is duly organized and existing. The meeting was properly called and held and that a quorum was present.

_____
Duncan Miller, Town Clerk

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-117

TO: **Mayor Collins and Town Council Members**

FROM: **Kevin Burke, Town Manager**
Duncan Miller, Town Clerk

DATE: **April 13, 2017**

DEPARTMENT: Town Manager

AGENDA TITLE:
Approval of Special Event Liquor License for Treasure House

Council Goals or Other Policies / Statutory Requirements:
A.R.S. §4-203.02

RECOMMENDATION:
Approve and authorize the Town Manager to sign a Special Event Liquor License application for Treasure House for an event on Friday, May 5, 2017, subject to the following stipulations: only those people authorized by law be allowed to dispense and/or consume alcoholic beverages; consumption shall be limited to the premises as indicated in the application; and Section 10-7 Control of Excess Noise be observed.

SUMMARY STATEMENT:

Treasure House, a charitable organization that provides services to young adults with intellectual and developmental disabilities, will hold an event on Friday, May 5, 2017 from 6:00 p.m. to 10:00 p.m. at a private residence located at 8340 N. Morning Glory Rd. Alcohol will be provided at the event, thus requiring them to obtain a special event liquor license.

State law requires the Town to approve special event liquor licenses before the State Liquor Board can issue a license. The Police Department and Community Development Department have reviewed the application and find no reason to oppose it as long as the stipulations listed above are observed.

ATTACHMENT(S):
Applicant cover letter

TREASURE HOUSE
PHOENIX

March 27 2017

Duncan Miller
Town of Paradise Valley
Town Clerk/Management Analyst
6401 E Lincoln Drive
Paradise Valley AZ 85253

RE Application for Special Event for Treasure House

Dear Mr Miller

On Friday May 5 2017 from 6pm – 10pm Bert and Karen Hayenga of 8340 N Morning Glory Road will be providing their residence for a dinner charity event to benefit Treasure House Treasure House (EIN 80-0836112) a 501 c 3 nonprofit provides a supportive living community for young adults with intellectual and developmental disabilities

We will be hosting a dinner for approximately 200 guests who will enjoy acoustic guitar musical entertainment and a brief program in the backyard of the residence (which is surrounded by privacy walls) Two distributors have pledged to provide our wine beer and spirits in-kind We will have valet registration and two security personnel (who are knowledgeable about the Arizona liquor laws) during the course of the event

All proceeds (100%) from the event will benefit Treasure House as a donor has given funds to underwrite all of the rental valet food and liquor expenses

We will comply with town codes relating to control of excessive noise and other stipulations and terms of having a special event permit

Thank you for your assistance with this matter A $25 check is enclosed

Warm regards

Lisa Hartsock
Development Director

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-113

TO: **Mayor Collins and Town Council Members**

FROM: **Kevin Burke, Town Manager**
Duncan Miller, Town Clerk

DATE: **April 13, 2017**

DEPARTMENT: Town Manager

AGENDA TITLE:
Approval of Board of Adjustment Chair

Council Goals or Other Policies / Statutory Requirements:
Town Code Section 2-5-2

RECOMMENDATION:
Approve Emily Kile to serve a one-year term as Chair of the Board of Adjustment

SUMMARY STATEMENT:
On April 5, 2017, the Board of Adjustment selected Emily Kile to serve a one-year term as chair. Pursuant to Town Code Section 2-5-3, the Council must either approve or reject the selection within 30-days. Board Members are allowed to serve two consecutive terms as chair.

Emily Kile has served on the Board of Adjustment since 2004. She is a graduate of the Northeastern School of Law in Boston, Massachusetts. She is a practicing attorney with Kile & Kupiszewski focusing on estate planning and related matters, including Medicaid (ALTCS), VA and long term care planning, special needs planning, guardianship and conservatorship issues and estate settlement/probate. The Supreme Court of Arizona appointed her to serve on the Fiduciary Board. The Fiduciary Board oversees the approval and discipline of fiduciaries licensed in the State of Arizona by the Supreme Court.

BUDGETARY IMPACT:
None

ATTACHMENT(S):
None

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-114

TO: **Mayor Collins and Town Council Members**

FROM: **Kevin Burke, Town Manager**
Duncan Miller, Town Clerk

DATE: **April 13, 2017**

DEPARTMENT: Town Manager

AGENDA TITLE:
Approval of Planning Commission Chair

Council Goals or Other Policies / Statutory Requirements:
Town Code Section 2-5-2

RECOMMENDATION:
Approve Daran Wastchak to serve a one-year term as Chair of the Planning Commission.

SUMMARY STATEMENT:
On April 4, 2017, the Planning Commission selected Daran Wastchak to serve a one-year term as chair. Pursuant to Town Code Section 2-5-2, the Council must either approve or reject the selection within 30-days. Commissioners are allowed to serve two consecutive terms as chair.

Daran Wastchak has served on the Planning Commission since 2015. Mr. Wastchak has a PhD in Public Administration and Policy from Arizona State University. He is President/Owner of D.R. Wastchak, LLC specializing in consulting and training services for ENGERY STAR and LEED certification. His company received the EPA's national "Partner of the Year" award as well as the "Spirit of Enterprise" award for business innovation from the W.P. Carey School of Business at Arizona State University.

BUDGETARY IMPACT:
None

ATTACHMENT(S):
None

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-129

TO: **Mayor Collins and Town Council Members**

FROM: **Kevin Burke, Town Manager**

DATE: **April 13, 2017**

DEPARTMENT: Town Manager

AGENDA TITLE:
Approval of Resolution 2017-08 Declaring the Town's Storm Water Management Policy

Council Goals or Other Policies / Statutory Requirements:
Storm Water - Identify the scope, scale and possible solutions to recurring storm water management issues.

RECOMMENDATION:
Approve Resolution 2017-17

SUMMARY STATEMENT:

Following several extreme rain and flood events in 2013 and 2014, the Town Council identified a review of Storm Water Management practices as one of its priorities. During that time staff, Mayor and Town Council have reviewed existing ordinances, maintenance efforts or failures, the details of federal and private flood insurance programs, and conducted a comprehensive analysis of flood flows and mitigations options in the Cheney watershed. This extensive multi-year review and analysis resulted in a philosophical conversation about what level of storm water management service was appropriate for the Town to fund and deliver.

The attached resolution is an articulation of that philosophy which will serve as the Town's policy going forward and guide funding, construction, and regulatory choices.

BUDGETARY IMPACT:
The resolution itself has no budgetary impact. The policy adopted may result in appropriations for flood mapping, small construction projects, and possible participation in regional projects with the appropriate cost-to-benefit outcomes.

ATTACHMENT(S):

File #: 17-129

Resolution 2017-08

RESOLUTION NUMBER 2017-

A RESOLUTION OF THE TOWN OF PARADISE VALLEY, ARIZONA, DECLARING ITS STORM WATER MANAGEMENT POLICY

WHEREAS, the Town of Paradise Valley practices a limited government model; and,

WHEREAS, the Town has historically limited its participation in large publicly funded, constructed and operated flood control projects in favor of privately built measures in newly constructed developments as well as participation in the National Flood Insurance Program; and,

WHEREAS, in 2013 and 2014 the Town and surrounding region experienced extreme rain and flood events that questioned the Town's practice; and,

WHERAS, the Town recently conducted an thorough analysis of one of its six watersheds and was presented with infrastructure and cost options necessary to manage a 100 year, 2 hour storm event within that watershed; and

WHEREAS, the size, scale and return-on-investment does not warrant a radical departure from that policy; and,

WHEREAS, better articulation of what the Town's Storm Water Management Policy entails is appropriate:

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE TOWN OF PARADISE VALLEY, ARIZONA, THAT:

SECTION 1. The Town of Paradise Valley will:

A. provide storm water data and information available to it concerning the 100 year, 2 hour storm event to property owners;
B. participate in National Flood Insurance Program such that property owners have the ability to purchase federally backed flood insurance;
C. regulate development to mitigate the impacts of storm drainage;
D. budget for small (i.e. under the Capital Improvement Program financial threshold) flood control projects that benefit two or more Paradise Valley parcels and seek cost sharing opportunities for these or other storm water management projects; and,
E. consider cost-benefit analysis for all proposed projects.

SECTION 2. In order to accomplish the policy objective articulated in Section 1, the Town shall periodically develop, update and share information, including maps, showing the location, flows, and depths of storm waters associated with the 100 year, 2 hour storm event in each of the Town's six watersheds.

SECTION 3. In order to accomplish the policy objective articulated in Section 1, the Town shall be a member in good standing in the National Flood Insurance Program.

SECTION 4. In order to accomplish the policy objective articulated in Section 1, the Town shall adopt and periodically update a Storm Drainage Design Manual that provides regulatory and design parameters for new construction in Paradise Valley.

SECTION 5. In order to accomplish the policy objective articulated in Section 1, the Town may budget for small (i.e. under the Capital Improvement Program financial threshold) flood control projects that benefit two or more Paradise Valley parcels. The Town will seek cost sharing opportunities for these and other storm water management projects.

SECTION 6. In order to accomplish the policy objective articulated in Section 1, the Town may participate in the study of regional storm water analyses, design and construction projects when the cost to benefit information is deemed appropriate by the Town Engineer, Town Manager and Mayor and Town Council.

PASSED AND ADOPTED by the Town Council this 13th day of April, 2017

_____
Michael Collins, Mayor

ATTEST:

_____
Duncan Miller, Town Clerk

APPROVED AS TO FORM:

_____
Andrew M. Miller, Town Attorney

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-121

TO: **Mayor Collins and Town Council Members**

FROM: **Kevin Burke, Town Manager**
Brent Skoglund, Public Works Director
Jeremy Knapp, Engineering Services Analyst

DATE: **April 13th, 2017**

DEPARTMENT: Public Works and Engineering Department

AGENDA TITLE:
Adoption of Ordinance 2017-01 updating the Town's Storm Drainage Design Manual; and Adoption of Resolution 2017-06 establishing said document a public record

Council Goals or Statutory Requirements:
Storm Water - Identify the scope, scale and possible solution to recurring storm water management issues.

RECOMMENDATION:
Adopt Ordinance 2017-01 updating the Town's Storm Drainage Design Manual; and Adopt Resolution 2017-06 establishing said document a public record

SUMMARY STATEMENT:
The Storm Drainage Design Manual is a document utilized by Town staff to review and approve improvement plans and storm water master plans on a day-to-day, lot-by-lot basis. It sets Town specific standards utilized by developers and builders to design and implement drainage improvements on private property. In addition, the Town uses it for guidance on stormwater improvements included in Town designed and constructed projects.

The Town's current Storm Drain Design Manual was adopted in 1987 and has never been amended. One of Dibble Engineering's (consulting engineer) tasks associated with the on-going watershed studies project was to update the manual. Town staff received a first draft of the updated manual in August of 2016. A staff stormwater committee, which consisted of representatives from the Building Department, Planning Department, Code Enforcement, Engineering, Public Works, and the Town Manager, reviewed the document and provided comments.

The revised document addresses many new regulations enacted since 1987 as well as some policy decisions. The new regulations include:

1. First flush requirements;
2. Storm water quality during and after construction;
3. Updated rainfall data and engineering practices;
4. Incorporation of all aspects of stormwater management (floodplain management, erosion hazards, etc.);
5. Introduction of low impact development; and,
6. Specific guidance on drainage reports, plans, easements, etc.

The revised manual was presented to Town Council at their February 9th, 2017 Work Study Session for comment and direction on adoption process. The discussion led to several Town Council questions which needed further input as well as council request for public comment.

The Engineering Department began publicizing the draft document, advertising a public meeting, and soliciting public comment the week of February 20th. Staff utilized the town's website, e-mailed the notify me builders list, placed flyers at the Building and Engineering Departments counters, published a noticed in the March 8th Paradise Valley Independent, and placed ads on the TV screens at Town Hall. On March 21st, staff held a public meeting in the Community Room to present the draft and receive public input.

A summary of the public input was presented at the March 23rd Council Meeting. In addition, staff recommended to adopt the manual as presented which includes the following policy decisions:

1. Use the disturbed area only for flatland retention calculations
2. Hillside retention requirements on a tiered scale
3. Addition of first flush requirement for first ½" of rainfall
4. Retention basin easement requirements

Additionally, staff is recommending revising Section 15-2-12 of the Town Code which prohibits the discharge of pool/spa backwash into a sanitary sewer line. Approved pool backwash procedures are updated in the Storm Drain Design Manual which mimic those procedures of our neighboring jurisdictions, Phoenix and Scottsdale, both of which permit pool backwash into a sanitary sewer. Phoenix and Scottsdale are the town's two sewer providers and have agreed that the town should update its policy to match theirs.

BUDGETARY IMPACT:
None

ATTACHMENT(S):
Ordinance 2017-01
Resolution 2017-06
Storm Drainage Design Manual 4/5/2017
Comment Tracking and Resolution
PowerPoint Presentation

ORDINANCE NUMBER 2017-01

AN ORDINANCE OF THE TOWN OF PARADISE VALLEY, ARIZONA; AMENDING CHAPTER 5 BUILDING AND CONSTRUCTION INCLUDING ARTICLE 5-10, DEVELOPMENT, SECTION 5-10-3, STORM DRAIN DESIGN AND CHAPTER 15 SANITARY SEWERS INCLUDING ARTICLE 15-2, SANITARY SEWERS; DESIGN, CONSTRUCTION, INSPECTION AND USAGE, SECTION 15-2-12, PROHIBITED SUBSTANCES.

WHEREAS, the Town of Paradise Valley adopted Ordinance Number 27 on February 13, 1964, which adopted the Code of the Town of Paradise Valley, including "Chapter 5 – Building," and

WHEREAS, A.R.S. §9-240(28)(a) establishes the authority to make, amend, or repeal all ordinances necessary or proper for the carrying into effect of the powers vested in the corporation, or any department or officer thereof, and Article 2-6 of the Town Code establishes procedures for amending the Town Code; and

WHEREAS, the Mayor and Council deem it necessary, in order to protect the public health, safety and welfare and public and private property, to adopt certain rules and regulations controlling the design, construction, quality of materials, erection, installation, alteration, repair, location, relocation, replacement, addition to, and maintenance of storm drainage improvements, and;

WHEREAS, in 1987 the Mayor and Town Council adopted the Storm Drain Design Manual, Subdivision drainage design, and;

WHEREAS, the updated 2017 Storm Drainage Design Manual is meant to replace the 1987 Storm Drain Design Manual, Subdivision drainage design, previously adopted by the Mayor and Town Council, and;

WHEREAS, this 2017 Storm Drainage Design Manual is consistent with the rules and regulations of the Flood Control District of Maricopa County, incorporates requirements from Federal and State authorities, integrates best practices utilized by local municipalities and was subject to public review and comment and;

NOW THEREFORE BE IT ORDAINED BY THE MAYOR AND TOWN COUNCIL OF THE TOWN OF PARADISE VALLEY, ARIZONA AS FOLLOWS:

Section 1. Article 5-10-3 Storm Drain Design, is modified as follows, showing text to be added in underline and text to be deleted in strikethrough.

5-10-3 Storm Drainage Design

That certain document, known as the Storm Drainage Design Manual, ~~Subdivision drainage design,~~ Town of Paradise Valley, three copies of which are on file in the office of the Town Clerk of Paradise Valley, Arizona, which document was made a public record by Resolution No. 2017-06~~537~~ of the Town of Paradise Valley, is adopted as a part of this chapter as if fully set forth in this section.

Section 2. Article 15-2-12 Prohibited Substances, is modified as follows, showing text to be added in underline and text to be deleted in strikethrough.

5-2-12 Prohibited Substances

A. No person shall discharge or cause to be discharged, any new sources of inflow, including, but not limited to, storm water, surface water, ground water, roof runoff, subsurface drainage, cooling water, ~~pool water,~~ or unpolluted industrial process waters into any sanitary sewer.

Section 3. Any person found guilty of violating any of the provisions of this ordinance shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not to exceed $2,500, or imprisonment not to exceed six months, or by both such fine and imprisonment. Each day that a violation continues shall be a separate offense punishable as described. A violation of the provisions of this Code or amendments thereto may constitute a civil offense, and any person who is served with a citation charging such violation and who admits, or is found responsible for such offense shall be liable to pay to the Town a civil sanction in an amount as specified in Town of Paradise Valley Town Code Section 1-9-3. Each day that a violation continues shall be a separate offense punishable as described.

Section 4. All former ordinances or parts thereof conflicting or inconsistent with the provisions of this ordinance or of the 2017 Storm Drainage Design Manual are hereby repealed.

Section 5. If any section, subsection, sentence, clause, phrase or portion of this ordinance or any part of "Chapter 5 – Building and Construction" or "Chapter 15 – Sanitary Sewers" is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portion(s) thereof.

Section 6. This Ordinance and the rules, regulations, provisions, requirements, orders and matters established and adopted hereby shall take effect on July 1st, 2017.

PASSED AND ADOPTED by the Mayor and Council of the TOWN OF PARADISE VALLEY, Arizona, this 13th day of April, 2017.

_____
Michael Collins, Mayor

SIGNED AND ATTESTED THIS ____ DAY OF _____ 2017.

ATTEST:

_____
Duncan Miller, Town Clerk

APPROVED AS TO FORM:

_____
Andrew Miller, Town Attorney

RESOLUTION NUMBER 2017-06

A RESOLUTION OF THE MAYOR AND TOWN COUNCIL OF THE TOWN OF PARADISE VALLEY, ARIZONA, DECLARING THAT A CERTAIN DOCUMENT FILED WITH THE TOWN CLERK AND ENTITLED: STORM DRAINAGE DESIGN MANUAL AND ARTICLE 5-10 SECTION 3 AND ARTICLE 15-2 SECTION 12 OF THE TOWN CODE AS PUBLIC RECORDS PURSUANT TO A.R.S. §9-801.

NOW THEREFORE BE IT RESOLVED BY THE MAYOR AND TOWN COUNCIL OF THE TOWN OF PARADISE VALLEY, ARIZONA AS FOLLOWS:

Section 1. A.R.S. §9-802 et. seq. provides for the adoption by reference of public records.

Section 2. Available for public use and inspection during normal business hours, pursuant to Ordinance Number 2017-01, is a certain document known as the Storm Drainage Design Manual.

Section 3. The above referenced document is hereby declared to be a public record within the meaning of A.R.S. §9-802, and three (3) copies thereof shall be kept on file in the office of the Town Clerk and available for public use and inspection during normal business hours.

PASSED AND ADOPTED by the Mayor and Council of the TOWN OF PARADISE VALLEY, Arizona, this 13th day of April, 2017.

_____
Michael Collins, Mayor

ATTEST:

_____
Duncan Miller, Town Clerk

APPROVED AS TO FORM:

_____
Andrew M. Miller, Town Attorney

STORM DRAINAGE DESIGN MANUAL

TOWN OF PARADISE VALLEY

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STORM DRAINAGE DESIGN MANUAL

TOWN OF PARADISE VALLEY

6401 E LINCOLN DR
PARADISE VALLEY, AZ 85253

PH: 480-348-3692

FX: 480-443-3236

BY THE TEAM OF:

Dibble Engineering

Michael Baker INTERNATIONAL

LOGANSIMPSON

APRIL, 2017

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TABLE OF CONTENTS

FOREWORD

STORMWATER DRAINAGE DESIGN

This chapter provides guidance for complying with specific federal, state, county, and town regulations applicable to floodplain management, water quality, and stormwater management. It presents guidance for preparing drainage reports and grading and drainage plans using the design standards and methodologies adopted by the Town of Paradise Valley, the Flood Control District of Maricopa County, the Arizona Department of Water Resources, and the Federal Emergency Management Agency.

Natural wash through neighborhood in Paradise Valley

Fully charged drainage in Paradise Valley

Erosion in Paradise Valley

Stormwater management facilities integrated with natural landscape

OVERVIEW

1-1 GENERAL INFORMATION

A. This document, entitled the Paradise Valley Storm Drainage Design Manual (SDDM):

1. Administers Chapter 5, Article 5-10-3 and 5-11-1 to 27 of the Paradise Valley Town Code.
2. Provides guidance for complying with federal, state, county and town regulations applicable to floodplain management, water quality and stormwater management.
3. Outlines requirements for preparing drainage reports and grading and drainage plans.

B. This document is intended to provide guidance for designing meaningful flood protection, but such protection can be challenging because much of the natural grade has already been disturbed, existing development may constrain drainage options, or other reasons. In such cases, the Floodplain Admnistrator may require different or additional flood protections to:

1. Avoid any increased danger or damage to persons or property, and
2. Meet the general intent and purposes of the regulations.

1-2 GOVERNMENT AUTHORITIES

A. Federal authorities

1. Federal Emergency Management Agency (FEMA)
2. U.S. Environmental Protection Agency (EPA)
3. The U.S. Army Corps of Engineers (Corps)
4. The U.S. Department of Agriculture (USDA) Natural Resources Conservation Services

B. State authorities

1. Arizona Department of Water Resources (ADWR)
2. Arizona Department of Environmental Quality (ADEQ)

C. Local authorities

1. Flood Control District of Maricopa County (FCDMC)
2. Maricopa County Department of Public Health
3. Town of Paradise Valley (PV)

D. Coordination

Applicants are responsible for coordinating with other interested parties, including utilities, federal and state agencies. Other agency permits may be necessary before applying for Town permits. Applicants should consider the time frames for obtaining those other permits.

1-3 STANDARDS

A. FEMA 44 CFR

http://ecfr.gpo.gov/cgi/t/text/text-idx?&c=ecfr&tpl=/ecfrbrowse/Title44/44tab_02.tpl

B. ADWR State Standards

http://www.azwater.gov/azdwr/SurfaceWater/FloodManagement/StateStandards.htm

C. Drainage Design Policies and Standards for Maricopa County

http://www.fcd.maricopa.gov/downloads/2016-Drainage-Policies-Standards-Manual.pdf

D. Paradise Valley Storm Drain Design Ordinance (1987)

http://paradisevalleyaz.gov/documentcenter/view/3953

1-4 RESOURCES

A. Federal

1. National Flood Insurance Act
   http://www.fema.gov/library/viewRecord.do?id=2216
2. Flood Insurance Rate Maps (FIRMs)
   http://www.fema.gov/hazard/map/firm.shtm
3. Clean Water Act (CWA)
   http://www.epa.gov/owow/watershed/wacademy/acad2000/cwa/
4. USDA Natural Resources Conservation Services (NRCS) soil survey maps
   http://www.nrcs.usda.gov/
5. National Oceanic and Atmospheric Administration (NOAA)
   http://www.nws.noaa.gov/oh/hdsc/currentpf.htm
6. US Environmental Protection Agency, Storm Water Management Model (SWMM)
   https://www.epa.gov/water-research/storm-water-management-model-swmm#description
7. US Environmental Protection Agency, Low Impact Development (LID)
   https://www.epa.gov/polluted-runoff-nonpoint-source-pollution/urban-runoff-low-impact-development

B. State

1. ADWR
   http://www.azwater.gov/azdwr/default.aspx
2. ADEQ
   www.azdeq.gov/environ/water/permits/stormwater.html

C. Local

1. Paradise Valley Town Code, in particular Chapters 5 and 8
   http://paradisevalleyaz.gov/DocumentCenter/Home/Index/30
2. Paradise Valley Document Center
   http://paradisevalleyaz.gov/documentcenter
3. Paradise Valley Area Maps
   http://paradisevalleyaz.gov/DocumentCenter/Index/16
4. Paradise Valley Record Request Form
   http://paradisevalleyaz.gov/documentcenter/view/137
5. Flood Control District of Maricopa County
   www.fcd.maricopa.gov
6. Maricopa County Health Department Standards
   http://www.maricopa.gov/clk_board/Ordinances/P14_Health_Code.pdf

FLOODPLAIN MANAGEMENT

2-1 GENERAL INFORMATION

A. The Town's design, construction and documentation requirements for development in Special Flood Hazard Areas (SFHAs) and pending SFHAs are in this manual. Unless otherwise approved by the Floodplain Administrator, each project must conform to the Town's requirements as referenced in Article 5-11.

B. All habitable structures must be designed so that they will not flood in a base flood as defined in 5-11-1.

2-2 PERMIT REQUIRED

A. Appropriate permits are required before construction or development begins within any SFHA, as mapped on the FIRMs. Applications for permits shall be made on Town forms and may include, but are not limited to, plans drawn to scale showing the nature, location, dimensions and elevation of the area of development, existing or proposed structures, fill, excavation, storage of materials, and drainage facilities. Specifically, the following information is required:

1. Proposed elevation in relation to North American Vertical Datum (NAVD 88) of the lowest floor (including basement) of all structures.
2. Proposed elevation in relation to NAVD 88 to which any non-residential structure will be floodproofed.
3. Certification by an Arizona licensed engineer that the floodproofing methods for any nonresidential structure meet the floodproofing requirements of the Town and FEMA.
4. Base floor elevation for all development within or contiguous to floodplains.
5. Description of the extent to which any watercourse will be altered or relocated as a result of proposed development. See Section 6, Drainage Report and Plans.

2-3 SPECIAL FLOOD HAZARD AREAS

A. Portions of the Town fall within special flood hazard areas, as mapped on the FIRMs. Special flood hazard areas are flood zone designations that begin with an "A" and require particular attention when being analyzed and designed for development.

2-4 SUBSTANTIAL IMPROVEMENTS AND SUBSTANTIAL DAMAGE IN SFHAS

A. This section applies when a structure in an SFHA is not in compliance with current standards, and:

1. Improvements requiring a building permit are proposed; or
2. Repairs to damage, requiring a building permit, are proposed.

B. Upon application to the Community Development Department for a building permit, if it appears that this section is applicable to the project, the applicant shall submit an appropriate Substantial Improvement/Substantial Damage Worksheet, available from Town Engineer. The Substantial Improvement/Substantial Damage Worksheet is a screening tool to establish which projects exceed 60% or are less than 40% of the structure's existing market value before the improvements or repairs utilizing FEMA criteria.

C. If it appears that the project costs between 40% and 60% of the structure's existing market value, the applicant shall provide an appraisal of the value of the existing structure (excluding land value and other improvements to the property such as a swimming pool or accessory structures, before improvements and/or repairs), and a construction proposal signed by an Arizona licensed contractor.

D. An applicant may bypass the Substantial Improvement/Substantial Damage Worksheet, or challenge the Worksheet's calculation, by providing an appraisal of the value of the existing structure as described in C above and a signed construction proposal from an Arizona licensed contractor.

E. In case of substantial improvements or repairs to substantially damaged structures, defined as projects costing 50% or more of the value of the existing structure, the entire structure must be brought into compliance with the Town's floodplain management regulations.

For information refer to FEMA's guide to substantial damage and substantial improvements. http://www.fema.gov/library/viewRecord.do?id=1636

The Town's substantial improvement/substantial damage worksheets are available upon request from the Town Engineer.

Stormwater Management

3-1 GENERAL INFORMATION

A. Use the design standards and methodologies described in the Drainage Design Manual (DDM) for Maricopa County, Arizona, latest edition, which includes Volume I - Hydrology, Volume II - Hydraulics and Volume III - Erosion. The SDDM prevails in any conflict between the DDM for Maricopa County and the Town's SDDM whenever the latter is more restrictive. Design Engineer should discuss any conflict with the appropriate Town staff for resolution before submitting reports and plans for review.

3-2 STORMWATER STORAGE

A. Generally

1. Stormwater storage facilities are designed primarily as retention facilities. Other stormwater management facilities, such as detention basins, dry wells, pumps and injection wells, will only be allowed as approved by the Town Engineer.

2. All new developments shall make provisions to retain the runoff of a 100-year, 2-hour duration storm falling within the boundaries of the development unless the drainage can be conveyed directly to an existing major channel or natural drainageway, and the developer can demonstrate no adverse off-site impacts to the satisfaction of the Town Engineer.

3. Lot to Lot drainage within a new development is prohibited unless permanent drainage facilities are constructed in dedicated drainage easements or tracts that are maintained by the Town or a homeowners association (HOA).

4. Developments with HOAs may locate retention facilities in private dedicated drainage tracts. These tracts will be maintained by the homeowners association.

B. Stormwater Storage Volume

1. Design Volume

a. For all new development, the standard formula for determining the required stormwater storage runoff volume is shown below.

$$Vr = C(R/12)A$$

Vr = Required storage volume in cubic feet.

R = Precipitation amount = The depth in inches of the 100-year, 2-hour rainfall, from FCDMC Hydrology Manual Figure A.56 at the site.

A = Area (square feet) of entire project site, including:

(1) Easements, tracts and rights-of-way within the development, plus

(2) Where the development includes improvements to the rights-of-way on the perimeter of the property, the area of those improvements up to the ROW centerline.

C = Weighted average runoff coefficient over entire site, per the FCDMC Hydrology Manual tables 3.2 and 3.3

b. For single family residential lots (not hillside)

$$Vr = C(R/12)A$$

100% retention amount

c. For hillside lots (steeper than 10% slope)

$$Vr = \triangle C(R/12)A$$

100% of the pre-vs.-post calculated amount

d. Volume requirement may be prorated based on average slope steepness across the entire site as measured at its midpoint. General guidelines are:

- 10-20% slopes require 100% of the pre-vs.-post calculated retention volume
- 20-30% slopes require 50% of the pre-vs.-post calculated retention volume
- slopes steeper than 30% require 0% (no retention required).

The Town Engineer may waive requirement if proved otherwise, based on certain criteria, such as adverse impact and soil type.

e. The Town encourages the use of Low Impact Development (LID) techniques, as described in Chapter 6, to both reduce the amount of impervious surfaces constructed, and to provide required storage volume. LID techniques can be used to reduce the site composite runoff coefficient, thus reducing the overall storage requirement.

2. First Flush Volume

a. Where detention is allowed, first flush volume shall be retained on all lots or within common retention areas, and a reasonable attempt shall be made to route all runoff from disturbed areas to the first flush basin(s) subject to grading plan approval.

b. The first flush volume shall be calculated using the following formula:

$$Vf = CPA$$

Vf = the required first flush storage volume, in cubic feet;

C= the weighted average runoff coefficient for the disturbed area of the proposed development;

P= the required precipitation depth of 0.5 inches, converted to feet; and

A= the disturbed area of the proposed development, in square feet.

c. If retention of the first flush volume is provided, the stormwater storage facility must be fully evacuated within 36 hours. The maximum allowable infiltration rate shall be 50% of the in-situ tested rate of the as-constructed basin. Testing shall be conducted using double-ring infiltrometer methodology in accordance with FCDMC standards.

3. Certified Volume

a. Before acceptance, or before the issuance of a certificate of occupancy, the engineer of record/property owner must provide the Town with certified, as built dimensions of the facilities, and the actual volume of storage provided.

b. The actual volume of storage provided must:

i. Be based on as-built topographic surveys performed by an engineer or surveyor;
ii. Reflect permanent, finished landscaping in place;
iii. Meet or exceed the required volume;
iv. Be constructed to perform as designed; and
v. Be certified by an engineer.

c. The volume of storage provided must equal or exceed the approved design volume before the Town will issue a Certificate of Occupancy. See volume table in Appendix 6A.

C. Storage Facilities Design

1. All on-site water retention areas other than piped systems shall be entirely landscaped. Storage facilities shall be located to intercept the flows generated for each tributary area within the entire development, to the maximum extent practicable.

2. Storage facilities shall be set back at least 5 feet from adjacent properties, rights-of-way (ROW), public utility easements (PUE's) or other utility easements or as approved by the Town Engineer.

3. In-stream storage facilities are prohibited because they interrupt the natural flow of the wash and can create debris and sediment obstructions.

4. Retention/detention facilities should be designed with a positive gravity drain system whenever possible.

5. Basin side slopes shall not exceed a 4:1 (4 foot horizontal to 1 foot vertical) ratio.

6. The design depth of stored water in a facility shall not exceed 3 feet except as otherwise approved by the Town Engineer.

7. Ultimate outfall of basins must be one (1) foot below adjacent finished floor elevations.

8. Facilities shall have an emergency spillway to safely direct overflow into a recognized watercourse or to the historical outfall of the lot.

9. Above-ground storage facilities contained by an embankment are generally prohibited. If above-ground storage facilities are permitted, they must be designed and constructed according to generally accepted geotechnical and, if necessary, structural-engineering principles. Slope stability, piping, seepage, sliding, overturning and material integrity shall be considered.

10. Except as provided in 11 below, stormwater storage facilities for residential subdivisions shall be located in a tract.

11. Stormwater storage facilities for a residential subdivision may be located on a private lot if the owner:

    a. Provides a physical demarcation around the stormwater storage facility, to avoid interference with its purpose, in accordance with an approved plan, and dedicates unobstructed physical, legal and visual access from the right-of-way to the facility.

    b. Constructs and maintains an approved cistern for rainwater harvesting.

12. Detention basins and related facilities shall be designed to drain to a recognized watercourse, such as a established wash, or to the historical outfall of the lot. Unless otherwise approved by the Town Engineer, stormwater may not be discharged onto a street, alley, storm drain or gutter.

13. A stormwater storage facility shall not detain or retain standing water longer than thirty-six (36) hours unless the facility is designed and constructed to be a permanent body of water with appropriate health, safety, and water quality measures. Consistent with requirements specified in the DDM for Maricopa County, double-ring infiltrometer testing shall be required with a factor of safety of 2 to demonstrate adequate drawdown within 36 hours for all basins.

14. Drain time should be maximized to ensure the effectiveness of the facilities. Drain time should generally be from 12 to 24 hours. Discharge from the detention basin may be regulated with a hinged orifice plate, with a minimum diameter of 6 inches, over the entrance of the outlet pipe if the outlet pipe meets the minimum size requirements. Storage facilities shall be equipped with a baffle, or other approved method, to keep oil, grease and other floatables in the basin. Baffles, if utilized, shall extend 6 inches below the bleeder invert elevation.

15. Storage facilities shall be designed to allow for regular maintenance activities, such as providing access for inspection vegetation and soil management, and removal of sediment, debris and other obstructions.

16. Stormwater storage may occur in a private road, driveway or parking lot if the following conditions are met:

    a. At least the first 50% of the required storage volume is provided in a stormwater storage basin or underground storage tank, if approved;

    b. No more than 50% of the required storage volume is provided;

c. The depth of water does not exceed six inches; and

d. Interference with pedestrian traffic is minimized.

3-3 UNDERGROUND STORMWATER STORAGE POLICY

A. This policy supplements the Town 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 Town will only approve underground storage after rigorous analysis of storage system location, specifications, access, operation and maintenance, liability, and signage.

B. Projects qualifying for underground stormwater storage must meet the following criteria:

1. Projects located within a commercial, non-residential or multi-family development with a viable property maintenance organization or other maintenance mechanism to assume continued maintenance of the underground stormwater storage system and protect the public interest.

2. Single family residences with an underground storage easement instead of a drainage easement.

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 the Town Code and related policies.

2. All underground stormwater storage elements must meet industry standards or stricter standards.

3. Storage system must not be located under buildings or parking garages.

4. The owner must dedicate a drainage easement to the Town which meets the standards for all drainage easements.

5. Design must address:

a. Water quality protection measures to protect underground and surface water resources to meet applicable water quality standards.

b. Vector control within storage system.

c. Redundancy in case of storage system failure, with particular attention to the possibility of structure or street flooding, sediment accumulation, or storm events that are greater than the 100-year, 2-hour event.

d. Initial suspended sediment load removal.

e. At least a 75 year life of entire system, including the lining and coating of the underground storage tank.

f. Drainage by gravity. Pumped systems or drywells 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 to prevent debris from collecting in the pipe, reducing its effective volume.

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. Contractor or maintenance staff with experience in operating, 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 Town Code and other applicable requirements, owner shall:

   a. Inspect system after each storm event of 0.6 inch or more, and semiannually,preferably before summer and winter rains.

   b. Remove accumulated trash and debris from inlet and outlet structures as needed to ensure free flow of stormwater.

   c. 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, the 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 Town 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 Town harmless from any such liability. Before receiving a certificate of occupancy, the owner must record a signed and notarized document to this effect, in a form satisfactory to the Town Attorney, in the Maricopa County Recorder's Office.

3-4 STORMWATER STORAGE WAIVERS

A. Waiver of Stormwater Storage Requirements

A waiver approval does not relieve the developer of liability if flood damage occurs resulting from the waiver.

B. Waiver of First Flush

Generally, there is no waiver permitted for stormwater storage volume required to hold runoff from the first one-half inch of precipitation. However, the owner may provide a smaller basin and/or alternative stormwater controls, if it meets the approval of the Town Engineer.

C. Waiver Process

To apply for a waiver, the developer shall complete and submit with the final drainage report:

1. A Request for Stormwater Storage Waiver Form, including in-kind contributions calculations sheet, which may be obtained from the office of the Town Engineer, and

2. A certified engineering report stamped by a licensed Arizona engineer, along with documentation satisfactory to the Town Engineer that the project qualifies for a waiver.

The Town Engineer may request additional information and may deny the waiver, approve it, or approve it with conditions.

Unless the project is designed to provide full storage, the Town Engineer will not accept final improvement plans without a copy of the approved Waiver Form.

3-5 STREET DRAINAGE

A. Access

Generally, street improvements for new development shall provide access to properties during a base flood. To prove access, an engineer must demonstrate that at least one structural roadway section with asphalt, concrete or compacted aggregate has a depth of flow no greater than 1 foot during a base flood. Refer to Fig. 1.3-1, Street Hydraulic Design Criteria Chart, for limits of inundation for specific street sections.

B. General Design Standards

Streets may carry water from adjacent property and from local areas, but should not be used as major water carriers in lieu of natural washes or man-made channels. The design criteria below imply that water may flow deeper than a normal vertical curb height, for a short distance over sidewalk or other back-of-curb areas, but the flow is always confined to the right-of-way or drainage easements. Engineers should provide catch basins, scuppers, or similar facilities, together with necessary channels, at appropriate locations (particularly street sag areas) to remove water flowing in the streets to comply with MAG, DDM and the design criteria below.

HYDRAULIC DESIGN CRITERIA dmax = maximum depth at any point within the right-of-way			
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-wide dry driving lane in each direction.	N/A	Contain runoff below the building's lowest floor. Confine runoff to street rights-of-way or drainage easements. dmax = 8 inches.
Street without Curb & Gutter (Dirt Roads, Ribbon Curbs)	Contain longitudinal runoff within roadside channels with water surface elevation below pavement subgrade.	N/A	Contain runoff below the building's lowest floor. Confine runoff to street rights-of-way or drainage easements. dmax = 8 inches.
Street without Storm Drain System	Add pipes or roadside channels if runoff from 10-year flood exceeds street capacity, unless waived.	N/A	Add storm drain systems if a base flood inundates building's lowest floor. Provide catch basins, scuppers, etc. to remove water so dmax = 8 inches.
Cross Road Culvert or Bridge for Collector & Arterial Streets	N/A	Convey runoff by culvert or bridge under street with no flow overtopping the street for a 50-year flood.	Convey runoff by culvert and by flow over the street so dmax =6 inches.
Cross Road Culvert or Bridge for Collector Streets, and Local Streets	Convey runoff by culvert or bridge under street with no flow overtopping the street.	For a 25-year event, convey runoff by culvert or bridge and by flow over the street with so dmax = 6 inches.	dmax = 12 inches.
Any street or watercourse crossing that provides the only access to residential area.	N/A	N/A	Make all lots and structures accessible by at least 1 street with dmax = 12 inches for a base flood.
Local Streets with Low Volume Average Daily Trips	N/A		

FIGURE 3.1 STREET HYDRAULIC DESIGN CRITERIA CHART

C. Valley Gutters

Valley gutters are permitted on local streets to transport runoff when a storm drain system is not required. Valley gutters are generally not acceptable on collector or arterial streets. In unusual cases, valley gutters may be necessary to convey runoff across a collector street. In such situations, the valley gutter shall be a minimum of 8 feet wide to lessen the impact on traffic.

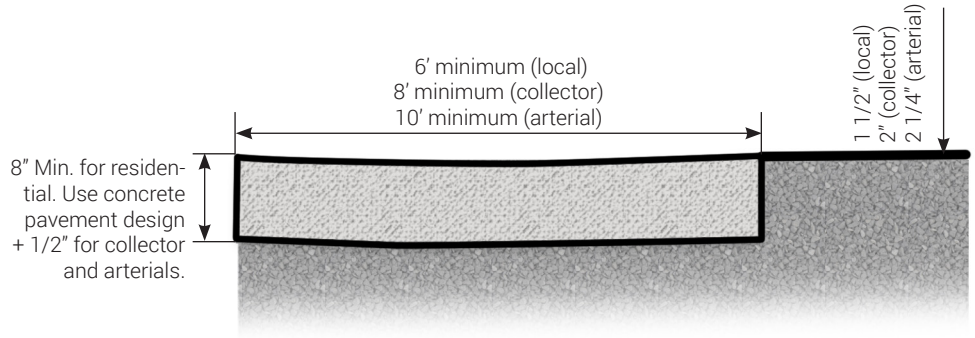

FIGURE 3.2 TYPICAL SECTION FOR VALLEY GUTTER

D. Roadside Swales

Unless waived by Town staff, swales must intercept and safely convey flow to the nearest recognized watercourse within the same watershed. If velocities exceed 5 feet per second, then the engineer must design the swale to provide erosion and scour protection. Swales are necessary to prevent:

1. Runoff and debris from washing onto the roadway,
2. Erosion of roadway areas adjacent to the edge of pavement or curbing, and
3. Roadway runoff from flowing into front yards, driveways, garages and homes. Refer to Figure 3.3 Typical Cross Section for Roadside Swales, on non-raised curb street or straight cross slope.

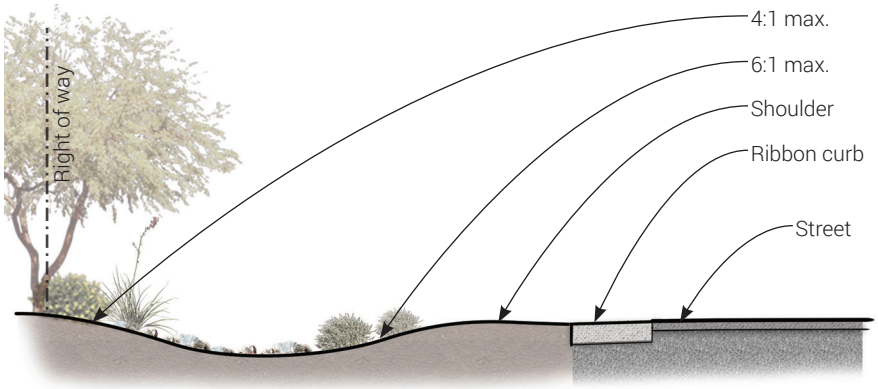

FIGURE 3.3 TYPICAL CROSS SECTION FOR ROADSIDE SWALES

E. Wet Crossings

1. For wet crossings of road, calculate flow velocity for sediment erosion. Erosion control measures for scour protection must be evaluated and documented.
2. Wet crossings shall be constructed of concrete paving or include continuous ribbon curb per MAG standard detail.

F. Pools and Spas

1. Pools and spas shall not be drained or backwashed into a street, storm drain or natural wash. The Town's two sanitary sewer providers, (City of Scottsdale and Phoenix) currently allow the disposal of pool or spa water into their collection systems. If discharging into a sanitary sewer, pool or spa water shall enter the sewer on private property by appropriate means, such as through a sanitary clean-out. Some other examples of appropriate locations to backwash a pool or spa may include onsite retention basin(s) with adequate volume, or an approved septic tank hauling service.

3-6 CHANNEL DRAINAGE

A. Channel Design

Man-made Channel: When man-made channels are required, the emphasis will be placed on a "natural" appearance and on safety. Native landscape lining will be allowed, with side slopes 6:1 or flatter, with specific Town approval. Full channel lining will be considered on a case by case basis.

1. Design shall be in accordance with the Drainage Design Manual for Maricopa County, Arizona Department of Water Resources; Delineation of Riverine Floodplains and Floodways in Arizona, State Standard Attachment SSA 2-96; the State Standard for Detention/Retention, SSA8-99; and the Watercourse Bank Stabilization, SSA 7-98; or the current version of the aforementioned. The developer is required to coordinate compliance with any requirements of the Army Corps of Engineers Section 404 Certification. The developer is required to coordinate all revisions to the FEMA flood insurance rate maps resulting from construction of bank protection.

2. Channel sections shall be designed so the final finish grade is the surface of any channel lining for erosion protection. Channel capacity shall be designed for increased capacity to accommodate any reduction that might occur from landscaping, vegetation and/or sediment accumulation, as shown in Fig. 3.4 Channel Lining Design Capacity.

FIGURE 3.4 CHANNEL LINING DESIGN CAPACITY

3. Maximum Velocities/Erosion Protection: In general the maximum velocity shall not exceed the scouring velocity of the soil (with natural cover). When the scour velocity is exceeded, additional erosion protection shall be provided. Bank/channel protection may consist of one or more of the following:

   a. Concrete or gunite lining, reinforced with 4 inch x 4 inch WWF-12GA.

   b. Natural stone grouted riprap 4-inch to 12-inch diameter stones - leave a minimum 1/4 diameter exposed.

   c. Natural Stone loose riprap 4-inch to 12-inch diameter stone.

   d. Gabion Baskets/Gabion Mattresses.

   e. Soil Cement.

3-7 CULVERTS AND STORM DRAINS

A. Culverts and bridges within the Town are generally within the public right-of-way for the road. Additional easement or right-of-way, beyond the normal street width may be required to facilitate the construction, operation and/or maintenance of the structure. Design plans for the structure shall include the proposed easement and/or right-of-way limits. Maintenance issues and access shall be considered in the structure design, and appropriate measures should be included to facilitate proper maintenance (i.e. access road if necessary, etc.).

B. The minimum pipe size of culverts and storm drain laterals in the public right of way shall be 18 inches in diameter. Where debris may be expected, follow the FCDMC requirements for preventing clogging.

C. Culverts and storm drain laterals on private property should be sized to manage the 100-year runoff event, but shall not be less than 12 inches in diameter. Culverts 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 or storage basin.

D. In special cases, if a culvert invert is placed below the natural wash flowline, the design capacity of the culvert shall be reduced by the cross-sectional area below grade level as approved by Town Engineer.

E. Stormwater runoff shall not be conveyed in a culvert or pipe under structures, except to drain a fully enclosed courtyard, where redundancy is required. Exceptions may be made where a lot is considered otherwise unbuildable, as approved by the Town Community Development Director or Town Engineer.

F. Manholes or junction structures are required at all horizontal and vertical changes in culvert alignment, pipe junctions, and changes in pipe diameter.

1. The hydraulic grade line in storm drains shall be no higher than six inches below the gutter line in a 10-year storm event.

2. Minimum drainage easement widths shall be calculated using the following formula:

Width = pipe outside diameter + 2 feet + 2x depth to invert

G. Storm drain inlets and outlets shall be designed to meet current Town and MAG standards. Structures shall be buried or otherwise blended with surrounding grade with colors and textures to match or complement adjacent structures as approved by the Town.

H. Headwalls shall extend a maximum of 18 inches above top of pipe with top of wall not to exceed finished grade of surrounding areas. Slope to top of headwall maximum 4:1. Where vertical drop is greater than 30 inches install guardrail meeting Town and MAG standards. Retaining walls shall be constructed of natural stone or poured-in-place concrete. Concrete walls shall be finished with integral color and form liner as approved by Town.

I. Fence and Wall Openings, Trash Racks and Railings shall be designed in accordance with Town and MAG standards. Steel fabrications shall consist of evenly spaced slats 8 inches on center max., smooth coved welds, primed and painted to match adjacent structures as approved by Town. Grates are required on private lots only and shall be cleaned and maintained by property owner.

J. Obstructions. Obstructions to drainage are fences, walls, berms, swales, retaining walls, patios, pools, decks, sheds, pens, corrals, water troughs, canals or any other construction that alters redirects, impedes or suspends drainage from its natural course. Obstructions can occur in landscaping which includes mounding, raised beds, edging, furrowing, gardens, water harvesting, planter boxes, or any other landscape method or construction that alters, redirects, impedes or suspends drainage from its natural course.

K. Ownership and Maintenance Requirements. As part of the initial layout design, the designer must consider and accommodate the future need of vehicular access for maintenance purposes. Preliminary design should minimize long-term maintenance requirements. It is essential that maintenance be considered during the planning, design and construction of drainage facilities. Maintenance is provided so that the facility is maximized. Common maintenance problems associated with drainage facilities includes growth of undesirable vegetation, debris accumulation, sedimentation, erosion, scour, soil piping, soil settlement, structural damage and failing to plan for maintenance access. Culverts and bridges are to be designed to avoid impacts to existing sediment transport conditions.

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Erosion Hazard management

4-1 GENERAL INFORMATION

A. The Town uses, as a minimum, the design standards and methodologies described in the ADWR Erosion Hazard Guidelines and FCDMC Hydraulics Manual. These apply to:

1. Structures that could fail or incur significant damage as a result of erosion.
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 land divisions.
5. Watercourses identified by the Town 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.

B. Erosion hazard zones consistent with ADWR may be required for all properties under development where watercourses will be left in an undisturbed state. The Town may require further analysis (ADWR Level II or III) under certain geomorphic conditions where staff is concerned that erosion limits may exceed those estimated by a Level I analysis. The Town may also require a slope stability analysis.

4-2 HILLSIDE DEVELOPMENT

A. Hillside Overlay Districts:

The Town of Paradise Valley has a hillside zoning ordinance (Article XXII) that restricts development on lots that have slopes greater than 10%. The Hillside Building Committee will review all applications for development in these areas.

B. Purpose and Need:

Hillside lots have special needs for stormwater management due to the higher runoff rates and difficulty establishing retention areas on site. This is exacerbated by construction of impervious surfaces that increase runoff intensity and volume during a storm event. These sites are also likely to be more visible from surrounding off-site areas. The purpose of these requirements is to preserve the character of the hillsides while accommodating responsible development and protecting people and property from potentially hazardous conditions unique to hillside development.

C. Storm Drainage on Hillside Lots:

The first priority of hillside development is to properly site buildings, structures and use areas to preserve natural drainageways on the site. This can be accomplished by clustering development while preserving connected natural washes and linear open spaces that convey and store stormwater. Development restrictions for hillside lots are identified in the Town's hillside zoning ordinance.

Development shall be accomplished in such a way to minimize changes to existing topography, including natural drainageways. Where excavation and filling is required for approved site improvements grades and vegetation shall be restored to meet the requirements of the Town Landscape Design Guidelines. Application of Low Impact Development (LID) approaches, as identified in Section 6, can reduce the amount of impervious surfaces in order to mimic predevelopment runoff conditions on the site. The Town may consider waivers to on site retention requirements only in such cases where approved LID practices, such as porous pavements, green roofs and/or reduced pavement areas are proposed that are equal to, or exceed, required on-site retention.

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Stormwater Quality

5-1 CONSTRUCTION GENERAL PERMITS

A. Arizona Department of Environmental Quality (ADEQ) administers the Construction General Permit under the Clean Water Act (CWA). The Town requires evidence that the development will comply with the ADEQ Construction General Permit, when applicable, before issuing development permits.

B. 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 with the Construction General Permit will help prevent these pollutants from entering washes, lakes, other surface waters and the Town's storm drain system.

5-2 HOW TO OBTAIN STATE AND TOWN APPROVAL

A. The operator of a construction site is responsible for applying for appropriate permits from ADEQ. The operator may be the owner, developer, general contractor or individual contractor responsible for operational control. When this responsibility is shared, all operators must apply for ADEQ approval. ADEQ will require a Notice of Intent (NOI) and Stormwater Pollution Prevention Plan (SWPPP). The Town requires submittal of the SWPPP for review prior to submittal to ADEQ.

B. After ADEQ approval, the operator must include 2 copies of the approved NOI and SWPPP with improvement plan submittal to the Town.

5-3 OPERATIONAL REQUIREMENTS

A. The operators must keep a copy of the SWPPP on site. In addition to ADEQ enforcement, the Town will enforce stormwater management requirements, through inspections, responding to complaints and other means.

5-4 COMPLETING CONSTRUCTION

A. Once construction is completed, as defined in the Construction General Permit, the operators must send a Notice of Termination (NOT) to ADEQ and the Town.

5-5 SECTION 404 PERMITS

A. The Town requires developments to comply with Section 404 of the CWA.

5-6 ACTIVITIES REGULATED UNDER SECTION 404

A. The US Army Corps of Engineers (Corps) and EPA 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:

1. Stream crossings;
2. Dam construction and flow regulation;
3. Water diversion for canals, irrigation systems and stock tanks;
4. Streambed modification and stabilization; and
5. Building subdivisions, master planned communities, nonresidential structures, highways and airports.

B. Projects that are determined by the Corps to have a minimal environmental impact, require compliance with nationwide permits in a streamlined process. Projects with potentially significant impacts may require individual permits and public notice.

C. Projects cannot jeopardize the continued existence of a threatened or endangered species or its

critical habitat. Developers should consult with the Corps or the US Fish and Wildlife Service for guidance concerning threatened and endangered species in the Town.

5-7 SECTION 401 CERTIFICATION

A. Before the Corps can issue a 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. No discharge of dredged or fill material is permitted if:

   1. A practicable alternative exists that is less damaging to the aquatic environment, or
   2. The nation's waters would be significantly degraded.

B. ADEQ may grant, deny or waive water quality certification for both individual and nationwide Section 404 permits.

5-8 COMPLIANCE REQUIREMENTS

The Town will not issue any development permit where Corps action is required but not yet taken. An applicant must comply with the requirements of Sections 401 and 404 of the CWA, as applicable, prior to commencing construction.

5-9 WASTE DISPOSAL SYSTEM LOCATIONS

A. Waste disposal system locations shall comply with Arizona Revised Statutes, Section 48-3609. Refer to

   http://www.azleg.state.az.us/FormatDocument.asp?inDoc=/ars/48/03609.htm&Title=48&DocType=ARS

B. Waste disposal system locations shall comply with Maricopa County standards. Refer to

   http://www.maricopa.gov/EnvSvc/AboutUs/pdf/C2S2.PDF

   and

   http://www.azsos.gov/public_services/title_18/18-09.pdf

Low Impact Development

6-1 General Information

Low Impact Development (LID) is a sustainable approach to stormwater management that utilizes the landscape to absorb storm runoff, reducing flows that can contribute to flooding and increase infrastructure costs. The goal of LID is to mimic and sustain a predevelopment hydrologic regime by applying techniques that are included in this chapter. LID strategies can divert, store and utilize stormwater runoff to support native and designed landscapes. They can be utilized to supplement, and sometimes reduce the need for, traditional methods for stormwater management. While traditional methods often channelize and pipe runoff away from development, LID utilizes this water close to its source, to support vegetation growth and reduce runoff volume.

LID is adaptable to a wide range of land use types and project scales. Low impact development can be particularly effective reducing increased runoff for hillside development. Breaking down developed areas into their constituent components – private property and public realm; buildings, paved areas and landscape – presents a way to organize potential actions to implement LID. These approaches are encouraged by the Town.

6-2 Potential Benefits

Increased stormwater runoff is directly related to the amount of impervious surfaces in a given area and to how land is developed and improved. Improvements in managing stormwater can have multiple benefits for cities and their residents and businesses. LID actions can be taken by governments, organizations and private interests. The benefits of LID have been published for many national and local examples, and are supported by the Environmental Protection Agency (EPA) in its Municipal Separate Storm Sewer System (MS4) requirements.

A. Direct benefits:
   1. Detains stormwater close to its source, potentially reducing runoff volume and velocity downstream.
   2. Collects sediment and reduces pollutants in storm-water runoff.
   3. Utilizes stormwater to support native vegetation and landscape improvements.

B. Indirect benefits:
   1. Reduces irrigation water requirements for landscape areas.
   2. Reduces impacts on existing stormwater infrastructure and the need for new channels and pipes.
   3. Is compatible with the protection and restoration of natural systems, which supports climate resiliency.
   4. Complements site improvements for human activities.
   5. Provides and sustains habitat for wildlife.
   6. Supports tree canopy growth for increased shade, which can significantly decrease urban heat-island effects.
   7. Adds value to property through efficient use of space and resources.
   8. Provides multiple-use opportunities, such as open space and landscaping, that improve a community's quality of life.

6-3 Applications

A. The LID tools identified in this chapter can be used to:
   1. Enhance the built environment by implementing LID projects that use ecologically friendly and aesthetically pleasing design solutions that provide multiple benefits for the community.
   2. Mitigate impacts on proposed development sites to produce the amount of impervious surface and reduce stormwater runoff potential.
   3. Provide means for hillside development that satisfies the Town's stormwater storage requirements.
   4. Review and assess current Town policies, codes, regulations and checklists to determine which updates are required to enable and encourage the implementation of LID techniques.
   5. Educate Town agencies, residents, businesses, and developers about the advantages and benefits of LID.

LID MATRIX

SOURCE

BUILT OR PROPOSED ORIGIN OF STORMWATER RUNOFF

	PUBLIC STREETS IN PARKING AREAS	HOMES AND BUILDINGS ROOF TOPS

ACTION

METHOD OF MANAGING STORMWATER RUNOFF

	CONVEY	STORE	INFILTRATE

TOOLS

MEANS TO ACCOMPLISH ACTIONS

TECHNICAL VARIATIONS

GREEN STREET	VEGETATED SWALE	BIORETENTION	POROUS PAVEMENT
Curb Cuts	Landscaped Channel	Vegetated Basin	Stabilized Aggregate
Ribbon Curb	Restored Wash	Bioretention Cell	Pervious Asphalt
Curb Cut with Sediment Capture			Pervious Concrete
Wheelstop Curb			Permeable Pavers
			

DRIVEWAYS AND PATIOS

LANDSCAPE AREAS

FILTER

EVAPO-TRANSPORATE

REUSE

GROUNDWATER INFILTRATION

Underdrains

Recharge

GREEN ROOF

Rooftop Garden

Downspout Disconnection

RAINWATER HARVESTING

Cisterns

Underground Storage

LANDSCAPE

Tree Preservation

Soil Amendment

Impervious Surface Reduction

Plant Selection

6-4 LID TOOLKIT

A. Source

The tools included in this document have been derived from, and include, pioneering work for southwest applications of LID by the cities of Mesa, Glendale and Tucson, and the Watershed Management Group. Tools have been identified that are appropriate for the low density, natural character landscape of Paradise Valley. The EPA has published several guides to LID that describe LID methods that have been implemented throughout the country.

This LID Toolkit provides a representative cross section of Best Management Practices (BMPs) that can be developed in Paradise Valley and throughout the region.*

B. Tools

As described in the LID matrix on the previous page each tool is categorized by its context within a site or system, and by which action(s) the tool is intended to perform with respect to the stormwater that is being managed.

These tools are compatible with development methods and building codes in Paradise Valley. Tools are appropriate in developed or developing areas and are consistent with current or proposed city policies.

C. Technical Variations

Many of the BMP techniques illustrated in the LID Toolkit have multiple variations and/or site specific adaptations. The arid region in which we live, requires special understanding and care when implementing these techniques. Within the appropriate site and project context, LID tools can be effectively deployed to achieve the Town's stormwater management goals.

Context and site specific issues that should be considered when applying the LID Toolkit to the stormwater management system include:

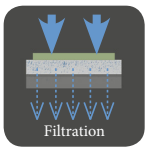
1. Knowledge of local codes and regulations (The Town of Paradise Valley will determine which practices are appropriate for each application).
2. Anticipating high intensity storms that may exceed the capacity of LID facilities.
3. Extended periods of drought require vegetation to have access to supplemental irrigation.
4. Periods of extreme heat requiring adapted and highly tolerant vegetation.
5. Extreme daily temperature fluctuations leading to expansion and contraction, affecting design requirements.
6. Opportunities and constraints associated with the type and use of local materials.
7. Dusts, sediment and debris accumulation between storms.

* LID Tools are not intended to address all requirements of local, state, federal, and other codes, regulations, and standards. Additional analysis will be required for each application.

Functions

Some LID tools provide a specific function related to stormwater. Most LID tools can perform several functions. The function intended by the designer is often a determining factor in the selection of which tool/technique to use in the design.

Flow Control
-the regulation of stormwater runoff flow rates.



Filtration
-the sequestration of sediment or pollutants from stormwater runoff through a porous medium.

Detention
-the temporary storage of stormwater runoff to allow for metered discharge that reduces peak flow rates.

Infiltration
-the vertical movement of stormwater runoff through soil, recharging groundwater.

Retention
-the storage of stormwater runoff on-site to allow for sedimentation of suspended solids.

Treatment
-processes that use plant materials, soils and bacterial colonies to metabolize contaminants in stormwater runoff.

Shade
-promotes vegetated shade

Recreation
-allows for recreational uses

Design
-encourages creative solutions to stormwater management

Heat Island
-reduces or mitigates heat island effects

Habitat
-provides wildlife habitat area

Aesthetics
-enhances attractiveness and beauty

Education
-provides learning opportunity

Infrastructure
-reduces impact on existing or future infrastructure

Benefits

LID can provide benefits that go well beyond stormwater management. By managing stormwater close to its source, they can nourish a healthy community landscape. This provides visual interest in the landscape, reduces water and energy use, improves water quality and reduces the cost of stormwater infrastructure. and contaminants downstream. These icons identify the multiple benefits associated with each LID practice.

Location

Some LID tools are specific to certain locations and types of development. Other tools can be used in multiple locations and be adapted to different development types. In order to be context sensitive, it is important to assess which locations and applications each tool is appropriate for during the design process. The locations and development types identified by the following icons are intended to be scalable. For example, a landscaped yard around a residence can be considered similar to the site area around a small business or school. Open space can describe a park, or a large landscaped area on the campus of an institution or corporate facility.

Street Buffer
-landscaped area between street and building

Pedestrian Path
-designed walkway for pedestrians

Street Median
-distinct island in middle of road designed to guide traffic

Driveway
-private vehicular accessway

Parking Island
-distinct island in parking area designed to guide traffic

Parking Lot
-designated area for parking

Residential Landscape
-unpaved and hardscape areas outside homes

Nonresi Landscape
-unpaved and hardscape areas outside non-residential buildings

Parks and Open Space
-large contiguous landscape areas for public or common use

Parking Shading
-trees or structures that provide shade

Nonresi Building
-buildings without residential uses

Residential Building
-buildings with residential uses

Green Street – Standard Curb Cut & Ribbon Curb

Description

A. Standard Curb Cut

Standard curb cuts are openings created in a curb to direct stormwater from an impervious surface, such as streets, parking lots, or hardscape areas, into a lower landscaped area (LID facility). The curb cut is a useful tool for retrofitting existing development with green infrastructure practices without major reconstruction. Since curb cut openings are perpendicular to the flow of stormwater on the street, they will usually collect only a portion of the water flowing along the gutter. If attenuating stormwater flows along the street is the goal, place multiple curb cuts at intervals along the street.

B. Ribbon Curb

Ribbon curbs allow, distributed stormwater runoff from impervious surfaces into landscaped areas and stormwater facilities. Stormwater flow is distributed more evenly which reduces the potential for erosion and clogging along a pavement edge.

Installation

A. Standard Curb Cut

1. Openings should be at least 18 inches wide, but up to 36 inches is preferred for ease of maintenance.
2. Locate curb cut openings at low points and space them based upon stormwater velocity and volume, and the capacity of the area behind curb for retention/detention infiltration and access to overflow systems.
3. The curb cut can either have vertical or angled sides. The design intent is to create a smooth transition from the paved surface to full curb height.
4. Curb cuts work well with relatively shallow stormwater facilities that do not have steep side slopes that might erode.
5. Set the elevation of the bottom of the curb cut to maximize flow into the landscape area.
6. A drop in grade should occur between the curb cut entry point and the finish grade of the landscape area to allow for passage of sediment.
7. Small amounts of hand placed rip-rap can be used on the LID facility side of the curb cut opening to reduce the potential for erosion in landscaped areas.

B. Ribbon Curb

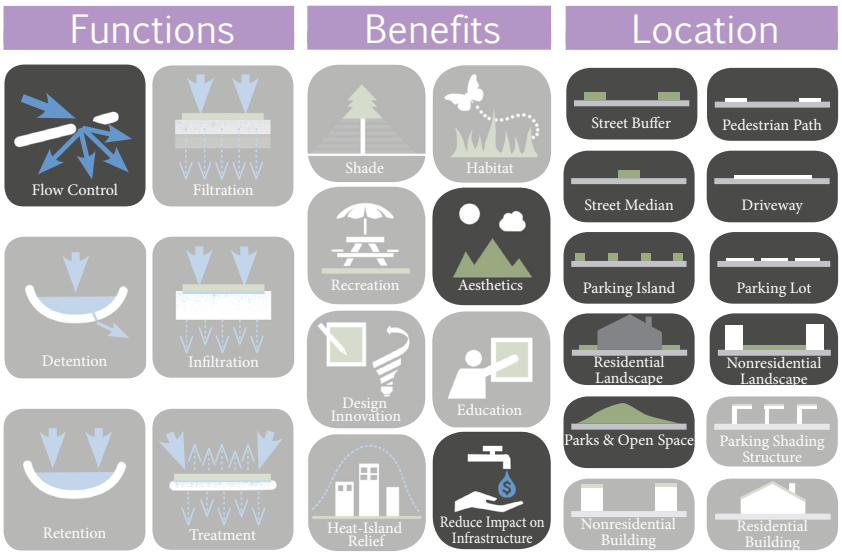
1. Top of concrete curb should be installed flush with the pavement surface, with allowances for subgrade compaction and future settlement, and should have the same cross-slope as the adjacent pavement.
2. A drop in grade should occur between the top of the flush curb and the finished grade of the landscaped area to allow for passage of sediment and debris to drop out.
3. Utilize temporary erosion control measures when seeding or planting adjacent areas to reduce the portential for erosion.
4. A wider surface area and contrasting color for the flush curb provides an important visual cue when used on roads, driveways and bicycle paths.
5. This tool will be considered on a case by case basis for street rights-of-way, per Paradise Valley and MAG standard curb details.

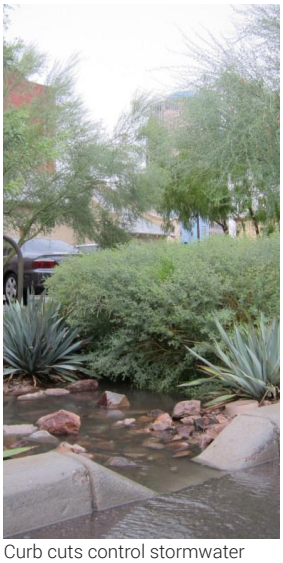
Maintenance

A. Standard Curb Cut: regularly clear curb cuts of any debris and sediment that prevents the free flow of stormwater into LID facility (1-2 times per year and after storm events). Periodically check rip rap areas for signs of erosion damage. Repair and reinforce as necessary (annually and after storm events).

B. Ribbon Curb: check the flush curb for signs of damage or settlement causing ponding or concentration of stormwater runoff. Check landscape edge condition for signs of rilling or erosion and repair or reinforce as needed (annually). Remove sediment and debris from landscape area, that may cause water to pond or backup.

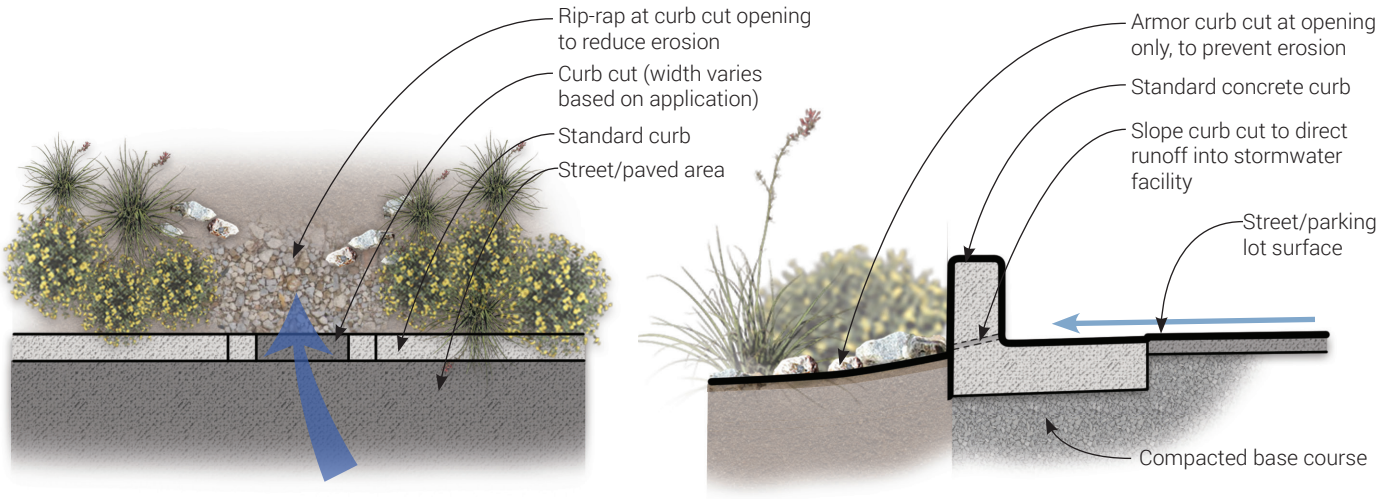
Source: http://flowstobay.org/files/greenstreets/pg132-136ch5.pdf





Curb cuts control stormwater flow from streets to LID facilities.

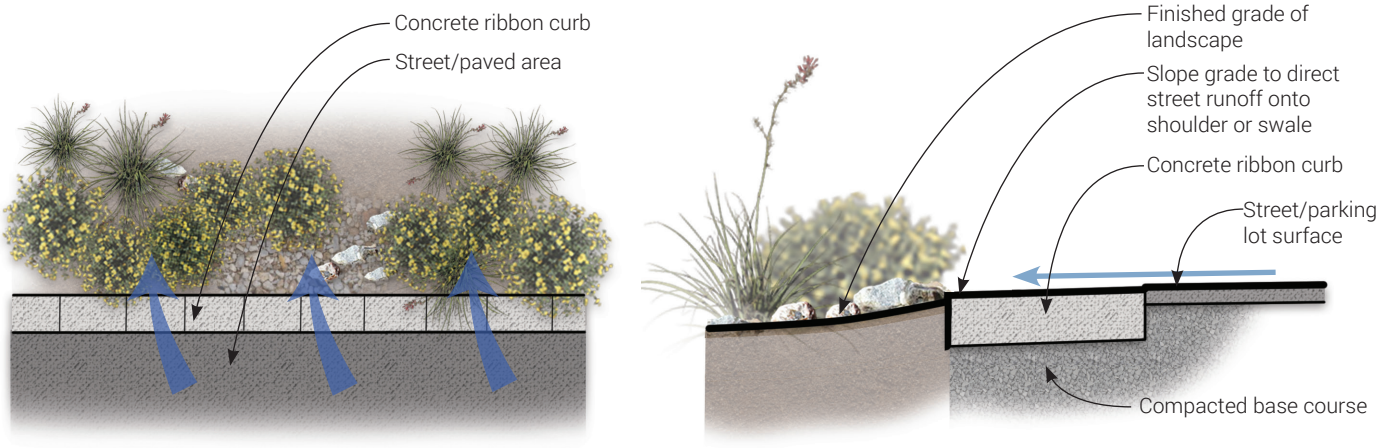
Ribbon curbs allow stormwater to sheet drain to landscape areas.



Curb Cut Plan

Curb Cut Section

Figure 6.1 - Standard Curb Cut



Ribbon Curb Plan

Ribbon Curb Section

Figure 6.2 - Ribbon Curb

Vegetated swale – swale & restored wash

Description

A. Vegetated Swale

Vegetated swales are stormwater runoff conveyance systems that provide an alternative to piped storm sewers. They can absorb low flows and direct runoff from heavy rains to storm sewer inlets or directly to surface waters. Vegetated swales improve water quality by enhancing infiltration of the first flush of stormwater runoff and promoting infiltration of storm flows they convey. Costs vary greatly depending on size, plant materials, and site considerations. Vegetated swales are generally less expensive when used in place of underground piping.

B. Restored Wash

The natural Sonoran Desert consists of washes that flood infrequently yet allow established native riparian plants to flourish. Wash restoration follows natural drainage patterns and supports a healthy naturalistic landscape palette, requiring little or no supplemental irrigation. Restored washes provide natural beauty, wildlife habitat and recreation opportunities that are valuable to city residents. Restoring washes recreates riparian systems while accommodating flood protection.

Installation

A. Vegetated Swale

1. Deep-rooted native plants are preferred to promote water infiltration and reduce erosion and maintenance requirements.
2. Evaluate site soil conditions. Ideally soil infiltration rates should be greater than one-half inch per hour. Soil Amendments may be needed to achieve ideal infiltration rates.
3. A meandering alignment is preferred where space allows, with side slopes that do not exceed 4:1, and slopes adjacent to walkways or accessible hardscape areas that do not exceed 6:1. In some contexts, a more linear alignment may be appropriate.
4. Refer to the adopted building codes for maximum depths allowed without a guardrail requirement. In any case, a vertical drop of more than 30 inches will require guardrail protection.
5. Current standards require that all swales that retain or detain stormwater shall completely drain within 36 hours.

B. Restored Wash

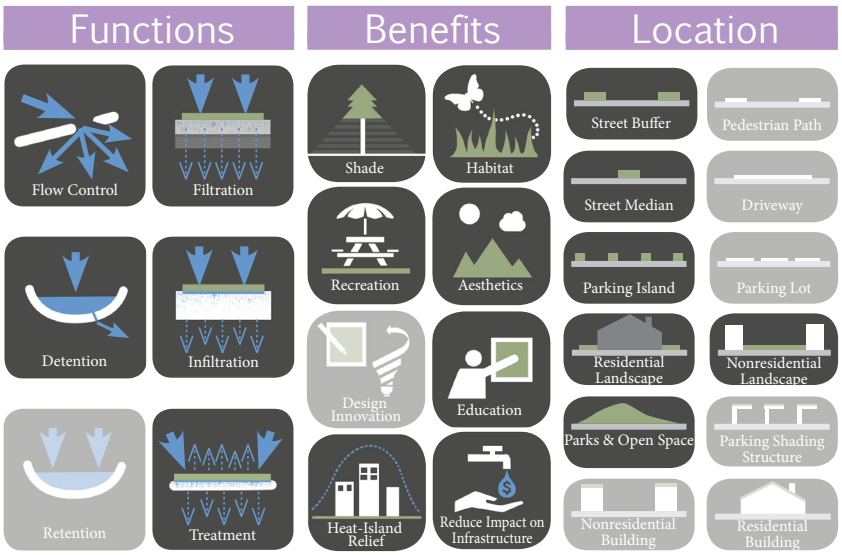
1. Channel alignments and side slopes must be designed in close coordination with civil engineers to ensure that they convey stormwater while minimizing erosion damage.
2. Employ erosion control and channel stabilization techniques that encourage upland and riparian vegetation to establish over time.
3. Provide access for regular inspection and maintenance efforts.

Maintenance

A. Vegetated Swale: vegetation in the swale will require regular maintenance such as removal of debris and dead branches, and occasional pruning. Supplemental irrigation may be required to maintain healthy landscape plants. Removal of sediment and regrading will be necessary to maintain the swale shape and volume over time. As with plant waste, sediment should be removed and disposed of properly. See also: http://paradisevalleyaz.gov/523/Wash-Maintenance

B. Restored Wash: restored washes have unique maintenance needs due to native and riparian vegetation and the potential for soil erosion. These areas must have a maintenance plan executed by experienced professionals.

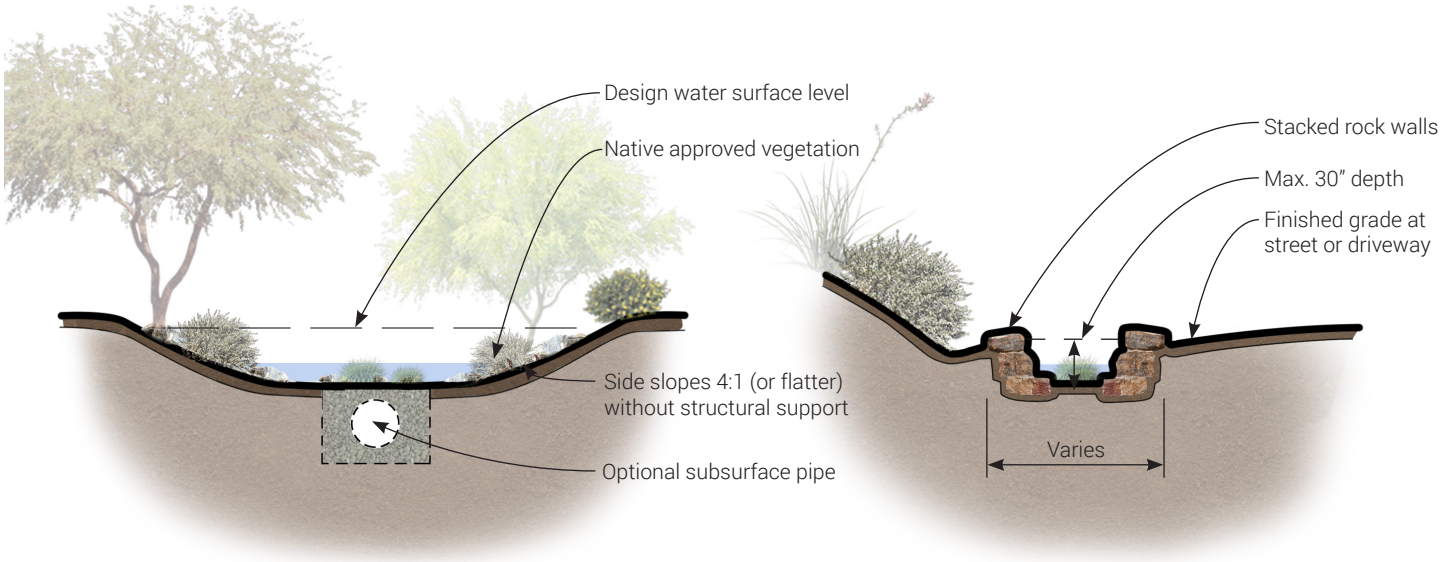
Source: http://www.bfenvironmental.com/pdfs/veggieSwale.pdf, http://watershedmg.org/tech-trainings/urban-streams http://webcms.pima.gov/cms/one.aspx?portalId=169&pageId=687544, http://www.streamdynamics.us/



Vegetated swales accept storm-water for conveyance, storage and infiltration.

Restored washes maintain hydrology, reducing infrastructure costs.

Plan



Section at Swale

Section at Channel

Figure 6.3 - Vegetated Swale

Bioretention – Vegetated Retention Basin & bioretention cell

Description

A. Vegetated Retention Basin: Bioretention basins are shallow depressions in the landscape that typically include plants and a mulch layer or ground cover. Porous soils allow stormwater to infiltrate and supply plants with needed water. In addition to increased groundwater recharge, bioretention basins can improve water quality during smaller, more frequent storm events. In addition to removing sediments coming off paved areas, pollutants can also be removed through absorption into plantings and evaporation. Bioretention basins often referred to as rain gardens, can be used in residential settings, to accept runoff from a roof or other impervious surface.

B. Bioretention Cell: Bioretention cells are shallow depressions with a designed soil mix and plants adapted to the local climate and soil conditions. These are used in more urban conditions and where subsoils are porous and allow infiltration into the subgrade. Bioretention cells capture and infiltrate stormwater into the ground below the cell and have an overflow that carries excess stormwater to a discharge point. Bioretention cells that include vegetation for stormwater absorption are called bioretention planters.

Installation

A. Vegetated Retention Basin:

1. Creative shaping and planting of bioretention basins can utilize soil excavated from the basin to accommodate sloping berms.
2. Adding hand placed stones where stormwater enters the basin from a curb cut, pipe or downspout can help dissipate concentrated flows and reduce erosion.
3. Vegetation should be selected based on local microclimate and soil conditions. Plants should be set in the ground so the surface soil is level with the bottom of the basin. Once the plants are installed, the area should be mulched to retain soil moisture and reduce erosion.
4. Basin side slopes should not exceed 4:1. Where adjacent to walkways or accessible hardscape areas they should not exceed 6:1.
5. An irregular or meandering shape may be most appropriate. More geometric configurations are appropriate in a more urban context.
6. Current standards require all basins that detain stormwater to completely drain within 36 hours.

B. Bioretention Cell:

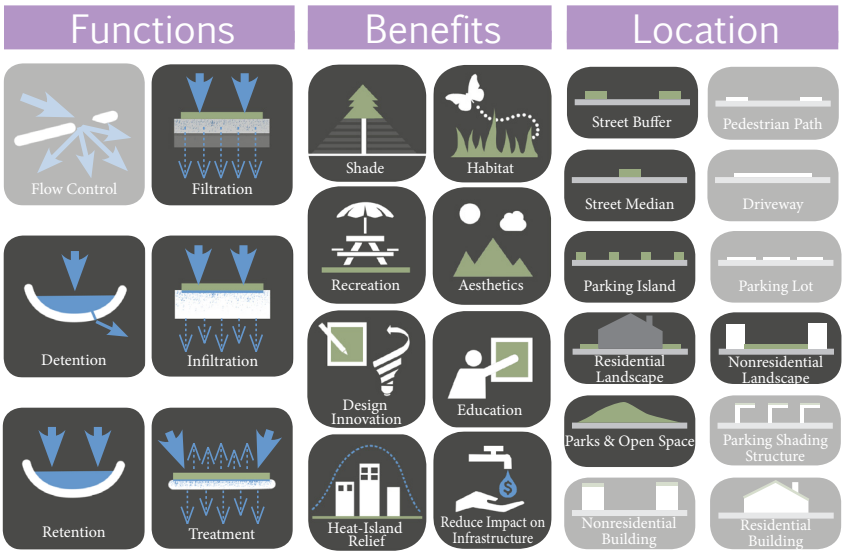
1. Bioretention cell bottoms should be relatively flat and not lined. The bottom surface should be loosened several inches deep prior to placing the bioretention soil mix. The cell bottom area should be designed based on the ability of the soil to freely drain into the subgrade.
2. Stormwater enters the bioretention cell by surface flow or pipe inlet. A sediment capture area can be designed to protect the bioretention cell by slowing incoming flows at the point of entry.
3. A minimum depth of specially graded soil is necessary for the proper function of a bioretention cell.
4. An appropriate surface mulch layer should be selected to reduce weed establishment, regulate soil moisture and temperature, and add organic matter to the soil.
5. Stormwater ponding above the cell provides storage for storm flows, settles out particulates such as sediment, and provides for uptake and filtering of pollutants within the cell.
6. Plants used must be drought tolerant, and suitable for occasional saturation.
7. Overflow for the bioretention cell should transport excess stormwater to an approved discharge point.

Maintenance

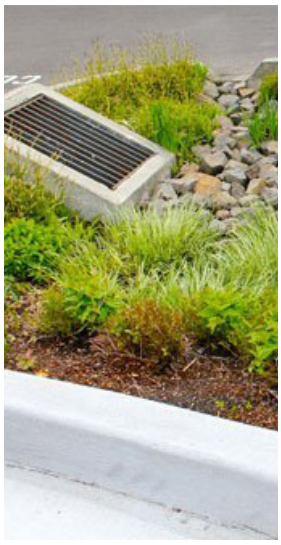
A. Vegetated Retention Basin: plantings should get adequate supplemental irrigation until fully established. Maintain landscaped areas including pruning shrubs to remove dead material and encourage new growth. The roots of healthy vegetation will improve the function of the basin. Regularly check for erosion, remove sediment and debris (vegetative litter as well as trash). Long-term maintenance activities include repairing erosion, continued weed control, removing weeds and invasive species, and controlling mosquitoes.

B. Bioretention Cell: Regularly check bioretention cells for blockages from debris and sediment. Remove sediment and debris and dispose of properly. Maintain landscape by replacing dead vegetation, pruning healthy vegetation and removing weeds regularly. Do not use herbicides in stormwater facilities. Bioretention soil may need to be replaced if soil percolation rates fall below the design flow capacity. Check percolation rates if bioretention cells have been contaminated by sediment inflows.

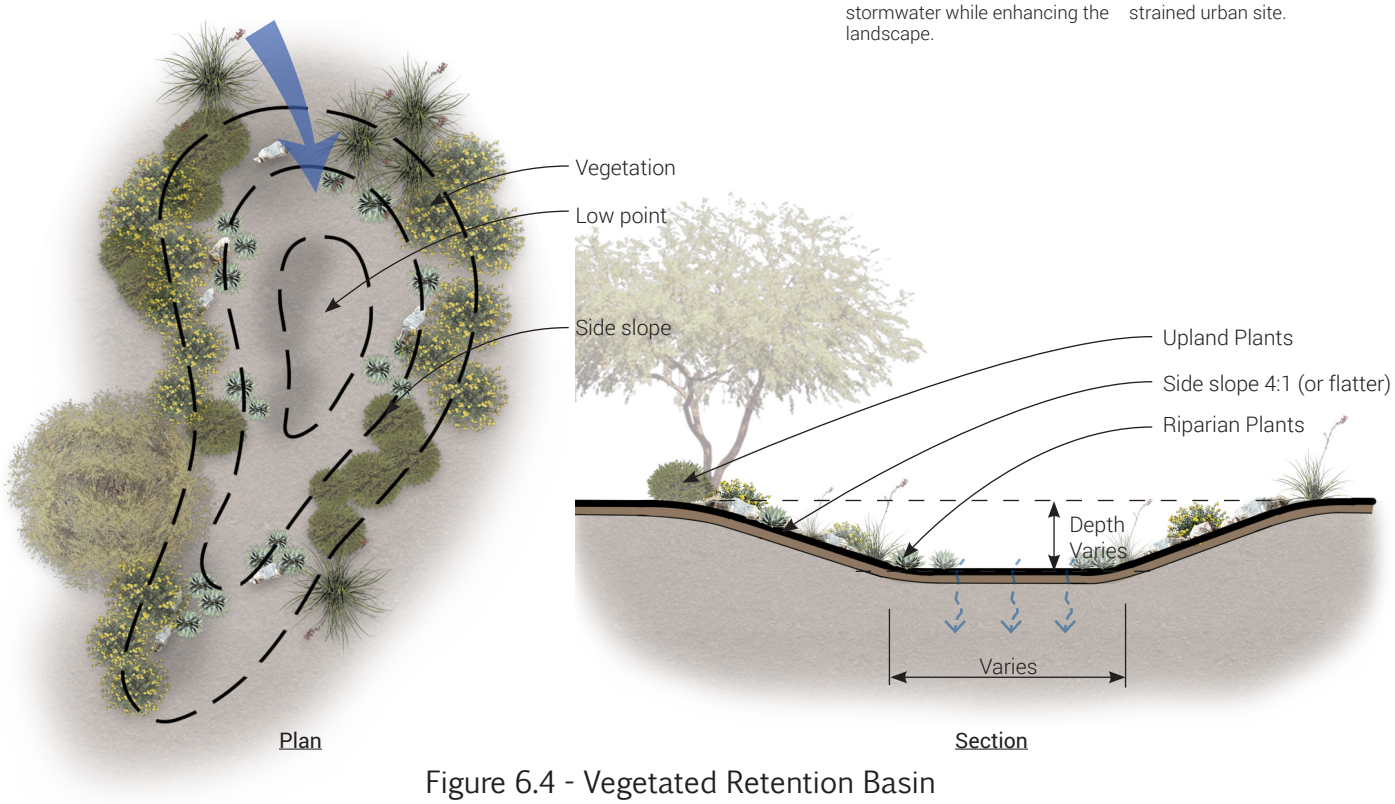
Source: http://buildgreen.ufl.edu/fact_sheet_bioretention_basins_rain_gardens.pdf, http://www.seattle.gov/DPD/Publications/CAM/cam532.pdf



Bioretention areas detain stormwater while enhancing the landscape.



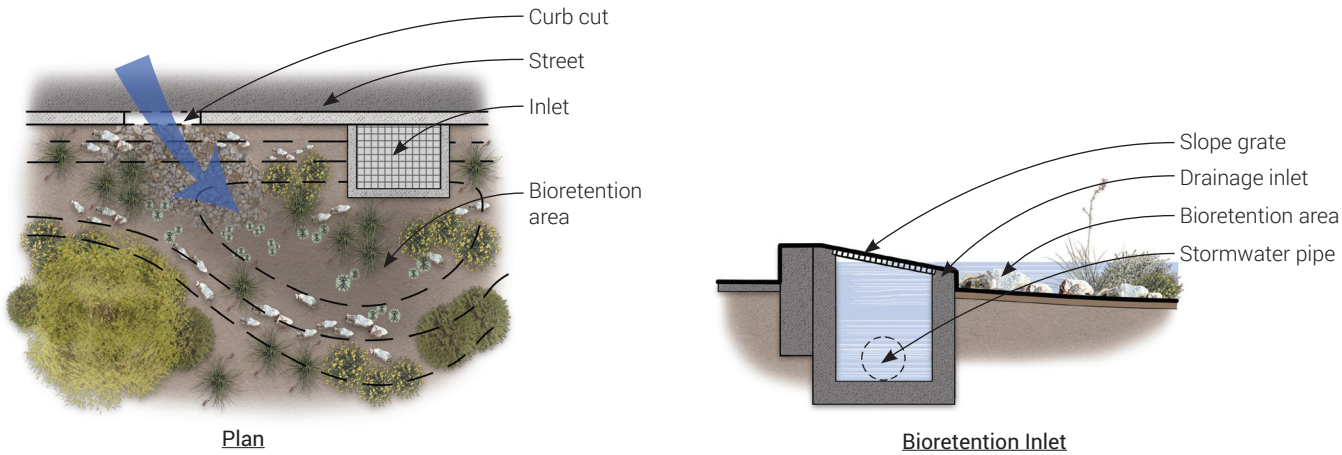
Bioretention cells fit into constrained urban site.



Plan

Section

Figure 6.4 - Vegetated Retention Basin



Plan

Bioretention Inlet

Figure 6.5 - Bioretention Cell

Permeable Paving – Permeable Pavers & Porous Concrete

Description

A. Permeable Pavers: Permeable pavers are comprised of precast concrete unit pavers designed to be set on a compacted base and highly permeable setting bed with joints filled with sand or fine gravel. Water enters the joints between the unit pavers and flows through an open-graded base, to infiltrate into the subgrade or be carried out into the storm system via underdrain piping. The void spaces in the subbase store water and infiltrate it back into the subgrade, or allow it to evaporate providing local air cooling. The sand joints provide surface permeability and helps filter stormwater sediments and pollutants.

B. Porous Concrete: Single size aggregate, also know as porous concrete, consists of a special mix design with void spaces that make it highly permeable. Aggregates are normally screened to provide particles that can fall within narrow limits to ensure porosity. About 30% to 40% of the material is void space, and its permeability is often measured in hundreds of inches per hour. Porous concrete reduces the velocity and volume of stormwater runoff delivered into storm sewer system and can reduce contaminants in runoff prior to its discharge to the storm sewer system

Installation

A. Permeable pavers:

1. A stable compacted subbase is essential for any flexible pavement such as porous pavers. The depth of rock and gravel must be capable of holding rainwater long enough for the soil underneath to absorb it.
2. Excavate to required subgrade depth, compact subsoil using a roller or vibratory compactor, and install geotextile fabric.
3. Prepare base material and compact using a roller or compactor. Install the crushed rock in separate layers and recompact. Install bedding layer and then paving stones with edge restraints.

B. Porous concrete:

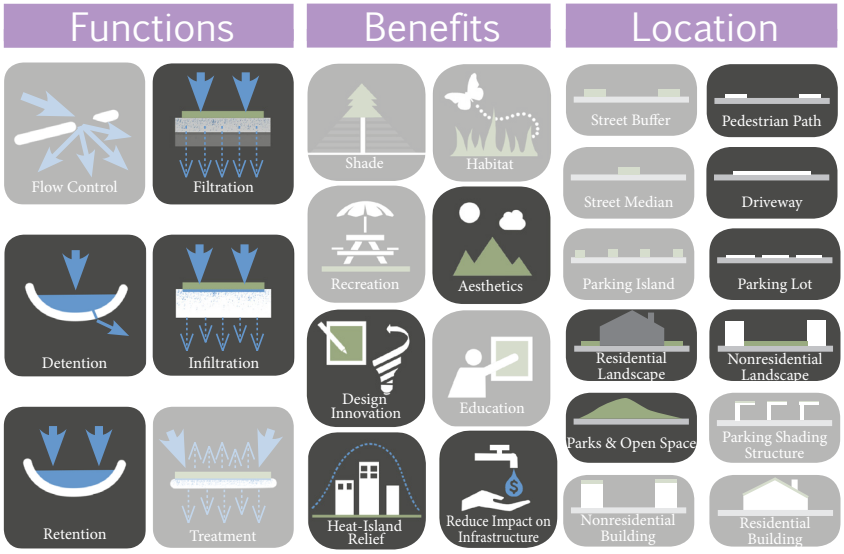
1. The porous concrete mix must be designed and installed by an experienced contractor. Poor materials and/or installation can result in a higher risk of failure.
2. The design for porous concrete consists of several layers, including a compacted sub-base, geotextile, a reservoir stone aggregate, and poured surfacing layer, formed with a screed finish.
3. Porous concrete is normally set flush with adjacent pavements or grades.
4. The subgrade reservoir should allow for drainage to the stormwater system through underdrain tile or piping, especially if the subgrade does not allow adequate infiltration. Underdrain tile or piping is sometimes necessary to achieve proper drainage.

Maintenance

A. Permeable pavers: inspect pavers regularly for settlement and broken pavers. Replace broken pavers immediately to prevent structural instability. Pavers can be removed individually and replaced during utility work. Do not pressure wash concrete unit pavers. Sweeping and vacuuming should be performed when paver areas are dry. Although a more expensive option for permeable pavement, concrete unit pavers are the most effective at reducing runoff and are often the most aesthetically pleasing option.

B. Porous concrete: Maintenance includes the regular vacuuming of surface areas to remove sediment and minimize clogging. With regular maintenance, porous concrete can have a service life of at least 20 years. Porous concrete should be checked periodically for settlement and cracking, and damaged areas repaired to match the original pavement design.

Source: http://www.icpi.org/permeable, http://www.wikihow.com/Install-Permeable-Pavers, http://www.perviouspavement.org/materials.html



Permeable paving is an attractive way to provide runoff reduction in paving and pedestrian areas.

Porous concrete can reduce runoff sustaining in sidewalks and plaza areas.

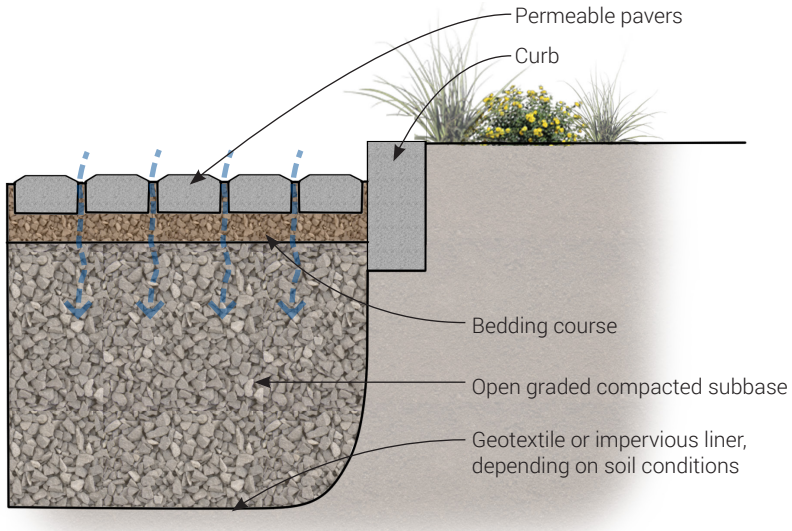


Figure 6.6 - Permeable pavers

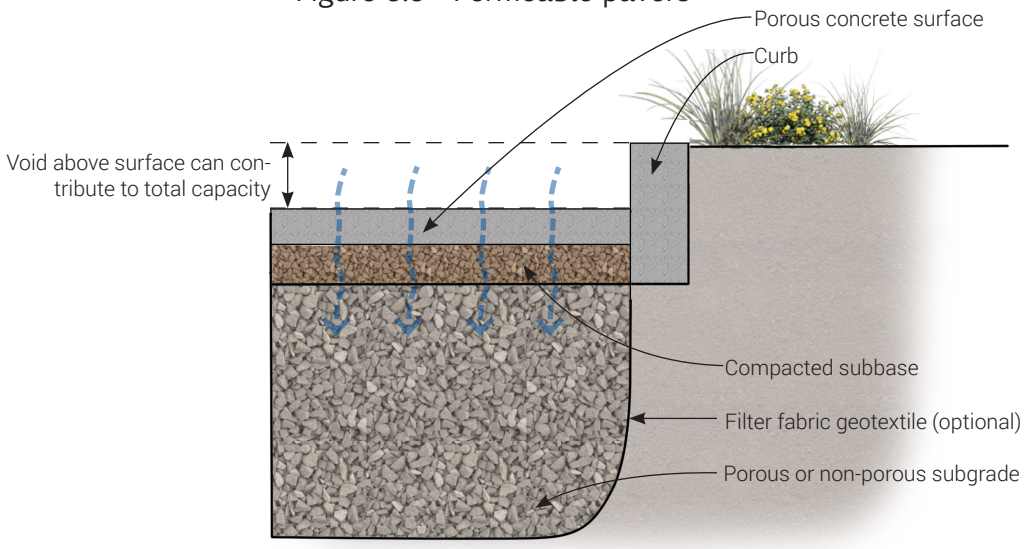


Figure 6.7 - Porous Concrete

GREEN ROOF – Rooftop Garden & downspout disconnection

Description

A. Rooftop garden

A green roof or Xeriscape living roof is when the roof of a building or structure is at least partially covered with a growing medium and vegetation planted over a waterproofing membrane. It may also include a root barrier, drainage mat and irrigation system. There are two types of green roofs: Extensive and Intensive. The difference is in the depth of soil and the ability to support simple groundcover planting (extensive) versus larger materials such as trees and shrubs (intensive). Green roofs provide stormwater storage and absorption, reduce runoff from buildings, and insulate buildings from solar gain and heat loss.

B. Downspout disconnection

Downspout disconnection is the practice of directing rainwater from the rooftop into a landscaped yard instead of into a piped system or into the street. Downspouts can direct stormwater to landscape areas where it is used to irrigate landscape plants, store or infiltrate into the ground.

Installation

A. Rooftop garden

1. The intended function of a green roof will have a significant effect on its design.
2. The height of the roof above grade, its exposure to wind, orientation to the sun and shading by surrounding buildings will all impact types of materials used and maintenance requirements. Views to and from the roof will also determine where elements are located for maximum effect.
3. Professionals must be consulted for the design and construction of the green roof. A qualified architect, structural engineer, landscape architect and facility maintenance personnel are critical to the success of a green roof project.
4. Access to a green roof site is crucial - not only for installation and maintenance, but also for delivery of materials, soil and plants.

B. Downspout disconnection

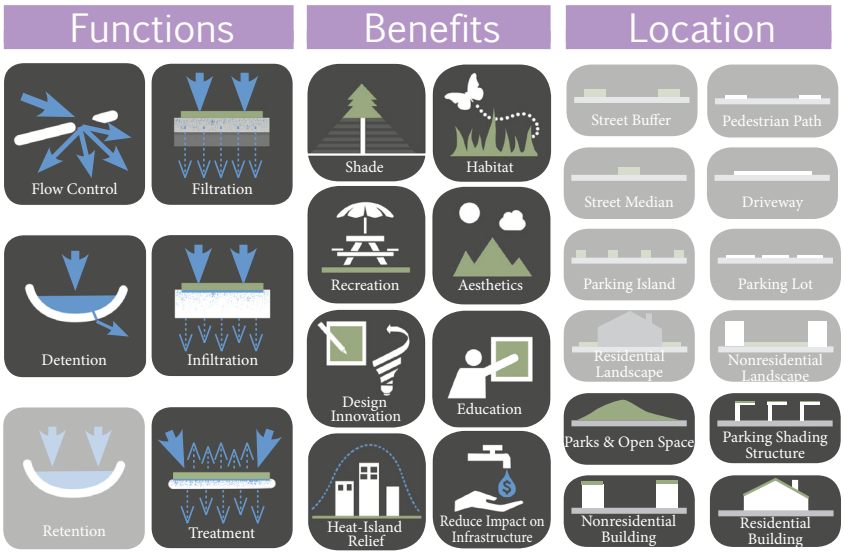
1. Direct downspout extensions away from building foundations or adjacent properties to avoid structural damage or nuisance flooding.
2. Firmly anchored splash blocks or hand placed rock can be installed to direct downspout drainage to landscaped areas.
3. Ensure that the offsite overflow is sufficiently lower than the building floor elevation to reduce the potential for building flooding.

Maintenance

A. Rooftop garden: only very hardy plants should be used in our desert environment and supplemented irrigation will be required. Depending on whether the green roof is extensive or intensive, required plant maintenance will range from two to three yearly inspections to check for weeds or damage, to weekly visits for irrigation, pruning, and replanting. Both plant maintenance and maintenance of the waterproofing membrane are required. To ensure continuity in the warranty and the maintenance requirements, the building architect, structural engineer and/or owner should specify and maintain everything up to and including the waterproof membrane. The greenroof designer and installer is only responsible for those items above the waterproof membrane, including soils, drainage and plantings.

B. Downspout disconnection: clean gutter at least twice a year, and more often if there are overhanging trees. Make sure gutters are pitched to direct water to downspouts. Caulk leaks and holes. Make sure roof flashing directs water into the gutters. Look for low spots or sagging areas along the gutter line and repair with spikes or place new hangers as needed. Check and clear elbows or bends in downspouts to prevent clogging. Each elbow or section of the downspout should funnel into the one below it. All parts should be securely fastened together. Maintain landscaping so that there is positive drainage away from all structures. Don't build up grade, soils, groundcover mulches, or other materials near the building that might inhibit positive drainage.

Source: http://www.cmhc-schl.gc.ca/en/inpr/bude/himu/coedar/upload/Design-Guidelines-for-Green-Roofs.pdf, Green Roof Service LLC, http://www.dwsd.org/downloads_n/announcements/general_announcements/downspout_disconnect_brochure.pdf, http://www.rwra.org/wp-content/uploads/2012/03/Owensboro-Downspout-Disconnect-Guidelines.pdf



Green roofs store and utilize stormwater to reduce runoff from building sites.

Disconnecting a downspout allows rainwater to supplement irrigation in the landscapes.

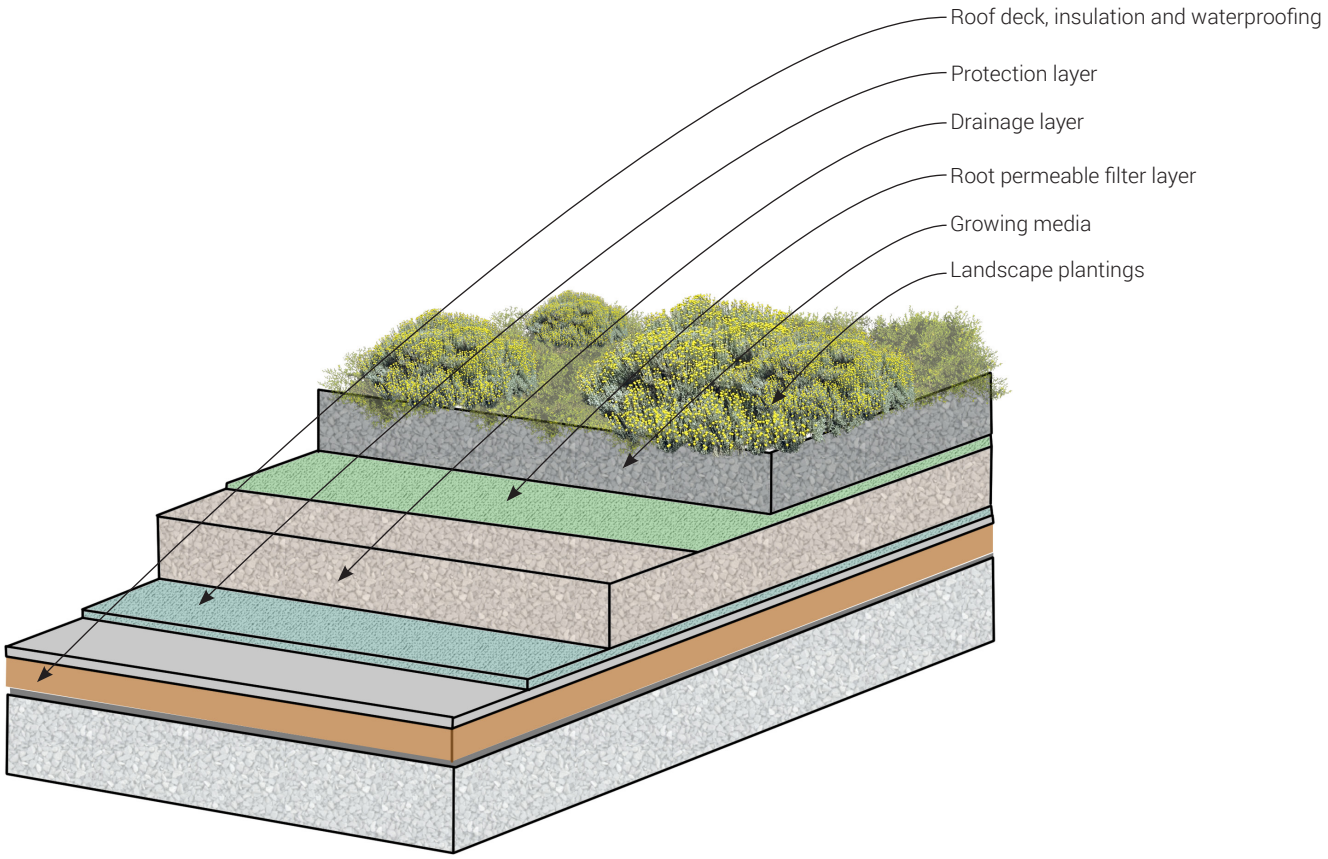
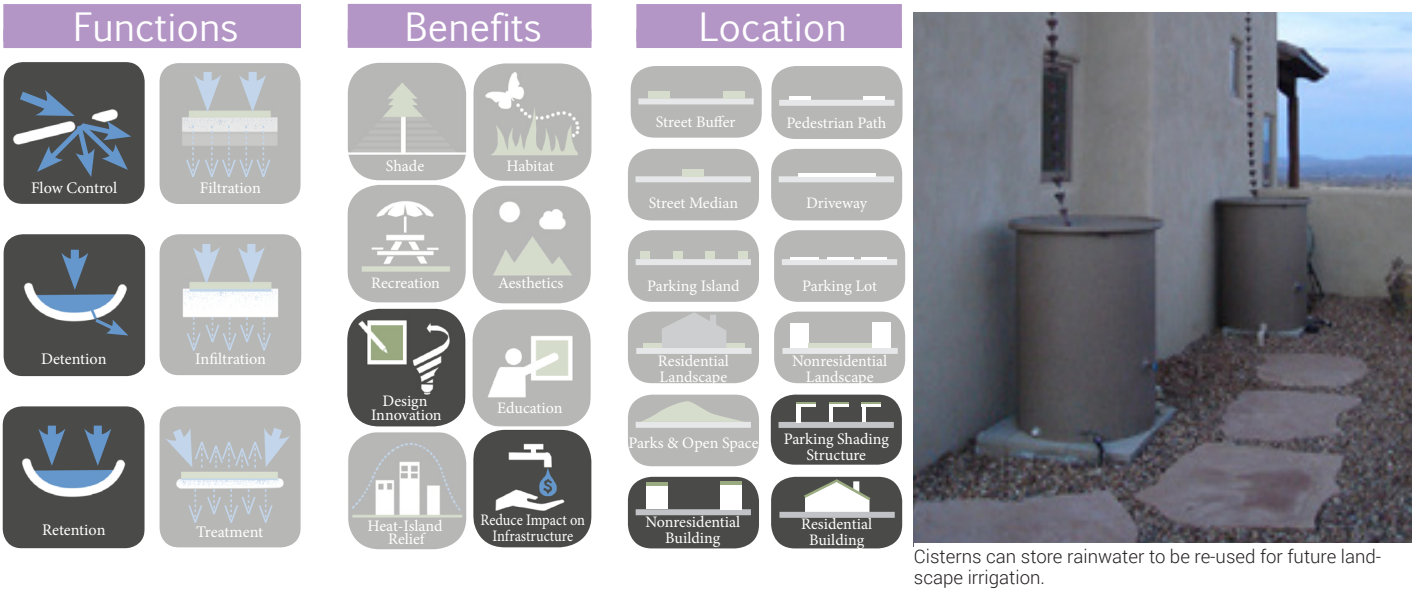


Figure 6.8 - Rooftop Garden

Rainwater Harvesting - Cisterns



Cisterns can store rainwater to be re-used for future landscape irrigation.

Description

A. A rainwater harvesting system captures stormwater runoff, often from a rooftop, and stores the water for later use. The storage capacity of a rainwater cistern depends on several factors, including the amount of rainfall available for use, the roof-catchment area available for collecting rainfall, the daily water requirements of the household and costs.

B. A rainwater harvesting system consists of four main components: a gutter system that collects runoff from the rooftop and directs it into the cistern, a cistern that stores runoff for later use, an overflow pipe that allows excess runoff to leave the cistern in a controlled manner, and an outlet pipe, sometimes connected to a pump, that draws water from the bottom of the cistern for irrigation use.

Installation

A. The most commonly available cisterns are made of plastic, fiberglass, or galvanized metal. Underground cisterns may be constructed of concrete or fiberglass. The size of the cistern can have the greatest impact on system cost and performance. Several factors must be considered, including contributing rooftop area, rainfall patterns and anticipated usage.

B. The primary constraint in selecting a cistern location is the position of the gutter downspouts. It is generally easiest and most cost effective to place the cistern near an existing downspout. When possible, locate the cistern near the site where water will be used.

C. A building, stone or gravel backfill or a poured concrete pad, may be required to provide structural support to an aboveground cistern.

D. Some type of overflow or bypass is required to release water when the cistern has reached its capacity.

E. To draw water from the cistern, some type of faucet or outlet pipe must be installed.

F. An existing gutter system can be easily modified to direct rainwater into a cistern.

G. Above-ground cisterns must meet all Town zoning requirements and receive all necessary permits.

Maintenance

A. Regularly check the gutters to make sure debris is not entering the rainwater harvesting system.

B. Inspect the screens annually to make sure debris is not collecting on the surface and that there are not holes allowing mosquitoes or other insects to enter the cistern.

C. Clean the inside of the cistern twice a year to prevent buildup of debris. Clean out debris twice a year, preferably prior to the beginning of each rainy season.

D. Maintain pumps or filters used in the rainwater harvesting system in accordance with manufacturer's recommendations.

Source: http://www.ces.ncsu.edu/depts/agecon/WECO/documents/WaterHarvestHome2008.pdf

Drainage Reports and Plans

7-1 Activities Requiring a Drainage Report and Grading Plans

A. An applicant may be required to submit a Drainage Report and Grading Plans when submitting any of the following applications. The specific nature of the plans and reports, and the requirements for submittal, will be determined by Town staff during the pre-application process.

1. Re-zoning
2. Special Use Permit
3. Development Plan
4. Preliminary and/or Final Subdivision Plat
5. Hillside Building Committee
6. Board of Adjustment
7. Final Plat, lot splits, lot line adjustment, lot combination and/or improvement plans
8. Right-of-way Permit
9. Building Permit with a grading component
10. Grading Permit
11. Modification or release of a dedicated drainage or retention easement

7-2 Types of Drainage Reports and Grading Plans

A. There are sequential levels of drainage reports and grading plans as development proposals range from broad and conceptual to project specific and detailed, as well as requirements for master-planned development proposals. Drainage reports and grading plans address stormwater flows and drainage issues that affect a proposed development, plus adjacent and nearby sites; and drainage solutions, in accordance with applicable ordinances and standards, to mitigate adverse effects resulting from the proposed development. Each drainage report and grading plan shall describe how the proposed development will manage stormwater runoff, the details of infrastructure to be constructed, the sequence of infrastructure installation, and any phasing of the project. Drainage reports and grading plans for single-family residences may vary from the sequence below, subject to town staff approval.

1. Conceptual Drainage Reports and Grading Plan. With re-zoning and special use permits, the applicant shall submit a Conceptual Drainage Report and Grading Plan that identifies the basic drainage conditions that apply to the site and possible stormwater management solutions that relate to the proposed development and unique condition of the site. In many cases, the Conceptual Drainage Report and Grading Plan will be included in a Development Plan (DP). The Conceptual Drainage Report and Grading Plan shall show how the drainage systems on the site will relate to and extend existing drainage systems serving adjacent and nearby properties. The Conceptual Drainage Report and Grading Plan shall establish the key elements for consideration in any future drainage reports and grading plans for the site, including applicable FEMA floodplain designations.

2. Preliminary Drainage Report and Grading Plan. With preliminary plat, subdivision, Master Plan and Hillside Building Committee or Board of Adjustment applications, the applicant shall submit a Preliminary Drainage Report and Grading Plan. While a Preliminary Drainage Report and Plan will not contain sufficient detail and accuracy to function as improvement plans, the Preliminary Drainage Report and Grading Plan must provide detailed design concepts, specifications for proposed drainage facilities, and management plans for operating and maintaining the drainage facilities. The Preliminary Drainage Report and Grading Plan presents the justification for final improvement plans and lowest floor elevations, the plan for connecting the proposed development to existing and planned drainage facilities on and adjacent to the site; pre- and post-project topography; and stormwater runoff calculations including off-site drainage that enters the site.

The Preliminary Drainage Report and Grading Plan shall also demonstrate consistency with any applicable Conceptual Drainage Report and Grading Plan and stipulations associated with approval.

3. Final Drainage Report and Grading Plans. With improvements plans for final plats, construction plans for public infrastructure, the modification of a drainage or retention easement, and construction plans for on-site development, the applicant shall submit a Final Drainage Report and Grading Plan. A Final Drainage Report and Grading Plan is intended for construction and therefore must be fully detailed; compliant with Town of Paradise Valley design standards and applicable regional, State and Federal statutes; and consistent with previously approved Preliminary Drainage Reports and Grading Plans and stipulations, if any.

4. Master Drainage Reports and Grading Plans. For multi-phased and complex development proposals, the Town may require the applicant to submit a Master Drainage Report and Grading Plan after a rezoning and intermediate/major special use permit amendment approval. A Master Drainage Report and Grading Plan provides the basis for constructing major common drainage improvements that serve an individual phase or property within the proposed development, the entire proposed development, or a portion of the regional drainage requirements. A Master Drainage Report and Grading Plan also establishes the drainage improvement requirements necessary for each phase of the development. A Master Drainage Report and Grading Plan shall be submitted before or with the first Preliminary Plat or Development Review case for the site.

7-3 STANDARDS

A. All drainage reports and grading plans should be prepared in conformance to the requirements in this chapter. Hydrology calculations may be performed using Drainage Design Management System for Windows (available at no cost through the FCDMC), HEC-1, HEC-HMS or the Rational Method. Hydraulic calculations may be performed using HEC-RAS. However, the Town encourages sound, innovative design and the use of new techniques where special conditions or needs exist. With prior Town staff approval, alternate methods, models and procedures may be used with appropriate supporting documentation.

B. Development shall not increase peak discharge rates above the historic peak discharge rates for 10-year and 100-year storm events.

C. Proposed grading shall be at least 0.5% to allow for positive drainage.

D. At a minimum, drainage reports should meet the following standards:

1. Reflect Town, County, State and Federal requirements
2. Use the best and most current data available
3. Provide a clear narrative of the methods used, parameters selected in the analysis and conclusions drawn
4. Be technically and legally defensible
5. Be well-organized and concise
6. Provide safe, reasonable and reliable results
7. Provide results that are consistent with adjacent jurisdictions

E. All drainage reports and grading plans shall conform to Town of Paradise Valley codes and standards.

7-4 LIMITATIONS

The Town does not guarantee the reliability of specific hydrologic methods, techniques and/or parameter values. The engineer is expected to validate the reasonableness of the estimated values and design the plan to keep the development and the Town relatively safe from flooding. The owner must submit the completed Warning and Disclaimer of Liability form, as available from the Town Engineer, with each grading and drainage plan.

7-5 GRADING AND DRAINAGE PLANS—METHODOLOGY AND CALCULATIONS

A. There are two methods to determine peak discharge:

1. The Rational Method (generally used for watersheds less than 160 acres that are regularly shaped and uniformly contoured). The methodology is provided in the FCDMC Hydrology Manual.
2. A rainfall runoff model using the Corps' HEC-1 or HEC-HMS Flood Hydrograph Package (generally used for watersheds that are larger than 160 acres, irregular in shape and contour, or if routing of flows is necessary).

B. Watershed Conditions

Watersheds are subject to change. Grading and drainage plans shall consider all watershed conditions that would result in the greatest peak discharge rate, to:

1. Size drainage facilities, and
2. Determine lowest floor elevations.

C. The Rational Methods

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.
2. Time of Concentration. Time of concentration "Tc" is the total time of travel from the most hydraulically remote part of the watershed to the concentration point of interest. The calculation of "Tc" must follow FCDMC Hydrology Manual procedures.
3. Runoff Coefficients. Use Runoff Coefficients for Use with Rational Method, as detailed in the Maricopa County Hydrology Manual, pages 3-5/3-6, to obtain the runoff coefficients or "C" values. Applying weighted average values calculated for the specific site is an acceptable approach.

D. HEC-1 or HEC-HMS Model

1. Minimum submittals.
   a. A printout of the input data
   b. A schematic (routing) diagram of the stream network
   c. The runoff summary output table, including drainage basin name, area, 100-year flow and 10-year flow values
   d. Electronic input file(s) on CD or DVD
   e. Supporting documentation and source material for parameter selection
   f. A narrative detailing the impact of adjustments to the modeling parameters made to address warnings and error messages
2. Precipitation. Determine precipitation values for modeling using the FCDMC Hydrology Manual, 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 addressed, see the FCDMC Hydrology Manual at

   http://www.fcd.maricopa.gov/downloads/manuals/Hydrology-Manual.pdf.
3. Infiltration. Determine infiltration or soil losses using Green and Ampt (G&A) procedures per FCDMC Hydrology Manual. Use the following, most recent, applicable USDA NRCS soil survey maps of the area to determine the hydrologic soil group or surface soil texture for the G&A procedures:

a. Aguila Carefree Area

b. Parts of Maricopa and Pinal Counties

c. Eastern Maricopa and Northern Pinal Counties

4. Hydrograph Generation. Generate small basin or sub watershed hydrographs using the Clark unit hydrograph procedure or S-graph method as described in the FCDMC Hydrology Manual.

5. Time of Concentration ("Tc"). Use the estimated time of travel from the most hydraulically remote part of the watershed to the concentration point. The FCDMC Hydrology Manual is recommended for obtaining Tc.

6. Channel Routing. Use the Normal Depth (Modified Puls), eight point routing procedure as described in the FCDMC Hydrology Manual for channel routing.

7. Existing and Proposed Discharge Analysis. Use the following analysis procedures when necessary to compare existing and proposed discharge (runoff)conditions. Reflect full development conditions by:

a. Increasing the percentage of impervious surfaces on the LG card to show the amount of impervious surface that will exist after full development.

b. Recalculating the time of concentration (Tc) based on the proposed drainage system, after full development.

c. Subdividing, as necessary, the existing condition model to create concentration points that match the sub-watershed areas above each proposed storage facility after full development.

d. Modeling each proposed storage facility as it will physically exist after full development, with appropriate routing and combining operations through each facility and through the entire watershed. Modeling storage capacity provided, as one hypothetical facility at the outlet with all upstream storage arbitrarily combined in the facility, is not acceptable.

e. Analyzing the 10-year and 100-year frequency events, at a minimum.

f. Comparing discharge values for existing and full development at concentration points just downstream from each proposed storage facility,other critical locations such as road crossings, and points where flows exit the development.

E. Calculation of Runoff Volumes

1. Standard Formula for Runoff Volumes The standard formula for determining the required stormwater storage runoff volume is in Section 3.2 above.

2. HEC-1 and HEC-HMS Computer Modeling. HEC-1 and HEC-HMS modeling may be used for storage basin design,routing and analysis. Use modified Puls level pool routing option in HEC-1 forhydrograph routing through storage basins and lakes. For permanent lakes,assume no available storage below the normal water surface elevation.

F. Methods for Estimating Water Surface Elevations and Inundation Limits

The engineer may use any standard method for determining water surface elevations. The Town prefers the U.S. Army Corps of Engineers' HEC-RAS, to determine inundation limits. If the applicant uses the U.S. Army Corps of Engineers' HEC-RAS Computer Models, the minimum required submittals for HEC-RAS are:

1. A printout and CD or DVD of the input and output data.

2. A plan of the contributing stream network and sub-basins with cross section locations and stationing, including 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 work map.

3. A detailed output summary table, including 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. Supporting documentation and source material for parameter selection.
6. A narrative to validate warning and error messages with details of the impact of adjustments to the modeling parameters on the output, if the Town staff allows warning or error messages.

7-6 GRADING AND DRAINAGE PLANS—ADDITIONAL REQUIREMENTS BY PLAN TYPE

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. Special Use and Multifamily Permits

The plan must show:

1. The location, orientation and an outline of refuse enclosures, including approach slabs.
2. Details of driveways conforming to town standard details, plus 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.
3. Horizontal control for proposed buildings, drive aisles, parking space dimensions and any other substantial improvements.
4. All drainage features such as catch basins, curbs and gutters, pipes, headwalls, basins, and drywells, along with flow arrows and appropriate elevations for each feature.
5. High and low points for driveway paving, with elevations.
6. Building setback lines.
7. Traffic and parking striping.
8. Access to underground parking areas.

B. Residential Subdivisions

The plan must show:

1. Lot numbers.
2. Tract names and street names from the final plat.
3. Street, tract and rights-of-way widths, and street centerlines from paving plans.
4. All drainage features such as catch basins, curbs and gutters, pipes, headwalls, basins, and drywells, along with flow arrows and appropriate elevations for each feature.
5. Street longitudinal and cross slopes.
6. 10-year and 100-year peak discharge rates at curb cuts and catch basins.
7. Flow path for small washes or swales through lots in custom residential subdivisions.
8. High and low points within streets, with elevations.
9. Building setback lines.
10. Top of curb elevations at the intersection of lot lines with the tract or rights-of-way lines.

C. Requirements for single-family development can be found at http://www.paradisevalleyaz.gov/DocumentCenter/Home/View/10.

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Drainage Easements

8-1 GENERAL INFORMATION

A. Drainage Easement Requirements

Refer to Town Code Section 6-3-8. Drainage easements are required for:

1. Watercourses with a 100-year, peak discharge rate of 50 cfs or greater.
2. Washes having historical banks, a bed and a cross sectional area of least 10 square feet.
3. All drainage and stormwater storage facilities.

Forms are available on the Town's website at http://paradisevalleyaz.gov/24/Permits-and-Handouts.

B. Extent of Drainage Easement Dedication

A drainage easement shall be dedicated to the Town to the limits of stormwater inundation from a base flood for the watercourses described above, plus drainage and stormwater storage facilities. Drainage easement dedications shall encompass all physical structures and sufficient area to access and maintain the facilities, including a setback from the property line. If the drainage easement is not contiguous to the right-of-way, a minimum 16-foot access easement, to maintain the drainage facility with mechanical equipment, shall also be dedicated, regardless of who maintains the drainage facility.

If a stormwater storage facility is fenced or barricaded, the access easement shall include a 20-foot setback between the fence or barricade around the perimeter of the facility. If a stormwater storage facility is not fenced or barricaded, the access easement shall include a 5-foot setback from the top of the bank around the perimeter of the facility.

Refer to Section 5-10-7 Paragraph C of the Town Code for easement requirements.

C. Maintaining a Drainage Easement

1. Unless otherwise indicated on the document dedicating the drainage easement or in a recorded agreement, the property owner is responsible for maintaining the drainage easement.
2. In addition to the requirements for maintaining a drainage easement in the Storm Drain Design Ordinance, the owner shall:
   a. Inspect the drainage facilities after each storm event of 0.6 inch or more, and semiannually, preferably before summer and winter rains.
   b. Remove accumulated trash and debris from inlet and outlet structures as needed for the free flow of stormwater.
   c. 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.

D. Releasing a Drainage Easement

1. A drainage easement may be released only if the applicant documents one of the following circumstances:
   a. Upstream flows have been physically cut off or diminished;
   b. More detailed or accurate topographic mapping and/or aerial photography show the original dedication is incorrectly located; or
   c. The original hydrology is outdated or in error.
2. The Town staff may determine that retaining the easement is in best interest of the Town, and may not grant the release. The Town staff may impose reasonable conditions before releasing a drainage easement. Once all conditions have been satisfied, as determined by Town Council, Town Council may grant the release.

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Grading Permits

9-1 GENERAL INFORMATION

A. A review of the improvement plans must be completed by Town staff before applying for a grading permit.

B. Before a grading permit is issued:

1. All substantial grading and drainage issues associated with a project must be resolved to the satisfaction of the Town Engineer.
2. The Town Council must have approved the final plat, or other entitlement if applicable, for the project. This requirement may be waived by the Town Engineer at the Applicant's own risk.
3. The owner must complete a Native Plant Preservation Plan. The Native Plant Preservation Plan shall be placed with the improvement plans submitted for the preliminary grading permit.
4. If applicable, the owner must obtain a Haul Permit.
5. If applicable, the owner must obtain a Stormwater Storage Waiver.
6. The completed No Conflict signature box must be placed on the cover sheet, signed and dated, and all applicable No Conflict letters submitted.
7. The owner must provide a copy of the approved AZPDES Notice of Intent (NOI) and SWPPP.
8. When applicable the owner must provide a completed Section 404 Certification form and a copy of a permit from the US Army Corps of Engineers.
9. The owner must submit 2 full size sets of grading plans (24 inches x 36 inches).
10. The owner must meet any other project specific requirements to issue a final grading permit.

C. A Grading Permit may only be issued upon approval by Town staff.

9-2 STOCKPILE PLANS

A. Upon Town staff approval, an applicant may temporarily store on-site excess soil from construction operations. To receive approval, the applicant must submit:

1. A letter signed by the applicant stating the duration of the stockpile and the methods used to control dust.
2. A plan prepared in conformance with grading and drainage plan requirements showing the stockpile location.
   a. The stockpile may not be located on, or within, any easements, rights-of-way or watercourses.
   b. The plan must provide at least one cross-section through the stockpile, labeling the side slopes and the maximum height of the stockpile, and show the total volume of the stockpile.
   c. The plan must show and label all proposed open space areas.
   d. The plan must manage drainage runoff from the stockpile and upstream watersheds by considering stockpile location, stockpile design and grading, and/or temporary stormwater storage.
3. A Native Plant Preservation Plan for the area to be used for stockpile. The Native Plant Preservation Plan shall be placed on the stockpile plan.

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DESIGN AND MAINTENANCE GUIDELINES

10-1 SITE CONTEXT

A. 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.

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. Refer to Town Zoning Code Chapters 22 and 24 for retaining wall and fence requirements.

10-2 NATURAL AREAS

A. Preservation:

Grading and design of landscape improvements will preserve and restore natural wash corridors that provide stormwater conveyance.

B. Aesthetic Standards:

All designed channels shall be formed to blend with the surrounding landscape, including contoured site grading for earthen channels and matching plant types and density.

C. Landscaping:

Utilize Sonoran Desert indigenous plant material wherever appropriate in landscaping associated with construction and maintenance of public property and easements for stormwater conveyance. Town Landscape Guidelines can be found at: http://www.paradisevalleyaz.gov/DocumentCenter/Home/View/37

D. Visual Character:

In order to create high quality and high performance landscapes that reflect the positive character of the Town, drainageways, wash corridors and other storm drainage facilities will be designed to provide visual and physical continuity through attractive, cohesive and diverse design elements consistent with the Town Landscape Guidelines.

E. Natural Wash Corridors:

Town rights-of-way and easements along natural wash corridors are important to maintain and preserve the natural environment and landscape features. Natural Wash Corridors shall include, whenever feasible, a landscape buffer area of at least 5 feet on each side, perpendicular from the top of the bank.

F. Maintenance:

Regular (annual) inspections are required by the property owner, to determine the condition of drainageways, including erosion, sedimentation, dead or unhealthy vegetation, potential for blockage and need for maintenance. Dead or dying plants shall be replaced immediately. Vegetation shall be pruned regularly to remove dead limbs and overgrowth.

Figure 10.1 - Typical Natural Wash Landscape

G. Access:

For Natural Washes, new development should provide, if possible, a minimum 10-feet wide accessible clear zone area for emergency and ordinary maintenance vehicle access. For access to minor drainageways and basins including roadside swales, ditches and sediment basins, allow for reasonable access for regular maintenance and emergency use. Access may be combined with trails.

10-3 DRAINAGE PLANNING

A. 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 retention and detention basins to blend into the natural contours and undulations of the site and the local natural terrain.
10. Locate retention and 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.

B. Retention Basins

1. The design depth of water stored in the basin shall not exceed 3 feet.
2. The maximum side slope of the basin is 4:1 unless otherwise approved by Town staff.
3. Round and contour the bottom and top edges of the side slopes in order to achieve a gradual slope transition.
4. Where retaining walls are utilized as part of a basin, use textured and/or dark surface treatments on the portion of the wall that could be inundated to minimize the visibility of water staining. Guardrails may be required at the top of such walls per the Town's adopted building code.
5. Use only plant materials in basins that are capable of surving while being inundated. 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 percent of the frontage landscaped area unless specifically approved by the Town.
7. Unless otherwise waived by the Town Engineer, drainage basins should not be placed on individual lots unless all of the following criteria are met:
   a. Basin is designed to retain pre-vs.-post volume per Section 3
   b. Basin is directly accessible and visible from a street or alley
   c. Maintenance of the basin is designated to a property owners association
   d. Basin and its access are placed within a drainage and access easement
8. Landscape installation shall conform to the most current Town 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.
12. 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

C. 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 on-site use, such as dining patios or pathways, 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 onsite buildings.
4. Any rock used in any drainage facility shall be native and/or crushed rock. Do not use river-run cobbles.

10-4 CONTEXT SENSITIVE DEVELOPMENT OF STORMWATER FACILITIES

A. Planning and Design:

Planning of drainage facilities should be based upon integrating natural waterways, designed channels and other storm drainage improvements into the development of a desirable setting where aesthetic enhancement is a primary motive. Storm drainage facilities that are designed to be sensitive to their site and community context can provide multiple benefits and encourage proper care and maintenance. Since drainageways and washes are normally continuously connected, they provide unique opportunities for linear open space and vista corridors, as well as landscape buffers, trail connections and wildlife linkages across the community.

B. Conveyance and Storage:

Wherever possible drainage corridors and stormwater storage basins should be combined with open space and neighborhood parks to create focal points and use areas for the community. Passive recreation activities such as hiking, jogging, and enjoyment of natural areas is highly compatible with the function of natural wash corridors and stage facilities. Avoid placing recreation facilities in the bottom of stormwater facilities to minimize risk of damage and harm. Amenities within the inundation area of a storm water facility shall be adequately secured to prevent them from becoming waterborne debris.

C. Aesthetic Design of Materials:

Concrete channels are generally not permitted in stormwater conveyances. Use of concrete structures shall be minimized and all structures shall be designed with colors and finishes appropriate to their context. Flat or sloped concrete surfaces shall be designed with a roughened surface to discourage inappropriate recreational use. Exposed concrete structures require the use of integral colored concrete with a formed finish as approved by the Town. Railings are highly discouraged, but where required shall be designed and finished to blend with the surrounding landscape as approved by the Town. Use of rip-rap for channel protection is discouraged.

10-5 IMPROVEMENTS TO NATURAL WASHES

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 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 areas 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 areas 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 watershed area 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.

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 Town Engineer), 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 with warning signs.

10-6 STREET GRADING

This section establishes criteria for cut and fill slopes, slope stabilization, erosion controls and restoration of scarred areas due to grading associated with street construction. All 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 right-of-way is 4:1 (horizontal to vertical) and for cut slopes is 3:1, unless otherwise approved by the Town engineer.
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 may require the use of guardrails.
5. The maximum height of cuts and fills for roadway improvements is 8 feet, as measured vertically from the pavement surface to the natural grade at the toe or top of the constructed slope.
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.
7. Maintain an average height of 6 feet 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.
9. Heights exceeding the above criteria may be allowed by the Town engineer provided the applicant demonstrates that objectives of the Storm Guidelines 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. Town staff may require mitigation techniques for cuts and fills greater than 8 feet. 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 Town building code and also conform to the following requirements. The heights and types of retaining walls shall be subject to Town engineer approval, 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 Town.
3. Consider terraced walls in place of a single wall for instances requiring retaining walls in excess of 6 feet in height. 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. Refer to chapter 22 and 24 of the Town Zoning Code for retaining wall and fence requirements.
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

10-7 PLANT MATERIALS

Protected Native Plants

A. Species

Specific native plants are protected as described in the Town's Native Plant Ordinance.

1. Trees over four (4) inches caliper of the following species:

BOTANICAL NAME	COMMON NAME
Acacia constricta	Whitethorn Acacia
Acacia greggii	Catclaw Acacia
Cercidium floridum (Parkinsonia florida)	Blue Palo Verde
Cercidium microphylum (Parkinsonia microphyllum)	Foothills Palo Verde
Olneya tesota	Ironwood
Prosopis spp.	Mesquite

2. Cacti

BOTANICAL NAME	COMMON NAME
Carnegia gigantea	Saguaro
Ferocactus spp.	Barrel
Fouquieria splendens	Ocotillo
Peniocereus greggii	Desert Night-Blooming Cereus

No protected plant material (as defined above) may be relocated, removed, or destroyed without approval of a Native Plant Preservation Plan. No native plant certification shall be issued unless an application is submitted in conjunction with an existing or proposed development for approval.

B. 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.
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.

Native Plants in Retention and Detention Basins and Drainage Channels

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

1. Plants that can be placed on the bottom of a basin:

BOTANICAL NAME	COMMON NAME
Prosopis velutina	Velvet Mesquite
Atriplex canescens	Four-wing Saltbush
Celtis pallida	Desert Hackberry
* Acacia greggii	Catclaw
Justicia californica	Chuparosa
Ambrosia ambrosioides	Canyon Ragweed

2. Plants that may be placed on the sides of a basin (including all plants listed above):

BOTANICAL NAME	COMMON NAME
Olneya tesota	Ironwood
Cercidium floridum	Blue Palo Verde
Chilopsis linearis	Desert Willow
Lycium Species.	Wolfberry
Hyptis emoryi	Desert Lavender
Calliandra eriophylla	Fairy Duster
Larrea tridentata	Creosote
* Simmondsia chinensis	Jojoba
* Dodonaea viscosa	Hopbush
* Ephedra trifurca	Mormon Tea
Hymenoclea monogyra	Cheese Bush
* Lotus rigida	Deer-Vetch

3. Plants that should not be used in any part of a basin:

BOTANICAL NAME	COMMON NAME
Cercidium microphylla	Foothills Palo Verde
Opuntia Species.	Chollas and Pricklypears
Ferocactus Species.	Barrel Cacti
Ambrosia deltoidea	Bursage
Agave Species.	Century plants
Encelia farinosa	Brittlebush
Eriogonum fasciculatum var. poliofolium	Buckwheat
Fouquieria splendens	Ocotillo

Slope Revegetation with Native Plants

1. Restore all exposed slopes created by grading to a natural condition and stabilize them to minimize erosion and slope collapse or wasting.
2. Restoration shall include revegetation with native species as found on similar natural slopes in the area.
3. Treat cuts into rock or caliche with artificial weathering techniques.
4. Irrigate all revegetated areas for at least 3 years or until the vegetation has become established.
5. Do not use imported decomposed-granite soil-cover/mulch in revegetated areas or in any place within open space areas.
6. 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.

10-8 LANDSCAPE MAINTENANCE

Most native and desert adapted plants need little or no water and fertilization once they are established. Fertilizer and pesticides should not be used in or around stormwater management areas as the materials can contaminate downstream water courses. Plants should be inspected annually to determine the need for pruning or replacement. Most desert native and adapted plants can maintain their natural form without much pruning. Prune plants properly as recommend by a certified arborist when at least one of the following conditions is present:

1. Need to remove dead diseased or weakened branches or plants
2. Keep flow channels and lines of sight clear for inspection and maintenance of channels and washes.
3. Need to control or direct growth

After major storm events, and at least annually, inspect grading, ground coverings/mulch, irrigation systems and other site improvements for signs of damage or erosion. Repair or restore immediately to minimize additional damage.

Refer to Paradise Valley Landscape Guidelines and the Town Code Section 5-8-4 for more information.

Appendix 6A

DRAINAGE REPORTS AND PLANS

A. For all Drainage Reports and Plans, provide as required for the level of detail for each type of drainage report and plan:
   1. Analysis based on:
      a. HEC-1, HEC-HMS, HEC-2 or HEC-RAS, Flowmaster, HY-8, Culvert Master and/or DDMSW; or
      b. Nonstandard software, if approved by town staff, and if working nonstandard software is provided.
   2. Two bound copies (3 ring, GBC or Coil wire, no staples), with card stock front and back covers.
   3. Information for the entire project site and off-site at least fifty feet from site.
   4. Topography, based on current surveys, as follows:
      a. For topography on site and 25 feet beyond the property line, as well as any area subject to a hydraulic model, show existing and proposed topography with minimum 1-foot contours, with 5-foot contour lines distinguished for readability. Exceptions may be considered on a case-by-case basis for substantial areas of undisturbed ground not subject to inundation in a base flood.
      b. For off-site topography necessary to delineate watershed boundaries, show existing topography with minimum 2-foot contours. Subject to town staff approval, show spot elevations in lieu of 1-foot contours for development that does not have enough relief to use 1-foot contours.
      c. All proposed contours must align with all existing contours.
      d. Showing how topography influences stormwater runoff from the development and off-site watersheds.
      e. Provide cross sections as necessary to adequately demonstrate how the proposed site grading will not adversely affect other property.
   5. Current color aerial photographs:
      a. On-site, minimum 400 scale aerial photos, clearly identifying project site.
      b. Off-site, minimum 800 scale aerial photos, showing project site in context.
   6. On-site photographs to support parameter selection.
   7. Drainage Plans: show 1-foot contours, 24” x 36”.
      a. Scales of Drainage Plans are shown below; alternate scales are subject to town staff approval.
      b. All plans shall label substantial cut and fill areas with a directional arrow, with the slope expressed as horizontal to vertical (H:V).
      c. All plans shall provide a legend for all line types, symbols and abbreviations used on the plan.

   d. All plans shall be clearly readable even if reduced by 50%, as determined by city staff.
8. Sufficient detail to allow thorough review.
9. Plan Check Number and/or Case Number on the right margin of cover and each page.
10. FEMA blocks, information and certification as required in Chapter 1.
11. Full size plans/maps, folded, contained in pockets and listed in the Table of Contents.
12. The Drainage Report and Plan, including all Chapters, Figures, Attachments, Plans, Maps and Appendices as a PDF file.
13. A compact disk (CD) or digital video disk (DVD) containing the entire Drainage Report and Plan, including all Chapters, Figures, Attachments, Plans, Maps and Appendices with data files of analysis required above, all in PDF format. The CD and DVD shall be labeled and include the engineer's name, firm name, project name, date, and Plan Check Number and/or Case Number. The CD or DVD shall be in a case and placed in the separate folder in the Drainage Report and Plan. This CD or DVD shall also contain all hydrologic and hydraulic input and output files such as HEC-1 and HEC-RAS.
14. Completed and signed Warning and Disclaimer of Liability. See App. 6B in this chapter.

B. For all Drainage Reports and Plans, provide:
   1. Title Page:
      a. Type of Report (Conceptual, Preliminary, Final or Master Plan).
      b. Project Name.
      c. Location.
      d. Plan Check Number and/or Case Number.
      e. Benchmark datum of NAVD 1988, or subject to town staff approval, a local benchmark with an elevation equation related to NAVD 1988, to nearest hundredth of a foot in the format LF88 = X,XXX.XX.
      f. Engineer's seal, signature, and date, in accordance with AZBTR requirements.
   2. Table of Contents:
      a. List of All Chapters, Figures, Attachments, Plans, Maps and Appendices.
      b. Engineer's seal, signature, and date.
   3. Introduction:
      a. Project Name, location, size and brief description (including scope of project).
      b. Vicinity map.
      c. Purpose and objectives of Drainage Plan.
      d. Executive summary of findings, conclusions and proposals.
      e. Special Conditions, if applicable, including project stipulations; erosion issues; 401 and 404 Permits; ADEQ Permits; AZPDES Permits; and stormwater storage waiver, wash modification and phasing proposals.

4. Data Analysis Methods: Provide a narrative of, pre- and post-development, for on-site and off-site conditions:
   a. Hydrologic procedures, parameter selection and assumptions.
   b. Hydraulic procedures, methods, parameter selection, design criteria and assumptions.
   c. Stormwater storage calculation methods and assumptions, including accounting for sediment.
   d. Basis for setting lowest floor elevations relative to designated floodplains and adjacent washes; or outside a floodplain, relative to highest adjacent grade.
5. Conclusions.
   a. Summarize the data analysis methods used.
   b. State how the conclusions are reached.
6. References and Appendices: Provide the following technical data to support the conclusions, based on the level of detail required for each type of grading report and plan described in section 6.2.
   a. Data and calculations
   b. Peak flow calculations (e.g. Rational Method or HEC-1 printouts)
   c. Channel design calculations including toe-down protection and drop structure design
   d. Culvert design calculations
   e. Floodplain calculations (e.g. Manning's and/or HEC-RAS printouts)
   f. Stormwater runoff calculations
   g. Storage volume calculations
   h. Retention/detention basin inflow outflow analysis and design calculations
   i. Street capacity calculations
   j. Curb opening, catch basin calculations
   k. Storm drain calculations
   l. Sediment and scour calculations
   m. Rip-rap sizing
   n. Erosion/sediment control plan
   o. Soils and or geologic analyses
   p. Hydrologic and hydraulic data and calculations
7. Different information and format:
   a. Town staff may require additional information, or information in a different form from that required above, to address unique situations or assist town staff in thorough review of the Drainage Report and Plan.

c. Additional information must conform to generally accepted engineering principles and practices to allow town staff to assess whether the Drainage Report and Plan meets town standards.

C. For Conceptual Drainage Reports and Plans, provide the documents required in A and B above with further specifications below:
   1. Plans to a minimum scale of 1" = 40'
   2. The Report must include the phasing information, including:
      a. Graphic of areas to be phased, with labels of phases.
      b. Justification for phasing.
   3. The Plan must show and label, on separate pages, (1) pre-development, on-site and off-site, and (2) post-development, on-site and off-site:
      a. Watershed and floodplain boundaries.
      b. FEMA floodplain designations.
      c. Dimensions and calculation of disturbed area.
      d. Flow lines and flow rates; with dashed lines for flow line of watercourse bottoms.
      e. Historical flow path entry and exit locations.
      f. 100-year peak discharge rates at key concentration points.
      g. Land use, building footprints, utilities and development conditions.
      h. Existing watershed and drainage characteristics, network and patterns.
      i. Location, description and purpose of existing and proposed drainage infrastructure; conveyance of off-site flows; connections to and probable effect on upstream and downstream drainage systems.
      j. Existing drainage easements and rights-of-way, with the Maricopa County Recorder's number.

D. For Preliminary Drainage Reports and Plans, provide the documents required in A., B. and C. above with further information and specifications below:
   1. Plans to a minimum scale of 1" = 30'.
   2. FIRMs.
   3. Proposed waiver of any stormwater storage requirement.
   4. Topographic plan resulting from proposed on-site grading.
   5. The Report must include the following descriptions and analysis:
      a. Existing land use in the watershed area, and proposed land use resulting from development.
      b. Explanation of parameters of analysis used.
      c. Basis of selection of lowest floor elevations.
      d. In AO Zones, the lowest floor elevations and highest adjacent grade (HAG), calculated as follows: Determine the Regulatory Flood Elevation (RFE) to set the LF88

for residential structures. The RFE = the HAG Elev + AO depth No.+ 1 foot of freeboard.

e. In local floodplains and special flood hazard areas, for all structures, show the lowest floor elevations, BFE, highest adjacent grade, and, in addition, for commercial structures, floodproofing elevations. If the lowest floor is below the base flood elevation, the design for protecting the interior of the structure. For calculating the BFE, see FEMA Publication 265: Managing Floodplain Development in Approximate Zone A Areas – A Guide for Obtaining and Developing Base (100-year) Flood Elevations at http://www.fema.gov/library/viewRecord.do?id=1526.
f. For all mechanical equipment and attendant utilities, in local floodplains and special flood hazard areas, show the lowest floor elevations, BFE, highest adjacent grade, and, in addition, for commercial structures, floodproofing elevations, if applicable.
g. Existing walls and provide top of wall elevations.
h. Wash cross-sections to show that the wash has adequate capacity and freeboard to convey runoff through the site.
i. Scour effects.
j. Proposed drainage infrastructure, including storage facilities design criteria, volume required (VR = XXX ft3), volume provided (VP = XXX ft3), and basin locations.
k. Management plans for operating and maintaining all drainage infrastructure.
l. Consistency with applicable ordinance requirements, standards, approved stipulations, General Plan (Land Use Element), Conceptual Drainage Report and Plan, Master Drainage Report and Plan, and other proposed developments affecting the site, including capital improvement projects.
m. Phasing information, including detailed graphic of areas to be phased, with labels of phases, and descriptions and analysis of all drainage Improvements to be constructed in each phase, timetables for each phase, impact of phased construction, and required interim drainage infrastructure. Each phase shall provide drainage infrastructure to serve that phase, and create no adverse impact off-site.

6. The Plan must show and label, pre- and post-development, on-site and off-site:
   a. Topographic or other physical discontinuities relative to adjacent properties.
   b. Existing and proposed property lines and, for existing properties, assessor's parcel numbers.
   c. Plan Check Number and/or Case Number for adjacent development that has occurred in the last 5 years.
   d. 100-year peak discharge rate at all entry and exit locations, and flow concentration points.

e. Runoff from a base flood, and consideration of storm events more frequent than the base flood. Development shall not increase peak discharge rates above the historic peak discharge rate for any event up to and including the base flood.
f. Modeling results of flow amounts, velocities and routes.
g. Location of proposed drainage infrastructure, including storage facilities (with volume required, volume provided and drain times), and related to adjacent properties, regional drainage plans and existing drainage infrastructure.
h. Wash cross-sections, including flow rate, water surface elevation, velocity and top width.
i. Size, capacity and nature of off-site drainage infrastructure entering and exiting the project site.
j. Impact of development on project site and future development within fifty feet of project site.
k. Proposed drainage easements, including easements over watercourses with a 100-year peak discharge rate of 25 cfs or greater, showing the limits of the easement.
l. Upon town staff request, spot elevations.

E. For Final Drainage Reports and Improvement Plans, provide the documents required in A, B, C and D above with further specifications below:
1. Plans to a minimum scale of 1" = 20' showing grade breaks and flow arrows.
2. One-foot topographic contours based on a current survey for the entire development site to 25 feet beyond the property line and for off-site areas where a hydraulic model is necessary.
3. Certification that all applicable local, state and federal permits have been obtained.
4. Notice of Intent, Stormwater Pollution Prevention Plan and ADEQ checklist, as approved by ADEQ, as applicable.
5. Proposed drainage easement agreements, including legal descriptions, title commitments and confirmation of easements signed by lienholders.
6. Certification:
   a. The plan relies on accurate figures and analysis.
   b. The plan meets all applicable requirements and standards.
   c. The plan reflects all elevations based on the city's benchmark of NAVD 1988, or subject to town staff approval, based on a local benchmark with an elevation equation related to NAVD 1988.
   d. The plan is consistent with approved stipulations and the Preliminary Drainage Report and Plan.
   e. All structures are safe from flooding.

f. The development shall have no adverse impact on-site or off-site.

7. The Report must include the following descriptions and analysis:
   a. Location of all on-site and off-site culverts, with number, material, size of pipes, and upstream and downstream invert elevation labels.
   b. How topographic changes from the project affect drainage characteristics, including time of concentration.
   c. Whether model was developed with subcritical, supercritical or mixed flow analysis.
   d. Methods to address any erosion issues consistent with DSPM requirements.
   e. Existing land use and Green Ampt soil characteristics for the site, including USDA NRCS soil survey maps.
   f. Phasing information, including detailed timetables for each phase, and demonstrated compliance with applicable stipulations.
   g. An appendix addressing town review comments, with cross-references to the revised Plan.
8. The Plan must meet standards for improvement plans, complete with detailed engineering and construction notes. The Plan must show and label, pre- and post-development, on-site and off-site:
   a. On-site drainage sub-basins.
   b. Limits of inundation for all watercourses with a 100-year peak discharge rate greater than 50 cfs.
   c. 10-year and 100-year peak discharge rates for all washes entering and exiting the site, with intermediate locations of 10-year and 100-year peak discharge rates within the site at least 1 time per sheet per wash, at confluences and points of interest such as culverts, storm drains, utility crossings, and channel improvements, shown with a directional arrow in the following format: Q10/Q100 = xx cfs.
   d. All existing and proposed walls, and top and base wall elevations at wall ends, changes in elevation, and as required by town staff.
   e. Utilities labeled by type.
   f. Easements labeled by type, such as drainage, water, sewer, access, public utility, sidewalk and natural area open space.
   g. Dimensions, capacities, materials, cross-sections and typical details of proposed drainage infrastructure.

F. For Master Drainage Reports and Plans, provide the documents required in A, B and C above with further specifications below:
   1. Plans to a minimum scale of 1” = 100’.

2. The Report must include the descriptions and analysis of all drainage Improvements to be constructed in each phase, the impact of phased construction, and required interim drainage infrastructure.
3. The Plan must show and label, pre- and post-development, on-site and off-site:
   a. Existing land use in the watershed area, and modified land use resulting from proposed development.
   b. Size, capacity and nature of off-site drainage infrastructure entering and exiting the project site.
   c. All drainage improvements to be constructed in each phase and required interim drainage infrastructure.

Appendix 6B

WARNING AND DISCLAIMER OF LIABILITY

The Town's Stormwater and Floodplain Management Ordinance is intended to minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding.

The Stormwater and Floodplain Management Ordinance identifies floodplains, floodways, flood fringes and special flood hazard areas. However, a property outside these areas could be inundated by floods. Also, much of the Town is a dynamic flood area; floodways, floodplains, flood fringes and special flood hazard areas may shift from one location to another, over time, due to natural processes.

WARNING AND DISCLAIMER OF LIABILITY

The flood protection provided by the Stormwater and Floodplain Management Ordinance 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 constructed or natural causes. The Stormwater and Floodplain Management Ordinance does not create liability on the part of the Town, any officer or employee thereof, or the federal, state or county government for any flood damages that result from reliance on the Ordinance or any administrative decision lawfully made thereunder.

Compliance with the Stormwater and Floodplain Management Ordinance does not ensure complete protection from flooding. Flood-related problems such as natural erosion, streambed meander, or constructed obstructions and diversions may occur and have an adverse effect 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.

_____	_____	_____
Plan Check #	Owner	Date

REVIEW COMMENT RESOLUTION

PARADISE VALLEY WATERSHED STUDIES

Designer: Dibble Engineering
Reviewed By: Town of Paradise Valley Staff

Disposition Codes:
A. Will Comply
B. Consultant to Evaluate
C. Client to Evaluate
D. No Further Action

Responses: April 7, 2017
Scope of Review: Storm Drainage Design Manual (Dated 2/1/17)

MASTER ITEM #	ITEM #	REVIEWED BY	SHEET/ PAGE	SECTION/ PARA.	REVIEW COMMENT	DISPOSITION INITIAL	DISPOSITION FINAL	RESPONSE
1	1	Mayor Collins	8	3.3.B.2	Appears the manual prohibits underground retention for single family residential, is this true?	B	A	Revised to state…"Single family residences with an underground storage easement instead of a drainage easement."
2	2	Vice Mayor Bien-Willner	41	8-1.A	Is there another mechanism for documenting retention basins in lieu of an easement?	B/C	D	An easement is the least "invasive" method for ensuring that drainage infrastructure on private property continues to function to protect downstream property owners. A deed restriction is essentially the same. Other methods such as quitclaim deeds involve taking ownership of property
3	3	Councilmbr. Pace	11	3-5.F.1	The manual only discusses what's prohibited in regards to backwashing pools, can we list possible alternatives?	B/C	A	The Town's two sanitary sewer providers (City's of Scottsdale and Phoenix) currently allow the disposal of pool or spa water into their collection systems, as such we are recommending changing town policy to align with the sewer provider practice. If discharging into a sanitary sewer, pool or spa water shall enter the sanitary sewer on private properrty by appropriate means, such as through a sanitary clean out. Some other examples of appropriate locations to backwash a pool or spa water may include an onsite retention basin with adequate volume, and a private water hauling service.
4	4	Councilmbr. Moore	1	1-1.A	Change the word entitled to titled in final draft	A	A	Will revise with final printing
5	5	Councilmbr. Moore	5	3-2.A.2	Remove the text "unless the drainage can be conveyed directly to an existing major channel or natural drainageway, and the developer can demonstrate no adverse off-site impacts to the satisfaction of the Town Engineer."	B/C	D	It is common practice within the valley to include such text, as in certain but rare occaisions this approach may be the most appropriate way to deal with onsite drainage. It is the responsibility of the developers engineer to ensure there will be no negative off-site impacts
6	1	J. Knapp	6	3-2.B.2.a	Is the town obligated by a federal or state requirement to require first flush retention or is it a policy decision each municipality can make on its own?	A	A	Revised to state…"Where detention is allowed, first flush volume shall be retained on all lots or within a common area, and a reasonable attempt shall be made to route all runoff from disturbed areas to the first flush basin(s) subject to grading plan approval."
7	2	J. Knapp	45	10-2.E	Remove the term visually significant corridors and the reference to guidelines being developed. . Maybe talk about how they are important landscapes to preserve naturally.	A	A	Revised to state..."Town rights-of-way and easements along natural wash corridors are important to maintain and preserve the natural environment and landscape features. Natural Wash Corridors shall include, whenever feasible, a landscape buffer area of at least 5 feet each side, perpendicular from the top of the bank."
8	3	J. Knapp	46	10-2.G	There are concerns regarding requiring a 10' wide clear zone along the wash. Revise to suggest during design incorporating a 10' wide access area to the wash for maintenance from the nearest driveway.	A	A	Revised to state..."For Natural Washes, new development should provide, if possible, a minimum 10-feet wide accessible clear zone area for emergency and ordinary maintenance vehicle access. For access to minor drainageways and basins including roadside swales, ditches and sediment basins, allow for reasonable access for regular maintenance and emergency use. Access may be combined with trails."
9	1	F. Fleet	5	3-2.A.1	Town code reference invalid	C	A	Stormwater storage facilities are designed primarily as retention facilities. Other stormwater management facilities, such as detention basins, dry wells, pumps and injection wells, will only be allowed as appoved by the Town Engineer.

REVIEW COMMENT RESOLUTION

PARADISE VALLEY WATERSHED STUDIES

Designer: Dibble Engineering
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MASTER ITEM #	ITEM #	REVIEWED BY	SHEET/ PAGE	SECTION/ PARA.	REVIEW COMMENT	DISPOSITION INITIAL	DISPOSITION FINAL	RESPONSE
10	2	F. Fleet	5	3-2.A.3	May want to wordsmith lot to lot drainage to be clear we aren't talking about existing offsite flows	A	A	Revise to state..."Lot to Lot drainage within a new development is prohibited unless permanent drainage facilities are constructed in dedicated drainage easements or tracts that are maintained by the Town or a homeowners association (HOA)."
11	4	F. Fleet	6	3-2.B.2.c	What's referenced by "safety factor of 2"?	B/C	A	Revise to state..."If retention of the first flush volume is provided, the stormwater storage facility must be fully evacuated within 36 hours. The maximum allowable infiltration rate shall be 50% of the in-situ tested rate of the as-constructed basin. Testing shall be conducted using double-ring infiltrometer methodology in accordance with FCDMC standards.
12	5	F. Fleet	8	3-3.C.5.b	Vector control?	B/C	D	No need to define "vector control"
13	6	F. Fleet	8	3-3.D.2	Why are we prohibiting corrugated pipe for underground storage?	B/C	A	Corrugated pipes commonly trap debris within the pipe voids, lowering the pipe capacity. They also allow water to stand in the voids which is a potential breeding ground for misquitos.
14	1	P. Peshkin			Involve Planning Dept. at the beginning when elevation is involved.	C	C	Planning Department is involved with every permit at the beginning now as a policy
15	2	P. Peshkin			Observe adjacent existing properties and provide/require drainage protection to protect those properties. Do not rely on calculations to determine "meeting engineering requirements". For example if Retention Basins are included in the plans and they will capture runoff meeting the engineering requirements, look at the location of the retention basins and identify that they will capture runoff that could injure and cause harm to adjacent existing properties. This should be the Town's responsibility especially when alerted ahead of time by the neighbors living in those adjacent properties, i.e. prior to construction starting.	B/C	C	The town is reliant on the professional judgement of the professional who signs and seals the grading and drainage plan. It is their responsibility to address these concerns.
16	7	P. Peshkin			Evaluate Velocity issues affected by: elevation, impervious area, enlarged structure footprint, slanted roofs, front landscaping runoff direction, etc. which affects the existing neighboring properties. This violates the increased FLOW not allowed code	B/C	C	The town is reliant on the professional judgement of the professional who signs and seals the grading and drainage plan. It is their responsibility to address these concerns.
17	8	P. Peshkin			Review locations of retention basins on the property. Should be constructed where storm runoff will cause harm to existing properties.	B/C	C	This is a case by case review of the proposed plan by town staff.
18	9	P. Peshkin			Require provisions to capture storm runoff in submitted plans:culverts, catch basins, spillways, equalizer pipes...	B/C	C	This is a case by case review of the proposed plan by town staff.
19	10	P. Peshkin			Poll neighboring properties when not in a Floodplain, and in Zone X (less than 1% chance of flooding) to ask their experience with flooding and stormwater drainage BEFORE requiring (per TPV)to elevate a home. When a home is not in a Floodplain, not in a Special Hazard Zone, they will get NO professional support from FEMA. The damaged property will also NOT have a valid FLOOD claim with Flood Insurance NFIP due to the FEMA definition of a flood. Perhaps a modified elevation could be considered if there has been no history of flooding.	B/C	C	While this may be a good practice, it is difficult to require a professional engineer to design projects based on anecdotal information.

REVIEW COMMENT RESOLUTION

PARADISE VALLEY WATERSHED STUDIES

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Scope of Review: Storm Drainage Design Manual (Dated 2/1/17)

MASTER ITEM #	ITEM #	REVIEWED BY	SHEET/ PAGE	SECTION/ PARA.	REVIEW COMMENT	DISPOSITION INITIAL	DISPOSITION FINAL	RESPONSE
20	11	P. Peshkin			When elevating a structure look at the design of the house and require a design that is compatible with the existing neighborhood and does not interfere with drainage. For example a split level design where the garage area/front area is lower (not interfering with runoff pattern) and the home in the front elevates to the main floor which is elevated in the back. This maintains the existing storm runoff design that historically works.	C	C	The town does not have flatland architectural standards to enforce this type of requirement.
21	12	P. Peshkin			Require monsoon protection at the beginning of construction and extra protection when a storm is predicted in Monsoon Season.	C	C	Town and state required Storm Water Pollution Prevention Plans address runoff of construction debris during construction.
22	13	P. Peshkin			Research origination of calculation comparisons submitted by the engineer when historical calculations DO NOT EXIST. Calculations were never required in 1973. Verify current calculations and not rely on data from 1987 since the land has constantly changed due to erosion, construction,walls, etc. and these calculations are NOT always accurate.	C	C	Town requires existing conditions to be documented when a new project is proposed. The existing conditions are those on the site as of just prior to initiating the project, not historical conditions.
23	14	P. Peshkin			Give more authority to the onsite inspectors to question construction that although it was approved per the plan, it is not compliant with the existing site, the engineer, architect, contractor, owner, etc. must be advised that the submitted plan has deficiencies and must be corrected. Currently the onsite inspector just verifies that what is on the plan is what is being built. A second layer of protection to the residents should be enforced. Also contact with the adjacent property owners/residents should be available and considered valuable information throughout the construction.	C	C	The town inspectors are resonsible to ensure the plans are built to the approved plans.
24	15	P. Peshkin			Keep ALL required G/D documents, AS BUILT plans and any other studies on file at a minimum, a digital file.	C	C	This is the policy of the town as of the early 2000's.
25	16	P. Peshkin			Do not encourage lawsuits/civil disputes between neighbors but rather have the town enforce the codes during the permitting process, onsite inspections, proactive/preventive alerts from neighbors, etc.	C	C	The town does not encourage lawsuits between neighbors.
26	17	P. Peshkin			Have the Town's Planning and Zoning Dept. be involved at the beginning of all construction when elevation is involved. An onsite visit with the neighboring residents should be required in situations where a larger footprint, elevation, change of natural water path, landscaping that does not respect the natural wash will complicate the development. A drainage review should be conducted.	C	C	The planning deparment is involved with all construction projects at the beginning.
27	18	P. Peshkin			Devise ways to protect existing residents in older properties when they do not own any property to correct a storm drainage challenge.	B/C	C	Town code requires individual residents to address storm water issues on their individual properties.
28	1	N. Prodanov	1	1-3	AS THESE CODES ARE SUBJECT TO UPDATES, THE LINKS MAY NOT WORK 3 YEARS FROM NOW. CONSIDER REMOVING.	B/C	D	Noted. Document can be updated as links change.
29	2	N. Prodanov	5	3-2.A.2	PLEASE CONFIRM INCREASE FROM THE CURRENTLY REQUIRED PRE- V. POST-DEVELOPMENT.	B	D	The proposed calculation more acurately reflects the actual impervious area of a development as opposed to the currently used Pre vs. Post. In some cases, more retention will be required, in others, it may not.
30	3	N. Prodanov	5	3-2.B.1.a	RUNOFF COEFFCIIENT IS LEFT FOR OPEN INTERPRETATION. PLEASE CONSIDER ADDING A REFERENCE.	A	A	Revised to state..."C = Weighted average runoff coefficient over entire site, per the FCDMC Hydrology Manual tables 3.2 and 3.3."
31	4	N. Prodanov	6	3-2.B.2.b	TYPICALLY C=1.0 FOR FIRST FLUSH CONDITIONS.	B	D	Preference is to use the weighted C value.

REVIEW COMMENT RESOLUTION

PARADISE VALLEY WATERSHED STUDIES

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32	5	N. Prodanov	6	3-2.B.3	ADD A TABLE TO THE PLAN VOLUME PROVIDED.	B/C	C	The calculation table, showing basins and area for certifying as built conditions is a good idea. "This is an in Town policy and will be added to Appendix 6A."
33	6	N. Prodanov	6	3-2.C.1	CONSIDER ADDING REQUIREMENT TO PROVIDE RETENTION FOR EACH CORRESPONDING TRIBUTARY AREA WITHIN THE DEVELOPMENT. IT DOES NOT MAKE SENSE TO HAVE RETENTION BASIN IF LIMITED RUNOFF COULD GET TO IT.	B/C	A	Added to 3-2.c.1
34	7	N. Prodanov	7	3-2.C.6	POOL BARRIER IS REQUIRED FOR OVER 18" DEEP BASIN. DRY WELL OR PERC TESTS WILL BE REQUIRED.	B	D	The building code ony requires fences for inground, above ground, and on-ground swimming pools, hot tubs, and spas that contain 18" of water or more. It does not require a pool barrier for retention.
35	8	N. Prodanov	35	7-1.A	REQUIRE DRAINAGE REPORTS TO BE SUBMITTED ON EACH SITE WITH OFFSITE FLOWS IMPACTING THE DEVELOPMENT. HISTORIC, CURRENT AND PROPOSED CONDITIONS TO BE DISCUSSED AND ANALYZED.	B/C	D	This section states which activities may trigger the need for a drainage report. The existence of offsite flows onto a parcel would not be a triggering event. Making improvements to the parcel would.
36	9	N. Prodanov	40	7-6	CONSIDER ADDING NARRATIVE FOR LOTS THAT ARE HAVE GRADES BELOW THE STREET LEVEL.THE OUTFALL SHALL BE 14" BELOW THE FFE OF THE HOUSE.DRIVEWAY ENTRANCE TO HAVE 6" RIDGE ABOVE THE ADJACENT STREET PAVEMENT.TOP OF WINDOW WELL SERVING BASEMENT TO BE 12" ABOVE FINISH GRADE.	B/C	D	The Town may want to add a statement requiring protection of structures with FFE's lower than adjacent roads. However, we do not recommend requiring specific standards such as the ones proposed. They could result in unanticipated challenges. This should be left to the design engineer to propose and the Town to review/approve.
37	10	N. Prodanov	41	8-1.B	THE TOWN REQUIRES FROM TOP OF BANK TO TOP OF BANK +5' FOR EROSION.	B/C	A	Noted. See comment 3 response. However, this comment is not necessarily for erosion purposes.
38	1	Dibble Team	6	3-2.B.2.a	Change First Flush requirements for all lots to say "or within common retention areas."	A	A	Revised
39	2	Dibble Team	7	3-2.C.4	Change "Retention" to be "Retention/Detention"	A	A	Revised
40	3	Dibble Team	7	3-2.C.10	Change "As provided in 10…" to be "As provided in 11…"	A	A	Revised
41	4	Dibble Team	7	3-2.C.11.a and b	Combine into one subheading	A	A	Revised
42	5	Dibble Team	24	A.2	Change "Retention" to be "Retention/Detention"	A	A	Revised
43	6	Dibble Team	46	10-2.G	1st sentence, change "are" to "area"	A	A	Revised
44	7	Dibble Team	46	10-3.A.9	Change "detention" to "retention and detention"	A	A	Revised
45	8	Dibble Team	46	10-3.A.10	Change "detention" to "retention and detention"	A	A	Revised
46	9	Dibble Team	53	Header	Change "Detention" to "Retention and detention"	A	A	Revised
47	10	Dibble Team	53	1st Para.	Change "detention" to "retention and detention"	A	A	Revised

STORM DRAINAGE DESIGN MANUAL UPDATE

April 13th, 2017

RECOMMENDED ACTION

Approve Ordinance 2017-01, Amending Sections 5-10-2 and 15-2-12 of the Town Code

and

Approve Resolution 2017-06, establishing the Storm Drainage Design Manual and amended Town Code Sections as public documents

AGENDA

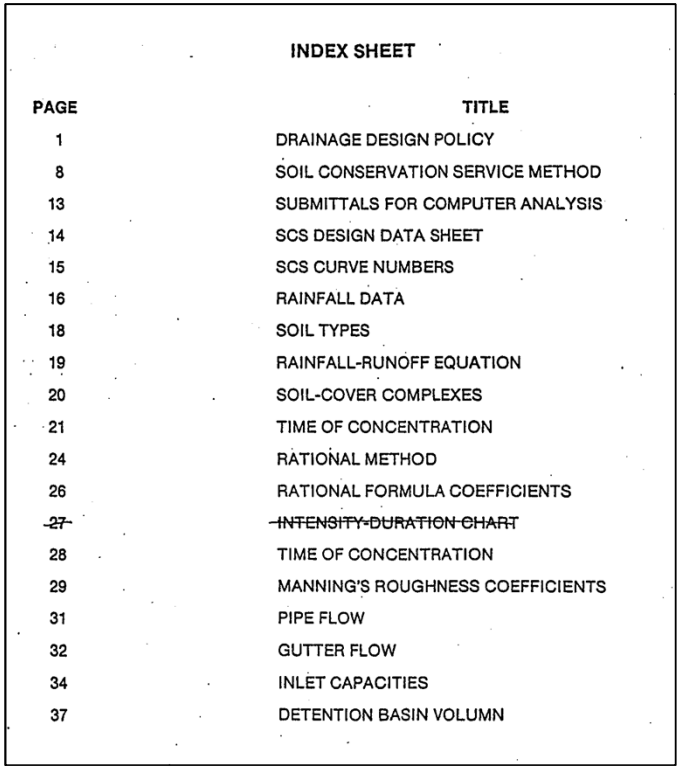
- **What is the Storm Drainage Design Manual?**
- **Current Storm Drain Design Manual**
- **Updated Storm Drainage Design Manual**
- **Public Outreach**
- **Adoption Process / Recommended Action**

WHAT IS THE STORM DRAINAGE DESIGN MANUAL?

- **Day to day document utilized by staff to review drainage improvement plans and stormwater master plans typically for development of private property**
- **Document utilized by developers to design drainage improvement plans for their projects**
- **Includes:**
  - **Acceptable design requirements specific to the Town**
  - **Submittal requirements for drainage plans/reports**
  - **Methods for runoff calculations, retention, etc.**

CURRENT STORM DRAIN DESIGN MANUAL

- **Originally adopted in March of 1987 by Resolution 537**
- **Uses outdated rainfall data and engineering practices**
- **Part of Dibble's scope with the Watershed Studies to Update this document**



INDEX SHEET

UPDATED STORM DRAINAGE DESIGN MANUAL

- **Incorporates all aspects of Stormwater Management**
  - **Floodplain Management**
  - **Stormwater Management**
  - **Erosion Hazards**
  - **Stormwater Quality**
  - **Low Impact Development**

UPDATED STORM DRAINAGE DESIGN MANUAL

- **In addition, more specifically provides guidance on:**
  - **Drainage Reports and Plans**
  - **Drainage Easements**
  - **Grading Permits**
  - **Design and Maintenance of infrastructure**
- **All while keeping with the Town's unique character**

UPDATED STORM DRAINAGE DESIGN MANUAL

- **Coordination of Government Authorities and their Standards (i.e. FEMA, EPA, Corps, ADWR, ADEQ, FCDMC)**
- **Requirements for Stormwater Quality during construction**

Figure 10.1 - Typical Natural Wash Landscape

UPDATED STORM DRAINAGE DESIGN MANUAL

- **Stormwater Quality During Construction**
  - **Provides information to contractors on the Arizona Department of Environmental Quality's process for Notice of Intent**
  - **Storm Water Pollution Prevention Plan requirements and process**

UPDATED STORM DRAINAGE DESIGN MANUAL

- **Requirement for First Flush per the Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES)**
  - **Reduces the amount of pollutants entering the storm drain system and subsequent washes and waterways**
  - **Requires first ½ inch of rainfall to be retained and/or "treated" before leaving the site**

UPDATED STORM DRAINAGE DESIGN MANUAL

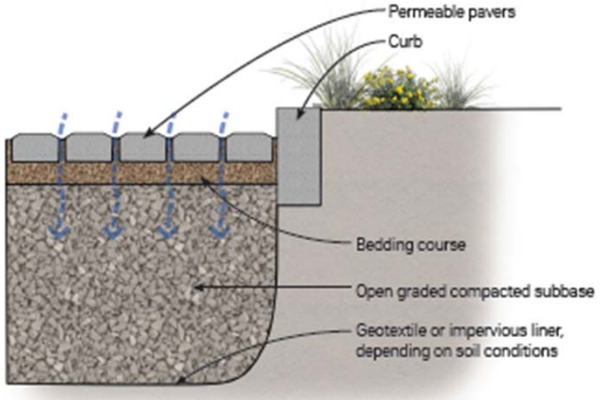
- **Stormwater Storage Volume based on 100 Year 2 Hour Storm for consistency with FCD**
  - **Non-SFR – Retain entire runoff volume**
  - **Flatland SFR's – Retain change in runoff volume due to development**
  - **Hillside SFR's – Retain change in runoff volume with a tiered reduction based on increasing slopes**
- **Certified volume requirement and easements over retention basins**

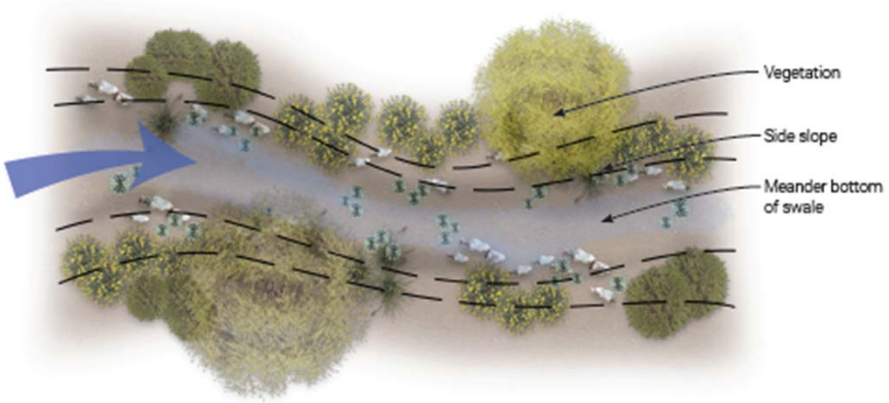
UPDATED STORM DRAINAGE DESIGN MANUAL

- **Hillside SFR's – Retain change in runoff volume with a tiered reduction based on increasing slopes**
  - **Lots with Slope 10-20% require 100% retention**
  - **Lots with Slope 20-30% require 50% retention**
  - **Lots with Slope above 30% require no retention**
- **Storage options:**
  - **Basins, underground storage, permeable pavers, LID techniques**

UPDATED STORM DRAINAGE DESIGN MANUAL

- **Low Impact Development**
  - **Toolbox for homeowners/developers to utilize**
  - **Encourages more natural approach to addressing stormwater management at the source**



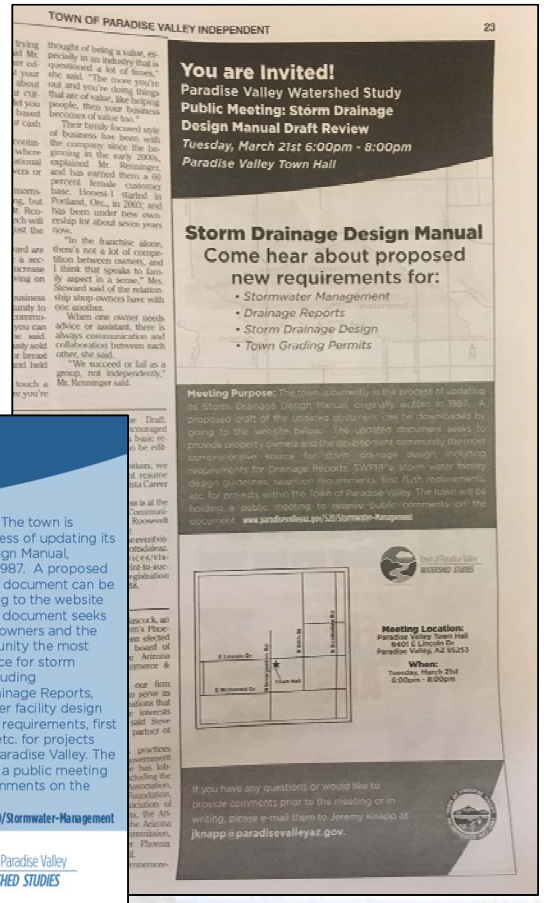


UPDATED STORM DRAINAGE DESIGN MANUAL

- **Drainage Reports**
  - **Type of reports required for different submittals**
  - **What is required in each report**
- **Drainage Plans and Permits**
  - **When required**
  - **Acceptable methodology and calculations**
- **Grading Permits**
- **On-going maintenance**

PUBLIC OUTREACH

- **March 8th Newspaper Advertisement**
- **Flyers at Building Dept and Engineering Dept**
- **Media Boards**
- **Notify Me E-mail List**



PUBLIC COMMENTS

- **Phone Calls / E-mails**
  - **2 e-mails, 1 phone call**
- **March 21st Public Meeting**
  - **3 Residents**
  - **1 Project Manager**
  - **1 Engineer**
- **Public and Council Comments in attached Comment Resolution Document**

ADOPTION PROCESS

- **Two part process:**
  1. **Ordinance to change the text of Town Code Section 5-10-3 Storm Drainage Design and Section 15-2-12 regarding pool backwash**
  2. **Resolution adopting the amended Storm Drainage Design Manual**

RECOMMENDED ACTION

Approve Ordinance 2017-01, Amending Sections 5-10-3 and 15-2-12 of the Town Code

and

Approve Resolution 2017-06, establishing the Storm Drainage Design Manual and amended Town Code Sections as public documents

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-122

TO: **Mayor Collins and Town Council Members**

FROM: **Kevin Burke, Town Manager**
Jinnett Hancock, Human Resources Manager

DATE: **April 13, 2017**

DEPARTMENT: Town Manager

AGENDA TITLE:
Adoption of Resolution Number 2017-07 Authorizing Membership in the Arizona Metropolitan Trust (AzMT) for Employee Medical, Dental, Vision, Life, Accidental Death and Short Term Disability Insurance

Council Goals or Other Policies / Statutory Requirements:

RECOMMENDATION:
Adopt Resolution Number 2017-07.

The Town of Paradise Valley has been a member of Arizona Public Employers Health Pool (APEHP) since July 1, 2013. Several factors lead us to examine the Town's employee health insurance program to determine if current services could be improved upon. The following concerns were found.

- The cost for both the Town and the employees.
- Concerns regarding last year's premium increase. Initially the Pool advised the Town that the increase would be 3%. Later staff was advised that the increase would be 5% instead.
- Dozens of prescription drugs were removed from the plan's Formulary List and are no longer covered.
- The large gap between the deductibles employees are required to pay and the Out of Pocket Maximums of the plans.
- Questions regarding the competitiveness of the Town's insurance plans in relation to what other municipalities offer.

The Town identified the Arizona Metropolitan Trust (AzMT) as a better alternative to the Town's current health insurance. AzMT is a self-insured employee benefits pool that provides health benefits and services to public entities. It is made up of nine members, which include: City of Avondale, City of Apache Junction, City of El Mirage, Town of Fountain Hills, City of Maricopa, Pinal County, Town of Youngtown, Buckeye Valley Fire District and Sun City Fire District.

The insurance plans offered by AzMT come at a lower cost and provide better, more comprehensive coverage. Additionally the Trust offers an enhanced Wellness Program and free phone access to a physician 24/7. Attached are a comparison of the Town's current insurance plans versus AzMT's plans and a schedule of the Town/Employee cost sharing of premiums for FY 18. AzMT offers employee's the choice of four different insurance plans, while the Town currently offers only two insurance plans. This allows employees to select the right plan and level of coverage for them and their family's specific medical needs. Enhanced benefits at a lower cost, adds a valuable recruitment and retention tool allowing the Town of Paradise Valley to be more competitive in the market. The estimated annual cost savings for medical insurance is $59,816.16 and $7,517.28 for dental insurance, totaling $67,333.44.

The current contracts with Arizona Public Employers Health Pool (APEHP), Delta Dental of Arizona, VSP Vision and Standard Life, Accidental Death and Dismemberment and Disability expire June 30, 2017. A new contract with the Arizona Metropolitan Trust (AzMT) is included in the Town Manager's FY 2017-2018 Recommended Budget.

BUDGETARY IMPACT:

Current vs. AzMt 2017-18 Health Premiums

Coverage Level	# Covered	Current	New AzMt
Employee Only	34	$286,338.08	$263,024.24
Employee and Spo	10	$146,161.60	$135,680.80
Employee and Chil	11	$154,600.16	$142,403.36
Employee and Fam	26	$439,400.00	$425,575.28

Current Annual Tot $1,026,499.84
AzMt Annual Total $966,683.68
Cost Savings: $59,816.16

Current vs. AzMt 2017-18 Dental Premiums

Coverage Level	# Covered	Current	New AzMt
Employee Only	34	$15,508.08	$14,488.08
Employee and Spo	10		$7,210.80
Employee and Chil	11		$8,735.76
Employee and Fam	26	$51,572.16	$29,128.32

Current Annual Tot $67,080.24
AzMt Annual Total $59,562.96
Cost Savings: $7,517.28

ATTACHMENT(S):

1. **AzMt vs Current Insurance Comparison 2017-18**
2. **Schedule of Town/Employee Cost Sharing Premiums**

3. **Resolution #**
4. **Trust Document Approval**

Resolution 2017-07

A RESOLUTION ENACTED BY THE TOWN OF PARADISE VALLEY ACCEPTING MEMBERSHIP IN THE ARIZONA METROPOLITAN TRUST

WHEREAS The Town of Paradise Valley is empowered pursuant to ARS § 11-981(A) to procure Health, Accident, Life, and/or Disability benefits for its employees through either insurance or self-insurance; and

WHEREAS ARS § 11-952 and ARS § 11-952.01 provide that two or more public agencies may join together to provide for Health, Accident, Life, and/or Disability benefits for employees of the Town of Paradise Valley through either insurance or self-insurance; and

WHEREAS the Town of Paradise Valley desires to enter into an agreement with the Arizona Metropolitan Trust (AzMT or Trust) to provide employee benefits of the type generally described under the provisions of ARS § 11-952 and ARS § 11-952.01; and

WHEREAS AzMT has extended an invitation to the Town of Paradise Valley to join its Trust; and

WHEREAS AzMT requires acceptance by the Town of Paradise Valley through a resolution;

THEREFORE be it resolved by the Town of Paradise Valley Town Council as follows:

1. The Town of Paradise Valley hereby approves AzMT membership commencing July 01, 2017 and terminating June 30, 2020; and

2. The Town of Paradise Valley hereby approves and agrees to be bound by the provisions of the Trust Agreement provided by AzMT effective July 01, 2017 and as may be amended from time to time.

3. The Town of Paradise Valley hereby approves the Trust Agreement referenced in Paragraph 2.

4. The Town of Paradise Valley hereby accepts the Trust Bylaws provided by AzMT effective July 01, 2017 and as may be amended from time to time.

5. The Town of Paradise Valley hereby accepts the proposed schedule of contributions to be effective on July 01, 2017 and as may be amended from time to time.

6. The Town of Paradise Valley hereby appoints the following Trustee to serve on the Board of Trustees of AzMT from July 01, 2017 until the appointment of a duly-qualified successor:

Trustee Kevin Burke

7. The Town of Paradise Valley hereby appoints the following Alternate Trustee to serve on the Board of Trustees of AzMT from July 01, 2017 until the appointment of a duly-qualified successor:

Alternate Trustee Jinnett Hancock

8. This approval is based on the AzMT Trust Agreement and Bylaws reflecting compliance with ARS § 42-17106.

WITNESS the signatures of the members of the Town of Paradise Valley Town Council this 13th day of April 2017.

_____
Michael Collins, Mayor

APPROVED AS TO FORM

_____
Andrew Miller, Town Attorney

ATTEST:

_____
Duncan Miller, Town Clerk

2017/2018 Medical Premiums

Current - APEHP HDHP	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	HSA/457 Contribution	Annual Town Cost	Employee Pays (Pay Period)
Employee Only	$484.64	$484.64	$0.00	$2,600.00	$8,415.68	$0.00
Emp + Child(ren)	$802.88	$802.88	$76.50	$4,420.00	$14,054.56	$38.25
Emp + Spouse	$971.36	$849.68	$116.25	$4,420.00	$14,616.16	$58.13
Emp + Family	$1,225.12	$1,040.00	$185.12	$4,420.00	$16,900.00	$92.56

Current - APEHP PPO /Copay	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	HSA/457 Contribution	Annual Town Cost	Employee Pays (Pay Period)
Employee Only	$735.28	$735.28	$0.00	$0.00	$8,823.36	$0.00
Emp + Child(ren)	$1,218.88	$1,097.98	$120.90	$0.00	$13,175.76	$60.45
Emp + Spouse	$1,468.48	$1,285.18	$183.30	$0.00	$15,422.16	$91.65
Emp + Family	$1,856.40	$1,576.12	$280.28	$0.00	$18,913.44	$140.14

NEW AzMt HDHP	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	HSA/457 Contribution	Annual Town Cost	Employee Pays (Pay Period)
Employee Only	$444.09	$444.09	$0.00	$2,600.00	$7,929.08	$0.00
Emp + Child(ren)	$799.27	$710.48	$88.79	$4,420.00	$12,945.76	$44.40
Emp + Spouse	$868.42	$762.34	$106.08	$4,420.00	$13,568.08	$53.04
Emp + Family	$1,179.55	$995.69	$183.86	$4,420.00	$16,368.28	$91.93

NEW AzMt PPO	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	HSA/457 Contribution	Annual Town Cost	Employee Pays (Pay Period)
Employee Only	$478.41	$478.41	$0.00	$0.00	$5,740.92	$0.00
Emp + Child(ren)	$875.74	$776.41	$99.33	$0.00	$9,316.92	$49.67
Emp + Spouse	$951.06	$832.90	$118.16	$0.00	$9,994.80	$59.08
Emp + Family	$1,289.89	$1,087.02	$202.87	$0.00	$13,044.24	$101.44

NEW AzMt PPO Buy Up	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	HSA/457 Contribution	Annual Town Cost	Employee Pays (Pay Period)
Employee Only	$489.09	$489.09	$0.00	$0.00	$5,869.08	$0.00
Emp + Child(ren)	$896.12	$794.36	$101.76	$0.00	$9,532.32	$50.88
Emp + Spouse	$973.58	$852.46	$121.12	$0.00	$10,229.52	$60.56
Emp + Family	$1,322.08	$1,113.83	$208.25	$0.00	$13,365.96	$104.13

NEW AzMt EPO	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	HSA/457 Contribution	Annual Town Cost	Employee Pays (Pay Period)
Employee Only	$501.02	$501.02	$0.00	$0.00	$6,012.24	$0.00
Emp + Child(ren)	$918.95	$814.47	$104.48	$0.00	$9,773.64	$52.24
Emp + Spouse	$998.81	$874.36	$124.45	$0.00	$10,492.32	$62.23
Emp + Family	$1,358.10	$1,143.83	$214.27	$0.00	$13,725.96	$107.14

Current Health Savings Account (HSA)

Health Savings Account (HSA) - HDHP PLAN PARTICIPANTS ONLY	Annual Town Contribution	Town Per Pay Period Contribution (26 Annually)	IRS Annual Max (Calendar Year 2017)
Employee Only	$2,600	$100	$3,350
Emp + Dependent(s)	$4,420	$170	$6,750

NEW Health Savings Account (HSA) & 457 Contributions

Health Savings Account (HSA) HDHP PLAN PARTICIPANTS ONLY	Annual Town HSA Contribution	Town Per Pay Period HSA Contribution (26 Annually)	Annual Town 457 Contribution	Town Per Pay Period 457 Contribution (26 Annually)	Wellness Incentive	IRS HSA Annual Max (Calendar Year 2017)
Employee Only	$1,300	$50	$1,200	$46.16	$100	$3,350
Emp + Dependent(s)	$2,600	$100	$1,720	$66.16	$100	$6,750

Current 2017/2018 Dental Premiums

Delta Dental PPO	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	Employee Pays (Pay Period)
Employee Only	$38.01	$38.01	$0.00	$0.00
Emp + Family	$109.25	$91.44	$17.81	$8.91

NEW 2017/2018 Dental Premiums

NEW AzMT Delta Dental PPO	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	Employee Pays (Pay Period)
Employee Only	$35.51	$35.51	$0.00	$0.00
Emp + Child(ren)	$76.42	$66.18	$10.24	$5.12
Emp + Spouse	$68.28	$60.09	$8.19	$4.10
Emp + Family	$112.64	$93.36	$19.28	$9.64

NEW AzMT Delta Dental PPO Buy-Up	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	Employee Pays (Pay Period)
Employee Only	$36.77	$36.77	$0.00	$0.00
Emp + Child(ren)	$83.15	$71.56	$11.59	$5.80
Emp + Spouse	$70.82	$62.31	$8.51	$4.26
Emp + Family	$122.71	$101.23	$21.48	$10.74

Current 2017/2018 VSP Vision Premiums

VSP Voluntary Vision Plan 1	Employee Pays (Monthly)	Employee (Per Paycheck)
Employee Only	$9.69	$4.85
Employee +1 Dependent	$15.50	$7.75
Employee + Child(ren)	$15.83	$7.92
Employee + Family	$25.52	$12.76

VSP Voluntary Vision Plan 2	Employee Pays (Monthly)	Employee (Per Paycheck)
Employee Only	$5.64	$2.82
Employee +1 Dependent	$9.03	$4.52
Employee + Child(ren)	$9.21	$4.61
Employee + Family	$14.86	$7.43

NEW 2017/2018 VSP Vision Premiums

VSP Voluntary Vision Plan 2	Employee Pays (Monthly)	Employee (Per Paycheck)
Employee Only	$6.21	$3.11
Employee +1 Dependent	$13.27	$6.64
Employee + Child(ren)	$11.75	$5.88
Employee + Family	$18.72	$9.36

2017/2018 Medical Premiums

NEW AzMt HDHP	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	HSA/457 Contribution	Annual Town Cost	Annual Employee Cost
Employee Only	$444.09	$444.09	$0.00	$2,600.00	$7,929.08	$0.00
Emp + Child(ren)	$799.27	$710.48	$88.79	$4,420.00	$12,945.76	$1,065.48
Emp + Spouse	$868.42	$762.34	$106.08	$4,420.00	$13,568.08	$1,272.96
Emp + Family	$1,179.55	$995.69	$183.86	$4,420.00	$16,368.28	$2,206.32

NEW AzMt PPO	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	HSA/457 Contribution	Annual Town Cost	Annual Employee Cost
Employee Only	$478.41	$478.41	$0.00	$0.00	$5,740.92	$0.00
Emp + Child(ren)	$875.74	$776.41	$99.33	$0.00	$9,316.92	$1,191.96
Emp + Spouse	$951.06	$832.90	$118.16	$0.00	$9,994.80	$1,417.92
Emp + Family	$1,289.89	$1,087.02	$202.87	$0.00	$13,044.24	$2,434.44

NEW AzMt PPO Buy Up	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	HSA/457 Contribution	Annual Town Cost	Annual Employee Cost
Employee Only	$489.09	$489.09	$0.00	$0.00	$5,869.08	$0.00
Emp + Child(ren)	$896.12	$794.36	$101.76	$0.00	$9,532.32	$1,221.12
Emp + Spouse	$973.58	$852.46	$121.12	$0.00	$10,229.52	$1,453.44
Emp + Family	$1,322.08	$1,113.83	$208.25	$0.00	$13,365.96	$2,499.00

NEW AzMt EPO	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	HSA/457 Contribution	Annual Town Cost	Annual Employee Cost
Employee Only	$501.02	$501.02	$0.00	$0.00	$6,012.24	$0.00
Emp + Child(ren)	$918.95	$814.47	$104.48	$0.00	$9,773.64	$1,253.76
Emp + Spouse	$998.81	$874.36	$124.45	$0.00	$10,492.32	$1,493.40
Emp + Family	$1,358.10	$1,143.83	$214.27	$0.00	$13,725.96	$2,571.24

NEW (HDHP ONLY) Health Savings Account (HSA), 457 Contributions & Wellness Inc

Health Savings Account (HSA) HDHP PLAN PARTICIPANTS ONLY	Annual Town HSA Contribution	Town Per Pay Period HSA Contribution (26 Annually)	Annual Town 457 Contribution	Town Per Pay Period 457 Contribution (26 Annually)	Wellness Incentive	IRS HSA Annual Max (Calendar Year 2017)
Employee Only	$1,300	$50	$1,200	$46.16	$100	$3,350
Emp + Dependent(s)	$2,600	$100	$1,720	$66.16	$100	$6,750

NEW 2017/2018 Dental Premiums

NEW AzMT Delta Dental PPO	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	Employee Pays (Pay Period)	Annual Town Cost	Annual Employee Cost
Employee Only	$35.51	$38.01	$0.00	$0.00	$456.12	$0.00
Emp + Child(ren)	$76.42	$66.18	$10.24	$5.12	$794.16	$61.44
Emp + Spouse	$68.28	$60.09	$8.19	$4.10	$721.08	$49.14
Emp + Family	$112.64	$93.36	$19.28	$9.64	$1,120.32	$115.68

NEW AzMT Delta Dental PPO Buy-Up	Monthly Premium	Town Pays (Monthly)	Employee Pays (Monthly)	Employee Pays (Pay Period)	Annual Town Cost	Annual Employee Cost
Employee Only	$36.77	$36.77	$0.00	$0.00	$441.24	$0.00
Emp + Child(ren)	$83.15	$71.56	$11.59	$5.80	$858.72	$69.54
Emp + Spouse	$70.82	$62.31	$8.51	$4.26	$747.72	$51.06
Emp + Family	$122.71	$101.23	$21.48	$10.74	$1,214.76	$128.88

NEW 2017/2018 VSP Vision Premiums

VSP Voluntary Vision Plan	Employee Pays (Monthly)	Employee (Per Paycheck)
Employee Only	$6.21	$3.11
Employee +1 Dependent	$13.27	$6.64
Employee + Child(ren)	$11.75	$5.88
Employee + Family	$18.72	$9.36

APPROVALS

Town of Paradise Valley

The Town of Paradise Valley hereby approves and accepts the foregoing Agreement and Declaration of Trust and agrees to be bound by the provisions thereof effective at 12:00:01 A.M., July 01, 2017.

By: _____
Kevin Burke, Town Manager

Date: _____

Pursuant to A. R. S. Section 11-952(D), the foregoing agreement has been reviewed by the Attorney for the Town of Paradise Valley and it is in proper form and is within the powers and authority granted to the Town of Paradise Valley under the laws of the State of Arizona.

By: _____
Andrew M. Miller, Attorney

Date: _____

IN WITNESS HEREOF, the undersigned Trustee and Alternate Trustee hereby accept appointment and approve the Agreement and Declaration of Trust.

Name	Position	Signature	Date
Kevin Burke	Town Manager	_____	_____
Jinnett Hancock	Human Resources	_____	_____

ARIZONA METROPOLITAN TRUST (AzMT)

AGREEMENT AND DECLARATION OF TRUST

Effective:
July 01, 2012

TABLE OF CONTENTS

This Agreement and Declaration of Trust, with an effective date of July 1, 2012, is made and entered into by and between the Participating Entities who have been invited to Join this Trust and who have provided a Resolution adopted by the Governing Board of the Participating Entity accepting membership in this Trust, for the purposes set forth in A.R.S. § 11-952.01.

RECITALS

WHEREAS, The Participating Entities desire to enter into an agreement pursuant to A.R.S. § 11-952.01 et seq. to pool and maintain a program of employee benefits for the Employees of the Participating Entities and to certain other persons deemed eligible for coverage hereunder; and

WHEREAS, To effect the aforesaid purpose, it is mutually beneficial to the parties hereto to declare and create a Trust which establishes a Trust Fund for and in the manner more particularly set forth herein; and

WHEREAS, The Participating Entities which accept this Agreement and Declaration of Trust and agree to be bound by the provisions hereof shall, upon acceptance by the Board of Trustees, be deemed parties to this Agreement and Declaration of Trust.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing recitals, which are incorporated herein by reference, the following mutual covenants and conditions, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Participating Entities hereby agree as follows:

ARTICLE I. DEFINITIONS

The following are definitions of terms as used in the By-Laws as well as this Trust Agreement. To the extent a term is not specifically defined in the By-Laws, but is defined in this Trust Agreement, the term shall have the meaning given to it in this Trust Agreement.

1.01 "A.R.S." shall mean the Arizona Revised Statues, as amended.

1.02 "Beneficiary" shall mean Employees, their dependents and such other persons designated by the Participating Entities as eligible for coverage as set forth in the Summary Plan Description and approved by the Board.

1.03 "Benefits Administrator" shall mean the person(s) or firm employed by the Board who is responsible for processing of claims and payment of benefits, and related services.

1.04 "Board of Trustees" or "Board" shall mean the Trustees of the Arizona Metropolitan Trust acting in their joint capacity as the governing board of the Trust.

1.05 "Employee" shall mean any person employed by a Participating Entity on a regular basis working not less than the number of hours per week required by the Participating Entities for eligibility, and who are not eligible for benefits under any other employee benefits to which the Participating Entity makes contributions.

1.06 "Employee Benefit Program" shall mean the program of benefits to be established by the Board pursuant to this Trust Agreement and A.R.S. § 11-952.01(c).

1.07 "Employee Contributions" shall mean any contributions made by Employees whether comprising part of the Entity Premium or whether made directly to the Fund in order to obtain coverage by the Employee Benefit Program.

1.08 "Entity Contributions" shall mean the contributions made by Participating Entities comprising all or part of the Entity Premium.

1.09 "Entity Premium" shall mean the total monies paid by each Participating Entity to the Fund for the Employee Benefit Program, and shall be equal to the sum of Entity Contributions and Employee Contributions.

1.10 "Fund" shall mean the Trust Fund created by this instrument, and shall mean generally, the monies, property, contracts or things of value, tangible or intangible, received and held by the Board for the uses and purposes of the Trust set forth herein, and those things of value which comprise the corpus and additions to the Fund.

1.11 "Governing Board" shall mean the policy making board of a Participating Entity duly elected or appointed to their respective positions in accordance with the laws and constitution of the State of Arizona.

1.12 "Participating Entities" shall mean those entities listed in Exhibit A which is attached hereto and incorporated by reference herein, and such additional Participating Entities as may be approved for membership by the Board of Trustees pursuant to Article XIII of this Trust Agreement.

1.13 "Summary Plan Description" shall mean the document(s) that generally describe the employee benefits to be provided by the Trust to the Beneficiaries.

1.14 "Trust" shall mean the entity established by the Trust Agreement pursuant to A.R.S. § 11-952.01 et seq., which shall be referred to as the Arizona Metropolitan Trust.

1.15 "Trust Agreement" shall mean this Agreement and Declaration of Trust and any modifications or amendments thereto.

1.16 "Trust Administrator" shall mean the employee benefit consultant retained by the Board to carry out the obligations of this Agreement in compliance with A.R.S. § 11-952.01(H)(5).

1.17 "Trustee or Trustees" shall mean the individual Trustees and their successors as provided for in this Trust Agreement.

ARTICLE II. PURPOSE OF TRUST AND APPLICATION OF THE FUND

2.01 Creation of Trust. There is hereby declared and created the Arizona Metropolitan Trust to provide employee benefits for the Beneficiaries of the Trust. Such benefits may include, but are not limited to those described under Article 4.05 of this Trust Agreement, whether provided through one or a combination of self-funded or insured programs or both.

2.02 Principal Office. The Principal Office of the Trust shall be located at the location specified in the Bylaws (hereinafter designated and referred to as the "Principal Office").

ARTICLE III. BOARD OF TRUSTEES

3.01 Trustees. The Employee Benefit Program shall be operated and administered by a Board of Trustees for the benefit of the Beneficiaries. Individual Trustees shall be selected by the Participating Entities as provided herein and may resign or be removed at any time by the applicable Participating Entity's Governing Board. Trustees must be employees of the Participating Entity.

3.02 Membership and Appointment. The Board of Trustees shall be comprised of one Trustee and one "Alternate Trustee" appointed by each participating entity. The Trustee shall be the City Manager (or that participating entity's equivalent) and the Alternate Trustee shall be a management level staff member employed by the Participating Entity. The appointing Participating Entity may remove a Trustee at any time without cause. In the event of the removal or resignation of a Trustee, the appointing Participating Entity shall designate a successor to such Trustee to serve the remainder of the vacated term. The successor shall succeed to the legal interest of his/her predecessor and have the same powers and duties.

3.03 Votes. Each Participating Entity shall be entitled to cast one vote in matters requiring a vote of the Board of Trustees which vote may be cast by a duly-appointed Trustee or Alternate Trustee. In the event the Trustee and the Alternate Trustee are present at the same meeting, in person or by phone, only the Trustee shall cast the Participating Entity's vote.

3.04 Terms of Office. Following appointment, Trustees and Alternate Trustees shall serve until such time as they resign, are removed by the appointing Participating Entity's Governing Board or cease to be employees of the Participating Entity that they were designated to represent. In the event that a Trustee or Alternate Trustee resigns, is removed or ceases to be an employee of the designating Participating Entity, the position shall be deemed vacant and a new Trustee or Alternate Trustee shall be designated by that Participating Entity.

ARTICLE IV. POWERS AND DUTIES OF THE BOARD OF TRUSTEES

4.01 Appointment of Trustees. The Trust shall be administered by the Board of Trustees who shall be selected and shall serve as provided in Article III.

4.02 Duties of the Board of Trustees. The Board of Trustees shall:

(a) Hold, manage, care for and keep the Fund for the benefit of the Beneficiaries and collect the income and increments thereof, and shall keep and maintain adequate and proper records to render an annual audit, accounting and reports as hereinafter mentioned.

(b) Employ or hire such agents, attorneys, accountants, actuaries, employees or other persons and shall purchase, lease or rent real or personal property as may be necessary or desirable in administering the Fund and carrying out its purposes. Agreements for such expenditures shall be in writing and formally approved by the Board. Fees, salaries, wages, emoluments or compensation of any and all such persons and other such expenses shall be paid from the Fund. When acting upon and consistent with advice of counsel for the Trust, the Board shall be relieved of all responsibility for acts performed or not performed.

(c) Pay any and all taxes of whatever nature the Fund is, or may be, obligated to pay and incur any expenses for supplies, rental of space, or other items, or anything else determined to be necessary or desirable in administering the Fund and carrying out the objects and purposes of this Trust and Trust Agreement.

(d) Establish terms and conditions of coverage within the plan document including the exclusions of coverage.

(e) Ensure that all claims are paid promptly.

(f) Take all necessary precautions to safeguard the assets of the Trust.

4.03 Authority of the Board of Trustees. In carrying out the purposes of the Trust Agreement, the Board shall have all right, power and authority to:

(a) Enter into contracts, procure insurance policies, or provide such benefits through self-funding, and to place into effect and maintain the desired schedule of benefits.

(b) Provide the intended benefits under this Trust by means of self-funding by the Trust and/or by the procurement of group insurance contracts (as permitted by the laws of the State of Arizona) including group insurance contracts issued to and in the name of the Trust, together with such other forms of contracts issued by qualified insurance companies authorized to do business in the State of Arizona as may be selected by the

Board for the purpose of providing for all or part of the benefits provided for under this Trust. The Board is hereby expressly authorized to pay to any insurance company as may be selected by the Board the required insurance premiums in connection with such group insurance contracts issued to the Trust. Whether or not benefits are provided by means of self-funding or by the procurement of group insurance, such decision shall be at the sole and exclusive discretion of the Board.

(c) Should the Board select or provide for any policy or program of self-funding, no claims for benefits or claims for liabilities shall be brought against the Board or any individual Trustee. The sole and exclusive liability of said Board in the management and operation of any program of self-funding shall be limited to due care in the selection of administrators, claims representatives, actuaries or other officials charged with the administration of such a program of self-funding, subject to the limitations upon such liability based on actions taken with advice of counsel as provided in Section 4.03 of this Agreement. In the event that submitted claims of employees exceed the funds available, the claims shall be paid in the order received.

(d) Do all those things that the Board determines to be necessary or desirable for the administration and operation of and accomplishment of the objectives and purposes of the Fund and this Trust and Trust Agreement.

4.04 Selection of Benefits. The Board may, subject to their discretion and the continuing right to change, obtain for the Beneficiaries of the Trust forms of employee benefits which may include, but are not limited to, the following:

(a) Medical and Prescription Drug;

(b) Long and Short-Term Disability;

(c) Accidental Death and Dismemberment;

(d) Dental Benefits;

(e) Vision Benefits;

(f) Life Insurance;

(g) Health Savings Accounts, Health Reimbursement Accounts and Flexible Spending Accounts; and

(h) Employee Wellness Programs, Employee Assistance Programs, utilization review programs, claims management programs and other programs intended to (i) improve Employee health, (ii) reduce costs to the Trust and to Employees and (iii) otherwise control losses.

4.05 Deposits and Investments. All corpus or portion of the Fund not expended pursuant to Article IV may be deposited by the Board in the name of the Trust in such depository or depositories as the Board shall from time to time select in accordance with this Section, and any such deposit or deposits should bear interest. The Board is empowered to receive for the benefit of the Fund such interest as might accrue on the above deposits.

(a) If not so deposited, any accumulated funds not currently required for the purposes of this Trust shall be invested by the Board in reasonably secure, reasonably liquid investments in a manner consistent with the adopted investment policy of the Trust and in compliance with the provisions of A.R.S. § 35-323 et seq.

(b) The Board may accumulate dividends, experience rating refunds or other monies, if any, accruing from any insurance policy or policies, deposits or investments. Such dividends, refunds or other monies, or all of them, shall be held in the Fund, applied to the payment of self-funded claims, the payment of insurance premiums or held, used or applied as herein set forth.

(c) The Board may enter into financial services agreements with banks and may authorize the Trust to issue checks in its own name as required to further the purposes and objectives of the Trust.

4.06 Trustees' Expense Reimbursement. The Trustees shall receive reimbursement for actual reasonable and necessary expenses incurred by the Trustees in carrying out their duties pursuant to the Trust Agreement. Expenses reimbursed under this provision shall be limited to those which would be reimbursable under the policies of the Participating Entity that the Trustee has been appointed to represent.

4.07 Trustees' Compensation. The Trustees shall not receive compensation for services rendered pursuant to the Trust Agreement.

4.08 Presumption of Validity. No person transacting business with the Board shall be obligated to (i) ensure proper application of any monies or property of the Fund, (ii) ensure that the terms of this Trust Agreement have been complied with or (iii) inquire as to the necessity of expediency of any act by the Board. Every instrument executed by the Board shall be conclusive in favor of every person who in good faith relies upon it that:

(a) At the time of the delivery of the instrument, this Trust Agreement was in full force and effect;

(b) The instrument was executed in accordance with the terms and conditions of the Trust Agreement; and

(c) The Board was duly authorized to execute the instrument or direct its execution.

4.09 Withdrawals. All checks, drafts, vouchers or other withdrawals from the fund or

depositories and the transfer or liquidating of insurance policies of investments shall be signed by appropriate signatories as determined by the Board of Trustees.

4.10 Administrative Disputes. In the event of any dispute between the Board and the Benefits Administrator or any other parties providing services to the Trust over exercise of powers granted herein, the Board's interpretation shall prevail and the service organization shall have no liability to any person with respect to the disputed act or omission in the event that it gives written notice of its dissent from such act or omission to each Trustee and to the Participating Entities no later than thirty (30) calendar days from the date of such event or disputed act.

4.11 Selection of Chairperson. The Trustees shall elect from among themselves at their first meeting a Chairperson who shall preside at all meetings of the Board and who shall be empowered to perform ministerial duties of the Board as the Board may from time to time delegate to him/her.

4.12 Selection of Vice-Chairperson. The Trustees shall elect from among themselves at their first meeting a Vice-Chairperson who shall, in the absence or incapacity of the Chairperson, preside at all meetings of the Board and who shall, when acting as Chairperson, be empowered to perform ministerial duties of the Board as the Board may from time to time delegate to him/her.

4.13 Selection of Recording Secretary. The Chairperson shall appoint a Recording Secretary who shall keep minutes of all meetings, proceedings and acts of the Board, which record shall be available at the Principal Office for inspection by all the Trustees and interested persons during usual business hours. Such record and minutes need not be verbatim. The Recording Secretary need not be a Trustee.

4.14 Board of Trustees' Meetings. The Board shall hold an initial meeting as soon as practical after being appointed. The Board shall determine the time and place of the regular meetings which shall be held at least quarterly. Special meetings may be called by the Chairperson or by a number of Trustees equal to one less than a majority of the Board. Minutes of all meetings shall be taken. Meetings shall be conducted in accordance with applicable laws, rules, bylaws or regulations. At least seven (7) days written notice designating the time and place of an annual, regular or special meeting shall be given to the Trustees. In the event of an emergency, a special meeting may be held with such lesser notice as may be appropriate and otherwise permissible by law. Any meeting at which all Trustees are present, in person or concerning which all Trustees have waived notice in writing, shall be a valid meeting without requirement that notice be given to the Trustees.

4.15 Quorum Requirement and Voting. To constitute a quorum at any regular or special meeting of the Board, there must be present in person or telephonically at least one Trustee or Alternate Trustee from a majority of the Participating Entities. Unless otherwise specifically stated in this Agreement, or as required by applicable law, action of the Board of Trustees will be by a majority vote of the quorum present when such action is taken.

4.16 Location of Meetings. All meetings of the Board shall be held at such location or locations as designated from time to time by the Board, and Trustees may appear by telephonic or other electronic means if necessary. When meetings are conducted electronically, reasonable efforts will be made to accommodate public participation at a publicly accessible location in the Principal Offices or at a facility owned or controlled by a Participating Entity and in a manner consistent with applicable federal and Arizona laws and regulations.

4.17 Fiscal Year and Audit. The accounting year of the Fund shall be on a fiscal year basis. The initial fiscal year shall commence on July 1, 2012 and end on June, 30 2013. Subsequent fiscal years shall commence on July 1 and end on June 30 of the following year. Any report required by law, city, county, State or Federal or the respective subdivisions thereof, shall be made by the Board. The Board shall have an annual audit and accounting of the Trust Fund by an independent Certified Public Accountant in accordance with generally accepted accounting practices, at the end of each fiscal year. The Accountant shall certify to the accuracy of the audit and accounting. A statement of the results of each audit shall be available for inspection by authorized persons at the Principal Office of the Trust. Copies of the audit and generalized statements of the accounting and reports shall be filed with the Arizona Department of Insurance and also delivered to the Clerk of the Governing Board of each Participating Entity and to each Trustee after each audit or as otherwise required. Copies of the audit shall be retained by the Board of Trustees for a period of at least five years.

4.18 Bylaws, Rules and Regulations. The Board shall have the power to adopt bylaws, rules, procedures and regulations pertaining to the purpose, powers and administration of the Trust, which shall be consistent with covenants, terms, conditions and duties as set forth in the Trust Agreement. Such bylaws, rules, procedures and regulations shall be binding on all persons transacting business with the Trust and upon any and all persons claiming any benefits thereunder. Adoption or amendment of bylaws, rules, procedures or regulations shall require a majority vote of the Board of Trustees.

4.19 Bonding Requirements. The Board shall procure or provide for the procurement of fidelity bonds for the Trust and persons and organizations authorized to receive handle, deal with or draw upon the monies in the fund for any purpose whatsoever, said bonds to be in such amount to aid in the reimbursing of bondable loss of money, and in the event shall meet the requirements as may be required, from time to time as applicable under United States or State law. Such bonds are to be obtained from reputable fidelity or surety companies as the Board shall determine. If convenient, and in conformity with the law, such bonds may be position bonds. The cost of the premiums on such bonds may be paid out of the corpus or income of the fund or paid for by the persons or organizations required to purchase such bonds. If any fidelity or surety company refuses to bond or write a bond for any Trustee, or other person described in this section, said Trustee or person shall not serve and shall resign.

ARTICLE V. PAYMENTS TO THE FUND

5.01 Entity Contributions. In order to effectuate the purposes of the Trust, each Participating Entity shall contribute to the Fund an amount determined by the Board to be necessary to pay for the benefits provided hereunder to the Employees and other persons covered by the Employee Benefit Program. The Entity Contributions shall be due and payable as of the date specified in the Bylaws. The Entity Contributions shall not include amounts payable directly by persons receiving extended coverage under the Employee Benefit Program as required by law or otherwise.

5.02 Interest on Premiums in Arrears. Entity Premiums not paid as of the due date as provided in Section 5.01 shall be subject to the late payment process as outlined in the Bylaws.

5.03 Employer Contributions Not Wages. Employer Contributions paid or accrued to the order of the Fund through Entity Premiums shall not constitute or be deemed wages due employees, nor shall such contributions in any manner be subject to the debts, contracts or liabilities of the Participating Entity. No Participating Entity, Employee, or Beneficiary under the Plan shall have any rights, title or interest in the Fund, except as specifically provided in this Trust Agreement.

5.04 Employee Contribution. Employees may be required to contribute a portion of the Entity Premium in amounts to be determined by each Participating Entity as appropriate for the benefits to be provided hereunder. Nothing in this paragraph shall be deemed to preclude a Participating Entity from making all or any portion of Employee Contribution payments on behalf of its employees.

5.05 Payment in Lieu of Benefits. No employee shall have any right to receive any part of his/her own Employee Contributions or any part of Employer Contributions paid to such Employee in lieu of benefits.

5.06 Payroll Deductions. All Employee Contributions shall be paid by payroll deductions. The Participating Entity shall remit all monies obtained through payroll deductions in a lump sum to the Fund as part of the Entity Premium described herein.

5.07 Manner of Payment. All Entity Premiums and other payments to the fund shall be payable to the name of the Trust and shall be paid in the manner and form determined by the Board.

5.08 Wage Reports/Audits. The Participating Entity shall provide to the Trust or make available to the Trust for inspection all payroll or wage reports required by the Board upon request. The Board may at any time vote to have an audit of a Participating Entity's payroll records performed by an independent Certified Public Accountant or other qualified individual or organization as determined by the Board to confirm the accuracy of required reports and to confirm the correct levels of contributions.

5.09 Contributions Irrevocable. Subject to the provisions of Article XVII with respect to

termination of this Trust Agreement, Article XVI with respect to suspension and expulsion and Article XV with respect to voluntary termination of membership in the Trust, all Contributions to the Fund shall be irrevocable and under no circumstances shall any monies properly paid into the Fund, or any part of the Fund, be recoverable by or payable to a Participating Entity or any Employee, nor shall any of the same be used for or diverted to purposes other than for the exclusive program of benefits for Employees and other covered persons as provided in this Trust Agreement.

5.10 Assessments. In the event a deficit shall develop which is creditable to any plan or fiscal year, the Board shall specifically notify each Participating Entity of such deficit and vote to order an assessment to the Participating Entities sufficient to cure the deficit. Assessments shall be distributed among the Participating Entities on a pro-rata basis, as calculated by the amount of each member's contributions for the plan or fiscal year to which the deficit is credited. Assessments shall not exceed the amount of the member's annual contribution to the pool. All such assessments shall be made to comply with applicable provisions of A.R.S. § 11-952.01 et seq.

ARTICLE VI. PAYMENT OF BENEFITS

6.01 Benefits Liability. Subject to the terms and conditions set forth in this Trust Agreement, the Summary Plan Description and other procedures, rules, regulations and conditions established by the Board, the Trust shall pay all claims for which each Participating Entity's Beneficiaries would be liable and would be entitled to receive benefits under the Employee Benefit Program.

6.02 Discharge of Liability. Subject to the terms and conditions set forth in this Trust Agreement, the Summary Plan Description and other procedures, rules, regulations and conditions established by the Board, liabilities incurred for claims for services rendered to the Beneficiaries of Participating Entities under the Employee Benefit Program will be relieved only by payment of claims by the Trust, by the Beneficiary or by such other party who may be deemed responsible for payment of such claims.

6.03 Method of Payment. The Board shall arrange for disbursement of benefits under the Employee Benefit Trust through a Benefits Administrator appointed by the Board.

6.04 Summary Plan Description. The Benefits to be provided pursuant to the Trust Agreement, whether by self-funding or by insurance contract, shall be set forth in one or more Summary Plan Descriptions which shall also explain the eligibility rules for coverage for employees and dependents.

6.05 Protection of Employees. Prior to payment to an Employee or other Beneficiary, all assets of the Trust shall be owned by the Trust and shall not be liable in any way for any debt or obligation of any Employee. To the extent permitted by law, all Trust benefits shall be exempt from attachment, garnishment, levy of execution, bankruptcy proceedings, or other legal process at any time subject to the Trustee's possession and control; but in any event, such assets shall be

subject to such process only to the extent of such Employee's benefits hereunder as they come due.

6.06 Employee Claims to Benefits. No Employee or other Beneficiary shall have any right or claim to benefits under the Employee Benefit Plan except as specified in the policy or policies or contract or contracts or self-funded benefits procured or entered into pursuant to Articles II and IV of this Agreement and as set forth in the Summary Plan Description. Any disputes as to eligibility, time, amount, or duration of benefits shall be resolved by the appropriate insurance carrier or Benefits Administrator, under and pursuant to the applicable policy or contract; and the Employee or other Beneficiary shall not have the right or claim in respect thereto against the Fund or The Board. Any dispute as to eligibility, type, amount, time or duration of benefits provided by the Fund as self-funded shall be decided by the Board, and all disputes shall be finally settled pursuant to Article VII of this Agreement.

6.07 Maintenance of Reserves. The Board shall maintain, as part of the Trust Fund, claim reserves in an amount at least equal to known incurred losses and reasonable estimates of claims incurred but not reported.

6.08 Failure to Pay Benefits. Neither the Participating Entities nor the Board shall be liable for the failure or omission, for any reason, to pay any benefits under the Employee Benefit Program. If for any reason, including, but not limited to, epidemics, catastrophes, or normal depletion, the Board determines that self-insured funds are insufficient to pay current claims, the amount of benefits payable to an eligible Employee or other Beneficiary shall, in all events, be limited to the extent that sufficient funds are available to the Board for the payment of all such claims; and, in such event, benefits payments to each eligible Employee or other Beneficiary shall be limited to the extent that sufficient funds are available from the Trust Fund, and shall be further prorated in such amounts that all such claims shall be treated proportionally equal to the ratio that such total claims bear to the funds that are available for such payment. If any controversy or dispute exists concerning such matters, they shall be settled in accordance with the provisions of Article VII of this Agreement.

ARTICLE VII. CONTROVERSIES AND DISPUTES

7.01 Interpretation of Trust Documents. The Board of Trustees shall have the power to construe, interpret and apply the provisions of the Agreement and Declaration of Trust or any amendments, rules or regulations adopted pursuant thereto and the terms used herein and any construction, interpretation or application adopted in good faith shall be final and binding upon the Participating Entities, and upon Employees and their respective families, dependents, successors, assigns, executors, administrators and/or their legal representatives.

7.02 Settlement of Benefit Claims. The Board may, in its sole discretion, compromise or settle any disputed benefits claim controversy in such manner as it deems appropriate and consistent with applicable law and regulation. All decisions made by the Board shall be conclusive and binding upon all parties.

ARTICLE VIII. RESPONSIBILITIES AND LIABILITIES

8.01 Responsibilities and Liabilities of the Board of Trustees. The Board shall only be responsible for monies when and if said monies are received in accordance with the provisions of this Trust Agreement. The Trustees shall only be responsible for any liability arising from their respective gross negligence, bad faith or willful misconduct in handling of the monies received in hand by them for execution and administration of the terms of the Fund. The Trustees shall not be responsible for the actions or omissions of their Co-Trustees, nor for the acts or omissions of other agents, or for any of the acts or omissions of any insurance company or its agents, servants or representatives, including, but not limited to non-payment of claims by an insurance company or companies for any reason. No Trustee shall be entitled to any indemnifications of court costs or attorneys' fees from any liability arising from his/her own willful misconduct, bad faith or gross negligence. To the extent that their actions do not constitute willful misconduct, bad faith or gross negligence, Trustees shall not be liable for actions taken on advice of counsel for the Trust as provided in Section 4.03.

8.02 Successors' Liability. No Successor Trustee shall be liable or responsible for any acts or defaults of his/her predecessor(s), or for any losses or expenses resulting from or occasioned by acts or omissions of the prior administration of the Fund or the Trust. A Successor Trustee is responsible solely for his/her actions as set forth in Section 8.01 herein.

ARTICLE IX. AMENDMENT OF THE TRUST AGREEMENT

9.01 Powers. It is anticipated that in the administration of this Trust, conditions may arise that are not foreseen at the time of execution of this Trust Agreement and it is the intention of the Participating Entities that the power of amendment which is herein granted be exercised in order to carry out the spirit, object and purposes of the Trust. Therefore the general power is granted by the Participating Entities to amend this Agreement in accordance with the procedures set forth in Article IX of this Trust Agreement. All parties to the Trust and all persons claiming any interest hereunder are and shall be bound thereby.

9.02 Procedures. Prior to amendment of this Trust Agreement, the Board shall notify each Participating Entity not less than thirty (30) calendar days prior to the date on which such proposed amendments are to be considered by the Board of Trustees. Such notice shall set forth in sufficient detail the nature of the proposed amendments and shall invite questions or comments. Amendments to the Trust Agreement shall require a 2/3 vote of the Board of Trustees. Approved amendments shall be signed by the Chairperson of the Board of Trustees. Amendments to the Trust Agreement shall be filed with the governmental entity or entities as required by law and in the manner provided by law for such agreements. Proposed amendments to the Trust Agreement shall be reviewed and approved in writing as to form by counsel for the Trust prior to consideration by the Board of Trustees. Following approval by the Board of Trustees, proposed amendments shall be submitted to the Governing Boards of the Participating Entities. A proposed amendment shall become effective on the date specified after approval by the Governing Boards of no less than ¾ of the total number of Participating Entities. Upon

approval of a proposed amendment by the requisite number of Governing Boards as provided herein, a Participating Entity whose Governing Board fails to approve the proposed amendment may elect to voluntarily terminate its membership in the Trust pursuant to the provisions of Article XV of this Trust Agreement.

ARTICLE X. NON-VESTING OF RIGHTS

10.01 Rights Not Vested. No Employee, family, dependent, Beneficiary nor any other person or group nor their respective successors, assigns, nor legal representatives, shall have any right, title or interest, vested or otherwise, in or to the Fund, its corpus (income or increments thereto), insurance dividends, cash value, if any, or any insurance or benefits or monies payable therefrom, payments from the Fund, or in or to the eligibility requirements for benefits as changed or altered. Any participating Employee who withdraws or ceases to participate in the Employee Benefit Program shall be deemed to expressly waive and forfeit any right, title or interest in and to the Fund, its corpus and assets. No Employee, family, dependent, Beneficiary nor any other person or group nor their respective successors, assigns nor legal representatives shall have any right in or to the Trust Fund, corpus, insurance dividends, cash value, if any, of insurance, interest, income, benefits, or any benefits or money payable therefrom, or anything arising out of or in this Trust during the term of this Agreement and any benefit he or they may have is forever terminated and discharged upon the Employee's termination of employment with the Participating Entity (voluntary or involuntary discharge or otherwise), or when this Trust Agreement is terminated, wound up or dissolved. No benefit, right or interest of the forgoing is transferable by the Employee to another Employee or person, corporate or otherwise except to physicians, hospitals and any other person or institution furnishing medical services within the terms of this Trust Agreement. No monies, property or equity of any nature in the Fund, nor insurance policies or benefits or monies payable therefrom, nor investments, nor deposits nor any part or portion of the Fund, shall be subject in any manner by any Employee, or person claiming through such employee, ownership, anticipation, alienation, sale, transfer, assignment, pledge, encumbrance, garnishment, attachment, execution, mortgage lien or charge of whatsoever nature or kind and any attempt to cause the same is and shall be null and void.

ARTICLE XI. PROVISIONS RELATING TO INSURANCE COMPANIES

11.01 Status of Insurance Companies. No insurance company that issues any policies or contracts for the purpose of fulfilling the terms of the Agreement shall be deemed to be a party to this Agreement, nor shall it be responsible for the validity of this Agreement, nor is this Agreement in any manner for the benefit of any insurance company or companies. No insurance company shall be required to determine the validity of this Agreement or to question the authority of or action of the Board, or be responsible to confirm that any action taken by the Board is authorized by the terms of this Agreement.

ARTICLE XII. PROGRAM ADMINISTRATION

12.01 Allocation of Administrative Duties. The Board shall have the full obligation and

responsibility for administration of the Employee Benefit Program but may designate any person, firm, corporation or other entity as an agent or representative, for purposes of carrying out the objectives of the Trust. The Board shall designate an administrator to carry out the policies established by the Board and to provide day to day management. An administrator appointed pursuant to Section 12.03 may also serve in this capacity.

12.02 Termination of Agents. The Board may remove any agent for administration at any time, without cause, after thirty (30) calendar days written notice to the agent unless otherwise provided in contracts for employment of such agents that were approved by the Board.

12.03 Consultant/Administrator. The Board shall retain a Benefits Administrator and a Trust Administrator, both of whom must be licensed pursuant to Title 20, Chapter 2, Article 3 or 9 or such other law as may be applicable. Such licensing shall be verified by the Board prior to any appointment pursuant to this section. The Board shall keep minutes of its actions and shall reflect in those minutes the retention of these Administrators and the areas of their authority as required by A.R.S. § 11-952.01(H)(5).

12.04 Duties of Agents. Agents shall perform all designated duties in a workmanlike and professional manner and shall keep accurate and complete records of activities as prescribed by the Board. Any agent designated as Benefits Administrator shall, in addition to the other duties set forth in this section, keep its records open for examination at reasonable times during business hours by any person authorized by the Board of Trustees and shall, within sixty (60) calendar days after the end of each Trust year or such other date as determined by the Board, file with the Board a complete statement of its administrative activities during the period of time since the closing date of the previous statement.

12.05 Business Offices. The Trust may establish offices within the State of Arizona as required for the conduct of business and may employ necessary staff to carry out the purposes of the Trust.

ARTICLE XIII. ADDITIONAL MEMBERS

13.01 Eligibility for Membership. Effective July 02, 2012, cities, towns, counties, fire districts, municipal corporations and any other political subdivisions of these types of entities as may be eligible for membership pursuant to A.R.S. § 11-952 et seq. located within the State of Arizona shall be eligible to be considered for membership as a Participating Entity.

13.02 Application for Membership. An entity desiring membership in the Trust may petition the Board for permission to become a Participating Entity. Applicants shall submit application forms as prescribed by the Board and shall provide such additional information as may be requested in order to fully evaluate the application. Completed applications and supporting data shall be submitted no later than the deadlines established by the Board. Applications deemed incomplete by the established deadlines may be rejected at the sole discretion of the Board.

13.03 Approval of Applications. Completed applications will be reviewed and evaluated based on standards established by the Board to ensure that approvals of applications are based on the best interest of the Trust, its Participating Entities and their Employees. Decisions of the Board may be based upon recommendations of their employees or agents. The Board, in a regularly convened meeting, may, by two-thirds vote, approve the application for membership subject to such terms and conditions as may be established by the Board in their sole discretion. Decisions of the Board with respect to membership applications will be final. If accepted for membership, an entity will be bound by all applicable terms and conditions of this Agreement and Declaration of Trust as well as all policies, procedures and regulations established pursuant to this Agreement. Representatives of Participating Entities approved for membership may attend meetings of the Board of Trustees, but will not be allowed to vote or otherwise formally participate in the governance or benefits of the Trust until the date on which the Entity's Employees become eligible to receive benefits under the Employee Benefit Program.

ARTICLE XIV. DURATION OF AGREEMENT

14.01 Term of Agreement. This Declaration of Trust shall continue in full force and effect until terminated as provided in accordance with the procedures set forth in Article XVII of this Trust Agreement.

14.02 Initial Term of Participation; Renewals. The initial membership term for new members shall be for a period of not less than thirty six (36) calendar months. The length of the initial term shall be set to align the Participating Entity's membership term with the July 01 to June 30 Fiscal Year of the Trust at the earliest possible date. Membership in the Trust may not be terminated by any Participating Entity during the initial membership term except as expressly provided herein. Notwithstanding these limitations on voluntary termination, coverage under the Employee Benefit Plan may be suspended or terminated as provided herein for nonpayment of Entity Premiums or other violations of the terms of this Agreement and Declaration of Trust. After expiration of the initial membership term, a Participating Entity may terminate its participation as provided in Article XV herein or may request that the Board of Trustees approve an additional Renewal Term. Renewal terms shall be for thirty six (36) calendar months. Approval of Renewal Terms requires a 2/3 vote of the Board of Trustees. Membership in the Trust may not be voluntarily terminated during Renewal Terms except as expressly provided herein.

14.03 Non-Appropriation Penalty. In the event a Participating Entity fails to appropriate the funds for any particular plan year, or portion of a plan year, within that Participating Entity's initial term of participation, or the current renewal term, which is applicable, the Participating Entity agrees to pay a penalty in an amount equal to what that Participating Entity's obligations would have been for the entire remainder of the initial term of participation, or the current renewal term, whichever is applicable, had the appropriation been made. The "initial term of participation" and the "renewal term" are set forth in Section 14.02 above.

ARTICLE XV. VOLUNTARY TERMINATION OF MEMBERSHIP

15.01 Procedure. Membership in the Trust may be voluntarily terminated by a Participating Entity upon conclusion of its Initial Term of Participation or a subsequent Renewal Term, subject to the following conditions:

(a) Written notice of voluntary termination must be received no later than ninety (90) calendar days prior to the last day of the Participating Entity's Initial Term of Participation or current Renewal Term, as applicable.

(b) Termination will be effective as of the last day of the Participating Entity's Initial Term of Participation or current Renewal Term, as applicable.

(c) Once termination is effective, a former Participating Entity shall not be eligible for readmission to the Trust for a minimum of three fiscal years. Application for readmission shall be made according to the procedures set forth in Article XIII of this Agreement.

(d) Termination will not relieve a former Participating Entity of any obligations, financial or otherwise, imposed upon Participating Entities pursuant to this Agreement for the period during which the former Participating Entity was a member of the Trust.

(e) Participating Entities terminating their membership in the Trust in accordance with this Article shall receive surplus amounts due them and shall remain liable for deficits owed by them to the Trust in accordance with Article 18.02 of this Agreement.

15.02 Termination Due to Amendment of the Trust Agreement. Notwithstanding the provisions of Article 15.01 a Participating Entity may elect to voluntarily terminate its membership prior to the end of their Initial Term of Participation or their subsequent Renewal Term provided the Participating Entity provides a ninety (90) calendar days advance notice as required by A.R.S. § 11-952.01(L), under the following conditions:

(a) The Governing Board of the Participating Entity wishing to terminate its membership pursuant to this Article must have failed to approve a proposed amendment to the Trust Agreement which was approved by the requisite number of Governing Boards pursuant to Article 9.02 of this Trust Agreement.

(b) The approved amendment to the Trust Agreement is to become effective prior to the end of the current renewal period.

(c) The proposed date of termination of membership is to be on or before the effective date of the approved amendment to the Trust Agreement or upon such later date as

may be approved by the Board of Trustees during which period the terminating entity shall not be subject to the provisions of the approved amendment to the Trust Agreement.

(d) Any voluntary termination pursuant to this Article 15.02 shall also be subject to the provisions of Article 15.01(c) of this Trust Agreement.
(e) Participating Entities voluntarily terminating their memberships in the Trust in accordance with this Article shall receive surplus amounts due them and shall remain liable for deficits owed by them to the Trust in accordance with Article 18.02 of this Trust Agreement.

ARTICLE XVI. SUSPENSION AND EXPULSION

16.01 Suspension. In the event that any Participating Entity shall fail to make its contributions as specified herein, or shall fail to comply with any other terms or conditions of this Trust Agreement or other requirements established by the Board, the Board may suspend benefits provided to the Beneficiaries of that Participating Entity. Prior to any suspension, the Board shall provide written notice of default to the Participating Entity. The notice of default shall advise the Participating Entity that:

(a) Unless the default is cured within ten (10) calendar days of receipt of the notice, coverage may be suspended for a period of up to eighty (80) calendar days without further notice or administrative process.

(b) During the eighty (80) day suspension period, the Board of Trustees shall determine if the Participating Entity should be expelled as a Participating Entity effective ninety (90) calendar days following receipt of notice of expulsion.

(c) That prior to removal of any previously-imposed suspension, the Board may impose specific reasonable conditions for reinstatement of coverage and continued membership in the Trust.

(d) That the defaulting Participating Entity will be liable for unpaid premiums and/or benefit payments, administrative costs and other costs incurred by the Trust between the date that premium payments became in arrears and the date of suspension of benefits plus interest accrued as provided in Section 5.02 of this Trust Agreement.

16.02 Expulsion. Participating Entities may only be expelled from the Trust upon a majority vote of a quorum of Trustees and upon the statutory required ninety calendar (90) notice prior to the effective date of expulsion. Participating Entities that are expelled from membership in accordance with this Article shall receive surplus amounts due them and shall remain liable for deficits owed by them to the Trust in accordance with Article 18.03 of this Agreement.

ARTICLE XVII. TERMINATION OF TRUST

17.01 Termination by the Trustees. The Trust created by this Agreement and Declaration of Trust may be terminated at any time by formal resolution approved by majority vote of the Board of Trustees.

17.02 Notice of Termination. Upon termination of the Trust as provided herein, the Board shall forthwith notify all Employees and all other necessary parties.

17.03 Duration after Termination. Notwithstanding any provision set forth in this Trust Agreement regarding duration and termination of the Trust, the Trust shall continue in existence for as long a period as may be required to wind up its business. Upon termination, the Board shall continue in its capacity as a Board of Trustees for so long a period as may be required to wind up the business of the Trust.

17.04 Disposition of Trust Assets and Final Accounting. Upon termination of this Trust, any and all monies remaining in the Fund shall be disposed of in accordance with Article 18.01. At such time as the business of the Trust is wound up, the Board shall render a final accounting of the affairs of the Trust to the Participating Entities. Thereafter, there shall be no claim or action against the Board except as expressly provided herein and they shall have no further responsibility or duties and they shall be discharged.

ARTICLE XVIII. DISTRIBUTIONS OF SURPLUSES AND DEFICITS UPON TERMINATION OF THE TRUST, VOLUNTARY TERMINATION OF MEMBERSHIP OR EXPULSION

18.01 Termination of the Trust. Upon termination of the Trust, the Board shall, by majority vote, provide for the development of a plan (the termination plan) to wind up the Trust's business over the course of a period not to exceed thirty six (36) calendar months from the effective date of the Trust's termination. The termination plan shall provide for at least the following:

(a) Payment of all administrative and other costs reasonably required to wind up the Trust's operations;

(b) Payment of all outstanding claims liabilities of the Trust including, without limitation, all known claims and incurred but not reported liabilities;

(c) Payment to the Trust of any deficits owed to it by any current or former Participating Entities; and

(d) Payment of any outstanding amounts due to former Participating Entities that have previously voluntarily terminated their memberships in the Trust in accordance with Articles 15.01 or 15.02 of this Trust Agreement.

18.02 Voluntary Termination of Membership. For entities voluntarily terminating membership as provided under Article 15.01 or 15.02, surpluses and deficits allocated to the Participating Entity during the term of its membership, including adjustments for administrative expenses associated with the termination, shall be paid in accordance with the following schedule:

(a) Surpluses payable to the former Participating Entity shall be paid in two (2) installments, with the first installment comprised of an amount not to exceed seventy five percent (75%) of the total estimated amount due being paid no later than one hundred eighty (180) calendar days after the effective date of such termination, and any remaining surplus balances due being paid not later than twenty seven (27) months after the effective date of such termination, or in accordance with such other schedule as may be agreed to between the former Participating Entity and the Board.

(b) Deficits payable to the Trust from the former Participating Entity shall be paid in two (2) installments, with the first installment comprised of an amount not to exceed seventy five percent (75%) of the total estimated amount due being paid no later than one hundred eighty (180) calendar days after the effective date of such termination and any remaining deficit balances due being paid not later than twenty seven (27) months after the effective date of such termination, or in accordance with such other schedule as may be agreed to between the former Participating Entity and the Trustees.

(c) At the time of the final distribution of surpluses or deficits as provided for in this section 18.02, the Board shall render a final accounting of the affairs of the Trust to the former Participating Entity whose membership terminated as provided hereunder.

18.03 Expulsion. In the event that a Participating Entity is expelled and membership involuntarily terminated in accordance with Article 16.02 above, surpluses and deficits allocated to the Participating Entity during the term of its membership, including adjustments for administrative expenses associated with the termination, shall be paid in accordance with the following schedule:

(a) Former Participating Entities shall remain liable for the full amount of contributions that would otherwise have been due to the Trust during the period of time between the date of such Entity's expulsion and the scheduled end of such Entity's Initial or Renewal Term of Participation. Amounts due to the Trust under this Article may be collected through reduction of any surpluses otherwise due to the former Participating Entity in accordance with Article 18.03 (b) or, in the event the former Participating Entity has no surplus due to it, or that the amount due to the Trust under this Article exceeds the amount of surplus due to the former Participating Entity, through assessment in accordance with Article 18.03(c) of this Trust Agreement.

(b) Surpluses payable to former Participating Entities that were expelled in accordance

with Article XVI shall be reduced by the amount of the Member Contributions that would otherwise have been due to the Trust during the period of time between the date of such Entity's expulsion and the scheduled end of such Entity's Initial or Renewal Term of Participation. The balance of any remaining surpluses due to the former Participating Entity after making such adjustment shall be paid in two (2) installments, with the first installment comprised of an amount not to exceed seventy five percent (75%) of the remaining total estimated amount due being paid no later than one hundred eighty (180) calendar days after the effective date of such expulsion, and any remaining surplus balances due being paid not later than twenty seven (27) months after the effective date of such expulsion, or in accordance with such other schedule as may be agreed to between the former Participating Entity and the Board.

(c) Deficits payable to the Trust from an expelled former Participating Entity shall be paid in two (2) installments, with the first installment comprised of an amount not to exceed seventy five percent (75%) of the total estimated amount due being paid no later than one hundred eighty (180) calendar days after the effective date of such termination and any remaining deficit balances due being paid not later than twenty seven (27) months after the effective date of such termination, or in accordance with such other schedule as may be agreed to between the former Participating Entity and the Board.

(d) At the time of the final distribution of surpluses or deficits as provided for in this section 18.03, the Board shall render a final accounting of the affairs of the Trust to the former Participating Entity whose membership terminated as provided hereunder.

ARTICLE XIX. MISCELLANEOUS

19.01 Prosecution and Defense of Lawsuits. In the event any claim, suit, action or legal or administrative proceeding is brought against the Trust, the Board of Trustees, one or more Trustees or the Fund, in connection with any matter arising out of the administration of the Trust or Fund or in connection with this Trust Agreement or in connection with any act or omission of the Board of Trustees or one or more of the Trustees, or in the event of any suit, action or proceeding commenced by the Board, including, but not limited to, a request for a judicial settlement of accounts, a suit for construction, a bill of interpleader, or any other matter relating to the Trust, the Board shall have the power and authority to employ legal counsel to represent it in any such suit, action or proceeding. Expenses, including legal counsel fees and other costs shall be paid from the Fund as long as the Board has acted in good faith and not with gross negligence, bad faith or willful misconduct, it being the intent to indemnify the Trustees, individually and as a Board, against all honest mistakes in judgment and all acts or omissions that are not deliberate or willful violations of the duties of the Board. In addition, the Board shall have the right to commence and prosecute such suits, actions or proceedings as it may determine are necessary and proper in order to protect the interest of the Trust or Fund, and, in this connection, the Board shall have the same rights and entitlement to reimbursement for costs and expenses as heretofore described for the defense of lawsuits.

19.02 Fiduciary Liability. The fiduciary liability and funding of all eligible benefits as determined by the Plan Document shall be the sole responsibility of the Board acting in their official capacity and shall not be determined to be a fiduciary duty of any Participating Entity.

19.03 Worker's Compensation. The insurance coverage contemplated by this Trust Agreement shall not apply in any case which is compensable under Worker's Compensation.

19.04 Situs of Trust. The City of Phoenix, County of Maricopa, State of Arizona, shall be deemed the situs of the Trust created hereunder. All questions pertaining to validity, construction and administration shall be determined in accordance with the laws of such State and County. This Trust Agreement is deemed made, executed and delivered in such State.

19.05 Interpretation of Trust Agreement. Whenever any words are used in this Trust Agreement in the masculine gender, they shall be construed as though they were also in the feminine or neuter gender in all situations where they would so apply and wherever any words are used in this Trust Agreement in the singular form, they shall also be construed as though they were also used in the plural form in all situations where they would so apply, and whenever any words are used in this Agreement in the plural form they shall be construed as though they were also in the singular form in all situations where they would so apply.

19.06 Captions. It is understood and agreed that the captions and headings contained in this Trust Agreement are included for convenience only and that they are not and shall not be deemed a part of the Agreement and that they shall in no way define, limit or expand any of the terms, obligations or conditions set forth herein.

19.07 Severability. The parties agree that, to the extent that any provision of this Trust Agreement is in conflict with any applicable statute, regulation or rule, that provision shall be deemed unenforceable and the applicable statute, regulation or rule shall govern. Should any provision or term in this Trust Agreement be deemed or held to be unlawful or invalid for any reason, such a determination will not adversely affect the remaining provisions contained herein unless such a determination will make the operation of the Trust impossible or impractical. In such a case, the appropriate parties shall immediately adopt such provisions as may be required to facilitate the proper functioning of the Trust.

19.08 Taxation of Contributions, Assets, Income and Benefits. This Trust Agreement is being entered into and contributions are being made based upon the expectation that contributions made hereunder will not be subject to taxation and that benefits received by employees or other beneficiaries will not be deemed compensation in determination of federal, state or local tax liability. The parties hereto, individually and collectively, agree to take or cause to be taken any and all steps that may be necessary or advisable in order to obtain and/or maintain a tax-exempt status for this Trust. In the event that any provisions of this Trust Agreement are determined to impose tax obligations on any Participating Entity or Employees or other Beneficiaries, any steps necessary to eliminate such obligations shall be taken immediately. Nothing in this section shall be deemed to impose liability on the Board, the Trust or Participating Entities in the event that

contributions or benefits are deemed taxable or in the event that investment income received by the Trust is determined to be subject to taxation.

19.09 Cancellation. This Agreement is subject to cancellation pursuant to A.R.S. § 38-511.

ARTICLE XX. STOP LOSS PROVISIONS

20.01 Stop Loss Requirement. Specific stop-loss reinsurance shall be an integral part of any self-funded benefit program established pursuant to this Trust Agreement. It is the intent of the parties to this Trust Agreement that stop-loss coverage, with such attachment points and policy limits as may be deemed necessary to protect the loss fund and allow complete and timely payment of benefits, be provided by an authorized carrier licensed to execute contracts in the State of Arizona.

ARTICLE XXI. LOSS CONTROL PROGRAM

21.01 Loss Control Program. The Board shall provide for the development and implementation of a program of loss control for each plan year of Trust operations. The loss control program shall be further described in the Plan of Risk Management approved each year and may include one or combinations of:

(a) Specific and/or aggregate reinsurance;

(b) Conventional insurance, partial or full self-insurance;

(c) Access to Preferred Provider Organizations (PPO) for benefit offerings;

(d) Medical pre-certification, concurrent and/or post discharge review;

(e) Large case management;

(f) Health and wellness promotion;

(g) Employee assistance programs; and

(h) Such other loss control programs as the Board may determine to be appropriate.

ARTICLE XXII. USE AND DISCLOSURE OF PROTECTED HEALTH INFORMATION BY PARTICIPATING ENTITIES

22.01 The Participating Entities in the Arizona Metropolitan Trust shall only use protected health information ("PHI") to the extent of and in accordance with the uses and disclosures permitted by the Health Insurance Portability and Accountability Act of 1996 ("HIPAA"). Specifically, the Participating Entities may use and disclose PHI for purposes related to health care treatment,

payment for health care and health care operations.

22.02 Payment includes activities undertaken by the Participating Entities individually or through the Benefits Administrator to determine or fulfill its responsibility for coverage and provision of plan benefits that relate to a Beneficiary to whom health care is provided. These activities include, but are not limited to, the following:

(a) Determination of eligibility, coverage and cost sharing amounts (for example, cost of a benefit, plan maximums and copayments as determined for an individual's claim);

(b) Adjudication of health benefit claims (including appeals and other payment disputes);

(c) Subrogation of health benefit claims;

(d) Establishing Employee Contributions;

(e) Risk adjusting amounts due based on enrollee health status and demographic characteristics;

(f) Billing, collection activities and related health care data processing;

(g) Claims management and related health care data processing, including auditing payments, investigating and resolving payment disputes and responding to Beneficiary inquiries about payments;

(h) Obtaining payment under a contract for reinsurance (including stop-loss and excess of loss insurance);

(i) Medical necessity reviews or reviews of appropriateness of care or justification of charges;

(j) Utilization review, including precertification, preauthorization, concurrent review and retrospective review;

(k) Disclosure to consumer reporting agencies related to the collection of premiums or reimbursement (the following PHI may be disclosed for payment purposes: name and address, date of birth, Social Security number, payment history, account number and name and address of the provider and/or health plan); and

(l) Reimbursement to the Trust.

22.03 Health Care Operations include, but are not limited to, the following activities:

(a) Quality assessment;

(b) Population-based activities relating to improving health or reducing health care costs, protocol development, case management and care coordination, disease management, contacting health care providers and patients with information about treatment alternatives and related functions;

(c) Rating provider and plan performance, including accreditation, certification, licensing or credentialing activities;

(d) Underwriting, premium rating and other activities relating to the creation, renewal or replacement of a contract of health insurance or health benefits, and ceding, securing or placing a contract for reinsurance of risk relating to health care claims (including stop-loss insurance and excess of loss insurance);

(e) Conducting or arranging for medical review, legal services and auditing functions, including fraud and abuse detection and compliance programs;

(f) Business planning and development, such as conducting cost-management and planning-related analyses related to managing and operating the Trust, including formulary development and administration, development or improvement of payment methods or coverage policies;

(g) Business management and general administrative activities of the Trust, including, but not limited to:

(i) Management activities relating to the implementation of and compliance with HIPAA's administrative simplification requirements, or

(ii) Customer service, including the provision of data analyses for Employees, the Trust or other Beneficiaries; and

(h) Resolution of internal grievances.

22.04 The Participating Entity agrees to:

(a) Not use or further disclose PHI other than as permitted or required by the Plan Document or as required by law;

(c) Ensure that any agents, including a subcontractor to whom the Participating Entity provides PHI received from the Plan agree to the same restrictions and conditions that apply to the Participating Entity with respect to PHI;

(d) Not use or disclose PHI for employment-related actions and decisions unless authorized by a Beneficiary;

(e) Not use or disclose PHI in connection with any other benefit or employee benefit plan of

the Participating Entity unless authorized by a Beneficiary;

(f) Report to the Trust any PHI use or disclosure that is inconsistent with the uses or disclosures provided for of which it becomes aware;

(g) Make PHI available to a Beneficiary in accordance with HIPAA's access requirements;

(h) Make PHI available for amendment and incorporate any amendments to PHI in accordance with HIPAA;

(i) Make available the information required to provide an accounting of disclosure;

(j) Make internal practices, books and records relating to the use and disclosure of PHI received from the Plan available to the HHS Secretary for the purposes of determining the Trust's compliance with HIPAA; and

(k) If feasible, return or destroy all PHI received from the Trust that the Participating Entity still maintains in any form, and retain no copies of such PHI when no longer needed for the purpose for which disclosure was made (or if return or destruction is not feasible, limit further uses and disclosures to those purposes that make the return or destruction infeasible).

22.05 In accordance with HIPAA, only the following employees or classes of employees of a Participating Entity may be given access to PHI:

(a) The human resources director or the individual assigned by the governing body of a Participating Entity to perform said function; and

(b) Staff designated by the person assigned pursuant to Article 22.05(a).

22.06 The persons described in Article 22.05 may only have access to and use and disclose PHI for plan administration functions that the Trust performs for the Participating Entity.

22.07 If the persons described in Article 22.05 do not comply with the Plan Document, the Trust may provide a mechanism for resolving issues on noncompliance, including disciplinary sanctions.

EXHIBIT A

Participating Entities – Arizona Metropolitan Trust as authorized and approved by the Board of Trustees as of July 1, 2012 including Initial Terms of Participation established pursuant to Article 14.02 of the Trust Agreement.

	Participating Entity	Membership Term
1.	City of Apache Junction	July 01, 2012 - June 30, 2018
2.	City of Avondale	July 01, 2012 - June 30, 2018
3.	City of El Mirage	July 01, 2012 - June 30, 2018
4.	Town of Youngtown	July 01, 2012 - June 30, 2018

Participating Entities – Arizona Metropolitan Trust as authorized and approved by the Board of Trustees effective March 1, 2015:

	Participating Entity	Membership Term
1.	Buckeye Valley Fire District	March 01, 2015 - June 30, 2018

Participating Entities – Arizona Metropolitan Trust as authorized and approved by the Board of Trustees effective July 1, 2015:

	Participating Entity	Membership Term
1.	Pinal County	July 01, 2015 - June 30, 2018

Participating Entities – Arizona Metropolitan Trust as authorized and approved by the Board of Trustees effective July 01, 2016:

	Participating Entity	Membership Term
1.	Town of Fountain Hills	July 01, 2016 – June 30, 2019
2.	Sun City Fire District	July 01, 2016 – June 30, 2019

Participating Entities – Arizona Metropolitan Trust as authorized and approved by the Board of Trustees effective January 01, 2017:

	Participating Entity	Membership Term
1.	City of Maricopa	January 01, 2017 – June 30, 2020

TOWN OF PARADISE VALLEY

Employee Health Insurance

Purpose of Presentation

- Introduction of Arizona Metropolitan Trust (AzMT)
- Approval of Resolution # accepting the Town's membership to the Trust

Strategic Decision

How the Town provides medical insurance to its Employees is an important strategic decision. An opportunity exists for better coverage and better value to both employees and the Town.

Current Insurance

- Arizona Public Employers Health Pool (APEHP)
- Member since July 1, 2013
- 2 Plans – HDHP & PPO plan
- Contract directly with insurance companies for Dental, Vision, Life, ADD, Disability

Reasons for Change

- Obligation to the Town and to the Employees to Always Examine Current Services for Improvement
- Concerns with APEHP
  - Cost for both the Town and employees
  - Initially told last year that the premium increase was 3%, but was 5%
  - Rx Plan continues to change and remove drugs on Formulary list
  - Gap between the Deductible and Out of Pocket Max
  - Questions regarding competiveness in relation to other municipalities

Arizona Metropolitan Trust - AzMT

- Self-insured employee benefits pool that provides health benefits and services to public entities
- 9 Members: 1)Avondale 2)Apache Junction 3)El Mirage 4)Fountain Hills 5)Maricopa 6)Pinal County 7)Youngtown, 8)Buckeye Valley Fire District 9)Sun City Fire District

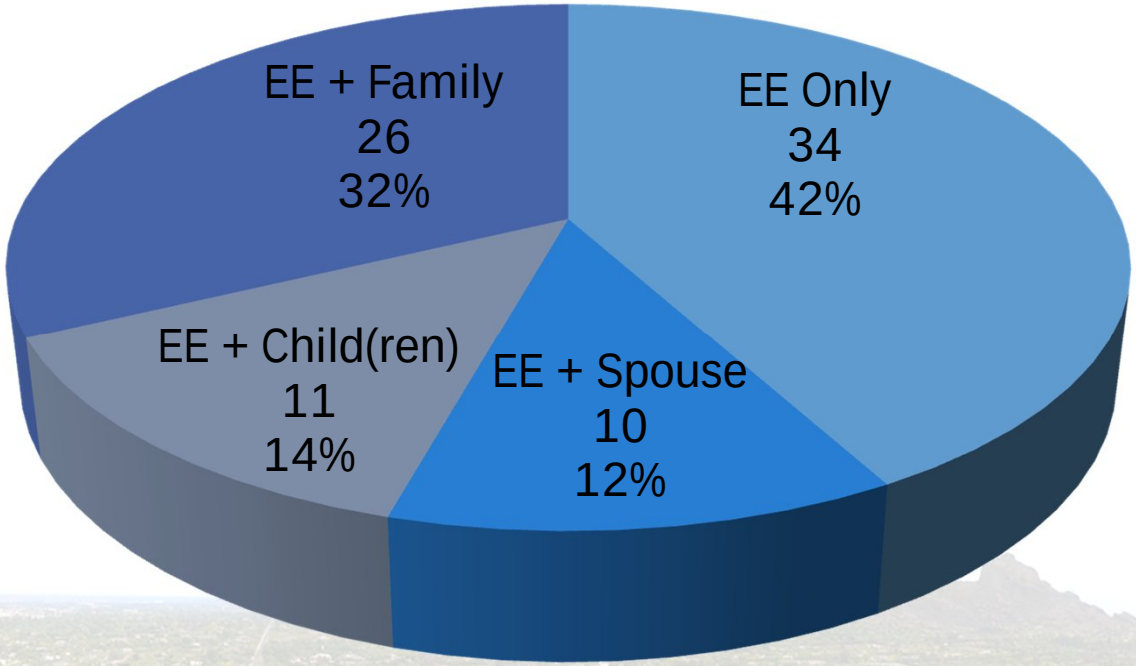
Arizona Metropolitan Trust - AzMT

- More Choices – 4 Plans vs. 2 Plans
  1. High Deductible Health Plan (HDHP)
  2. PPO Plan
  3. PPO Buy-Up Plan
  4. EPO (Exclusive Provider Organization)
- Lower Deductibles and Lower Out of Pocket Maximums

Arizona Metropolitan Trust - AzMT

- Includes Dental, Vision, Life, ADD & Disability
- Enhanced Wellness Program –Health Risk Assessments, Cardiac & Organ Screening, Health Education Programs, etc
- TeleDoc – 24/7/365 access to a doctor
- Employee Assistance Program
  - Up to 6 free sessions per issue
  - LawAccess – Legal and Financial Services by a lawyer or financial professional
  - SafeRide – Reimbursement for use of cab service instead of driving while impaired
- Competitive – Attract and Retain

Coverage levels (81 employees)



Arizona Metropolitan Trust (AzMt)

- Estimated Town Savings Medical Insurance

Current vs. AzMt 2017-18 Health Insurance Premiums

Coverage Level	# Covered	Current	AzMt
Employee Only	34	$286,338.08	$263,024.24
Employee and Spouse	10	$146,161.60	$135,680.80
Employee and Children	11	$154,600.16	$142,403.36
Employee and Family	26	$439,400.00	$425,575.28
Current Annual Total	$1,026,499.84		
AzMt Annual Total	$966,683.68		
	$59,816.16		

Arizona Metropolitan Trust (AzMt)

- Estimated Town Savings Dental Insurance

Current vs. AzMt 2017-18 Dental Premiums

Coverage Level	# Covered	Current	AzMt
Employee Only	34	$15,508.08	$14,488.08
Employee and Spouse	10		$7,210.80
Employee and Children	11		$8,735.76
Employee and Family	26	$51,572.16	$29,128.32
Current Annual Total	$67,080.24		
AzMt Annual Total	$59,562.96		
Cost Savings:	$7,517.28		

Questions and Comments

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-111

TO: **Mayor Collins and Town Council Members**

FROM: **Kevin Burke, Town Manager**
Duncan Miller, Town Clerk

DEPARTMENT: Town Manager

AGENDA TITLE:
Consideration of Requests for Future Agenda Items

Council Goals or Other Policies / Statutory Requirements:
Resolution Number 1250: Town Council Rules of Procedure

RECOMMENDATION:
Review the current list of pending agenda topics.

SUMMARY STATEMENT:
Attached is the most recent Town Council Study Session Topic Schedule. Pursuant to the Council's Rules and Procedures as adopted by Resolution Number 1250, any member of the Council may move to have the Town Manager add a new agenda item to a future agenda. Upon concurrence of three or more Members, which may include the Mayor, the item will be added to the list of future agenda items and placed on a meeting agenda within sixty days. Reminder is provided that any discussion on the motion to add a future agenda item shall be limited to the propriety of placing such item on a future agenda and shall not include discussion on the merits of the topic itself.

BUDGETARY IMPACT:
None

ATTACHMENT(S):
Future agenda topics schedule

TOWN COUNCIL STUDY SESSION TOPIC SCHEDULE
April 7, 2017

04/27	05/11	05/25	06/08
3:30 PM STUDY SESSION • Budget Review - (& Capital Improvement Plan Budget) 30 minutes • Bicycle/Pedestrian Master Plan - 90 Minutes • Legislative Update – 10 Min. **EXECUTIVE SESSION** **PRESENTATION** • Recognition of Elaine Gordon, Robert Nagle, & Jeff Wincel **CONSENT** **PUBLIC HEARING** **ACTION ITEMS** • Lincoln and Tatum Turn Lanes **STUDY SESSION CONTINUED** • Alarm Monitoring Service • Council Retreat Follow Up	**4 PM STUDY SESSION** • Trash Ordinance – Vehicle Emissions • Joshua Tree Lot Split • PCDS • Town Owned Property • Legislative Update **EXECUTIVE SESSION** **PRESENTATION** **CONSENT** **PUBLIC HEARING** **ACTION ITEMS** • Adopt Tentative Budget • Community Services Funding **STUDY SESSION CONTINUED** • Cell Phone Towers	**4 PM STUDY SESSION** • Legislative Update • Sanctuary Resort SUP **EXECUTIVE SESSION** **PRESENTATION** **CONSENT** **PUBLIC HEARING** **ACTION ITEMS** • Joshua Tree Lots Split • PCDS **STUDY SESSION CONTINUED** • Council Goals TBD	**4 PM STUDY SESSION** • Cell Service Ordinance • Phoenix Entryways • Bicycle / Pedestrian Master Plan **EXECUTIVE SESSION** **PRESENTATION** **CONSENT** **PUBLIC HEARING** • Final Budget **ACTION ITEMS** • Sanctuary Resort SUP • Court Disaster Recovery IGA **STUDY SESSION CONTINUED** • Council Goals TBD

06/22	09/14	09/28	10/12
4 PM STUDY SESSION **EXECUTIVE SESSION** **PRESENTATION** **CONSENT** **PUBLIC HEARING** **ACTION ITEMS** **STUDY SESSION CONTINUED** • Council Goals TBD	**4 PM STUDY SESSION** **EXECUTIVE SESSION** **PRESENTATION** **CONSENT** **PUBLIC HEARING** **ACTION ITEMS** **STUDY SESSION CONTINUED** • Council Goals TBD	**4 PM STUDY SESSION** **EXECUTIVE SESSION** **PRESENTATION** **CONSENT** **PUBLIC HEARING** **ACTION ITEMS** **STUDY SESSION CONTINUED** • Council Goals TBD	**4 PM STUDY SESSION** **EXECUTIVE SESSION** **PRESENTATION** **CONSENT** **PUBLIC HEARING** **ACTION ITEMS** **STUDY SESSION CONTINUED** • Council Goals TBD

Items to be scheduled

1. Fee Schedule – outside review of certain plan submittals
2. Emergency Planning
3. Maintaining Phoenix Entryways into PV
4. Hillside Code Update
5. Lighting Code Update
6. Ritz Carlton Area C Final Plat
7. PCDS SUP
8. Cell Service Ordinance

Town of Paradise Valley

6401 E Lincoln Dr
Paradise Valley, AZ 85253

Action Report

File #: 17-128

TO: Mayor and Town Council

FROM: Eva Cutro, Community Development Director

DATE: April 13, 2017

CONTACT:

AGENDA TITLE:
Lighting Code Revisions to Article 10 Height and Area Regulations, Section 1023 Outdoor Lighting and Illumination: Article 22 Hillside Development Regulations, Section 2208 Outdoor Lighting; Article 25 Signs, Section 2506 Lighting; and Special Use Permit Guidelines, Section 2 Lighting as contained in Ordinance # 2016-04.

PURPOSE:

Staff has been tasked with exploring several Quality of Life Initiatives including lighting.

At the Council Retreat in March consensus was to:

> "Preserve low light level conditions while realizing lighting is necessary for safety, security, and enjoyment of outdoor living".

The current Hillside Section of the Town Code states,

> "Require limited and efficient use of exterior lighting to maintain minimal night-time lighting levels and preservation of the dark sky".

Over the past year there have been numerous discussions at both the Planning Commission and Town Council meetings regarding how to address the above goals, update the outdated sections of the Town Code, and resolve conflicting opinions on lighting. Staff has explored allowing additional types of lighting, using different lighting measurements, applying the rules of CPTED (Crime Prevention Through Environmental Design), and also applying Dark Skies regulations. Mayor and Council requested a pause in processing changes in order to establish what the Town is trying to accomplish before any further study is commenced.

BACKGROUND:
The Town Code sections pertaining to lighting have not been updated in over 20 years. In January 2016 Chairman Strom asked to have a discussion regarding possible modifications to the Town lighting code regulations, specifically the use of watts versus lumens. Since that time revisions to the

lighting code were discussed in detail at nine Planning Commission work sessions and at a public hearing in September. The lighting code was then discussed at a Town Council work session on November 3, 2016 and a public hearing on November 17, 2016.

Certain portions of the lighting code are outdated and do not reflect current standards. Other sections of the Code need "housekeeping" such as the addition of definitions, diagrams, and clarifications. Lastly, sections do not address current trends in lighting such as: pole lights, string lights, carriage lights, and tree lights.

Certain revisions are technical and easier to amend. Wattage can be changed to lumens, kelvin measurements can be added, and light measurements can be changed from foot-candles to Lux. Philosophical differences are much more difficult to resolve. These may include: whether lighting is measured at the source or the property line or both; if certain fixtures such as uplights or unshielded string lights should be permitted; and, how much lighting is necessary for security, safety, and enjoyment of outdoor living. The purpose of this study session is for Mayor and Council to discuss their objectives, or philosophical preferences, for a lighting code. An outline or framework for this philosophical position will be garnered with the intent of converting it into a Statement of Direction (SOD) to the Planning Commission. Once an SOD is adopted, the rewrite of the lighting provisions will be referred to the Planning Commission for drafting.

Staff will provide additional information in the power point and presentation on April 13th and looks forward to Council input and guidance.