MISSION SPRINGS WATER DISTRICT
Desert Hot Springs, California

Sewer Improvement Project
Project Report

Prepared by

Albert A. Webb Associates
Engineering Consultants
Riverside, California

June, 1997

REGISTERED PROFESSIONAL ENGINEER
WALLANCE H. FRANZ
No. 26979
Exp. 3-31-01
CIVIL
STATE OF CALIFORNIA

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I. INTRODUCTION

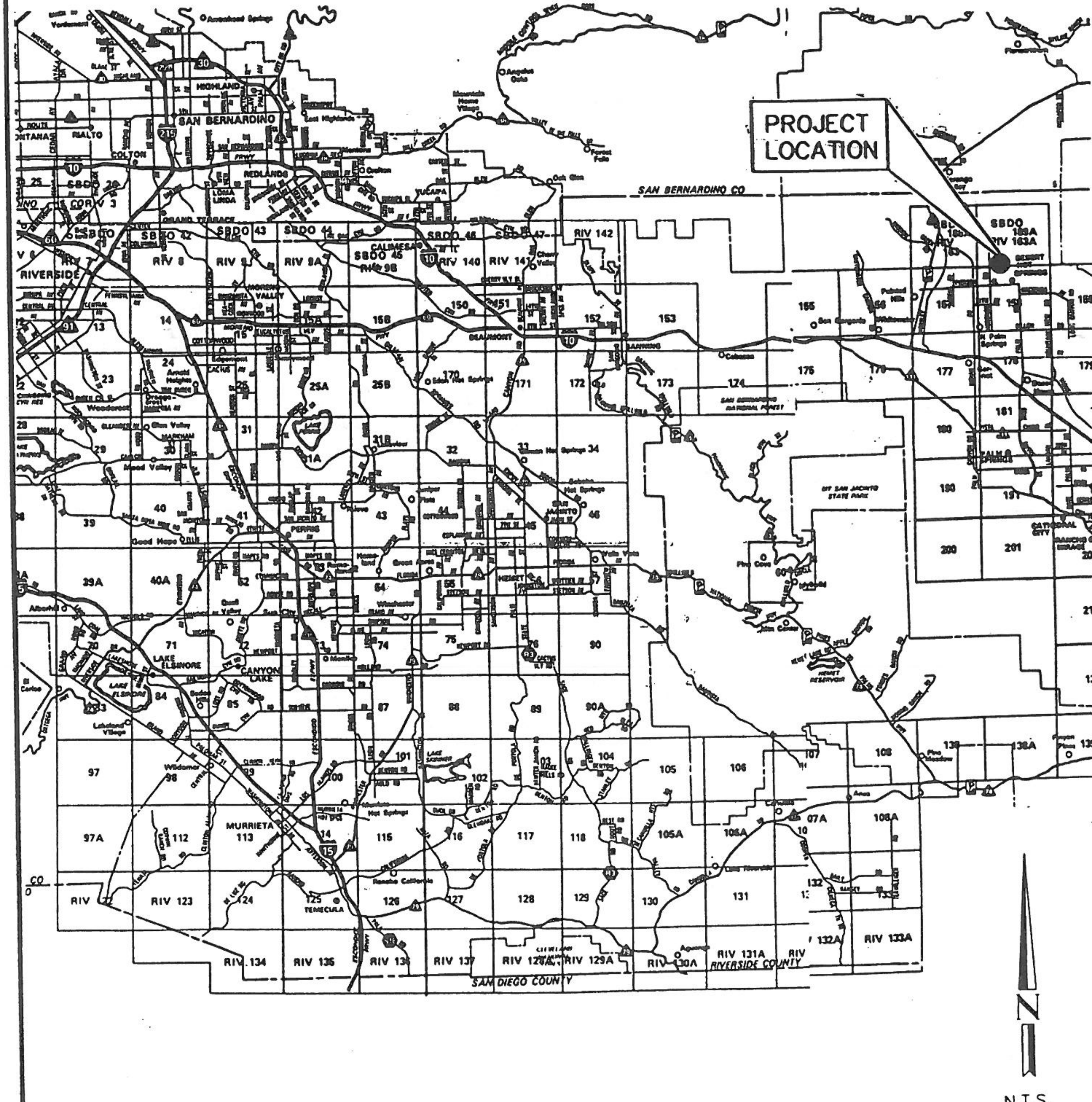
Organization and Boundaries

Mission Springs Water District (District or MSWD) is a California special district that was incorporated in 1953 after the consolidation of two smaller mutual water companies. By the 1970s, the District's original jurisdiction of one square mile had grown to its current size of approximately 133 square miles. MSWD provides water and sewer services to the communities of Desert Hot Springs, North Palm Springs, Desert City, West Garnet, West Palm Springs Village, Painted Hills, a small portion of Palm Springs, the Mission Lakes and Desert Crest country clubs, Dillon Mobile Home Park, Holmes Trailer Park and Calente Springs Recreational Vehicle Park (See Figures I-1 and I-2 for vicinity map and District boundaries). The District currently serves a resident population of approximately 25,000 and also serves seasonal residents and visiting spa clientele that expand the service population by as much as 100% during the high season. The District has 35 full-time employees and an annual budget of $3.7 million.

The approximately 14 square mile portion of the MSWD service area that constitutes the project area for the sewer collection system improvements proposed under this program includes approximately 6,000 acres located within the corporate limits of the City of Desert Hot Springs and another approximately 3,000 acres of immediately adjacent unincorporated lands.

Water Service

The Mission Creek Subbasin of the Upper Coachella Valley Groundwater Basin is currently the sole source of water supply for the project area. The subbasin is estimated to contain 1.2 million acre-feet of water, with an average depth to groundwater varying from 300



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ENGINEERING CONSULTANTS

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VICINITY MAP

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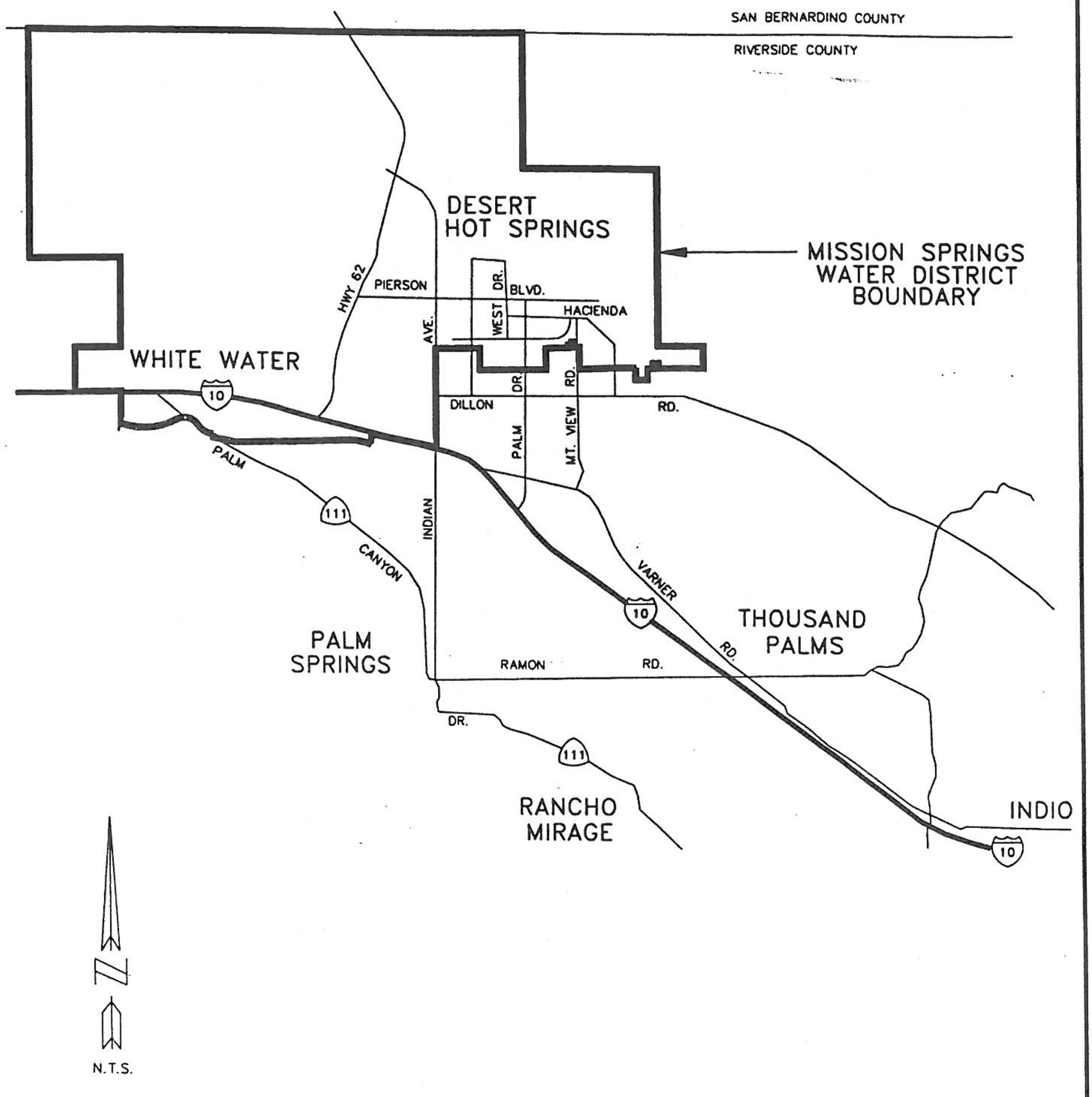

ALBERT A.
WEBB
ASSOCIATES
ENGINEERING CONSULTANTS

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LOCATION MAP

W.O. 96-0195

to 550 feet below land surface. Sources of recharge for the local groundwater basin presently consist of percolation of surface runoff (including natural and irrigation sources), subsurface inflow from upgradient groundwater basins, and seepage from individual septic systems.

The water supply system operated by MSWD includes 9 wells, 23 reservoirs with a combined storage capacity of 18.5 million gallons, 10 pump stations, and about 232 miles of pipeline. The District maintains about 7,700 water connections, with a current average demand of nearly 6 million gallons per day. The current maximum demand which is approximately twice this amount, is largely a reflection of the surge in weekend and seasonal population associated with the spas and winter tourism.

Plans for future water supply development include a proposal for conjunctive use of the local groundwater resource as a joint project between several water purveyors in the Coachella Valley region. Under this proposal, water conveyed through the Colorado River Aqueduct would be stored in the local groundwater basin for subsequent withdrawal.

Water - The Economic Connection

In addition to its function as the sole source of supply, the local groundwater resource is also a substantial component of the local economic base, with the Desert Hot Springs Subbasin supporting a commercial spa industry that comprises nearly half of the local economy.

Sewer Service

The District currently operates two wastewater treatment plants, serving a total of about 2,700 customers. The Horton Wastewater Treatment Plant has a capacity of 1,000,000 gallons per day and plans and specifications are available for expansion to 2,000,000 gallons per day. Funding for this expansion is currently being pursued. This treatment facility primarily uses an extended aeration process for treatment and disposes the treated effluent by way of percolation ponds. A separate, smaller system (180,000 gallons per day capacity) serves a country club development and mobile home park outside the study area. A network of 38 miles of sewers and one pump station complete the existing wastewater treatment system.

Wastewater treatment for the remaining approximately 5,000 customers in the MSWD is by means of individual septic systems. This method of disposal has been the predominant method of wastewater treatment in the Desert Hot Springs community for five decades.

There is substantial concern that continued reliance on individual septic systems may seriously impact the future of the local water supply and the local economy. The presently operating well system does not evidence human fecal coliform or nitrate concentrations in excess of maximum contaminant levels for these parameters; however, evidence of contamination of the local groundwater resource from septic system seepage has been detected in one District well. Several wells were abandoned in the 1970s as a result of excessive coliform, bacteriological, and nitrate levels attributed to contamination by septic tank seepage.

Although a community treatment system is available, the local community has demonstrated substantial resistance to connecting to the system. Local history reflects the substantial turmoil that resulted in the 1960s and 1970s when MSWD proposed assessments to finance community-wide connection. Although there may be several reasons for community opposition, it is evident that the economic ramifications (approximately $5,500 per service connection fee) were a substantial factor in past community opposition. In light of the considerable time that has passed, heightening risk of groundwater contamination, and apparent favorable changes in community attitude toward use of centralized treatment, this sewer system improvement project is one of the District's highest priorities.

Proposed Project Background

The Mission Springs Water District (MSWD) is located in the northern portion of the Coachella Valley and encompasses the City of Desert Hot Springs. "A fault called the Mission Creek Fault (Plate 1) a splay of the San Andreas Fault, obliquely bisects the City and creates two groundwater aquifers. Geothermal groundwater is found east of the northwest - trending fault zone, and potable water is located to the west of the fault."[1] The geothermal groundwater is used by local resorts and spas which attract many tourists to the area. The Mission Springs Water District obtains it's entire water supply from wells located in the potable water aquifer.

The problem the District must mitigate is the potential of widespread groundwater contamination from the dense concentration of private sewage disposal systems (septic systems) in the area.

"In 1995, there were about 5,230 septic tank systems in the city of Desert Hot Springs and surrounding communities. Contamination of ground water resulting from the increasing quantity of wastewater discharge into the unsaturated zone is a major concern to the District. The underlying alluvial aquifer on the west side of the city of Desert Hot Springs is the sole source of public water supply and alternate sources of water are not available. Wastewater contains contaminants, such as nitrogen, bacteria, and organic chemicals, that may degrade the quality of ground water and render it unsuitable for potable consumption. Because the Mission Creek subbasin is a sole source aquifer for Desert Hot Springs and surrounding communities, it is prudent to determine the potential for ground-water contamination from septic tank wastewater."[1]

Report's Purpose

The primary purpose of this study is to provide sufficient information for the technical and economic evaluation of the feasibility of mitigating the potential for groundwater contamination from private sewage disposal systems. Specifically, this document is to serve as a project report in order for the District to obtain grants, low interest loan money, and/or special appropriation funding for the implementation of the proposed project.

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[1] United States Department of the Interior, U.S. Geological Survey, letter report to John Morgan, General Manager of MSWD, dated June 17, 1996.

This report consists of a systematic approach whereby all the related elements could be assembled and analyzed relative to the proposed project. Based on this analysis, a basic strategy for development of a plan to provide wastewater system improvements was made considering engineering and environmental constraints.

Scope of the Report

In order to accomplish the objectives of this report, the scope of the study included the following:

1. Review and evaluation of existing applicable reports and planning documents;
2. Review of environmental characteristics;
3. Review of demographic conditions and trends;
4. Development of a proposed project that will mitigate contamination concerns;
5. Develop project cost estimates;
6. Obtain public input;
7. Review potential funding mechanisms.

Acknowledgments

Albert A. Webb Associates acknowledges with thanks the information and advice provided by various individuals during the preparation of this report. In particular, they are:

MISSION SPRINGS WATER DISTRICT

Board of Directors

Nancy Wright, President
Dorothy Glass, Vice-President
Mary Gibson
John Warner
Jack Webb

District Staff

John L. Morgan, General Manager
Ray Padgett, Director of Operations
Wayne Nielson, Controller
Don Coleman, Community Coordinator/Supervisor, Resource Preservation
George Thacker, District Engineer
Chuck Dodd, Construction Inspector
Justine A. Mayo, District Secretary

Personnel

Albert A. Webb Associates formed a planning team consisting of its own planning and design engineers to prepare this report.

This report was prepared by:

A. Hubert Webb, P.E., President
Fred Hans Hanson, Vice-President
Wallace H. Franz, P.E., Project Manager
Kathy Dale, Principal Environmental Specialist
Alissa Cope, Environmental Specialist
Paul Thompson, Manager Special Tax and Assessment Division
Robert Payne, Senior Designer

II. PROJECT PURPOSE AND NEED

Existing Situation

As previously discussed, the proposed project's purpose is the mitigation of groundwater contamination risks from the high concentration of private sewage disposal systems.

"There are a total of about 5,230 septic systems on record with MSWD as of October 3, 1995 (Nona Crawford, MSWD, written commun., 1995). The majority are active all year long and the rest are in operation seasonally when part-time residents occupy dwellings during the mild winters. A small sampling of subsurface waste disposal system densities in Desert Hot Springs, overlying both the thermal and cold ground-water subbasins, indicated that between 1.6 and 2.0 systems per acre was typical, which is 2.3 to 2.8 times, respectively, the recommended density of 0.7 systems per acre (Desert Water Agency [DWA] and University of California, Riverside [UCR], 1993) pg. 16). The density of systems in the Mission Lakes area, which completely overlie the cold water subbasin, was even higher, at 2.4 systems per acre. Septic systems generally consist of two parts - a septic tank or pit and a seepage pit area. Bacterial digestion in the tank reduces the volume of collected solids, and converts organic matter into simple chemical compounds and septage (DWA and UCR, 1993). After passing through the septic tank, wastewater enters a seepage pit area and migrates downward into the soil. Dispersion areas must provide sufficient surface area to allow wastewater penetration into surrounding soil. If active septic systems are spaced too close together, wastewater maybe unable to penetrate the soil at a rate equivalent to or greater than production. When failure occurs, wastewater rises to ground surface and the bacteriological component causes a nuisance (offensive odors) and public health risks (from disease).

"The fecal matter of humans may contain human enteroviruses, viruses that infect and replicate in the intestinal tract, and parasites, such as <u>Giardia</u>. Members of the enterovirus group include viruses that cause poliomyelitis, aseptic meningitis, myocarditis, and diseases that cause severe central nervous system disorders (DWA and UCR, 1993). Enteroviruses are incapable of living outside of primate cells; thus, their detection is conclusive evidence of relatively recent (less than one year) contamination by human waste. Another group of viruses, coliphage, is also present in human fecal matter because they infect <u>Escherichia coli</u>, a bacterium that is always present in human intestinal tracts. The chemical and physical characteristics of coliphage are similar to enteroviruses, so coliform counts are often used as indicators for the presence of enteroviruses because the methods of detection in water and soil samples are relatively easy and rapid.

"Even if the wastes being processed through the septic tank system undergo complete biological decomposition and the viruses expire, one of the byproducts is nitrate (NO_3). Nitrate does not sorb out of the soil as do the majority of soluted compounds. Nitrate either remains in solution and percolates downward or it can be converted to nitric oxide (NO), nitrous oxide (N_20), and dinitrogen (N_2) by denitrification. Denitrification is the process of degradation of organic carbon by nitrate-respiring micro-organisms in the absence of oxygen."[1]

[1] United States Department of the Interior, U.S. Geological Survey, letter report to John Morgan, General Manager of MSWD, dated June 17, 1996.

The USGS conducted a septic tank groundwater contamination study in the Upper Mojave River Basin which is environmentally similar to the Mission Springs Water District's area. The contamination potential from septic tank systems is illustrated by the following described results of the USGS study.

"Because of the similarity in environment, results from the ground-water contamination potential study recently completed by the USGS in the Upper Mojave River Basin area, southeast of Victorville, are summarized here and similar calculations are presented for the Mission Creek subbasin. Although the lithology and aridity are similar between these two areas, depths to water table around Victorville were considerably shallower, ranging from 112 to 254 ft between 1988-89 in 12 boreholes at 8 residences, with an average depth of 150 ft (Umari and others, 1995, Table 3).

"Rates of vertical movement of a wastewater-wetting front, calculated from three different types of data collected in the Mojave study, ranged from 0.07 ft/d for unconsolidated, poorly sorted older alluvium and moderately to well-consolidated older fan deposits to 1.0 ft/d for unconsolidated silty sand and gravel. Based on those rates, travel time for the wastewater-wetting front to move down 150 ft through the unsaturated zone ranged from about 6 years to 6 months, although the movement rates of wastewater (solute) itself are significantly slower (Umari and others, 1995, pg. 53). Thus, the wetting front from pits constructed prior to the mid-1980s would have reached the water table by the time of the study. There were no elevated fecal coliform counts in any soil samples nor elevated nitrate concentrations in ground water samples collected near the water table; however, monitoring is continuing at two sites (Umari and others, 1995, pg. 79). There were about 46,000 unsewered residences in the study area of the Upper Mojave River Basin. It was estimated that, assuming an average discharge of 70 gal/d/person and 2.5 people per household, annual septic-tank wastewater discharge would have been 9000 acre-ft/yr, equal to about 18% of the estimated natural recharge. Concentration of total nitrogen in the wastewater ranged from 2.2 to 63 mg/L and averaged 46 mg/L (Umari and others, 1995). Water-quality mixing-model simulations made on the basis of the data collected in the Victorville study indicate that predicted nitrate-N concentrations in ground water would exceed 10 mg/L (equivalent to 45 mg/L as NO_3) in less than 20 years under most reasonable assumptions for the various model parameters. Data collected on nitrate-respiring bacterial activity in the unsaturated zone coupled with the model simulations support the existence of a nitrogen-removal process and dilution by vertical mixing with low-nitrate ground water as mechanisms contributing to the non-elevated concentrations of nitrate in the samples collected."[1]

Preliminary analysis of the Mission subbasin are as follows.

"As stated previously, the depth to water ranges from 300 to 550 ft below land surface in the Mission Creek subbasin. Using the range of 0.07 to 1.0 ft/day for the vertical rates of water movement that were measured in the Mojave River Basin study, the travel times for the wastewater wetting front to reach the water table in the Mission Creek subbasin range

[1] United States Department of the Interior, U.S. Geological Survey, letter report to John Morgan, General Manager of MSWD, dated June 17, 1996.

from a minimum of 0.8 years (300 ft/1.0 ft/day/365 d/yr) to a maximum of 21.5 years (550 ft/0.07 ft/d/365/yr). The actual rates of wastewater (solute) will be significantly less than the rates for the wetting front, so the period of time for the wastewater to arrive at the water table will increase accordingly. Because many of the septic tank systems have been in operation for more than 25 years, these travel time estimates suggest that wastewater should be reaching the water table in the Mission Creek subbasin."[1]

It should be noted, however, that the water levels of the hot water side (Desert Hot Springs Groundwater Basin) are much higher (less than 35 feet of depth from the surface) than that of the cold water side (Mission Springs Groundwater Basin). Therefore, the hot water side is more susceptible to contamination from the private sewerage disposal systems in the Mission Springs service area. Contamination of the hot water side is subject to traversing the fault and spreading the contamination into the cold water side groundwater, affecting the District's water supply wells and other users of the regional groundwater basin.

"There are an estimated 5,230 households utilizing septic tank systems in the Desert Hot Springs area. Assuming an average daily septic-tank discharge of 23.4 ft^3 (Umari and others, 1995), annual septic-tank wastewater discharge is estimated to be 1,000 acre-ft/yr [(5,230 households x 23.4 ft^3/d/household x 365 days/yr)/43,560 ft^2/acre)]. Previous estimates of natural recharge to the area were about 6,000 acre-ft/yr (California Department of Water Resources, 1964). Therefore, the estimated septic tank discharge is equal to about 17% of the natural recharge to the area.

"The total nitrogen concentration in septic wastewater is high (22 to 63 mg/L as nitrogen or 90 to 280 mg/L as nitrate) based on results from the Mojave River Basin study (Umari and others, 1995). The above absence of widespread high nitrate concentrations in ground water in the area indicate that either a significant fraction of the nitrogen present in wastewater is no longer present when it mixes into the ground water, or the nitrate is confined to shallow depths below the water table that have not been sampled."[1]

The District has collected information during recent years regarding the District's water supply wells, private hot water wells, individual privately-owned sewerage disposal systems, and the hot and cold water sides of the groundwater basin bisected by the Mission Creek Fault. This information reveals cases where effluent from privately-owned sewerage disposal systems has commingled with the hot water side of the basin at

[1] United States Department of the Interior, U.S. Geological Survey, letter report to John Morgan, General Manager of MSWD, dated June 17, 1996.

locations where the groundwater is shallow or surfacing in the vicinity of Desert Hot Springs. As an example, during the mid-1970s District records indicate that water supply Well Nos. 10, 11, and 21 were abandoned and plugged due to contamination of the well water from privately-owned septic tank wastewater disposal systems in adjacent areas, as evidenced by fecal chloroform, failed bacteriological tests and high nitrate levels. Since 1992, District surveys documented about 100 privately-owned sewerage disposal systems which failed and needed to be pumped from 2 to 16 times per year. The District continues to receive unsolicited comments supportive of constructing sewers.

Problem Definition

From the previous discussion, it is apparent that since there are numerous private sewage disposal systems in the District, at densities greater than the recommended, the potential for groundwater contamination is very high. This potential for groundwater contamination is evidenced by the previously quoted United States Department of the Interior U.S. Geological Survey Study (Appendix A) and a study prepared by Michigan Technological University (Appendix B).

Appendix C documents the concerns of various regulatory agencies including the California Regional Water Quality Control Board (Colorado River Basin; Region 7), the City of Desert Hot Springs, and the Department of Health Services Office of Drinking Water. Appendix D and Plate 1 provides information for septic systems that have been pumped more than once and which are not located in existing assessment districts that have constructed sewerlines. Plate 1 also shows the locations of the areas with a high concentration of septic systems in relationship to the District's water supply wells. As can be seen on Plate 1, the concentrated areas of septic systems lie in upstream locations relative to the District's wells. Hence, there is a high probability that groundwater contamination by the septic systems could migrate and seriously impact the only water supply source for the District.

Solution Alternatives

The best solution and most cost effective method of mitigating the potential for groundwater contamination is to construct sewer pipelines that collect the sewage and transport the wastewater to the existing treatment plant that safely disposes the treated effluent in an approved, regulated manner. Construction of the sewer pipelines would eliminate the risk for groundwater contamination and hence maintain and/or improve the groundwater quality for the various interests utilizing the basin for their water needs.

Other possible solution alternatives, such as well head treatment or groundwater basin cleanup, are a reactive type of response to the problem and could be "too little, too late". Treatment could also change the taste of the water, judged best untreated in a recent water purveyor competition (Appendix E). Should the groundwater basin incur mass contamination, these types of alternatives would be extremely costly and take too long to implement, thus resulting in the loss of a safe water supply for the region.

Consequences of Inaction

As is normally the case in situations such as the one that is occurring within the District's groundwater basins, inaction will only lead to a larger and more devastating problem. Even if future development would not occur, over time, pollution will eventually reach the groundwater. The additional growth that is developing will only accelerate the problem. The local hot springs encourage a large amount of tourism in the area. Contamination of the Hot Springs would severely impact tourism and the business community at large. Contamination of the water supply for the area would have catastrophic consequences.

Study Area Determination

Upon review of Plate 1, it is evident that elimination of the highly concentrated septic systems, especially those which could immediately impact existing water supply wells should be included within the study area. Secondly, areas where septic systems have and are failing should be included in the proposed sewer improvement project area. Finally, since it is more economical to extend pipelines from existing sewered areas, the study area should include areas where sewers can be easily extended. Based upon these criteria, the proposed sewer improvement area (study area) was determined as shown on Plate 1.

As will be discussed in the following chapters, the proposed sewer improvement areas were divided into thirteen sewer service areas. A review of these service areas was made to determine the number of sewered and unsewered parcels and those which were developed and those which are undeveloped. A summary of this information is shown on Table II-1. As can be seen on Table II-1, there are approximately 3,633 developed parcels within the study area that are presently unsewered.

TABLE II-1

MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
SUMMARY OF SERVICE AREA PARCEL CHARACTERISTICS

SERVICE AREA DESIGNATION	TOTAL NO. OF PARCELS			NO. OF SEWERED PARCELS			NO. OF UNSEWERED PARCELS		
	NO. OF PARCELS	NO. OF DEVELOPED PARCELS	NO. OF UNDEVELOPED PARCELS	NO. OF PARCELS	NO. OF DEVELOPED PARCELS	NO. OF UNDEVELOPED PARCELS	NO. OF PARCELS	NO. OF DEVELOPED PARCELS*	NO. OF UNDEVELOPED PARCELS
A	890	690	200	29	23	6	861	667	194
B	268	150	118	0	0	0	268	150	118
C	442	243	199	0	0	0	442	243	199
D	1010	438	572	18	5	13	992	433	559
E	509	257	252	0	0	0	509	257	252
F	1207	491	716	65	26	39	1142	465	677
G	229	76	153	36	23	13	193	53	140
H	410	124	286	46	16	30	364	108	256
I	410	149	261	77	23	54	333	126	207
J	635	305	330	69	23	46	566	282	284
K	262	154	108	0	0	0	262	154	108
L	842	443	399	16	10	6	826	433	393
M	916	262	654	0	0	0	916	262	654
TOTAL	8030	3782	4248	356	149	207	7674	3633	4041

* Number of developed parcels (structures) were determined from Riverside County Assessor Records and aerial photographs. Actual dwelling unit count will be greater when multiple-family structures are determined.

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III. PROJECT AREA CHARACTERISTICS

Political Setting

The study area is situated in eastern Riverside County in southern California and includes lands both within the incorporated City of Desert Hot Springs and adjacent unincorporated lands. The approximately 14-square-mile study area represents just less than 10% of the entire approximately 133-square-mile jurisdiction of Mission Springs Water District.

Physical Environment

The study area lies at the base of the Little San Bernardino Mountains in the north end of the Coachella Valley. Dominant physical characteristics are the mountains, the broad floodplains associated with numerous intermittent drainages and the San Andreas Fault zone. Open space lands managed by the Federal Bureau of Land Management, immediately adjoining the study area and further beyond in Joshua Tree National Park, are beyond the influence of the proposed improvements.

The mountains, drainages and fault noted above are all important features of the local groundwater resource, protection of which is the purpose of the proposed improvements.

The study area overlies two groundwater subbasins that are defined by the Mission Creek Fault. The Mission Creek Subbasin lies to the west of the northwest/southeast trending fault, with the Desert Hot Springs Subbasin to the east. The groundwater resources in each of these subbasins are substantially different, with the Desert Hot Springs basin producing hot mineral waters and the Mission Creek Subbasin producing high-quality water suitable for domestic supply. The hot mineral waters drawn from wells to the east of the fault support the spa industry which is the backbone of the local economy. Wells located to the west of the fault provide the sole source of local domestic water supply.

With its central role as life support and economic support, the local groundwater resource has been the subject of considerable attention in the political, social, and economic development of the local community. The Mission Springs Water District and the previous individual and mutual water companies, as developers of the water resource have demonstrated an ongoing commitment to protection of the local resource. Ongoing monitoring programs and groundwater investigations aimed at gaining a better understanding of local hydrogeology are an important component of water district operations.

Sediments in the area are alluvial fan or stream wash deposits characterized by sands and silts. The thickness of water-bearing sediments in the Mission Springs subbasin is estimated at 800 to 1,000 feet, with the water table situated 300 to 550 feet below ground surface. The Desert Hot Springs basin is much shallower, with water at a depth of about 35 feet. At a few locations within the study area, groundwater surfaces as springs, primarily along the Mission Creek Fault.

The area receives less than five inches of rainfall per year; however, considering rates of evapotranspiration, rainfall represents a negligible source of groundwater recharge. Major sources of recharge are tributary area runoff, subsurface inflow from the surrounding mountains, irrigation return flow and seepage from individual wastewater disposal systems, as well as limited volumes of irrigation runoff. Tributary runoff comes from intermittent drainages flowing from the surrounding mountains - including the Little Morongo and Long Canyon drainages which are tributary to the Desert Hot Springs Subbasin, and the Mission Creek, Big Morongo Canyon and Dry Morongo Wash drainages which are tributary to the Mission Creek Subbasin.

Water movement within the basins is generally to the southeast. Since 1952, a steady, moderate decline in the water levels has been experienced, attributed to groundwater extractions. The Mission Creek Fault has long been understood to act as an effective barrier to groundwater movement between the two subbasins. However, evidence of migration across this barrier has been documented in the area just southeast of the study area. An ongoing study by researchers at Michigan Technological University is pursuing development of a computer model to evaluate the possibility of migration of flows from the Desert Hot Springs Subbasin to the Mission Creek Subbasin (Appendix B).

Septic tank wastewater disposal systems have been in use in the study are for three to four decades, and the residency status of the local community has shifted from a primarily resort destination to a community with year-round residents. In the 1970s, three domestic wells were abandoned due to evidence of excessive coliform, bacteriological and nitrate concentrations. The elevated level of these contaminants was attributed to seepage from septic disposal systems prevalent in the study area. More recently, sampling records for the period 1970 to 1996 evaluated in conjunction with a groundwater study by the United States Geological Survey (USGS) identified increasing nitrate levels in District Well Number 22. The USGS conclusion is that this result suggests that septic-tank wastewater has contaminated the shallow part of the saturated zone. Of particular concern relative to protection of the local groundwater resource is the potential for nitrate contamination because conventional water treatment has no significant effect on nitrate removal. Nitrate is one of the by-products of the biological decomposition that occurs in septic systems. Nitrate binds to the soil and is dissolved into solution as it percolates toward the water table. It is important to note that the quality of water presently extracted from District production wells in the Mission Creek Subbasin is of such high quality that no treatment is required prior to delivery. In contrast, the high mineral content of groundwater in the Desert Hot Springs Subbasin has limited its use for domestic purposes.

There are still more that 5,000 parcels within the study area utilizing individual septic disposal systems overlaying the recharge areas for both the thermal and cold water resources. Investigations conducted as part of the previously-mentioned USGS study indicate that septic systems in the Desert Hot Springs area at a density 2.3 to 2.8 times the recommended density (based on local soil conditions) of 0.7 systems per acre. The USGS estimates that the volume of septic tank discharge is equal to about 17% of the natural recharge to the area. USGS study conclusions regarding septic tank seepage based upon a similar study in the Victorville area suggested that septage should reach the groundwater within about 25 years, and that given the longer history of use in the study are, the absence of widespread nitrogen contamination could be attributed to confinement of nitrate contamination to the shallow depths not sampled due to the substantially deeper location of District wells. Further investigations involving new sampling wells that will sample at varying depths have been recommended.

It should be noted that data provided by the USGS from one of their recent groundwater contamination transport studies in the desert area near Victorville, California indicates that contamination (wastewater wetting front) from privately-owned septic tank wastewater disposal systems traveled downwards towards the groundwater through the upper unsaturated portion of the Mojave River Groundwater Basin at velocities ranging between 0.07 - 1.00 vertical feet per day, depending upon the soil type and characteristics. District water supply well information indicates static water levels in the wells are dropping from about 0.6 ft/yr to about 2.6 ft/yr. Hence, based upon the Mojave River groundwater investigation, it would appear that the wastewater wetting front is moving faster than the drop in the static water levels of the wells.

Demographics

Because the study area for the proposed improvements is largely located within the City of Desert Hot Springs, much of the following information is compiled from local, state and federal tabulations for the City.

Desert Hot Springs began as a resort community with the desert climate and mineral hot springs attracting elderly persons both as permanent residents and as tourists. Because of the moderate cost of homes and proximity to jobs in nearby Palm Springs and the greater Coachella Valley area, there has been a trend toward younger families moving into the area as permanent residents. Based upon 1990 Census block-group level data, the population of the study area is approximately 15,200 (11,670 within the City and 3,530 outside the City). For comparison, the 1996 State Department of Finance population estimate for the City of Desert Hot Springs is 14,850. Also of importance relative to local population is the dramatic change in population on weekends and during the winter, when the influx of tourists can result in a doubling of the population.

Reflecting the dominance of young families, the median age of the study area population is 35 years, with approximately equal proportions of the population over the age of 65 and under the age of 18, about 26% each (1990 Census). Ethnically, the study area population is predominately white (approximately 84%), with approximately 18% of the population considering themselves of Hispanic origin.

The study area includes 8,049 total dwelling units, with 1,826 vacant units (1990 Census). The 1990 Census also indicates that 830, or about 10%, of the dwelling units within the study area are held for occasional use. The largest percentage of the housing stock is detached, single-family units (52%), with about 30% of the housing stock within multiple-unit structures of less than 10 units (29%). Mobile homes make up about 5% of the housing stock.

The median household income in the study area is $21,303 (1990 Census), with more detailed block group-level data indicating median incomes ranging from $14,665 to $45,417 (Plate 2). The 1990 Census reported approximately 800 households (about one in eight) within the study area received public assistance and that approximately 1,000 households (about one in six) had an income below the poverty level.

The State of California Department of Finance population projections data for Riverside County reports a 1990 population of 1,195,400 and projected populations of 1,775,00 and 2,406,700 for the years 2000 and 2010, respectively. These figures represent an average annual growth rate of approximately 4% for the years 1990-2000 and 3% for the years 2000-2010. Applying these growth rates to the 1990 study area population of 15,201 yields estimated 2000 and 2010 populations of about 22,500 and 30,200, respectively.

Demographic information is summarized on Table III-1.

TABLE III-1

MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
SUMMARY OF DEMOGRAPHIC INFORMATION

BLOCK GROUP #	LOCATION	POPULATION	MEDIAN HOUSEHOLD INCOME	HOUSEHOLDS ON PUBLIC ASSISTANCE	MEDIAN AGE	AGE 55 & OLDER	AGE 65 & OLDER	AGE 18 & UNDER	HOUSEHOLDS BELOW POVERTY LEVEL	ETHNICITY (WHITE)	ETHNICITY (HISPANIC)
1	DHS City	1,698	$33,259	31	33	377	246	505	62.0	1,495	197
1	Outside city	81	$45,417	0	50.6	37	19	13	9.0	80	4
1	Total	1779	$33,616	31	34	414	265	518	71	1575	201
2	DHS City	2,523	$14,665	220	31	619	441	659	235.0	1,974	601
2**	Total	2523	$14,665	220	31	619	441	659	235.0	1974	601
3	DHS City	609	$31,823	0	30.1	104	70	205	19.0	510	98
3	Outside city	694	$20,250	17	47.3	294	209	123	18.0	622	88
3	Total	1303	$26,250	17	39	398	279	328	37	1132	186
4	DHS City	4,308	$16,983	278	27	693	468	1,378	424.0	3,453	1,088
4**	Total	4308	$16,983	278	27	693	468	1378	424.0	3453	1088
5	DHS City	306	$15,859	42	61.5	176	129	55	20.0	237	33
5	Outside city	1,049	$18,992	46	35	314	230	294	40.0	869	212
5	Total	1355	$17,388	88	41	490	359	349	60	1106	245
6	DHS City	690	$23,382	55	29.9	154	100	195	29.0	616	95
6**	Total	690	$23,382	55		154	100	195	29.0	616	95
7	DHS City	868	$31,858	26	36.1	242	156	201	26.0	783	103
7	Outside city	40	$39,688	12	40.8	10	3	8	0.0	39	8
7	Total	908	$32,578	38	36	252	159	209	26	822	111
8	DHS City	140	$16,136	0	30.7	20	7	40	11.0	127	15
8	Outside city	790	$18,500	46	63	492	351	78	57.0	746	65
8	Total	930	$18,000	46	58	512	358	118	68	873	80
9	DHS City	526	$31,250	28	31	128	78	172	23.0	422	148
9	Outside city	879	$41,328	0	52.3	409	207	113	40.0	838	43
9	Total	1405	$40,417	28	44	537	285	285	63	1260	191
TOTALS	DHS City	11,668	$20,687	680	31	2,513	1,695	3,410	849.0	9,617	2,378
	Outside city	3,533	$23,039	121	48	1,556	1,019	629	164.0	3,194	420
GRAND TOTAL		15201		801	35	4069	2714	4039	1,013.0	12811	2798

Notes:
**All of block group is within the City of Desert Hot Springs boundary
Population and housing statistics are based on the 100% count base of the census data
Income statistics area based on the sample component of the census data
Ethnicity percentage calculations are subject to rounding errors
The NW corner study area includes a small portion of Tract 445.01. This area is largely uninhabited and therefore not included in the above census data and calculations.

IV. PROPOSED IMPROVEMENTS

The proposed improvements were developed based upon the following process:

- Determination of Projected Wastewater Flows;
- Determination of Design Criteria;
- Development of Preliminary Sewer Layouts and Service Areas;
- Development of Cost Estimating Criteria;
- Determination of Construction and Project Costs.

Projected Wastewater Flow

The objective of this section is to project the quantity of tributary wastewater flow to the proposed facilities in order to determine their sizes. Specifically, the sizes of the facilities that would need to be determined in this report consist of pipelines and treatment plant capacity. The sizes of the pipelines have previously been determined in a Sewer Master Plan dated November, 1991, prepared by NBS/Lowry, Incorporated. The referenced Sewer Master Plan designates the vast majority of the proposed pipelines to be 8-inch in diameter. It should be noted, however, that these pipeline sizes will need to be verified during the design process based upon criteria to be presented in following sections.

The determination of the quantity of the projected wastewater flow is also required to confirm there is adequate treatment capacity at the District's wastewater treatment plant. As previously indicated on Table II-1 within the study area there are approximately 3,633 developed (those with a structure) parcels that are currently unsewered. The 3,633 parcels include buildings with multiple family structures. Therefore, the actual number of equivalent dwelling units (EDUs) will be greater than the number of parcels. The District is presently reviewing the actual number of equivalent dwelling units that are located on the 3,633 developed parcels. Once this review is complete, an accurate estimate of additional wastewater flow can be made.

However, in order to estimate an "order of magnitude" projected increase in wastewater flow at the treatment plant upon completion of the proposed project, the following methodology was used. Based upon local knowledge of the study area, it is estimated that there could be about a third more dwelling units in the study area than there are parcels. Therefore, it is currently estimated that there could be about 4,800 (3,633 x 1.33±) existing unsewered equivalent dwellings units in the study area. Based upon 1990 census data, Table III-1 shows the area population to be 15,201 people with a total number of occupied dwelling units of 7,053 including 830 units held for seasonal use. Hence, there are about 2.2 people/DU. The District uses an average per capita wastewater flow of 100 gpd/capita. Therefore, the average wastewater flow per dwelling unit is estimated to be 220 gpd/DU. However, for planning purposes, the District uses a wastewater generation factor of 240 gpd/DU. Based upon the estimated number of new connections of existing dwelling units and a wastewater generation factor of 240 gpd/DU, a flow increase at the treatment plant of about 1,152,000 gpd can be expected.

The District is currently in the process of expanding their Horton Wastewater Treatment Plant, to which 100% of the study area is tributary, from 1.0 mgd to 2.0 mgd. A report entitled "Mission Springs Water District Project Report For The Expansion of The Horton Wastewater Treatment Plant from 1.0 mgd to 2.0 mgd" dated November 10, 1994 prepared by NBS/Lowry, Incorporated indicates the average daily flow to the Horton Facility to be 0.768 mgd. Therefore, upon completion of the treatment plant expansion there would appear to be sufficient capacity for connection of the dwelling units which are a part of this project.

Design Criteria

Wastewater System design criteria basically falls into one of four wastewater facility components: (1) collection; (2) transportation; (3) treatment; and (4) effluent disposal. Specific design criteria applicable to this project are for collection and transportation facilities. Therefore, assumptions applicable to these two components are discussed below. It should be noted that the following criteria is from the Mission Springs Water District's Standards for Sanitary Sewers dated December, 1972.

Wastewater Flows

The flow used for the design capacity for sewers and sewage lift stations shall be the "computed peak flow", which shall be determined on the basis of projected land use and average daily per capita flow. The average daily per capita flow for the Mission Springs Water District is 100 gallons per capita per day.

Sewer flows shall be computed from projected land use and population density over the area tributary to the sewer reach under consideration. The following peaking factors shall be applied to the sewer flows as determined above:

Average Flow (mgd)	Peak Factor
0.00 - 0.01	4.0
0.05	3.4
0.10	3.2
0.20	3.0
0.30	2.8
0.50	2.7
0.80	2.6
1.00	2.5
1.50	2.4
2.50	2.3
4.00	2.2
6.00	2.1
10.00	2.0
15.00	1.9
30.00	1.8

Design flows from commercial, industrial, hotels, motels, campgrounds, etc. are determined in consultation with the District.

Collection Sewers

Collection sewers in this report are considered to be pipes less than 10 inches in diameter. These pipes should be designed under peak conditions to be flowing one-half full. Sewer diameters are determined by means of Manning's formula, using a roughness coefficient of 0.013.

Trunk Sewers

The capacity to be provided in each section of a trunk sewer is based on the peak rate of flow calculated for the area tributary to that section. For each area this rate is the summation of peak domestic, commercial, and industrial rates plus storm water inflow which is known as the peak wet weather flow.

Trunk sewer lines are sized on the principle of conducting wastewater at a minimum velocity of 2 ft/sec when flowing 50 percent full, and are sized to carry peak hourly flows without surcharge. A mean pipe friction coefficient of roughness of n = 0.013 is used for tentative new pipe sizing.

When possible, the pipelines should be designed to flow by gravity. Pump stations should be installed only when existing topography prevents gravity flow or to avoid excessive trench depths.

A summary of design criteria for gravity flow sewer pipelines as follows:

The preliminary hydraulic sizing of gravity sewers should be based on Manning's formula, with a roughness coefficient (n) equals to 0.013. A safety factor should be included in the design of all collection lines to account for errors due to the variability of the initial approximation of flow and partial clogging of the sewer. The method of accounting for the inherent variables is to limit the depth of flow. The following list shows the design depth of flow ratio:

Pipe Diameter (In Inches)	Ratio of Depth of Sewage Flow to Diameter of Sewer
8	0.50
10 and greater	0.75

Since low velocities in the sewers will cause deposition of solids and result in sulfide problems, minimum slopes should be set to maintain a flow velocity of not less than 2 feet per second during maximum flows. The following is a list of the minimum allowable slopes:

Pipe Diameter (In Inches)	Minimum Slope (Feet/100 feet)
8	.40
10	.29
12	.22
15	.16
18	.12
21	.10
24 and greater	.08

Manholes shall be located at all junctions, all changes in direction, and all changes in pipe size. Where the distance between manholes required for the foregoing reasons exceeds 350 feet, good judgment should be used in placing intermediate manholes at points of probable sewer intersections, or lacking other reasons, at approximately equal intervals. In general, the maximum of 350 feet should be observed.

Vitrified clay pipe material, unless otherwise indicated, is assumed to be used in future construction for purposes of comparative cost evaluation. However, final recommendation of any specific sewer pipe material will be made at the time of final design.

Initially, some of the new trunks or interceptors may not have sufficient velocity (greater than 2 fps) to prevent deposition of solids. These lines may require special preventative maintenance of other control procedures for the first few years to prevent the formation of hydrogen sulfide and subsequent damage to the pipe.

Inverted Siphons

The purpose of an inverted siphon is to carry the flow under an obstruction such as a stream or depressed highway and to regain as much elevation as possible after the obstruction has been passed. Self-cleaning velocities (2 to 3 fps) should be obtained at least once a day, even during the early years of operation. To insure adequate minimum velocities, it may be necessary to use multiple lines. Flow in these lines can be regulated by control structures such as overflow weirs. Inverted siphons may require cleaning more often than gravity sewers.

A conservative Hazen-Williams C of 100 (Manning n from 0.014 to 0.018) should be used to calculate head loss. Material that would be considered for siphons include VCP and concrete lined ductile iron pipe. Final selection of pipe materials would be made during the detailed design phase.

Force Mains

Force mains are designed to flow full with minimum velocities required to prevent deposition of suspended solids. Velocities normally fall within a range of from 3 to 5 fps. A velocity of 2 fps is considered to be sufficient to prevent settling of solids, but velocities of from 2.5 to 3 fps are required to resuspend those which already have accumulated in the force main. If flushing velocities are attained once or twice a day, excessive deposits are not likely to occur.

Material that would be considered for force mains is mortar-lined ductile iron pipe. Final selection of pipe materials would be made during the detailed design phase.

Diameters were calculated using the Hazen-Williams formula with a coefficient of roughness equal to 110.

Pump Stations

Pump stations should be planned to have three units of equal size. One or two units could operate at one time with the third unit acting as a standby in case one of the primary units fail. Two pumping units operating at the same time should be sized to handle the peak hourly flow. Large pump stations should be designed for staged construction where necessary. Large pump stations provide for complete separation of wet and dry wells with easy access to both. The smaller pump stations are assumed to be a packaged unit type that are installed below grade and access is made through a manhole structure. In all cases, standby drives or power units will be provided in cases where bypassing cannot be allowed around the pump station.

Preliminary Sewer Layouts and Service Areas

In order to determine preliminary sewer layouts and service areas, tributary wastewater flow areas had to be developed. The tributary sewage flow areas (service areas) shown on Plate 3 were developed based on two criteria. First, in undeveloped regions, tributary sewage flow areas were determined from Riverside County Flood Control Topographic Maps (1 inch equals 400 feet). Thus, only generalized tributary areas could be determined due to the accuracy of the maps. The exact drainage boundaries may vary when future engineering plans are developed. Therefore, in the undeveloped areas, the wastewater was assumed to flow based on the natural drainage patterns of the existing topography.

In the developed areas of the study area, the tributary sewage flow areas were based on the layout of the existing collection system. These areas are also approximate since many areas adjacent to existing sewer lines may be able to drain differently than originally assumed.

To permit an analysis of the finances necessary to construct new sewers, preliminary layouts or designs of the proposed facilities were made for each service area. These layouts are preliminary. Many factors may change with a more focused design engineering report. Hence, it is expected that relocation and/or resizing of some of the facilities may be required at a later date as a result of detailed engineering analysis during the preparation of construction drawings and specifications.

The proposed sewage pump station (service areas L & M) should be designed so ready expansion can occur when necessary. Thus, mechanical equipment may be installed at various stages of development. In general, large trunk and interceptor sewers should be designed for long-term requirements.

Gravity flow pipelines should be designed with the latest pipe materials providing rubber or plastic ring joints to assure a permanent water tightness. Vitrified clay pipe material, unless otherwise indicated, is assumed to be used in future construction of gravity pipelines for purposes of comparative cost evaluation. Final recommendation of any specific sewer pipe material, however, will be made at the time of final design.

Based upon the locations of the existing sewerlines, capital improvement projects proposed by the District, and the tributary topographical areas previously discussed, the study area was divided into thirteen sewer service areas. These thirteen service areas are shown on Plates 3 through 9.

Cost Estimation Criteria

Proper and consistent cost estimation is essential in determining the feasibility of a proposed project. Construction costs for all plans are based upon preliminary layouts of proposed facilities. For estimating purposes, the prices of comparative work were obtained from a variety of available sources of current information such as recent project bid data, literature publications, telephone and personal contacts with manufacturers and suppliers of equipment.

In reviewing the cost estimates presented herein for the proposed projects, it is essential to realize that changes in estimates during final design will alter the totals to some degree, and that future changes in the cost of material, labor, and equipment will certainly cause comparable changes in the cost summarized herein. Some of the specific cost estimating factors are discussed in the following subsections. The cost data presented herein is comprised of two primary components: estimated construction costs and estimated project costs.

Estimated Construction Costs

The basic estimated construction costs apply to preliminary design and layout of the major facilities required for the proposed facilities. In such layouts, detailed construction drawings and specifications are not required. Instead, reasonably close approximations of the size, location, route and cost of the various facilities were developed in sufficient detail to permit cost estimates to be made. Estimated construction costs were based upon what one might expect of a "low bid" price to construct the required improvements.

Estimated Project Costs

In addition to construction costs which are commonly referred to as "hard costs", incidental costs, commonly referred to as "soft costs", which are necessary during the planning, design, and construction of the project, must be included to obtain an overall or total project cost. Project costs include construction costs, construction contingencies, design engineering, surveying and mapping, geotechnical, legal and administration, inspection, environmental documentation (excluding an EIR and/or EIS) assessment engineering and finance. The total project cost in this report has been determined to be 1.45 times the estimated construction cost plus land acquisition costs. It should be noted that the total project costs include public right-of-way portions only (i.e. sewermain to

R-O-W line). Private side costs (i.e. abandonment of septic system and construction of the lateral from the R-O-W line to the structure) are not included. These private side costs are estimated to be $1,300-$2,100 per parcel. Additionally, sewer connection charges which are currently at $1,910/EDU are not included. The connection charge is comprised of two components: (1) wastewater treatment facility expansion (83%); and (2) interceptor line installation (17%).

A contingency allowance is made for uncertainties associated with preliminary design. Such factors as differences in final lengths and exact topography associated with the pipelines, unknown underground substructures, and changes made during construction, are a few of the many items which may increase contract costs and for which some allowance must be made in preliminary design estimates.

The cost of engineering services for major construction projects may include special investigations, predesign reports, surveys, foundation explorations, location of interfering utilities, detailed design, preparation of contract drawings and specifications, construction inspection, materials testing, and final inspection of the completed work. Depending on the size and type of the project, total engineering costs may range from 7 to 20 percent of the contract cost. The lower percentage applies to large projects and those which do not require a large amount of preliminary investigation. The higher percentage applies to smaller projects or to those which require a relatively large amount of preliminary work.

Legal costs would include items such as assistance in R-O-W acquisition, specification review, construction contract review and approval, coordination during construction, etc. Administrative costs would be those associated with contract administration, progress payments to the Contractor, change orders, notice of completion, etc. Assessment engineering and financing costs are those associated with securing funds to pay for the proposed improvements and determination of equitable method(s) of sharing the costs (i.e. costs to benefits). Environmental documentation includes those basic services necessary to obtain environmental clearance to perform the construction. However, extensive environmental services such as those that would be necessary for an environmental impact report and/or environmental impact statement are not included.

Construction costs can be expected to undergo long-term changes in keeping with corresponding changes in the national economy. The best available barometer of these changes is the Engineering News-Record Construction Cost Index (ENR-CCI), which is computed from prices of construction materials and labor. For purposes of this report, cost data are based on an ENR-CCI Los Angeles of 6519 (September, 1996). By reference to the ENR-CCI at any future date, the estimated construction costs included herein can be adjusted to match the current costs at that future date. This allows the estimated costs to be updated to the time when actual construction is undertaken.

Cost Estimates

Total project costs for this report were derived based upon two components. The first component is costs relating to the collection system improvements within the thirteen sewer service areas (Plate 3). The second component is costs relating to the District's trunk sewer capital improvement projects that are required to provide service to several of the sewer improvement areas (Plate 3).

Construction and project costs were determined for each of the thirteen service areas of the first cost-estimating component and were based upon preliminary layouts of the proposed sewers in these service areas. Cost estimating data for construction was based upon the unit construction cost figures provided in Appendix F. Using the unit construction cost in Appendix F and the estimated quantity of sewer main and laterals, total estimated construction and project costs were determined for each of the thirteen service areas. Table IV-1 provides a summary of the total estimated construction and project costs for the thirteen proposed sewer areas.

TABLE IV-1

MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
PRELIMINARY PROJECT COST ESTIMATE

SERVICE AREA DESIGNATION	TOTAL SEWER MAIN PIPELINE LENGTH (LF)	ESTIMATED SEWER MAIN CONSTRUCTION COST [1,2]	NUMBER OF UNSEWERED PARCELS [3]	ESTIMATED SEWER LATERAL CONSTRUCTION COST [2,4]	TOTAL ESTIMATED CONSTRUCTION COST [2]	TOTAL ESTIMATED PROJECT COST [2,5]
A	46,400	$2,710,000	861	$990,000	$3,700,000	$5,370,000
B	8,500	$500,000	268	$310,000	$810,000	$1,170,000
C	17,800	$1,040,000	442	$510,000	$1,550,000	$2,250,000
D	47,700	$2,780,000	992	$1,150,000	$3,930,000	$5,700,000
E	27,400	$1,600,000	509	$590,000	$2,190,000	$3,180,000
F	44,200	$2,580,000	1142	$1,320,000	$3,900,000	$5,660,000
G	17,900	$1,040,000	193	$220,000	$1,260,000	$1,830,000
H	17,700	$1,030,000	364	$420,000	$1,450,000	$2,100,000
I	13,400	$780,000	333	$380,000	$1,160,000	$1,680,000
J	25,900	$1,510,000	566	$650,000	$2,160,000	$3,130,000
K	14,500	$850,000	262	$300,000	$1,150,000	$1,670,000
L	34,400	$2,410,000	826	$950,000	$3,360,000	$4,870,000
M	42,400	$2,470,000	916	$1,060,000	$3,530,000	$5,120,000
TOTALS	358,200	$21,300,000	7674	$8,850,000	$30,150,000	$43,730,000
CAPITAL IMPROVEMENT PLAN PIPELINES [8]						$2,356,000
TOTAL ESTIMATED SEWER IMPROVEMENT PROJECT COST [9]						$46,086,000

1 Cost of sewermain including manholes, wyes and mainline pavement removal, replacement and cap (refer to Appendix F for details).
2 Cost rounded to nearest $10,000
3 All parcels contiguous to existing sewermain within the service area were assumed to have existing sewer laterals. The remaining parcels within the service area whether undeveloped or developed were assumed to require a lateral to be constructed (refer to Table II-1 for details).
4 Cost of sewer laterals including lateral pavement removal, replacement, and cap (refer to Appendix F for details).
5 Project cost is 1.45 times construction cost. Project cost includes: construction cost, construction contingencies, engineering, legal, assessment engineering, geotechnical services, inspection, finance and District administration. Costs are based upon Engineering News Record (ENR) Construction Cost Index Los Angeles September, 1996 (ENR 6519). Right-of-way and land acquisition costs are not included.
6 Includes $200,000 and $200,000 allowances for construction of a sewage lift station and force main respectively.
7 Costs include public right of way portion only (i.e. sewermain to R-O-W line). Private side costs (i.e. abandonment of septic system and construction of the lateral from the R-O-W line to the structure) are not included. These private side costs are estimated to be $1,300-$2,100 per parcel.
8 Refer to Table IV-2
9 Sewer connection charges which are currently at $1,910/EDU are not included. The connection charge is comprised of two components: (1) wastewater treatment facility expansion (83%); and (2) interceptor line installation (17%).

The second cost-estimating component consists of District capital improvement projects (Plate 3) that are required to provide sewer service to several of the above mentioned sewer service areas. These projects are itemized on Table IV-2 along with their estimated project costs.

TABLE IV-2

MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
CAPITAL IMPROVEMENT PLAN PIPELINES
PRELIMINARY PROJECT COST ESTIMATE

ITEM NO.	PROJECT DESCRIPTION	TOTAL ESTIMATED PROJECT COST [1]
1	Two Bunch Palms Trail sewer extension - 1,950 linear feet of 8" vitrified clay pipe on Two Bunch Palms Trail from LaMesa to West Drive to serve the new elementary school	$220,000
2	Project #37 sewer interceptor - 2,900 linear feet of 8" vitrified clay pipe and 10,900 linear feet of 12" vitrified clay pipe to provide sewer service into the Corsini School area	$923,000
3	Project #37A addition - 2,500 linear feet of 8" vitrified clay pipe from Project #37 north on Mountain View Road	$136,000
4	Project #37B addition - 1,600 linear feet of 8" vitrified clay pipe from Project #37 north into the Miracle Hill area	$88,000
5	Project #37C addition - 3,300 linear feet of 8" vitrified clay pipe from Verbena Drive north and east into the Two Bunch Palms Trail area north of Miracle Hill	$289,000
6	Project #S2 sewer interceptor - 7,900 linear feet of 8" vitrified clay pipe from Eighth Street and West Drive north. Installation in West Drive, Mission Lakes Boulevard, Santa Cruz Road and Casa Grande Drive	$700,000
	TOTAL ESTIMATED PROJECT COST	$2,356,000

[1] Mission Springs Water District Annual Budget for fiscal year 1996-97.

V. PROJECT BENEFITS

From the background information previously presented, it is evident that a wastewater system improvement project is required that will significantly reduce the potential of and hopefully eliminate a groundwater contamination event. When the District expands it's Alan L. Horton Wastewater Treatment Plant from 1,000,000 gallons per day to 2,000,000 gallons per day, one of the primary benefits of the expansion will be to provide a safe and reliable facility to treat the area's wastewater.

As previously presented, the groundwater basin on the northeast side of the Mission Creek Fault (Plate 1) generally contains hot water at a depth of about 35-75 feet, or less in certain locations near the fault. The primary business activity and economic base of the community within the District's area centers upon commercial spas, mineral baths, hotels, motels, etc. which depend upon utilizing privately-owned hot water vertical wells for source of supply. The groundwater basin on the southwest side of the fault generally contains cold water at a depth of about 300-550 feet. The District's sole source of water supply for its domestic/fire protection system is from its pristine cold water vertical deepwells. Further, in near future, Colorado River water will also be available through a turnout in the aqueduct to resupply the Mission Creek Subbasin. Therefore, protection of the groundwater does not only protect the economic base of the community but also the only source of water supply for the District and surrounding agencies.

Construction of the proposed sewer project is planned to mitigate the threat of groundwater contamination, by sewering the 3,633 presently unsewered developed parcels. This proposed sewerline extension project will: (1) benefit the City's economic base mainly comprised of existing and future commercial spas, mineral baths, hotels, and motel businesses by protecting the quality of the hot side groundwater; (2) benefit the existing and future homeowners and businesses by eliminating the need for expensive, repetitive pumping and/or replacement of individual, privately-owned failing sewerage disposal systems; (3) benefit all existing and future residential and business customers connected to the District's domestic/fire protection system by protecting the quality of the cold side groundwater; and (4) benefit other existing and future downstream users of the regional groundwater basin.

In summary, a sewer improvement project must be implemented that will accomplish the District's goal of mitigating the potential of groundwater contamination. The successful implementation of such an improvement project will benefit the community at large by maintaining the area's groundwater quality thus eliminating any catastrophic public health event.

VI. IMPLEMENTATION, PRIORITIES AND FUNDING

Implementation

Procedure

The items to be completed subsequent to this Project Report, necessary to implement the proposed phased sewer improvement project include:

1. Make applications for funding assistance.
2. Continue public participation.
3. Obtain environmental compliance.
4. Obtain necessary permits and easements.
5. Finalize funding programs and financial plan.
6. Establish final phased-construction priorities.
7. Complete final design plans and specifications.
8. Perform project construction.

Regulatory Compliance

During implementation of the proposed sewer improvement project, compliance is required with the regulations and policies of the California Regional Water Quality Control Board, the California Department of Health Services Office of Drinking Water, the Riverside County Environmental Health Department, and of the Federal, State, and/or County funding agencies involved in the final funding program(s), including California Environmental Quality Act (CEQA) and National Environmental Protection Act (NEPA) documentation as required.

Priorities

Implementation Plans

The implementation plan may need to be adjusted subsequent to further investigations and determinations including funding eligibility/availability, public participation/input, groundwater contamination studies, growth areas, development densities, septic system failure rates, environmental documentation, etc. — all of which can affect final financing plans and/or construction time schedules for all or any portion of the proposed sewer improvement project.

Funding

As shown on Plate 3, the proposed sewer project is phased into service areas A through M, plus trunk mains named Extension 37, Addition A, Addition B, Addition C, Extension S-2, and Two Bunch Palms Trail.

The District's and Webb's staff jointly determined the unit construction cost-estimating data for the sewermains and sewer laterals. This data is summarized in Appendix E. Sewermain unit construction costs total $58.30 per lineal foot (for 8" VCP), and lateral unit construction costs total $1,155 per each (4" VCP). Construction costs include VCP mains and laterals, pavement work, manholes, mobilization, traffic control, shoring and bracing, special construction items such as sand-cement slurry backfill under "tunneled" existing concrete facilities (i.e. curb and gutter), existing landscape and facility repair and/or replacement, ductile iron sewer pipe (where required), concrete encasement, etc.

Utilizing the unit construction costs developed in Appendix E, Table IV-1 subtitled Preliminary Project Cost Estimate summarizes for each service area A through M the sewermain length, sewermain construction cost, number of unsewered parcels, sewer lateral construction cost from main to R-O-W, total construction cost, and total estimated project cost. Project cost is 1.45 times construction cost to provide funding for construction contingencies, engineering, legal, assessment engineering, geotechnical services, inspection, finance, and District administration. Construction costs are based upon the ENR-LA index of 6519 (September, 1996). Private on-site costs for abandonment of septic system and construction of the lateral from the R-O-W line to the structure are not included. The District's sewer connection charge is also not included. The estimated project cost for the proposed sewer collection facilities for service areas A through M totals $43,730,000, for a total sewermain pipeline length of 358,200 lineal feet, including appurtenances.

Some years ago, final design-level plans were prepared for the District detailing the proposed sewer collection facilities for the service area A (Mission Lakes) portion of the entire project. During December 1996, for purposes of an independent check of current sewer construction costs in the Desert Hot Springs area, a qualified local sewer contractor priced the construction of the sewer collection facilities proposed for Mission Lakes, based upon the detailed plans previously prepared. The local sewer contractor's price was within $40,000 of the total estimated construction cost of $3,700,000 for Service Area A, thus indicating basic confirmation of the construction cost estimates utilized herein.

Regarding the sewer trunk mains named Extension S-2 and 37, Additions A, B, C, and Two Bunch Palms Trail, Table IV-2 summarizes for each facility the sewermain length and size, and estimated project costs. The estimated project cost for the proposed trunk sewermains totals $2,356,000 for a total trunk main length of 31,050 lineal feet, including appurtenances.

The overall estimated project cost for the proposed sewer collection facilities for service areas A through M including the proposed six (6) trunk sewermains totals $46,086,000 for a total sewermain pipeline length of 389,250 lineal feet, including appurtenances.

During the second half of 1996 the District borrowed $5,000,000 via an installment sale agreement. The purpose of the loan was to provide funding for: (1) the advance construction of these six (6) trunk sewermains; (2) reimbursement to the District for sewer expenses regarding increasing capacity of the existing Horton Wastewater Treatment Plant; (3) lining existing sewer mains in the Desert Crest Country Club area; (4) sewer hookup program development within existing Assessment District No.'s 1, 3, 4 and 7; (5) reserve for purchasing 90 acres for siting the proposed regional Wastewater Treatment Plant in the North Palm Springs area, and; (6) funding required accounts and costs appurtenant to the issuance and execution of the installment sale agreement. Table VI-1 lists by line-item the description and estimated project cost for each scheduled disbursement by the trustee from the installment sale trust account totaling $5,000,000. The District is presently underway to complete the various items of work listed in Table VI-1, with completion planned for some of the items in advance of processing the

TABLE VI-1

MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
DESCRIPTION AND ESTIMATED PROJECT COSTS
INSTALLMENT SALE AGREEMENT

LINE ITEM (#)	SCHEDULED DISBURSEMENTS FROM INSTALLMENT SALE AGREEMENT (1996) (Description)	TOTAL ESTIMATED PROJECT COST[1] ($)
1	Construct Trunk Sewermain Extension 37	$ 923,000
2	Construct Trunk Sewermain Addition A	$ 136,000
3	Construct Trunk Sewermain Addition B	$ 88,000
4	Construct Trunk Sewermain Addition C	$ 289,000
5	Construct Trunk Sewermain Extension S-2	$ 700,000
6	Construct Trunk Sewermain Two Bunch Palms	$ 220,000
7	Reimburse District for SRF Loan for Increased WWTP Capacity	$ 951,676
8	Reimburse District for Engineering for Increased WWTP Capacity	$ 270,000
9	Reimburse District for Lining Existing Main, Desert Crest Country Club	$ 545,000
10	Existing Assessment Districts 1, 3, 4 & 7. Add remaining unconnected developed properties to the sewer collection system	$ 79,800
11	Reserve for Purchase 90 Acres for Regional WWTP	$ 335,000
12	Construction Contingency and Costs of Securing Loan	$ 462,524
	TOTAL	$ 5,000,000

[1] District's estimated costs.

assessment district procedures involved with the construction of sewer collection facilities for service areas A through M (Plate 3). Those portions of the disbursement amounts made under the District's installment sale agreement, then determined to benefit one or more of the sewer service areas A through M, are planned to be added into the total project cost of each respective assessment district in proportion to benefit received; thereby reimbursing the District accordingly for such eligible costs.

Implementation Plans

The District is tentatively planning to implement phased-construction of the proposed sewer project; initially constructing the six (6) sewer trunk mains, followed by combining the project collection facility work for the 13 service areas A through M into individual or combined assessment districts. This tentative plan is subject to future adjustments due to the results of further considerations including the District's Board policies, funding, public input, technical, environmental, and other issues.

Preliminary Financial Analysis for the Project

The District is tentatively planning to implement phased-construction of the proposed sewer project; initially constructing the six (6) sewer trunk mains, followed by combining the project collection facility work for the 13 service areas A through M into individual or combined assessment districts. This tentative plan is subject to future adjustments due to the results of further considerations including the District's board policies, funding, public input, technical, environmental, and other issues.

The following analysis is performed to obtain an estimate of costs per unsewered parcel to evaluate financial feasibility. The total project costs were spread on an unsewered parcel basis and will require further analysis as each assessment district is formed. Presently only Service Area "A" has had an analysis completed that identifies equivalent dwelling units and other uses on which the costs were spread. The future more in-depth analysis will identify the land uses or potential land uses within each service area. A daily residential waste water discharge quantity will be used as a base unit to determine an equivalent dwelling unit amount for all other land uses (those other than single family residential). These other land uses include multifamily, commercial, industrial, institutional and recreational.

As can be seen on Table IV-1 Service Area "G", has a very low number of parcels, (193), with a fairly high construction cost $1,830,000. Upon review of Plate No. 8, it can be seen that a substantially large portion of this service area has not been sub-divided and consists of some larger parcels. When an analysis is performed for the potential land use of those large undivided parcels, the unsewered parcel count, or ultimately the equivalent dwelling units, will be increased significantly. The same type of analysis will be necessary for Service Area "J", "K" and "M". There is also a school and the Riverside County Housing Authority located near the terminus of Extension 37. In addition, there are some large areas beyond the boundaries of the proposed service areas that will eventually be served by Extension 37, and Sewer Additions "A" and "B". At the present time, the entire costs of the trunk sewer facilities have been assigned to the aforementioned service areas which currently do not include potential service areas outside the proposed.

It should be noted that the Mission Springs Water District has a sewer connection fee that will be charged in addition to any assessment district costs and also there will be an on-site cost for the abandonment of the existing septic tank system and connection to the proposed sanitary sewer system.

The following is an analysis that provides estimated costs per parcel for individual and combined sewer service areas. It should be noted that these cost estimates do not take into consideration any cost reduction that would occur if grants can be obtained.

Service Area "A" (Plate 5)

- Total Number of Equivalent Dwelling Units (EDU's) are from Actual Counts Provided by the Staff of Mission Springs Water District and are calculated as follows:

  168 Condominiums x 0.75 = 126 Equivalent Dwelling Units (EDU's)
  901 Single Family Lots = 901 Equivalent Dwelling Units
  126 EDU's + 901 EDU's = 1,027 total EDU's

- Total Estimated Project Costs = $5,370,000

  - Assessment Calculation/DU

    $$\frac{\$5{,}370{,}000 \text{ Project Costs}}{1{,}027 \text{ EDU's}} = \$5{,}228.82/\text{EDU}$$

  - Annual Costs per EDU Based on a Bond Term for 20 Years at 7.5 Percent is $98.10 per $1,000 of Assessment

    $$\frac{\$5{,}228.82}{\$1{,}000} \times \$98.10 = \$512.95$$

Service Area "B" and "C" (Plate 6)

- Total Estimated Project Costs

Area "B"	$ 1,170,000
Area "C"	$ 2,250,000
Line S-2	$ 700,000
	$ 4,120,000

- Total Number of Unsewered Parcels from Table II-1

Area "B"	268
Area "C"	442
Total	710

- Total Cost Per Unsewered Parcel

$$\frac{\$4,120,000}{710} = \$5,802.82$$

- Annual Cost Per Unsewered Parcel Based on Bond Term of 20 Years at 7.5 Percent is $98.10 Per $1,000 of Assessments

$$\frac{\$5,802.82}{1,000.00} = \$98.10 = \$569.25\text{/per year}$$

Service Area "D" and "E" (Plate 6)

- Total Estimated Project Costs

Area "D"	$ 5,700,000
Area "E"	$ 3,180,000
	$ 8,880,000

- Total Number of Unsewered Parcels from Table II-1

Area "D"	992
Area "E"	509
Total	1,501

- Total Cost Per Unsewered Parcel

$$\frac{\$8,880,000}{1,501} = \$5,916.06$$

- Annual Cost Per Unsewered Parcel Based on Bond Term of 20 Years at 7.5 Percent is $98.10 Per $1,000 of Assessments

$$\frac{\$5,916.06}{1,000.00} = \$98.10 = \$580.37\text{/per year}$$

Service Area "F" (Plate 7)

- Total Estimated Project Costs

  Area "F" $ 5,660,000

- Total Number of Unsewered Parcels from Table II-1

  Area "F" 1,142

- Total Cost Per Unsewered Parcel

$$\frac{\$5,660,000}{1,142} = \$4,956.22$$

- Annual Cost Per Unsewered Parcel Based on Bond Term of 20 Years at 7.5 Percent is $98.10 Per $1,000 of Assessments

$$\frac{\$4,956.22}{1,000.00} = \$98.10 = \$486.20\text{/per year}$$

Service Area "G" (Plate 8)

- Total Estimated Project Costs

  Area "G" $ 1,830,000

- Total Number of Unsewered Parcels from Table II-1

  Area "G" 193

- Total Cost Per Unsewered Parcel

$$\frac{\$1,830,000}{193} = \$9,481.86$$

- Annual Cost Per Unsewered Parcel Based on Bond Term of 20 Years at 7.5 Percent is $98.10 Per $1,000 of Assessments

$$\frac{\$9,481.86}{1,000.00} = \$98.10 = \$930.17/\text{per year}$$

Service Area "H" (Plate 8)

- Total Estimated Project Cost

Area "H"	$ 2,100,000
Addition "C"	$ 289,000
Total	$ 2,389,000

- Total Number of Unsewered Parcels from Table II-1

Area "H" 364

- Total Cost Per Unsewered Parcel

$$\frac{\$2,389,000}{364} = \$6,563.18$$

- Annual Costs Per Unsewered Parcel Based on Bond Term of 20 Years at 7.5 Percent is $98.10 Per $1,000 of Assessments

$$\frac{\$6,563.18}{1,000.00} = \$98.10 = \$643.85/\text{per year}$$

Service Area "I", "J", and "K" (Plate 8)

- Total Estimated Project Cost

Area "I"	$ 1,680,000
Area "J"	$ 3,130,000
Area "K"	$ 1,670,000
Sewer Extension 37	$ 923,000
Addition "A"	$ 136,000
Addition "B"	$ 88,000
Total	$ 7,627,000

- Total Number of Unsewered Parcels from Table II-1

Area "I"	333
Area "J"	566
Area "K"	262
Total	1,161

- Annual Costs per Unsewered Parcel Based on a Bond Term of 20 Years at 7.5 Percent is $98.10 per 1,000 of Assessment

$$\frac{\$7,627,000}{1,161} = \$6,569.34$$

- Annual Costs Per Unsewered Parcel Based on Bond Term of 20 Years at 7.5 Percent is $98.10 Per $1,000 of Assessments

$$\frac{\$6,569.34}{1,000.00} = \$98.10 = \$644.45\text{/per year}$$

Service Area "L" and "M" (Plate 9)

- Total Estimated Project Costs

Area "L"	$ 4,870,000
Area "M"	$ 5,120,000
Total	$ 9,990,000

- Total Number of Unsewered Parcels from Table II-1

Area "L"	826
Area "M"	916
Total	1,742

- Total Costs per Unsewered Parcel

$$\frac{\$9,990,000}{1,742} = \$5,734.79$$

- Annual Costs Per Unsewered Parcel Based on Bond Term of 20 Years at 7.5 Percent is $98.10 Per $1,000 of Assessments

$$\frac{\$5,734.79}{1,000.00} = \$98.10 = \$562.58/\text{per year}$$

A summary of the forgoing costs is provided on Table VI-2. It should be noted that these costs are estimates only. The final costs will be based upon actual construction bids, incidental costs, and bond rates. Further, the following observations are noted.

- Service Area "B" and "C" include the total costs of line S-2. This line may be prorated to other service areas depending upon further analysis.

- Service Area "G" has only 193 parcels and a cost of $1,830,000. This parcel count is a bit misleading as there are some very large undeveloped properties within the Service Area and subsequent development will increase the number of unsewered parcels in this Service Area substantially.

- Service "H" includes the total cost of Addition "C". This line, more than likely will be prorated to other areas that are presently unsewered and are not part of this study.

TABLE VI-2

MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
PROJECT COST SUMMARY PER PARCEL[1, 2, 3, 14]

SEWER SERVICE AREA[4]	ESTIMATED PROJECT COST PER PARCEL[5, 6]	ESTIMATED ANNUAL DEBT SERVICE PER PARCEL[7, 8]
A	$5,230[9]	$515[9]
B, C[10]	$5,810	$570
D, E	$5,920	$585
F	$4,960	$490
G	$9,490[11]	$935
H[12]	$6,570	$645
I, J, K[13]	$6,570	$645
L, M	$5,740	$565

1 The District is tentatively planning to implement phased-construction of the proposed sewer project; initially constructing the six (6) 1996 capital improvement projects (Plate 3), followed by combining the project collection facility work for the 13 service areas A through M (Plate 3) into individual or combined assessment districts. This tentative plan, including the combination of service areas shown, is subject to future adjustments due to the results of further considerations including the District's board policies, funding, public input, technical, environmental, and other issues.

2 This analysis was performed to obtain an estimate of costs per unsewered parcel to evaluate financial feasibility. The total project costs were spread on an unsewered parcel basis and will require further analysis as each assessment district is formed. A future more in-depth analysis will identify the land uses or potential land uses within each service area and identify the number of equivalent dwelling units. When the analysis is performed for the potential land use of large undivided parcels, the unsewered parcel count, and ultimately the equivalent dwelling units, will be increased which would consequently reduce the costs per residential parcel. In addition, there are some large areas beyond the boundaries of the proposed service areas that will eventually be served by Extension 37, and Sewer Additions "A" and "B". At the present time, the entire costs of these trunk sewer facilities have been assigned to the appropriate service area which currently do not include potential service areas outside the proposed. Finally, the costs provided do not reflect any reduction in project costs should grants become available.

3 Costs are based upon Engineering New Record (ENR) Construction Cost Index, Los Angeles, September, 1996 (ENR 6519). Right-of-way and land acquisition costs are not included.

4 Refer to Plate 3.

5 Costs do not include "on-site" costs such as abandonment of the existing septic tank system and the private side lateral from the street right-of-way to the structure to be sewered. These private side costs are estimated to be $1,300 - $2,100 per residential parcel. Also, it does not include the District's sewer connection fee which is presently $1,910/EDU.

6 Costs rounded up to nearest $10 increment.

7 Costs rounded up to neared $5 increment.

8 Annual cost per unsewered parcel based on bond term of 20 years at 7.5%.

9 Estimated cost per EDU.

10 Includes Line S-2 (Plate 3). This line may be prorated to other service areas depending on further analysis.

11 Service Area "G" has only 193 parcels and a cost of $1,830,000. This parcel count is a bit misleading as there are some very large undeveloped properties within the Service Area and subsequent development will increase the number of unsewered parcels in this Service Area substantially.

12 Includes Addition "C" (Plate 3). This line, more than likely, will be prorated to other areas that are presently unsewered and are not a part of this study.

13 Includes Sewer Extension 37, Addition A, and Addition B (Plate 3). Service Areas "I", "J", and "K" have been assessed for all of Sewer Extension Number 37. In addition, there is a large County housing project and an elementary school included in these service areas that are only counted as one parcel. Subsequent analysis will identify the number of EDU's within these service area. In addition, there are significant areas beyond the boundaries of these service areas that will receive service from Sewer Extension Number 37.

14 It should be emphasized that subsequent work will determine the exact amount of existing and future EDU's which will provide a more accurate depiction of costs to the customers.

- Service Areas "I", "J" and "K" have been assessed for all of sewer Extension Number 37. In addition, there is a large County housing project and an elementary school included in these service areas that are only counted as one parcel. Subsequent analysis will identify the number of EDU's within these service areas. In addition, there are significant areas beyond the boundaries of these service areas that will receive service from Sewer Extension Number 37.

- It should be emphasized that subsequent work will determine the exact amount of existing and future EDU's which will provide a more accurate depiction of costs to the customers.

Finally, as previously presented, the above mentioned costs do not include the costs of the abandonment of the existing septic tanks, the connection of the structure to the right-of-way line (on-site sewer lateral). In addition, there are sewer connection fees in the amount of $1,910/EDU that are required at the time of hook-up by the Mission Springs Water District.

Potential Funding Sources/Programs

A few years ago, the District made initial contact with the California State Water Resources Control Board (SWRCB) for financial assistance for extending the District's wastewater collection system into unsewered areas, resulting in the District being placed on their annual Priority List (Wastewater Collection System SRF Project No. C-06-4250-310) which was the first step towards possible funding assistance under the State Revolving Fund (SRF) Loan Program. The SWRCB's annual Priority List included this proposed wastewater collection project at a $25,700,000 cost, and having a Priority Class D. This proposed project has continued to be placed on the SWRCB's annual Priority List each year, pursuant to their routine annual correspondence to the District, and the District's affirmative response. Appendix G contains a copy of the SWRCB's latest Notice to All Agencies dated November 7, 1996 including page 25 of the current Priority List showing Mission Springs Water District's wastewater collection project.

Last year, the District initiated written contact with U.S. Congressman Sonny Bono (44th District, California) and State Assemblyman Jim Battin (80th District), requesting their help and guidance in obtaining grants that would offset the high cost of this proposed wastewater collection project. Appendix H contains copies of the District's letters dated June 20, 1996, addressed to the legislator's local offices. Both Congressman Bono and Assemblyman Battin responded verbally to the District's General Manager John Morgan, offering their continuing assistance in this regard.

During December, 1996 as requested by the District, Webb reviewed and updated a comprehensive list of potential funding sources for this proposed sewer project including Federal, State and County agencies/programs, which tentatively identified for further review about three dozen sources. Webb next obtained and reviewed written summaries of each identified funding program, including phoning some agencies as required, for initial screening purposes and to verify names and addresses in preparation for transmitting the District's initial correspondence. This initial screening of the three dozen sources resulted in the preliminary selection of ten agencies, handling twenty potential funding programs, who are the contacts for reviewing the District's initial correspondence regarding funding availability, eligibility, etc. Appendix I contains a listing of funding contacts including names and mailing addresses, along with the name/title of the one or more potential funding programs initially handled by each contact organization. Also, as requested by the District, Webb is currently completing preparation of the initial correspondence package for the District's transmittal to each funding contact organization. Appendix J contains a copy of said initial correspondence package titled "Overview of Mission Springs Water District and Background Information for Proposed Sewer Project" (Final Draft, dated April 7, 1997) including the attached 11" x 17" Plate 1 and Tables 2 through 4. The District plans to follow-up as required with all prospective grant/loan funding sources, including pre-applications, applications, meetings, etc.

In addition, the District plans to transmit copies of said initial correspondence package (Appendix J) to the appropriate Federal, State and County legislators, requesting Special Legislative Appropriation(s) for grant assistance to offset the high cost of this proposed wastewater collection project. The District plans to coordinate closely with the legislators involved with handling these special appropriations.

As shown on Plate 3, ten of the thirteen service areas planned for construction of sewer collection facilities under this project, and almost all of the six proposed sewer trunkmains, are located within the boundary of the City of Desert Hot Springs. The District plans to continue close coordination with the City regarding all aspects of this project, including exploring the possibility of the City applying for and possibly obtaining grant funds (such as Community Development Block Grant, or other funding program available to cities) for a contribution in aid of construction towards the cost of project facilities located within the City.

The District is currently completing preparation of a letter requesting written responses supporting this proposed sewer project, explaining needs for sanitary sewers and recommending support through grants and loans. Appendix K contains a draft copy of the District's letter, along with the mailing list including regulators, legislators and various public organizations.

VII. PRELIMINARY ENVIRONMENTAL EVALUATION

Overview

The pipeline and lift station improvements proposed under this sewer improvement project are essentially limited to paved roads within areas of existing development in the City of Desert Hot Springs. The following limited lengths of pipeline are located outside of existing disturbance areas (i.e. paved roads) and are the focus of the following discussion:

Sewer Extension 37 (2900 linear feet of 8-inch diameter sewer and 10,900 linear feet of 12-inch diameter sewer to provide sewer service into the Corsini School area).

Addition B (1600 linear of 8-inch diameter sewer from Project 37 north into the Miracle Hill Area).

Terrace Way/Pomelo Drive Connection (approximately 400 linear feet of 8-inch diameter sewer to drain Pomelo Drive into Terrace Way).

Casa Grande/Santa Cruz Road Connection (approximately 400 linear feet of 8-inch diameter sewer connecting the Casa Grande sewer to the Santa Cruz Road sewer).

Mission Lakes Boulevard/Little Morongo Road Connection (it is anticipated that this section of 12-inch diameter sewer will be reconfigured to be constructed in Mission Lakes Boulevard. and Little Morongo Road).

Potential Issue Areas

The preliminary evaluation summarized below is based upon the impact areas outlined in the standard California Environmental Quality Act checklist form and the various federal statutory regulations that are typically considered in environmental evaluations pursuant to various federal programs. The following summarization of potential issues considers existing information from local general plans, established mapping resources and recent aerial photographs of the study area. The nature of the proposed improvements and conditions in the project area eliminate potential constraints related to land use and planning, population and housing, energy and mineral resources, hazards, noise, public services, aesthetics, recreation, coastal resources, agricultural lands, forest lands, wild and scenic rivers, and wilderness areas.

Geologic Problems

As noted in the preceding discussion of the physical setting, the study area is bisected by the Mission Creek Fault which is a splay of the San Andreas Fault, for which a Special Studies Zone is designated. While the potential magnitude of impact for the proposed pipelines and lift station is limited, the exposure nevertheless exists, and presents the potential for spills of raw waste in the event of a pipeline break or pump failure as a result of seismic activity. Established engineering design features and District operation (valves and shut-down procedures) address this potential.

Water

The out-of-street pipeline segments include crossings of intermittent drainages and alluvial fan areas within designated flood zones. The subsurface nature of proposed pipelines and nature of flood flows across the broad plains limit the exposure to damage related to scour and exposure of the pipelines. Standard engineering practice will ensure consideration of scour hazard and incorporation of necessary design features to protect the proposed improvements and the floodplain. If federal funding is pursued, compliance with the "practicable alternative" evaluation requirements of Executive Order 11988 may be required.

Air Quality

The study area is within a designated blowsand hazard area. Relative to air quality, this means that established construction methods may be required to control particulate emissions during facility construction.

Transportation/Circulation

The project may temporarily inconvenience local residents during construction of pipeline segments within local roads. Considering standard traffic control measures and the limited duration of potential impacts at any one location, this is not considered a significant issue.

Biological Resources

Based upon review of existing resources and informal consultation with United States Fish and Wildlife Service representatives, several federal and/or state-listed species are potentially present in the project area, including the Coachella Valley fringe-toed lizard, desert tortoise, flat-tailed horned lizard, and San Bernardino gilaia. Habitat for the desert bighorn sheep is restricted to the mountains beyond the potential impact area. Also, a comprehensive plan for protection of the fringe-toed lizard is in place; although the project established a mitigation fee area which includes part of the study area for the proposed improvements, the proposed project is exempt from mitigation fees because it is a public works project.

Utilities

The proposed sewer conveyance facilities will result in delivery of additional flows to the District's Horton wastewater treatment plant. The Horton plant is presently designed to treat a volume of 1 million gallons per day, while receiving flows of approximately 0.8 mgd. Engineering plans and specifications are available for an expansion to a capacity of two million gallons per day and construction is scheduled to begin when additional capacity is required. The approximately 5,000 unsewered residences would represent an additional flow of about 1.1 million gallons per day based upon an average flow of 100 gallons per capita per day.

Cultural Resources

Considering known information about Indian occupation and historic settlement of the Desert Hot Springs area, there is some potential for existence of cultural resources within potential disturbance areas for the proposed improvements. Prior to any construction, a records search will be conducted and, if necessary, site-specific surveys by a qualified cultural resources specialist will be conducted.

Summary of Preliminary Environmental Evaluation

The proposed improvements are substantially located in existing developed areas and represent limited potential for environmental impacts. Established programs and practices are available to address potential issues related to seismicity and blowsand hazards. Further evaluation of potential impacts related to flood hazard, biological resources, and cultural resources may be required for portions of facilities located outside existing disturbance areas. While much of the proposed improvement project would likely be considered categorically exempt under the California Environmental Quality Act (CEQA) , and categorically excluded under the National Environmental Policy Act (NEPA), it is expected that out-of-road improvements and potential issues related to biological resources, flood hazard, and cultural resources will require preparation of an initial study to support adoption of a negative declaration under CEQA and preparation of an environmental assessment to support adoption of a finding of no significant impact (FONSI) under NEPA.

VIII. PUBLIC PARTICIPATION

Public Involvement to Date

The District's commitment to public involvement is evidenced by the fact that they have a community coordinator who is a full time employee of the District that prepares informational material for District customers and staff.

The Mission Springs Water District has been involved in educating the public about the protection of groundwater since the early 1990s. This public involvement began with a survey sent out to the customers served by the Mission Springs Water District to solicit their thoughts regarding septic tanks, water quality, sewers, and the cost of constructing additional sewers. The community responded by informing the District that they believed sewers were superior to septic tanks and they wanted sewers but they would not pay for them. Realizing the resistance to the installation of additional sewers throughout the District, the Board of Directors decided to first educate the community and then take another look at the problem. The educational process started about 1990 in the local schools. The District spoke to various civic groups including the Rotarians, retired community members, Mayor's Breakfast Meetings, The Hoteliers Association meetings and to each City Council person of the City of Desert Hot Springs. The Water District also started a quarterly eight page pamphlet called "The Pipeline". Topics covered in this pamphlet are all inclusive, everything of which the District needs to make the public aware of including the need for sewers and how important they are to protect the groundwater quality within the community. This pamphlet is sent to each customer. The District also instituted a *Waterways* column in the local newspaper that covers current news on District activities and water quality. This column is written by the District's Community Coordinator on an as-needed basis and offered by the newspaper as a public service. This has proven very successful in the past and the District will continue to use it.

The Water District is one of the first Southern California communities to become a National Groundwater Foundation Member, which has evolved into the Groundwater Guardian Committee within the local Chamber of Commerce. This committee runs groundwater information programs which have made great progress in educating residents about their number one resource within the community - groundwater quality. From time to time, there is also a news program on the local cable channel discussing groundwater issues as they relate to the community as a whole. Efforts of the Groundwater Guardians resulted in the water being judged best untreated (second best against the other - four treated waters) in an international water tasting and competition, held in Berkeley Springs, West Virginia, February 22, 1997 (Appendix E).

Other sources of information provided to the public include the District's "Speakers' Bureau" which utilizes staff members to provide informational programs to various organizations throughout the District.

Description of the Proposed Program

The District, at the present time, is conducting numerous public informational meetings to educate the community on the potential groundwater pollution problems that the District and the community as a whole is facing. The public meetings include information on the geological makeup of the basin, including discussion of the Mission Creek Fault which causes hot water on the north side of the community and cold water on the south side of the community. Because of this fault the community is well known throughout Southern California for its spas and hot springs. This has enhanced the tourist industry in the community, and it is emphasized in these public meetings that to continue this tourist trade it is very necessary to protect the groundwater quality on both sides of the fault line. In addition to the geologic makeup of the basin, the president of the

Groundwater Guardian Committee gives talks about the groundwater guardian's goals and objectives. Also, there are presentations on assessment districts and other funding mechanisms to install the sanitary sewer systems and also the financial impact of doing nothing. In other words, the cost of cleaning up the groundwater is and will be much more expensive than preventing the pollution from occurring in the beginning. The Mission Springs Water District is also conducting site tours by bus for residents who are interested in viewing the District's existing facilities, including water wells, the wastewater treatment plant and other District facilities that relate to the sanitary sewer system. Also during these site tours the fault is pointed out and areas of heavy septic tank use and how they relate to the existing wells and the potential for the pollution of those wells. These site tours and workshops will continue for a period of time and will be followed up with meetings regarding the formation of assessment districts which will fund the construction and installation of the sanitary sewer systems. There will be continued mailings and hearings to keep the public involved, educated, and informed.

Summary of Project Related Outreach

In summary, the Mission Springs Water District is heavily involved in public education of the community as a whole about the need to protect the groundwater. Education of the community is evidenced by the eight-page pamphlet "The Pipeline", the *Waterways* column in the local newspaper, the Groundwater Guardian Committee and the continued public educational meetings and site tours. The Water District has a full-time employee who coordinates all of these activities to insure that the residents of the community and the customers of the Mission Springs Water District are fully aware and educated about the great resource they have - their groundwater.

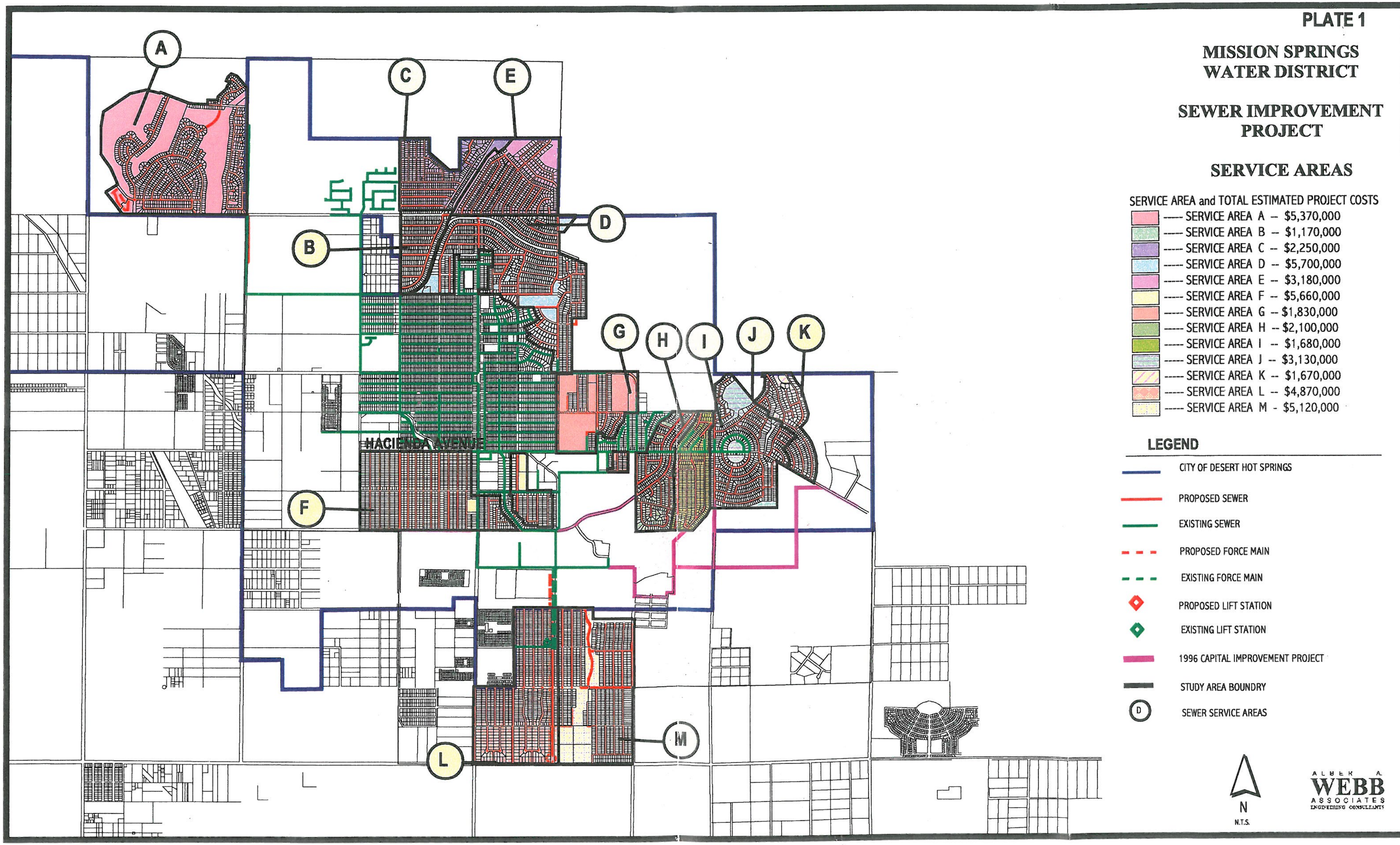


PLATE 1
MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
SERVICE AREAS
SERVICE AREA and TOTAL ESTIMATED PROJECT COSTS
----- SERVICE AREA A -- $5,370,000
----- SERVICE AREA B -- $1,170,000
----- SERVICE AREA C -- $2,250,000
----- SERVICE AREA D -- $5,700,000
----- SERVICE AREA E -- $3,180,000
----- SERVICE AREA F -- $5,660,000
----- SERVICE AREA G -- $1,830,000
----- SERVICE AREA H -- $2,100,000
----- SERVICE AREA I -- $1,680,000
----- SERVICE AREA J -- $3,130,000
----- SERVICE AREA K -- $1,670,000
----- SERVICE AREA L -- $4,870,000
----- SERVICE AREA M - $5,120,000
LEGEND
CITY OF DESERT HOT SPRINGS
PROPOSED SEWER
EXISTING SEWER
PROPOSED FORCE MAIN
EXISTING FORCE MAIN
PROPOSED LIFT STATION
EXISTING LIFT STATION
1996 CAPITAL IMPROVEMENT PROJECT
STUDY AREA BOUNDRY
D
SEWER SERVICE AREAS
A
B
C
D
E
F
G
H
I
J
K
L
M
HACIENDA AVENUE
N
N.T.S.
WEBB
ASSOCIATES
ENGINEERING CONSULTANTS

PLATE 2

MISSION SPRINGS WATER DISTRICT

SEWER IMPROVEMENT PROJECT

MEDIAN INCOME EXHIBIT

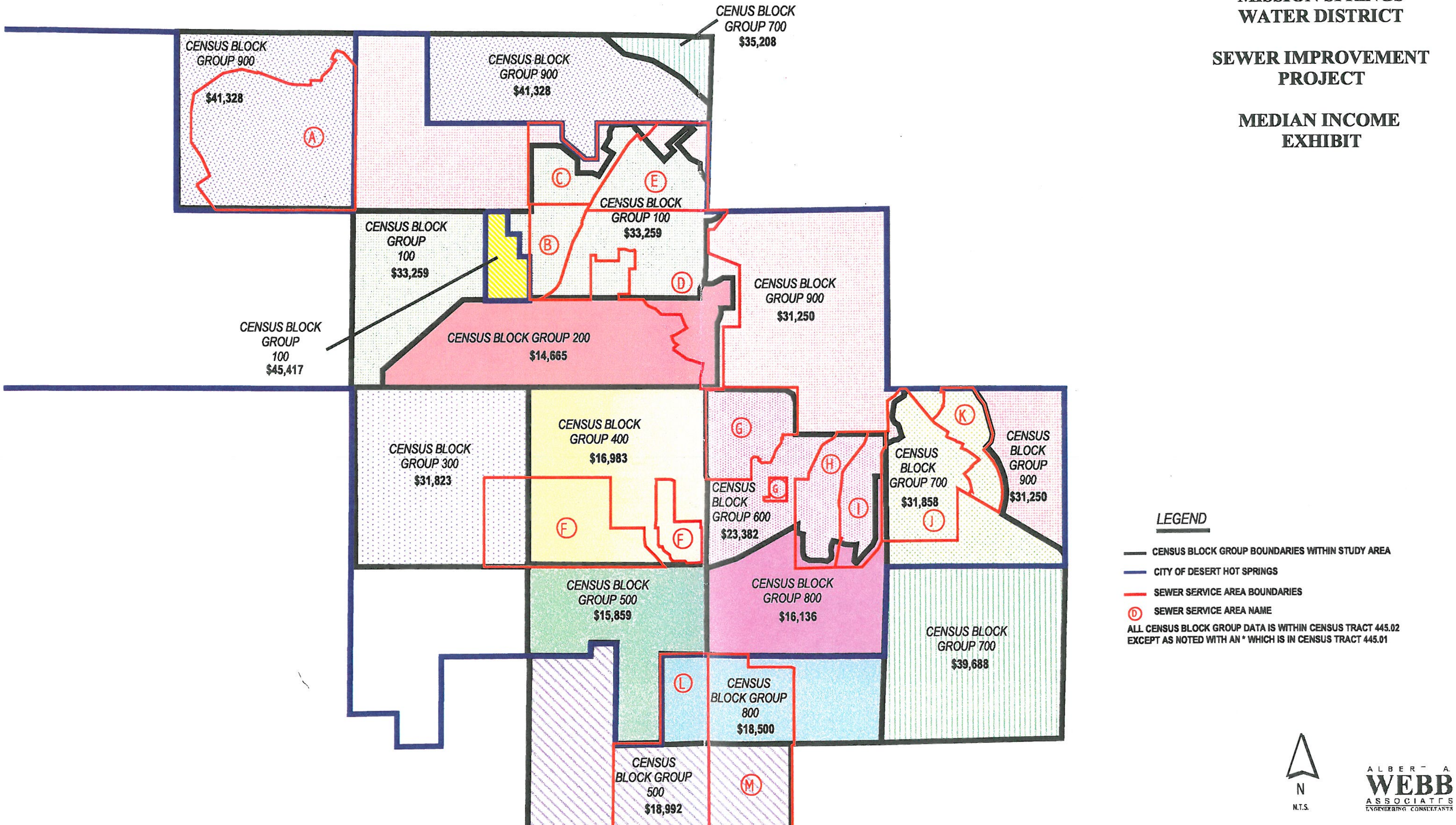
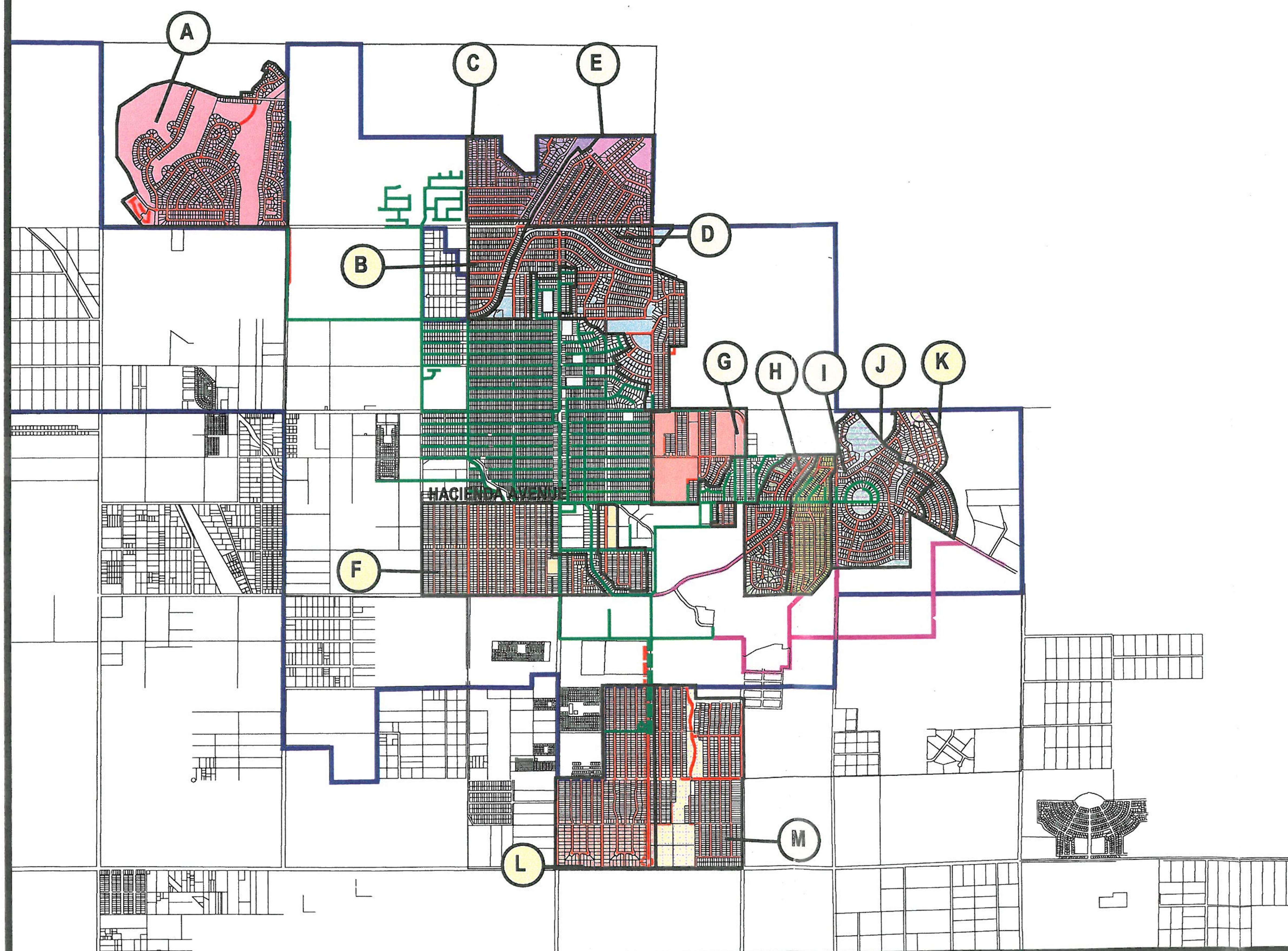


PLATE 3

MISSION SPRINGS WATER DISTRICT

SEWER IMPROVEMENT PROJECT

SERVICE AREAS



SERVICE AREA and TOTAL ESTIMATED PROJECT COSTS

SERVICE AREA A	$5,370,000
SERVICE AREA B	$1,170,000
SERVICE AREA C	$2,250,000
SERVICE AREA D	$5,700,000
SERVICE AREA E	$3,180,000
SERVICE AREA F	$5,660,000
SERVICE AREA G	$1,830,000
SERVICE AREA H	$2,100,000
SERVICE AREA I	$1,680,000
SERVICE AREA J	$3,130,000
SERVICE AREA K	$1,670,000
SERVICE AREA L	$4,870,000
SERVICE AREA M	$5,120,000

LEGEND

- CITY OF DESERT HOT SPRINGS
- PROPOSED SEWER
- EXISTING SEWER
- PROPOSED FORCE MAIN
- EXISTING FORCE MAIN
- PROPOSED LIFT STATION
- EXISTING LIFT STATION
- 1996 CAPITAL IMPROVEMENT PROJECT
- STUDY AREA BOUNDRY
- (D) SEWER SERVICE AREAS

N
N.T.S.

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS

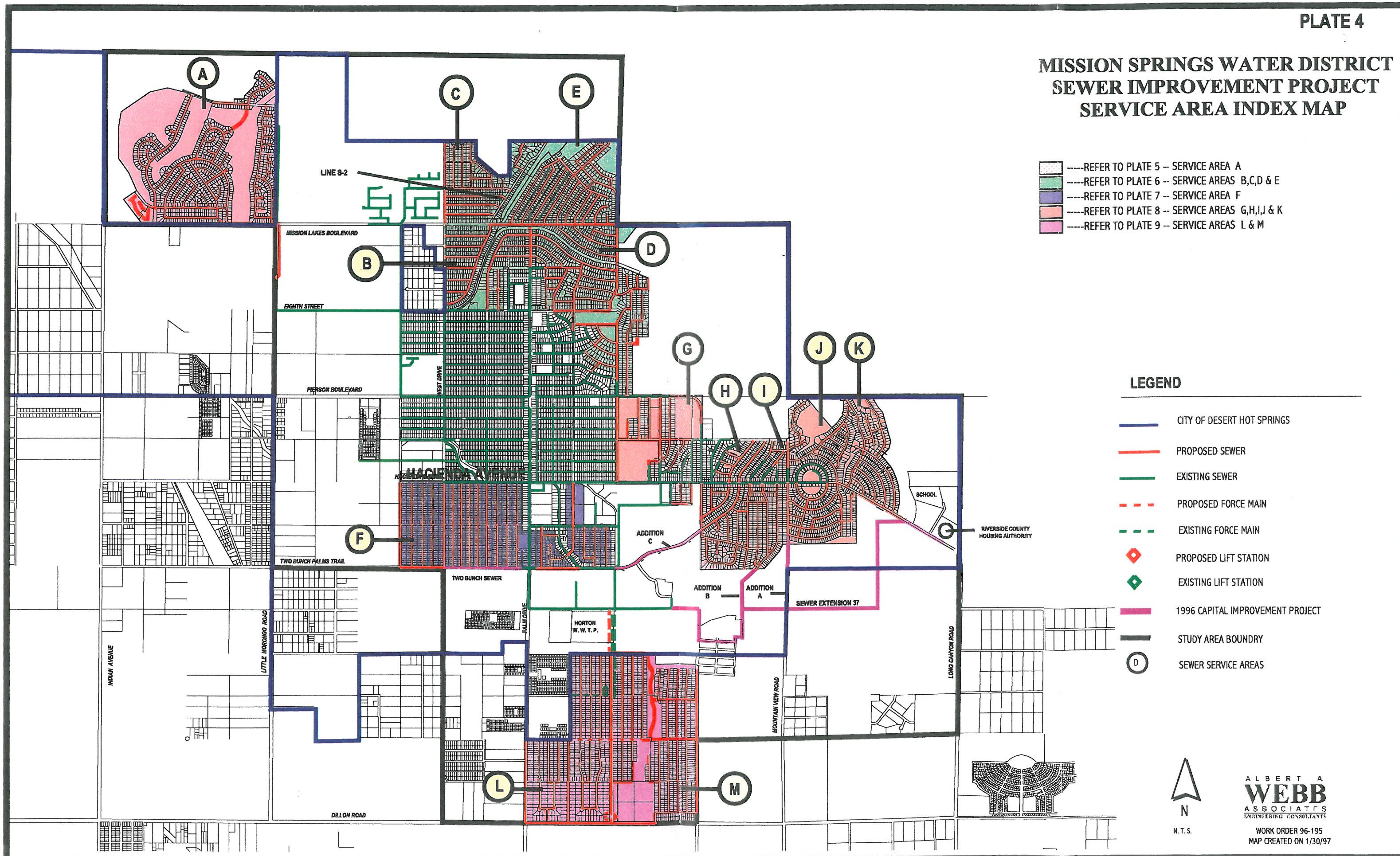


PLATE 4
MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
SERVICE AREA INDEX MAP
-----REFER TO PLATE 5 -- SERVICE AREA A
-----REFER TO PLATE 6 -- SERVICE AREAS B,C,D & E
-----REFER TO PLATE 7 -- SERVICE AREA F
-----REFER TO PLATE 8 -- SERVICE AREAS G,H,I,J & K
-----REFER TO PLATE 9 -- SERVICE AREAS L & M
LEGEND
CITY OF DESERT HOT SPRINGS
PROPOSED SEWER
EXISTING SEWER
PROPOSED FORCE MAIN
EXISTING FORCE MAIN
PROPOSED LIFT STATION
EXISTING LIFT STATION
1996 CAPITAL IMPROVEMENT PROJECT
STUDY AREA BOUNDRY
D SEWER SERVICE AREAS
A
B
C
D
E
F
G
H
I
J
K
L
M
LINE S-2
MISSION LAKES BOULEVARD
EIGHTH STREET
PIERSON BOULEVARD
WEST DRIVE
HACIENDA AVENUE
TWO BUNCH PALMS TRAIL
TWO BUNCH SEWER
PALM DRIVE
HORTON W. W. T. P.
ADDITION C
ADDITION B
ADDITION A
SEWER EXTENSION 37
SCHOOL
RIVERSIDE COUNTY HOUSING AUTHORITY
INDIAN AVENUE
LITTLE MORONGO ROAD
MOUNTAIN VIEW ROAD
LONG CANYON ROAD
DILLON ROAD
N
N. T. S.
ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS
WORK ORDER 96-195
MAP CREATED ON 1/30/97

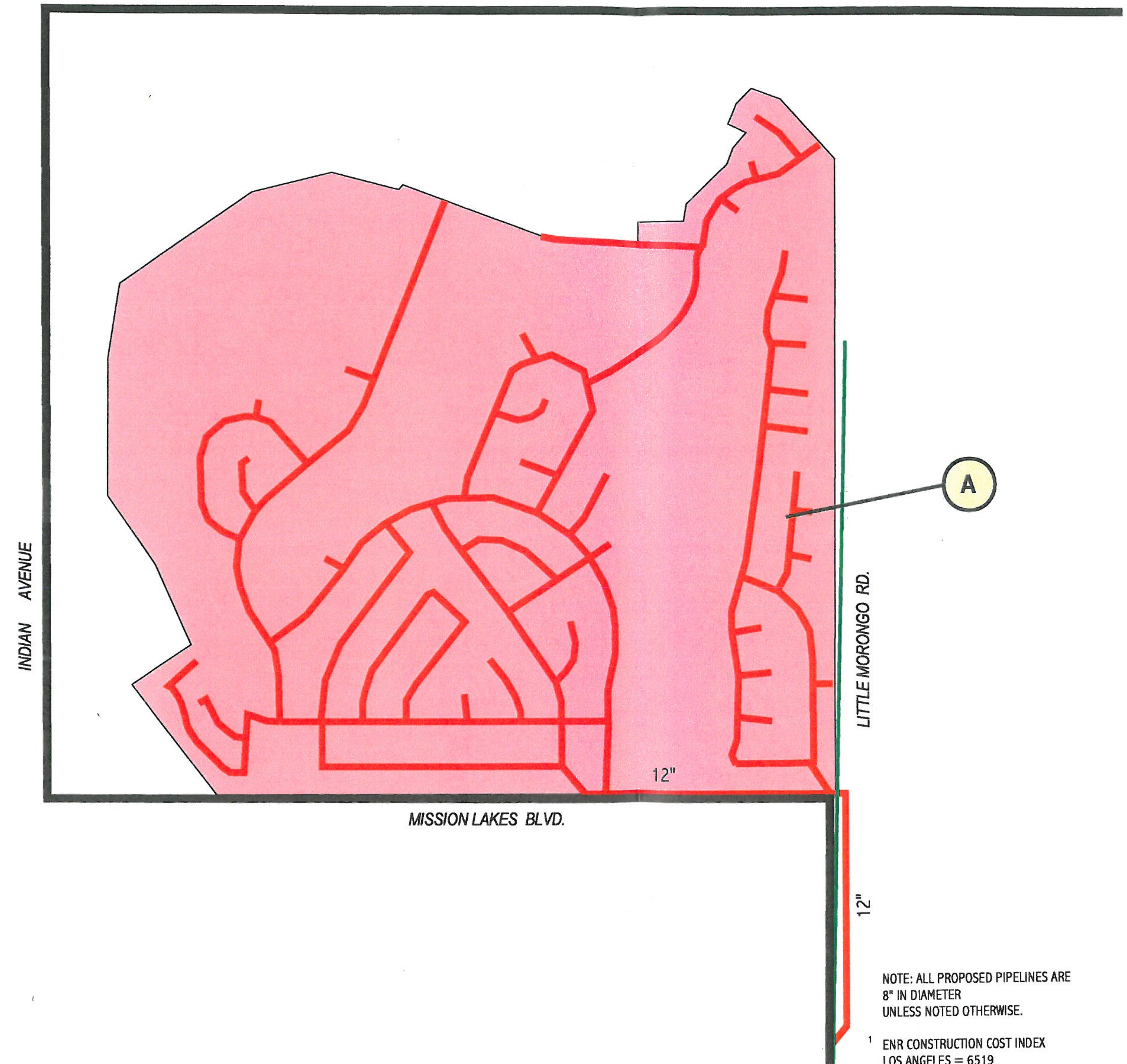
PLATE 5

MISSION SPRINGS WATER DISTRICT

SEWER IMPROVEMENT PROJECT

SERVICE AREA A

TOTAL ESTIMATED PROJECT COST [1]



LEGEND

- CITY OF DESERT HOT SPRINGS
- PROPOSED SEWER
- EXISTING SEWER
- PROPOSED FORCE MAIN
- EXISTING FORCE MAIN
- PROPOSED LIFT STATION
- EXISTING LIFT STATION
- 1996 CAPITAL IMPROVEMENT PROJECT
- STUDY AREA BOUNDRY
- (D) SEWER SERVICE AREAS

NOTE: ALL PROPOSED PIPELINES ARE 8" IN DIAMETER UNLESS NOTED OTHERWISE.

[1] ENR CONSTRUCTION COST INDEX LOS ANGELES = 6519

N

SCALE: 1"=800'

ALBERT A. WEBB ASSOCIATES
CONSULTING ENGINEERS

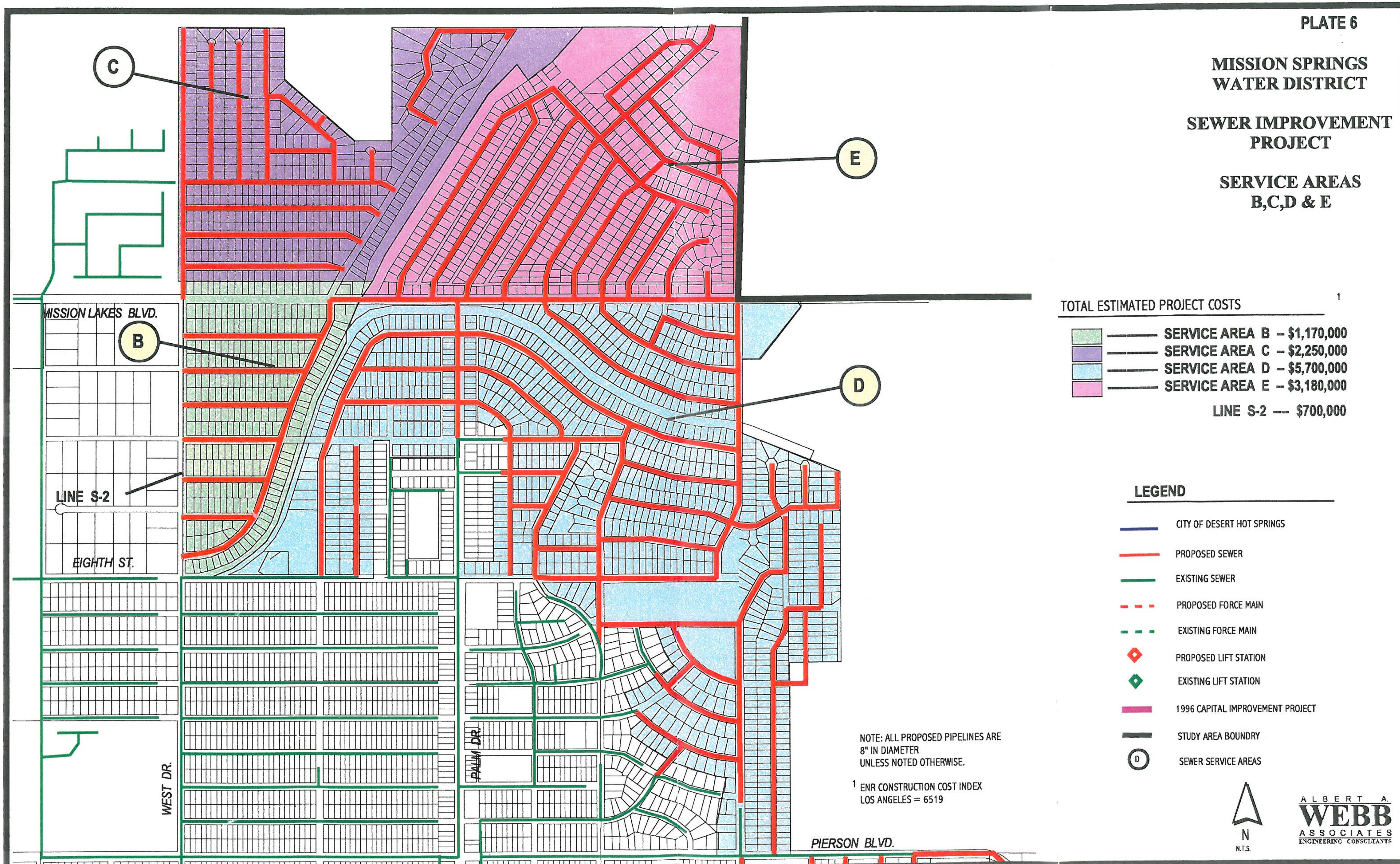


PLATE 6
MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
SERVICE AREAS B,C,D & E
TOTAL ESTIMATED PROJECT COSTS [1]
SERVICE AREA B – $1,170,000
SERVICE AREA C – $2,250,000
SERVICE AREA D – $5,700,000
SERVICE AREA E – $3,180,000
LINE S-2 --- $700,000
LEGEND
CITY OF DESERT HOT SPRINGS
PROPOSED SEWER
EXISTING SEWER
PROPOSED FORCE MAIN
EXISTING FORCE MAIN
PROPOSED LIFT STATION
EXISTING LIFT STATION
1996 CAPITAL IMPROVEMENT PROJECT
STUDY AREA BOUNDRY
SEWER SERVICE AREAS
NOTE: ALL PROPOSED PIPELINES ARE 8" IN DIAMETER UNLESS NOTED OTHERWISE.
1 ENR CONSTRUCTION COST INDEX LOS ANGELES = 6519
C
E
B
D
MISSION LAKES BLVD.
LINE S-2
EIGHTH ST.
WEST DR.
PALM DR.
PIERSON BLVD.
N
N.T.S.
ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS

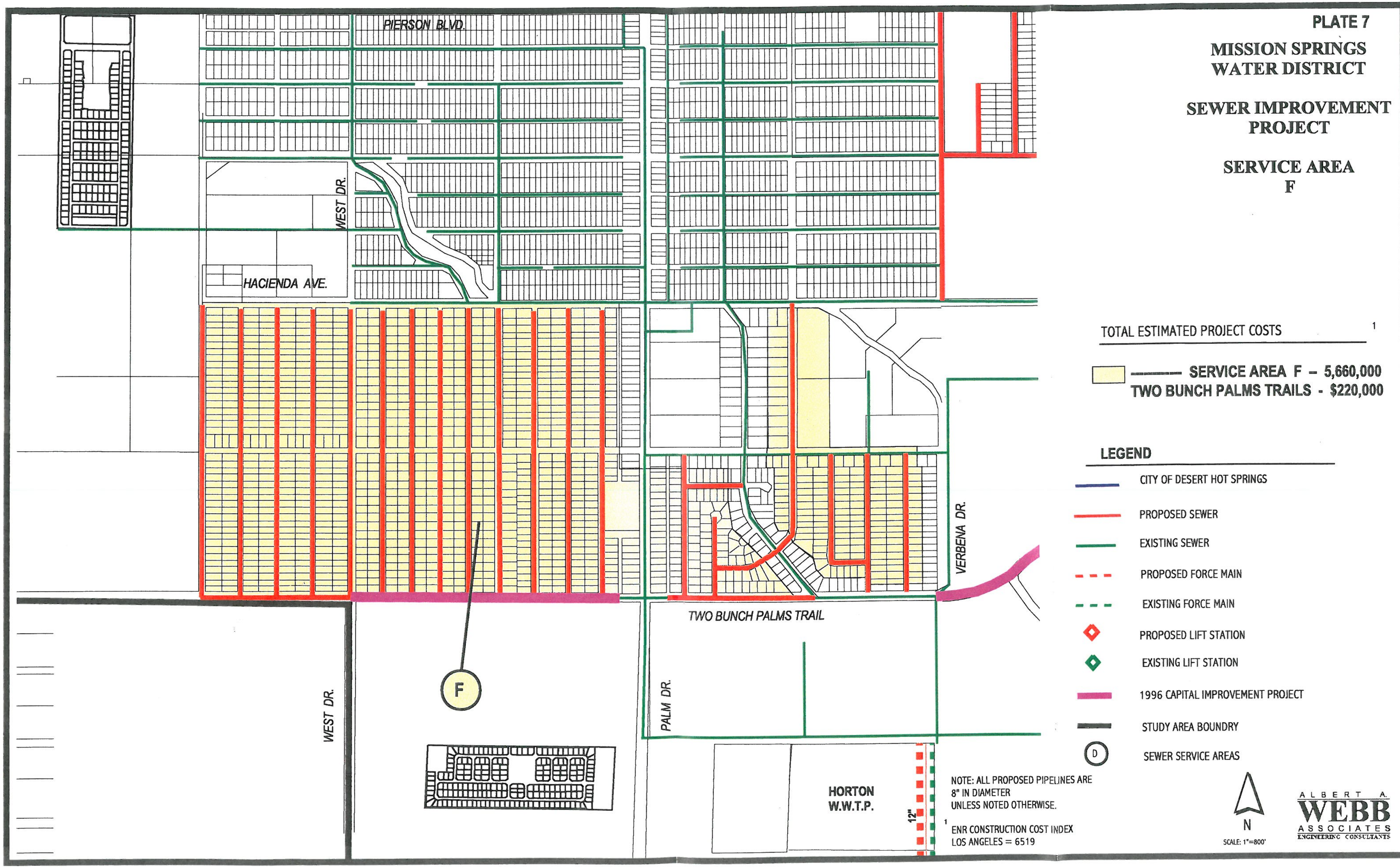


PLATE 7
MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
SERVICE AREA F
TOTAL ESTIMATED PROJECT COSTS [1]
SERVICE AREA F – 5,660,000
TWO BUNCH PALMS TRAILS - $220,000
LEGEND
CITY OF DESERT HOT SPRINGS
PROPOSED SEWER
EXISTING SEWER
PROPOSED FORCE MAIN
EXISTING FORCE MAIN
PROPOSED LIFT STATION
EXISTING LIFT STATION
1996 CAPITAL IMPROVEMENT PROJECT
STUDY AREA BOUNDRY
D
SEWER SERVICE AREAS
NOTE: ALL PROPOSED PIPELINES ARE 8" IN DIAMETER UNLESS NOTED OTHERWISE.
[1] ENR CONSTRUCTION COST INDEX LOS ANGELES = 6519
N
SCALE: 1"=800'
ALBERT A. WEBB ASSOCIATES ENGINEERING CONSULTANTS
PIERSON BLVD.
WEST DR.
HACIENDA AVE.
PALM DR.
VERBENA DR.
TWO BUNCH PALMS TRAIL
F
HORTON W.W.T.P.
12"

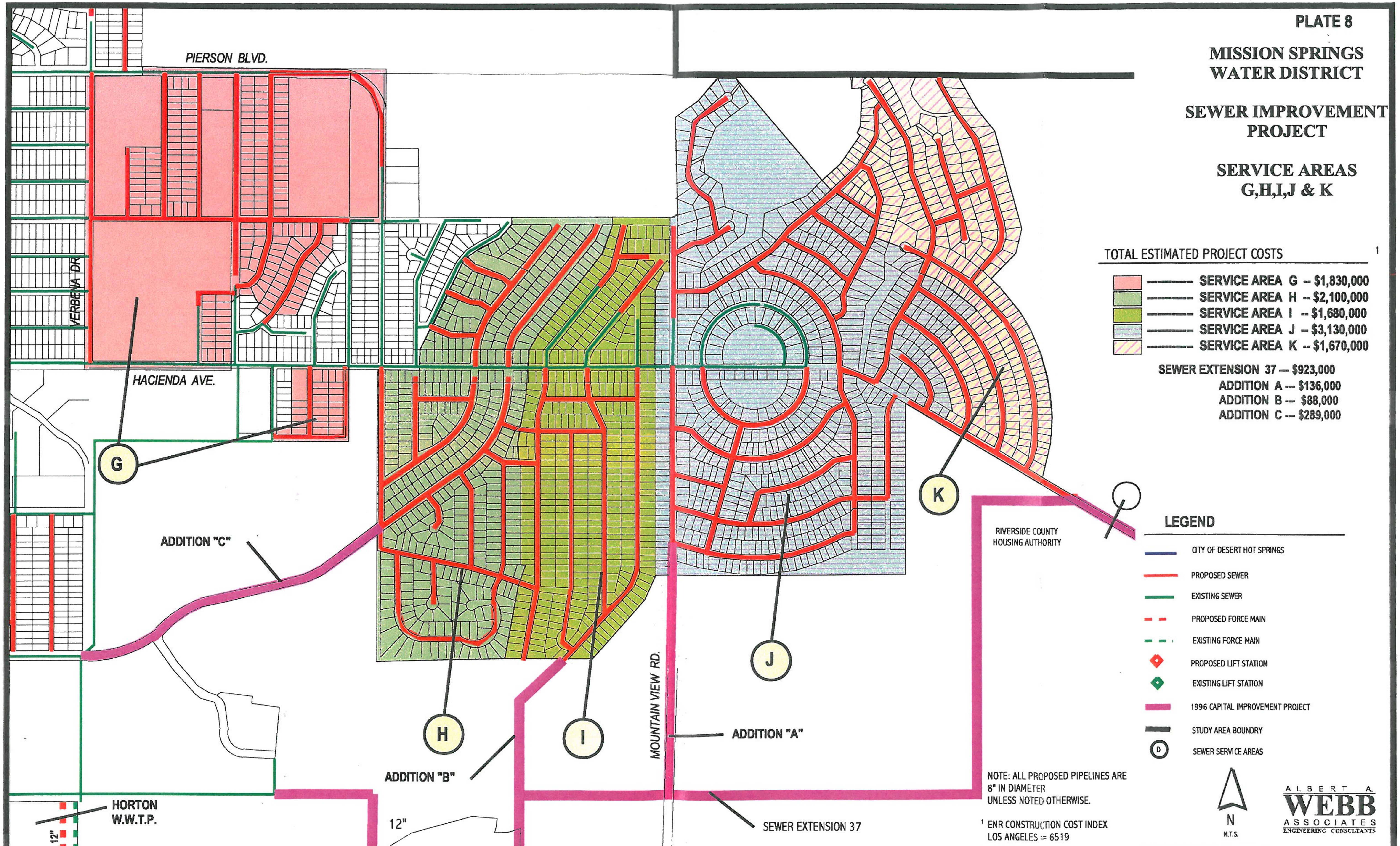


PLATE 8
MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
SERVICE AREAS G,H,I,J & K
TOTAL ESTIMATED PROJECT COSTS [1]
SERVICE AREA G -- $1,830,000
SERVICE AREA H -- $2,100,000
SERVICE AREA I -- $1,680,000
SERVICE AREA J -- $3,130,000
SERVICE AREA K -- $1,670,000
SEWER EXTENSION 37 --- $923,000
ADDITION A --- $136,000
ADDITION B --- $88,000
ADDITION C --- $289,000
LEGEND
CITY OF DESERT HOT SPRINGS
PROPOSED SEWER
EXISTING SEWER
PROPOSED FORCE MAIN
EXISTING FORCE MAIN
PROPOSED LIFT STATION
EXISTING LIFT STATION
1996 CAPITAL IMPROVEMENT PROJECT
STUDY AREA BOUNDRY
SEWER SERVICE AREAS
PIERSON BLVD.
VERBENA DR.
HACIENDA AVE.
MOUNTAIN VIEW RD.
G
H
I
J
K
ADDITION "A"
ADDITION "B"
ADDITION "C"
RIVERSIDE COUNTY HOUSING AUTHORITY
HORTON W.W.T.P.
12"
12"
SEWER EXTENSION 37
NOTE: ALL PROPOSED PIPELINES ARE 8" IN DIAMETER UNLESS NOTED OTHERWISE.
[1] ENR CONSTRUCTION COST INDEX LOS ANGELES = 6519
N
N.T.S.
ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS

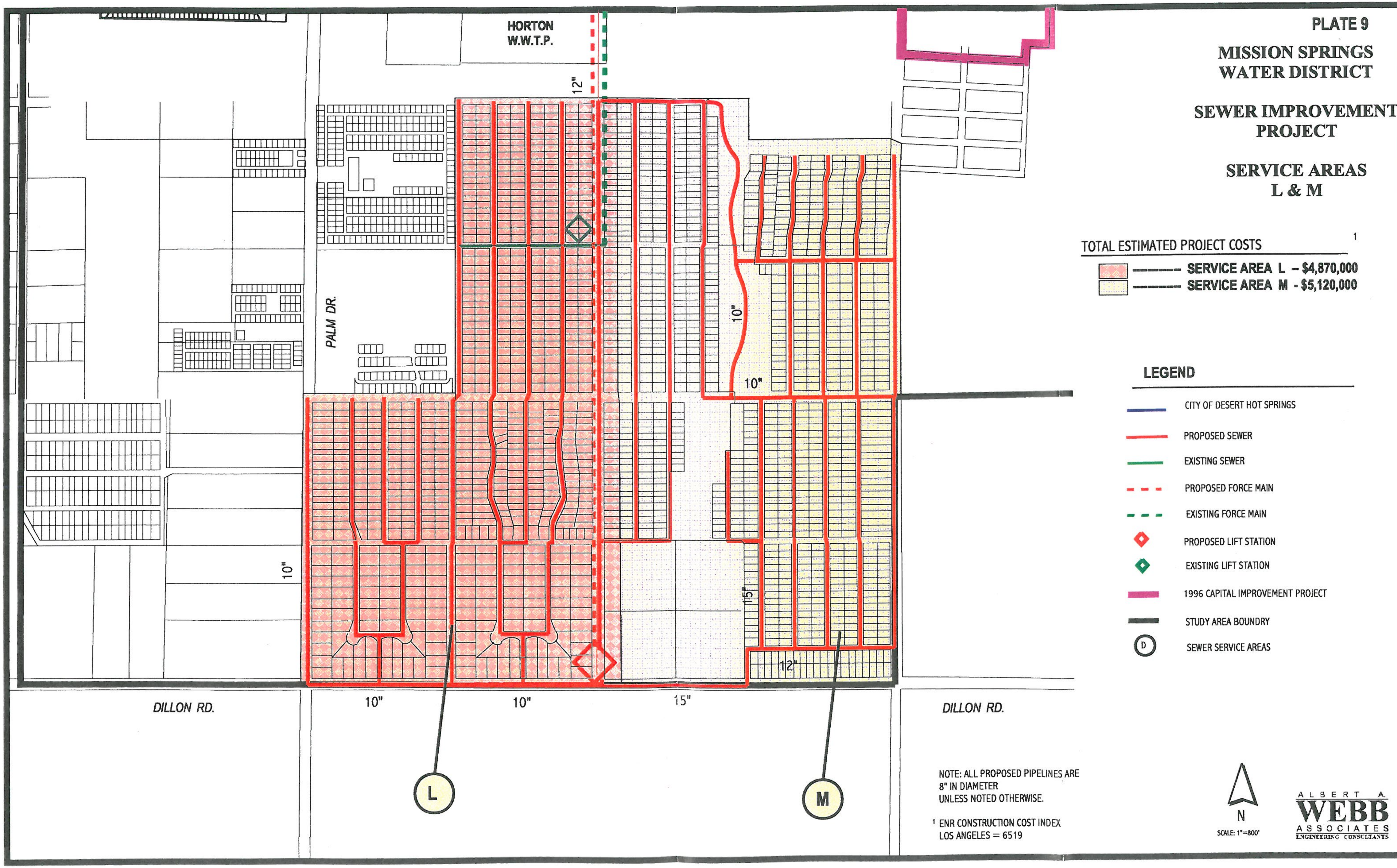


PLATE 9
MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
SERVICE AREAS L & M
TOTAL ESTIMATED PROJECT COSTS 1
SERVICE AREA L – $4,870,000
SERVICE AREA M - $5,120,000
LEGEND
CITY OF DESERT HOT SPRINGS
PROPOSED SEWER
EXISTING SEWER
PROPOSED FORCE MAIN
EXISTING FORCE MAIN
PROPOSED LIFT STATION
EXISTING LIFT STATION
1996 CAPITAL IMPROVEMENT PROJECT
STUDY AREA BOUNDRY
SEWER SERVICE AREAS
HORTON W.W.T.P.
PALM DR.
DILLON RD.
DILLON RD.
12"
10"
10"
10"
10"
10"
15"
15"
12"
L
M
D
NOTE: ALL PROPOSED PIPELINES ARE 8" IN DIAMETER UNLESS NOTED OTHERWISE.
1 ENR CONSTRUCTION COST INDEX LOS ANGELES = 6519
N
SCALE: 1"=800'
ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS

APPENDIX A

U.S.G.S. GROUNDWATER STUDY

Mission Springs Water District

October 18, 1996

A. Hubert Webb
c/o Albert A. Webb Associates
3788 McCray St.
Riverside, CA 92506

Groundwater Management - Mission Creek Subbasin

I was finally able to track down all of the participants for our meeting which has been set for Monday, December 2nd, at 10 a.m. This seemed to fit everyone's schedule.

Jack Oberle, General Manager of Desert Water Agency, has agreed to have the meeting at his agency and provide lunch. The location is:

1200 S. Gene Autry Trail
Palm Springs, CA 92262
(619-323-4971)

Please call me with the number of people you will be bringing so we know how many to expect.

Sincerely,

Whitey

John L. Morgan
General Manager

Enclosure

66-575 Second Street, Desert Hot Springs, California 92240 • 619/329-6448
Fax 619/329-2482

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Water Resources Division
California District
Sacramento Projects Office
Federal Building, Room W-2233
2800 Cottage Way
Sacramento, California 95825
(916) 979-2615
Fax (916) 979-2668
http://water.wr.usgs.gov

June 17, 1996

Mr. John Morgan
Mission Springs Water District
66575 E. Second St.
Desert Hot Springs, CA 92240

Dear Whitey:
Attached is a short summary about our study of the contamination risk potential to the groundwater aquifers in your service area. It discusses the potential problem of contamination from septic tank systems, the factors influencing the groundwater situation, and some of the questions being examined in our analysis.

Please let me know if this is sufficient for your meeting with CVWD and DWA managers. I wish you well in your effort to talk and plan together to best utilize and protect your groundwater.

Sincerely,

Marti Ikehara

Marti Ikehara
Hydrologist

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL # of pages ▸ 3

To John Morgen	From Marti Ikehara
Dept./Agency MSWD	Phone # 916 979-2615 x384
Fax # 619 329 2482	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Mission Springs Water District (MSWD) requested the U.S. Geological Survey (USGS) to evaluate the potential risks of contamination to groundwater from septic tank systems in their service area which is centered in the city of Desert Hot Springs. Groundwater in the area, at the north end of Coachella Valley, is found both as a potable drinking-water supply and as a geothermally-heated resource. The two aquifers are separated by the Mission Creek Fault, a splay of the San Andreas Fault, which obliquely bisects the city. Geothermal groundwater is found east of the northwest-trending fault zone, and potable water is located to the west of the fault.

The USGS did not collect new data and examined existing data provided by MSWD and reviewed data from previous USGS studies of similar situations, most notably one in the Victorville area. Three primary aspects of this kind of a risk contamination study are the geology, the hydrology, and the septic tank operational characteristics. Data examined included water level, temperature, and chemistry data for cold and hot water wells; well construction data. Septic tank densities and areal extent and other potential sources of groundwater contamination were also reviewed.

Groundwater flow paths are critical in the study of groundwater contamination issues, and in this locale, the role of Mission Creek Fault as a barrier to or conduit for groundwater flow is a key question. Examination of the data provided indicates that the fault is currently an effective barrier to groundwater flow at the northern (upgradient) end of the hydrologic subbasins. On the basis of water chemistry and water level data, it appears that, in the past, some water from the thermal aquifer had migrated to the cold aquifer southeast of the city, south of Dillon Rd, between View and Corkhill Roads.

Factors influencing groundwater migration are recharge sources and conditions, and water quality considerations such as differing densities due to mineral content and water temperature. How do man-induced changes in the hydrologic regime affect groundwater? Could artificial recharge, whether intentional or incidental, exacerbate other problems? Factors influencing groundwater contamination are heavily influenced by the characteristics of the subsurface medium. Does the soil-contaminant reaction dissipate or alter or concentrate the contaminant? How do the physical properties of the subsurface lithology influence the mobility of the contaminant? One of the concerns in considering the thermal aquifer contamination potential is that the thermal groundwater is very shallow and actually seeps at the surface in some places near Miracle Hill. The risk of contamination to this resource from a number of sources is high under these circumstances.

One of the keys to protecting groundwater resources is to monitor various aspects of the aquifer(s), such as water levels or certain water chemistry parameters. Recommendations to be presented by the USGS in the final report will include suggestions about what to monitor and target locations. Early detection of changes in existing conditions, where no contamination has yet been measured, may enable changes in practices to eliminate or reduce the source of the contaminant.

Prepared by
Marti Ikehara
USGS Hydrologist

TRANSPORT OF CONTAMINANTS FROM WASTEWATER DISPOSAL SYSTEMS NEAR MISSION CREEK SUBBASIN, DESERT HOT SPRINGS, CALIFORNIA

PROBLEM

Septic tank wastewater disposal systems have been in use in the Desert Hot Springs community for three to four decades, and the city has changed from being a predominantly resort destination, noted for their natural hot water spas, to a community with year-round residents. In 1995, there were about 5,230 septic tank systems in the city of Desert Hot Springs and surrounding communities. Contamination of ground water resulting from the increasing quantity of wastewater discharge into the unsaturated zone is a major concern to the area's water purveyor, Mission Springs Water District (MSWD). The underlying alluvial aquifer on the west side of the city of Desert Hot Springs is the sole source of public water supply and alternate sources of water are not available. Wastewater contains contaminants, such as nitrogen, bacteria, and organic chemicals, that may degrade the quality of ground water and render it unsuitable for potable consumption. Because the Mission Creek subbasin is a sole source aquifer for Desert Hot Springs and surrounding communities, it is prudent to determine the potential for ground-water contamination from septic tank wastewater.

STUDY OBJECTIVES

The objectives of the proposed study are:

1. to measure the vertical distribution and concentrations of various chemical forms(species) of nitrogen and other compounds in the unsaturated zone and the shallow part of the saturated zone at two sites, and
2. to determine the potential for ground-water contamination from septic-tank wastewater.

DESCRIPTION OF STUDY AREA

Geography

Desert Hot Springs is an urban community of about 15,000 people (14,390 people in 1994, State Controller's office) situated at the far northern end of Coachella Valley in Riverside County, Southern California. It is about 60 mi east of Riverside, about 10 mi north of Palm Springs, and about 12 mi south of the town of Yucca Valley. Desert Hot Springs, at an altitude of about 1,100 ft, is at the base of the Little San Bernardino Mountains which extend to the north and east and rise to elevations exceeding 5,000 ft (fig. 1). This area receives less than 5 in. of rainfall per year, and has hot, dry summers and mild winters.

Geology

Other than the active stream channels, all of the sediments in the area are alluvial fan or stream wash deposits in former channels (California Division of Mines and Geology, 1968). Lithologic logs examined show that there are essentially no clay deposits, so the predominant sediments are sands and silts, with minor amounts of cementation. The absence of clay deposits suggests that the sediments are relatively permeable. The thickness of water-bearing sediments around the center of the Mission Springs subbasin is on the order of 800-1000 ft thick (Geotechnical Consultants, Inc., 1979, plate 8.)

A series of northwest-trending, principally strike-slip faults traverse this northern end of Coachella Valley. One of these faults is the Mission Creek Fault, with the upthrown side on the northeast. This fault divides the ground-water system into a thermal-water aquifer on the northeast side, known as the Desert Hot Springs subbasin, and a cold-water aquifer on the southwest, known as the Mission Creek subbasin (fig. 1). Farther southwest are other faults, notably the Banning Fault and Garnet Hill Fault, which further compartmentalize the ground-water flow system. The faults have been mapped on the basis of geomorphology and botanic growth patterns visible in aerial photographs as well as evidence in the field. Cracks in manmade structures in the city delineate the location of Mission Creek Fault, and palm oases (Two Bunch Palms) and other heavy vegetative growth demarcate where ground-water surfaces as springs along this fault zone. Indirect evidence that Mission Creek Fault controls ground-water mobility are the differences in water levels and water chemistry, including temperature, on opposite sides of the divide. The low permeability of most faults, usually resulting from the presence of fault gouge, makes them effective barriers to ground-water flow. Fault gouge is pulverized, clayey material found between the walls of some faults and filling a fault zone. It is formed by the crushing and grinding of rock material as the fault developed, as well as by subsequent decomposition and chemical alteration caused by subsurface circulating solutions (Bates and Jackson, 1980, p. 224).

Hydrology

For the period 1949-78, annual rainfall averaged 4.7 inches at a rain gage (2S/5E-30P) in the northeast part of the city (Geotechnical Consultants, Inc., 1979). As is typical of arid desert environments with meager rainfall, potential evapotranspiration is much greater (on the order of 6 or 7 times) than average annual precipitation and results in negligible recharge from precipitation. At present, there are no artificial recharge facilities operated by MSWD, so the primary sources of recharge are tributary runoff, subsurface inflow from surrounding mountains, irrigation return flow and the water treated by individual wastewater disposal systems. The average seasonal tributary runoff from Mission Creek, the predominant (intermittent) stream in Mission Creek subbasin, was estimated to be 6,000 acre-ft for the period 1935-1957 (Department of Water Resources, 1964, p. 111). The average seasonal (annual) subsurface inflow from Morongo Valley through Big and Little Morongo Canyons was estimated to be about 200 acre-ft for the same period (Department of Water Resources, 1964, p. 113). An artificial source of recharge in the Mission Creek subbasin is return flow of irrigation water from the Mission Lakes Golf Course and surrounding residences, northwest of Desert Hot Springs. Another source of recharge is the wastewater from septic tank systems in the Mission Lakes area and the southwestern part of Desert Hot Springs.

None of the five named streams in the two subbasins are perennial, so there is no surface water outflow from the Mission Creek or Desert Hot Springs subbasins. Ground water springs, while important to the development of the city's economy, do not discharge significant quantities of water in terms of the water budget (Tyley, 1971). Evapotranspiration from the ground and from phreatophytes (native vegetation) is also a negligible source of ground-water discharge. The majority of ground-water discharge is pumpage from wells, both potable cold water and thermal water used in spa operations. MSWD owns 14 cold-water potable-supply wells, 9 of which are currently active (Table 1).

Water-level elevations observed in wells in Mission Creek subbasin indicate that ground-water flow is generally to the southeast in the western part of the basin, basically parallel to the fault boundaries, and to the south and southwest in the eastern part of the basin (fig. 2). Three public-supply wells in T2S/R4E-Section 36, MSWD Wells 22, 24, and 29, are probably altering the regional flow direction near the wells. The depth to water ranges from 300 to 550 ft in the area of Big Morongo Wash and Mission Creek channels, west of the city of Desert Hot Springs.

Ground-water quality

Water analyses done in 1993 from samples collected at the five MSWD wells in the Mission Creek subbasin that produce the majority of the water supplied for drinking water have been plotted as Stiff diagrams and are displayed adjacent to their locations (figure 3). Stiff diagrams display the relative amounts of the principal constituent cations and anions in milliequivalents per liter, and often include total dissolved solids (TDS). The cations shown are calcium (Ca), magnesium (Mg), and sodium plus potassium (Na + K) on the left side of the axis, and the anions are chloride (Cl), sulfate (SO_4), and bicarbonate (HCO_3) shown on the right. They were plotted in the same order (counterclockwise from the upper left) as those depicted on Plate 13 of Geotechnical Consultant's report for ready comparison with historic data. Comparisons between the 1993 and 1978 analyses show little change in the general chemical composition of these waters.

To date, human fecal coliform counts and nitrate concentrations of samples from public potable water supplies and thermal water wells have not exceeded maximum contaminant levels (MCL) for these parameters. Data from about 10 samples from 1970 to 1996 are provided (table 2) and graphed (figure 4) for nitrate (as NO_3), chloride (Cl), and sulfate (SO_4)for water from MSWD Well 22 and Well 23 and one sample from Well 30, which replaced Well 23 in production. In Well 22, variable nitrate (as NO_3) concentrations have been observed, increasing from a low of <1 ppm (parts per million, equivalent to milligrams per liter) in 1982 to a high of 6 ppm in 1993. This variability may suggest that septic-tank wastewater has contaminated the shallow part of the saturated zone.

CONTAMINATION RISKS FROM SEPTIC SYSTEMS

Of particular concern is the potential for nitrate to contaminate the aquifer because conventional water treatment has no significant effect on nitrate removal from water (National Academy of Sciences, 1974). Primary drinking water standards state that the MCL for nitrate concentration is either 45 mg/L as NO_3^- (promulgated by California Department of Health Services) or 10 mg/L as nitrogen (N)(promulgated by the U.S. Environmental Protection Agency [EPA]) (California Department of Water Resources, 1995). High levels of nitrate pose a risk to infants, particularly under 3 months old, who are bottle fed with formula prepared with tap water (U.S. EPA, 1986). Under certain circumstances, nitrate can be reduced to nitrite in the gastrointestinal tract and reach the bloodstream, reacting directly with hemoglobin to produce methemoglobin, consequently impairing transport of oxygen by the blood. Although many infants have drunk water that exceeded the MCL without developing the pediatric disease methemoglobinemia, serious and occasionally fatal poisoning of infants has occurred enough to warrant promulgation of water quality standards for this contaminant. The differences in susceptibility are not understood but appear to be related to a combination of factors including nitrate concentration, enteric bacteria, and the lower acidity that is characteristic of the digestive systems of baby mammals.

The issue of nitrate, bacteriological and virological contamination potential from septic system effluent to both the potable cold water and the thermal water resources is of significant concern.

There are a total of about 5,230 septic systems on record with MSWD as of October 3, 1995 (Nona Crawford, MSWD, written commun., 1995). The majority are active all year long and the rest are in operation seasonally when part-time residents occupy dwellings during the mild winters. A small sampling of subsurface waste disposal system densities in Desert Hot Springs, overlying both the thermal and cold ground-water subbasins, indicated that between 1.6 and 2.0 systems per acre was typical, which is 2.3 to 2.8 times, respectively, the recommended density of 0.7 systems per acre (Desert Water Agency [DWA] and University of California, Riverside [UCR], 1993) pg. 16). The density of systems in the Mission Lakes area, which completely overlie the cold water subbasin, was even higher, at 2.4 systems per acre (fig. 5). Septic systems generally consist of two parts--a septic tank or pit and a seepage pit area. Bacterial digestion in the tank reduces the volume of collected solids, and converts organic matter into simple chemical compounds and septage (DWA and UCR, 1993). After passing through the septic tank, wastewater enters a seepage pit area and migrates downward into the soil. Dispersion areas must provide sufficient surface area to allow wastewater penetration into surrounding soil. If active septic systems are spaced too close together, wastewater maybe unable to penetrate the soil at a rate equivalent to or greater than production. When failure occurs, wastewater rises to ground surface and the bacteriological component causes a nuisance (offensive odors) and public health risks (from disease).

The fecal matter of humans may contain human enteroviruses, viruses that infect and replicate in the intestinal tract, and parasites, such as Giardia. Members of the enterovirus group include viruses that cause poliomyelitis, aseptic meningitis, myocarditis, and diseases that cause severe central nervous system disorders (DWA and UCR, 1993). Enteroviruses are incapable of living outside of primate cells; thus, their detection is conclusive evidence of relatively recent (less than one year) contamination by human waste. Another group of viruses, coliphage, is also present in human fecal matter because they infect Escherichia coli, a bacterium that is always present in human intestinal tracts. The chemical and physical characteristics of coliphage are similar to enteroviruses, so coliform counts are often used as indicators for the presence of enteroviruses because the methods of detection in water and soil samples are relatively easy and rapid.

Even if the wastes being processed through the septic tank system undergo complete biological decomposition and the viruses expire, one of the byproducts is nitrate (NO_3^-). Nitrate does not sorb out of the soil as do the majority of soluted compounds. Nitrate either remains in solution and percolates downward or it can be converted to nitric oxide (NO), nitrous oxide (N_2O), and dinitrogen (N_2) by denitrification. Denitrification is the process of degradation of organic carbon by nitrate-respiring micro-organisms in the absence of oxygen.

CONTAMINATION POTENTIAL FROM SEPTIC TANK SYSTEMS

Results from a Septic Tank Study in Mojave River Basin

Because of the similarity in environment, results from a ground-water contamination potential study recently completed by the USGS in the Upper Mojave River Basin area, southeast of Victorville, are summarized here and similar calculations are presented for the Mission Creek subbasin. Although the lithology and aridity are similar between these two areas, depths to water table around Victorville were considerably shallower, ranging from 112 to 254 ft between 1988-89 in 12 boreholes at 8 residences, with an average depth of 150 ft (Umari and others, 1995, table 3).

Rates of vertical movement of a wastewater-wetting front, calculated from three different types of data collected in the Mojave study, ranged from 0.07 ft/d for unconsolidated, poorly sorted older alluvium and moderately to well-consolidated older fan deposits to 1.0 ft/d for unconsolidated silty sand and gravel. Based on those rates, travel time for the wastewater-wetting front to move down 150 ft through the unsaturated zone ranged from about 6 years to 6 months, although the movement rates of wastewater (solute) itself are significantly slower (Umari and others, 1995, pg. 53). Thus, the wetting front from pits constructed prior to the mid-1980s would have reached the water table by the time of the study. There were no elevated fecal coliform counts in any soil samples nor elevated nitrate concentrations in ground water samples collected near the water table; however, monitoring is continuing at two sites (Umari and others, 1995, pg. 79). There were about 46,000 unsewered residences in the study area of the Upper Mojave River Basin. It was estimated that, assuming an average discharge of 70 gal/d/person and 2.5 people per household, annual septic-tank wastewater discharge would have been 9000 acre-ft/yr, equal to about 18% of the estimated natural recharge. Concentration of total nitrogen in the wastewater ranged from 2.2 to 63 mg/L and averaged 46 mg/L (Umari and others, 1995). Water-quality mixing-model simulations made on the basis of the data collected in the Victorville study indicate that predicted nitrate-N concentrations in ground water would exceed 10mg/L (equivalent to 45 mg/L as NO_3) in less than 20 years under most reasonable assumptions for the various model parameters. Data collected on nitrate-respiring bacterial activity in the unsaturated zone coupled with the model simulations support the existence of a nitrogen-removal process and dilution by vertical mixing with low-nitrate ground water as mechanisms contributing to the non-elevated concentrations of nitrate in the samples collected.

Preliminary analysis of the Mission Creek subbasin

As stated previously, the depth to water ranges from 300 to 550 ft below land surface in the Mission Creek subbasin. Using the range of 0.07 to 1.0 ft/day for the vertical rates of water movement that were measured in the Mojave River Basin study, the travel times for the wastewater wetting front to reach the water table in the Mission Creek subbasin range from a minimum of 0.8 years (300 ft/1.0 ft/day/365 d/yr) to a maximum of 21.5 years (550 ft/0.07 ft/d/365 d/yr). The actual rates of wastewater (solute) will be significantly less than the rates for the wetting front, so the period of time for the wastewater to arrive at the water table will increase accordingly. Because many of the septic tank systems have been in operation for more than 25 years, these travel time estimates suggest that wastewater should be reaching the water table in the Mission Creek subbasin.

There are an estimated 5,230 households utilizing septic tank systems in the Desert Hot Springs area. Assuming an average daily septic-tank discharge of 23.4 ft^3 (Umari and others, 1995), annual septic-tank wastewater discharge is estimated to be 1,000 acre-ft/yr [(5,230 households x 23.4 ft^3/d/household x 365 days/yr)/43,560 ft^2/acre)]. Previous estimates of natural recharge to the area were about 6,000 acre-ft/yr (California Department of Water Resources, 1964). Therefore, the estimated septic tank discharge is equal to about 17% of the natural recharge to the area.

The total nitrogen concentration in septic wastewater is high (22 to 63 mg/L as nitrogen or 90 to 280 mg/L as nitrate) based on results from the Mojave River Basin study (Umari and others, 1995). The absence of widespread high nitrate concentrations in ground water in the area indicate that either a significant fraction of the nitrogen present in wastewater is no longer present when it mixes into the ground water, or the nitrate is confined to shallow depths below the water table that have not been sampled. Additional studies are needed to determine the fate and transport of the septic tank wastewater.

STUDY APPROACH

The objectives of this study will be met by investigating the transport of septic-tank wastewater at two key sites. The rate of wastewater movement and changes in concentration of selected contaminants with depth in the unsaturated zone and the saturated zone will be monitored at each site. Both sites would be near wastewater systems that are active year-round, but one site would be representative of the older (>25 years) septic tank systems installed in Desert Hot Springs and shallower depth to ground water, and the other would be sited near the younger (< 25 years) systems in Mission Lakes and greater depths to water. The approximate locations (shown in fig. 4) are T2/R4E-Section 23, as close to Well 28 as practical yet near a septic tank system, and T2S/R5E-Section 31 near Southwest Drive.

Drilling and Data Collection

Drill-Core Samples: Because of the relatively large depth to water, the ODEX (overburden drilling by the excenter) method will be employed at both sites. Core samples of undisturbed sediments will be collected while drilling. Core samples will be collected continuously from land surface to a depth of 10 ft beneath the bottom of the seepage pit, then at 10- or 20-ft intervals to the water table. Core will be obtained in three sections of 6-in. hollow tubing. A sub-sample from each section will be analyzed for moisture content and grain size using standard soil laboratory analytical procedures. A second sub-sample from the middle section will be submitted for biological analysis. All remaining material will be immediately sealed in glass jars and frozen to protect against microbial activity.

Monitoring Instruments:

A suction lysimeter will be installed to allow periodic sampling to detect moisture in the unsaturated zone and to assess changes in pore-water chemistry. At each site, a water-quality well will be completed at three different depths to allow sampling at specific depths of the aquifer. The three depths of screened casing to be installed for each set of multiple wells are 1) within the top 10 ft, 2) at about 50 ft, and 3) at 100 ft below the water table.

Chemical and Biological Analyses of Core Samples: Field specific conductance will be measured and all other analyses would be done at the National Water Quality Laboratory of the USGS. Samples will be analyzed for dissolved nitrate, nitrite, chloride, and organic carbon and nitrogen will be extracted from the frozen samples. The concentration of each nitrogen species in soil and soil-water extracts from core samples and the suction lysimeters will be determined. Because bacterial growth and nitrogen transformations require a source of organic carbon, concentrations of organic carbon will be determined for some samples. Chloride concentrations will be determined because it is physically conservative and biologically unreactive, which makes it a useful tracer of the wastewater wetting front. Comparisons of chloride to nitrogen profiles will document the effect of nitrogen attenuation (denitrification) in the unsaturated zone. Soil cores will be analyzed in the on-site mobile laboratory for fecal coliform and fecal streptococcal bacteria.

Radioisotope Sampling

Hydrogen and oxygen isotopes will be used to distinguish sources of water in both the unsaturated and saturated zones.

FUNDING

The total cost for this study is $229,000 to accomplish the scope of activities outlined above. If Federal matching funds were to become available under the cooperative program, the USGS share of funding would then be 40 percent ($91,600) and the cooperator, Mission Springs Water District, would fund 60 percent ($137,400).

	FY 1997	FY 1998
Salaries and benefits	$87,700	$43,400
Drilling	63,800	–
Monitoring instrument materials	1,800	–
Sampling equipment and supplies	7,500	
Lab analytical costs and shipping	6,400	600
Travel	5,600	1,000
Contingency fund	9,400	–
Report production	–	1,800
Total	$182,200	$46,800

PERSONNEL, PRODUCTS and TIMEFRAME

The study will be conducted by a team of hydrologists in the California District. The team will consist of a GS-12 geochemist, a GS-11 hydrologist, and a GS-9 hydrologic technician or hydrologist. At the completion of the study, a Water Resources Investigation Report will be produced. It is anticipated that the study would be completed in two years. The data collection effort would extend for one year following acceptance of the project proposal, and the analysis and report production would be done in the following year.

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Table 1: Wells owned by Mission Springs Water District

Well	State Well Number	Latitude[a]	Longitude[b]	Perforated Zone(s)	Date Drilled	Status
5	2S/5E-31H1	33 57 18	116 29 32	274-291,513-517, 661-699,761-784	1949	2" plug ok
7	2S/4E-25B1	33 58 32	116 38 49	160-190	1950	Observable
11	2S/5E-31L1	33 57 13	116 30 08	220-285	1954	1" plug ok
12	2S/4E-25N1	33 57 42	116 31 22	320-370	1954	1.5" plug ok
[c]13	2S/4E-35Q1	33 57 01	116 31 54	185-217,265-380	1954	1" plug ok
22	2S/4E-36D1	33 57 41	116 31 28	390-780	1970	Active
24	2S/4E-36D2	33 57 38	116 31 27	400-790	1973	Active
25	3S/3E-7M1	33 55 23	116 43 08	330-455	1958	Active
26	3S/3E-8M1	33 55 20	116 41 55	225-553	1958	Active
27	3S/4E-11L2	33 55 30	116 32 25	180-380	1980	Active
28	2S/4E-26C1	33 58 33	116 32 14	590-890	1989	Active
29	2S/4E-36K1	33 57 02	116 31 02	410-930,970-1050	1992	Active
30	2S/4E-23N2	33 58 35	116 32 38	640-1080	1992	Active
31	3S/4E-11L4	33 55 27	116 32 24	270-440,470-650, 670-920,950-980	1993	Active

a. Referenced to North American Datum 1927 (NAD27), accuracy is +/- 1 second.
b. ditto
c. Monitored by Coachella Valley Water District

Table 2. Selected water quality analyses from

MSWD wells downgradient from Mission Lakes

Well No.	Date	NO3 (ppm)	SO4 (ppm)	Cl (ppm)
22	05/12/70	5	255	36
22	08/18/70	4	110	20
22	06/23/71	2	170	16
22	01/31/73	3	176	21
22	07/26/75	2.9	145	25
22	08/14/78	1	160	18
22	01/20/82	<1	132	23
22	03/18/88	3.9	170.9	16.8
22	04/21/93	6	74.9	54.2
22	02/27/96	4	186.3	17.2
23	03/04/70	4	142	18
23	07/28/70	2	120	14
23	07/16/75	2.2	137	22.5
23	08/14/78	1	155	14
23	01/20/82	<1	103	21
23	03/18/88	1.4	158.5	12.1
23	06/05/93	1.7	153.2	12.6
30	03/05/96	<2	164.7	10.9

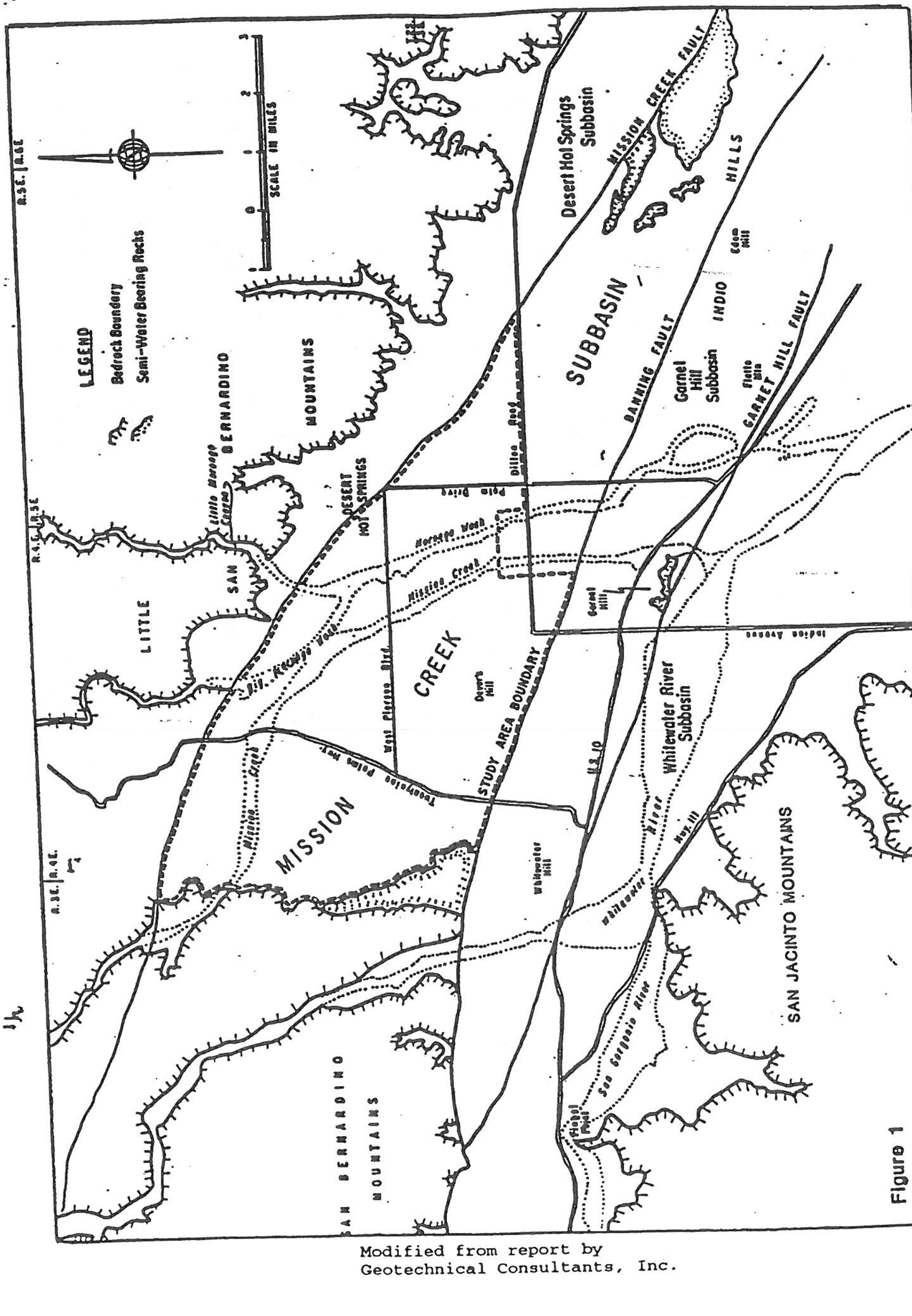


Figure 1
Location Map

Modified from report by
Geotechnical Consultants, Inc.

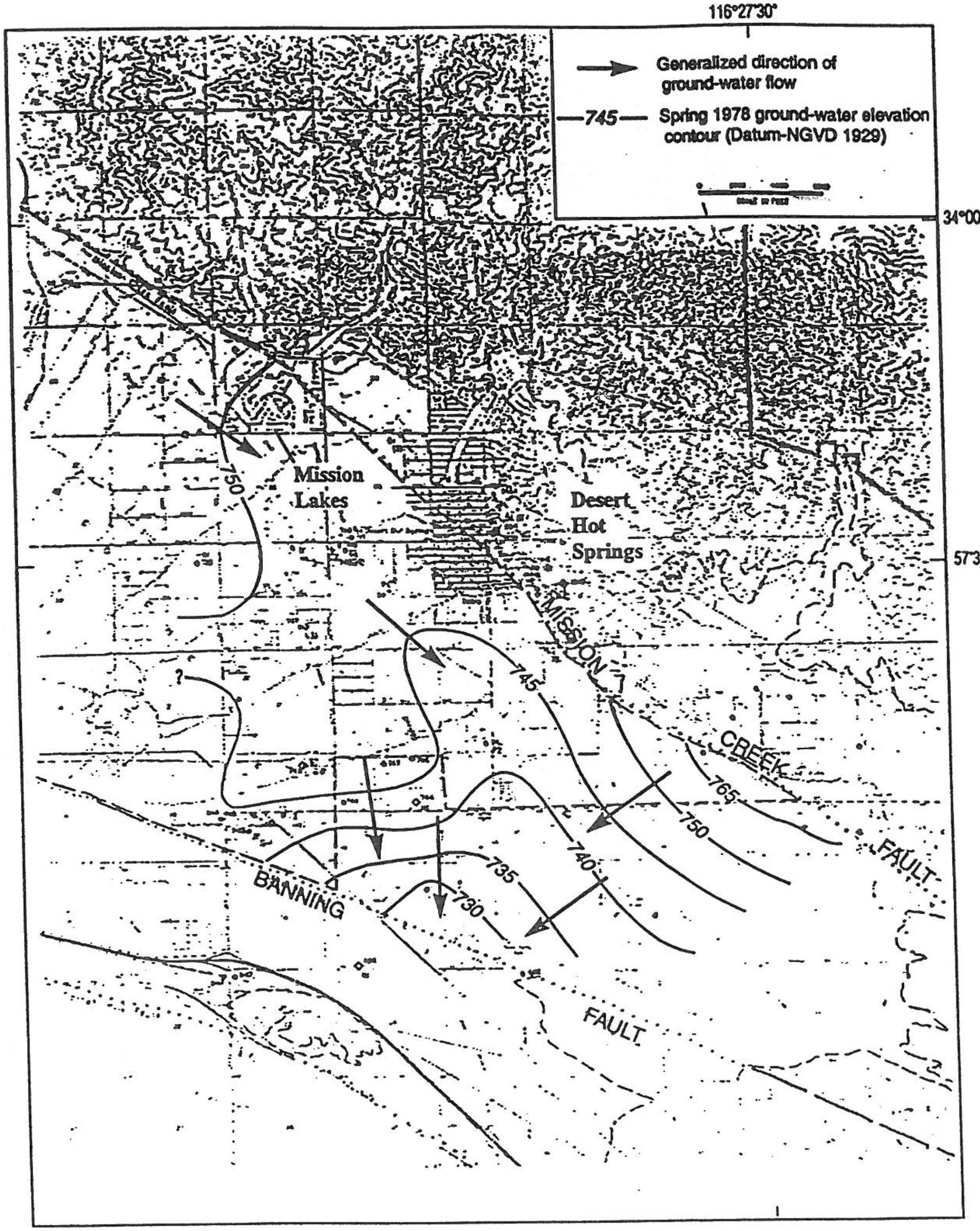


Figure 2. Generalized direction of regional ground-water flow in Mission Creek subbasin

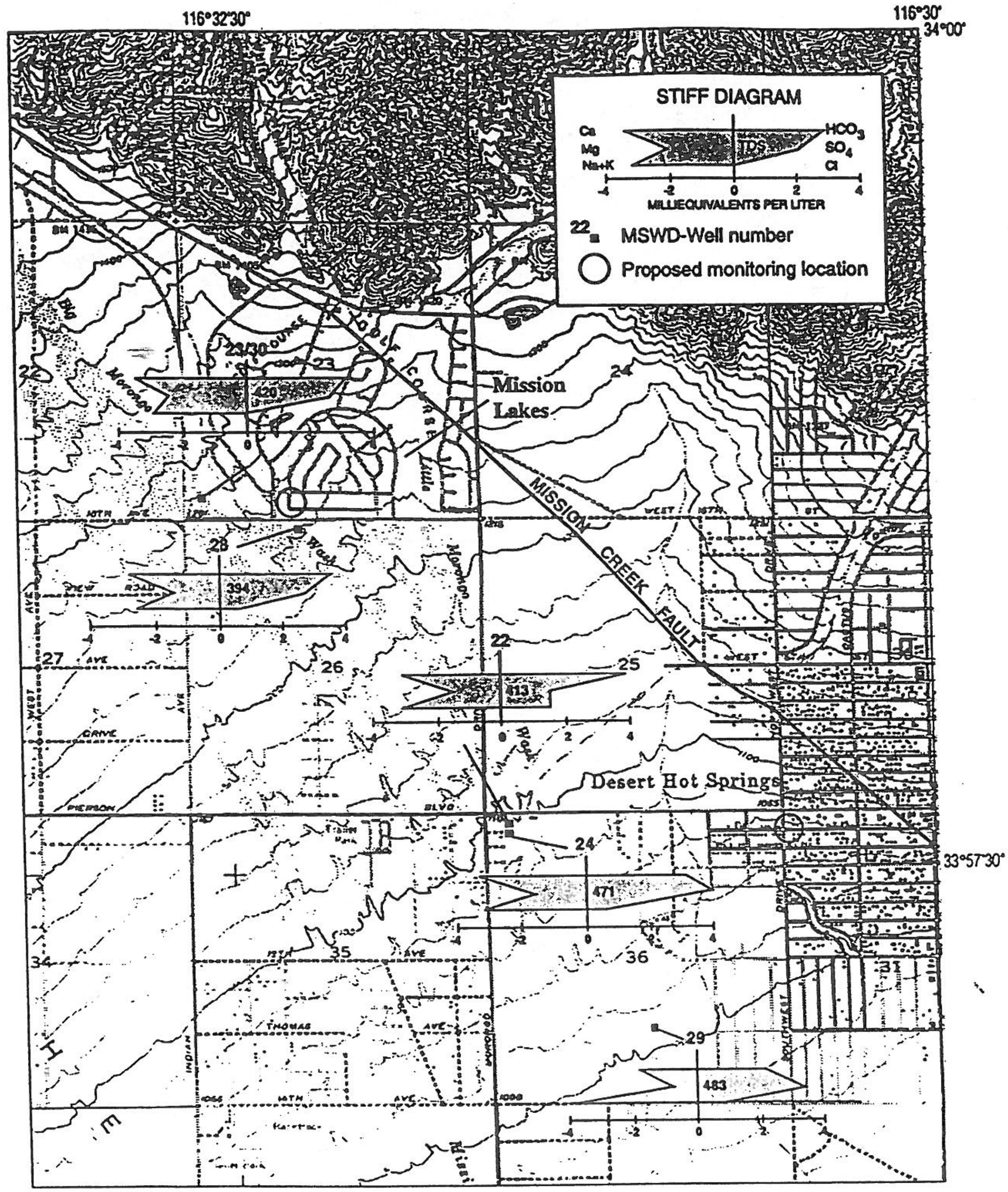


Figure 3. Water-quality analyses (Stiff diagrams) of five MSWD wells
and proposed monitoning location

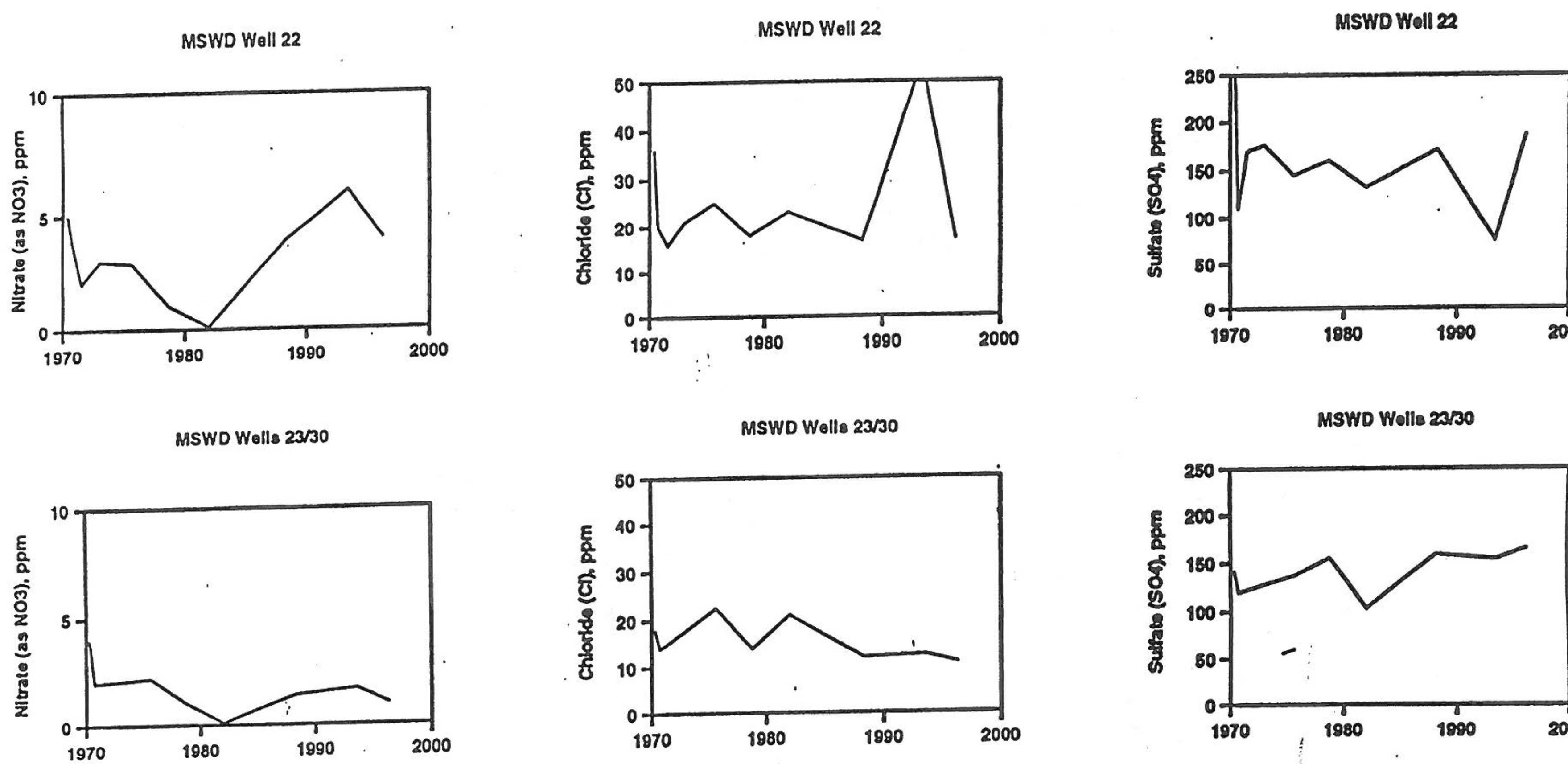


Figure 4. History of Nitrate, Chloride, and Sulfate concentrations in MSWD Wells 22 and 23/30

Data provided by MSWD

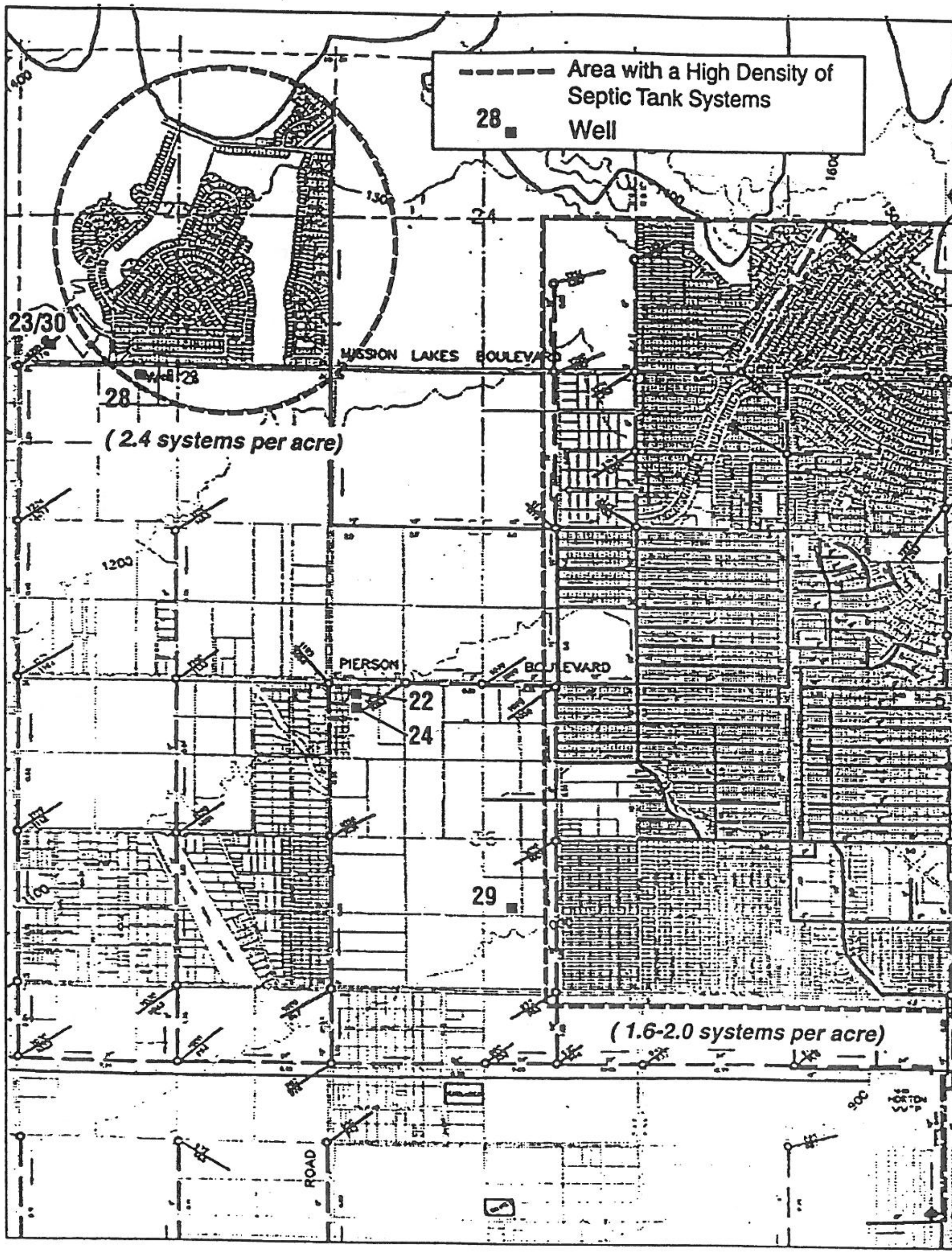


Figure 5. Location of five MSWD wells in the vicinity of high-density septic-tank system areas

APPENDIX B

MICHIGAN TECHNOLOGICAL UNIVERSITY GROUNDWATER STUDY

Michigan Technological University
1400 Townsend Drive, Houghton, Michigan 49931-1295

Department of Geological
Engineering and Sciences
Phone: 906/487-2531
FAX: 906/487-3371
(906) 487-3372
E-mail: asmayer@mtu.edu

September 12, 1996

Mr. J. L. Morgan
Mission Springs Water District
66-575 E. Second Street
Desert Hot Springs, CA 92240

Dear Whitey:

I hope you are doing well. Fall is approaching quickly here. I have enclosed a short report of our activities since I saw you last May in Desert Hot Springs. Please do not hesitate to contact me if you have any questions.

We are planning to come out to Desert Hot Springs to do our geophysical survey November 23–30. I will be calling you soon to talk about our trip and a few other items.

Sincerely,

Alex S. Mayer, Ph.D., P.E.
Assistant Professor
Geological and Environmental Engineering

Report of Activities for the Project

Characterization of a Large Fault Zone as a Barrier to Fluid Flow: The San Andreas Fault near Desert Hot Springs, California

For the Period 6/96 to 8/96

Alex S. Mayer, Ph.D, P.E.
Department of Geological Engineering and Sciences
Michigan Technological University
Houghton, Michigan
September 12, 1996

The purpose of this report is to describe our recent activities on the subject project. This work has been performed by Dr. Mayer and his graduate research assistant, Wesley May. Following is a summary of our activities for the period 6/96 to 8/96.

- Our work has focused on refining our groundwater model of the Desert Hot Springs/ Mission Creek sub-basins. We have completed the first two phases of our modeling efforts. These phases involved calibration of hydrogeological parameters. Calibration involves variation of the hydrogeological parameters while comparing our groundwater model output to existing groundwater level data from 1936 to 1967. When a reasonable match is obtained between model output and existing data, we assume that we have found the best estimate of the parameters. The calibrated parameters include transmissivities, storativities, and combined surface water/groundwater inflows and outflows. Calibration is necessary because independent values of the parameters are unavailable or the quality of the existing values is suspect. Accurate values of each of these parameters are critical to the ultimate success of our groundwater model.

- We have begun the the third phase of our modeling efforts. This phase involves using the calibrated parameters from Phases I and II in our groundwater model to simulate groundwater levels form 1968 to 1995. We are calling Phase III the "verification phase," because we will evaluate the quality of our model calibration. We will compare our model output to the observed 1968 to 1995 groundwater levels. This phase is nearing completion, but we need some additional well pumping rate data to complete our input data for the model. We are sending under separate cover a request for this additional data. When Phase III is completed, we will have our first estimates of the current groundwater flow rate across the fault zone.

- Following Phase III we will conduct a sensitivity analysis, which will be the last phase of the modeling work. In this phase, we will vary the hydrogeologic parameters that we believe to be uncertain. We will use the groundwater model output from the sensitivity analysis to put upper and lower bounds on our estimates of the groundwater flow rate across the fault zone.

- We are planning our field geophysical survey for this November. The geophysical survey will provide detailed information on groundwater levels on either side of the fault zone. We will be using resistivity and possibly other survey methods to determine depth to the water table over a relatively large area. We will conduct a one-week geophysical survey in at least two areas: the Long Canyon break in the Miracle Hill scarp and the vegetated area near Two Bunch Palms. The Two Bunch Palms area is of interest because there is much evidence to suggest that the fault zone is an effective barrier here. The Long Canyon site is of interest because there is reason to believe that the fault zone is a less effective barrier in this area. If time permits, we will also survey the area around Mission Lakes, since this area is of special interest to MSWD. Also if time permits, we may use other geophysical instruments that could provide a "picture" of the fault zone structure. Dr. James Diehl of MTU will provide the geophysics expertise that we will need to conduct the survey. Our tentative plan is to conduct the survey November 23–30, 1996.

- We have extended the completion date for Wesley May's M.S. thesis to mid-November. The calibration work has taken longer than we originally expected. Mr. May has completed about one-third of written thesis, and as described above, has completed a substantial portion of the modeling work.

For further information, contact Dr. Alex S. Mayer, Department of Geological Engineering and Sciences, Michigan Technological University, 1400 Townsend Drive, Houghton, Michigan 49931.

Progress Report:

Characterization of a Large Fault Zone as a Barrier to Fluid Flow: The San Andreas Fault near Desert Hot Springs, California

Mr. Wesley L. May
Dr. Alex S. Mayer

Department of Geological Engineering & Sciences
Michigan Technological University
Houghton, Michigan

June 14, 1996

PURPOSE AND MOTIVATION

The purpose of this report is to provide an update on the current status of our modeling efforts for estimating the rate at which water is flowing across the Mission Creek Fault, a section of the San Andreas Fault in the Upper Coachella Valley.

SUMMARY

Data has been acquired in the form of water levels, pumpage rates and precipitation. A conceptual model of the groundwater flow system was created based on this information. Input files for the USGS MODFLOW (McDonald and Harbaugh, 1988) computer program were created. The first of three modeling phases has been completed with minor revisions to follow. This first phase consisted of a steady state calibration based on 1936 conditions. The second phase, a transient calibration based on the conditions from 1936-67, is currently in progress and will be completed in the next few weeks, allowing work on the third phase (1967-present) to begin.

FORMULATION OF CONCEPTUAL MODEL

The aquifer around Desert Hot Springs consists of Upper Pleistocene sedimentary deposits known as the Cabezon Fanglomerate and Ocotillo Conglomerate, and are overlain by recent alluvium and sand accumulations. The sedimentary deposits are bounded to the north by the metamorphic, pre-Mesozoic San Gorgonio Complex in the Little San Bernardino Mountains and to west by the Upper Miocene Coachella Fanglomerate in the San Bernardino Mountains. The main tectonic features in the area are the Mission Creek and Banning Faults. The Mission Creek is the most active tectonic feature in the area and evidence indicates that it is a barrier to fluid flow (Proctor, 1968).

Formulation of the conceptual model has required the gathering of quantitative and qualitative information. Water levels, well logs, previous research in modeling desert environments, previous modeling work in the Coachella Valley area, geologic descriptions of the area and the function of faults under impermeable conditions are just a few of the various types of information which have been acquired for the creation and verification of the conceptual model.

The conceptual model of the study area consists of a single layer aquifer of unknown thickness, with varying transmissvities and storage coefficients. The aquifer is homogenous vertically and heterogeneous arealy. The conceptual model divides the study area into two unequal parts on either side of the Mission Creek Fault. The fault acts as a horizontal barrier to fluid flow (e.g. Proctor, 1968). The conceptual model is bounded by no-flow boundaries on the north, west, and the southern portion of the eastern boundary, and by constant flux boundaries to the south (Banning fault) and the northern portion of the eastern boundary (see Figure 1). Five area's of inflow and two area's of outflow exist within the study area.

Although it is likely that layers of different geologic materials exist, the processes responsible for the deposition of the aquifer materials make it hard to distinguish the consistency of the layers. That, in combination with the overall thickness and general uniformity of the deposit, led to the assumption that one single layer would be adequate.

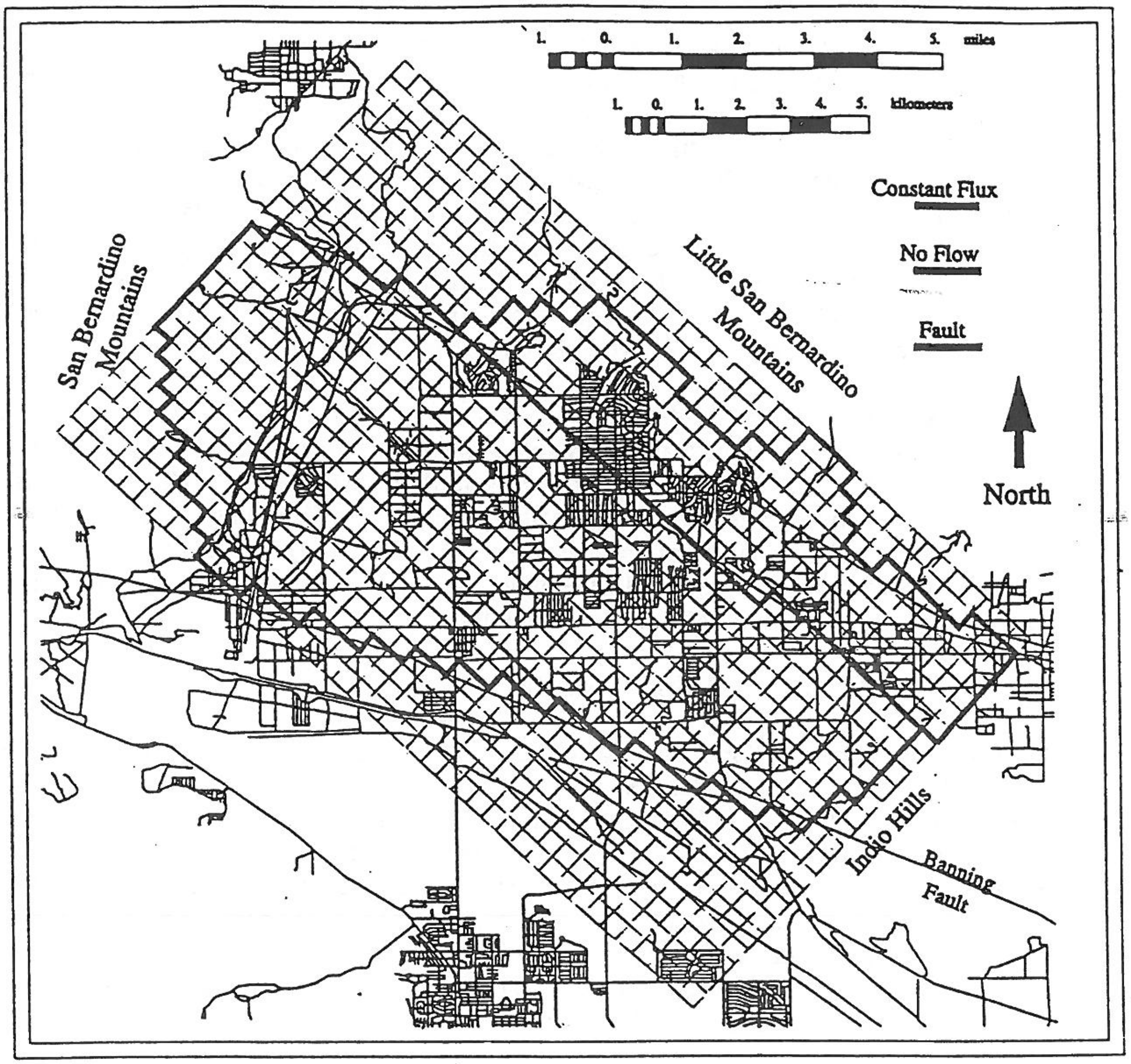
The Desert Hot Springs (DHS) subbasin comprises the northern part of the study area, and is bounded by the Little San Bernardino Mountains to the north and west, Mission Creek Fault to the south and a natural topographic divide to the east. The Mission Creek (MC) subbasin in the southern part of the study area is bounded by the San Bernardino Mountains to the west, Mission Creek Fault to the north, Banning Fault to the south, and the Indio Hills to the east.

The boundaries of the study area were based on the natural hydrogeology of the upper Coachella Valley Region. The San Bernardino (western no-flow boundary) and Little San Bernardino Mountains (northern no-flow boundary) to the west and north, provide no-flow boundaries based on their low hydraulic conductivity in relation to the study area. The Indio Hills (Indio Hills no-flow boundary) to the east, although semi-permeable, are also assumed to be no-flow. The eastern boundary of the DHS subbasin (eastern constant flux boundary) coincides with a natural topographic divide, and is considered a constant flux boundary. The final boundary is to the south, along the Banning Fault (Banning Fault constant flux boundary). Swain (1978) showed that there is a significant amount of groundwater flow across the Banning Fault, with the overall flow direction across the fault being from north to south.

MODFLOW MODEL

The groundwater flow model chosen for the project is the USGS's MODFLOW program. The horizontal flow barrier package (Hsieh and Freckleton, 1993) was added to the base USGS code. The horizontal flow barrier package allows for relatively simple modeling of the barrier behavior of the fault. The parameters used to develop the conceptual model were transferred into a form which could be used as input into the MODFLOW program.

Figure 1: Study Area Showing Boundaries and Grid



The MODFLOW model grid was oriented in such a way that it would most accurately represent the fault while minimizing the amount of inactive cells. The grid is oriented 42 ° east of north, with a uniform spacing of 500 m x 500 m (see Fig. 1). There are 46 columns and 26 rows and a total of 1196 cells within the model grid. Of the 1196 cells, 665 are active and 531 are inactive. The Mission Creek Fault is represented as a horizontal flow barrier within MODFLOW. The MODFLOW program assumes all horizontal barriers to be vertical. The Mission Creek fault is nearly vertical and it has been assumed that the vertical orientation will have little to no affect on the model. The Mission Creek horizontal flow barrier is placed into MODFLOW in the form of a K/b value, where K is the hydraulic conductivity and b is the horizontal thickness of the fault.

It is evident that the aquifer in the study area is unconfined. However, modeling an unconfined aquifer presents some difficulties for this study. In order for an unconfined aquifer simulation to be performed, the saturated thickness and the hydraulic conductivity of the aquifer are needed. The hydraulic conductivity is constant in time and could be determined through calibration. On the other hand, since the saturated thickness changes with time, it is difficult to determine the saturated thickness through calibration. Although, data is available on the saturated thickness at specific times, the accuracy of this data is questionable. Given the difficulty of calibrating to the saturated thickness and the inaccuracy of the existing saturated thickness data, it was decided to model the area under confined rather than unconfined conditions. This change would allow for the input of transmissivity value's that are constant in time, rather then a combination of saturated thickness and hydraulic conductivity. The transmissivity will be allowed to change in space, accounting for spatial variations in hydraulic conductivity and saturated thickness.

The assumption of confined conditions in an unconfined aquifer, brings up the question of what effects this assumption will have on the model as the water levels change. Historic water levels indicate a maximum drawdown of approximately 40 ft. for any one well. Taking into consideration that the saturated thickness in the vicinity of the major wells is anywhere from 700 ft. to 1000 ft., and calculating a transmissivity based on an estimated hydraulic conductivity, it can be seen that the effect on the model will be no more then 4%-6%. This percent error is considered insignificant for the purposes of this modeling effort.

CONCEPTUAL MODEL VERIFICATION

The procedure for the calibration and verification model consists of three separate phases. Phase I is a steady-state model run under the conditions which existed in the vicinity of Desert Hot Springs during 1936. Very little pumping was occurring at this time, making it ideal for a steady state model. The second phase is slightly more involved, as the model is now run from 1936-67 under transient conditions. Pumping was present in the area during this time, but was not a significant amount of the overall water budget. The third and final phase consists of modeling from 1967 to the present. During this time a large amount of pumping was occurring in the area, including a significant number of wells being used by the Mission Springs Water District (MSWD), Coachella Valley Water District (CVWD) and other local users.

PHASE I

WATER BUDGET CALIBRATION

The conceptual model has five inflow and two outflow areas, all of which represent a combination of the surface and subsurface flow. Little Morongo Canyon and Long Canyon both drain into the DHS subbasin, whereas Mission Creek, Big Morongo Canyon and the Dry Morongo Wash all drain into the MC subbasin. It should be noted that the previous model by Tyley (1971) assumed a combined flow from the Morongo Canyons to be flowing into the DHS subbasin. After studying both the topographic and geologic maps of the area, no justification could be found for the inflow from Big Morongo Canyon flowing into the DHS subbasin. Thus, inflow from the Big and Little Morongo Canyons have been evenly divided among the DHS subbasin and the MC subbasin. The inflow values for Mission Creek and the Big and Little Morongo Canyons are from Tyley (1971). The Long Canyon and Dry Morongo Wash inflow values are estimates based on comparisons with the known values.

Representation of the constant flux boundaries was accomplished by designating the cells along the boundary as extraction cells. This allowed the flux rate to be controlled, as the total output along each of the regions was divided evenly among each of the cells. The Banning fault is currently represented by 40 extraction cells, each set at the same extraction rate. The eastern constant flux boundary has six extraction cells, with each set at the same extraction rate

Table 1: Phase I Water Budget

Inputs/Outputs	acre-ft./yr.	m^3/s
INFLOW		
Mission Creek	3,400	0.134
Dry Morongo Wash	875	0.035
Little Morongo Canyon	1,750	0.070
Big Morongo Canyon	1,750	0.070
Long Canyon	875	0.035
INFLOW TOTAL	8,650	0.344
OUTFLOW		
Eastern Constant Flux	1,510	0.060
Banning Constant Flux	7,140	0.284
OUTFLOW TOTAL	8,650	0.344

Table 1 shows the input and output values for the various streams and boundaries for the 1936 steady state model run. The steady state MODFLOW model simulation requires that the water budget balances. The flow across the eastern constant flux boundary was estimated by using current water levels to determine a gradient. The gradient was then multiplied by an estimated hydraulic conductivity for the aquifer to determine the outflow rate. The Banning Fault flux was used as the balancing term in the water budget.

TRANSMISSIVITY AND FAULT PROPERTY CALIBRATION

The phase I steady state MODFLOW simulation was calibrated by adjusting the transmissivities in the subbasins, as well as the K/b values for the Mission Creek Fault.
The data set used in the transmissivity and fault calibration were taken from Tyley's (1971) 1936 contour map of the actual water levels. The contour map was used because the original data points used for the creation of the contour maps could not be obtained. The 1936 contours were overlain onto the model grid and head values were assigned to various cells according to the intersections of the cell centers with the individual contours. These values were contoured using SURFER

(Surfer, 1989), and a head value for each of the active cells was obtained. These head values were used as the calibration data set for the 1936 steady state calibration.

Transmissivities were also obtained from Tyley (1971), but these values were later abandoned as it became evident that they produced poor results in terms of calibration. Several reasons for this can be considered. First, our study area is approximately a fourth of the size of that used by Tyley (1971). Also, the size of the previous model allowed for Long Canyon and Dry Morongo Wash to be ignored as input values. A third possibility might be found in a comparison of the analog method used by Tyley (1971) and the numerical method that is currently being used.

Calibration of phase I consisted of matching, as accurately as possible, the 1936 head values to the output from MODFLOW. Initial runs were compared visually and appropriate adjustments were made. As the changes in heads became more subtle, the method of least squares of the residuals was used to help determine the optimal configuration of transmissivities and K/b values.

CURRENT RESULTS

The current results indicate that the area can be represented by three areas of transmissivity ranging from 4,500 to 66,000 gal/day/ft. (Figure 2). The Mission Creek fault is currently represented by a single K/b value of 2.0×10^{-7} sec^{-1} at each cell over the length of the fault. The Mission Creek fault may need to be broken into two or more smaller sections, to account for lateral changes in permeability. Research conducted by Slade and Misen (1979) indicates the possibility of a lower permeability area along the fault from Miracle Hill to the Indio Hills.

Phase I of the model still needs some work. The current conditions do not represent the DHS subbasin as accurately as would be liked. There are several possibilities for this error. First, the water budget has not been completely solidified. It is assumed that when accurate values are obtained for the flow coming from the Long Canyon and Dry Morongo Wash areas, a better representation of inflows ad outflows will be obtained. Further work in determining the best transmissivities for the aquifer and K/b values for the fault should help as well. The transmissivity may need to be broken down into more than three sections, and may represent an even wider range of values then the present steady state model predicts. The fault may also be separated into smaller sections, representing changes in permeability as you move laterally along the fault.

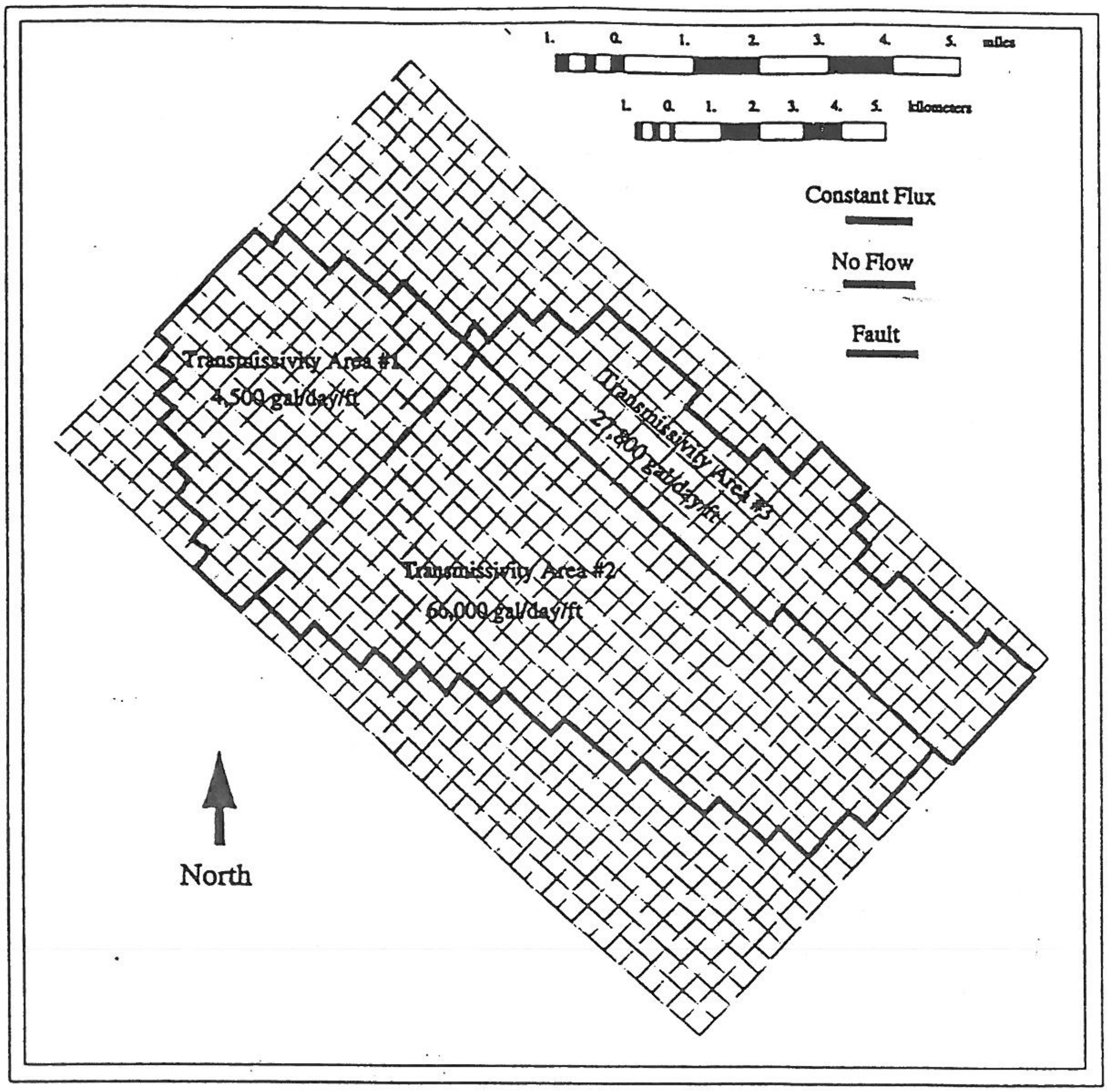
PHASE II

WATER BUDGET

The second phase of the MODFLOW simulation required the addition of the pumping wells into the water budget and MODFLOW was run under transient conditions. The original data points for the pumpage rates for the years 1936-1967, as used by Tyley (1971), have been obtained and input into the model. Tyley's model grid was different than ours, so the locations of the data points were interpreted appropriately.

The water budget inputs and outputs from phase I were left unchanged. The transient model requires the addition of a storage coefficient for each of the active cells.

Figure 2: Transmissivity Assignments from Phase I



STORAGE COEFFICIENT CALIBRATION

The MODFLOW model was run under transient conditions from 1936 to 1967, using a one year time step. Unlike the steady state model, a storage coefficient was needed for each of the cells in the transient model, and pumpage data for the active wells during this time period were added to the MODFLOW model as well.

The second phase was calibrated in approximately the same fashion as Phase I, except that only the storage coefficient was varied. The transmissivity and K/b values determined from Phase I were not changed in Phase II. The 1951 and 1967 contour maps from Tyley (1971) were converted to point vales in the same manner as in Phase I. These head values were compared to the model outputs in the same manner as in Phase I.

CURRENT RESULTS

Currently, a sufficient result has not been obtained for the second phase, although several observations have been made. First, large scale changes (order of magnitude) can be made in the storage coefficient, without dramatically changing the output heads from simulation to simulation. Also, the transient model confirms the basic principles of the storage coefficient. The higher the coefficient, the closer the output heads will be to the initial heads, and the lower the coefficient, the larger the difference between then initial and final heads.

Difficulties are occurring in the matching of the model output to the actual heads from Tyley (1971). The head values calculated by the first phase steady state MODFLOW simulation, although reasonable, are not a perfect match of the 1936 contour map values. This creates difficulties in the matching of contours during the second phase. It is hard to justify using the contour maps for 1951 and 1967 (Tyley, 1971) as the calibration goal, when the transient simulation input values as determined by MODFLOW in phase I, did not accurately match the 1936 water level contours.

We will continue to refine the transmissivity and storage coefficient to better match the 1936 and 1967 head values.

PRELIMINARY RESULTS

Some preliminary results have been obtained, which show the effect of various hydraulic conductivities on the amount of water which flows across the fault (Table 2). It should be noted that these values do not represent final results from the modeling.

As Table 2 shows, the amount of water flowing across the fault begins to decrease as the hydraulic conductivity increases. The same method used to obtain these values will eventually be used during the sensitivity analysis portion of the research. As the sensitivity of the model to changes in the permeability of the Mission Creek fault are examine.

Table 2: Flow Across Mission Creek Fault for given K

Hydraulic Conductivity (m/sec)	Flow Across Fault (acre-ft./yr.)
1.0×10^{-2}	950
1.0×10^{-3}	940
1.0×10^{-4}	840
1.0×10^{-5}	765

* All values based on a horizontal thickness of 50 m for the fault

FUTURE WORK

The second phase will be finished in the next few weeks, allowing work on the third phase to begin. Changes will continue to be made to the first and second phases and the conceptual model, as necessary. Eventually a sensitivity analysis of the Mission Creek fault will be completed. The sensitivity analysis will be used to determine the affect of the fault on the head values in the study area. The data obtained from the model will then be used to estimate the flow across the Mission Creek Fault from the DHS subbasin into the MC subbasin.

REFERENCES

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Surfer Version 4.01, 1989, Golden Software Inc., Golden, Colorado

Swain, L.A., 1978, Predicted Water-Level and Water Quality Effects of Artificial Recharge in the Upper Coachella Valley, California, Using a Finite Element Digital Model, USGS-WRD, 61 pp.

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APPENDIX C

VARIOUS REGULATOR AGENCY CONCERN/PROJECT SUPPORT DOCUMENTATION

STATE OF CALIFORNIA - CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN • REGION 7
73-720 FRED WARING DR., SUITE 100
PALM DESERT, CA 92260
Phone (619) 346-7491
FAX (619) 341-6820

MAY 17 1996

To: Septic Tank Users in the Coachella Valley

RE: Consideration of Alternatives to Subsurface Wastewater Disposal Systems (Septic Tanks)

The California Regional Water Quality Control Board issued a notice last year to all owners and operators in Coachella Valley having Waste Discharge Requirements, which permit the use of subsurface wastewater disposal systems to dispose of domestic wastewater. Since that time Regional Board staff has accumulated considerable evidence indicating that septic tanks have the potential to adversely impact ground water which supplies the Valley with its drinking water supply. Although subsurface wastewater disposal systems do provide some treatment of domestic wastewater, they are also known to be sources of surface and ground water pollution.

The most common problem associated with subsurface disposal systems is their location in high density development areas. The U.S. Environmental Protection Agency has designated areas with septic tank densities of greater than 1 system per 16 acres as areas of potential ground water pollution. Numerous cases of ground water pollution have been reported in areas of high septic tank density.

The types of pollution which have been identified include bacteria, viruses, ammonia, chlorides, phosphates, sodium, nitrates, and hazardous chemicals. Several monitoring reports recently received by this office show levels of volatile organic compounds in wastewater having concentrations exceeding the maximum contaminant levels allowed by the California Drinking Water Standards, apparently resulting from use of cleaning solvents at car and bus washes, and even at mobile home and RV parks. As a result of these discharges of pollutants, the owners or operators of many of these facilities have been required by the Regional Board to have qualified professionals conduct extensive soil sampling and/or cleanup of polluted soil and ground water at considerable expense.

Considering the extremely high cost associated with the cleanup of soil and ground water pollution, Regional Board staff believes that prevention of ground water pollution must be aggressively pursued. Thus, we are strongly recommending that septic tank users phase out the use of septic tanks, particularly where they receive hazardous chemicals or are located in high density developments, and consider alternative disposal methods such as connection to local municipal sewer collection systems as soon as possible.

If you have any questions or desire to meet with us, please contact Charles Springer at (619) 776-8940. We would be pleased to meet with you to discuss this further.

Phil Gruenberg
PHIL GRUENBERG
Executive Officer

CS/pkg

File: ST GC 1.1

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY

PETE WILSON Governor

DEPARTMENT OF HEALTH SERVICES
OFFICE OF DRINKING WATER
601 NORTH 7TH STREET
P. O. BOX 942732
'RAMENTO, CA 94234-7320
.6) 323-6111
FAX (916) 327-6092

RECEIVED
APR 30 1993
REGION 7

April 27, 1993

Mr. Phil Gruenberg
California Regional Water Quality Control Board
Colorado River Basin - Region 7
73-720 Fred Waring Dr., Suite 100
Palm Desert, CA 92260

Dear Mr. Gruenberg:

We have reviewed the report, submitted by the Desert Water Agency (DWA), regarding the study of the effects of subsurface wastewater disposal on groundwater quality in Cathedral City. We agree with the conclusions and recommendations of this report. We have the following responses and recommendations:

1. The immediate health threats posed by overflowing septic tanks and improper use of graywater in residential areas must be addressed. The State Department of Health Services has contacted the local health agency to ensure that they are aware of this situation and that violations are investigated and all possible corrective actions are taken until the area is sewered.

2. Based on the immediate health threat, we recommend that planning necessary for a sanitary sewer system to serve the Cathedral City area be initiated.

3. The DWA operates the domestic water supply system serving the Palm Springs and Cathedral City areas. The Agency obtains most of its water supply from twenty-four wells many of which are located along the Whitewater River channel and within the city limits of Palm Springs and Cathedral City. Well depths range from 450 to 1,123 feet deep, with perforations set at various depths ranging from 268 to 900 feet.

   Although this study was conducted by the Desert Water Agency, its implications may be applicable to other areas of Coachella Valley where subsurface disposal systems are used. Palm Desert Water & Services District, City of Indio, City of Coachella and Coachella Valley Water District all rely exclusively on groundwater from the basin for their domestic water supplies.

There is some debate as to the significance of finding coliphage viruses, or higher than normal nitrate levels individually in a monitoring well. However, the combined presence of coliphage, enteroviruses, and high nitrate levels, in the absence of other possible sources of contamination, definitively supports the premise that wastewater, of human origin, is present in the groundwater in the area of the monitoring wells.

The groundwater contamination found in this area does not pose an immediate threat to the DWA's wells since their wells pump from a greater depth in the aquifer, but it could pose a long-term threat to groundwater quality in the Whitewater River basin.

4. With regard to the Whitewater River basin in general and the number of public water systems relying solely on groundwater supplies, long-term protection of groundwater quality should be addressed in a comprehensive basin management plan. The plan should require all new developments within city boundaries and other areas where high density development may occur to be sewered. Areas presently served by subsurface wastewater disposal systems (within city boundaries) should be connected to wastewater collection and treatment facilities as they become available.

If you have any questions regarding this letter please contact Ms. Toby Roy at (619) 525-4159.

Sincerely,

Cliff Sharpe

Clifford A. Sharpe, P.E., Chief
Field Operations Branch
Office of Drinking Water

cc: Riverside County Department of Health
1737 Atlanta Ave., Bldg. H-5
Riverside, CA 92507
Attn: John Silva

Desert Water Agency
P.O. Box Drawer 1710
Palm Springs, CA 92263
Attn: Gordon Lewis

STATE OF CALIFORNIA — HEALTH AND WELFARE AGENCY

PETE WILSON, Governor

DEPARTMENT OF HEALTH SERVICES
DRINKING WATER FIELD OPERATIONS BRANCH
1350 FRONT STREET, ROOM 2050
SAN DIEGO, CA 92101
(619) 525-4159
FAX (619) 525-4383

April 16, 1997

RECEIVED

APR 24 1997

ALBERT A. [illegible]
CIVIL ENGINEERS

John L Morgan
Mission Springs Water District
66-575 Second Street
Desert Hot Springs, CA 92240

Dear Mr. Morgan:

On March 10, 1997, we received the information you sent on the transport of contaminants from wastewater disposal systems in your groundwater basin and the potential adverse impacts to water quality. It is my understanding the Mission Springs Water District is considering installation of sewers to replace existing septic tanks in an effort to protect the quality of water in your groundwater basin. We support your efforts to protect your groundwater supply by providing municipal sewer service.

Septic tanks can be a source of nitrate, virological and bacteriological contamination in the basin and will have a long term detrimental impact on the quality of water produced by your wells. In addition, future groundwater disinfection regulations will take location and number of septic tanks into consideration when determining disinfection requirements for water systems.

Protecting drinking water supplies and preventing contamination is a high priority for this Department. Recent changes to the Federal Safe Drinking Water Act mandate that States take a more proactive approach to protecting groundwater supplies. As a result, this Department is in the process of adopting a Well Head Protection Program (WHPP) to encourage water systems to take actions which will prevent contamination from occurring. We recommend that you implement a WHPP to further identify areas which are contributing to your water supply and establish well head protection zones for your sources. Attached is some information which you may find useful for establishing a WHPP in your area.

If you have any questions regarding this letter, or need any technical assistance in setting up a WHPP, please contact Brian Bernados or me at (619) 525-4497.

Sincerely,

Toby J. Roy

Toby J. Roy, P.E.
District Engineer

Attachment
cc: Riverside County Environmental Health Services

COUNTY OF RIVERSIDE • HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH

April 22, 1997

John L. Morgan
Mission Springs Water District
66-575 Second Street
Desert Hot Springs, CA. 92240

Dear Mr. Morgan,

The Department of Environmental Health is very supportive of your Districts position regarding the elimination of septic tanks within the Mission Springs Service Area.

Although properly designed and installed individual subsurface sewage disposal systems (septic) can function for many years in desert areas, the adverse impact on ground water can be significant, especially when dwelling/unit density exceeds one per 1/2 acre. This department has already noted elevated nitrate levels in the shallow ground water aquifers in some portions of your service area (as you know, nitrate levels in drinking water of more than 45 parts per million may cause a serious blood disorder in infants call Methemoglobinemia).

Finding an affordable method to finance public sewers is always a problem. If you haven't already contacted the County Economic Development Agency regarding possible grants or low interest loans. I suggest you call Vickie Burt at (760) 863-7060.

Sincerely,

Donovan E. Park

Donovan E. Park,
Assist. Public Health Engineer

John M. Fanning, Director
4065 County Circle Drive • Riverside, CA 92503 • Phone (909) 358-5316 • FAX (909) 358-5017
(Mailing Address – P.O. Box 7600 • Riverside, CA 92513-7600)

STATE OF CALIFORNIA - CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

PETE WILSON, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN • REGION 7
73-720 FRED WARING DR., SUITE 100
PALM DESERT, CA 92260
Phone (619) 346-7491
FAX (619) 341-6820

FEB 13 1997

John L. Morgan, General Manager
Mission Springs Water District
66-575 Second Street
Desert Hot Springs, CA 92240

RE: Septic Tank Use

We strongly support and encourage the use of community sewerage systems rather than septic tank systems in your community. Community sewerage systems lead to a better treated and better controlled discharge than do septic tank systems. Septic tank systems, as discovered numerous times throughout our Region, can serve as a repository for hazardous wastes and anything else dumped into them. We have accumulated considerable evidence indicating that septic tank systems have the potential to adversely impact groundwater which serves as the Coachella Valley's drinking water supply.

Once groundwater has been polluted, it is extremely expensive to clean. One case involving a septic tank and subsurface disposal system required the discontinued use of a major municipal supply well. Thus, the community served by that particular well lost the capital investment associated with the well construction. Also, the drinking water demand which that well satisfied required replacement. Unfortunately, the burden of groundwater clean up and overall costs of such sites is often paid by the public. Small businesses and property owners rarely possess the funds needed to adequately clean the groundwater to the safe levels for municipal use. Groundwater clean up projects are extremely expensive.

Community sewerage systems, on the other hand, provide excellent protection of groundwater resources and relieve the homeowner of the burden associated with maintenance and rehabilitation of the septic tank system. Inappropriate wastes entering sewerage systems, and eventually the environment, can be controlled or identified and abated through an effective pretreatment program. Wastewater treated by a community sewerage system is of significantly better quality and can be reused for irrigation or process water. When percolated back to the water table, the quality of community system treated wastewater is much more protective of the groundwater. Threat of nitrate pollution in the groundwater is reduced through the generation and removal of the sewage sludge. Also, operation, maintenance, and conveyance of wastewater is the responsibility of trained and experienced professionals. Such individuals are dedicated to the protection of human health and the environment. Community sewerage systems alleviate the homeowner from having to deal with costly septic tank pumpings, hazardous disposal field failures, and costly disposal field replacement. It is well established that all disposal fields eventually fail. Overall, it is in the interest of the community to support community sewage treatment systems.

In most cases, community sewage treatment systems are not prohibitively expensive. Various institutions have low interest loans available with up to forty year lending periods. Some institutions combine some grant money with the loans. The State Revolving Fund is California's funding source through the Clean Water Act. It provides direct low-interest loans with interest rates at approximately one-half the interest rate of the most recent sale of a State general obligation bond. Loan terms for the State Revolving Fund Loan cannot exceed twenty years. Loans can also be obtained through private corporations. By obtaining low-interest loans, communities have found that community sewage treatment systems are generally affordable and cost-effective. Our contact person for the State

Revolving Fund Loan is Suhas Chakraborty. He can be reached at (619) 776-8961.

Should you have any questions regarding this matter, please do not hesitate to phone Todd Thompson at (619) 776-8941.

PHIL GRUENBERG
Executive Officer

TT/hs

File Ref: ST GC 1.1

SACRAMENTO ADDRESS:
NANCY LUCCHESI NEWBILL
CHIEF OF STAFF
☐ STATE CAPITOL
SACRAMENTO, CA 95814
(916) 445-5581
FAX (916) 327-2187

COMMITTEES:
AGRICULTURE & WATER RESOURCES
APPROPRIATIONS
BUSINESS & PROFESSIONS
ENERGY, UTILITIES & COMMUNICATIONS
TRANSPORTATION, VICE CHAIRMAN

Senate
California Legislature

DAVID G. KELLEY
SENATOR
37TH DISTRICT

CHAIRMAN
CONSTITUTIONAL AMENDMENTS COMMITTEE

DISTRICT ADDRESS
DOROTHY MOELTER
DISTRICT COORDINATOR
☐ 11440 W. BERNARDO CT., #104
SAN DIEGO, CA 92127
(619) 675-8211
(619) 675-8262 FAX
☐ 73-710 FRED WARING DRIVE, #108
PALM DESERT, CA 92260
(619) 346-2099
(619) 346-0341 FAX
1(800) 824-5200

February 28, 1997

Mr. John L. Morgan
General Manager
Mission Springs Water District
66-575 Second Street
Desert Hot Springs, CA 92240

Dear Mr. Morgan:

Thank you for your recent correspondence regarding the elimination of septic tanks in the Desert Hot Springs area.

I understand the need for the construction of sewers to replace septic tanks. I commend the water district for taking steps to start this process. I support that effort.

As I sit on the Agriculture and Water Resources Committee, I understand the great need to protect our state's groundwater. I commend the district for making the community aware of the importance of our groundwater. Certainly it is less costly to use preventative measures versus cleanup.

Desert Hot Springs sits in a unique area in the Coachella Valley and is famous for it's mineral spring spas which attract many tourists. So the importance of sewers from the standpoint of economy and safety is something the citizens of Desert Hot Springs deserve.

This project, undertaken by Mission Springs Water District, has my full support.

Best regards,

DAVE KELLEY

DK/bc

Desert Hot Springs Groundwater Guardian Team

February 21, 1997

John L. Morgan
General Manager
Mission Springs Water District
66575 Second Street
Desert Hot Springs Ca.

Dear Mr. Morgan:

The Groundwater Guardian Team has worked with the Water District for the past several years, protecting our wonderful natural resource-our water.

It is important for you to know that the Groundwater Guardian Committee is behind the Mission Springs Water District 100%, in its efforts to construct sewers in Desert Hot Springs. We are all aware that the one thing that will contaminate our wonderful hot mineral water and our pure drinking water is inadequate septic systems.

We sincerely hope that the lending institutions as well as local, state and federal agencies will be aggressive in giving their support in this critical process.

Thank you for your efforts in protecting our wonderful water. If there is anything that the Groundwater Guardian Committee can do, please give us the opportunity.

Sincerely,

Mac H. Villines
Chairman, Groundwater Guardian Committee

* Desert Hot Springs Chamber of Commerce • Post Office Box 848 • Desert Hot Springs, California 92240

Wednesday, February 19, 1997

Mission Springs Water District
John Morgan, Manager
66575 E. 2nd
Desert Hot Springs, CA 92240

Dear John,

Desert Hot Springs Sunrise Rotary Club realizes the importance of clean, fresh, mineral water for our potable water supplies and the need for our hot water for our spas and resorts in the community.

We certainly support the board's and your efforts to construct municipal sewers in the Desert Hot Springs area. Any effort that we can help you with in this regard will certainly be considered by our rotary club.

Sincerely,

Colleen Peters

Colleen Peters
President

Desert Hot Springs Women's Club

P.O. BOX 955 * DESERT HOT SPRINGS, CA. 92240

March 4, 1997

Mr. John L. Morgan
General Manager
Mission Springs Water District
66575 Second Street
Desert Hot Springs CA 92240

Dear Mr. Morgan,

Your letter of February 12, 1997 was read at our monthly business meeting today. The information regarding the community sewer system was most informative.

As citizens we are also deeply concerned about the pollution of our groundwater. You are to be commended for your efforts in aleviating this problem.

Most Sincerely,

Gretchen McBride

Gretchen McBride, Corresponding Secretary

APPENDIX D

RECORDS FOR SEPTIC SYSTEMS PUMPED MORE THAN ONCE WHICH ARE NOT LOCATED IN EXISTING ASSESSMENT DISTRICTS

Misslon Springs Water District
Septic Systems Pumped more than once
Not in Assessment Districts

Address	Dates Pumped
65820 10h St.	1/07/94 9/19/95
66071 12th St.	9/15/92 1/17/95 5/08/95
66195 12th St.	1/09/94 4/01/94
66472 12th St.	12/17/92 8/29/94 10/13/94
66735 12th St.	7/20/94 12/31/95
66125 14th St.	2/14/92 3/23/92 6/08/93 6/19/93 7/31/93 8/07/93
66215 14th St.	2/10/92 1/15/94
64580 16th Ave.	5/27/93 12/03/94
12570 Agua Cayendo	4/19/93 6/28/95
12890 Agua Cayendo	3/08/94 1/31/95
57858 Annandale "The Ranch"	2/13/92 5/13/92 8/12/92 11/11/92 2/11/93 5/12/93 8/11/93 2/09/95 5/09/95
16190 Ave. Descanso	10/05/94 10/21/94

Mission Springs Water District
Septic Systems Pumped more than once
Not in Assessment Districts

66188 Ave. Dorado	12/20/94 12/06/95
15422 Ave. Florencita	10/4/94 7/17/95
15560 Ave. Florencita	9/29/94 10/02/94
16433 Ave. Garcia	10/1/94 12/09/95 3/30/96
13260 Ave. Hermosa	4/02/93 5/26/94
13316 Ave. Hermosa	4/02/93 5/26/94
66014 Ave. Jalisco	12/11/92 12/15/92 3/15/93 9/13/94 2/16/95 2/20/95 9/21/95
66035 Ave. Jalisco	6/11/93 11/20/93
66176 Ave. Ladera	1/29/94 2/02/94
12394 Ave. Serena	2/10/93 2/02/94 7/14/94
12577 Ave. Serena	7/20/94 5/03/95
66223 Ave. Suenos	7/04/94 10/18/94
15500 Bubbling Wells Mobile Home Park	41 times between 1/03/92 and 4/22/96 almost twice a month during the season (winter)
16400 Bubbling Wells RV Park attached to 15500	6 times in 1994
13740 Cactus	4/28/93 6/04/93

Mission Springs Water District
Septic Systems Pumped more than once
Not in Assessment Districts

13875 Caliente	3/07/95 10/27/95 12/19/95 6/05/96
68061 Calle Azteca	2/05/93 2/22/93 3/15/93 5/05/93 6/09/95 7/01/95
68073 Calle Azteca	7/15/94 10/27/94
68110 Calle Blanco	2/28/94 3/22/94
68065 Calle Bolso	11/13/94 12/06/94
68265 Calle Cerritos	2/21/93 4/11/94 4/25/94
9275 Calle Escorial	5/18/92 11/15/92 6/15/94 6/10/95
68135 Calle Las Tiendas	3/21/92 10/09/92 9/08/94 1/02/95 5/05/95 6/06/95
68140 Calle Las Tiendas	10/18/95 1/24/96
12770 Catalpa	1/8/94 3/09/94 5/10/94 6/18/94
12852 Catalpa	3/16/92 4/11/92 3/02/94 1/15/95

Mission Springs Water District
Septic Systems Pumped more than once
Not in Assessment Districts

13686 Colony	1/15/93 7/06/93 1/24/96
13696 Colony	1/22/92 10/29/93
13735 Colony	6/25/94 1/09/96
17129 Covey	7/03/95 3/16/96
12788 Cuando	5/06/92 5/08/95 7/03/95
12945 Cuando	7/15/93 8/14/93 12/27/93 9/25/95
13370 Cuando	5/02/94 3/09/95
13420 Cuando	3/26/92 5/13/95
13475 Cuyamaca	1/22/92 1/29/92 2/4/92
9550 Del Diablo	6/23/92 11/15/92
13615 Del Ray	5/12/92 9/18/92 1/08/95
65260 Dillon	4/11/94 4/06/95
66455 Dillon	2/07/93 1/22/94
70405 Dillon	2/03/94 2/17/94 2/22/94 2/28/94 4/08/94

Mission Springs Water District
Septic Systems Pumped more than once
Not in Assessment Districts

13604 Don English — Riverside Co. Housing	12/20/93 1/25/95 3/15/95 3/30/95 4/03/95 4/19/95 1/19/96 plus ten more between this date in 4/30/96
13267 El Cajon	5/02/94 2/13/96 3/02/96
9526 El Mirado	9/12/94 10/20/94
9780 El Mirado	10/16/93 3/20/94 5/05/94 6/24/94 9/19/94
13369 El Rio	2/14/95 6/29/95
11255 Foxdale	6/4/92 6/15/92 5/16/94
13285 Hermano	11/12/94 11/12/95
13485 Hermano	12/15/92 11/09/93
13525 Hermano	1/20/92 3/19/92
13640 Hermano	6/25/94 9/28/94 1/30/96
12575 Hidaldgo	4/17/92 10/07/92 6/09/93 8/31/94
13680 Hidalgo	4/904/94 9/18/95

Mission Springs Water District
Septic Systems Pumped more than once
Not in Assessment Districts

13850 Hidalgo	12/02/92 2/26/94
13885 Hidalgo	3/24/93 4/26/93 4/10/94
13900 Hidalgo	12/13/94 1/25/95
13485 Inaja	1/25/95 2/09/95
14200 Indian	7/08/92 10/19/92 6/01/94 12/08/94
17069 Indian	3/17/92 10/08/92
17825 Indian	8 times in 1992 2 in 1993 2 in 1994 1 in 1995
66320 Ironwood	8/19/93 9/23/93 9/13/94 11/27/95 3/30/96
13315 La Mesa	3/06/95 6/30/95
13924 La Mesa	6/27/94 5/09/95
16800 Little Morongo	4/08/92 9/17/92
67745 Loma Vista	11/20/93 1/27/95
67750 Loma Vista	1/05/96 6/11/96
13575 Mark	5/04/92 1/29/95
13285 Mesquite	3/23/92 5/04/92 11/12/92

Mission Springs Water District
Septic Systems Pumped more than once
Not in Assessment Districts

66071 Mission Lakes Blvd.	12/22/94 1/17/95
66854 Mission Lakes Blvd.	2/17/93 6/08/95
64035 Mobile	1/25/93 2/16/94 9/09/94 3/25/95
12550 Mountain View	5/27/95 8/28/95
13484 Mountain View	5/18/95 10/31/95
15733 Ocotillo	1/21/93 3/30/94
10805 Palm	01/31/92 2/01/93
13947 Palm	5/13/94 12/05/94 7/11/95
14881 Palm	11/4/92 11/14/94
64625 Pierson Blvd.	5/10/93 5/21/93 7/09/93 8/24/93 4/04/94 9/22/94 11/25/94 1/30/95
66709 Pinto	1/25/94 2/01/94
13305 Quinta	1/19/92 4/16/93
13460 Quinta	5/08/95 7/05/95
13705 Quinta	4/23/93 10/10/94 6/01/95 8/07/95

Mission Springs Water District
Septic Systems Pumped more than once
Not in Assessment Districts

13038 Ramona	5/06/92 1/18/95 2/28/95
13425 Ramona	4/17/93 2/11/95
12572 Redbud	7/04/92 1/08/96
66894 San Ardo	2/08/95 5/03/95
66965 San Ardo	2/14/94 1/27/95 10/23/95
66809 San Bruno	3/03/92 11/02/93
66920 San Carlos	10/06/94 3/19/96
66051 San Jose	2/02/93 2/21/94 6/20/94 9/20/94
66327 San Juan	6/22/94 11/08/94 6/23/95
66414 San Marcus	12/09/93 02/07/94
66473 San Marcus	3/13/92 6/28/96
66540 San Marcus	2/25/92 4/15/92 5/05/94 9/19/94 12/20/94 3/14/95 4/07/95 plus 13 between this date and 10/26/95 nothing since
66596 San Marcus	3/21/96 3/25/96

Mission Springs Water District
Septic Systems Pumped more than once
Not in Assessment Districts

9638 San Rafael	1/08/93 3/03/94 12/31/94
66636 San Rafael	4/06/92 12/23/92 4/15/93
66671 San Rafael	7/27/92 10/01/94 6/03/95
66878 San Rafael	5/06/92 12/24/94
66919 San Rafael	9/29/93 2/09/94 2/19/94 2/22/94 10/28/95
9638 San Simeon	1/12/94 2/08/94
9728 San Simeon	8/24/92 12/28/92 4/19/93 2/13/95
9751 San Simeon	1/14/92 9/30/93 12/07/93
67684 San Tomas	3/13/94 6/14/94
9900 Santa Cruz	2/24/92 9/07/95
10270 Santa Cruz	9/22/94 10/04/94 10/29/94
10304 Santa Cruz	3/05/93 2/16/95
10386 Santa Cruz	2/07/92 12/29/92 3/10/93

Mission Springs Water District
Septic Systems Pumped more than once
Not in Assessment Districts

66125 Santa Rosa	1/10/92 11/09/94 4/26/95
66181 Santa Rosa	10/26/93 12/15/93
12501 Spruce	1/05/93 8/26/93 12/28/95
12921 Tamar	10/29/92 12/30/93
12101 United	5/25/94 4/17/95
9665 Valparaiso	7/11/94 2/21/95
9705 Verbena	9/18/93 3/22/94 11/29/95
55860 Verbenia	10/07/92 9/22/93 10/02/95
16225 Via Corto	2/25/93 4/10/93 4/27/93 11/23/93 1/26/94 2/18/94 8/27/94 9/01/94 5/21/95
16280 Via Corto	11/14/93 7/30/94
16200 Via El Rancho	7/09/94 1/02/95
16410 Via El Rancho	3/12/92 5/08/95
15533 Via Quedo	11/25/92 10/12/93

Mission Springs Water District
Septic Systems Pumped more than once
Not in Assessment Districts

15650 Via Quedo	3/28/92 5/26/93 1/31/94
16365 Via Quedo	9/21/94 11/13/95
16400 Via Quedo	2/07/94 11/13/95
13920 Via Real	4/07/94 10/15/94 1/18/95 7/27/95
66574 Yucca	12/23/92 4/28/94
66622 Yucca	12/21/92 8/23/94

APPENDIX E

NEWSPAPER ARTICLE
INTERNATIONAL WATER TASTING AND COMPETITION

APPENDIX F

UNIT CONSTRUCTION COST ESTIMATING DATA

MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT
CONSTRUCTION COST ESTIMATING DATA[1,2]

1. SEWERMAIN CONSTRUCTION COST

8" VCP Sewer	=	$30.30/LF
Pavement Removal, Replacement, & Cap		
3" AC Over 6" AB = $16.00/LF		
1" AC Cap (12' Wide) = 4.00/LF		
	=	$20.00/LF
Manholes $2400/ea		
÷ 300' (Avg. Spacing)	=	$ 8.00/LF
TOTAL SEWERMAIN CONSTRUCTION COST	=	$58.30/LF

2. SEWER LATERAL CONSTRUCTION COST[3]

4" VCP	= 30 x $28.60	=	$ 858
3" AC Over 6" AB	= 30 x $ 7.70	=	$ 231
1" AC Cap (8' Wide)	= 30 x $ 2.20	=	$ 66
TOTAL SEWER LATERAL CONSTRUCTION COST		=	$1,155/EA

1. Engineering News Record (ENR) Construction Cost Index Los Angeles, September, 1996 (ENR 6519).
2. Construction costs include items indicated as well as costs for mobilization, traffic control, shoring and bracing, and special construction items such as sand cement slurry backfill under "tunneled" existing concrete facilities (i.e. curb and gutter), existing landscape and facility repair and/or replacement, ductile iron pipe sewer (where required), concrete encasement, etc.
3. Assumed average length = 30 LF.

APPENDIX G

STATE WATER RESOURCES CONTROL BOARD
NOTICE TO ALL AGENCIES SEEKING FFY 1997 STATE REVOLVING FUND LOANS

Cal/EPA

State Water
Resources
Control Board

Division of
Clean Water
Programs

Mailing Address:
P.O. Box 944212
Sacramento, CA
94244-2120

2014 T Street,
Suite 130
Sacramento, CA
95814
(916) 227-4428
FAX (916) 227-4349

Pete Wilson
Governor

NOV 7 1996

NOTICE TO ALL AGENCIES SEEKING FEDERAL FISCAL YEAR (FFY) 1997 STATE REVOLVING FUND (SRF) LOANS IN CALIFORNIA

RECEIVED
NOV 18 1996
ALBERT A. ... CIVIL ENGINEERS

Enclosed is the FFY 1997 SRF Loan Project Priority List which was adopted by the State Water Resources Control Board (SWRCB) on September 19, 1996. This list was subsequently approved by the Environmental Protection Agency (EPA) on October 16, 1996.

On May 16, 1996, the preliminary list was distributed to interested parties for review and comment. Opportunity for comment was provided at a public hearing on July 3, 1996, and at the September 4, 1996 workshop. Modifications to the preliminary list were made in response to the comments received.

As indicated in Resolution No. 96-064, the SWRCB:

1. Approved the placement of Priority Classes A through D on the fundable portion of the FFY 1997 Priority List.

2. Approved funding in FFY 1997 for construction of new collection systems and combined sewer overflow projects to be funded in FFY 1997 and defers funding for major sewer rehabilitation projects and directs that major sewer rehabilitation projects be placed on the unscheduled portion of the FFY 1997 list.

3. Approved placement of a funding cap between $5 million to $20 million (the amount of funds that any one agency can receive from FFY 1997 funds) depending on the level of funding available in FFY 1997.

All scheduled projects will compete for SWRCB approval on a first-come, first-served basis until the available funds are expended. To ensure funding in FFY 1997, we encourage all agencies on the fundable portion of the list to proceed as quickly as possible to submit the required documentation and obtain the approvals necessary to receive a loan. The fundable portion of the list includes projects in Classes A,B,C, and D. Inclusion on the fundable portion of the FFY 1997 Priority List is not a commitment to fund a project.

Any questions on the FFY 1997 Priority List should be directed to Eric Torguson of my staff at (916) 227-4449.

Sincerely,

Harry M. Schueller, Chief
Division of Clean Water Programs

Enclosure

STATE OF CALIFORNIA
REVOLVING FUND LOAN PROGRAM

FINAL
FEDERAL FISCAL YEAR 1997
PROJECT PRIORITY LIST

SEPTEMBER 19, 1996

BASIN	AGENCY	PROJECT NUMBER	DESCRIPTION / ELIGIBLE COST BY NEEDS CATEGORY ($1000)	PROJECT COST	CLASS	RANK	'97	'98	'99	'00	'01	'UN
7	HOLTVILLE,CITY OF	4503-11	WASTEWATER TREATMENT PLANT EXPANSION (I)=4500	4500	C	22000						X
7	MISSION SPRINGS WATER DISTRICT	4250-21	WASTEWATER TREATMENT PLANT EXPANSION-PHASE II (I)=5000	5000	D	800	X					
7	MISSION SPRINGS WATER DISTRICT	4250-31	WASTEWATER COLLECTION SYSTEM (IIIA)=25700	25700	D	900	X					
7	NEEDLES, CITY OF	4430-11	WASTEWATER TREATMENT PLANT IMPROVEMENTS (I)=6000	6000	C	7000	X					
7	PALM SPRINGS, CITY OF	4249-11	WASTEWATER TREATMENT PLANT EXPANSION (I)=19000	19000	D	7600						X
8	BEAUMONT, CITY OF	4194-11	STAGE I WASTEWATER TREATMENT PLANT EXPANSION (RECLAMATION) (II)=6265	6265	C	13000	X					
8	BIG BEAR AREA REGIONAL WW AGENCY	4212-11	LANDSCAPE IRRIGATION AND GROUNDWATER RECHARGE (RECLAMATION) (I)=7000	7000	C	22300						X
8	BIORECYCLING TECHNOLOGIES INC.	6030-11	DAIRY MANURE RECYCLING FACILITY (VI)=17813	17813	B	2500	X					
8	CHINO BASIN MUNICIPAL WATER DISTRICT	4175-11	LANDSCAPE IRRIGATION-CARBON CANYON (RECLAMATION) (I)=6200	6200	C	17600	X					
8	CHINO BASIN MUNICIPAL WATER DISTRICT	4183-11	LANDSCAPE IRRIGATION (REGIONAL PLANT NO. 4) (RECLAMATION) (I)=19400	19400	C	17700	X					
8	CHINO BASIN MUNICIPAL WATER DISTRICT	4185-11	LANDSCAPE IRRIGATION - REGIONAL PLANT NO. 1 (RECLAMATION) (I)=2000	2000	C	17800	X					
8	CHINO BASIN MUNICIPAL WATER DISTRICT	4347-11	REGIONAL PLANT NO. 1 - (TREATMENT PLANT) DENITRIFICATION UPGRADE (I)=24400	24400	C	18900		X				
8	CHINO BASIN MUNICIPAL WATER DISTRICT	4348-11	TREATMENT PLANT UPGRADE & RELOCATION - REGIONAL PLANT NO 2 (I)=100000	100000	C	19000		X				

BASIN	AGENCY	PROJECT NUMBER	DESCRIPTION / ELIGIBLE COST BY NEEDS CATEGORY ($1000)	PROJECT COST	CLASS	RANK	'97	'98	'99	'00	'01	'UN
8	COLTON, CITY OF	4251-12	TOTAL DISSOLVED SOLIDS FACILITIES (I)=4313	4313	C	2200	X					
8	COLTON, CITY OF	4251-11	2 MGD SECONDARY TREATMENT PLANT EXPANSION AND TITLE 22 REPAIRS (I)=19400	19400	C	10300	X					
8	CORONA, CITY OF	4461-11	WASTEWATER TREATMENT PLANT #1 EXPANSION & GROUNDWATER DESALTER (I)=69360	69360	D	1500	X					
8	CORONA, CITY OF	6016-11	SANTA ANA RIVER DISCHARGE PROGRAM (VI)=100	100	D	5900	X					
8	EL TORO WATER DISTRICT	4453-11	WWRP RECONSTRUCTION PROJECT (I)=12871	12871	C	400	X					
8	ELSINORE VALLEY MUNICIPAL WATER DIST	4417-13	CANYON LAKE PIPE & MANHOLE SEALING (IVA)=1300	1300	C	9100	X					
8	ELSINORE VALLEY MUNICIPAL WATER DIST	4311-11	COTTONWOOD HILLS-CYN LAKE RECLAMATION SYSTEM (RECLAMATION) (I)=5000	5000	C	18600		X				
8	ELSINORE VALLEY MUNICIPAL WATER DIST	4310-11	DOWNTOWN RECLAMATION SYSTEM (RECLAMATION) (I)=8500	8500	C	20200			X			
8	ELSINORE VALLEY MUNICIPAL WATER DIST	4312-11	NORTH LAKE ELSINORE RECLAMATION SYSTEM (RECLAMATION) (I)=4500	4500	C	20300			X			
8	ELSINORE VALLEY MUNICIPAL WATER DIST	4313-11	SOUTH LAKE ELSINORE RECLAMATION SYSTEM (RECLAMATION) (I)=5750	5750	C	20600			X			
8	ELSINORE VALLEY MUNICIPAL WATER DIST	4314-11	NORTHEAST LAKE ELSINORE RECLAMATION SYSTEM (RECLAMATION) (I)=3500	3500	C	20700			X			
8	ELSINORE VALLEY MUNICIPAL WATER DIST	4335-11	WILDOMAR SEWER COLLECTION SYSTEM (IVA)=9750	9750	D	7100			X			
8	IDYLLWILD WATER DISTRICT	4205-11	GROUNDWATER RECHARGE (RECLAMATION) (I)=2000	2000	C	14300	X					

APPENDIX H

MISSION SPRINGS WATER DISTRICT
LETTERS TO U.S. AND CALIFORNIA LEGISLATORS

June 20, 1996

The Honorable Sonny Bono
44th District, California
1555 South Palm Canyon, Ste. G101
Palm Springs, CA 92264

Dear Congressman Bono:

Many years ago Mission Springs Water District Directors worried only about our cold water supplies and how they effected the Desert Hot Springs area, but with growth comes the inevitable pollution from a great many sources such as light industrial, commercial and residential that may affect all groundwater in the Coachella Valley.

Because of this present day concern, the water district decided to protect all underground water in the area, including the subbasin containing the hot water the local area is known for. No other organization has been able to develop adequate interest in this serious problem. Some years ago, the water district started an educational program in our local schools that explains about pollution and how to fight it.

The district encouraged citizens to form the first ever Groundwater Guardian Program in Southern California. The program is presently being run by our local Chamber of Commerce. It is also strongly committed to education of our children with respect to pollution and conservation of our natural underground resources both hot and cold water.

District personnel, including me, have been on a constant campaign to enlighten our community through the various local groups such as the Rotary, Chamber of Commerce, women's clubs, Soroptimists and other local organizations on protection of our groundwater supplies through all means, including the installation of sewers.

Today, more than ever, we find the community of Desert Hot Springs is behind our efforts to accomplish the task the task of providing sanitary sewers for all Desert Hot Springs residents. We presently are working on various programs with the County of Riverside, the City of Desert Hot Springs and local banks to provide funding for this very important program (see enclosed information).

We are caught between the possible pollution of our underground water supplies and the cost to solve this problem before it causes financial and economic ruin of our community. The district is looking for ways to borrow enough money to start this program in this community, but we must contend with an economy that is still unfriendly to many of our residents that need to be connected to a new and modern sanitary sewer system.

We desperately need your help and guidance with this issue. The district will continue searching for low interest loans, but we would be able to approach this task easier if through your help, we could secure grants that would offset the high cost of this tremendous project. I know this must be a source of daily frustration for you and your staff, trying to help with sources of financial help which is shrinking on a regular basis. Any help or assistance you might provide for us in this matter would be greatly appreciated by the water district, the community and your constituents.

If I can provide specific information on our needs, please have your representative call me personally at (619) 329-6448.

Sincerely,

John L. Morgan
General Manager

June 20, 1996

The Honorable Jim Battin
Eightieth District
73-710 Fred Waring Dr.
Palm Desert, CA 92260

Dear Assemblyman Battin:

Many years ago Mission Springs Water District Directors worried only about our cold water supplies and how they effected the Desert Hot Springs area, but with growth comes the inevitable pollution from a great many sources such as light industrial, commercial and residential that may affect all groundwater in the Coachella Valley.

Because of this present day concern, the water district decided to protect all underground water in the area, including the subbasin containing the hot water the local area is known for. No other organization has been able to develop adequate interest in this serious problem. Some years ago, the water district started an educational program in our local schools that is gradually teaching our children the importance of conservation and a safe water supply.

The water district encouraged citizens to start the first ever Groundwater Guardian Program in Southern California. It is being run by our local Chamber of Commerce. The Chamber program is also strongly committed to education of our children as well as their parents with respect to conservation and pollution and the effects on our natural underground resources both hot and cold water.

District personnel, including me, have been on a constant campaign to enlighten our community through the various local groups such as the Rotary, Chamber of Commerce, Hoteliers Association, retired PERS employees, women's clubs and any other local organization that will listen to our plea to save our groundwater.

Today, more than ever, we find the community of Desert Hot Springs is behind our efforts to accomplish the task the task of providing sanitary sewers for all Desert Hot Springs residents. We presently are working on various programs with the County of Riverside, the City of Desert Hot Springs and local banks to provide funding for this very important program (see enclosed information).

We are caught between the possible pollution of our underground water supplies and the cost to solve this problem before it causes financial and economic ruin to our community. The district is presently looking for ways to borrow adequate funds to start this project in the community, but we must contend with large segments of these residents who because of the present economy are unable to participate in the effort to connect them to a new and modern sanitary sewer

We desperately need your help and guidance with this Issue. The district will continue searching for low interest loans, but we would be able accommodate these resident easier if through your help, we could secure grants that would offset the high cost of this tremendous project. I know that finding enough financial help for your constituents must be a source of daily frustration for you and your staff. Any help or assistance you might provide for us in this matter would be appreciated by the Board of Directors and our community.

If I can provide specific information on our needs, please have your representative call me personally at (619)-329-6448.

Sincerely,

John L. Morgan
General Manager

APPENDIX I

LIST OF POTENTIAL FUNDING SOURCES

MAILING LIST FOR FUNDING PACKAGES
Mission Springs Water District
96-0195
5/97

California State Water Resources Control Board
Division of Clean Water Programs
2014 "T" Street, Suite 130
P. O. Box 944212
Sacramento, CA 94244-2120
(916) 227-4400

Eric Torguson - SRF for wastewater treatment facilities
(916) 227-4449

(Mr.) Lynn Johnson, Chief, Office of Water Recycling - SRF for water reclamation
(916) 227-4580

The Division of Clean Water Programs handles:

- State Revolving Fund (SRF) loans under the federal Clean Water Act for wastewater collection and treatment facilities.

- Small Communities Grant Program, for areas of 5,000 population or less.

California Department of Water Resources
Division of Local Assistance
1020 Ninth Street, 3rd Floor
P. O. Box 942836
Sacramento, CA 94236-0001

Dan Otis
Manager, Loans and Grants Administration
(916) 327-1657
fax (916) 327-1648
e-mail: dotis@water.ca.gov

DWR is currently drafting regulations to implement the following funding programs under Proposition 204:

- Local projects for water supply.

- Water conservation and groundwater recharge program.

California Department of Health Services
Division of Drinking Water
601 N. Seventh Street, MS 92
P. O. Box 942732
Sacramento, CA 94234-7320
(916) 323-6111

(Mr.) Robin Hook - drinking water SRF program
(916) 323-0871

- New Drinking Water State Revolving Fund under the federal Safe Drinking Water Act Amendments of 1996.

CoBank
Main Office
P. O. Box 5110
Denver, CO 80217
(303) 740-4000

Steve Gustafson
Rural Utility Banking Group

- CoBank loans.

U.S. Department of Agriculture
Natural Resource Conservation Service
2121-C Second Street, Suite 102
Davis, CA 95616-5475
(916) 757-8200

Mr. Hershel Read
State Conservationist

- Resource Conservation and Development Grants.

U.S. Department of Agriculture
Rural Economic and Community Development Services
45-691 Monroe Street, Suite 1
Indio, CA 92201
(619) 342-4624

Jeffrey A. Hays

- Water and Waste Disposal Systems for Rural Communities.
- Resource Conservation and Development Loans.
- Emergency Community Water Assistance Grants.
- Water and Waste Disposal Loans and Grants (Section 306c).
- Rural Economic Development Loans and Grants.
- Rural Development Grants.

U.S. Department of Commerce
Economic Development Administration
Southern California Office
201 South Lake Street, Room 511
Pasadena, CA 91101
(818) 583-6713

David Svensen
Economic Development Representative

U.S. Department of Commerce
Economic Development Administration
Jackson Federal Building
915 Second Avenue, Room 1856
Seattle, WA 98174

A. Leonard Smith
Regional Director

- Economic Development Grants for Public Works and Infrastructure Development.
- Economic Development Public Works Impact Program.

APPENDIX J

OVERVIEW OF MISSION SPRINGS WATER DISTRICT AND BACKGROUND INFORMATION FOR PROPOSED SEWER PROJECT

ALBERT A.
WEBB
ASSOCIATES
ENGINEERING CONSULTANTS

April 7, 1997
Final Draft

OVERVIEW OF MISSION SPRINGS WATER DISTRICT AND BACKGROUND INFORMATION FOR PROPOSED SEWER PROJECT

The District is a public agency located in the Desert Hot Springs area of Riverside County, California, which currently provides sewer service to about 2,700 developed parcels, and provides water for domestic purposes and fire protection to about 7,800 developed parcels. The District's service area includes the City of Desert Hot Springs along with additional County area surrounding the City, totaling about 133 square miles. For orientation purposes, the District is located northerly of Palm Springs, CA.

The proposed sewer project plans for a phased series of line extensions, scheduled by priority, for construction of collection and trunk line facilities required to sewer the 5,000 unsewered developed parcels within the District. Refer to attached Plate 1. About 3,500 of the presently unsewered developed parcels lie within the City limits, with about 1,500 unsewered developed parcels located within the County area nearby the City. Septic tank wastewater disposal systems have been in use in the Desert Hot Springs community for five decades.

The Mission Creek Fault bisects the District's service area, oriented in a NW to SE direction through the City of Desert Hot Springs and the adjacent County area. The groundwater basin on the NE side of the fault generally contains hot water at a depth of about 35-75 feet or less in certain locations near the fault. The primary business activity and economic base of the community within the District's area centers upon commercial spas, mineral baths, hotels, motels, etc. which depends upon utilizing privately owned hot water vertical wells for source of supply. The groundwater basin on the SW side of the fault generally contains cold water at a depth of about 300-550 feet. The District's sole source of water supply for its domestic/fire protection system is from its pristine cold water vertical deepwells.

Sewerage disposal for currently developed parcels within the District's boundary is accomplished in two ways. The District's Horton Wastewater Treatment Plant provides secondary treatment to the sewerage generated by the 2,700 developed parcels which are presently sewered. The District is presently underway with a separately funded phased program to construct additional wastewater treatment capacity as required to handle future influent flows. The disposal of treatment plant effluent is accomplished by utilizing percolation ponds located adjacent to the plant on the SW (cold water) side of the Mission Creek Fault. Sewerage disposal for the 5,000 unsewered developed parcels is provided by individual, privately owned disposal systems mainly consisting of septic tanks followed by either vertical seepage pits or horizontal leach lines. Individual, privately owned disposal systems are located on both (hot and cold water) sides of the fault. A survey of the existing septic tank wastewater disposal systems within the District indicates a high-density ranging from 1.6-2.4 systems per acre, which is 2.3 to 3.4 times the recommended density of 0.7 disposal systems per acre.

The District has collected information during recent years regarding the District's water supply wells, private hot water wells, individual privately owned sewerage disposal systems, and the hot and cold water sides of the groundwater basin bisected by the Mission Creek Fault. This information reveals cases where effluent from privately owned sewerage disposal systems has commingled with the hot water side of the basin at locations where the groundwater is shallow or surfacing in the vicinity of Desert Hot Springs. As an example, even years ago during the mid-1970s, District records indicate that water supply Well Nos. 10, 11 and 21 were abandoned and plugged due to contamination of the well water from privately owned septic tank wastewater disposal systems in adjacent areas, as evidenced by fecal choloform, failed bacteriological tests and high nitrate levels. Since 1992, District surveys documented about 100 privately owned sewerage disposal systems which failed and needed to be pumped from 2 to 16 times per year. The District continues to receive unsolicited comments supportive of constructing sewers.

The District recently made separate arrangements with the U.S. Geological Survey (USGS) and Michigan Technological University (Michigan Tech) to conduct groundwater studies in the vicinity of the Mission Creek Fault in the Desert Hot Springs area. The USGS report confirms further potential contamination of the shallow hot water side groundwater due to failures of privately owned sewerage disposal systems. The Michigan Tech study is nearly completed, and a preliminary status report confirms that the Mission Creek Fault is not impervious, thereby allowing hot water side groundwater to flow in places across the fault and commingle with the cold water. The Michigan Tech study will include a computer model of the groundwater basins in the vicinity of Desert Hot Springs.

Therefore, the hot water side groundwater is presently subject to contamination from the failure of private sewerage disposal systems in the Mission Springs service area, and subject to traversing the fault and spreading the contamination into the cold water side groundwater, affecting the District's water supply wells and other users of the regional groundwater basin. Additional correspondence from the USGS summarizes one of their recent groundwater contamination transport studies in the desert area near Victorville, California; documenting that contamination (wastewater-wetting front) from privately-owned septic tank wastewater disposal systems traveled downwards towards the ground water through the upper unsaturated portion of the Mojave River groundwater basin at velocities ranging between 0.07 - 1.00 vertical feet per day, depending upon the soil type and characteristics. A further local groundwater basin study and report should be prepared as a part of the preliminary engineering scope of work for this proposed sewer project, to assist in finalizing priorities for the various portions of the construction, by further documenting transport of contaminants into both the hot and cold water groundwater basins from the privately-owned septic tank wastewater disposal systems in the Desert Hot Springs community. Sewers are essential to the future of the Desert Hot Springs community. Prevention of groundwater contamination is inexpensive when compared to cleanup costs.

Construction of the proposed sewer project is planned to mitigate the threat of groundwater contamination, by sewering the 5,000 presently unsewered developed parcels. This sewer line extension project will: (1) benefit the City's economic base mainly comprised of existing and future commercial spas, mineral bath, hotel, and motel businesses by protecting the quality of the hot side groundwater, (2) benefit the existing and future homeowners and businesses by eliminating the need for expensive, repetitive pumping and/or replacement of individual, privately owned failing sewerage disposal systems, (3) benefit all existing and future residential and business customers connected to the District's domestic/fire protection system by protecting the quality of the cold side groundwater, and (4) benefit other existing and future downstream users of the regional groundwater basin.

The proposed sewer project is phased into service areas A through M, totaling 358,200 linear feet of sewer main, with a total estimated project cost of $43,730,000, plus trunk main extensions having an estimated project cost of $2,356,000. The District needs phased financial assistance in order to fund a proposed sewer project of this large magnitude.

Tables 2 - 4 (attached) summarize the service area parcel characteristics, construction cost estimating data, and preliminary construction and project cost estimates. The following Table 1 lists preliminary priorities for each service area designation, along with the preliminary project cost estimate for each priority. It is estimated that the phased construction program would be completed over a period of about 12 years.

TABLE 1

Preliminary Estimated (1) Priority	Service Area Designation/ District Capital Improvement Project	Preliminary Project Cost Estimate
1	Trunk Ext. 37	$ 923,000 (4)
2	H, I, J - N'ly (2)	$ 1,450,000
3	H, I, J - S'yl (3) & addtl. a, b, c	$ 5,973,000 (4)
4	K	$ 1,670,000
5	Two Bunch Palms Sewer Ext.	$ 220,000 (4)
6	B & Trunk Ext. S-2	$ 1,870,000 (4)
7	C	$ 2,250,000
8	E	$ 3,180,000
9	A	$ 5,370,000
10	D	$ 5,700,000
11	F	$ 5,660,000
12	G	$ 1,830,000
13	L	$ 4,870,000
14	M	$ 5,120,000
	Total:	$ 46,086,000

(1) Priorities are subject to revision, based upon additional preliminary engineering studies and funding criteria.

(2) North of Hacienda Avenue.

(3) South of Hacienda Avenue.

(4) See Plate 1

The Mission Springs Water District's financial audit report for FY1995-96 shows the following for the sewer district portion of the report:

Total Assets, less accumulated depreciation and amortization	$12,573,000
Total Current Assets	$3,240,000
Total Current Liabilities	$763,000
Total Operation Expenses, excluding depreciation	$606,000
Net Income, excluding depreciation	$685,000
Total Long-Term Debt	$997,000[1]

Research of the U.S. Census Data for 1990 by block group number 1-9 in the general vicinity of Desert Hot Springs indicates median household income ranging from $14,665 (Block 2) to $45,417 (Block 1), lists 808 households on public assistance, 1,013 households below poverty level, and shows a total population of 15,264 (11,668 within the City and 3,596 outside the City). Approximately 16.7 percent of the total population of 15,264 are senior citizens over the age of 65. Approximately 24.6 percent of this total population are over the age of 55. The census data also indicates a total of 8,049 dwelling units (5,494 within the City) of which 1,826 are vacant including 830 units held for seasonal use.

Upon comparing the sewer district current financial status with respect to the proposed $46,086,000 sewer project, it is evident that the District needs financial assistance, compatible with the phased construction planned under the priority schedule.

[1] During the current FY 1996-97, the District borrowed an additional $5,000,000 long-term debt for use by the sewer district.

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS

TABLE 2

MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT

SUMMARY OF SERVICE AREA PARCEL CHARACTERISTICS

SERVICE AREA DESIGNATION	TOTAL NO. OF PARCELS			NO. OF SEWERED PARCELS			NO. OF UNSEWERED PARCELS		
	NO. OF PARCELS	NO. OF DEVELOPED PARCELS	NO. OF UNDEVELOPED PARCELS	NO. OF PARCELS	NO. OF DEVELOPED PARCELS	NO. OF UNDEVELOPED PARCELS	NO. OF PARCELS	NO. OF DEVELOPED PARCELS*	NO. OF UNDEVELOPED PARCELS
A	890	690	200	29	23	6	861	667	194
B	268	150	118	0	0	0	268	150	118
C	442	243	199	0	0	0	442	243	199
D	1010	438	572	18	5	13	992	433	559
E	509	257	252	0	0	0	509	257	252
F	1207	491	716	65	26	39	1142	465	677
G	229	76	153	36	23	13	193	53	140
H	410	124	286	46	16	30	364	108	256
I	410	149	261	77	23	54	333	126	207
J	635	305	330	69	23	46	566	282	284
K	262	154	108	0	0	0	262	154	108
L	842	443	399	16	10	6	826	433	393
M	916	262	654	0	0	0	916	262	654
TOTAL	8030	3782	4248	356	149	207	7674	3633	4041

* Number of developed parcels (structures) were determined from Riverside County Assessor Records and aerial photographs. Actual dwelling unit count will be greater when multiple-family structures are determined.

96-195/PAR_CHAR.xls
4-7-97

ALBERT A. WEBB ASSOCIATES
ENGINEERING CONSULTANTS

TABLE 3

MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT

PRELIMINARY PROJECT COST ESTIMATE

SERVICE AREA DESIGNATION	TOTAL SEWER MAIN PIPELINE LENGTH (LF)	ESTIMATED SEWER MAIN CONSTRUCTION COST [1,2]	NUMBER OF UNSEWERED PARCELS [3]	ESTIMATED SEWER LATERAL CONSTRUCTION COST [2,4,7]	TOTAL ESTIMATED CONSTRUCTION COST [2]	TOTAL ESTIMATED PROJECT COST [2,5]
A	46,400	$2,710,000	861	$990,000	$3,700,000	$5,370,000
B	8,500	$500,000	268	$310,000	$810,000	$1,170,000
C	17,800	$1,040,000	442	$510,000	$1,550,000	$2,250,000
D	47,700	$2,780,000	992	$1,150,000	$3,930,000	$5,700,000
E	27,400	$1,600,000	509	$590,000	$2,190,000	$3,180,000
F	44,200	$2,580,000	1142	$1,320,000	$3,900,000	$5,660,000
G	17,900	$1,040,000	193	$220,000	$1,260,000	$1,830,000
H	17,700	$1,030,000	364	$420,000	$1,450,000	$2,100,000
I	13,400	$780,000	333	$380,000	$1,160,000	$1,680,000
J	25,900	$1,510,000	566	$650,000	$2,160,000	$3,130,000
K	14,500	$850,000	262	$300,000	$1,150,000	$1,670,000
L	34,400	$2,410,000 [6]	826	$950,000	$3,360,000	$4,870,000
M	42,400	$2,470,000	916	$1,060,000	$3,530,000	$5,120,000
TOTALS	358,200	$21,300,000	7674	$8,850,000	$30,150,000	$43,730,000

1 Cost of sewermain including manholes, wyes and mainline pavement removal, replacement and cap (refer to Table 2 for details).

2 Cost rounded to nearest $10,000

3 All parcels contiguous to existing sewermain within the service area were assumed to have existing sewer laterals. The remaining parcels within the service area whether undeveloped or developed were assumed to require a lateral to be constructed (refer to Table 1 for details).

4 Cost of sewer laterals including lateral pavement removal, replacement, and cap (refer to Table 2 for details).

5 Project cost is 1.45 times construction cost. Project cost includes: construction cost, construction contingencies, engineering, legal, assessment engineering, geotechnical services, inspection, finance and District administration. Costs are based upon Engineering News Record (ENR) Construction Cost Index Los Angeles September, 1996 (ENR 6519). Right-of-way and land acquisition costs are not included.

6 Includes $200,000 and $200,000 allowances for construction of a sewage lift station and force main respectively.

7 Costs include public right of way portion only (i.e. sewermain to R-O-W line). Private side costs (i.e. abandonment of septic system and construction of the lateral from the R-O-W line to the structure) are not included. These private side costs are estimated to be $1,300-$2,100 per parcel.

ALBERT A.
WEBB
ASSOCIATES
ENGINEERING CONSULTANTS

TABLE 4

MISSION SPRINGS WATER DISTRICT
SEWER IMPROVEMENT PROJECT

REVIEW OF DIVIDING SERVICE AREAS H, I, AND J

SERVICE AREA DESIGNATION	TOTAL ESTIMATED PROJECT COST [1]	TOTAL ESTIMATED PROJECT COST NORTH OF HACIENDA AVE.	TOTAL ESTIMATED PROJECT COST SOUTH OF HACIENDA AVE.
H	$2,100,000	$550,000	$1,550,000
I	$1,680,000	$190,000	$1,490,000
J	$3,130,000	$710,000 [2]	$2,420,000
TOTAL	$6,910,000	$1,450,000	$5,460,000

[1] Refer to Table 3.

[2] Approximately 49 percent of the service are north of Hacienda Avenue is tributary to proposed sewers south of Hacienda Avenue. Therefore, the sewerline cost associated with 49 percent of the area north of Hacienda has been included with the costs south of Hacienda Avenue.

96-0195 REVIEW.xls
4-7-97

COUNTY OF RIVERSIDE • HEALTH SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALT

April 22, 1997

John L. Morgan
Mission Springs Water District
66-575 Second Street
Desert Hot Springs, CA. 92240

Dear Mr. Morgan,

The Department of Environmental Health is very supportive of your Districts position regarding the elimination of septic tanks within the Mission Springs Service Area.

Although properly designed and installed individual subsurface sewage disposal systems (septic) can function for many years in desert areas, the adverse impact on ground water can be significant, especially when dwelling/unit density exceeds one per 1/2 acre. This department has already noted elevated nitrate levels in the shallow ground water aquifers in some portions of your service area (as you know, nitrate levels in drinking water of more than 45 parts per million may cause a serious blood disorder in infants call Methemoglobinemia).

Finding an affordable method to finance public sewers is always a problem. If you haven't already contacted the County Economic Development Agency regarding possible grants or low interest loans. I suggest you call Vickie Burt at (760) 863-7060.

Sincerely,

Donovan E. Park,
Assist. Public Health Engineer

John M. Fanning, Director
4065 County Circle Drive • Riverside, CA 92503 • Phone (909) 358-5316 • FAX (909) 358-5017
(Mailing Address – P.O. Box 7600 • Riverside, CA 92513-7600)

DEPARTMENT OF HEALTH SERVICES
DRINKING WATER FIELD OPERATIONS BRANCH
1350 FRONT STREET, ROOM 2050
SAN DIEGO, CA 92101
(619) 525-4159
FAX (619) 525-4383

April 16, 1997

RECEIVED

APR 24 1997

ALBERT A. ... CIVIL ENGINEERS

John L Morgan
Mission Springs Water District
66-575 Second Street
Desert Hot Springs, CA 92240

Dear Mr. Morgan:

On March 10, 1997, we received the information you sent on the transport of contaminants from wastewater disposal systems in your groundwater basin and the potential adverse impacts to water quality. It is my understanding the Mission Springs Water District is considering installation of sewers to replace existing septic tanks in an effort to protect the quality of water in your groundwater basin. We support your efforts to protect your groundwater supply by providing municipal sewer service.

Septic tanks can be a source of nitrate, virological and bacteriological contamination in the basin and will have a long term detrimental impact on the quality of water produced by your wells. In addition, future groundwater disinfection regulations will take location and number of septic tanks into consideration when determining disinfection requirements for water systems.

Protecting drinking water supplies and preventing contamination is a high priority for this Department. Recent changes to the Federal Safe Drinking Water Act mandate that States take a more proactive approach to protecting groundwater supplies. As a result, this Department is in the process of adopting a Well Head Protection Program (WHPP) to encourage water systems to take actions which will prevent contamination from occurring. We recommend that you implement a WHPP to further identify areas which are contributing to your water supply and establish well head protection zones for your sources. Attached is some information which you may find useful for establishing a WHPP in your area.

If you have any questions regarding this letter, or need any technical assistance in setting up a WHPP, please contact Brian Bernados or me at (619) 525-4497.

Sincerely,

Toby J. Roy

Toby J. Roy, P.E.
District Engineer

Attachment
cc: Riverside County Environmental Health Services

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
COLORADO RIVER BASIN • REGION 7
73-720 FRED WARING DR., SUITE 100
PALM DESERT, CA 92260
Phone (619) 346-7491
FAX (619) 341-6820

FEB 13 1997

John L. Morgan, General Manager
Mission Springs Water District
66-575 Second Street
Desert Hot Springs, CA 92240

RE: Septic Tank Use

We strongly support and encourage the use of community sewerage systems rather than septic tank systems in your community. Community sewerage systems lead to a better treated and better controlled discharge than do septic tank systems. Septic tank systems, as discovered numerous times throughout our Region, can serve as a repository for hazardous wastes and anything else dumped into them. We have accumulated considerable evidence indicating that septic tank systems have the potential to adversely impact groundwater which serves as the Coachella Valley's drinking water supply.

Once groundwater has been polluted, it is extremely expensive to clean. One case involving a septic tank and subsurface disposal system required the discontinued use of a major municipal supply well. Thus, the community served by that particular well lost the capital investment associated with the well construction. Also, the drinking water demand which that well satisfied required replacement. Unfortunately, the burden of groundwater clean up and overall costs of such sites is often paid by the public. Small businesses and property owners rarely possess the funds needed to adequately clean the groundwater to the safe levels for municipal use. Groundwater clean up projects are extremely expensive.

Community sewerage systems, on the other hand, provide excellent protection of groundwater resources and relieve the homeowner of the burden associated with maintenance and rehabilitation of the septic tank system. Inappropriate wastes entering sewerage systems, and eventually the environment, can be controlled or identified and abated through an effective pretreatment program. Wastewater treated by a community sewerage system is of significantly better quality and can be reused for irrigation or process water. When percolated back to the water table, the quality of community system treated wastewater is much more protective of the groundwater. Threat of nitrate pollution in the groundwater is reduced through the generation and removal of the sewage sludge. Also, operation, maintenance, and conveyance of wastewater is the responsibility of trained and experienced professionals. Such individuals are dedicated to the protection of human health and the environment. Community sewerage systems alleviate the homeowner from having to deal with costly septic tank pumpings, hazardous disposal field failures, and costly disposal field replacement. It is well established that all disposal fields eventually fail. Overall, it is in the interest of the community to support community sewage treatment systems.

In most cases, community sewage treatment systems are not prohibitively expensive. Various institutions have low interest loans available with up to forty year lending periods. Some institutions combine some grant money with the loans. The State Revolving Fund is California's funding source through the Clean Water Act. It provides direct low-interest loans with interest rates at approximately one-half the interest rate of the most recent sale of a State general obligation bond. Loan terms for the State Revolving Fund Loan cannot exceed twenty years. Loans can also be obtained through private corporations. By obtaining low-interest loans, communities have found that community sewage treatment systems are generally affordable and cost-effective. Our contact person for the State

Revolving Fund Loan is Suhas Chakraborty. He can be reached at (619) 776-8961.

Should you have any questions regarding this matter, please do not hesitate to phone Todd Thompson at (619) 776-8941.

PHIL GRUENBERG
Executive Officer

TT/hs

File Ref: ST GC 1.1

APPENDIX K

DISTRICT LETTER AND MAILING LIST SOLITICING PROJECT SUPPORT

Mission Springs Water District

January 27, 1997

Ms. Toby Roy
California Department of Health Services
Office of Drinking Water
1350 Front St., Room 2050
San Diego, CA 92101

Dear Ms. Roy:

As recommended in numerous letters from the Regional Water Quality Control Board, the district has taken an assertive stance to eliminate the use of septic tanks within the Desert Hot Springs area. However, we need your support!

The following will give you some history on what has occurred in our community in regards to sewers:

> During the early 70's, Mission Springs Water District decided to construct a treatment plant along with a collection system. The plant was built with a loan and the collection system was built through the use of assessment districts
>
> At that time, the Board of Directors fought the community in order to build the collection system. Needless to say, the assessment districts split the community and the outcome was the recall of four board members. However, that battle started the collection system on its way which was ultimately built. Those same memories of yesteryear linger today. No sewers have been constructed by the district since then. It's easy to see why.
>
> In about 1990, the board decided to ask residents in the community what they thought about sewers, septic tanks, water quality and the cost of sewers. The community responded by telling us they wanted sewers, that sewers were superior to septic systems, but they would not pay for them. The board backed off then and decided we should take a different approach. They decided to first educate the community and then take a closer look at the problem.

66-575 Second Street, Desert Hot Springs, California 92240 • 619/329-6448
Fax 619/329-2482

The education process started about the same year in local schools. We spoke to everyone who would listen to us about preservation of our groundwater and why sewers were needed. We spoke to Rotarians, various civic groups, retired community members, at Mayor's Breakfast meetings, Hoteliers' Assn. meetings, and to each council member. We took every opportunity to tell everyone about sewers. We started a quarterly, 8-page pamphlet called the *Pipeline* which was filled with the same information. This was sent to each customer. We instituted a *Waterways* column in the local paper covering current news on district activities and water quality.

Our community is one of the first in southern California to become a National Groundwater Foundation member which has evolved into a Groundwater Guardian Committee within the local Chamber of Commerce. This Committee runs groundwater programs which have made great progress educating the residents about their number one resource -- the hot and cold water.

It's been an uphill battle but we feel it's time to proceed again with the formation of assessment districts and construction of sewers. We are certainly aware of how inexpensive prevention is when compared to cleanup.

The Mission Springs Water District just recently borrowed $5 Million to start the ball rolling. We are presently securing easements for future collection and interceptor systems. Albert A. Webb Associates, our engineering firm, is looking at demographics, the possibility of securing grants and low-interest loans, and will be meeting with community members along with our staff to get the process underway.

The United States Geological Survey along with Michigan Technological University just completed a study for us that shows a very high probability of pollution from septic systems working its way into our potable water supply. We must move on this matter quickly!

The district will be sending requests to lending institutions as well as local, state and federal agencies to secure grants and loans for sewer projects. A letter from your agency explaining the need for sanitary sewers and recommending support through grants and loans will certainly be very helpful in this matter.

If there is any other information I can provide, please call. I will contact you next week to discuss this request.

Sincerely,

John L. Morgan

John L. Morgan
General Manager

Letters sent to the following on January 27, 1997

Ms. Toby Roy
California Dept. of Health Services
Office of Drinking Water
1350 Front St., Rm. 2050
San Diego, CA 92101
(619) 525-4159

Mr. Don Park
Environmental Health Dept.
46209 Oasis, Rm. 209
Indio, CA 92201
(619) 863-7000

Dr. Alex Mayer
Michigan Technological University
Dept. of Geological Engineering and Sciences
1400 Townsend Dr.
Houghton, MI 49931-1295
(906) 487-3372

Mrs. Susan Seacrest
Groundwater Guardian Foundation
P. O. Box 22558
Lincoln, NE 68542
(402) 434-2740

Desert Hot Springs City Council
65950 Pierson Blvd.
Desert Hot Springs, CA 92240

The Honorable Sonny Bono
House of Representatives
324 Cannon Office Building
Washington, DC 20515
619-230-1076

The Honorable David Kelley
California State Senate
73710 Fred Waring Dr., Ste 108
Palm Desert, CA 92260
619-346-2099

Coleen Peters, President
Sunrise Rotary
c/o Vista Realty
66350 Pierson
Desert Hot Springs, CA 92240
(619) 329-3130

Mac Villines, President
Noon Rotary
c/o Palm Springs Savings Bank
66565 Pierson Blvd.
Desert Hot Springs, CA
(619) 329-4411

Eva Lees, President
DHS Women's Club
P. O. Box 998
Desert Hot Springs, CA 92240
(619) 329-6893

Ardella Cook, President
Soroptimist International
9631 Brookline
Desert Hot Springs, CA 92240

Jack Oberle, General Manager
Desert Water Agency
P. O. Box 1710
Palm Springs, CA 92263
619-323-4971

Hank Schmidt, President
Hoteliers' Association
c/o The Lido Palms Motel-Spa
12801 Tamar
Desert Hot Springs, CA 92240
(619) 329-6033

Mac Villines, President
Groundwater Guardian Committee
D.H.S. Chamber of Commerce
11711 West Dr.
Desert Hot Springs, CA 92240
(619) 329-6403

Mr. Phil Gruenberg, Executive Officer
State Water Resources
Control Board — Region 7
73720 Fred Waring Dr., Ste 100
Palm Desert, CA 92260
(619) 346-7491

Letters sent to the following on January 27, 1997

Lindsay Roberts, Association Manager (Paid position) State Section –
California Water Environment
Control
7677 Oakport, Ste. 525
Oakland, CA 94621
(510) 382-7800

The Honorable Jerry Lewis
House of Representatives
1150 Brookside Ave., Ste J-5
Redlands, CA 92363
(909) 792-5901

Robert Wilburn, City Manager
City of Desert Hot Srings
65950 Pierson Boulevard
Desert Hot Springs, CA 92240
(619) 329-6411

Becky ~~Cain,~~ CAIN President
League of Women Voters
1730 M St. NW, Ste. 1000
Washington, DC 20036
(202) 429-1965

Report & thesis
to toby Roy
she called
5 - FEB - 97

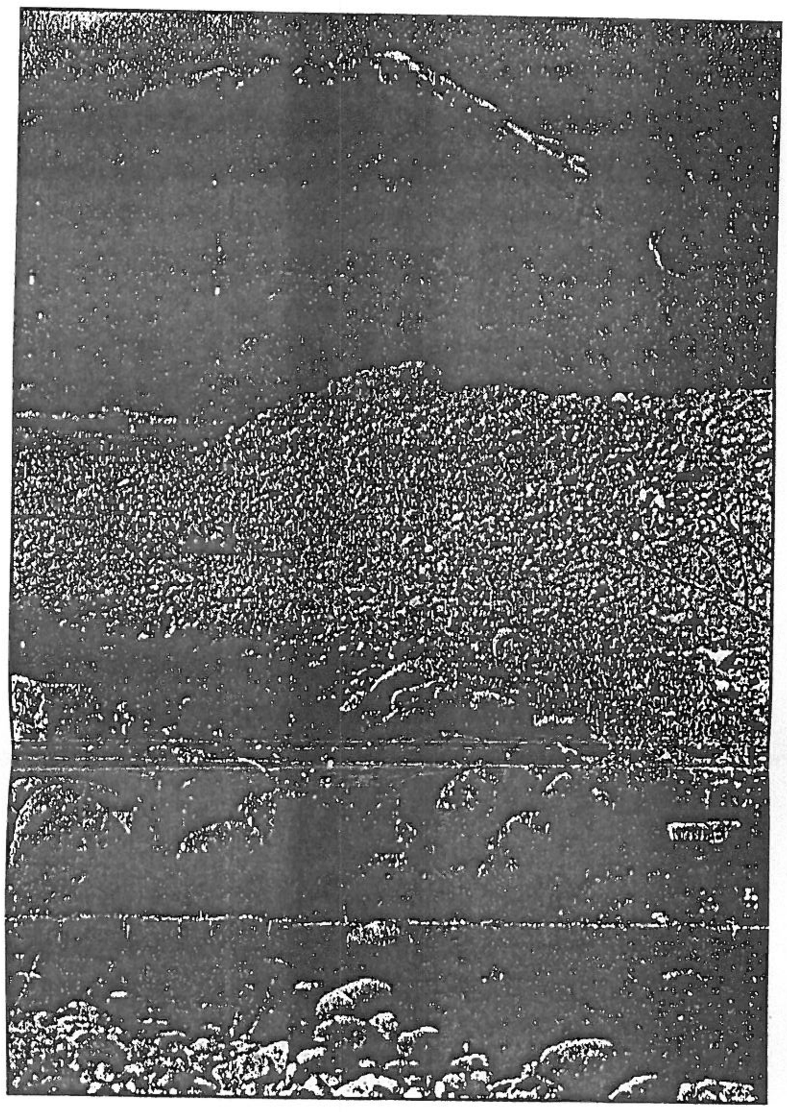
DESERT SENTINEL
SERVING DESERT HOT SPRINGS, CALIFORNIA—THE NATION'S HEALTH CENTER

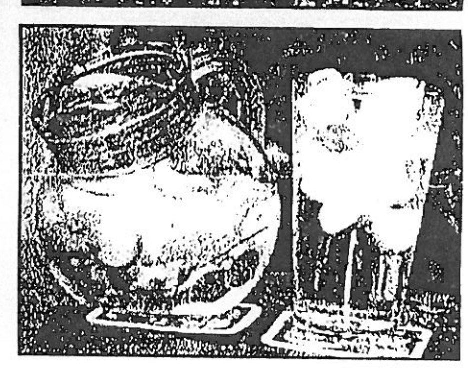
INTERNATIONAL WATER TASTING COMPETITION

Forget the rest; local water is BEST, panel says

The only untreated water in the municipal category, Desert Hot Springs water takes second place in a West Virginia international competition.

BY JOHN WATERS JR.
Desert Sentinel Editor





Desert Sentinel photos by John Waters Jr.

Tracing the water – From above (counter-clockwise), the course of the best untreated water in the municipal category of last week's water testing in W.Virginia makes its way down San Gorgonio Mountain, through Mission Creek and into the Mission Creek Subbasin where it is pumped by Ol' No. 27 and Chuck Dodd, of the Mission Springs Water District before it ends up in a pitcher at your home.

Just as Williamsburg, Tenn. is know as the home of "Old No. 7," the signature brew of the Jack Daniels Whisky empire, Desert Hot Springs may become known as the home of Old No. 27, the well which produced the nation's best-tasting untreated municipal water.

> **"The decision comes as no surprise to me."**
>
> -- Augusta "Gus" Merchall, long-time resident

Residents of Desert Hot Springs have long touted the city's clean-tasting water, which flows naturally from the surrounding mountains, but last Saturday, judges at the largest ever "Toast to the Tap: International Water Tasting and Competition" held in Berkeley Springs, W. Va. declared the local water the second best tasting in the municipal water category. Desert Hot Springs' water is the only water among the five top winners that is not treated, making it the best tasting natural water in the municipal category in the country.

"Their determination comes as no surprise to me," said Augusta "Gus" Merchall. "We have enjoyed our water since we moved here in 1953.

"A lot of families come here to live or visit, and they are really surprised how good the water tastes," Merchall said after hearing the news Monday. "I've known how good the water is for a long time, since the days of Dr. Robert Bingham, who made the water famous when he used it to treat people for arthritis and other ailments many years ago. I also used to go to Coffee's spa. There was a public bib there where people would go everyday and fill up their water jugs."

Saturday's competition included 82 different kinds of water from 23 states and four countries, including France, Italy and Canada.

After the sniffing, swishing, scanning and sipping was done, the water of Dubuque, Iowa was rated number one in the municipal category. Desert Hot Springs, with the only untreated water in the category, came in second, followed by Dover, Delaware. Metropolitan Water District of Southern California landed the fourth place and the fifth place went to the 1995 winner in the municipal group, Kent, Ohio.

There were 38 water companies competing in the municipal category.

The only other water winner from California came from the Napa Valley. Calistoga Sparkling Mineral Water took home the top honors in the sparkling water division, out-sparkling France's Perrier Sparkling Mineral Water.

"This is wonderful news for the community," Don Coleman, community coordinator for Mission Springs Water District said Monday. "It really confirms everything that we have known for years, only now we are going to get world-wide publicity for our water, and that has got to be good for the city.

Mission Springs Water District supplies water to Desert Hot Springs and several surrounding communities.

"On the other hand," he added. "It underscores why we need to protect the quality of our water."

Judges for the "Toast of the Tap" included freelance writers and media representatives from National Public Radio, Beverage Industry Magazine, Spa Goer magazine, National Geographic Traveler, the Washington Post, the National Drinking Water Clearinghouse and others.

Dr. Paul Ross, a Ground Water Guardian, researched information on the water contest, and the Mission Springs Water District submitted the sample, collected from well number 27, located near North Palm Springs, in the contest.

"I just found out how we could enter the contest," Ross said. "Don Coleman did the rest.

"Our water is our claim to fame," he added. By checking our history, you'll see our water was discovered. Then they discovered its healing aspects and our town evolved around the water. We have something no one else has. I'm thrilled we did so well."

Thursday, February 27, 1997 issue

Letters requesting aid with sewer project
Mailed to following on January 30, 1997

Lobbyists
~~Charlotte Townsend (Bobby)~~ BOBBIE LARSEN — CALLED 2/12/97 — LTR NVR REC'D — RESENDING + TOLD HER WE'D FOLLOW UP NEXT WEEK
California Association of
Sanitation Agencies
925 L. Street, Ste. 1400
Sacramento, CA 95614
(916) 446-0388

Bill Killian, President spoke to Jean
California Rural Water Assoc.
6920 Fair Oaks Blvd., Ste. 100
Carmichael, CA 95608
(916) 944-0236

Billy Turner, President
Water Environment Federation
601 Wythe Street
Alexandria, VA 22314-1994
(703) 684-2400
