



Submitted to:



**Flood Control District  
of  
Maricopa County**

**City of Peoria**



**Maricopa County  
Department of  
Transportation**

## Maintenance Plan

**83<sup>rd</sup> Avenue / Pinnacle Peak Road  
Drainage Improvements  
FCDMC Contract No. 2006C005  
Project Control No. 450.02.33**

**February, 2007**

Submitted by:

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**A450.915**

# **83<sup>rd</sup> Avenue/Pinnacle Peak Road Drainage Improvements**

**Prepared for:**

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## Foreword

The purpose of this maintenance plan is to ensure the drainage facilities continue to provide 100-year storm protection for the area between 83<sup>rd</sup> Avenue and 87<sup>th</sup> Avenue and 10-year storm protection for the area between 87<sup>th</sup> Avenue and 91<sup>st</sup> Avenue. In addition, proper maintenance will result in facilities that are aesthetically pleasing and safe for use by the public. Proper maintenance of these facilities will also save in long term costs by minimizing major reconstruction and rehabilitation efforts.

The City of Peoria will be responsible for ownership, operation and maintenance of the detention basins and storm drain facilities within the city limits. All other storm drain improvements will be owned, operated and maintained by the Maricopa County Department of Transportation (MCDOT). Roadway improvements along Cielo Grande and Avenida del Sol will also be maintained by MCDOT.

The drainage system to be maintained consists of inlet structures along Calle Lejos, Cielo Grande, Avenida del Sol, 91<sup>st</sup> Avenue, 87<sup>th</sup> Avenue, Pinnacle Peak Road, and 83<sup>rd</sup> Avenue. Storm water collected by these inlet structures are conveyed by a storm drain system to a detention basin at 87<sup>th</sup> Avenue and Avenida del Sol and a detention basin at 83<sup>rd</sup> Avenue and Pinnacle Peak Road. All storm water collected by this system is drained through a storm drain in 83<sup>rd</sup> Avenue from Pinnacle Peak Road to the outlet at Deer Valley Estates. This outlet is on the east side of 83<sup>rd</sup> Avenue, south of Williams Road and is located in an existing landscaped open channel that drains south through the Deer Valley Estates development.

## Table of Contents

<b>Inlet Structures .....</b>	<b>1</b>
<b>Concrete V-Ditches .....</b>	<b>4</b>
<b>Storm Drains .....</b>	<b>5</b>
<b>Outlet Structures and Erosion Protection .....</b>	<b>6</b>
<b>Detention Basins .....</b>	<b>8</b>

### TABLES

<b>1 Inlet Structure Inspection and Maintenance Schedule .....</b>	<b>3</b>
<b>2 Concrete V-Ditch Inspection and Maintenance Schedule .....</b>	<b>4</b>
<b>3 Storm Drain Inspection and Maintenance Schedule .....</b>	<b>5</b>
<b>4 Outlet Structure Inspection and Maintenance Schedule .....</b>	<b>7</b>
<b>5 Detention Basin Inspection and Maintenance Schedule .....</b>	<b>13</b>

## Inlet Structures

### Calle Lejos Drop Inlets

Along the north side of Calle Lejos between 83<sup>rd</sup> Avenue and 87<sup>th</sup> Avenue, drop inlets and inlet structures have been constructed. The drop inlets are located at Summit at Sunrise and at 85<sup>th</sup> Avenue. These structures have trash racks that will have to be inspected periodically and cleaned as needed. Since the runoff entering these inlets has drained from undeveloped property through natural washes, sediment and debris will be expected. These materials will have to be removed. The handrails on the drop inlets will have to be repaired if any damage is apparent and painted on a regular basis.

### Ventana Picachos Inlet Structures

Inlet structures have been constructed adjacent to the retention basins at the Ventana Picachos development. Only during large storm events will these structures be used; therefore clogging of the grates will be a rare event. Primary concerns will be periodic painting of the handrails.

### 91<sup>st</sup> Avenue Drop Inlets

At the intersection of 91<sup>st</sup> Avenue and Cielo Grande and at the intersection of 91<sup>st</sup> Avenue and Pinnacle Peak Road, drop inlets have been constructed to intercept storm water flowing in a southerly direction. To protect the inlet areas, riprap has been installed. Geotextile filter fabric has been placed under the riprap. Periodic maintenance will be needed to clean debris and sediment from the riprap and to repair any damage to the geotextile filter fabric. At the entrances to the drop inlets, trash racks have been provided. The trash racks will have to be inspected for debris buildup and cleaned as needed. The handrails on the drop inlets will have to be repaired if any damage is apparent and painted on a regular basis.

### Cielo Grande and Avenida del Sol Catch Basins

After storm events, the grates of all catch basins and inlets, located along Cielo Grande and Avenida del Sol, shall be checked for clogging. Debris shall be removed as soon as possible. During yearly inspections, sediment that may have deposited in the catch basins or inlets will require removal/flushing, and such activities shall be scheduled as

soon as possible. High pressure water shall be used to remove sediment from catch basins and inlets.

### 89<sup>th</sup> Avenue Trench Drain

At the northeast corner of the Cielo Grande and 89<sup>th</sup> Avenue intersection, a trench drain has been provided. Since this structure has grates on top, clogging from debris is very likely. After every storm, the trench drain should be inspected and cleaned as necessary. Since the trench drain is adjacent to the roadway, it should be periodically inspected for damage from vehicles that may have driven across the structure.

### Pinnacle Peak Road Catch Basins

Between 87<sup>th</sup> Avenue and 91<sup>st</sup> Avenue, seven catch basins have been installed along the north side of Pinnacle Peak Road. These catch basins have been located to intercept storm water flows from the north. Particular attention should be given to the flow patterns. If storm water is bypassing the catch basins, it may be necessary to grade with ditches and swales so that the storm water is directed to the catch basins. Since these structures have grates on top, clogging from debris is very likely. After every storm, the catch basins should be inspected and cleaned as necessary. Since the catch basins are adjacent to the roadway, they should be periodically inspected for damage from vehicles that may have driven across the structure and damaged the concrete aprons.

Catch basins have also been installed between the Pinnacle Peak detention basin and 87<sup>th</sup> Avenue. These structures located to drain runoff that has been intercepted by concrete V-ditches. These catch basins will collect storm water from unimproved properties. After every storm, the catch basins should be inspected for debris and sediment and cleaned as needed.

### Pinnacle Peak Road Trench Drain

At an existing driveway, Station 236+54, a trench drain has been provided. Since this structure has grates on top, clogging from debris is very likely. After every storm, the trench drain should be inspected and cleaned as necessary. Since the trench drain is located across a driveway, it should be periodically inspected for damage from vehicles that may have driven across the structure. If the concrete apron has been damaged, the replacement or repairs should be provided as soon as possible.

### 83<sup>rd</sup> Avenue Drop Inlets

At the intersection of 83<sup>rd</sup> Avenue and Avenida del Sol and the intersection of 83<sup>rd</sup> Avenue and Pinnacle Peak Road, drop inlets have been constructed to intercept storm

water flowing in a southerly direction. To protect the inlet areas, riprap has been installed. Geotextile filter fabric has been placed under the riprap. Periodic maintenance will be needed to clean debris and sediment from the riprap and to repair any damage to the geotextile filter fabric. At the entrances to the drop inlets, trash racks have been provided. The trash racks will have to be inspected for debris buildup and cleaned as needed. The handrails on the drop inlets will have to be repaired if any damage is apparent and painted on a regular basis.

**Table 1**  
**Inlet Structure Inspection and Maintenance Schedule**

<b>Structure</b>	<b>Storm Event Inspection</b>	<b>Scheduled Inspection</b>	<b>Storm Event Maintenance</b>	<b>Scheduled Maintenance</b>
Calle Lejos Drop Inlets	Yes	Annual	Yes	Annual
Ventana Picachos Inlet Structures	No	Annual	No	Annual
91 <sup>st</sup> Avenue Drop Inlets	Yes	Annual	Yes	Annual
Cielo Grande and Avenida del Sol Catch Basins	Yes	Semi-Annual	Yes	Semi-Annual
89 <sup>th</sup> Avenue Trench Drain	Yes	Semi-Annual	Yes	Semi-Annual
Pinnacle Peak Road Catch Basins	Yes	Annual	Yes	Annual
Pinnacle Peak Road Trench Drain	Yes	Semi-Annual	Yes	Semi-Annual
83 <sup>rd</sup> Avenue Drop Inlets	Yes	Annual	Yes	Annual

## Concrete V-Ditches

To collect runoff that is expected to be sheet flow, concrete V-ditches have been constructed at certain locations on the south side of Calle Lejos and on the north side of Pinnacle Peak Road. Since it is likely this runoff will contain sediment and debris, a frequent inspection and maintenance schedule will be required. Removal of these materials can be accomplished by hand or with a Bobcat. The V-ditches are located adjacent to roadways and may be driven across by vehicles. Particular attention should be given to damages from vehicles.

**Table 2**  
**Concrete V-Ditch Inspection and Maintenance Schedule**

<b>Concrete V-Ditch</b>	<b>Storm Event Inspection</b>	<b>Scheduled Inspection</b>	<b>Storm Event Maintenance</b>	<b>Scheduled Maintenance</b>
Calle Lejos	Yes	Semi-Annual	Yes	Semi-Annual
Pinnacle Peak Road	Yes	Semi-Annual	Yes	Semi-Annual

## Storm Drains

During yearly inspections, all storm drain pipes shall be checked for sedimentation and debris. Excessive sediment that may have deposited in the storm drain pipes may require removal/flushing, and such activities shall be scheduled as soon as possible. High-pressure water may be used to remove excessive sediment from storm drain pipes. During yearly inspections of the concrete pipe, the crown of the pipe shall be checked for cracking (hairline cracks are normal) and the joints checked for cracks and damage. Cracks that are wider than the thickness of a quarter shall be repaired as soon as possible.

Due to the undeveloped nature of subbasins draining to Calle Lejos, Cielo Grande, and Avenida del Sol, storm drains in these roadways should be inspected after any major storm event. Debris and sediment should be flushed from the pipes followed by an inspection of pipe interiors and joints.

**Table 3**  
**Storm Drain Inspection and Maintenance Schedule**

<b>Storm Drain</b>	<b>Storm Event Inspection</b>	<b>Scheduled Inspection</b>	<b>Storm Event Maintenance</b>	<b>Scheduled Maintenance</b>
Calle Lejos, Cielo Grande and Avenida del Sol	Yes	Annual	Yes	Annual
All Others	No	Annual	No	Annual

## Outlet Structures and Erosion Protection

Dumped riprap has been placed at the storm drain outlets into each of the detention basins. The riprap has been installed with geotextile filter fabric meeting Arizona Department of Transportation Specification 1014-5. During storm events the riprap may be disturbed and/or collect sediment and debris. After each storm event these riprap areas at each storm drain outlet into the basins will be inspected for any damage, and repair work will be scheduled as required. Repairs to any eroded areas will include replacing geotextile filter fabric and riprap rock in accordance with the original construction plans and grades. Handrail on the headwalls should be inspected for damage and the need for painting.

The outlet at Deer Valley Estates is protected with grouted riprap. It is unlikely this riprap will be damaged during storm events but it should be inspected to verify the integrity of the riprap. In the lower portion of the grouted riprap, a sediment trap has been constructed with a smooth surface. The sediment can be removed by a Bobcat. Access to the sediment trap should be from the north while avoiding the trees, shrubs and other landscape features. Particular attention should be given to the gap in the concrete curb. This gap was installed to drain the sediment trap after a storm event. It should be free of debris and provide positive drainage of the sediment trap. Handrail on the headwall and across the scupper should be inspected for damage and the need for painting.

Outlet into the Pinnacle Peak detention basin is through headwalls. Storm water exiting these headwalls will cross riprap. This rock should be inspected for damage after every major storm event and repaired as needed to the original construction plans and grades. Debris and sediment collected in the riprap will need to be removed.

Outlet into the 87<sup>th</sup> Avenue detention basin is through a concrete stilling basin. Storm water exiting the stilling basin will cross riprap. This rock should be inspected for damage after every major storm event and repaired as needed to the original construction plans and grades. Debris and sediment collected in the riprap will need to be removed. The sump in the stilling basin will collect sediment and debris also. This will need to be cleaned on a regular basis. At the outlet of the stilling basin, weepholes have been provided to drain the sump to the riprap. These weepholes must be kept clear so that positive drainage is always present. Access to the interior of the stilling basin is provided through a padlocked gate at the outlet end or through a manhole cover over the inlet end. All metal components including gates, access barriers, handrail and wire fabric should be inspected for damage and paint deterioration. This large structure is also susceptible to graffiti. All graffiti should be removed or painted over as soon as possible. Timely removal of graffiti will discourage its future application.

**Table 4**  
**Outlet Structure Inspection and Maintenance Schedule**

<b>Structure</b>	<b>Storm Event Inspection</b>	<b>Scheduled Inspection</b>	<b>Storm Event Maintenance</b>	<b>Scheduled Maintenance</b>
Deer Valley Estates	Yes	Annual	Yes	Annual
Pinnacle Peak Detention Basin	Yes	Annual	Yes	Annual
87 <sup>th</sup> Avenue Detention Basin	Yes	Annual	Yes	Annual

## Detention Basions

### Pinnacle Peak Basin

This basin is located at the northwest quadrant of 83<sup>rd</sup> Avenue and Pinnacle Peak Road. The northern limits of the basin abut the Camino del Oro right-of-way. This facility was designed to function as a flood protection element only. No recreational uses are planned for the facility; therefore, access has been restricted by a view wall and view fence. Access for maintenance purposes is provided through an access gate in the north border of the basin at Camino del Oro. A maintenance perimeter road and access ramp has been constructed with decomposed granite over AB. Although the basin is designed to contain a 100-year storm event, provisions have been made for an emergency spillway. This is necessary if an unexpected event was to occur or if the outlet structures became blocked. This emergency spillway is at the southeast corner of the basin. Concrete cut-off walls have been constructed along each side of the basin perimeter road at the emergency spillway location. The two storm drains that outlet into the basin will also provide conveyance out of the basin for the storm water after the storm has subsided. The emergency spillway, view fence and outlet storm drain shall be kept clear of debris, trash and vegetation.

### 87<sup>th</sup> Avenue Basin

This basin is located at the southeast quadrant of 87<sup>th</sup> Avenue and Avenida del Sol. The southern limits of the basin abut the Camino del Oro right-of-way. This facility was designed to function as a flood protection element and to provide future recreational uses; therefore, access has not been restricted. A maintenance perimeter road and access ramp has been constructed with decomposed granite over AB. Although the basin is designed to contain a 100-year storm event, provisions have been made for an emergency spillway. This is necessary if an unexpected event was to occur or if the outlet structures became blocked. This emergency spillway is in the southern limits of the basin. Concrete cut-off walls have been constructed along each side of the basin perimeter road at the emergency spillway location. The storm drain that outlets into the basin will also provide conveyance out of the basin for the storm water after the storm has subsided. Another headwall has been provided at the southwest corner of the basin to assist in draining the basin. Off-site runoff also enters the basin by riprap spillways in the northern limits of the basin and at the northeast corner of the basin. Concrete cut-off walls have been constructed along each side of the basin perimeter road at the riprap spillways. The emergency spillway and outlet storm drain shall be kept clear of debris, trash and vegetation.

### Riprap Spillways

The riprap spillways located in the basins shall be regularly inspected and maintained to function as intended to capture and convey storm water runoff. Repairs will be made to correct any damage to the riprap and to any eroded areas at or nearby the spillways.

### Vegetation

The two detention basins will have native Sonoran Desert trees, shrubs, accents, and groundcovers. Vegetation types that must be removed include the woody-stemmed plants Desert Broom and Salt Cedar. The basin sideslopes that have been covered with decomposed granite shall be inspected on a regular basis to check for vegetative growth. Where vegetative growth is observed, schedule the areas for weed and grass control. Basin sideslopes that have been seeded with native hydroseed shall be left to grow in a native condition. All clippings from the mowing and/or cutting process and all tree and plant trimmings will be removed from the basins. Trees located within the basin and on the top surface areas shall be inspected on a regular basis for trimming.

### Sediment Deposits

Remove deposits of loose sediment material to the original designed grades and cross sections. Refer to the construction drawings and specifications for control elevations. At a minimum, sediment deposits shall be removed annually, unless quarterly inspections identify a need for more frequent removal. Sediment collected shall be disposed of off-site at approved locations.

### Erosion

The sideslopes for each of the basins need to be inspected after each storm. Make repairs to any eroded areas of decomposed granite by replacing lost material with compacted earth and new materials. The decomposed granite shall be ¼" minus roller compacted with Table Mesa Brown color and maintained to a depth of 2-inches.

### Debris/Trash

After each storm, the debris and trash that has deposited within each of the basins will need to be collected and removed for disposal away from the basins. The basins and the top surface areas shall be inspected on a regular basis to identify debris and trash for removal.

### Cut-Off Walls

In extreme storm events, the basins may fill and overtop via the emergency spillway. After any such storm event, City personnel will make a thorough inspection of the top finished grades of each basin and check its integrity and the existence of any erosion damage to or along the basin cut-off walls and emergency spillways. All erosion shall be repaired by replacing lost soil with compacted soil to lines and grades shown on the construction drawings and specifications. Cutoff wall damage shall also be repaired in accordance with the original construction plans and specifications.

### Fences, Walls and Gates

All fences, walls and gates located around the Pinnacle Peak basin will be inspected on a quarterly basis for damage and required repairs to ensure the safety of the public. The need for painting will be considered during inspections. Properties of adjoining lots have CMU block walls that have been painted. If these walls become unsightly, the property owners will need to be contacted and arrangements made for painting those structures.

### Signs

The City should place and constantly maintain “keep out” or “no trespassing” signs on the view wall and view fence around the Pinnacle Peak basin. The City name and telephone number shall be posted on the signs. An emergency telephone number should also be posted.

### Landscape Irrigation System

1. Landscape Irrigation System Electrical Controls
  - a. Irrigation controllers and clocks shall be inspected on a quarterly basis to ensure operational quality and to make seasonal adjustments for watering schedules. All valves should be operated and checked at both the controller and at each remote control valve to ensure that all connections and sequencing are complete and functioning.
  - b. Remove and replace 9-volt rechargeable power failure back-up batteries every 6 months.
  - c. Solar irrigation controllers shall be inspected on a quarterly basis to ensure operational quality and to make seasonal adjustments for watering schedules. All valves should be operated and checked at both the controller and at each remote control valve to ensure that all connections and sequencing are complete and functioning.

## 2. Backflow Preventers/Valves

- a. Backflow preventers should be checked and serviced on an annual basis by a certified testing service technician to insure that the unit is operating within the specifications and maintaining the required level of protection.
- b. Filters/screens where applicable should be removed and cleaned every 6 months.

## 3. Remote Control Valves

- a. Remote control valves for drip irrigation should be inspected quarterly for leaks. All piping fittings and wiring connections should also be inspected to ensure they are complete and operational.
- b. Remote control valve boxes should be inspected quarterly to verify soundness and durability and to ensure that all lids and locking/hold down mechanisms are in place and secured in accordance with the original installation.
- c. Remote control valves for drip irrigation shall have wye filters removed, cleaned and inspected on an annual basis
- d. Remote control valves drip lateral piping should be flushed on an annual basis, by operating each drip valve with the lateral pipe end caps removed to allow for any sediment or debris to be flushed from the system. This same procedure should be performed after any portion of the system has been damaged and repaired.

## 4. Drip Emitters

- a. Drip emitters should be inspected on a weekly basis to insure that all emitters are functioning properly and that the required water applications are being properly maintained.
- b. Emitter tubing for trees and shrubs should be checked on a weekly basis to ensure that the installed locations are maintained around each tree and that all remain connected to the emitter. Based on the growth of the tree and on an annual basis, the tree emitter tube emission points should be adjusted as necessary to maintain desired water applications at the outer limits of the tree root zone/canopy edge.

### Rodent Control

Rodents can damage detention basins by burrowing deep holes with more than one outlet. Fresh mounds of soil can identify new rodent outlets. Rodent activity must be treated to avoid potential foundation/embankment failures during storm events. A licensed pesticide applicator shall apply the appropriate pesticide for rodent control. The Material Safety Data Sheets shall be maintained by the licensed applicator. After rodent activity has been controlled, holes are to be filled and compacted.

### Graffiti and Vandalism

Graffiti needs to be removed as soon as possible to discourage repeated applications. General vandalism could include cutting or damaging fences and handrails, removal of structure grates, illegal ingress, and dumping trash. These activities must be corrected as soon as noted to ensure proper function of the storm drain and basin system and for the safety of the general public.

### Inspections

Inspections will be accomplished in accordance with this manual and as required by unusual circumstances. As part of each inspection City personnel will:

- a. list any damages identified,
- b. note repairs required, and
- c. schedule necessary repairs.

Annual inspections shall be completed and documented in reports to be maintained on file with the City. The City will invite the District to participate in the annual inspections. After major storm events, inspections should record flow depth and high water levels in the detention basins.

After receiving a citizen's complaint or inquiry, City personnel shall investigate the area of complaint, develop a response and contact the citizen within 48 hours of the initial contact.

**Table 5**  
**Detention Basin Inspection and Maintenance Schedule**

<b>Item</b>	<b>Storm Event Inspection</b>	<b>Scheduled Inspection</b>	<b>Storm Event Maintenance</b>	<b>Scheduled Maintenance</b>
Maintenance Roads	Yes	Annual	Yes	Annual
Vegetation	No	Monthly	No	Monthly
Sediment	Yes	Annual	Yes	Annual
Erosion	Yes	Semi-Annual	Yes	Semi-Annual
Debris/Trash	Yes	Bi-Weekly	Yes	Bi-Weekly
Cut-Off Walls	Yes	Annual	Yes	Annual
Fences, Walls and Gates	No	Quarterly	No	Quarterly
Emergency and Riprap Spillways	Yes	Annual	Yes	Annual
Irrigation Controllers	No	Quarterly	No	Quarterly
Back-Up Batteries	No	Semi-Annual	No	Semi-Annual
Backflow Preventers	No	Annual	No	Annual
Filters/Screens	No	Semi-Annual	No	Semi-Annual
Remote Control Valves	No	Quarterly	No	Quarterly
Wye Filters	Yes	Annual	Yes	Annual
Lateral Piping	Yes	Annual	Yes	Annual
Drip Emitters	Yes	Weekly	Yes	Weekly
Emitter Tubing	Yes	Weekly	Yes	Weekly