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THE
LOCAL FLOODING MITIGATION PROGRAM
A REPORT ON LOCAL FLOODING ISSUES

VOLUME I OF II - REPORT

PREPARED

by

THE FLOODPLAIN MANAGEMENT SECTION

OF THE

STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX
125 EAST WASHINGTON STREET
PHOENIX, ARIZONA 85004

MARCH, 1992

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ACKNOWLEDGEMENTS

This report was prepared by the Street Transportation Department of the City of Phoenix. The principal investigator was Paul E. Kienow, P.E., Floodplain Management Supervisor, assisted by Donna Weiss, Engineering Technician, and Armilda Furney, Secretary II. The Project Location Plan sheet format was prepared by Richard Park, Chief Drafting Technician using the Design, Planning & Safety Division's AutoCad System. The location plans were prepared by Donna Weiss. The Engineering and Architectural Services Department, Central Records staff and Reprographics staff located and copied over 700 documents for this project.

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EXECUTIVE SUMMARY

During the period of July 11th through September 3, 1990, portions of the City of Phoenix experienced seven large rainstorms. These included rainstorms with the following statistical frequency of occurring: one 100-year storm, one 20-year storm, one 5-year storm, one 4-year storm, one 2-year storm and two 1-year storms. As a result of these rainstorms, the City received four hundred and seventy reports of flooding from citizens. The Street Maintenance Division was able to perform corrective action for two hundred and ninety of these problems. One hundred and eighty were referred to the Drainage Task Force for further investigation.

This report is a result of that further investigation. The report recommends that remedial action be taken and that the cost of these remedial measures is estimated to be more than two hundred million dollars. The City does not have any funds to provide mitigation measures other than approximately two million dollars from the 1988 Storm Drain Bond Program Funds. The report concludes that development standards have been effective but need to be improved slightly. It recommends that the City create a Storm Water Utility to provide operation, maintenance, and capital improvement funds for a Storm Water Management System.

It further recommends that the City enter into discussions with the Flood Control District of Maricopa County to see how the twenty four million dollars a year paid by City residents to the Flood Control District could be used to fund the Storm Water Utility Program within the city. It recommends that a committee be formed to prioritize the projects. It also concludes that staff and the public are not aware of the degree and cause of local flooding and recommends training for staff and that a Public Awareness Program be initiated.

SECTION I

INTRODUCTION

The City of Phoenix experienced several heavy rainstorms during the period of July through September of 1990. As a result of these intense thunderstorms, one of which equaled a 100-year event, many structures within the City were flooded.

Background

The Street Transportation Department received a total of 470 Requests for Service. The Street Maintenance Division responded to all of these requests and during the storms provided assistance such as providing sandbags and pumping out ponded water. After the storms the Division performed whatever minor construction was possible with maintenance crews to help reduce the flooding from subsequent rainstorms. This assistance generally was limited to clearing of brush from drainageways, constructing small berms at the entrance to streets to prevent water from flowing down cul-de-sacs, raising the grade of some streets, and construction of channels within existing drainage easements. After these projects were completed a large number of problem areas still existed which would require much more work

than the manpower and dollars which are available. There were at least 180 known incidents of flooding of structures which could not be prevented with minor maintenance type improvements. These 180 incidents of flooding were turned over to the Drainage Task Force. This Task Force includes representatives from the Design & Construction Management Division, Street Maintenance Division, and Floodplain Management Section, all of the Street Transportation Department. During the period of September through December, 1990 the Task Force met and a second review of the problem areas was made. It became apparent that the scope in cost and time far exceeded the resources available to provide a solution.

The Drainage Task Force recommended that a Consultant or Consultants be retained to investigate these remaining flooding incidents and estimate the cost to remedy them. Unfortunately, as a result of budgetary constraints there were no funds available. Consequently, the incidents of flooding were turned over to the Floodplain Management Section for disposition. This report is a result of the Floodplain Management Section's investigations. The report consists of two volumes. This report constitutes volume I. Volume II includes the reports for each flooding incident which is not for public distribution, but is an internal record of the individual incidents.

Summer Rainstorms, July - September, 1990

At the time of the 1990 storms, the City of Phoenix, Street Transportation Department maintained a system of ten recording type rain gauges. The major rainfalls of 1990 are shown in Table 1.

TABLE 1
Significant Rainstorms Recorded in 1990

DATE	STATISTICAL FREQUENCY OF OCCURRENCE
7/11/90	1-YEAR (14TH ST. & THOMAS)
7/21/90	2-YEAR (32ND AVE. & GREENWAY)
7/24/90	5-YEAR (16TH ST. & MISSOURI)
8/3/90	4-YEAR (16TH ST. & MISSOURI)
8/11/90	1-YEAR (16TH ST. & MISSOURI)
8/14/90	100 YEAR (DEER VALLEY AIRPORT & 16TH STREET & MISSOURI)
9/3/90	20-YEAR (59TH AVE. & INDIAN SCHOOL RD.) The Flood Control District reported a 100-year rainfall at 67th Avenue and Greenway Road.

There were five storms which exceeded the intensity and duration which can be expected on an annual basis (1-year storm). Storms of greater or lesser magnitude may well have occurred in

locations where gauges were not present. Also, some gauges were inoperable during certain storms. It is important to note, however, that while severe flooding resulted from several of these storms only one of them was a 100-year event. The 100-year storm is the criteria established by the National Flood Insurance Program as the intensity and duration to be used as a standard, for flood insurance purposes. As a result it is becoming the design standard for many projects. The summer rainstorms were intense thunderstorms and only extended over a few square miles. Therefore it is not unusual that one rain gauge would record a severe rainfall event and other rain gauges may not record any precipitation.

Corps of Engineers Design Storm

None of these storms approached the intensity and duration of the design storm for the Phoenix area. In the 1960's the Corps of Engineers selected a storm that occurred in Queen Creek, Arizona on August 19, 1954 as a design criteria. This storm deposited over five (5) inches of rain over an area of 140 square miles. When this size of storm hits the City of Phoenix all of these areas will flood simultaneously and will flood to a much greater amount. In June 1972 a storm centered over 24th Street and Camelback Road deposited 5" of rain over one square mile and over 2" of rain on an area of over 90 square miles. This storm

caused stormwater to flood large areas of Phoenix causing over \$10,000,000 in damage (1972 dollars). It was estimated to be a 70-year storm by the Corps of Engineers.

Thus the City of Phoenix should take into consideration that while these intense rainstorms of several inches of rainfall occur nearly every other year somewhere within the City of Phoenix, they do not approach the amount of rainfall and damage that will result from a 5" rainfall which could extend over 100 to 200 square miles at the same time. The effect of this run-off down the City streets will be much more severe than anything that was experienced during 1990. For that reason, the reports of flooding that are recorded and investigated within this report are considered to be only the "Tip of the Iceberg".

In nearly every incident only one home in a neighborhood reported flooding. A visit to the neighborhood however revealed that many of the homes in the area were at the same elevation. It can only be assumed therefore that many people do not bother to notify the City recognizing that the storm is an act of God and not the responsibility of the City. For that reason, in each case, an estimate was made of how many homes would flood in a true 100-year storm event. This is a very rough estimate but would provide a general idea of the extent of damage that can be expected to result from the true 100-year storm.

City of Phoenix Storm Drain System

Some of the areas which experienced flooding do not drain well, if at all. As a result the City, over the past 20 years, has installed catch basins and small lateral storm drains to drain these areas. In some cases this is the only drainage possible. This approach can only be used when a storm drain system exists in the vicinity of the problem. When a major storm occurs the storm drains will not carry the water off at the same rate that it falls. The sole purpose of the storm drain and catch basin is to drain the area after the storm. This may take several hours, or days, depending on the amount of water ponded. Frequently the residents believe that the storm drain was the cause of their flooding.

The City of Phoenix Storm Drain System is a two year design. It has been designed to drain the streets from the 2-year storm while leaving one lane of traffic passable in either direction. This means that the water depth will be up to the top of the curb and/or sidewalk. Therefore, it is not possible to install large catch basins in areas to drain more than an "every day" storm. The reason is that the outlet will never be large enough because the main trunk lines are sized for a 2-year storm.

Additionally, the areas where water ponds and is drained by these neighborhood catch basins often received a large amount of silt. The silt tends to plug up the catch basin at the end of

the storm. This adds to the resident's belief that the storm drain was plugged and was the cause of the flooding.

The decision to have a 2-year storm drain system was made many years ago by the City Engineer and subsequently approved by Mayor and Council when the City recognized that a 10-year storm drain system costs twice as much as a two year system.

Installing larger storm drains so that the streets would be not flooded once every ten years was not cost effective. Increasing the size of storm drains would equal the size of constructing another street improvement. This would double or triple the cost of street improvements within the City of Phoenix and was not considered to be cost effective.

Flood Control District ADMS Program

The Flood Control District of Maricopa County has initiated an Area Drainage Master Study (ADMS) Program. An ADMS is a study over a large area. The purpose is to provide hydrology and locate areas of flooding and possible improvements. The Flood Control District has two large ADMS's in progress in the City at this time. The first is the Arizona Canal Diversion Channel (ACDC ADMS), which includes nearly all of the area above the Arizona Canal from the westerly city limits to the Indian Bend Wash Watershed. The second study is the Laveen ADMS, which includes most of the South Mountain area west of Central Avenue. A third study (Hohokam ADMS) is about to begin and it is located

generally east of Central Avenue and south of the Salt River. A study for the Maryvale area is programmed for next fiscal year. A ADMS (Foothills ADMS) is planned for the area south of the South Mountains in 1993. None of these studies will produce results for two or more years.

The approach of this report is different than that of the Flood Control District since it is investigating areas of known flooding rather than attempting to estimate where the flooding may occur. We believe that this is a better approach. The areas of flooding are so shallow that they are difficult if not impossible to determine in the field using normal standards of investigation.

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Storm Drain System

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Legal and Policy Issues

There are a variety of legal and policy issues which impact upon any report of flooding, flood claims, and potential solutions to flooding problems by the City. The City is not responsible for the fact that rain falls. A variety of theories have been utilized by attorneys representing claimants to impose liability for what happens to the rain after it falls.

Storm Drain System

By far the most frequent allegation against the City is that the City is "negligent" simply because the storm drain system in

place throughout the City does not carry away all of the stormwater which reaches City streets. The storm drain system, however, was never designed or intended to carry away all of the stormwater; rather, it was designed to handle a storm of a two year statistical frequency storm. In the past several years, however, Phoenix has sustained storms of greater than 50 year statistical frequency. The result is that some areas of the City have received water in excess of what the storm drain can handle and in excess of what the streets can carry away. Flooding results in these areas.

Other City Improvements

Another frequently asserted claim is that changes made to City streets, sidewalks, or other road improvements cause water to enter claimants' property that did not previously enter the property. Although this can occur, more frequently the cause is a centralized rain storm of an unusual magnitude occurring in an area where the City coincidentally is performing street maintenance, repairs or improvements. The reality is that many and perhaps most of these properties would flood regardless of the work done by the City.

City Non Action

A third category of claims are those brought alleging that the City "allowed" changes to occur which resulted in flooding. Examples include "allowing" the City to grow in such a fashion that run-off is increased, "allowing" business or other property owners to build structures at a higher elevation than the claimant's property, resulting in the diversion of water, etc. Interestingly, most of these claims pertain to areas that were developed under Maricopa County standards before annexation into the City of Phoenix, or were developed and built before 1972 when the City enacted its grading and drainage ordinance. The drainage task force analysis has determined that over 81% of the flooding problems from last summer's monsoons were in areas that were developed under those circumstances.

There are a variety of defenses available to the City for most of the flooding claims that are filed against it. Only where the City has failed to use reasonable care or has performed some activity resulting in a change to the natural flow of surface water is the City likely to be found legally responsible for flooding damages. As a result, the City had aggressively defended most flood claims submitted historically. Because of the complexity of such cases, however, the cost of defense for such claims is typically higher than many of the other types of claims submitted against the City.

City Liability Not Determined

Because of the variety of factors involved in determining whether the City has, or may have, liability for a particular flooding incident, and what the City's percentage of fault may be when compared with other parties at fault, this report has not attempted to determine the liability risks for the City with respect to each of the flooding incidents investigated. Such a determination would necessarily require legal expertise to review and determine. Rather, this report is simply a compilation of the flooding locations and potential solutions to the flooding issues, without regard to the question of responsibility or liability. Should Council wish a determination of prospective liability with respect to any or all of the flooding locations, staff will work with the City's legal department and outside legal staff, if necessary, to categorize such issues. Such determinations should be done within the attorney/client context, however, so that any findings by our attorneys are privileged and protected from disclosure.

SECTION II

A SAMPLE FLOODING PROBLEM

According to records in the Street Transportation Department the intersection of 24th Avenue and Camelback Road has a history of flooding dating back to at least 1981. This flooding problem contains a number of typical elements. These elements are:

1. A history of development practices which have created the problem.
2. A history of repeated flooding.
3. A history of public contact reporting the flooding to the City of Phoenix.
4. The City of Phoenix advising the resident that a storm drain project (2-year design) is planned for the near future.
5. The installation of the storm drain project with catch basins installed specifically at the site of the flooding problem.
6. Repeated flooding is reported after the installation of the storm drain.

7. The public assumes that the cause of the flooding now is the improper design, installation, and/or operation of the storm drain.
8. The public again appeals to the City to correct the problem.

History of Development

The most readily assessable information concerning the history of development includes the series of aerial photographs which the City of Phoenix has had taken since 1961, and the recorded subdivision plats. While a subdivision plat does not prove that development occurred at a particular time, it does provide a date from which development could be expected to begin soon after the recordation of the subdivision plat. The City has aerial photographs showing this area in 1961, 1964, 1971, 1975, 1978, 1982, and 1986.

The 1961 aerial photograph shows that the freeway is of relatively new construction and Camelback Road exists with four lanes. There is a farmhouse located on the south side of Camelback Road across from the 24th Avenue alignment. The homes on either side of 24th Avenue, north of Camelback Road have been constructed. The land south of Camelback Road is irrigated farmland. The only structures are the aforementioned farm and a

building which could be a church at the southwest corner of 23rd Avenue and Camelback Road. Because of the irrigated fields a drainage pattern cannot be determined. The subdivision along 24th Avenue north of Camelback is called Casa Blanca and was subdivided in 1945. It is one of the earlier subdivisions in the area. Drainage has already been cut-off to the south by the development of the land between Coolidge Street and Highland Avenue from Interstate 17 to 23rd Avenue. This land has been split up into parcels without the benefit of platting. It is mostly built-out in the 1961 aerial photograph with homes constructed in the alignment of 24th Avenue. Therefore prior to 1961, the stage was set for a future flooding problem at the intersection of 24th Avenue and Camelback Road. The area was annexed into the City in 1958, so this could be considered to be the situation as it existed when the City annexed the area.

Little change exists in the 1964 photograph. The farm is still one of two developments on the south side of Camelback Road from 23rd Avenue to Interstate 17. The property at the southwest corner of 23rd Avenue and Camelback Road has been redeveloped with a different building on the site.

The 1971 photograph shows the complete development of the farm and all of the land immediately to the south of Camelback Road. It has now been developed as the two large car dealerships which exist there today. However, the land south of the car dealerships is still vacant. A wall exists along the south side

of the car dealerships preventing drainage to the south.

In 1975 the land south of the car dealerships is still vacant. The wall on the south side of the car dealership has been extended to fully enclose the southwest corner. The car dealerships have now completely cut-off drainage to the south from the intersection. Camelback Road has been expanded to four lanes plus a left turn lane. The 1971 photo also shows the addition of condominium projects, which by 1975 have completely blocked-off drainage in the 24th Avenue alignment, south of Hazelwood.

In 1972 the City of Phoenix completed the improvement of Camelback Road from Interstate 17 to 19th Avenue. The survey information for this project, which was obtained sometime prior to 1971, indicates that the project matched the curb and gutter at Interstate 17 and the existing ground elevations for 24th Avenue. It also matched existing ground at 23rd Avenue. In other words, there was a low spot approximately 3 feet deep at 24th Avenue between 23rd Avenue and Interstate 17. Camelback Road matched existing ground elevations as best it could.

The USGS Quadrangle Map (Sunnyslope, Arizona) issued in 1965 (produced from aerial photographs taken in 1962) indicated that Camelback Road would have been approximately flat or drained to the east to the old Cave Creek Wash which existed at about approximately 15th Avenue. Since there are only ten foot

contours on this map, it can not be determined that 23rd Avenue was higher than 24th Avenue. The 1978 photograph does not show much change in the area.

The 1982 aerial photograph shows the beginning of the construction of a large apartment project south of the car dealerships. Because the car dealerships did not provide for water to drain to the south, the apartment complex was constructed without providing for drainage through it.

The 1986 aerial photograph shows the site as it exists today with drainage to the south now blocked by:

1. The two car dealerships.
2. A very large apartment complex north of Highland Avenue.
3. Unsubdivided single family homes south of Highland Avenue.
4. Three condominium projects located along the north side of Campbell Avenue between 23rd Avenue and Interstate 17.

Therefore, it is totally unfeasible to drain this intersection.

History of Rainfall

The City has maintained a system of rain gauges and has rainfall information dating from 1972. Time did not allow a complete search back to 1972. Table 2 lists the significant

amounts of rain which were associated with reported flooding during the period of 1981-1990.

RAINFALL DATA 1981 - 1990

(Reported Flooding Only)

TABLE 2

DATE	APPROXIMATE RETURN FREQUENCY (YEARS)	INCHES OF RAINFALL	LOCATION
7-29/30-81	40	2.21	16th St. & Missouri
08-16-83	8	1.72	16th St. & Missouri
08-28/29-86	8	1.66	16th St. & Missouri
	40	2.29	27th Ave. & Northern
10-14-88	8	2.03	16th St. & Missouri
07-23-90	5	1.46	16th St. & Missouri
08-3-90	4	0.87	16th St. & Missouri
08-14-90	100	3.80	16th St. & Missouri
09-03-90	20	2.15	59th Ave. & Indian School Road

From the table above it appears that significant flooding exists and enters the homes whenever a 24 hour rainfall exceeds approximately 1.50 inches.

History of Public Contact

The City of Phoenix had initiated two systems of recording public contact concerning flooding. One of these systems was located in the Storm Drain Section (now disbanded) of the Engineering Department. Their records indicate that sometime in 1972 they began keeping a record of public contact concerning flooding problems. The early years of this record are not complete and so it is possible that public contact was made that is not discussed here. The first public contact that was noted on their control cards was on October 1, 1981. Mrs. Bill Williams of 5002 North 24th Avenue reported flooding on July 29 and 30, 1981. An examination of Table 2 above shows that 2.21 inches of rain fell during that period. The records indicate that this fell very quickly in a time of about 1-1/2 hours. This was recorded at the rain gauge at 16th Street and Missouri and was a 40-year rainfall for that area. This same record indicates that Mrs. Williams again contacted the City on August 29, 1986 when another 40-year rainfall occurred. This record goes on to say that a catch basin was modified and scheduled for construction in 1986. Mrs. Williams was told in 1986 that the situation probably won't be solved until the 23rd Avenue storm drain was installed, and was advised that this was an indefinitely delayed project. The next record indicates that on August 16, 1983, Mr. Guy Brown of 5001 North 24th Avenue

contacted the City about flooding. The record notes that a catch basin would be modified in June 1986. The last record from the Storm Drain Sections' records indicates that on August 28, 1986 a Leslie Murphy at 5007 North 24th Avenue reported that the house was flooded throughout except for the bath. In the remarks section of the record the citizen stated that the flooding may have been caused by the construction of the new storm drain at 24th Avenue and Camelback, which had been completed only three weeks earlier.

Table 2 above indicates that 1.66 inches of rain fell at 16th Street and Missouri and 2.29 inches fell at 27th Avenue and Northern. These were an 8-year and a 40-year return frequency. What actually has happened is the largest rainstorms since 1981 have occurred.

The second set of records that the City has concerning flooding incidents were kept by the Grading and Drainage Section (now disbanded) in the Engineering Department. These records began in the early 1980's and they also have a report of the 1986 flooding. Mrs. Williams, at 5002 North 24th Avenue, reports that her house gets flooded and that apparently the storm drains are too small. The inspector's report notes that the house at 5008 North 24th Avenue shows watermarks about one foot above the floor.

In 1988 Mrs. Williams at 5002 North 24th Avenue again

reported that the catch basin in front of her property does not work and that water from Camelback Road floods her yard. She has been able to protect her house by retaining walls. Mrs. Williams now understands that the small storm drain project does not have any influence on the flooding and is recommending a larger storm drain.

In 1989 the manager of Camelback Dodge at 2331 West Camelback Road had requested assistance through the Deputy City Manager's Office. The Storm Drain Section responded to the Deputy City Manager, after describing the problem and writing that improving and cleaning the storm drain might be able to help the situation. They also suggested the use of drywells at a cost of \$10,000 each.

In 1989 the records also indicate that Camelback Dodge believes that the flooding is caused by the parking lot of the adjacent car dealership. The second report in 1989, through the District 5 Councilman's office, is from Linda Kanter at 5015 North 24th Avenue. Her reports of flooding are similar to the others. The Inspector notes that there doesn't seem to be any damage to Ms. Kanter's house. It was explained to Ms. Kanter that the extra catch basin had been constructed to help mitigate it. She was also advised that the Local Drainage Task Force would be looking at the matter.

In June 1991, Ms. Kanter has again contacted her District 5 Councilman requesting action. Staff has discussed this flooding

with her and she discusses the floodwalls that some homeowners have constructed. She associates the flooding with the freeway pumps. She believes that water backs up when the pumps are on and it drains better when the pumps are off, and asks "Is there a connection?". She requests a solution to the problem.

Investigation reveals that the freeway pumps discharge into a storm drain to the Salt River and not into the City streets.

In summary, the residents have reported flooding since 1981. The characteristics of the flooding do not seem to change while new people move into the area and associate the flooding with different activities that happen at the time. That is, new construction, the freeway pumps, catch basins, storm drains, etc. The real cause of the flooding is that at least 8 rainstorms of a statistical frequency greater than 4 years have occurred in a 9 year time period. We know that the area has not drained well since sometime between 1964 and 1971 when the land on the south side of Camelback Road was developed. This example is typical of the flooding incidents reported.

SECTION III

ALTERNATIVE SOLUTIONS

Because all of the areas of flooding are in heavily developed areas only expensive solutions are possible. These are discussed below. All cost estimates are in 1991 dollars.

Elevate the Structure

The Federal Emergency Management Agency (FEMA) publishes several manuals on floodproofing methods. One method is to simply elevate the structure. Unfortunately, since nearly all of the structures effected within the City of Phoenix are buildings constructed on a concrete slab on the ground, the cost of elevating them would be prohibitive. The manuals cite several examples and provide an estimated cost to elevate a typical single family home that is constructed on a concrete slab at \$35,000 per structure.

Relocate the Structure

The same floodproofing manuals provide a cost estimate of \$80,000 to move a structure which is constructed on a concrete slab on grade. This high cost is because there is no floor which can be moved, and the cost of holding the building together during the move, in addition to raising it, is excessive. Therefore it is almost cost prohibitive to move the homes. The cost of moving a frame building, however, is only \$25,000 and would often be economically feasible. Unfortunately, there are very few homes of this nature that were effected.

Demolish Structure and Purchase Property

Another alternative is to simply demolish the structure and purchase the property. Generally, this would almost be as cost effective as raising or relocating a block structure, built on a concrete slab on grade.

Construction of Flood Walls

The FEMA manuals contain many examples of constructing flood walls. The estimated cost for a 3 foot flood wall around a typical single family residence would be \$13,000; for a 5 foot flood wall the cost estimate is \$17,000. The cost of automatic closures is extremely expensive and a cost estimate of \$20,000 for a single 3 foot wide enclosure is provided in the manuals.

Retention Basins

The preferred solution would be the installation of large retention basins throughout the City. The function of a retention basin is to take the initial quantity of water and retain it and release it through a small pipe which can be drained off by the storm drain system after the storm. However, since most of the areas are already built up this would involve the demolition of many homes in each case. A typical retention basin size would be 20 acres. 20 acres could have as many as 100 homes on it. The question is, even if the cost could be afforded, would it be in the neighborhood's best interest to lose 100 homes? Additionally, the City would lose a significant tax base.

Retention basins are most feasible when the land is vacant and relatively inexpensive. The ideal retention basin would be a multi-use facility with a park. However, as in most compromises, there are problems. A park that fills full of water each time it rains can not be used until the water runs off. Additionally the silt and heavy watering can cause damage to grass and shrubs. Retention basins can be designed that only flood on an infrequent interval such as 10-years or 25-years. Again no buildings or substantial structures could be built in these areas. In this report, retention basins are only suggested in areas where vacant land exists. However, the cost of land at nearly \$100,000 an acre makes the cost of a retention basin very expensive.

Inverted Crown Streets

As the investigation of flooded homes proceeded, it became apparent that a possible alternative would be to reconstruct many streets with an inverted crown (lower at the middle of the street). The City has had a long standing policy of not allowing inverted crown streets except in unusual circumstances. However, converting to an inverted crown street may be the only viable solution to prevent flooding to homes along the street where homes are at or below curb elevation. Therefore it is important that the City reexamine the prohibition of inverted crown streets. Two of the objections that have been mentioned are:

1. Water from overwatering and other neighborhood activities during a time other than a rainstorm would be in the center of the street. If an auto accident occurs the City may be blamed by a claimant because the water was in the middle of the street.
2. Existing utilities could be damaged from the construction process due to their age. That is, even though the utilities are buried deep enough, the activity of construction, primarily compaction and the weight of construction vehicles, could damage old utility lines.

Because a solution had to be proposed in order to estimate the cost, inverted crown streets are frequently proposed in this report. This proposal includes a 4' valley gutter down the

center of the street with a storm drain underneath the street. A slotted drain would be installed down the center of the street which would keep the street dry except during heavy rains. At that time the street will be able to store, and carry, a great quantity of rainfall runoff. The cost estimate used is \$100,000 for 500' or \$1.56 million per mile which includes both the street and the storm drain.

Channels

The City of Phoenix is an unusual metropolitan area in that it extends for nearly 20 miles from 48th Street on the east to 99th Avenue on the west without a single drainage channel, river, wash, or other means of conveying flood waters south to the Salt River. Therefore, another solution might be to establish a system of surface channels, or drains, to convey large quantities of water to the Salt River. These would involve the demolition of hundreds or even thousands of homes. Underground channels beneath the streets could be considered however it would be prohibitive due to construction costs, plus the problem of relocating and finding a location for the many utilities which are already under the streets.

Many people are not aware of the number of utilities that are in a typical city street. They include: telephone, water, storm drains, natural gas, cable T.V., sanitary sewer, underground electric, private communication lines, and others. When

one considers that some of these have to also service each property on both sides of the street, the problem of putting large structures under the streets is obvious.

Tunnels

Another form of drainage system would be to construct a series of very large tunnels beneath the City as was done for the 25' diameter drains for the Papago Freeway. This has been considered in the past and would be more costly than any of the other alternatives.

SECTION IV

INVESTIGATION

The Floodplain Management Section was provided a list of 180 Requests For Service from the Street Maintenance Division. The Street Maintenance Division had resolved as many of these as possible and then turned over the remainder to the Floodplain Management Section for investigation. This section of the report discusses the methods used in the investigation.

Prior Investigations

The Street Maintenance Division in many cases had visited each location at least twice prior to turning it over to the Floodplain Management Section. The initial request was investigated by a crew or member of the work force from that service district of the City. When the investigator determined that there was nothing that the work crews could do, it was forwarded to the Drainage Task Force. In that case, a member of the Drainage Task Force or a supervisor from the Street Maintenance Division investigated the incident a second time,

often contacting the person who made the request and obtaining additional details. In general the level of detail was quite complete and it was not necessary for an additional visit with the person making the request. However, the principal investigator visited the site and if the nature of the problem could not be determined, contact was made with someone in the neighborhood, usually the complainant.

Quarter Sections

The City of Phoenix maintains an excellent set of quarter section maps. This is a one hundred foot to one inch scale map of a quarter of one section (1 square mile). The City of Phoenix, as is many areas in the west, is laid out on one mile lines, (section lines) or areas including 640 acres. The section lines are bisected by streets at every half mile and consequently include an area of one quarter section in size (160 acres). Since the City has such a good set of quarter section maps it was decided that the projects would be grouped within the quarter section. This provides an accurate system of locating the areas. Also, many quarter sections include two foot topography within the quarter section which is invaluable in assessing the extent and cause of flooding.

Project Location

Volume II of this report includes a location plan for each project. Sometimes these location plans can be very specific, for example where a cul-de-sac does not drain, or a channel is inadequate or blocked. In other cases the project encompasses the entire quarter section.

Scope Of This Report

Because the study time was necessarily limited, and the number of future projects very large, the study scope is very large but is limited in each case. The cost estimates are conservative and are based on a brief site visit and the principal investigator's experience in investigating flooding problems within the City of Phoenix. Volume II of the report includes a two page summary for each Local Flooding Mitigation Project. The first page is a portion of the quarter section map which graphically shows the area of flooding and includes the subdivision name where available, the date subdivided, the quarter section and the Council District. The new Council Districts are used as they will be in 1992.

Project Numbers

The project numbering system is a quarter section number plus a suffix. Thus, if more than one project would result in a single quarter section they could be numbered 1, 2, 3, etc. In

most cases the problem was all encompassing and no one item could be broken out. Occasionally smaller scope projects such as cul-de-sacs that wouldn't drain existed within the entire quarter sections. Where it was felt that the smaller project could be resolved without the larger project being done, these are broken out separately by the suffix.

Subdivision Name and Date Subdivided

The subdivision name used is the subdivision which is believed to have been the main contributor to the problem of the flooding. This also provides a date of occurrence, since the subdivisions are recorded, and in later years approved by either the City Council or the County Board of Supervisors on a particular date. This provided information as to whether or not present development standards were used. The subdivision name usually is the subdivision where the flooding is occurring. Occasionally, the flooding is caused by a later subdivision or construction downstream from that location. In that case, where the subdivision information was available, that subdivision and subdivided date was used. In several cases the flooding problem can be traced to areas which have never been subdivided. In this case the date given is approximated by the date of subdivisions in the area or the date that it appeared that development began. Usually these are given a date of January 1st of some particular year. Therefore if a date is January 1st, the reader will know

that it is an estimated date.

Project Name

At first it was thought to use the subdivision name as the project name. However, the subdivision names are seldom used after lots have been sold, and in older neighborhoods most people would not know the name of the subdivision. Therefore it was decided it would be a more useable document if the nearest street intersection was used for the project name. In the case of an entire quarter section the intersection selected was more or less random. In every case, except for Central Avenue, the street is one of the numbered streets or avenues which appears first, providing a numerical listing with which the user can locate projects.

Description

The second sheet of the two page report is meant to be a one page summary with which a user can quickly determine the nature and extent of the problem. The description is the principal investigator's assessment of the actual cause of flooding. Minor details are omitted and it is intended to be a clear and concise statement which a non technical person can understand as the nature of the problem.

Estimated Number of Structures

In order to provide some indication of the severity of the problem, and a way to prioritize the incidents of flooding, it is necessary to estimate the number of structures which would flood. In nearly every case only one or two property owners contacted the City to report the flooding. In other cases these are the results of claims received through the Risk Management Department of the City and/or lawsuits. However, as stated in the introduction, since one home flooded and all the other homes are at basically the same elevation, they are all at risk. An estimate was made as to how many homes would have flooded. Additionally, it is believed that because most of these storms were less than the magnitude of a true 100-year storm they are merely an indicator of areas that will flood when future 100-year storms occur. Therefore an estimate was made of the number of homes which would flood in a 100-year storm. Generally these were based on the elevation of the buildings above the curb, the steepness of the terrain, and the ability of the area to drain. A subdivision where all of the homes are located at or below curb elevation will experience more flooding than a subdivision where all of the homes are one or two feet above the curb elevation. Since these are estimates they are given in round numbers, such as 10, 20, 50, or 100.

Suggested Solution

Because one of the objectives of this study is to provide a cost estimate to provide protection for these areas, it is necessary to suggest a solution to the problem. In other words, it is not possible to estimate the cost to solve the problem if one does not determine a way to solve that problem. Virtually all of the flooding problems have a difficult and costly solution. If this were not the case, they probably would have been resolved years ago. In many cases these areas have reported flooding for ten or more years. Problems often include the homes being too low and the street not being able to carry the water. A feasible solution in such an example would be to drain the area with inverted crown streets. While this would be costly, it is a solution that would work and therefore is frequently recommended. This solution would not require the demolition of any homes and the neighborhoods would remain relatively intact.

Cost Estimates

Since the purpose was to determine the cost of a remedy and to prioritize all of these projects, cost estimates were necessary. Cost estimates are approximate and are intended to be conservative. On the other hand they are uniform throughout the study so that the relative cost between projects is reasonable. Table 3 shows the estimated unit costs. All costs are in 1991 dollars.

UNIT COSTS

Table 3

Cost of overlay for 500' of local streets	\$20,000
Source - Street Transportation Overlay Program	
Cost of storm drain for 500' of local streets	\$50,000
Source - Design & Construction Management Division	
Cost of new street for 500' of street	\$50,000
Source-Improvement District Section	
Cost of 3' berm around single family dwellings	\$13,000
Cost of moving a building constructed on a slab	\$80,000
Cost of moving a frame single family dwelling on a foundation	\$25,000
Cost to elevate a single family dwelling	\$35,000
Floodwalls-3' high for single family dwelling	\$13,000
Floodwalls-5' high for single family dwelling	\$17,000
Automatic closures 3' wide	\$20,000

The source of the listed floodproofing methods above are the Floodproofing Manual produced by the Federal Emergency Management Agency (FEMA).

Locations of Known Flooding

The locations of known flooding were limited to locations that were actually reported. If the report was unclear as to whether or not water actually entered a particular dwelling the

investigator used his own judgement. The sources of locations of known flooding included, the Request For Service, reports from the old Grading & Drainage and Storm Drain Sections, reports from the Risk Management Division, and any other written reports which might have been available.

SECTION V

CONTRIBUTING FACTORS

One of the objectives of this study is to determine "lessons learned" concerning the development process. After many of the flooding incidents had been investigated it became clear that almost all could be attributed to one or more of nine typical contributing factors. This section discusses these contributing factors.

Constructed Prior to Development Standards

The development process in Phoenix has evolved much the same as it has evolved throughout the United States. Early development was completely unregulated. An individual could purchase land and subdivide it into any shapes and configurations the owner desired without regard to drainage, public improvements, etc. The areas that experienced flooding ranged from the earliest plats in the inner-city, which were subdivided in 1909, to the recent development of an office property at 44th Avenue and Bloomfield Road. In each case a copy of the plat was reproduced for the file.

The very early subdivision plats were not "approved" by anyone. The owner had a surveyor produce a drawing showing the streets and lots, and recorded it with the County. In the 1950's an approval process was developed by Maricopa County. In the 60's the planning process was evolving and more details and approvals were required. For the purpose of this study development prior to 1972 was considered as being prior to present development standards. The most serious problems from early development exists in the foothills of the Phoenix Mountains surrounding Sunnyslope. Small lots were created without regard to drainage, existing washes and channels. In the early days lots in the washes were sold and people developed on the "good" lots. However, during the last thirty years people have actually constructed homes in washes. Large areas of Sunnyslope have washes encroached upon so completely that the natural drainage system no longer exists.

Median Date

The median date of the development of all projects was 1955. That is to say, 59 of the 118 flooding locations are on land subdivided prior to 1955 and 59 are on land subdivided after 1955. Eleven were developed between 1972 & 1979 and 11 were developed in 1980's. If we use 1972 as the date that present development standards became effective, only 22 of the 118

incidents (19%) have occurred on land subdivided after present development standards were adopted.

Floors Too Low

When early settlers came to Arizona, they copied the type of construction that they were familiar with in the East. The homes were constructed three steps, approximately 24 inches, above the existing ground. A foundation was constructed of stone or concrete in order to elevate the structure this amount. This type of building can be seen throughout the inner-city neighborhoods in Phoenix. Unfortunately, sometime in the 1940's or 1950's builders decided that they could safely build on a concrete slab at the existing ground elevation, or elevated only one or two inches. This type of construction existed throughout the 1950's and 1960's. In the areas of Phoenix below the Arizona Canal on the north side, and the Highline Canal on the south side, homes were built very low in conjunction with lots being irrigated. Since the lots were irrigated they were below the street and the homes were elevated only enough to be above the irrigation. In many cases, these homes are below the curb elevation.

Grading & Drainage Manual

The City of Phoenix recognized this problem, and in 1972 published its first "Grading and Drainage Manual". This manual required buildings/homes to be built a minimum of 14" above the top of curb or lot outfall. Nearly all of Phoenix must depend upon its street system for drainage. When the street system cannot carry the water and overtops the curb it will flood homes which are built at or below curb elevation. In this report, when the flooded homes were less than 6" above the curb elevation they were reported as being constructed with floors too low. This was the single most common contributing factor with 97 of the projects out of the 118 having the floors too low as a contributing factor. If early builders had constructed the floor elevations 14" above the top of curb the incidents of flooding today would be almost non existent.

Streets Abandoned So That Drainage Was Cut-Off

Occasionally in the development process, developers feel they have a better way to develop a neighborhood and have abandoned streets which have already been dedicated. It was noted that occasionally the abandonment of these streets cuts off the drainage system such that the neighborhood upstream now floods because water has no where to drain. This problem was noted in five of the local flooding incidents.

Failure to Continue Existing Street Pattern

In the early days the streets within the City of Phoenix were laid out in a rectangular grid manner. This was due to the flat terrain, which made it possible. It is also the easiest way for a surveyor to subdivide land since it does not involve any complex computations. In 24 of the incidents it was noted that the subdivisions up-slope had a typical grid pattern with streets stubbed out on the downhill side. When new development came in later years, the developer elected to not connect these stubbed streets and produced some other type of pattern. In some cases the land would be used for commercial purposes and the developer did not want to have any streets through the project. In 24 incidents this is a contributing factor. Stormwater is required to travel through inadequate, meandering, channels or flow across slopes for considerable distances to seek an outlet, or simply flow into people's homes.

Failure to Allow Drainage Through New Projects

This category was established to identify that situation where a new project was constructed downstream and did not provide for the drainage from the existing subdivision. Unfortunately, on some occasions this category was used to identify projects which did not allow for drainage to flow through the project itself. Therefore this is not a completely reliable count of projects which had a project constructed

downstream obstructing the drainage. Thirty five out of the one hundred and twenty projects included this as a contributing factor. Most of these were the case of drainage being obstructed by a new project downstream. However, the figure is not completely reliable.

Streets Which Drain To The End Of A Cul De Sac

In 31 of the cases the subdivider created a cul-de-sac which drain to the end of the cul-de-sac. Drainage from the cul-de-sac, and in some cases from a large portion of the subdivision up-slope, was channeled into this cul-de-sac. In those cases where the developer provided an outlet at the end of the cul-de-sac it was generally inadequate. Many instances of 4' wide easements exist. Over the years almost all of these easement have been blocked by the homeowners with walls and other structures constructed in them. Unfortunately, what the developer did not consider was that water one and two feet deep flows down these cul-de-sacs and it has no outlet. These are rather expensive problems to solve since the only solution will be the removal of at least one of the homes at the end of the cul-de-sac. Similar problems are caused by "loop" type streets and curvilinear streets. For a period of time in the 1950's it was fashionable to have "curvy streets" within a subdivision. Unfortunately, this type of street system does not work well where it is flat and the street system must carry all of the

stormwater. In some cases, as soon the streets start to make these turns, water leaves the street and floods homes.

Major Storm Run-Off Exceeds Street Capacity

This is the third most common factor with 69 of the 188 projects exhibiting this characteristic. This is a problem that occurs with many of the other problems. Obviously, if the water stayed within the street, no flooding would occur. Within the City of Phoenix, which does not have any major drains, the streets must carry the run-off. Unfortunately, the developers and their engineers did not consider how much water would be entering the subdivision from outside of the subdivision. This water exceeds the curb height of the street and when the homes are built at or below curb height they are flooded.

Structures Constructed in Drainage Channels

25 of the 118 projects exhibited this problem. This primarily exists in the Sunnyslope area and the mountain areas. In these areas, which were subdivided in the 1930's and 1940's, property owners simply blocked up the natural channels. This type of problem is continuing in the Sunnyslope area and the Development Services and the Street Transportation Departments try to prevent people from constructing buildings in the channels. An example of the cost of correcting this problem is 10th Street Wash, which is a major drain in the Sunnyslope area.

The estimated cost to replace the natural channel system for the 10th Street Wash Basin is \$32 million. This is primarily due to the fact that there are several miles of channel which have been encroached upon. Most of this encroachment occurred well prior to 1970.

Structures Constructed in Ponding Areas

Since Phoenix has several major canals which flow parallel to the slope of the land, water flowing downslope will pond on the upstream side of the canal. All of these areas have been designated floodplains or Special Flood Hazard Areas (SFHA) by the National Flood Insurance Program (NFIP). Since none of the storms recorded in 1990 approached the "true" 100-year storm only a few cases were reported.

A similar problem included in this category is ponding along the freeway, and along railroads. In a true 100-year flood thousands of homes would be flooded along the canals. This is because water ponds to the elevation of the canal and depths range from a few inches in some locations to 10 or more feet along 44th to 55th Streets. In the June 22, 1972 Flood water ponded along the Arizona Canal from Scottsdale Road to Cave Creek Wash (23rd Avenue). It is estimated that over 300 homes and businesses were flooded (about 200 in the City of Phoenix). Water ponded along the Grand Canal from 44th Street to 15th Avenue. It is estimated that this flooded another 200 homes and

businesses. Flooded properties included the Arizona Biltmore Hotel and Brophy College Preparatory School. The Corps of Engineers estimated the cost of damages above the Arizona Canal at \$530,000 and above the Grand Canal at \$1,717,000 (1972 dollars). This was caused by a 2" rain falling on 90 square miles.

SECTION VI

OTHER NEEDS

The section following this will discuss possible funding sources. There are a number of other needs which are presently unfunded or funded through the General Fund which also could be funded by the sources described in Section VII. These other needs are discussed here because they are an important part of this same problem.

Storm Drain Operation and Maintenance

The Street Maintenance Division of the Street Transportation Department presently maintains the drainage systems with 1.5 million dollars appropriated from the General Fund every year. The Division also provides minor construction of channels and other protective measures as described in Section I of this report.

Maintenance of Other Drainage Facilities

At this time, the City of Phoenix spends very little money on maintenance of drainage facilities because of budgetary

constraints. What little maintenance is done on drainage facilities is done at the expense of maintaining the streets and storm drain system. By properly funding a Drainage Utility the City can provide proper maintenance on the many washes and drainage easements and channels located within the City limits.

The City has resisted assuming maintenance responsibility for channels, easements, and retention basins trying to place this task onto Homeowners' Associations. Unfortunately, the Homeowners Associations, in many cases, see the drainage facility as a regional issue. Examples of this are the Overland Hills subdivisions, west of 43rd Avenue on Scatter Wash. This is an outstanding job of landscaping provided by the developer. It also provides open spaces and a bike and/or equestrian trail. The residents have now appealed to their Council person to have the City take over the maintenance.

National Pollution Discharge Elimination System (NPDES)

This is another program recently mandated by Congress which puts an increased cost burden on the City of Phoenix. The City has already spent \$400,000 for the completion of Part I of the NPDES Permit Application. It plans to spend another \$600,000 in 1991-1992 to complete Part II of the NPDES Permit Application. This has been funded by the 1988 Storm Drain Bond Funds. An additional \$250,000 of initial cost is estimated to be required to implement the NPDES Program as required by the Federal

Government. Annual operation and maintenance costs of between \$800,000 and \$1,000,000 have been estimated. This annual cost of \$800,000 to \$1,000,000 will also have to come from the General Fund.

The National Flood Insurance Program

The National Flood Insurance Program was created by an act of Congress in 1968. The Federal Government will not allow any mortgages guaranteed by the Federal Government to be issued in a City which does not participate in the program. These mortgages include any loans which are associated with agencies insured by the Federal Government, which includes nearly all banks, savings and loan organizations, and other funding sources. The mortgage companies are required to review their portfolios at this time and ensure that flood insurance is provided on all of their mortgages that are located in floodplains as defined by the National Flood Insurance Program. The average annual premium is approximately \$273. As of February 20, 1990 there were 11,066 policies on mortgages in the City of Phoenix for a total annual premium of \$3,024,500. As the auditing by the mortgage companies progresses, it is estimated that this number will at least triple. All flood insurance premiums are transferred to Washington and can be considered a net debit to the local economy. Therefore, it is important that the City have correct floodplains and attempt to reduce the floodplains and the

requirement for flood insurance, since it can have a serious negative effect on the local economy. When a property is identified as being in a floodplain by the National Flood Insurance Program it immediately creates a reduced property value because of the burden of the flood insurance in addition to the known or perceived threat of flooding. At this time the City has no funded program to take corrective action on the existing floodplains.

The cost to the City to fund the Floodplain Management Section, Street Transportation Department is \$250,000 per year. This is the money needed to provide a minimal program of maintaining the maps and correspondence with the Federal Emergency Management Agency. The 2.5 person section also provides information on the floodplains to an average of 400 citizens each month. This \$250,000 is taken directly from the General Fund.

Peripheral Planning Areas C & D

The City has completed seven planning documents for Peripheral Planning Areas C & D. The total cost for the projects recommended by these studies is \$400,000,000. Future development in Peripheral Planning Areas C & D will be funded by impact fees which are paid by the development. Unfortunately, the major drainage facilities will have to be in place prior to the development. The City at this time, is trying to deal with

finding a means to fund these improvements prior to receipt of the impact fees. It is concluded that a revolving fund of at least \$20 million dollars will be required to proceed with drainage facilities in Peripheral Planning Areas C & D.

Other Floodplains

This report does not include funds to reduce flooding along several floodplains as defined by the National Flood Insurance Program (NFIP) which include the following:

Cave Creek Wash, Indian Bend Wash, Dreamy Draw Wash, Flynn Lane Wash, Echo Canyon Wash, Scatter Wash, Skunk Creek, Salt River.

These floodplains have not been included in this report in order to complete the report in a reasonable amount of time. No estimate has been put on the elimination of the existing floodplains, but a very rough estimate would be at least \$100,000,000.

Summary

In summary there are now total annual costs of nearly \$3 million dollars for Storm Water Management Programs which will have to come from the General Fund. Additionally, a substantial amount of money will be required to construct any new facilities and to provide a revolving fund for construction in Peripheral Planning Areas C & D.

SECTION VII

FUNDING SOURCES

This report establishes that over \$200,000,000 worth of drainage projects need to be constructed to alleviate known flooding incidents within the urbanized part of the City of Phoenix. Also, \$3,000,000 annually will have to be appropriated from the General Fund to fund maintenance and Federally Mandated Programs.

This section discusses possible funding mechanisms to implement the work described in this report and the other work described above. Possible funding mechanisms are: the General Fund, Drainage Improvement Districts, a Bond Program, a Drainage Utility, and/or completion by the Flood Control District.

The General Fund

While it is possible that projects could be funded from the General Fund, this is not very likely. The General Fund is now used in its entirety for other public needs and recently these have had to be reduced due to a leveling off of the amount of money available from the General Fund.

Drainage Improvement Districts

The mechanism exists for Improvement Districts to be formed to correct drainage problems. The advantage of this method would be that it does not tax the public as a whole but only those in the general location of the improvements. Unfortunately this is not a viable alternative because the areas to benefit from the various projects cannot be ascertained as clearly as they can in the manner of a street improvement. Particularly, when channel projects and retention projects are constructed, they may benefit many other residents besides those in the immediate vicinity. Therefore, Drainage Improvement Districts are not considered a viable alternative except in very localized special cases.

General Obligation Bonds

A possible source of funds would be for the City to sell bonds to finance the drainage projects. This has been the traditional way that the City has funded major street and storm drain projects. However the City has reached its bonding limitation and as a result of slow growth has had to stretch the recent 5-year plan out to 8 years. It can be expected that when these bonds are retired additional needs of the traditional nature such as storm drains, parks, fire stations, police stations, etc. will be needed for any bonding ability the City has. The last storm drain bond issue was for \$135,000,000. The

funds required here are perhaps twice times that amount. The City also went through a very difficult prioritization process to determine which of the many needs would be funded with the bond issue. Therefore a Bond Issue to accomplish these projects also is not a viable alternative.

Drainage Utility

In recent years many public agencies have formed Drainage Utilities. This is a public utility similar to the water utility, sewer utility, and waste collection. The public is assessed a monthly fee per resident based on some method of benefit. One method is a fee based on the amount of impervious area that a property has on it. These Drainage Utilities have become quite useful since they provide a large amount of money and provide a rational method of taxing the public for the storm water management system. Each property is taxed for only as much of the drainage problem that it is believed it creates through the construction of impervious areas. It is relatively easy to create since there are several consulting firms familiar with the process. They might provide the money for the consulting contract "up front" so that a Drainage Utility can be formed with no "up front" cost to the public agency. The consultant is then paid when the first revenues are received. The only detriment to this is that City of Phoenix residents are already taxed by the

Flood Control District of Maricopa County. Therefore a Drainage Utility would become a form of double taxation.

Flood Control District of Maricopa County

The Flood Control District of Maricopa County (FCDMC) was created in the 1959 at the urging of the City of Phoenix, the Salt River Project, and Maricopa County. The purpose was to create an agency large enough to be the local sponsor for the Corps of Engineer project which created the Arizona Canal Diversion Channel and the several dams associated with it. This project has been nearly completed at a cost of over four hundred million dollars (one half supplied by the Federal Government). The need for local sponsors with the Corps of Engineers has become unnecessary because recent laws passed by Congress make it very difficult for Federal funds to be used in flood control projects. The law now requires a substantial match from the local agencies. With the large overhead required by Federal projects, and the uncertainty of a project receiving funding over multiple years, future federally funded projects are unlikely.

As a result, the Flood Control District of Maricopa County has expanded into other areas. The City, with an area over four hundred square miles is now larger than many counties in the United States. Its residents are taxed more than \$24,000,000 annually by the Flood Control District of Maricopa County.

However, when the City requests the Flood Control District of Maricopa County to construct projects within the City, the District requires fifty percent matching funds from the City. Since the City already provides over fifty percent of the Flood Control District funds, it therefore must fund seventy five percent of any projects which the FCDMC constructs in the City. It also funds fifty percent of all projects outside the incorporated areas. Recently the District agreed to maintain eleven miles of roadside channels in Sun City. It is also constructing a channel to protect Litchfield Park. The City should enter into discussions with the District to seek out better funding arrangements.

SECTION VIII

RESULTS AND RECOMMENDATIONS

Table 4 shows the number of structures, estimated feasibility cost and estimated construction cost for each Council District. There are 6,154 structures estimated to be subject to flooding. The cost of engineering feasibility studies is \$5,235,000 and the total estimated construction cost to correct all of these problems is \$197,660,000. It is estimated that these are only 80% of the problems. There are some areas that did not receive heavy rains during this time frame and have not been reported.

TABLE 4

Total Costs Within 1992 Council Districts

District	Number Structures	Feasibility Cost	Construction Cost
1	1170	840,000	39,840,000
2	316	320,000	19,820,000
3	402	330,000	13,500,000
4	3274	1,550,000	86,090,000
5	440	1,580,000	13,950,000
6	80	100,000	2,800,000
7	255	220,000	7,260,000
8	217	295,000	14,400,000
TOTAL	6154	5,235,000	197,660,000

Conclusions

A number of conclusions can be drawn from this report.

1. Local flooding does occur within the City of Phoenix each time a rain storm at least 1 1/2 inches of depth falls in a part of the City in a short time period. This is separate from the potential flooding problems identified by the National Flood Insurance Program. There are approximately 15,000 structures in designated floodplains. We can assume

that at least an additional ten thousand structures within the City can expect flooding within the structure from local flooding.

2. The development standards which have been created over the last twenty years have been significantly effective in reducing the incidents of local flooding.
3. Some development standards still need to be examined and looked at more carefully. They are:
 - a. Allowing construction in drainageways and easements.
 - b. Allowing large developments downstream from existing developments to attempt to route the off-site water around the project rather than providing proper channels and easements through the project.
 - c. Streets, alleys, and easements should not be abandoned without a report prepared by a Professional Engineer certifying that storm water does not flow down it.
 - d. Not enough attention is paid to the off-site water which will flow into a project from the watershed upstream.
4. Staff and the public are not aware of the magnitude of the local flooding problem. Additionally, staff and the public do not understand the nature of the flooding problem. Flooding usually is not caused by the storm drain system, new projects, improvement districts, pumps that don't work, etc.

5. The City needs to investigate a different funding arrangement with the Flood Control District.
6. Very little has been done by the City to alleviate local flooding.. The only projects which have been implemented are the series of detention basins in the mountains which were completed in the 1970's, the Arizona Canal Diversion Channel (ACDC) project, and the detention basins and channels located in the Upper East Fork of Cave Creek Wash. The last two should not count as local flooding since they were associated with large known floodplains.
7. A new funding source needs to be located to provide mitigation measures for the flooding problem. Funds are also required to study more accurately the existing floodplains and administer the Floodplain Management Program properly.

Recommendations

1. The City should enter into discussions with the Flood Control District of Maricopa County concerning funding City projects without matching funds.
2. The City should move forward with the creation of a Drainage Utility. The City should take \$50,000 of the 1988 Bond money to retain a consultant and start the process to create a Drainage Utility.

3. A committee should be formed to prioritize the projects listed in this report. The committee should include representatives of the Mayor and Council, Street Maintenance Division, Design and Construction Management Division, the Development Services Department, and the general public. It should be chaired by the Floodplain Management Section.
4. The City should begin training of staff concerning the causes of flooding and the proper comments to be made to members of the public when they are investigating flooding incidents.
5. The City should begin a Public Awareness Program so that people are aware of the nature of local flooding within the City limits. The City should use \$50,000 of the 1988 Storm Drain Bond funds and provide a manual for the design of floodwalls which residents could erect to protect their own residence.
6. The results of this report should be adopted by the Mayor and Council and this summary made public.
7. The City should fund a feasibility study for a typical problem to look at the inverted crown street solution in detail, and if supported by the study, construct one as a test case.

APPENDIX B

LIST OF PROJECTS IN ALPHABETICAL ORDER
(LFRPT1)

PROJECT NAME	SUBDIVIDED BY	DATE SUBDIVIDED	PROJECT NUMBER	CONSTRUCTION COST	FEASIBILITY COST	NUM. STRUCT.	COST/STRUCT.
1ST AVENUE AND GLENDALE AVENUE	CITY	02/19/80	22/27-1	2000000	25000	50	40000
1ST AVENUE AND HATCHER ROAD	COUNTY	01/20/47	27/27-1	100000	25000	10	10000
2ND STREET AND LEXINGTON AVENUE	COUNTY	03/14/46	15/28-1	300000	10000	5	60000
3RD AVENUE AND CLAREMONT AVENUE	COUNTY	03/10/55	21/27-1	1500000	25000	50	30000
3RD AVENUE AND ROYAL PALM ROAD	COUNTY	07/12/51	25/27-1	2000000	25000	100	20000
3RD AVENUE WEST OF MYRTLE AVENUE	COUNTY	01/23/57	23/27-1	400000	25000	20	20000
3RD PLACE AND ILLINI STREET	COUNTY	01/01/50	5/28-1	2000000	100000	20	100000
3RD STREET AND ALICE AVENUE	COUNTY	01/04/11	26/28-1	4000000	50000	50	80000
3RD STREET AND DESERT DRIVE	CITY	10/26/71	02/28-2	3000000	50000	30	100000
3RD STREET AND SOUTH MOUNTAIN AVENUE	CITY	09/14/71	01/28-1	5000000	50000	5	1000000
4TH AVENUE AND MULBERRY DRIVE	CITY	10/29/53	15/27-1	1000000	25000	32	31250
4TH STREET AND UNION HILLS DRIVE	COUNTY	01/22/72	38/28-1	1000000	50000	100	10000
5TH AVENUE AND FRIER DRIVE	COUNTY	05/27/52	24/27-1	200000	20000	20	10000
5TH AVENUE AND MISSION LANE	COUNTY	04/11/50	27/27-2	300000	25000	10	30000
7TH AVENUE AND CINNABAR AVENUE	COUNTY	12/06/46	28/26-1	2000000	50000	100	20000
7TH AVENUE AND EVANS DRIVE	CITY	04/03/79	33/25-1	500000	15000	0	*****
7TH AVENUE AND GEORGIA AVENUE	COUNTY	09/25/28	19/27-1	6000000	100000	200	30000
7TH AVENUE AND PALOVERDE DRIVE	COUNTY	09/17/47	20/27-1	6000000	100000	200	30000
7TH AVENUE NORTH OF HEATHERBRAE	COUNTY	12/05/28	17/26-1	1000000	25000	20	50000
7TH STREET AND BASELINE ROAD	COUNTY	01/01/50	1/29-1	300000	10000	10	30000
7TH STREET AND MARLETTE AVENUE	COUNTY	08/12/11	21/29-1	1500000	25000	50	30000
7TH STREET AND SIESTA DRIVE	COUNTY	08/03/59	02/28-1	3000000	50000	100	30000
10TH AVENUE AND MCLELLAN BLVD.	COUNTY	12/04/51	22/26-1	200000	10000	10	20000
10TH PLACE AND BETHANY HOME ROAD	COUNTY	05/11/50	20/29-1	1500000	25000	50	30000
10TH STREET AND GRISWOLD ROAD	COUNTY	05/19/54	25/29-1	1500000	20000	150	10000
10TH STREET AND MOUNTAIN VIEW	COUNTY	04/22/38	28/29-1	2000000	50000	50	40000
11TH AVENUE AND HATCHER ROAD	COUNTY	12/29/42	27/26-1	2000000	50000	20	100000
11TH AVENUE AND SAN MIGUEL AVENUE	COUNTY	09/05/50	20/26-1	6000000	100000	200	30000
11TH STREET AND DUNLAP AVENUE	COUNTY	01/29/44	27/29-1	6000000	10000	400	15000
11TH STREET AND TOWNLEY AVENUE	COUNTY	01/31/47	26/29-1	2000000	20000	500	4000
12TH STREET AND COUNTRY GABLES DRIVE	CITY	01/05/82	34/29-1	100000	10000	4	25000
13TH AVENUE AND BECKER LANE	COUNTY	01/01/55	29/26-1	200000	10000	10	20000
13TH AVENUE AND ELM STREET	COUNTY	01/12/55	18/26-1	260000	25000	2	130000
13TH PLACE AND MEADOWBROOK	COUNTY	07/29/29	18/30-1	300000	25000	20	15000
13TH PLACE NORTH OF GRAND CANAL	COUNTY	04/22/14	17/30-1	1000000	25000	50	20000
13TH STREET AND LAWRENCE LANE	COUNTY	10/18/61	26/30-1	2000000	20000	20	100000
14TH PLACE AND BETHANY HOME ROAD	COUNTY	09/21/50	20/30-1	2000000	50000	50	40000
14TH STREET AND BROWN STREET	COUNTY	01/01/46	28/30-1	4000000	50000	50	80000
14TH STREET AND CHOLLA STREET	COUNTY	11/05/20	29/30-1	3000000	40000	50	60000
14TH STREET AND GARFIELD STREET	CITY	02/18/09	11/30-1	500000	10000	2	250000
15TH AVENUE AND DESERT COVE	COUNTY	05/29/45	29/25-1	500000	25000	10	50000
15TH AVENUE AND TOWNLEY AVENUE	CITY	11/26/63	26/26-1	2000000	25000	100	20000
15TH AVENUE AND WINDROSE DRIVE	COUNTY	06/22/59	31/25-1	300000	25000	10	30000

APPENDIX B

LIST OF PROJECTS IN ALPHABETICAL ORDER
(LFRPT1)

PROJECT NAME	SUBDIVIDED BY	DATE SUBDIVIDED	PROJECT NUMBER	CONSTRUCTION COST	FEASIBILITY COST	NUM. STRUCT.	COST/STRUCT.
15TH AVENUE NORTH OF BELL ROAD	COUNTY	03/21/60	37/25-1	200000	50000	50	40000
15TH STREET AND OREGON AVENUE	COUNTY	01/26/53	19/30-1	50000	25000	10	50000
15TH STREET AND SUNNYSLOPE LANE	COUNTY	01/01/45	27/30-1	400000	50000	50	80000
16TH AVENUE AND DANBURY ROAD	CITY	01/01/84	37/25-2	50000	25000	10	50000
16TH AVENUE AND EL CAMINITO DRIVE	COUNTY	11/15/55	25/25-1	200000	25000	100	20000
16TH AVENUE AND TAYLOR STREET	CITY	03/04/11	11/25-1	100000	15000	0	*****
16TH PLACE AND SELDON LANE	CITY	12/12/78	26/31-1	100000	15000	2	50000
16TH STREET AND CAMPO BELLO DRIVE	COUNTY	03/23/70	37/30-1	300000	50000	20	15000
16TH STREET AND HATCHER DRIVE	COUNTY	10/19/55	27/31-1	200000	50000	20	100000
16TH STREET AND MYRTLE AVENUE	CITY	04/23/80	23/31-1	300000	50000	50	60000
16TH STREET AND SANDRA TERRACE	COUNTY	02/27/53	36/30-1	300000	25000	4	75000
17TH AVENUE AND ACDC	COUNTY	10/15/47	27/25-1	100000	25000	10	100000
17TH AVENUE AND BETHANY HOME ROAD	COUNTY	12/18/50	21/25-1	600000	100000	200	30000
17TH AVENUE AND ORANGWOOD AVENUE	COUNTY	12/02/54	23/25-2	200000	50000	50	40000
17TH STREET AND CHAMBERS STREET	COUNTY	08/07/58	3/31-1	60000	25000	50	12000
18TH AVENUE AND MORTON AVENUE	COUNTY	06/27/54	24/25-1	300000	50000	100	30000
19TH AVENUE AND GLENDALE AVENUE	COUNTY	01/01/54	23/25-1	210000	15000	7	30000
20TH AVENUE AND ROMA AVENUE	COUNTY	02/18/55	17/24-1	100000	50000	20	50000
22ND AVENUE AND LOUISE DRIVE	CITY	01/01/85	43/24-1	100000	25000	5	20000
22ND DRIVE SOUTH OF DEVONSHIRE	COUNTY	01/01/54	17/24-2	120000	15000	6	20000
23RD AVENUE AND NORTHERN AVENUE	COUNTY	07/09/28	24/24-1	200000	25000	100	20000
23RD AVENUE AND ROSE GARDEN LANE	COUNTY	03/11/53	42/23-1	100000	20000	50	20000
23RD DRIVE AND GLENDALE AVENUE	COUNTY	01/23/46	22/23-1	200000	25000	100	20000
24TH AVENUE AND CAMELBACK ROAD	CITY	01/01/69	19/23-1	200000	50000	20	100000
24TH AVENUE AND LOUISE DRIVE	COUNTY	01/01/65	43/23-1	400000	50000	32	125000
24TH DRIVE AND VILLAGE DRIVE	COUNTY	09/29/58	37/23-1	200000	50000	10	200000
24TH PLACE AND SQUAW PEAK DRIVE	CITY	10/13/65	22/33-1	1	0	0	*****
26TH AVENUE AND VERDE LANE	COUNTY	01/23/50	15/23-1	200000	25000	100	20000
26TH STREET AND SHEA BOULEVARD	CITY	06/22/71	29/33-1	50000	25000	10	50000
27TH LANE AND WILLETA STREET	CITY	04/11/75	12/22-1	20000	10000	4	50000
28TH DRIVE AND GLENDALE AVENUE	COUNTY	11/09/23	22/22-1	200000	25000	20	100000
28TH STREET AND VOLTAIRE AVENUE	COUNTY	04/08/53	32/33-1	100000	10000	4	25000
29TH AVENUE AND BETHANY HOME ROAD	COUNTY	01/22/51	21/22-1	250000	25000	100	25000
20TH AVENUE AND GEORGIA AVENUE	COUNTY	05/29/50	19/24-1	300000	100000	100	30000
31ST AVENUE AND LINCOLN STREET	COUNTY	03/23/28	9/21-1	40000	15000	20	20000
33RD AVENUE AND CACTUS ROAD	COUNTY	01/25/60	31/21-1	100000	25000	50	20000
34TH AVENUE AND BETHANY HOME ROAD	COUNTY	04/22/53	20/21-1	300000	50000	100	30000
35TH AVENUE AND BETHANY HOME ROAD	COUNTY	01/12/55	20/20-1	300000	50000	100	30000
35TH AVENUE AND MISSOURI AVENUE	CITY	01/01/73	19/21-1	300000	50000	100	30000
36TH AVENUE AND VAN BUREN STREET	COUNTY	09/09/43	11/20-1	150000	25000	100	15000
36TH STREET AND BELL ROAD	COUNTY	01/30/47	36/35-1	150000	50000	50	30000
37TH AVENUE AND ROOSEVELT STREET	COUNTY	02/21/45	12/20-1	50000	20000	40	12500
37TH AVENUE AND TOPEKA DRIVE	COUNTY	03/24/65	39/20-1	200000	50000	50	40000

APPENDIX B

LIST OF PROJECTS IN ALPHABETICAL ORDER
(LFRPT1)

PROJECT NAME	SUBDIVIDED DATE BY	SUBDIVIDED	PROJECT CONSTRUCTION NUMBER	FEASIBILITY COST	NUM. COST STRUCT.	COST/ STRUCT.
37TH AVENUE AND WILSHIRE DRIVE	CITY	07/03/79	14/20-1	600000	25000	20 30000
37TH DRIVE AND BUCKEYE ROAD	CITY	01/01/85	9/20-1	60000	10000	1 60000
38TH AVENUE AND GRISWOLD ROAD	CITY	03/28/67	25/20-1	2000000	25000	100 20000
39TH AVENUE AND ALICE AVENUE	CITY	11/28/61	26/20-1	2000000	50000	100 20000
39TH AVENUE AND MOHAWK LANE	COUNTY	04/13/70	41/20-1	1000000	20000	50 20000
39TH AVENUE AND PEORIA AVENUE	CITY	08/01/72	28/19-1	1000000	25000	50 20000
39TH AVENUE AND POINSETTIA DRIVE	CITY	04/07/70	30/20-1	3000000	50000	50 60000
39TH DRIVE AND LOMA LANE	CITY	03/19/59	25/19-1	200000	25000	20 10000
40TH AVENUE AND TOWNLEY AVENUE	CITY	06/06/61	26/19-1	2000000	25000	100 20000
40TH DRIVE AND RUE DE LAMOUR	CITY	05/03/78	32/19-1	1000000	50000	50 20000
40TH STREET AND PINNACLE PEAK ROAD	COUNTY	01/01/85	44/36-1	13000000	25000	50 260000
41ST STREET AND ROBERT E. LEE STREET	COUNTY	06/19/57	38/37-1	120000	10000	6 20000
42ND AVENUE AND CHRISTY DRIVE	CITY	08/02/77	29/19-1	3000000	50000	100 30000
42ND AVENUE AND NORTHERN AVENUE	CITY	03/09/62	24/19-1	2000000	50000	100 20000
42ND DRIVE AND EL CAMINO	COUNTY	05/10/66	25/19-2	40000	10000	5 8000
42ND PLACE AND GROVERS AVENUE	COUNTY	02/03/54	38/37-2	1000000	25000	50 20000
43RD AVE AND SAGUARO PARK LANE	COUNTY	01/01/80	46/18-1	300000	15000	8 37500
43RD AVENUE AND BEHREND DRIVE	COUNTY	01/01/55	40/19-1	5000000	50000	10 500000
43RD AVENUE AND BURGESS LANE	COUNTY	03/15/71	2/19-1	3500000	75000	50 70000
44TH AVENUE AND BLOOMFIELD ROAD	CITY	01/18/89	31/18-1	1000000	25000	20 50000
47TH AVENUE AND GREENWAY	COUNTY	06/07/68	34/17-1	1000000	50000	20 50000
47TH LANE AND INDIAN SCHOOL ROAD	COUNTY	10/25/56	16/17-1	400000	25000	20 20000
49TH AVE AND HAPPY VALLEY ROAD	COUNTY	04/03/73	46/17-1	500000	15000	10 50000
49TH AVE AND TIERRA BUENA LANE	COUNTY	12/16/68	35/17-1	2000000	50000	50 40000
49TH AVENUE AND CONTINENTAL DRIVE	COUNTY	08/08/77	37/17-1	300000	10000	10 30000
49TH AVENUE AND PARADISE DRIVE	CITY	07/05/72	30/17-1	2000000	25000	50 40000
49TH AVENUE AND THUNDERBIRD	CITY	07/19/83	33/17-1	200000	15000	10 20000
55TH AVENUE AND PINNACLE PEAK RD	COUNTY	10/29/79	45/16-1	2000000	15000	50 40000
58TH AVENUE AND INDIAN SCHOOL ROAD	COUNTY	12/07/59	16/15-1	400000	25000	20 20000
58TH STREET AND EVERETT DRIVE	CITY	11/15/86	34/41-1	100000	25000	10 10000
59TH STREET AND CACTUS ROAD	COUNTY	09/19/57	30/41-1	300000	10000	10 30000
70TH AVENUE AND CAMBRIDGE AVENUE	CITY	03/03/79	14/12-1	50000	5000	0 *****
CENTRAL AVENUE AND ROYAL PALM ROAD	COUNTY	08/18/64	25/28-1	100000	10000	10 10000
*** Total ***				199660001	4835000	6174 *****

APPENDIX C

LIST OF PROJECTS BY PROJECT NUMBER
(LFRPT9)

PROJECT NUMBER	PROJECT NAME	DATE SUBDIV	SUBDIV BY	ESTIMATED CONSTRUCTION COST	PRELIMINARY ENGINEERING COST	NUM. OF STR	COST PER STRU
1/29-1	7TH STREET AND BASELINE ROAD	01/01/50	COUNTY	300000	10000	10	30000
2/19-1	43RD AVENUE AND BURGESS LANE	03/15/71	COUNTY	3500000	75000	50	70000
3/31-1	17TH STREET AND CHAMBERS STREET	08/07/58	COUNTY	600000	25000	50	12000
5/28-1	3RD PLACE AND ILLINI STREET	01/01/50	COUNTY	2000000	100000	20	100000
9/20-1	37TH DRIVE AND BUCKEYE ROAD	01/01/85	CITY	60000	10000	1	60000
9/21-1	31ST AVENUE AND LINCOLN STREET	03/23/28	COUNTY	400000	15000	20	20000
01/28-1	3RD STREET AND SOUTH MOUNTAIN AVENUE	09/14/71	CITY	5000000	50000	5	1000000
02/28-1	7TH STREET AND SIESTA DRIVE	08/03/59	COUNTY	3000000	50000	100	30000
02/28-2	3RD STREET AND DESERT DRIVE	10/26/71	CITY	3000000	50000	30	100000
11/20-1	36TH AVENUE AND VAN BUREN STREET	09/09/43	COUNTY	1500000	25000	100	15000
11/25-1	16TH AVENUE AND TAYLOR STREET	03/04/11	CITY	100000	15000	0	*****
11/30-1	14TH STREET AND GARFIELD STREET	02/18/09	CITY	500000	10000	2	250000
12/20-1	37TH AVENUE AND ROOSEVELT STREET	02/21/45	COUNTY	500000	20000	40	12500
12/22-1	27TH LANE AND WILLETA STREET	04/11/75	CITY	200000	10000	4	50000
14/12-1	70TH AVENUE AND CAMBRIDGE AVENUE	03/03/79	CITY	50000	5000	0	*****
14/20-1	37TH AVENUE AND WILSHIRE DRIVE	07/03/79	CITY	600000	25000	20	30000
15/23-1	26TH AVENUE AND VERDE LANE	01/23/50	COUNTY	2000000	25000	100	20000
15/27-1	4TH AVENUE AND MULBERRY DRIVE	10/29/53	CITY	1000000	25000	32	31250
15/28-1	2ND STREET AND LEXINGTON AVENUE	03/14/46	COUNTY	300000	10000	5	60000
16/15-1	58TH AVENUE AND INDIAN SCHOOL ROAD	12/07/59	COUNTY	400000	25000	20	20000
16/17-1	47TH LANE AND INDIAN SCHOOL ROAD	10/25/56	COUNTY	400000	25000	20	20000
17/24-1	20TH AVENUE AND ROMA AVENUE	02/18/55	COUNTY	1000000	50000	20	50000
17/24-2	22ND DRIVE SOUTH OF DEVONSHIRE	01/01/54	COUNTY	120000	15000	6	20000
17/26-1	7TH AVENUE NORTH OF HEATHERBRAE	12/05/28	COUNTY	1000000	25000	20	50000
17/30-1	13TH PLACE NORTH OF GRAND CANAL	04/22/14	COUNTY	1000000	25000	50	20000
18/26-1	13TH AVENUE AND ELM STREET	01/12/55	COUNTY	260000	25000	2	130000
18/30-1	13TH PLACE AND MEADOWBROOK	07/29/29	COUNTY	300000	25000	20	15000
19/21-1	35TH AVENUE AND MISSOURI AVENUE	01/01/73	CITY	3000000	50000	100	30000
19/23-1	24TH AVENUE AND CAMELBACK ROAD	01/01/69	CITY	2000000	50000	20	100000
19/24-1	20TH AVENUE AND GEORGIA AVENUE	05/29/50	COUNTY	3000000	100000	100	30000
19/27-1	7TH AVENUE AND GEORGIA AVENUE	09/25/28	COUNTY	6000000	100000	200	30000
19/30-1	15TH STREET AND OREGON AVENUE	01/26/53	COUNTY	500000	25000	10	50000
20/20-1	35TH AVENUE AND BETHANY HOME ROAD	01/12/55	COUNTY	3000000	500000	100	30000
20/21-1	34TH AVENUE AND BETHANY HOME ROAD	04/22/53	COUNTY	3000000	500000	100	30000
20/26-1	11TH AVENUE AND SAN MIGUEL AVENUE	09/05/50	COUNTY	6000000	100000	200	30000
20/27-1	7TH AVENUE AND PALOVERDE DRIVE	09/17/47	COUNTY	6000000	100000	200	30000
20/29-1	10TH PLACE AND BETHANY HOME ROAD	05/11/50	COUNTY	1500000	25000	50	30000
20/30-1	14TH PLACE AND BETHANY HOME ROAD	09/21/50	COUNTY	2000000	50000	50	40000
21/22-1	29TH AVENUE AND BETHANY HOME ROAD	01/22/51	COUNTY	2500000	25000	100	25000
21/25-1	17TH AVENUE AND BETHANY HOME ROAD	12/18/50	COUNTY	6000000	100000	200	30000
21/27-1	3RD AVENUE AND CLAREMONT AVENUE	03/10/55	COUNTY	1500000	25000	50	30000
21/29-1	7TH STREET AND MARLETTE AVENUE	08/12/11	COUNTY	1500000	25000	50	30000

APPENDIX C

LIST OF PROJECTS BY PROJECT NUMBER
(LFRPT9)

PROJECT NUMBER	PROJECT NAME	DATE SUBDIV	SUBDIV BY	ESTIMATED CONSTRUCTION COST	PRELIMINARY ENGINEERING COST	NUM. OF STR	COST PER STRU
22/22-1	28TH DRIVE AND GLENDALE AVENUE	11/09/23	COUNTY	2000000	25000	20	100000
22/23-1	23RD DRIVE AND GLENDALE AVENUE	01/23/46	COUNTY	2000000	25000	100	20000
22/26-1	10TH AVENUE AND MCLELLAN BLVD.	12/04/51	COUNTY	200000	10000	10	20000
22/27-1	1ST AVENUE AND GLENDALE AVENUE	02/19/80	CITY	2000000	25000	50	40000
22/33-1	24TH PLACE AND SQUAW PEAK DRIVE	10/13/65	CITY	1	0	0	*****
23/25-1	19TH AVENUE AND GLENDALE AVENUE	01/01/54	COUNTY	210000	15000	7	30000
23/25-2	17TH AVENUE AND ORANGEWOOD AVENUE	12/02/54	COUNTY	2000000	50000	50	40000
23/27-1	3RD AVENUE WEST OF MYRTLE AVENUE	01/23/57	COUNTY	400000	25000	20	20000
23/31-1	16TH STREET AND MYRTLE AVENUE	04/23/80	CITY	3000000	50000	50	60000
24/19-1	42ND AVENUE AND NORTHERN AVENUE	03/09/62	CITY	2000000	50000	100	20000
24/24-1	23RD AVENUE AND NORTHERN AVENUE	07/09/28	COUNTY	2000000	25000	100	20000
24/25-1	18TH AVENUE AND MORTON AVENUE	06/27/54	COUNTY	3000000	50000	100	30000
24/27-1	5TH AVENUE AND FRIER DRIVE	05/27/52	COUNTY	200000	20000	20	10000
25/19-1	39TH DRIVE AND LOMA LANE	03/19/59	CITY	200000	25000	20	10000
25/19-2	42ND DRIVE AND EL CAMINO	05/10/66	COUNTY	40000	10000	5	8000
25/20-1	38TH AVENUE AND GRISWOLD ROAD	03/28/67	CITY	2000000	25000	100	20000
25/25-1	16TH AVENUE AND EL CAMINITO DRIVE	11/15/55	COUNTY	2000000	25000	100	20000
25/27-1	3RD AVENUE AND ROYAL PALM ROAD	07/12/51	COUNTY	2000000	25000	100	20000
25/28-1	CENTRAL AVENUE AND ROYAL PALM ROAD	08/18/64	COUNTY	100000	10000	10	10000
25/29-1	10TH STREET AND GRISWOLD ROAD	05/19/54	COUNTY	1500000	20000	150	10000
26/19-1	40TH AVENUE AND TOWNLEY AVENUE	06/06/61	CITY	2000000	25000	100	20000
26/20-1	39TH AVENUE AND ALICE AVENUE	11/28/61	CITY	2000000	50000	100	20000
26/26-1	15TH AVENUE AND TOWNLEY AVENUE	11/26/63	CITY	2000000	25000	100	20000
26/28-1	3RD STREET AND ALICE AVENUE	01/04/11	COUNTY	4000000	50000	50	80000
26/29-1	11TH STREET AND TOWNLEY AVENUE	01/31/47	COUNTY	2000000	20000	500	4000
26/30-1	13TH STREET AND LAWRENCE LANE	10/18/61	COUNTY	2000000	20000	20	100000
26/31-1	16TH PLACE AND SELDON LANE	12/12/78	CITY	100000	15000	2	50000
27/25-1	17TH AVENUE AND ACDC	10/15/47	COUNTY	1000000	25000	10	100000
27/26-1	11TH AVENUE AND HATCHER ROAD	12/29/42	COUNTY	2000000	50000	20	100000
27/27-1	1ST AVENUE AND HATCHER ROAD	01/20/47	COUNTY	100000	25000	10	10000
27/27-2	5TH AVENUE AND MISSION LANE	04/11/50	COUNTY	300000	25000	10	30000
27/29-1	11TH STREET AND DUNLAP AVENUE	01/29/44	COUNTY	6000000	10000	400	15000
27/30-1	15TH STREET AND SUNNYSLOPE LANE	01/01/45	COUNTY	4000000	50000	50	80000
27/31-1	16TH STREET AND HATCHER DRIVE	10/19/55	COUNTY	2000000	50000	20	100000
28/19-1	39TH AVENUE AND PEORIA AVENUE	08/01/72	CITY	1000000	25000	50	20000
28/26-1	7TH AVENUE AND CINNABAR AVENUE	12/06/46	COUNTY	2000000	50000	100	20000
28/29-1	10TH STREET AND MOUNTAIN VIEW	04/22/38	COUNTY	2000000	50000	50	40000
28/30-1	14TH STREET AND BROWN STREET	01/01/46	COUNTY	4000000	50000	50	80000
29/19-1	42ND AVENUE AND CHRISTY DRIVE	08/02/77	CITY	3000000	50000	100	30000
29/25-1	15TH AVENUE AND DESERT COVE	05/29/45	COUNTY	500000	25000	10	50000
29/26-1	13TH AVENUE AND BECKER LANE	01/01/55	COUNTY	200000	10000	10	20000
29/30-1	14TH STREET AND CHOLLA STREET	11/05/20	COUNTY	3000000	40000	50	60000

APPENDIX C

LIST OF PROJECTS BY PROJECT NUMBER
(LFRPT9)

PROJECT NUMBER	PROJECT NAME	DATE SUBDIV	SUBDIV BY	ESTIMATED CONSTRUCTION COST	PRELIMINARY ENGINEERING COST	NUM. OF STR	COST PER STRU
29/33-1	26TH STREET AND SHEA BOULEVARD	06/22/71	CITY	500000	25000	10	50000
30/17-1	49TH AVENUE AND PARADISE DRIVE	07/05/72	CITY	2000000	25000	50	40000
30/20-1	39TH AVENUE AND POINSETTIA DRIVE	04/07/70	CITY	3000000	50000	50	60000
30/41-1	59TH STREET AND CACTUS ROAD	09/19/57	COUNTY	300000	10000	10	30000
31/18-1	44TH AVENUE AND BLOOMFIELD ROAD	01/18/89	CITY	1000000	25000	20	50000
31/21-1	33RD AVENUE AND CACTUS ROAD	01/25/60	COUNTY	1000000	25000	50	20000
31/25-1	15TH AVENUE AND WINDROSE DRIVE	06/22/59	COUNTY	300000	25000	10	30000
32/19-1	40TH DRIVE AND RUE DE LAMOUR	05/03/78	CITY	1000000	50000	50	20000
32/33-1	28TH STREET AND VOLTAIRE AVENUE	04/08/53	COUNTY	100000	10000	4	25000
33/17-1	49TH AVENUE AND THUNDERBIRD	07/19/83	CITY	200000	15000	10	20000
33/25-1	7TH AVENUE AND EVANS DRIVE	04/03/79	CITY	500000	15000	0	*****
34/17-1	47TH AVENUE AND GREENWAY	06/07/68	COUNTY	1000000	50000	20	50000
34/29-1	12TH STREET AND COUNTRY GABLES DRIVE	01/05/82	CITY	100000	10000	4	25000
34/41-1	58TH STREET AND EVERETT DRIVE	11/15/86	CITY	100000	25000	10	10000
35/17-1	49TH AVE AND TIERRA BUENA LANE	12/16/68	COUNTY	2000000	50000	50	40000
36/30-1	16TH STREET AND SANDRA TERRACE	02/27/53	COUNTY	300000	25000	4	75000
36/35-1	36TH STREET AND BELL ROAD	01/30/47	COUNTY	1500000	50000	50	30000
37/17-1	49TH AVENUE AND CONTINENTAL DRIVE	08/08/77	COUNTY	300000	10000	10	30000
37/23-1	24TH DRIVE AND VILLAGE DRIVE	09/29/58	COUNTY	2000000	50000	10	200000
37/25-1	15TH AVENUE NORTH OF BELL ROAD	03/21/60	COUNTY	2000000	50000	50	40000
37/25-2	16TH AVENUE AND DANBURY ROAD	01/01/84	CITY	500000	25000	10	50000
37/30-1	16TH STREET AND CAMPO BELLO DRIVE	03/23/70	COUNTY	300000	50000	20	15000
38/28-1	4TH STREET AND UNION HILLS DRIVE	01/22/72	COUNTY	1000000	50000	100	10000
38/37-1	41ST STREET AND ROBERT E. LEE STREET	06/19/57	COUNTY	120000	10000	6	20000
38/37-2	42ND PLACE AND GROVERS AVENUE	02/03/54	COUNTY	1000000	25000	50	20000
39/20-1	37TH AVENUE AND TOPEKA DRIVE	03/24/65	COUNTY	2000000	50000	50	40000
40/19-1	43RD AVENUE AND BEHREND DRIVE	01/01/55	COUNTY	5000000	50000	10	500000
41/20-1	39TH AVENUE AND MOHAWK LANE	04/13/70	COUNTY	1000000	20000	50	20000
42/23-1	23RD AVENUE AND ROSE GARDEN LANE	03/11/53	COUNTY	1000000	20000	50	20000
43/23-1	24TH AVENUE AND LOUISE DRIVE	01/01/65	COUNTY	4000000	50000	32	125000
43/24-1	22ND AVENUE AND LOUISE DRIVE	01/01/85	CITY	100000	25000	5	20000
44/36-1	40TH STREET AND PINNACLE PEAK ROAD	01/01/85	COUNTY	13000000	25000	50	260000
45/16-1	55TH AVENUE AND PINNACLE PEAK RD	10/29/79	COUNTY	2000000	15000	50	40000
46/17-1	49TH AVE AND HAPPY VALLEY ROAD	04/03/73	COUNTY	500000	15000	10	50000
46/18-1	43RD AVE AND SAGUARO PARK LANE	01/01/80	COUNTY	300000	15000	8	37500
*** Total ***				199660001	4835000	6174	*****

THE
LOCAL FLOODING MITIGATION PROGRAM
A REPORT ON LOCAL FLOODING ISSUES

VOLUME II OF II - LOCATION MAPS AND PROJECT SUMMARIES

PREPARED

by

THE FLOODPLAIN MANAGEMENT SECTION

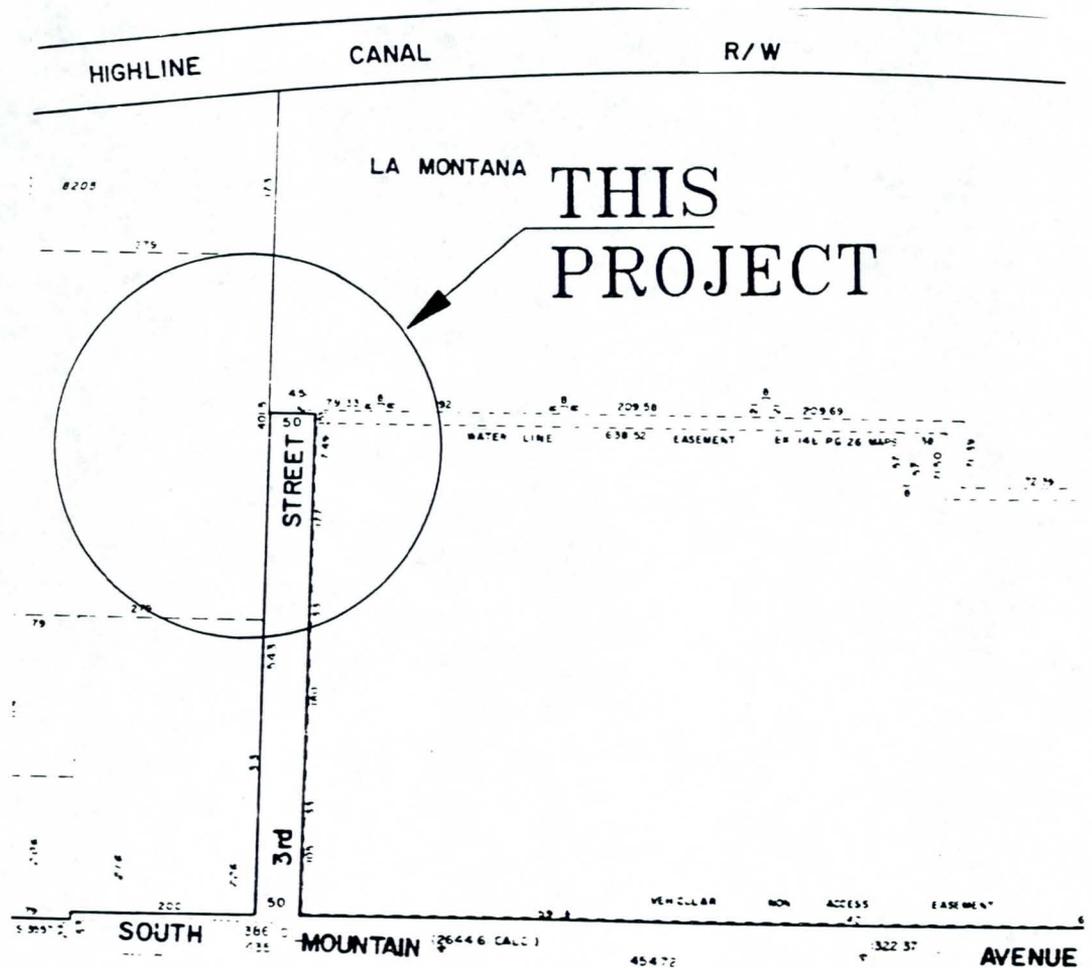
OF THE

STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX
125 EAST WASHINGTON STREET
PHOENIX, ARIZONA 85004

MARCH, 1992

910601R

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: LA MONTANA DEL SUR
 MOBILE HOME PARK (CITY)
 DATE SUBDIVIDED: 09-14-71



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
3RD STREET & SOUTH MOUNTAIN AVENUE	01/28	05-20-91	8

PROJ. NO. 01/28-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 3rd Street and South Mountain Avenue

PROJECT NUMBER: 01/28-1

DESCRIPTION: Storm water from south flows through La Montana Del Sur Mobile Home Park.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 5

SUGGESTED SOLUTION: Construct South Mountain with inverted crown to retain water and carry it to Central. Construct 7th Street and Central Avenue with same to convey water to Baseline.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$5,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$1,000,000

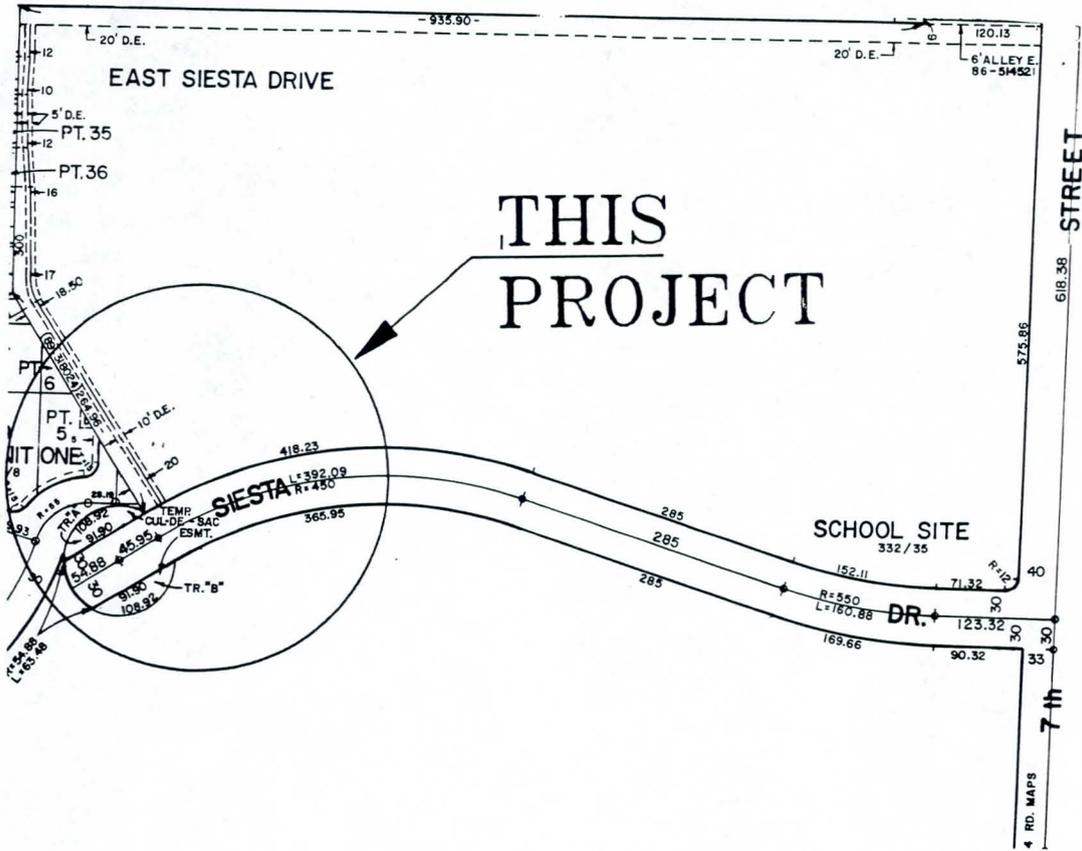
FIELD INSPECTION DATE: 5/17/91/PK

LOCATIONS OF KNOWN FLOODING:
NONE

CONTRIBUTING FACTORS:
Failure to continue existing street pattern

LFMP34

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: THUNDERBIRD COUNTRY CLUB
ESTATES UNIT 5 (COUNTY)

DATE SUBDIVIDED: 08-03-59



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
7TH STREET & SIESTA DRIVE	02/28	05-20-91	8

PROJ. NO. 02/28-1

2

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 7th Street and Siesta Drive

PROJECT NUMBER: 02/28-1

DESCRIPTION: Storm water from undeveloped land to the south sheet flows north and west to Siesta Drive. It overtops the curb and floods Bush School retention areas flooding homes along Euclid Avenue. To the west of the school a small ditch is all that protects 12 homes. All homes are at or below alley grade. Homes flood west of Central Avenue also.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct flood wall along north side of alley (south of Euclid) from 7th Street to Central Avenue. Construct 20 acre detention basin west of school. A regional drain is needed in this area.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 4/1/91/PK

LOCATIONS OF KNOWN FLOODING:

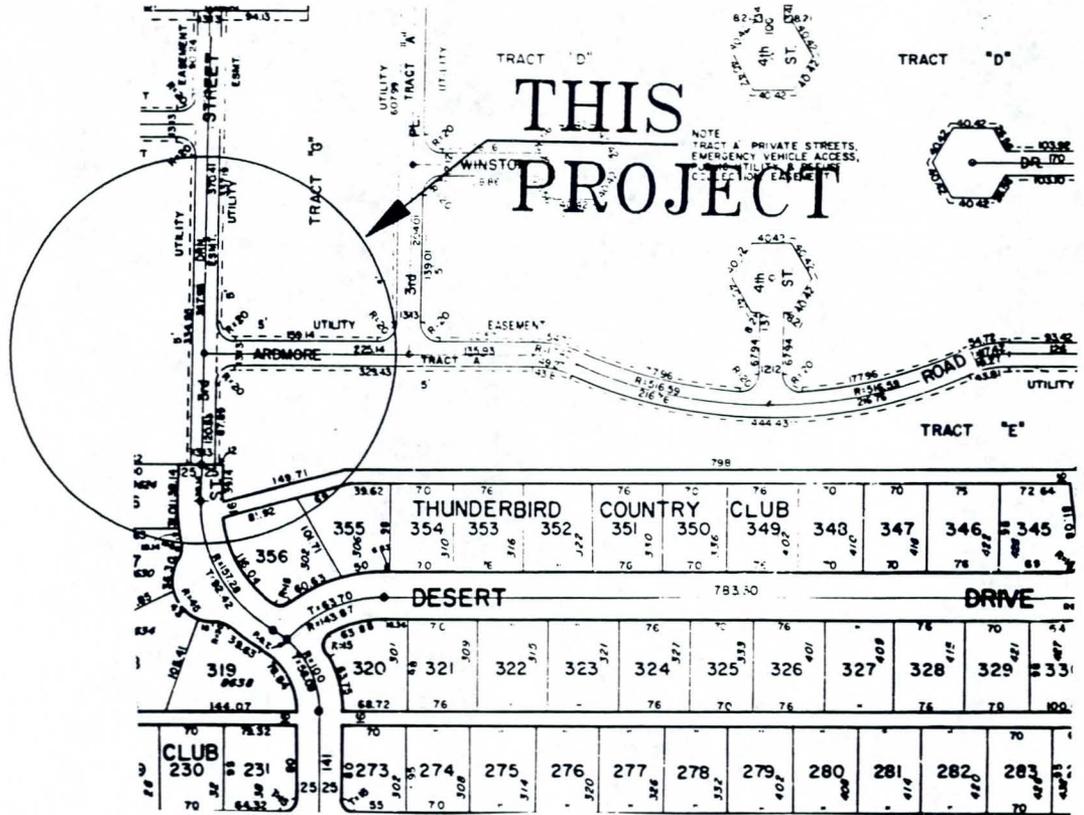
314, 311, 323, 329, 415, 421 East Euclid Avenue
301, 309 East Desert Drive

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Failure to allow drainage through new projects
Major storm run-off exceeds street capacity

LFMP28

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: CASA DE FRANCISCO
MOBILE HOME PARK (CITY)
DATE SUBDIVIDED: 10-26-71



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
3RD STREET & DESERT DRIVE	02/28	05-20-91	8

PROJ. NO. 02/28-2

3

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 3rd Street and Desert Drive

PROJECT NUMBER: 02/28-2

DESCRIPTION: Storm water from south flows through Casa De Francisco Mobile Home Park.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 30

SUGGESTED SOLUTION: Rebuild Euclid Avenue with inverted crown and storm drain to carry water to 7th Street and Central Avenue. Rebuild 7th Street and Central Avenue with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$100,000

FIELD INSPECTION DATE: 5/17/91/PK

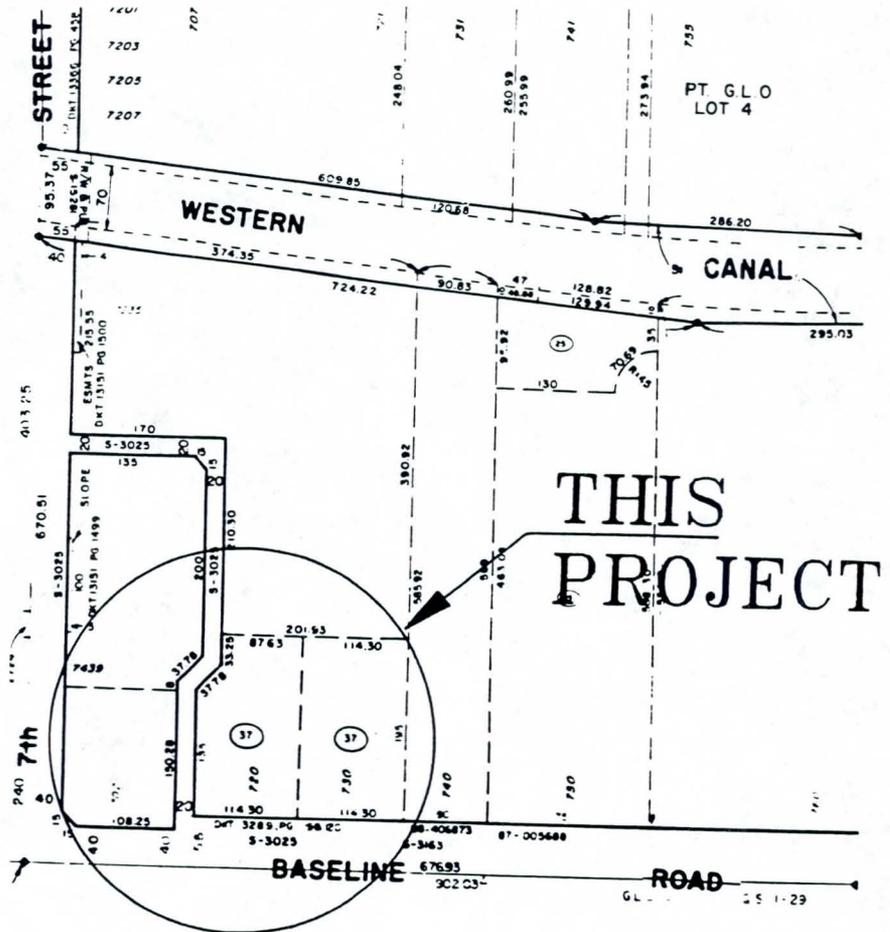
LOCATIONS OF KNOWN FLOODING:
NONE

CONTRIBUTING FACTORS:

Failure to continue existing street pattern
Failure to allow drainage through new projects
Major storm run-off exceeds street capacity

LFMP36

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



PROJ. NO. 1/29-1

SUBDIVISION NAME: UNSUBDIVIDED (COUNTY)

DATE SUBDIVIDED: 01-01-50



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
7TH STREET & BASELINE ROAD	1/29	05-20-91	8

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LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 7th Street and Baseline Road

PROJECT NUMBER: 1/29-1

DESCRIPTION: Storm water exceeds capacity of Baseline Road and floods properties to north which are 3' below Baseline Road top of curb.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Flood proof buildings

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$300,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 5/17/91/PK

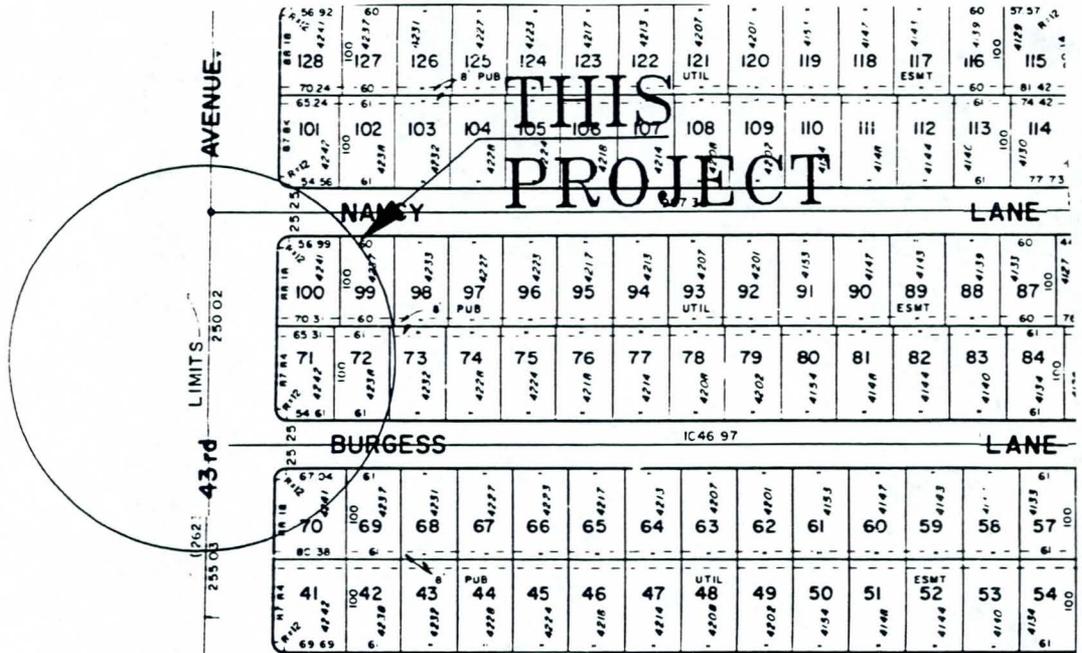
LOCATIONS OF KNOWN FLOODING:
740 East Baseline Road

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity
Structures constructed in ponding area along canal

LFMP35

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: LAS CASAS GRANDES (COUNTY)

DATE SUBDIVIDED: 03-15-71



NO SCALE

PROJECT NAME: 43RD AVENUE & BURGESS LANE	QS 2/19	DATE: 05-20-91	C.D. 7
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PROJ. NO. 2/19-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 43rd Avenue and Burgess Lane

PROJECT NUMBER: 2/19-1

DESCRIPTION: Storm water ponds to a depth of nearly 3' in Burgess Lane and 2' in Alta Vista Road because 43rd Avenue is 3' higher than land to the east. This is about 1' higher than drainage channel to the north. (Alignment extended). This is in the location of an old drain which flowed to the southwest. Problem is complex because of irrigation ditch and tailwater rights. No drain exist to south and west (downhill) per Salt River Project.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: 20 acre retention area and 96" storm drain 1 1/2 miles north on 43rd Avenue to Salt River.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$75,000

COST PER STRUCTURE TO REDUCE FLOODING: \$70,000

FIELD INSPECTION DATE: 5/13/91/PK

LOCATIONS OF KNOWN FLOODING:

4241 West Burgess Lane
4229 West Alta Vista

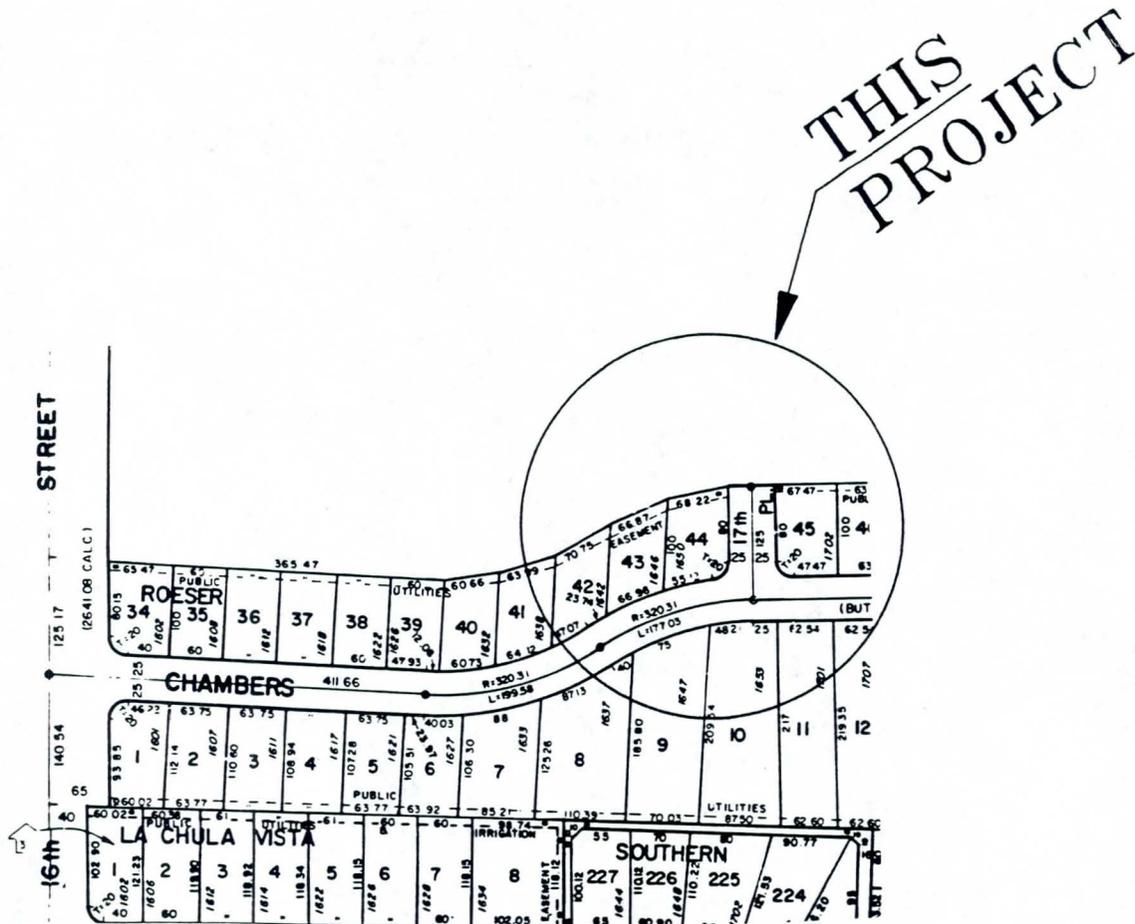
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Structures constructed in natural drainage channels or drainage easements
Structures constructed in ponding area along canal

LFMP37

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

PROJ. NO. 3/31-1



SUBDIVISION NAME: ROESER PARK (COUNTY)

DATE SUBDIVIDED: 08-07-58



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
17TH STREET & CHAMBERS STREET	3/31	05-20-91	8

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 17th Street and Chambers Street

PROJECT NUMBER: 3/31-1

DESCRIPTION: Storm water from subdivision drains to this location. 17th Street is a dead end to irrigated farm land. Farmer has constructed a 3' high dam to prevent drainage from subdivision from entering farmland. This same condition exists at 18th Street. Bowker and 17th Place drain to a corner above this location. NOTE: 17th Street is labeled 17th Place on plat and quarter section.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Condemn land and complete 17th Street to Roeser Road (1300 L.F.). Construct 18th Street half street to Roeser Road (Right of Exists-Resolution S-2661), also 1300 L.F. Farmer is using this R/W. Purchase two homes (1712 East Bowker & 1711 East Chambers and construct drainage channel from Bowker to Chambers.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$600,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$12,000

FIELD INSPECTION DATE: 5/16/91/PK

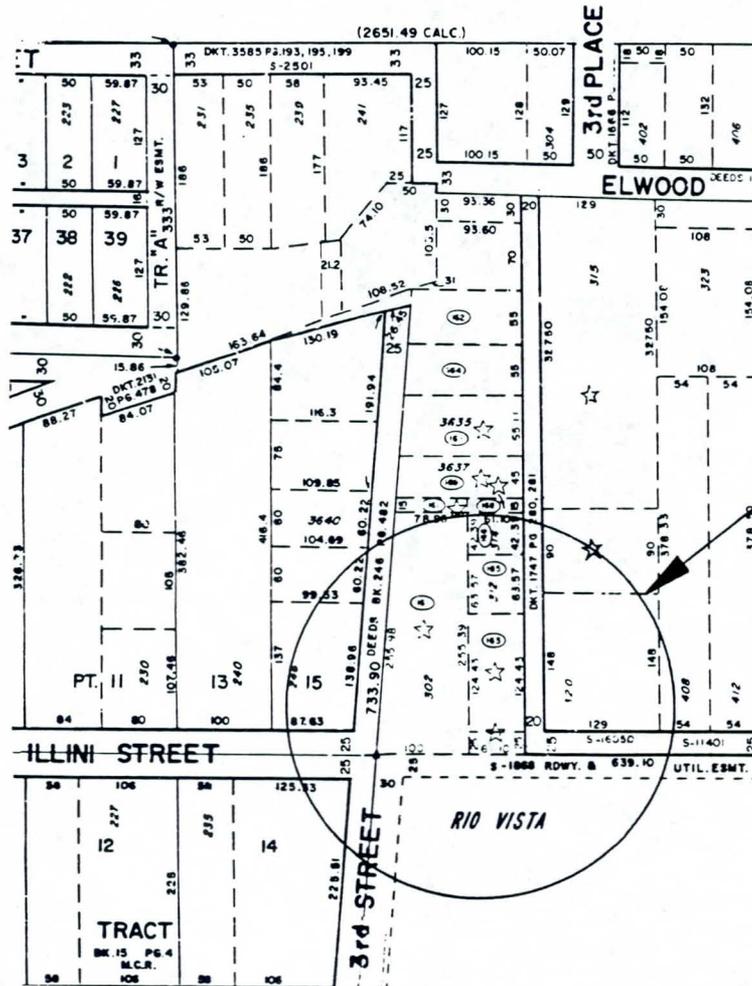
LOCATIONS OF KNOWN FLOODING:
1702 East Chambers

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Streets which drain to the end of a cul de sac or otherwise dead end

LFMP39

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS
PROJECT

SUBDIVISION NAME: UNSUBDIVIDED (COUNTY)

DATE SUBDIVIDED: 01-01-50



NO SCALE

PROJECT NAME: 3RD PLACE & ILLINI STREET	QS 5/28	DATE: 05-20-91	C.D. 8
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LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 3rd Place and Illini Street

PROJECT NUMBER: 5/28-1

DESCRIPTION: Storm water sheet flows through neighborhood.
Streets are not paved, nor in many cases dedicated.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Create Neighborhood Improvement project to
dedicate and pave streets.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$100,000

COST PER STRUCTURE TO REDUCE FLOODING: \$100,000

FIELD INSPECTION DATE: 5/17/91/PK

LOCATIONS OF KNOWN FLOODING:
312 East Illini (could not locate)

CONTRIBUTING FACTORS:

Constructed prior to Development Standards

Floors too low

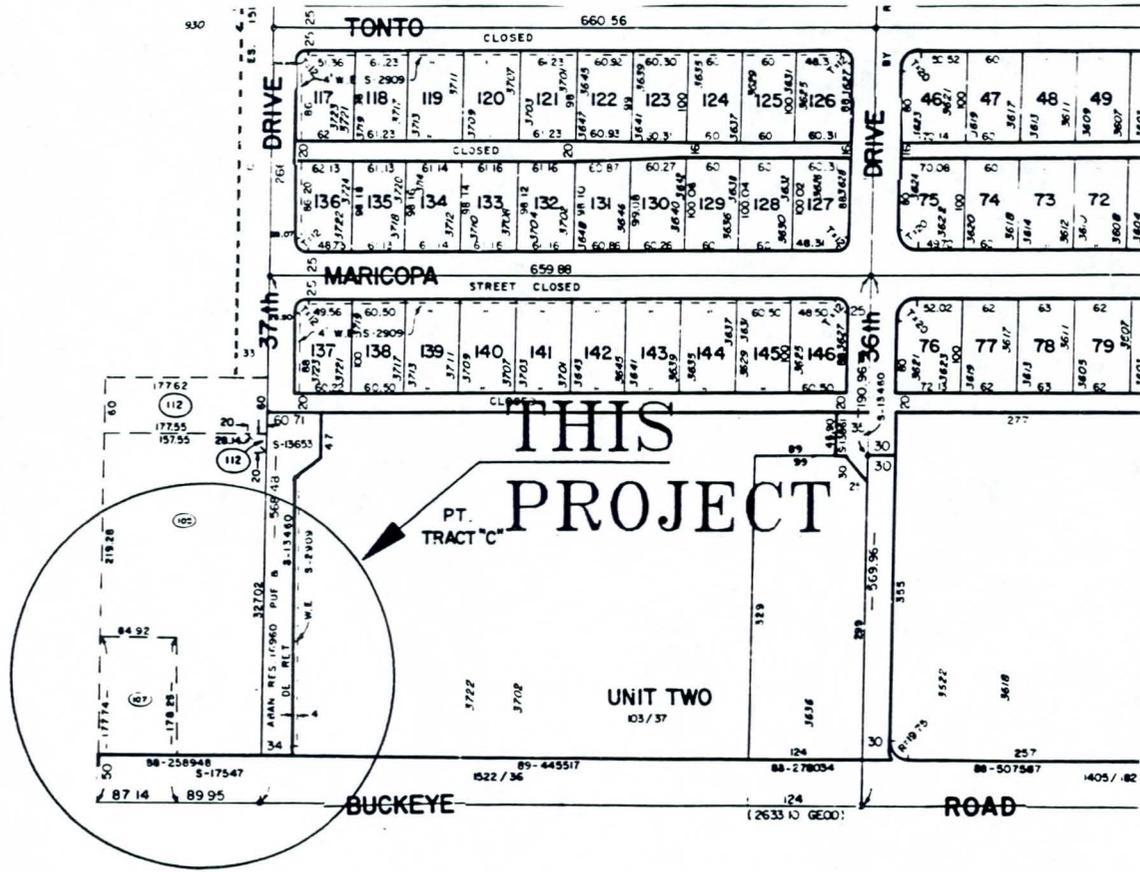
Failure to continue existing street pattern

Streets which drain to the end of a cul de sac or otherwise dead
end

Major storm run-off exceeds street capacity

LFMP33

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: UNSUBDIVIDED (CITY)

DATE SUBDIVIDED: 01-01-85



NO SCALE

PROJECT NAME: 37TH DRIVE & BUCKEYE ROAD	QS 9/20	DATE: 05-15-91	C.D. 7
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LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 37th Drive and Buckeye Road

PROJECT NUMBER: 9/20-1

DESCRIPTION: This quarter section drains to the southwest corner (39th Avenue) and Buckeye Road. Industrial development and the abandonment of 36th and 37th Drive have obstructed drainage to the south. Water flows west along closed alley south side of Westward Homes and south into easement on 37th Drive alignment. Easement is flat and cannot carry water so it flows onto property at 3740 West Buckeye Road flooding one residence on commercial lot.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 1

SUGGESTED SOLUTION: Construct lined channel (400 L.F.) for 100-year storm from end of 37th Drive to Buckeye Road. Remove encroachment from east and curb on Buckeye Road. Provide berm on west side of channel. Purchase easement and construct channel on 36th Drive alignment.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$60,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$60,000

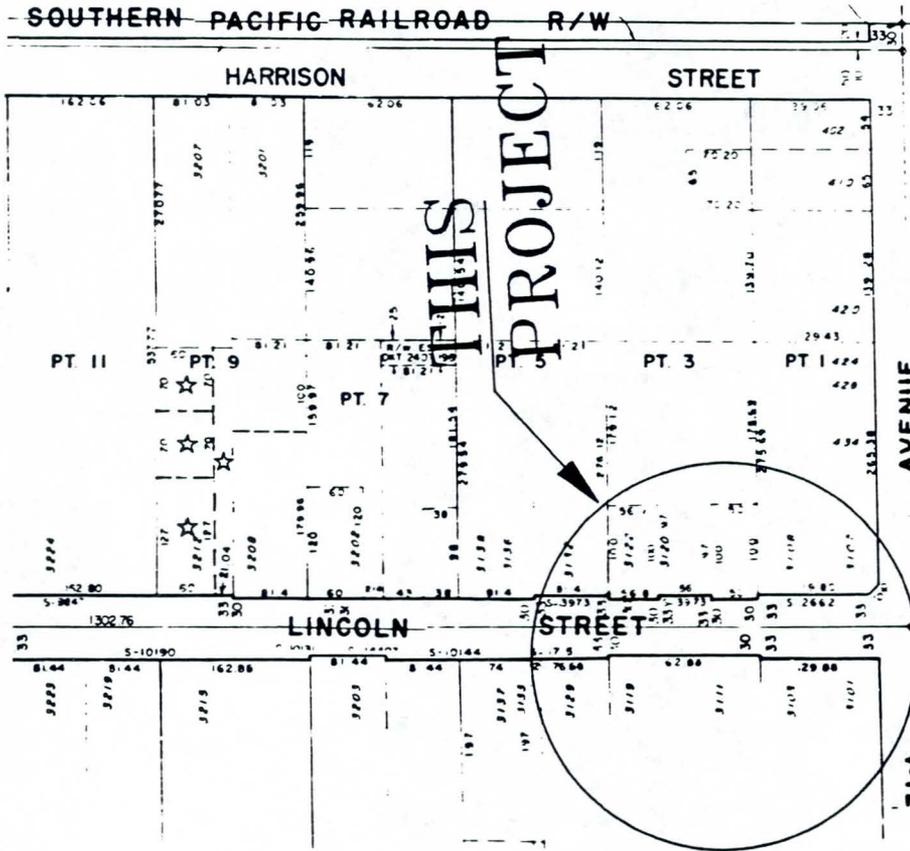
FIELD INSPECTION DATE: 4/18/91

LOCATIONS OF KNOWN FLOODING: 3740 West Buckeye Road

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Streets abandoned so that drainage was cut off
Failure to continue existing street pattern
Failure to allow drainage through new projects

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: CAPITOL HEIGHTS (COUNTY)

DATE SUBDIVIDED: 03-23-28



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
31ST AVENUE & LINCOLN STREET	9/21	05-20-91	7

PROJ. NO. 9/21-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 31st Avenue and Lincoln Street

PROJECT NUMBER: 9/21-1

DESCRIPTION: Storm water overflows Lincoln Street and floods businesses which are constructed at ground elevation. 31st Avenue is lower than Lincoln. Railroad embankment is one block to north. Street does not have curbs.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Flood walls, develop streets

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$400,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$15,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

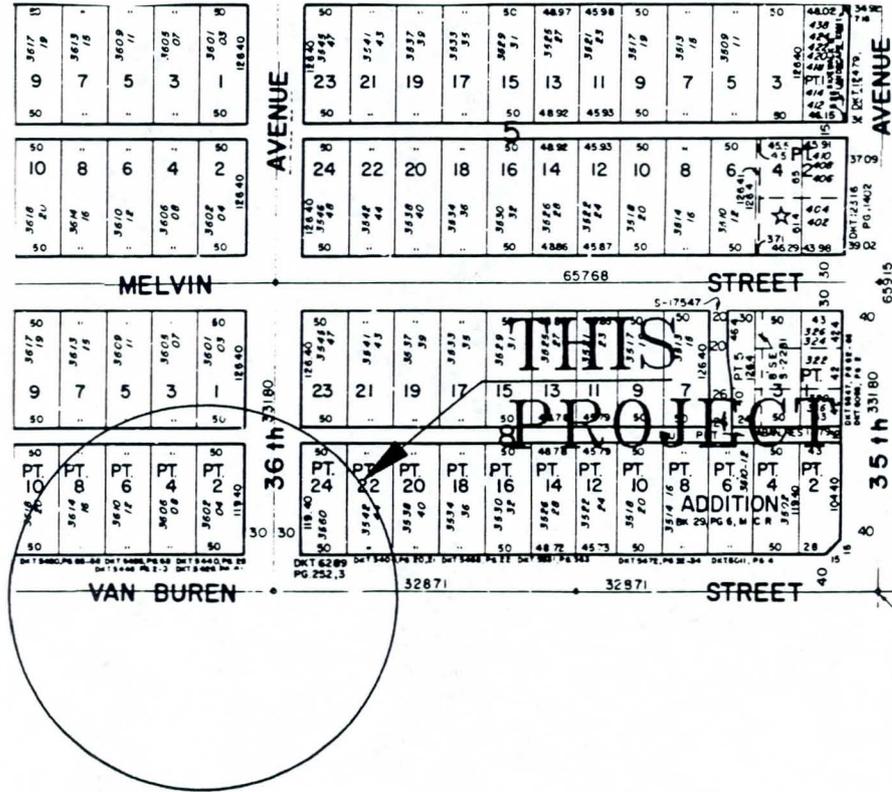
FIELD INSPECTION DATE: 5/13/91/PK

LOCATIONS OF KNOWN FLOODING:
3112 West Lincoln Street

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Streets abandoned so that drainage was cut off

LFMP38

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: WEST PHOENIX ADDITION (COUNTY)

DATE SUBDIVIDED: 09-09-43



NO SCALE

PROJECT NAME: 36TH AVENUE & VAN BUREN STREET	QS 11/20	DATE: 05-20-91	C.D. 7
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LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 36th Avenue and Van Buren Street

PROJECT NUMBER: 11/20-1

DESCRIPTION: Storm water overtops curb in Van Buren flooding businesses. Many low homes on streets to north. Freeway is 3/4 mile north and intercepts water. Building at, or below curb. Development is pre-1952.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Retention basin or flood walls.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$ 1,500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$ 25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$ 15,000

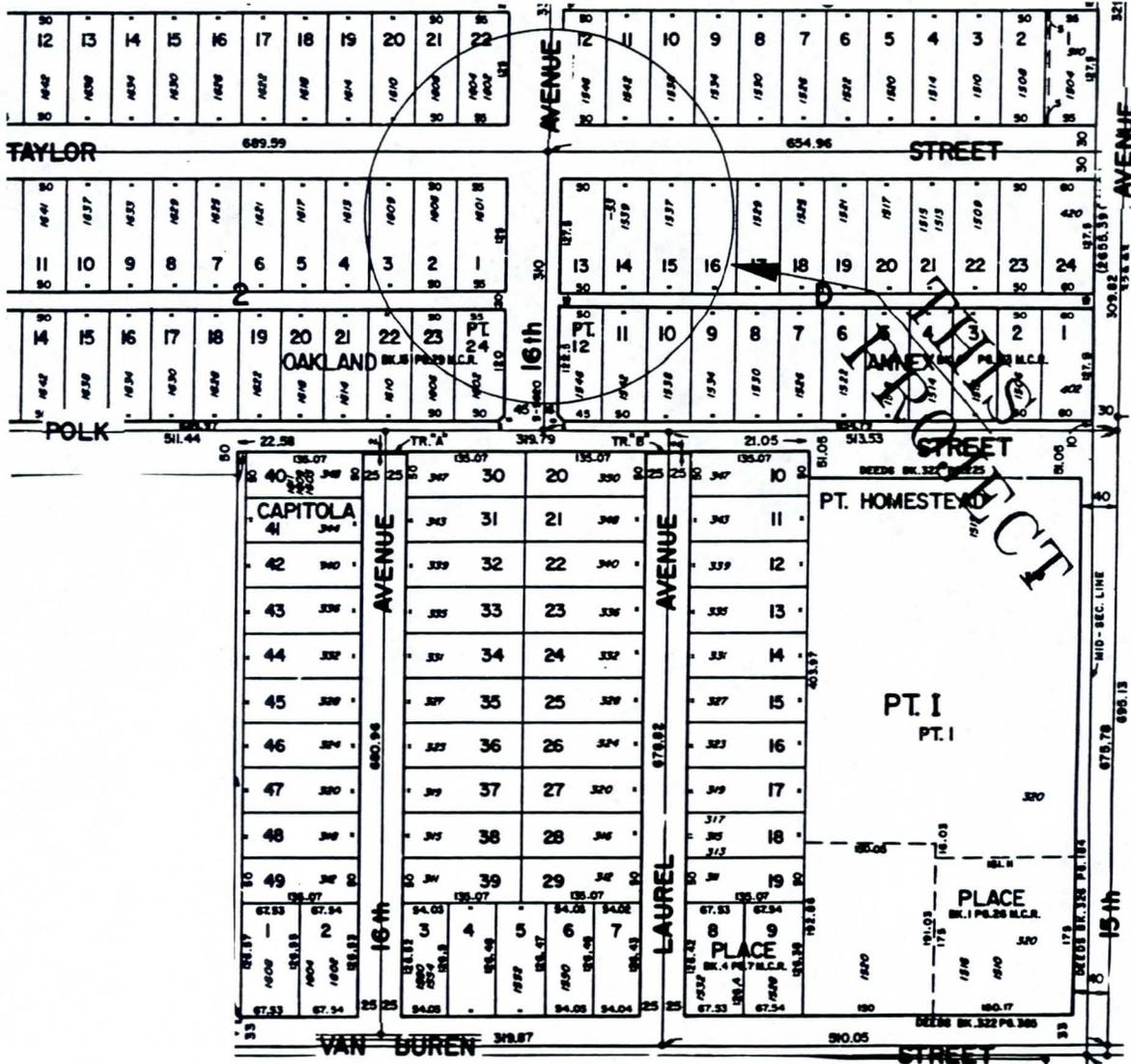
FIELD INSPECTION DATE: 5/13/91/PK

LOCATIONS OF KNOWN FLOODING:
3602 West Van Buren Street

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP32

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: WEST LAWN ANNEX (CITY)

DATE SUBDIVIDED: 03-04-11



NO SCALE

PROJECT NAME: 16TH AVENUE & TAYLOR STREET	QS 11/25	DATE: 05-15-91	C.D. 7
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LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 16th Avenue and Taylor Street

PROJECT NUMBER: 11/25-1

DESCRIPTION: Intersection is low point. Catch basins with drywell installed in 1926. Drywell no longer drains. Water ponds on Taylor from intersection to 1/2 block east. No structures flooded but this is a nuisance to residents.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 0

SUGGESTED SOLUTION: Replace drywell with modern drywell (short term). Reconstruct Taylor from 15th Avenue to 17th Avenue (long term).

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$100,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$15,000

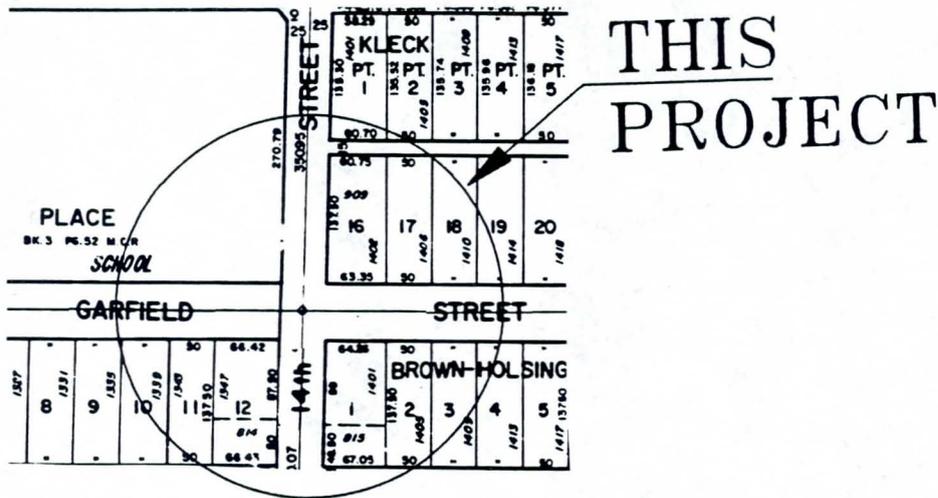
COST PER STRUCTURE TO REDUCE FLOODING: N/A

FIELD INSPECTION DATE: 4/8/91/PK

LOCATIONS OF KNOWN FLOODING:
None

CONTRIBUTING FACTORS:
Constructed prior to Development Standards

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: GERMANIA PLACE (CITY)

DATE SUBDIVIDED: 02-18-09



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
14TH STREET & GARFIELD STREET	11/30	05-31-91	8

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 14th Street and Garfield Street

PROJECT NUMBER: 11/30-1

DESCRIPTION: Storm water on 14th Street overtops curb and floods restaurant at northeast corner. Restaurant entrance is at sidewalk elevation. This was caused by the abandonment of Garfield between 13th Street and 14th Street for school construction.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 2

SUGGESTED SOLUTION: Construct 14th Street and McKinley Street to west with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$250,000

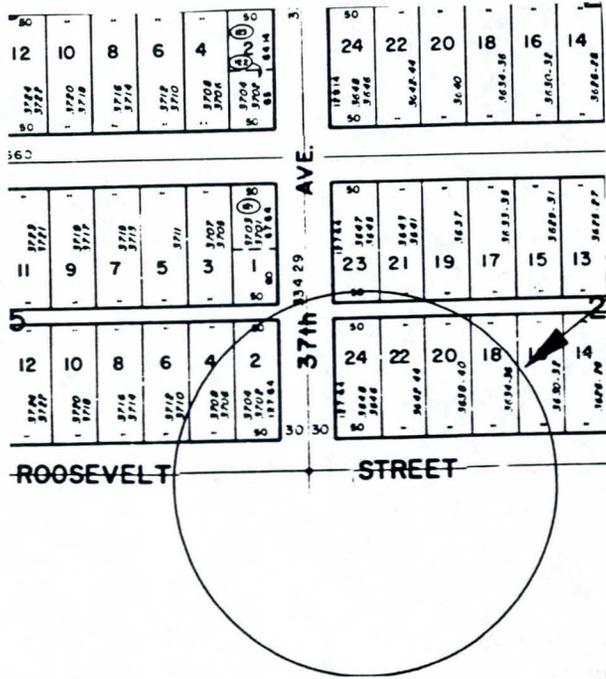
FIELD INSPECTION DATE: 4/26/91/PK

LOCATIONS OF KNOWN FLOODING:
909 North 14th Street
1402 East Garfield Street

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Streets abandoned so that drainage was cut off
Major storm run-off exceeds street capacity

LFMP60

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



THIS
 PROJECT

SUBDIVISION NAME: WEST PHOENIX #4 (COUNTY)

DATE SUBDIVIDED: 02-21-45



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
37TH AVENUE & ROOSEVELT STREET	12/20	05-31-91	7

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 37th Avenue and Roosevelt Street

PROJECT NUMBER: 12/20-1

DESCRIPTION: Storm water flows south to Roosevelt Street. There is little or no slope to the east or west and Roosevelt Street has a high crown. Homes on the north side (uphill) are flooded.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 40

SUGGESTED SOLUTION: Reconstruct Roosevelt with an inverted crown (for retention) and storm drain. This will allow water to flow to the south at a lower elevation.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$20,000

COST PER STRUCTURE TO REDUCE FLOODING: \$12,500

FIELD INSPECTION DATE: 5/30/91/PK

LOCATIONS OF KNOWN FLOODING:
3616 West Roosevelt Street

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low

LFMP57

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 27th Lane and Willetta Street

PROJECT NUMBER: 12/22-1

DESCRIPTION: Storm water drains down 27th Lane and Willetta to a corner without an outlet. Storm drain in place for nuisance water.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 4

SUGGESTED SOLUTION: Purchase right of way to south and construct channel.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$200,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$50,000

FIELD INSPECTION DATE: 2/22/91/PK

LOCATIONS OF KNOWN FLOODING:
2721 West Willetta Street

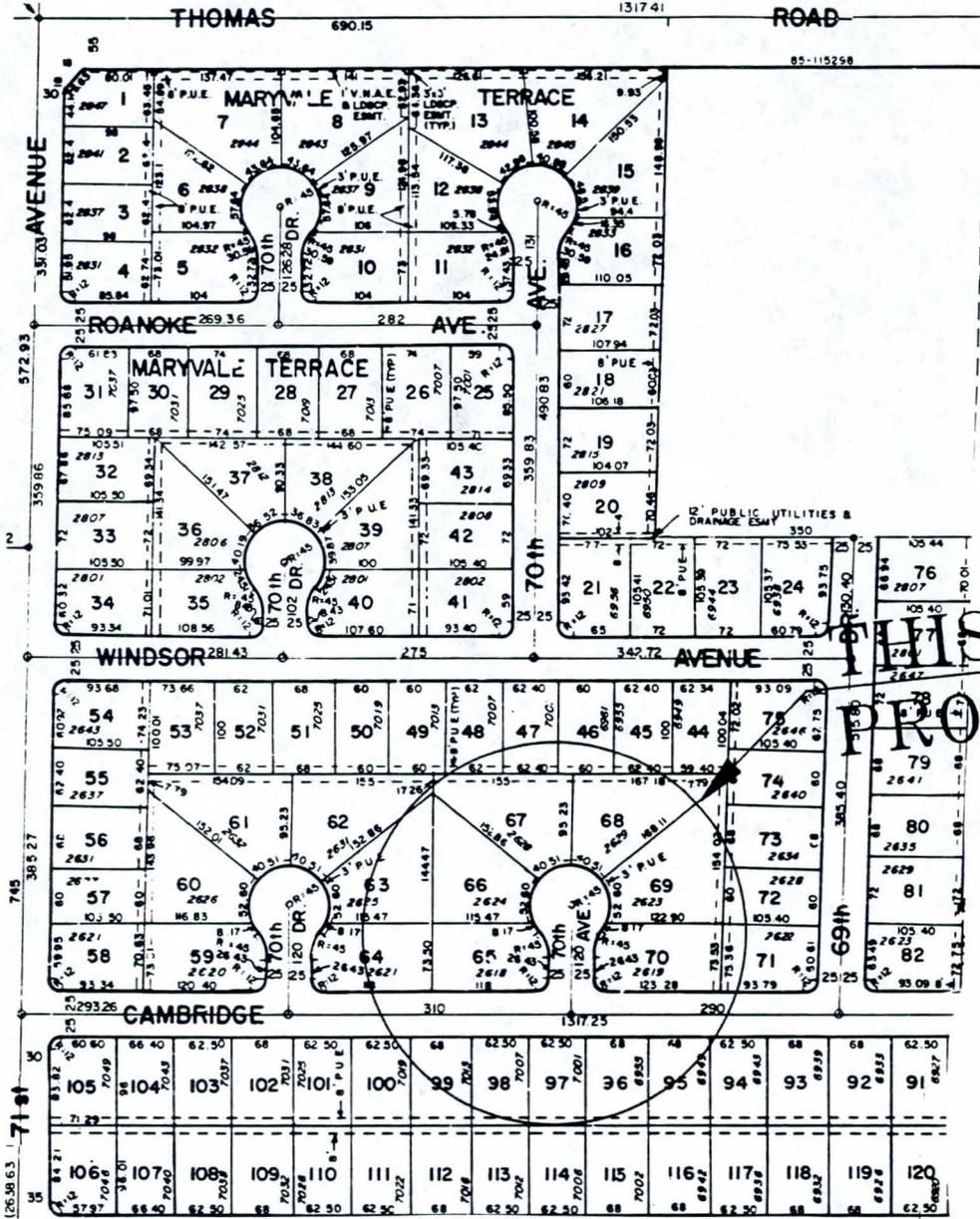
CONTRIBUTING FACTORS:

Floors too low

Streets which drain to the end of a cul de sac or otherwise dead end

LFMP59

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: MARYVALE TERRACE #58 (CITY)

DATE SUBDIVIDED: 03-03-79



NO SCALE

PROJECT NAME: 70TH AVENUE & CAMBRIDGE AVENUE	QS 14/12	DATE: 05-31-91	C.D. 5
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PROJ. NO. 14/12-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 70th Avenue and Cambridge

PROJECT NUMBER: 14/12-1

DESCRIPTION: Irrigation tailwater flows into street creating a driving hazard and nuisance.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: NONE

SUGGESTED SOLUTION: Install 600 L.F. of new storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$50,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$5,000

COST PER STRUCTURE TO REDUCE FLOODING: \$N/A

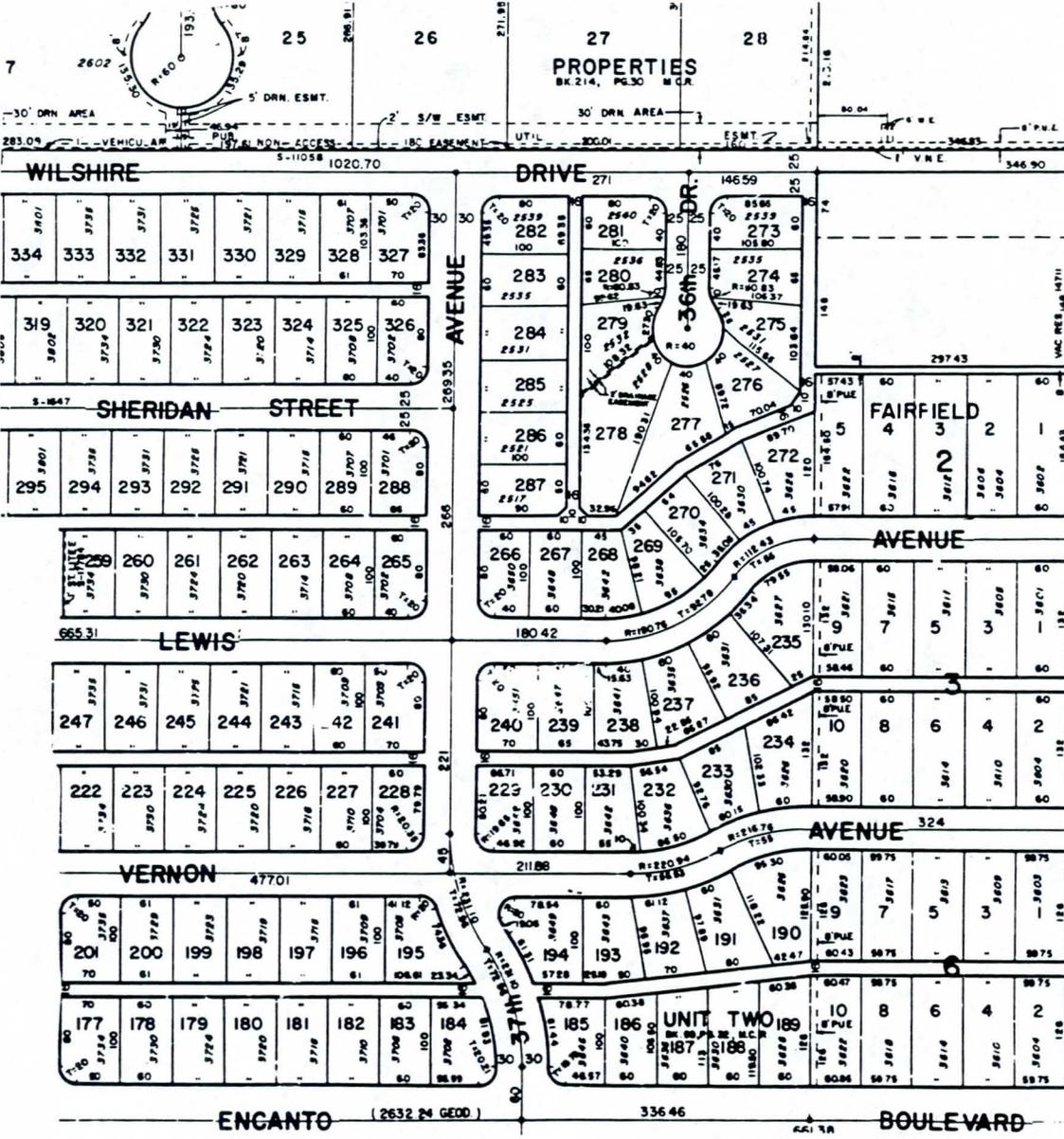
FIELD INSPECTION DATE: 5/7/91/PK

LOCATIONS OF KNOWN FLOODING:
NONE (Street only)

CONTRIBUTING FACTORS:
Failure to allow drainage through new projects
Structures constructed in natural drainage channels or drainage easements

LFMP56

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: THOMAS ROAD PROPERTIES (CITY)

DATE SUBDIVIDED: 7-3-79


 N
 NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
37th AVENUE & WILSHIRE DRIVE	14/20	7-1-91	7

PROJ. NO. 14/20-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 37th Avenue and Wilshire Drive

PROJECT NUMBER: 14/20-1

DESCRIPTION: Storm water from 60 acre industrial project drains to a retention area across street. Water exceeds retention area and flows east on Wilshire and south on 37th Avenue. It exceeds street capacity and floods homes.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Construct Wilshire and 37th Avenue with inverted crowns and storm drains.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$600,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 5/30/91/PK

LOCATIONS OF KNOWN FLOODING:
3721, 3735 West Wilshire

CONTRIBUTING FACTORS:

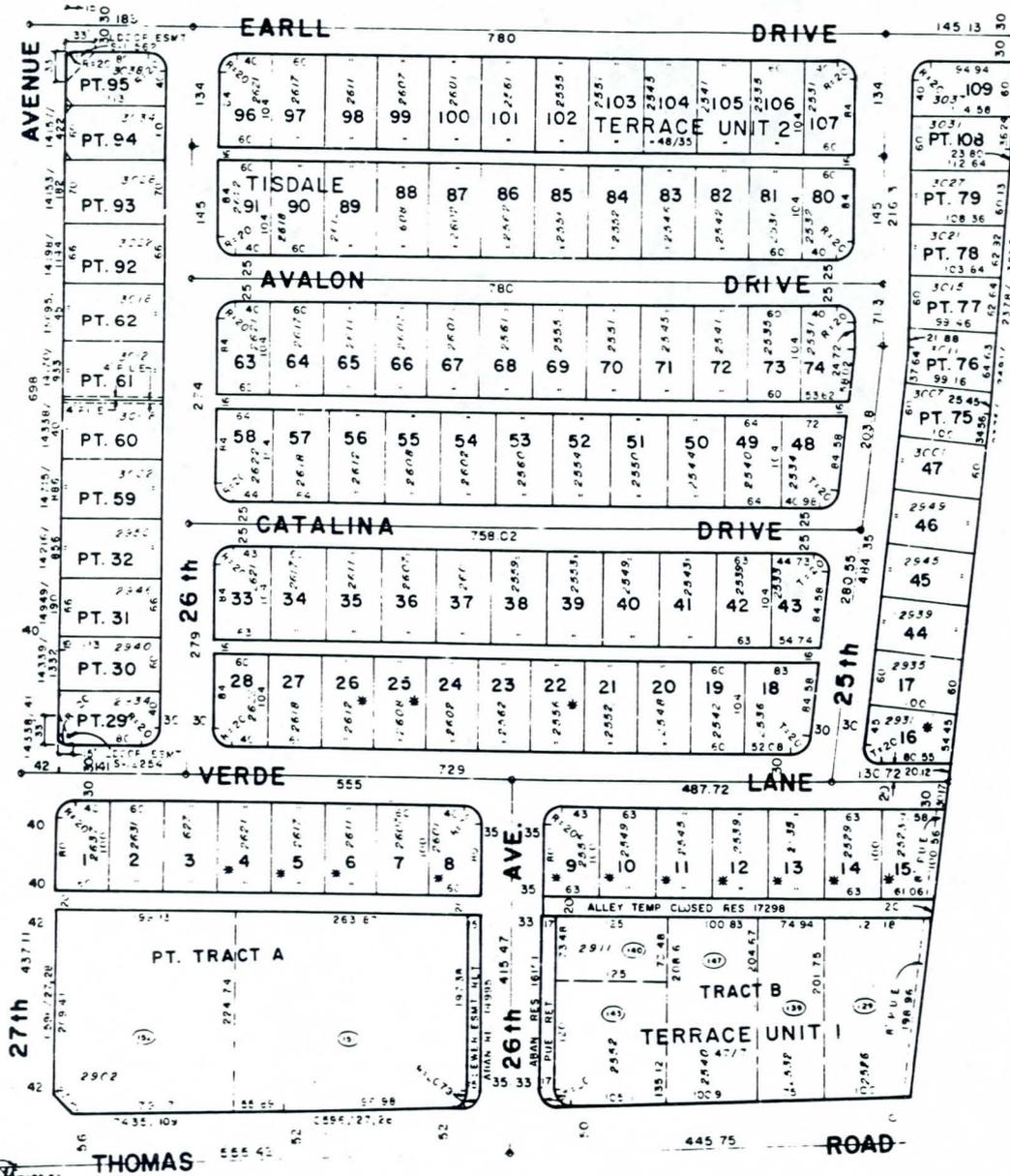
Floors too low

Failure to continue existing street pattern

Failure to allow drainage through new projects

LFMP58

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: TISDALE TERRACE (COUNTY)

DATE SUBDIVIDED: 01-23-50

NO SCALE

PROJECT NAME: 26TH AVENUE & VERDE LANE	QS 15/23	DATE: 05-31-1	C.D. 5
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PROJ. NO. 15/23-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 26th Avenue and Verde Lane

PROJECT NUMBER: 15/23-1

DESCRIPTION: Site inspection was made on March 26 for the area bounded by Earll Drive, Verde Lane, 26th Drive, and 27th Avenue. All of the homes have been built about the same time and are the same style. They all have floor elevations at or near top of curb level. The homes on the south side being lower than the homes on the north side, therefore more subject to flooding. There had been showers earlier on this date and standing water on most of the streets indicates very little slope between 26th Drive and 25th Drive. There is also very little slope along 25th Drive from Avalon to Verde Lane. Verde Lane is a low area created by the elevation of McDowell Road which is designed to meet Interstate 17, Grand Avenue, and the Santa Fe Railroad Tracks. All of the homes in this area are subject to flooding with the most severe flooding being Verde Lane. This would be the first to flood and will flood on the lower frequency events.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Provide an outlet at 26th Avenue and 27th Avenue for all of this water or prevent water from entering the area up at Osborn. Purchase 50 homes and create a detention basin.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 3/26/91/PK

LOCATIONS OF KNOWN FLOODING:

Earll Drive, Avalon Drive, Catalina Drive, Verde Lane, 25th Avenue, and 26th Avenue.

CONTRIBUTING FACTORS:

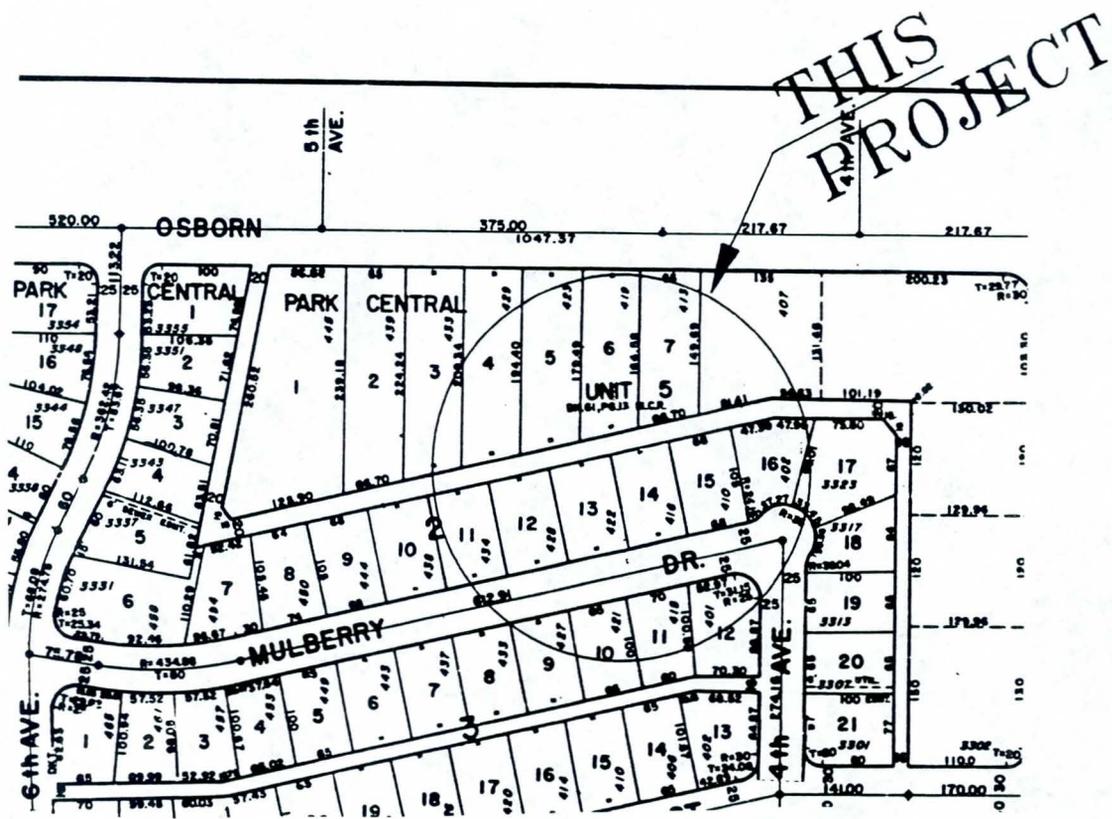
Constructed prior to Development Standards

Floors too low

Structures constructed in ponding area along railroad

LFMP64

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: PARK CENTRAL - UNIT ONE (CITY)

DATE SUBDIVIDED: 10-29-53



NO SCALE

PROJECT NAME: 4TH AVENUE & MULBERRY DRIVE	QS 15/27	DATE: 05-08-91	C.D. 4
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PROJ. NO. 15/27-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 4th Avenue and Mulberry Drive

PROJECT NUMBER: 15/27-1

DESCRIPTION: Drainage north of Osborn Road from 4th and 5th Avenues is cut off by Osborn Road which is very flat. Therefore it can carry little water. Water overflows Osborn Road to the south, flowing through apartment complexes and homes. Many homes have constructed flood walls.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 32

SUGGESTED SOLUTION: Reconstruct Osborn Road, Mulberry Drive, alley, and 6th Avenue; or, flood walls and berms.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$31,250

FIELD INSPECTION DATE: 4/25/91/PK

LOCATIONS OF KNOWN FLOODING:

439, 445 West Osborn Road
410, 458 West Mulberry Drive
3337 North 6th Avenue

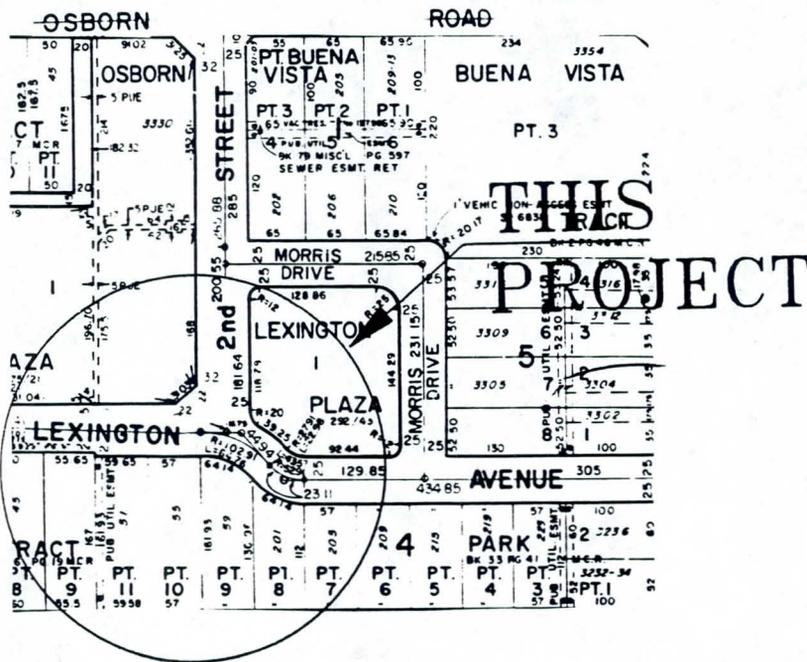
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Major storm run-off exceeds street capacity

LFMP40

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

PROJ. NO. 15/28-1



SUBDIVISION NAME: BUENA VISTA PARK (COUNTY)

DATE SUBDIVIDED: 03-14-46



NO SCALE

PROJECT NAME: 2ND STREET & LEXINGTON AVENUE	QS 15/28	DATE: 05-31-91	C.D. 4
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LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 2nd Street and Lexington Avenue

PROJECT NUMBER: 15/28-1

DESCRIPTION: Lexington does not have curb on south side. Storm water flows south on Morris Drive and into house, which is at grade.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 5

SUGGESTED SOLUTION: Construct Lexington Avenue, 1st Place, and Monterey Way with an inverted crown and storm drain from 3rd Street to Central Avenue.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$300,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$60,000

FIELD INSPECTION DATE: 4/26/91/PK

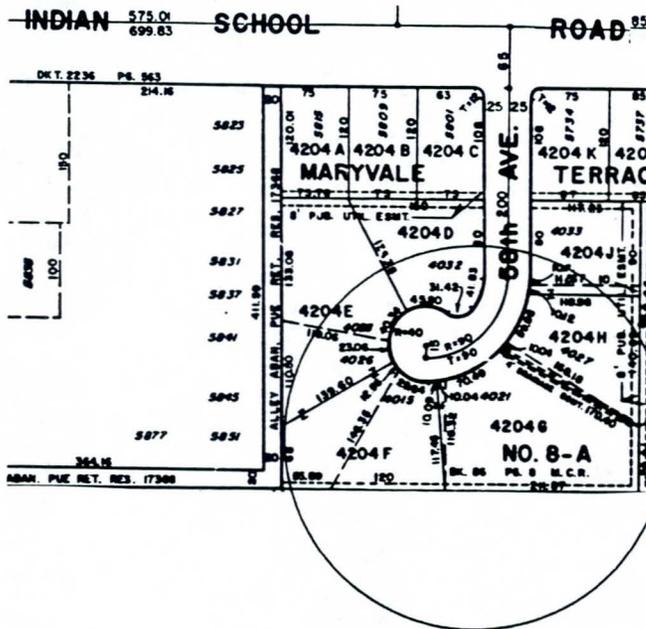
LOCATIONS OF KNOWN FLOODING:
209, 215 East Lexington Avenue

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Major storm run-off exceeds street capacity

LFMP61

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

PROJ. NO. 16/15-1



THIS
PROJECT

SUBDIVISION NAME: MARYVALE TERRACE #8A (COUNTY)

DATE SUBDIVIDED: 12-07-59



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
58TH AVENUE & INDIAN SCHOOL ROAD	16/15	05-31-91	7

20

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 58th Avenue and Indian School Road

PROJECT NUMBER: 16/15-1

DESCRIPTION: Storm water exceeds the capacity of Indian School Road and flows to the south. Homes are 3' below Indian School Road. This is a cul de sac without an outlet for surface drainage.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Purchase 3 lots and connect 58th Avenue and 57th Drive to 58th Avenue to the south.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$400,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 5/30/91/PK

LOCATIONS OF KNOWN FLOODING:
4021, 4026 North 58th Drive

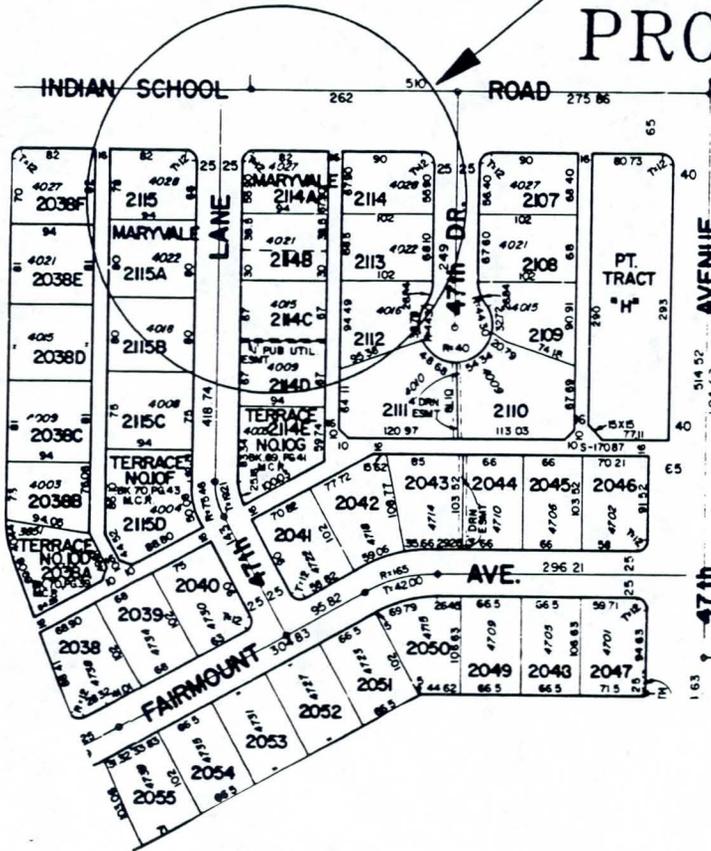
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Streets which drain to the end of a cul de sac or otherwise dead end

LFMP62

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

THIS
 PROJECT



SUBDIVISION NAME: MARYVALE TERRACE NO. 10G (COUNTY)

DATE SUBDIVIDED: 10-25-56



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
47th LANE AND INDIAN SCHOOL ROAD	16/17	06-03-91	5

PROJ. NO. 16/17-1

21

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 47th Lane and Indian School Road

PROJECT NUMBER: 16/17-1

DESCRIPTION: Storm water exceeds capacity of Indian School Road and floods homes on south side which are 3' below Indian School Road.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Flood walls along Indian School Road. Purchase land and construct drainageway through 47th Drive cul de sac.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$400,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

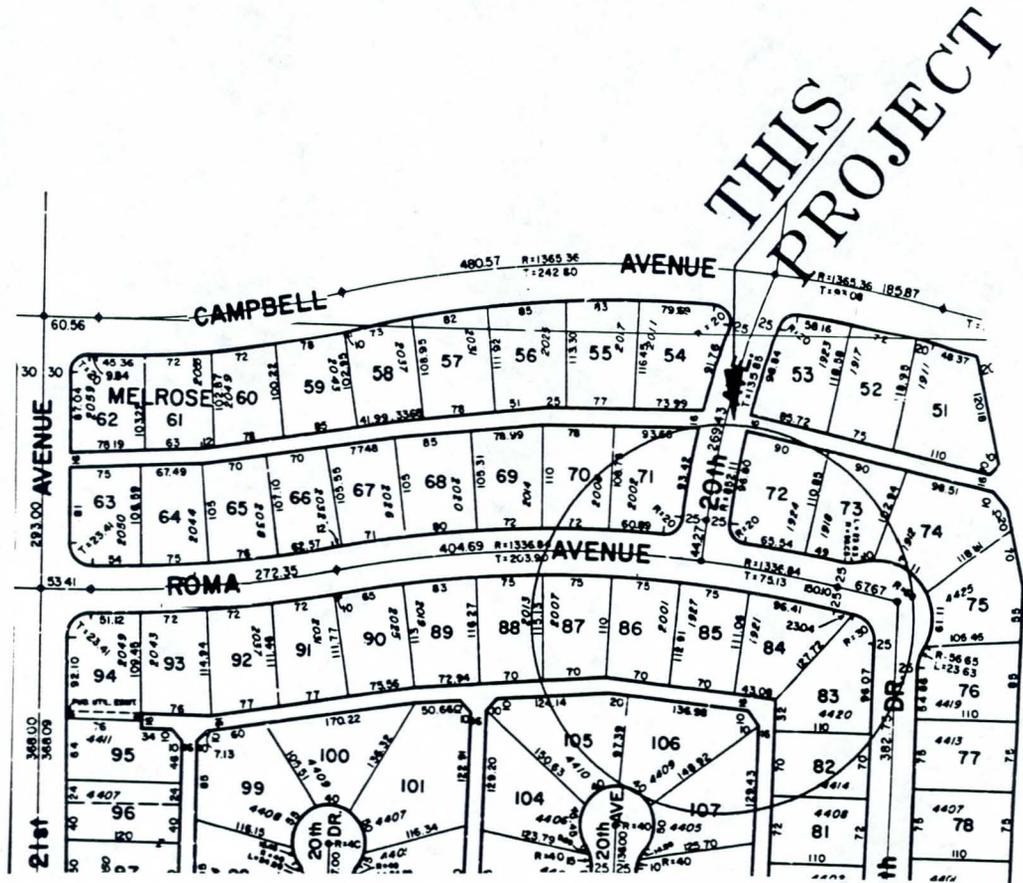
FIELD INSPECTION DATE: 5/30/91/PK

LOCATIONS OF KNOWN FLOODING:
4027 North 47th Lane

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Streets which drain to the end of a cul de sac or otherwise dead end
Major storm run-off exceeds street capacity

LFMP63

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: MELROSE ESTATES (COUNTY)

DATE SUBDIVIDED: 02-18-55



NO SCALE

PROJECT NAME: 20TH AVENUE & ROMA AVENUE	QS 17/24	DATE: 05-15-91	C.D. 4
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PROJ. NO. 17/24-1

22

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 20th Avenue and Roma Avenue

PROJECT NUMBER: 17/24-1

DESCRIPTION: Storm water from 20th Avenue flows into Roma Avenue. Roma Avenue is flat and water overtops curb.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Reconstruct 20th Avenue, Roma Avenue, and Turney Avenue with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$50,000

FIELD INSPECTION DATE: 5/8/91/PK

LOCATIONS OF KNOWN FLOODING:
2025 West Roma Avenue

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 22nd Drive south of Devonshire

PROJECT NUMBER: 17/24-2

DESCRIPTION: Storm water in 22nd Drive floods property to the west. West side does not have curb and gutter. Ground rises to the south. This is a cul de sac. This is a Special Flood Hazard Area along the Grand Canal and flood insurance is mandatory

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 6

SUGGESTED SOLUTION: Reconstruct 22nd Drive with inverted crown. Purchase right of way south to Indian School Road and construct channel.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$120,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$15,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

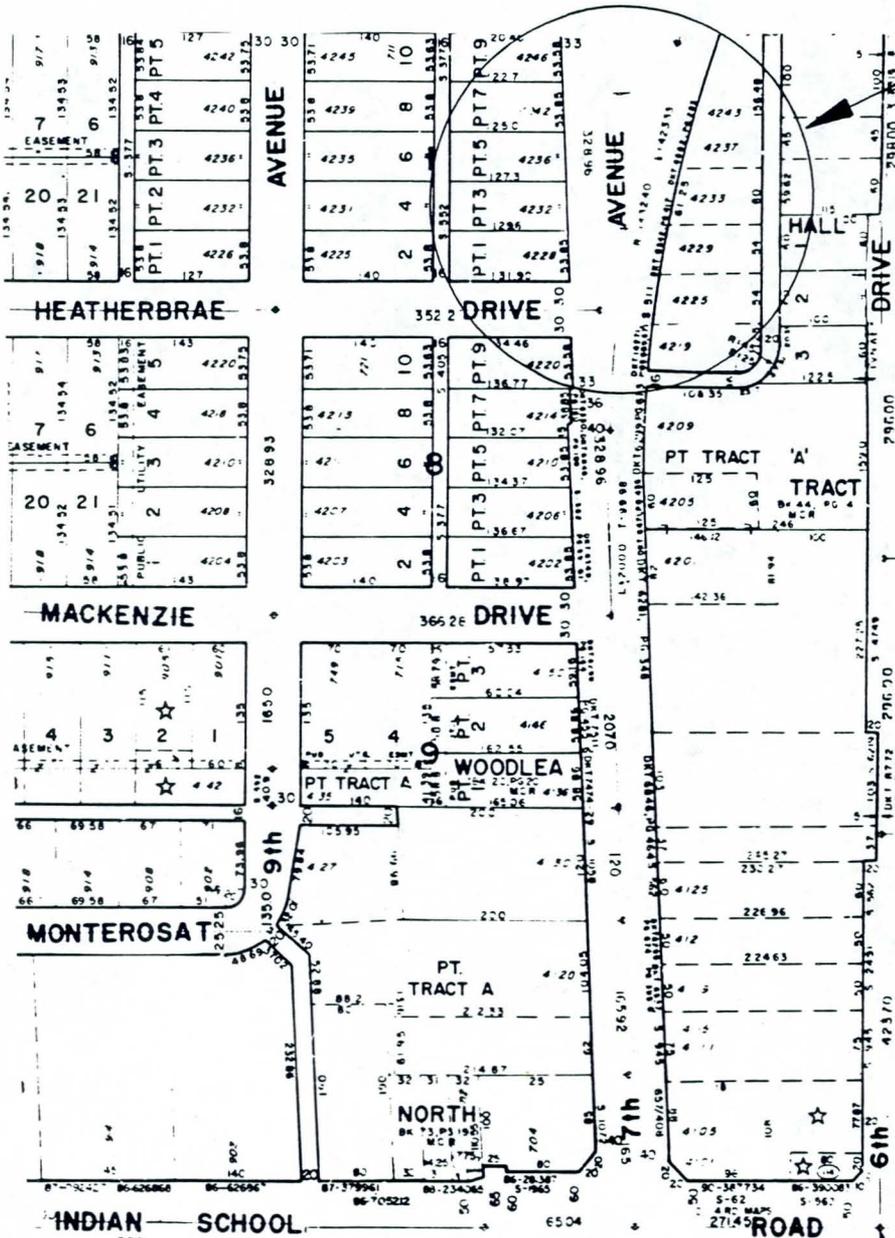
FIELD INSPECTION DATE: 5/8/91/PK

LOCATIONS OF KNOWN FLOODING:
4133 North 23rd Avenue

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Streets which drain to the end of a cul de sac or otherwise dead end
Major storm run-off exceeds street capacity
Ponding along canal

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS PROJECT

SUBDIVISION NAME: WOODLEA NORTH (COUNTY)

DATE SUBDIVIDED: 12-05-28



NO SCALE

PROJECT NAME: 7TH AVENUE & NORTH OF HEATHERBRAE	QS 17/26	DATE: 05-08-91	C.D. 4
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PROJ. NO. 17/26-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 7th Avenue north of Heatherbrae Drive

PROJECT NUMBER: 17/26-1

DESCRIPTION: Run off in 7th Avenue exceeds curb depth. Floods structures at or below curb height.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Floodproofing, elevate structures, rebuild some interior streets.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000.

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$50,000

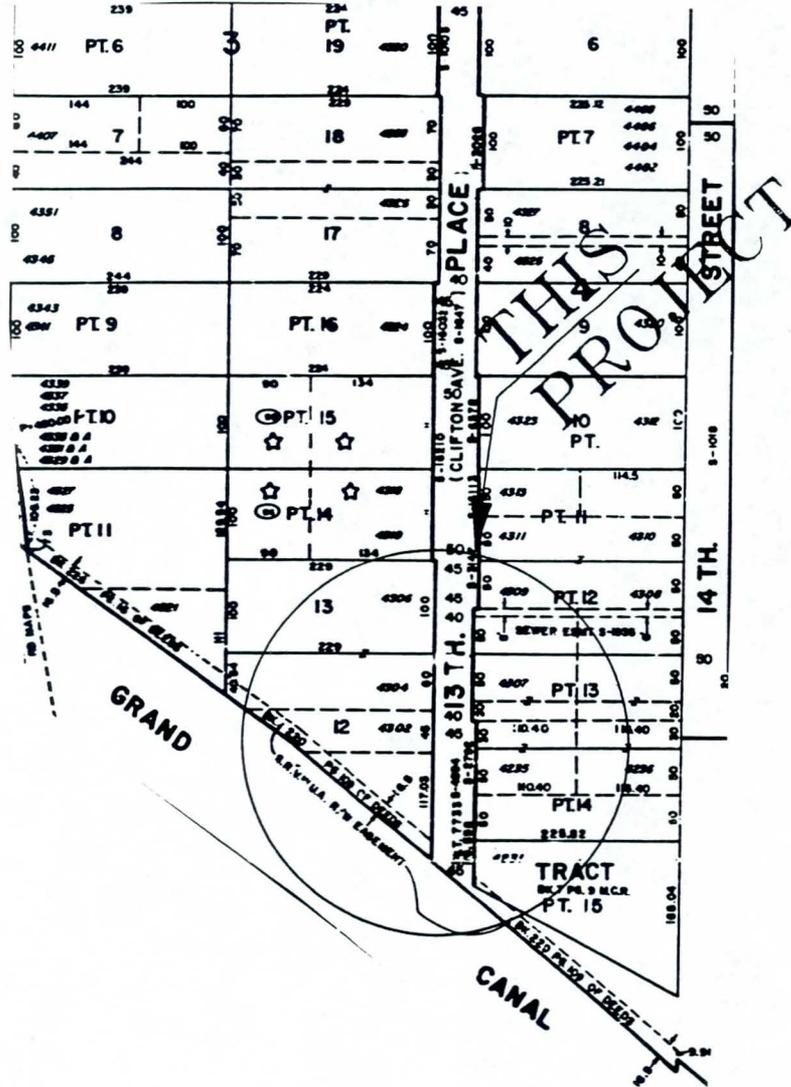
FIELD INSPECTION DATE: 3/7/91/PK

LOCATIONS OF KNOWN FLOODING:
4232 North 7th Avenue

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: MEADOWBROOK TRACT (COUNTY)

DATE SUBDIVIDED: 04-22-14



NO SCALE

PROJECT NAME: 13TH PLACE & GRAND CANAL	QS 17/30	DATE: 05-08-91	C.D. 6
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PROJ. NO. 17/30-1

25

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 13th Place north of the Grand Canal

PROJECT NUMBER: 17/30-1

DESCRIPTION: Water ponds along the north side of the Grand Canal and floods structures. This is a Special Flood Hazard Area and flood insurance is mandatory.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Elevate buildings or construct flood walls.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 3/1/91/PK

LOCATIONS OF KNOWN FLOODING:
4306 North 13th Place

CONTRIBUTING FACTORS:

Constructed prior to Development Standards

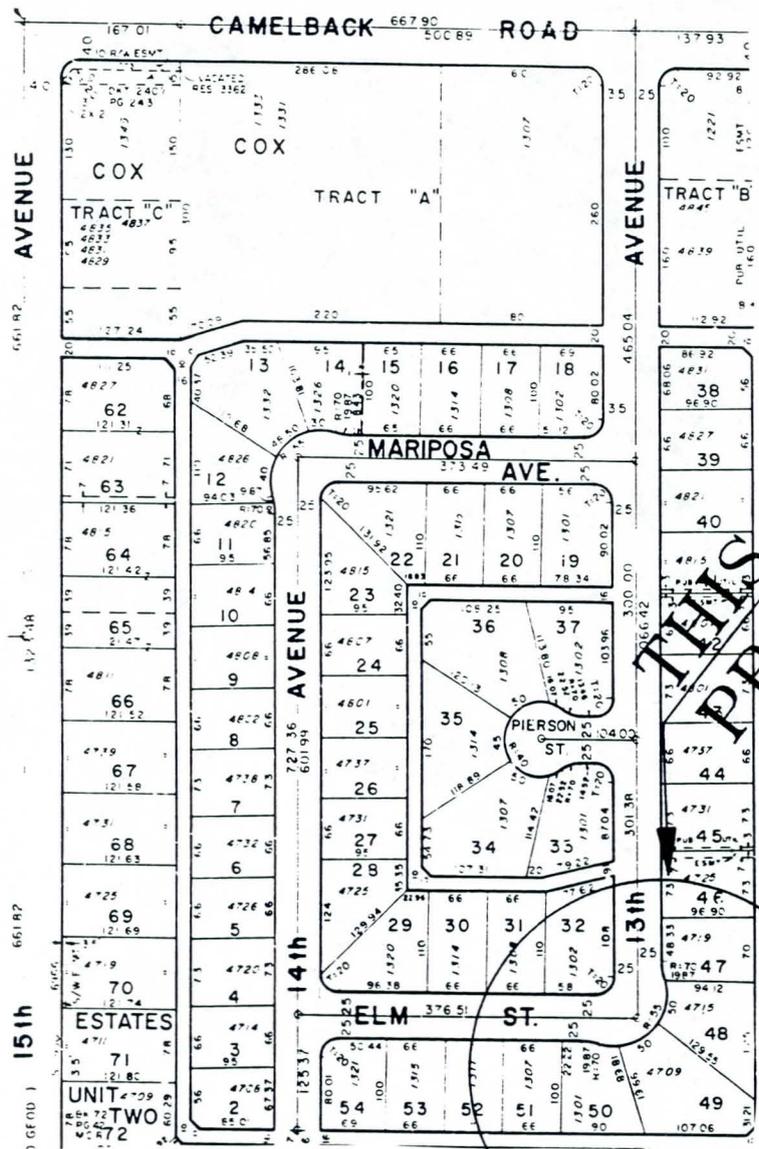
Floors too low

Streets which drain to the end of a cul de sac or otherwise dead end

Structures constructed in ponding area along canal

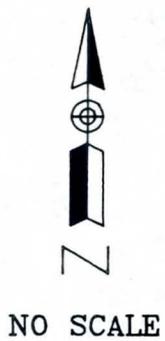
LFMP17

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: COX ESTATES (COUNTY)

DATE SUBDIVIDED: 01-12-55



PROJECT NAME: 13TH AVENUE & ELM STREET	QS 18/26	DATE: 05-08-91	C.D. 4
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PROJ. NO. 18/26-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 13th Avenue and Elm Street

PROJECT NUMBER: 18/26-1

DESCRIPTION: Run off flows south to a corner formed by 13th Avenue and Elm Street.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Extend 13th Avenue to Highland.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$260,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$26,000

FIELD INSPECTION DATE: 3/7/91/PK

LOCATIONS OF KNOWN FLOODING:
1219 West Elm (4709 North 13th Avenue)

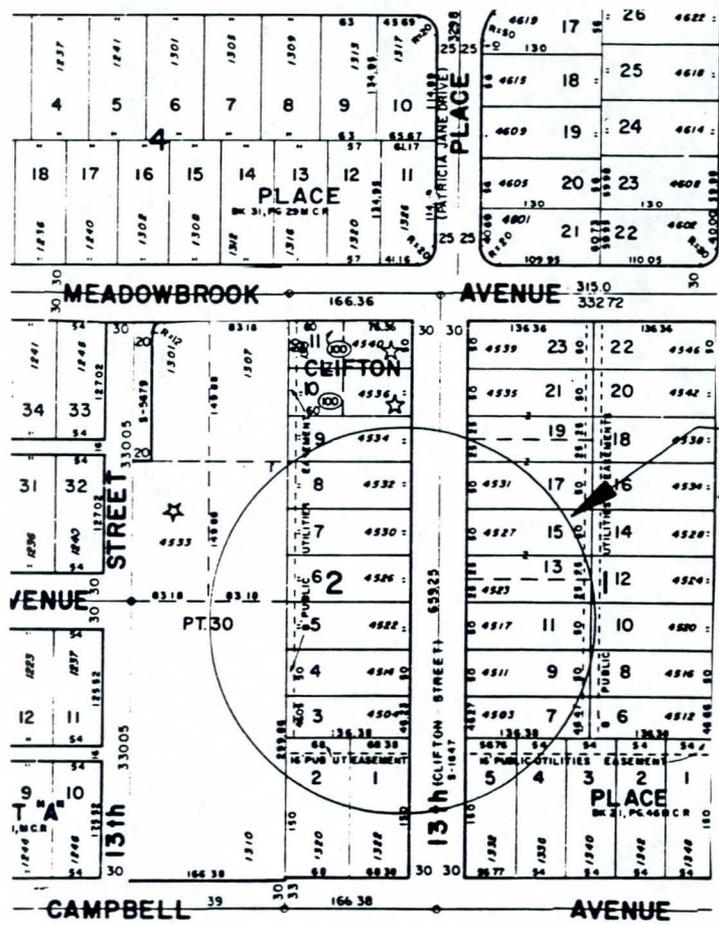
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low

Streets which drain to the end of a cul de sac or otherwise dead end

Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS
PROJECT

SUBDIVISION NAME: CLIFTON PLACE (COUNTY)

DATE SUBDIVIDED: 07-29-29



NO SCALE

PROJECT NAME: 13TH PLACE & MEADOWBROOK	QS 18/30	DATE: 05-08-91	C.D. 6
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PROJ. NO. 18/30-1

27

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 13th Place and Meadowbrook Avenue

PROJECT NUMBER: 18/30-1

DESCRIPTION: Drainage from the north exceeds street capacity.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Reconstruct 13th Place with inverted crown & catch basins.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$300,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$15,000

FIELD INSPECTION DATE: 3/7/91/PK

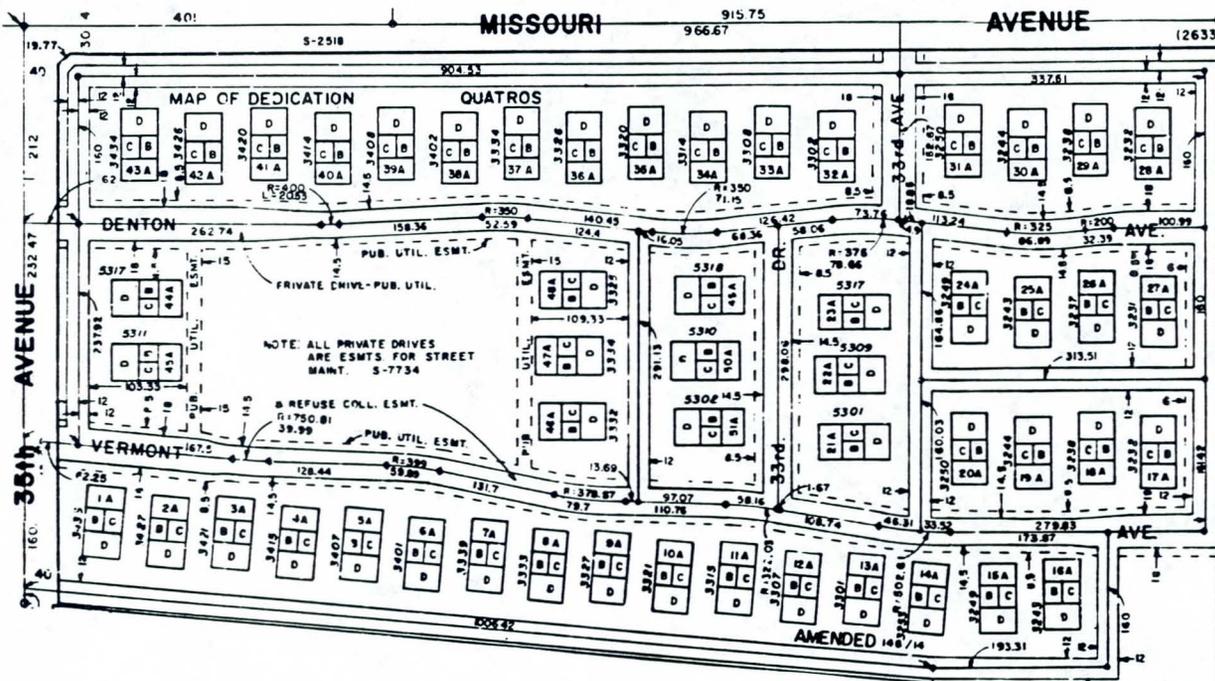
LOCATIONS OF KNOWN FLOODING:
4500 North 13th Place

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

PROJ. NO. 19/21-1



SUBDIVISION NAME: QUATROS AMENDED (CITY)

DATE SUBDIVIDED: 1-1-73



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
35th AVENUE & MISSOURI AVENUE	19/21	7-1-91	5

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 35th Avenue and Missouri Avenue

PROJECT NUMBER: 19/21-1

DESCRIPTION: Storm water exceeds capacity of Missouri Avenue and floods condominium complex to south. There are no streets from Missouri south from 30th Drive to 35th Avenue.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Purchase right of way and construct 31st Avenue with inverted crown and storm drain from Missouri to Camelback.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

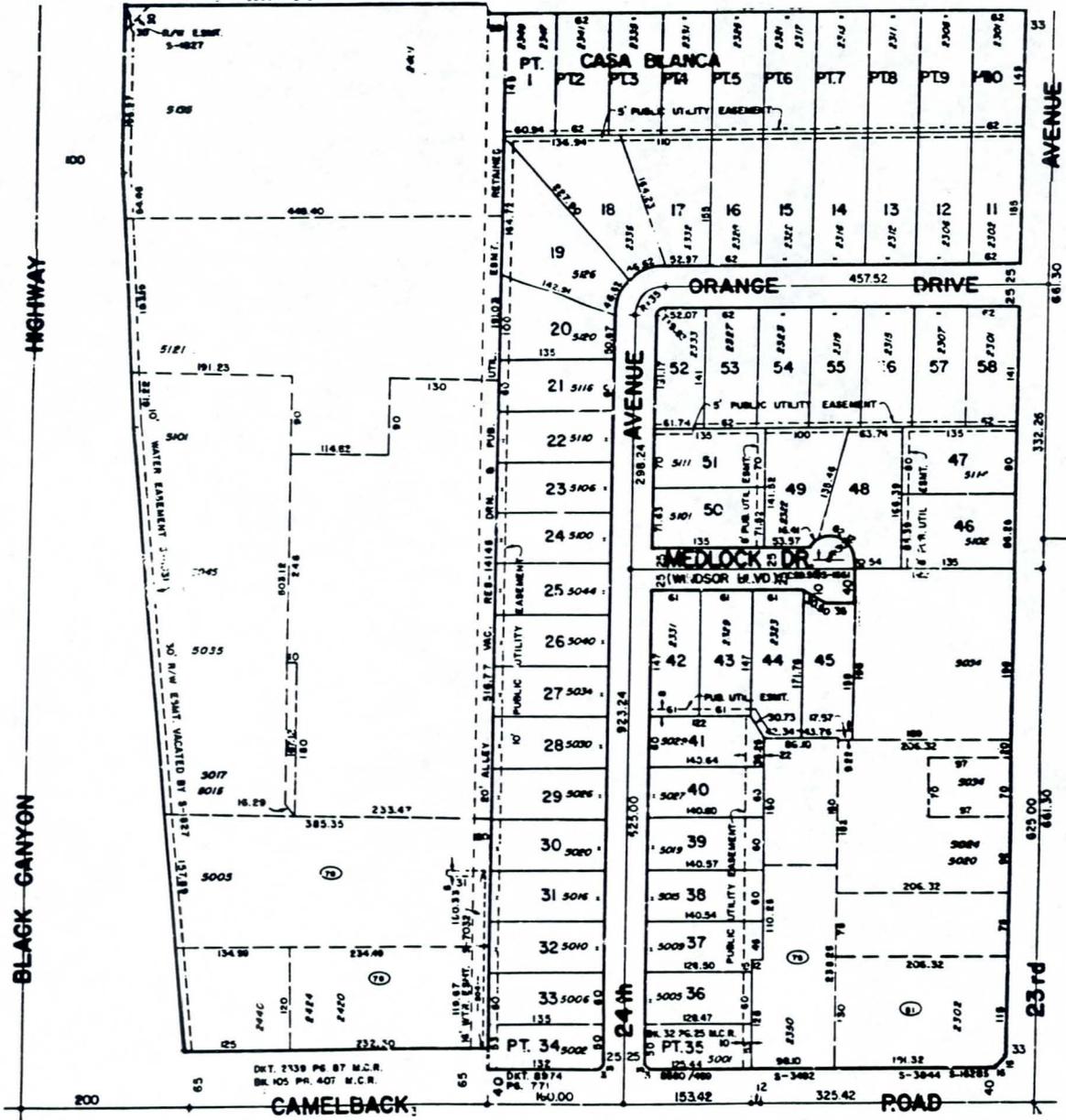
FIELD INSPECTION DATE: 5/31/91/PK

LOCATIONS OF KNOWN FLOODING:
Quatros Condominiums (7 units)
Southeast corner

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Major storm run-off exceeds street capacity

LFMP66

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: UNSUBDIVIDED (CITY)

DATE SUBDIVIDED: 1-1-69

NO SCALE

PROJECT NAME: 24th AVENUE & CAMELBACK ROAD	QS 19/23	DATE: 7-1-91	C.D. 4
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PROJ. NO. 19/23-1

29

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 24th Avenue and Camelback Road

PROJECT NUMBER: 19/23-1

DESCRIPTION: This intersection is a low area which cannot drain. Water ponds to 2' - 3' of depth before flooding car dealerships to south. Drainage is cut off south of car dealerships. There is a three foot rise to 23rd Avenue.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Purchase 20 homes and construct a detention basin, or owners construct flood walls. NOTE: Drain to south is blocked by numerous condominiums, apartments, and businesses.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$100,000

FIELD INSPECTION DATE: 6/14/91/PK

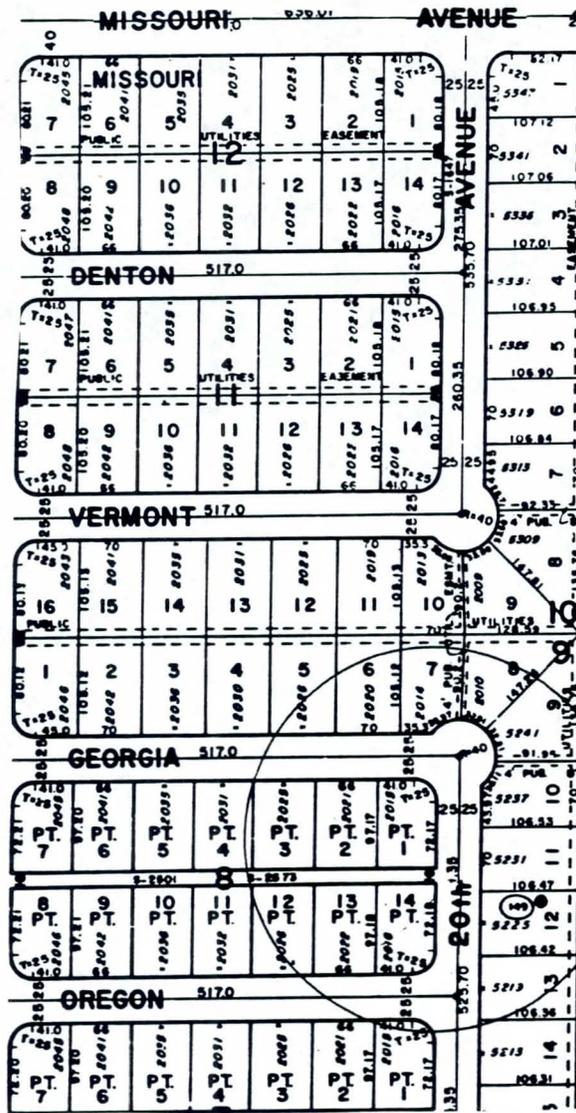
LOCATIONS OF KNOWN FLOODING:
5015, 5002 North 24th Avenue
2331 West Camelback Road

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Failure to allow drainage through new projects

LFMP16

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS
PROJECT

SUBDIVISION NAME: MISSOURI PARKWAY (COUNTY)

DATE SUBDIVIDED: 05-29-50



NO SCALE

PROJECT NAME:

20th AVENUE AND GEORGIA AVENUE

QS

19/24

DATE:

06-03-91

C.D.

4

PROJ. NO. 19/24-1

30

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 20th Avenue and Georgia Avenue

PROJECT NUMBER: 19/24-1

DESCRIPTION: Storm water flows south and east on 20th Avenue and Georgia Avenue. It exceeds street capacity. Also some dead end intersections.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct 21st Avenue with storm drain and inverted crown from Missouri to Camelback. Also Georgia and 20th Avenue. Maybe connect Vermont and Georgia on 20th alignment.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 5/31/91/PK

LOCATIONS OF KNOWN FLOODING:

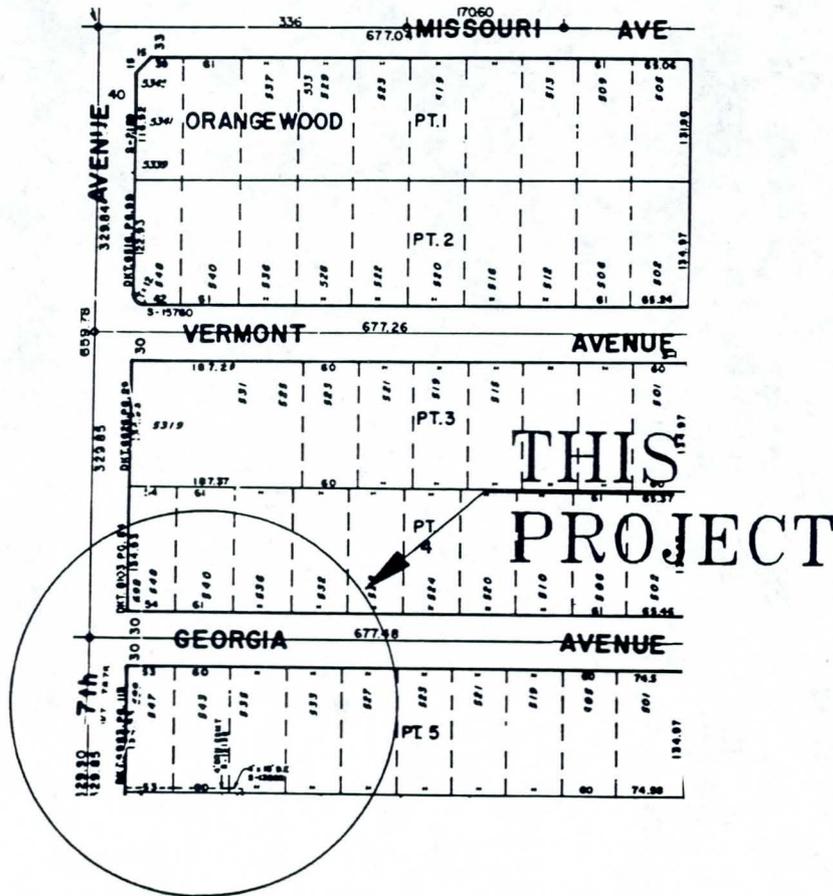
2009 West Colter
5237 North 20th Avenue
2010 West Georgia Avenue

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Streets which drain to the end of a cul de sac or otherwise dead end
Major storm run-off exceeds street capacity

LFMP68

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



THIS
 PROJECT

SUBDIVISION NAME: ORANGEWOOD ESTATES (COUNTY)

DATE SUBDIVIDED: 09-25-28



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
7th AVENUE AND GEORGIA AVENUE	19/27	06-03-91	4

PROJ. NO. 19/27-1

31

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 7th Avenue and Georgia

PROJECT NUMBER: 19/27-1

DESCRIPTION: Storm water exceeds street capacity. Georgia is lower than 7th Avenue. This is a Special Flood Hazard Area according to the Flood Insurance Rate Map.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 200

SUGGESTED SOLUTION: Construct local street with inverted crowns and storm drains.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$6,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$100,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

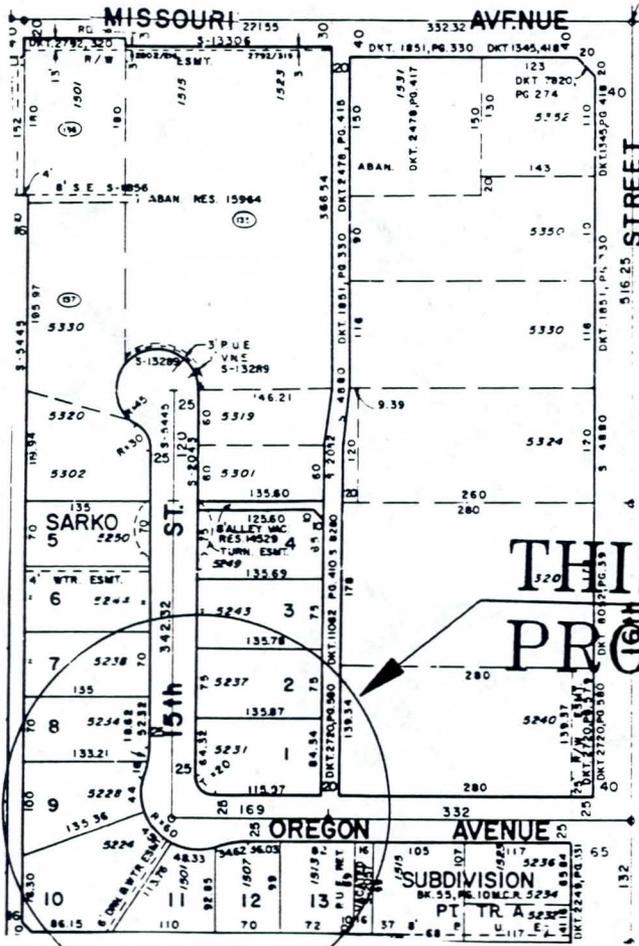
FIELD INSPECTION DATE: 5/31/91/PK

LOCATIONS OF KNOWN FLOODING:
527 West Georgia Avenue

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP71

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



**THIS
PROJECT**

SUBDIVISION NAME: SARKO SUBDIVISION (COUNTY)

DATE SUBDIVIDED: 01-26-53



NO SCALE

PROJECT NAME: 15TH STREET & OREGON AVENUE	QS 19/30	DATE: 06-05-91	C.D. 6
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PROJ. NO. 19/30-1

32

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 5th Street and Oregon Avenue

PROJECT NUMBER: 19/30-1

DESCRIPTION: Storm water flows to corner of 5th Street and Oregon Avenue. There is no outlet for the drainage other than a 12" pipe for nuisance water.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Purchase right of way and construct street or channel to the west or south.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$50,000

FIELD INSPECTION DATE: 5/31/91/PK

LOCATIONS OF KNOWN FLOODING:
1501 East Oregon Avenue

CONTRIBUTING FACTORS:

Constructed prior to Development Standards

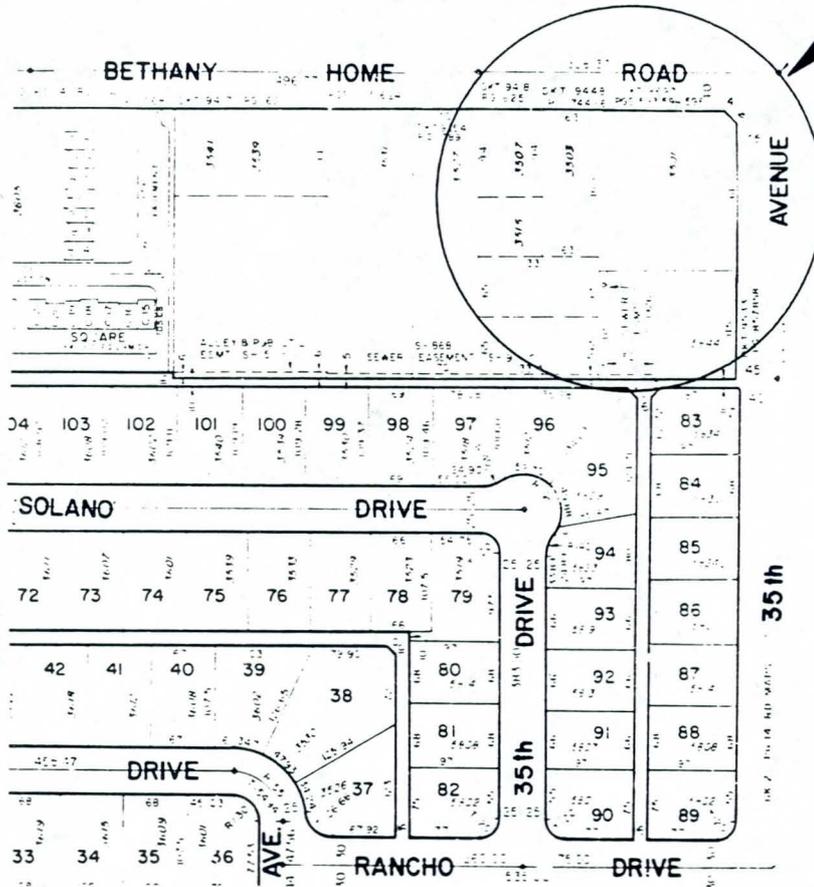
Floors too low

Streets which drain to the end of a cul de sac or otherwise dead end

LFMP75

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

**THIS
 PROJECT**



SUBDIVISION NAME: LISTEL VISTA (COUNTY)

DATE SUBDIVIDED: 01-12-55



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
35th AVENUE AND BETHANY HOME ROAD	20/20	06-03-91	5

PROJ. NO. 20/20-1

33

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 35th Avenue and Bethany Home Road

PROJECT NUMBER: 20/20-1

DESCRIPTION: Storm water exceeds capacity of Bethany Home Road.
No outlet to south. Floods apartments and homes south of Bethany
Home Road. Bethany Home is very flat here.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Purchase land and extend 37th Avenue 500'
north to Bethany Home Road. Construct 1/2 mile 37th Avenue with
storm drain and inverted crown.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 5/31/91/PK

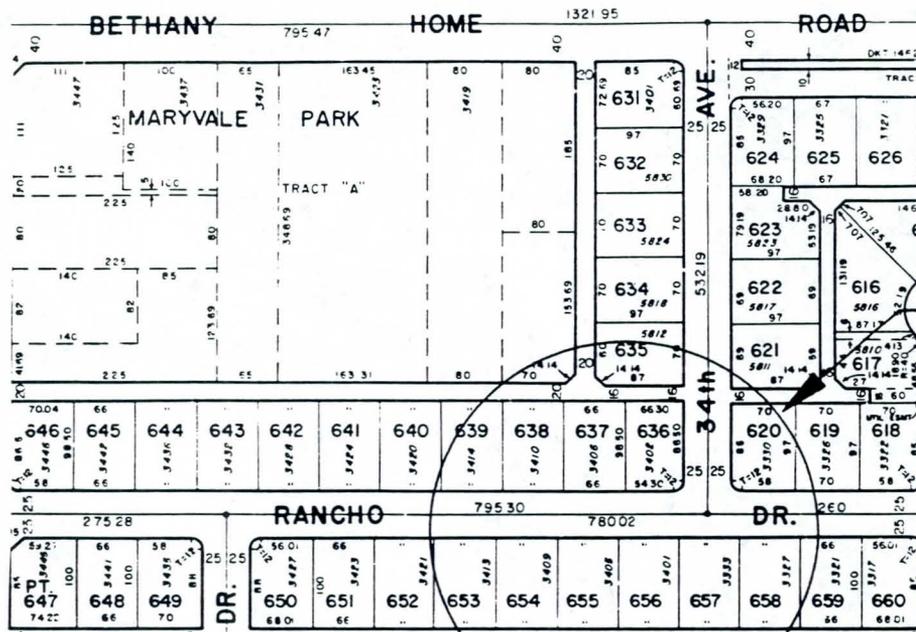
LOCATIONS OF KNOWN FLOODING:
3625 West Bethany Home Road

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Major storm run-off exceeds street capacity

LFMP67

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

PROJ. NO. 20/21-1



THIS
PROJECT

SUBDIVISION NAME: MARYVALE PARK #3 (COUNTY)

DATE SUBDIVIDED: 04-22-53



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
34TH AVENUE & BETHANY HOME ROAD	20/21	06-04-91	5

34

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 34th Avenue and Bethany Home Road

PROJECT NUMBER: 20/21-1

DESCRIPTION: Storm water exceeds capacity of Bethany Home which is flat (E/W). Floods homes below curb on south side of street.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct inverted crown and storm drain for 33rd Avenue to Missouri.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 5/31/91/PK

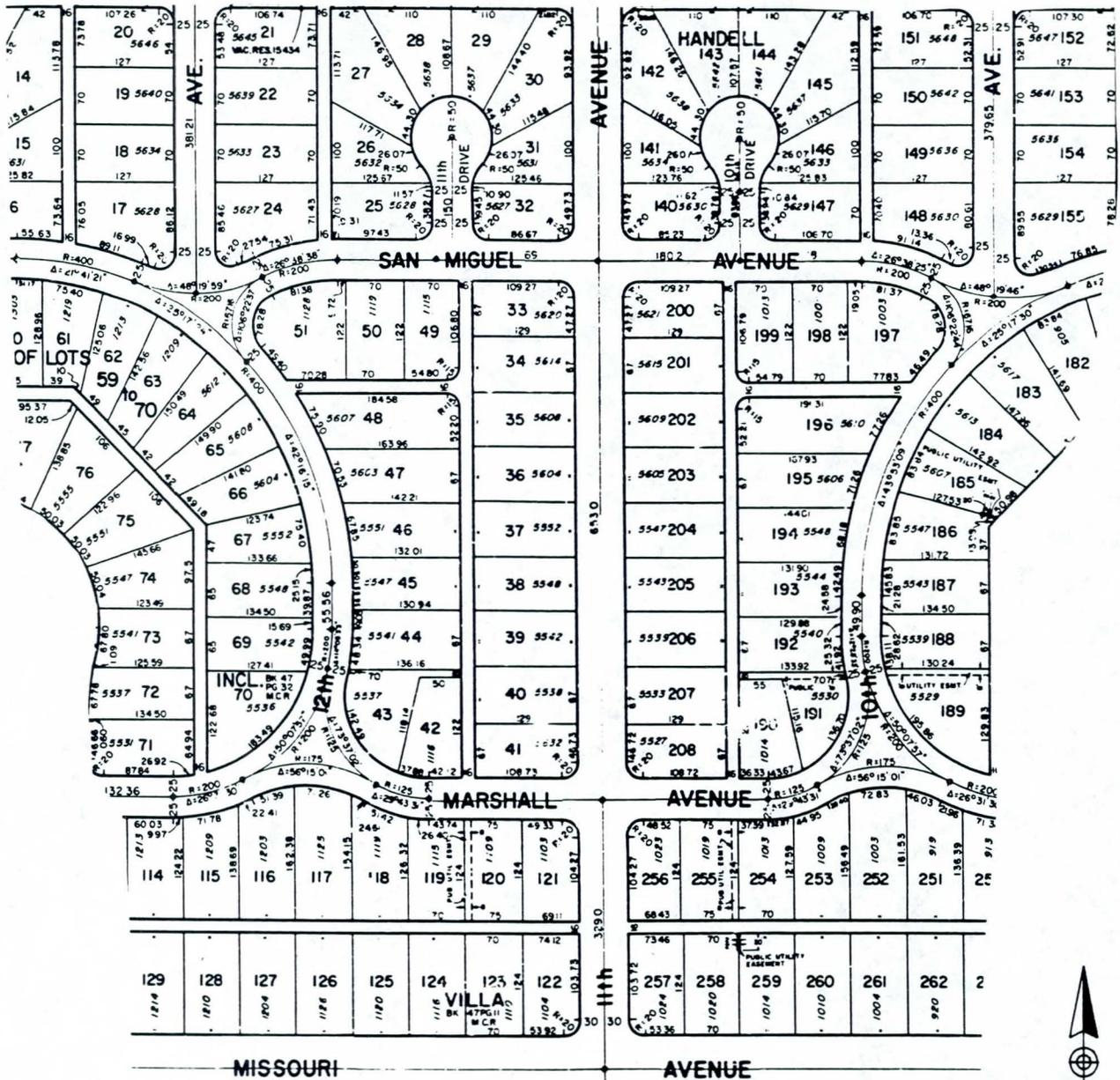
LOCATIONS OF KNOWN FLOODING:
3329 West Bethany Home Road

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Major storm run-off exceeds street capacity

LFMP65

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: HANDELL VILLA ANNEX (COUNTY)

DATE SUBDIVIDED: 09-05-50

NO SCALE

PROJECT NAME: 11TH AVENUE & SAN MIGUEL AVENUE	QS 20/26	DATE: 06-04-91	C.D. 4
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PROJ. NO. 20/26-1

35

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 11th Avenue and San Miguel Avenue

PROJECT NUMBER: 20/26-1

DESCRIPTION: Storm water exceeds capacity of 19th Avenue, 11th Avenue, and 7th Avenue. Flows into local streets which overflow into homes. This is a Special Flood Hazard Area according to the Flood Insurance Rate Map.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 200

SUGGESTED SOLUTION: Inverted crown streets with storm drains for 15th Avenue and 11th Avenue. Open up bottleneck at 10th Avenue and Montebello Avenue.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$6,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$100,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

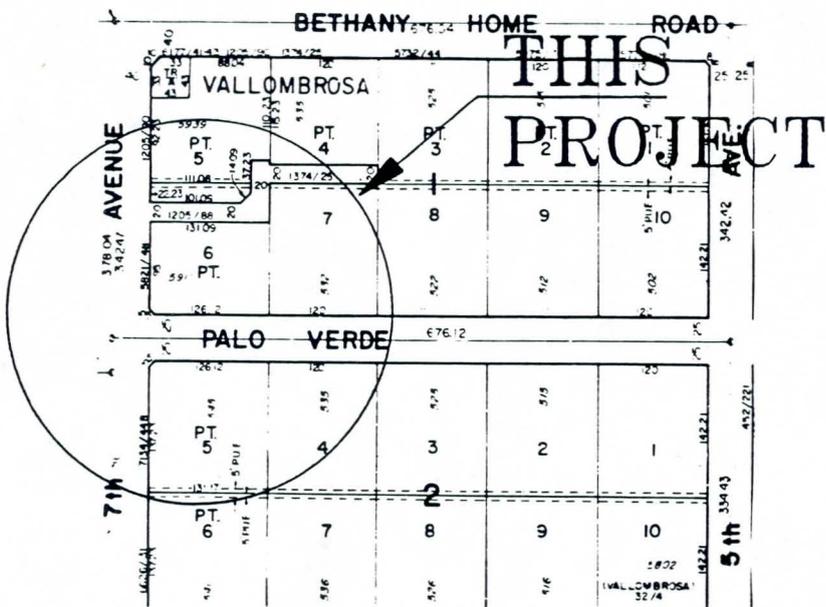
FIELD INSPECTION DATE: 5/31/91/PK

LOCATIONS OF KNOWN FLOODING:
719 West San Miguel
5633, 5629 North 10th Drive
1309 West Marshall Avenue

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP70

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: VALLOBROSA (COUNTY)

DATE SUBDIVIDED: 09-17-47



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
7TH AVENUE & PALOVERDE DRIVE	20/27	06-04-91	4

PROJ. NO. 20/27-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 7th Avenue and Palo Verde Drive

PROJECT NUMBER: 20/27-1

DESCRIPTION: Storm water exceeds street capacity. This is a Special Flood Hazard Area according to the Flood Insurance Rate Map.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 200

SUGGESTED SOLUTION: Construct local streets with inverted crowns and storm drains.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$6,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$100,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 5/31/91/PK

LOCATIONS OF KNOWN FLOODING:

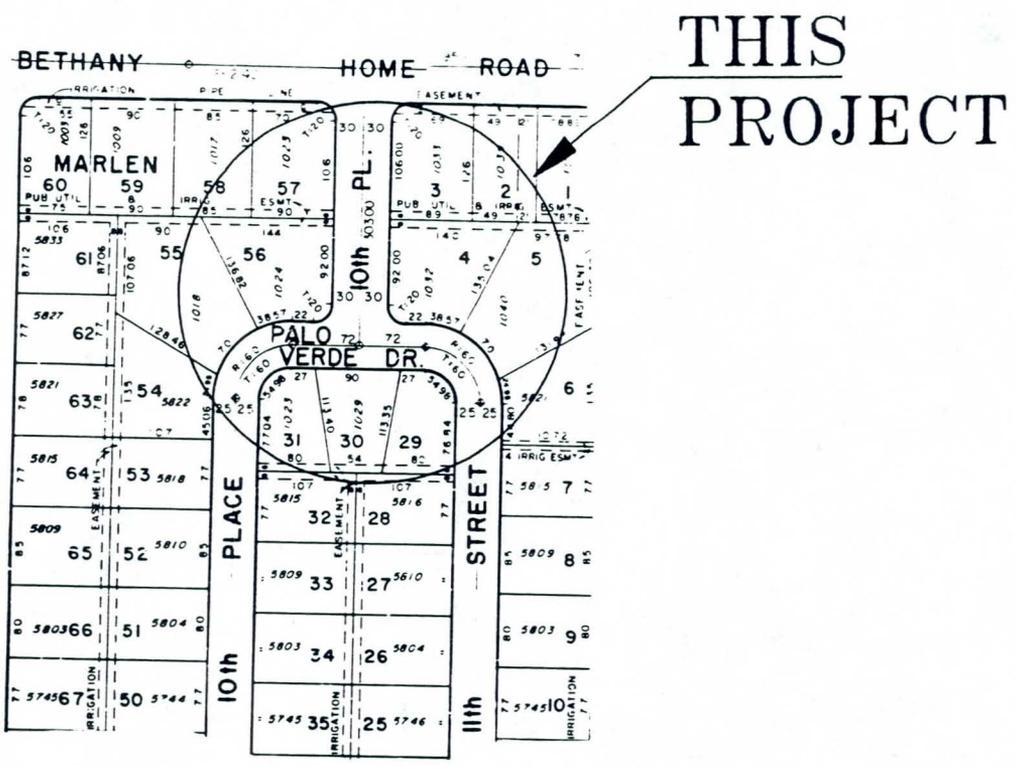
5802 North 5th Avenue
526 West Rancho Drive
119 West Marshall Avenue
525 West Bethany Home Road
525 West Palo Verde Drive
547 West San Juan

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP72

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



**THIS
PROJECT**

SUBDIVISION NAME: MARLEN GROVE (COUNTY)

DATE SUBDIVIDED: 05-11-50



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
10TH PLACE & BETHANY HOME ROAD	20/29	06-04-91	4

PROJ. NO. 20/29-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 10th Place and Bethany Home Road

PROJECT NUMBER: 20/29-1

DESCRIPTION: Storm water exceeds capacity of Bethany Home Road
and floods home to south.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct 10th Street and Rose Lane with
inverted crown and storm drain to bleed water off major street
and to provide retention.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

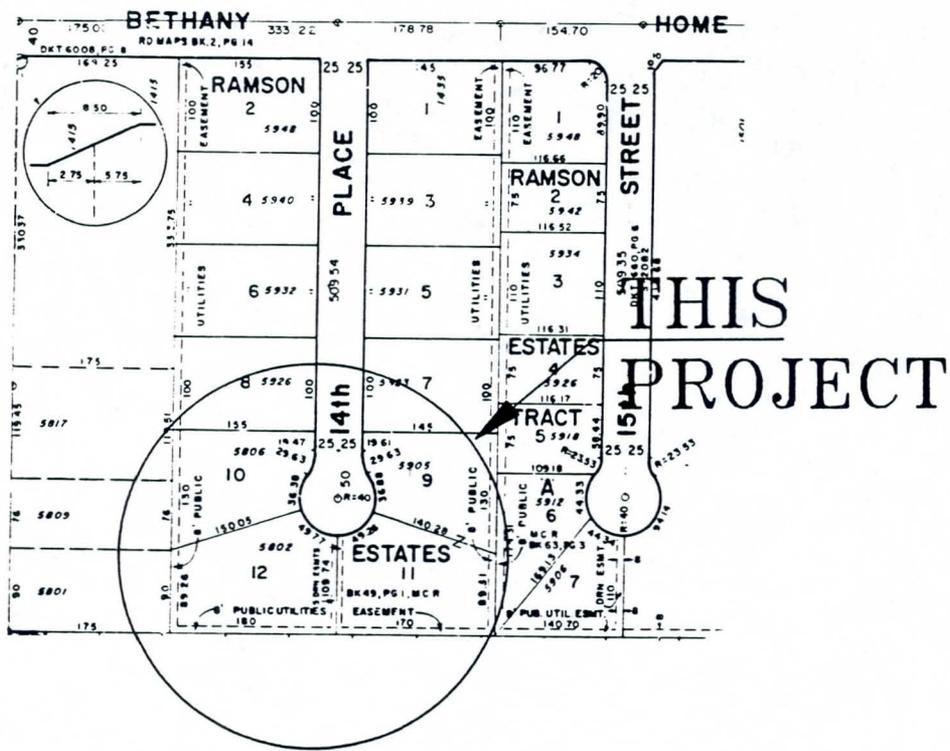
FIELD INSPECTION DATE: 5/31/91/PK

LOCATIONS OF KNOWN FLOODING:
1033 East Bethany Home Road

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP76

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: RAMSON ESTATES (COUNTY)

DATE SUBDIVIDED: 09-21-50



NO SCALE

PROJECT NAME: 14TH PLACE & BETHANY HOME ROAD	QS 20/30	DATE: 06-04-91	C.D. 6
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PROJ. NO. 20/30-1

38

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 14th Place and Bethany Home Road

PROJECT NUMBER: 20/30-1

DESCRIPTION: Storm water exceeds capacity of Bethany Home Road and floods homes on south side which are below curb height.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct 14th Street and Montebello Avenue with inverted crown and storm drain. Purchase right of way to complete 14th Street. Purchase four houses and construct drain for 14th Place & 15th Street cul de sacs.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$40,000

FIELD INSPECTION DATE: 5/31/91/PK

LOCATIONS OF KNOWN FLOODING:
5940 North 14th Place

CONTRIBUTING FACTORS:

Constructed prior to Development Standards

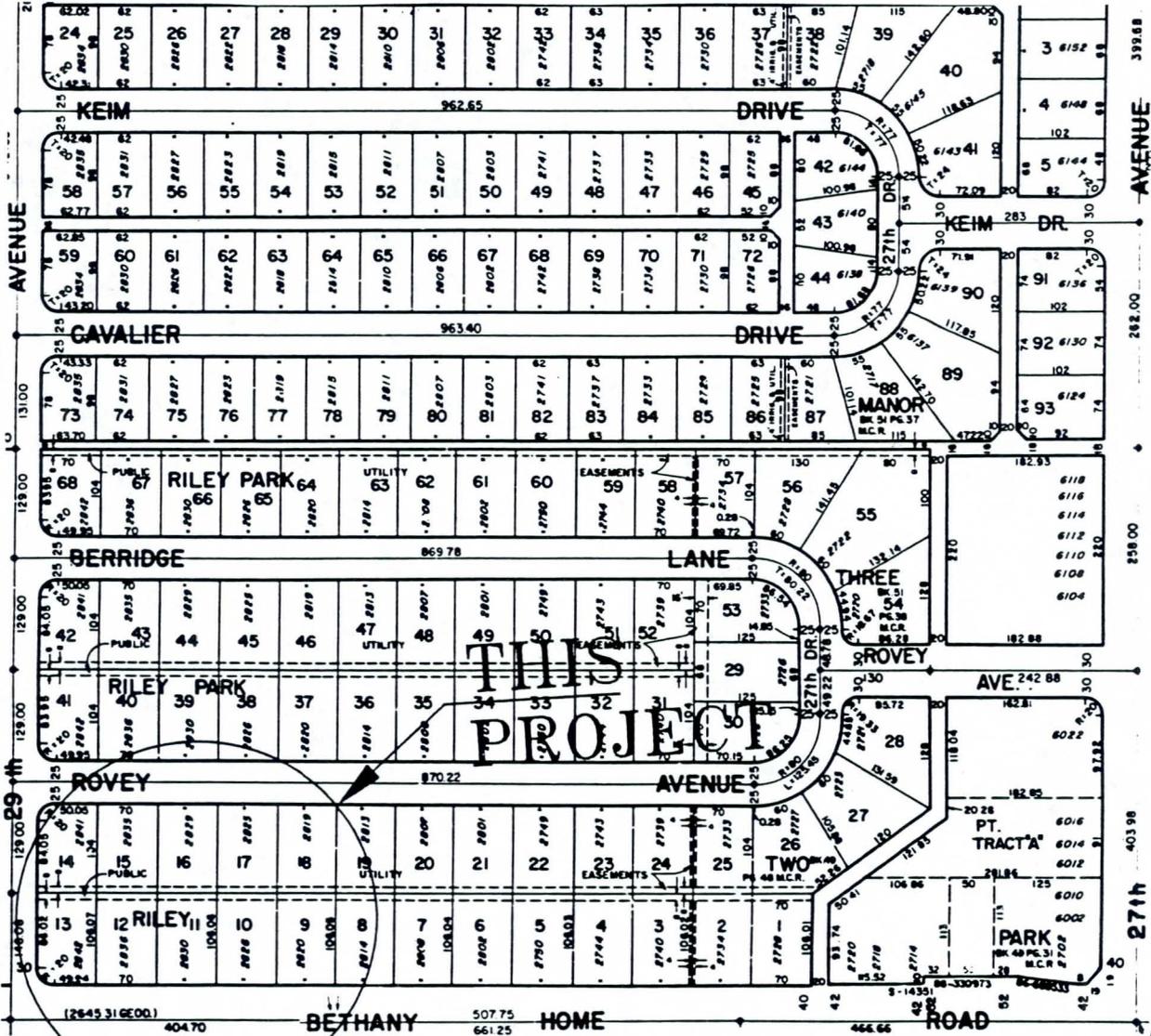
Floors too low

Streets which drain to the end of a cul de sac or otherwise dead end

Major storm run-off exceeds street capacity

LFMP79

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: RILEY PARK (COUNTY)

DATE SUBDIVIDED: 01-22-51

NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
29TH AVENUE & BETHANY HOME ROAD	21/22	05-08-91	5

PROJ. NO. 21/22-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 29th Avenue and Bethany Home Road

PROJECT NUMBER: 21/22-1

DESCRIPTION: Water from north floods from 29th Avenue onto Keim Drive, Cavalier Drive, Berridge Lane, Rovey Avenue, and Bethany Home Road.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Reconstruct Rose Lane, 29th Avenue, and Bethany Home Road with inverted crowns.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$25,000

FIELD INSPECTION DATE: 4/18/91/PK

LOCATIONS OF KNOWN FLOODING:

2810 West Keim Drive

2813, 2820, 2825, 2829, 2830, 2835, 2836, 2841 West Rovey Avenue

2820, 2826, 2830, 2836, 2842 West Bethany Home Road

CONTRIBUTING FACTORS:

Constructed prior to Development Standards

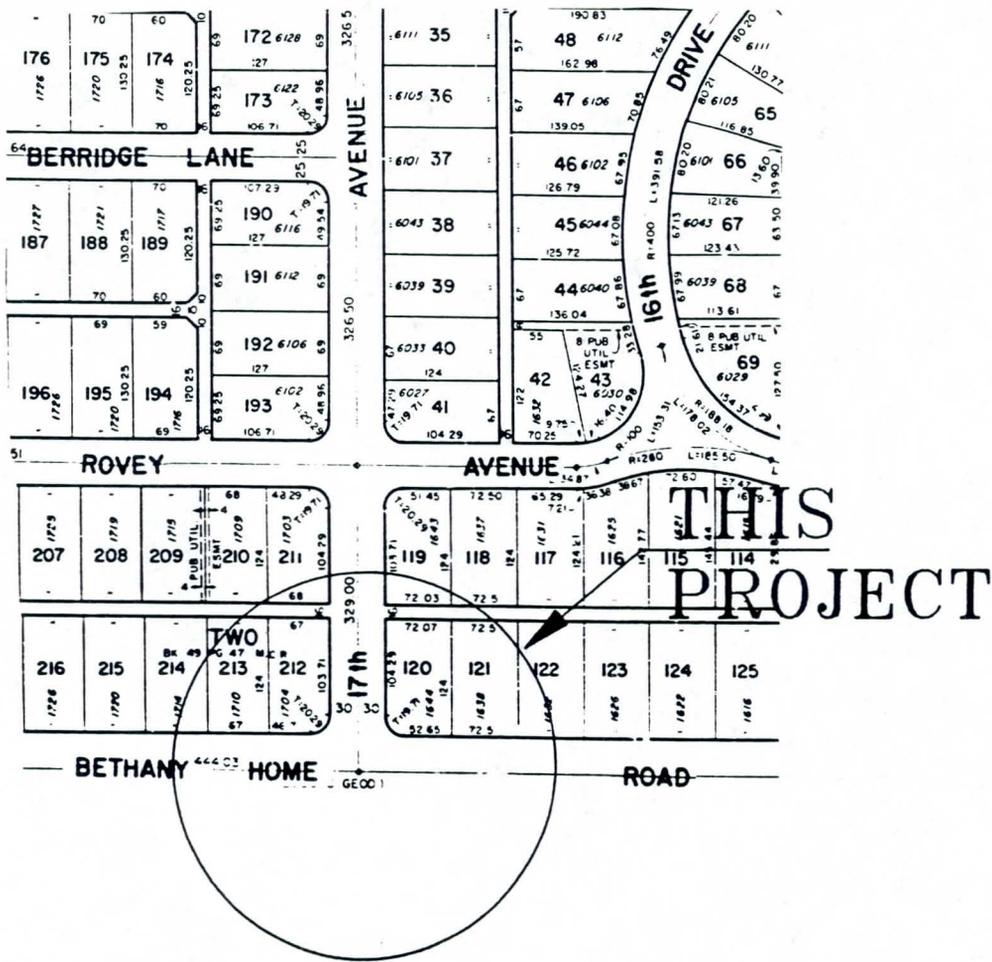
Floors too low

Major storm run-off exceeds street capacity

LFMP18

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

PROJ. NO. 21/25-1



SUBDIVISION NAME: HOFFMAN TOWN (COUNTY)

DATE SUBDIVIDED: 12-18-50



NO SCALE

PROJECT NAME: 17TH AVENUE & BETHANY HOME ROAD	QS 21/25	DATE: 06-05-91	C.D. 4
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40

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 17th Avenue and Bethany Home Road

PROJECT NUMBER: 21/25-1

DESCRIPTION: Storm water exceeds capacity of streets in the area including Bethany Home Road. Chris Town Shopping Mall cuts off drainage to south. This is low point of Old Cave Creek Wash.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 200

SUGGESTED SOLUTION: Construct streets with inverted crowns and storm drains. Rose Lane, 17th Avenue and 15th Avenue south of Bethany Home Road.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$6,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$100,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

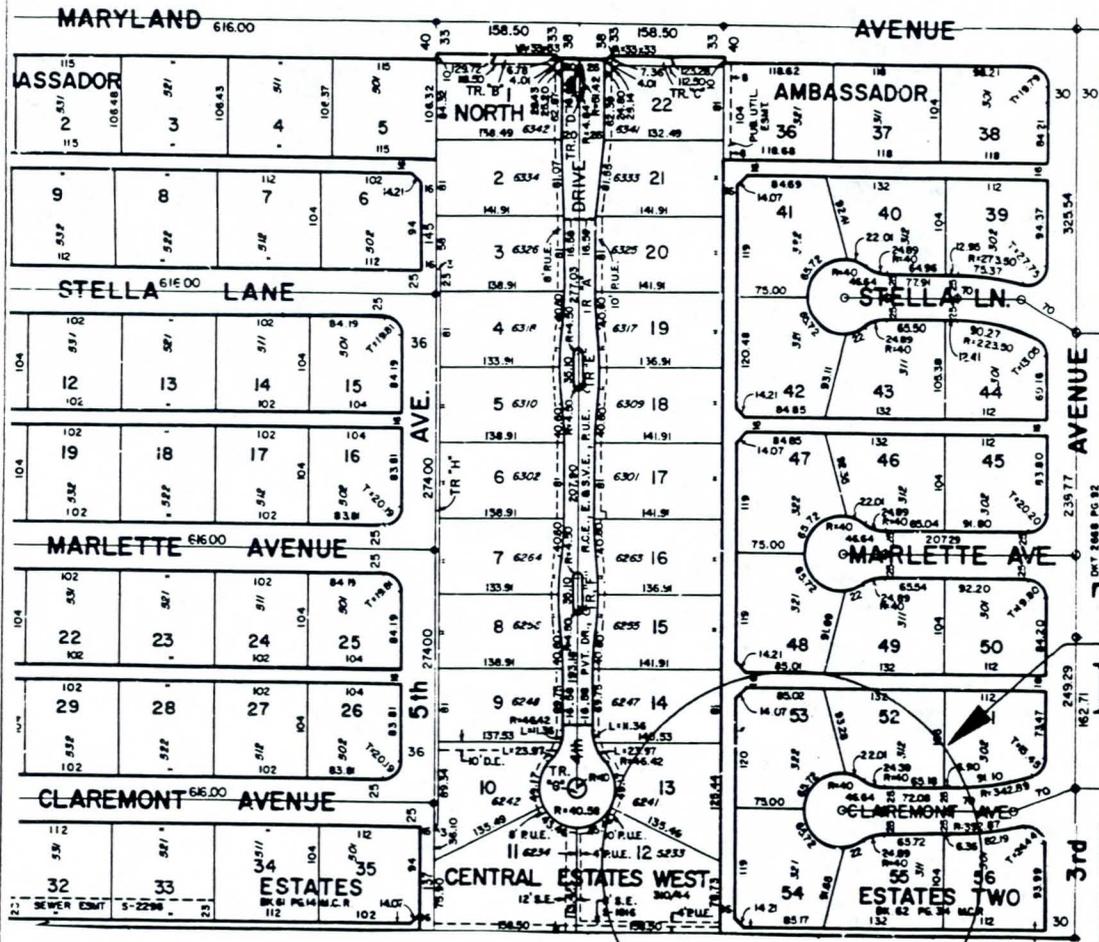
FIELD INSPECTION DATE: 5/31/91/PK

LOCATIONS OF KNOWN FLOODING:
1720, 1616 West Bethany Home Road
1619 West Keim Drive

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP69

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS
PROJECT

SUBDIVISION NAME: AMBASSADOR ESTATES TWO (COUNTY)

DATE SUBDIVIDED: 03-10-55



NO SCALE

PROJECT NAME:

3RD AVENUE & CLAREMONT AVENUE

QS

21/27

DATE:

06-04-91

C.D.

4

PROJ. NO. 21/27-1

41

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 3rd Avenue and Claremont Avenue

PROJECT NUMBER: 21/27-1

DESCRIPTION: 3rd Avenue is discontinuous to south. Only a small channel exists. Claremont is a cul de sac which drains to dead end (or is nearly flat). Storm water overflows street and floods homes which are below curb.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Purchase right of way and construct 3rd Avenue and Rose Lane with inverted crown and storm drain. Construct Claremont cul de sac to drain to east.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 5/31/91/PK

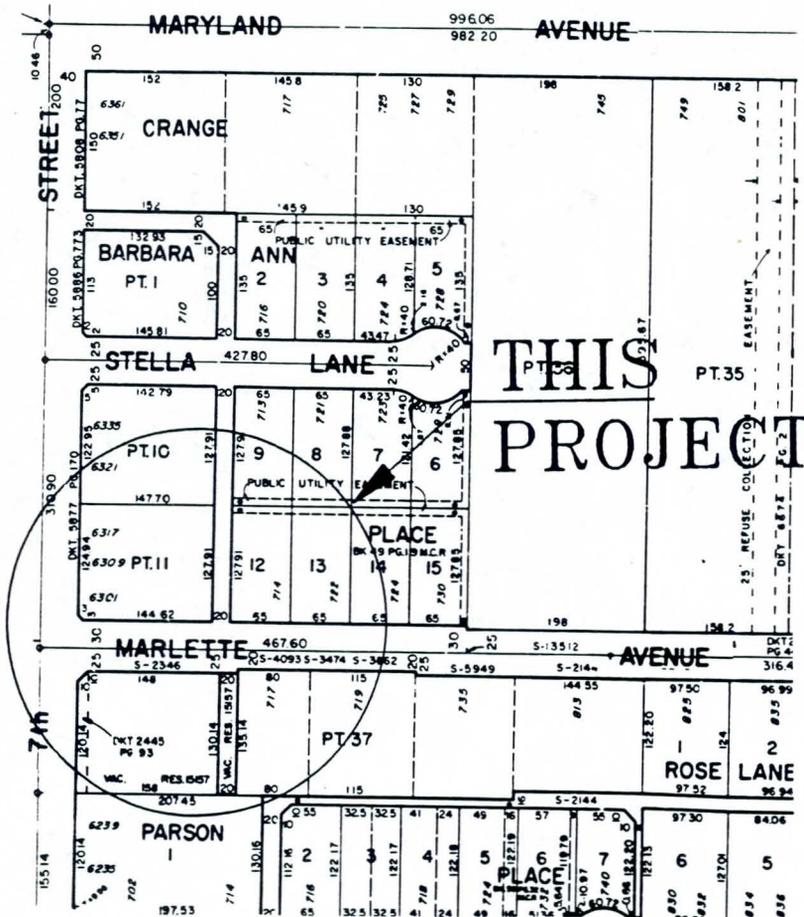
LOCATIONS OF KNOWN FLOODING:
303, 311, 312, 321, and 322 West Claremont Avenue

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Failure to allow drainage through new projects
Streets which drain to the end of a cul de sac or otherwise dead end
Major storm run-off exceeds street capacity

LFMP77

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: UNSUBDIVIDED (COUNTY)

DATE SUBDIVIDED: 08-12-11



NO SCALE

PROJECT NAME: 7TH STREET & MARLETTE AVENUE	QS 21/29	DATE: 06-04-91	C.D. 3
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PROJ. NO. 21/29-1

42

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 7th Street and Marlette Avenue

PROJECT NUMBER: 21/29-1

DESCRIPTION: Storm water exceeds capacity of Marlette Avenue and floods homes and apartments which are below curb height.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Reconstruct Rose Lane, 10th Street, Marlette Avenue, and Claremont Avenue with storm drain and inverted crown.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 5/31/91/PK

LOCATIONS OF KNOWN FLOODING:
812 East Marlette Avenue

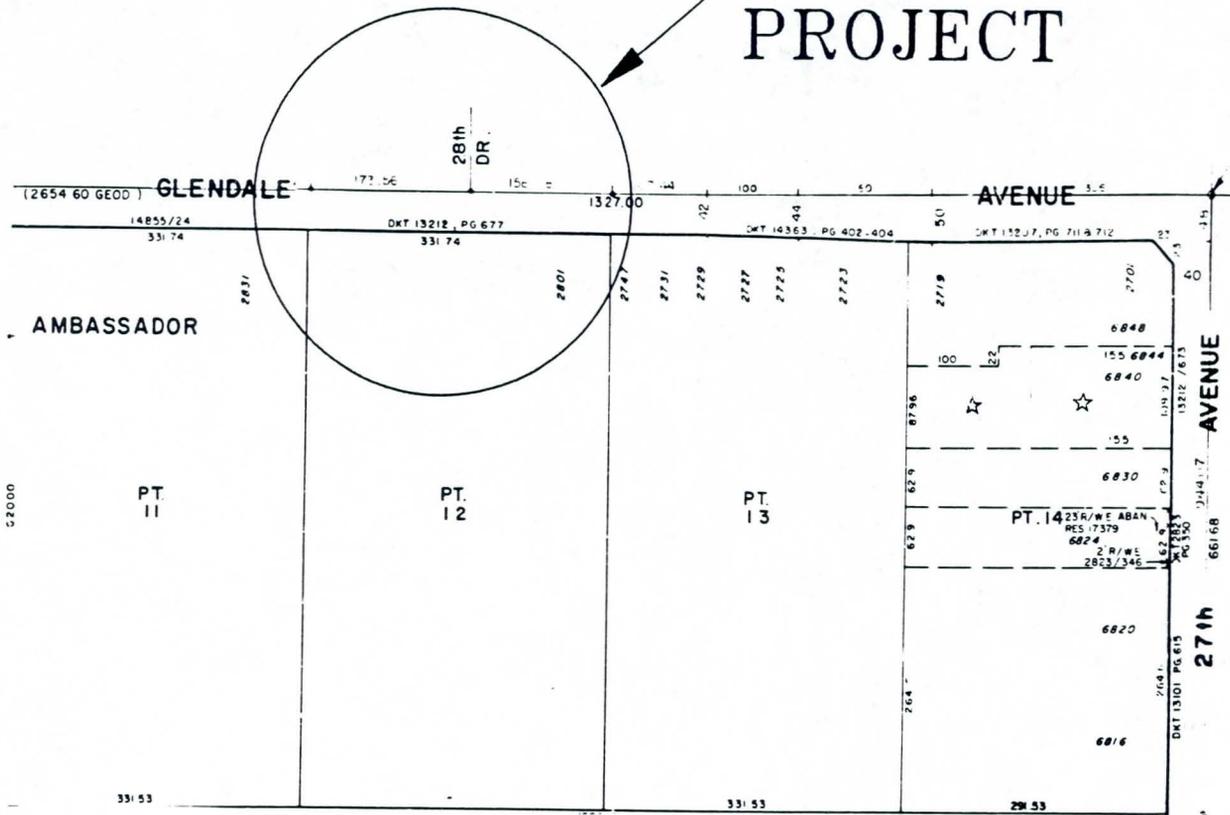
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP80

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

**THIS
PROJECT**



SUBDIVISION NAME: AMBASSADOR HEIGHTS (COUNTY)

DATE SUBDIVIDED: 11-09-23



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
28TH DRIVE & GLENDALE AVENUE	22/22	06-04-91	5

PROJ. NO. 22/22-1

43

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 26th Drive and Glendale Avenue

PROJECT NUMBER: 22/22-1

DESCRIPTION: Storm water exceeds capacity of Glendale Avenue and 27th Avenue and floods properties below curbs.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Purchase right of way and construct 23rd Drive from Glendale to Maryland.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$100,000

FIELD INSPECTION DATE: 6/1/91/PK

LOCATIONS OF KNOWN FLOODING:
2801 West Glendale Avenue
6824 North 27th Avenue

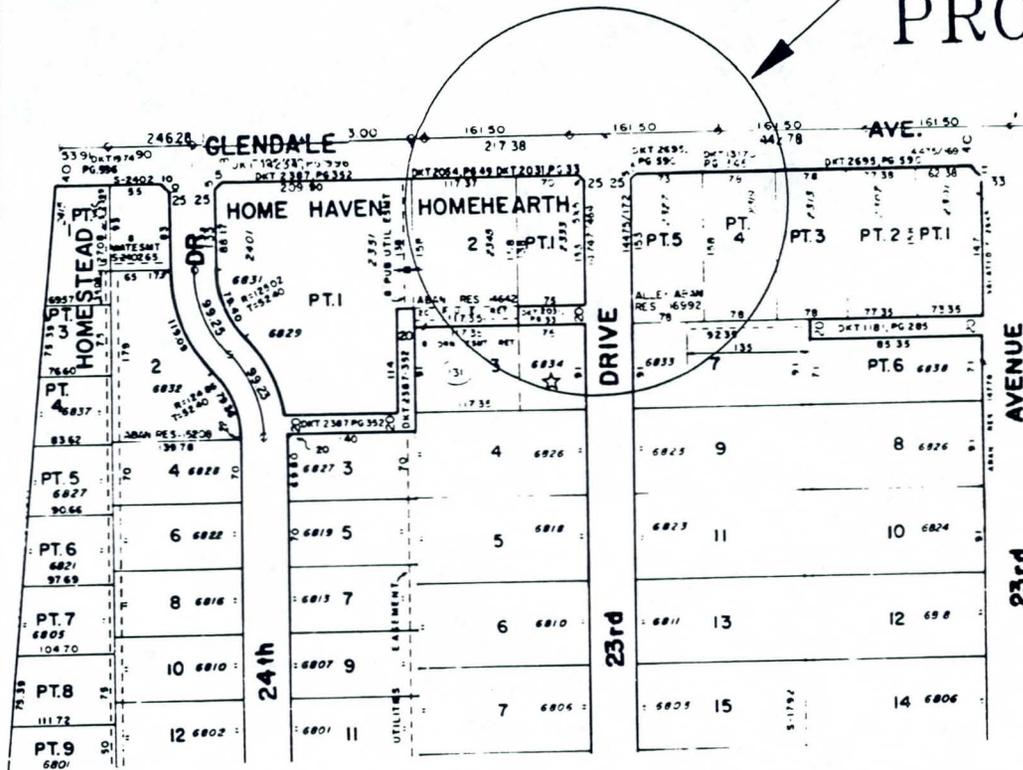
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Major storm run-off exceeds street capacity

LFMP85

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

**THIS
PROJECT**



SUBDIVISION NAME: HOMEHEARTH ADDITION (COUNTY)

DATE SUBDIVIDED: 01-23-46



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
23RD DRIVE & GLENDALE AVENUE	22/23	06-04-91	4

PROJ. NO. 22/23-1

AA

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 23rd Drive and Glendale Avenue

PROJECT NUMBER: 22/23-1

DESCRIPTION: Storm water exceeds street capacity and floods homes lower than curb elevation.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct 5,000 L.F. of inverted crown streets with storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/1/91/PK

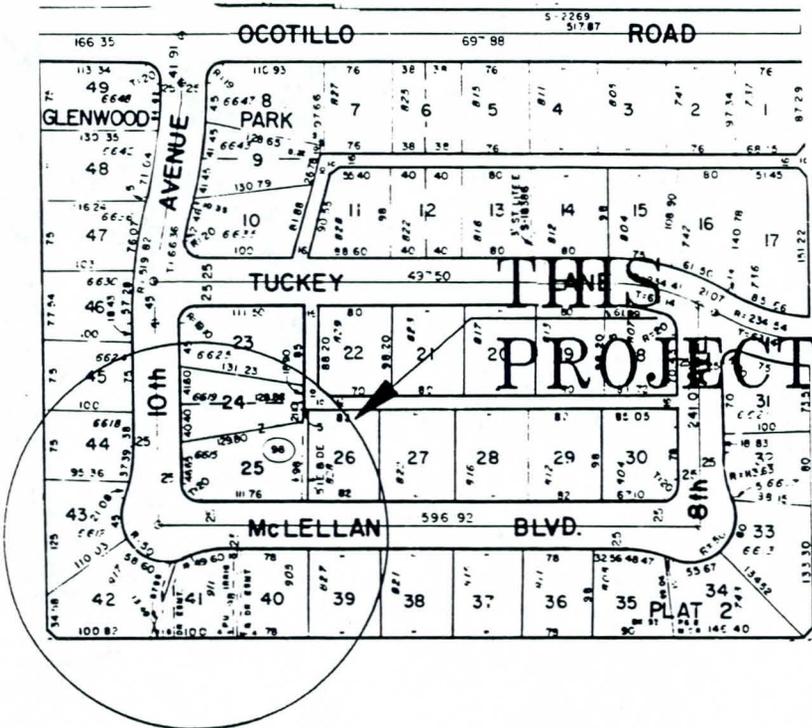
LOCATIONS OF KNOWN FLOODING:
6805 North 23rd Drive

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP84

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: GLENWOOD PARK PLAT #2 (COUNTY)

DATE SUBDIVIDED: 12-04-51



NO SCALE

PROJECT NAME: 10TH AVENUE & MCLELLAN BLVD.	QS 22/26	DATE: 05-30-91	C.D. 4
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PROJ. NO. 22/26-1

45

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 10th Avenue and McLellan Boulevard

PROJECT NUMBER: 22/26-1

DESCRIPTION: Storm water from 7th Avenue flows west on Ocotillo Road and Tuckey Lane, thence south on 10th Avenue and 8th Avenue into dead-end corner formed by 10th Avenue and McLellan Boulevard. Drainage easements exist south to 11th Avenue but no path exists for surface drainage. Small pipe for nuisance water.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Purchase Lot 41 of Glenwood Park Part 2 (Book 52, Page 8). Construct channel through to 11th Avenue.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$200,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 8/10/90/PK

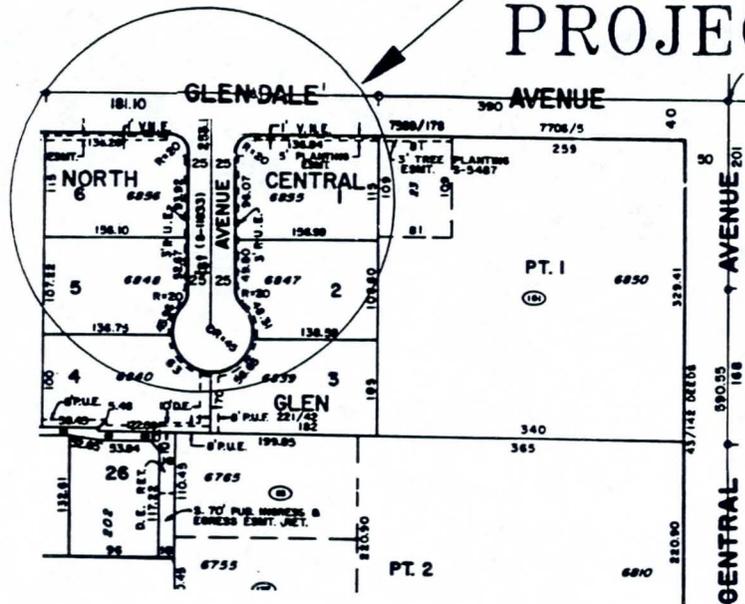
LOCATIONS OF KNOWN FLOODING:
905, 911, 917 West McLellan Boulevard
6512 North 10th Avenue

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Streets which drain to the end of a cul de sac or otherwise dead end

LFMP41

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

**THIS
PROJECT**



SUBDIVISION NAME: NORTH CENTRAL GLEN (CITY)

DATE SUBDIVIDED: 02-19-80



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
1ST AVENUE & GLENDALE AVENUE	22/27	06-04-91	4

PROJ. NO. 22/27-1

46

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 1st Avenue and Glendale Avenue

PROJECT NUMBER: 22/27-1

DESCRIPTION: Storm water exceeds the capacity of Glendale Avenue and flows into cul de sac without an outlet for drainage. 16' drainage easement is blocked.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct outlet for cul de sac, and reconstruct 3rd Avenue with inverted crown and storm drain from Glendale to Maryland to drain water south.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$40,000

FIELD INSPECTION DATE: 6/1/91/PK

LOCATIONS OF KNOWN FLOODING:
6840 North 1st Avenue

CONTRIBUTING FACTORS:

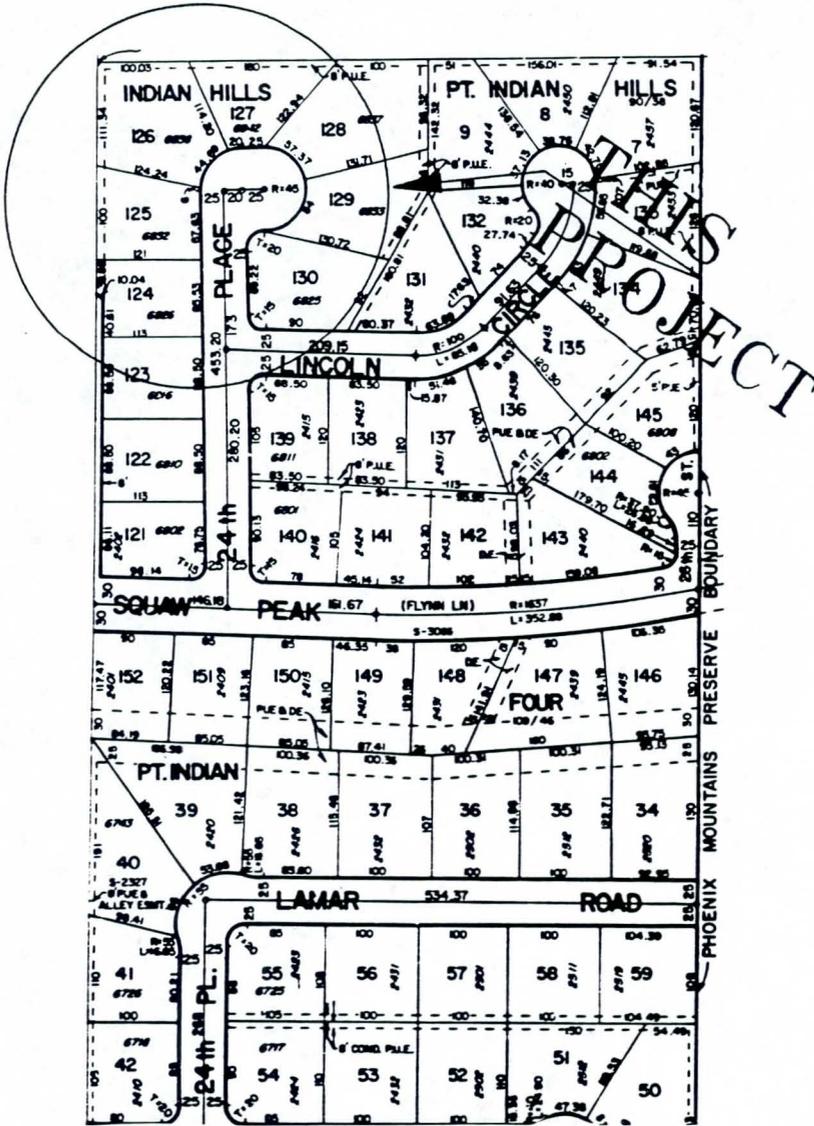
Floors too low

Streets which drain to the end of a cul de sac or otherwise dead end

Structures constructed in natural drainage channels or drainage easements

LFMP83

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: INDIAN HILLS FOUR (CITY)

DATE SUBDIVIDED: 10-13-65



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
24TH PLACE & SQUAW PEAK DRIVE	22/33	06-12-91	3

PROJ. NO. 22/33-1

A7

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 54th Place and Squaw Peak Drive

PROJECT NUMBER: 22/33-1

DESCRIPTION: Home at 6838 North 24th Place is built against mountain on Mountain Preserve. Lot has been blasted out of the mountain and is at risk from falling boulders, rocks, mud, and water.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: -0-

SUGGESTED SOLUTION: This is not a City problem. Homeowner must take action to protect the house.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$-0-

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$-0-

COST PER STRUCTURE TO REDUCE FLOODING: \$-0-

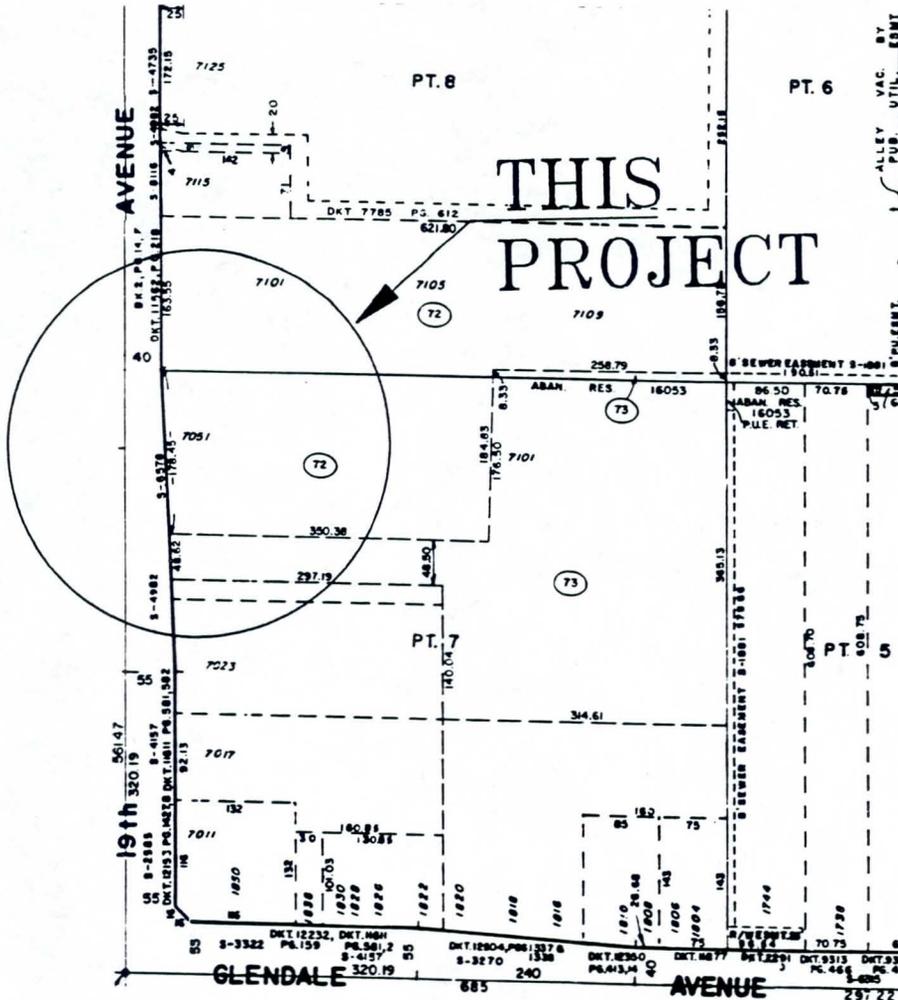
FIELD INSPECTION DATE: 6/1/91/PK

LOCATIONS OF KNOWN FLOODING:
N/A

CONTRIBUTING FACTORS:
Structure built too close to mountain.

LEMP81

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: UNSUBDIVIDED (COUNTY)

DATE SUBDIVIDED: 01-01-54



NO SCALE

PROJECT NAME: 19TH AVENUE & GLENDALE AVENUE	QS 23/25	DATE: 05-15-91	C.D. 4
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PROJ. NO. 23/25-1

48

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 19th Avenue and Glendale Avenue

PROJECT NUMBER: 23/25-1

DESCRIPTION: Storm run-off from 19th Avenue overtops curb south of Myrtle and floods vacant property at 7101 North 19th Avenue. This floods the rear of apartment located at 1744 West Glendale Avenue. There is a 4' drop across the property to the apartments.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 7

SUGGESTED SOLUTION: Flood walls or elevate structures.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$210,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$15,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 3/10/91/PK

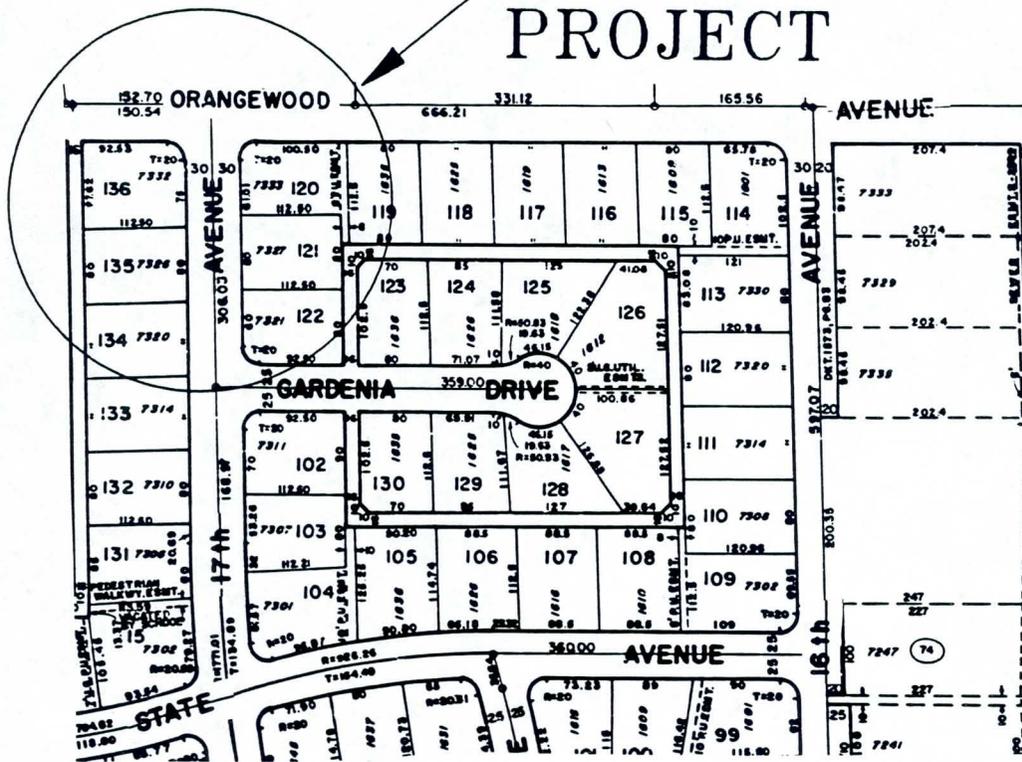
LOCATIONS OF KNOWN FLOODING:
1744 West Glendale

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

THIS
 PROJECT



SUBDIVISION NAME: WESTWOOD HEIGHTS (COUNTY)

DATE SUBDIVIDED: 12-02-54



NO SCALE

PROJECT NAME:

17TH AVENUE & ORANGEWOOD AVENUE

QS

23/25

DATE:

05-15-91

C.D.

4

PROJ. NO. 23/25-2

79

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 17th Avenue and Orangewood

PROJECT NUMBER: 23/25-2

DESCRIPTION: This is the low point for old Cave Creek Wash. See 24/25-1. Water flows from north, west and east to this intersection.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct 17th Avenue, 17th Drive, and Myrtle with inverted crown for detention and conveyance.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$40,000

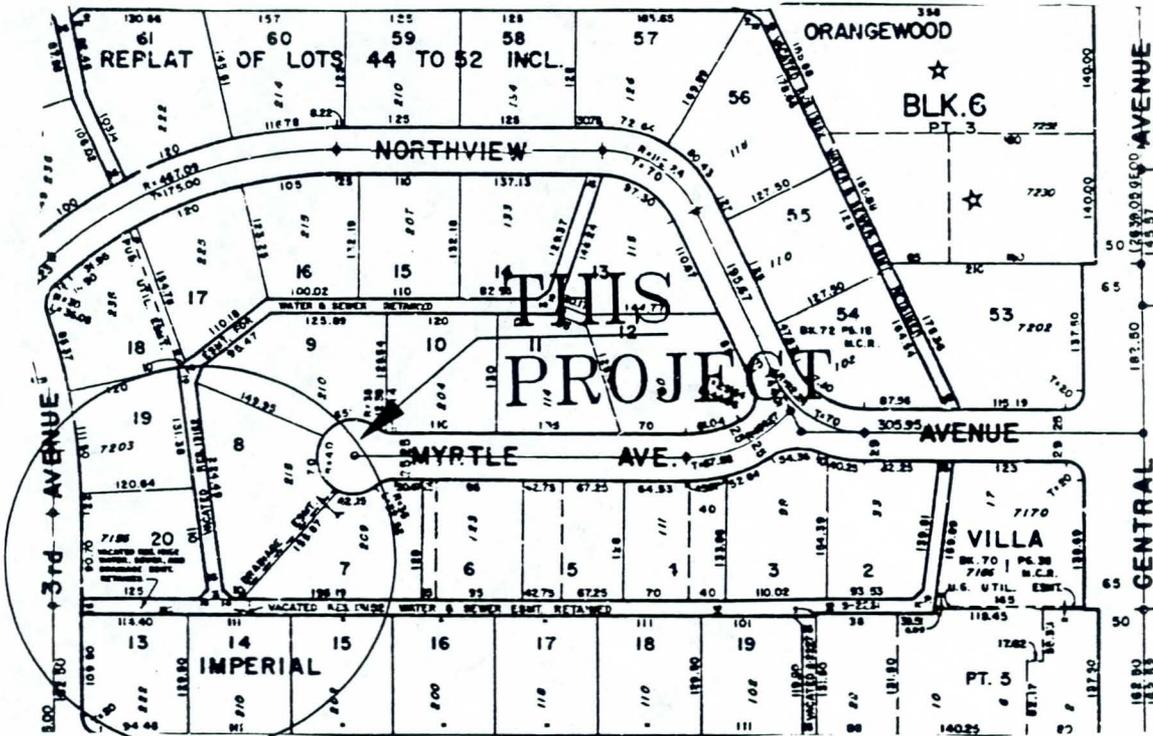
FIELD INSPECTION DATE: 3/10/91/PK

LOCATIONS OF KNOWN FLOODING:
1635 West Orangewood (1984)

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Failure to allow drainage through new projects
Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: NORTH CENTRAL VILLA (COUNTY)

DATE SUBDIVIDED: 01-23-57

NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
3RD AVENUE WEST OF MYRTLE AVENUE	23/27	05-15-91	4

PROJ. NO. 23/27-1

50

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 3rd Avenue west of Myrtle Avenue

PROJECT NUMBER: 23/27-1

DESCRIPTION: Rainfall run-off from Central Avenue, Northview Avenue and Myrtle Avenue drains to the end of the Myrtle Avenue cul de sac in the west 200 block. There is a steep grade west from Central Avenue onto Northview Avenue. The 4' wide drainage easement between lots 7 & 8 is inadequate. The drainage easement behind 210 & 222 West Palmaire Avenue is blocked by walls and vegetation. A small pipe has been installed to drain the cul de sac after a rain. The same problem probably exists at 7030 & 7029 North 2nd Drive.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Obtain larger easement between lots 7 & 8. Construct channel to 3rd Avenue. Reconstruct Palmaire Avenue, Glenn Drive, 2nd Drive, and 3rd Avenue with inverted crowns. Obtain easements to drain 2nd Drive.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$400,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 4/24/91

LOCATIONS OF KNOWN FLOODING: 163 (209), 215 West Myrtle Avenue

CONTRIBUTING FACTORS:

Constructed prior to Development Standards

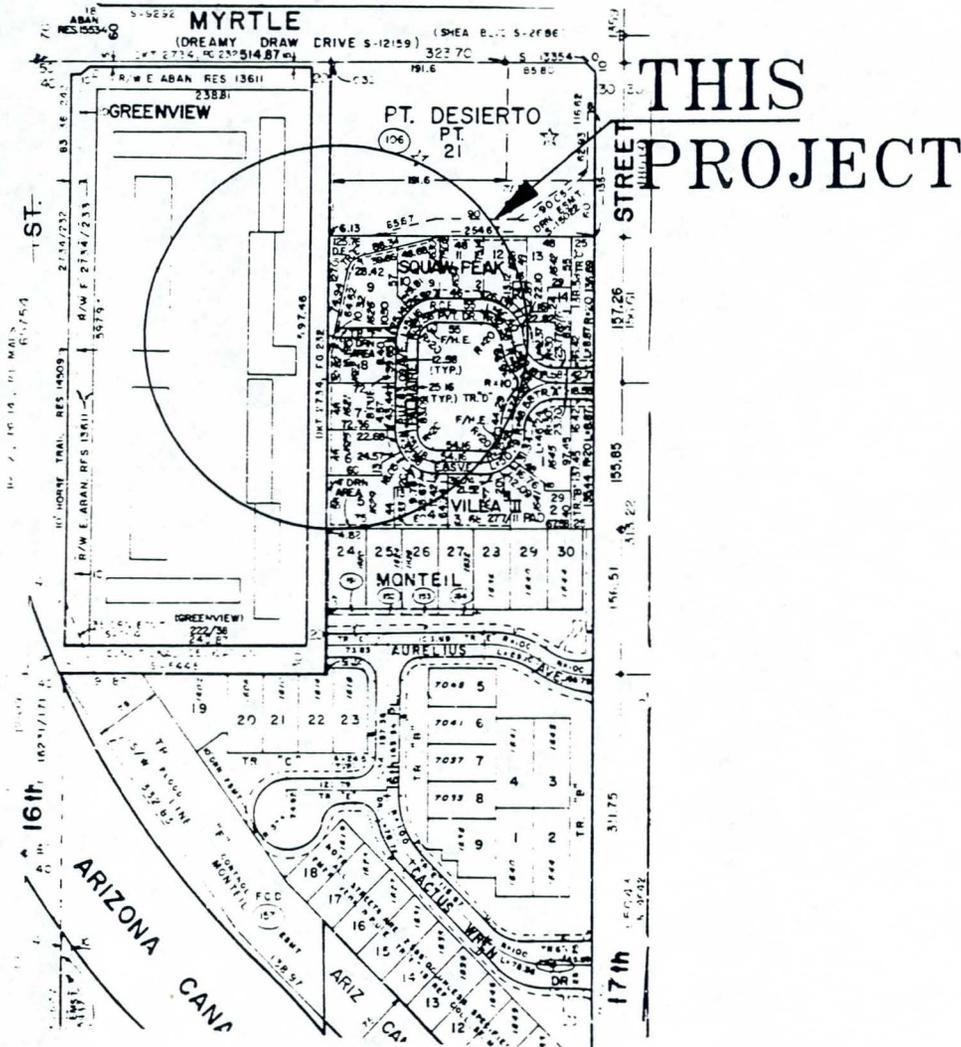
Floors too low

Streets which drain to the end of a cul de sac or otherwise dead end

Major storm run-off exceeds street capacity

Structures constructed in natural drainage channels or drainage easements

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS
PROJECT

SUBDIVISION NAME: GREENVIEW (CITY)

DATE SUBDIVIDED: 04-23-80



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
16TH STREET & MYRTLE AVENUE	23/31	06-04-91	3

PROJ. NO. 23/31-1

51

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 16th Street and Myrtle Avenue

PROJECT NUMBER: 23/31-1

DESCRIPTION: Apartment building constructed in Myrtle Avenue Wash. This is a large wash and is a Special Flood Hazard Area according to the Flood Insurance Rate Map.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct channels and bridges for Dreamy Draw Wash and Myrtle Avenue Wash.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$60,000

FIELD INSPECTION DATE: 6/1/91/PK

LOCATIONS OF KNOWN FLOODING:
7141 North 16th Street

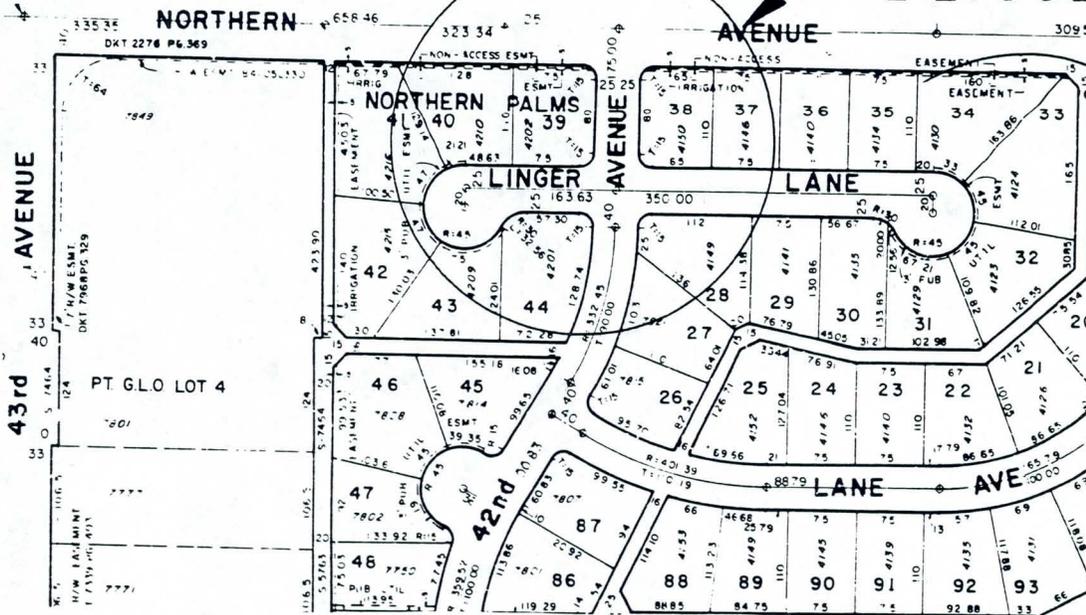
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Structures constructed in natural drainage channels or drainage easements

LFMP82

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

THIS
PROJECT



SUBDIVISION NAME: LORI HEIGHTS (CITY)

DATE SUBDIVIDED: 03-09-62



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
42ND AVENUE & NORTHERN AVENUE	24/19	06-04-91	1

PROJ. NO. 24/19-1

52

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 42nd Avenue and Northern Avenue

PROJECT NUMBER: 24/19-1

DESCRIPTION: Storm water exceeds capacity of Northern Avenue and flows down 42nd Avenue. It exceeds the capacity of the local streets and floods homes at or below curb elevation.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct 5,000 feet of local streets with inverted crown and storm drains. Property may have to be purchased to provide an adequate route.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/1/91/PK

LOCATIONS OF KNOWN FLOODING:
4263, 4259 West Morten Avenue

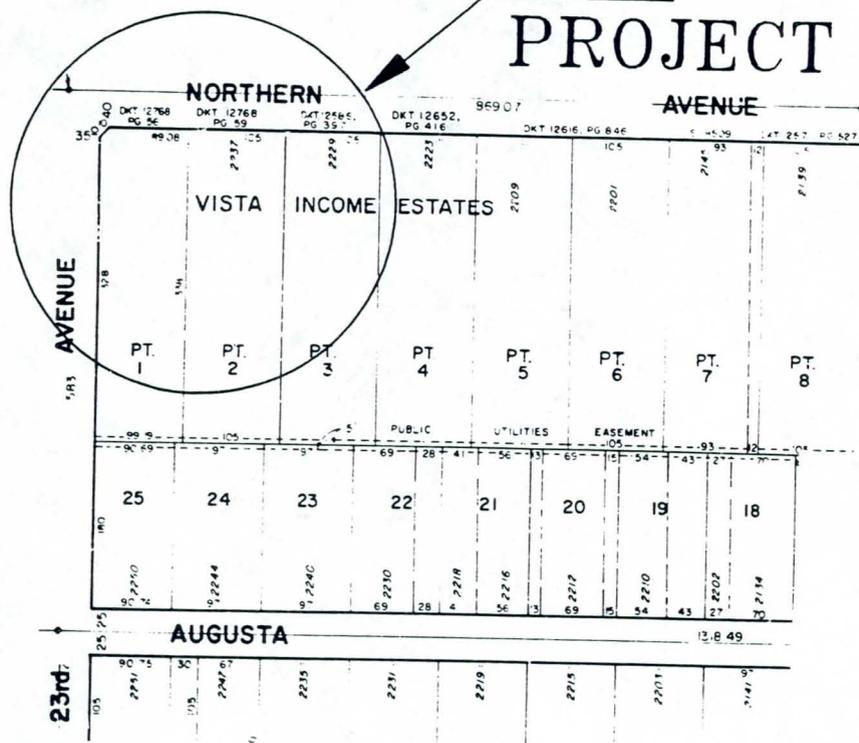
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP86

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

**THIS
 PROJECT**



SUBDIVISION NAME: VISTA INCOME ESTATES #2 (COUNTY)

DATE SUBDIVIDED: 07-09-28



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
23RD AVENUE & NORTHERN AVENUE	24/24	06-04-91	4

PROJ. NO. 24/24-1

53

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 23rd Avenue and Northern Avenue

PROJECT NUMBER: 24/24-1

DESCRIPTION: Storm water exceeds capacity of Northern Avenue and other streets flooding homes which are at or lower than curb elevation.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct 5,000 feet of local street with inverted crown and storm drain to carry water.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/1/91/PK

LOCATIONS OF KNOWN FLOODING:

2130, 2134 West Augusta
2118 West Hayward
2145 West Northern
2235 West Orangewood

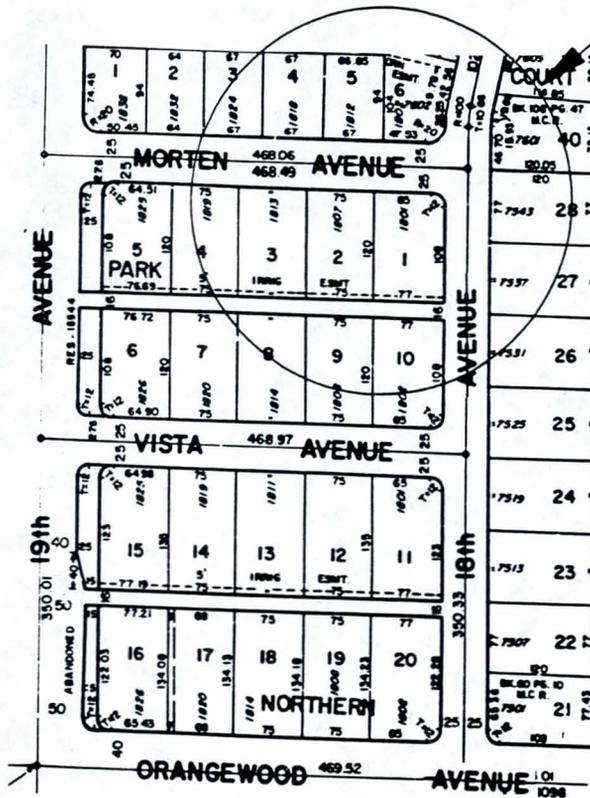
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP89

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

THIS
 PROJECT



SUBDIVISION NAME: PARK NORTHERN (COUNTY)

DATE SUBDIVIDED: 06-27-54



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
18TH AVENUE & MORTON AVENUE	24/25	05-08-91	4

PROJ. NO. 24/25-1

54

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 18th Avenue and Morten Avenue

PROJECT NUMBER: 24/25-1

DESCRIPTION: Storm water flows from 19th Avenue east to 17th Avenue; and from 15th Avenue west to 17th Avenue. It also flows south from Northern.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct inverted crown streets with storm drain under for Augusta, Frier, Morten, Vista, Orangewood, 17th Avenue, 18th Avenue, 17th Drive, 16th Lane including 17th Avenue to Glendale.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

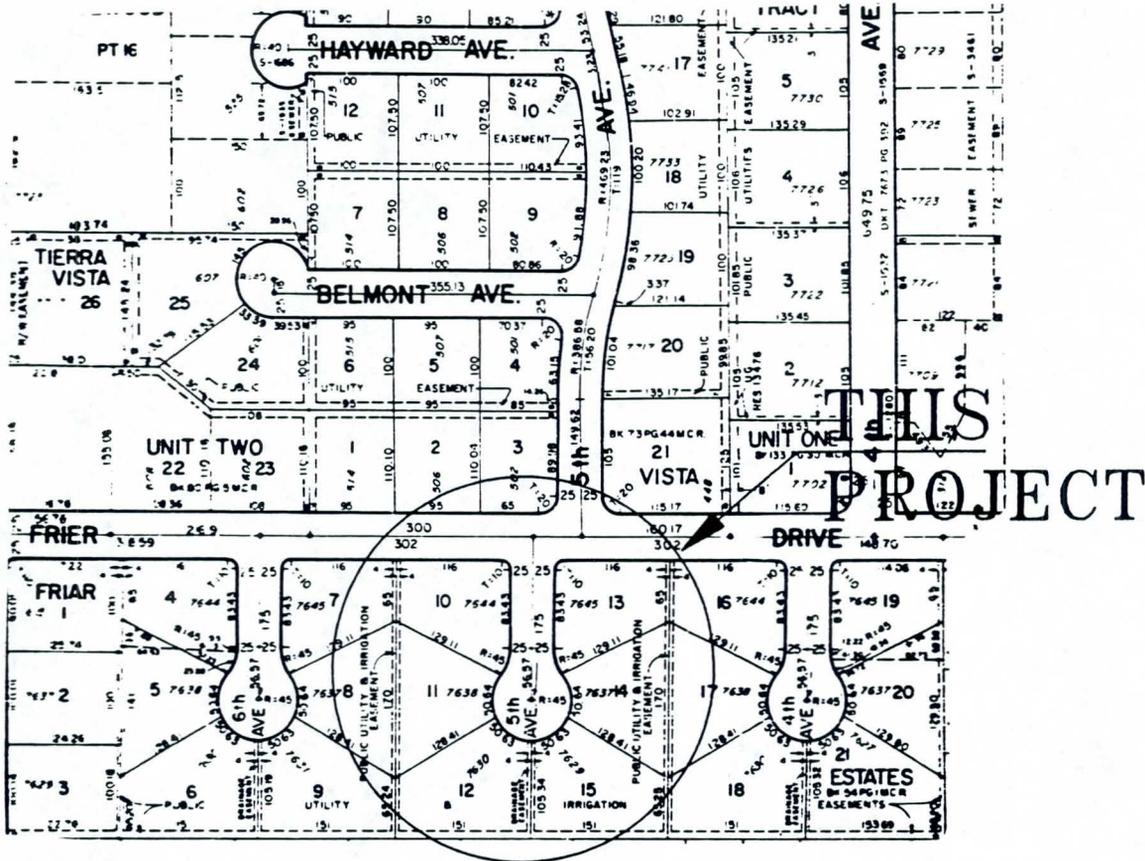
FIELD INSPECTION DATE: 4/5/91/PK

LOCATIONS OF KNOWN FLOODING:
1801 West Morten
7543 North 18th Avenue

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Failure to allow drainage through new projects
Streets which drain to the end of a cul de sac or otherwise dead end
Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: FRIAR ESTATES (COUNTY)

DATE SUBDIVIDED: 05-27-52



NO SCALE

PROJECT NAME: 5TH AVENUE & FRIER DRIVE	QS 24/27	DATE: 06-12-91	C.D. 4
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PROJ. NO. 24/27-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 5th Avenue and Frier Drive

PROJECT NUMBER: 24/27-1

DESCRIPTION: Fourth, Fifth, and Sixth Avenue cul de sacs all drain to a dead-end with inadequate drainage easements which are blocked.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Construct channel to street to south (Kaler). Obtain right of way.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$200,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$20,000

COST PER STRUCTURE TO REDUCE FLOODING: \$10,000

FIELD INSPECTION DATE: 6/5/91/PK

LOCATIONS OF KNOWN FLOODING:
7630 North 5th Avenue

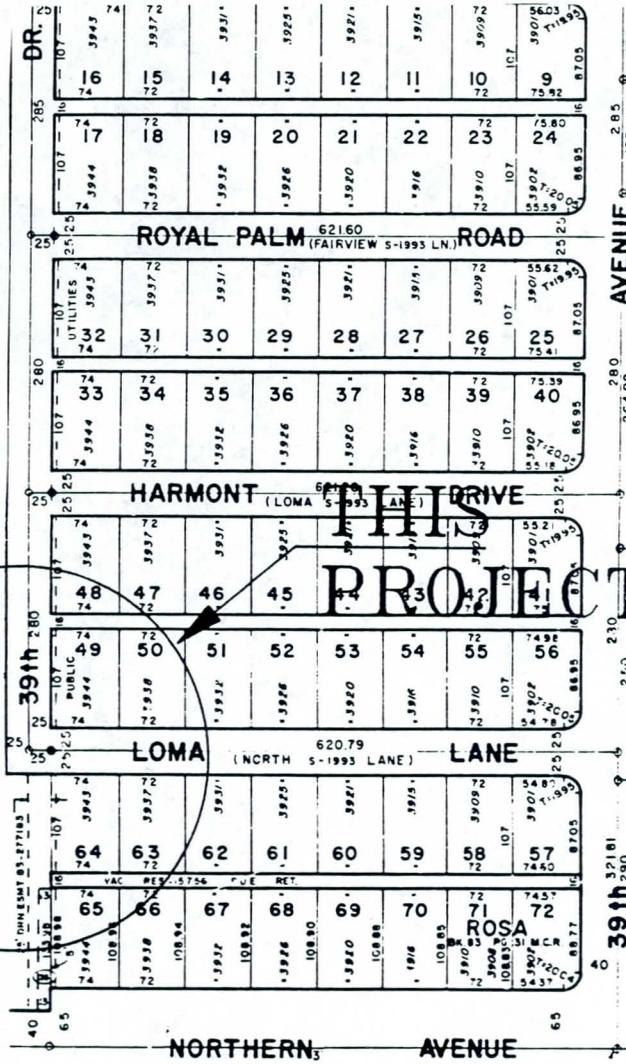
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low

Streets which drain to the end of a cul de sac or otherwise dead end

LFMP12

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: WEST ROSA (CITY)

DATE SUBDIVIDED: 03-19-59



NO SCALE

PROJECT NAME: 39TH DRIVE & LOMA LANE	QS 25/19	DATE: 05-15-91	C.D. 1
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PROJ. NO. 25/19-1

56

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 39th Drive and Loma Lane

PROJECT NUMBER: 25/19-1

DESCRIPTION: 39th Drive and Loma Lane drain to a corner with inadequate out fall. Area is very flat to south and west.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Extend 39th Drive south to Northern. Rebuild 39th Drive and Loma Lane.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$200,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$10,000

FIELD INSPECTION DATE: 3/7/91/PK

LOCATIONS OF KNOWN FLOODING:

3943 West Loma Lane

3938 West Northern Avenue

CONTRIBUTING FACTORS:

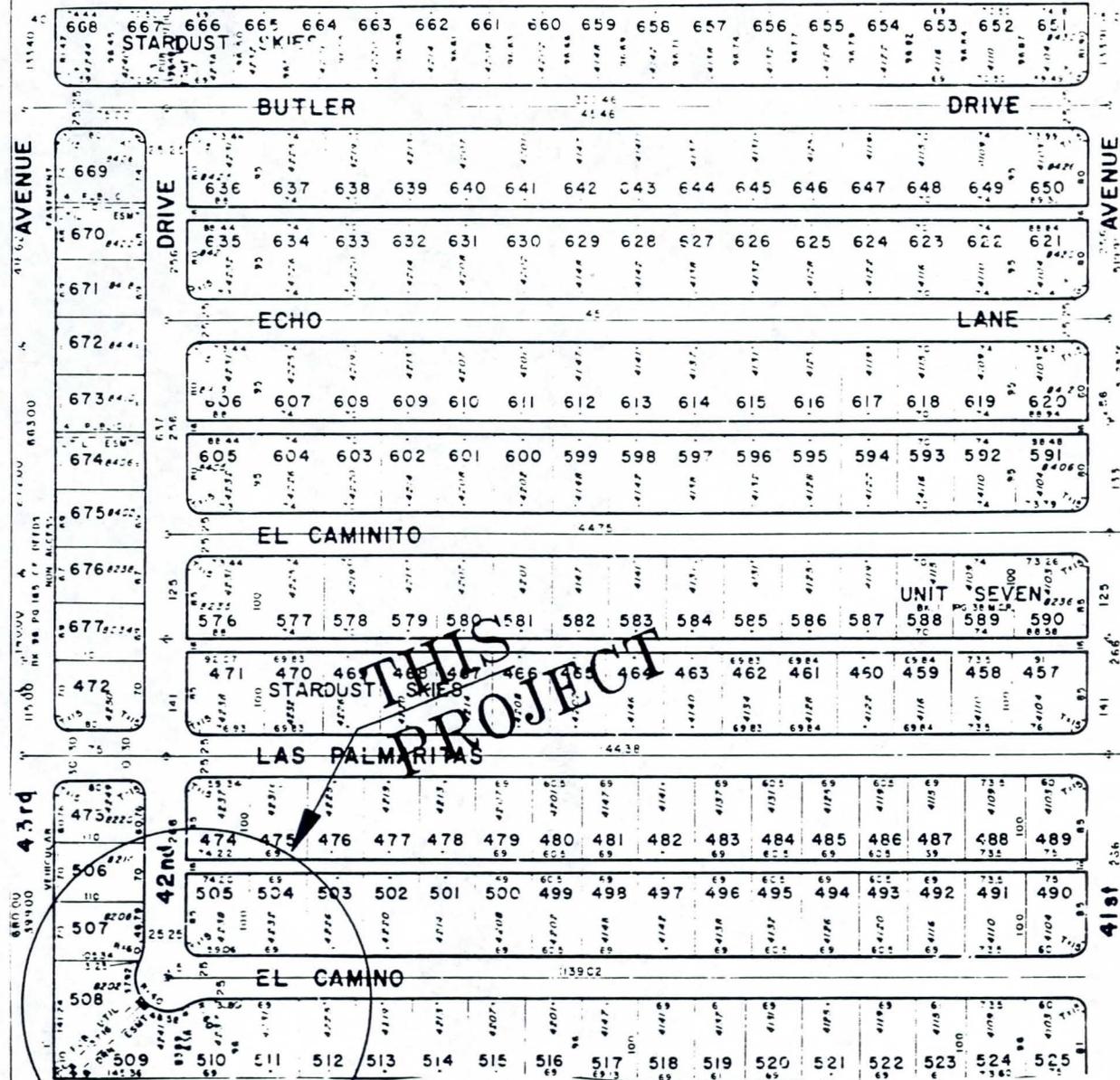
Constructed prior to Development Standards

Floors too low

Streets which drain to the end of a cul de sac or otherwise dead end

Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: STARDUST SKIES (COUNTY)

DATE SUBDIVIDED: 05-10-66

NO SCALE

PROJECT NAME: 42ND DRIVE & EL CAMINO	QS 25/19	DATE: 05-08-91	C.D. 1
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PROJ. NO. 25/19-2

57

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 42nd Drive and El Camino

PROJECT NUMBER: 25/19-2

DESCRIPTION: Run off flows south on 42nd Drive and West on El Camino to a corner with inadequate out fall.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Clear easement and construct drainage channel to 43rd Avenue.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$40,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$4000

FIELD INSPECTION DATE: 3/7/91/PK

LOCATIONS OF KNOWN FLOODING:
4219 West Camino

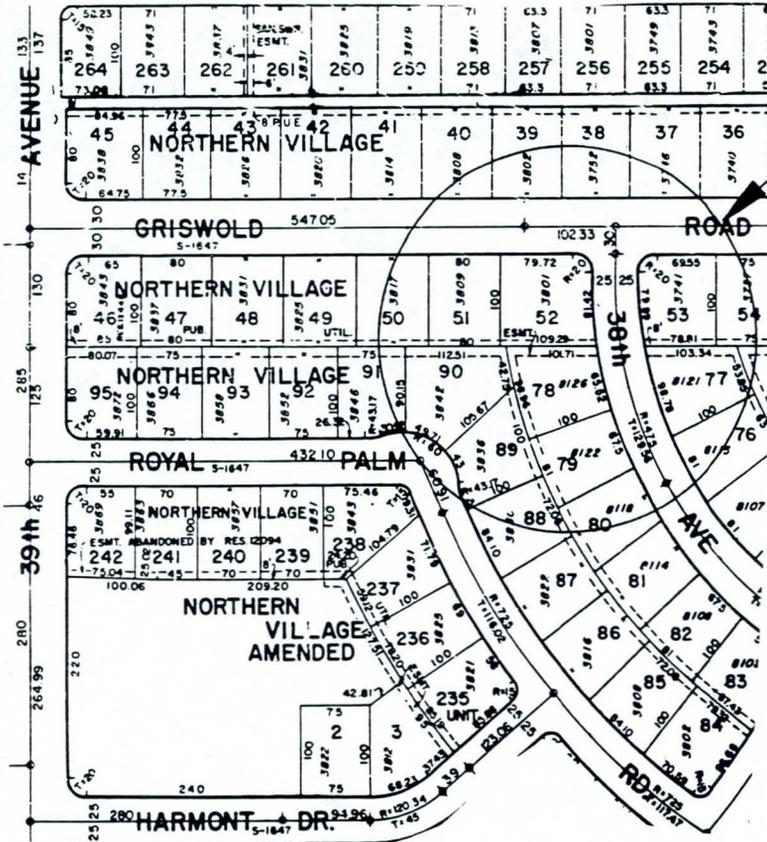
CONTRIBUTING FACTORS:

Floors too low

Streets which drain to the end of a cul de sac or otherwise dead end

Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS
PROJECT

SUBDIVISION NAME: NORTHERN VILLAGE EXTENSION #3
(CITY)

DATE SUBDIVIDED: 03-28-67



NO SCALE

PROJECT NAME: 38TH AVENUE & GRISWOLD ROAD	QS 25/20	DATE: 06-04-91	C.D. 1
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PROJ. NO. 25/20-1

58

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 38th Avenue and Griswold Road

PROJECT NUMBER: 25/20-1

DESCRIPTION: Storm water exceeds capacity of local streets and floods homes at or below curb elevation.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct 5,000 feet of local street with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/1/91/PK

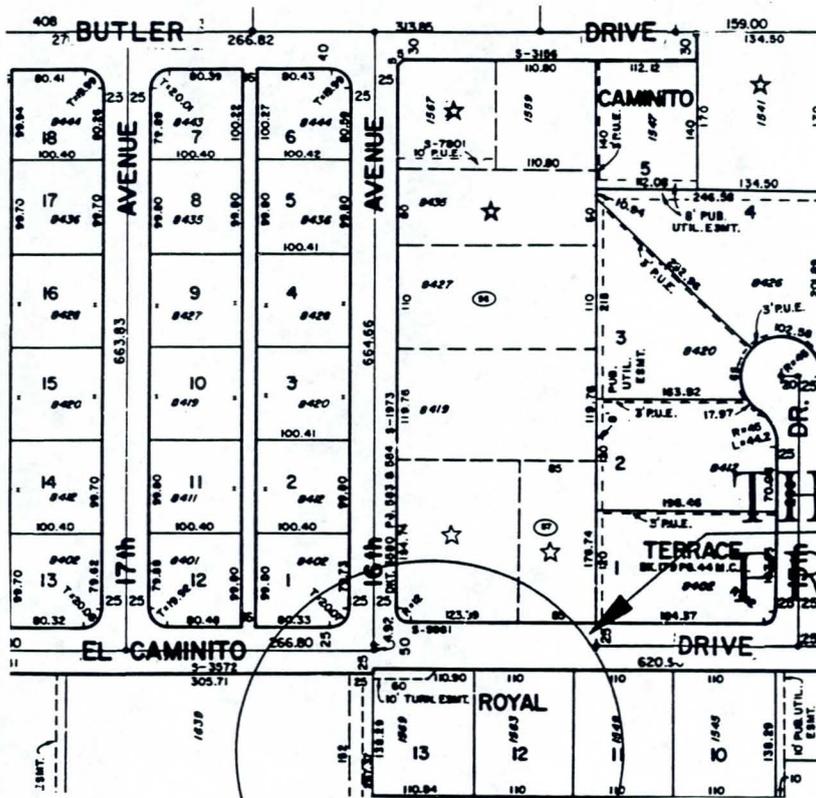
LOCATIONS OF KNOWN FLOODING:
8118 North 38th Avenue

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP87

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



THIS PROJECT

SUBDIVISION NAME: ROYAL ESTATES (COUNTY)

DATE SUBDIVIDED: 11-15-55



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
16TH AVENUE & EL CAMINITO DRIVE	25/25	06-04-91	4

PROJ. NO. 25/25-1

59

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 16th Avenue and El Caminito Drive

PROJECT NUMBER: 25/25-1

DESCRIPTION: Storm water exceeds capacity of El Caminito and floods homes at or below curb elevation.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct 5,000 feet of local street with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/1/91/PK

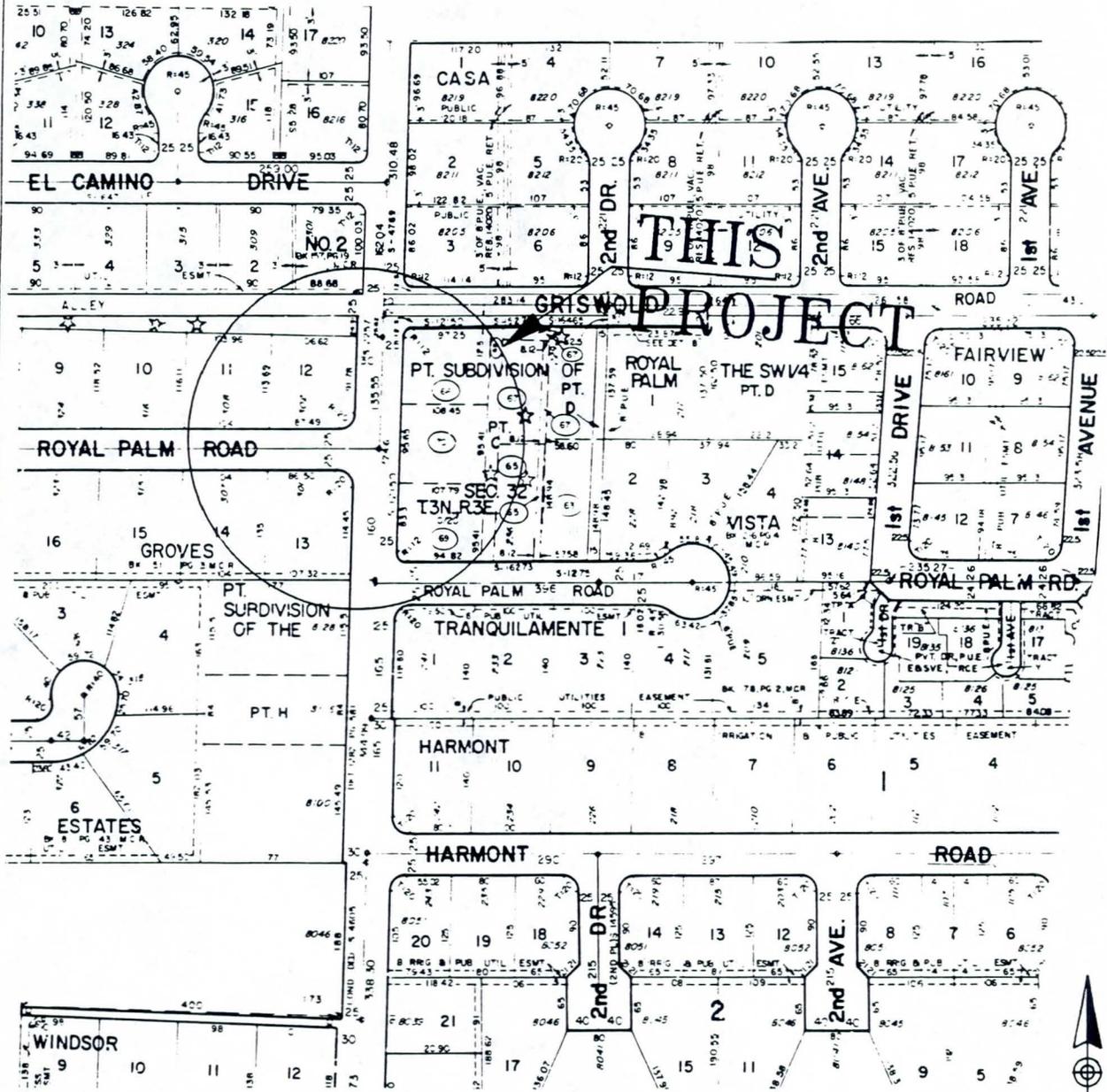
LOCATIONS OF KNOWN FLOODING:
1569 West El Caminito Drive

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern

LFMP74

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: SUNKIST GROVES (COUNTY)

DATE SUBDIVIDED: 07-12-51

NO SCALE

PROJECT NAME: 3RD AVENUE & ROYAL PALM ROAD	QS 25/27	DATE: 06-04-91	C.D. 4
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PROJ. NO. 25/27-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 3rd Avenue and Royal Palm Road

PROJECT NUMBER: 25/27-1

DESCRIPTION: Storm water exceeds the capacity of 3rd Avenue and floods homes which are at or below curb elevation.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct 5,000 feet of local street with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/1/91/PK

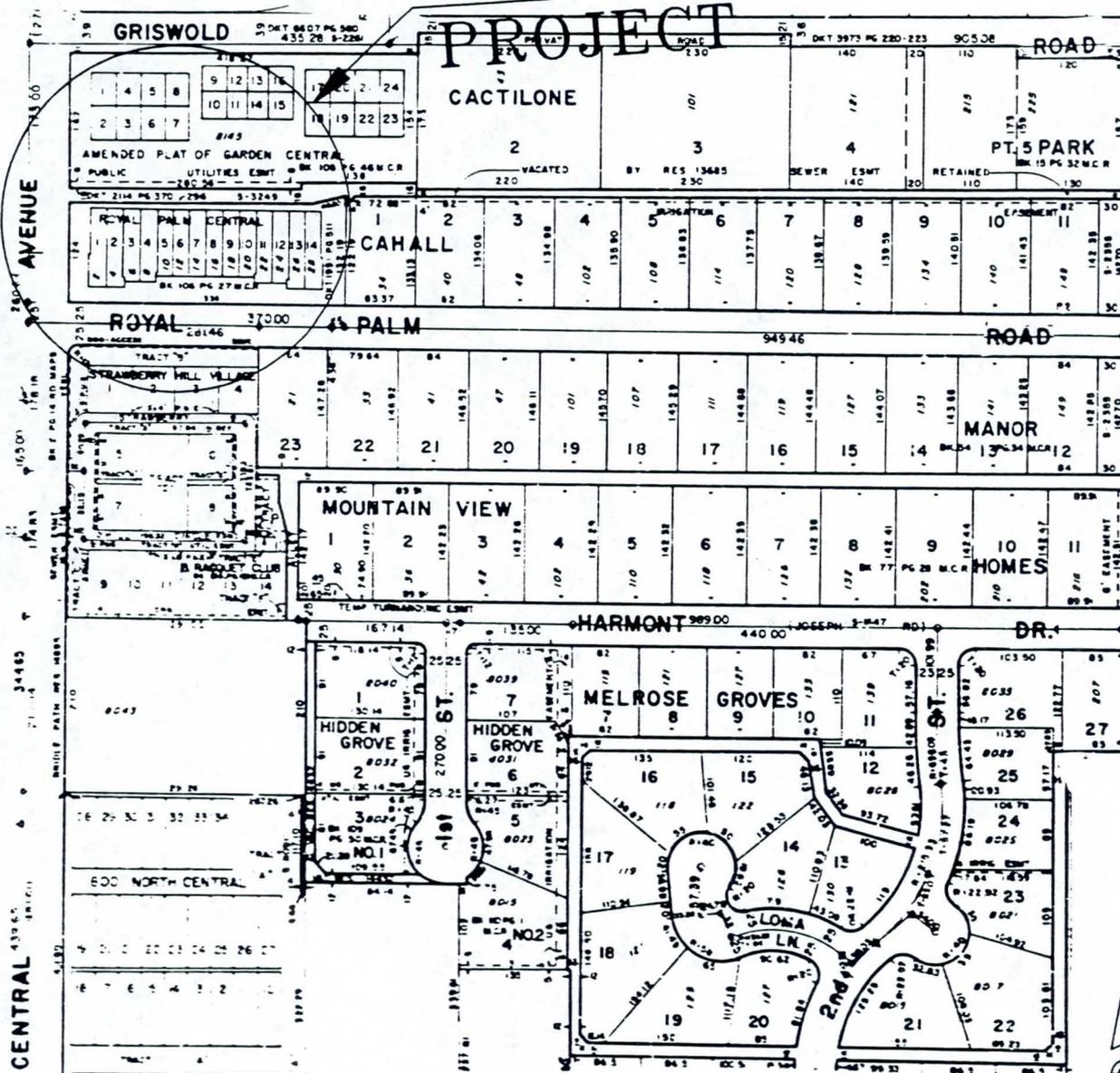
LOCATIONS OF KNOWN FLOODING:
301 West Royal Palm Road

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP90

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: ROYAL PALM CENTRAL (COUNTY)

DATE SUBDIVIDED: 08-18-64

NO SCALE

PROJECT NAME: CENTRAL AVENUE & ROYAL PALM ROAD	QS 25/28	DATE: 05-30-91	C.D. 4
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PROJ. NO. 25/28-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: Central Avenue and Royal Palm Road

PROJECT NUMBER: 25/28-1

DESCRIPTION: Storm water from Central Avenue and land to the northeast floods 14 unit condominium project.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Construct flood protection wall around project.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$100,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$10,000

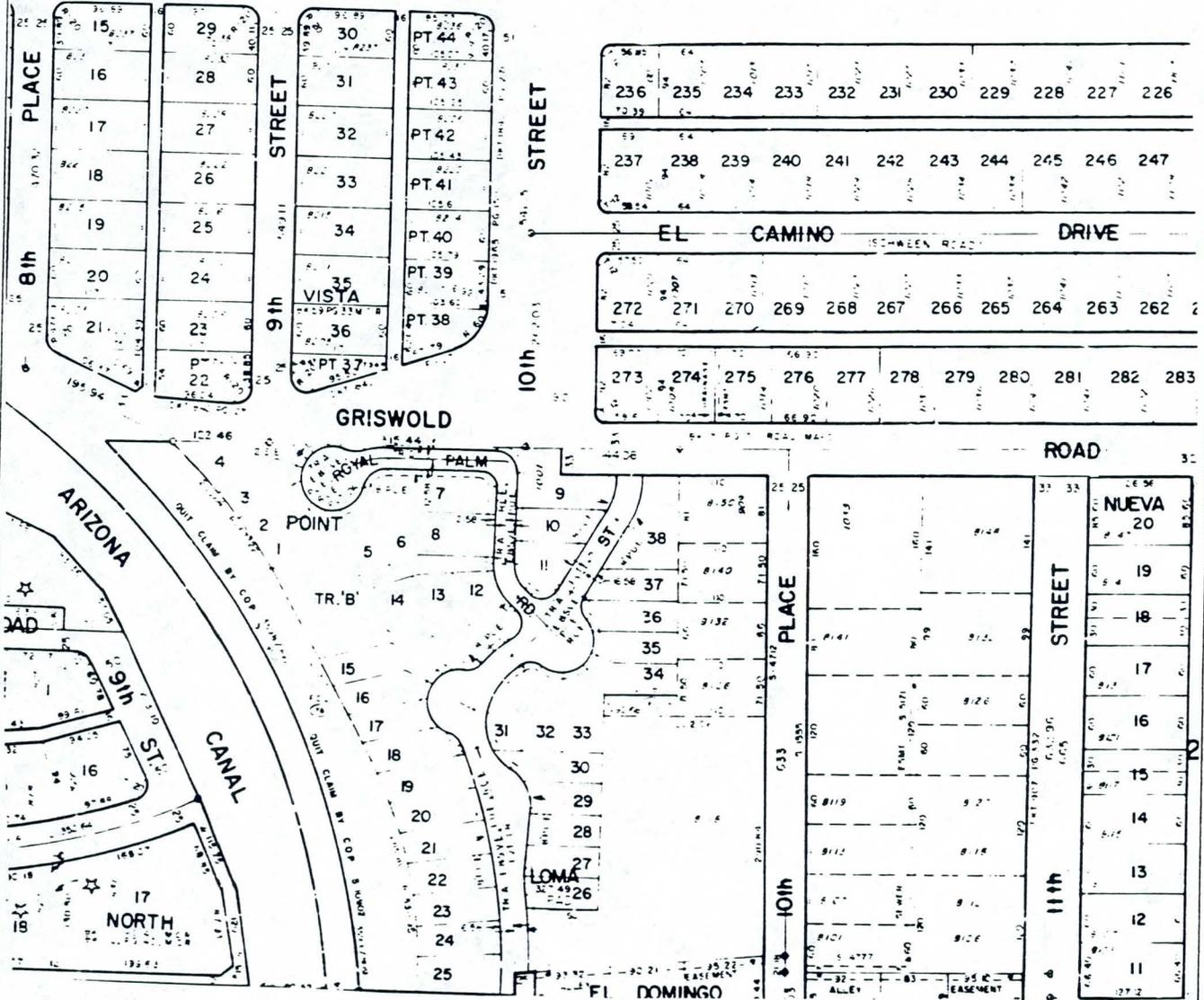
FIELD INSPECTION DATE: 5/29/91/PK

LOCATIONS OF KNOWN FLOODING:
8135 North Central Avenue

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low

LFMP52

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



236	235	234	233	232	231	230	229	228	227	226
237	238	239	240	241	242	243	244	245	246	247
272	271	270	269	268	267	266	265	264	263	262
273	274	275	276	277	278	279	280	281	282	283

SUBDIVISION NAME: SKYLINE VISTA (COUNTY)

DATE SUBDIVIDED: 05-19-54



NO SCALE

PROJECT NAME: 10TH STREET & GRISWOLD ROAD	QS 25/29	DATE: 05-30-91	C.D. 4
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PROJ. NO. 25/29-1

62

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 10th Street and Griswold Road

PROJECT NUMBER: 25/29-1

DESCRIPTION: 10th Street Wash is inadequate to carry 100-year storm creating large floodplain.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 150

SUGGESTED SOLUTION: Construct 10th Street Wash project.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,500,000 (This quarter section only.)

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$20,000

COST PER STRUCTURE TO REDUCE FLOODING: \$10,000

FIELD INSPECTION DATE: 3/1/91/PK

LOCATIONS OF KNOWN FLOODING:
8216 North 8th Place

CONTRIBUTING FACTORS:

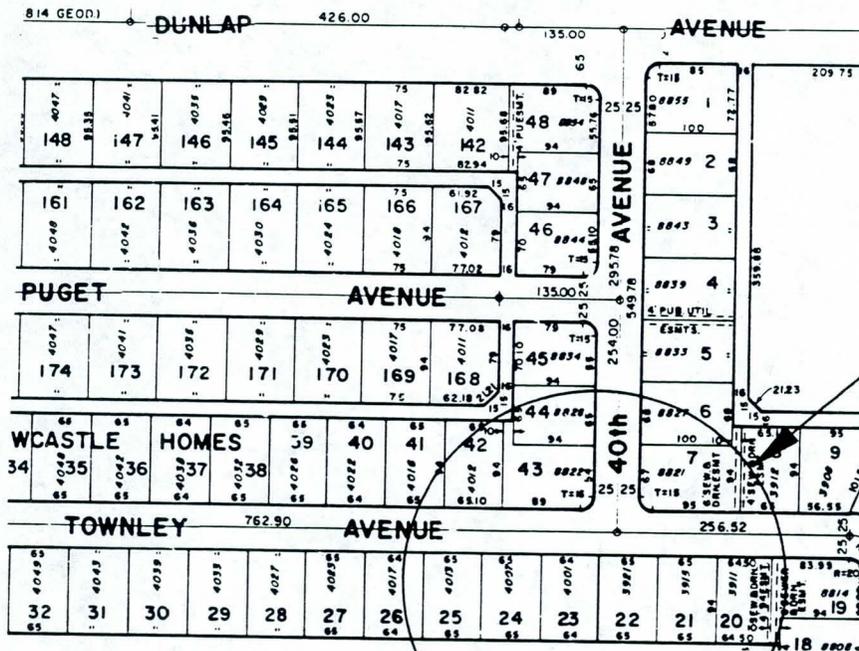
Constructed prior to Development Standards
Floors too low

Structures constructed in natural drainage channels or drainage easements

LFMP51

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

PROJ. NO. 26/19-1



THIS PROJECT

SUBDIVISION NAME: NEWCASTLE HOMES #4 (CITY)

DATE SUBDIVIDED: 06-06-61



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
40TH AVENUE & TOWNLEY AVENUE	26/19	06-04-91	1

63

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 40th Avenue and Townley Avenue

PROJECT NUMBER: 26/19-1

DESCRIPTION: Storm water flows off of vacant property at southwest corner of 39th Avenue and Dunlap Avenue. This floods the rear of lots which cannot drain through.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Purchase corner for retention basin or construct 5,000 feet of local street with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/1/91/PK

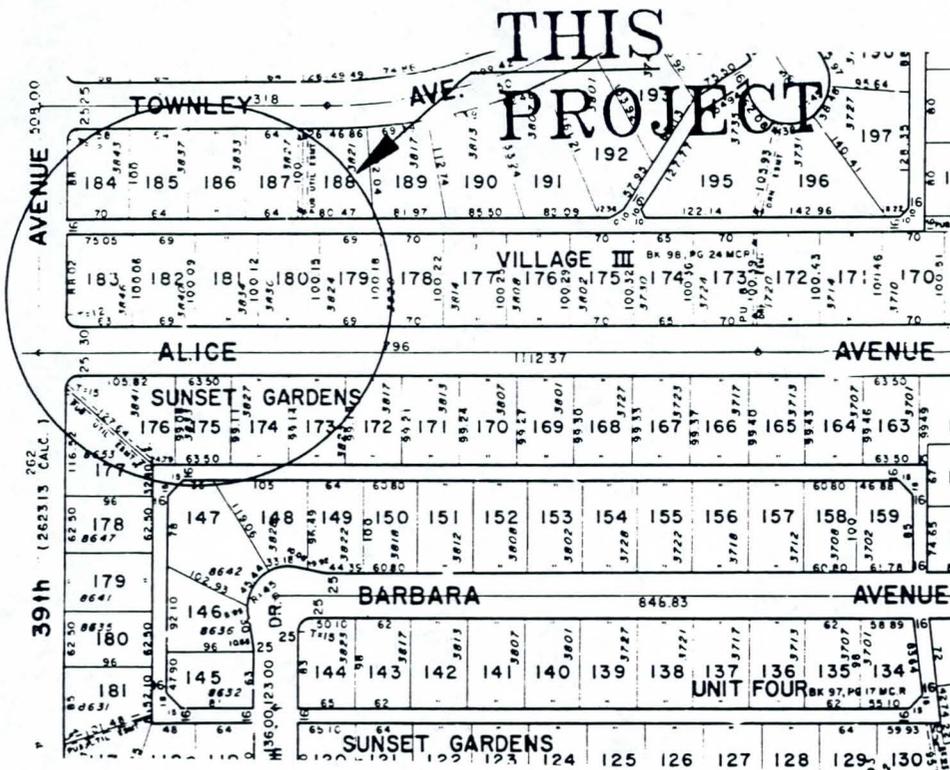
LOCATIONS OF KNOWN FLOODING:
8821 North 40th Avenue

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low

LFMP88

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

PROJ. NO. 26/20-1



SUBDIVISION NAME: SUNSET GARDENS #4 (CITY)

DATE SUBDIVIDED: 11-28-61



NO SCALE

PROJECT NAME: 39TH AVENUE & ALICE AVENUE	QS 26/20	DATE: 06-04-91	C.D. 1
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64

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 39th Avenue and Alice Avenue

PROJECT NUMBER: 26/20-1

DESCRIPTION: Storm water exceeds capacity of Alice Avenue and floods homes which are at or below curb elevation.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct 5,000 feet of street with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/1/91/PK

LOCATIONS OF KNOWN FLOODING:

3833 West Alice

3616 West Puget

CONTRIBUTING FACTORS:

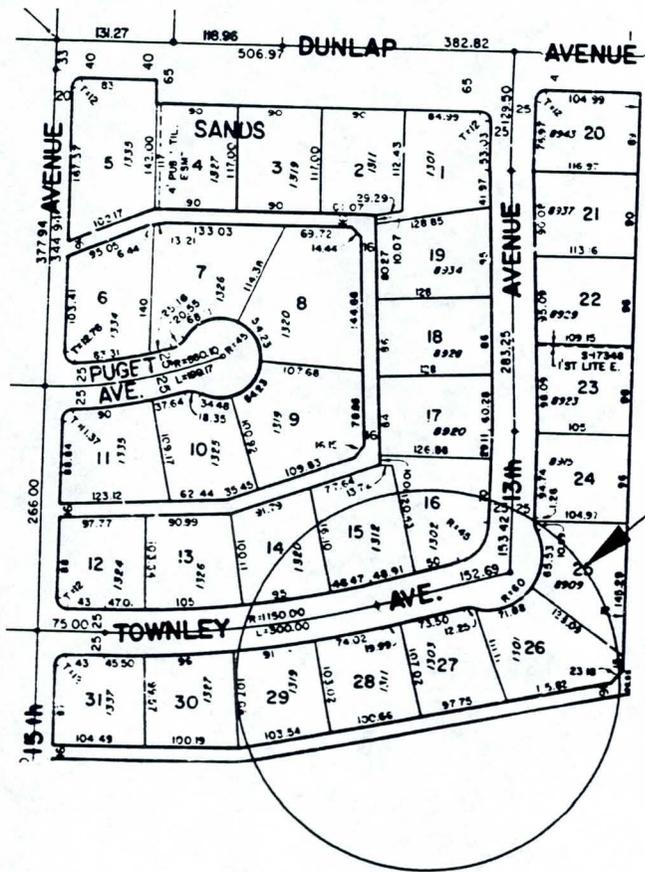
Constructed prior to Development Standards

Floors too low

Major storm run-off exceeds street capacity

LFMP73

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS
PROJECT

SUBDIVISION NAME: SANDS CENTRAL (CITY)

DATE SUBDIVIDED: 11-26-63



NO SCALE

PROJECT NAME: 15th AVENUE & TOWNLEY AVENUE	QS 26/26	DATE: 06-04-91	C.D. 4
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PROJ. NO. 26/26-1

65

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 15th Avenue and Townley Avenue

PROJECT NUMBER: 26/26-1

DESCRIPTION: Storm water which drains the 1100 block of West Townley, which is a cul de sac, flows into alley and floods homes from rear. Outlet easement is blocked.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Construct 5,000 feet of local street with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/1/91/PK

LOCATIONS OF KNOWN FLOODING:
1311 West Townley Avenue

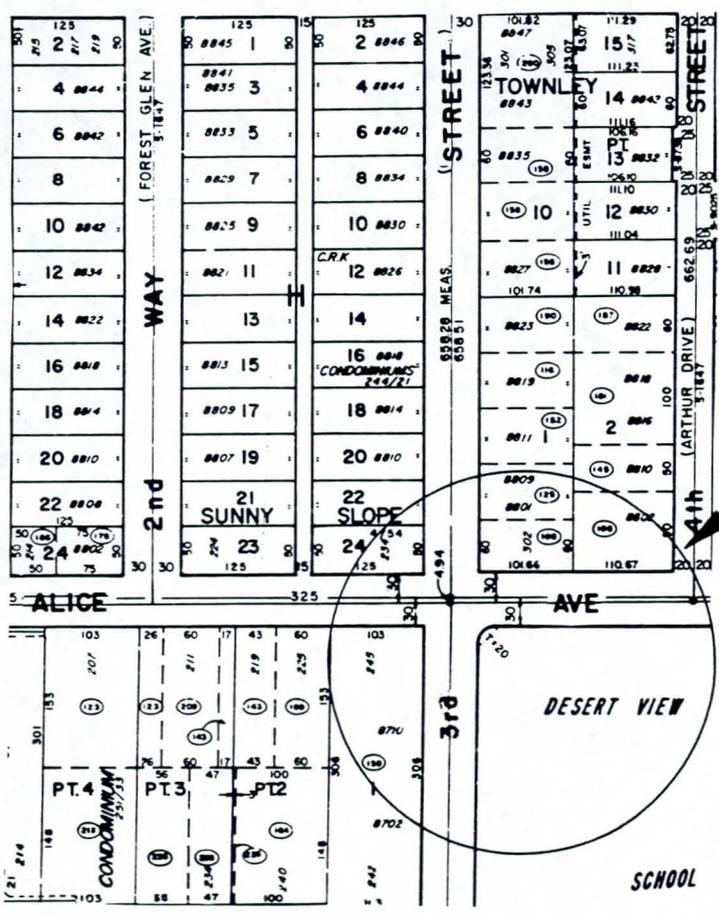
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Streets which drain to the end of a cul de sac or otherwise dead end

LFMP78

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

PROJ. NO. 26/28-1



THIS
PROJECT

SUBDIVISION NAME: SUNNYSLOPE (COUNTY)

DATE SUBDIVIDED: 01-04-11



NO SCALE

PROJECT NAME: 3rd STREET AND ALICE AVENUE	QS 26/28	DATE: 06-03-91	C.D. 4
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66

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 3rd Street and Alice Avenue

PROJECT NUMBER: 26/28-1

DESCRIPTION: This project would be part of a Tenth Street Wash project although it does not drain to Tenth Street Wash. This would provide a drain system for the area bounded by Central Avenue, 7th Street, North Mountain & the Arizona Canal.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Develop a channel system or drain system to drain the area. (Must be implemented along with Tenth Street Wash improvements.)

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$4,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$80,000

FIELD INSPECTION DATE: NA

LOCATIONS OF KNOWN FLOODING:

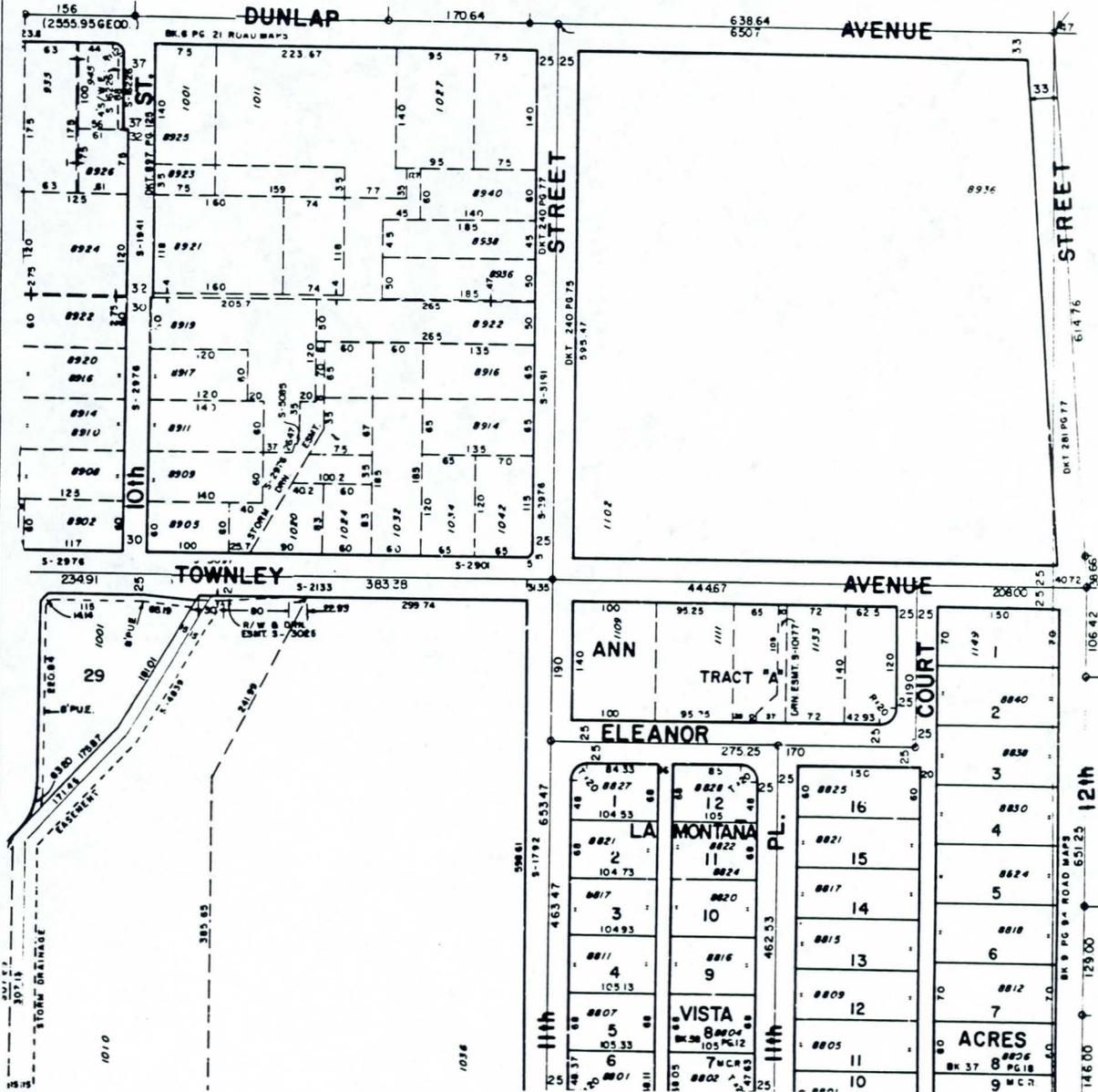
8819 North 1st Street
9202 North 6th Street
9204 North 7th Street
9601 North 3rd Street

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Structures constructed in natural drainage channels or drainage easements

LFMP54

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: ANN ACRES (COUNTY)

DATE SUBDIVIDED: 01-31-47

NO SCALE

PROJECT NAME: 11TH STREET & TOWNLEY AVENUE	QS 26/29	DATE: 05-30-91	C.D. 4
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PROJ. NO. 26/29-1

67

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 11th Street and Townley Avenue

PROJECT NUMBER: 26/29-1

DESCRIPTION: The main stem of Tenth Street Wash and one major tributary pass through this quarter section. Most of this quarter section is a floodplain. Channels severely encroached upon.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 500

SUGGESTED SOLUTION: Purchase land and construct 10th Street Wash project.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$20,000

COST PER STRUCTURE TO REDUCE FLOODING: \$4,000

FIELD INSPECTION DATE: 3/1/91/PK

LOCATIONS OF KNOWN FLOODING:

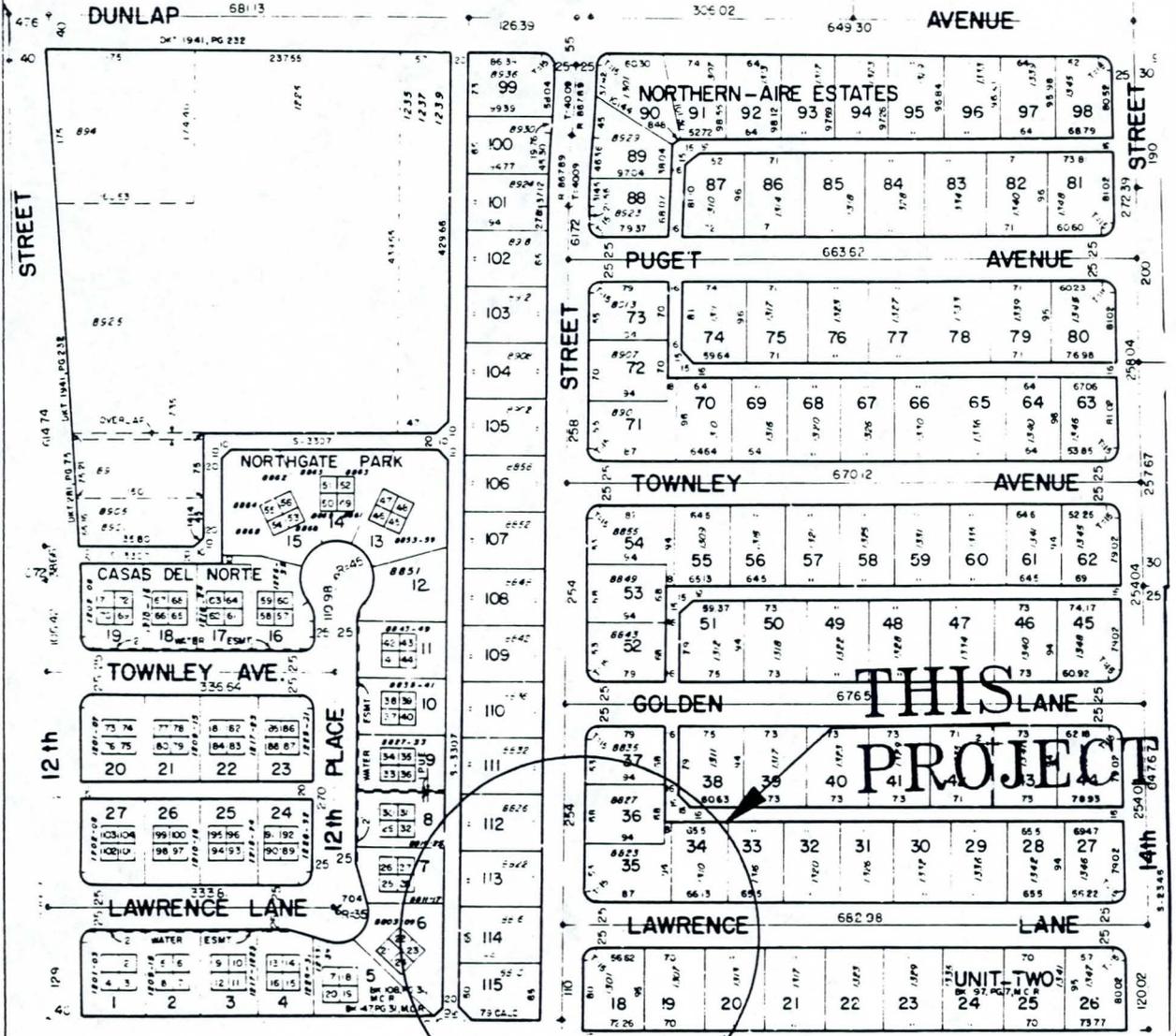
1133 East Townley
8824 North 11th Place

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Structures constructed in natural drainage channels or drainage easements

LFMP47

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: NORTHERN-AIRE ESTATES
UNIT 2 (COUNTY)
DATE SUBDIVIDED: 10-18-61

NO SCALE

PROJECT NAME: 13TH STREET & LAWRENCE LANE	QS 26/30	DATE: 05-30-91	C.D. 4
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PROJ. NO. 26/30-1

68

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 13th Street and Lawrence Lane

PROJECT NUMBER: 26/30-1

DESCRIPTION: A major tributary to Tenth Street Wash has been filled in by development.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Rebuild 13th Street with inverted crown with storm drain. Purchase land and construct channel to meet Townley Avenue channel at 12th Street. (Must be part of 10th Street Wash project.)

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$20,000

COST PER STRUCTURE TO REDUCE FLOODING: \$100,000

FIELD INSPECTION DATE: 3/1/91/PK

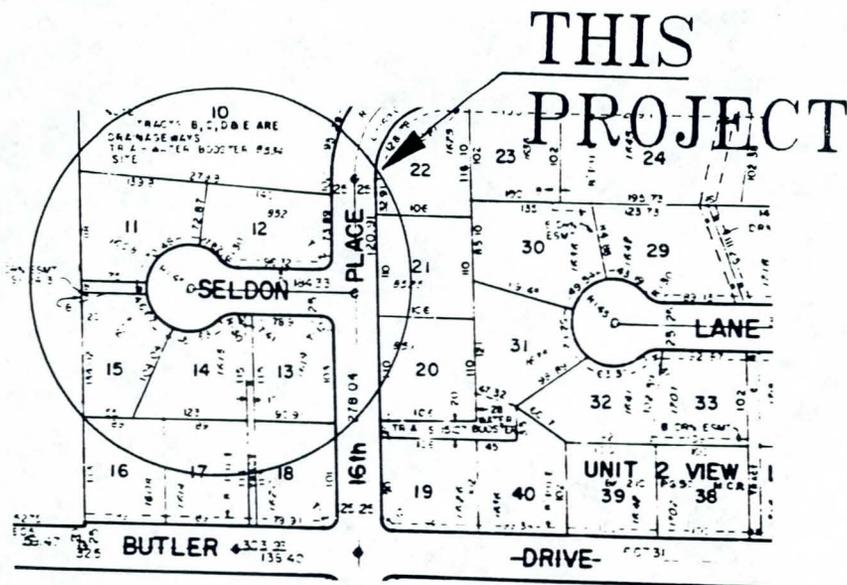
LOCATIONS OF KNOWN FLOODING:
8822 North 13th Street

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Structures constructed in natural drainage channels or drainage easements

LFMP48

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: VISTA CANDELAS UNIT 2 (CITY)

DATE SUBDIVIDED: 12-12-78



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
16TH PLACE & SELDON LANE	26/31	05-30-91	4

PROJ. NO. 26/31-1

69

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 16th Place and Seldon Lane

PROJECT NUMBER: 26/31-1

DESCRIPTION: Storm water from mountain enters end of cul de sac. After one lot it must turn 90 degrees into an 8' drainage channel. It cannot make the turn and floods two houses.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 2

SUGGESTED SOLUTION: Reconstruct streets and/or drainage system.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$100,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$15,000

COST PER STRUCTURE TO REDUCE FLOODING: \$50,000

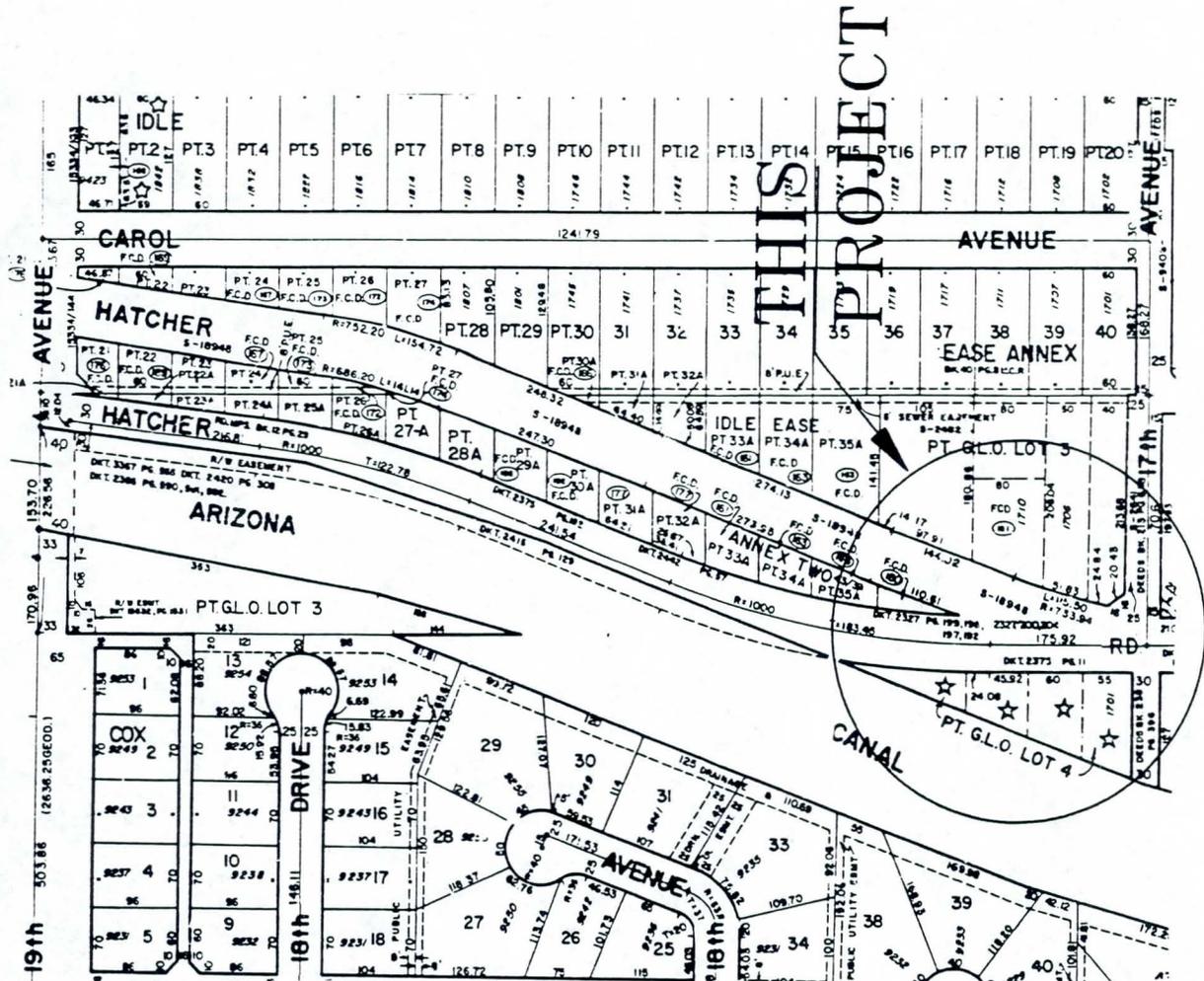
FIELD INSPECTION DATE: 5/29/91/PK

LOCATIONS OF KNOWN FLOODING:
1615, 1619 East Seldon Lane

CONTRIBUTING FACTORS:
Failure to allow drainage through new projects
Major storm run-off exceeds street capacity

LFMP53

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: IDLE EASE ANNEX (COUNTY)

DATE SUBDIVIDED: 10-15-47



NO SCALE

PROJECT NAME: 17TH AVENUE & ACDC	QS 27/25	DATE: 05-08-91	C.D. 4
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PROJ. NO. 27/25-1

70

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 17th Avenue and ACDC

PROJECT NUMBER: 27/25-1

DESCRIPTION: Ponding along Arizona Canal. Storm water from Vogel to Carol cut-off. Miscellaneous problems due to unsubdivided parcels and lot splits.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Purchase lots for drainage right of way. Construct streets for drainage. Note: ACDC has corrected ponding along the canal.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$100,000

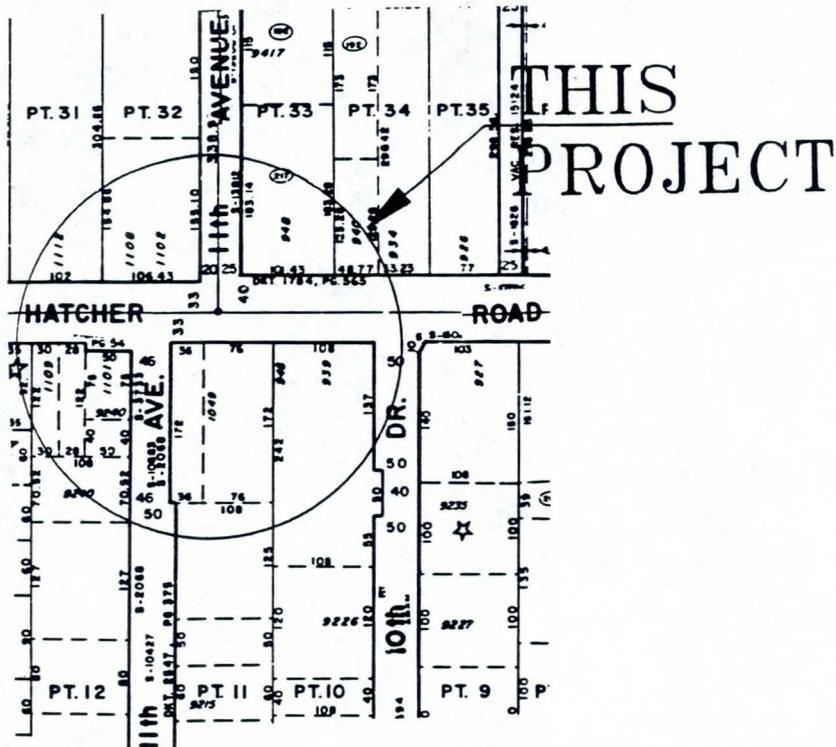
FIELD INSPECTION DATE: 2/27/91/PK

LOCATIONS OF KNOWN FLOODING:
1814, 1742 West Carol
1514 West Palmer

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Streets abandoned so that drainage was cut off
Streets which drain to the end of a cul de sac or otherwise dead end
Major storm run-off exceeds street capacity
Structures constructed in ponding area along canal

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: FOOTHILL ACRES (COUNTY)

DATE SUBDIVIDED: 12-29-42



NO SCALE

PROJECT NAME: 11TH AVENUE & HATCHER ROAD	QS 27/26	DATE: 05-30-91	C.D. 4
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PROJ. NO. 27/26-1

7

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 11th Avenue and Hatcher

PROJECT NUMBER: 27/26-1

DESCRIPTION: Development has eliminated a large wash which was located along the 12th Avenue alignment between Mountain View Road and Hatcher Road.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Condemn properties and construct 12th Avenue between Vogel Avenue and Hatcher Road. Extend 10th Avenue, 10th Drive, and 12th Avenue to ACDC.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$100,000

FIELD INSPECTION DATE: 5/20/91/PK

LOCATIONS OF KNOWN FLOODING:
1112, 1217 West Hatcher Road

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low

Failure to continue existing street pattern

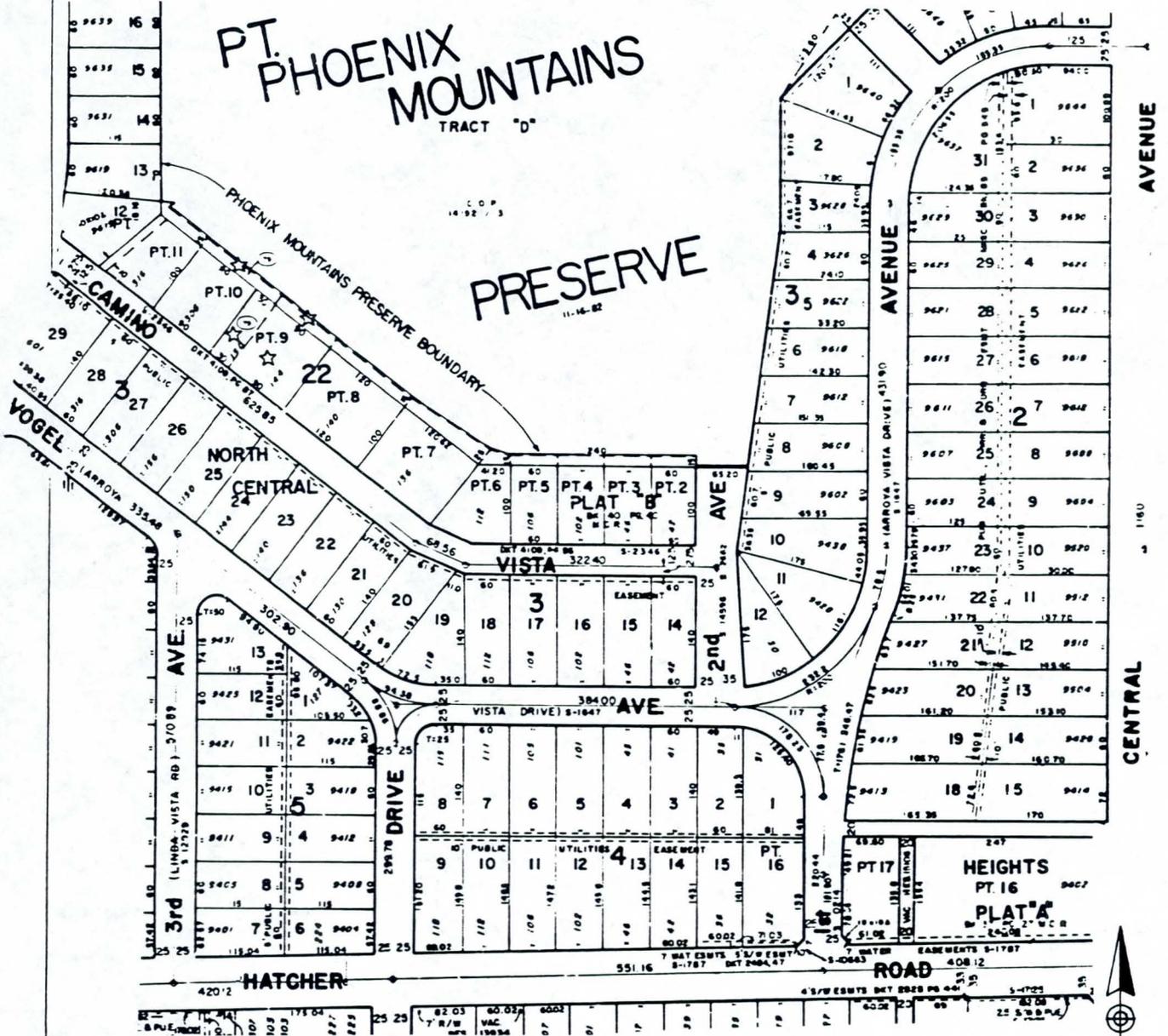
Failure to allow drainage through new projects

Streets which drain to the end of a cul de sac or otherwise dead end

Structures constructed in natural drainage channels or drainage easements

LFMP42

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: NORTH CENTRAL HEIGHTS
 PLAT "A" (COUNTY)

DATE SUBDIVIDED: 01-20-47

NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
1ST AVENUE & HATCHER ROAD	27/27	05-30-91	4

PROJ. NO. 27/27-1

72

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 1st Avenue and Hatcher Road

PROJECT NUMBER: 27/27-1

DESCRIPTION: Large wash flows between 1st Avenue and Central Avenue north of Hatcher Road. Wash is not continued through Lot 16 thereby flooding businesses located there. Businesses are lower than alley with minimum set back.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10
(1 structure)

SUGGESTED SOLUTION: Improve wash for 1200 feet.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$100,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$10,000

FIELD INSPECTION DATE: 5/20/91/PK

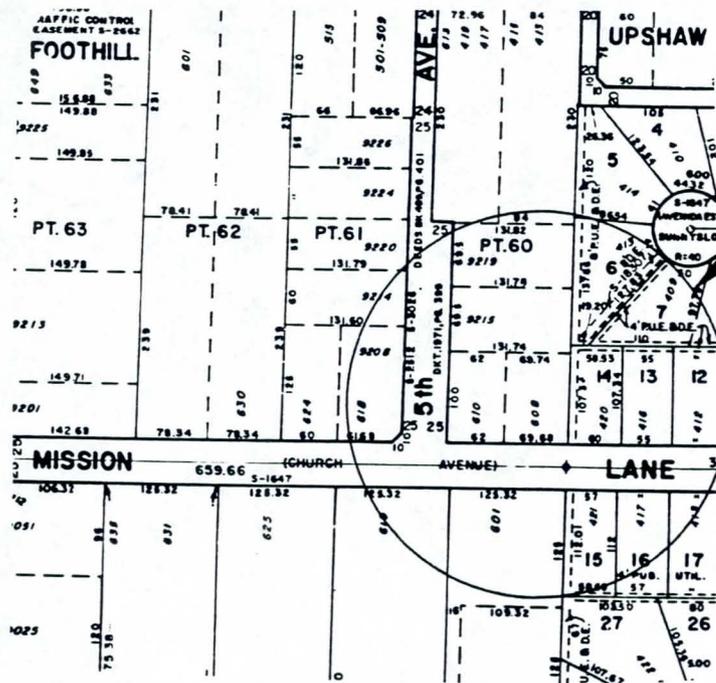
LOCATIONS OF KNOWN FLOODING:
9402 North Central Avenue (No. 8)

CONTRIBUTING FACTORS:
Floors too low
Failure to allow drainage through new projects

LFMP43

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX

PROJ. NO. 27/27-2



THIS
PROJECT

SUBDIVISION NAME: UPSHAW DESERT GARDENS (COUNTY)

DATE SUBDIVIDED: 04-11-50



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
5th AVENUE AND MISSION LANE	27/27	06-03-91	4

73

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 5th Avenue and Mission Lane

PROJECT NUMBER: 27/27-2

DESCRIPTION: Storm water exceeds drainage easement capacity from Sunnyslope Lane cul de sac to Mission Lane

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Remove one house and purchase easement to Arizona Canal Diversion Channel.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$300,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 5/20/91/PK

LOCATIONS OF KNOWN FLOODING:
608 West Mission Lane

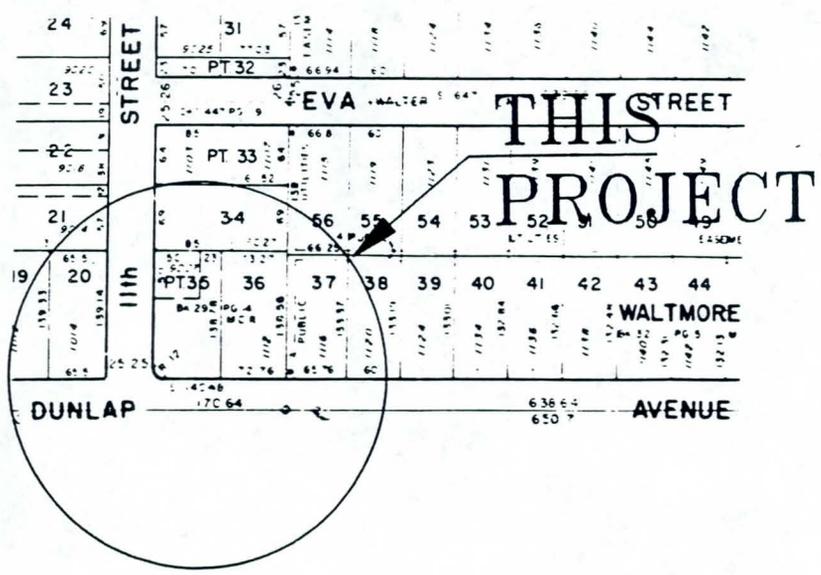
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Streets which drain to the end of a cul de sac or otherwise dead end

LFMP44

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

PROJ. NO. 27/29-1



SUBDIVISION NAME: WALTMORE (COUNTY)
 DATE SUBDIVIDED: 01-29-44



NO SCALE

PROJECT NAME: 11TH STREET & DUNLAP AVENUE	QS 27/29	DATE: 05-30-91	C.D. 4
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74

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 11th Street and Dunlap

PROJECT NUMBER: 27/29-1

DESCRIPTION: Tenth Street Wash between Dunlap Avenue and Mountain View Road, main branch. Nearly entire quarter section is floodplain.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 400

SUGGESTED SOLUTION: Construct Tenth Street Wash Channel.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$6,000,000 (This quarter section only)

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000 (This quarter section only)

COST PER STRUCTURE TO REDUCE FLOODING: \$15,000

FIELD INSPECTION DATE: 4/2/91/PK

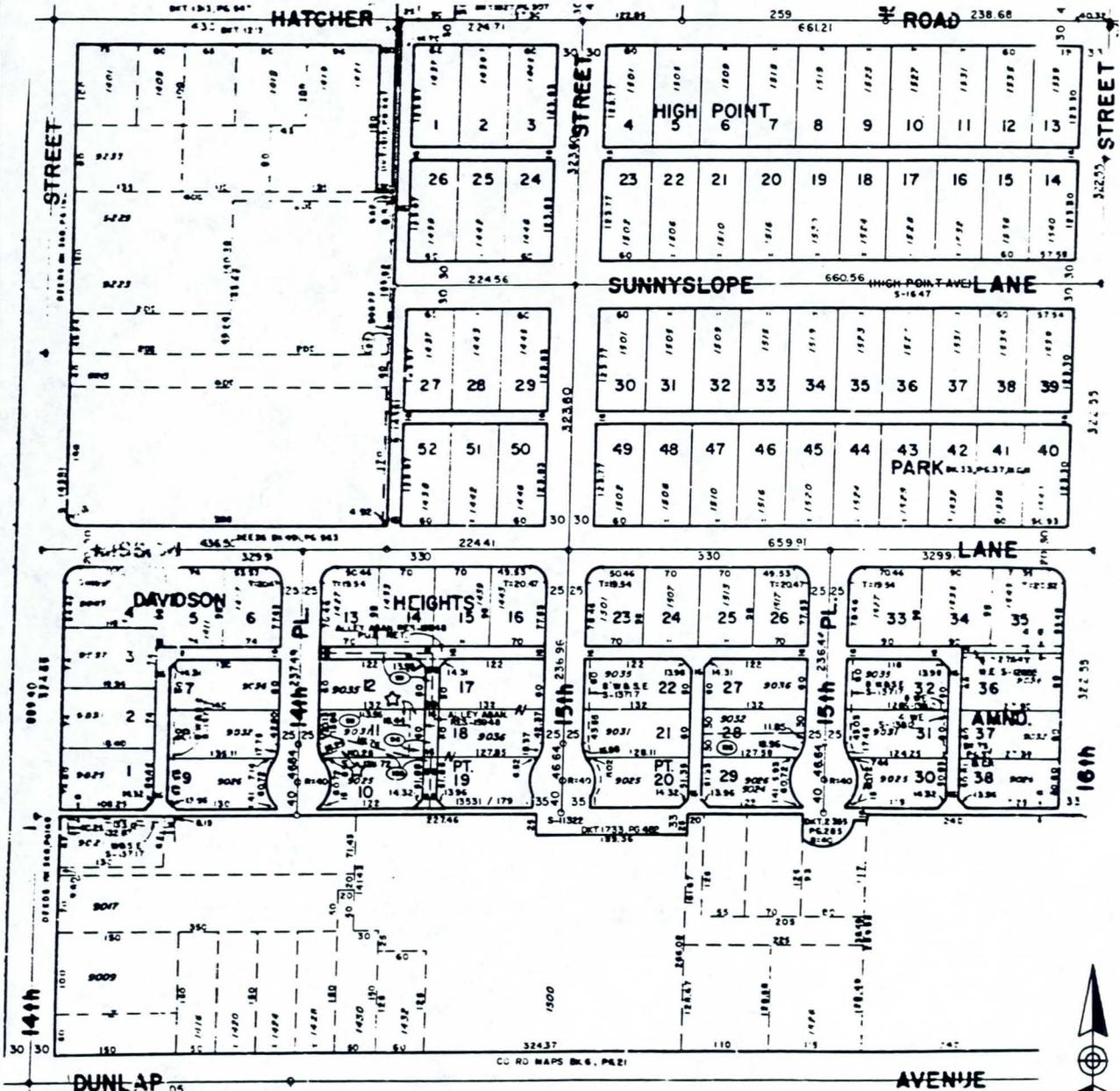
LOCATIONS OF KNOWN FLOODING:

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Structures constructed in natural drainage channels or drainage easements

LFMP40

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: UNSUBDIVIDED (COUNTY)

DATE SUBDIVIDED: 01-01-45

NO SCALE

PROJECT NAME: 15TH STREET & SUNNYSLOPE LANE	QS 27/30	DATE: 05-30-91	C.D. 4
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PROJ. NO. 27/30-1

75

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 15th Street and Sunnyslope Lane

PROJECT NUMBER: 27/30-1

DESCRIPTION: This quarter section contains 3 washes which are major tributaries to the Tenth Street Wash. Each of the washes has caused structures to be flooded. The washes are on the alignment of Malapai Drive, Carol Avenue, and Sunnyslope Lane. The washes have been encroached on by development and little or no room remains to carry storm water.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Purchase land and construct 7,000 L.F. of channel system. (Must be part of a Tenth Street Wash project.)

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$4,000,000 (This quarter section only)

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$80,000

FIELD INSPECTION DATE: 2/20/91/PK

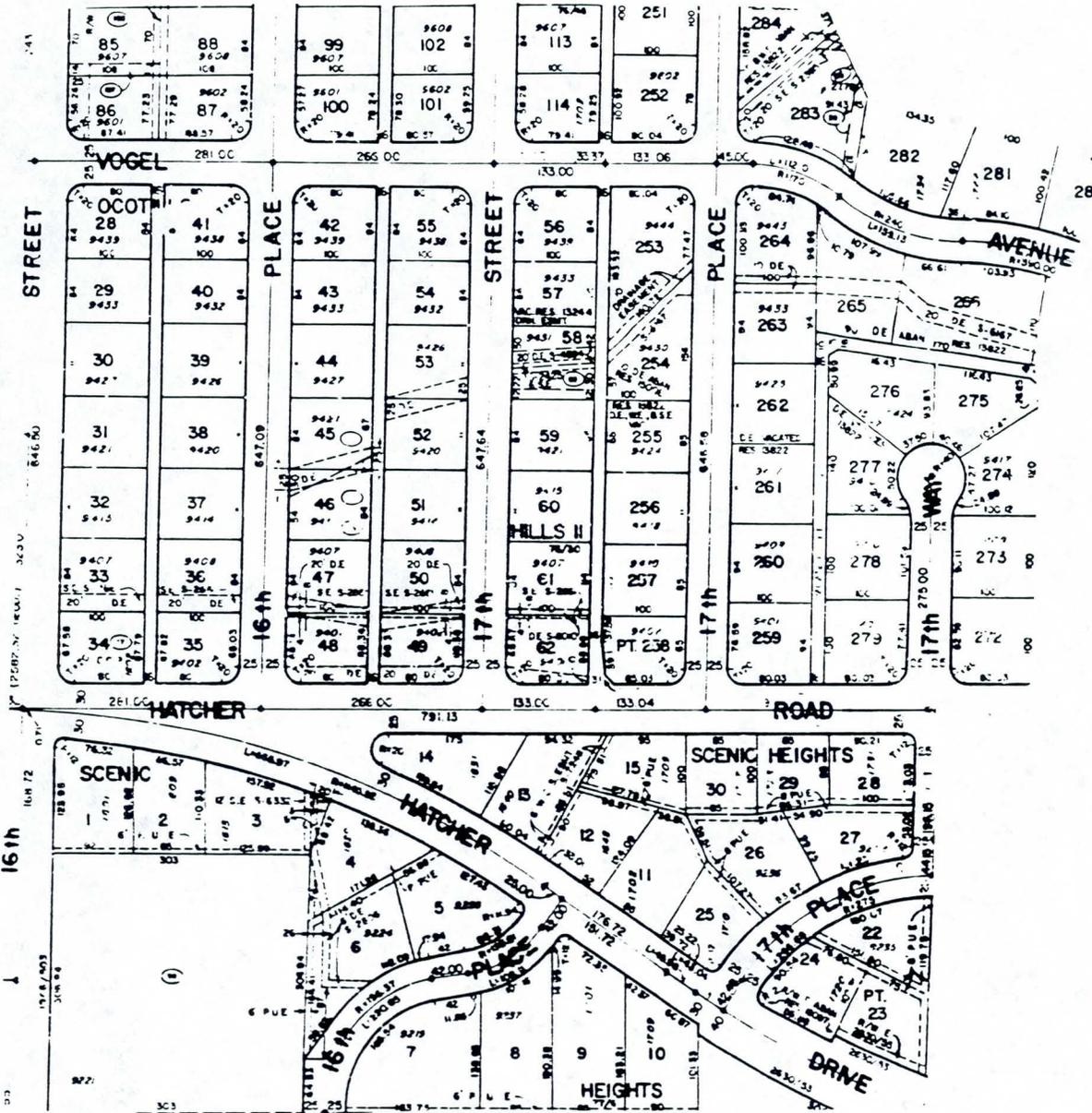
LOCATIONS OF KNOWN FLOODING:

1244, 1506 East Mission Lane
1536 East Sunnyslope Lane
1238 East Vogel
9420 North 15th Street

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity
Structures constructed in natural drainage channels or drainage easements

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: OCOTILLO HILLS 2 (COUNTY)

DATE SUBDIVIDED: 10-19-55



NO SCALE

PROJECT NAME: 16TH STREET & HATCHER DRIVE	QS 27/31	DATE: 05-30-91	C.D. 3
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PROJ. NO. 27/31-1

76

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 16th Street and Hatcher Drive

PROJECT NUMBER: 27/31-1

DESCRIPTION: This quarter section contains 4 washes tributary to Tenth Street Wash. They have been completely removed by constructing homes in them. Water has been rerouted down alleys where it remains until it finds its way into yards and homes. In many cases the homes being flooded are not the ones in the wash.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Purchase homes and construct channels.
(This should be part of a Tenth Street Wash project.)

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$100,000

FIELD INSPECTION DATE: 5/20/91/PK

LOCATIONS OF KNOWN FLOODING:

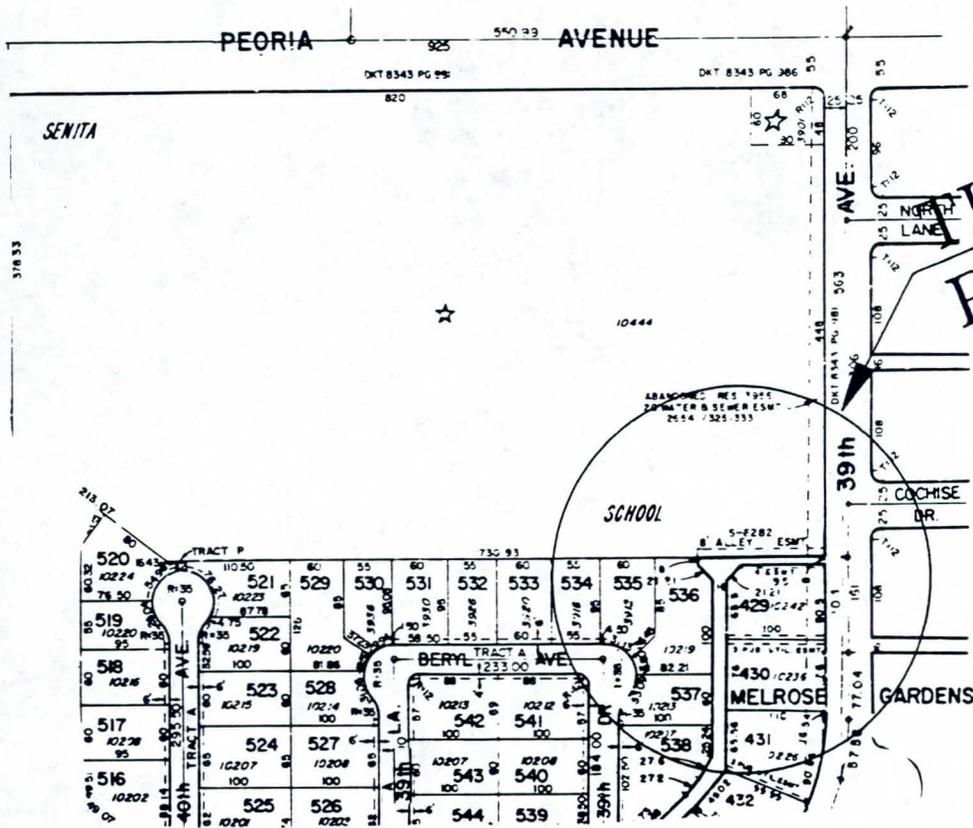
9401 North 17th Street
9602 North 17th Place
9421, 9615 North 16th Street

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Structures constructed in natural drainage channels or drainage easements

LFMP45

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS PROJECT

SUBDIVISION NAME: GARDEN VILLA (CITY)

DATE SUBDIVIDED: 08-01-72



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
39TH AVENUE & PEORIA AVENUE	28/19	06-12-91	1

PROJ. NO. 28/19-1

77

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 39th Avenue and Peoria Avenue

PROJECT NUMBER: 28/19-1

DESCRIPTION: Storm water from 39th Avenue and Senita School parking lot floods rear of homes on 39th Drive and Beryl Avenue.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct 39th Avenue with inverted crown. Obtain right of way into Arizona Canal Diversion Channel.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/5/91/PK

LOCATIONS OF KNOWN FLOODING:
10219 North 39th Drive

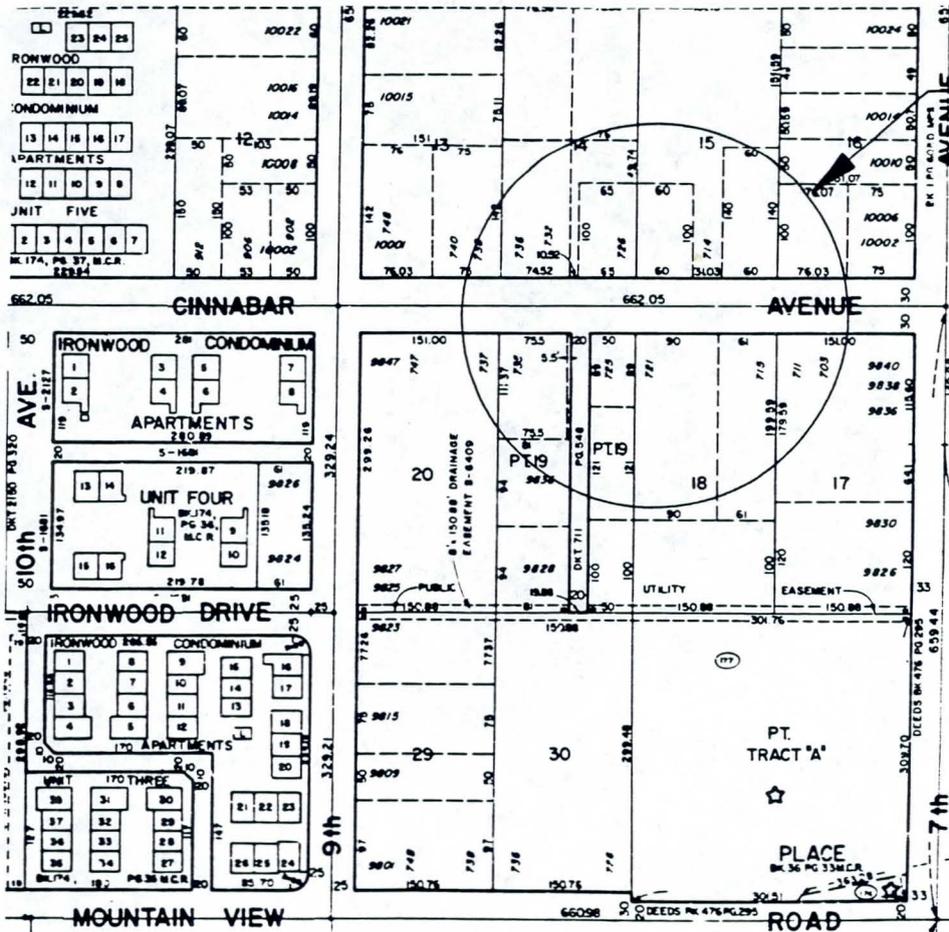
CONTRIBUTING FACTORS:

Floors too low

Major storm run-off exceeds street capacity

LEMP15

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS
PROJECT

SUBDIVISION NAME: IRONWOOD PLACE (COUNTY)

DATE SUBDIVIDED: 12-06-46



NO SCALE

PROJECT NAME:

7TH AVENUE & CINNABAR AVENUE

QS

28/26

DATE:

06-05-91

C.D.

4

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 7th Avenue and Cinnabar Avenue

PROJECT NUMBER: 28/26-1

DESCRIPTION: Three major washes and two minor washes in this quarter section have been blocked by development.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Purchase right of way and construct channels. Must be done with work in quarter section 27/26.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/3/91/PK

LOCATIONS OF KNOWN FLOODING:
9826 North 7th Avenue

CONTRIBUTING FACTORS:

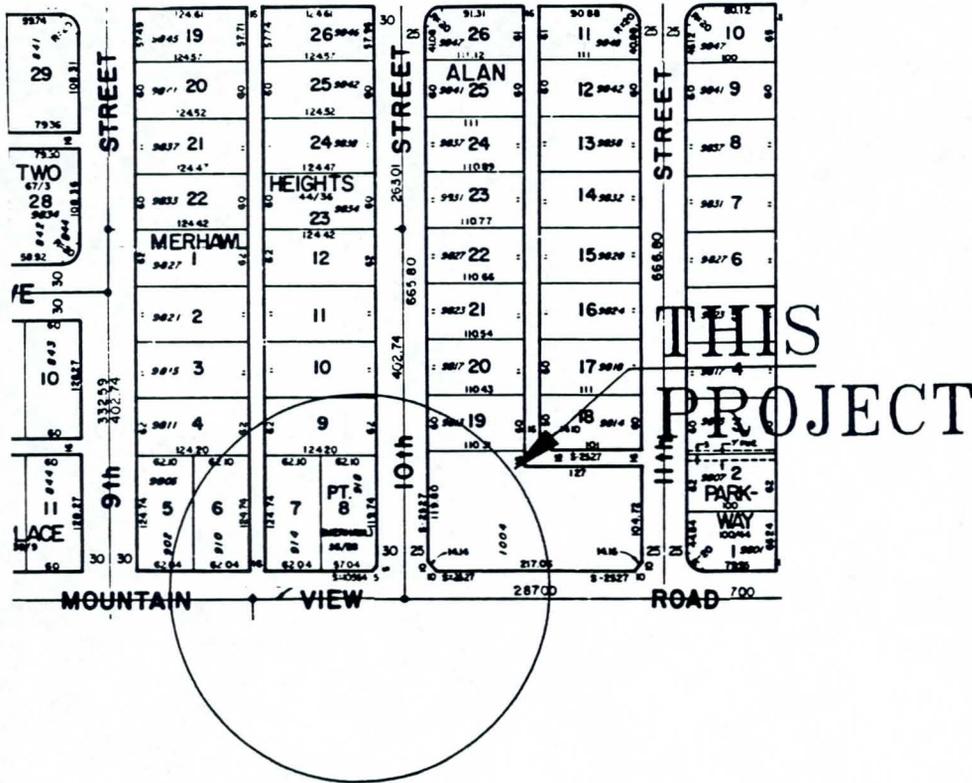
Constructed prior to Development Standards

Floors too low

Structures constructed in natural drainage channels or drainage easements

LFMP91

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: WORKMAN PLACE (COUNTY)

DATE SUBDIVIDED: 01-22-38



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
10th STREET AND MOUNTAIN VIEW	28/29	06-03-91	4

PROJ. NO. 28/29-1

79

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 10th Street and Mountain View

PROJECT NUMBER: 28/29-1

DESCRIPTION: Four tributary washes to Tenth Street Wash and Sunnyslope area. All have been encroached upon by development.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Purchase land and construct channels. (Must be part of Tenth Street Wash system.)

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$40,000

FIELD INSPECTION DATE: 4/91/PK

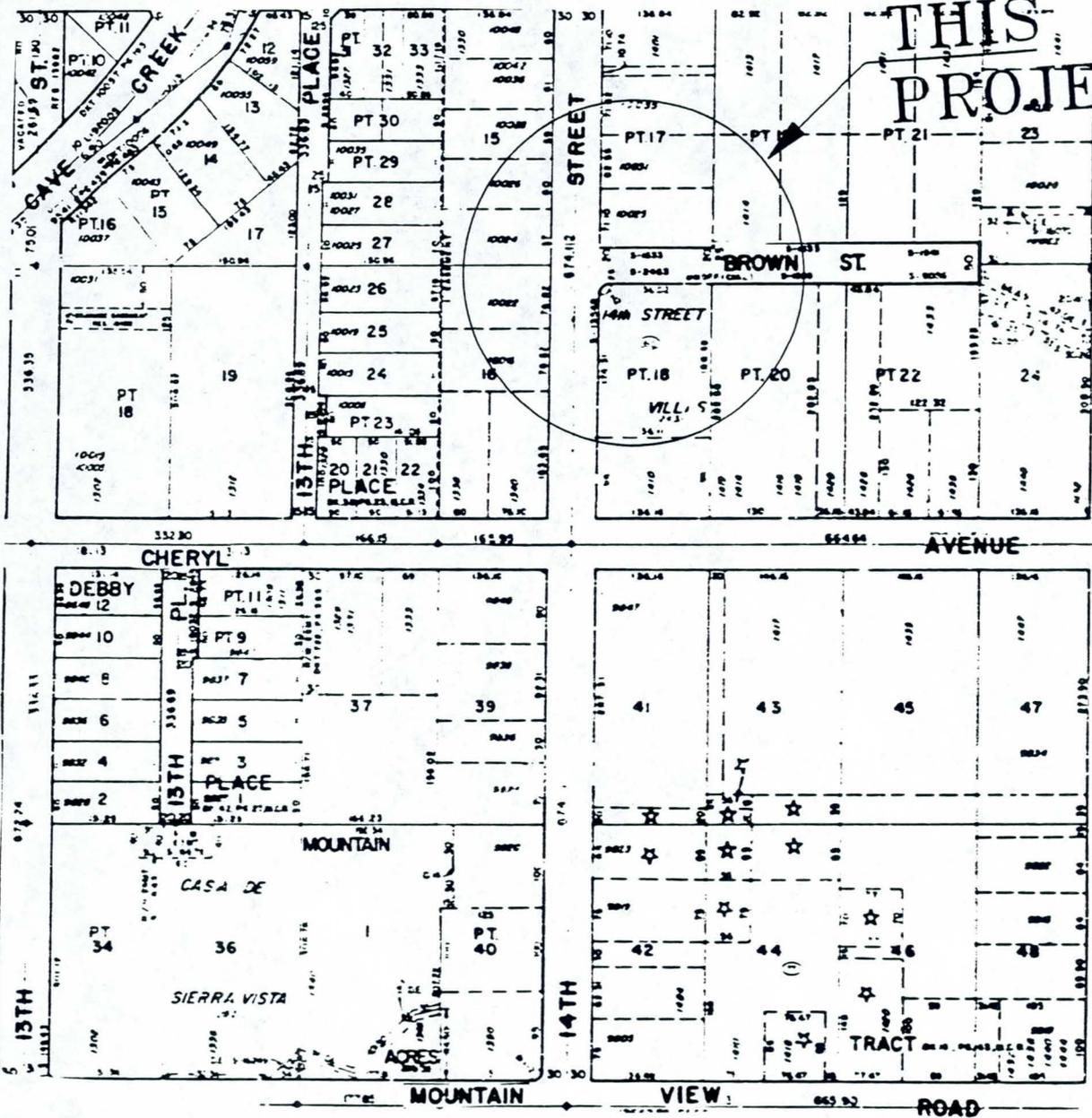
LOCATIONS OF KNOWN FLOODING:
NONE

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Structures constructed in natural drainage channels or drainage easements

LFMP55

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT



THIS PROJECT

SUBDIVISION NAME: UNSUBDIVIDED (COUNTY)

DATE SUBDIVIDED: 01-01-46



NO SCALE

PROJECT NAME: 14TH STREET & BROWN STREET	QS 28/30	DATE: 05-30-91	C.D. 4
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PROJ. NO. 28/30-1

80

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 14th Street and Brown Street

PROJECT NUMBER: 28/30-1

DESCRIPTION: This quarter section contains three tributaries to the Tenth Street Wash and the main stem of Tenth Street Wash. Two tributaries are along the alignments of Brown Street and Ironwood Drive. The washes have been encroached on by development and little or no room remains to carry storm water.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Purchase land and construct 7,000 L.F. of channel system. (Must be part of Tenth Street Wash project.)

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$4,000,000 (This quarter section only.)

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$80,000

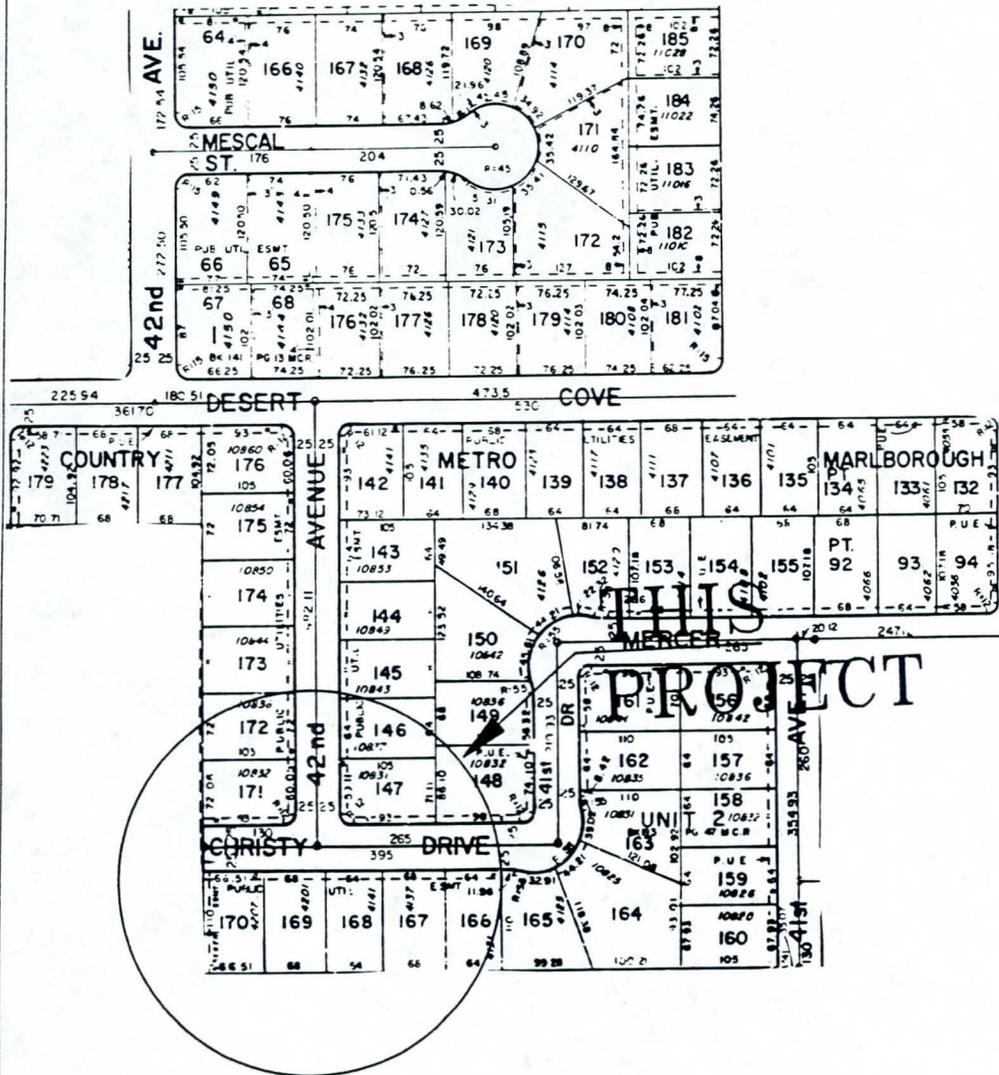
FIELD INSPECTION DATE: 2/20/91/PK

LOCATIONS OF KNOWN FLOODING:
10015 North 14th Street (Apartments)

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Structures constructed in natural drainage channels or drainage easements

LFMP49

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: MARLBOROUGH COUNTRY
METRO UNIT TWO (CITY)
DATE SUBDIVIDED: 08-02-77



NO SCALE

PROJECT NAME: 42ND AVENUE & CHRISTY DRIVE	QS 29/19	DATE: 06-12-91	C.D. 1
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PROJ. NO. 29/19-1

81

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 42nd Avenue and Christy Drive

PROJECT NUMBER: 29/19-1

DESCRIPTION: Most of this quarter section drains to this location. Christy Drive has been blocked by an apartment complex with inadequate channel dedicated.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Purchase 20 apartment units and obtain right of way for outlet. Construct 4,000 feet of inverted crown street with storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 6/5/91/PK

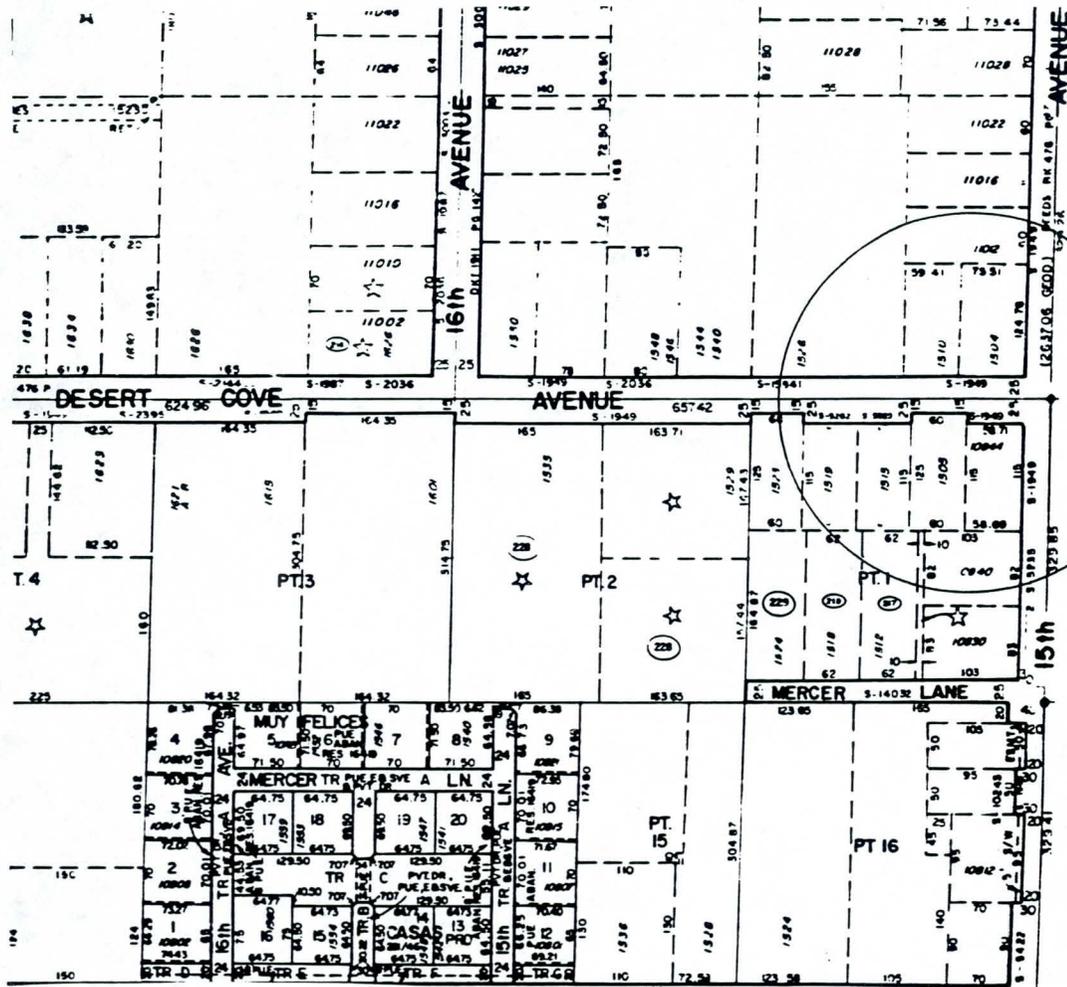
LOCATIONS OF KNOWN FLOODING:
4131 West Christy Drive

CONTRIBUTING FACTORS:

Failure to continue existing street pattern
Streets which drain to the end of a cul de sac or otherwise dead end

LFMP10

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



**THIS
PROJECT**



NO SCALE

SUBDIVISION NAME: DESERT COVE EXTENSION (COUNTY)
DATE SUBDIVIDED: 05-29-45

PROJECT NAME: 15TH AVENUE & DESERT COVE	QS 29/25	DATE: 06-05-91	C.D. 3
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PROJ. NO. 29/25-1

82

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 15th Avenue and Desert Cove Avenue

PROJECT NUMBER: 29/25-1

DESCRIPTION: Natural washes have been obstructed by development.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Purchase right of way and construct channels
in this quarter section.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$50,000

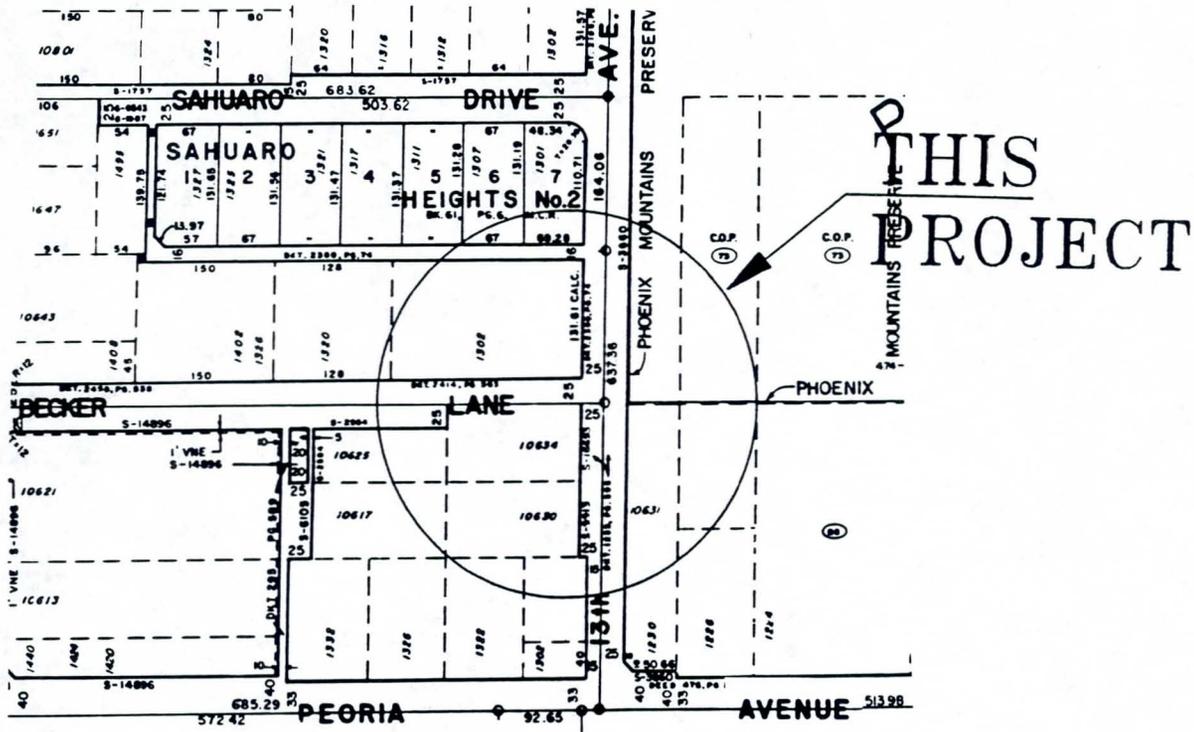
FIELD INSPECTION DATE: 6/4/91/PK

LOCATIONS OF KNOWN FLOODING:
1515, 1519 West Desert Cove Avenue

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Structures constructed in natural drainage channels or drainage
easements

LFMP93

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: UNSUBDIVIDED (COUNTY)

DATE SUBDIVIDED: 01-01-55



NO SCALE

PROJECT NAME: 13TH AVENUE & BECKER LANE	QS 29/26	DATE: 06-05-91	C.D. 3
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83

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 13th Avenue and Becker Lane

PROJECT NUMBER: 29/26-1

DESCRIPTION: Storm water exceeds capacity of 13th Avenue and floods apartments at 1302 West Becker Lane. Mountain Preserve land is across 13th Avenue. Very steep slopes.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Construct Becker with crown to carry more water.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$200,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/4/91/PK

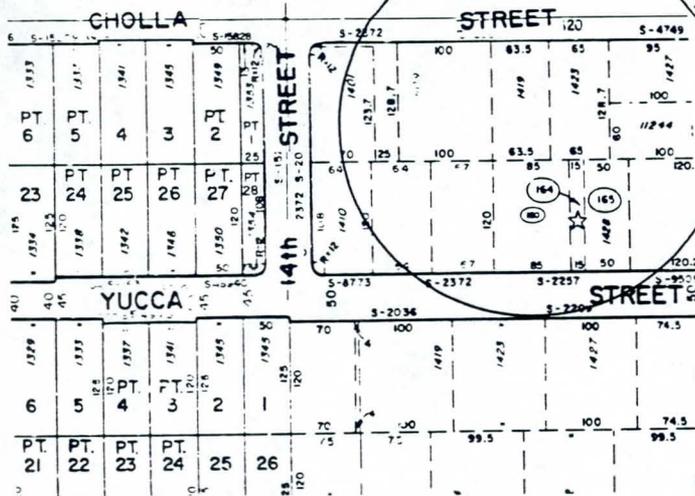
LOCATIONS OF KNOWN FLOODING:
1302 West Becker Lane (apartments)

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Major storm run-off exceeds street capacity

LFMP92

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

THIS
 PROJECT



SUBDIVISION NAME: CACTUS HEIGHTS (COUNTY)

DATE SUBDIVIDED: 11-05-20



NO SCALE

PROJECT NAME: 14TH STREET & CHOLLA STREET	QS 29/30	DATE: 05-30-91	C.D. 3
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PROJ. NO. 29/30-1

87

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 14th Street and Cholla Street

PROJECT NUMBER: 29/30-1

DESCRIPTION: This quarter section contains the headwaters of Tenth Street Wash. The washes have been encroached on by development.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Purchase land and construct 7,000 L.F. of channels. (Must be part of Tenth Street Wash project.)

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$40,000

COST PER STRUCTURE TO REDUCE FLOODING: \$60,000

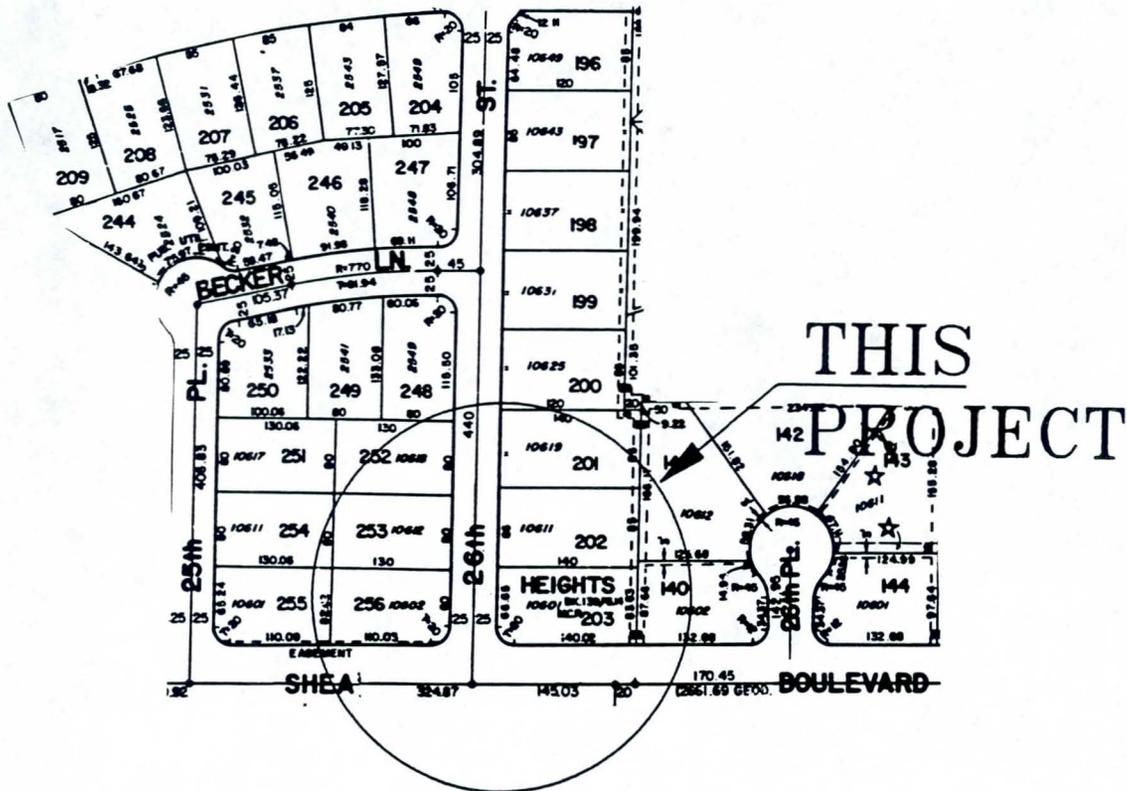
FIELD INSPECTION DATE: 3/29/91/PK

LOCATIONS OF KNOWN FLOODING:
1409, 1413, & 1419 East Cholla Street

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Structures constructed in natural drainage channels or drainage easements

LFMP50

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: SHEA HEIGHTS (CITY)

DATE SUBDIVIDED: 06-22-71



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
26TH STREET & SHEA BOULEVARD	29/33	06-05-91	3

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 26th Street and Shea Boulevard

PROJECT NUMBER: 29/33-1

DESCRIPTION: Storm water exceeds the capacity of Shea Boulevard and floods homes at this corner.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Purchase two homes and connect Sahuaro Drive cul de sacs, or construct Shea Boulevard with an inverted crown.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$50,000

FIELD INSPECTION DATE: 6/4/91/PK

LOCATIONS OF KNOWN FLOODING:
10601 North 26th Street

CONTRIBUTING FACTORS:

Floors too low

Major storm run-off exceeds street capacity

LFMP99

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: CONTINENTAL NORTH UNIT 8 (CITY)

DATE SUBDIVIDED: 07-05-72

NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
49TH AVENUE & PARADISE DRIVE	30/17	06-12-91	1

PROJ. NO. 30/17-1

86

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 49th Avenue and Paradise Drive

PROJECT NUMBER: 30/17-1

DESCRIPTION: Storm water exceeds the capacity of streets and floods yards. Reports of water 3' - 4' deep. Houses are 1 foot above curb.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct 4,000 feet of inverted crown local streets. Purchase right of way to ACDC which is inadequate.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$40,000

FIELD INSPECTION DATE: 6/5/91/PK

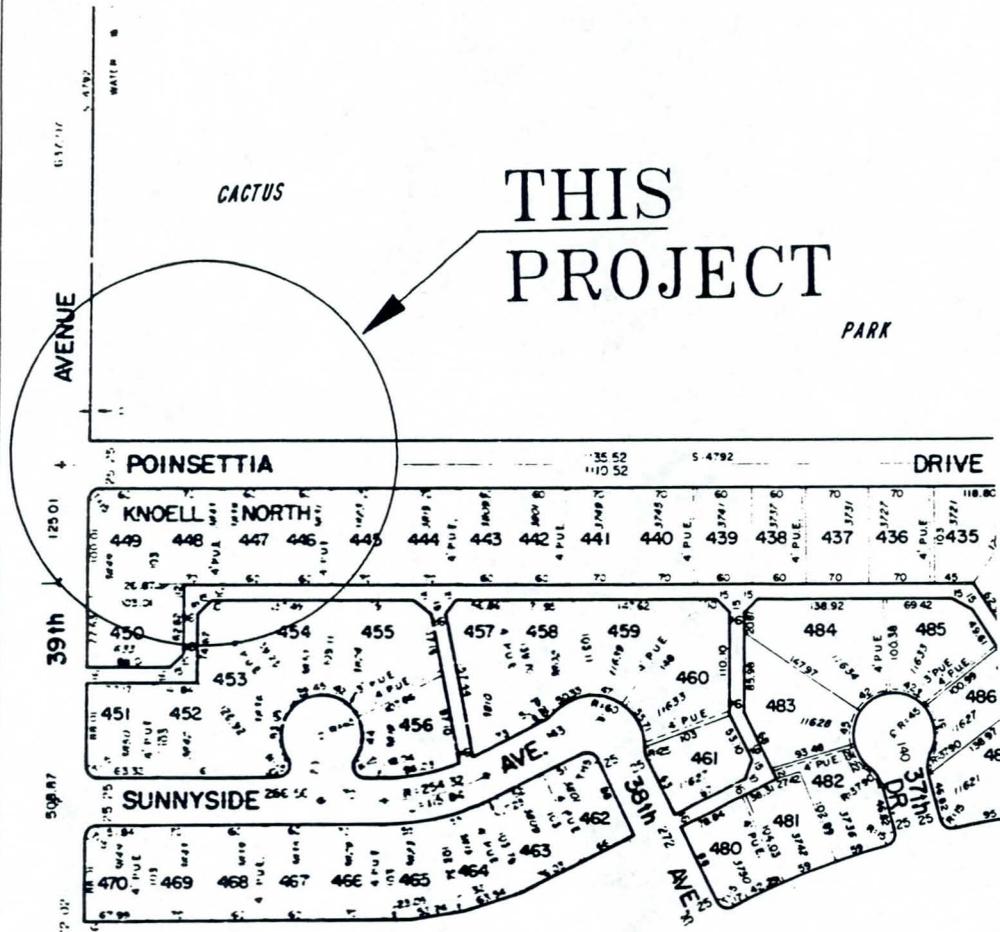
LOCATIONS OF KNOWN FLOODING:
NONE

CONTRIBUTING FACTORS:

Major storm run-off exceeds street capacity

LFMP13

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: KNOELL NORTH UNIT FIVE (CITY)

DATE SUBDIVIDED: 04-07-70



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
39TH AVENUE & POINSETTIA DRIVE	30/20	06-12-91	1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 39th Avenue and Poinsettia Drive

PROJECT NUMBER: 30/20-1

DESCRIPTION: Storm water exceeds capacity of 39th Avenue and Poinsettia Drive and floods homes which are 2' above the curb. Storm water from Cactus floods Moon Valley High School.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct 39th Avenue and Poinsettia Drive with inverted crown and storm drain. Rebuild Cactus with inverted crown.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$3,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$60,000

FIELD INSPECTION DATE: 6/5/91/PK

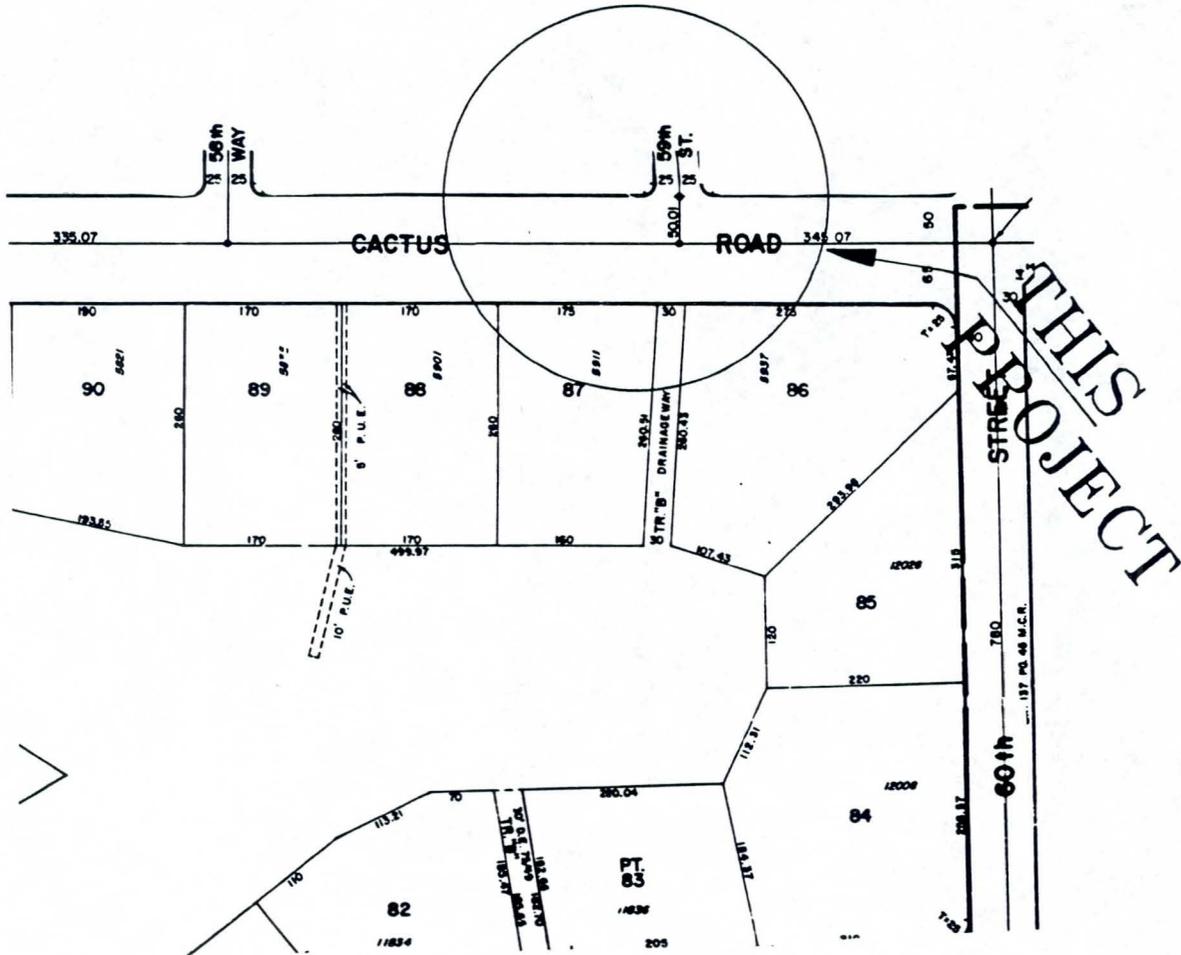
LOCATIONS OF KNOWN FLOODING:
Moon Valley High School

CONTRIBUTING FACTORS:

Floors too low
Failure to allow drainage through new projects
Major storm run-off exceeds street capacity

LFMP14

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: CENTURY CLUB ESTATES (COUNTY)

DATE SUBDIVIDED: 09-19-57



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
59TH STREET & CACTUS ROAD	30/41	06-05-91	2

PROJ. NO. 30/41-1

88

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 59th Street and Cactus Road

PROJECT NUMBER: 30/41/-1

DESCRIPTION: 59th and 57th Streets drain a large area into Cactus Road. Storm water overtops Cactus Road and floods homes on south side of Cactus.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Construct large grate inlets and box culverts at 57th and 59th Streets under Cactus Road.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$300,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 6/4/91/PK

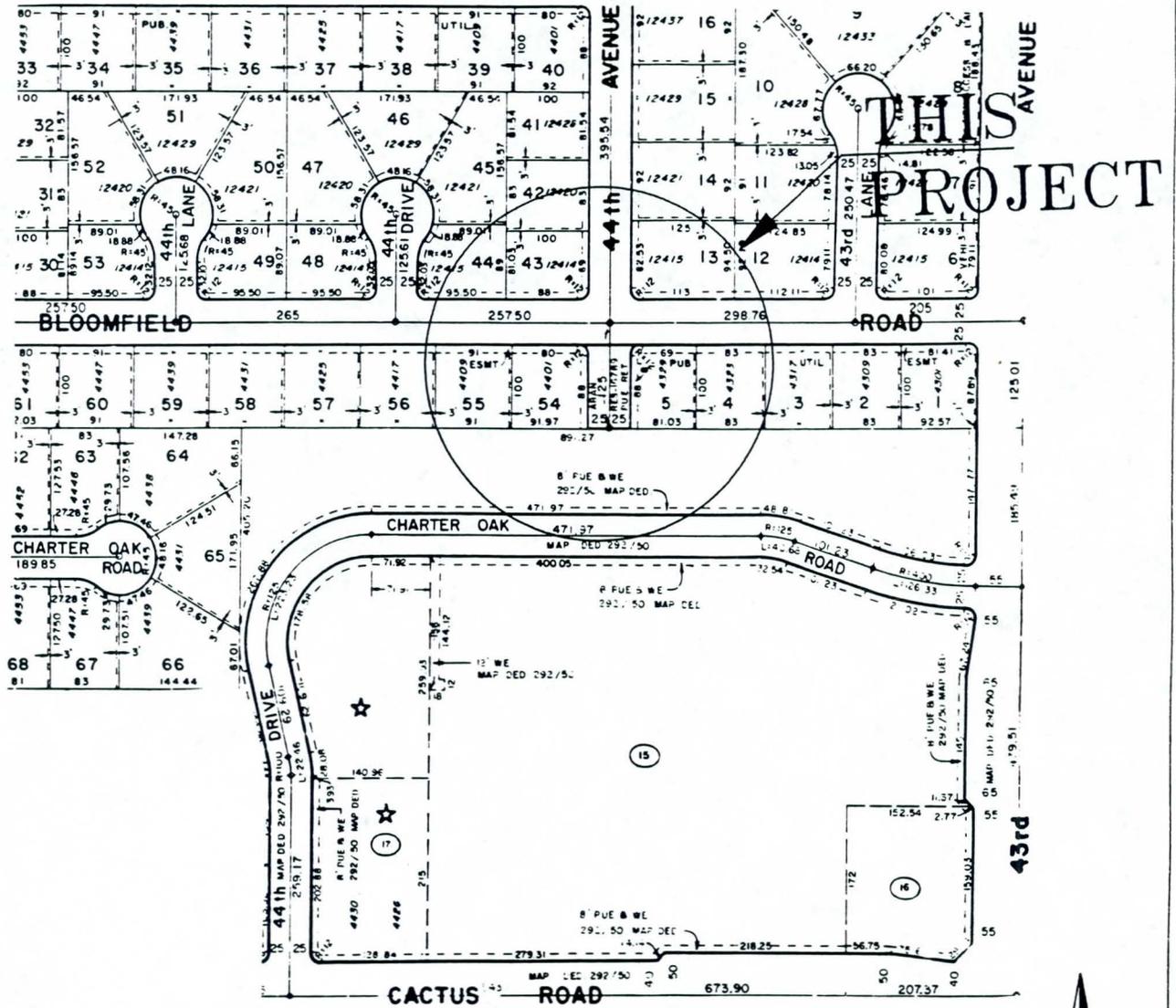
LOCATIONS OF KNOWN FLOODING:
5701, 5911 East Cactus Road

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP98

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: OFFICE ON CHARTER OAK (CITY)

DATE SUBDIVIDED: 01-18-89



NO SCALE

PROJECT NAME: 44TH AVENUE & BLOOMFIELD ROAD	QS 31/18	DATE: 06-12-91	C.D. 1
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PROJ. NO. 31/18-1

89

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 44th Avenue and Bloomfield Road

PROJECT NUMBER: 31/18-1

DESCRIPTION: Storm water flows from 43rd Avenue west and south on 44th Avenue to this location. Drainage to south has been cut off by new project with inadequate channel.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Construct 4,000 feet of local street with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$50,000

FIELD INSPECTION DATE: 6/5/91/PK

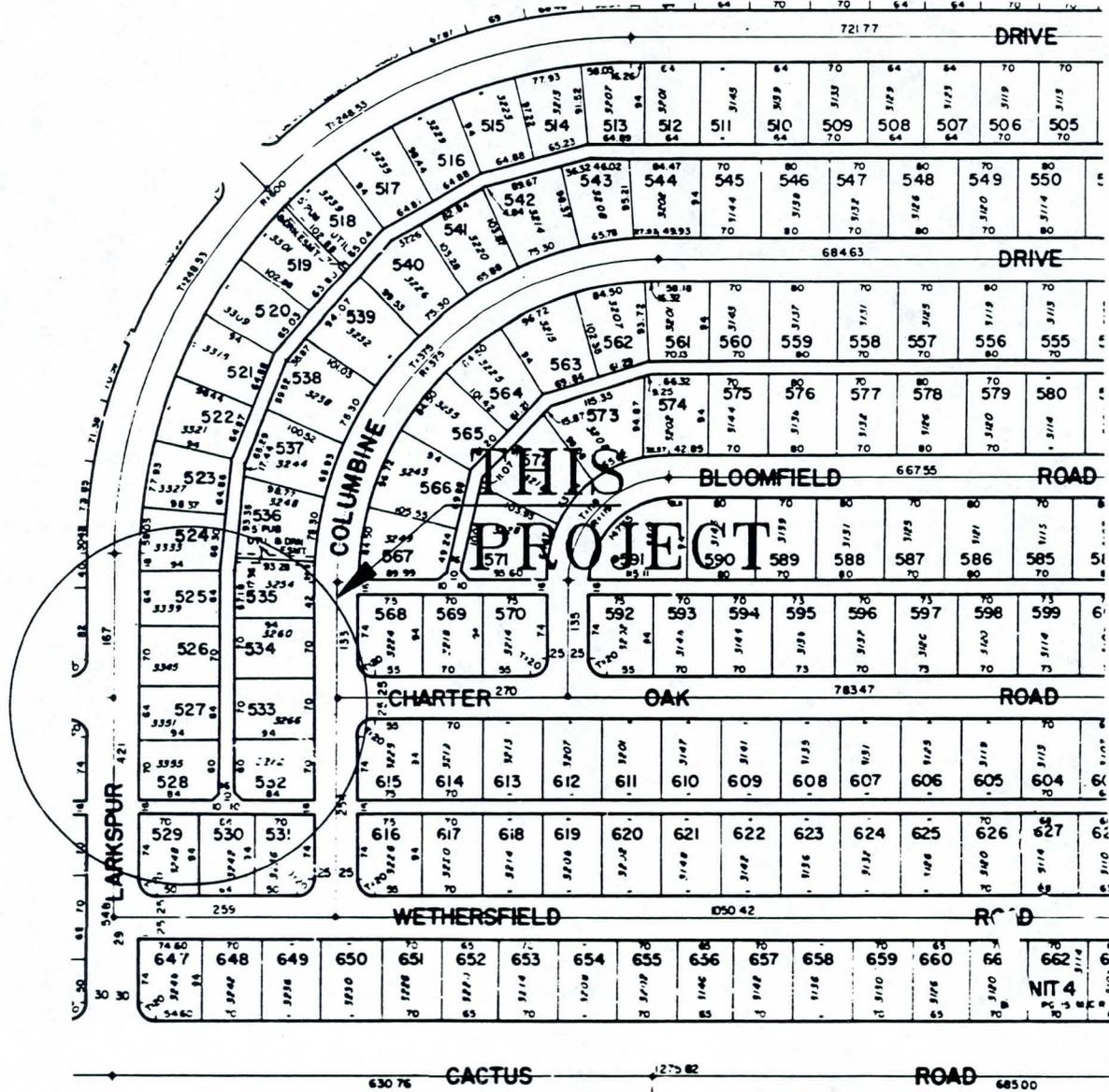
LOCATIONS OF KNOWN FLOODING:
NONE

CONTRIBUTING FACTORS:

Failure to continue existing street pattern
Failure to allow drainage through new projects
Major storm run-off exceeds street capacity

LFMP11

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: WESTTOWN UNIT 5 (COUNTY)

DATE SUBDIVIDED: 01-25-60

NO SCALE

PROJECT NAME: 33RD AVENUE & CACTUS ROAD	QS 31/21	DATE: 06-12-91	C.D. 1
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PROJ. NO. 31/21-1

90

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 33rd Avenue and Cactus Road

PROJECT NUMBER: 31/21-1

DESCRIPTION: Storm water exceeds the capacity of Larkspur and floods homes which are at curb height. NOTE: Larkspur is on the alignment of 33rd Avenue and drains nearly the entire quarter section to this point.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct 4,000 feet of local street with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

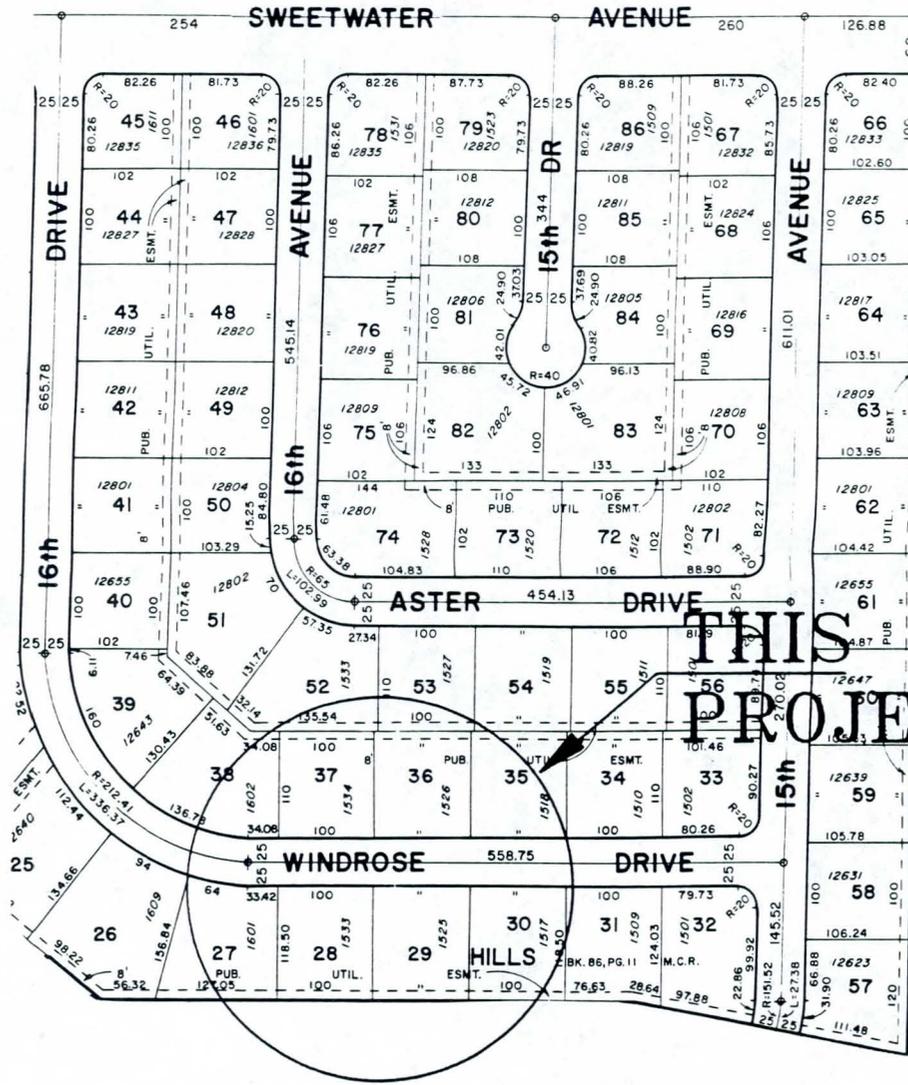
FIELD INSPECTION DATE: 6/5/91/PK

LOCATIONS OF KNOWN FLOODING:
3364, 3376, 3382 West Larkspur

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP19

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: MOON HILLS (COUNTY)

DATE SUBDIVIDED: 06-22-59



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
15TH AVENUE & WINDROSE DRIVE	31/25	05-08-91	3

PROJ. NO. 31/25-1

91

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 15th Avenue and Windrose Drive

PROJECT NUMBER: 31/25-1

DESCRIPTION: Storm water from north side of Shaw Butte flows through lots adjacent to the Mountain Preserve. Floods homes on Windrose Drive and Aster Drive.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Construct Windrose & Aster with inverted crown, and/or channel on Mountain Preserve.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$300,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

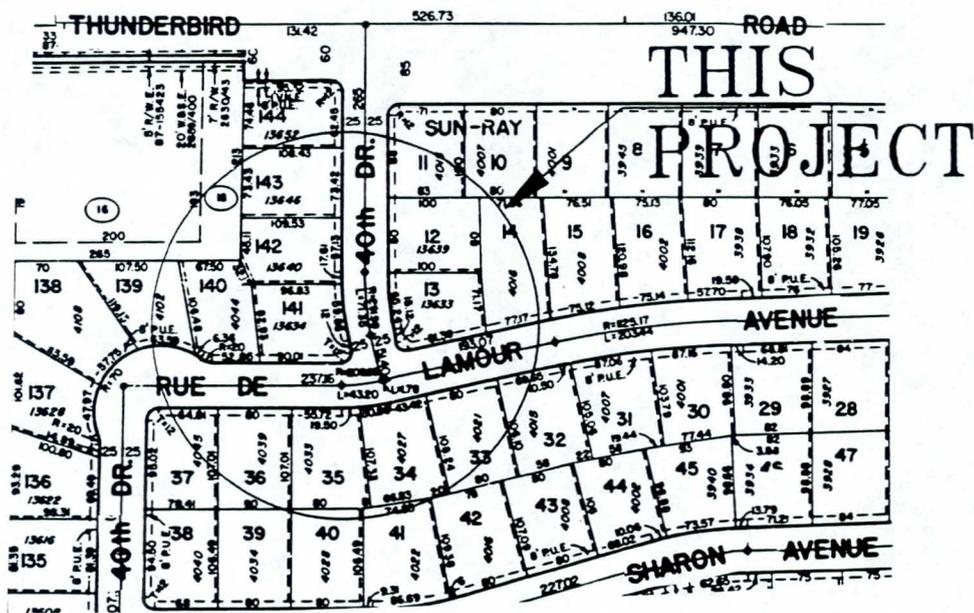
COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 12/4/90/PK

LOCATIONS OF KNOWN FLOODING:
1509, 1510, 1518, 1526 West Windrose
1511, 1519, 1527, 1533 West Aster Drive

CONTRIBUTING FACTORS:
Failure to allow drainage through new projects
Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: SUNRAY MANOR (CITY)

DATE SUBDIVIDED: 05-03-78



NO SCALE

PROJECT NAME: 40TH DRIVE & RUE DE LAMOUR	QS 32/19	DATE: 05-15-91	C.D. 1
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PROJ. NO. 32/19-1

92

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 40th Drive and Rue De Lamour

PROJECT NUMBER: 32/19-1

DESCRIPTION: Run off overflows from Thunderbird Road south on 39th Avenue and 40th Drive. It then overflows Rue De Lamour, Sharon & Voltaire Avenues. A drainage easement west from Voltaire Avenue is inadequate.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Reconstruct Rue De Lamour, Sharon & Voltaire Avenues and 40th Drive with inverted crowns. Secure easement through apartment project to the west.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

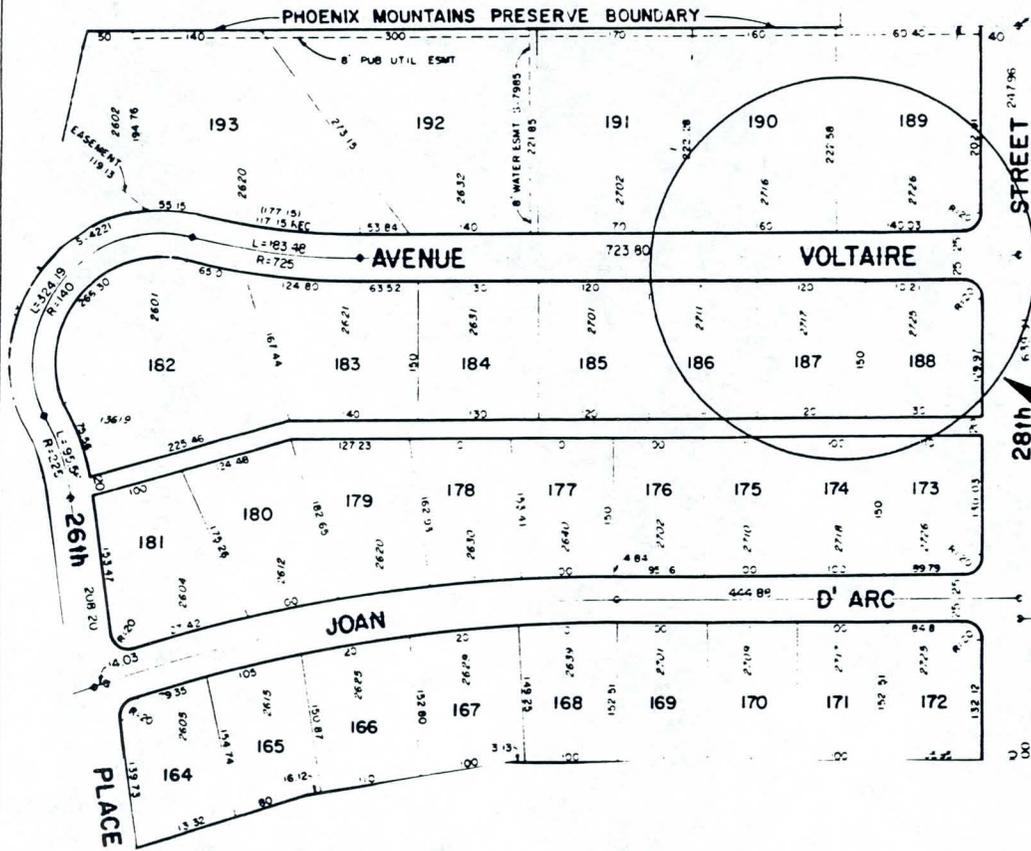
FIELD INSPECTION DATE: 3/19/91/PK

LOCATIONS OF KNOWN FLOODING:
13602, 13608 North 40th Drive
4027 West Rue De Lamour Avenue
4045 West Sharon Avenue

CONTRIBUTING FACTORS:

Floors too low
Failure to continue existing street pattern
Streets which drain to the end of a cul de sac or otherwise dead end
Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS PROJECT

SUBDIVISION NAME: CHATEAU THIERRY (COUNTY)

DATE SUBDIVIDED: 04-08-53



NO SCALE

PROJECT NAME: 28TH STREET & VOLTAIRE AVENUE	QS 32/33	DATE: 06-05-91	C.D. 3
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93

PROJ. NO. 32/33-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 28th Street and Voltaire Avenue

PROJECT NUMBER: 32/33-1

DESCRIPTION: Storm water exceeded the capacity of Voltaire Avenue and 28th Street, flooding houses. A spillway was added to divert water to the natural wash. Homeowners believe this is silting up "their wash."

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 4

SUGGESTED SOLUTION: Construct 28th Street with inverted crown to take water to wash.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$100,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$25,000

FIELD INSPECTION DATE: 6/4/91/PK

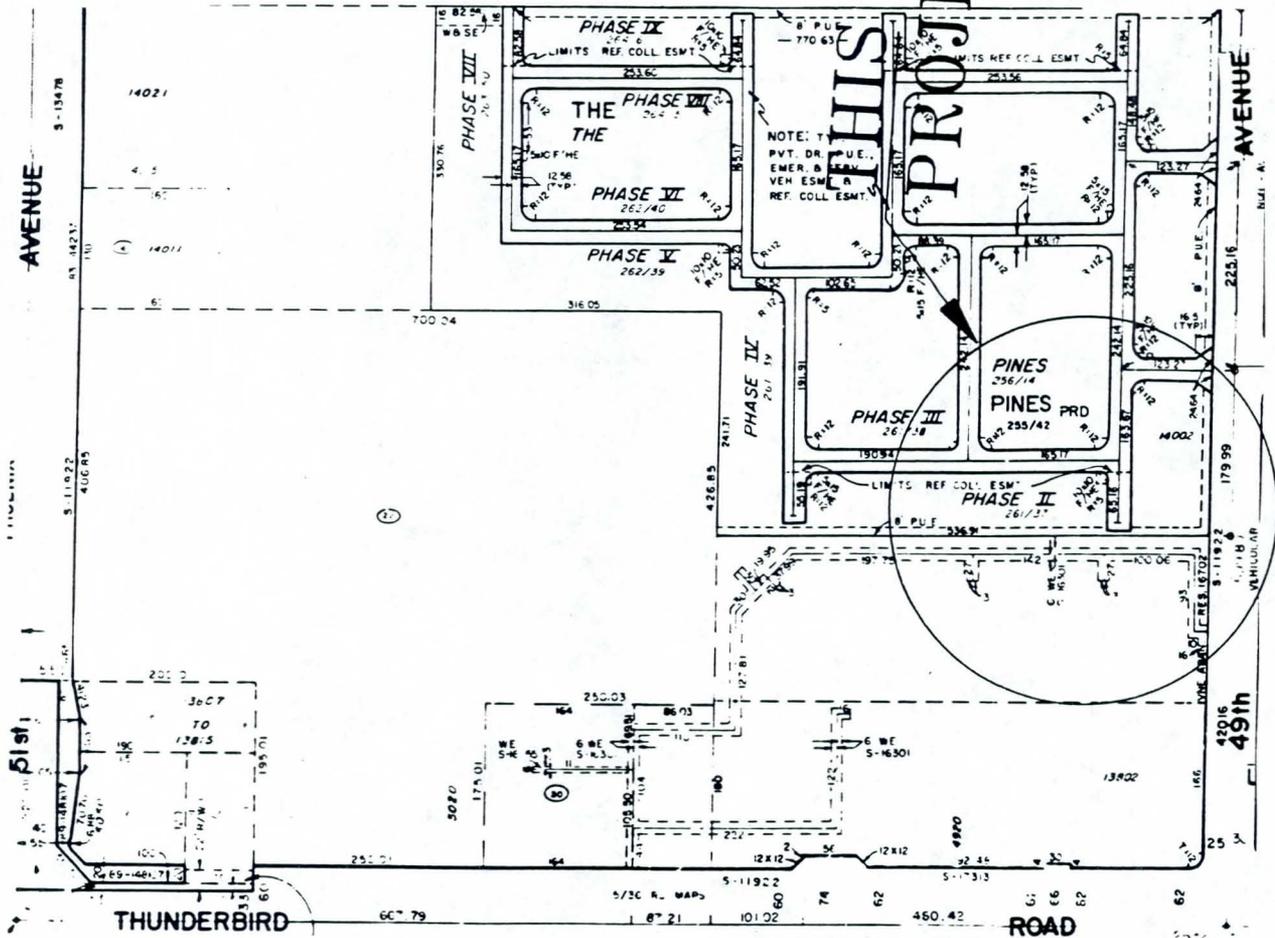
LOCATIONS OF KNOWN FLOODING:
2725 East Voltaire Avenue

CONTRIBUTING FACTORS:

Major storm run-off exceeds street capacity
Structures constructed in natural drainage channels or drainage easements

LFMP97

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: THE PINES (CITY)

DATE SUBDIVIDED: 07-19-83



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
49TH AVENUE & THUNDERBIRD ROAD	33/17	05-15-91	1

PROJ. NO. 33/17-1

94

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 49th Avenue and Thunderbird Road

PROJECT NUMBER: 33/17-1

DESCRIPTION: Storm water flow is from east to west on Redfield Road and Dailey Street. This flow exceeds capacity of 49th Avenue to carry water to the south. 48th Avenue is flat.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Construct inverted crown on 49th & 48th Avenues, Redfield Road to Thunderbird Road.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$200,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$15,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 3/8/91/PK

LOCATIONS OF KNOWN FLOODING:
14002 North 49th Avenue

CONTRIBUTING FACTORS:

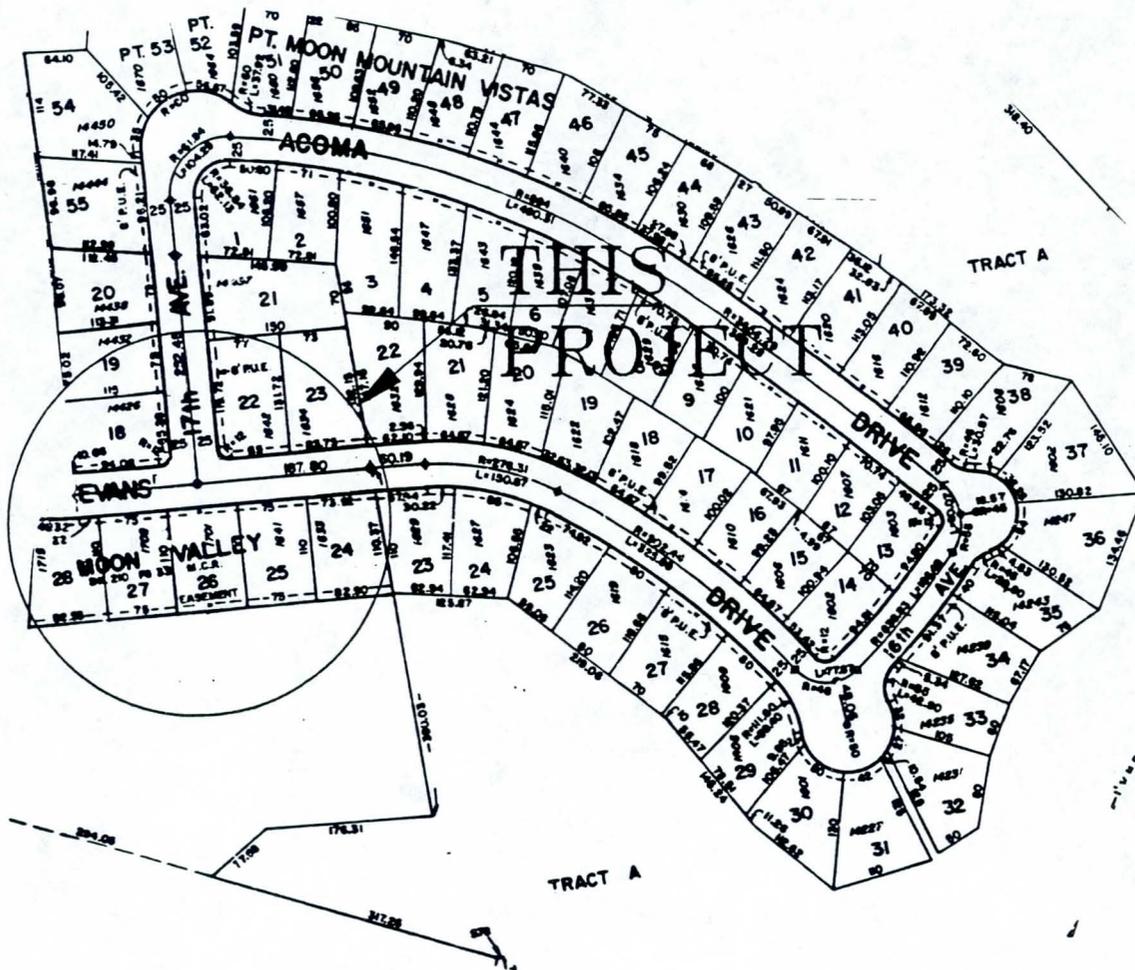
Floors too low

Failure to continue existing street pattern

Failure to allow drainage through new projects

Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: EATON MOON VALLEY (CITY)

DATE SUBDIVIDED: 04-03-79



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
17TH AVENUE & EVANS DRIVE	33/25	06-12-91	3

PROJ. NO. 33/25-1

95

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 7th Avenue and Evans Drive

PROJECT NUMBER: 33/25-1

DESCRIPTION: Storm water flows down Evans draining a large area.
Low spot at 1709 West Evans is always wet plus silt after rains.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 0

SUGGESTED SOLUTION: Construct Evans and 17th Avenue with storm
drain and inverted crown.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$15,000

COST PER STRUCTURE TO REDUCE FLOODING: \$N/A

FIELD INSPECTION DATE: 6/4/91/PK

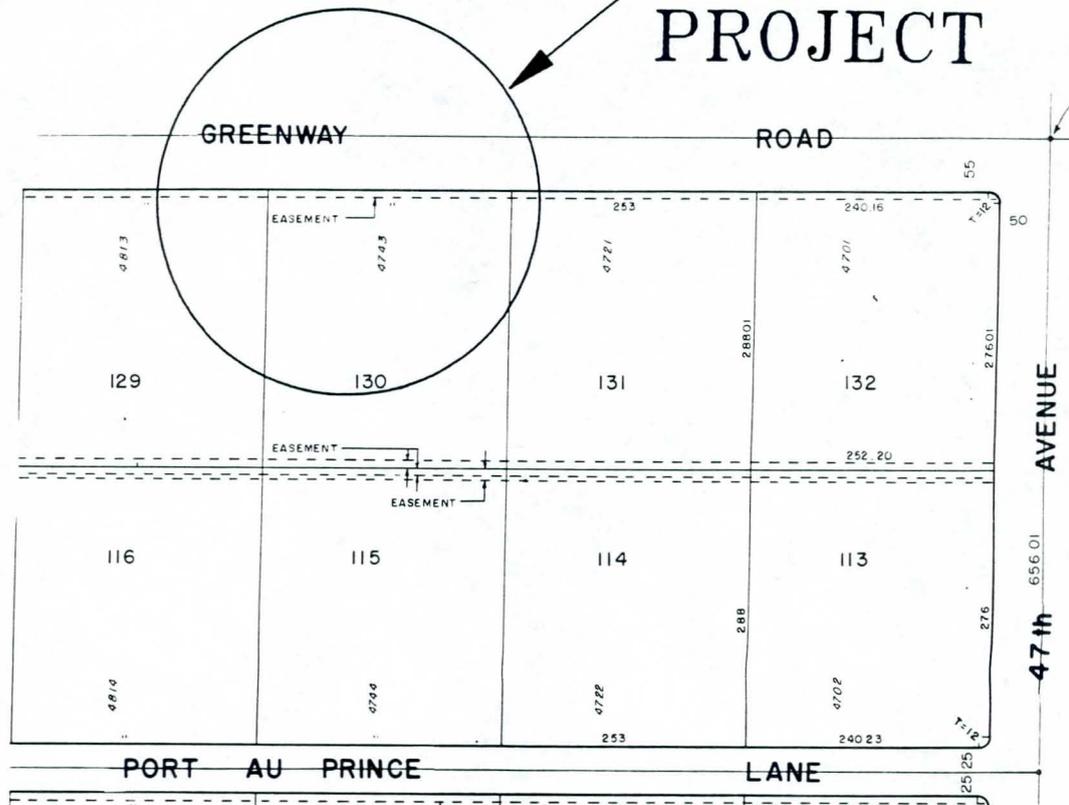
LOCATIONS OF KNOWN FLOODING:
NONE

CONTRIBUTING FACTORS:
Major storm run-off exceeds street capacity

LEMP03

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

**THIS
 PROJECT**



SUBDIVISION NAME: SUNBURST FARMS - FIVE (COUNTY)

DATE SUBDIVIDED: 06-07-68



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
47TH AVENUE & GREENWAY ROAD	34/17	05-08-91	1

PROJ. NO. 34/17-1

96

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 47th Avenue and Greenway

PROJECT NUMBER: 34/17-1

DESCRIPTION: Storm run-off from north and east exceeds capacity of Greenway and side ditch. Flows onto properties on south side of Greenway. Greenway has good slope to west.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Construct Greenway with inverted crown, or large berms on each side, or large storm sewer to ACDC, or drainageways to the south.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$50,000

FIELD INSPECTION DATE: 3/8/91/PK

LOCATIONS OF KNOWN FLOODING:
4701, 4923, 5009 West Greenway

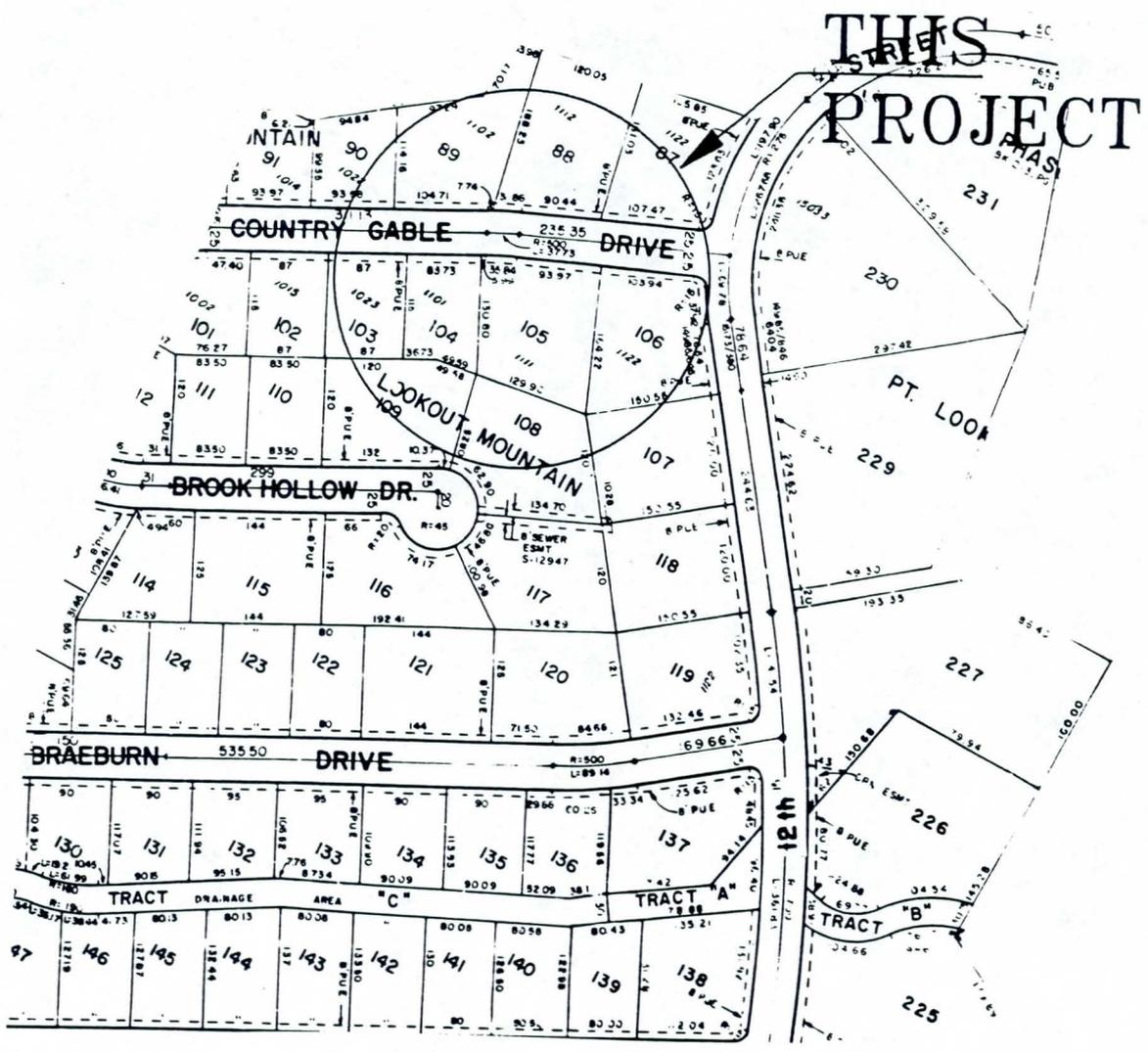
CONTRIBUTING FACTORS:

Floors too low

Failure to allow drainage through new projects

Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: LOOKOUT MOUNTAIN PHASE 3 (CITY)
 DATE SUBDIVIDED: 01-05-82

NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
12TH STREET & COUNTRY GALES DRIVE	34/29	06-12-91	3

PROJ. NO. 34/29-1

97

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 12th Street and Country Gables Drive

PROJECT NUMBER: 34/29-1

DESCRIPTION: Storm water exceeds capacity of Country Gables and flooded home which is below curb.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 4

SUGGESTED SOLUTION: Construct 500 feet of Country Gables Drive with inverted crown.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$100,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$25,000

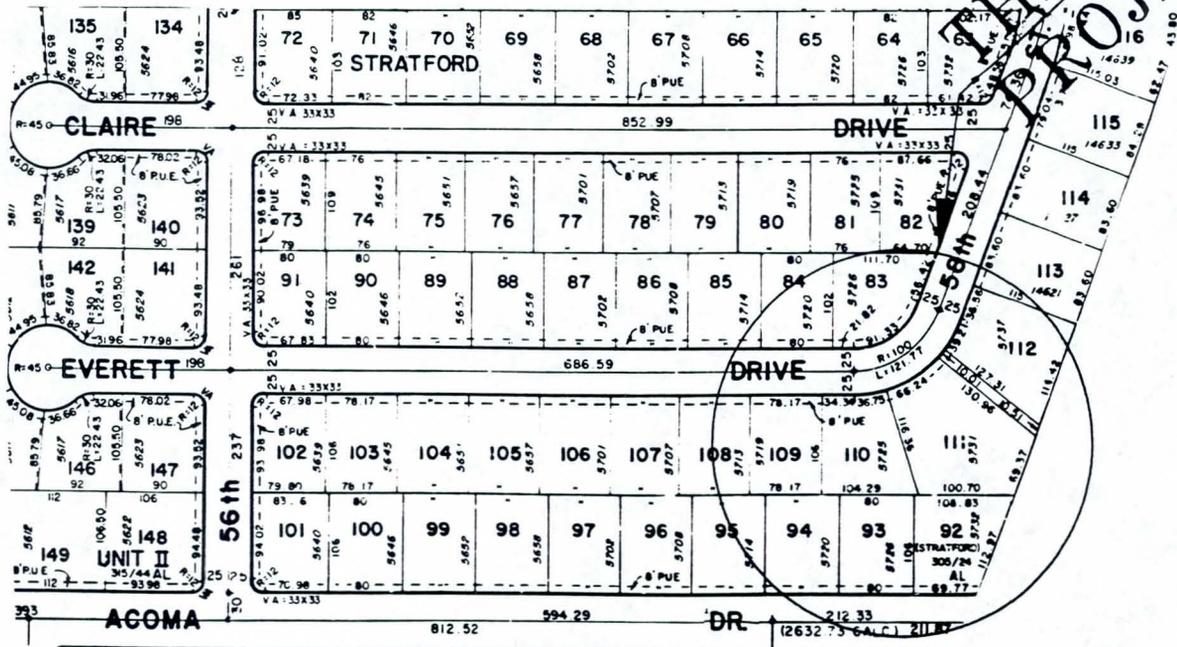
FIELD INSPECTION DATE: 6/4/91/PK

LOCATIONS OF KNOWN FLOODING:
1101 East Country Gables Drive

CONTRIBUTING FACTORS:
Major storm run-off exceeds street capacity

LFMP04

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



PROJ. NO. 34/41-1

SUBDIVISION NAME: STRATFORD (CITY)

DATE SUBDIVIDED: 11-15-86



NO SCALE

PROJECT NAME: 58TH STREET & EVERETT DRIVE	QS 34/41	DATE: 06-05-91	C.D. 2
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98

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 58th Street and Everett Drive

PROJECT NUMBER: 34/41-1

DESCRIPTION: Storm water from 58th Street and Everett Drive flows to a 10' drainage easement. Drainageway downstream is to capacity and water backs up 2-3 deep in these streets.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Improve channel and road crossings.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$100,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$10,000

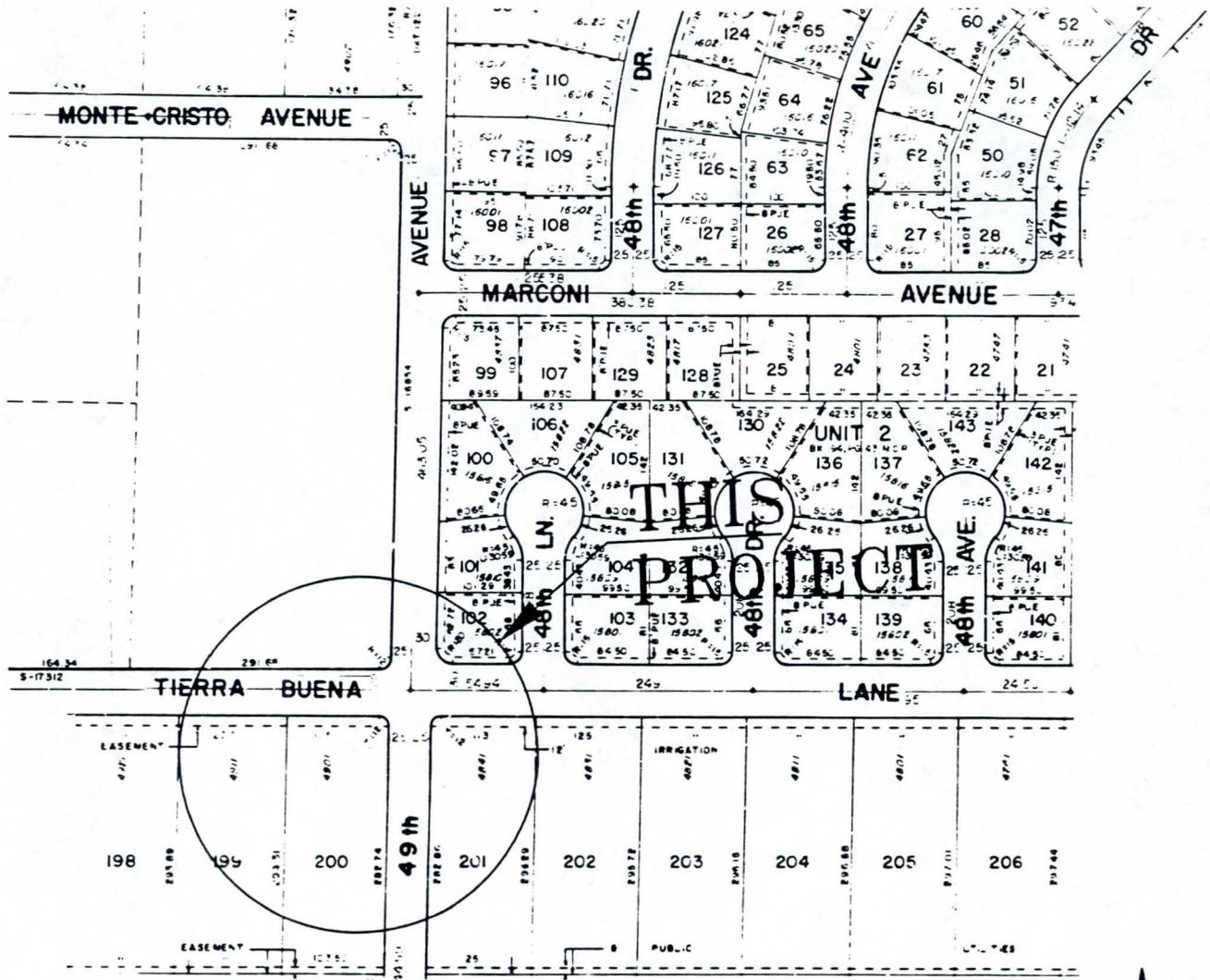
FIELD INSPECTION DATE: 6/4/91/PK

LOCATIONS OF KNOWN FLOODING:
5707, 5726 East Everett Drive

CONTRIBUTING FACTORS:
Major storm run-off exceeds channel capacity

LFMP96

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: SUNBURST FARMS SEVEN (COUNTY)

DATE SUBDIVIDED: 12-16-68



NO SCALE

PROJECT NAME:

49TH AVENUE & TIERRA BUENA LANE

QS

35/17

DATE:

05-15-91

C.D.

1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 49th Avenue and Tierra Buena Lane

PROJECT NUMBER: 35/17-1

DESCRIPTION: Storm water flows 3-4' deep on Paradise Lane, down 49th Avenue and onto Tierra Buena and Greenway. This is part of regional problem.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Two miles of inverted crown collector streets with storm drain, or major drain to ACDC.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

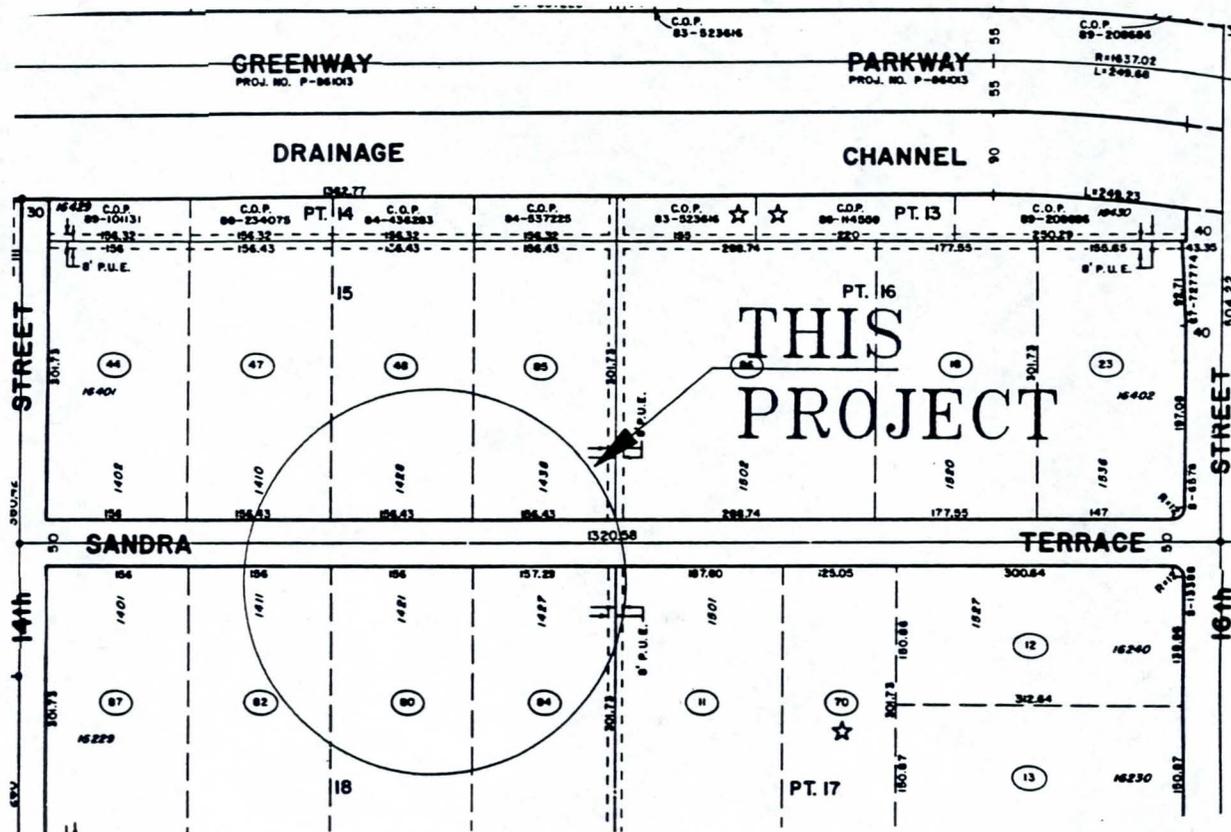
COST PER STRUCTURE TO REDUCE FLOODING: \$40,000

FIELD INSPECTION DATE: 3/8/91/PK

LOCATIONS OF KNOWN FLOODING:
4247 West Paradise Lane
4341, 4921, 4931 West Tierra Buena Lane

CONTRIBUTING FACTORS:
Floors too low
Failure to allow drainage through new projects
Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: DENHAM ESTATES (COUNTY)

DATE SUBDIVIDED: 02-27-53



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
16TH STREET & SANDRA TERRACE	36/30	05-08-91	3

PROJ. NO. 36/30-1

A (100)

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 16th Street and Sandra Terrace

PROJECT NUMBER: 36/30-1

DESCRIPTION: Storm water from mountains flows into Paradise Lane and spreads out between 16th Street and 14th Street. Subdivision was built in natural washes with no provision for drainage. See Improvement District Job P-888560 I.D.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Construct channel/pipes to convey water around subdivision.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$300,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 2/27/91/PK

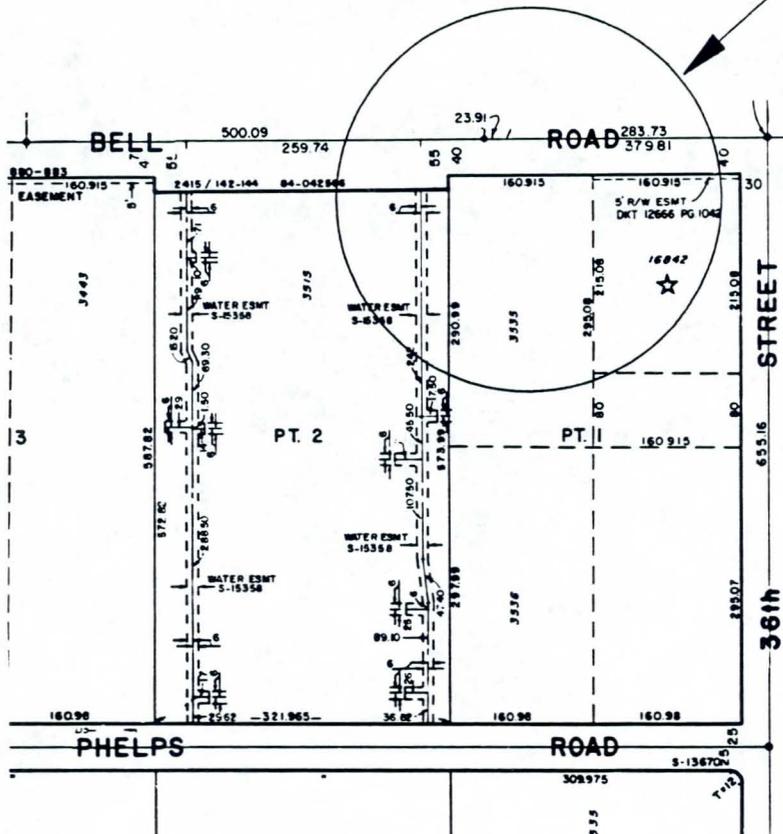
LOCATIONS OF KNOWN FLOODING:

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects
Structures constructed in natural drainage channels or drainage easements

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

THIS PROJECT



SUBDIVISION NAME: PARADISE ACRES (COUNTY)

DATE SUBDIVIDED: 01-30-47



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
36TH STREET & BELL ROAD	36/35	06-05-91	2

PROJ. NO. 36/35-1

(1011)

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 36th Street and Bell Road

PROJECT NUMBER: 36/35-1

DESCRIPTION: A large channel directs storm water to Bell Road. Below Bell Road no channel exists and floods one home and an apartment complex. Large mobile home complex blocks watershed below Aire Libre alignment.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct box culvert for Bell Road and channel downstream.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

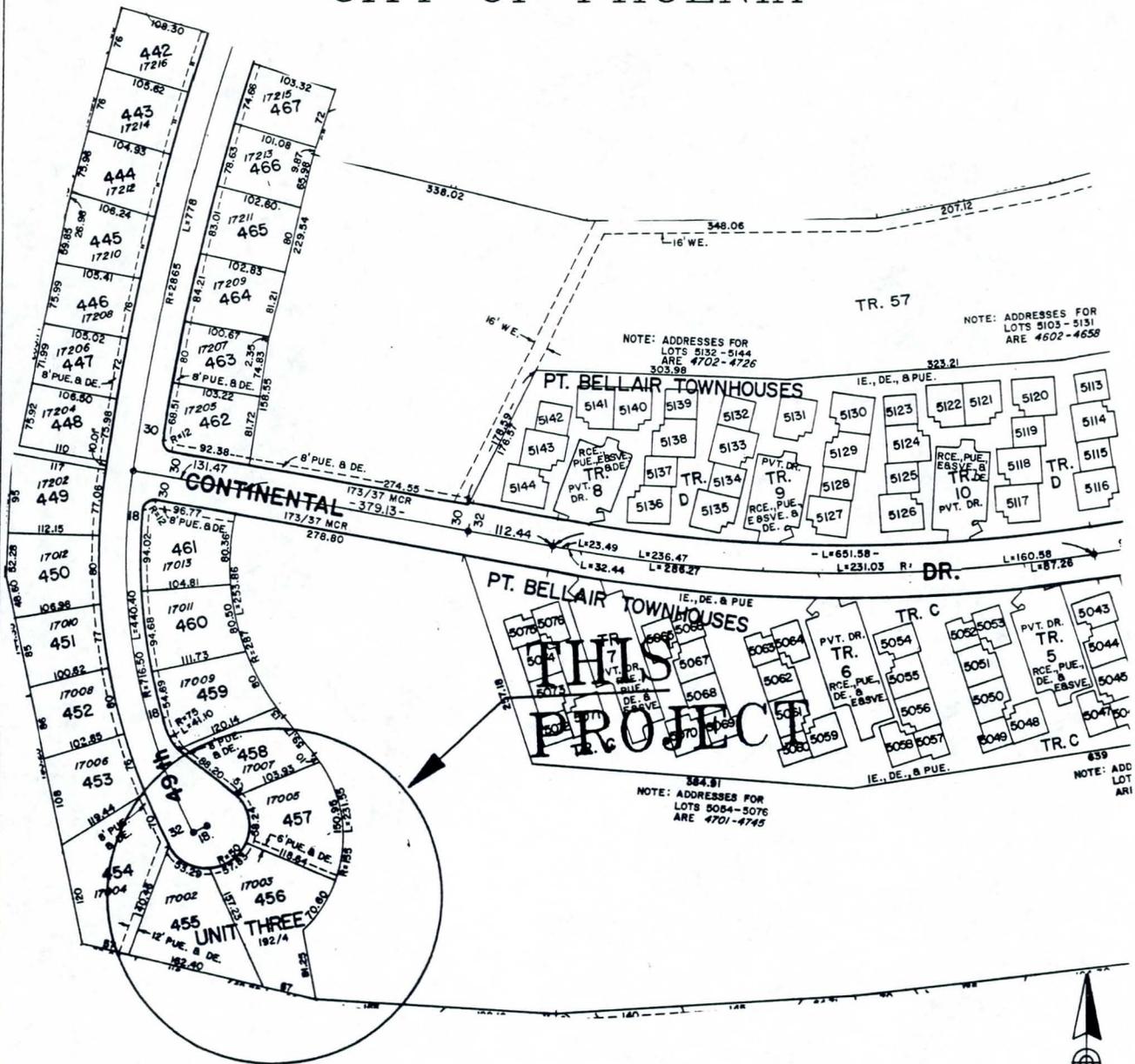
FIELD INSPECTION DATE: 4/9/91/PK

LOCATIONS OF KNOWN FLOODING:
3535, 3515 East Bell Road

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Floors too low

LFMP01

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: BELLAIRE UNIT 3 (COUNTY)

DATE SUBDIVIDED: 08-08-77

NO SCALE

PROJECT NAME: 49TH AVENUE & CONTINENTAL DRIVE	QS 37/17-1	DATE: 06-12-91	C.D. 1
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PROJ. NO. 37/17-1

C (102)

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 49th Avenue and Continental Drive

PROJECT NUMBER: 37/17-1

DESCRIPTION: Storm water exceeds capacity of small 16' drainage easement at end of cul de sac and floods homes.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Purchase home and install proper drainageway.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$300,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$30,000

FIELD INSPECTION DATE: 6/5/91/PK

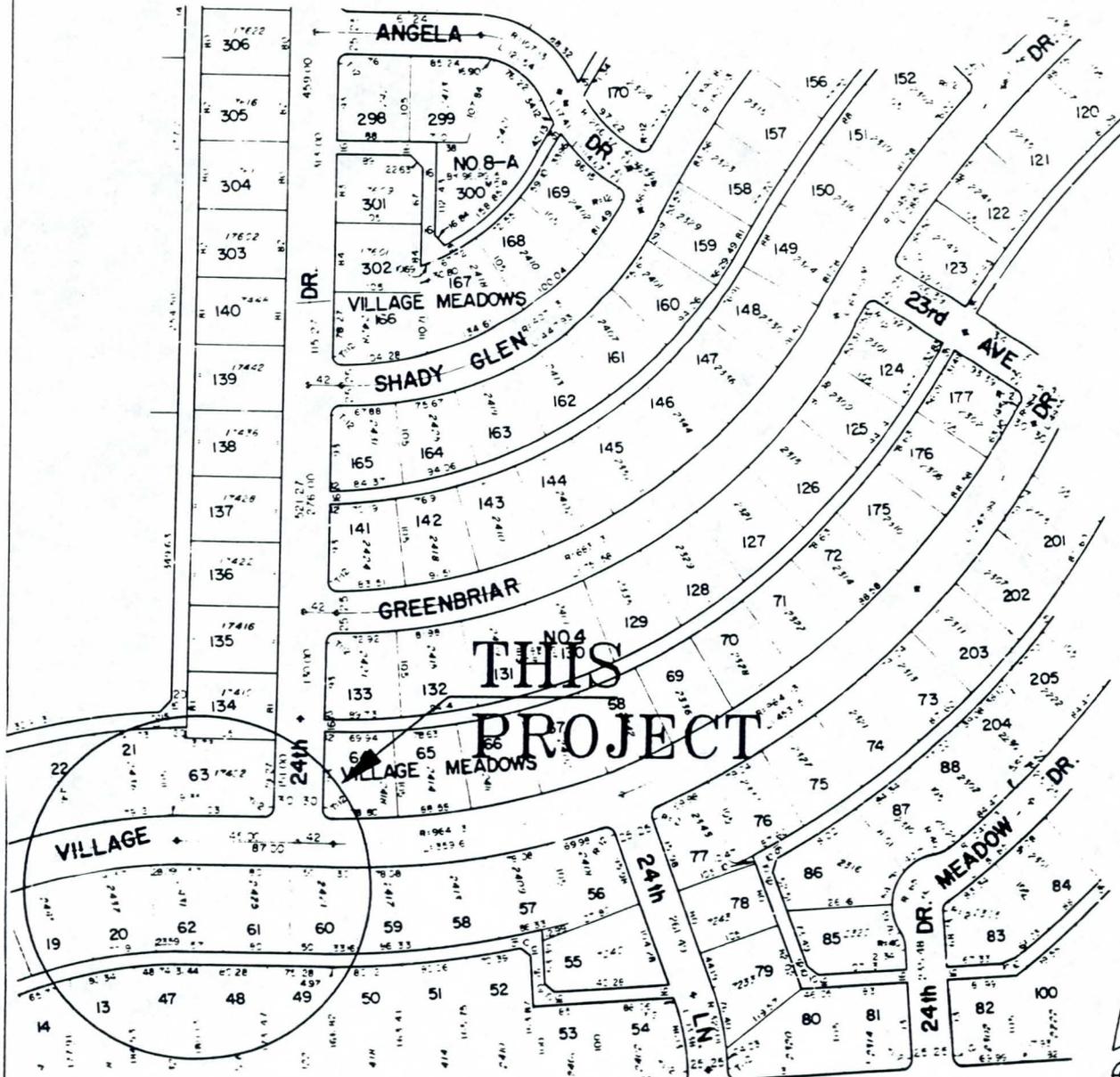
LOCATIONS OF KNOWN FLOODING:
17007 North 49th Avenue

CONTRIBUTING FACTORS:

Streets which drain to the end of a cul de sac or otherwise dead end

LFMPO9

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: VILLAGE MEADOWS (COUNTY)

DATE SUBDIVIDED: 09-29-58

NO SCALE

PROJECT NAME: 24TH DRIVE & VILLAGE DRIVE	QS 37/23	DATE: 06-12-91	C.D. 2
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PROJ. NO. 37/23-1



LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 24th Drive and Village Drive

PROJECT NUMBER: 37/23-1

DESCRIPTION: Interstate 17 obstructs drainage and causes ponding along Village Drive.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Arizona Department of Transportation must construct larger culvert to drain this area.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$200,000

FIELD INSPECTION DATE: 6/5/91/PK

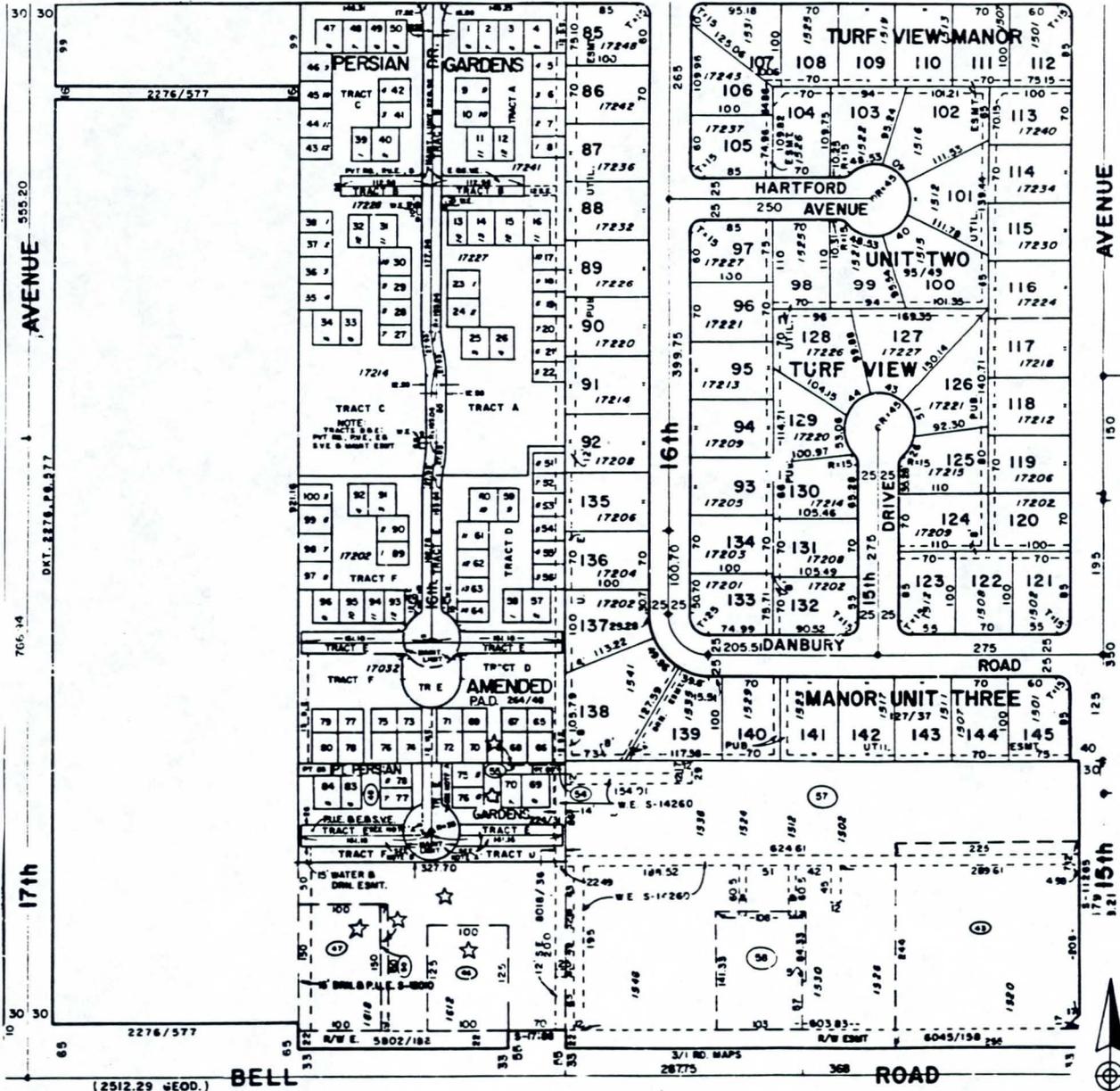
LOCATIONS OF KNOWN FLOODING:
2549, 2543 West Village Drive

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to allow drainage through new projects

LFMP07

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: TURF VIEW MANOR (COUNTY)

DATE SUBDIVIDED: 3-21-60

NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
15th AVENUE NORTH OF BELL ROAD	37/25	7-1-91	2

PROJ. NO. 37/25-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 15th Avenue north of Bell Road

PROJECT NUMBER: 37/25-1

DESCRIPTION: Storm water from approximately 1 1/2 square miles is directed to 15th Avenue and Grovers Avenue. Flow south on 15th Avenue exceeds street capacity. Flows west into Helena Drive cul de sac and floods at least three homes.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Rebuild two miles of collector streets with inverted crown and storm drain. Includes Helena Drive.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$40,000

FIELD INSPECTION DATE: 8/2/90/PK

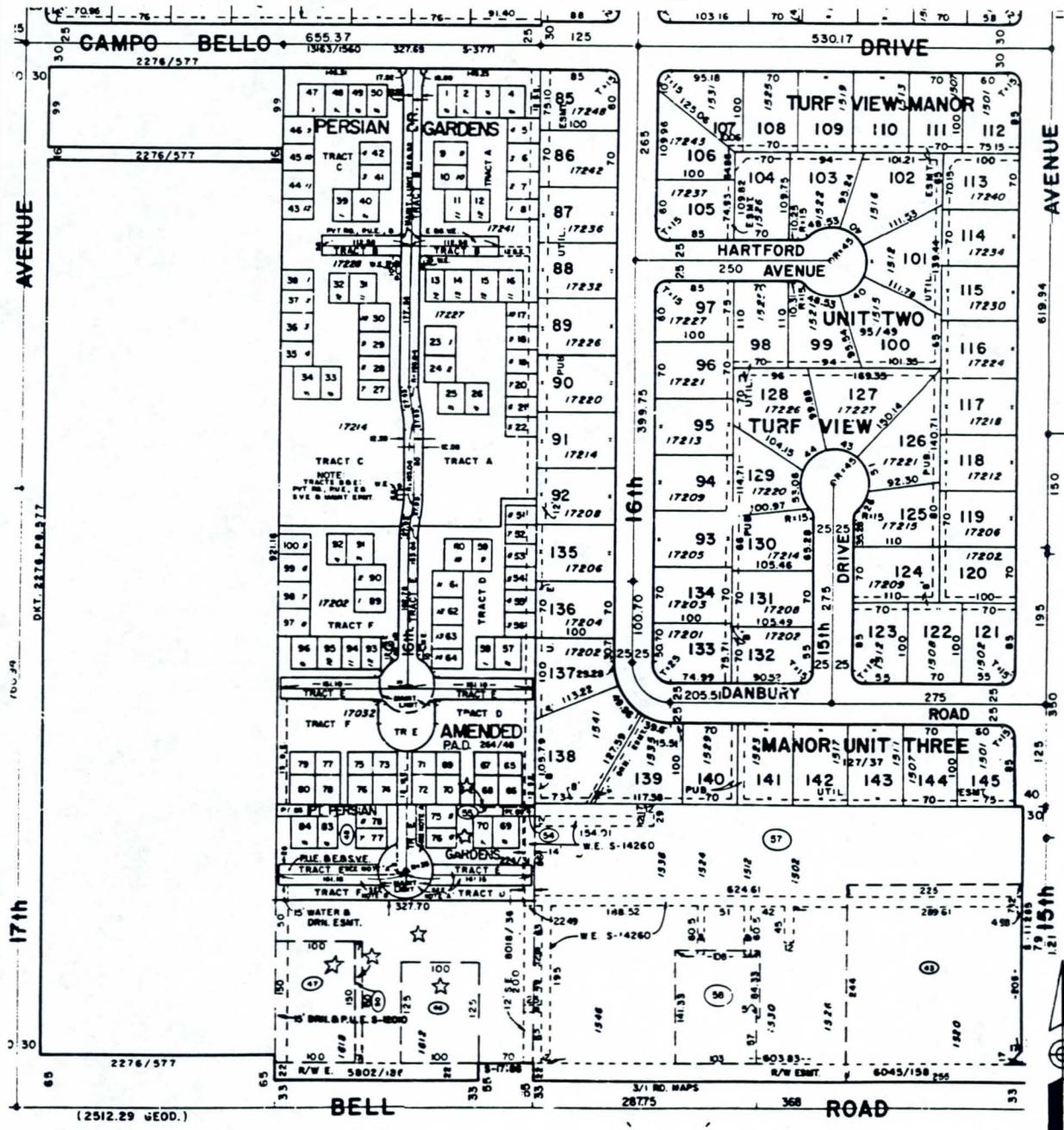
LOCATIONS OF KNOWN FLOODING:

17025, 17206, 17218, 17234 North 15th Avenue
17413, 17417 North 16th Avenue
1525 West Helena

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Failure to continue existing street pattern
Streets which drain to the end of a cul de sac or otherwise dead end
Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



DATE SUBDIVIDED: 01-01-84

NO SCALE

PROJECT NAME: 16TH AVENUE & DANBURY ROAD	QS 37/25	DATE: 05-20-91	C.D. 2
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PROJ. NO. 37/25-2

K

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 16th Avenue and Danbury Road

PROJECT NUMBER: 37/25-2

DESCRIPTION: Storm water flows to corner with 8' drainage easement. Outlet has been cut off by development to the south. Same problem with Persion Gardens project to west.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Condemn easements to Bell Road and construct drainageways.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$50,000

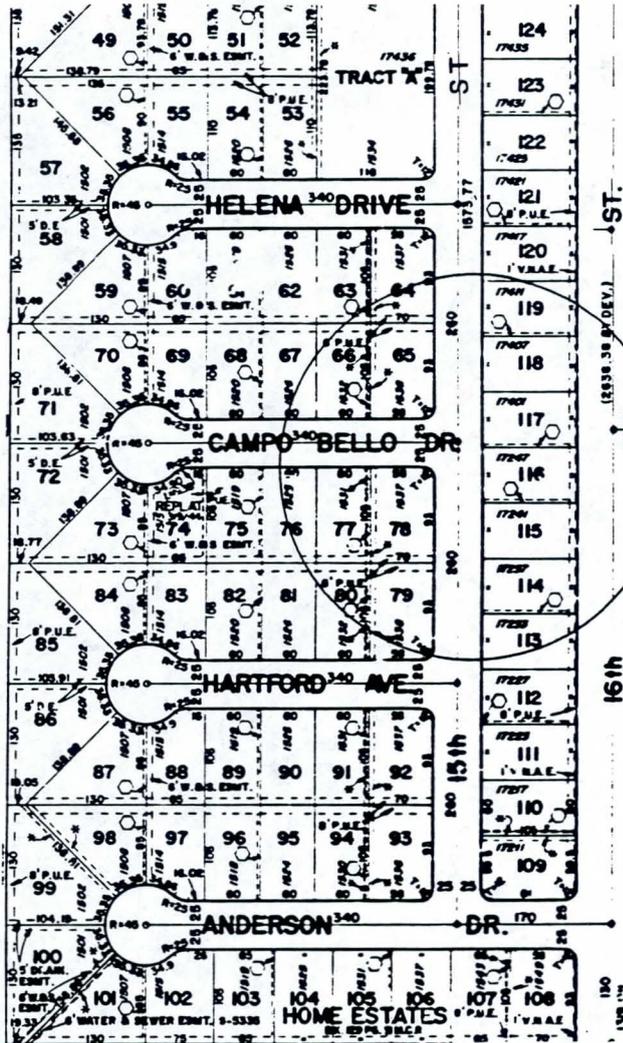
FIELD INSPECTION DATE: 8/2/90/PK

LOCATIONS OF KNOWN FLOODING:
1535 West Danbury Road (8/20/84)

CONTRIBUTING FACTORS:

Failure to allow drainage through new projects
Streets which drain to the end of a cul de sac or otherwise dead
end

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



THIS
 PROJECT

CAMPO BELLO DR

16th

SUBDIVISION NAME: BELL CASAS MOBILE HOME
 ESTATES (COUNTY)

DATE SUBDIVIDED: 03-23-70



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
16TH STREET & CAMPO BELLO DRIVE	37/30	06-05-91	2

PROJ. NO. 37/30-1

6

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 16th Street and Campo Bello Drive

PROJECT NUMBER: 37/30-1

DESCRIPTION: Storm water has been blocked by Bell Casas Mobile Home Estates to the west. Upper East Fork Detention Basin (under design) may help this problem.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 20

SUGGESTED SOLUTION: Inlet and box culvert under Bell Road.
Construct channel thru Bell Casas.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$300,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$15,000

FIELD INSPECTION DATE: 4/17/91/PK

LOCATIONS OF KNOWN FLOODING:

17601 North 16th Street

17607 North 15th Place

CONTRIBUTING FACTORS:

Floors too low

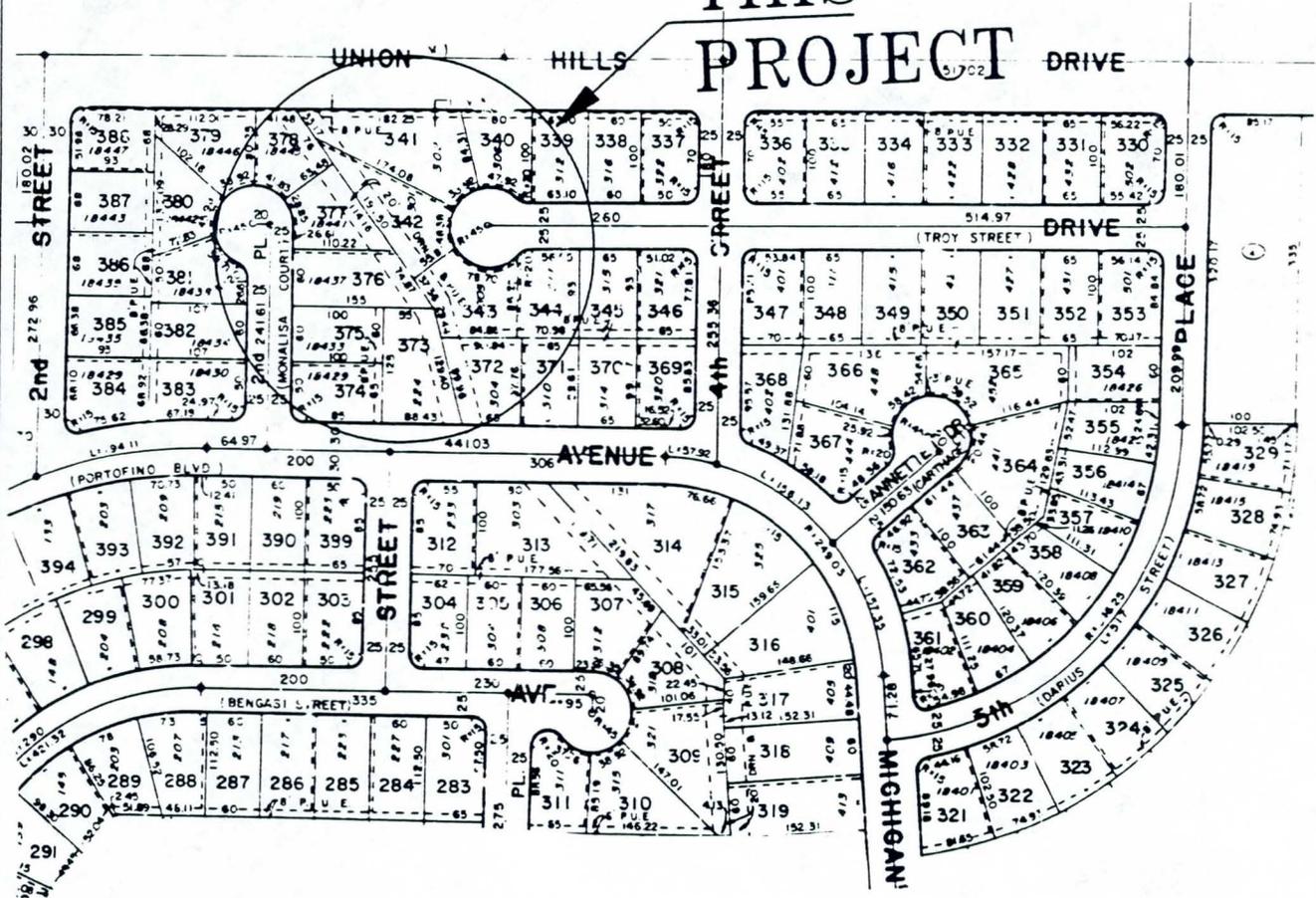
Major storm run-off exceeds street capacity

Structures constructed in natural drainage channels or drainage easements

LFMP94

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

THIS
 PROJECT



SUBDIVISION NAME: SEVEN PALMS MOBILE HOME ESTATES
 UNIT TWO (COUNTY)

DATE SUBDIVIDED: 01-22-72



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
4TH STREET & UNION HILLS DRIVE	38/28	06-12-91	2

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 4th Street and Union Hills Drive

PROJECT NUMBER: 38/28-1

DESCRIPTION: Mobile homes and other encroachments have been allowed in drainage easement. This will cause flooding down streets.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 100

SUGGESTED SOLUTION: Remove obstructions and pave/fence drainage way.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$10,000

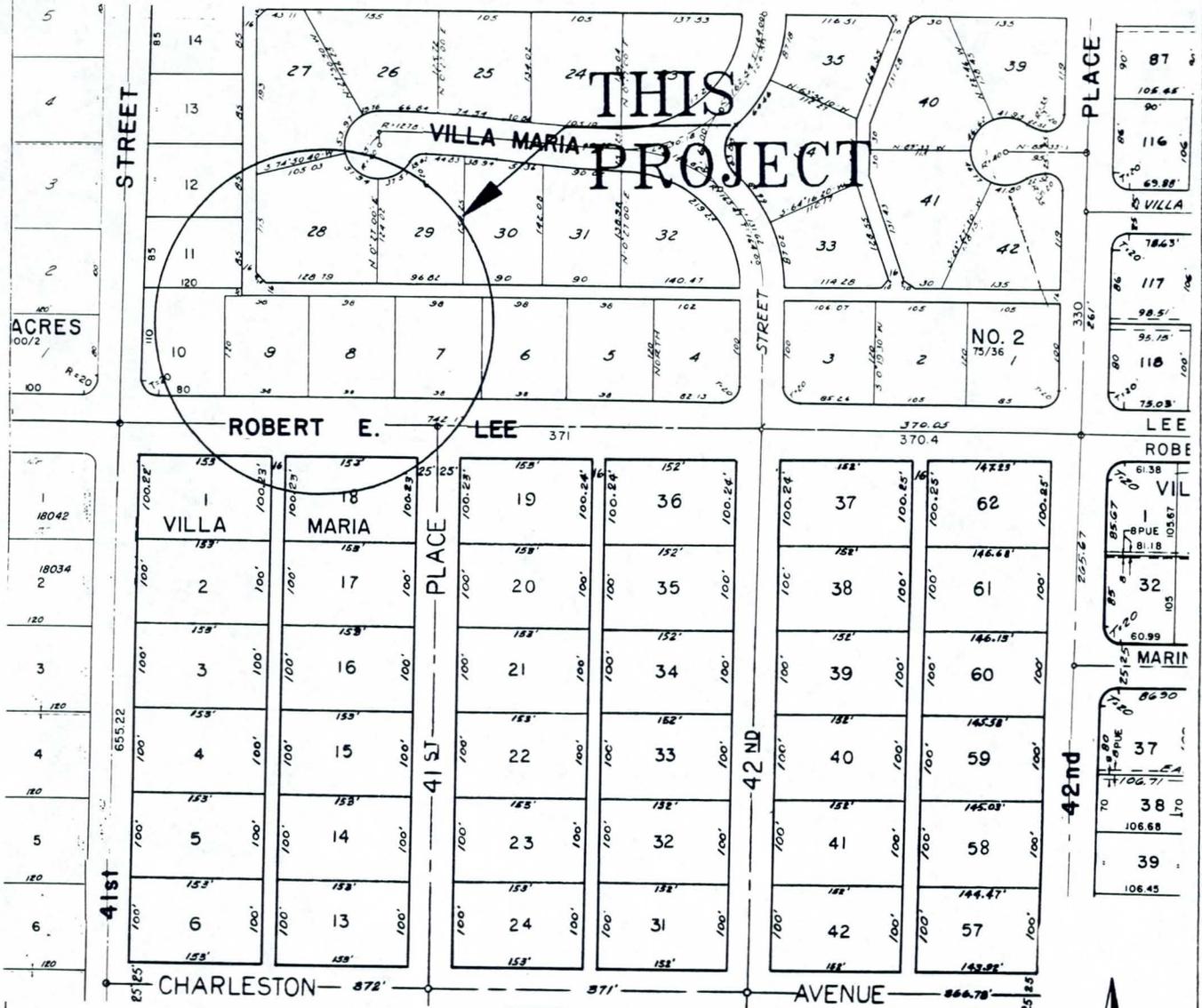
FIELD INSPECTION DATE: 6/5/91/PK

LOCATIONS OF KNOWN FLOODING:
NONE

CONTRIBUTING FACTORS:
Structures constructed in natural drainage channels or drainage easements

LFMP06

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



PROJ. NO. 38/37-1

SUBDIVISION NAME: VILLA MARIA #2 (COUNTY)

DATE SUBDIVIDED: 06-19-57

NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
41ST STREET & ROBERT E. LEE STREET	38/37	06-05-91	2

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 41st Street and Robert E. Lee Street

PROJECT NUMBER: 38/37-1

DESCRIPTION: Storm water flows to end of Villa Maria Drive cul de sac. Easement is inadequate to drain to Robert E. Lee.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 6

SUGGESTED SOLUTION: Purchase right of way between streets to drain cul de sac.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$120,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$10,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 4/1/91/PK

LOCATIONS OF KNOWN FLOODING:
N/A

CONTRIBUTING FACTORS:

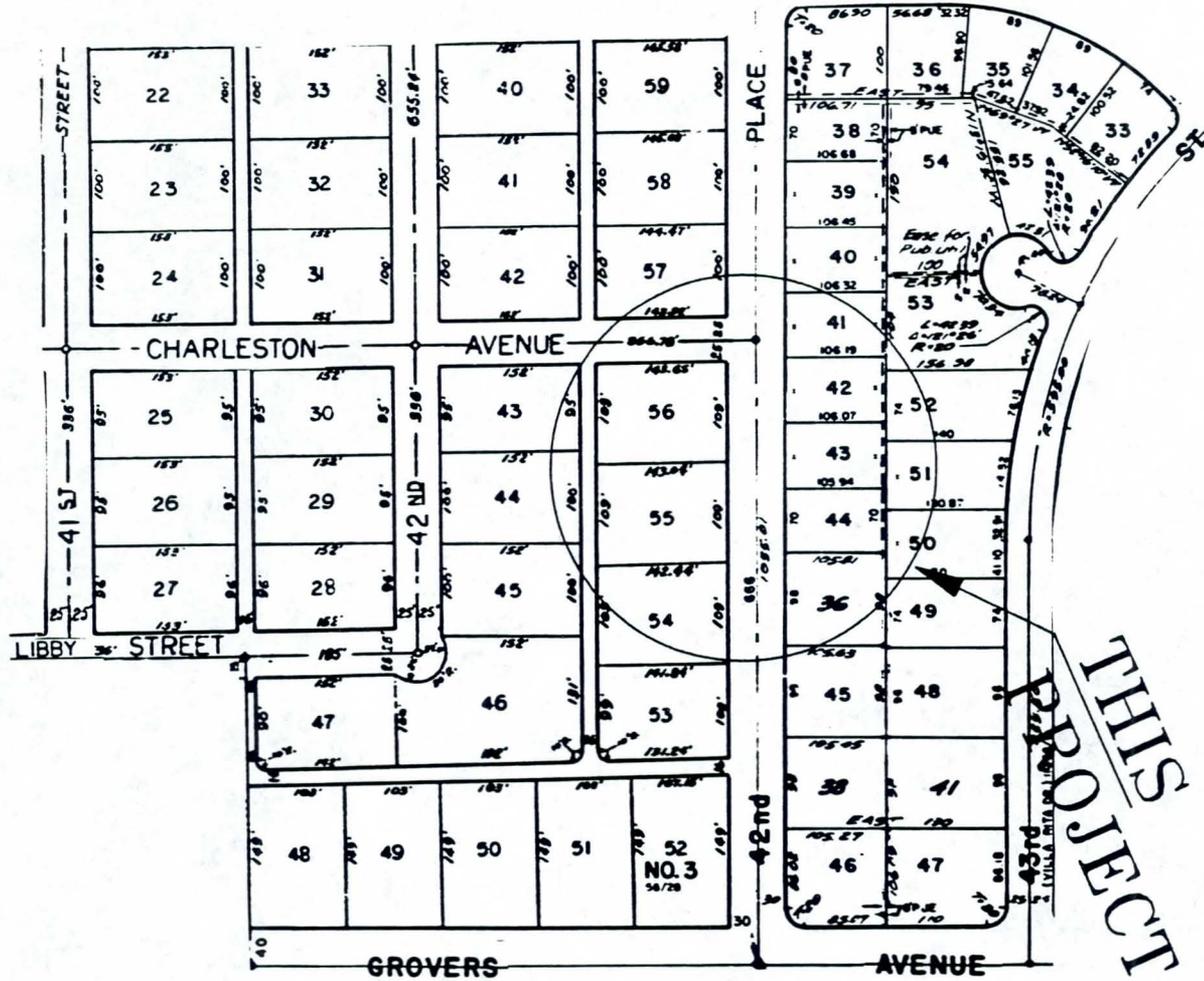
Constructed prior to Development Standards

Floors too low

Streets which drain to the end of a cul de sac or otherwise dead end

LFMP02

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: VILLA MARIA #3 (COUNTY)

DATE SUBDIVIDED: 02-03-54



NO SCALE

PROJECT NAME: 42ND PLACE & GROVERS AVENUE	QS 38/37	DATE: 06-05-91	C.D. 2
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PROJ. NO. 38/37-2

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 42nd Place and Grovers Avenue

PROJECT NUMBER: 38/37-2

DESCRIPTION: Storm water exceeds local street capacity and floods homes which are at or below curb height.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct 5,000 feet of local street with inverted crown and storm drain.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 6/4/91/PK

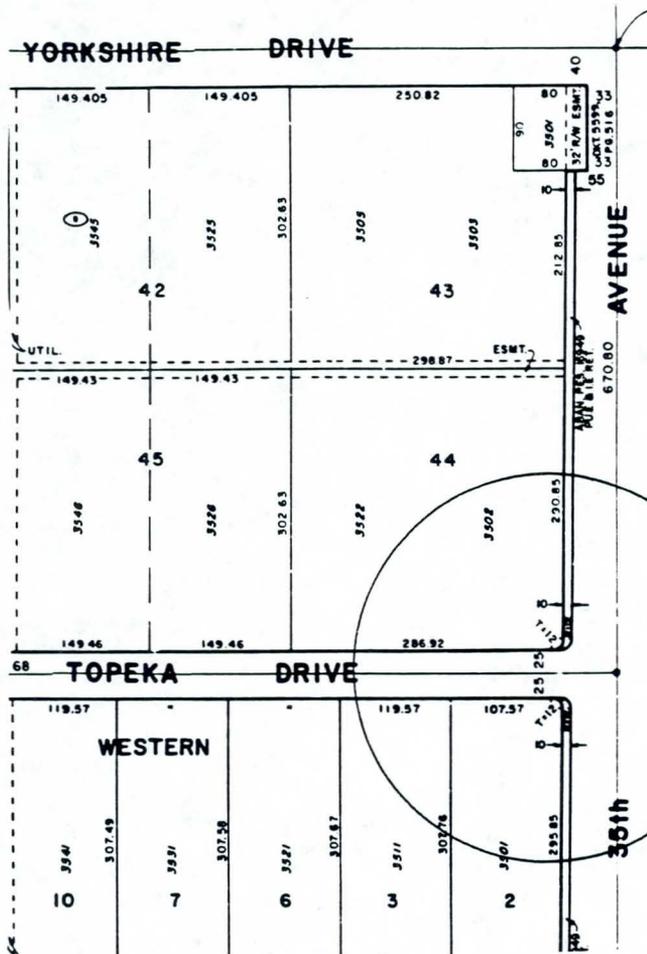
LOCATIONS OF KNOWN FLOODING:
17832, 17824 North 42nd Place

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP95

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



THIS
 PROJECT

SUBDIVISION NAME: WESTERN MEADOWS (COUNTY)

DATE SUBDIVIDED: 03-24-65



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
35TH AVENUE & TOPEKA DRIVE	39/20	05-15-91	1

PROJ. NO. 39/20-1

K

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 37th Avenue and Topeka Drive

PROJECT NUMBER: 39/20-1

DESCRIPTION: Storm water exceeds capacity of 35th Avenue, Topeka, and 37th Avenue. This is part of regional problem.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Two miles of inverted crown collector streets with storm drain, or major drain to ACDC.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$40,000

FIELD INSPECTION DATE: 3/8/91/PK

LOCATIONS OF KNOWN FLOODING:
3501, 3701 West Topeka

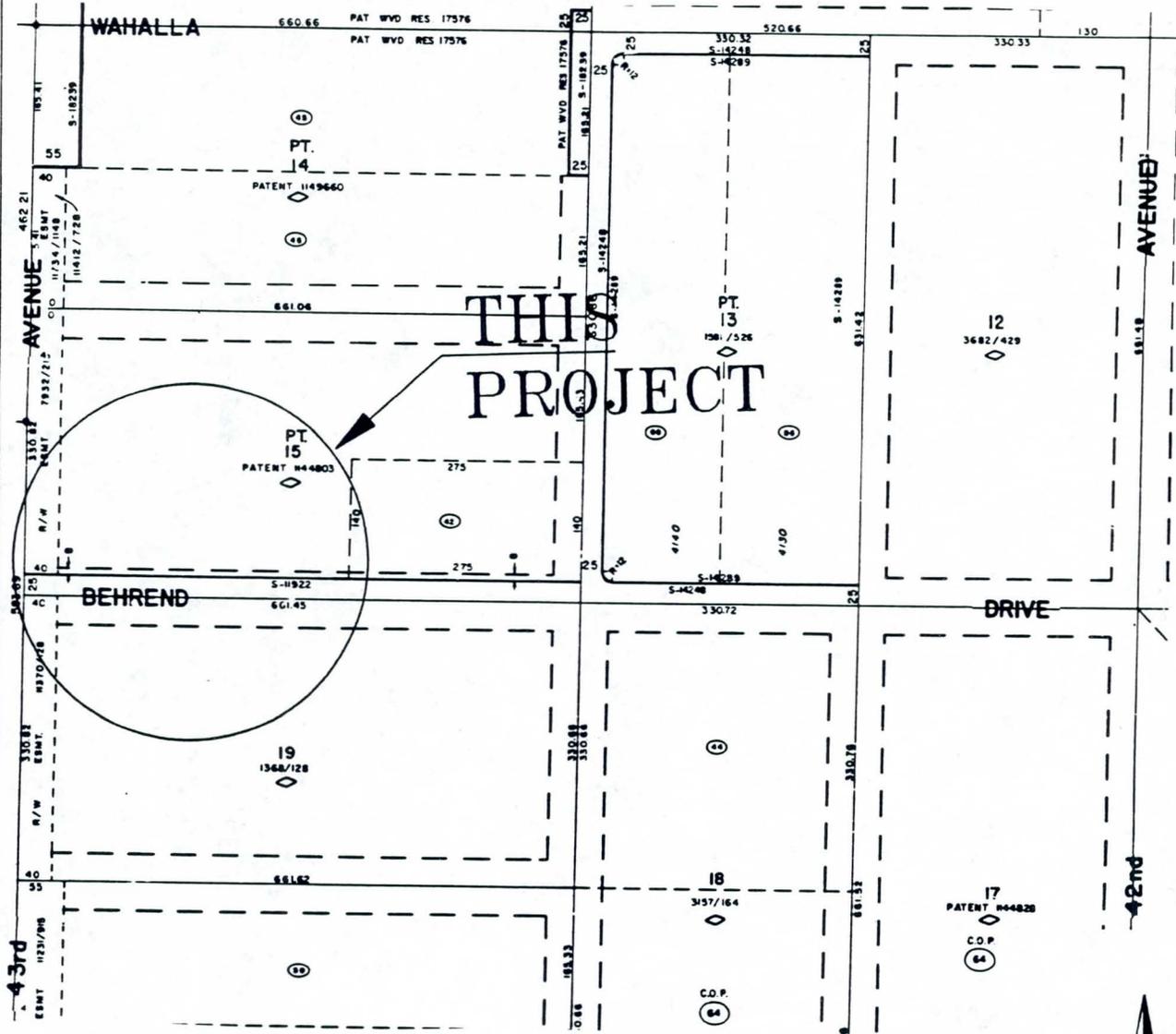
CONTRIBUTING FACTORS:

Floors too low

Failure to allow drainage through new projects

Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: UNSUBDIVIDED (COUNTY)

DATE SUBDIVIDED: 01-01-55



NO SCALE

PROJECT NAME: 43RD AVENUE & BEHREND DRIVE	QS 40/19	DATE: 06-12-91	C.D. 1
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PROJ. NO. 40/19-1

V

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 43rd Avenue and Behrend Drive

PROJECT NUMBER: 40/19-1

DESCRIPTION: Homes are constructed in the Scatter Wash floodplain and are subject to flooding.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: Construct channel from Beardsley Road to 43rd Avenue.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$5,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$500,000

FIELD INSPECTION DATE: 6/8/91/PK

LOCATIONS OF KNOWN FLOODING:
19617 North 43rd Avenue

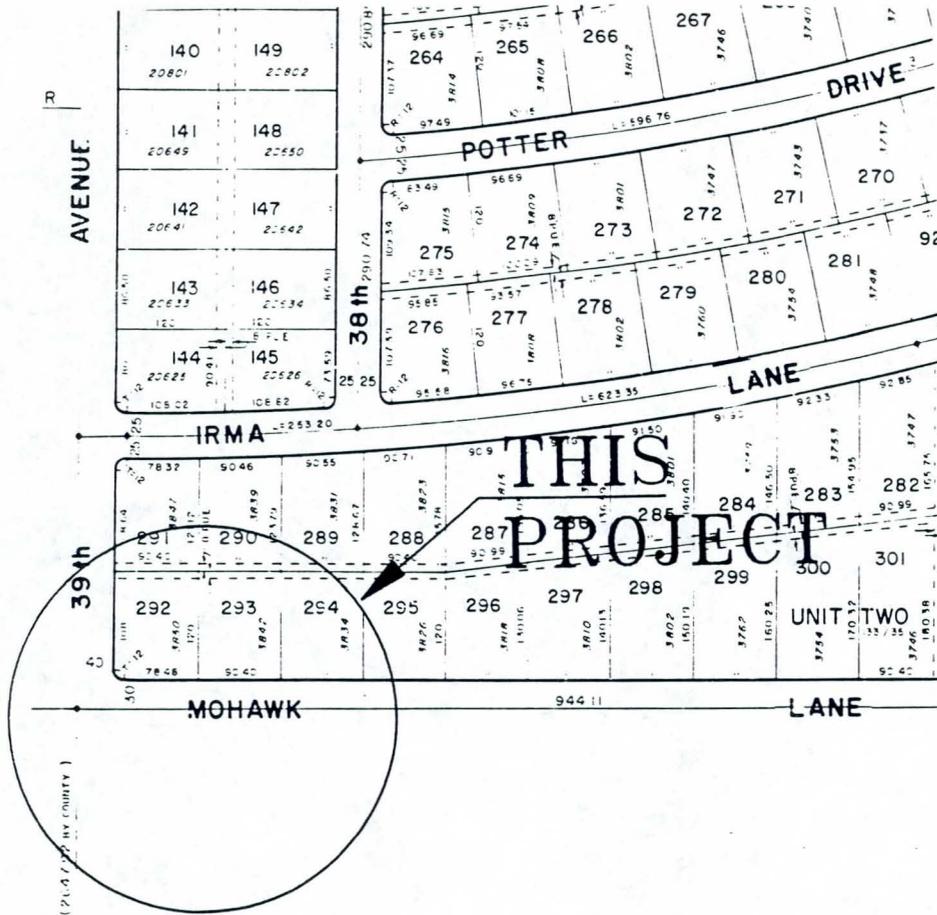
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low

Structures constructed in natural drainage channels or drainage easements

LFMP08

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: JADE PARK NORTH UNIT TWO (COUNTY)

DATE SUBDIVIDED: 04-13-70



NO SCALE

PROJECT NAME: 39TH AVENUE & MOHAWK LANE	QS 41/20	DATE: 05-20-91	C.D. 1
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PROJ. NO. 41/20-1

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 39th Avenue and Mohawk Lane

PROJECT NUMBER: 41/20-1

DESCRIPTION: Storm water from one half a square mile of small lots, without retention, drain to this intersection. It is a low point and was the channel for an old tributary to Scatter Wash which is 1500' south. Both 39th Avenue and Mohawk Lane are 1/2 streets. Flow will increase when development moves to the south and west.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: 39th Avenue and Mohawk Lane should be constructed with inverted crown and storm drains to Scatter Wash and/or Skunk Creek.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$20,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

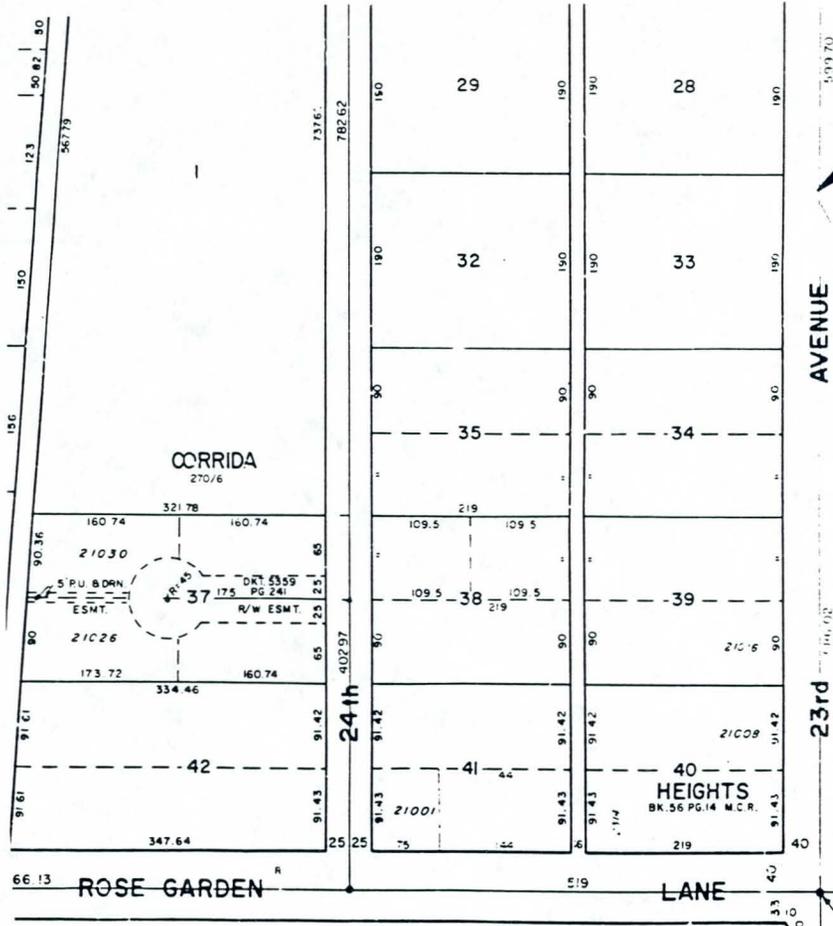
FIELD INSPECTION DATE: 3/8/91/PK

LOCATIONS OF KNOWN FLOODING:
3847 West Irma Lane

CONTRIBUTING FACTORS:
Constructed prior to Development Standards
Major storm run-off exceeds street capacity

LFMP29

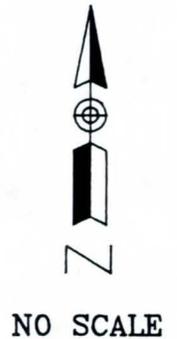
LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



THIS
PROJECT

SUBDIVISION NAME: BLACK CANYON HEIGHTS (COUNTY)

DATE SUBDIVIDED: 03-11-53



PROJECT NAME: 23RD AVENUE & ROSE GARDEN LANE	QS 42/23	DATE: 05-20-91	C.D. 1
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PROJ. NO. 42/23-1

N

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 23rd Avenue and Rose Garden Lane

PROJECT NUMBER: 42/23-1

DESCRIPTION: Storm water from the north and east collects in 23rd avenue between Beardsley and Deer Valley Road. Lots along west side of 23rd Avenue are 1/2 foot below curb.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Construct 23rd Avenue with storm drain and inverted crown from Beardsley to Deer Valley Road.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$1,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$20,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 3/8/91/PK

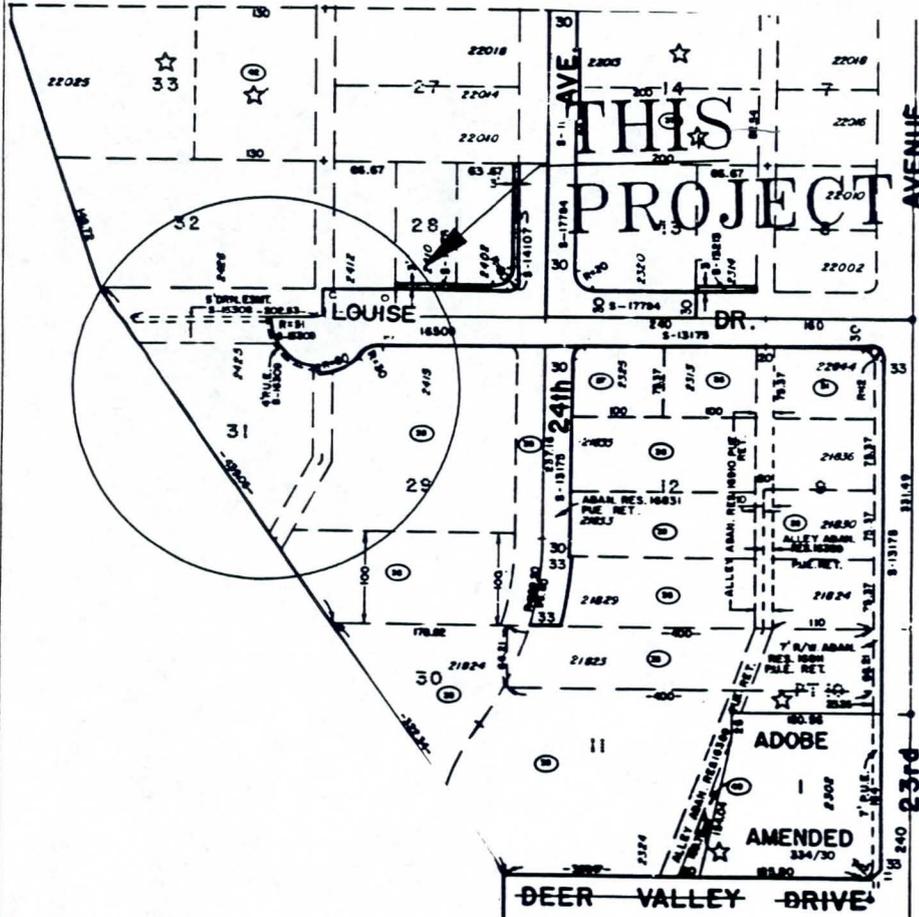
LOCATIONS OF KNOWN FLOODING:
21040 North 23rd Avenue

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Major storm run-off exceeds street capacity

LFMP30

LOCAL FLOODING MITIGATION PROGRAM STREET TRANSPORTATION DEPARTMENT CITY OF PHOENIX



SUBDIVISION NAME: UNSUBDIVIDED (COUNTY)

DATE SUBDIVIDED: 01-01-65



NO SCALE

PROJECT NAME: 24TH AVENUE & LOUISE DRIVE	QS 43/23	DATE: 05-20-91	C.D. 1
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LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 24th Avenue and Louise Drive

PROJECT NUMBER: 43/23-1

DESCRIPTION: Storm water ponds between Black Canyon Freeway, 24th Avenue, Deer Valley Drive, and Williams Drive. 24th Avenue and the alley to the west cannot drain because of no slope to north or south. Drainage is to west into pond (sump conditions). This is a Special Flood Hazard Area and flood insurance is mandatory.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 32

SUGGESTED SOLUTION: Construct Adobe Drive with inverted crown and storm drain to provide drain for the area. Install box culverts under I-17 and construct channel to Scatter Wash. Scatter Wash must be constructed for this flow of 1300 cfs.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$4,000,000 (not including Scatter Wash)

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$50,000

COST PER STRUCTURE TO REDUCE FLOODING: \$125,000

FIELD INSPECTION DATE: 3/8/91/PK

LOCATIONS OF KNOWN FLOODING:

22015, 22047 North Black Canyon Freeway (1984, 1988)
22010 North 24th Avenue

CONTRIBUTING FACTORS:

Constructed prior to Development Standards

Floors too low

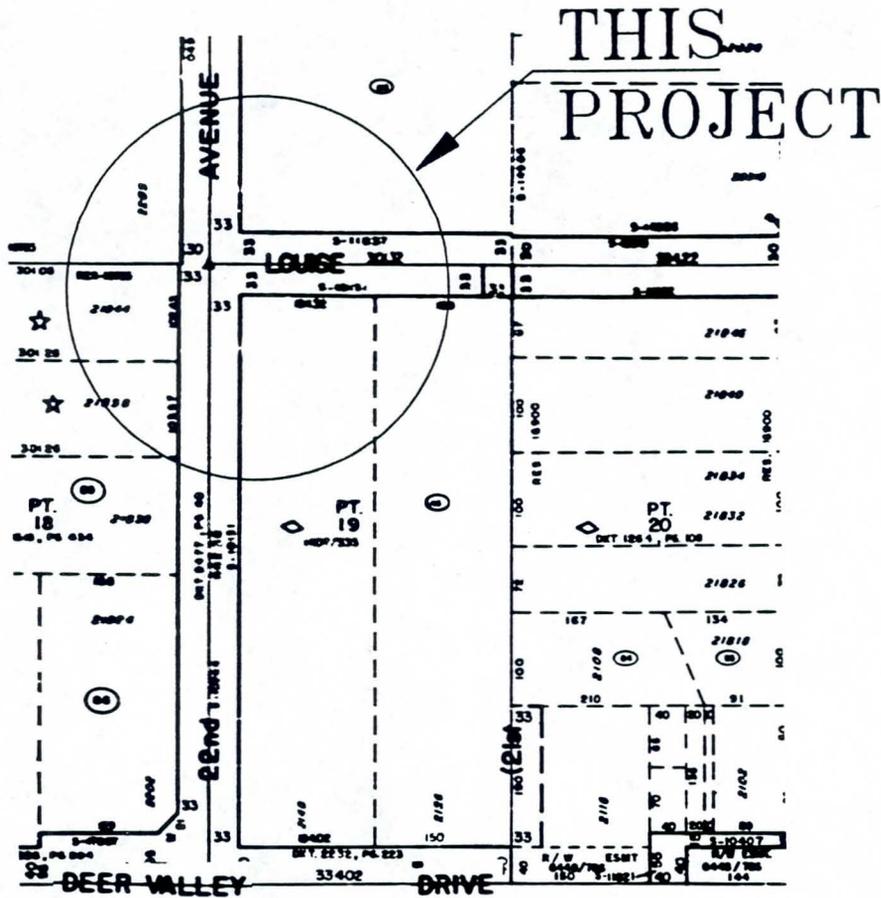
Failure to continue existing street pattern

Failure to allow drainage through new projects

Streets which drain to the end of a cul de sac or otherwise dead end

Structures constructed in ponding area along freeway

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



THIS
 PROJECT

SUBDIVISION NAME: UNSUBDIVIDED (CITY)

DATE SUBDIVIDED: 01-01-85



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
22ND AVENUE & LOUISE DRIVE	43/24	05-20-91	1

PROJ. NO. 43/24-1

R

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 22nd Avenue and Louise Drive

PROJECT NUMBER: 43/24-1

DESCRIPTION: Storm water flows west on Louise Drive to 22nd Avenue. 22nd Avenue is flat to north and to south so that water cannot drain off. Businesses are flooded on west side of 22nd Drive. NOTE: Louise Drive west of 22nd Avenue was abandoned over objections of the Engineering Department.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 5

SUGGESTED SOLUTION: Condemn right of way for Louise Drive and construct between 22nd and 23rd Avenues.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$100,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$20,000

FIELD INSPECTION DATE: 3/8/91/PK

LOCATIONS OF KNOWN FLOODING:

21844 North 22nd Avenue
21830 North 22nd Avenue (1987)
2020 East Deer Valley Drive (1984, 1988)

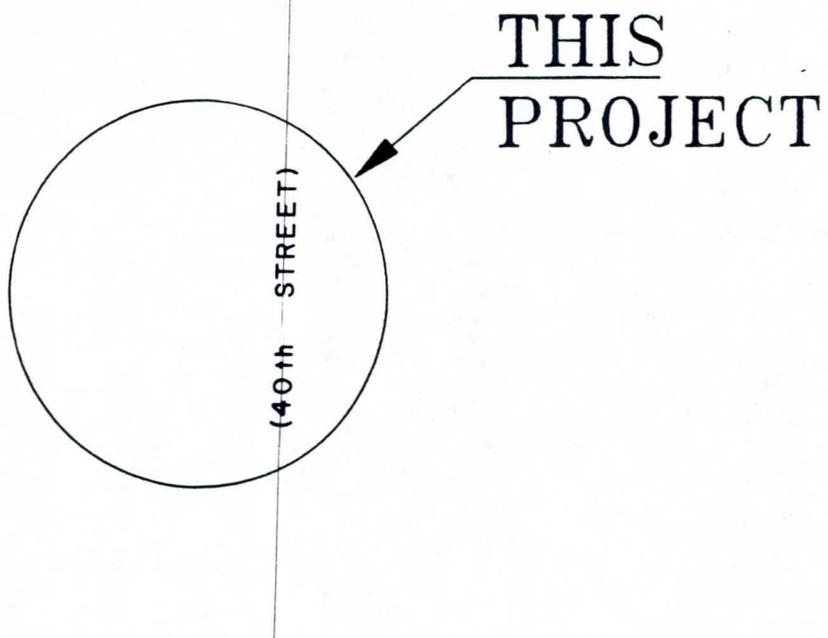
CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Streets abandoned so that drainage was cut off

LFMP26

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX

PINNACLE PEAK ROAD
8/9 RD MAP



THIS
 PROJECT

SUBDIVISION NAME: UNSUBDIVIDED (COUNTY)

DATE SUBDIVIDED: 01-01-85



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
40TH STREET & PINNACLE PEAK ROAD	44/36	05-20-91	2

PROJ. NO. 44/36-1

G

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 40th Street and Pinnacle Peak Road

PROJECT NUMBER: 44/36-1

DESCRIPTION: Mobile Home Park has been constructed which blocks sheet flow and several washes. Storm water has been routed around Mobile Home Park in 40th Street alignment. Channel is too steep and undersized causing flooding into Mobile Home Park.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Implement Paradise Valley Fan Terrace Drainage plan by constructing dike and channel along Pinnacle Peak Road (long term). Mobile Home Park owners will have to protect their property in the meantime.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$13,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$25,000

COST PER STRUCTURE TO REDUCE FLOODING: \$260,000

FIELD INSPECTION DATE: 3/8/91/PK

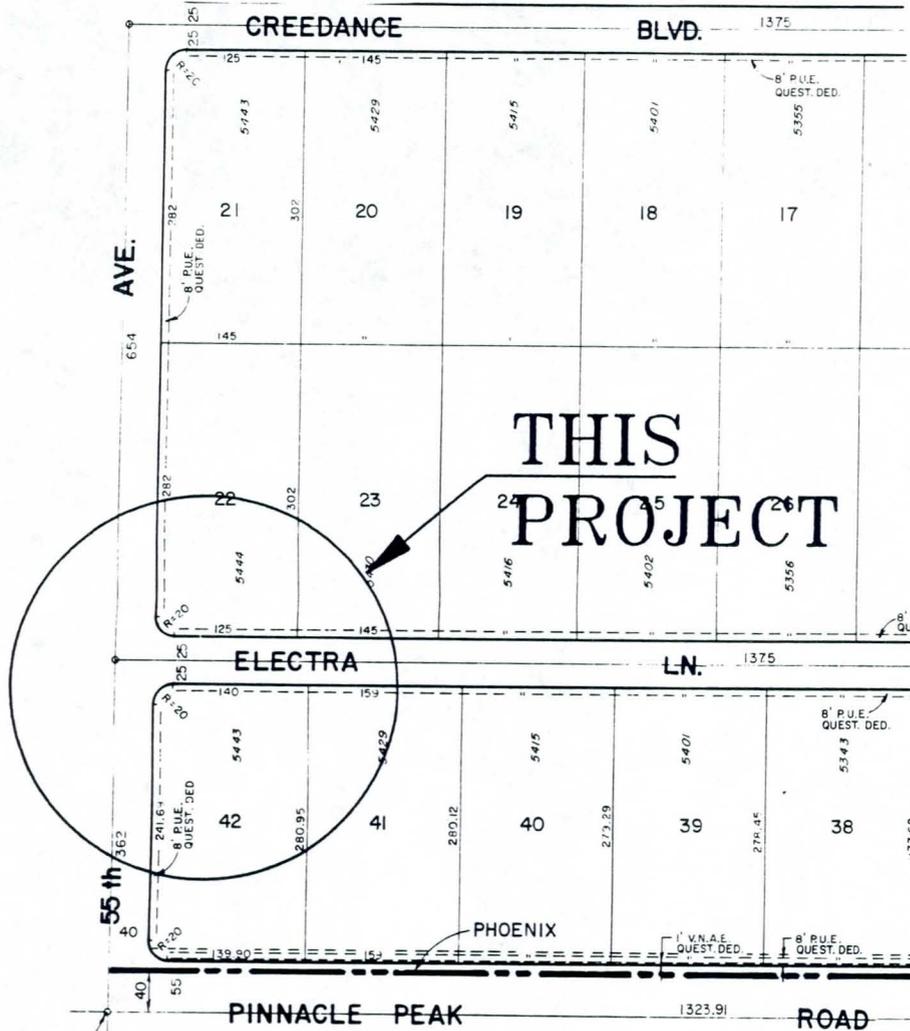
LOCATIONS OF KNOWN FLOODING:
3901 East Pinnacle Peak Road

CONTRIBUTING FACTORS:

Failure to allow drainage through new projects
Structures constructed in natural drainage channels or drainage easements

LFMP27

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



SUBDIVISION NAME: SADDLEBACK HILLS (COUNTY)

DATE SUBDIVIDED: 10-29-79



NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
55TH AVENUE & PINNACLE PEAK ROAD	45/16	05-08-91	1

PROJ. NO. 45/16-1

R

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 55th Avenue & Pinnacle Peak Road

PROJECT NUMBER: 45/16-1

DESCRIPTION: Creedance Boulevard, one block north of Electra, has many homes with low finished floors and apparent flood walls. This entire quarter section will be subject to shallow flooding and needs some special attention. Particular attention should be paid by the Design Engineer when the north/south streets in this area are improved. That would include every 1/2 mile street from 55th Avenue east. All of these streets will have to be designed to carry a 100-year flow to Pinnacle Peak Road in some manner. Most likely by a roadside channel. If the streets are improved by installing curbs, extending them to six lanes, and doing away with the roadside channel system that exists, major flooding could increase. Electra lies in an improved subdivision with rolled curb and paved streets, however homes on the south side of the street could be at or below curb height. Some indication of berm and flood protection exists although it may only be ornamental. Many of the homes on the south side of the street could be subject to flooding because of low finished floors. Large amounts of water flow down 55th Avenue from the north. A roadside ditch has been bladed in on the west side of the street to intercept water off of the hills beginning there and the street is a 1/2 half street sloped to the east. This only confirms the earlier comments concerning low finished floors and high flow rates down all the north/south streets in this valley which is formed by the hills to the north and the Adobe Recreational Area to the south.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 50

SUGGESTED SOLUTION: Channels along 55th & 51st Avenue to carry 100 year flow. See Little Deer Valley Area Drainage Master Study.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$2,000,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$15,000

COST PER STRUCTURE TO REDUCE FLOODING: \$40,000

FIELD INSPECTION DATE: 3/8/91/PK

LOCATIONS OF KNOWN FLOODING: 5444 West Electra Lane

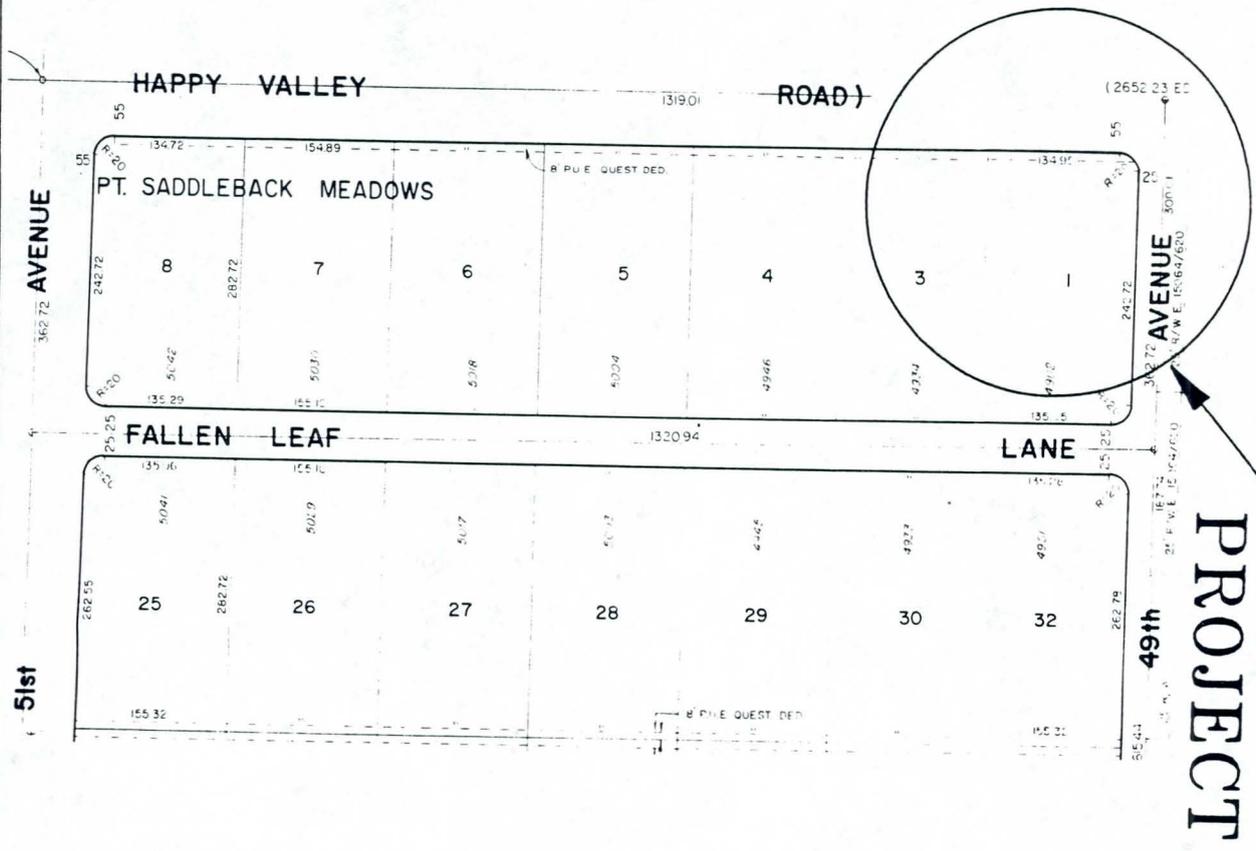
CONTRIBUTING FACTORS:

Floors too low

Failure to allow drainage through new projects

Major storm run-off exceeds street capacity

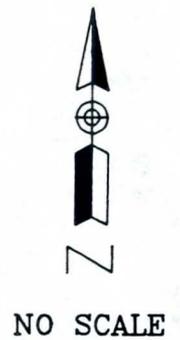
LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



**THIS
 PROJECT**

SUBDIVISION NAME: SADDLEBACK MEADOWS (COUNTY)

DATE SUBDIVIDED: 04-03-73



PROJECT NAME:	QS	DATE:	C.D.
49TH AVENUE & HAPPY VALLEY ROAD	46/17	05-08-91	1

PROJ. NO. 46/17-1

S

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 49th Avenue and Happy Valley Road

PROJECT NUMBER: 46/17-1

DESCRIPTION: 49th Avenue is paved to the north of Happy Valley Road with curb, and drains a large subdivision. Flow will increase as the subdivision is built out and adds water to the intersection of 49th Avenue and Happy Valley Road. Happy Valley Road also carries drainage from 51st Avenue easterly to 49th Avenue. At the intersection of 49th Avenue and Happy Valley Road the flow splits and some flows south of 49th Avenue and some flows east on Happy Valley Road to 43rd Avenue and the channel and culvert located there. There is evidence of berms and flood walls along 49th Avenue south of Happy Valley Road. This problem can be expected to increase as development in the subdivision north of Happy Valley Road progresses. Homes flood on east side of 49th Avenue (unsubdivided). Finish floors are at grade. County subdivisions have ignored natural drainage system.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 10

SUGGESTED SOLUTION: This situation has been identified in the Little Deer Valley Area Drainage Master Study. A 100-year drainage facility has been planned east on Happy Valley Road to the 43rd Avenue channel (2-48" pipes). Property owners on 49th Avenue will have to continue to provide protection for their homes with berms and flood walls until the improvement has been made.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$500,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$15,000

COST PER STRUCTURE TO REDUCE FLOODING: \$50,000

FIELD INSPECTION DATE: 3/8/91/PK

LOCATIONS OF KNOWN FLOODING:
24817, 24807 North 49th Avenue

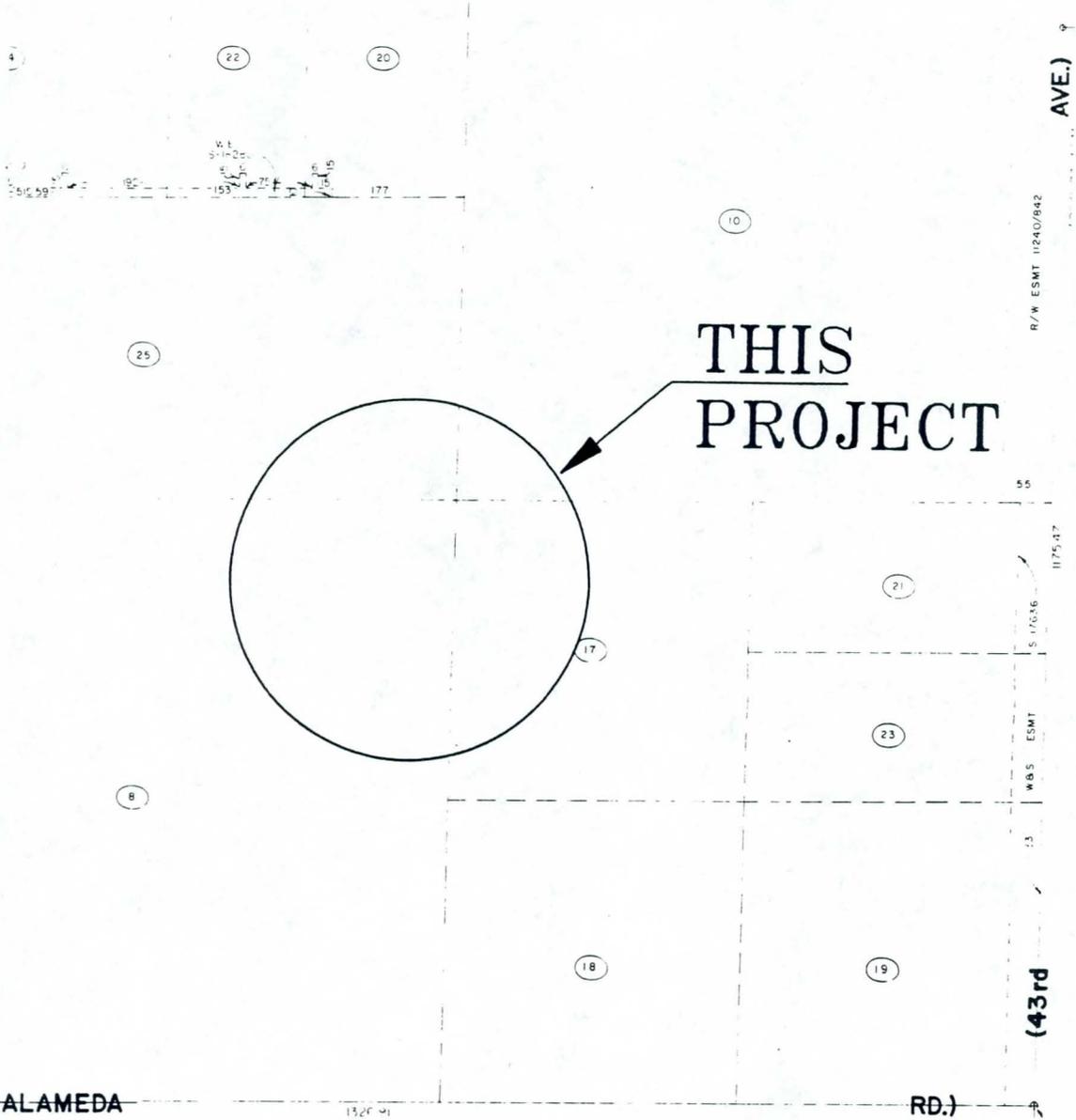
CONTRIBUTING FACTORS:

Floors too low

Failure to allow drainage through new projects

Major storm run-off exceeds street capacity

LOCAL FLOODING MITIGATION PROGRAM
 STREET TRANSPORTATION DEPARTMENT
 CITY OF PHOENIX



**THIS
 PROJECT**

SUBDIVISION NAME: UNSUBDIVIDED (COUNTY)
 DATE SUBDIVIDED: 08-08-80

NO SCALE

PROJECT NAME:	QS	DATE:	C.D.
43RD AVENUE & SAGUARO PARK LANE	46/18	05-08-91	1

PROJ. NO. 46/18-1

K

LOCAL FLOODING MITIGATION PROGRAM
STREET TRANSPORTATION DEPARTMENT
CITY OF PHOENIX

PROJECT NAME: 43rd Avenue and Saguaro Park Lane

PROJECT NUMBER: 46/18-1

DESCRIPTION: This is an unsubdivided area without dedicated streets (according to the Quarter Section Map). Homes were constructed at grade in a major wash area under County jurisdiction.

ESTIMATED NUMBER OF STRUCTURES SUBJECT TO FLOODING: 8

SUGGESTED SOLUTION: Dedicate and pave streets. Construct channel #44 identified in Little Deer Valley Area Drainage Master Study.

PRELIMINARY COST ESTIMATE THIS SOLUTION: \$300,000

FEASIBILITY STUDY COST BY ENGINEERING CONSULTANT: \$15,000

COST PER STRUCTURE TO REDUCE FLOODING: \$37,500

FIELD INSPECTION DATE: 3/8/91/PK

LOCATIONS OF KNOWN FLOODING:

4414 West Saguaro Park Lane
24432 North 45th Avenue
Homes on 43rd Avenue south of Saguaro Lane

CONTRIBUTING FACTORS:

Constructed prior to Development Standards
Floors too low
Structures constructed in natural drainage channels

