CITY OF SANTA ROSA
P.O. Box 1678
Santa Rosa, CA 95402

SEP 24 1996

DEPARTMENT OF
COMMUNITY DEVELOPMENT

COMMENTS ON THE CONCLUSION THAT RIVER DISCHARGE IS LESS ENVIRONMENTALLY DESTRUCTIVE AMONG ALTERNATIVES

No mention is made of the environmental advantages of not going into the River. 001
In the water short west, we cannot throw the resource away.

Exhibit A: Letter from John Brown 002
Vice Chair, State Water Resource Control Board

Staying in the reclamation business will provide water for landscaping, golf courses, and the double plumbing of houses.

The urban re-use of the resource will delay the time when new potable sources of water need to be developed. Such development could be very damaging to the environment. 003

Increasing percentage of discharge to the River each year has all the potential for environmental damage. 004

Strengthening the economic viability of agriculture has all the positive fall out of preserving open space, keeping the dairy industry in Sonoma County, and promoting the grape industry. 005

The EIR is using the wrong measurements to determine that River discharge is the least damaging environmental solution. 006

Bill Kortum, 180 Ely Rd., Petaluma CA 94954 707-762-6219 9/24/1996 page 1

SOUTH COUNTY PROJECT

The EIR shows bias toward River discharge by engineering three alternatives that are too costly to consider. I will use the South County alternative as an example. 007

EIR does not address a partnership or a contractual relation with Petaluma to gain the economy of scale by combining the projects. 008

Exhibit B
Petaluma is considering a $37 million storage and delivery system. They devote 8 pages in the EIR to partnership with Santa Rosa.
Project savings: $15-20 million for each city

Exhibit C 009
Parson Engineers a $15 million catchment system for Tolay and then turns around in Technical Memorandum of September 26, 1995, and creates a Water Balance model that allows "collected storm water runoff and evaporation were considered for storage reservoirs."

Exhibit D
Koretsky King study avoids catchment and in contrast collects surrounding water to add to the lake.
Project savings: $15 million

EIR describes a 22 mile transmission line from Llano plant to Tolay with no delivery capability. 010

Santa Rosa has delivered wastewater to the Poncia pond through a transmission line for years -- until some recent reconfiguration, Poncia used the water when he needed it and he did not utilize the water pressure in the transmission line.

The EIR does not address using the transmission line to deliver to farm ponds and smaller reservoirs on its way to Tolay, a system similar to the Poncia pond. Instead, the EIR describes a whole new parallel distribution line coming back to Penngrove operating under pressure with multiple pump sites, a $66 million add on. 010 (cont.)

Exhibit E 011

Parsons determined that 40 pounds per square inch was to be delivered to every node of the system. Using a modeling system called Kypipe, the computer gave no consideration for:

1. Using the transmission line for a non-pressurized delivery system to the South County
2. Pond deliver to grape lands that are marginal users of water and cannot justify elaborate pressure system.

Should reexamine need for $66 million pressured delivery system.

Project savings: $46 million

South County Wastewater Project

	HBA*	HBA reconfigured*
Land costs	8	8
Tolay storage	46	31
Transmission line	16	16
Transmission line pump	4	4
Transmission line 20 year energy cost	16	16
Distribution line pipes, pumps	66	20
Irrigation equipment	8	8
Urban irrigation	12	12
Sebastopol ag	10	10
	186	125
Less Petaluma partnership		-20
		105
Contingency and OH and P (40%)		42
		147
Using phased project to reduce debt service		-60
COST OF PROJECT		87

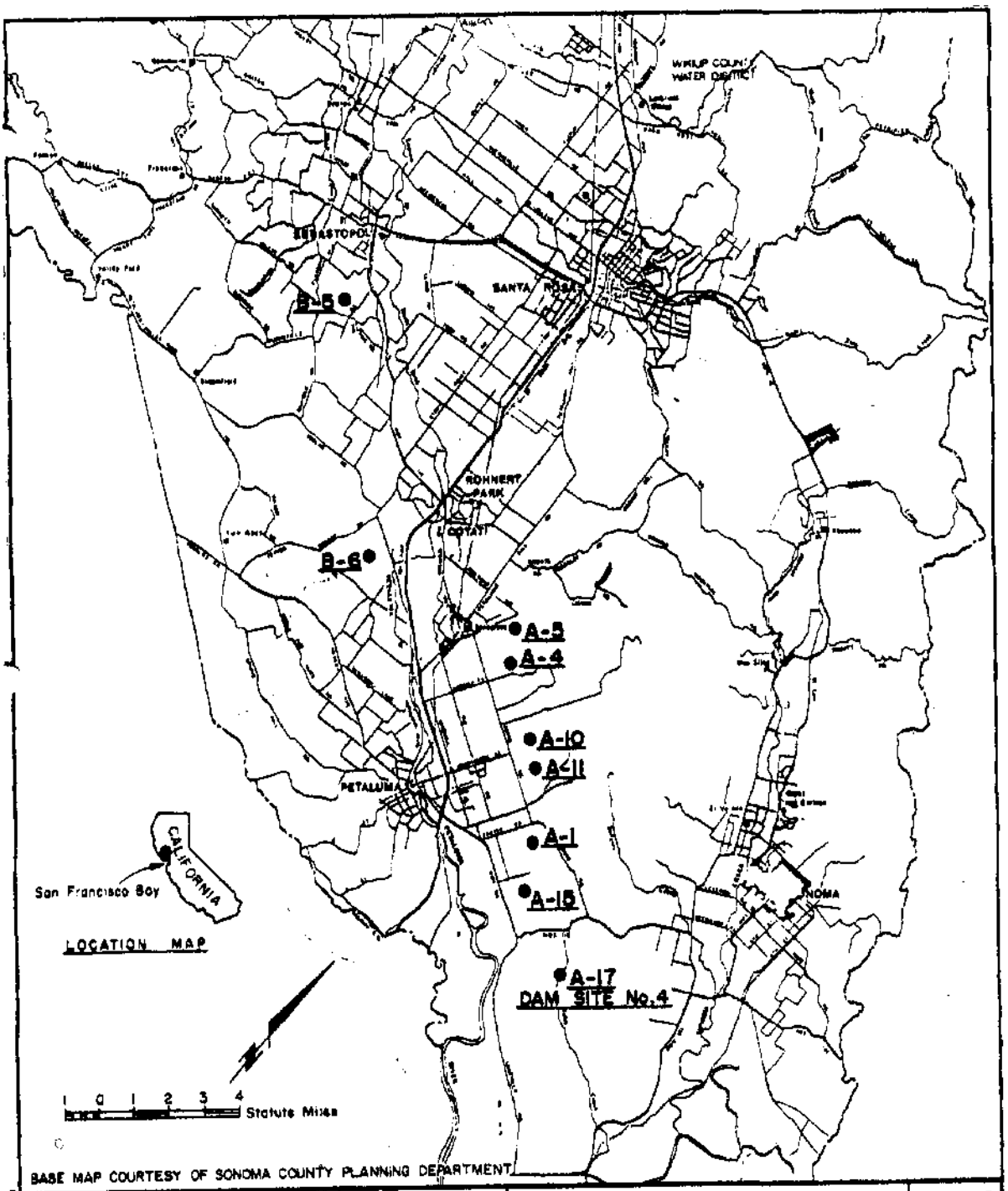
* figures in millions of dollars

Bill Kortum, 180 Ely Rd., Petaluma CA 94954 707-762-6219 *9/24/1996* *page 4*

9 of the 50 reservoir sites mentioned in the Hagstrom King Report.

Reservoir Code	Approximate Storage (acre-feet)*	Approximate Dam Height** (feet)
A-1	2,400	70
A-4	2,400	90 + long dike
A-5	2,300	80
A-10	2,700	100
A-11	9,400	160 and 140
A-15	6,900	160
A-17	29,900	100
B-5	3,300	110
B-6	3,000	70

* Rounded to nearest 100 acre-feet
** Typically, the dams will be earth fill; dam height neglects freeboard.



HARDING-LAWSON ASSOCIATES *Consulting Engineers and Geologists*	SITE LOCATION MAP Sonoma County Waste Water Reclamation Study	PLATE 1
Job No. 8141,005,01 Appr. EEC Date 5/25/79		

EIR fails to discuss: 012

1. Obtaining smaller sites
2. Transmission line in center of potential irrigation acreage 013
3. Transmission line straight shot to Tolay 014
4. South County project makes available diked baylands which provide ability to expand the system in years to come 015
5. Financial advantages of a phased system. 016

COMMENTS ON THE EIR AS VIEWED BY RATEPAYERS

1. Water resource is valuable to agriculture and would have considerable economic impact on Sonoma County. 017

   Well covered in EIR with multiplier effect of $115 million over life of project.

2. Strengthens agriculture, therefore underwriting the preservation of open space. 018

   EIR does not discuss open space preservation.
   EIR does not discuss Open Space District participation.

3. Long range goal of keeping River discharge below 5%. 019

   EIR addresses three alternatives to accomplish low discharge, but prices South and West County and Geysers too high to be acceptable.
   EIR should address alternatives within each of these projects to reduce their cost, example being the South County Project.

4. Delivery to agriculture would remove the necessity to increase each year the percentage of treated wastewater in the potable water supply. 020

   EIR uses a risk assessment model to prove the safety of water.
   EIR does not address consumer acceptance of a compromised potable water source.

5. What is the value of urban reuse to the ratepayer? 021

   EIR addresses urban reuse.
   EIR does not contain a freshwater wastewater flow chart to measure the advantages of substituting wastewater for potable water to delay the startup time for new sources of potable water.

Direct dollar benefit to ratepayer not achieved by Laguna discharge. 022

Bill Kortum, 180 Ely Rd., Petaluma CA 94954 707-762-6219 9/24/1996 page 7

6. Delivery to agriculture would keep per cent of discharge below 5% as opposed to Laguna discharge which would build to 20% over life of project. 023

EIR does not address next solution after project life. Does percentage to River go to 35% or 40%?

EIR does not address expandability of a South County or West County project. 024

How feasible and what are comparative costs to expand at the end of project life? 025

7. EIR addresses cost of denitrification vs. wetland polishing. 026

Exhibit F
EIR does not discuss avoidance of denitrification by keeping discharge levels below 5% as accomplished by delivery to agriculture.

$42 million denitrification cost would build a transmission line to Tolay. 027

8. EIR does not address potential cost of a water treatment plant at some midway point when potable water quality may be challenged. 028

Exhibit G
North Marin Water quotes $210 million.

To a ratepayer the Laguna discharge looks financially attractive, but on the long haul, financially unattractive. 029

WHAT ARE THE LONG TERM COSTS AND LOCAL BENEFITS IF LAGUNA DISCHARGE ALTERNATIVE IS CHOSEN? 030

In Summary and not addressed in EIR:
1. Costs of denitrification.
2. Costs of water treatment plant.
3. Lost benefit from not delaying development of new water supply.
4. Costs to expand the system at the conclusion of the project's life.

Bill Kortum, 180 Ely Rd., Petaluma CA 94954 707-762-6219 9/24/1996 page 8

Bill Kortum

PETE WILSON, Governor

CALIFORNIA - CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

E WATER RESOURCES CONTROL BOARD
BONDERSON BUILDING
TREET
X 100
nto, California 95812-0100
) 657-1627
(916) 657-0932

FOR YOUR INFORMATION

RECEIVED
APR 25 1996
CITY OF SANTA ROSA
MANAGEME

A

April 15, 1996

Mr. Ed Brauner
Assistant City Manager
P.O. Box 1678
Santa Rosa, CA 95402

Dear Mr. Brauner:

I wanted to thank you and Dan for taking time recently to show and explain the vast treatment and reclamation facilities at Santa Rosa. We very much appreciate your time and dedication to water reuse. Water reuse will continue to play an increasing roll if we are to balance water demands with water supplies within the State.

I remember your reclamation program from the early 1980s and I am pleased at the growth and your professional approach. I look forward to a continuing working relationship with the City and wish you the finest in your endeavors.

Best personal regards.

John W. Brown
Vice Chair

cc: Mr. Jack Pandol
California Environmental Protection Agency
555 Capitol Mall, Suite 525
Sacramento, CA 95814

Mr. Ross Liscum
North Coast Regional Water Quality
Control Board
5550 Slylane Boulevard, Suite A
Santa Rosa, CA 95403

The Revised Draft EIR identifies potential impacts for the wetland storage and reclamation options related to vector control of mosquitoes, botulism and potential for bioaccumulation of toxic substances in the sediments and vegetation. Best management practices are specified as mitigation measures to control mosquitoes, botulism and buildup of toxins in the sediments.

Creation of a marsh system within these sites would require filling of farmed wetlands for creation of storage cells and levee roads for maintenance. An estimated 20 acres of farmed wetlands on the Gray parcel and an estimated 10 acres of seasonal wetlands on the Brazil parcel could be potentially affected by fill. Avoidance of areas with high habitat values and development of a detailed mitigation plan for creation of replacement wetlands in upland areas is recommended to ensure no net loss of wetland area and preservation of existing values.

Loss of housing on the Gray parcel is identified as a significant impact that may be avoided by the sizing and design of a marsh system. Conversion of farmland and disruption of farm operations remain significant unavoidable impacts for all storage options and site alternatives evaluated.

Santa Rosa Joint Venture Project Alternative

It has been suggested through the public workshops that the City of Petaluma may save considerable ratepayers expense by joining with Santa Rosa in construction of expanded storage and pipeline facilities. The City of Santa Rosa is currently in the process of evaluating several options for storage and irrigation in the vicinity of Petaluma which may present an opportunity for a joint venture project. Santa Rosa is in the process of preparing an EIR/EIS that will address the potential impacts of the various options for a "South County Alternative". Because Santa Rosa is preparing an EIR/EIS that includes the South County Alternative, a joint project alternative is not evaluated in the Revised Draft EIR prepared by the City of Petaluma. Although the EIR/EIS will not specifically address a joint project, it may be used by both the City of Petaluma and the City of Santa Rosa, if a joint venture project is pursued that is consistent with the options evaluated.

A joint project would only be plausible if Santa Rosa selects the South County Alternative. If the South County Alternative is selected, the feasibility of a joint project with Santa Rosa will depend upon the available capacity of the selected reservoir site, timing for completion of the project, the quality of the effluent from both treatment systems, and project costs. The availability of sufficient land for expanded irrigation and the potential for competition between communities is another issue of concern for expansion of both reclamation programs in the South County. The availability of land for irrigation expansion is a concern with any South County alternative pursued by the City of Santa Rosa, regardless of whether there is a joint project with Petaluma. The following discussion presents an analysis of these factors for consideration.

Santa Rosa's Subregional Facilities

The City of Santa Rosa manages a subregional system that serves the cities of Santa Rosa, Rohnert Park, Sebastopol, Cotati, and an unincorporated area of Sonoma County. Santa Rosa's wastewater management system currently stores water in a number of reservoirs and discharges to the Russian River during wet weather periods and reclaims wastewater through agricultural irrigation during the dry season - similar to Petaluma's system. Because the Russian River is a drinking water source (unlike the Petaluma River) Santa Rosa's discharge is not only limited by the time of year, but also is limited to a percentage of flow in the Russian River. This limitation has made Santa Rosa's system extremely weather dependent. Planned growth within the five communities and requirements established by the Regional Board to develop a more reliable system have led to the proposed expansion of the Santa Rosa's storage and reclamation/disposal system.

Storage Requirements

The amount of storage needed for the subregional system will depend to a great extent on the amount of discharge to the Russian River. Santa Rosa is considering a range of discharge scenarios from 1 to 20 percent of the flow in the Russian River. (Santa Rosa currently discharges up to 5 percent of the flow in the Russian River.) The maximum storage and reclamation requirements are associated with the one percent discharge scenario. The maximum capacity required for the subregional system with a one percent discharge scenario is 13,800 acre-feet or 4,500 million gallons (mg). The storage requirements are substantially reduced as the discharge to the Russian River is increased.

Likewise, the amount of storage needed for the City of Petaluma will depend on the amount of discharge to the Petaluma River. The City is proposing to limit the discharge not to exceed present levels and phase out the discharge over the long term. The maximum storage required for phase out of the discharge is 4,300 acre-feet (or approximately 1,500 mg). With continued discharge to the Petaluma River (not exceeding current levels) the required capacity would be approximately 1,300 acre-feet (or approximately 500 mg).

The maximum capacity required for a joint project that would meet the storage needs of both the subregional system and the City of Petaluma (at the lowest discharge scenarios) is estimated at 18,000 acre-feet or approximately 6,000 mg. The amount of discharge allowed under either system would reduce the storage requirements.

Site Alternatives

The City of Santa Rosa is in the process of evaluating four reservoir sites in the South County area. Only one of the reservoir sites under consideration has sufficient capacity for both the City of Petaluma (with phase out) and the subregional system (with one percent discharge). Other options under consideration include construction of two smaller reservoirs that may also

provide additional capacity. The various reservoir sites that are presently under consideration as options for the subregional facilities are illustrated in Exhibit 3.

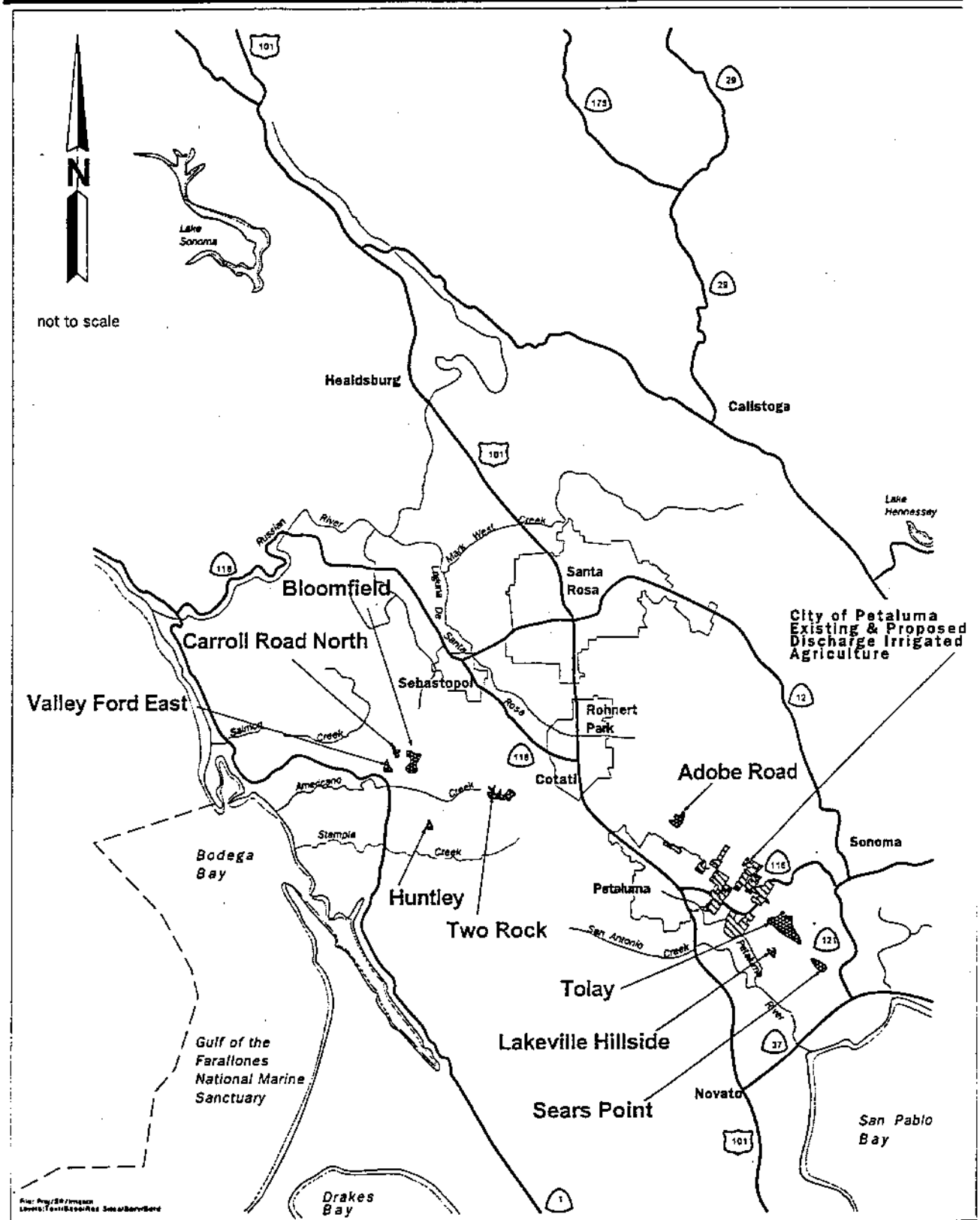
(1) Tolay Creek reservoir. The Tolay reservoir site is situated south of Stage Gulch Road between Adobe Road and Lakeville Highway, just south of the City's irrigation project area. The Tolay site has been recommended in facility plans for the subregional system since the early 1970's. At that time, it was envisioned that Petaluma's system would eventually be connected to the regional system. The Tolay site has a total useable capacity of approximately 20,000 acre feet (approximately 6,500 mg). (pers. comm. Robin Cort, Parsons Engineering Science).

Santa Rosa is presently evaluating two configurations for the Tolay reservoir. One configuration would inundate the entire Tolay Valley as shown in Exhibit 3. The second configuration includes a "back dam" across the valley that would prevent inundation of the area that is presently extensively cultivated. Because of the large surface area of the reservoir, a small incremental increase in the dam height will provide a substantial increase in available capacity.

The Tolay site is the only single site that would provide sufficient capacity to accommodate both the City of Petaluma's storage needs for phase out and the needs of the subregional system with a one percent discharge. However, the back dam configuration for the Tolay site may not provide sufficient storage for complete phase out of the Petaluma discharge and a one percent discharge for Santa Rosa's subregional system. The back dam configuration may provide sufficient capacity if the discharge is increased above minimum levels for either system. The back dam configuration could also be developed with one of the other reservoir sites discussed below.

(2) Sears Point Reservoir. The Sears Point Reservoir site is situated just north of State Route 37, west of SR 121. This site has a maximum capacity of 12,000 acre-feet that is less than the 13,800 acre feet required for the subregional system under the lowest discharge scenario. Additional capacity to accommodate Petaluma's needs at this location, would depend on the level of discharge from the regional system to the Russian River or whether a second reservoir site would be developed.

(3) Adobe Road Reservoir. The Adobe Road site is situated east of Old Adobe Road just north of the intersection of East Washington Street with a capacity of 11,400 acre-feet (or 3,700 mg). This site alone would not meet the needs of the subregional system under the lowest discharge scenario, but may meet the systems needs if the discharge to the Russian River was greater than one percent. There is no additional capacity available at this site unless a second reservoir site were also developed or if the discharge to the Russian River were increased.



Santa Rosa Subregional Long-Term Wastewater Project

PROPOSED RESERVOIR SITES

EXHIBIT 3

(4) The Lakeville Road Reservoir site is east of Lakeville Road, south of the Stage Gulch Road/SR116 with a capacity of 5,200 acre-feet (or 1,700 mg). This site alone would not provide sufficient capacity for the subregional system but may be combined with another reservoir alternative described above. If this site were developed in conjunction with another site, there may be some additional capacity available for Petaluma.

Clearly, the Tolay site provides the greatest opportunity for a joint-venture project that would meet the needs of both the subregional system and the City of Petaluma. If two reservoir sites were developed for the subregional system, there may be some additional capacity available for Petaluma, however, it will depend upon the allowable discharge to the Russian River determined for the subregional system. (It should be noted that Santa Rosa is under the jurisdiction of the North Coast Regional Water Quality Control Board which will determine the allowable discharge for the subregional system. Whereas, Petaluma is within the San Francisco Bay Basin and the discharge to the Petaluma River is determined by the San Francisco Bay Regional Board.)

Project Timing

The City of Petaluma's immediate need is for new treatment facilities to replace the aging plant and provide expanded capacity. Additional storage capacity is needed to limit the discharge to the Petaluma River to current levels as growth occurs. Because the treatment system will affect the available storage in the existing oxidation ponds, the timing for expansion of storage and reclamation will depend to a great extent on the design option selected for the new treatment facility. Two of the design options are sited within the City's existing oxidation ponds and would eliminate some of the available storage in the City's existing system. One design option to expand the existing oxidation pond system would provide added storage capacity. The effect of the treatment design on the available storage is summarized below and in Exhibit 4.

- **Oxidation Ponds.** Expansion of the oxidation ponds would increase the available storage capacity by 150 acre-feet and allow for later phasing of expanded storage.

- **Oxidation ditch or equivalent.** If an oxidation ditch or equivalent system is selected approximately 50 acre-feet of storage would be eliminated. This may require added storage to be constructed concurrently with the new treatment facility, or it may be feasible to provide a water balance during an interim period with expanded irrigation.

- **Deep Facultative/High Rate Ponds.** If the ponds were converted to a deep facultative/high rate ponds system, 625 acre-feet of storage would be eliminated in the existing system, requiring that additional storage be constructed in advance of the treatment system to limit discharge levels.

SUMMARY OF FACILITY REQUIREMENTS

Treatment[a]				Additional Storage[b]		Disposal - Irrigation[c]	
Optional Technology	Total Area (acres)	Remaining Ponds (acres)	Available Storage (acre-feet)	Continued Discharge (acre-feet)	Phase Out Discharge (acre-feet)	Continued Discharge (acres)	Phase Out Discharge (acres)
Oxidation ponds	190	160	950	400 - 900	3,100 - 3,600	1,400 - 1,800	2,500 - 2,900
Oxidation ditch	15	145	750	600 - 1,000	3,300 - 3,800	1,500 - 1,800	2,500 - 2,900
High Rate ponds	125	35	175	1,200 - 1,700	3,900 - 4,400	1,400 - 1,700	2,400 - 2,800

[a] Oxidation ponds - acquire and construct an additional 30 acres of oxidation ponds, retain 160 acres of existing oxidation ponds providing 950 acre-feet of combined storage, and construct primary treatment ahead of the pond system.

Oxidation ditch - fill an existing pond for construction of an oxidation ditch, retain 145 acres of existing ponds providing storage capacity of 750 acre-feet, and construct new reservoir for additional storage.

High-rate ponds - convert existing ponds to 35 acres of facultative ponds and 90 acres of high-rate ponds, retain 35 acres of existing oxidation ponds providing 175 acre-feet of storage, and construct new reservoir for additional storage.

[b] Lower storage volume represents projected flows and facility requirements with implementation of extensive conservation retrofit program. Higher storage volume represents projected flows and facility requirements with no additional water conservation programs.

[c] Acres of irrigable land area required at build out of the General Plan. For all options, it is assumed that 100 acres of golf course will be irrigated with reclaimed water in addition to the agricultural acreage shown.

EXHIBIT 4

The timing for completion of Santa Rosa's project has been delayed because of litigation and resulting court decision over the adequacy of the alternatives evaluated in a previous EIR. Previously, the City of Santa Rosa had decided to construct the West County Alternative with a reservoir in the Two Rock area. After the court decision, the City of Santa Rosa embarked on a new planning process to evaluate a full range of alternatives. The City has been ordered by the North Coast Regional Board to certify an EIR/EIS on the long-range project bySeptember 1996. To meet this deadline, Santa Rosa intends to publish a Draft EIR/EIS for public review in the Spring of 1996.

The City of Petaluma has published a Revised Draft EIR for expansion of the wastewater management system and is expected to make a determination on the adequacy of the document and begin consideration of proposals by the end of 1995. Because the City intends to privatize the new treatment facility, once a determination on the EIR is made, negotiations and the process of obtaining an exemption from the Public Utilities Commission (PUC) must be completed before design and construction would begin. This process is expected to require another six months to one year. Negotiations are expected to be completed by the end of 1996. Design and construction is expected to begin in 1997 for completion in 1998.

The new storage and pipeline facilities proposed by the City will be subject to public bid and would not require PUC approval to begin design and land acquisition. It may be necessary to begin the expansion of the storage and/or pipeline facilities prior to completing negotiations on the treatment facility, in order to ensure that the discharge to the Petaluma River does not exceed permit levels. As previously noted, the timing for completion of expanded storage facilities would be most critical for a Deep Facultative/High Rate Pond system that would require storage be completed in advance of the treatment facility. Design of a storage system could begin as soon as a vendor is selected.

Because the decision making process for both projects overlaps, design and construction of Petaluma's storage facility may not begin until after Santa Rosa has made a final determination on their project in the Fall of 1996. The possibility of a joint venture project would not be precluded by the timing of the decision-making process.

However, because of the intense public interest and scrutiny involved with Santa Rosa's subregional system, there is risk of delay in tying Petaluma's storage needs to the larger subregional system. Expansion of the subregional system has in the past been delayed through litigation and could be further delayed in the review of the EIR/EIS. The scope of the project may also require longer lead times in design, land acquisition and construction schedules.

Water Quality

Santa Rosa's Laguna treatment facility consists of an activated sludge process for secondary treatment that has been upgraded to tertiary treatment to include filtration and nitrification. These advanced treatment processes are required for discharge to the Russian River.

Although filtration and nitrification is not necessary for agricultural irrigation, the Santa Rosa continues the advanced treatment process year-round in order to manage the operational fluctuations that invariably occur in a seasonal system and ensure that the reclaimed water stored in the ponds will meet discharge standards.

Petaluma's system currently provides only secondary treatment. However, filtration is recommended to meet the anticipated shallow water discharge standards that have been developed for the San Francisco Bay. Nitrification is also recommended for continued discharge to the Petaluma River or to a marsh system or if the reclaimed water is used for streamflow enhancement. These processes, if included in the facility design, would make the treatment systems comparable.

Project Costs

Detailed cost estimates for Santa Rosa's reservoir alternatives are not yet available, but are being prepared and are expected to be available in the fall of 1995. However, Santa Rosa has developed preliminary construction cost estimates for the dam embankments used in their screening analysis of various reservoir sites. These preliminary cost estimates, prepared in 1994, reflect construction costs for the dams only and do not include land acquisition costs, pump stations, pipelines, access roads, fencing, design or project and construction management costs. Added costs for any required mitigation measures or underlying geologic conditions are also not included. Preliminary cost estimates provided in the Project Report prepared by the City of Petaluma for the two reservoir alternatives include all of these additional costs and therefore cannot be compared directly. However, the construction costs for the dams only can be broken out for comparison purposes as shown in Exhibits 5 and 6.

Construction costs for the various reservoir site alternatives can vary widely depending on the size of the dam required at each site. Because of economies of scale, construction costs on a per unit basis are generally less expensive for sites with large capacities. Likewise, for any given site, the initial costs for the dam foundation is generally the most substantial cost. Typically, each increment added to the dam height will generally provide a proportionately larger increase in capacity at lower added cost, thus reducing the overall unit costs.

During the preliminary screening of reservoir sites for the subregional system, completed in the Spring of 1994, Santa Rosa determined that reservoir sites with preliminary unit costs exceeding $5,000 per acre-foot (af) would not be cost effective for the amount of storage required. All South County reservoir site alternatives recommended for further evaluation were estimated within a range of $1,500 to $3,500 per acre foot of storage.

The two sites recommended for further evaluation for Petaluma's system provide a comparable range of unit costs. Unit costs for the dam only at the Higgins Creek site range from approximately $2,100/af for the largest capacity to approximately $3,500/af for the lowest capacity alternative. The Wheat Creek site has slightly higher unit costs because a larger dam is required. Unit costs for the various capacity alternatives at the Wheat Creek

components for the Fountaingrove and East Santa Rosa/Bennett Valley irrigation areas. Both alternatives were evaluated with and without the Sebastopol agricultural irrigation area, which is a common component that could be affiliated with either alternative. In addition, any fraction of the total available Sebastopol irrigation area (2,200 acres) may be used with either alternative.

Existing storage and irrigation area data are taken from the 1994 Reclamation Annual Report prepared by the City of Santa Rosa. The reported existing irrigation area is about 5,300 acres. An additional 200 acres is currently being added through the interim reclamation master plan for the Rohnert Park pipeline extension. The reported existing storage is 1,500 million gallons (MG). However, only 1,200 MG was used in the Water Balance Model to account for dead storage and to allow for some flexibility in the management of the existing storage system. Existing system capacity is assumed fixed for all alternatives and discharge rates.

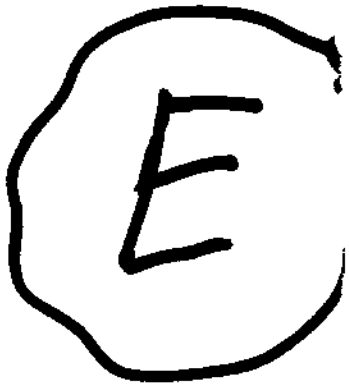
The model was run for both Alternatives 2 and 3, at four permitted Russian River discharge rates: 1, 5, 10, and 20 percent. As the permitted Russian River discharge rate increases, system requirements for irrigation and storage decrease. The 1 percent permitted discharge rate with maximum Sebastopol irrigation area requires the greatest total number of acres for irrigation because Sebastopol irrigation has the lowest annual irrigation demand or consumption rate. The maximum total required irrigated acreage (includes existing acreage) for the South County and Sebastopol is 10,700 acres, the maximum total for West County and Sebastopol is 12,400 acres. The maximum active reclaimed water storage volume required for both alternatives, with or without Sebastopol agricultural irrigation, is 4,000 MG. Additional storage volume will be required for stormwater runoff and dead storage, and is included as part of the reservoir calculations.

Irrigation areas were adjusted subsequent to water balance model runs. The effects of collected stormwater runoff and evaporation were considered for the storage reservoirs. The model results for irrigation acreage were adjusted for disposal of collected stormwater. Irrigation acreage results were also adjusted to account for irrigation efficiency. Previously, model results were based on crop requirements only. Considering irrigation efficiency (losses due to evaporation, percolation, etc.), allows for less land to be used for the disposal of reclaimed water. Model results were revised accordingly.

The 20 percent discharge option requires almost no expansion beyond existing facilities. A relatively small addition of urban irrigation area (100 acres) would achieve the required reliability at this discharge rate and no additional storage would be required.

Average and maximum contingency volumes are also shown for each alternative at the permitted discharge rates in Tables 1 and 2. Contingency volume is defined as the amount of reclaimed water in excess of the permitted discharge rate. Contingency volumes would be disposed of through winter irrigation, emergency conservation, and as a last resort, additional river discharge. Contingency volumes occur only 1 in 20 discharge months. Discharge months are October to mid-May. Based on the present reliability requirements, contingency volumes would occur approximately once every 2-3 years. Average contingency volumes range from

Technical Memorandum
from John Parkin
Parsons ES
26 Sept 1995



Draft

TECHNICAL MEMORANDUM

KYPIPE MODEL OPTIMIZATION FOR AGRICULTURAL IRRIGATION SYSTEMS (TM-P-7)

TO: Anders Hauge (HBA)
Robin Cort (Parsons ES)
Pat Collins (HBA)

FROM: Jessamy Zagel Trisler (Parsons ES)
Therese Wooding (Parsons ES)
Lance Houser (Parsons ES)

DATE: 3 August 1995

SUBJ.: Santa Rosa Subregional Long-Term Wastewater Project

INTRODUCTION

The irrigation distribution systems for the Santa Rosa project was modeled using KYPIPE computer modeling to make preliminary determination of pipeline sizes and pump station horsepower requirements. The intent in utilizing this model is to provide a minimum residual pressure of 40 pounds per square inch (psi) at all demand points in the system (nodes). However, for a given distribution network, the model can be used to create numerous combinations of diameters and horsepowers which will meet this pressure criteria. Each combination has an associated total construction and present worth operating cost. The piping systems must be optimized to meet the following initial criteria:

- Minimize the total construction and present worth cost;
- Provide 40 psi at all delivery nodes in the system;
- Limit the maximum pressure to 150 psi and maximum velocity to 7 feet per second (fps) everywhere in the system to use low pressure class pipe and minimize friction loss; and
- Locate and size booster pump stations.

Using the Sebastopol irrigation distribution network as an example, this memo describes the approach used to optimize the irrigation system and set model design criteria.

BACKUP DATA FOR TABLE 3.8

F

MEMORANDUM

TO: Robin Cort, Parsons ES
Andy Hauge, HBA

FROM: Dave Smith
Jeff Peters, Questa Engineering Corp.
Gary Halsey, Parsons ES

DATE: 7 March 1995

SUBJECT: Evaluation of Created Wetland Conceptual Design

Reducing the discharge of nitrogen in effluent during the spring algal growth season is expected to be a necessary component of a long-term wastewater management project that involves River discharge. Wetlands in the Laguna watershed are a potential project component to provide effluent polishing (which includes nitrogen removal), consumptive wastewater reuse, and community separator benefits. The BPU has provided input to the process of wetland site selection and conceptual design, and this input is reflected in memoranda entitled *Proposed Refined Approach to Wetland Creation* (28 July 1994), *Wetland Creation Site Selection Criteria* (22 November 1994), and *Status of Created Wetland Conceptual Design Site* (8 December 1994). The purpose of this memorandum is to update the BPU and to recommend that wetland creation for wastewater polishing purposes be eliminated as a component of the long-term wastewater management alternatives.

DEVELOPMENT OF THE POLISHING WETLANDS CONCEPT

In response to BPU direction, wetlands acreage needs have been identified, sites have been identified, preliminary cost estimate for wetlands creation has been developed, and the cost of constructing facilities at the treatment plant for polishing has been estimated for comparison to wetlands. Each component of the evaluation is summarized below.

Acreage Needs. Using data from Kelly Farm Demonstration Wetlands (KFDW) and other sites in United States (previous acreage estimate was based on KFDW data only), the following acreage needs have been identified to remove inorganic nitrogen to a provide an effluent concentration of about 1 mg/L:

Updated Preliminary Estimate of Wetland Acreage Needed For Effluent Polishing

	Discharge Rate (percent)			
	1	5	10	20
Estimated Wetland Area Needed For Polishing (acres)	320	640	870	1280

Wetland Sites. Potentially suitable sites for creation of approximately ~~creation~~ 800 wetland acres have been identified to two general areas, one east of Rohnert Park along Petaluma Hill Road, and the other west of Rohnert Park near Stony Point Road. These sites are currently actively

farmed, and are either currently being irrigated or are potentially irrigable. The sites are not within the original community separator zone, and since they are zoned agriculture and outside Rohnert Park's sphere of influence, are already protected from development. Insufficient City-owned land that is suitable for wetland creation was identified (only 70 acres) to avoid the need to consider other lands.

Wetland Cost Estimate. The capital cost of wetlands creation is expected to be $25,000 to $40,000 per acre, depending on how much soil removal from a site would be needed to avoid visual impacts. This estimate includes land purchase. Assuming a capital cost of $25,000 (lower end of cost range) and a 1,200-acre polishing wetlands facility (upper end of acreage range), the capital cost would be $30 million. Annual operations and maintenance (O&M) costs would be approximately $500,000.

Treatment Plant Cost. Nitrogen removal to an effluent concentration of about 2 mg/L is feasible by constructing additional two-phase (anoxic and aerated) basins at the treatment plant. The approximate capital cost would be about $38 million, and the annual O&M cost would be about $750,000.

Cost Comparison. The cost of the wetlands and treatment plant options are summarized as follows:

Cost Comparison of Nitrogen Removal Alternatives
(NPV period: 1999-2010, discount rate = 6¼, 1995 dollars)

	Wetlands	Treatment Plant
Capital	$30,000,000	$38,000,000
Annual O&M	$500,000	$750,000
Net Present Value	$32,000,000	$41,000,000

RECOMMENDATION

The recommendation to discontinue development of the polishing wetlands component is based on the following considerations:

Displacement of Agriculture. Land that would be used for created wetlands is viable, productive agricultural land that uses reclaimed water. An alternative nitrogen removal method to wetlands is available (treatment plant), but no comparable alternative exists for irrigated agriculture.

Community Separator Benefits. The creation of wetlands on the identified sites would not offer community separator benefits that would not be provided by agriculture. Insufficient acres of wetland sites are available to create a true wetland community separato

Cost Effectiveness of Disposal. Irrigation costs approximately 25 percent less per million gallons consumed than wetlands, as shown in the following table:

Cost Comparison of Wetlands and Irrigation

	Land Cost ($/acre)	Water Use (AF/acre)	Disposal Cost ($/MG)
Irrigation	$10,000	2	$15,000
Wetlands	$25,000	4	$19,000

Need For Nitrogen Removal. Although the evaluation of River discharge impacts is incomplete, discharge of nitrogen in the spring algal growth season will likely need to be limited in spring to avoid stimulation of algal growth in the River. This could possibly be accomplished by reducing discharge rates in spring instead of nitrogen removal. At such time that an alternative is selected and the need for nitrogen removal is thus evident, the appropriate strategy for nitrogen removal can be identified. Since nitrogen removal at the treatment plant is technically feasible and *[Note to reviewers: need some statement about how this approach works within CEQA/NEPA constraints]*.

I:\WINWORD\261\WETLCRT7.DOC

NORTH MARIN WATER DISTRICT
999 RUSH CREEK PLACE • POST OFFICE BOX 146 • NOVATO, CALIFORNIA 94948 • (415) 897-4133 • FAX (415) 892-8043

December 6, 1995

Honorable Mayor and Council Members
City of Santa Rosa
P.O. Box 1678
Santa Rosa, CA 95403

Subj: Santa Rosa's Plan Involving Construction of a 54-Inch Pipeline to Discharge Treated Wastewater Upstream of All of the Sonoma County Water Agency's (SCWA) Collector Facilities

Ladies and Gentlemen:

The Project Description Report, dated October 27, 1995, includes five wastewater alternatives Santa Rosa has selected for EIR study. Alternative 5 involves direct discharge to the Russian River with two sub-alternatives to be studied:

Alt. A - Discharge to the Russian River *above all* of the SCWA's intakes via a 54-inch pipe.

Alt. B - Continued discharge to the Russian River via the Laguna (which enters the Russian River just above two of the collectors and, because of local streamline hydraulics, remains virtually isolated from the two downstream collectors).

Why in the world does Santa Rosa want to study an alternative that exposes the bulk of the urban population of Sonoma and Marin counties to increased risk? The November 27, 1995 Press Democrat estimates the SCWA supply serves 400,000 people and Santa Rosa's mayor is quoted as stating: "It would be a strictly political move to put it (the wastewater discharge) upstream of our intake." This is political nonsense, which could lead to serious implications if water quality is affected.

The water diverted from the Russian River by SCWA is naturally filtered through the sands and gravels overlying the Ranney collectors and produces drinking water of exceptional quality and clarity. By locating such massive wastewater disposal facilities above the SCWA Ranney collectors, the high quality SCWA supply may be compromised exposing SCWA customers, including Santa Rosa customers, to increased health risks which may trigger a Department of Health Services requirement for full filtration of water diverted by the SCWA collectors. Capital costs for such a facility in today's dollars is estimated to be $107,335,950 and North Marin would argue that Santa Rosa and its subregional wastewater partners should foot that bill and cost of operation of such a facility (estimated to be $9,159,900 per year)!

DIRECTORS: GEORGE A. AMAROLI • JACK BAKER • JAMES D. FRITZ • JOHN C. SCHOONOVER • WILLIAM W. WRIGHT
OFFICERS: CHAS S. DeGABRIELE, General Manager/Chief Engineer • JOYCE S. REED, Secretary • DAVID L. BENTLEY, Auditor/Controller

Please review the arguments that the SCWA and North Marin Water District offered in objection to a similar alternative (rapid infiltration) proposed by Santa Rosa in 1986 (see Attachment A and B respectively). In response, Santa Rosa wisely dropped consideration of that alternative. We urge you to have the good conscience and political wisdom to do so again.

Sincerely,

/S/

Chris DeGabriele
General Manager/Chief Engineer

Enclosures:

Attachment A - Comments of the Sonoma County Water Agency on the DEIR for the Long Range Wastewater Management Plan of the City of Santa Rosa, dated January 12, 1987

Attachment B - Comments of North Marin Water District on DEIR for the Long Range Wastewater Management Plan of the City of Santa Rosa, dated February 5, 1987

cc: w/o enclosures (attached list)

NORTH MARIN WATER DISTRICT
999 RUSH CREEK PLACE • POST OFFICE BOX 146 • NOVATO, CALIFORNIA 94948 • (415) 897-4133

February 5, 1987

Post-it® Fax Note 7671

Co./Dept. Co.

Phone # Fax #

Honorable Mayor and Council Members
City of Santa Rosa
P. O. Box 1678
Santa Rosa, CA 95403

Subj: Comments of North Marin Water District on Draft Environmental Impact Repo entitled "Long Range Wastewater Management Plan" dated December 1986

Ladies and Gentlemen:

As regards the rapid infiltration alternative, the subject report contains significa errors, omissions and deficiencies. Principal among these are:

1. The report significantly understates the potential impact of this proposed alternative on public health. As demonstrated by expert testimony before the North Coast Regional Water Quality Control Board and by the written position of the Department of Health Services (January 20, 1987 letter to Regional Water Quality Control Board from David Clark). It is clear that the agency whose responsibility is to safeguard public health will not tolerate this option.

2. Setting aside Item 1 for the moment, the report significantly understates the level of treatment required of the wastewater prior to infiltration pond disposal **and** the increased level of treatment required of water extracted at the Ranney collector system operated by the Sonoma County Water Agency which distributes potable water to a population of 400,359 people located in the urban areas of Sonoma and Marin Counties. The North Marin Water District has explored the potential cost of the additional treatment to the water supply (see Attachment A). This cost varies from a low of $50.9 million to a high of $98.9 million depending on the level of treatment that would be required by the Department of Health Services. The cost of additional treatment of the wastewater effluent has not been estimated but could easily run between $25 and $50 million. Clearly, consideration of these costs makes the RI option uneconomic compared to other available options.

DIRECTORS: JACK BAKER, President • GEORGE A. AMAROLI • BARBARA B. MUNDEN • JOHN C. SCHOONOVER • WILLIAM W. WRIGHT
OFFICERS: JOHN OLAF NELSON, General Manager • NORMA B. MORRIS, Secretary • SAGE L. MORRIS, Auditor-Controller • JAMES D. FRITZ, Chief En

3. The DEIR ignores the issue of public acceptability but appears to embrace the comparison made by CH2M Hill in the Phase 2 report entitled "Evaluation of Alternatives" wherein the acceptability of the ocean project is rated equal to the acceptability of the RI option. This simply does not square with the many historic studies on this subject which show that the public does not prefer to have a significant amount of reclaimed sewerage in its public drinking supply. The public will not accept this option when there are other safer alternatives available from a public health perspective.

Enclosed for your study and consideration is the following reference material:

Attachment 1: Report by CWC-HDR, Inc., a renowned engineering company whic has designed many water supply and wastewater treatment plants and has been selecte often by the United States Environmental Protection Agency to perform special studie of water quality and water treatment plant costs. The attachment is a special repor which identifies in detail the estimated cost of additional treatment that would b required at the Ranney collectors. The results are presented as a range of number because it is at this point not clear how far the Department of Public Health woul require the Sonoma County Water Agency to go with additional treatment. The minimur requirement, however, has been determined to be $51 million (capital costs). The Cit of Santa Rosa, who is a signator to the Master Agreement for Water Supply from th Sonoma County Water Agency, would be responsible pursuant to that agreement for 5 percent of these costs. The first page of the CWC-HDR report contains the followin significant statement:

> "Because of the proximity to the point of effluent disposal and the assessment that 90 percent of the water collected by the Ranney wells is underflow from the Russian River, there is justifiable concern that during low stream flows a high percentage of the water captured by the Ranney wells will be treated wastewater. Currently, water from the Ranney collector meets the Department of Health Services' drinking water standards and receives only chlorination prior to distribution. Addition of high concentrations of wastewater will increase the total dissolved solids content, increase background organic concentration levels, and potentially increase the level of toxic heavy metals in the supply. It is contemplated that additional treatment will be needed to remove heavy metals and organics if this in-stream effluent disposal alternative is adopted. Further, the Department of Health Service would probably mandate that complete treatment facilities with provisions to remove heavy metals and organics be installed."

Attachment 2: Statement (and qualifications) before the North Coast Regio Water Quality Control Board of Henry J. Ongerth, January 22, 1987. This stateme concludes that the rapid infiltration alternative is extremely risky from a public hea viewpoint and should not be considered further since other options are available to t City of Santa Rosa. It is particularly noteworthy that Henry J. Ongerth is the form Chief of the Bureau of Sanitation, Department of Health Services. During the ma years that he held that post (1968-1978) Mr. Ongerth was a leader in establishing wat quality standards not only in California but across the nation. Now retired, Mr. Onge lectures at the University of California at Berkeley in the Department of Sanita Engineering and does occasional selective consultant work, principally for federal a state agencies.

Attachment 3: A paper entitled "Health Consequences of Wastewater Reuse" Henry J. Ongerth and his son, Jerry E. Ongerth, Sanitary Engineers. The paper appear in a 1982 issue of Annual Review Public Health and is an excellent update on the sta of the art of health consequences of wastewater reuse.

Attachment 4: Questions raised on effluent chemistry, RI pond longevity a performance and dilution estimates by the geotechnical/engineering firm of Hardin Lawson and Associates, who were asked to review portions of the DEIR.

Attachment 5: Resolution No. 87-4 of the Board of Directors of North Mar Water District recommending that the Russian River sewage disposal pond alternati be dropped from further consideration and setting forth reasons therefor.

Attachment 6: Numerous other comments of North Marin Water District on t errors, omissions and deficiencies in the DEIR.

In closing, it is obvious to this District, based on expert advice and based the combined 130+ years of professional experience in the field of water supply a wastewater engineering represented by our staff, that the proposed rapid infiltrati alternative: 1) presents public health risks not worth taking and unnecessary to tal given the fact there are other safer alternatives available; 2) is uneconomic compare to other alternatives available; and 3) is unacceptable to the public. We recommer the RI alternative be dropped from further consideration.

Sincerely yours,

John Olaf Nelson
General Manager

JON:nm
enclosures

STATEMENT OF HENRY J. ONGERTH
Consulting Sanitary Engineer
to
North Coast Regional Water Quality Control Board
January 22, 1987

Recycling of Santa Rosa sewage into the Sonoma County Water Agency water source presents the risk of unacceptable health hazards to the potable water users of this system.

This is so because the treatment proposed for this sewage disposal does not adequately remove the stable organic substances found in all community sewage effluents. These organic substances originate in feces and urine and in a large array of substances disposed of in homes and commercial and industrial establishments. For example, it is common practice for households to put into their sewer system unwanted substances including cleaning materials, solvents, paints, medicines, cosmetics; any substance used in the home that can be dumped or poured into a toilet, a laundry tray or a wash basin.

Treated sewage effluent, as a consequence, contains a wide variety of substances mineral and organic. The organics include a stable fraction that is not biogradable and will thus pass through the treatment process proposed by Santa Rosa and will travel unchanged through the environment. Only a small fraction of these stable organics have been identified and toxiologists have barely begun to determine the toxicity of this complex organic soup.

The widely observed mutagenic activity of advanced waste treatment effluent is of unknown public health significance and a matter of growing concern.

Consumer acceptance is another significant factor. The California State Department of Health Services and other agencies have sponsored scientifically designed consumer attitude surveys. These studies have consistently established that a majority of the public rejects projects which would recycle reclaimed sewage for potable purposes.

The proposed rapid infiltration alternative is particularly risky because the sewage effluent would percolate into coarse river gravels not far upstream from the Sonoma County Water Agency Ranney Collectors. Calculations based on measured river flows including the assumption of complete mixing of sewage and river water before reaching the first collector, show the maximum month reaching 34% sewage in the water supply with many months exceeding 20%, and with a 10-year average of about 8% based on a relatively recent dry period (1923-1932). This is not, however, a conservative calculation

ATTACHMENT 2

because the recharged sewage will initially travel in ribbons which will mix slowly with river underflow and may arrive at the first collector only partly mixed or not mixed to any significant degree.

Whether mixed completely or only partially, a recycling of stable substances both organic and mineral will result in a buildup through each recycle from sewer to water supply, to sewer, and on and on to some final higher concentration. This will significantly and dangerously degrade the water supply of the City of Santa Rosa and for all other users of water of the Sonoma County Water Agency.

Because of earlier proposals to deliberately recycle sewage effluents into ground water sources of potable water, the California Department of Health Services over ten years ago assembled a panel of nationally recognized experts to study the issue. The panel recommended against such practices. That recommendation still stands.

Proponents of potable reuse point to many examples of indirect reuse where sewage is discharged upstream and water supply is withdrawn downstream. This is an undesirable situation. Appropriate public policy should be to mitigate such existing hazards as promptly as possible and to reject new projects for return of sewage effluents to potable water sources, where feasible alternatives are available.

Philip Handler, President of the National Academy of Sciences, commenting on risks, writes, "It has become a function of government to determine whether a known technological benefit is worth the attendant risk. A sensible guide would surely be to reduce exposure to hazard wherever possible and to accept substantial hazard only for great benefit."

In support of your Board policy to protect sources of domestic water as the highest water use, your Board should reject the rapid infiltration alternative. This recharge would have a serious impact on an important domestic water source. This is not acceptable in public health terms, it is not acceptable in terms of consumer attitudes, and it is not necessary.

Ron Brust, City Engineer
City of Rohnert Park
6750 Commerce Blvd
Rohnert Park, CA 94928

Miles Ferris, Director of Utilities
City of Santa Rosa
69 Stony Circle
Santa Rosa, CA 95401

Bonnie Long, City Manager
City of Cotati
201 W. Sierra Avenue
Cotati, CA 94931-4217

Michael Alexander, General Manager
Valley of the Moon Water District
P.O. Box 280
El Verano, CA 95433

George Roberts, General Manager
Forestville County Water District
P.O. Box 261
Forestville, CA 95436

Richard L. Rowland, Public Works
City of Sonoma
City Hall, No. 1 The Plaza
Sonoma, CA 95476

John Scherer, City Manager
Steve Simmons
Tom Hargis
City of Petaluma
P.O. Box 61
Petaluma, CA 94952

Randy Poole, General Manager
Sonoma County Water Agency
P.O. Box 11628
Santa Rosa, CA 95406

Pam Nicolai, General Manager
Marin Municipal Water District
220 Nellen Avenue
Corte Madera, CA 94925

Cliff Bowen, Senior Sanitary Engineer
State of California
Division of Health Services
2151 Berkeley Way, #458
Berkeley, CA 94704

Ben Kor, Executive Director
North Coast Regional
Water Quality Control Board
5550 Skylane Blvd
Santa Rosa, CA 95403

CD\jsa

c:\wp51\Chris\discharge.95

Press

Bill Korten

COMMENTS ON THE CONCLUSION THAT RIVER DISCHARGE IS LESS ENVIRONMENTALLY DESTRUCTIVE AMONG ALTERNATIVES

No mention is made of the environmental advantages of not going into the River.
In the water short west, we cannot throw the resource away.

Exhibit A: Letter from John Brown
Vice Chair, State Water Resource Control Board

Staying in the reclamation business will provide water for landscaping, golf courses, and the double plumbing of houses.

The urban re-use of the resource will delay the time when new potable sources of water need to be developed. Such development could be very damaging to the environment.

Increasing percentage of discharge to the River each year has all the potential for environmental damage.

Strengthening the economic viability of agriculture has all the positive fall out of preserving open space, keeping the dairy industry in Sonoma County, and promoting the grape industry.

The EIR is using the wrong measurements to determine that River discharge is the least damaging environmental solution.

SOUTH COUNTY PROJECT

The EIR shows bias toward River discharge by engineering three alternatives that are too costly to consider. I will use the South County alternative as an example.

EIR does not address a partnership or a contractual relation with Petaluma to gain the economy of scale by combining the projects.

Exhibit B
Petaluma is considering a $37 million storage and delivery system. They devote 8 pages in the EIR to partnership with Santa Rosa.

Project savings: $15-20 million for each city

Exhibit C
Parson Engineers a $15 million catchment system for Tolay and then turns around in Technical Memorandum of September 26, 1995, and creates a Water Balance model that allows "collected storm water runoff and evaporation were considered for storage reservoirs."

Exhibit D
Koretsky King study avoids catchment and in contrast collects surrounding water to add to the lake.

Project savings: $15 million

EIR describes a 22 mile transmission line from Llano plant to Tolay with no delivery capability.

Santa Rosa has delivered wastewater to the Poncia pond through a transmission line for years -- until some recent reconfiguration, Poncia used the water when he needed it and he did not utilize the water pressure in the transmission line.
The EIR does not address using the transmission line to deliver to farm

ponds and smaller reservoirs on its way to Tolay, a system similar to the Poncia pond. Instead, the EIR describes a whole new parallel distribution line coming back to Penngrove operating under pressure with multiple pump sites, a $66 million add on.

Exhibit E
Parsons determined that 40 pounds per square inch was to be delivered to every node of the system. Using a modeling system called Kypipe, the computer gave no consideration for:

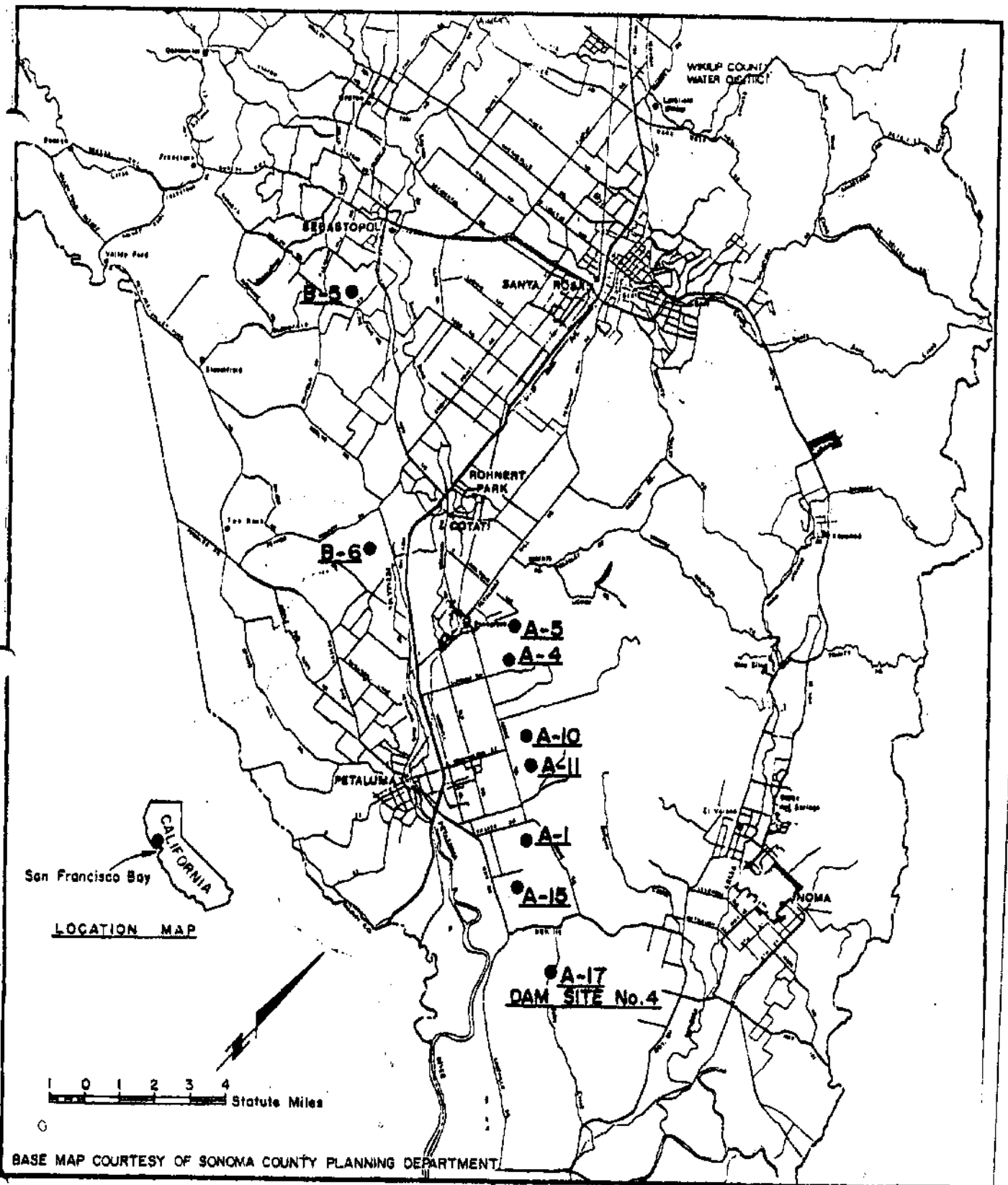
1. Using the transmission line for a non-pressurized delivery system to the South County
2. Pond deliver to grape lands that are marginal users of water and cannot justify elaborate pressure system.

Should reexamine need for $66 million pressured delivery system.
Project savings: $46 million

South County Wastewater Project

	HBA*	HBA reconfigured*
Land costs	8	8
Tolay storage	46	31
Transmission line	16	16
Transmission line pump	4	4
Transmission line 20 year energy cost	16	16
Distribution line pipes, pumps	66	20
Irrigation equipment	8	8
Urban irrigation	12	12
Sebastopol ag	10	10
	186	125
Less Petaluma partnership		-20
		105
Contingency and OH and P (40%)		42
		147
Using phased project to reduce debt service		-60
COST OF PROJECT		87

* figures in millions of dollars



HARDING-LAWSON ASSOCIATES
Consulting Engineers and Geologists

Job No. 8141,005.01 Appr. HLK Date 5/25/79

SITE LOCATION MAP

Sonoma County Waste Water Reclamation Study

PLATE 1

Reservoir Code	Approximate Storage (acre-feet)*	Approximate Dam Height** (feet)
A-1	2,400	70
A-4	2,400	90 + long dike
A-5	2,300	80
A-10	2,700	100
A-11	9,400	160 and 140
A-15	6,900	160
A-17	29,900	100
B-5	3,300	110
B-6	3,000	70

* Rounded to nearest 100 acre-feet
** Typically, the dams will be earth fill; dam height neglects freeboard.

EIR fails to discuss:

1. Obtaining smaller sites
2. Transmission line in center of potential irrigation acreage
3 Transmission line straight shot to Tolay
4. South County project makes available diked baylands which provide ability to expand the system in years to come
5. Financial advantages of a phased system.

COMMENTS ON THE EIR AS VIEWED BY RATEPAYERS

1. Water resource is valuable to agriculture and would have considerable economic impact on Sonoma County.

   Well covered in EIR with multiplier effect of $115 million over life of project.

2. Strengthens agriculture, therefore underwriting the preservation of open space.

   EIR does not discuss open space preservation.
   EIR does not discuss Open Space District participation.

3. Long range goal of keeping River discharge below 5%.

   EIR addresses three alternatives to accomplish low discharge, but prices South and West County and Geysers too high to be acceptable. EIR should address alternatives within each of these projects to reduce their cost, example being the South County Project.

4. Delivery to agriculture would remove the necessity to increase each year the percentage of treated wastewater in the potable water supply.

   EIR uses a risk assessment model to prove the safety of water.
   EIR does not address consumer acceptance of a compromised potable water source.

5. What is the value of urban reuse to the ratepayer?

   EIR addresses urban reuse.
   EIR does not contain a freshwater wastewater flow chart to measure the advantages of substituting wastewater for potable water to delay the startup time for new sources of potable water.
   Direct dollar benefit to ratepayer not achieved by Laguna discharge.

6. Delivery to agriculture would keep per cent of discharge below 5% as

opposed to Laguna discharge which would build to 20% over life of project.

EIR does not address next solution after project life. Does percentage to River go to 35% or 40%?
EIR does not address expandability of a South County or West County project.
How feasible and what are comparative costs to expand at the end of project life?

7. EIR addresses cost of denitrification vs. wetland polishing.

   Exhibit F
   EIR does not discuss avoidance of denitrification by keeping discharge levels below 5% as accomplished by delivery to agriculture.
   $42 million denitrification cost would build a transmission line to Tolay.

8. EIR does not address potential cost of a water treatment plant at some midway point when potable water quality may be challenged.

   Exhibit G
   North Marin Water quotes $210 million.

To a ratepayer the Laguna discharge looks financially attractive, but on the long haul, financially unattractive.

WHAT ARE THE LONG TERM COSTS AND LOCAL BENEFITS IF LAGUNA DISCHARGE ALTERNATIVE IS CHOSEN?

In Summary and not addressed in EIR:
1. Costs of denitrification.
2. Costs of water treatment plant.
3. Lost benefit from not delaying development of new water supply.
4. Costs to expand the system at the conclusion of the project's life.