

**MAINTENANCE PLAN
FOR
HERMOSA VISTA/HAWES ROAD
STORM DRAIN AND BASIN PROJECT**

WOOD/PATEL

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FOR
HERMOSA VISTA/HAWES ROAD
STORM DRAIN AND BASIN PROJECT**

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1.0 PURPOSE

In order to ensure a storm drain system that will function according to the intent of its design, a post-construction maintenance program that calls for regular and periodic maintenance of the various components of the storm drain system is required. This document is intended to serve as a guide for maintenance personnel to perform the required proper maintenance of the Hermosa Vista/Hawes Road Storm Drain and Basin (HVSD&B) Project.

The HVSD&B Maintenance Plan is divided into two parts and furnished in Appendix A and Appendix B. Appendix A contains the maintenance activities for the storm drain and basin elements while Appendix B contains the maintenance plan for the landscaping elements of the project.

This document provides general guidance regarding anticipated maintenance activities required for the project and provides general guidelines for conducting maintenance activities for the elements of the HVSD&B project. The guidelines and activities noted in this report are specific for this project only.

This report does not supplant any standard operating procedures established by the Flood Control District of Maricopa County (District), the Maricopa County Department of Transportation (MCDOT), or the City of Mesa (COM). All maintenance activities conducted by the District, MCDOT, or the COM shall comply with all existing and applicable national, state, and local codes, safety standards (OSHA), and protocols. The District and the COM have already established Best Management Practices (BMP's) that are implemented to meet stormwater quality requirements as part of the National Pollution Discharge Elimination System (NPDES) program. By way of reference, those applicable BMPS are incorporated into this report.

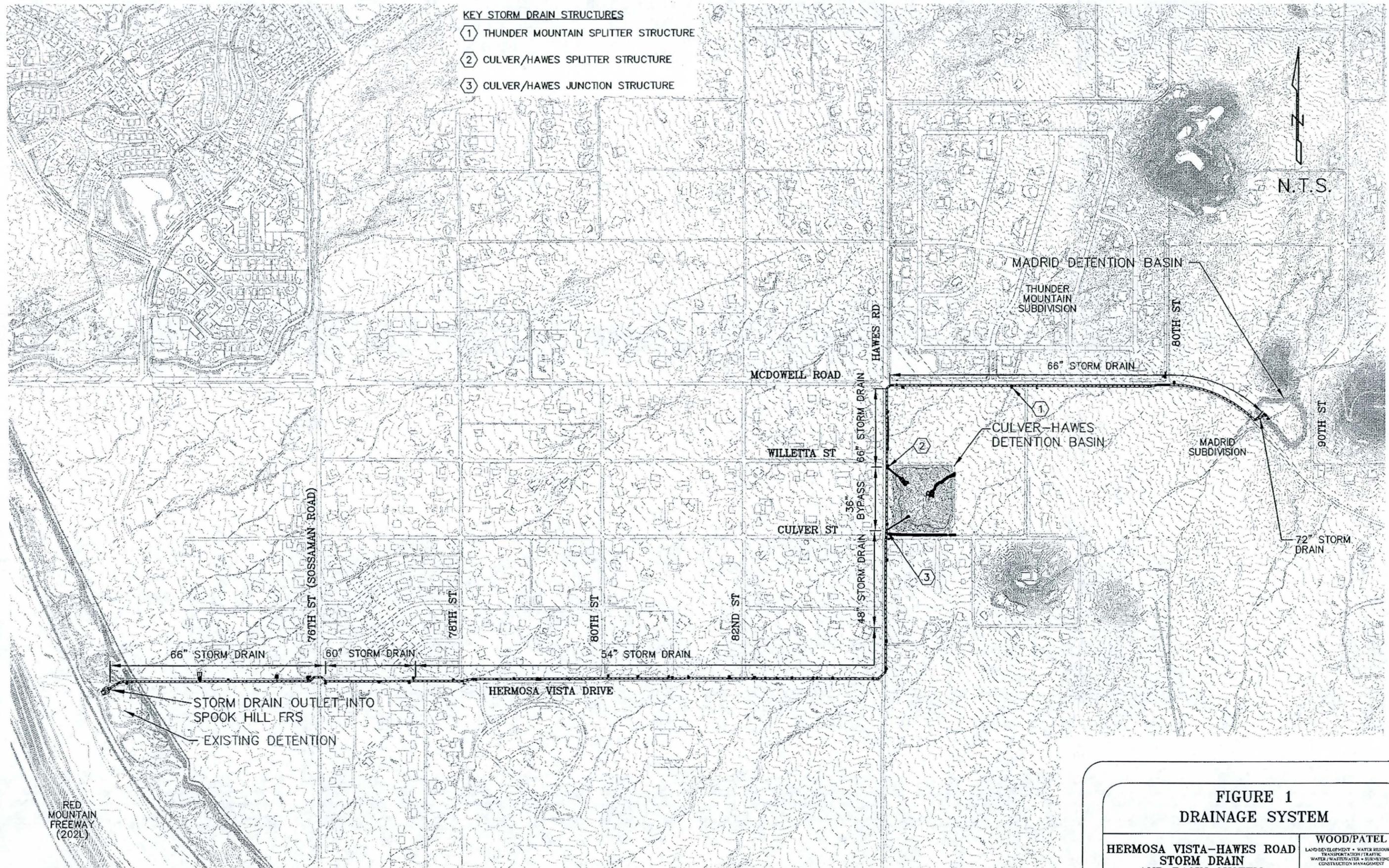
2.0 LOCATION

The project is located in northeast Mesa within Township 1 North, Range 7 East. The project limits are between 90th Street and McDowell Road on the east and Hermosa Vista Drive at the Spook Hill Floodwater Retarding Structure (FRS) adjacent to the Loop 202 (Red Mountain Freeway) on the west. The HVSD&B project begins at the existing Madrid basin (near 90th Street

north of McDowell Roads) and runs west in McDowell Road to Hawes Road. At Hawes Road the storm drain turns south and runs down to Culver Street where it connects into an off-line detention basin (Culver/Hawes detention basin) located at on the northeast corner of Hawes and Culver roads. From the Culver/Hawes detention basin the system continues south in Hawes Road to Hermosa Vista Drive where it turns west, eventually discharging into the Spook Hill FRS. The storm drain varies in size from 36-inches to 72-inches in diameter and is designed to drain the Madrid detention basin, collect off-site storm water runoff as identified in the design concept report and to intercept flood flows that pass through existing drainage structures along Hermosa Vista Drive. The Culver/Hawes detention basin was implemented in order to minimize the size of storm drain for the remainder of the project limits. Figure 1 on the following page shows the HVSD&B system in its entirety.

KEY STORM DRAIN STRUCTURES

- ① THUNDER MOUNTAIN SPLITTER STRUCTURE
- ② CULVER/HAWES SPLITTER STRUCTURE
- ③ CULVER/HAWES JUNCTION STRUCTURE



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RED MOUNTAIN FREEWAY (202L)

**FIGURE 1
DRAINAGE SYSTEM**

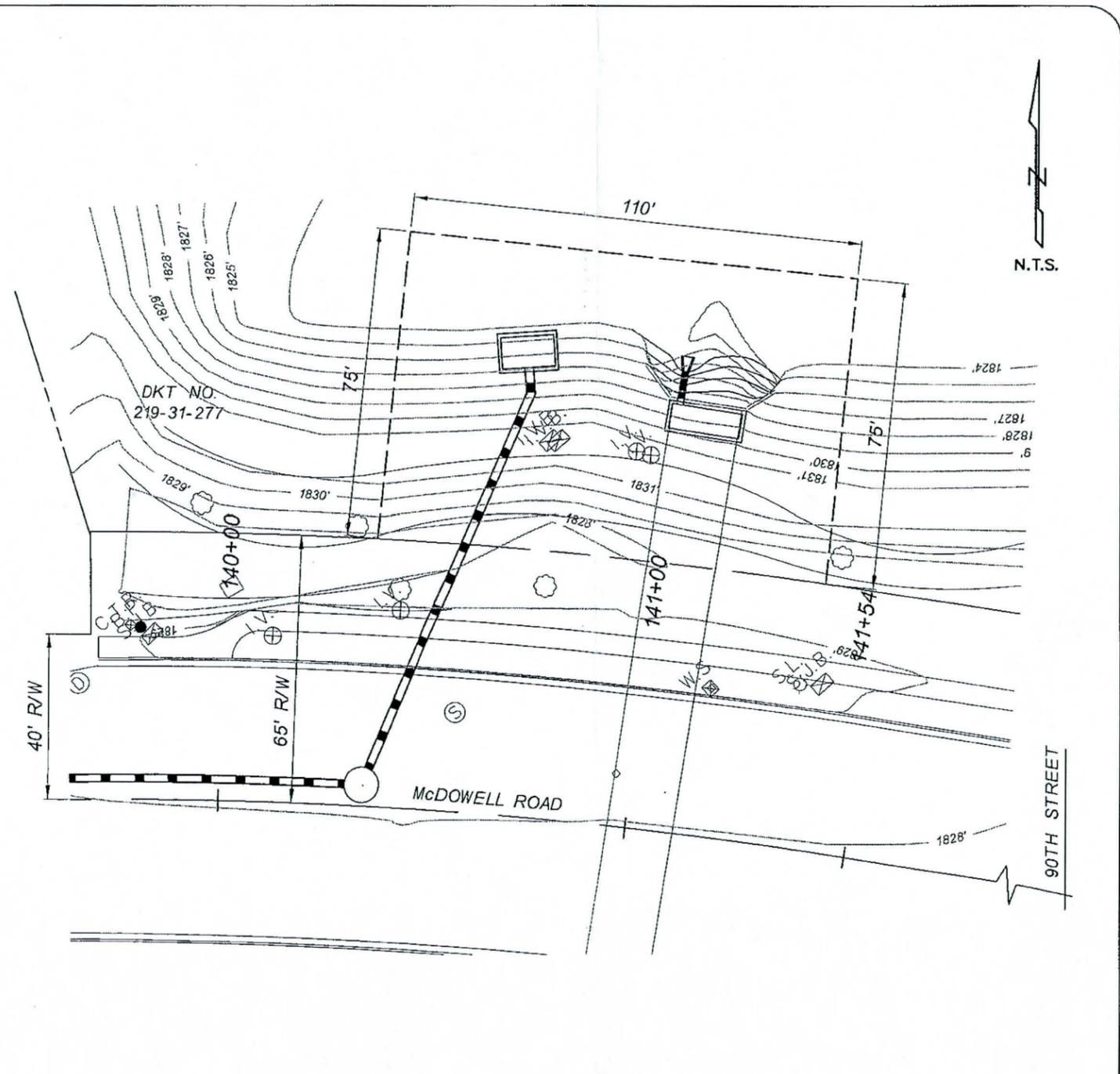
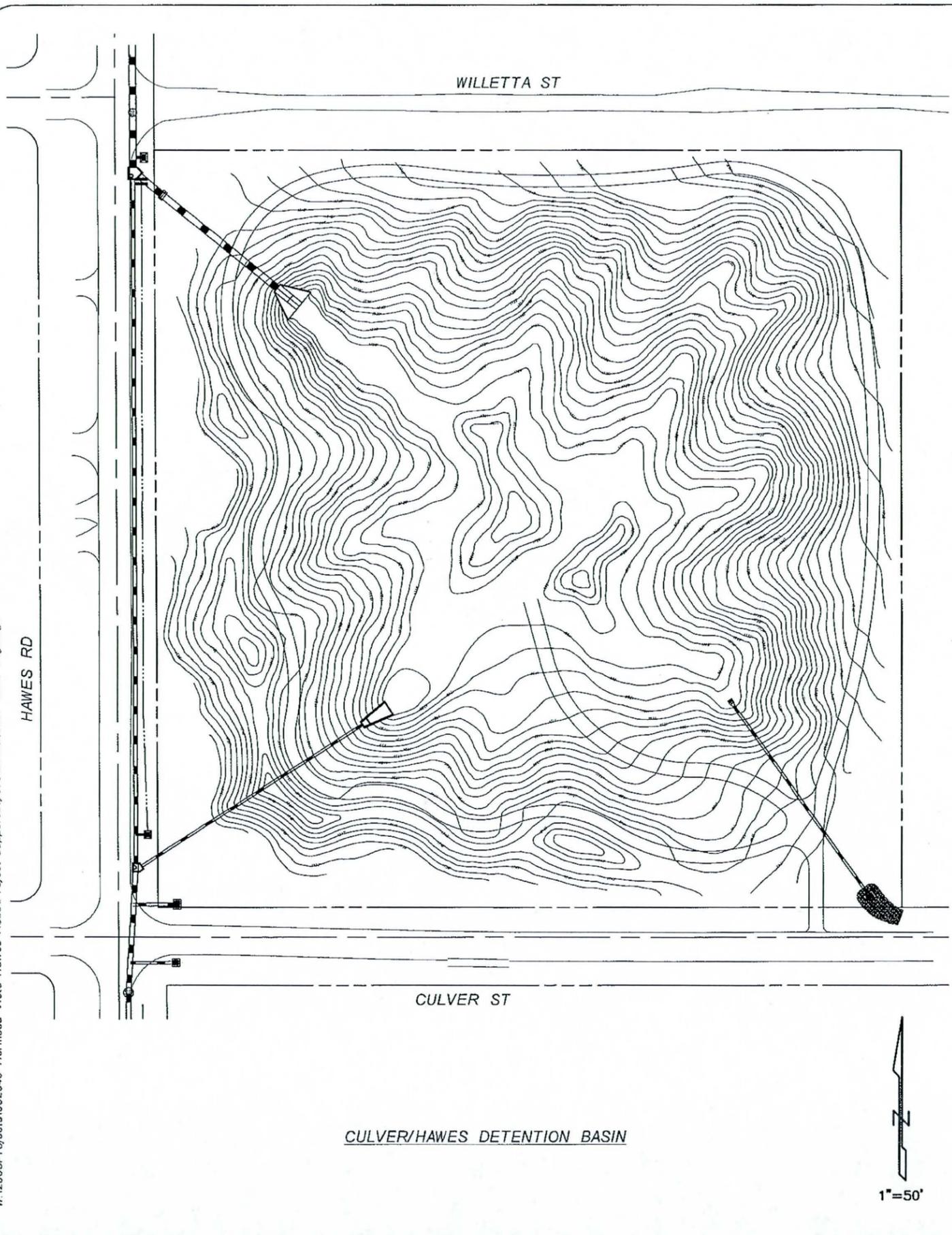
**HERMOSA VISTA-HAWES ROAD
STORM DRAIN
AND BASIN SYSTEM**

WOOD/PATEL
LAND DEVELOPMENT • WATER RESOURCES
TRANSPORTATION / TRAFFIC
WATER / WASTEWATER • SURVEYING
CONSTRUCTION MANAGEMENT
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3.0 RIGHT-OF-WAY

The HVSD&B Project is constructed within the City of Mesa and Maricopa County roadway right-of-way with the exception of the basins. A drainage easement was acquired at the outfall of the Madrid Basin and the Culver/Hawes basin site was acquired in its entirety. The storm drain system outfalls into the existing FCDMC Spook Hill FRS right-of-way. The storm drain outfall can be accessed for maintenance from the north via McDowell Road. The storm drain inlet easement at Madrid Basin and Culver/Hawes Basin right-of-way are shown in Figure 2.

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MADRID DETENTION BASIN OUTFALL & DRAINAGE EASEMENT

**FIGURE 2
DRAINAGE SYSTEM**

HERMOSA VISTA-HAWES ROAD STORM DRAIN AND DETENTION BASIN RIGHT-OF-WAY	WOOD/PATEL LAND DEVELOPMENT • WATER RESOURCES TRANSPORTATION / TRAFFIC WATER / WASTEWATER • SURVEYING CONSTRUCTION MANAGEMENT
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4.0 SYSTEM COMPONENTS

The HVSD&B Project consists of the following components, each of which are described below and are shown in Figure 1:

- 1) **Inlet structure at Madrid Basin** - A 72-inch principal outlet pipe with inlet structure is located near the southwest corner of the basin. A trash rack covers the inlet structure opening to prevent large debris from entering the storm drain as well as prevent unauthorized access. A raised weir outlet with steel picket railing around the perimeter, was constructed at the inlet end of the existing concrete box culvert (CBC) outlet as an emergency basin outlet. A 24-inch pipe was constructed at the CBC invert to allow some flows to continue along their historic path in order to maintain the vegetation in the existing drainage corridor constructed within the Madrid subdivision. The inlets to both of these structures are located within a drainage easement. These facilities can be accessed directly from McDowell Road.
- 2) **McDowell Road Storm Drain** - The McDowell Road storm drain varies from 72-inch to 66-inch and extends from the Madrid Basin outlet to Hawes Road within (MCDOT) road right-of-way and includes inlets to collect off-site runoff at 88th Street, Waterbury, and Hawes Road. A splitter structure located east of Thunder Mountain Drive allows a portion of the flow from the existing Thunder Mountain Subdivision 54-inch storm drain into the HVSD&B system while allowing some flow to continue along its historic path to the south in order to maintain downstream vegetation. A small raised weir outlet from the Thunder Mountain basin ties into the storm drain in McDowell Road immediately east of Hawes Road.
- 3) **Hawes Road Storm Drain to Culver-Hawes Detention Basin** - The storm drain remains 66-inches in size up to the Culver Hawes detention basin. Grated inlets located along the east side of Hawes Road reach collect runoff from several anticipated runoff points.
- 4) **Culver/Hawes Detention Basin** - At the Culver/Hawes detention basin, a splitter structure diverts flows to the Culver Hawes detention basin. The structure has an inlet

pipe of 66-inches and diversion pipe 66-inches that connects to the detention basin. The structure is designed so that the detention basin performs as an off-line basin. This is achieved by incorporating an adverse grade on the 66-inch diversion pipe. The invert elevation on the diversion pipe is set so that low-flows will continue in the 36-inch storm drain until higher flows are encountered where head in the splitter structure will then force flows into the Culver/Hawes detention basin. The storm drain inlet and outlet at the basin each consists of a headwall, wing walls, access barrier and loose riprap apron. In addition, there is a loose riprap swale directing concentrated flows into the basin at the northeast corner of the basin and a grated inlet and 24-inch pipe allowing flow into the basin at the southeast corner of the basin.

- 5) **Culver/Hawes Detention Basin to Hermosa Vista Drive Storm Drain** - At the southwest corner of the Culver/Hawes detention basin the 36-inch bypass pipe connects to a junction structure that drains the Culver/Hawes detention basin via a 24-inch pipe. A 48-inch storm drain continues south from the junction structure where it increases in size to 54-inch as it continues south to Hermosa Vista Drive.
- 6) **Hermosa Vista Drive Storm Drain** - The Hermosa Vista Drive storm drain varies from 54-inch to 66-inch and extends from Hawes Road to the west where it discharges into the Spook Hill FRS. The outlet structure consists of a headwall, wing walls, access barrier, safety railing and loose riprap stilling basin.

APPENDIX A

Hermosa Vista/Hawes Road Storm Drain and Basin Maintenance Plan

Removing obstructions that reduce the ability of water to enter the storm drain system and the removal of accumulated sediment from the system are the primary tasks directed by the maintenance plan. Obstructions tend to collect at the grates and openings of the storm drain, clogging and reducing the area of the inlet opening and preventing the storm drain from operating at its design capacity. Accumulated sediment within basins can reduce the storage capacity of the basins and sediment accumulated within the storm drain can adversely impact the performance of the entire system.

Routine Inspection and Cleaning

- 1) Inspect and clean as needed, all area inlets and catch basins annually or before the sump is 40% full.
- 2) Stencil catch basins per standard BMP (e.g.: "Rain only in the Drain")
- 3) Inspect and clean as needed, all area inlets and catch basins after major storm events and in known problem areas more than once a year.
- 4) Inspect and clean as needed, all storm drain pipe systems in known problem areas more than once a year.
- 5) Develop flushing schedule of the storm drain based on experience gained over time and from amount of debris and sediment accumulation in the storm drain.
- 6) Inspect and clean as needed, the Madrid detention basin drop inlet and debris rack, the Culver/Hawes inlet and outlet debris racks and access barriers and the HVSD outlet and access barrier.
- 7) Cleaning activities may occur on a year round basis; however, known problem areas shall be targeted prior to the rainy season which correspond to summer monsoon (July through September) and the winter rainy season (November through March).
- 8) Inspect and clean as needed, all storm drain facilities that have been affected by emergency response activities (fire response, hazmat response, etc.)

- 9) Remove and transport collected solid waste debris and sediment to landfill.
- 10) Inspect Thunder Mountain subdivision channel inlet at 88th Street for sediment deposits and debris around the bottom in the inlet to the channel and clean as needed
- 11) Inspect the storm drain facilities at the Madrid detention basin outlet for sediment deposition and debris and clean as needed. A drainage easement has been acquired for this purpose and is shown in Figure 2. Inspect 24-inch outlet pipe for debris and clogging. Inspect, access barrier around emergency spillway on top of existing CBC for debris and clean. Make appropriate repairs if necessary.
- 12) Inspect the Culver/Hawes detention basin for sediment deposition and debris and clean as needed. If sediment buildup occurs to an average depth of 1 foot or greater, remove sediment using FCDMC standard practices. Inspect side slopes for erosion and deterioration and repair as needed. Make note of signs of off-road vehicle activity (ATVs, motorcycles, etc.) and damages caused by such activity. Inspect basin during major flow events and after drawdown of flood pool.
- 13) Routinely inspect and clean, as needed, key storm drain structures including: Thunder Mountain splitter, Culver/Hawes Splitter and Culver/Hawes junction structure. These underground structures require access through manhole covers. The location of these structures is shown on Figure 1. Remove debris and sediment accumulation from the inverts of these structures.
- 14) Inspect and clean as needed headwall safety railings and access barriers. Check structural integrity of railings and barriers and bolts. Paint as needed.
- 15) Conduct storm drain video survey on an annual basis
- 16) Check for illicit discharges to the storm drains, catch basins, and inlets as part of the routine annual condition survey

Solid Waste Best Management Practices

- 1) Provide a referral and follow-up process between storm drain operation and maintenance and illicit connection and illegal dumping investigation staff for problems found in the field.

- 2) Document any unusual flows observed during inspection (particularly dry weather flows) and the follow-up actions/referrals.
- 3) Check catch basins, inlets, and basin site for signs of illegal dumping. Remove dumped wastes as appropriate. Post "No Dumping" signs if required.

Staff/Contractor Training and Coordination

- 1) Provide a referral and follow-up process between storm drain operation and maintenance and illicit connection and illegal dumping investigation staff for problems found in the field.
- 2) Provide staff training for storm drain operation and maintenance personnel at least once a year with emphasis on controlling storm water pollution through storm drain operation and maintenance.
- 3) Include provisions for stormwater pollution prevention in contract specifications for conducting storm drain operation and maintenance.

Record Keeping and Evaluation

- 1) Maintain records tracking all cleaning activities. The records shall show when and which facilities have been inspected and cleaned. Spill and illegal dumping incidents and responses to both incidents shall also be documented and tracked.
- 2) Review the records annually to critique the effectiveness of storm drain operation and maintenance activities. Modifications of storm drain operation and maintenance activities shall be identified in the annual individual work plans.
- 3) Document any unusual flows observed during inspection (particularly dry weather flows) and the follow-up actions/referrals.

Operational Improvement, Structural Retrofit and Design Changes

- 1) Review the storm drain operation and maintenance program annually and if needed, identify operational improvements, opportunities for structural retrofit and design changes.

- 2) Operation and maintenance provisions shall be included in planning and design phases of Capital Improvement Projects (for retrofit) to ensure that stormwater quality issues are considered in the design of storm drain systems.

APPENDIX B
Landscaping Maintenance Plan

1.0 GENERAL

1.01 SCOPE

- A. Provide all supervision, labor, materials, equipment and transportation required for continuous landscape maintenance, complete as specified.

1.02 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Perform all work in accordance with all applicable laws, codes, and regulations required by authorities having jurisdiction over such work.
2. Provide for all inspections and permits required by Federal, State, and local authorities in furnishing, transporting, and installing of all agricultural chemicals.
3. The County Agricultural Commissioner's Office must, by law, be given a monthly record of all herbicides, insecticides and disease control chemicals used.

B. Applicable Standards: Apply standards as described in the following:

Arizona Nursery Association Current Standards

C. Work Force:

1. The landscape maintenance provider shall have a full-time foreman assigned to the job. He shall have a minimum of four years experience in landscape maintenance supervision, with experience or training in entomology, pest control, soils, fertilizers and plant identification.
2. The landscape maintenance provider's labor force shall be thoroughly familiar and trained in the work to be accomplished and perform the task in a competent, efficient manner acceptable to the Flood Control District of Maricopa County (District).
3. The work force shall be directly employed and supervised by the foreman. The work force shall be under supervision at all times. Notify the District of all changes in supervision.
4. The landscape maintenance provider's labor force shall have proper identification at all times and be uniformly dressed in a manner satisfactory to the District.

1.03 SUBMITTALS

Submit to the District for approval, two (2) copies each of the following items:

- A. Schedule: Schedule of maintenance operations and monthly status report including list of all equipment and materials proposed to be used for the job and watering schedule.
- B. Restricted Weed, Pest, and Disease Control Application Recommendations: Written application recommendation by a licensed agricultural pest control advisor for all weed, pest and disease controls restricted by the Director of Agriculture proposed for this work.
- C. Licenses and Insurance: All licenses and insurances required by the District, the State, or Federal government pertaining to this work.
- D. Chemicals: Monthly record of all herbicides, insecticides and disease control chemicals used for the project.
- E. Site Conditions: Initial documentation of site conditions (included existing planting and irrigation system) with corrective recommendations, if any, and cost and schedule for corrections.
- F. Maintenance Manual: Include in a single, 3-ring binder a landscape maintenance manual containing an indexed collection of all schedules, records and permits listed above, as well as a documentation of condition of planting, irrigation, and landscaping at each site visit recording plant materials which are damaged or dying, if any.

1.04 SCHEDULING & COORDINATION

- A. Hours: Perform all maintenance during hours mutually agreed upon between the District and the maintenance provider.
- B. Work Force: Work force shall be present at the project site as necessary to perform specified maintenance in accordance with the approved maintenance schedule.
- C. Site Visits: Visit the site once a month for general maintenance. Frequency of site visits should be re-evaluated at the time of every visit as to whether or not the site needs to be visited more frequently.

2.0 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A Fertilizers:

Sierra Chemical Company
 1001 Yosemite Drive
 Milpitas, CA 95035
 (408) 263-8080

B Herbicides:

Chevron Chemical Company
575 Market Street
San Francisco, CA 94105
(415) 894-0880

Rhone-Poulenc Chemical Company
Agro Chemical Division
P.O. Box 125
Mon Mouth Junction, NJ 08852
(201) 297-0100

Ciba-Geigy Corporation
Agricultural Division
P.O. Box 1830
Greensboro, NC 27419
(919) 292-7100

Elanco Products Company
740 S. Alabama St.
Indianapolis, IN 46285
(317) 261-3638

The DOW Chemical Company
P.O. Box 1706
Midland, MI 48640
(517) 636-0236

3M Company-Agri Chemicals Project
3M Center, Bldg. 223-6SE
St. Paul, MN 55144
(317) 261-3000

2.02 MATERIALS

- A. General: The maintenance provider, unless otherwise indicated, shall provide all materials and equipment.
- B. Water: As available from the District. Transport as required
- C. Fertilizers:
1. Tightly compressed slow-release and long lasting complete fertilizer tablets bearing manufacturer's label of guaranteed analysis of chemicals present.
 2. Balanced, once-a-season application controlled-release fertilizers with a blend of coated prills which supply controlled-release nitrogen, phosphorus and

potassium, and uncoated, rapidly soluble prills containing nitrogen and phosphorus.

- D. Herbicides, Insecticides, and Fungicides: Best quality obtainable with original manufacturers' containers, properly labeled with guaranteed analysis. Use non-staining materials.
- E. Replacement Tree Guys, Stakes, Ties and Wires: Match existing materials on the site (Provide detail(s) in 8-1/2 in. x 11 in. format if necessary).

2.03 EQUIPMENT

- A. General: Use only the proper tool for each job. Maintain tools in sharp, properly functioning condition. Clean and sterilize pruning tools prior to usage.
- B. Insect/Disease Prevention: Take measures to prevent introduction of insect or disease-laden materials onto the site.

3.0 GENERAL PLANT CARE

3.01 PREPARATION

- A. Protection:
 - 1. Protect new planting areas from damage.
 - 2. Provide temporary protection fences, barriers and signs as required for protection. Posts and signs may need to be put up where people are driving or walking through the site.
 - 3. Evaluate if additional barriers such as fencing are needed to prevent people driving or walking through the site resulting in damage to the landscaping.
- B. Replacements:
 - 1. Immediately treat or replace plants that become damaged or injured as a result of Maintenance Provider's operations or negligence, as directed by District, at no cost to the District.
 - 2. Replacement plants shall match size, condition and variety of plants replaced.

3.02 PLANTING

- A. Watering Basins:
 - 1. Maintain watering basins around plants so that enough water can be applied to establish moisture through major root zones.

2. In rainy season, open basins to allow surface drainage away from the root crown where excess water may accumulate. Restore watering basins at end of rainy season.
3. For supplemental hand watering of watering basins, use a water wand to break the water force.
4. Reset plants to proper grades or upright position.

B. Weed Control:

1. All areas between plants, including watering basins, shall be weed free.
2. Use only recommended and legally approved herbicides to control weed growth.
3. Avoid frequent soil cultivation that destroys shallow roots and breaks the seal of pre-emergent herbicides.

C. Fertilization:

1. Recently installed plant materials: Verify from District month of actual completion date of planting installation including amount and type of applied fertilizers.
2. Established plant materials: Do not use complete fertilizers unless soil test shows specific nutrient deficiencies.

D. Pruning:

1. Prune trees to select and develop permanent scaffold branches that are smaller in diameter than the trunk or branch to which they are attached, which have vertical spacing of from 18 to 48 inches and radial orientation so as not to overlay one another.
2. Prune trees to eliminate diseased or damaged growth, narrow V-shaped branch forks that lack strength and to reduce toppling and wind damage by thinning out crowns.
3. Prune trees to maintain growth within space limitations, maintain a natural appearance and to balance crown with roots.
4. No stripping of lower branches ("raising up") of young trees will be permitted.
5. Retain lower branches in a "tipped back" or pinched condition with as much foliage as possible to promote caliper trunk growth (tapered trunk). Cut lower branches flush with the trunk only after the tree is able to stand erect without staking or other support.

6. Do primary pruning of deciduous trees during the dormant season. Prune damaged trees or those that constitute health or safety hazards at any time of year as required.
7. Make all cuts clean and close or flush with the trunk, without cutting into the branch collar. "Stubbing" will not be permitted. Cut smaller branches flush with trunk or lateral branch. Make larger cuts (1 in. in diameter or larger) parallel to shoulder rings, with the top edge of the cut at the trunk or lateral branch.
8. Branches too heavy to handle shall be precut in three stages to prevent splitting or peeling of bark. Make the first two cuts 18 in. or more from the trunk to remove the branch. Make the third cut at the trunk to remove the resulting stub.
9. Do not prune or clip shrubs into balled or boxed forms.
10. Take extreme care to avoid transmitting disease from one infected plant to another. Properly sterilize pruning tools before going from one infected plant to all other plants.

E. Staking and Guying of Trees:

1. Inspect stakes and guys at least every three (3) months to check girdling of trunks or branches, and to prevent rubbing that causes bark wounds. Eyescrews in specimen tree trunks are preferred to looped wire and hose.
2. Remove existing stakes or guys when trees attain a trunk caliper of 4 inches. Recommend replacement to District if trees are still unstable at this time.
3. Conform to the recommended industry standard procedures of staking and guying and as specified in the construction documents.

F. Replacement of Plants: Immediately bring to the District's attention, all dead plants and those in a state of decline. Replacement plants shall be of a size, condition and variety acceptable to District, to be paid for by the District unless due to negligence of the Maintenance Provider.

G. Maintenance of Existing Plantings to Remain:

1. General: Conform to applicable paragraphs regarding pruning, watering, spraying and fertilizing of new plant materials as specified in this section.
2. Symptoms: Be alert to symptoms of construction damage to existing plantings as evidenced by wilting, unseasonal or early flowering or loss of leaves, and insect or disease infestation due to declining vigor.
3. Notification: Submit in writing of evidences of declining vigor immediately upon discerning the problem. Take appropriate interim measures to mitigate the severity of the problem as specified in this section.

4. Proposal: Submit written proposal and cost estimate for the correction of all conditions before proceeding with permanent correction work.

3.03 GROUNDCOVERS

- A. Watering: Check for moisture penetration throughout the root zone at least once a month. Water as frequently as necessary to maintain healthy growth of groundcovers.
- B. Weed Control:
 1. Control weeds, preferably with selective systemic herbicides.
 2. Minimize hoeing of weeds in order to avoid plant damage.
- C. Fertilization:
 1. Recently installed plant materials: Verify with District actual completion date of planting installation and rate of prior application of fertilizers.
 2. New plant materials: Do not use complete fertilizers unless soil test shows specific nutrient deficiencies.
 3. Established Plant Materials: Do not use complete fertilizers unless soil test shows specific nutrient deficiencies.
- D. Replacement: Replace dead and missing plants after obtaining District's agreement to pay for replacement. Damages due to Maintenance Provider's negligence shall be paid for without charge to the District.

3.04 HYDROSEED

- A. Watering: Watering hydromulched areas. Initial watering of seeded areas will be done to maximize growth of seedlings. The Maintenance Provider shall water and perform soil preparation and reseed as required to maintain a fully established stand of plants. The method of watering shall be the Maintenance Provider's responsibility. The Maintenance Provider may utilize an alternate hydroseed irrigation system to water those seed mix areas which can be watered by the system if approved and agreed upon by the District.
- B. Protective Devices: Protective devices shall be provided as required to protect seeded areas from traffic. The Maintenance Provider shall repair and reseed areas damaged by traffic, erosion or poor germination and reseed to obtain successful germination based on the supplier's specified germination rates and species used.
- C. Weed Control:
 1. Control weeds, preferably with selective systemic herbicides.
 2. Minimize hoeing of weeds in order to avoid plant damage.

3.05 INSECTS, PESTS, AND DISEASE CONTROL

- A. Inspection: Inspect all plant materials for signs of stress, damage and potential trouble from the following:
 - 1. Presence of insects, moles, gophers, ground squirrels, snails and slugs in planting areas.
 - 2. Discolored or blotching leaves or needles.
 - 3. Unusually light green or yellowish green color than normal green color of trees.
- B. Personnel: Only licensed, qualified, trained personnel shall perform spraying for insect, pest and disease control
- C. Application:
 - 1. Spraying for insect, pest and disease control shall be done only by qualified, trained personnel.
 - 2. Spray with extreme care to avoid all hazards to any person or pet in the area or adjacent areas.

4.0 GENERAL MAINTENANCE

4.01 CLEANING

- A. Landscape Waste and Mulch: Sweep walkways and dispose of pruned materials, clippings, and leaves. Remove any dead trees or shrubs found on site.
- B. Trash: Pick-up and dispose of trash throughout the basin site.
- C. Maintenance Containers: Remove from the site containers and evidence of maintenance activities.
- D. Site Disturbance: Re-grade, rake out, and clean up any disturbed areas due to people driving or walking through the site. Posts and signs may need to be put up where people are driving or walking through the site. Evaluate if additional barriers such as fencing are needed to prevent damage to the landscaping resulting from people driving or walking through the site.