Technical Memorandum Name: **Effluent Reuse and Disposal, April 2008**
Commenter: **Keith Wimer**
Comments Date: **May 26 2008**
Responses Date: **July 1, 2008**

The following comments were submitted in response to the above listed Technical Memorandum (TM). The TM was developed as part of the EIR process for the project, in order to help facilitate and broaden the discussion of project issues important to the community. The responses should be considered preliminary because the EIR process is not complete, and the information necessary to fully respond has not yet been developed. The project team is grateful to those citizens who took the time to review the TM and provide comments at this early stage in the process. The project team will endeavor to fully address the comments and concerns through the on-going project development process.

	Comment	Response
1	May 25, 2008 LOWWP Project Team, Michael Brandman Associates, and LOWWP TAC <u>Subject:</u> **Response to the Effluent Reuse/Disposal TM: Reasons why Broderson is unsustainable, three sustainable alternatives for Broderson, and problems with the *Fine Screening Report's* seawater intrusion analysis)** Dear LOWWP Project Team, Michael Brandman Associates, and TAC The Broderson leach field alternative goes against the basic principles of good planning and sustainable development (which have become synonymous), for two main reasons: 1) it does not take a precautionary approach to environmental harm or provide adequate opportunities for future flexibility and adaptability, and 2) it does not take a long-term, whole systems approach to resource protection/management, as it seeks multiple solutions. (Note: The Broderson alternative also fails to meet the only two sustainability criteria mentioned in the *Fine Screening Report*: "…it is the goal of the Los Osos community to consider the future of the project so as to minimize future expenditures and the possibility of stranded assets" (p. 1-8). There are three sustainable alternatives, which accomplish seawater mitigation at levels equal to or greater than Broderson leach fields—with much less risk, much greater flexibility/adaptability, and many more benefits: 1) a reuse/recycling alternative, which provides water to individual residences, as well as other urban users, 2) a conservation alternative, which reduces current usage by about 25-30 % via water-efficient retrofits, and 3) an ag exchange program, which produces at least 200 AFY of ground water from wells east of Los Osos Valley Creek and/or outside of the basin	The Broderson percolation site provides a high degree of benefit and future flexibility for the community's water resources. Disposal at Broderson 1. has capacity for up to 2/3 of the disposal needs for the project; 2. is a flexible-all weather disposal option; 3. will provide between 100 and 200 AFY of seawater intrusion mitigation to the lower aquifer; 4. recharges the upper aquifer; 5. and ensures a distribution backbone for future urban reuse (purple pipe) programs. Disposal at Broderson does not preclude other water resource management options such as conservation, urban reuse, or agricultural reuse.

2	**How Broderson fails the "precautionary" test and does not provide adequate future flexibility:** 1. All the potential benefits of the Broderson site are posited from analyses and modeling; therefore, they contain a level of scientific uncertainty and risk.	Scientific analysis and modeling are common methods for development of engineered solutions. The analysis includes identification and mitigation of risks and unknown conditions.
3	2. Respected experts and authoritative sources dispute that the soils at the Broderson site can handle the amount of water predicted by Fugro and Cleath. Some say it will handle only 1/10th the amount (i.e., about 45,000 gpd vs. 450,000 gpd).	Extensive scientific study and prototype testing by experts in the fields of geology, hydrogeology, engineering, and environmental science from many different agencies and consulting firms over the last 20 years has consistently supported the conclusion that the site has the capacity for high rate infiltration.
4	3. It's failure can cause serious harm to homes, serious harm to sensitive ecosystems (if subsurface from flows from the site fail to reach saltwater interfaces, e.g., Sweet Springs), and serious harm to ESHA habitat (if more space than anticipated is needed to expand the leach fields).	Groundwater transport in the basin occurs over many years and the water levels down gradient of Broderson will be extensively monitored to ensure that the levels are responding as planned.
5	4. It's failure (and even its intended use) can cause more harm to the ground water than good 1) by failing to provide the hydraulic pressure needed in the upper aquifer to recharge the lower aquifer, thus worsening seawater intrusion, 2) by failing to adequately recharge the upper aquifer (i.e., causing a reduction in the volume of water in the upper aquifer), thus increasing the concentrations of upper aquifer nitrates and other contaminants, rather than decreasing them, 3) by requiring high levels of chlorine disinfection, thus increasing concentrations of harmful chlorine by-products in the upper aquifer, e.g., NDMA, and 4) by increasing the concentration of other contaminants in the upper aquifer if the benefits of ground filtration/disinfection are compromised at the site (e.g., if percolation rates, heavy use of Broderson, and/or mounding reduce the effectiveness/size of the vadose zone). (Note that trace contaminants from new manmade chemicals, called "emerging contaminants," are becoming a growing concern since many are recognized carcinogens or cause other health problems.)	1) The assertion that water disposed at Broderson would not reach the upper and lower aquifers is unfounded and not supported by the analysis. 2) The assertion that disposal at Broderson would increase nitrogen levels is unfounded since nitrogen levels in the treated effluent will be much lower than the existing levels in the groundwater. 3) Disinfection will be with ultraviolet light, not chlorine. UV light does not have residual by-products. 4) Disposal at Broderson does not rely on the soil, or vadose zone, for treatment. All water quality requirements will be met at the treatment plant prior to transmission to Broderson. The additional benefits of subsurface filtration occur in both the vadose and saturated zones. Note that treated effluent from the wastewater project will have much lower levels of contaminants than are currently discharged from untreated septic tank effluent.
6	5. Broderson allows only limited ability to improve system capacity or make adjustments if recharge capability proves much less than predicted by Fugro and Cleath. If aquifer levels begin to drop once this option is installed and/or supplies of fresh water to sensitive habitats (e.g., along the bay) are insufficient, it will be difficult and costly—likely impossible—to modify Broderson to remedy the problem(s).	The assertion that Broderson is not suitable for high rate percolation is unfounded and not supported by the analysis. Additionally, the implementation of multiple reuse and disposal options affords the ability to adjust flows as conditions require.

7	**How Broderson fails to take a long-term, whole-systems approach that seeks multiple benefits.** 1. Broderson will only get more expensive to operate in the future with the likelihood of increasing energy costs and increasingly stringent water quality requirements.	Broderson is one of the most cost effective means of providing disposal capacity and mitigating sea water intrusion. The environmental review and design phases will continue to consider potential impacts that affect the overall life cycle costs.
8	2. Its use will result in permanent alteration of ESHA habitat on the Broderson site.	ESHA impacts on the Broderson property are primarily temporary construction impacts and will be mitigated by site restoration and the permanent preservation of adjacent habitat. The Broderson disposal site has also been previously permitted by State and Federal resource agencies.
9	3. Even if it works as predicted, it accomplishes only limited goals: limited recharge, limited ground water improvement (i.e., mostly near the site), and limited benefits to sensitive habitats.	Broderson is one of the most effective means of mitigating sea water intrusion. However each reuse and disposal option has physical limits to the level of water resources benefits provided. It is important to have multiple reuse and disposal options for the wastewater project.
10	*How and why a reuse distribution system (e.g., purple pipe) is preferable to Broderson* Broderson is a relatively high risk option, with relatively limited benefits. On the other hand, a reuse distribution system (e.g., purple pipes) to homes and larger users is much less risky, more adaptable, and produces numerous benefits, including water use reduction (conservation) and greater potential to reduce seawater intrusion than Broderson. Because a reuse distribution system not only contributes to recharge of the aquifers, but reduces pumping of the aquifers, it has a two-fold beneficial impact on seawater intrusion. If all homes within the Prohibition Zone were served by a reuse distribution system, current pumping of the aquifer would be reduced by at least 1/3rd (or about 600 AFY—approximate current outdoor use). If Carollo Engineers' .55 mitigation factor is applied, reuse distribution would reduce seawater intrusion by 300 AFY, or 3 X's that of Broderson (about 100 AFY). Therefore (applying Carollo Engineers' factors) only 1/3rd of the community would have to be connected to a reuse system to achieve the same benefits as Broderson—and this doesn't count the beneficial effects of ground water recharge achieved by dispensing recycled water on site. Further, this option, which results in reduced pumping for the lower aquifer, is likely to provide much greater mitigation than Carollo Engineers assigns it—see comments on Carollo's seawater mitigation analysis below.	An urban reuse (purple pipe) system does have the potential to provide a large amount of sea water intrusion mitigation by offsetting pumping demand. It is also one of the most expensive reuse and disposal options. Costs would be similar to the construction of the wastewater collection system (estimated at $65-$90 million for construction costs alone). Ultimately, the development of a basin management plan by the community water purveyors, in cooperation with the County, will drive decisions on the most cost effective methods for reuse of treated wastewater effluent and development of future water supply enhancements. Construction of percolation facilities at Broderson will provide the necessary pipeline to convey treated effluent to a central area of the community for a potential urban reuse program.
11	**How reuse distribution is less risky and provides greater future flexibility:** 1. It provides much more seawater mitigation than Broderson and potentially can stop seawater intrusion.	A purple pipe reuse program can provide more sea water intrusion than Broderson, at a significantly higher cost. Urban reuse does not have the capacity for disposal of all of the

		wastewater project effluent. This highlights the importance of implementing multiple reuse and disposal options to ensure operational flexibility.
12	2. It helps to recreate the existing conditions (i.e., water widely dispersed over the aquifers via the existing leach fields), so it imitates a system that is proven to recharge the aquifers and supply subsurface water to sensitive ecosystems.	The existing conditions have been proven unsustainable, as shown by the existing sea water intrusion problem. Dispersed recharge to the upper aquifer is not an efficient way to provide recharge to the lower aquifer and much of the water is lost to outflow to Morro Bay.
13	3. It avoids habitat destruction and the possibility of ground destabilization and property damage.	Habitat and high groundwater impacts must be mitigated under any reuse or disposal option.
14	4. It allows for strategic installation of systems over parts of the community where the greatest outdoor use occurs and/or where ground filtration/treatment/recharge is best achieved.	Strategic reuse and disposal is important for the project. The basin management plan will develop the framework for strategic reuse of the treated wastewater effluent.
15	5. It provides for relatively rapid improvements in the upper aquifer through strategic installation of systems and greater recharge capacity.	Purple pipe reuse is not expected to provide benefits to the upper aquifer. The upper aquifer currently has excess water that is being lost to Morro Bay.
16	6. It allows for expansion of the system as needed to adjust to future needs (e.g., situations in which ground water levels or quality require remediation)	Once recycled water is provided to homes and major urban users there would be little opportunity for future expansion within the existing service area that is affected by sea water intrusion.
17	7. It provides for more complete natural ground filtration/treatment than Broderson by avoiding overuse and saturation of the vadose zone. (Note: As the already high water mound under Brodersion rises when Broderson comes on line, the vadose zone will likely shrink significantly or disappear.)	This is an incorrect assertion. Subsurface filtration occurs in both the vadose and saturated zones. Note: there is not a current mound under the Broderson site. In fact, there is over 150 feet of separation from the surface to groundwater. The overuse and high water levels are occurring in the Prohibition Zone as a result of septic tank discharges.
18	**How reuse distribution takes a long-term, whole system approach that seeks multiple benefits:** 1. It looks long-term at the benefits of recycling and reusing wastewater (i.e., conservation).	Wastewater reuse certainly has long term benefits.
19	2. It achieves the multiple benefits of aquifer recharge, aquifer improvement, and reuse/recycling (conservation).	Purple pipe reuse can reduce the pumping requirements on the basin and potentially mitigate sea water intrusion to a certain degree. It does not, however, provide for recharge or improvements to the basin quantity or quality.
20	3. It recognizes that reuse is a necessity in the future to maintain sustainable water supplies, and that the California Legislature has provided laws and	Purple pipe reuse is certainly an important and growing water supply strategy in California. For the

	other incentives (e.g., grants) to encourage reuse and recycling.	community of Los Osos, the basin management plan will develop the framework for the most cost effective method of reuse of the treated wastewater effluent.
21	*How and why conservation is preferable to Broderson* At least a 25-30% reduction in water use is achievable through indoor and outdoor water saving devices and practices, according to well-respected authorities, including Drs. Asano and Tchobanoglous in the text, *Water Reuse* (2007), and Dr. Peter Gleick of the Pacific Institute in the report, "*Want Not, Waste Not*" (2003). This would reduce current water use in the Prohibition Zone by about 550 AFY. At a minimum (if Carollo Engineers' mitigation factor of .55 is applied) this level of conservation would provide 3X's the amount of seawater intrusion achieved by Broderson (i.e., about 300 AFY vs. about 100 AFY). Further, this option, which results in reduced pumping for the lower aquifer, is likely to provide much greater mitigation than Carollo Engineers assigns it—see comments below on Carollo's seawater mitigation analysis.	Conservation is an important element of water management in Los Osos and can be implemented regardless of the effluent reuse and disposal options. The Fine Screening Report and other project documents assume that a more conservative level of conservation of 160 AFY can be reasonably expected. The community water purveyors maintain the option to develop programs to achieve higher levels of conservation.
22	**How conservation is less risky and provides greater future flexibility:** 1. It provides much more seawater mitigation than Broderson and potentially can almost stop it.	This is an incorrect assertion. The analysis shows that conservation provides a lesser level of sea water intrusion mitigation than disposal at the Broderson site. Reliance solely on conservation has inherent risks, as it depends on the water use patterns of thousands of individuals.
23	2. It avoids habitat destruction and the possibility of ground destabilization and property damage.	Comment noted: A benefit of conservation is that it can be implemented with minimal impacts.
24	3. It helps build reserve/response capacity into water systems (i.e., restores the level of aquifers), creating the potential for excess water to be banked or traded for future water rights.	Existing water demand, even with conservation, exceeds the available resources. Therefore, conservation does not have the potential to build water reserves or create excess water.
25	4. It increases the residence time of water in the aquifers, improving the water quality.	Groundwater residence time is on the order of decades or centuries. Conservation is not expected to have a measurable effect on water quality.
26	**How conservation takes a long-term, whole system approach that seeks multiple benefits:** 1. In addition to reducing seawater intrusion, conservation reduces wastewater pumping, treatment needs and plant size (e.g., costs); it reduces energy use due to reduced water pumping and heating (e.g., for laundry and showers); and it creates greater opportunity for ground filtration/treatment if water is dispensed to landscaping, on-site leach fields, or other reuse options.	Conservation does have many benefits for both the wastewater project and ground water resource management. It has been identified by the County and water purveyors as an important element of project development.
27	2. It recognizes that conservation is a cornerstone of sustainable development, necessity in the future	See above.

	to maintain sustainable water supplies.	
28	3. It recognizes that conservation is the least expensive source of new water, according to experts, e.g., Dr. Peter Gleick (see #1 above).	See above.
29	*How and why ag exchange is preferable to Broderson* Ag exchange should be able to provide at least 200 AFY of water, which would mitigate seawater intrusion at a level at least equal to Broderson (i.e., about 100 AFY vs. about 100 AFY) (Broderson @ about 500 AFY Xs a .22 mitigation factor vs. ag exchange @ about 200 AFY Xs a .55 mitigation factor). Unfortunately, this option has been put on the back burner so far because ag reuse and exchange programs are said to take time to develop. However, contact with farmers should be made now to see if contracts can be negotiated by the start up of the LOWWP. A related approach is for land to be purchased inside or outside of the basin (e.g., along Turri Road) to provide ag exchange opportunities from community-owned property.	Agricultural exchange is one of the options available for reuse of the treated wastewater effluent. This option would also require that the water purveyors secure agreements for appropriating irrigation water for potable use and build the necessary pumping and transmission facilities. Ultimately, the development of a basin management plan by the community water purveyors, in cooperation with the County, will drive decisions on the most cost effective methods for reuse of treated wastewater effluent and development of future water supply enhancements.
30	**How ag exchange is less risky and provides greater future flexibility:** 1. Exploring this option now, and possibly signing contracts with farmers (or carefully reviewing the ag exchange potential for community-own property inside and outside the basin), would address and likely remove many perceived/potential risks from these options.	The basin management plan will identify the most cost effective water management strategies related to the reuse of the treated wastewater effluent. Ag exchange is one of the options under consideration.
31	2. Ag exchange, especially in combination with conservation and purple pipe, provides for flexibility in how water resource and environmental issues are mitigated (e.g., unexpected fluctuations in the quality or quantity of the aquifers due to sea level rises, etc.).	Disposal and reuse of treated wastewater effluent will require multiple options to ensure flexibility to meet the needed capacity. Irrigation dependent options cannot be relied on to meet disposal demand during wet weather.
32	3. Having other sources of water for the community builds adaptability and response capacity into the system.	The ag exchange water envisioned is from the Los Osos groundwater basin and is not a new source.
33	4. It avoids habitat destruction and the possibility of ground destabilization and property damage.	Ag exchange would require construction of additional infrastructure, potentially within sensitive habitat areas.
34	**How ag exchange takes a long-term, whole system approach that seeks multiple benefits:** 1. Ag exchange can benefit farmers and the Los Osos Valley Water Basin by providing water rich in nutrients (e.g., nitrates), so that farmers can stop or reduce application of nitrate fertilizers.	Farmers have the ability to decide whether or not to accept treated effluent and control the application of fertilzers.
35	2. Combining ag exchange with the purple pipe and/or conservation alternatives (mentioned above) can produce surplus community water, which might be blended with treated water to further improve the quality of water going to farmers. (Free or inexpensive water may enable opportunities to negotiate contracts which secure future water for Los Osos) (see #3 above).	Existing water demand, even with conservation and reuse of treated effluent, exceeds the available resources. It should not be expected that there would be excess water in the urban portion of the basin.

36	3. Community property ag exchange may also provide for solids recycling (e.g., via underground injection or uses for composted solids). Community crops could sequester carbon (i.e., reduce the project's carbon foot print) and provide revenue to offset the cost of the project.	Purchase of ag property for ag exchange is an option for consideration through the basin management plan, or the community may decide in the future to purchase land for agricultural production or biosolids composting. Note that land disposal of biosolids would not likely be compatible with agricultural uses.
37	*Problems with the Fine Screen Report's seawater intrusion mitigation analysis* The *Fine Screening Report's* seawater mitigation analysis has several problems that must be considered in the context of a reuse discussion. For one thing, assigning a seawater mitigation factor of .55 to all strategies, which reduce pumping of the aquifers is illogical and not consistent with Cleath's *Sea Water Intrusion Assessment* (July 2005). Taken to the extreme, this is the same as saying, "If pumping were stopped altogether, seawater intrusion mitigation would still be only .55 (or 55%)"—obviously illogical. To arrive at the .55 factor, Carollo Engineers appears to assume (see *Fine Screening Report*, p. 2-21) that reduced pumping will be evenly distributed among all wells tapping the lower aquifer. This assumption is not supportable, especially since water purveyors have now signed an agreement allowing them to strategically pump to avoid overdraft. Obviously, reduced pumping from wells at the western-most part of the community would have a mitigation factor of closer to 1.0 or 100%)—and if the total lower aquifer overdraft (550-600 AFY according to Cleath) were no longer pumped from the western wells, seawater intrusion should stop. Therefore, mitigation strategies involving reduced pumping should have a higher mitigation factor than .55.	The sea water intrusion mitigation analysis in the Fine Screening Report was developed by Cleath and Assoc. and is consistent with their July 2005 report. A key assumption in the analysis is that reduced water demand from conservation and reuse would cause the water purveyors to reduce pumping from their wells that are on the west side of town (0.55 factor). The maximum 0.55 mitigation factor applies to any strategy that reduces west side lower aquifer production. If lower aquifer pumping on the west side of the basin (approximately 1,200 AFY) were stopped altogether, the sea water intrusion mitigation value would be 660 AFY, or 55% of the offset in production, and intrusion would stop. Of course, the community would have to find a replacement for that lost production. Sea water intrusion in the lower aquifer is a 3-dimensional problem. As ground water is pumped from the aquifer, the void is filled with water from all sides. Fresh water moves in from the easterly side (creek valley) and from above (upper aquifer leakage), while sea water moves in from the westerly side. Pumping closer to the ocean induces more sea water intrusion, up to 0.55 gallons of sea water intrusion per gallon pumped. Pumping on the east side of town only induces 0.1 gallons of sea water intrusion per gallon pumped.
38	Secondly, the mitigation factor (.1 of 10%) for reuse alternatives to the east of Los Osos Creek (e.g., ag reuse) are most-likely too low. The Cleath *Sea Water Intrusion Assessment* (July 2005) indicates that 420 AFY of the total freshwater recharge of the lower aquifer is from the creek valley. Although the report states that faulting will interrupt flows from west of the creek, more than 30% of the inflow into the lower aquifer originates from the area.	See above. The sea water intrusion mitigation analysis in the Fine Screening Report was developed by Cleath and Assoc. and is consistent with their July 2005 report. In contrast to urban area production, lower aquifer water pumped from the

	As Cleath suggests, a focused recharge project might not be ineffective due to faulting; however, when/if pumping in the area slows or stops due to ag reuse, for example, the beneficial impacts on water flow are likely to be much greater, with seawater mitigation much greater (i.e., than .1). Further, general dispersion of water via ag reuse would maintain current levels of ground percolation and inflow to the basin; therefore, shutting down wells would be a net benefit to the aquifers. (Note: Ag reuse should be evaluated in the EIR in light of the fact it is likely to provide greater seawater intrusion mitigation than Carollo Engineers assigns to it, and because it offers multiple benefits, e.g., several noted above for ag exchange.)	creek valley is replenished in large part by the creek valley alluvial aquifer. The 0.1 mitigation factor for ag reuse is related to the fact that the creek valley aquifer does not have much excess storage capacity and the creek valley alluvium has a high hydraulic conductivity. If agricultural pumping is reduced in the creek valley, the majority of the excess groundwater is expected to flow out to Morro Bay while the groundwater levels and flow to the lower aquifer remain relatively constant.
39	Finally, the mitigation factor Carollo Engineers assigns to current septic systems (.22) is too low. The *Fine Screening Report* (p. 2-3) states that current septic discharges mitigate seawater intrusion by approximately 90 AFY in the Prohibition Zone. The Cleath *Seawater Intrusion Assessment,* however, concludes that the upper aquifer is the main source of recharge for the lower aquifer (920 AFY of 1330 AFY), most of which is from septics. Further, the *Fine Screening Report* acknowledges that septic systems contribute 850 AFY of recharge to the upper aquifer in the Prohibition Zone alone. Septic systems, therefore, provide considerably more than .22 (22%) mitigation of seawater intrusion, and are likely to provide well over .5 or 50%. This means that offsetting the current seawater intrusion mitigation of septic systems (i.e., maintaining status quo) would require mitigating at least 250 AFY, not 90 AFY. While a .22 mitigation factor for Broderson may very well be too high, a .22 for septics seriously (and dangerously) underestimates their beneficial impacts on seawater intrusion, i.e., the potential negative impacts caused when they are taken off line. The *Fine Screening* seawater intrusion analysis tends to support the adequacy of Broderson by downplaying the current importance of septic flows on the system. On its face, the claim that Broderson leach fields, at about 500 AFY (450,000 gpd), will replace the approximately 1100 AFY of septic flows is illogical. Even if much of the current septic flow never makes it into the upper aquifer, running off to the creek and bay (e.g., 400 AFY or so), analyses suggesting that rain water percolation or other inflow will make up the difference—are speculative. Adequate mitigation of the impacts resulting from septics being taken off line is key to the LOWWP's improving the ground water, rather than harming it, and avoiding serious environmental damage to ESHA land in the area. A precautionary, sustainable approach should be taken. The three alternatives presented above do this. Conservation with reduced pumping is the most direct way to ensure mitigation, while a purple pipe system, or other systems that distribute and/or discharge reuse water onsite—which tend to recreate existing conditions—are much more prudent than	See above. The sea water intrusion mitigation analysis in the Fine Screening Report was developed by Cleath and Assoc. and is consistent with their July 2005 report. The assertions in this analysis are incorrect. The upper aquifer recharges the lower aquifer by using hydraulic head pressure to push water through the clay layers (aquitard) to the lower aquifer. The primary source of water input into the basin is from rainwater. The distribution of polluted septic tank discharges has a minimal effect on increasing head pressure and recharging the lower aquifer and results in much of the water flowing to Morro Bay, approximately a 0.1 factor. The septic tank discharges are a primary reason the status quo has resulted in the unsustainable overdraft of the basin, which is evidenced by sea water intrusion. Compared to septic tank discharges, percolation at the Broderson site results in a higher hydraulic head above the lower aquifer due to more than 150 feet of separation to groundwater. This condition forces more water into the lower aquifer, resulting in the 0.22 factor. The Fine Screening Report does draw the conclusion that percolation at Broderson recharges the lower aquifer more effectively than septic tank discharges.

	Broderson.	
40	Conclusion The above alternatives are more sustainable than the Broderson reuse/recharge/discharge alternative. They are much less risky, provide greater future adaptability, address conditions in a long-term, whole systems manner, and provide multiple solutions (e.g., seawater intrusion mitigation, recharge, and reduced water use). The *Fine Screening Report* estimates the Broderson leach fields will cost about $3 million (not counting the approximately $7 million for land acquisition). These costs will quickly escalate with any potential problem mentioned above, e.g., the need to expand leach fields, drill harvest wells, find other means of recharge, provide higher levels of treatment, and/or repair damaged homes. When risks are factored in—along with Broderson's limited benefits and limited future flexibility—purple pipe, conservation, and ag exchange emerge as better alternatives and better investments. Purple pipe, conservation, and ag exchange can be combined and phased in to control costs and/or to allow time to develop particular programs (e.g., ag exchange and conservation). Since these options (in lieu of Broderson) achieve seawater mitigation and aquifer balance (i.e., benefit the entire community, especially new development), they can be financed (at least in part) with development fees. Purple pipe and ag exchange systems can also be operated by purveyors in lieu of current groundwater pumping-distribution operation, thus eliminating O&M costs for the systems, along with the O&M for Broderson. Furthermore, these approaches have a better chance of receiving grant funding—due to Legislative emphasis on conservation and recycling, as reflected in such laws as Porter-Cologne Water Quality Control Act, Chapter 7 (Water Code, Division 7), Sections 13512 and 13515, etc., which state, "It is the intention of the Legislature that the state undertake all possible steps to encourage development of water recycling facilities so that recycled water may be made available to help meet the growing water requirements of the state. In order to implement the policy declarations of this chapter, the state board is authorized to provide loans for the development of water reclamation facilities…"	Conservation, urban (purple pipe) reuse, and agricultural exchange are all potential options for managing the community's water resources. They do not, however, provide adequate capacity for all of the treated wastewater effluent nor do they recharge the groundwater basin. Implementation of multiple options will be necessary to provide capacity for the wastewater effluent and cost effectively mitigate sea water intrusion. Purple pipe and ag exchange would certainly be a decision of the water purveyor, but neither would replace their ongoing responsibilities for their existing systems.
41	Given that the above alternatives achieve the purpose of Broderson leach fields more effectively, with less risk, greater adaptability, and more benefits; the Broderson alternative should be abandoned in favor of more sustainable options. Sincerely, Keith Wimer	