NPDES Stormwater Permit Application
City of Tempe, AZ

NPDES PERMIT APPLICATION FOR DISCHARGES FROM MUNICIPAL SEPARATE STORM SEWER SYSTEM

FOR

CITY OF TEMPE
MARICOPA COUNTY
STATE OF ARIZONA

PART I

MAY 16, 1992

INTRODUCTION

This Part 1 Permit Application by the City of Tempe, Arizona, has been prepared in accordance with EPA Document 505/8-91-003A, April 1991 Guidance Manual for the Preparation of Part 1 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems.

The Permit Application is organized in a textual narrative document accompanied by appendices referenced to the specific subjects addressed in the narrative. The appendices are found in three-ring binders and are paginated to maintain order as they are referenced from the text. These two documents are accompanied by a roll of forty-eight (48) Section Maps (1-inch equals 200 feet) for the entire City of Tempe stormwater/storm drain system. The maps may be mosaicked using the Section index map as a guide. These maps indicate on a micro-scale: land use, runoff coefficient, storm drain systems and stormwater retention criteria. In addition, retention basins for non-contributing areas to the Waters of the U.S. are delineated.

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PART I - GENERAL INFORMATION

Individual Application

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Phone Number: (602) 350-8200

Ownership Status: City owns and maintains approximately 95% of the storm sewers within the City limits. The Salt River Valley Water Users Association and the Arizona Department of Transportation are responsible for the approximate 5% remaining (ADOT has previously submitted a Part 1 Application for this program).

See Appendix B, Page: APP.B.1 for the delineation of storm drain ownership.

LEGAL AUTHORITY

LEGAL AUTHORITY

The City of Tempe has or can obtain through agreement, or ordinance if necessary, sufficient authority to fully implement all required activities outlined at 40 CFR §122.26(d)(2)(i).

Section I below describes regulatory authority currently existing in the City of Tempe Charter and Code. Section II describes additional authority available under State law.

I. Regulatory Authority Under the City's Charter and Code

A. The City of Tempe is a "home rule" or "charter" City for which the principal source of authority is the City Charter ("Charter"). Tempe's Charter establishes the rights, powers and duties of the City government. A.R.S. §9-283; 9-284. The Charter provides authority to legislate independently of state law for those matters of purely local concern, subject only to any limitations in the Arizona State Constitution. State v. Jacobson, 121 Ariz. 65, 588 P.2d 358 (Ct.App. 1978); Shaffer v. Allt, 25 Ariz. App. 565, 545 P.2d 76 (1976). The City has broad authority to legislate within the City on matters of statewide concern, provided that City ordinances are not inconsistent with general state law. Id.

The Charter provides ample authority for the implementation of ordinances to comply with municipal stormwater NPDES permit conditions. This authority includes general police power to legislate for the health and welfare of the inhabitants of the City, as well as the proprietary power to own, operate, regulate the use of, and protect the streets and storm drain system owned by the City.

The Charter states at Section 1.01 that:

> The municipal corporation now existing and known as the "City of Tempe" shall remain and continue to be a body politic and corporate

under the name of the "City of Tempe" with all powers, functions, rights, privileges and immunities possible under the Constitution and general laws of Arizona as fully as though they were specifically enumerated in this Charter, and all of the powers, functions, rights, privileges and immunities granted or to be granted to charter cities and to cities and towns incorporated under the provisions of Title 9, Arizona Revised Statutes, not in conflict herewith. The enumeration of the powers, functions, rights, privileges and immunities made in this Charter shall never be construed to preclude, by implication, or otherwise, the city from doing any and all things not inhibited by the constitution and laws of Arizona. (5-14-74)

B. The City Code provides extensive authority for control of direct or indirect discharges to the municipal storm sewer system.

[1] **Chapter 12 - Drainage and Flood Control.**

a. Article II of Chapter 12 contains numerous restrictions applying to activities within flood hazard areas of Tempe.

b. Article III of Chapter 12 regulates activities within the Salt River Flood Channel. Section 12-36 prohibits any person other than the United States, the state or its subdivisions from placing any dirt, sand, gravel, garbage, junk or refuse in the Salt River floodway or floodway fringe without a permit from the City Council. This will ensure that flood waters do not carry these materials into the City's storm sewers or stormwater retention basins.

c. Article IV of Chapter 12 is entitled Storm Water Retention, and contains a number of relevant provisions. Section 12-56 requires the owner or developer of any parcel of land in an area designated by the City as a stormwater storage zone to provide storage sufficient to hold the total runoff from a design storm falling either on his own parcel, or where required by the city on his parcel as well as adjacent street and alley rights-of-way.

d. Article V sets forth the City's stormwater system extension policy. This policy ensures that storm sewers will be installed with or in anticipation of all new development as follows:

Section 12-58 provides for designation by the City of stormwater storage zones and amendment of those zones as the City deems necessary.

Section 12-59 provides that violators of this article shall be guilty of a misdemeanor.

Section 12-71 provides that no building permits shall issue for properties within a stormwater storage zone until receipt of notification from the City Engineer that a drainage plan has been approved; and that no certificates of occupancy shall issue until receipt of notification from the City Engineer that construction has been completed in substantial compliance with the approved drainage plan, or that subsequent completion has been guaranteed by other means acceptable to the City.

Section 12-73 provides that no person may fill or substantially alter the surface of any parcel without obtaining a drainage permit; and sets forth prerequisites to issuance of such permits.

Section 12-86 sets forth standards and specifications for on-site stormwater storage.

[2] **Chapter 21 - Nuisances.** This is a comprehensive set of ordinances giving the City broad authority to require removal of any public nuisance, including those listed below. Section numbers listed below are references to the applicable portions of Section 21 of the Tempe City Code.

1) Privies, vaults, cesspools, dumps, pits or like places which are not securely protected from insects or rodents, or which are foul or malodorous;

2) Filthy, littered or trash-covered exterior areas, including all building and structures thereon and areas adjacent thereto;

3) Animal manure in any quantity which is not securely protected from insects and the elements, or which is kept or handled in violation of this Code or any other ordinance of the city or the county; provided that nothing in this subsection shall be deemed to prohibit the utilization of such animal manure on any farm or ranch in such a manner and for such purposes as are compatible with customary methods of good husbandry;

5) Bottles, glass, cans, ashes, small pieces of scrap iron, wire, metal articles, bric-a-brac, broken stone or cement, broken crockery, broken glass, broken plaster and all other trash or abandoned material, unless the same is kept in covered bins or metal receptacles approved by the county health officer or this Code or any other ordinance of the city;

6) Trash, litter, rags, accumulations of empty barrels, boxes, crates, packing

cases, mattresses, bedding, excelsior, packing straw, packing hay or other packing material, lumber not neatly piled, scrap iron, tin and other metal not neatly piled or anything whatsoever in which insects may breed or multiply or which provides harborage for rodents or which may create a fire hazard;

8) All places used or maintained as junkyards or dumping grounds, or for the wrecking, dissembling, repair or rebuilding of automobiles, trucks, tractors or machinery of any kind, or for the storing or leaving of worn out, wrecked or abandoned automobiles, trucks, tractors or machinery of any kind or of any of the parts thereof, or for the storing or leaving of any machinery or equipment used by contractors or builders or by other persons, which places are kept or maintained so as to essentially interfere with the comfortable enjoyment of life or property by others; provided, that nothing contained in this subsection shall be deemed to prohibit any automobile wrecking yard or other junkyard where the same are permitted by the city zoning regulations; and nothing contained in this subsection shall be deemed to prohibit the dissembling, repair or rebuilding or the storage of any of the parts thereof on any farm or ranch where such dissembling, repair, rebuilding or storage are customary and incidental to such farming or ranching activities;

9) Any putrid, unsound or unwholesome bones, meat, hides, skins or the whole or any part of any dead animal, fish or fowl, butcher's trimmings and offal, or any waste vegetable or animal matter in any quantity, garbage, human excreta, sewage or other offensive substances; provided, that nothing contained in this subsection shall prevent the temporary retention of waste in receptacles in the manner approved by the health officer of the county or this Code or any other ordinance of the city;

10) The erection, continuance or use of any building, room or other place in the city for the exercise of any trade, employment or manufacture which, by noxious exhalations, including but not limited to smoke, soot, dust, fumes or other gases, offensive odors or other annoyances, is discomforting or offensive or detrimental to the health of individuals or of the public;

13) Burning or disposal of refuse, sawdust or other material in such a manner as to cause or permit ashes, sawdust, soot or cinders to be cast upon the streets or alleys of the city, or to cause or permit the smoke, ashes, soot or gases arising from such burning to become annoying to any considerable number of persons or to injure or endanger the health, comfort or repose of such persons; provided, that this subsection shall not apply where the person responsible for the action has properly

obtained a fire permit from the city fire department or the county health officer;

14) Any unguarded or abandoned excavation, pit, well or hole dangerous to life;

18) Wilfully or negligently permitting or causing the escape or flow of water into the public right-of-way in such quantity, in the opinion of the city engineer, as to cause flooding, to impede vehicular or pedestrian traffic, to create a hazardous condition for such traffic, or to cause damage to the public streets or alleys of the city through their failure or neglect to properly operate or maintain any water facility or device, including, but not limited to, sprinklers, hoses, pipes, ditches, standpipes, berms, valves and gates.

Section 21-6 of this Chapter gives the City complete abatement authority.

[3] **Chapter 22 - Offenses.** Miscellaneous relevant provisions are Article I, Section 22-4 prohibiting the obstruction or interference with the use of any public ways, and Section 22-7 regulating the deposit of excavated material and prohibiting the deposit of any excavated material containing garbage debris, trash, refuse, construction materials or other waste on any parcel of land within the City. Article III contains additional prohibitions against excessive litter, debris or trash in any unenclosed area outside any single-family or multi-family dwelling. The article also provides that violations may be prosecuted civilly or criminally, and are in addition to any other violations of the Tempe City Code or State Statutes.

[4] **Chapter 23 - Parks and Recreation.** This Chapter prohibits acts which could lead to the contamination of park lakes or stormwater retention basins which connect to the City's larger stormwater system.

Section 23-38 provides: "No person shall damage or wastefully or improperly use the toilet, water and sewer facilities in any city park, playground or golf course ...".

Section 23-39 provides; "No person shall use any portion of any city park or city lake, lagoon or other water-facilities located in any city park or areas without the express written permission of the official designated by the community services director."

Section 23-42 provides: "No person shall commit any act in a public park or recreation facility so as to endanger the health and safety of themselves or other park and recreation uses.

Section 23-72 provides: "All applicable city ordinances and statutes of the state and all boating regulations of the state game and fish department shall be observed while boating upon the waters of any city park or area. In the event of a conflict between a city ordinance and a state statute or regulation, the more restrictive provisions shall prevail and be obeyed.

[5] **Chapter 25 - Planning and Development.** Article IV of the chapter regulates off-site improvements, including storm drains, curb and gutter, valley gutters, sanitary sewers and irrigation facilities; and empowers the City to deny final approval and certificate of occupancy of any building until the required off-site improvements are completed or guaranteed to the satisfaction of the City.

Article V regulates water and sewer extensions to newly developed areas.

Article VI authorizes the City to require curb and gutters, valley gutters and storm drainage facilities in advance of development of a property.

[6] **Chapter 27 - Sewers and Sewage Disposal.** Chapter 27 comprehensively regulates the disposal of sewage and industrial wastes into the enclosed conveyance system feeding the City's publicly owned treatment works. Section 27-5 gives the City broad inspection and permitting enforcement authority.

Section 27-21 gives the City authorization to require abatement of all privies, cesspools and open or unconnected drains and to require connection to the sewage system.

The Chapter also prohibits many other acts which could contaminate stormwater, such as the discharge of stormwater into the sewage collection system, (Section 27-64) or the disposal of sludge or other material removed from industrial waste in violation of any applicable federal, state or local laws, (Section 27-84(b))

[7] **Chapter 28; Solid Waste.** This ordinance governs the collection, storage and disposal of solid waste and provides the City with broad inspection authority. Section 28-54 prohibits burning of garbage, which will be useful in preventing the accumulation of ash and other particulate matter which could contaminate stormwater. Section 28-53 prohibits placement of any garbage, debris, trash, refuse, papers, or other materials on any site except as specifically permitted by the City. Section 28-57 prohibits depositing any garbage, trash, swill or refuse on any premises in the City. Section 28-58 provides for removal of dead animals. Other sections provide for containment and collection of refuse in a manner which will prevent

contamination of stormwater.

[8] **Chapter 29; Streets and Sidewalks.**

Section 29-2 of Chapter 29 requires all property owners to keep all irrigating and waste ditches running by their premises in good repair so as to prevent the escape of water; and to maintain alleys free of debris.

Section 29-3 requires dustproofing of alleys.

Section 29-20 provides that no person shall discharge from his premises or place of business into any street, alley or public right-of-way, any water or other liquid unless authorized in writing by the City Engineer.

[9] **Chapter 33; Water.** This chapter regulates water service by the City. Article III regulates water for irrigation use. Section 33-76 requires property owners to properly maintain ditches and conduits, and Sections 33-77 prohibits a property owner from allowing water to escape outside his property.

II. Statutory Authority Under State Law. There are a number of State statutes that grant specific powers that may be in addition to those included within the City Charter and Code as discussed above. Statutes that are particularly relevant to the stormwater control program are listed below.

A. In the exercise of the zoning power, the City is required to prepare a general plan to guide land use regulation within the City. This general plan includes a conservation element to prevent and abate water pollution. Ariz. Rev. Stat. Ann. §9-461.05(D)(1). Through the City zoning ordinance the City can control the uses of land which may contribute to the contamination of stormwater runoff.

B. Several of the enumerated municipal powers in Title 9 of the Arizona Revised Statutes include authority for the City to enact regulations for the purpose of preventing water pollution. For example, the City may "[r]egulate and prevent the throwing of offensive

material in and prevent injury to any street, way, alley or public grounds". Ariz. Rev. Stat. Ann. §9-276(A)(7). The City may "[p]rovide for the cleaning and purification of waters, watercourses and canals, and the draining or filling of ponds on private property when necessary to prevent or abate nuisances". Id. at §9-276(A)(9). The City may regulate the construction, repair, and use of sewers and gutters. Id. at §9-276(A)(16). The City may compel the owner or occupant of property to remove trash rubbish, weeds or other accumulation or filth or debris. Id. at §9-499.

C. The City may enter into intergovernmental agreements with other governmental entities for the joint exercise of governmental power, the assignment of certain tasks or work functions, and the provision of services. Ariz. Rev. Stat. Ann. §11-952. It may be useful for the City to enter into an intergovernmental agreement for the protection of stormwater leaving state freeways that are within the jurisdiction of the Arizona Department of Transportation, and for the use and maintenance of stormwater conveyance systems that are under the jurisdiction of the Maricopa County Flood Control District. In addition, Tempe may enter into intergovernmental agreements with neighboring cities and towns to provide for an integrated stormwater collection and regulation program, if necessary.

D. The City may prohibit the pollution of domestic water, which is specifically defined as an environmental nuisance. Ariz. Rev. Stat. Ann. §49-141(6). The City is authorized to issue abatement orders requiring property owners to remove substances that are causing water pollution, and can enter and inspect property to insure that nuisances are not being created. Id. §§ 49-143 and 49-144.

E. The City can receive a delegation of authority from the Arizona Department of

Environmental Quality ("ADEQ"). Ariz. Rev. Stat. Ann. §49-107. The City may seek a delegation of certain permitting, inspection, monitoring, and enforcement authority for some of ADEQ's programs, as may be necessary.

F. The City may prosecute misdemeanor violations of A.R.S. §49-263. This section provides that it is unlawful to:

1. Discharge without a permit or appopriate authority under this chapter.
2. Fail to monitor, sample or report discharges as required by a permit issued under this chapter.
3. Violate a discharge limitation specified in a permit issued under this chapter.
4. Violate a water quality standard.

G. The City may enforce general state criminal laws that provide for the punishment of misdemeanors. Two criminal statutes that could be invoked to prevent pollution of stormwater include the crime of criminal damage to property. Ariz. Rev. Stat. Ann. §13-1602(A)(1). Because the City owns much of the stormwater collection system within the City, some activities that pollute the stormwater collection system constitute criminal damage to City property.

Another relevant provision is that pertaining to criminal littering or polluting. Ariz. Rev. Stat. Ann. §13-1603(A)(1) and (2). This statute makes it unlawful to dispose of materials on public property, e.g., the stormwater collection system, and prohibits unlawful dumping of any litter or destructive or injurious material, which could include pollutants. This section also proscribes the discharge of sewage, oil products, and other harmful substances into any waters or onto the shorelines of any waterways within the State.

H. The City may prosecute misdemeanor offenses of §5-348, providing that no person shall dump, deposit, place, throw or leave refuse, rubbish, debris, filthy or odoriferous objects, substances or other trash on any waterways or the shorelines of any waterways of the State. Section 5-391 sets forth provisions relating to violations and enforcement.

From the foregoing, it is evident that the City has ample authority to do all things necessary to implement an program to protect stormwater quality. An example of the City's exercise of this authority in connection with NPDES permits is the pretreatment program to regulate industrial discharges into the sewer system, as required for the operation of two publicly owned treatment works. See 33 U.S.C. §1317(b). The EPA has determined that the City has adequate authority to regulate the discharge of pollutants into the domestic sewer system. The same legal principles that support that authority are applicable here concerning the authority of the City to regulate the discharge of pollutants into a stormwater collection system.

See Appendix A, Legal Authority, for Statute and Code References.

SOURCE IDENTIFICATION

I. LOCATION OF KNOWN MSSSS OUTFALLS TO WATERS OF THE UNITED STATES

II. DESCRIPTION OF LAND USE ACTIVITIES

III. LOCATION AND DESCRIPTION OF LANDFILLS

IV. LOCATION AND PERMIT NUMBER OF KNOWN NON-STORMWATER DISCHARGES

V. LOCATION OF MAJOR STRUCTURAL CONTROLS FOR STORMWATER DISCHARGE

VI. IDENTIFICATION OF PUBLICLY OWNED PARKS, RECREATIONAL AREAS, AND OTHER OPEN LANDS

I. LOCATION OF KNOWN MSSSS OUTFALLS TO WATERS OF THE UNITED STATES

The location of the Municipal Separate Storm Sewer System outfalls to Waters of the U.S. have been included specifically in the Section maps (1-inch equals 200 feet). In addition, a large roll map showing the complete catchment areas for the outfalls is also included in the package. This specific map includes land use characteristics expressed as a percentage of total acreage.

Although there are more "outfalls" shown than meet the definition of outfall for EPA purposes, the Permit Application is for storm drains emptying into the Salt River (SR ____ designation), Indian Bend Wash (IB ___ designation) and Kiwanis Park Lake (KP01). The remaining outfalls either do not meet the EPA definition (they empty into another storm drain/irrigation conveyance operated by others) or they empty into retention basins.

The Salt River Valley Water User's Association (SRVWUA or SRP) is an irrigation entity that operates and maintains a system of canals and laterals (pipes) for delivery and return of irrigation water. The SRP system is co-mingled with the storm drain system of Tempe. We share outfalls. There has not been a complete identification of infrastructure of joint use. Tempe will attempt to clarify this lack of information during the Part 2 Application process.

See: Large Roll Map, Section Maps (1 inch equals 200 feet), and Appendix B, Page: App.B.2.

II. DESCRIPTION OF LAND USE ACTIVITIES

The land use activities have been delineated on the Section maps (1-inch equals 200 feet). They include the following:

Code Name	Description
Residential Low Density	Single family, 2 & 4 plexes, townhomes and one story condominiums
Residential High Density	Multi-story condominiums, apartment complexes
Comm Res Office, Church	Commercial - residential office zoning class, churches
Comm Hotels, Restaurants	Commercial - hotels, motels, & restaurants
Comm Mall, Strp Ctr, Ret	Commercial - shopping malls, strip centers, retail sales
Comm Auto, Gas Sta, Pk Lot	Commercial - Auto sales & service, gas stations and parking lots
Ind Park - Light	Industrial - Industrial parks with light industry
Ind Park - Large Site - Med.	Industrial - Large site, one company
Ind. Foundry, Elec, PP's	Industrial - Heavy industry, electric power facilities, potential polluters (process)
Agricultural	Agricultural - Arable crop or livestock operations, equestrian property
Vacant Land	Vacant land
Open Space, Pks, Golf	Open space - Public parks, golf courses (public and private)
Open Space, School	Open space - School buildings and grounds
Municipal Facilities	Water and Wastewater Plants, offices, yards, Police and Fire
Public Street	All public streets, some paved alleys

As a result of a data and time constraint, it was not possible to incorporate population estimates for the drainage areas in this particular submittal. In lieu of that, the populations for the 1990 Census are shown on a separate map by Section. This activity will be expanded upon in the Part 2 Application Process.

The runoff coefficient for individual drainage parcels is displayed on the Section Maps (1-inch equals 200 feet). In addition, a composite coefficient has been developed for the macro drainage area that ultimately discharge at an outfall.

See Roll Map, Section Maps (1 inch equals 200 feet), See Appendix B, P.P.: App.B.3-5

III. LOCATION AND DESCRIPTION OF LANDFILLS

There are currently no operating municipal landfills within the City of Tempe. There have been various landfills operating in the past. In addition, landfill activity by the Salt River Valley Water Users' Association (Salt River Project) has been conducted at various sites designated by SRP preceding a number on the map. Tempe was actively involved with the RS designated site.

See Appendix B, Page App.B.6

IV. LOCATION AND PERMIT NUMBER OF KNOWN NON-STORMWATER DISCHARGES

The Kyrene Reclamation Plant located in South Tempe at the approximate intersection of Kyrene Road and Guadalupe Road, is the only permitted facility discharging to the MSSSS. It operates under Permit No. AZ0023248. The documentation for this discharge and a map indicating the location of the discharge from the plant is in Appendix B. In addition, the actual outfall of that storm drain system is to the Tempe Drain (also shown on the map) which is an open trapezoidal concrete lined channel that exits City of Tempe operating juris at 48th Street. It then becomes a Maricopa County Flood Control District operated and maintained storm water conveyance.

See Appendix B, P.P.: App.B.7 and 8

V. LOCATION OF MAJOR STRUCTURAL CONTROLS FOR STORMWATER DISCHARGE

The Section maps (1-inch equals 200 feet) show the retention and detention basins throughout the City of Tempe. The majority of these are located in public parks. In addition, these maps show drywells. These devices are used for enhancing infiltration of confined stormwater. The symbology on the map for drywells is a box with an "X" inside. Drywells are also used extensively by private owners to dispose of stormwater retained onsite in compliance with Tempe's Stormwater Retention Ordinance.

See Section Maps (1 inch equals 200 feet)

VI. IDENTIFICATION OF PUBLICLY OWNED PARKS, RECREATIONAL AREAS, AND OTHER OPEN LANDS

The Section Maps contain information for parks, recreation areas, and other open lands. These land uses are perhaps better illustrated on maps included in Appendix B. In almost all cases, recreation areas are associated with schools and/or parks. There are several major areas that are parks and/or open lands that are not associated with schools. The amenities for public use within the parks are also documented in the Appendix.

See Appendix B, P.P.: App.B.9-11

DISCHARGE CHARACTERIZATION

I. EXISTING PRECIPITATION AND WATER QUALITY DATA

II. FIELD SCREENING ANALYSIS

III. CHARACTERIZATION PLAN

A. PRECIPITATION DATA

Tempe, Arizona is located in an arid environment. It receives between seven and eight inches of total precipitation on an annual basis. Tempe has no official National Weather Service Weather Station within its city limits. The geographic center of Tempe (intersection of Rural Road and the Superstition Freeway) is six miles southeast of Sky Harbor International Airport which has a NWS Weather Station. We have obtained rainfall information from the Maricopa County Flood Control District that presents historical rainfall analysis based on the Sky Harbor data. This data is similar, if not identical, to data submitted by the City of Phoenix.

See Appendix C, Page: App.C.1

B. EXISTING STORM SEWER DISCHARGE QUALITY AND QUANTITY DATA

Tempe has conducted a limited amount of storm event sampling in the past. Quality data was developed for certain parameters, however, no quantity data has been developed thus far. Quality data will be presented in this section by the inclusion of the analyses of the grab samples that were procured. These particular locations are for outfalls to the Salt River.

It should be noted that these outfalls presently do not exist. As a result of a channelization program that has been undertaken in conjunction with the Maricopa County Flood Control District and the Arizona Department of Transportation to channelize the entire reach of the Salt River within the City of Tempe improvements to the Salt River have and will be constructed. Suffice it to say that old outfalls have been extended/relocated. Historically, sheet flow conditions did exist in addition to conduits emptying into the channel. It is now highly improbable that storm water runoff can get to the Salt River through any mechanism other than storm drain pipes penetrating the new levees.

See Appendix C, P.P.: App.C.2-8

C. LIST OF WATER BODIES RECEIVING DISCHARGES FROM THE MUNICIPAL STORM SEWER SYSTEM

The recently adopted Water Quality Standards for Navigable Waters for the State of Arizona have listed receiving waters of the Tempe MSSSS as follows:

Name	Designated Uses
Indian Bend Wash	$A+W_w$, PBC, FC
Kiwanis Park Lake	$A+W_w$, PBC, FC, AgI
Salt River	$A+W_e$, PBC

The Indian Bend Wash is a flood control/urban greenbelt/park that provides an outlet for drainage for a 107 square mile area that encompasses portions of Scottsdale, Paradise Valley, and North Phoenix. It passes through Tempe as a one mile segment that contains a grassed public 9-hole golf course (Rio Salado Golf Course). Immediately downstream of this public recreational facility the Indian Bend Wash takes on a desert wash flavor. The confluence with the Salt River will be formalized with a grade control/outlet structure as part of the continuing channelization of the Salt River within the City of Tempe, previously mentioned. Discharges from the Indian bend Wash to the Salt River only occur from storm water runoff.

The Salt River is controlled by a series of Bureau of Reclamation dams upstream of the valley floor to create reservoirs for water storage. This system of reservoirs is operated by the Salt River Valley Water Users Association (SRVWUA). At its inception, the association was composed of farmers interested in irrigating the valley to produce crops. In the years since it was established, a high percentage of the arable land has been converted to urban use. As a result, agricultural tailwater ditches have been tiled (piped) and portions of the water delivery and return (tailwater) system have become part of the municipal storm drain system. The definition of ownership is unclear for some segments, but it is a viable system. Dry weather flows of agricultural return water or simply return flows from "flood" irrigated urban landscapes are normal for some outfalls.

The Salt River within the City of Tempe is ephemeral. Quoting from the Arizona Water Quality Standards for Navigable Waters, "ephemeral water" means a navigable water that has a channel that is at all times above the water table, that flows only in direct response to precipitation and that does not support a self-sustaining fish population. The total discharge from Tempe storm drains into the Salt River during storm events does not create any distinguishable flow within the channelized river. Flow does not leave the City of Tempe in the Salt River as a result of Tempe storm drain activity.

The Salt River is channelized on the southbank from the western city limit of Tempe to McClintock Drive Bridge. The northbank has been stabilized as part of the channelization from the western city limit to just east of Rural Road Bridge. The remainder from Rural Road Bridge east to the McClintock Drive Bridge will be under construction in the fall of 1992, with completion in 18 months. The channelization design is in excess of the 100 year flood event. This will complete the channel improvements of the Salt where the Tempe Municipal Separate Storm Sewer System enters the Waters of the U.S. through piped penetrations of the levees.

Kiwanis Park Lake is a twelve acre lake within Tempe's largest park. Kiwanis Park has a total of one hundred twenty five acres of multiple use land. The lake itself is very shallow, with an average depth of approximately 4 1/2 feet. The Fish Consumption (FC) designated use has been included due to the stocking of trout or catfish on a seasonal basis by the Arizona Department of Game and Fish. Tempe participates in the State urban fishing program and this facility operates as "put and take" lake. The surrounding park land is sprinkler irrigated with water that is stored in and pumped from the lake. The lake receives water from the SRVWUA through their canal delivery system. The lake also serves as a storm water retention basin for the runoff of the park and adjacent (predominantly single family residential) land. Kiwanis Park is the only true receiving water of the MSSSS. Since it also is a terminal lake (no outlet) water quality may be affected by inflows from various sources.

See Roll Map, See Appendix C, Page: App.C.9

II. FIELD SCREENING ANALYSIS

A. OUTFALLS

B. SAMPLING PROCEDURE AND METHODOLOGY

C. FIELD DATA SHEETS

A. OUTFALLS

The procedure to identify and sample outfalls for the City of Tempe MSSSS was facilitated by the limited number of stormwater conveyances to receiving waters. Since this number was relatively small (thirty-three) there was no need to establish a grid system. The conveyances in all cases are piped and their physical outfall to the receiving water is discreet.

The outfalls were observed, photographed, sampled where appropriate, and documented on the field data sheets. The investigation was undertaken by Tom Ankeny, Senior Civil Engineer, Public Works-Engineering, and Mike Golden, Environmental Technician II with Public Works-Environmental Services Division. The Environmental Services Division's sample van was used for sampling and kit analyses associated with screening. Mr. Ankeny used his personal Cannon AE-1 SLR for photos (it has no date capability). The actual screening took place in April and as the photos will attest, the weather was clear and dry. The photos will also show water in the Salt River channel as a result of releases from the upstream impoundments by the Salt River Valley Water User's Association. The river flow is not associated with any local precipitation/run-off events within the City of Tempe city limits.

The outfalls are coded with a five digit alphanumeric designation, followed by a narrative description. Please refer to the photos and to the field data sheets for the information gathered during the reconnaissance. It should be noted that Tempe has received an average annual amount of precipitation within the first three months and two days of 1992. This may have some effect on the amounts of vegetation found at several outfall locations. In addition, outfalls that were sampled (observed flow) were discharging as a result of irrigation tailwater from deliveries made by the Salt River Valley Water User's Association to customers within the Tempe area. Subsequent four hour return sampling was not conducted.

See Appendix C, P.P.: App.C.9-24

B. SAMPLING PROCEDURE AND METHODOLOGY

Where discharge from the outfall was observed grab samples were taken and additional data was entered on the data sheets. A very limited number of outfalls were in a discharge condition, as would be expected. It is normal, for discharges to occur as a result of the previously mentioned interconnection of the Salt River Valley Water User's Association tailwater facilities and City of Tempe's storm drain system.

The method used is grab sampling, using glass beakers (cleaned according to City of Tempe QA/QC procedures). Field screening included pH, temperature, phenol, total chloride and copper, and detergents. Appropriate amounts of sample are collected and properly split into contract lab containers (phenol analysis) and then placed in ice filled coolers to maintain a 4 degree centigrade temperature. On the initial day of screening, the kit analysis for phenol was not available. Therefore, four samples were obtained and processed using Automated Color .420.2 in a State Certified laboratory. Kit analysis was performed for the appropriate parameters.

The description of the outfall is consistent from the photos to the field data sheets to any maps representing the outfalls.

See Appendix C, Page: App.C.25

C. FIELD DATA SHEETS

See Appendix C, P.P.: C.26-29

III. CHARACTERIZATION PLAN

A. SAMPLING LOCATIONS

B. SAMPLING PERIOD AND FREQUENCY

C. SAMPLING METHODS

D. SAMPLING PARAMETERS

E. QA/QC

F. Analytical methods

A. SAMPLING LOCATIONS

The parameters for selecting sampling locations include representativeness of land use, overall size of the catchment, and uniformity of land use. In addition, in an arid region such as Tempe's location having the catchment characteristics being appropriate for storm uniformity over the catchment during an event is also critical. The majority of outfalls to Waters of the U.S. within Tempe are complex in land use and of such convoluted shape and extent for catchments that it would be very difficult to select representative sampling sites for outfalls to Waters of the U.S. for all land uses. The City of Tempe is proposing five sampling sites.

The selected commercial outfall is the Ash Avenue storm drain (SR07) that outlets to the Salt River. It encompasses a drainage catchment that can be classified as the "old downtown Tempe" area that has and continues to be redeveloped in commercial/office use. Historically, there has been no significant onsite stormwater retention in this particular drainage area. It contains runoff from streets that carry a substantial amount of traffic in association with Arizona State University activities.

The largest catchment area is composed of predominantly single family residential use, interspersed with some commercial use and a minor amount of multi-family residential use. This outfall to the Salt River is known as the Dorsey Drain (SR08). Although the catchment area is large in extent, it is relatively uniform in dimension so that storm tracks cover the catchment fairly uniformly.

It is with some difficulty that an industrial catchment/outfall is determined. There is no distinct area served by a storm drain that is exclusively industrial in use. Currently, the Maricopa County Flood Control District is monitoring an industrial outfall located within the City of Tempe limits. This catchment is very small in size and may or may not be representative of other industrial activities within Tempe. We propose to use this site as our industrial catchment (TD01).

Estrada Park Retention Basin - The residential representative catchment actually drains into a city park which is a retention basin and is drained by drywells. It is totally residential in character and therefore should give more representative data than other potential areas. In addition, this site does not collect water from any arterial streets.

A combination of open space, single family residential and limited commercial uses describe the Kiwanis Park Lake catchment (KP08). This is the only receiving water for the MSSSS in Tempe that may be impacted by stormwater runoff. It has a large area of open space and may provide data relating to this land use.

See Appendix C, Page: App.C.30

B. SAMPLING PERIOD AND FREQUENCY

Tempe is located in an arid region and is impacted by two separate storm seasons. Sampling for both summer convective storms and winter frontal storms will be done. Because of the seasonal difference in storm events and the difference in antecedent moisture, humidity and temperature conditions, it would be useful to collect data from both seasons to fully develop the character of the stormwater runoff.

C. SAMPLING METHODS

Samples will be taken in the field by automatic sampling devices or by Environmental Services Division personnel. Grab samples and flow weghted composite samples will be obtained. Specifications for an automatic remote sampling station are included in Appendix C.

See Appendix C, Page: App.C.31

D. SAMPLING PARAMETERS

Sampling will be conducted to quantify the parameters in Table 4-14.

See Appendix C, Page: App.C.32

E. QUALITY ASSURANCE - QUALITY CONTROL (QA/QC)

The City of Tempe Environmental Services Division uses field and laboratory analyses to determine compliance of discharging industries, investigative studies for environmental crimes, hazard evaluations, wastestream characterizing, and for reporting requirements. Since these analyses will be documenting violations and environmental crimes, all data, procedures, certifications, methods, and QA/QC must be defensible in a court of law.

Quality Assurance (QA) is a set of standard operating principles that are strictly followed during sample collection and analysis that will produce repeatable data of a known and defensible quality. Quality Control (QC) and Quality Assessment are subparts of Quality Assurance and will be discussed later.

Tempe's Quality Assurance plan can be broken down to three subsections. They are as follow:

I. Taking a representative sample

II. Maintaining the integrity of the sample prior to analysis

III. Sample analysis

Enclosed is a copy of Tempe's Quality Assurance and Quality Control Program.

TEMPE QUALITY ASSURANCE PROGRAM

I. <u>Taking a representative sample</u>

Taking a representative sample involves using both proper equipment and procedures. The quality of the sample is dependent on that both are correct for each type of sample. Tempe does automatic composite and manual grab sampling.

A. Proper Equipment

1. Flow Meters - Most of Tempe's categorical and significant industries have their own flow meters built into their wastestreams. These flow meters are to be annually calibrated to their factory specifications (City ordinance). For those locations without a built-in flow meter and flow measurements are needed, the Environmental Services Division uses one of its own meters. The City has seven portable flow meters.

These flow meters not only measure flow, but are used to activate automatic sampling units so that samples can be taken by flow units rather than time units. In this way, the number of samples taken are proportional to the flow.

2. Automatic Samplers - The Environmental Services Division has fourteen automatic samplers that are capable of both flow or time compositing.

3. Laboratory or commercially cleaned and prepared sample containers - These sample containers are cleaned to EPA Specifications listed in 40CFR136. Samples that need chemical preservatives have them added to the sample containers at the laboratory prior to actual use. Reagent quality chemicals are used for preservation.

4. Sample Van - This large vehicle is used for all sampling and for HazMat emergencies. This vehicle contains about everything a person would need out in the field. Listed below are some of its features:

   a. Mini Lab - Including reagent grade chemicals and EPA reagent grade water, sink, Orion Model #SA520 pH meter, reference books, glassware, Pensky-Martins Flash Point Tester, Yellow Springs Dissolved Oxygen meter, Drager air Test Kits, 200-quart ice chest with ice, plus more.

   b. Traffic Control Equipment - Including large flashing arrows, cones, strobes, flags, vests, portable lights and large fixed lights.

   c. Tools - Full tool box, chains, locks, eight and four pound sledges, picks, shovels, ropes, full set of alpine climbing gear, alpine climbing ropes, crow bars, master key set, vector control gear, extension cords and connectors, and more.

   d. Sample Gear - Sampling equipment for manual and automatic sampling, large storage supply of sample bottles, field test kits, forms, labels, anti-tampering devices and tools, including a UV/IR light, maps of sanitary sewer system, and more.

   e. HazMat gear (other than listed above) - Three MSA air packs with extra air bottles, chemical suits, gloves, helmets, radio communication, HazCat Kit, HazMat flagging tape, Exotox gas monitors, Gasponder III gas monitor, Arizona Instruments Hydrogen Sulfide meter, explosion-proof lights, etc.

B. Proper Procedures

1. Sampling Technique

The Environmental Services Division has strict sampling protocol as outlined in 40CFR136, 40CFR261, 40CFR403, and the following EPA manuals:

1. EPA-600/2-80-018, Samplers and Sampling Procedures for Hazardous Waste Streams

2. EPA-600/4-79-020, Methods for Chemical Analysis of Water and Wastes

3. EPA-600/8-78-017, Microbiological Methods for Monitoring the Environment

4. EPA-SW-846, Test Methods for Evaluating Solid Waste

2. Sampler Cleaning and Maintenance

The Environmental Services Division maintains their automatic samplers to factory specifications. Factory representatives assist in the maintenance and upgrading of the samplers. Automatic samplers are meticulously cleaned after each use. Sampler parts that have contact with samples are cleaned, plus rinsed with acid and EPA laboratory reagent grade water between each use to minimize cross-contamination problems. The Environmental Services Division keeps a separate sampling hose line for each site sampled with the automatic samplers.

3. Sample Log

A sample log is maintained to record each sampling event. Sample log items include location, date, time, field analysis conducted, and other documentation.

4. Field Analysis

Some samples must be immediately analyzed in the field because of procedure, lack of holding or preservation methods, or because of emergency conditions. Analysis for pH and temperature are examples of normal field analysis. These two analyses are recorded in the pH log book, along with the calibration checks. A Hazardous Material Response Log Book is maintained for any field analysis done during such emergencies.

5. Daily Log

Besides all of the other documentation the Environmental Services Division maintains for sampling, all the day's sampling activities are also recorded in the daily log book.

6. Chain of Custody Forms

The Chain of Custody form is used for every sample as part of the legal record of the sample. This form (enclosed) contains the who, what, when, and field test results of the sampling, along with the normal chain of custody information. This form remains with the sample until final disposal of the sample.

II. Maintenance of Sample Integrity

Maintaining sample integrity from the time of the sampling to final laboratory analysis is imperative not only from the legal and regulatory standpoint, but also because the high ambient temperatures of Tempe will quickly render a sample useless, thus requiring a second sampling, with the expenditure of more manhours and equipment tie-ups. Again, maintenance of the sample is dependent on proper equipment and procedures.

A. Proper Equipment and Procedures

1. Sample Preservation - Sample preservation methods are outlined in 40CFR136 and the Environmental Services Division uses these plus several other techniques to maintain the quality of the samples.

   a. EPA Procedures - The Environmental Services Division uses strict 40CFR136 sample preservation procedures for samples listed in 40CFR136. For other types of samples, the references listed earlier under I-B-1 are used.

   b. Prepared Sample Bottles - The Environmental Services Division uses sample bottles that contain premeasured amounts of chemical preservatives for those samples requiring them. These chemical preservatives are of reagent grade and are added by either a commercial laboratory or commercial supplier. Proper pH is field checked with an Orion Model #SA520 meter. If pH needs to be further adjusted, reagent grade chemicals are used.

   c. Chain of Custody Form - This form is maintained and modified during the handling of the sample.

d. Temperature Control - Many samples are very sensitive and will quickly degrade without being kept chilled. With summer time highs reaching 120 degrees F and over, this becomes a difficult task. The Environmental Services Division owns and maintains its own commercial ice-making machine. Samples that are required to be kept cold will have the automatic sampler iced. Replenishment of the ice during sampling periods is often required during the summer months. The sampling van carries 200 and 80 quart ice chests to transport samples and ice. samples that can not be quickly transported to the laboratory will be kept in the Division's sample refrigerator.

e. Checking of Equipment - Automatic samplers will often be re-checked (especially during the summer) during the sampling period for proper function and for ice.

2. Handling and Transportation of the Sample

   a. Labeling - all samples are handled in labeled containers that identify the source and date of the sample. This is done to eliminate confusion among the different samples and for ease of paperwork.

   b. Transportation - all samples are transported to the laboratory in the Environmental Services Division's own vehicles. The samples are kept under lock and key to eliminate the remote possibility of tampering or loss of sample. All handlers of the sample must sign the chain of custody form.

III. Sample Analysis

The Environmental Services Division sends all samples but the field analyses and a very small amount of HazMat emergency samples to commercial laboratories licensed by the State of Arizona for Water/Wastewater analysis. By having a "third party" do the analysis, conflict of interest and biased analyses are eliminated.

A. In-House Analysis

Many samples must be analyzed immediately, due to the unstable nature of them. The majority of field analyses are for pH, temperature, dissolved oxygen, and sulfide.

1. pH - An Orion Model #SA530 pH meter is used. It is calibrated before use with commercially prepared buffers traceable to National Bureau of Standards standard reference material. A two-point calibration curve is used in calibration. A pH log book is maintained after each calibration.

2. Temperature - The Orion meter has a built-in temperature feature. Calibration of this unit is checked on a periodic basis with one of the section's certified thermometers. Certified thermometers are traceable to the National Bureau of Standards and conform to Monograph #150 in specifications.

3. Dissolved Oxygen - A Yellow Springs Model #58 meter is used for field use. This meter is air-calibrated for field use.

4. Sulfides - For field analysis, the Environmental Services Division uses reagents made up by the City Water Lab. Analysis procedures are according to Standard Methods.

5. Other - The Environmental Services Division does other field tests for screening or for HazMat emergencies. Listed below are some of the instruments used and analyses done:

   a. Microtox Model 500 - for bioassay work, emergencies.

b. Precision Scientific Inc. Pensky-Martins Flash Point Tester - for EPA 1010 testing, emergencies.

c. Clor-N-Oil 50 PCB Screening Kit - PCB screening, emergencies.

d. Hach COD Reactor - COD screening.

e. Hach Digestahl Reactor - metals screening.

f. Hach DR/3 Spectrophotometer - analysis for Hach test.

g. Various Hach and Chemetrics field test kits - field screening, emergencies.

h. Haztech System Inc. HazCat Kit - Field screening, emergencies.

B. Commercial Laboratories

All analyses other than what are listed above are sent to a State Licensed and Certified laboratory. The laboratory must have a written Quality Assurance/Quality Control Program based on EPA Manual QAMS-004/80. Only EPA-approved methods can be used for analysis. More on commercial laboratories will be discussed under Quality Assessment.

TEMPE QUALITY CONTROL PROGRAM

Quality Control is the set of measurements within a sample analysis methodology to assure that the process is in control. Quality Control in the Tempe Quality Assurance Program refers to in-house analysis. Laboratory analysis conducted at the outside laboratories is out of the Environmental Services Division's direct control, thus, its Quality Control is measured under the Section of Quality Assessment.

Quality Control can be broken down to personnel, equipment, procedures, and documentation. Since equipment has been previously discussed, this section will cover the other three key ingredients.

A. Personnel - One of the more overlooked parts of any Quality Control Program is the quality of the staff. Tempe is fortunate that it has a staff of dedicated environmental professionals that have a high degree of training and experience. Of the six people who do the sampling, field analysis, and Hazardous Material emergency calls, they have between them fifty-eight years of sampling/laboratory experience, five University degrees, and numerous professional certifications. The staff is involved with many professional organizations. The EPA has been so impressed by the Tempe Industrial Waste Section (Environmental Services Division) and its program that it has cited it as a model program for other agencies.

B. Procedures - All procedures are either 40CFR136 or as the manufacturer states in the field test kits. Quality Control for the procedures are as follows:

1. Calibrations - All instruments shall be calibrated to factory specification prior to use. Calibration standard and buffers shall be of commercially prepared stock that is certified. Calibration logs are maintained.

2. Blanks - For applicable analysis, a blank (a sample of EPA Laboratory Reagent Quality Water) shall be analyzed. This sample will be a zero reading or one that is appropriate for blank sample.

3. Duplicates - At least one sample in ten or, if less than ten samples are run, at least one sample analyzed twice to demonstrate consistency of analysis. If the sample does not come within predetermined tolerance, the whole analysis will be scrapped and repeated.

4. Analysis of commercially prepared standard - This test will be of separate source of the calibration standard but of the same quality. Tolerance level for this sample shall be of the same as the duplicate sample.

5. Spike - If applicable, one of the samples already analyzed will have a known quantity of the standard added to it. The analysis results should be within tolerance of the calculated result of the spiked sample.

C. Documentation

All analysis shall be documented. Laboratory work containing the above information, results, and analysis shall be recorded with the Environmental Services Division Laboratory Workbook for those analyses that are applicable. Analysis for pH, dissolved oxygen (DO), and temperature shall be kept in the pH or DO logbook.

In situations where documentation is extremely sensitive, such as in potential criminal cases, written documentation will be supplemented with photography. The Environmental Services Division has one video recorder, two Polaroid Land cameras, three autofocus 35mm cameras, and one 35mm SLR camera. All 35mm cameras are equipped with databacks to record day of photo on each photo. Photography is also used to supplement documentation in inspections, hazardous material response, and other investigations.

The City of Tempe also owns and operates a sewer system video camera and van. The sewer camera van includes a recording device so that VCR tapes can be kept on file of any monitoring event. The camera itself is on tracks and can go down sewer pipes as small as four inches.

TEMPE QUALITY ASSESSMENT PROGRAM

Quality Assessment is the procedure to evaluate laboratory performance. This program is essential to the Tempe Quality Assurance Program, since the Environmental Servoces Division has no internal control of what happens inside the commercial laboratory once the sample arrives. To assure that the laboratory is carefully analyzing each sample, the Environmental Services Division conducts the following four-point program.

A. State Certification - If an Arizona State certification exists for any parameter or procedure, the laboratory shall hold that certification to do analysis for that parameter or procedure for the City of Tempe.

B. EPA QC Samples - The laboratory shall participate in the Environmental Services Division's EPA Quality Control check samples and report the results within EPA tolerances. These EPA QC samples are sent out on an annual basis.

C. Blind Sample - The laboratory will be sent unannounced check samples under a fictitious industry name. These samples may be sent to more than one laboratory to cross check results. Results are to be within EPA tolerances for each parameter.

D. Evaluation by Inspection - The old notion that a picture is worth a thousand words falls true in a visual inspection of a laboratory. Laboratories doing analysis for the Industrial Waste Section are subject to an annual inspection of their facilities. Visual observations of sample storage, housekeeping, waste disposal, recordkeeping, age of instruments, and procedure can give a lot of indications of the quality of work being done.

The Environmental Services Division uses State Licensed and Certified laboratories for their sample analysis. The two laboratories are as follows:

Analytical Technologies, Inc. (ATI)
2113 S. 48th Street, Suite 107
Tempe, AZ 85282 (602) 438-1530
License #0061 - Arizona Department of Health Services
Other Certification and Licensures - EPA Superfund
Contract Laboratory (CPL); California Department of Health Services
Approved Water Laboratory, Drinking Water Laboratory, Hazardous
Waste Analysis, and for AB1803; Navy NACIP Program

Arizona Testing Laboratories
817 W. Madison Street
Phoenix, AZ 85007 (602) 254-6181
License #0002 - Arizona Department of Health Services
Other Certifications and Licensures - Interim - State of Nevada for
Las Vegas; Arizona Approved for Drinking Water and Wastewater Analysis;
Arizona Approved for BOD, and micro-biological analysis

F. ANALYTICAL METHODS

ANALYSIS LIST FOR STORMWATER SAMPLES

Parameter	Methodology	Detection Limit	Units
Organic Analysis:			
Volatile Organics	GC/MS 624	5-20	ug/l
Semivolatile Organics	GC/MS 625	10-50	ug/l
Pesticdes/PCBS	GC/ECD 608	0.05-0.5	ug/l
Phenols, total	Automated Color. 420.2	20	ug/l
Metals:			
Antimony	GFAA 204.2	5	ug/l
Arsenic	GFAA 206.2	1	ug/l
Beryllium	GFAA 210.2	0.2	ug/l
Cadmium	GFAA 213.2	0.2	ug/l
Chromium, total	GFAA 218.2	1	ug/l
Chromium, hexavalent	Colorimetric 7196	20	ug/l
Copper	ICD 200.7	3	ug/l
Lead	GFAA 239.2	1	ug/l
Mercury	Cold Vapor 245.1	0.2	ug/l
Nickel	ICP 200.7	5	ug/l
Selenium	GFAA 270.2	0.8	ug/l
Silver	GFAA 272.2	0.2	ug/l
Thallium	GFAA 279.2	1	ug/l
Zinc	ICP 200.7	3	ug/l
Physical-Ions/Indicators/Nutrients			
pH	Meter 150.1	N/A	-
Total Dissolved Solids	Grav. 160.1	10	mg/l
Total Suspended Solids	Grav. 160.2	10	mg/l
Chemical Oxygen Demand	Tit. 410M	5	mg/l
Total Phosphorous	Color 365.3	0.05	mg/l
Dissolved Phosphorous	Color 365.3	0.05	mg/l
Cyanide, total	Automated Color 335.3	0.01	mg/l
Total Kjeldahl Nitrolgen	Automated Color 351.2	0.2	mg/l
Total Ammonia	Ion Selective 350.3	0.03	mg/l
Nitrite/Nitrate, Total	Automated Color 353.2	0.06	mg/l

MANAGEMENT PROGRAMS

I. LIST OF FLOOD CONTROL PROJECTS WITHIN CITY LIMITS

II. LIST OF LOCAL REQUIREMENTS DESIGNED TO CONTROL STORMWATER QUALITY AND/OR QUANTITY ENACTED AND ENFORCED

III. LIST OF PROGRAMS DESIGNED TO IMPROVE STORMWATER QUALITY

I. LIST OF FLOOD CONTROL PROJECTS WITHIN CITY LIMITS

The following list of structures/improvements were partially or totally funded by the Maricopa County Flood Control District and/or the City of Tempe. A designated name with a brief description will follow:

Gila Drain Tiling:

Piping of 2 1/2 miles of open, dirt lined trapezoidal channel. This facility is operated by the Salt River Valley Water Users Association as an irrigation tailwater collection facility and as a major dump/diversion from the Western Canal. There is arterial street storm water runoff that is also carried in this drainage pipe.

Hanger Park Detention Basin:

This 15 acre detention facility is a multi-use park operated and maintained by the City of Tempe adjacent to the Gila Drain. Gila Drain flows in excess of downstream capacity are diverted to the detention basin by overtopping a metering weir. Following subsidence of downstream flows detained water is pumped into the Gila Drain.

ADOT Pit, Channel:

On the east side of Interstate 10, north of the ADOT Pit retention facility, a major drainage way that was previously dirt and ill-defined was conduited with a box culvert structure and a concrete lined open channel. This facility is approximately 1 1/2 miles in length.

Salt River Channel and Grade Control Structures:

As mentioned elsewhere in this permit application there is a completed and ongoing project to channelize the entire reach of the Salt River within Tempe city limits. This major improvement involving installation of concrete stabilized alluvium toe-downs and levee structures with attendant grade control structures is to limit degradation of the channel and prevent erosion of the banks in addition to providing flood control capabilities for the hundred year design flood. The channel has a hydraulic capacity of 215,000 cubic feet per second with four feet of free board.

Tempe Drain:

This is an open channel of trapezoidal shape that was gunited to stabilize the sides and the bottom. It is a half-mile in length and is operated by the City of Tempe.

See Appendix D, Page: App.D.1

II. LIST OF LOCAL REQUIREMENTS DESIGNED TO CONTROL STORMWATER QUALITY AND/OR QUANTITY ENACTED AND ENFORCED

The City of Tempe has enacted numerous code requirements to facilitate reduction of storm water run-off to Waters of the U.S. and to enhance the quality of storm water retained. We will reference specific chapters of the City Code in this narrative, you will find them in their entirety in the **LEGAL AUTHORITY**. Appendix A.

Chapter 12, Drainage and Flood Control: a substantial portion addresses the on-site retention ordinance. To condense the ordinance we will describe its major components. The City of Tempe being in an arid region receives minimal rainfall on an annual basis. Tempe is also located in somewhat of a saddle and has very limited topographic relief. Natural outfalls or drainage ways are also limited. In addition, man-made obstacles, i.e., depressed freeways, elevated canals and interstate highway systems have prevented traditional storm drain system development. As a result, the retention of various design storms has been required for development of property. Retention calculation is based on retaining 95% of the total volume of run-off generated on a parcel regardless of its actual surface imperviousness (it is considered to be paved). Retention can be accomplished in single family residential areas if the lot is large enough by retaining run-off completely <u>on-lot</u>. Where residential lots are smaller in size, <u>combination storage</u> utilizing some on-lot retention and a central basin can occur. If the developer decides to forego any form of on-lot retention, then the <u>central storage</u> basin must be of sufficient size to handle the entire run-off. Central basins are designed for three feet of water depth with one foot of free board. If the central storage basin is of 5 acres or greater in size the City of Tempe, following the installation of landscaping and appropriate amenities, will assume maintenance of this facility. Retention must occur irrespective of land use. The developer is responsible for the adjacent street run-off, except where the adjacent street is an arterial street. As a result of this particular practice which has been on-going for 20 years and formalized since 1978 over 40 percent of the City has storm water retention. Please refer to the <u>Engineering Design Criteria</u> which contains the actual working policy as to how retention is accomplished.

Chapter 21, Nuisances: In particular Section 21-4 (18) concerning water going into a street;

Chapter 22 Offenses-Miscellaneous; Section 22-7 concerning excavated materials;

Chapter 27, Sewers and Sewage Disposal; Section 27-64 (a)(1) prohibits storm water from being discharged into sanitary sewer;

Chapter 28-Solid Waste, Article VIII Recycling;

Chapter 29-Streets and Sidewalks; Section 29-20 Discharge of Water from Private Premises;

Chapter 33; sections concerning irrigation water and potable water cross connections.

See Appendix A, P.P.: App.A.5-7, 10, 11-13
See Appendix D, Page: App.D.2

III. LIST OF PROGRAMS DESIGNED TO IMPROVE STORMWATER QUALITY

The City of Tempe has an on-going street sweeping program. Intervals of sweeping are two to three weeks in residential neighborhoods, and one week on arterial streets. The City of Tempe is actively involved in solid waste recycling. Selected neighborhoods have individual recycling containers for their homes. In addition, large containers are set up in school and park areas to accept recyclables (newspapers, aluminum cans and glass) on a continuous basis. The City of Tempe has conducted Household Hazardous Waste Days to allow residents to bring those types of materials to a specified site for disposal. Various community and valleywide recycling and waste disposal programs are documented in an Arizona Republic article. See Appendix D. The City of Tempe has also established a drop-off point for paint and certain other "canned" liquid products for disposal.

We would draw your attention to the fact that an on-going program to convert dirt and gravel streets to paved streets using Improvement District financing and/or direct city participation has produced an almost 99% paved surface to the Tempe street system.

See Appendix D, P.P.: App.D.3 and 4

FISCAL RESOURCES

I. MUNICIPAL STORMWATER BUDGET 1992-93

II. DESCRIPTION OF FUNDING MECHANISMS

III. DESCRIPTION OF DEBTS AND ASSETS

I. MUNICIPAL STORMWATER BUDGET 1992-93

The current funding for the Part 1 Application and non-city expenditures is included in this section. City staff expenditures (time and resources) are in excess of $200,000. The budget was approved by Council in April of 1992. It also shows projected expenditures for the Part 2 monitoring for a 5 year period.

See Appendix E, Page: App.E.1 and 2

II. DESCRIPTION OF FUNDING MECHANISMS

III. DESCRIPTION OF DEBTS AND ASSETS

See Appendix E, Page: App.E.3