Introduction: Applicable Statutory and Regulatory Background and Support for a Subsequent/Supplemental EIR, an EIS, or a Supplemental EA.

The following statutes, laws and policies provide legal bases for the preparation, circulation and certification of a subsequent or supplemental environmental impact report (SEIR), an environmental impact statement (EIS) or, at the very least, a supplemental or revised environmental assessment (supplemental EA) for upcoming actions and decisions by the State Water Resources Control Board (SWRCB), the Central Coast Regional Water Quality Control Board (CCRWQCB), the U.S. Department of Agriculture (USDA), and other responsible agencies, concerning the Los Osos Wastewater Project (LOWWP). Further environmental review prior to any financial or other public agency commitments to the LOWWP is essential to address major changes in project conditions and circumstances under which the project is being undertaken, new information of substantial environmental importance and as yet unmitigated impacts, and to correct flaws, to prevent disastrous environmental, social and economic impacts in the Los Osos/South Morro Bay area -- the area affected the centralized conventional-gravity waste water treatment option the LOWWP would implement.

The California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) and the State CEQA Guidelines (Guidelines) (Cal. Code Regs., tit. 14, § 15000 et seq.), require the preparation and circulation of a subsequent EIR under the following circumstances:[1]

"When an environmental impact report has been prepared for a project pursuant to [CEQA], no subsequent or supplemental environmental impact report shall be required by the lead agency or by any responsible agency, unless one or more of the following events occurs:

> "(a) Substantial changes are proposed in the project which will require major revisions of the environmental impact report.
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> "(b) Substantial changes occur with respect to the circumstances under which the project is being undertaken which will require major revisions in the environmental impact report.
>
> "(c) New information, which was not known and could not have been known at the time the environmental impact report was certified as complete, becomes available."

(§ 21166.) Guidelines section 15162 further specifies in pertinent part:

> "(a) When an EIR has been certified … for a project, no subsequent EIR shall be prepared for that project unless the lead agency determines, on the basis of substantial evidence in the light of the whole record, one or more of the following:

[1] All unlabeled section (§) references in this document are to the Public Resources Code.

> "(1) Substantial changes are proposed in the project which will require major revisions of the previous EIR … due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;
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> "(2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR … due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or
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> "(3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete … shows any of the following:
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> "(A) The project will have one or more significant effects not discussed in the previous EIR …;
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> "(B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;
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> "(C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or
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> "(D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative."

Guidelines section 15052 requires responsible agencies to assume the role of lead agency if (1) a subsequent EIR is required; (2) the lead agency has granted a final approval for the project; and (3) the statute of limitations for challenging the lead agency's action under CEQA has expired. Additionally, responsible agencies must assume the role of lead agency when "The lead agency has prepared inadequate environmental documents without consulting with the responsible agency as required by [Guidelines] Sections 15072 or 15082, and the statute of limitations has expired for a challenge to the action of the appropriate lead agency." (Guidelines, § 15052; see *id*., § 15096, subd. (e)(3)(4), (f).)

CEQA and the Guidelines require agencies to "avoid or minimize environmental damage where feasible" (Guidelines, § 15021, subd. (a); see §§ 21002.1, 21061, § 21080.5, subd. (d)(3)), using an "interdisciplinary" *natural- and social*-science-based approach. (Guidelines, § 15142; see § 21001.) EIR-level review, or the functional equivalent thereof for state agencies proceeding under a regulatory program certified under § 21080.5, is mandatory if a project "may have a significant effect on the environment." (§§ 21100, subd. (a), 21151, subd. (a).) EIR documents "should be prepared with a sufficient degree of analysis to provide decisionmakers with information which enables them to make a decision which intelligently takes account of environmental consequences." (Guidelines, § 15151; see *Watsonville Pilots Assn. v. City of Watsonville* (2010) 183 Cal. App.4th 1059, 1080; see *id*. 1086-1087 [CEQA violated because the EIR failed to analyze a reduced development alternative that would have been " 'capable of avoiding or substantially lessening any significant effects of the project,' even if it 'would impede to some degree the attainment of the project objectives' "].) When preparing an EIR, "an agency must use its best efforts to find out and disclose all that it reasonably can[,]" (Guidelines, § 15144), performing "thorough investigation…." (*Id*., § 15145; see *Berkeley Keep Jets Over the Bay Com. v. Board of Port Comrs.* (2001) 91 Cal.App.4th 1344, 1370-1371 [CEQA violated because port agency's response concerning adverse air quality impacts of airport expansion plan on neighboring communities and airport workers fell short of the " 'good faith reasoned analysis' mandated by CEQA for responding to significant conflicting information generated by the public"].)

Importantly, a responsible agency must meet its own responsibilities for complying with CEQA's information disclosure provisions, and -- based on the lead agency's EIR as well as all new information contained in an SEIR or other environmental review document the responsible agency may be required to prepare -- must reach its own conclusions on whether and how to approve a project. (Guidelines, §§ 15020, 15096, subd. (a).) Furthermore, regardless of whether the responsible agency must prepare and circulate an SEIR under § 21166 and Guidelines section 15162 or 15163, it must mitigate or avoid "the direct or indirect environmental effects of *those parts of the project which it decides to carry out,* ***finance****, or approve*." (Guidelines, § 15096, subd. (g)(1), italics and bold characters added.) While the responsible agency's mitigation responsibilities thus do not extend to those parts of a project outside its approval or financing purview, still:

> "[The responsible agency] "shall not approve the project as proposed if [it] finds any feasible alternative or feasible mitigation measures within its powers that would substantially lessen or avoid any significant effect the project would have on the environment." (Guidelines, § 15096, subd. (g)(2).)

As emphasized in *Berkeley Keep Jets Over the Bay Com.*, CEQA calls for written responses to public comments that including significant conflicting information generated therein. CEQA's written response requirement involves two distinct public duties. First, an agency subject to EIR-level review (whether in the form of an EIR or functional equivalent) must "consider" and actually "evaluate" the comments it receives. (§ 21091, subd. (d)(1) & (2)(A); see also § 21080.5, subd. (d)(2)(D).) Second, it must prepare written responses for inclusion in the final EIR, "describ[ing] the disposition of each significant environmental issue that is raised by commenters[,]" consistent with rigorous standards of adequacy set forth in Guidelines section 15088. (§ 21091, subd. (d)(2)(A) & (B); see *Mountain Lion Foundation v. Fish & Game Com.* (1997) 16 Cal.4th 105, 122-123, 133 (*MLF*); *Berkeley Keep Jets Over the Bay Com.,* 91 Cal.App.4th 1344, 1367; *Cleary v. County of Stanislaus* (1981) 118 Cal.App.3d 348, 356.) Evidently, the first requirement is intended to prevent hastily prepared or evasive responses, and to secure factual accuracy and scientific integrity. (See *Berkeley Keep Jets Over the Bay Com.*, 91 Cal.App.4th 1344, 1370-1371 [responses to comments must be supported "by scientific or objective data"].) Without the CEQA mandated good faith reasoned responsive analysis, reasons for rejecting opposing views in written form cannot be articulated, and "understanding of the significant points raised in opposition" cannot be sharpened. (*MLF*, 16 Cal.4th 105, 122-123.) Thus, "The written response requirement ensures that members of the [agency] will fully consider the information necessary to render decisions that intelligently take into account the environmental consequences. [Citations.]" (*Id*. at 133.) This also promotes CEQA's policy of citizen input. (*Ibid*.)

Furthermore, as part of the environmental review process, state and local agencies must consult with responsible and trustee agencies -- including federal agencies -- and such consultation extends to the scope and substance of an EIR. (§§ 21080.3, 21080.5, subd. (d)(2)(C), 21104, 21153; Guidelines, §§ 15082, 15083, 15086.) Consultation also must be conducted to determine whether or not EIR-level environmental review should be conducted. (Guidelines, § 15063, subd. (g).) The EIR must include environmental information "germane to the statutory responsibilities" of the responsible agencies consulted as specified by the responsible agencies during consultation. (§ 21080.4, subd. (a).) Public agencies, *whether acting as lead or responsible agencies*, may not approve a project for which an EIR was prepared unless either (a) the project will not have a significant effect on the environment; (b) the agency has eliminated or substantially lessened all significant effects on the environment and supported that conclusion with findings in compliance with Guidelines section 15091; or (c) the agency has determined that certain significant effects are unavoidable but acceptable and supported this determination with a statement of overriding considerations in compliance with Guidelines section 15093. (§ 21081; Guidelines, § 15092.) Such agencies must make findings as required by Guidelines section 15091 to support those determinations, and must adopt a mitigation monitoring or reporting program in compliance with section 21081.6. (Guidelines §§ 15091, subd. (d), 15096, subd. (h).) Decisions, determinations and findings to certify an EIR and to adopt a statement of overriding considerations must all find support in substantial evidence. (§§ 21081.5, 21168, 21168.5; Guidelines, § 15091, subd. (b).)

The National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.) and the Council on Environmental Quality's NEPA Regulations (40 C.F.R. § 1500 et seq.) require a federal agency to prepare an EIS for major federal actions affecting the quality of the human environment. (42 U.S.C. § 4332(2)(C).) In order to assist agencies in determining whether an EIS is necessary, NEPA generally requires the preparation of an environmental assessment (EA) as an initial step unless a categorical exclusion applies. A federal agency may allow a project applicant to prepare an EA for review by the federal agency. (40 C.F.R. § 1506.5(b).) However, if the federal agency allows this, the agency still must "make its own evaluation of the environmental issues and take full responsibility for the scope and content of the [EA]." (*Ibid.*) The EA must provide sufficient evidence and analysis to allow the federal agency to determine whether an EIS is required. (40 C.F.R. § 1508.9.) Specifically, an EA must discuss (1) the need for the proposed action; (2) the probable environmental impacts of the proposed action; (3) alternatives to the proposed action; and (4) agencies and persons consulted during preparation of the EA. (40 C.F.R. § 1508.9(b).)

NEPA contemplates consultation, which it refers to as "scoping." (40 C.F.R. §§ 1501.7, 1508.9 (b).) Also, Section 7 of the Endangered Species Act (16 U.S.C. § 1536(a)(2)), requires all federal agencies to consult with the National Marine Fisheries Service for marine and anadromus species (such as the steelhead), or the U.S. Fish and Wildlife Services for fresh-water and wildlife, if they propose an “action” that may affect listed species or their designated habitat. “Action” is defined broadly to include funding, permitting and other regulatory actions. (50 CFR §402.02.) For any project that requires a federal permit or receives federal funding, Section 7 consultation serves to insure that any action the federal agency authorizes or funds is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. Consultation involves preparation by the state agency proposing the project of a biological assessment (BA) to analyze its potential effects on listed species and critical habitat. Upon review of the BA, the federal agency may find that the project may adversely affect listed species or their habitat, in which case it prepares a "biological opinion" (BiOp).

If, after preparation of an EA, the federal agency determines that a project would not have a significant effect on the human environment, it must prepare a Finding of No Significant Impact (FONSI), which must include an explanation of the reasons for the agency’s conclusion. (40 C.F.R. §§ 1501.4(e), 1508.13.) The agency must also make the FONSI available to the public. (40 C.F.R. §§ 1501.4(e)(1), 1506.6(b).) After preparation of an EA, a supplemental EA must be prepared if, either (a) the federal “agency makes substantial changes in the proposed action that are relevant to the environmental concerns; or [¶ (b) There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action[.]” (*Idaho Sporting Congress, Inc. v. Alexander* (9th Cir. 2000) 222 F.3d 562, 566; *id.* at 566, fn. 2.)

The federal Clean Water Act (33 U.S.C. § 1251 et seq.) requires that any application for federal grant funding for “treatment works” (including wastewater treatment/recycling projects) “contain adequate data and analysis demonstrating such proposal to be, over the life of such works, the *most cost efficient alternative*[.]” (33 U.S.C. § 1292(b), italics added.)

USDA regulations applicable to USDA loans require that USDA-funded projects conform to NEPA and provide “the most economical service practicable.” (7 C.F.R. § 1780.57(a), (c), (f), (n), (o).) Guidance from the USDA’s Rural Utilities Program states that an applicant should, where practicable, consider, among others, alternatives “optimizing the current facilities (no construction) [and] centrally managed small cluster or individual facilities.” (USDA Rural Utilities Service, Bulletin 1780-2 (9-10-03) at 4-5.)

Flaws in the LOWWP Review Process and the Approved Project.

The LOWWP and its review process violate CEQA, NEPA, the Clean Water Act and USDA regulations and policies. Substantial new information, including information currently being developed in a revised BiOp revealing new project impacts on the federally endangered Morro shoulderband snail (due to a project change adopted by the California Coastal Commission after certification of the final EIR), as well as changes in relevant environmental conditions, mandate preparation of an SEIR and an EIS (or a combined SEIR/EIS). For the same reasons, and due to environmental information disclosure gaps in the EA prepared last year for the federally-funded, USDA Rural Utilities Service financial assistance for the project, NEPA also calls for recirculation of a supplemental (or revised) EA.

Violations of CEQA and NEPA

1. Contrary to CEQA and NEPA, neither the EIR nor the EA adequately disclose, address, avoid, minimize or mitigate substantial adverse environmental impacts (including indirect, cumulative, and socio-economic effects) or explain why certain impacts are not being mitigated. (See *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 712; §§ 21005, 21002.1, subd. (c), 21081, 21081.5; Guidelines, §§ 15003, subd. (i), 15002, subds. (a)(4) & (f), 15144, 15151, 15021, 15091, 15092, 15126.4, 15130, 15131, 15355, 15370; 42 U.S.C. §§ 4332, 4333; 40 C.F.R. §§ 1501.4, 1506.5, 1508.3, 1508.7, 1508.8, 1508.9(b), 1508.13, 1508.14, 1508.20, 1500.21, 1500.24, 1508.27.)

    - <u>Significant new seawater intrusion and freshwater salinization impacts in the Los Osos groundwater basin.</u> The EIR and the later EA do not adequately estimate or forecast the substantially adverse direct, indirect and cumulative environmental impacts on fresh groundwater storage and the coastal ecosystem, caused by seawater intrusion in the groundwater basin. This is so because when those environmental documents were prepared and finalized, the severity of the movement and extent of saline water into the basin was not known. Nor could it have been known: in May 2010 (eight months after the final EIR was certified), new baseline information emerged, based on seawater intrusion monitoring in the lower basin, conducted in December 2009 and January 2010 under the auspices of an interagency working group. This information is significant for it shows previously unknown, severe acceleration of seawater intrusion in the groundwater basin.[2] In May 2010, seawater intrusion was found to be moving 12 times faster than the EIR predicted, threatening to shut down major supply wells. (Attachment 2, exh. B; Attachment 3, at 1.)[3] According to the results of the current monitoring, seawater intrusion moved

[2] The interagency working group which developed the new information, known as the interlocutory stipulated judgment or "ISJ" working group, was established in adjudicative proceedings over basin water rights. The ISJ working group consists of representatives from the County of San Luis Obispo and the area's three major water purveyors. This working group released the new information in a report dated May 4, 2010, entitled "Los Osos Groundwater Basin Update." (Attachment 2.)

The ISJ working group is charged with preparing a groundwater basin management plan. The December 2009 and January 2010 seawater intrusion monitoring was conducted "to update estimates of the rate and extent of seawater intrusion" in the lower aquifer zones that are used for groundwater production. (Attachment 2, at 3.)

[3] Because saltwater has high concentrations of total dissolved solids and inorganic constituents, it is unfit for human consumption and other anthropogenic uses. It will force abandonment of the supply wells when concentrations of dissolved ions exceed drinking water standards.

between 2005 and 2010 700 feet per year, a half-mile in four years, through the large lower aquifers. In contrast, the final EIR for the LOWWP used a maximum estimated average annual rate of intrusion of 60 feet per year. Being based on outdated seawater intrusion data, the mitigation measures adopted as part of the approval of the LOWWP fail to avoid, minimize or mitigate the actual impacts of seawater intrusion. They fail to account for the rapidly accelerating seawater intrusion. Nor do they account for substantial uncertainties in basin modeling (Attachment 4, Attachment 10, at 4; Attachment 24, at 5); significantly reduced recharge/mitigation at the Broderson leach fields for two years as the leach fields are being tested; non-existent recharge/mitigation if the Broderson leach fields do not perform (Attachment 20, at 6; Attachment 33); a modified recycled water program that will not mitigate for adverse impacts on seawater intrusion and habitat at the same time, and may not be viable due to high salt content in the wastewater stream (Attachment 3, at 2; Attachment 25, at 10; Attachment 33, at 4); and certain project conditions (No. 97 and No. 99) for reuse and conservation.[4] The current mitigation for the adverse impacts of aquifer contamination due to seawater intrusion is inadequate, potentially infeasible and not fully funded. As designed and mitigated, the LOWWP is likely to do more harm than good to the basin. Indirect, public health and socio-economic effects from loss of the potable water resource, and those effects' own adverse impacts on the environment, must be considered before committing tens of millions of dollars of public funding to the LOWWP. CEQA and NEPA preclude responsible agency funding for the LOWWP without public environmental review of (1) the significantly increased saltwater movement into the basin -- a major change in physical baseline conditions affecting groundwater sustainability;[5] and (2) the relationship of this change to the changes in aquifer dynamics and freshwater storage that result from the implementation of the LOWWP, as designed and approved, including the attendant decommissioning of all onsite wastewater disposal systems. Environmental assessment crucial to informed decisionmaking on the seawater intrusion impacts of the LOWWP and the comparative impacts of feasible wastewater treatment alternatives must be performed, and mitigation measures correlated to the actual

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[4] Those conditions do not minimize impacts on seawater intrusion, and they are unenforceable. (Attachment 3, at 1-2; Attachment 4, at 2; Attachment 25, at 14-16; Attachment 33.) Condition No. 99, for instance, requires an indoor conservation program that is not enforceable, while providing only half the mitigation of an indoor-outdoor program. The reason an indoor conservation program is not enforceable is that water use is measured at the meter, and the meter does not differentiate between indoor and outdoor uses. What this means is that the County cannot be held to a measureable standard. Also, the County makes the patently absurd assumption that during two winter months in this coastal area there will be no outdoor use. Similarly, according to Condition No. 97, the recycled water program relies on the Broderson leach fields, which -- if the leach fields perform at all -- will provide less than half the mitigation options recommended by the Los Osos Sustainability Group would provide. (Attachment 25, at 10.)

[5] The basic scientific premise that seawater intrusion reduces the basin's fresh groundwater storage capacity is accepted by all affected stakeholders.

severity of the impact (the real, anticipated salinity levels and their distribution) must be developed and implemented, based on specific, measurable, enforceable and verifiable performance standards.

- Significant impacts on environmentally sensitive habitat, including habitat of national significance. Neither the EIR nor the EA adequately analyze, avoid, minimize or mitigate significant impacts on environmentally sensitive habitat, namely (1) the Willow Creek Drainage; (2) Los Osos Creek (protected steelhead habitat); and (3) wetlands, springs and marshes along Morro Bay National Estuary-State Marine Reserve, which are an integral part of the estuarine system. (Attachment 20, at 1, 4, 5, 9-13; Attachment 24, at 4, Attachment 41, at 20-29.) Relevant environmental assessments to assess resource impacts were deferred (including groundwater flow measurements) and specific, measurable and enforceable mitigation measures, such as mechanisms and water sources to restore flows, remain to be identified to address potential reduction of "several hundred acre feet" of groundwater flows. (Attachment 20, at 1; Attachment 25, at 2; Attachment 33; Attachment 41, at 23.) The LOWWP predecessor project (not built) mitigated these impacts with multiple leach fields and harvest wells. (See Attachment 35, at 1-3.) These are not included because they are considered a groundwater recharge program (GRRP) requiring higher levels of treatment (e.g., reverse osmosis). The feasibility of these measures has not been considered and they are not funded. (Attachment 43; Guidelines, § 15126.4, subd. (a)(1).)

- Significant cumulative impacts. Substantial changes in pumping patterns are currently planned by purveyors in the face of the rapid increase in seawater intrusion. The purveyor plan (which involves shifts in pumping, nitrate treatment of upper aquifer water and desalination) is due to be released in March of 2011. Neither the EIR nor the EA analyze, avoid, minimize or mitigate the cumulative effects on the basin (upper aquifer and eastern portions of the groundwater basin in the urban area) resulting from the LOWWP in combination with the reasonably foreseeable changes associated with the purveyor plan. Eugene Yates, a respected hydrogeologist, has pointed out that the LOWWP, in combination with the now-planned increased pumping from the upper aquifer, may allow seawater to intrude into the *upper* aquifer -- thereby exacerbating an already severe, previously seriously underestimated water quality impact. Yates urges environmental review of the previously unknown cumulative effect and recommends increased mitigation. (Attachment 3, at 1-4, 7.)[6] The public, especially the residents and local businesses dependent on the groundwater supply must be given an opportunity to offer comment on

[6] A peer review of the basin model included in the Basin Update released by the water purveyors on May 4, 2010, suggests purveyor changes will not cause impacts. However, the update does not consider accelerating seawater intrusion or a review of the model by Yates -- one of the model's creators. (Attachment 2, exh. C; Attachment 3, at 1-2; Attachment 24.)

those new circumstances and increased jeopardy to the sustainability of the basin, in the manner required by CEQA and NEPA.

- <u>Socio-economic effects.</u> The funding decisions to be made must also be preceded by environmental review of their socio-economic impacts, and the indirect environmental effects of those impacts. And they must address measures to prevent those impacts. The estimated monthly cost of the project (optimistically assuming no construction overruns) is $189-$377 per single family homeowner. (Attachment 27, at 1.) Steeply rising water costs from planned changes in purveyor basin management measures (e.g., treating water for nitrates and desalination) will push monthly sewer/water costs to $400-$500 (and higher) for many households. (Attachment 2, at 5-6; Attachment 27, at 1-2.) This will cause severe financial hardship for most people in the Los Osos community. *Thirty-three percent (33%) of residents collect Social Security (an indicator of the number of people on fixed incomes), which is 50% above the state average.* For at least 25% of homeowners, water and sewer costs will be well over 10% of household incomes. Many households will be unable to sustain the costs and will have to relocate. (Attachment 27, at F-G.) Excessive water-sewer costs will destroy home values and the equity families have in their homes, potentially forcing families into foreclosure. This will result in an economically depressed area, with many homes left empty or in disrepair. Businesses and local tax revenue will be harmed as jobs will be lost. This will cause adverse impacts on the environment since homeowners will be unable or unwilling to pay future project costs, including (1) the unfunded mitigations identified above; (2) construction overruns; (3) unfunded maintenance costs; and (4) emergency repairs due to damage caused by, among other things, earthquake and storm damage. Since sewer and water costs are tied to water use, outdoor watering will be curtailed, deteriorating community aesthetics while causing landscaping to dry up. This, in turn, will adversely impact quality of life in the area, tourism, local businesses and employment. Very low water use may also cause blockages in the LOWWP's proposed conventional sewer system, overflows, and contamination of homes and surface waters. Such problems will result in higher-than-budgeted sewer maintenance costs and additional water use (to flush the system), further depleting short supplies. The adverse cumulative effects will increase underfunding of project costs and reduce repairs and reduce available water for habitat. With rapidly worsening seawater intrusion, a spiral of more severe consequences may result, including (1) severe water shortages and rationing; (2) a non-viable recycled water program due to high salt content in the water supply; (3) permanent harm to environmentally sensitive wildlife habitat; (4) shutdowns of water and wastewater services; (5) environmentally damaging emergency projects to supply water (trucked-in water, desalination and pipeline projects); and (6) exodus of people from the Los Osos community. (Attachment 36.) Reasonably foreseeable, short- or long-term indirect effects on the environment, associated with the LOWWP, its costs and its cumulative effects must not be divorced from environmental review. (See Guidelines, § 15126.2, subd. (a).) In particular, economic or social changes must be identified to the extent necessary to trace the chain of (socio-economic) cause and (environmental) effect. (Guidelines, § 15131, subd. (a); 40 C.F.R. §§ 1508.8, 1508.14.) Also, "Economic, social, and particularly housing factors shall be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce or avoid the significant effects on the environment identified in the EIR." (Guidelines, § 15131, subd. (c).)

- <u>Significant growth inducing impacts.</u> The project will induce growth for two main reasons. First, it is oversized. The Coastal Development Permit (CDP) states that wastewater flows will be 700 acre-feet per year (AFY) -- 625,000 gallons per day (gpd) -- at project start up. However, at full build out, the project will have a capacity of 1,233 AFY (1,100,000 gpd). This amounts to 533 AFY more capacity than needed for the current population, *and 300 AFY more than needed for the build out population*. (Attachment 25, at 9.) Because the basin now has a critical seawater intrusion problem, the substantial excess capacity built into the system is unwarranted. The water management plan the water purveyors are preparing, due in March 2011, cannot and should not be assumed to balance the basin and reverse seawater intrusion while also providing enough additional water for growth. Prudent basin safe yields assumptions must account for substantial margins of safety. Hydrogeologist Eugene Yates found that shifts in pumping won't increase basin yields. (Attachment 3, at 1; Attachment 24, at 4.) Mr. Yates and Dr. Douglas Smith, another expert, have shown that basin yield estimates have considerable uncertainty requiring substantial margins of safety and intensive conservation to correct the imbalance and avoid permanent loss of basin capacity. (Attachment 3, at 7; Attachment 4, at 2; Attachment 24, at 5.) The project also promotes unsustainable growth by tying reductions in project costs to future development. A rates and charges ordinance approved by the County in December 2010 includes $27 million in project capital costs that were supposed to be paid by the owners of undeveloped properties. (Attachment 13, at 4.) However, due to the serious resource deficiency caused by seawater intrusion, County officials realize undeveloped property owners will not approve an assessment. Nevertheless, County officials and a flier sent to homeowners indicate sewer costs will go down when undeveloped properties are developed. (Attachment 13, at 4; Attachment 27, at B; Attachment 28, at 9, 10.) This linking of reduced sewer costs to development will drive future planning (the purveyor management plan and Local Coastal Plan Update), even though substantial, undisputed evidence in the public record (a long history of basin overdraft and seawater intrusion) supports the conclusion that the basin has reached or exceeded its carrying capacity for the current population and land uses. Additionally, supplemental water supplies (imported water and desalination) will be economically infeasible, and will have their own adverse environmental impacts. The oversized project, high costs and funding strategies promote unsustainable growth and, as a result, indirect and cumulative environmental impacts, including those discussed above.

- Significant impacts due to "hybrid" conventional gravity collection system. The proposed conventional gravity collection system, even with proposed upgrades, will have substantial adverse impacts that are not mitigated and could be avoided with a different system. The CDP application (at page 58) identifies 336 AFY (300,000 gpd) of the wastewater flows as "Inflow and Infiltration" (surface or groundwater water entering the system). (Attachment 25, at 9.) High levels of inflow and infiltration into a wastewater system is the leading cause of harmful overflows. (Attachment 39, at 3.) The gravity system is prone to this problem and while the septic tank effluent pumping (STEP) system is not. Review documents indicate the proposed alternative will have average flows 200 AFY greater than STEP system. (Attachment 21, at 4.) The June 8, 2010 CDP Application Addendum (at page 2) alleges that the proposed collection system is a "sealed system [that is] not anticipated to leak under appropriate installation practices." (Attachment 25, at 19.) This allegation is one example of how the review process has been biased toward the proposed conventional gravity system, i.e., by underestimating the potential for inflow and infiltration, and adverse impacts thereof on groundwater, surface waters and other resources. (Attachment 39, at 3; Attachments 11, 40.) High inflow and infiltration increases energy use, chemical use, GHG emissions, and operation and management costs due to wear and tear on the system and the need to pump and treat higher volumes of wastewater. Even with some of the proposed system chemically sealed (it is supposed to be sealed only in high groundwater areas), inflow and infiltration along with related adverse impacts will be considerably greater than for fully sealed "small-pipe" systems. Furthermore, sealing the system adds to costs relative to STEP, septic tank effluent gravity (STEG) and other "small-pipe" sealed systems (e.g., decentralized and vacuum). (Attachment 21, at 2-4.) Sections of the proposed collection system that are not chemically sealed are vulnerable to inflow from surface runoff and exfiltration (leakage of raw sewage out of the system). (Attachment 39, at 2, 3; Attachment 40.) Exfiltration can go unnoticed and leaks can be economically infeasible to repair in "large pipe" systems, thus giving rise to long-term groundwater pollution impacts. (Attachments 8, 11; see also the discussion of geotechnical impacts next.)

- Significant seismic and ground movement impacts. Los Osos is in a earthquake zone and liquefaction zone. The EIR has deferred assessment of the potentially significant adverse impacts of ground movement on the project, including its collection system. (Attachment 37.) The adverse effects of a major earthquake, and even a moderate one, on the gravity collection system may be severe, even catastrophic, rendering parts of the system or the entire system unusable pending difficult and costly repairs. Blockages of the system due to disconnected, misaligned or collapsed pipes will cause backups and overflows, adversely impacting human health, water supplies (ground and surface) and ecosystem function. Given the very high costs of the proposed system and its severe socio-economic repercussions, earthquake repairs may be deferred and underfunded, if feasible at all.

Alternative systems (see below) would avoid or, at a minimum, substantially lessen these adverse impacts.

2. The review process has failed, and continues to fail, to consider a reasonable range of feasible or potentially feasible project alternatives -- including the most cost-effective wastewater treatment alternative, or to provide an objective, accurate and adequate analysis of alternatives. (See *Laurel Heights Improvement Assn. v. Regents of the University of California* (1988) 47 Cal.3d 376, 399-407; *Kings County Farm Bureau*, 221 Cal.App.3d 692, 730-737; §§ 21002, 21081, subd. (a)(1), 21081.5, 21100, subd. (b)(4); Guidelines, §§ 15021, subd. (a)(2), 15091, 15092, subd. (b)(2)(A), 15126, subd. (f), 15126.6; 42 U.S.C. §§ 4332(2)(C)(iii) & (E), 4334; 40 C.F.R. §§ 1505.1(e), 1507.2(d).)

   - <u>A decentralized project with two treatment sites.</u> The EIR rejected this alternative as infeasible due to high cost and potential impacts to local environmentally sensitive habitat . However, with treatment sites at the north end of the Mid-town site (on acquired, already-disturbed land) and at the project staging site for the previous project (already disturbed), combined with Los Osos Sustainable Group (LOSG) Sustainable Basin Plan recommendations (which eliminated drain fields in the community), the alternative may reverse seawater intrusion and have significantly greater environmental benefits than the LOWWP. The benefits include (1) greater water quality improvements; (2) substantially lower energy costs and GHG emissions; (3) greater protection of coastal zone environmentally sensitive habitat areas (ESHAs); (4) more quality of life/community aesthetics features; and (5) lower costs -- about $35 million less than the LOWWP ($145 million vs. $180-$190 million). (Attachment 3, at 7; Attachment 8, at 2; Attachment 7, at 4-10; Attachment 10, at 1-3; Attachments 4, 5, 6, 15.)

   - <u>A decentralized project with a mix of on-site and cluster systems.</u> USDA policy specifically recommends consideration of this alternative, yet was not reviewed. Combined with the LOSG Sustainable Basin Plan recommendations, it may or would (1) reverse seawater intrusion; (2) reduce ground and surface water contamination (from all sources); (3) greatly reduce energy costs and GHG emissions; and (4) virtually eliminate threats to the basin and ESHA from altered/reduced groundwater flows -- all for about half the cost of the LOWWP ($85 million vs. $189 million). This cost-effective alternative would require amendments to the septic tank prohibition. These are within the discretion of the CCRWQCB -- which adopted the prohibition, and is a responsible and trustee agency concerning the LOWWP. (Attachment 3, at 7; Attachment 8, at 3-4; Attachment 7, at 9-10; Attachment 10, at 1-3; Attachment 15, at 1-3; Attachments 4, 5, 6, 9.)

   - <u>A centralized STEP project with objective, accurate assumptions.</u> The EIR evaluated this alternative but found it to be environmentally inferior to the LOWWP. This EIR finding was unsupported by substantial evidence. It was derived from biased assumptions and inaccurate information. Compared to the LOWWP, this alternative would reduce environmental impacts (due to less inflow and infiltration, the leading cause of sewage overflows) while accommodating conservation flows without redesign or added costs. It could be constructed much faster, and would be far less vulnerable to damage caused by earthquakes and liquefaction. And, in the event of an earthquake, repair costs would be far lower -- $20 million to $50 million less than the LOWWP. (Attachment 8, at 1; Attachment 12, at 2; Attachment 15, at 1-4; Attachment 21, at 1; Attachments 11, 16.)

- Optimizing the Current System. USDA policy specifically recommends consideration of this alternative, but the EIR did not consider it. Combined with the LOSG Sustainable Basin Plan recommendations for basin-wide water use efficiency and septic system, nitrate and stormwater management programs, this alternative may reverse seawater intrusion, significantly reduce nitrates and other forms of contamination, while also addressing concerns relating to septic systems located in high groundwater areas and near the estuary (by lowering groundwater levels and ensuring alternative maintenance systems). (Attachment 3, at 4; Attachments 4, 5, 6.) This alternative would achieve most of the project objectives at a fraction of the cost of the proposed project, while eliminating all significant adverse impacts of the project. Water use efficiency, septic system and nitrate management plans were never implemented in the basin.

3. Significant new information exists, calling for an SEIR for purposes of state responsible agency review; and an EIS (or, preliminarily, a supplemental EA) for purposes of federal agency review. (§ 21166; Guidelines, §§ 15162, 15163; see also *id*., 15088.5, 15052, 15096; *Idaho Sporting Congress, Inc. v. Alexander* (9th Cir. 2000) 222 F.3d 562, 566; *id.* at 566, fn. 2 [noting that 40 C.F.R. § 1502.9 is the standard for the duty to supplement *both* EISs and EAs].)

    - As emphasized at pages 6 through 8, above, in May 2010, the ISJ working group released the Basin Update, which revealed a substantial change in basin conditions -- far more rapidly accelerating seawater intrusion in the Los Osos Valley Basin than was previously known. (Attachment 2, exh. B.) The Basin Update showed the basin model -- the same one used to predict the LOWPP's adverse impacts on seawater intrusion -- is not reliable for estimating seawater intrusion, project effects thereon -- and hence on drinking water quality -- or the adequacy of the Broderson leach fields as mitigation for this significant impact. The Basin Update includes a peer review of the basin model that did not consider the accelerating seawater intrusion or two reviews of the basin by Mr. Yates who co-authored two basin studies. (Attachment 24, at 1, 2; Attachment 3.) The peer review recommends model upgrades to express uncertainty values and clarify data input. (Attachment 2, exh. C, at 9.) The Basin Update also indicates that water purveyors are considering desalination, nitrate treatment for the upper aquifer and other options that may have adverse environmental affects in combination with the LOWWP, and substantially undermine the need for the LOWWP. (Attachment 2, at 5-6.) Treatment of nitrates at the well head and desalination now are considered feasible mitigations or alternatives that could substantially reduce or avoid project impacts by reducing or removing the need for implementing the centralized conventional-gravity waste water treatment option the LOWWP represents. CEQA and NEPA require the alternatives to re-evaluated in a SEIR or EIS (or supplemental EA), given the new information now available, and its significance in negating EIR- and EA-based assumptions.

- In his June 2010 review of the Basin Update, considering the factual data contained therein, Mr. Yates opined that accelerating seawater intrusion into the basin is an "extremely urgent" problem requiring urgent action, including 500 AFY of reduced pumping from the urban compartment. (This is consistent with the water-use efficiency plan recommended by the Los Osos Sustainability Group). (Attachment 3, at 1, 3, 7; Attachment 5.) Yates also recommended the review of a wider range of mitigation options to address changes in basin conditions, adding that the project, in conjunction with the increased pumping from the upper aquifer may induce seawater intrusion in the *upper* aquifer. (Attachment 3, at 1, 2, 4-7.) Yates explained that accelerating seawater intrusion may make the LOWWP's recycled water reuse program -- viewed as key mitigation for the LOWWP -- less viable. (Attachment 3, at 2.) Finally, he reiterated the need (noted in his January 13 review) to account for substantial uncertainties in modeling, with margins of safety built into measures, including "proactive" conservation. (Attachment 3, at 1, 7; Attachment 24, at 4, 5.)

- In January 2010, after reviewing basin modeling submitted to the Coastal Commission for its CDP review, Mr. Yates found that the EIR overlooked impacts on wetlands and other sensitive habitat along the estuary and Willow Creek Drainage, and that the Broderson leach fields will not mitigate for these impacts, as assumed by the EIR. Yates also cautioned that the modeling has substantial uncertainties, casting considerable doubt on the adequacy of EIR mitigation measures. He indicated the need for substantial margins of safety. (Attachment 24, at 4-5.) This post EIR expert review and the findings it yielded have yet to be considered by responsible agencies and factored into their post EIR environmental review process and decisionmaking. (Attachment 25.)

- In March 2010, water quality testing for Morro Bay Estuary conducted by the National Estuary Program (NEP) and the San Luis Obispo Science and Ecosystems Alliance (SLOSEA) indicated that nitrate levels remain very low in the estuary, and fecal coliform levels are well within safe limits, and are possibly declining. These data provide substantial evidence that septic systems are not harming estuary water quality and do not pose a threat to the basin or human health. (Attachment 23.) The CDP and other project documents cite a 16-year old (1995) Regional Water Quality Control Board "preliminary working draft" for the proposition that septic systems are harming the estuary and habitat. But this preliminary draft does not establish that septic systems are the cause of cited problems (restrictions on shell fish harvesting). (Attachment 25, at 5, 6.) The "draft" report does not constitute substantial evidence.

- In April 2010, the U.S. Environmental Protection Agency (EPA) released its Chesapeake Bay guidelines for septic systems, which allow septic systems to remain in place near Chesapeake (a water body with known nitrate problems). It set discharge requirements based on proximity to the Bay. This reflects *current* EPA policy regarding use of onsite wastewater disposal systems in proximity to a sensitive water body adversely affected by nitrates. Available evidence shows that Morro Bay Estuary is not adversely affected. EPA provides examples of onsite systems and costs, which indicate that substantial reductions in nitrates in the basin can be achieved with onsite systems and system upgrades at per-unit costs substantially lower the LOWWP (approximately $36,000 per single family home). (Attachment 31, 3-5, 17-22.) The report also shows that a Nitrex underground treatment system (the same technology presented in the LOWWP decentralized technical memo for the LOWWP) can reduce nitrates to levels lower than predicted for the LOWWP. (Attachment 31, at 18; Attachments 7, 8, 9.) This new information is significant in that it shows that onsite wastewater disposal and treatment systems present a feasible alternative. As such, it must be accounted for prior to any funding or other discretionary responsible agency decisions concerning the LOWWP.

- In May 2010, a Stanford study established that pathogens from septic systems do not threaten surface water bodies if systems are functioning properly -- which can be monitored. (See Attachment 42, <http://www.stanford.edu/group/knowledgebase/cgi-bin/2010/09/10/from-septic-system-to-the-sea-tracking-groundwater-pollution> [as of Feb. 25, 2011].) This new study, too, is significant, in that it shows that onsite wastewater disposal and treatment systems present a feasible alternative. As such, again, it must be accounted for prior to any funding or other discretionary responsible agency decisions concerning the LOWWP.

- In June 2010, a Water Environment Research Foundation (WERF) study found that GHG emissions from septic tanks (including STEP tanks) are half as high as was assumed in the EIR. This shows a significant reduction of the estimated climate change effects of the centralized STEP and decentralized LOWWP alternatives, not to mention of the effects of existing septic systems. (Attachment 30.)

- In July 2010, the SWRCB published its proposed AB 885 statewide septic system waiver, providing further evidence that septic systems do not require pumping every five years. (Attachment 17.) GHG emissions and other impact estimates for the STEP alternative were based on the assumption that AB 885 would require septic tanks to be pumped every five years. This inaccurate assumption almost doubles some of the cost and impact estimates for the STEP project (i.e., hauling and handling of septage). (Attachment 16.) The waiver now recognizes that pathogens are not a threat to water bodies if systems are properly functioning, and it sets septic system discharge requirements based on proximity to protected water bodies.

- In August 2010 (in an update of his June review), Mr. Yates confirmed that the Broderson leach fields can be replaced with adequate conservation and additional recycled water storage. (Attachment 3, at 5; Attachment 5.) This would substantially reduce adverse impacts by avoiding the destruction of eight acres of ESHA and the considerable energy use and air pollution impacts caused by the construction and operation of the Broderson leach fields (e.g., significant greenhouse gas emissions related to pumping water uphill to the Broderson leach fields and by rehabilitating (re-excavating and disking) leach fields every five to seven years). (Attachment 15, at 3, 4; Attachment 20, at 6.)

- In December 2010, the San Luis Obispo Board of Supervisors approved a rates and charges Proposition 218 assessment and ordinance that raised the cost of the project for existing homeowners by about $42 million (from $127 million to $169 million, not counting on-lot costs of about $14 million). (Attachment 27, at B, C, F, G; Attachment 21, at 10; Attachment 28, at 8-10; Attachment 13, at 4.) Because the indirect environmental effects of this substantial increase in the project's adverse socio-economic impacts thus could not have been known when the final EIR was certified, they must be addressed through responsible agency supplemental environmental review.

Inconsistency with USDA regulations and policies

1. The EA is not consistent with 7 C.F.R. § 1780.57 (a) (c) (f):

    - The EA does not conform with this regulation governing the construction of USDA funded projects because the project/process (1) does not comply with NEPA; (2) "[f]acility design" does not "consider cost effective energy-efficient and environmentally sound products and services[;]" (3) the design does not prevent water losses and waste (it will result in considerable inflow and infiltration depleting scarce water supplies); and (4) the facility's design does not "provide the most economical service practicable."

2. The EA is not consistent with USDA Rural Utilities Bulletin 1780-2:

    - The EA does not conform to this policy because it does not consider among others, alternatives "optimizing the current facilities (no construction) [and] centrally managed small cluster or individual facilities." (USDA Rural Utilities Service, Bulletin 1780-2 (9-10-

03) at 4-5.)Furthermore, contrary to this guidance document's suggestion, mitigation measures necessary to avoid or minimize any adverse environmental effects are not integrated into project design. (*Id.* at 5.)

Inconsistency with the federal Clean Water Act

1. The EA is not consistent with 33 U.S.C. § 1292:

- The EA is not consistent with this section because it does not conform to the following provision:

  Any application for construction grants which includes wholly or in part such methods or systems shall, in accordance with guidelines published by the Administrator pursuant to subparagraph (C) of this paragraph, contain adequate data and analysis demonstrating such proposal to be, over the life of such works, the most cost efficient alternative to comply with sections 1311 or 1312 of this title, or the requirements of section 1281 of this title.

Attachment #2

LOS OSOS GROUNDWATER BASIN UPDATE
ISJ Working Group
May 4, 2010

The ISJ Working Group is working under the auspices of the Interlocutory Stipulated Judgment in the Los Osos Groundwater Basin (Basin) adjudication to draft and implement a Basin Management Plan (BMP). The BMP is in draft form and we expect will be released during 2010. This update discusses the basic elements of the BMP, updated information generated by recent groundwater investigations in the Basin, and various mitigation measures that are being evaluated to remedy water resource challenges facing the Basin.

I. LOS OSOS GROUNDWATER BASIN MANAGEMENT PLAN

The BMP is being created through collaborative participation of members of the ISJ Working Group. The BMP describes the Basin, its hydrologic and geologic settings, community water demands and groundwater quality. The BMP also acknowledges the major challenges facing the Basin, i.e., water quality in the upper aquifer and seawater intrusion in the lower aquifer.

The BMP is designed to memorialize the ongoing and future water monitoring processes, groundwater management goals for the Basin and to outline the mechanisms and processes by which those goals will be achieved. The anticipated goals include the following:

(A) Provide for a continuously updated hydrologic assessment of the Basin, its water resources and safe yield;
(B) Establish a strategy for maximizing the reasonable and beneficial use of Basin water resources;
(C) Provide sustainable water supplies for existing and planned future development within Los Osos;
(D) Stop seawater intrusion into the lower aquifer;
(E) Manage existing contamination and prevent future contamination of the upper aquifer;
(F) Protect environmentally sensitive areas within or influenced by the Basin hydrology;
(G) Quantify each party's rights to rely on the Basin water resources;
(H) Allocate costs equitably;
(I) Develop strategies to maximize the grant funding opportunities for ongoing BMP implementation; and
(J) Set water conservation goals.

The BMP describes in detail the actions that will be taken in order to implement these goals. These actions include determination of Basin water supply and demand, establishment of a groundwater monitoring program, and an operations and recharge plan for the Basin, which will provide for management of salts and nutrients in the groundwater. These actions will be coordinated with the actions to be taken by the County as part of the Los Osos Wastewater Project (LOWWP).

II. BACKGROUND

A. Groundwater Zones

The Basin contains roughly five layers of groundwater, which have been identified, from shallowest to deepest, as Zones A, B, C, D and E. Not all zones are present in all areas of the Basin. Zone A is comprised of Los Osos Creek bed alluvium. Zone B contains perched groundwater. Zones A & B are depicted in Exhibit A. Zones A & B are not generally used for groundwater production and are effectively isolated hydraulically from the underlying aquifers (Zones C, D & E) by an extensive clay layer. Zones C, D and E are the sources of groundwater production from the Basin. Zone C represents the upper aquifer, which suffers from nitrate pollution caused by septic systems. Zone D and Zone E together make up the lower aquifer, which is threatened by seawater intrusion.

B. Safe Yield

Safe yield is generally defined as the maximum draft on a basin that will not produce undesirable impacts. In the LOCSD Draft Water Management Plan produced in 2005, the Basin safe yield under then-current conditions was listed at 3,250 acre-feet per year (AFY), of which 800 AFY was for the Los Osos Creek Valley[1] and 2,450 AFY was for the urban area.

The steady-state groundwater model that has been developed primarily by Cleath + Harris, Inc. on behalf of the ISJ Working Group was updated in 2004, was converted to simulate seawater intrusion in 2005, and in 2008 was updated again to reflect current pumping conditions. The primary constraint on safe yield of the Basin is seawater intrusion. In 2009, the safe yield estimate was updated using the groundwater model. Under current conditions (assuming no Los Osos Creek Valley surplus water development), the overall basin yield estimate is 3,200 AFY. After subtracting 1,100 AFY in agricultural irrigation, private domestic use and golf course irrigation, the purveyors have available for their use an estimated 2,100 AFY of sustainable safe yield. This is comparable to the current level of community demand which has averaged approximately 2,040 AFY over the period from 2004-2008.[2]

Balancing the Basin without supplemental water requires a redistribution of pumping between the upper (Zone C) and lower (Zones D & E) aquifers. In other words, the safe yield analysis has clarified that more pumping should be done from the upper aquifer (Zone C), and less pumping from the lower aquifer (Zones D and E) in order to achieve sustainable safe yield from

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[1] The Los Osos Creek Valley, also known as the Creek Compartment, extends from the Eastside (defined below), across the Los Osos Creek Valley to the east limits of the basin.

[2] It should be noted that these figures are estimates based on the existing Basin model, and the ISJ parties will develop the BMP to include a reasonable buffer to account for the uncertainty that exists in every groundwater basin model.

the Basin. In addition, it may be necessary for pumping to shift from the Westside[3] to the Eastside[4] and the Los Osos Creek Valley.

In terms of safe yield by aquifer layer, for a balanced Basin under current conditions the upper aquifer (Zone C) yield is 1,700 AFY (assuming existing nitrate contamination is either removed or adequately treated) and the lower aquifer (Zones D and E) yield is 1,500 AFY. The distribution of upper aquifer versus lower aquifer yield varies across the Basin, however, with most of the lower aquifer yield in the Eastside and Los Osos Creek Valley. After subtracting water production allocated to agricultural irrigation, private domestic use and golf course irrigation, the safe yield distribution for water purveyors is 1,460 AFY from Zone C and 640 AFY from Zones D and E.

C. Seawater Intrusion

As is commonly known, the Basin is experiencing increasing levels of seawater intrusion into the lower aquifer (Zones D and E). Between 1985 and 2005, the average annual rate of intrusion in lower aquifer Zone D was estimated at 60 feet per year for the 250 milligram per liter (mg/l) isochlor line and 45 feet per year for the 2,500 mg/l isochlor line. During this same period, the rate of intrusion for precursor trends (early-detection at lower chloride concentration based on ion ratios) at approximately 200 feet per year between GSWC wells Pecho (13L4) and Rosina (13J4), and approximately 600 feet per year between GSWC Rosina and the LOCSD Palisades well (18L2).

Seawater intrusion monitoring was conducted in December 2009 and January 2010 to update estimates of the rate and extent of seawater intrusion in lower aquifer Zones D and E and to assist in planning, implementing and evaluating sea water intrusion mitigation measures. Results of the current monitoring event, which followed three years of drought conditions, indicate that: the seawater wedge has extended into the lower aquifer through “fingers” as well as a broader front; the average horizontal rate of intrusion between 2005 and 2010, based on the 250 mg/l isochlor, has accelerated to 700 feet per year; and the 250 mg/l isochlor line has reached the LOCSD Palisades well (18L2). The results of the monitoring are reported in the Technical Memorandum from Cleath + Harris, Inc., attached as Exhibit B.

D. Peer Review

The ISJ Working Group and the County have used the groundwater model referenced above to evaluate the safe yield of the Basin and the impact of actions to be undertaken as part of the BMP and LOWWP on the health of the Basin. In order to ensure that the model results are reasonably accurate for its purposes, the ISJ Working Group hired Stetson Engineers, Inc. to perform a peer review of the model. A memorandum describing the results of that peer review is attached as Exhibit C. The key findings are that:

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[3] The Westside of the basin extends west of Palisades Avenue and includes Cuesta-by-the-Sea, Redfield Woods, the Martin Tract, Cabrillo Estates, Sunset Terrace and Monarch Grove.
[4] The Eastside of the basin extends east of Palisades Avenue and includes Baywood, downtown Los Osos, Bayview Heights, Bayridge Estates, mobile home parks on Los Osos Valley Road and all rural residential neighborhoods between South Bay Boulevard and Palomino Drive.

- While there is uncertainty in all models, the SEAWAT model developed by Cleath-Harris Geologists and recent model results appear reasonable.

- SEAWAT is an appropriate model code for the Los Osos basin for evaluation of the average groundwater basin budget (including basin and subarea yields), the extent of seawater intrusion, and for use in evaluating the relative effects of development and changes in basin management or climate.

- The current SEAWAT model and results regarding seawater intrusion and safe yield provide usable results on which to base near-term changes in pumping distribution to mitigate seawater intrusion.

The various recommendations for improvements to the model made by Stetson Engineers, Inc. in the memorandum will be addressed as part of development of the BMP.

III. Groundwater Management Actions

Based on the increasing rate of seawater intrusion described above, it is clear that quick and decisive action must be taken to address the intrusion. Specific actions that are being considered are described below.

A. LOWWP Actions

In order to mitigate the effects of increased seawater intrusion from the removal of septic tank disposal, and to use the tertiary treated wastewater effluent to assist in ensuring a safe and reliable supply of water for the Basin into the future, the County of San Luis Obispo is currently planning to take the following actions as part of the LOWWP, subject to final approval of a Coastal Development Permit by the California Coastal Commission and adoption of a final due-diligence resolution by the County.

1. ***Broderson Disposal.*** Pursuant to Condition 97 of the Coastal Development Permit for the LOWWP, the project will dispose of tertiary treated effluent at the Broderson site, up to approximately 448 AFY.

2. ***Bayridge Leach Field.*** Pursuant to Condition 101, the project will dispose of approximately 33 AFY at the site of the existing Bayridge leach field.

3. ***Indoor Water Conservation.*** Pursuant to Conditions 1, 99, 103 and 108, the project (in consultation with the water purveyors) will implement an indoor water conservation program within the prohibition zone allowing for 50 gallons per capita per day indoor water use.

4. ***Agricultural Reuse.*** Pursuant to Condition 97, the County will apply treated effluent to agricultural re-use overlying the Basin.

5. ***Urban Reuse of Treated Wastewater Effluent.*** Pursuant to Condition 97, the County will apply treated effluent to urban re-use (as identified in the Effluent Re-Use and Disposal Tech Memo, July 2008).

The ISJ Working Group recognizes the above-listed LOWWP actions are crucial to mitigating the negative impacts with which the Los Osos community is faced and that implementation of these measures should be pursued as soon as possible. The group believes these measures are complementary to the additional actions being considered by the ISJ Working Group, which are described below.

B. BMP Actions

The following actions are not being pursued as part of the LOWWP, but the ISJ Working Group is investigating these actions further and considering them as part of the BMP as means of balancing the Basin. The ISJ Working Group is committed to presenting the ISJ parties with a BMP that includes sufficient actions to balance lower aquifer water supplies and demands and stop the progress of seawater intrusion. Potential actions under investigation include the following:

1. ***Relocation of Wells.*** This action would shift the location of a certain amount of groundwater production by LOCSD, GSWC and S&T from the Westside to the Eastside or the Los Osos Creek Valley. Implementation of this action may require the drilling of new groundwater production wells and transmission mains. This action may be integrated with the agricultural reuse described as a LOWWP action above.

2. ***Water Conservation.*** In addition to the indoor water conservation measures being taken under the LOWWP, there may be opportunities to reduce urban water demands in Los Osos based on indoor water conservation outside the prohibition zone and outdoor water conservation throughout the Basin area, primarily through changing landscape types and irrigation methods. For example, commercial and residential irrigation can be automated based on specific plant needs and weather and soil conditions.

3. ***Nitrate Removal from Zone C.*** This action would require the use of well-head treatment facilities to remove nitrates to achieve 1,400 AFY of safe yield from Zone C.

4. ***Use of Shallow Wells.*** There may be opportunities to reduce pumping from Zones C, D and E by using shallow wells from Zones A and B for irrigation.

5. ***Brackish Water Desalination.*** This action would produce groundwater from areas of Zones D and E that have been affected by seawater intrusion and treat it through a desalination process for municipal use. Strategic location of brackish groundwater production wells may assist in preventing seawater intrusion into new areas of the Basin.

6. ***Rainwater Harvesting.*** This action would involve working with local property owners to collect rainwater for use on site.

7. ***Installation of Greywater Systems.*** This action would involve working with local property owners to install greywater systems, by which certain types of wastewater are treated and reused on site.

Many of these actions would involve leadership or participation by the water purveyors, as well as residents and businesses within the Los Osos community.

IV. NEXT STEPS

The ISJ Working Group is currently studying the actions above and intends to prepare a public review draft of the BMP by the end of 2010. The BMP will include a financing strategy and timeline for implementation of adopted actions.

SB 542232 v6:006774.0151

EXHIBIT "A"

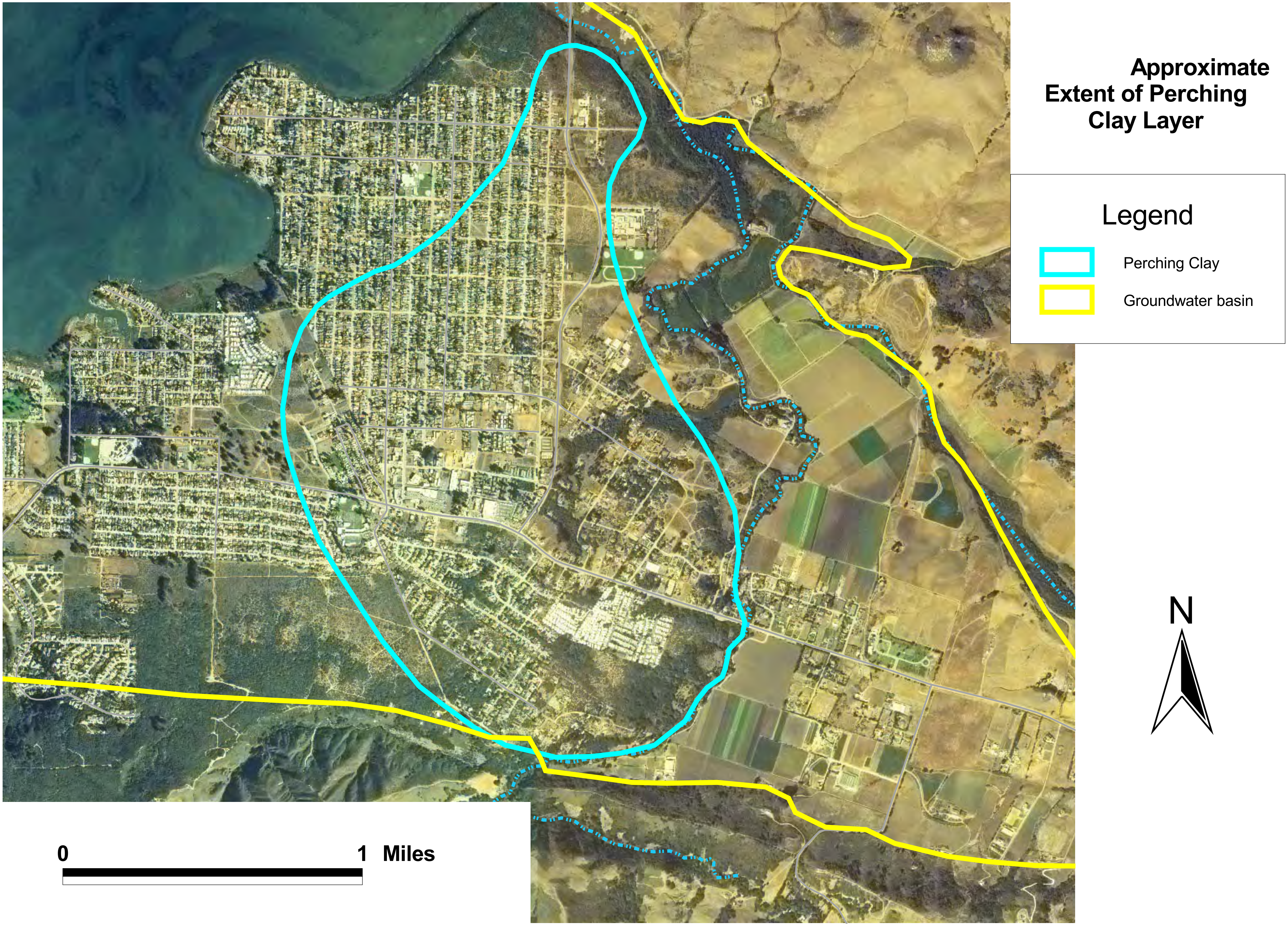
Approximate
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EXHIBIT "B"

Cleath-Harris Geologists, Inc.
11545 Los Osos Valley Road, Suite C-3
San Luis Obispo, California 93405
(805) 543-1413

CHG

Technical Memorandum

PROFESSIONAL GEOLOGIST
SPENCER J. HARRIS
No. HG 633
CERTIFIED HYDROGEOLOGIST
EXP. 10/31/11
STATE OF CALIFORNIA

Date: April 26, 2010
From: Spencer Harris
To: Los Osos ISJ Group

SUBJECT: Water Quality Monitoring Results Summary, November 2009 - January 2010, Los Osos Valley Groundwater Basin.

Water quality monitoring in the Los Osos Valley groundwater basin was conducted between November 2009 and January 2010. The purpose of monitoring is to update estimates concerning the rate and extent of sea water intrusion in the lower aquifer and to assist in planning, implementing, and evaluating sea water intrusion mitigation measures. The analytical results of groundwater samples collected from basin wells are presented in the attached Table 1.

Between 1985 and 2005, the average annual rate of intrusion in lower aquifer Zone D was estimated at 60 feet per year for the 250 milligram per liter (mg/l) isochlor line and 45 feet per year for the 2,500 mg/l isochlor line. These were the average annual rates estimated over the time period. Data from the 2005 study also showed the rate of intrusion for precursor trends (early-detection at lower chloride concentrations based on ion ratios) at approximately 200 feet per year between Golden State Water Company (GSWC) wells Pecho (13L4) and Rosina (13J4), and approximately 600 feet per year between GSWC Rosina and the Los Osos Community Services District (LOCSD) Palisades well (18L2).

Rates of sea water intrusion are affected primarily by water levels (pressure gradients), and aquifer permeability. The rate of intrusion is typically not uniform over time, but varies seasonally according to pumping cycles, and is accelerated during drought periods. Intrusion may also not be uniform within the aquifer zones, but may follow preferential pathways along discrete sand and gravel layers being tapped by pumping wells.

Results of the current monitoring event, which followed three years of drought conditions, indicate the average horizontal rate of intrusion between 2005 and 2010, based on the 250 mg/l isochlor, has accelerated to match the earlier precursor rates (up to approximately 700 feet per year), and has reached the LOCSD Palisades well (18L2). Evidence of accelerated seawater intrusion since 2005 has also been confirmed with geophysics at a deep monitoring well (13M1), where there has been a vertical rise in the seawater interface of 25 feet since the 2005 survey. By comparison, the sea water interface rose 30 feet at Well 13M1 between 1985 and 2005. The estimated location of the transition zone at the base of aquifer Zone D (250 mg/l isochlor) is shown in plan view in the attached Figure 1, with a cross-section of the transition zone movement in Zones D and E shown in Figure 2. An illustration showing the upward movement of sea water intrusion at monitoring well 13M1 is shown in Figure 3.

EXHIBIT "B"

Table 1
Water Quality Results - Sea Water Intrusion Monitoring
Los Osos ISJ Group

Station ID	Well Name	Sample Date	HCO3	Hardness	Cond	pH	TDS	Cl	NO3	SO4	Ca	Mg	K	Na
			mg/l	mg/l	mg/l		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
30S/10E-12J1	MBO5 DWR Obs.	11/20/2009	300	360	1150	7.5	732	83	ND	190	51	58	4.4	95
30S/10E-13J4	GSWC Rosina	1/14/2010	35	260	778	6	435	200	7.1	13	41	38	1.5	33
30S/10E-13L4	GSWC Pecho	11/20/2009	85	550	1610	7	979	460	10	48	91	78	2.1	69
30S/10E-13L7*	S&T #4	11/19/2009	60	110	410	6.9	270	49	59	14	18	15	1.4	38
30S/10E-13M2	Howard East	12/9/2009	55	1100	3740	7.1	2170	1100	2.2	220	160	160	4.8	370
30S/10E-13N	S&T #5	11/19/2009	41	89	386	6.8	267	73	27	11	15	13	1.4	38
30S/10E-24C1	GSWC Cabrillo	11/20/2009	60	150	611	7.1	347	130	18	22	23	22	1.6	52
30S/11E-7Q3	LOCSD 8th St.	11/19/2009	220	290	782	7.4	465	92	ND	46	46	42	1.9	53
30S/11E-17E7**	So. Bay Obs. Deep	11/19/2009	ND	100	1100	11.2	427	110	6.1	54	39	1	8.7	110
30S/11E-17E8	So. Bay Obs. Middle	11/20/2009	120	160	455	7.3	255	42	19	12	25	23	1.3	29
30S/11E-17N10	GSWC So. Bay #1	11/20/2009	230	220	638	7.3	357	41	2.4	30	35	33	1.7	37
30S/11E-18K8	10th St. Obs. East	11/20/2009	230	220	620	7.5	378	32	ND	40	51	24	1.8	23
30S/11E-18K9	LOCSD 10th St.	11/20/2009	180	160	539	7.2	307	36	4.6	27	27	24	1.3	32
30S/11E-18L2	LOCSD Palisades	11/19/2009	200	590	1460	7.2	890	360	1.8	39	94	86	2	44
30S/11E-18L6	Palisade Obs. 6"	12/9/2009	270	380	856	7.5	528	68	ND	85	70	50	2.2	36
	18L6 @ 400'	12/9/2009	280	400	857	7.3	535	68	ND	85	76	52	2.2	35
	18L6 @ 500'	12/9/2009	260	440	856	7.4	521	68	ND	84	81	59	2.5	42

ND = Not Detected

*Water sample from 13L7 affected by borehole leakage from upper aquifer

**Water sample from 17E7 affected by high pH. Alkalinity 140 mg/l as carbonate and hydroxide

Legend and Detection Limits

General Mineral	Description	Detection Limit for Reporting
HCO3	Bicarbonate Alkalinity in mg/L CaCO3	2.0
Hardness	Total Hardness in mg/L CaCO3	1.0
Cond	Electrical Conductance in µmhos/cm	1.0
pH	pH in pH units	0.1
TDS	Total Dissolved Solids in mg/L	10.0
Cl	Chloride concentration in mg/L	1.0
NO3	Nitrate concentration in mg/L	0.4
SO4	Sulfate concentration in mg/L	0.5
Ca	Calcium concentration in mg/L	0.03
Mg	Magnesium concentration in mg/L	0.03
K	Potassium concentration in mg/L	0.10
Na	Sodium concentration in mg/L	0.05

EXHIBIT "B"

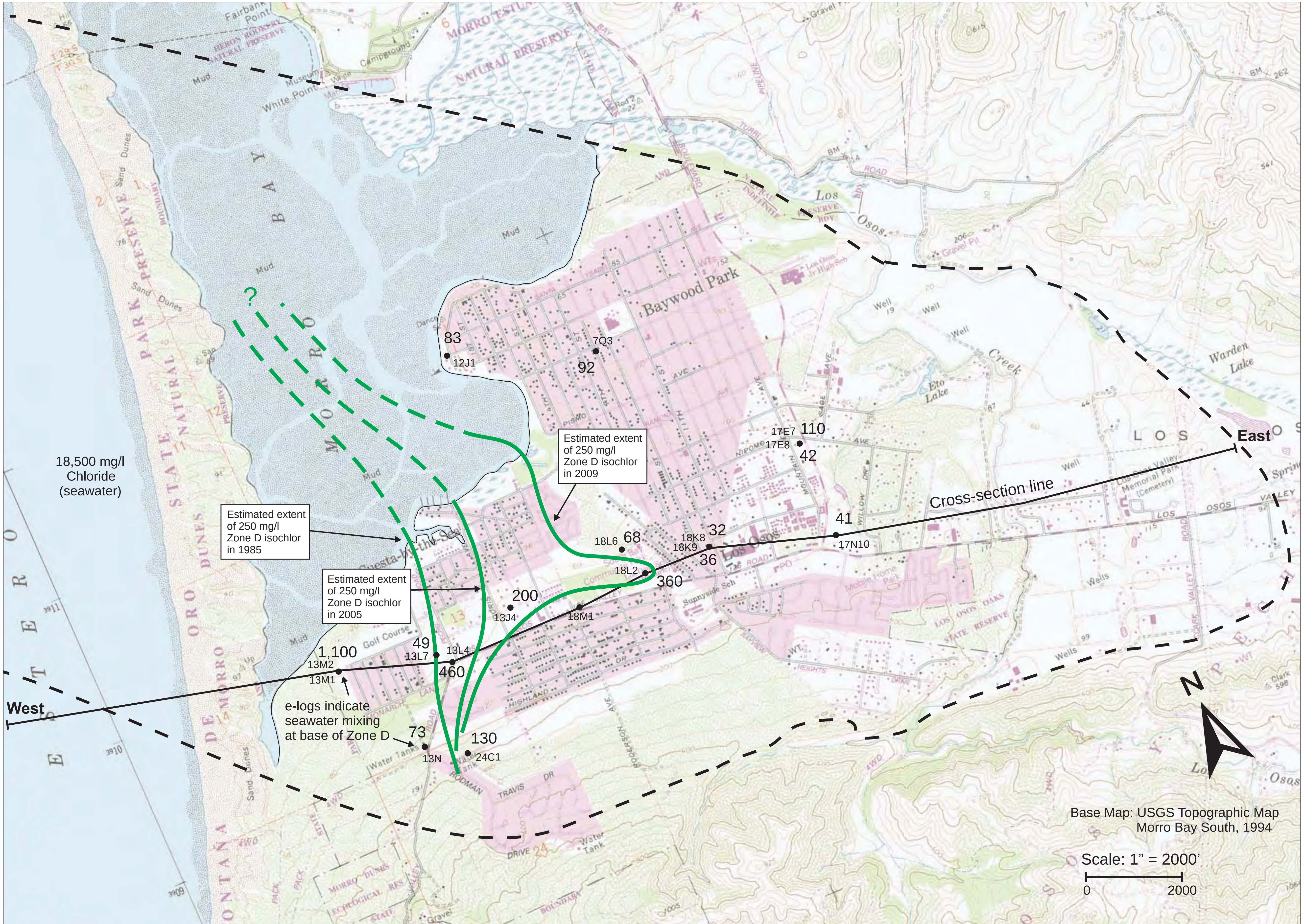


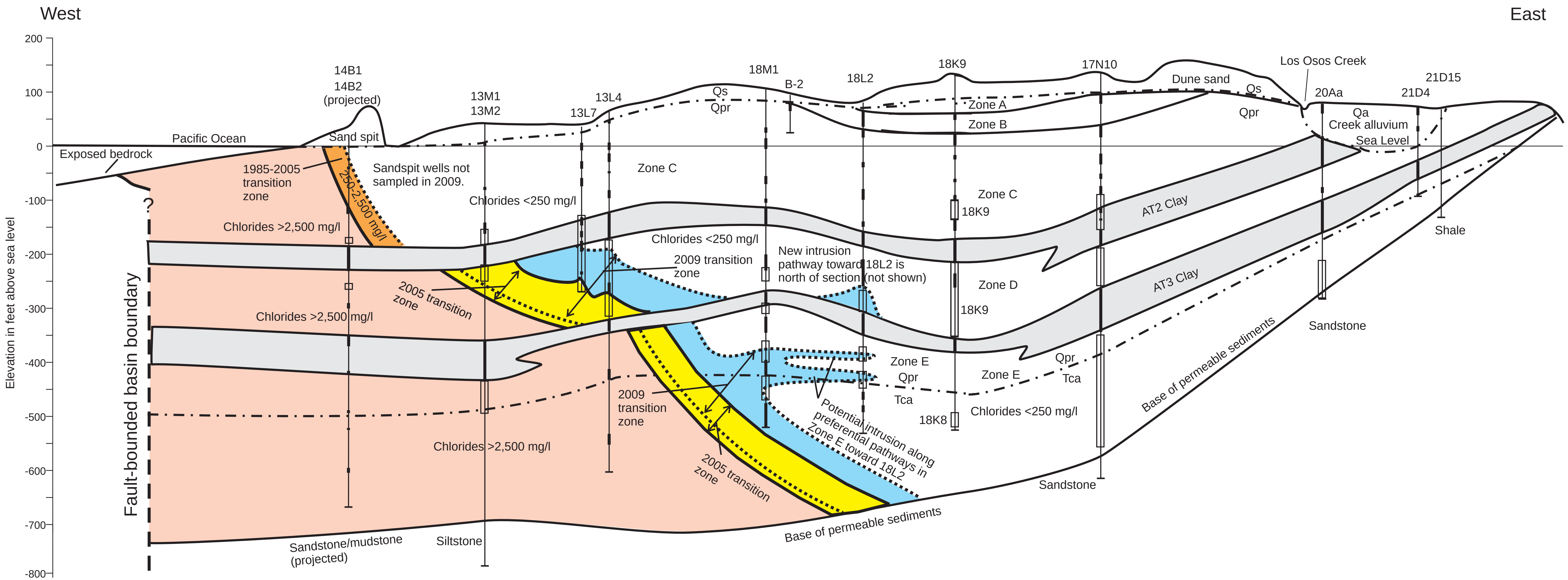
Figure 1

Lower Aquifer
Chloride Concentrations
Nov. 2009-Jan. 2010

Los Osos ISJ

Cleath-Harris Geologists, Inc.

EXHIBIT "B"



See Figure 1 for cross-section orientation

Explanation

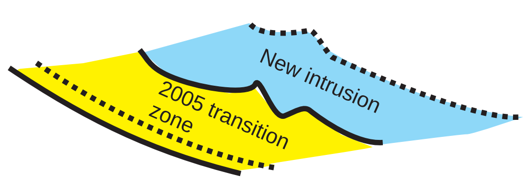
Aquifer Zones:
Zone A - Perched Aquifer
Zone B - Transitional Aquifer
Zone C - Upper Aquifer
Zone D - Lower Aquifer (shallow)
Zone E - Lower Aquifer (deep)

Well data point
18M1 Well ID
Clay layer
Well screen

Formation:
Qa - alluvium
Qs - dune sand
Qpr - Paso Robles Formation
Tca - Careaga Formation

200
0
0
2000

Vertical scale: 1” = 200’
Horizontal scale: 1” = 2000’



NOTE: the transition zone lines are estimated from water quality and geophysical data, and include consideration of well construction and use. Solid lines for 2005 estimate, dashed lines for 2009 estimate (a 5-year period). Only Lower aquifer Zones D and E were investigated.

Figure 2

Lower Aquifer
Sea Water Intrusion
Los Osos Valley Groundwater Basin

Los Osos ISJ

Cleath-Harris Geologists, Inc.

EXHIBIT "B"

Well 30S/10E-13M1

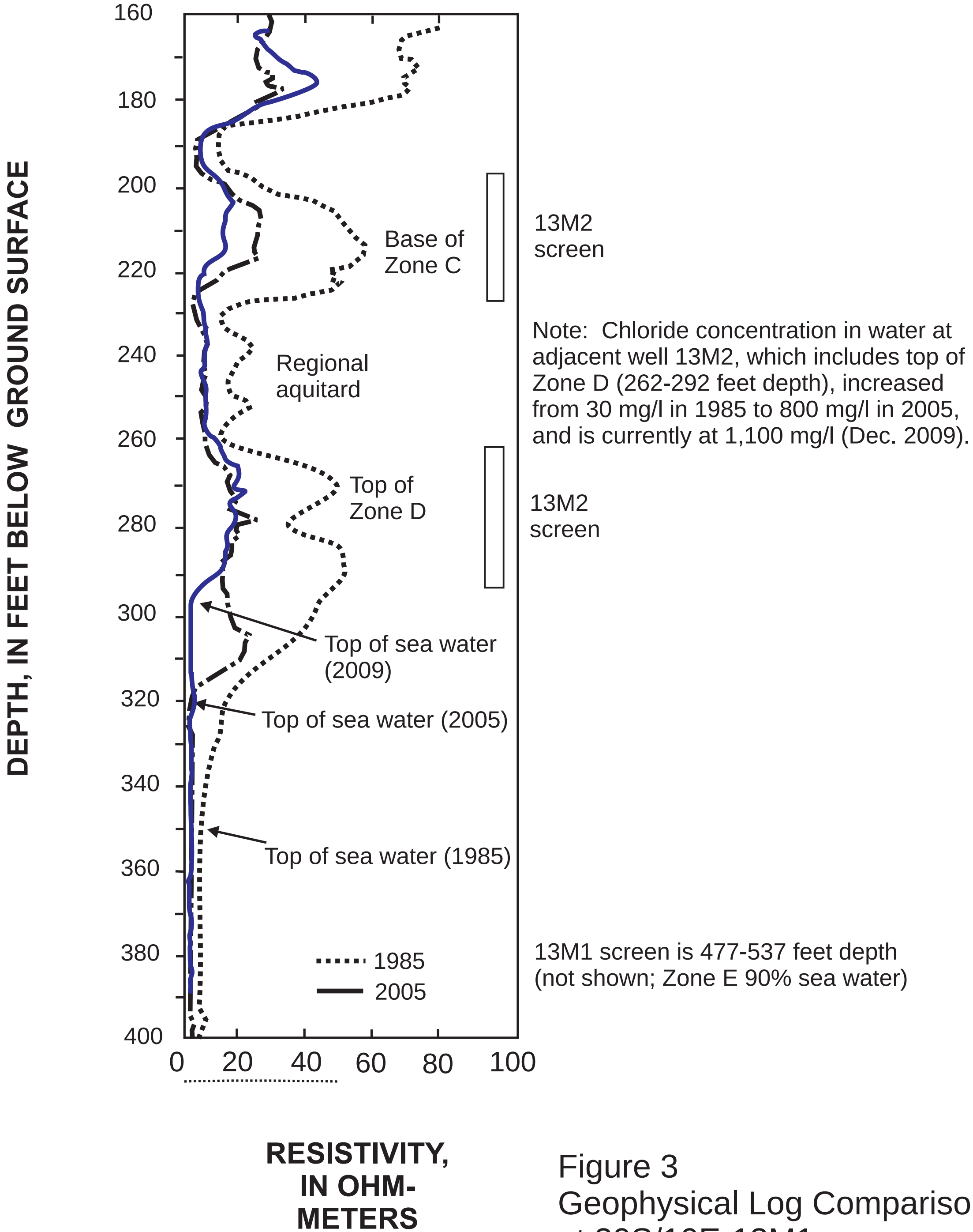


Figure 3
Geophysical Log Comparison
at 30S/10E-13M1

Los Osos ISJ

Cleath-Harris Geologists, Inc.

STETSON ENGINEERS INC.

TECHNICAL MEMORANDUM

2171 E. Francisco Blvd., Suite K • San Rafael, California • 94901
TEL: (415) 457-0701 FAX: (415) 457-1638

TO: Mr. Robert Miller, Wallace Group DATE: May 3, 2010

FROM: Peter M. Pyle, P.G., CHG. JOB NO: 2323

RE: Peer Review of the Los Osos Groundwater Model

Stetson Engineers Inc. was contracted by Brownstein Hyatt Farber Schreck, LLP, on behalf of the ISJ Parties to review and evaluate the groundwater model and related technical studies to determine the validity of the model and assumptions. We were also tasked with providing an opinion on the safe yield estimates determined using the model for the urban area and Los Osos Creek Valley portions of the groundwater basin with consideration of climate fluctuations. The contact for the ISJ Parties is Robert Miller of Wallace Group in San Luis Obispo who is managing the contract. Much assistance and additional data was provided by Mr. Spencer Harris of Cleath-Harris Geologists, Inc. (CHG).

Stetson Engineers, Inc. performed the following tasks for this peer review:

1) Reviewed key documents specified in the request for proposals (RFP) as well as additional information listed below.
2) Attended a kickoff meeting with the ISJ Technical Group in December 2009.
3) Conducted a one-day model work session with Spencer Harris of Cleath-Harris Geologists, Inc. of San Luis Obispo.
4) Reviewed the model electronic data and output.

Stetson Engineers, Inc. reviewed the following key reports for this study:

1) Seawater Intrusion Assessment and Lower Aquifer Source Investigation of the Los Osos Valley Groundwater Basin, Cleath and Associates, October 2005.
2) Flow Model Conversion and Urban Area Yield Update, Cleath-Harris Geologists, Technical Memorandum, July 2009a.
3) Los Osos Creek Valley Yield Evaluation, Cleath-Harris Geologists, Technical Memorandum, July 2009b.
4) Appendix D of the Draft Environmental Impact Report, Los Osos Waste Water Project, County of San Luis Obispo, November 2008.

In addition to those studies, the following reports and data were reviewed:

1) Simulated effects of a Proposed Sewer Project on Nitrate Concentrations in the Los Osos Valley Groundwater Basin, prepared for LOCSD and Cleath and Associates, Yates and Williams, November 2003.
2) Hydrogeology and Water Resources of the Los Osos Valley Groundwater Basin, USGS WRIR 88-4081, Yates and Wiese, 1988.
3) Conducted phone discussions with Spencer Harris of CHG on model input and output and basis for key model assumptions.
4) Sent via email requests for selected data and model sensitivity analyses, and reviewed and evaluated these additional data.
5) Los Osos Wastewater Management Plan Update, Technical Memorandum #3, Ripley Pacific Team, July 2006.
6) Comments regarding the Ripley Pacific Team's Technical Memorandum #3, Los Osos Wastewater Management Plan Update, Cleath and Associates, October 2006.
7) A Practical Guide to Groundwater and Solute Transport Modeling, Spitz and Moreno, 1996.
8) Applied Contaminant Transport Modeling, Zeng and Bennett, 1995.
9) A critical review of data on field-scale dispersion in aquifers, Gelhar and others, 1992.

Summary of Findings

While there is uncertainty in all models, the SEAWAT model developed by Cleath-Harris Geologists and recent model results (CHG, 2009a, b) appear reasonable. However, we have several recommendations; 1) The need for additional model documentation including definition of model limitations and uncertainty in the results and technical basis for input data, 2) Model refinement and additional scenarios including evaluation of climatic variability other than sea level rise and development of a monthly transient flow model using the model structure from the existing model with the addition of the STR package of Modflow. The recommendations are discussed in more detail in the various subsections and under Recommendations, below.

The scenario described in CHG (2009b) regarding redistribution of pumping in the basin with an increase in pumping the Los Osos Creek subbasin is reasonable and could be initiated without further modeling or analysis, provided the change is gradual, with continued water level and water quality monitoring and analysis. The model could be updated as the effects of that plan/strategy become more fully understood. The recommended approach is phased redistribution of pumping with contingency plans in place to make adjustments as needed and as ongoing monitoring data indicate.

Model Data and Assumptions

This section of the peer review focuses on important model structure and input data that can significantly affect model results.

Model Structure

Cleath and Associates (2005) report contains the information used as a basis for the current SEAWAT model of the Los Osos groundwater basin including the hydrogeology and structure of the basin, aquifer hydraulic parameters, sources of recharge, water quality (including isotope analysis) and the extent of seawater intrusion. Those data provide a strong foundation on which to build the groundwater flow and seawater intrusion model. The current (CHG, 2009a,b) SEAWAT model consists of four layers representing the three primary water bearing units in the basin and a thick aquitard that extends throughout much of the basin.

Based on the data and reports reviewed, the structure of the model is sound and can effectively simulate hydrologic processes in the groundwater basin, particularly as regards the different characteristics and extent of seawater intrusion in each of the main water bearing units (Zones C, D and E). The Los Osos creek subarea on the eastern side of the Los Osos basin has a slightly different structure which the current model (CHG, 2009 a,b) also suitably represents. The model grid is uniform at 250 x 250 feet which is reasonable for the Los Osos basin given its scale, density of data, and resolution required of model results.

Hydraulic Parameters

A key hydraulic parameter that controls groundwater and seawater flow in the model is horizontal hydraulic conductivity (Kh). Its distribution by layer were requested from CHG and reviewed. The distribution is shown for each model layer in the attached Figures 1 through 4. This distribution was discussed with Mr. Harris and compared to that of pumping test results presented in Cleath and Associates (2005), and supplemental data provided by Mr. Harris.

The K distribution by layer seems appropriate and honors the field test data, which need not be precisely replicated in the model due to field data limitations and scale. I had questions regarding the K distribution representing the Los Osos Creek alluvium which appeared different from that of typical stream alluvium. However, discussions with Mr. Harris confirmed that the K values used in that area honor the unique geology of this region.

This type of information (maps and discussion of aquifer hydraulic properties) should be included in a future report on the SEAWAT model used in the CHG (2009a,b) studies.

Recharge Preprocessor

The 2009 SEAWAT model does not include the upper two geologic units which occur in the western two thirds of the basin including the perched aquifer (Zone A) and the transitional aquifer (Zone B). The upper zones are not generally used for production and are effectively isolated hydraulically from the underlying aquifers (Zones C, D and E) by an extensive clay layer. An unsaturated zone exists between the clay layer and the underlying aquifers although there is some leakage that occurs through it. SEAWAT cannot simulate unsaturated flow while the more recently developed GSFLOW code developed by the USGS has that capability. This limitation of SEAWAT requires that recharge to the saturated flow portion of the model from precipitation, minor tributaries, return flow from irrigation and septic tank seepage be determined by other methods.

For the Los Osos basin this method has been a spreadsheet preprocessor developed by Yates and Williams (2003). That report briefly describes this recharge and nitrogen loading preprocessor program which calculates deep percolation. This model preprocessor was not evaluated in detail for this review. There are many parameters and sources of data which are used in that preprocessor, some of which were changed to develop input for the CHG 2009 SEAWAT model. An Excel worksheet containing the model and input data was provided by Mr. Harris for this review, but the input data could not be evaluated in detail in the time available.

It is suggested that the preprocessor documentation be updated such that the input data sources and methods of calculating deep percolation and evapotranspiration is transparent. Changes to the model for use in successive models should be sufficiently described, accessible and readily available for review. Flow diagrams showing how the spreadsheet preprocessor works and its most sensitive variables should be included. We do not have a suggestion at this time as to whether the preprocessor could be improved or replaced by a more conventional unsaturated flow model due to our limited knowledge of it. However, model code refinements may be available in the near future that will allow simulation of unsaturated flow and seawater intrusion using the same basic data sets as currently used in the current Los Osos model. It is suggested that the model be updated to include unsaturated flow when possible.

Representation of Los Osos Creek

The recharge pre-processor does not include calculation of the recharge from Los Osos Creek to the aquifer in the Los Osos Creek subarea. This is an important component of the model because it allows an increase in recharge as water levels decline in that area due to proposed increased pumping (CHG, 2009b). Recharge is controlled by the model using the RIV module which allows river/creek seepage based on the water level in the creek, the head in the aquifer beneath the creek, and a coefficient based on the width of the creek, creek bed thickness and vertical permeability. While use of the RIV module can produce usable results for this type of creek, the

STR module could have provided a better calibration. The STR module allows the stream flow to reduce or cease during dry periods or seasons, thus providing a limit to how much seepage/recharge can occur from the creek to the aquifer. A recent version of SEAWAT (late 2009 available in GW Vistas updates) is available and should be used in updated versions of the Los Osos model.

In order to evaluate whether the RIV module was properly used to represent Los Osos Creek seepage, two analyses were performed. For the first, Creek flow data and a precipitation graph with a cumulative departure curve was requested from CHG. The Creek flow data is shown in Figure 5. It shows that data is missing for 1983, a wet year, and 1985-93 most of which were dry years. The wet or dry year condition was determined using long term precipitation data with a cumulative departure curve requested from CHG (Figure 6). A comparison of Figures 5 and 6 indicate the creek flow data is skewed to wet years.

The average creek flow for all of the years shown is 3,940 afy with a median of 2,230 afy. If a balance period is selected (Figure 6) which is limited to 1979-81 creek flow data (Figure 5), the average is 2,326 afy with a median of 1,630 afy. This suggests that no more than about 1,600 afy should be allowed by the model to seep from the stream to the underlying aquifer. The results of the increased pumping in the Los Osos creek subarea by CHG (2009b) is well within this limit at 1,013 afy. In addition, the gage from which the flow data in Figure 5 was obtained is located somewhat downstream from the basin and model boundary such that some seepage to the aquifer can occur in the groundwater basin upstream of the gage. The STR package will allow more accurate representation of stream leakage in future revisions of the model.

The second analysis requested of CHG was a sensitivity analysis of the conductance coefficient used in the model RIV module representing Los Osos Creek. CHG went farther than that and performed a sensitivity analysis on all other RIV variables including head in the River. The results of that sensitivity analysis indicate that for a change in creek bed permeability of 100% the change in seepage is less than 1%. For a change in stream bed permeability of 100% and stream width increase of 100% the change in seepage is also less than 1%. The amount of seepage is more sensitive to stream stage with an increase in stream stage of 0.5 feet resulting in an increase in seepage of about 1.4% which is still not large. Mr. Harris has indicated he is aware of this sensitivity and has calibrated stream stage so as not to allow seepage in excess of available stream flow. Again, use of the more recent version of SEAWAT with the STR package and run in transient mode with monthly data, will improve model reliability with respect to the effects of increased pumping in the Los Osos Creek subarea.

Seawater Intrusion Coefficients

Seawater intrusion into the Los Osos groundwater basin is primarily effected by the relative elevations of the ocean and head in each aquifer, difference in fresh and seawater density and the aquifer coefficient of dispersion, particularly the longitudinal component (dL). This coefficient is an unknown that is dependent upon aquifer permeability and the scale of the intrusion problem. Three technical references were reviewed to evaluate the potential range of this variable for the Los Osos basin, as noted above. CHG was requested to perform a sensitivity analysis of the coefficient of longitudinal dispersivity. The results are shown below in Tables 1 and 2 for the 50 year calibration.

Table 1. Chloride 250 mg/l isochem - Distance from coastline 2005 (in feet)

Model Zone/Layer	Measured/Estimated	Calibration (dL/dT/dV)	Low range (dL/dT/dV)	High Range dL/dT/dV
		(100/20/2)	(10/2/0.2)	(200/40/4)
C/1	1,500	2,000	2,000	2,000
D/3	2,500 – 5,500	2,500 – 5,400	2,400 – 5,100	2,600 – 5,700
E/4	3,000 – 7,500	3,000 – 4,800	2,900 – 4,500	3,000 – 5,000

Note: dL = Longitudinal Dispersivity, dT =Transverse Dispersivity, dV = Vertical Dispersivity

Table 2. Change in distance of Chloride 250 mg/l isochem relative to calibration (in feet)

Model Zone/Layer	Calibration (dL/dT/dV)	Low range (dL/dT/dV)	High Range (dL/dT/dV)
	(100/20/2)	(10/2/0.2)	(200/40/4)
C/1	0 ft	0	0
D/3	0	-300	+300
E/4	0	-250	+250

The longitudinal, transverse and vertical dispersivities are related and are generally express as a ratio. Table 1 indicates the model simulated accuracy relative to the dL of 100 used in the model and to a wide range of values. Table 2 indicates the relative sensitivity of the model to the same range. The results indicate the model is surprisingly insensitive to longitudinal dispersivity and that the differences in simulated intrusion under the wide range of coefficients simulated is only 300 feet or about one model cell width after 50 years.

In addition to the analyses discussed above, Stetson Engineers requested that CHG provide a composite map of the simulated and measured extent of seawater intrusion as of 2005, the end of the 50 year calibration period to determine visually how well the model matches the data base on the 250 mg/l Chloride isochem. Figure 7 shows the results provided by CHG where the green area represents the 250 mg/l Chloride isochem as a wedge in Zone D due to density differences and the blue line (0.03 isochem) represent the model simulated extent of the 250 mg/l Chloride isochem in the middle of the aquifer. The model appears to match the data relatively well. A comparison of columns 2 and 3 in Table 1 provides a more precise measure of this difference.

SEAWAT Model Limitations

The current transient calibration for the SEAWAT model only represents three multi-year period and the predictions are run with steady-state (average hydrologic) inputs. This increases the uncertainty in the model for calibration and prediction of monthly water levels, recharge, stream seepage and storage change during critical dry periods. While the model structure is in place for developing a monthly transient calibration, it may take significant time and effort to calibrate the SEAWAT model. This is primarily due to known problems with numerical instability in SEAWAT when running in transient mode. This effort may be warranted in the long term but, in the short term the suggested redistribution of pumping to the Los Osos Creek area need not be delayed. In future model updates it is suggested that the model be calibrated with monthly stress and the STR package to better represent Los Osos Creek seepage to the underlying aquifer.

While careful use of the RIV module can result in reasonable results as discussed above, this is still a model limitation that, when combined with the absence of a transient SEAWAT calibration is of concern with respect to more precise evaluation of management alternatives. Note that what is suggested is more accurate predictions, and not that the current SEAWAT model does not provide useful results.

Model Results and Uncertainty

Although it was not a part of the scope of work for this review, it was hoped that an estimate of the uncertainty of the extent of predicted sweater intrusion and subbasin safe yield under future management scenarios could be provide in this review. However, as with most models, this is best defined by the developer of the model who is most familiar with the model, its input data and limitations. As suggested below, some estimate should be placed on these model results (current and future) for the purpose of assisting decision makers in allowing consideration of alternate plans should the model not prove100% accurate.

All models have an inherent degree of uncertainty. That does not invalidate their results, but knowing the uncertainty in key results is important for the planning process. In this case, such planning could include a gradual shift in municipal pumping to the Los Osos Creek subarea with appropriate monitoring to evaluate the effects of such a change, which will likely be slow to occur. Planning could therefore include various steps that could be taken should underpredicted, but not surprising results occur. For example large storage declines during dry periods in the Los Osos Creek subarea when pumping there is increased, or seawater intrusion does not slow at the rate expected, or the reduction in septic tank seepage does not slow at the rate expected, etc.

Seawater Intrusion

The model calibration provides reasonable results as noted above. However, there is likely some uncertainty regarding the exact extent of the landward movement of seawater intrusion under predictive scenarios. It is important to note that when making a comparison between predictive model simulations that the relative difference between the extent of seawater intrusion that is important for evaluating basin management alternatives rather than the absolute value of the extent of seawater intrusion or specific Chloride concentrations at any one location due to model limitations discussed above.

Given the limitations of SEAWAT, the Recommendations discussed below include suggestions for evaluating dry period, seasonal and intermittent stream conditions by updating the current model using monthly transient stress periods.

Safe Yield Estimates

The safe yield estimate for the Urban Area of 3,200 afy (CHG, 2009a) is a reasonable long term average estimate, but with limitations discussed above regarding the uncertain response of the aquifers during extended dry periods. It is suggested that a +/- value be added to that estimate based on model uncertainty.

The SEAWAT limitations regarding the RIV module to simulate leakage to the aquifer have been address above, and the additional recharge under the scenario of expanded pumping in this area is reasonable due to consideration of this limitation by CHG. An uncertainty range could also be added to the Los Osos Creek subarea safe yield estimate of 3,150 afy (CHG, 2009b) for the same reasons. Additional recharge from Los Osos Creek is an important component of this estimate. Improvements in model accuracy could be made through a monthly transient calibration of the existing SEAWAT model using the updated code with STR package capability. Reporting on an improved version of the model should still include a section on uncertainty.

Conclusions

The current SEAWAT model and results regarding seawater intrusion and safe yield provides usable results on which to base near-term changes in pumping distribution to mitigate seawater intrusion (CHG, 2009a, b). However, it is suggested that uncertainty values should be assigned by CHG to the model results given the model limitations to assist decision makers in their choice of action and any additional measures that should also be considered. Our involvement with the USGS in other basins indicates they include, and recommends others include, a limitations and uncertainty section in model documentation (W. Danskin, USGS Research Hydrologist, 2009). SEAWAT is an appropriate model code for the Los Osos basin for evaluation of the average groundwater basin budget (including basin and subarea yields), the extent of seawater intrusion, and for use in evaluating the relative effects of development and changes in basin management or climate variability.

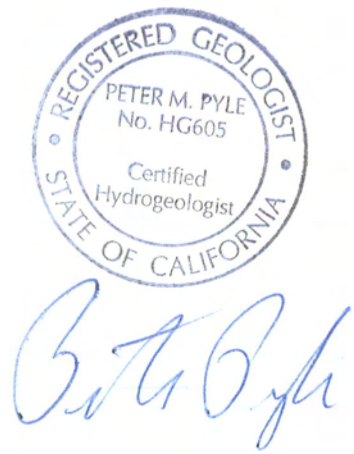
Recommendations

Although recommendations were not requested as part of this review, they are included in the text above and summarized below.

1) Add uncertainty values to seawater inflow extent and rate, and safe yield estimates in CHG (2009 a,b) and future model documentation, memos, etc.
2) Calibrate SEAWAT in monthly transient mode and use the STR package to represent Los Osos Creek. Use a long period of record that includes the critical dry period for the region. Repeat the same hydrologic period for predictive simulations.
3) Continue to review climate change literature and determine if a comprehensive scenario regarding climate change should be run using an updated version of the model.
4) Write up the Yates preprocessor used to estimate deep percolation to the saturated flow model (SEAWAT, MODFLOW, etc) including diagrams, screen capture or other method to show how model the works, include the source of model input data, what variables are usually changed for predictive runs and which variables are most sensitive. This preprocessor provides significant input to the flow models and more complete information is needed.
5) Additional model documentation is needed on the SEAWAT model for the Los Osos Creek Basin including assumptions, maps of hydraulic property distributions by layer, stream input data, reference to the unsaturated flow preprocessor and changes to input for model simulation, and other details sufficient for a complete understanding of the model.
6) For the benefit of users of model results, future reviewers or model users it is suggested that a summary of Los Osos models and related documents be prepared. This documentation should include, at a minimum, a table with; a) the model code used, b) whether transient or steady state, c) period simulated (calibration and prediction) and stress period length, d) if Yates preprocessor or other method used to estimated deep

percolation, f) if transport, which species were simulated, and g) date and title of key documentation. This would have saved the reviewer a lot of time in trying to determine relevance and differences between these models listed below.

- Yates and Weise,1988
- Yates and Williams, 2003
- URS, 2000
- CHG 2005
- CHG 2009a, b



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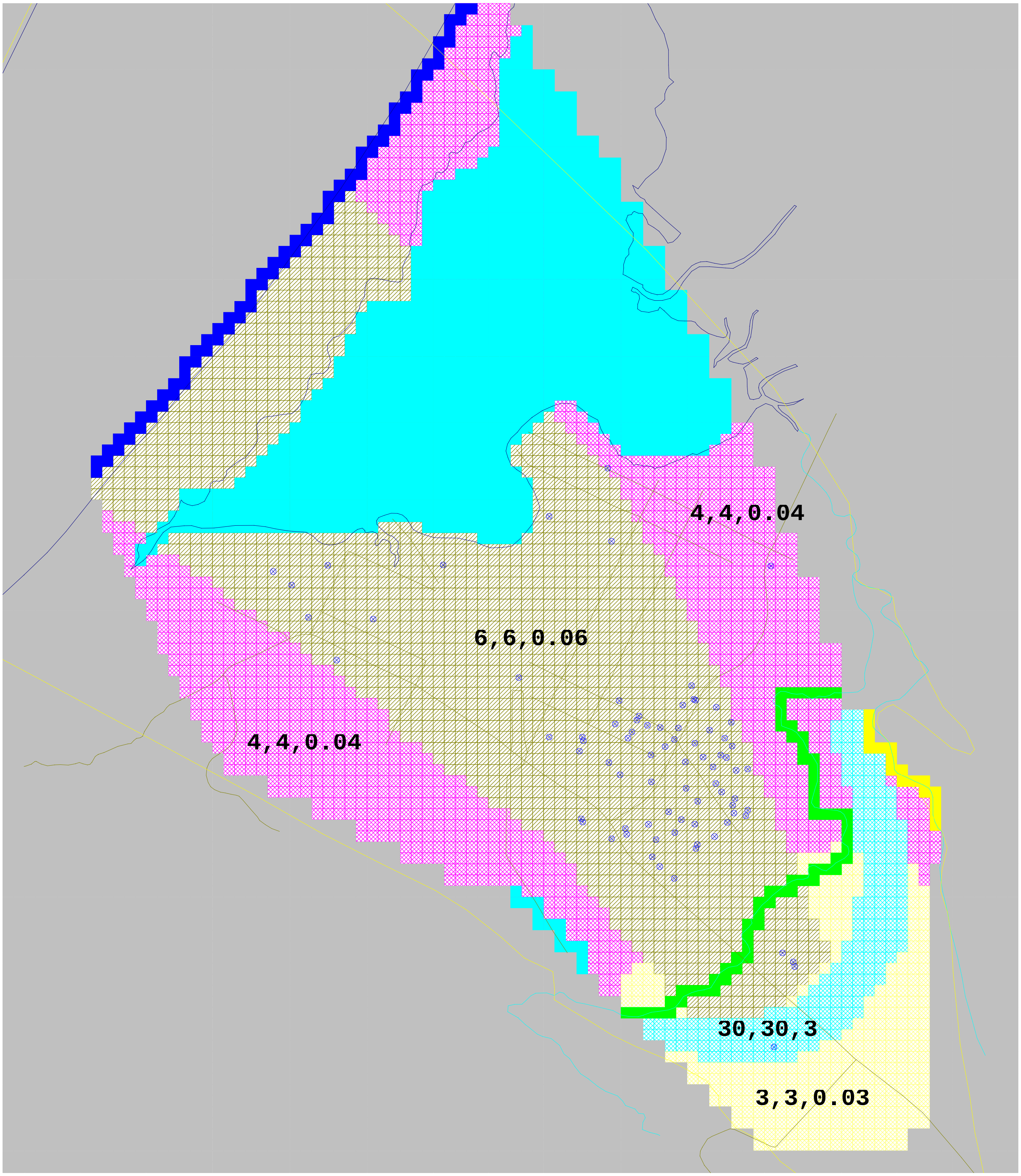


Figure 1. Horizontal Hydraulic Conductivity - Layer 1

EXHIBIT "C"

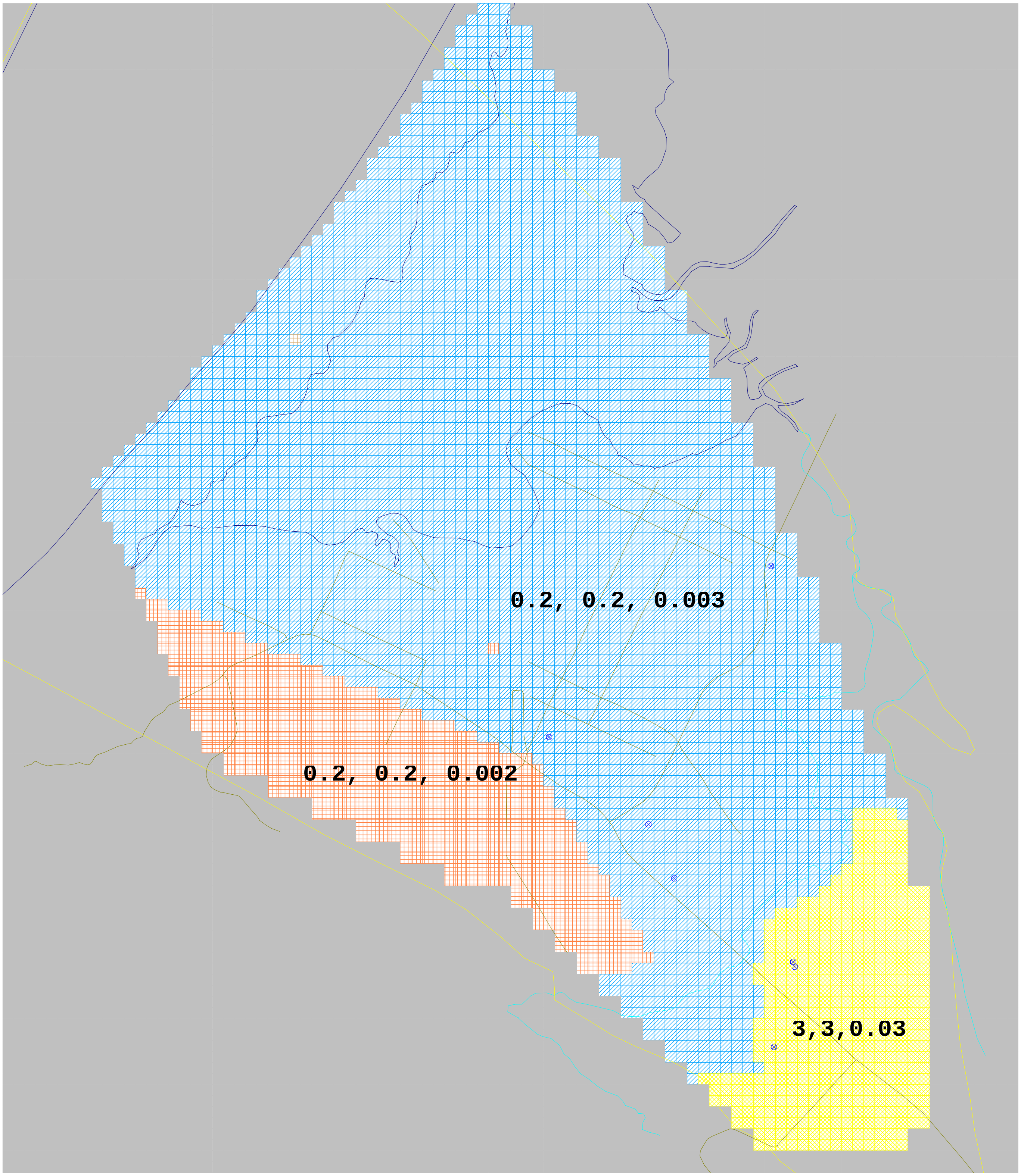


Figure 2. Horizontal Hydraulic Conductivity - Layer 2

EXHIBIT "C"

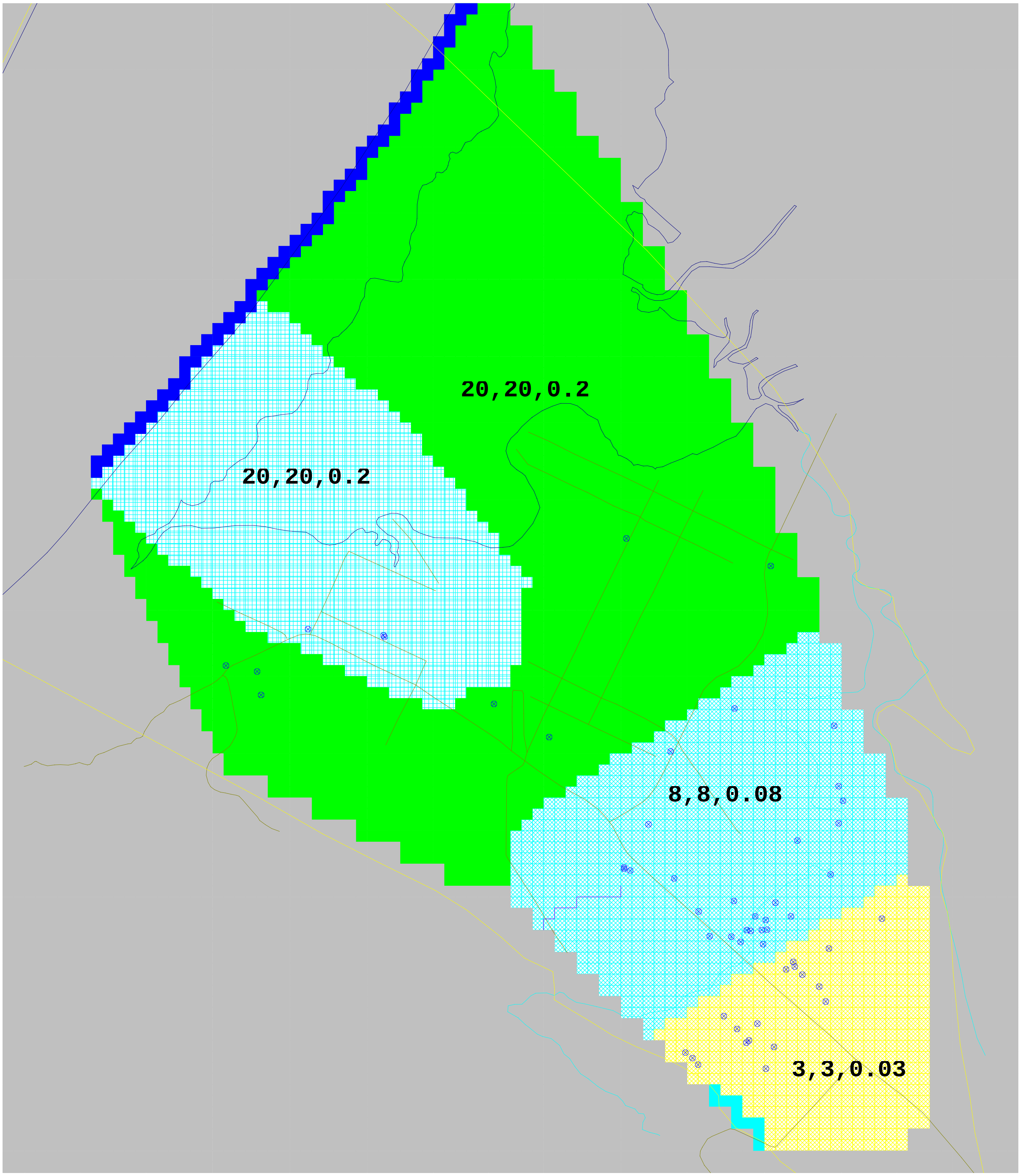


Figure 3. Horizontal Hydraulic Conductivity - Layer 3

EXHIBIT "C"

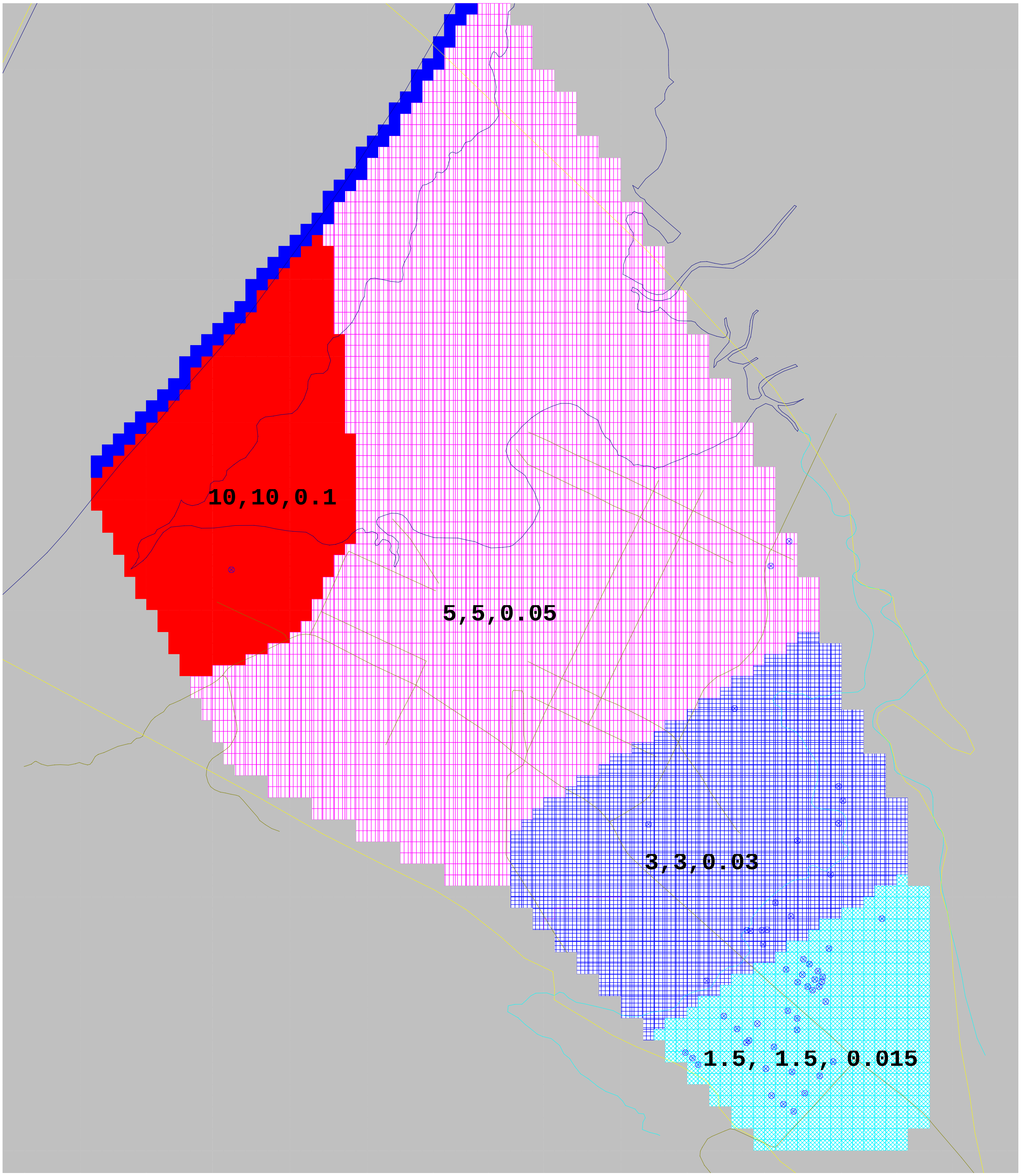


Figure 4. Horizontal Hydraulic Conductivity - Layer 4

EXHIBIT "C"

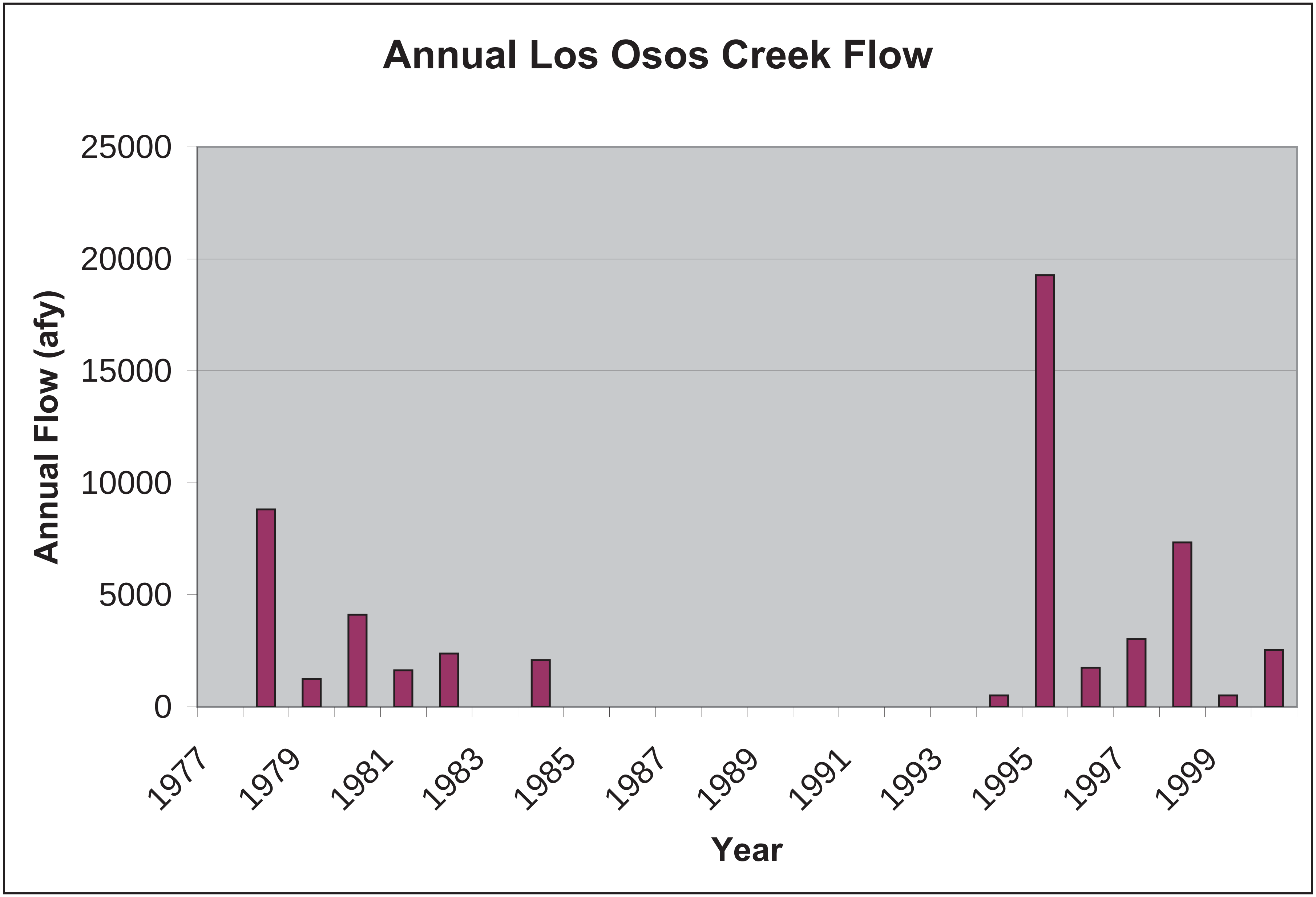


Figure 5. Annual Los Osos Creek Flow (1978-2002)

Attachment 2 Page 28

EXHIBIT "C"

Figure 6
Cumulative Departure Curve
Los Osos Station 197 (South Bay Fire Dept.)

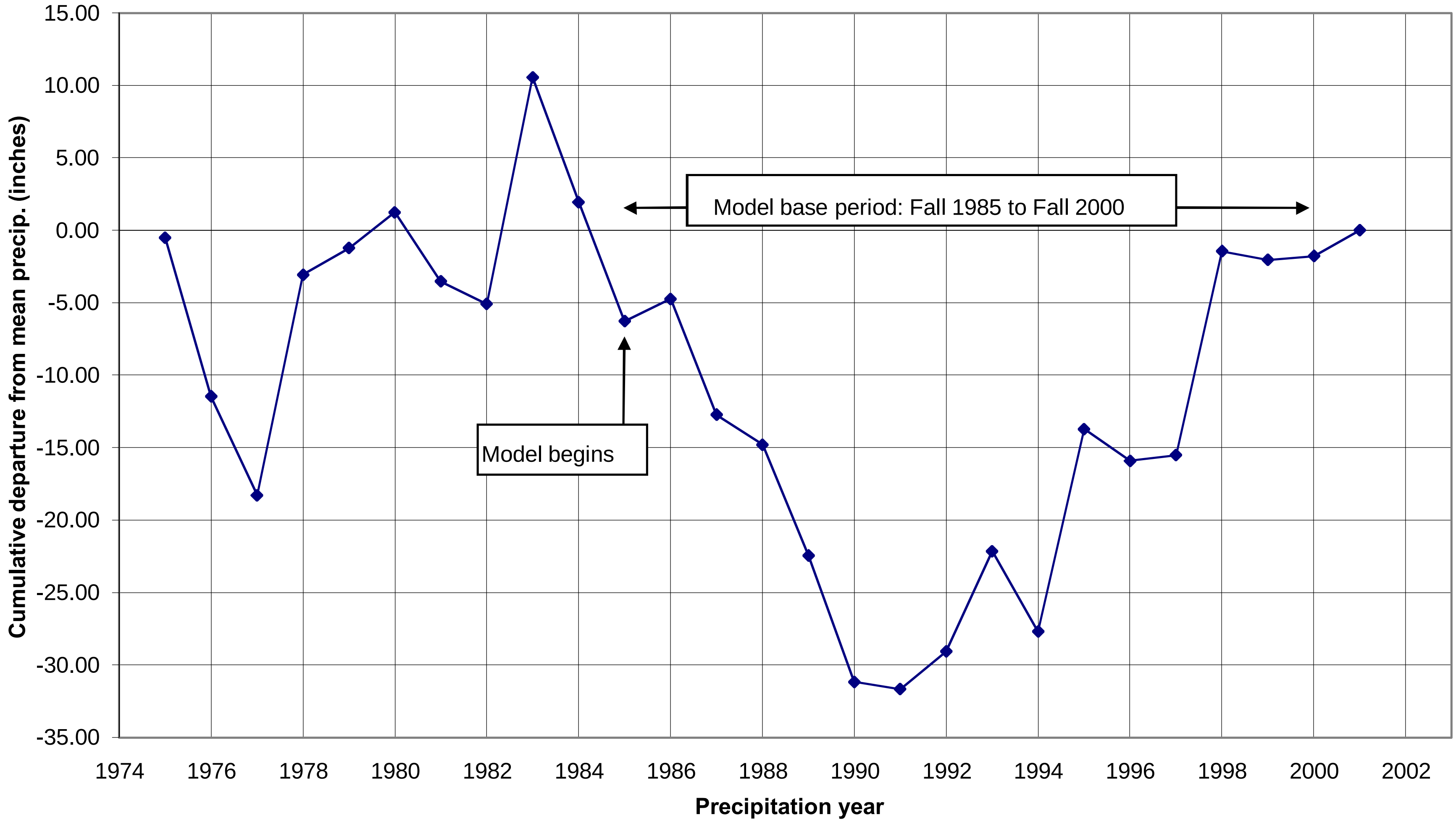
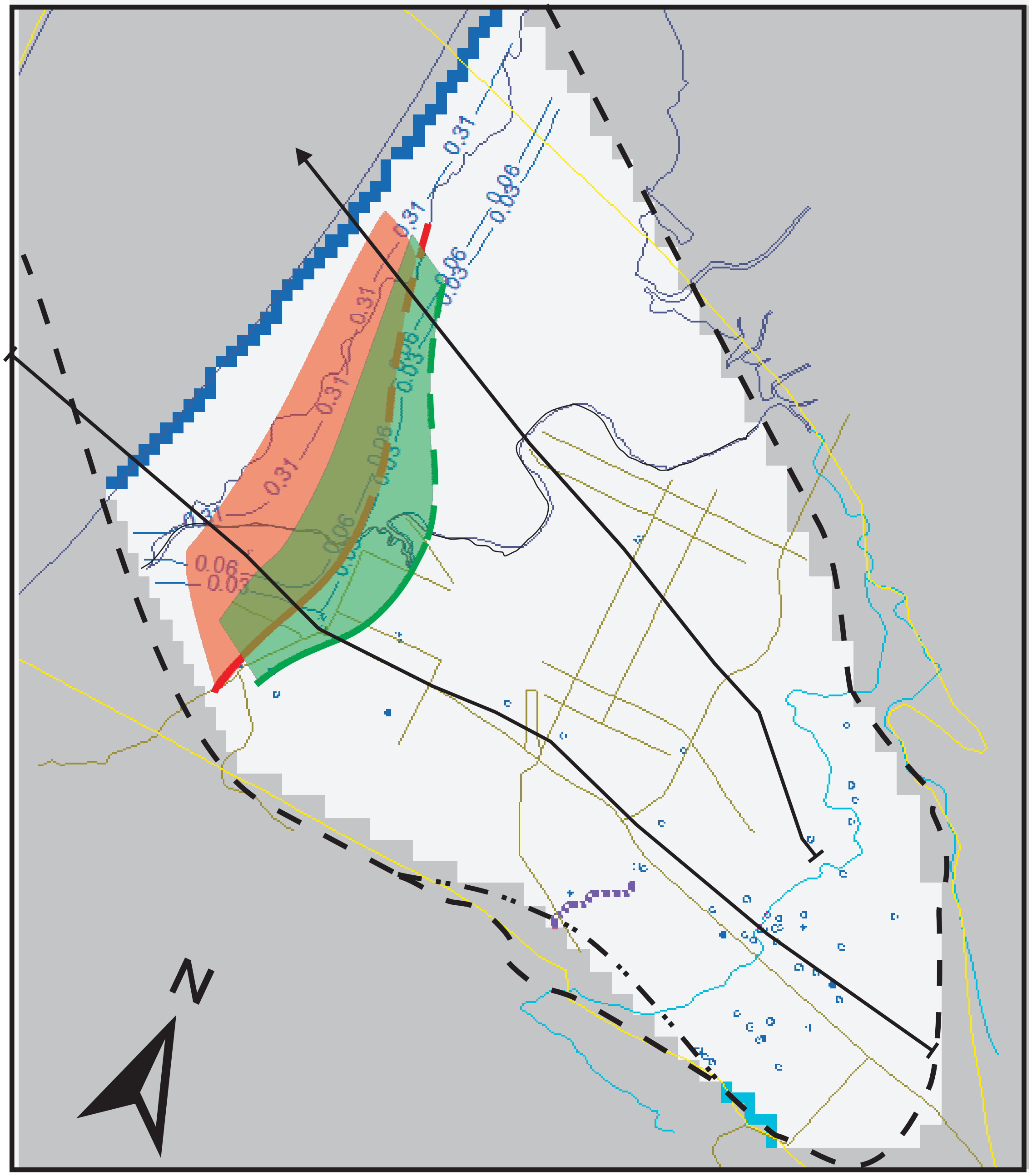


EXHIBIT "C"

Figure 7. Zone D, measured and simulated extent of seawater intrusion, 2005.
(modified from Figure A3, CHG, 2009b)



Scale 1" = 4000 feet

Simulated TDS isoconcentrations in lb/ft3

0.03 lb/ft3 = 500 mg/l TDS ≈ 250 mg/l Chloride
0.06 lb/ft3 = 1,000 mg/l TDS≈ 500 mg/l Chloride
0.31 lb/ft3 = 5,000 mg/l TDS≈ 2,500 mg/l Chloride

2005 Transition Zone:

Estimated extent of 2500 mg/l
Zone D isochlor (shading shows change with depth)

Estimated extent of 250 mg/l
Zone D isochlor (shading shows change with depth)

~~Figure A3~~

TDS Isoconcentrations
Calibration Run-2005 Zone D
May 2009 SEAWAT Model
Los Osos ISJ Group

Cleath-Harris Geologists, Inc.

Attachment #3

HYDROFOCUS INC.
Solutions for Land and Water Resources

3 August 2010

Mr. Keith Wimer
Los Osos Sustainability Group
1101 14th Street
Los Osos, CA 93402

SUBJECT: Review of Los Osos Basin Update and Current Wastewater Project Description--Revised

After reviewing San Luis Obispo County's update on groundwater conditions in the Los Osos basin and the current description of the wastewater project, I would like to offer the following observations.

- **The seawater intrusion problem is extremely urgent.** Seawater intrusion moved over a half mile in four years and has reached the center of municipal pumping from the lower aquifer. As I stated in my previous review (February 4) seawater intrusion is very difficult to reverse and renders water unusable for drinking when it exceeds only 1.5% of the inflow to a well. The most recent intrusion data indicate seawater intrusion is accelerating and threatens to shut down (or is already shutting down) the community's largest production wells.

- **Two immediate actions are needed to protect the water supply and prevent further intrusion.** Both actions can be implemented quickly (1-2 years), and both actions are mutually compatible:

    - **Shift most of the municipal pumping up from the lower to the upper aquifer system, and/or shift some of the municipal pumping farther inland.** This requires drilling new wells and laying more pipeline.
        - This action may not be sufficient to provide long-term protection against seawater intrusion because the basin has never experienced that much upper-zone pumping, particularly in the absence of septic system recharge.

    - **Decrease average per-capita water residential use from 104 gallons per capita per day (gpcd) to 74 gpcd or lower.** This latter level is reasonable since it is the current average for the City of San Luis Obispo.
        - This action provides more reliable long-term protection against seawater intrusion because it addresses the fundamental problem which is an overall imbalance in the water budget (i.e., more water is consumed in the basin than is being replenished). This would reduce total water production in the basin by about 500 AFY, which provides a reasonable

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margin of safety given the uncertainty in previous studies (simulated intrusion rates) and uncertainties in the effects of currently proposed projects (shifting large amounts of pumping from the lower to upper aquifer; the percolation capacity of the Broderson leach fields).

- **Seawater intrusion and nitrates must be managed with an integrated basin-wide plan—they are interconnected problems within a single hydrologic system.** Examples of the interconnectedness between issues include:

    - Sewering will greatly decrease recharge to the upper aquifer at the same time municipal pumping from the upper aquifer will be increasing to minimize seawater intrusion. These two major changes are a huge shift in the upper aquifer water balance and could cause seawater intrusion in that aquifer.
    - Indoor water conservation tends to increase the salinity of wastewater (same quantity of salts will be dissolved into a smaller volume of water). Conservation is urgently needed, but its effect on recycled water salinity needs to be considered when planning for irrigation reuse. The Fine Screening Analysis estimates domestic water use adds 200 mg/l of total dissolved solids (TDS) from salts to the wastewater stream.
    - A small amount of saltwater intrusion can also increase the salinity of the municipal water supply to the point that resulting reclaimed wastewater will be unacceptable for irrigation reuse. A small amount of intrusion could easily push the TDS concentration of the municipal supply to near the short-term drinking water MCL of 1,000 mg/L, if intrusion outpaces the upward shift in pumping. Adding 200 mg/L of TDS from normal urban use would result in a wastewater TDS approaching 1,200 mg/L. The reuse technical memorandum (Carollo Engineers 2008) indicated that this level of salts could decrease yields of lettuce and peppers to less than 90% of normal yields, although other crops would remain above 90%. Nevertheless, this constraint on crop selection could diminish the appeal of recycled water to local growers
    - Outdoor conservation measures, especially xeriscape, can also have a beneficial effect on the amount of nitrates and other contaminants entering the groundwater. As water tables drop, nitrates are treated to a greater extent in the vadose (dry) zone of the soil, and use of native plants with xeriscape requires fewer fertilizers reducing nitrates entering the soil.
    - Stormwater recharge, along with conservation, benefit the water balance equation. Stormwater recharge will also control flooding in problem locations, reduce pollution of surface water, and dilute contaminants in the groundwater by promoting more efficient percolation of clean stormwater (infiltrated before it picks up pollutants).

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- **The conservation target of 160 AFY in the project description is too small. Greater conservation is feasible and needed.**

    - The conservation element focuses only on residential indoor water use within the prohibition zone. This scope is unnecessarily narrow. Expanding to a larger footprint (the Urban Reserve Line) and to all types of water use (residential outdoor and commercial) greatly increases the conservation potential, as the following bullets demonstrate.
    - Current per-capita water use within the Urban Reserve Line is about 104 gpcd (1,722 AFY residential water use/14,800 residents, per LOSG data sheets).
    - o Residential water use in San Luis Obispo is 74 gpcd. If Los Osos decreases its water use to the same level, the annual savings would be 497 AFY. This exceeds the proposed percolation rate at the Broderson leach fields, and it does not include potential reductions in commercial and institutional use.
    - o The recent County update on the project commits to a target of 50 gpcd for residential indoor use within the prohibition zone (12, 450 population). This goal is less effective than meeting the San Luis Obispo target. If indoor residential use in this zone is 66 gpcd (per the Fine Screening Analysis), then a decrease to 50 gpcd would save only 223 AFY. If the 74 gpcd target were used in the prohibition zone, 418 gpcd would be saved. The target for overall use (74 gpcd) is preferable (especially if used within the URL) to the target for indoor use (50 gpcd) because it encompasses a broader range of conservation opportunities.
    - o Conservation has many co–benefits, such as reduced energy consumption for pumping and heating water for domestic and commercial uses. Conservation is doubly important in conjunction with the wastewater project, because it decreases the amount of water that is exported from the western half of the basin in the first place, thereby decreasing the volume of recycled water that needs to be piped back to the west side. This decreases energy and operating costs for water treatment, wastewater treatment, and conveyance in both directions.
    - o Conservation measures that decrease indoor water use or reuse water on-site have the dual benefit of decreasing municipal pumping and decreasing wastewater generation. These measures include low-flow plumbing fixtures and graywater systems. The previous, onerous regulations governing residential graywater systems were largely eliminated in the 2010 update to the California Plumbing Code. Graywater systems are now much more feasible from a permitting and cost standpoint.
    - o Other conservation and water management measures have no effect on wastewater generation but are needed to bring the water budget in the Western Compartment back into balance. Some of these are mentioned in the Basin Update and previous project design studies but are not included in the current project description. Measures in this category include agricultural exchange

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(using irrigation wells in the Los Osos Creek area for municipal supply in exchange for recycled water delivered for crop irrigation), stormwater management to increase percolation of runoff, and rainwater harvesting. These should all be included as part of a comprehensive program to address wastewater management and seawater intrusion.

- **Previous studies should be updated to reflect the current project description and current status of seawater intrusion.**
  The current project description reportedly does not include sprayfields. The recently documented arrival of seawater intrusion at the center of pumping in the lower aquifer will undoubtedly alter pumping patterns. Some of the cost and feasibility analyses in previous studies (for example, the Fine Screening Analysis and reuse technical memorandum) should be updated to reflect current conditions and opportunities.
  - The arrival of seawater intrusion at the center of pumping in the lower aquifer will force purveyors to shift a large percentage of municipal pumping from the lower aquifer to the upper aquifer. This would move the seawater intrusion problem from the lower aquifer to the upper aquifer. It also means that the "mitigation factors" used to evaluate the effect of wastewater alternatives on lower aquifer intrusion are not as relevant. The water balance and intrusion risk in the upper aquifer will be as important as in the lower aquifer, if not more so. For example, the effectiveness of percolation from the Broderson leach fields for mitigating upper aquifer intrusion is greater than for the lower aquifer, but new problems arise because the localized nature of Broderson recharge and increased upper aquifer pumping could result in seawater intrusion. As I mentioned in the previous review, Broderson recharge will not supply water to bay fringe marshes in the Baywood Park area.
  - The Fine Screening Analysis, the reuse technical memorandum (Carollo Engineers, 2008) and the Basin Update all assumed that water conservation would decrease water use and wastewater generation by only 160 AFY. The current project description assumes a 16 gpcd decrease in indoor water use (from 66 to 50 gpcd), which would decrease wastewater generation by 223 AFY for the initial population in the sewer service area (12,450 people) and by 330 AFY at buildout (18,428 people).
  - The previous studies rejected water conservation, urban reuse, graywater systems, low impact development (LID) and stormwater percolation as elements of the project because they would require purveyor participation. I disagree. All of those measures can be implemented by dealing directly with homeowners and public works agencies, bypassing the purveyors.
  - The current project description includes urban reuse, in spite of the previous conclusion that they would be infeasible because they require purveyor participation.

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- The current, rapid advance of the intrusion front could change purveyor willingness to participate in conservation measures and alternative supply options such as agricultural exchange.
- Collectively, these several changes in basic project parameters (increased conservation, shifting pumping from the lower to upper aquifer, elimination of sprayfields) warrant an updated evaluation of project design and operation with an eye toward minimizing overall costs and impacts.

- **Eliminating the Broderson recharge facility appears feasible and should be considered.**

  The current project description proposes to percolate 448 AFY at the Broderson leach fields to meet two objectives: preventing seawater intrusion and disposing of wastewater in winter. A decrease in municipal pumping of 448 AFY would be at least as effective for preventing intrusion and is achievable through water conservation, agricultural exchange and urban reuse (see above discussion). Winter wastewater handling could be achieved through additional seasonal storage. In the absence of sprayfields and the Broderson facility winter storage for 4 months of recycled water is needed in an average year, and 5 months in a wet year. Also, approximately 28 inches of additional reservoir depth is needed to store excess rainfall during an exceptionally wet winter. With an initial wastewater generation rate of 700 AFY and 83 AFY of inflow and infiltration during the wet season, then 5 months of seasonal storage would require reservoir capacity totaling 375 AF. The reuse technical memorandum indicated that reservoirs with a depth of 15 feet "should be possible in any location east of Los Osos Creek" (Carollo Engineers, 2008). On a gross area basis, this translated to 12 AF of storage per acre of reservoir. Because approximately 2 feet of reservoir depth must be reserved for storing rain that falls directly on the reservoir during an exceptionally wet year, recycled water storage would be approximately 10 AF per acre of reservoir. The Giacomazzi site has at least 12 acres available for a reservoir. The remaining 255 AF of storage (requiring about 26 acres) would need to be constructed off-site, possibly on property owned by the end users.

  The cost of the additional reservoir capacity would be substantially offset by eliminating the cost of the Broderson leach fields and possibly eliminating nitrate removal from the treatment process. Nitrate removal is necessary for recharge but not for irrigation. The storage facility (ies) would be on land not suitable for farming and without sensitive habitat, avoiding impacts to both. Since project construction will take several years, time is available to locate and plan these sites as reuse contracts are being developed.

  This alternative would recycle as much as 100% of the wastewater for irrigation (783 AFY, including winter inflow and infiltration). Current irrigation in the Los Osos Creek area is approximately 800 AFY (Cleath-Harris Geologists, Inc., 2008), and urban reuse

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opportunities totaling 133 AFY have been identified (Carollo Engineers, 2008). Thus, sufficient demand already exists to absorb the annual recycled water supply.

- **Wellhead treatment to meet primary drinking water standards is inevitable.** Seawater intrusion is forcing municipal production into the upper aquifer, where nitrate concentrations exceed the maximum contaminant level for drinking water in some locations. Wellhead treatment to remove nitrates using exchange resins is an approved technology, and is less costly and energy intensive than using reverse osmosis to desalinate seawater. Well-head treatment has been approved by the CPUC for Golden State Water Company in Los Osos.

- **The discrepancy between measured and simulated rates of seawater intrusion is not surprising.** The measured rate of advance of the saltwater/freshwater interface has been much greater than the simulated rate. The discrepancy likely stems from aquifer heterogeneity (water moves through the aquifer along preferred flow paths within sand lenses) that is not represented at the scale of the model. Heterogeneity does not have much effect on simulated water levels and basin yield, but it has a large effect on simulating the advance of the saltwater front.

- **If onshore water levels are above sea level, there will probably be no intrusion.** The rapid rate of seawater intrusion is caused by unsustainably low onshore groundwater levels. Although the greater density of seawater can theoretically cause intrusion even while onshore water levels are above sea level, I am unaware of a single instance when this occurred. In every case, seawater intrusion has occurred when onshore water levels fell below sea level. Water levels in the pumping trough in the center of Los Osos have been 5-10 feet below sea level for years Seawater will tend to move into this trough until water levels are brought up, which is why pumping must be reduced drastically in the lower aquifers (by approximately 1000 AFY according to model simulations[Cleath-Harris Geologists, 2009]) as soon as possible. Reduced pumping from conservation provides a rapid and direct way to address this issue, with long-term benefits.

- **Use monitoring data to track the saltwater interface and the model to track the water balance.** Models have trouble simultaneously simulating both detailed constituent transport and volumetric water budget components due to numerical instability. A transient groundwater flow model with monthly or shorter time steps will provide reasonable estimates of the water balance, particularly recharge and discharge along Los Osos Creek. The flows from that model can be inserted into the steady-state SEAWAT model to estimate the long-term interface location. Margins of safety should be applied to all modeling results to account for the uncertainties in modeling (see my January 13 comment memorandum) and the difficulty of reversing seawater intrusion.

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Given the rapid advance of the saltwater front, additional monitoring wells are probably warranted to monitor the status of intrusion and the effect of pumping reductions on the rate of intrusion.

- **In summary, the wastewater project must be designed to help solve the seawater intrusion problem as part of an integrated water management plan for the Los Osos basin.** Water conservation and wastewater recycling are the key links between the wastewater project and seawater intrusion, and the present level of commitment to those project components is inadequate. The project should include water conservation, wastewater recycling, agricultural exchange and stormwater management measures that were considered but prematurely dismissed in previous studies but that continue to be advocated by the Los Osos Sustainability Group. The reasons for dismissing them were based primarily on assumptions regarding institutional and public mindset rather than technical or financial infeasibility. Those assumptions are out of date, given the harsh reality of the intrusion situation and the opportunity to concurrently solve the intrusion and wastewater problems at minimum cost.

Please do not hesitate to contact me if you have any further questions.

Sincerely,

Gus Yates

Gus Yates, PG, CHg
Senior Hydrogeologist

Attachment #4

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June 9, 2010

California Coastal Commission
San Francisco, CA

Dear Commissioner,

Following a review of the literature describing the water resource issues in the Los Osos Valley Water Basin, I strongly support of the basin plan proposed by Keith Wimer and the Los Osos Sustainability Group.

I am a professor at the CSU Monterey Bay Division of Science and Environmental Policy. My degree is in Geological Sciences, and I have a long history of consulting and academic work in various aspects of watershed science. I currently serve on the Board of Directors for the Monterey County Water Resources Agency and as co-Director of the CSUMB Watershed Institute. My interest in the Los Osos Basin is strictly technical. Coastal communities of California are gradually running out of local water supplies. There are few models of sustainable water use in the region, so the Los Osos Valley Water Basin has the added responsibility of demonstrating best management practices for other basins to emulate. The decisions made here will be closely analyzed.

In 2009, I led a group of graduate students through an analysis of the water problems facing residents, resource managers, and water purveyors in the Los Osos Valley Water Basin (Smith et al., 2010). We thoroughly read the existing literature and found that there were basically two competing perspectives. There was the analysis provided in the Environmental Impact Report (and addenda), and an alternative analysis provided by the Los Osos Sustainability Group. This letter reiterates my strong support for the ideals and details developed by the Los Osos Sustainability Group.

There are several uncertainties in the water budget and physical elements of the aquifer system. Some uncertainties could be reduced with further fieldwork and modeling, and some must simply be accepted. Among the uncertainties are:

- Aquifer geometry
- Aquifer permeability
- Interaquifer exchange rates across aquicludes
- current position of the saltwater contamination
- Stream flows
- Current rainfall variability
- Future climate trends
- Sensitivity of groundwater modeling to variable inputs
- Values of water input and output that will lead to a sustainable clean water supply

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Our analysis suggests that the plan outlined in the EIR had the following main flaws. There is little acknowledgement of real uncertainties associated with the hydrologic budget and groundwater dynamics. The model outputs are presented as precise and accurate, yet we saw no evidence of sensitivity analysis. How do the model results change with realistic variability in input parameters? The lack of sensitivity analysis shows a lack of scientific rigor in modeling methodology. We believe that the plan in the EIR attempts to maximize water extraction from the basin, rather than "optimizing" the extraction for a safe and sustainable supply. Evidence of this philosophy is trying to balance the basin by allowing a finite amount of seawater intrusion to continue. A balanced basin requires a positive freshwater flow offshore, which is generally produced from a water table (or pressure head) that is maintained above sea level. There is no margin of safety in the plan; there is no monitoring plan; and, there is no contingency plan. These are significant shortfalls, given the real uncertainties and consequences of failure.

In contrast, the Los Osos Group plan maximizes conservation strategies. The plan includes both a margin of safety and a system of long-term monitoring and adaptive management. In other words, it qualitatively acknowledges the integrated uncertainty of groundwater movement, aquifer geometry, and climate. Caution and flexibility give the plan a much higher probability of long-term success. The plan strives to avoid further saltwater intrusion, and to turn the pressure offshore to regain aquifer storage and long-term resource security. An oversight NGO and technical advisory committee would foster adaptive management via real-time monitoring of basin conditions. It is important to give the community a strong voice and power to control their water supply.

Lastly, I see grave dangers in delaying basin-balancing activities. The available chloride data from the basin (although not up to date) indicates that saltwater intrusion is quickly progressing. If groundwater extraction continues at present rates, the volume of freshwater in the basin will quickly diminish. Quick action is called for because reversing aquifer contamination is much more difficult than avoiding contamination in the first place. Balanced hydrology should be a fundamental requirement of regional planning, so I would strongly support a moratorium on new construction or water use until such additional use can be clearly justified by evidence of both ample water supply and the reversal of saltwater intrusion. We are facing the current problems because urban development preceded water supply development; it is time to let water supply catch up.

Sincerely,

Douglas Smith

Dr. Douglas Smith, Professor
Science & Environmental Policy, CSUMB

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Cc: Keith Wimer
Los Osos Sustainability

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Attachment #5

Sustainable Basin Plan Recommendation

Wastewater project programs

Water-use efficiency program—Implemented within one year as part of an integrated basin-wide plan within the prohibition zone, the program would target at least 400 AFY of reduced water use/pumping in the urban area within two years (see next page for program description).

- $5 million allocated in Condition 99 of the present project could be maximized with grants, industry rebates, and innovative funding strategies, e.g., loans for water-saving measures paid back with water/energy cost savings. (Adequate funding would be part of any project selected.)
- A non-governmental organization would assist with program development and administration (SLO Greenbuild has offered to assist in the development and administration of a model program—see Attachment 26)

Recycled water use program—The recycled water program of a centralized wastewater project would target at least 400 AFY of reduced/offset pumping from the urban area with urban reuse and agricultural exchange. The recycled water program of a decentralized project would apply all recycled water in these ways, but it may be in lesser amounts. Note that ESHA would require less.

- Urban reuse (100-200 AFY* with the focus on commercial, institutional, and large properties)
- Agricultural exchange (at least 400 AFY* with at least 300 AFY of water exchanged/returned)
- ESHA support (100-200 AFY* with another 100 AFY from LID)

Summary of basin-wide plan and ordinance/components integrating and expanding the wastewater project components

(see more detailed recommendations below)

- Set the specific objective of reversing seawater intrusion within 5 years with benchmarks (e.g., a reduction of about 900 AFY of pumping from impacted wells in the lower aquifer within two years)**
- Set objectives and provide a framework for Regional Water Board and purveyor management plans and programs
- Provide for management plans, developed in cooperation with the Regional Water Board, to reduce contamination of all basin systems from all sources
- Provide for funding, cost-reduction strategies, and adequate incentives to achieve plan objectives and benchmarks
- Provide for costs to be apportioned basin-wide based on benefits
- Provide for an NGO to assist with development and implementation
- Prohibit building within the basin until seawater intrusion is reversed and a water surplus is established

(* Ranges reflect flexibility to adapt for ESHA, etc. **About 900 AFY less pumping from the lower aquifer reduces pumping to below the estimated safe yield for the aquifer, 655 AFY, with a margin of safety—see Attachment 18; also see County LOWWP website: *Flow Model and Urban Area Yield Update*, Cleath-Harris, July 2009,County LOWWP http://www.slocounty.ca.gov/PW/LOWWP/DOCS/Current_Documents.htm.)

(See Attachment 5, Page 7, for a diagram of basin balance with the sustainable basin plan.)

Water use efficiency program

The program is designed to be implemented as an integrated indoor-outdoor program, in which property owners with the assistance of water auditors, select the most cost-effective options from a menu of options. Auditors also inform and educate property owners on the goals and benefits of the program, identify on-site leaks, and monitor and report program effectiveness for continuous improvement.

- ***Indoor retrofits*** (high-efficiency toilets, faucet aerators and shower heads, washers, and hot water re-circulators)
- ***Outdoor measures*** (Xeriscape, efficient irrigation strategies—timed drip systems, ET sensors/rain shut offs, etc.)
- ***Rainwater harvesting/LID* systems** (Earthwork options—rain gardens, bio-swales, etc.; tank/storage options; integrated LID/graywater systems)
- ***Graywater systems*** (Washer systems and multi-source systems)
- ***Leak detection and repair***

Partial List of the Benefits of the Sustainable Basin Plan

1. Maximizes water use efficiency—the most cost-effective source of water per the California Water Plan and other authoritative sources—due, in part, to its many co-benefits, e.g., reduced energy use, GHG's, water and wastewater system upkeep, and treatment).
2. Provides the quickest, surest, and most-cost effective way to reverse seawater intrusion in the lower aquifer. [Eugene Yates states that conservation and shifts in pumping are the two quickest ways to address the "extremely urgent" seawater intrusion problem. However, he stresses that conservation is the more certain, cost-effective, and permanent because it reduces uncertainties and addresses the root cause of seawater intrusion, an imbalance in the basin water budget—see <u>Attachment 3</u>, Pages 1 & 2].
3. Minimizes the need to shift pumping to the upper aquifer and inland, reducing the risks (e.g., impacts on seawater intrusion and sensitive habitat) and costs (e.g., for treating upper aquifer water, infrastructure, and permitting) [Shifts to the upper aquifer may cause seawater intrusion in the upper aquifer, according to Mr. Yates. The ISJ peer review recommends only limited shifts inland to avoid harm to basin systems—see <u>Attachment 2</u>, Basin Update, Exhibit C, Pages 2 & 7].
4. Maximizes the recycled water-use strategies with the greatest seawater intrusion mitigation value (urban reuse and agricultural exchange). (These also provide greater co-benefits to property owners and farmers than Broderson leach fields.)
5. Avoids desalination of treated and/or extracted water, avoiding the high costs and environmental impacts of desalination, also supporting a strong recycled water use program. (Mr. Yates points out that seawater intrusion could jeopardize a viable reuse program by raising the salt content of recycled water—see <u>Attachment 3</u>, Page 2) .
6. Provides the best opportunity for basin sustainability by addressing water quality and supply with an integrated basin-wide approach, with measurable objectives and benchmarks.
7. Optimizes opportunities for grants and low-interest funding by emphasizing water-use efficiency, integrated management, and innovative programs.
8. Eliminates Broderson leach fields as a project component, optimizing recycled water use and avoiding major project impacts. (Broderson leach fields destroys eight acres of ESHA, accounts 40% of project energy use and about 20% of GHG production during construction. Mr. Yates confirms that Broderson can be eliminated with intensive conservation and added water storage) (see <u>Attachment 3</u>, Page 5).

LOSG Recommended Provisions of a Basin-Wide Plan and Ordinance

Purpose/Goal

The Los Osos Valley Water Basin shall be managed, maintained, and protected as the sole water source for the Los Osos area to insure the sustainability of vital environmental, social, and economic resources in the Los Osos area. To achieve this, the County of San Luis Obispo, in cooperation with the Regional Water Board, other agencies, water purveyors, the public, and other stakeholders, will immediately implement a basin-wide plan and ordinance. The environmental goals will be to protect the long-term integrity of the groundwater basin at present land use and population levels, accounting for climate change and other uncertainties, and to ensure ample groundwater is available to protect and maintain the environmentally sensitive habitat in the Los Osos area. The plan and ordinance shall implement precautionary, comprehensive, integrated, cost-effective measures with the costs shared equitably by all users of the basin. The plan and ordinance shall have the following provisions:

Plan Objectives

1. Raise groundwater levels in the lower aquifers of the Western Compartment of the Los Osos groundwater basin to the point at which seawater intrusion is reversed within three years, as indicated by measured water tables adequately above sea level to create outflows of freshwater (and reduced chloride levels at all lower aquifer supply and test wells to below 100 mg/l).
2. Maintain groundwater levels in the upper aquifer at present levels (or higher), to prevent seawater from intruding into that aquifer.
3. Reduce contamination of the basin and surface waters from all sources with a variety of methods, including septic system and nitrate management plans, also on-site and community rainwater harvesting/low impact development plans that enhance natural rainwater recharge while reducing polluted runoff. Contamination will also be reduced with a cost-effective and appropriate wastewater project that maximizes plan goals and objectives. (A centralized conventional gravity project is not recommended due the high cost and potential adverse impacts on ground and surface waters (e.g., from high levels of inflow, infiltration, and exfiltration, especially as the system ages).'
4. Maintain flows to environmentally sensitive habitat at levels that ensure the health and sustainability of the resources with cost-effective, specific measures that achieve multiple benefits if possible (e.g. low impact development features that provide landscaped provide and public spaces).
5. Develop a margin of safety in freshwater aquifer storage in the basin that provides a buffer for the current population that accounts for future climate change and other uncertainties. (If measurable stores of surplus water are shown to exist over time, then development within the basin will be allowed.)

Benchmarks: To assure timely progress toward the objectives, the initial benchmarks to be achieved within two years are the following:

1. No more than 500 AFY of pumping from the lower aquifer (approximately 900 AFY of reduced pumping) shall be from the Western Compartment of the basin from wells impacted by seawater intrusion.
2. No less than 500 AFY of the 900 AFY reduction shall be from conservation.
3. No more than 400 AFY of the 900 AFY reduction shall be from shifting pumping to the upper aquifer and inland (to be held to a minimum by maximizing conservation/water-use efficiency).
4. The effects of the initial benchmarks shall be monitored, with contingency plans in place to avoid undesirable effects, with adjustments approved by the Executive Director.

Recycled Water Use Program: To achieve plan and ordinance objectives and benchmarks, the following recycled water program shall be implemented if a centralized wastewater project is installed. If a decentralized project is installed, 100% of the recycled water would but in these ways but in reduced amounts.

1. An agricultural exchange program: Recycled water shall be exchanged for at least 400 AFY of water from the Creek Compartment and used to offset pumping from wells in the Western Compartment vulnerable to seawater intrusion. The applicant shall develop all agreements, infrastructure, storage facilities, permits and the other measures necessary to ensure the project is fully operational upon project start up.
2. Urban reuse program—From 100 to 300 AFY of recycled water shall be used to offset potable water now used for irrigation and pumped from wells in the Western Compartment vulnerable to seawater intrusion. To meet the target, the applicant shall supply institutional, commercial, and/or residential users per Water Code Section 13550 et. seq., and develop all agreements, infrastructure, permits and other measures necessary to ensure the project is fully operational upon project start up.
3. Habitat protection program—From 100-200 AFY of recycled water shall be used for habitat support and can be used to offset water pumped from the upper aquifer or upper zones used for habitat support.
4. Storage— To avoid use of Broderson leach fields as a “disposal” option, recycled water storage shall be provided for the anticipated winter recycled water flows, i.e., about 40% of flows for the recommended small-pipe sealed collection system (e.g., STEP/STEG).

Safe Yield, Conservation, and Storm Water Recharge: To achieve plan objectives and benchmarks (including co-benefits, such as a reduction in GHG’s), the following shall be implemented within two years.

1. A revised maximum yield for the basin of 2700 AFY, reduced from 3200 AFY, to account for uncertainties in basin modeling, respond to accelerating seawater intrusion, and bring up water tables caused by over pumping.
2. An integrated water use efficiency (indoor-outdoor conservation) program to reduce potable water use within the Urban Reserve Line by a minimum of 500 AFY (about 25% of the approximately 2000 AFY of current production).
3. A stormwater recharge (low impact development—LID) program to capture and infiltrate stormwater on-site and in community spaces within the URL. The community portion of the program would focus on stormwater run off now being collected and pumped to the Estuary and creeks. On-site and community programs would include a menu options as part of the integrated water-use efficiency program. Both would be designed to maximize recharge to the aquifer and/or supply groundwater flows to environmentally sensitive habitat. The initial target shall be 200 AFY of recharge.

Selecting Alternatives and Tracking Basin Condition

1. Costs shall be apportioned basin-wide and funding shall be from all necessary public and private sources (e.g., assessments, grants, permit fees, surcharges, and user fees); all reasonable efforts shall be made to keep costs as low as possible with grants, etc.
2. Sufficient water quality and quantity sampling, monitoring, and monitoring wells shall be conducted/installed to detect and respond to seawater intrusion and other contaminants.
3. The plan and ordinance shall establish standards and requirements for accurate, consistent, and timely reporting and monitoring of all water extractions and water deliveries within the basin.
4. A state-of-the-art basin model shall be developed for the basin and applied to predict the effects of management scenarios with the maximum possible accuracy.

Future Development

No development shall be approved in the basin until the objectives of this plan are achieved and enough surplus water is available to support the development.

Assistance from an NGO and TAC

To assist in the development, implementation, and administration of the Los Osos basin-wide management plan and ordinance, the applicant shall form an NGO, subject to the approval and on-going review of the Executive Director of the Coastal Commission. The makeup of the NGO and its tasks shall be the following:

1. The NGO shall be comprised of equal numbers of representatives from environmental resource agencies, environmental groups, local citizens groups, water purveyors, businesses, and other stakeholders in the basin.
2. The NGO shall elect an all-volunteer board of directors (or Executive Committee), comprised of equal numbers of members from the above groups.
3. The NGO Executive Committee shall determine NGO policies and procedures. (Decision making shall be democratic and apply "the precautionary principle." A professional facilitator shall be used, as needed, to assist in decision making.)
4. The NGO Executive Committee shall select a volunteer Technical Advisory Committee (TAC), which will provide input into decision making to assure decisions are science based and consider emerging laws, practices, and technologies. A majority of the TAC shall be comprised of expert volunteers from the watershed programs at UC and CSU campuses, including at least three from out of the area and one expert specializing in water use efficiency.
5. The NGO Executive Committee shall hold public meetings at least bi-monthly, shall report to the Board of Supervisors bi-monthly, and shall report to the Executive Director of the Coastal Commission at least semi-annually.
6. Two primary goals of the NGO shall be 1) to implement a state-of-the-art basin-management program, which can be used as a model for other California coastal communities, and 2) to keep the costs of the plan and ordinance as low as possible (with grants, rebates, low-cost loans, and innovative funding programs, etc.).
7. Total yearly funding to cover NGO expenses shall be $100,000 initially to be paid from appropriate assessments or other funding.
8. Adequate funding for the NGO to achieve plan objectives (develop, implement, administer, operate, and maintain plan and ordinance provisions and measures) shall be from all necessary public and private sources (e.g., assessments, grants, permit fees, surcharges, and user fees), and all reasonable efforts shall be made to keep costs as low as possible. Costs shall be apportioned basin-wide.
9. NGO tasks shall include, but not be limited to
   - providing input on all plan expenditures
   - developing and adjusting specific action steps and timelines to achieve plan benchmarks/objectives
   - developing/selecting monitoring and assessment procedures to measure progress toward benchmarks and objectives
   - identifying necessary studies and selecting the consultants and experts to perform studies and technical work
   - designing and assisting in the implementation of contingency plans
   - setting benchmarks beyond initial benchmarks
   - applying for grants and administering grant programs
   - creating and applying a valuation method (or metrics) to select and evaluate plan measures
   - designing and administering innovative programs
   - recommending modifications to continually improve the plan and ordinance.

Sustainable Basin Plan

(LOSG, 8/2010 Draft)

Sustainable Basin Plan
(Within 2 years)

~ Water from ~

Conservation (500)
LID recharge (100)
(Requires 400 AFY of shifted pumping to stop SWI)

~ Water to ~

Creeks
Springs (same)
Estuary

BALANCED*
(100 AFY added margin of safety)

- *Stops SWI in the lower aquifer.*
- *Much less likely to cause SWI in the upper aquifer and overdraft inland.*
- *Minimizes the need to treat upper aquifer water, relocate wells, monitor, and adapt.*
- *Most likely to provide an effective solution.*

Purveyor Plan
(Within 2 years)

~ Water from ~

Conservation (50)
(Requires 850 AFY of shifted pumping to stop SWI)

~ Water to ~

Creeks
Springs (less)
Estuary

Out of Balance*
(450 AFY deficit)

- *Stops SWI in the lower aquifer.*
- *May cause SWI in upper aquifer or overdraft inland.*
- *Maximizes the need to treat the upper aquifer, relocate wells, monitor, and adapt.*
- *Not likely to provide an effective solution.*

Sustainable Basin Plan
(With Project at Startup)

~ Water from ~

Conservation (500)
Ag Exchange (420)
Urban reuse (150)
Bayridge (30)
LID recharge (100)
(Requires no shifted pumping to stop SWI)

~ Water to ~

Creeks (200-300
Springs AFY to
Estuary ESHA)

Treatment (700)

BALANCED*
(100 AFY added margin of safety)

- *Stops SWI in lower aquifer and does not cause SWI in upper aquifer or overdraft inland.*
- *Provides 200-300 AFY for ESHA (above the 900 AFY needed to stop SWI intrusion).*
- *Avoids Broderson by reducing upper aquifer pumping by over 400 AFY (50 AFY more than Broderson recharges upper aquifer).*
- *Most likely to provide an effective solution.*

LOWWP/Purveyor Plan
(With Project at Startup)

~ Water from ~

Conservation (250)
Ag Reuse (80)
Urban reuse (140)
Broderson (0-450)
Bayridge (30), LID (50)
(Requires 510 AFY of shifted pumping to stop SWI)

~ Water to ~

Creeks (30-80
Springs AFY to
Estuary ESHA)

Treatment (700)

Out of Balance*
(200 AFY deficit)

- *Stops SWI in lower aquifer, but likely to cause SWI in the upper aquifer and/or overdraft inland (due to major shifts in pumping concurrent with the project).*
- *Provides 30-80 AFY for ESHA .*
- *Commits water to Broderson leach fields despite uncertain benefits & adverse impacts.*
- *Does not provide a solution.*

**** Note:** A 500 AFY margin of safety in the current basin "safe" yield is added to account for uncertainties (i.e., total yield = 2700 AFY vs. current 3200 AFY); 900 AFY of reduced pumping from the lower aquifer from conservation, ag exchange, urban reuse, and shifts in pumping is assumed to stop seawater intrusion; only conservation and LID reduce basin deficit by increasing water entering the system relative to water leaving; ag reuse does not reduce lower aquifer pumping in western wells, so does not reduce pumping shifts for the LOWWP/Purveyor Plan; wastewater start-up flows = 700 AFY; the LOWWP indoor-only conservation program is assumed to reduce pumping 200 AFY (although indoor reductions cannot be measured); a range of LID options (the Sustainable Basin Plan) are assumed to result in 50 AFY more recharge than the LOWWP single-option program due to greater homeowner participation; ag exchange in Sustainable Basin Plan, With Project at Startup is assumed to require 100 AFY more recycled water than well water exchanged resulting in 600 AFY (not 700 AFY) of recycled water for reducing seawater intrusion.*

Attachment #6

From: Munds, Ron <rmunds@slocity.org>
To: kwimer1@gmail.com

Date: Wed, Jun 9, 2010 at 2:51 PM
Subject: Los Osos Conservation Estimates
mailed-byslocity.org

2:51 PM (25 minutes ago)

Mr. Wimer,
I have reviewed your draft "Los Osos water use and conservation calculations" paper and I am in agreement with your Method 1 assumptions, calculations and water saving estimations. Though estimating water savings through water conservation is not an exact science, based on my experience in reviewing conservation plans and water saving calculations, I believe you represented the range of possible water savings accurately. An example is the current residential per capita rate cited in the document of 104 to 107 gallons per person per day (gpcd) in Los Osos. This is significantly higher than the actual residential per capita water use rate in the City of San Luis Obispo of 74 gpcd. In my opinion, the City of San Luis Obispo rate could easily be achieved (or exceeded) in Los Osos by implementing a comprehensive water conservation program that provides technical assistance, financial incentives, and informational materials to the community's water customers.
In summary, I believe the data and assumption contained in Method 1 appear to represent an accurate representation of the water savings potential in Los Osos. If you have any questions, or if I can help in any future water conservation analysis, please feel free to contact me for assistance.

Ron Munds
Conservation Manager
City of San Luis Obispo

805-781-7258
rmunds@slocity.org

Attachment #7

Attachment 7 Page 1

DEIR

system. The collection system is a combination of pipelines that flow by gravity and pipelines pressurized by the accumulated pressure from the individual STEP tank pumps. At least every five years, septage haulers will pump out the accumulated septage in each septic tank and haul the septage to the wastewater treatment plant.

Low Pressure Collection System

Low Pressure Collection Systems (LPCS) utilize individual grinder pumps at each connection that grind up solids and convey the resulting slurry to the collection system and then to a treatment site or pump station. LPCS are similar in design and operation to STEP systems, except that no individual septic tanks are used and both solids and liquids are conveyed through the collection system to the wastewater treatment plant.

Vacuum Sewer

Vacuum sewer systems rely on vacuum stations to create a collection system that operates under a vacuum. A small retention facility is located at each service connection. When the retention facility is full, a vacuum/interface valve opens and allows the solids and liquids to be conveyed to the main vacuum station. Since vacuum sewer systems are closed systems, the collection system pipelines can be located close to the ground surface, follow the natural grade and have smaller diameters than conventional gravity collection systems.

Comparison of Collection System Alternatives

The results of comparing the collection system component alternatives against the project screening criteria are summarized in Table 7-5. The Low Pressure Collection System (LPCS) with grinder pumps and the Vacuum System were classified as Level C alternatives and dropped from further consideration. Both the LPCS and vacuum collection system have higher energy requirements and maintenance costs than the gravity and STEP/STEG collection systems as indicated in Table 7-5.

Vacuum is not analyzed in DEIR Alternatives section (Append. P)

Gravity and STEP/STEG collection systems are both feasible collection systems and were designated Level A alternatives. As described in Table 7-5, each alternative has advantages and disadvantages compared to the other. For instance, gravity collection systems require more energy to operate, but they emit less greenhouse gasses because STEP/STEG systems emit a large amount of greenhouse gasses and odors from septic tanks, chemicals and septage hauling. (Carollo Engineers 2008i) Similarly, excavating streets to install gravity sewers is more disruptive to street traffic, but installing STEP/STEG tanks disrupts private properties and requires a permanent public easement on each property. The capital construction cost savings for STEP/STEG collection systems are offset by the higher operations and maintenance costs for maintaining the 4769 pump stations and periodically pumping and hauling the accumulated septage. More detailed comparisons of the potential collections systems are provided in Appendix P, Alternatives Information, and in the Fine Screening Report (Carollo Engineers 2007a).

Exaggerated, inaccurate description of STEP

A conclusion based on biased assumptions (see Attachments #8, 9, 11)

Attachment 7 Page 2

DEIR

Not accurate/supported

Table 7-5: Screening of Collection System Alternatives

Baseline Criteria	Gravity[1]	Combined Septic-Tank Effluent Pumping (STEP)/ Septic Tank Effluent Gravity (STEG) System	Low Pressure Collection System (LPCS)[1]	Vacuum System
Level Designation	**Level A**	**Level A**	**Level C**	**Level C**
Groundwater Quality & RWQCB Waste Discharge Requirements	• Meets RWQCB requirements for elimination of pollution to groundwater • Least ex-filtration • Septic tank effluent that currently recharges aquifer is removed	• Meets RWQCB requirements for elimination of pollution to groundwater • Some exfiltration with pressurized pipelines. • Septic tank effluent that currently recharges aquifer is removed	• Meets RWQCB requirements for elimination of pollution to groundwater • Less exfiltration than STEP; more than gravity system. • Septic tank effluent that currently recharges aquifer is removed	• Meets RWQCB requirements for elimination of pollution to groundwater
Water Resources	• Inflow - As gravity system ages, Inflow can occur at lateral connections, manholes, and mainline joints. Regular maintenance can reduce • Infiltration - Potential where mainlines and manholes are below water table. • Septic tank effluent that currently recharges aquifer is removed.	• Inflow - As STEP/STEG system ages, Inflow can occur at house lateral connections and STEP/STEG tank joints. • Infiltration - Unlikely. • Septic tank effluent that currently recharges aquifer is removed	• Inflow - As LPCS system ages, Inflow can occur at house lateral connections and grinder pump station connections. • Infiltration - Unlikely. • Septic tank effluent that currently recharges aquifer is removed	Not evaluated. Eliminated w/o analysis (see Appendix P)
Energy/Air Quality	• 500,000 kwhr/year • Odors - Minimal to Moderate Potential • Lower GHG emissions due to absence of septic tank venting and less chemical production.	• 425,000 kwhr/year • Odors - Moderate to severe potential • Higher GHG emissions due to septic tank venting, chemical production and septage hauling. • Sludge reduction in treatment plant is partially offset by septage addition. • Requires carbon addition for nitrogen removal. • Tanks replaced or moved to front yard	• 425,000 kwhr/year • Grinder pumps less efficient that STEP pumps. • Odors - Moderate potential	• Highest energy demand ?

A mix of cluster and on-site systems is not considered.

DEIR

Table 7-5 (Cont.): Screening of Collection System Alternatives

Biased assumptions that increase costs/impacts leading to the finding that gravity is environmentally preferable

Baseline Criteria	Gravity[1]	Combined Septic Tank Effluent Pumping (STEP)/ Septic Tank Effluent Gravity (STEG) System	Low Pressure Collection System (LPCS)[1]	Vacuum System
Level Designation	**Level A**	**Level A**	**Level C**	**Level C**
Costs	• 7 pump stations and 12 pocket pumps to maintain. • Deeper Sewers require greater disruption during construction. • Higher construction cost but lower O & M cost due to lower staffing and maintenance requirements.	• 4,769 pumps and STEP tanks to maintain. • Septage haulers pump STEP tanks at least every 5 years. • Shallower Depth for pipeline so trenchless technology can be used for portions of collection system. • Greater private yard disruption during STEP/STEG tank installation. • Lower construction cost but higher maintenance and septage hauling costs. • Permanent public easement required for STEP/STEG tank maintenance.	• 4,769 grinder pumps to maintain. • Shallower Depth for pipeline so trenchless technology can be used for portions of collection system. • Greater private yard disruption during grinder pump installation. • Can be used with gravity system in areas with shallow groundwater • Permanent public easement required for grinder pump maintenance.	• Highest maintenance cost. • Vacuum system pumps and 4,769 vacuum interface valves to maintain. • Shallower Depth ? Vacuum is not analyzed
Permitability	• Noise - Comparable to STEP/STEG during construction. Quieter during operations. • Cultural Resources - Lower potential impacts. • Aesthetics: Less impact since most community facilities are underground. Traffic - Construction of a gravity system would lead to temporary impacts, but would be located further away from homes, etc.	• Noise - Comparable to gravity during construction. Higher operations noise from false and real STEP/STEG tank alarms and septage pumping. • Cultural Resources - Higher potential impacts from STEP/STEG tank excavation in private yards. • Aesthetics: More impact during operations due to 2 24-inch grade lids, alarms and lights.	• Noise - Comparable to STEP/STEG during construction. Higher operations noise from false and real grinder pump alarms. Grinder pumps noisier than STEP pumps. • Cultural Resources: - Higher potential impacts from grinder pump excavation in private yards. • Aesthetics: More impact during operations due to access hatch, alarms and lights.	Not evaluated

Attachment 7 Page 4

assessment of how well regional treatment meets the project criteria, is provided in Appendix P-5 (Kennedy/Jenks Consultants 2008) and in the Regional Treatment Technical Memorandum (Carollo Engineers 2008j).

Decentralized Treatment

Decentralized treatment would involve collecting wastewater and treating the combined flow at between 2 and 30 neighborhood-level "cluster" treatment plants. Effluent disposal would occur through neighborhood leachfields and/or agricultural/urban reuse. Tertiary treatment would be required if the effluent is recycled for urban and/or agricultural purposes. It is unknown how difficult it would be to acquire vacant lots for the decentralized treatment facilities or to secure the necessary permits for each treatment facility and site. Individual WDRs and monitoring would be required for each treatment and disposal system. Since there are no existing decentralized treatment systems in California in a community similar in size to Los Osos, regulatory approval by the RWQCB for the proposed recirculating media filters (RMF) and Nitrex™ system is a critical concern that would need to be resolved.

The Mid-town site is purchased

only 2 sites

Recommended by EPA

Because the wastewater will not be pumped to a distant treatment plant, the raw wastewater conveyance system capital construction costs and energy requirements would be reduced. However, these savings would be offset by higher costs to construct the treatment facilities and effluent distribution systems, especially for the residential reuse scenarios. The additional staff time required for maintaining the decentralized system would also increase life cycle costs over a centralized system. For all these reasons, decentralized cluster-based treatment has been designated a Level C alternative and will dropped from further consideration. Additional detailed evaluation of this alternative is provided in Appendix P-6 (Kennedy/Jenks Consultants 2008) and in the Decentralized Treatment Technical Memorandum (Carollo Engineers 2008a).

Construction: $35M less

Not accurate

O&M $1m less per year with 1/5 th energy cost (see Attachments 8, 9 10, p. 3)

Centralized Treatment

Centralized treatment consists of collecting and transporting all the raw wastewater to a single treatment facility. This approach will consolidate many of the construction and operations phase impacts to a single site that can be somewhat distant from the Los Osos developed area. Effective, proven, and reliable treatment technologies such as facultative ponds, oxidation ditches and membrane bioreactors can be cost effective at this scale and provide easier monitoring and control of the effluent quality. There is also an economy of scale to construct and operate centralized treatment facilities, including reduced staffing. In addition, staff can more easily maintain safeguards to reduce the risk of treatment system failures. Partially offsetting the savings for the single treatment facility are the added capital and operating costs and energy requirements to transport the raw wastewater to the treatment facility.

Project design and permitting can be streamlined because there will be a single WDR permit from the RWQCB rather than separate WDR permits for each treatment facility that is part of a decentralized treatment system. From an environmental standpoint, the project impacts are consolidated on a single

DEIR, Appendix P (Tech Memo 2.2)

STEP/STEG or gravity collection system would be used, with the collection/conveyance system following the Los Osos Valley Road to Eto Lane alignment.

5.3 Priority C – Other Alternatives

Four alternative approaches to LOWWP implementation were defined and evaluated as part of the EIR planning process. The evaluations of the following four alternatives have been summarized in separate Tech Memos, as listed for each alternative.

- No Project
- Onsite Treatment (Tech Memo 2.3)
- Regional Treatment (Tech Memo 2.5)
- Decentralized Treatment (Tech Memo 2.6)

The EIR does not analyze a project with a mix of cluster and on-site systems.

The results of the evaluations indicated that three of these alternative approaches did not meet the project objectives, and the alternatives were dropped from further consideration. The fourth alternative is to be retained as part of the list of potentially viable alternatives. Following are summary notes regarding the status of each alternative:

this results from poor basin management, not septic systems.

No Project: The "no-action" alternative would maintain existing conditions, which involve septic systems and onsite leach fields. The negative effects from existing conditions on groundwater resources has been well documented, including continued salt-water intrusion, continued nitrogen loading in the upper aquifer, and a continuing decline in potable water quality. With the possibility of RWQCB enforcement action against the community if existing conditions are maintained, the "No Project" alternative was dropped from consideration as a non-viable option.

optimizing the current system w/ integrated management plans is not considered.

Onsite Treatment: Onsite treatment would involve constructing treatment facilities at each property location with habitable improvements. Several options for onsite treatment systems have been identified, including proprietary systems that have not been recognized by the RWQCB. Implementing onsite treatment would lead to extensive disruption throughout the project area, especially in sensitive habitat areas. In addition, the high life cycle costs for construction and maintenance of onsite systems resulted in onsite treatment being dropped from consideration as a non-viable option.

Regional Treatment: Regional treatment would involve collecting wastewater from the communities in the Morro Bay and/or the California Men's Colony (CMC) vicinity and treating the combined flow at one of three optional sites for a regional treatment plant. This alternative would involve constructing treatment capacity at the Morro Bay treatment plant, the CMC treatment plant, or constructing a new treatment facility in the Chorro Valley. In addition, large diameter pipes would be constructed to convey raw wastewater to the regional facility. Construction of the treatment facility and associated conveyance piping would lead to extensive disruption throughout the project area, especially in sensitive habitat areas. In addition, community acceptance for this alternative is low, and regional treatment has been dropped from consideration as a non-viable option.

see Attachments 5, 8, 9.

Decentralized Treatment: Decentralized treatment would involve collecting wastewater and treating the combined flow at between 2 and 30 neighborhood-level "cluster" treatment plants. Effluent disposal would occur through leach fields and/or agricultural/urban reuse. Construction of the treatment facilities and associated conveyance piping would lead to extensive disruption throughout the project area, especially in sensitive habitat areas. In addition, the additional staff time required for maintaining the decentralized system would increase life cycle costs over

The LOSG plan eliminates leach fields. The plan with 2 treatment sites uses the Mid-town site (purchased + disturbed) and the staging site for the prior project (already disturbed)

EIR TM 2.2, Appendix P, DEIR

3

centralized systems. Decentralized treatment, due to capital cost, operating cost, and operability requirements, will be dropped from further consideration.

The EIR brings forward biased assumptions from the LOWWP Fine Screening report and Tech memos that exaggerate the costs of STEP/STEG and decentralized alternatives, e.g., exaggerated pipe costs and assumption that every property must have a tank (no shared tanks) (see Attachments #8, 9, 11). The decentralized (Lombardo) alternative would also be 95% STEG (gravity), greatly reducing energy use and maintenance.

EIR Technical Memorandum 2.3: On-site Treatment Appendix P, DEIR

5

2.4 Complex and expensive monitoring requirements

Every discharger is required under public law 92-500 to have an approved permit issued by the regulating agency, in Los Osos, the Central Coast Regional Water Quality Control Board (CCRWCQB). The CCRWQCB is required to issue requirements in accordance with various Federal and State laws and in compliance with the Basin Plan, prepared and updated in accordance with Section 208 of PL 92-500. The Basin plan sets such governing requirements and receiving water requirements and discharge requirements based on the administratively determined beneficial uses of the local water.

USDA policy requires centralized management

In order to verify that these Basin Plan requirements, and through the permit, specific monitoring requirements are set by CCRWQCB action that will mandate frequency, sampling technique, and specific test requirements to observe and report the effluent water quality. The fact that a large number of onsite systems could serve in lieu of a central wastewater treatment system does not allow for an averaging effect of the potentially large number of systems. Each system would be required to monitor individually and incur the management, administrative, and laboratory costs for each onsite system. Each discharger could be expected to pay these recurring costs.

Not per 885 Waiver (see Attachment #17)

The regulatory and monitoring requirements are unclear. Assembly Bill (AB) 885 that was signed by the Governor in September 2000 requires the establishment of minimum statewide standards for on-site systems, and it is anticipated that extensive monitoring of these systems will be required. In addition it is unclear how or if the Central Coast Water Quality Control Board will permit these advanced individual on-site systems. The regulatory requirements for these systems are unclear at this time and will add to the costs of these systems and will delay project implementation (Carollo 2008a).

2.5 Complex and expensive maintenance and management requirements

These systems are quite complex with multiple pumps and process controllers required to operate both the anaerobic and aerobic processes. This complexity applied to 4,679 individual units would impose a major, long-term operation and maintenance (O&M) burden on the management entity set up for this project. This has led at least one expert (Lombardo Associates, Inc. (LAI) and equipment vendor) to dismiss this option as not being "technically feasible" Lombardo 2007). It is to be noted that the individual on-site denitrification system developed by LAI was the only system that met the required discharge standards in LaPine.

Typically, maintenance could include periodic checks on all mechanical systems, observation of valves and openings, and observation of the local electrical and control panel. Readings should be taken on local indicators for status of operating equipment. A log should be kept of these readings to determine if any changes in performance is occurring over time.

EIR TM 2.3
Appendix P
DEIR

An alternative w/ a mix of cluster and on-site systems is not analyzed.

Section 3: Conclusions

No on-site system that requires 4,769 individual units that must be operated and maintained by a public entity is considered feasible; therefore the on-site option is eliminated from further consideration. These are the factors that make this conclusion evident:

- Lack of space on some parcels
- High cost (compared to a community system)
- Community acceptance issues
- Inability to meet effluent requirements
- Complex and expensive monitoring requirements
- Complex and expensive maintenance and management requirements

There are a number of elements that are common to both scenarios. These commonalities include:

- A treatment process consisting of flow equalization, a recirculating media filter (RMF), a denitrification filter, a polishing filter, and final disinfection by UV and/or ozone.
- A disposal process consisting of individual residential on-lot drip irrigation facilities and/or non-residential drip irrigation and on-site subsurface disposal
- The treatment process area would be sized based on 0.23 sf/gpd, not including buffer and set back requirements
- The disposal area would be initially sized assuming a loading rate of 1 gpd/sf
- Storage of approximately 20 days would be required for periods when complete subsurface disposal could not be practiced due to climatic events.

Scenario 1
In Scenario 1, treatment is provided at 7 locations in Los Osos. The exact locations were not identified rather some representative sites were described. These included school property, vacant lots and "paper" street ("paper streets" are dedicated road rights-of-way that were never developed into streets maintained by a governmental entity. In a similar manner a number of potential disposal sites were identified, but final recommendations were not given.

Flows and treatment site requirements would be substantially reduced w/ LOSG Plan (see Attchmnt 5)

Scenario 2
In Scenario 2, treatment would occur at two sites. One site would be the Mid-Town site and would have a flow of approximately 767,000 gpd. The second site would be located in the northeast portion of Los Osos and have a flow of approximately 439,000 gpd. The potential treatment sites are better defined that those for Scenario 1, but the disposal sites are not defined in any greater detail than they were in Scenario 1.

Not needed w/ LOSG Plan

COST CONSIDERATIONS

Preliminary construction and operation and maintenance costs have been developed for these two Scenarios. These costs are presented in Table 1. It is to be noted that the capital costs include the costs of the collection system.

TABLE 1: DECENTRALIZED OPTIONS – COST SUMMARY

ITEM	SCENARIO 1		SCENARIO 2	
DISPOSAL	Residential	Non-Residential	Residential	Non-Residential
CAPITAL COST ($M)	216-240	171-1851	214-238	169-182
O&M COST ($M)	2.1	1.9	1.5	1.3

$1 million per year less (see Attachment 10, p.3)

Technical Memorandum

Three-page TM and level of analysis shows a very cursory review.

NON-COST CONSIDERATIONS

A number of items were identified in this technical memorandum as areas of concern that were not fully described. These areas of concern include:

- These decentralized facilities would be located in town in Environmentally Sensitive Habitat Areas (ESHAs) as defined by the California Coastal Commission and therefore unique siting and permitting issues must be addressed
- Adjacent homeowner opposition may exist
- The availability of vacant parcels for purchase and the County's position on vacating "paper streets" is unknown

Scenario 2 uses disturbed land for treatment sites.

Not w/ LOSG plan. (see Attachments #5 & 8)

REFERENCES

Carollo 2008 C: Carollo Engineers
Technical Memorandum
Decentralized Treatment
October 2008

LAI 2008a Lombardo Associates, Inc. 2008
Technical Memorandum, Task 1 – Design Criteria
May 2008

LAI 2008b Lombardo Associates, Inc. 2008
Technical Memorandum, Task 2 – Decentralized Wastewater Treatment Scenarios
3 July 2008

LAI 2008c Lombardo Associates, Inc. 2008
Technical Memorandum, Task 3 – Cost Estimate for Decentralized Scenarios
22 August 2008

Attachment #8

Alternative projects are more environmentally protective and cost-effective than the proposed project and should be reviewed and included in the design-build process

A centralized STEP project

Description/Benefits: A STEP alternative passed through the Fine Screening and EIR as a viable alternative, but was found to be less environmentally preferable based on biased assumptions (see Attachment 11). In fact, the STEP alternative has significant environmental and economic benefits over the proposed conventional gravity system. This is largely because its sealed, small diameter piping is much less costly and disruptive to install and because the technology virtually eliminates I/I and related impacts and costs (overflows, pollution, and expensive system repairs and upgrades to reduce overflows) (see Attachment 21). Additionally, STEP/STEG technology allows remote monitoring of tanks and pressurized lines to identify and repair problems quickly; and the shallower, smaller pipes allow less costly repairs. The system also reduces biosolids and related treatment and disposal costs and impacts (Biosolids are broken down in tanks by more than 50% via energy-free natural processes.); and STEP/STEG accommodates conservation flows without the need for redesign or additional maintenance (required by the proposed project). [Note: Intensive conservation is critical to reversing seawater intrusion and basin sustainability (see Attachment 3, e.g., pp.1 &3 and Attachment 4, p.2). Moreover, greater levels of conservation will occur naturally in the future with development of more water-efficient technologies and changing attitudes and policies. The rising cost of water and sewer fees tied to water use will drive use down as well.]

Representatives from local chapters of the Surfrider Foundation and Sierra Club, members of the LOSG, members of the public, and experts such as Dana Ripley of Ripley Pacific, documented the environmental superiority and greater cost-effectiveness of the STEP alternative during the review process; however, flaws in the process (e.g., bias and inaccurate assumptions) resulted in the STEP project never receiving full credit for its environmental benefits and cost savings (see Attachments 11 & 12).

The assumption that Broderson leach field disposal had to be part of any project is just one way STEP was penalized during the process. The Ripley Pacific plan developed for Los Osos in 2006 (available on the County LOWWP website) provided for 100% ag reuse, and did not require leach field disposal (similar to the LOSG plan). Combined with the Los Osos Sustainability Group (LOSG) or SLO Greenbuild plans (which emphasize water-use efficiency), the Ripley Plan could eliminate seawater intrusion, while requiring fewer ag reuse sites, allowing full reuse of recycled water over the basin (see Attachment 3, p. 5, Attachment 5, Attachment 11, p.2, and Attachment 26). This combination would also allow less recycled water storage and less pumping and treatment.

Costs, disagreement with project cost estimates, and why it should be included in the design-build process: The flawed LOWWP review process has prevented the public and decision makers from knowing the full potential of the STEP project to benefit the environment, reduce costs, and address concerns raised in the review process (e.g., on-lot impacts). Thus, requiring the design-build process for the collection system (and all project components), with the STEP team invited to compete, is essential to identifying the most cost-effective option (also see note at the end of this analysis).

Specific solutions to on-lot concerns could be addressed with use of existing tanks, shared tanks, and/or STEG (gravity units), while combining a STEP project with the LOSG plan would maximize seawater intrusion/environmental benefits and lower life cycle costs.

Because a STEP project has much lower construction costs—and because STEP avoids expensive repairs and upgrades required to manage I/I avoiding overflows and pollution of the National Estuary; STEP should have been credited with lower—rather than higher—life cycled costs (see Attachment 11). Dana Ripley of Ripley Pacific said at the Coastal Commission hearing on June 11, 2010, that STEP capital costs should be at least $50 million less than the proposed $180-$190 million project, with firm caps on costs (see Attachment 12, p.2). Also, the STEP design-build team that participated in qualifying interviews guaranteed significantly lower costs than competing gravity projects. Finally, combining the STEP alternative with the LOSG plan could produce a project that reverses seawater intrusion for $40-50 million less than the proposed project (see Attachment 5).

A decentralized treatment option

Description: The County retained Lombardo Associates, Inc. to provide designs and cost estimates for the alternatives review (see TM “Decentralized Collection” on the County LOWWP website; also see Attachment 9). He provided two scenarios using STEP/STEG technology, the least costly of which is Scenario 2 with non-residential reuse. This alternative is comprised of two cluster systems with small underground wetland Nitrex treatment systems at the Mid-town site and at a large undeveloped property on the east side of the prohibition zone, used as the staging site for the prior project. Scenario 2 also includes urban reuse at large sites (e.g., schools) and disposal/recharge at several drainfields within the prohibition zone. The Lombardo, Inc. plans included all on-lot costs (so homeowners would not pay on-lot costs separately as with the proposed project) and it includes all design costs. Substituting the LOSG sustainable basin plan proposal for the disposal/recharge component of the Lombardo Scenario 2 plan reduces project size and costs by maximizing water-use efficiency and eliminating drainfields (see Attachment 9, pp. 2-6). The LOSG plan would require adding more recycled water storage, e.g., at one or both treatment sites and/or the Giacomazzi site possibly as a constructed wetland. As with every project using STEP/STEG technology, biosolids are greatly reduced.

Benefits: Scenario 2 would have significant environmental and cost benefits over the proposed project. Because treatment occurs closer to the wastewater source, a decentralized project greatly reduces energy use and pumping costs, in addition to pipeline construction costs and impacts. Scenario 2 uses 95% STEG (gravity) units Therefore, it will have very low energy use/GHG production compared to other community systems (see Attachment 9, pp. 1 & 4; Attachment 10, p. 3; Attachment 15). Significant use of STEG systems also lowers electrical connection costs and other O & M costs. Scenario 2 includes on-lot costs for homeowners (estimated to be from $1500 to $10,000) (see Attachment 27, p. 1), so it also reduces overall costs for homeowners. Use of shared tanks, as the TM suggests, further reduces on-lot impact-cost concerns. Treatment with underground wetland systems provide attractive community spaces addressing community acceptance issues, and the Lombard Associates’ Nitrex systems is a proven technology that reduces nitrogen to very low levels (see Attachment 9, pp. 7, 8, 10).

Combining Scenario 2 with the LOSG plan avoids use of Broderson leach fields and drainfield adding further environmental and cost benefits, e.g., the potential to reverse seawater intrusion and fully restore flows to sensitive habitats. Installing a drainfield instead of added storage at the eastern treatment site of Scenario 2 may provide a way to maintain these flows. (This is an unmitigated and unfunded impact with the current project). The Decentralized TM states that treated water from the proposed Nitrex treatment systems is suitable to augment flows to habitat (see Attachment 9, pp. 7 & 10).

Costs and disagreement with project cost assumptions: The cost estimate for Scenario 2 in the decentralized TM is $170 million. However, Pio Lombardo, a nationally recognized leader in the design and installation of decentralized projects, disagrees with assumptions in the Fine Screening and TM's. He estimates removing the assumptions will bring costs down by $15 million to $17.3 million (see Attachment 9, pp. 6-9). This leaves costs of **$152.7 -$155** million. Substituting the LOSG sustainable basin plan for the drainfield disposal/recharge component of Scenario 2, reduces land costs for this option by about $12 million. Reducing the 30% construction contingency to 10% (equivalent to the contingency used for the current project), and deducting the escalation factor of 18%; reduces cost another $5 million, leaving **total project costs of $136 million to $138 million**.

The Mid-town property (one of the proposed treatment sites) has already been purchased, and the property for the second treatment site would be covered by the $3.5 million estimate for property in the TM. The cost of the Giacomazzi site (about $1.5 million) is covered by the remaining $1.8 million for drainfield land expense (i.e., $13.8 - $12 million). (Purchasing the Giacomazzi site allows it to be used for recycled water storage and/or solids processing.) Recycled water lines (e.g., to ag reuse sites and the Bayridge leach field), along with additional water storage required by the LOSG plan, are offset by drainfield/distribution costs savings (see Attachments 9, pp. 2-4, and Attachment 10). All design and on-lot costs are included in TM project costs (i.e., $1,500 to over $10,000) (see Attachment 27, e.g. p. 2). The costs for ag exchange wells and additional measures to restore flows to Willow Creek and Los Osos Creek are not included in this or the proposed project (for comparison). However, as noted above, installing a drainfield at the eastern treatment site of this alternative, instead of storage, may mitigate for reduced flows to the habitat at no additional cost.

Adding $5-7 million for the water use efficiency component of the Los Osos Sustainability Group (LOSG) plan (Attachment 5) provides a project alternative that could reverse seawater intrusion for under **$145 million**, and costs are likely to be substantially less in a competitive design-build process (see note at end of this analysis). Also, maximizing funding for the LOSG through rebates, grants, and innovative funding strategies could substantially reduce costs. SLO Greenbuild has offered to administer an integrated water-use efficiency plan and apply for grants (see Attachments 26, p. 2). The above estimates indicate project costs ate **at least $35 million less** than current project costs, and **O & M is $1 million less annually** (according to the TM) (see Attachments 9, p.4 and Attachment 10, p. 3). Thus, life-cycle costs are likely to be much lower than the proposed system.

Why the option should be reviewed and included in a design-build process: This alternative was not reviewed adequately or fairly, in part because the LOSG plan was not reviewed and considered although it is recommended and considered feasible by experts (see Attachment 3, pp. 5& 6, Attachments 4 & 6). The rough estimates above show this option could substantially reduce potential adverse project impacts and project costs, while doing much more to ensure the sustainability of environmental, social, and economic systems. Reduced impacts from greatly reduced energy use and the potential for very low life-cycle costs are particularly significant. Also, the Lombardo Associates'

Nitrex treatment system reduces nitrates to about 3 mg/l, under half the nitrate level of the proposed project (see Attachment 31, p.18) With solar power or wind generation added to the system, along with credit awarded for reduced energy use with the LOSG plan, the project could potentially be carbon neutral and a model of sustainable water-wastewater project design and management in the state. (This is also true of the project below and may be true for the STEP project above.)

A phased decentralized alternative

Description: This alternative is basically the decentralized project above installed in phases, with the first phase focused on properties near the estuary and in high groundwater areas (e.g., about 1000 of 4800 total properties), and the second phase implemented as needed depending upon the water quality benefits of the first project and future conditions in the basin. The first phase would be implemented with the LOSG sustainable basin plan, and include centrally managed septic system and salt & nutrient management plans (e.g., to ensure septic systems left in place are maintained and functioning to standards). The project may also include individual on-site systems where needed and cost-effective (e.g., at schools). One treatment facility would be on the Mid-town site as proposed in the decentralized TM. A nearby constructed wetland/finishing pond could be designed for passive recreation as a community amenity. Giacomazzi would not be needed unless it is used for storage, or it might be purchased for future expansion and storage. Reuse of recycled water (150-250 AFY) would focus on urban reuse and habitat support, so recycled water pipelines to the eastern side of the community would not be needed initially. Thus, mitigating for reduced groundwater flows to Willow Creek and Los Osos Creek would not be an issue because most septic systems on the eastern side of the community would be left in place. On-going water quality/seawater intrusion monitoring and assessments would determine if future project phases are needed.

Benefits: This option takes a precautionary approach to basin management recognizing that the urgent seawater intrusion problem and related uncertainties are critical factors in decision making, along with the potential adverse impacts on valuable environmentally sensitive habitat and endangered species. This project is much less likely to result in unintended consequences and harm to resources than a centralized project, while it addresses the most serious concerns, elevated nitrates (The project would manage nitrates from all sources.), septic systems in contact with groundwater, potential contamination of the estuary, and related health and safety concerns. Thus, it minimizes impacts and uncertainties, while maximizing water quality benefits.

Furthermore, it provides protection from overflows that might harm the estuary. Additional benefits from combining the Lombard Associates Scenario 2 with the LOSG plan are that an integrated plan emphasizing water use efficiency, with stormwater management (low impact development or LID) and xeriscape, will reduce nitrate levels in the groundwater by reducing nitrate loading and increasing dilution, while also increasing the vadose zone (dry zone) increasing natural soil treatment (for the septic systems left in place) and addressing high groundwater issues. Eugene Yates confirms these benefits in a review of the project's water management strategies (see Attachment 3, p.2). Basin-wide septic system and salt-nutrient management plans (as recommended by the LOSG) will also reduce nitrate contamination outside of the prohibition zone (see Attachment 5). The 2003 Yates and Williams study entitled *Simulated Effects of a Proposed Sewer Project on Nitrate Concentrations in the Los Osos Groundwater Basin* indicates that more than half the nitrates enter the groundwater are from sources outside of the prohibition zone and the water percolating to the groundwater from properties outside of the prohibition zone (e.g., low density residential properties, horse farms, and cropland) has higher concentrations of nitrates than the medium density properties within the prohibition zone (see the 2003 Yates and Williams study on the LOWWP website, Table 4).

This precautionary, integrated management approach will likely reduce nitrates in the upper aquifer effectively, while fully addressing the more critical concern, seawater intrusion, and not jeopardizing critical habitat. The project also creates an attractive community space at the Mid-town treatment site and it would allow preservation of the entire Broderson site ensuring full compensation for any impacts on ESHA.

Costs: Based on estimates in the decentralized TM and above, **costs would be less than half current capital project costs (i.e., under $ 90 million)**, which would include adequate funding for the LOSG plan components for the project. A small general benefit assessment would extend water-use efficiency, septic system, and salt & nutrient management programs basin-wide (as recommended by the LOSG).

Why the option should be reviewed and included in a design-build process: This option provides the greatest overall benefit to the basin, at well under $100 million, very close to community affordability levels, while maximizing benefits and reducing risks to valuable environmental resources and scarce public funding. The option requires a waiver or modification of the Waste Discharge Requirement (WDR) from Regional Water Board to allow some septic systems to remain in place within the prohibition zone, but the overall benefits of the option warrant such waiver. Benefits predicted from the currently-proposed wastewater project are modest and long-term at best—while its potential impacts on the basin and valuable habitat, along with its tremendous costs, place vital natural resources and the community at risk. Many families will experience extreme financial hardship with the current project, and/or be driven from the community, for a project that could do more harm than good. **This option is likely be the best way to assure and promote environmental, social, and community sustainability.**

Summary of Benefits from a Phased Decentralized Project:

1. Will maximize benefits and minimize environmental, social, and economic impacts and risk to resources.
2. Will potentially reduce nitrate loading as much or more than the proposed system by reducing nitrates from all sources in a variety of ways.
3. Will potentially reverse seawater intrusion.
4. Will address concerns about septic system effluent in contact with groundwater and septic system pollutants entering the estuary
5. Will maintain the recharge regime of the basin in most areas, minimizing negative impacts on seawater intrusion and habitat from changes in groundwater flows.
6. Will avoid overflows of raw sewage and contamination to the estuary, inevitable with the proposed 85% conventional gravity system.
7. Will reduce the need for social and economic mitigations, also contingency planning.
8. Will greatly reduce construction impacts and costs (e.g., for road repair, impacts on ESHA, and archeological impacts).
9. Will reduce O&M impacts and costs (e.g., reduce pumping, GHG's, and energy use).
10. Will reduce system vulnerability to earthquakes (e.g., liquefaction, major shut downs, repairs, and replacements) including health and safety risks.
11. Will provide as many or more jobs for construction and O&M, including green jobs (e.g., water auditors).

(<u>Note:</u> Further review of the above options/alternatives and allowing teams that represent alternative technologies and approaches to compete in a design-build process is essential to determining the most cost-effective, protective alternative. Because bias has been shown in the County process, future reviews and the design-build process must be conducted and/or closely overseen by a neutral third party. We recommend that the Design-build Institute of American conduct the design-build process. Additionally, it is important to note that the LOSG has requested review of these options/alternatives many times, pointing out problems with the review, at every level of the process. The increasingly critical seawater intrusion problem and escalating project costs, along with other emerging information, have made review of the above options/alternatives (and other viable options not reviewed or not adequately reviewed), along with use of the design-build process for every project component, even more crucial for informed decision making.)

Attachment #9

LOWWP TM: Decentralized Treatment Final, Oct. 2008; Task 3: Cost Estimates for Decentralized Scenarios

3. Type 3 – Existing septic tank in back yard to be abandoned and new STEP/STEG tank placed in front yard.

4. Type 4 – Existing septic tank in back yard to be abandoned and new STEP/STEG tank placed in front yard. Grade is such that a grinder pump is to be installed in the back yard to pump up to a STEP/STEG tank located in the front yard.

The distribution of each type of lot, as reported in the Fine Screening Analysis is as follows:

- Type 1 – 7.5%
- Type 2 – 67.5%
- Type 3 – 20.0%
- Type 4 – 5.0%

Estimates of the number of STEP systems required in each zone were made in the Task 2 TM. All other parcels were assumed to have STEG systems. The above distribution was used to determine the number of each type of STEP and STEG systems. The final individual lot quantities are presented in Table 2-1. The quantities for intercepting sewers, treatment and dispersal are the same as presented in the Task 2 TM.

Table 2-1: Scenarios Quantities for Wastewater Collection

Item Description	Type 1 STEG Conn.	Type 2 STEG Conn.	Type 3 STEG Conn.	Type 4 STEG Conn.	Number of STEG Conn.	Type 1 STEP Conn.	Type 2 STEP Conn.	Type 3 STEP Conn.	Type 4 STEP Conn.	Number of STEP Systems	Total Number of Systems
Units	EA	EA	EA	EA		EA	EA	EA	EA		
Scenario 1 Quantities	341	3,073	911	228	4,553	16	146	43	11	216	4,769
Scenario 2 Quantities	339	3,051	904	226	4,520	19	168	50	12	249	4,769

Item Description	Pressure Sewers / Force Mains	4" Gravity Sewer	Pocket Pump Station	Duplex Pump Station	Triplex Pump Station
Units	LF	LF	EA	EA	EA
Scenario 1 Quantities	24,900	221,000	4	2	0
Scenario 2 Quantities	26,100	220,100	2	2	1

95% gravity – only 249 units using pumps

Other quantities associated with the collection, treatment and dispersal systems are listed in Tables 2-2 and 2-3. Quantities are included for the option of returning water to the individual properties for reuse and/or dispersal.

LOWWP TM: Decent. Treatment
Task 3

Table 4-4: Construction Costs – Scenario 2, without Residential Reuse

Item No	Item Description	Quantity	Units	Unit Cost Low	Unit Cost High	Total Cost Low	Total Cost High
	Collection System						
1	Mobilization/Demobilization	1	EA	5%			$2,843,000
2	Type 1 STEG Connection	339	EA	$ 3,850	$ 3,850	$ 1,306,000	$ 1,306,000
3	Type 2 STEG Connection	3,051	EA	$ 3,850	$ 3,850	$ 11,747,000	$ 11,747,000
4	Type 3 STEG Connection	904	EA	$ 5,445	$ 5,445	$ 4,923,000	$ 4,923,000
5	Type 4 STEG Connection	226	EA	$ 9,845	$ 11,055	$ 2,225,000	$ 2,499,000
6	Type 1 STEP Connection	19	EA	$ 8,360	$ 9,570	$ 157,000	$ 179,000
7	Type 2 STEP Connection	168	EA	$ 8,360	$ 9,570	$ 1,406,000	$ 1,609,000
8	Type 3 STEP Connection	50	EA	$ 9,955	$ 11,165	$ 496,000	$ 557,000
9	Type 4 STEP Connection	12	EA	$ 12,265	$ 13,475	$ 153,000	$ 168,000
10	Pressure Sewer/Force Mains	26,100	LF	$60			$1,566,000
11	4" Gravity Sewer	220,100	LF	$129			$28,422,000
12	Road Restoration	1	EA	$2,000,000			$2,000,000
13	Pocket Pump Station	2	EA	$200,000			$400,000
14	Duplex Pump Station	2	EA	$433,333			$867,000
15	Triplex Pump Station	1	EA	$600,000			$600,000
16	Odor Control	5	EA	$50,000			$250,000
17	Standby Power Facilities	3	EA	$360,000			$1,080,000
					Subtotal	***$ 60,441,000***	***$ 61,016,000***
	Treatment System						
1	EQ / Recirculation / Dosing Tanks						$4,320,000
2	Biofilters						$8,880,000
3	Nitrex™						$4,560,000
4	Disinfection / Filtration / Controls						$2,760,000
5	Contractor' Overhead and Profit			15%			$3,078,000
6	Treatment Processes Contingency			30%			$6,156,000
7	Sales Tax			8%			$1,641,600
8	Land Acquisition	7.0	acres	$500,000			$3,500,000
9	Standby Power Facilities	2	EA	$360,000			$720,000
10	Odor Control	2	EA	$50,000			$100,000
					Subtotal		***$35,716,000***
	Dispersal / Reuse System - Non Residential						
1	Distribution Force Main	23,000	ft	$60			$ 1,380,000
2	Drainfield/Drip Irrigation	1,204,400	ft^2	$2			$ 2,408,800
3	Contractor Overhead and Profit			15%			$ 361,320
4	Contingency			30%			$ 722,640
5	Sales Tax			8%			$ 192,704
6	Land Acquisition	27.7	acres	$500,000			$ 13,850,000
					Subtotal		***$18,916,000***
	Scenario 2 Total Construction Costs - No Residential Reuse					**$115,073,000**	**$115,648,000**

The Mid-town site is purchased and this covers land costs for the eastern site

This covers costs for recycled water lines to Giacomazzi and for added storage.

Reducing the 30% contingencies to 10% and factoring the 18% escalation (see Page 12 of Task 3 attached), costs are reduced another $5 million.

This is reduced by about $12 million since the LOSG plan eliminates drain fields, leaving enough to purchase Giacomazzi ($1.5 million)

LOWWP TM: Decent. Treatment
Task 3

Table 4-5: Fine Screening Report Construction Cost Estimates

Project Element		Seawater Intrusion						Tri-W	LAI STEG Scenarios			
		Mitigation Level 1		Mitigation Level 2		Mitigation Level 3		Project	Scenario 1		Scenario 2	
		90 AFY ($1M)	140 AFY ($1M)	190 AFY ($1M)	240 AFY ($1M)	550 AFY ($1M)	600 AFY ($1M)	~285 AFY ($1M)	Non-Residential Reuse ($1M)	Residential Reuse ($1M)	Non-Residential Reuse ($1M)	Residential Reuse ($1M)
Collection System	STEP	$65 - 81	$65 - 81	$65 - 81	$65 - 81	$65 - 81	$65 - 81	$N/A	$60.4	$60.4	$61.0	$61.0
	Gravity	$83 - 90	$83 - 90	$83 - 90	$83 - 90	$83 - 90	$83 - 90	$81 - 82				
Treatment (Liquids & Solids)	STEP	$14 - 18	$23 - 25	$20 - 22	$23 - 25	$23 - 25	$23 - 25	N/A	$38.8	$38.8	$35.7	$35.7
	Gravity	$15 - 22	$23 - 26	$20 - 22	$23 - 26	$23 - 26	$23 - 26	$55				
Disposal / Reuse		$13 - 16	$13 - 14	$15 - 17	$13 - 14	$26 - 30	$26 - 27	$20 - 23	$18.9	$47.8	$18.9	$47.8
Treatment Facility Site		$1 - 3	$1 - 3	$1 - 3	$1 - 3	$1 - 3	$1 - 3	$1 - 3	Included in Treatment			
Permitting / Mitigation		$1 - 2	$1 - 2	$1 - 2	$1 - 2	$1 - 2	$1 - 2	$1 - 2	$2.00	$2.00	$2.00	$2.00
Total Construction Costs	STEP	$94 - 120	$103 - 126	$102 - 125	$103 - 126	$116 - 142	$116 - 139	N/A	$120.0	$148.95	$117.65	$146.56
	Gravity	$113 - 132	$121 - 135	$120 - 134	$122 - 135	$135 - 151	$134 - 148	$158 - 165				
Total Construction Costs Escalated to Mid-Point of Construction	STEP	$117 - 150	$128 - 157	$126 - 156	$129 - 157	$144 - 176	$144 - 173	N/A	$149.4	$185.44	$146.47	$182.46
	Gravity	$141 - 164	$151 - 168	$149 - 167	$152 - 168	$168 - 188	$167 - 184	$197 - 205				
Project Costs	STEP	$18 - 24	$18 - 24	$18 - 24	$18 - 24	$21 - 26	$21 - 26	N/A	$24.0	$29.79	$23.53	$29.31
	Gravity	$16 - 21	$16 - 21	$16 - 21	$16 - 21	$19 - 23	$19 - 23	$12 - 17				
Total Project Costs (Capital Costs)	STEP	$135 - 174	$146 - 181	$144 - 180	$147 - 181	$166 - 202	$165 - 199	N/A	$173.4	$215.23	$170.00	$211.78
	Gravity	$157 - 185	$167 - 189	$165 - 188	$168 - 189	$187 - 211	$186 - 207	$209 - 222				

Adjusted Cost

Minus $15 to $17.3m =
~$ 153 to $155m
(Removes exaggerated pipe costs and the assumption tanks cannot be shared - see Page 19 of this TM attached.)

Minus ~$17m =
~$136 to $138 m
(Subtracts $12 million in drainfield land costs and $5 million in contingency costs by using the 10% contingency for the proposed system and deducting the 18% escalation factor.)

Add $5-7 million for the water use efficiency and management components of the LOSG plan
Total cost = ~$145 m

~$35 million less than current project

- higher level of mitigation
- much less energy use/GHG production
- could reverse seawater intrusion

LOWWP TM: Decent. Treatment
Task 3

Table 5-4: Scenario 2 Collection and Dispersal System O&M Costs – No Residential Reuse

#	Description			Total
1	**Labor**	**Collection**	**Dispersal**	$ 249,600
	FTE	2	1	
	Total Hours	4,160	2,080	
	hourly rate	$40.00	$40.00	
2	**Sludge Disposal**			$ 143,100
	Frequency of pumping (years)	5	n/a	
	Total # Pumped per year	4,769	n/a	
	Cost / Pumpout	$150.00	n/a	
3	**Electricity**	**Collection**	**Dispersal**	$ 70,400
	Design Flow (gpd)	1,200,000	1,200,000	
	% Pumped	70%	100%	
	Power Unit Cost ($/kWh)	$ 0.12	$ 0.12	
	Total Pumping Cost	*$28,961*	*$41,354*	
4	**Equipment Maintenance/Replacement**			$ 160,600
	STEP Pump Maintenance / Replace			*$ 14,229*
	Frequency of Replacement (yr.)	7		
	# / year	36		
	Cost / Replacement	$400		
	Pump Station Maintenance / Replace			*$ 96,280*
	% of Construction Cost	2.0%		
	Odor Control Maintenance / Replace			*$ 50,000*
	% of Construction Cost	20.0%		
		Total O & M Cost		$ 623,700

← Very low energy costs compared to proposed project (about 1/5 th) (see Attachment 10, p. 3)

Table 5-6 presents the a comparison of the Fine Screening Report O&M cost estimates from the August 2007 Fine Screening Analysis Report to the O&M cost estimates developed for the LAI decentralized scenarios. As with the capital cost comparison, the costs presented include all contingencies and allowances and therefore are comparable to the high end of the ranges presented in the Fine Screening Analysis Report. In addition, only one treatment and collection system were analyzed, eliminating the need for a "Low" end of the costs. The LAI Scenarios O&M costs represent the "High" end of O&M cost estimates. *

LOWWP TM: Decent: Treatment
Task 3

Table 5-5: Summary of Treatment Facilities O&M Costs

Treatment Site	Design Flow (gpd)	Contract Operations	Sludge Disposal	Electricity	Equipment Maintenance / Replacement	Odor Control Maintenance / Replacement	Sampling - Lab Costs	Admin.	Permit Compliance Fees	Annual Misc. O&M Costs	Total
N-1	205,000	$29,120	$2,010	$20,200	$65,200	$10,000	$33,000	$12,000	$12,000	$19,000	$202,600
N-2	198,000	$29,120	$1,950	$19,900	$63,300	$10,000	$33,000	$12,000	$12,000	$19,000	$200,300
N-3	176,000	$29,120	$1,730	$18,400	$56,300	$10,000	$33,000	$12,000	$12,000	$18,000	$190,600
E-1	77,000	$29,120	$760	$12,200	$24,500	$10,000	$33,000	$12,000	$12,000	$14,000	$147,600
SE-1	95,000	$29,120	$930	$13,300	$30,100	$10,000	$33,000	$12,000	$12,000	$15,000	$155,500
W-1	164,000	$29,120	$1,610	$17,700	$52,300	$10,000	$33,000	$12,000	$12,000	$17,000	$184,800
W-2	193,000	$29,120	$1,890	$19,500	$61,500	$10,000	$33,000	$12,000	$12,000	$18,000	$197,100
Scenario 1 Total	**1,108,000**	**$203,840**	**$10,880**	**$121,200**	**$353,200**	**$70,000**	**$231,000**	**$84,000**	**$84,000**	**$120,000**	**$1,278,500**
Northeast	440,000	$29,120	$3,950	$32,700	$128,500	$10,000	$33,000	$12,000	$12,000	$27,000	$288,300
Midtown	770,000	$29,120	$6,900	$51,600	$224,500	$10,000	$33,000	$12,000	$12,000	$38,000	$417,200
Scenario 2 Total	**1,210,000**	**$58,240**	**$10,850**	**$84,300**	**$353,000**	**$20,000**	**$66,000**	**$24,000**	**$24,000**	**$65,000**	**$705,500**

Table 5-6: Comparison of O&M Cost Estimates

Project Element		Seawater Intrusion						Tri-W	LAI STEG Scenarios			
		Mitigation Level 1		Mitigation Level 2		Mitigation Level 3		Project	Scenario 1		Scenario 2	
		90 AFY ($1M)	140 AFY ($1M)	190 AFY ($1M)	240 AFY ($1M)	550 AFY ($1M)	600 AFY ($1M)	~285 AFY ($1M)	Non-Residential Reuse ($1M)	Residential Reuse ($1M)	Non-Residential Reuse ($1M)	Residential Reuse ($1M)
Collection System	STEP	0.8	0.8	0.8	0.8	0.8	0.8	N/A	$0.6	$0.8	$0.6	$0.8
	Gravity	0.5	0.5	0.5	0.5	0.5	0.5	0.7				
Treatment	STEP	$0.5 - 0.6	$0.9 - 1.8	$0.8 - 1.7	$0.9 - 1.8	$0.9 - 1.8	$0.9 - 1.8	N/A	$1.3	$1.3	$0.7	$0.7
	Gravity	$0.5 - 0.7	$0.8 - 1.8	$0.7 - 1.7	$0.8 - 1.8	$0.8 - 1.8	$0.8 - 1.8	$1				
Solids (Sub Class B)	STEP	$0.03 - 0.3	$0.03 - 0.3	$0.03 - 0.3	$0.03 - 0.3	$0.03 - 0.3	$0.03 - 0.3	N/A	Included in Collection and Treatment O&M Costs			
	Gravity	$0.04 - 0.5	$0.04 - 0.5	$0.04 - 0.5	$0.04 - 0.5	$0.04 - 0.5	$0.04 - 0.5	0.5				
Disposal / Reuse	STEP	$0.1 - 0.3	$0.1 - 0.2	0.4	0.4	$0.1 - 1.1	0.3	N/A	Included in Collection System O&M Costs			
	Gravity	$0.1 - 0.3	$0.1 - 0.2	0.4	0.4	$0.1 - 1.1	0.3	$0.4 - 0.5				
Total O&M Costs	STEP	$1.4 - 1.9	$1.8 - 3.0	$2.0 - 3.1	$2.1 - 3.2	$1.8 - 3.9	$2.0 - 3.1	N/A	$1.9	$2.04	$1.33	$1.50
	Gravity	$1.1 - 1.9	$1.4 - 2.9	$1.6 - 3.0	$1.7 - 3.2	$1.4 - 3.8	$1.6 - 3.0	$2.3 - 2.4				

$1 million less per year than the proposed project and may be less combined w/ the LOSG plan.

LOWWP TM: Decent. Treatment
Task 3

6. Cost Analysis Summary

Table 6-1 summarizes the costs for Scenarios 1 and 2 and compares them to the Fine Screening Report Estimates, using a total of 5,353 Benefit Units (BU) from the Assessment Engineers Report.

Table 6-1: Summary of Capital and Annual O&M Costs

Scenario			Project Cost ($1M)		Project Cost Per BU[3]		Annual O&M Cost ($1M)		Annual O&M / BU		Annual Power Use[1] (kWhr)	Average Annual Power Use[1] (kW)
			Level 2	Level 3	Level 2	Level 3	Level 2	Level 3	Level 2 (Low)	Level 3 (High)		
Scenario 1	7 Zones		$173	$215	$32,402	$40,207	$1.88	$2.04	$351	$382	1,600,000	183
Scenario 2	2 Zones		$170	$212	$31,758	$39,562	$1.33	$1.50	$248	$279	1,160,000	132
Fine Screening Report - Level 2 Mitigation	190 AFY	STEP	$144 - 180		$30,263		$2.0 - 3.1		$374	$579		
	190 AFY	Gravity	$165 - 188		$32,972		$1.6 - 3.0		$299	$560		
	240 AFY	STEP	$147 - 181		$30,637		$2.1 - 3.2		$392	$598		
	240 AFY	Gravity	$168 - 189		$33,346		$1.7 - 3.2		$318	$598		
Fine Screening Report - Level 3 Mitigation	550 AFY	STEP		$166 - 202		$34,373	$1.8 - 3.9		$336	$729		
	550 AFY	Gravity		$187 - 211		$37,175	$1.4 - 3.8		$262	$710		
	600 AFY	STEP		$165 - 199		$34,000	$2.0 - 3.1		$374	$579		
	600 AFY	Gravity		$186 - 207		$36,708	$1.6 - 3.0		$299	$560		

[1]Power use will be comparable for Residential Reuse and conventional reuse/dispopsal, as minor differences in dispersal power use are negligible compared to total collection/treatment/dispersal power use.

7. Caveats and LAI Opinions on Cost Estimates

In an effort to maintain as much consistency as possible between cost estimates developed in the Fine Screening Analysis Report, a number of assumptions were used for which LAI has a varying opinion. The preceding tables present cost data that is consistent with the Fine Screening Analysis. This section discusses items for which LAI has a varying opinion and the implications on the estimated costs.

7.1. Gravity Collection Pipe Costs

LAI has a varying opinion on the assertion that costs are similar between the STEG collection system and the conventional gravity collection system, and that $129/LF is the best available information for these costs. *

LAI is of the opinion that there is a significant difference between the installed cost of 4" vs. 8" gravity pipe. Material costs as well as installation costs are higher for 8" pipe and fittings. In addition, with Scenario 1, there will be no pipe greater than 8" with the vast majority being 4". LAI does not have local comparable bid tab values for the smaller pipe diameter and does not wish to render an opinion on the local installation costs. It is simply noted in this section that LAI believes a savings of $8+ million is reasonable with the STEG collection system due to pipes that will be half the size of conventional gravity pipe across most of the system. This * savings is based on an assumed unit price of $90/LF. These savings are not reflected in the

Biased assumption raises cost of STEP/STEG compared to conventional gravity (the proposed system).

LOWWP TM: Decent. Treatment
Task 3

preceding analysis that uses the $129/LF for STEG gravity collection pipe that was taken from bid tab values for 8" gravity sewer.

This caveat is summarized below:

Fine Screening Analysis Unit Cost - $129 / LF

LAI's Opinion of Appropriate Unit Cost - $90 / LF

Total Potential Savings - $8 million *

7.2. Gravity Collection Pipe Type Issues

STEG systems have costs/savings associated with septic tanks and smaller, shallower pipes. The septic tanks have a construction cost of around $10 million. Normally, these costs are offset by the savings associated with the smaller diameter, shallower pipe and potential treatment system cost savings. However, the methodology used in this analysis carries the costs of the septic tanks without crediting the savings of the smaller, shallower pipe. *

In consideration of this attribute of the cost estimating procedure, the alternative of a conventional gravity collection system with a large septic tank at the treatment sites may be desired/preferred. Construction costs for the "centralized" septic tanks would be approximately $2 - $3 million. This would result in a savings of approximately $7 - $8 million using this cost estimating methodology.

Addresses GHG issue.

In addition, this approach would mitigate the alleged concern that septic tanks are major contributors to greenhouse gases (in particular methane) and would allow recovery of the methane from the centralized locations for beneficial use.

This would also address on-lot impact concerns.

7.3. Treatment Facility Costs

The costs for the LAI scenarios presented in this report are for wastewater facilities that produce a Title 22 compliant effluent. The range of costs presented in the Fine Screening Analysis appears to encompass a variety of treatment facilities most of which will not produce Title 22 compliant effluent as analyzed. In comparing the options, this should be factored in so that the appropriate values are used for comparison.

Tertiary treatment is $3.5 million per SWRCB Financial Assistance Credit Review p. 1.

7.4. Reuse (Purple) Piping Costs

The Residential Reuse option carries the $47.8 million construction costs associated with purple pipe back to each individual residence in lieu of the drainfield option of $18.9 million construction costs. Capital costs are approximately 149.4% of construction costs. This option is unique to the LAI Residential Reuse scenarios.

LOWWP TM: Decent. Treatment
Task 3

7.5. Shared Septic Tanks

It is understood that a policy decision has been made that septic tanks are not to be shared and that this decision may be revisited as the project team explores cost saving measures. Given the density of development, there exists the potential to save approximately $4+/- million by sharing septic tanks. In addition, given the complicating issue of shared electrical service, LAI submits that STEG systems are the only systems that can feasibly utilize shared septic tanks. The majority of connections in LAI's scenarios are STEG systems. *

Potential Savings with Shared Septic Systems - $4 million

This biased assumption adds costs and on-lot impacts unnecessarily.

7.6. O&M Costs

Allowances were made in this report for the following costs that do not appear to be included in the Fine Screening Analysis:

- Administrative costs required for maintaining operations staff and equipment
- Daily sampling of effluent required by Title 22 as well as periodic sampling required by the permit
- Miscellaneous/Contingency for unanticipated operational expenses

There is a generic "Allowance" added to the Labor, Power, Maintenance/Replacement costs in the amount of $50,000 for most gravity collection system treatment facilities and $20,000 for STEP collection system treatment facilities. LAI believes that this is insufficient to cover the above listed costs. LAI has a total of $76,000 for these costs included in the O&M cost estimates presented in this report. This represents a difference of $26,000 - $56,000 on the annual O&M costs between the Fine Screening Analysis and this report.

7.7. Aesthetics

The Nitrex™ system will be largely below grade with the Nitrex™ filters taking the form of a constructed wetland. This feature can be landscaped into an area that has aesthetic value for minimal added expense. If this is desired, LAI estimates the additional landscaping costs to be approximately $2 million.

This adds to community acceptance and feasibility.

7.8. Total Potential Savings

The implications of our opinions on shared septic tanks and unit pricing on installed 4" vs. 8" pipe and fittings represents a total potential savings of $12 million dollars on the collection system costs. When project costs and escalation are added, this represents a total savings of $15 - $17.3 million that can be deducted from the bottom line in Table 4.5. *

It is LAI's opinion that the $7 - $8 million "savings" from replacing the septic tanks with centralized tanks is not representative of actual project costs. However, given that costs representative of a conventional gravity system are being carried forward, the $2 - $3 million

LOWWP TM; Decent. Treatment
Task 3

cost of adding centralized septic tanks is appropriate and may wish to be considered if there is a strong sentiment against individual septic tanks and/or if the greenhouse gas issue is of significance.

LOWWP TM: Decentralized Treatment
Task 2: Decentralized Wastewater Treatment Scenarios

*These factors add to the value of a decentralized system but were not considered in later reviews (e.g., EIR)

9. Environmental Issues and Caveats

Caveats:

1. It is noted that existing flows are approximately 77% of the buildout flows. The potential savings associated with a water conservation program could be further quantified by examining water use records and plumbing fixtures in representative properties. *

The LOSG sustainable basin plan maximizes conservation.

Environmental Issues:

1. Energy Use

Estimates of the energy use associated with the decentralized options will be provided, in the Task 3 Report.

2. Energy Generation / Sustainability

zero net energy use is possible from this project w/ the LOSG plan

Energy generation to at least offset consumptive use of the wastewater system could be a project component. Treatment and disposal sites could have solar panels. Wind power may be a cost-competitive option. We will provide opinions on these matters in the Task 3 Report. *

3. Carbon Footprint

It will have the smallest carbon footprint among alternatives.

Due to the passive nature of the proposed decentralized system, its carbon footprint is expected to be the lowest amongst options. Energy use of the different components will be provided in the Task 3 Report. *

As methane will be produced in the proposed septic tanks, it is suggested that the collection system incorporate ventilation design to concentrate these gases for destruction, or if economically viable, productive use.

4. Wetlands

The Nitrex™ component can be a subsurface flow wetland with or without open water to support varying types of aquatic vegetation. *

5. Landscape Design

The landscape of the treatment units can be visually appealing at modest cost, and can serve a multitude of uses such as walking/bike paths, gardens, etc. to engender public acceptance and in the interest of being a "good neighbor", it is proposed that creative landscaping with community input would be a major feature of the decentralized approach, such as illustrated on Figure 8-1. *

Attachment #10

Attachment 10 Page 1

4

ITEM 1: Estimated Project Construction and Annual O&M Costs

1.1. PROJECT CAPITAL COST ESTIMATE

Total project cost estimate for the proposed project is summarized below. The average of the low and high range estimate for cost eligible for public financing is $166 million, which is the assumed total capital project cost financed with a combination of USDA and State Revolving Fund (SRF) loans.

Table 1.1 Total Project Capital Cost Estimate

	Average Estimate ($ M)	Notes
Collection System		1
Mobilization/Demobilization	$3.9	
Gravity Sewers and Force Mains	$29.2	
Manholes	$4.5	
Shoring and Dewatering	$5.1	
Duplex Pump Stations	$2.6	
Triplex Pump Stations	$1.2	
Pocket Pump Stations	$2.4	
Standby Power Facilities	$2.5	
Misc. Facilities	$3.3	
Laterals in Right-of-Way	$9.3	
Road Restoration	$5.2	
Homeowner On-Lot Facilities	$13.3	2
Out-of-Town Conveyance	$3.4	3
Total Collection System	**$85.7**	
Treatment Process		
Secondary Process	$19.6	4
Tertiary Filtration/Disinfection	$3.5	5
Total Treatment Process	**$23.1**	
Solids Processing		
Thickening	$1.0	6
Mechanical Dewatering	$2.0	7
Total Solids Processing	**$3.0**	
Recycled Water Reuse		
Water Conservation Program	$0.0	8
Broderson Pipe and Leachfield	$6.1	
Recycled Water Turn-outs	$1.8	9
Recycled Water Storage (50 af)	$0.8	
Total Recycled Water Reuse	**$8.6**	
Sub-Total Construction	**$120.3**	
10% Construction Contingency	$10.7	10
Total Construction Costs (April, 2007 dollars)	**$131.0**	
Cost Escalation (18.0%) to Mid-Point of Construction	$23.6	11

Eliminated w/ the decentralized plan.

Eliminated w/ the LOSG plan

Table 1.1 Total Project Capital Cost Estimate

	Average Estimate ($ M)	Notes
Project Soft Costs		
Water Conservation Program	$5.0	12
Admin/Environmental Reports	$2.0	
Land - Treatment Site	$1.5	13
Environmental Permits/Mitigation	$2.8	
Design-Collection System	$2.8	
Design-Treatment Facility	$7.0	
Construction Management	$6.0	
Total Project Soft Costs	**$27.0**	
Total Capital Project Costs	**$181.6**	
Total Eligible Capital Project Costs	**$166.0**	

Eliminated w/the decentralized plan

(1) Collection System estimates from Fine Screening Report (FSR), Table 3.17, except as noted.
(2) Homeowner On-Lot Facilities not eligible for project financing; owner financed.
(3) Conveyance estimate from Conveyance Tech Memo, Table 7, with no micro-tunneling.
(4) Secondary treatment estimate from FSR, Tables 4.9 & 4.19.
(5) Tertiary treatment estimate from FSR, Section 4.8 for full flow.
(6) Thickening estimate from FSR, Table 5.3.
(7) Dewatering estimate from FSR, Table 5.5.
(8) Included in Project Soft Costs; no escalation on Water Conservation Program.
(9) Average of range for estimated 10,000 to 15,000 linear feet of recycled water pipeline at $143/lf.
(10) Assume 10% construction contingency, less Howeowner On-Lot Facilities.
(11) FSR, Appendix C estimated construction cost escalation at 5%, per year, from April 2007 to June 2011, the estimated mid-point of construction. The estimated construction cost escalation has been revised to reflect recent economic developments and project delays. The Engineering News Report Construction Cost Index 20-Cities Average for February, 2010 is 8671 (10.05% increase over April, 2007). Adding an assumed 3% annual escalation from February, 2010 to an assumed mid-point of construction in June, 2012, the total escalation is 18.0%.
(12) Water Conservation Program budget of $5 M required per project Coastal Development Permit conditions.
(13) Land Costs are not eligible for State Revolving Fund loan financing.

Table 1.7 Summary of Total Project Annual O&M Cost Estimate

	Annual O&M
Collection System	
• Labor	$170,000
• Power	$60,000
• Equipment Maintenance/Replacement	$200,000
Treatment Process	
• Labor	$310,000
• Power	$110,000
• Equipment Maintenance/Replacement	$75,000
• Allowances	$50,000
• Tertiary Filter O&M	$100,000
Solids Handling	
• Thickening & Dewatering	$450,000
• Hauling	$190,000
Recycled Water Reuse	
• Leachfield Energy	$165,000
• Leachfield Labor	$90,000
• Reuse Irrigation Energy	$40,000
Miscellaneous Costs	
• Habitat Mitigation	$10,000
• County Overhead and Billing	$300,000
• Contingency/Operating Reserves	$50,000
Total Annual O&M Costs	**$2,370,000**
Annual Short-Lived Asset Reserves	**$200,000**

(See Attachment 9)

Proposed project vs. Decentralized and LOSG plan

→ O&M about $1 million more annually than a decentralized system.

→ Total energy costs = $375,000 (5X's the energy costs of a decentralized system.

→ Broderson leach field energy costs = ~40% of project energy costs – eliminated w/ the LOSG plan.

* The LOSG plan may make a decentralized project carbon neutral

c. Recycled Water Reuse: Recycled wastewater will be reused within the community or surrounding agricultural land overlying the groundwater basin according the approved conditions of the Coastal Development Permit. It will either be discharged through leachfields or directly reused for urban or agricultural irrigation. The reuse program will consist of the following:

- 50 acre-feet of storage at the treatment plant site
- A recycled water main running from the treatment plant site, through the adjacent agricultural area, to reuse sites within the community
- 8 acres of leachfields at the Broderson site, with an annual capacity of 450 acre-feet
- Utilize one acre of existing leachfieds in the Bayridge Estates sub-division with an annual capacity of 33 acre-feet
- Provide approximately 130 acre-feet of recycled water to Los Osos schools, parks, golf course, and cemetery
- Provide recycled water main turn-outs to adjacent farmlands and develop reuse agreements for approximately 100 to 200 acre-feet per year

This does not provide for 200-250 AFY less water going to Broderson for 2-3 years as they are tested - (see Attachment 33)

The approved reuse program includes capacity to meet the flows from existing development that will connect to the system at project start-up. Connection of additional users, from currently undeveloped property, is specifically prohibited in the Coastal Development Permit, until certain conditions are met. These conditions include the requirement to develop a habitat conservation plan for Los Osos, develop a water management plan, and update the Local Coastal Plan to incorporate the habitat and water plans. Reuse capacity for the additional flows associated with new development is not necessary at project start-up, due to these conditions. The Coastal permit conditions effectively require a water management plan to identify the most beneficial reuse alternatives for the additional flows associated with new development, prior to any new connections to the system. The layout of the recycled water reuse sites is provided in Figure 4.1 (Project Diagram).

There is not enough water to supply flows to habitat (200-500 AFY) (see Attachments 20 + 21)

d. Water Conservation Program: A water conservation program will be implemented with residential and commercial fixture retrofits, appliance rebates, education, and water efficiency audits. The goal of the conservation program is to reduce indoor use by over 25% to 50 gallons per capita per day. The water conservation program will result in decreased demand on system facilities such as pump stations and treatment works, increase the operating life of the facilities, and increase operational flexibility.

This is not measurable

However I/I at 300,000 gpd will offset the benefit of conservation (see Attachment 25, p. 9)

Attachment #11

Bias in favor of a conventional gravity collection project in LOWWP review

For the public and government officials to make informed decisions regarding the most cost-effective and environmentally protective wastewater project, a fair and thorough review of alternative projects and components is necessary. However, the initial review of alternatives for the Los Osos wastewater project (Fine Screening report and Technical Memoranda by Carollo Engineers) failed to review the vacuum alternative and several other alternatives (e.g., more intensive conservation and reuse), applying assumptions that favor a conventional gravity project designed by Montgomery Watson Harza (MWH) for a prior Los Osos project.

During the review process, when members of the public expressed concerns over bias, County officials assured the public that a design-build process involving various technologies would follow, so that actual costs and project designs would be put on the table for the public and decision makers to see. The 2007 Prop 218 Assessment Engineer's Report and other County documents refer to this process (see Attachment 13).

Relying heavily on the LOWWP Fine Screening and Tech Memos (which added unnecessary costs and impacts to alternatives), the Draft EIR eliminated decentralized, vacuum, and other potentially superior projects with cursory reviews, failed to analyze others (e.g., a project with a mix of cluster and on-site systems), and concluded that the conventional gravity project was environmentally superior to the one STEP project reviewed (see Attachment 7).

Throughout the process, County officials used the flawed and inadequate reviews to claim the costs of STEP and conventional gravity (MWH) projects were essentially equal, a STEP project would cause greater impacts, and further review of alternatives (or including alternatives in the design-build, funding, and or permitting process) would lead to increased project costs and project delays that could result in Water Board enforcement action. County officials and consultants used these claims to justify sending only the MHW design forward for special funding in January of 2009, to create and justify a biased community survey in mid-2009 (see p. 6), and to eliminate STEP from Coastal Development Permit review from mid-2009 through mid-2010)(see Attachment 25, pp. 18-21).

Eventually, the Board of Supervisors abandoned design-build for the project's collection system, shifting to design-bid-build, after County staff claimed design-build contracts were "not allowed" by the USDA (see Attachment 14). This decision reduces competition, innovation, and the potential for cost-containment measures (e.g., caps on costs)—and it will undoubtedly lead to project over runs causing already extremely high project costs to escalate further..

Examples of bias favoring a conventional gravity design

The following are some of the assumptions/restraints/omissions in the alternatives review process that unfairly tipped the scale toward the proposed "hybrid" conventional gravity collection design with at least 80% conventional gravity piping (originally created by MWH for the prior Los Osos project). These assumptions have resulted in decentralized treatment, STEP/STEG, vacuum and low pressure alternatives appearing more costly, less environmentally protective, and/or less socially viable as compared to the proposed project than they are in reality.

The County alternatives analysis (Fine Screening report, Technical Advisory Committee report, Draft EIR, County staff reports, informational fliers and/or Community Survey)—

- **Assumed a 20-30% contingency added to cost estimates for STEP/STEG and other small pipe sealed alternatives, but only a 10% contingency for the gravity system design created by MWH.** The Fine Screening justified this based on the assumption the MWH design was essentially complete; even though it required significant changes from the original design for the prior project (e.g., redesign for out-of town treatment). Additionally, the Planning Commission decisions to increase conservation for the project required redesign for conservation flows, and the Coastal Commission required relocation of key pump stations. Further, the 10% contingency fails to factor the considerable uncertainties associated with the deep, open trenching in Los Osos (with sandy soils and high groundwater) which is sure to add costs, nor does it factor the Planning Commission's decision to require chemically sealing portions of the system in high groundwater. The County applied the unequal factors throughout the alternatives review despite the National Water Research Institute (NWRI) recommending the County provide equivalent costs for comparison. (see the NWRI review on the County LOWWP website, September 2008, p. 3). The unequal cost basis resulted in cost range overlaps, enabling officials to claim in community fliers, community survey (etc.) that no substantial cost differences existed between systems. This assumption exacerbates other construction costs added to alternative projects unnecessarily (see third bullet).

- **Assumed STEP/STEG tanks would have to be pumped every five years.** This is assumed even though members of the public pointed out during the review process that draft AB 885 regulations required <u>inspection</u> every five years and pumping as needed. The current proposed AB 885 waiver carries forward the draft requirements (see <u>Attachment 17</u> for a page from the summary, and see State Water Board website for waiver). The average pumping frequency for septic tanks in the county is every 10 years, so the assumption doubles estimates for many costs and impacts associated with pumping, hauling, and treating septage for the STEP/STEG and decentralized project alternatives. Energy use and GHG production would be reduced as much as half, and the costs for hauling and treatment would also be much less (see <u>Attachments</u> 7, 9, 15, 16, 17). This assumption penalizes STEP/STEG negating the credit it should receive for producing much less biosolids (at least 50% less) due to pre-treatment in STEP/STEG tanks. The 2006 National Water Research Institute peer review (of the 2005 Ripley Pacific Los Osos STEP project design) states that cost comparisons for alternatives should consider reduced biosolids production with STEP (see 2006 NWRI, County LOWWP website, "Findings and Recommendations," Item 3.2.7). **Changing this assumption would greatly reduce O & M and life-cycle cost estimates. (Note that a recent study has also found that septic tanks emit less than half of the GHGs assumed in the Draft EIR—see <u>Attachment 30</u>)**

- **Assumed pipe installation costs for the gravity system (average of 8" diameter) and small pipe systems (average of 4" diameter) are equal.** Pio Lombardo, a foremost expert in the design and installation of decentralize wastewater systems, states in the *LOWWP*

TM: Decentralized Treatment (Task 3, p. 18) that several assumptions applied in the screening process are not consistent with his experience. One of these is that material and installation costs for small-diameter piping are equal to the costs for larger conventional gravity piping, which he estimates adds $8 million unfairly to the cost of a STEP/STEG, or other project, using the smaller diameter piping (see Attachment 9, pp. 6-10).

- **Assumed there could be no cluster systems with a decentralized or centralized STEP/STEG systems, which would have reduced costs, impacts, and feasibility concerns of STEP/STEG project.** Mr. Lombardo states in the LOWWP Decentralized Treatment TM (Task 3, pp.18-19) that a screening assumption that every property must have a STEP/STEG tank adds unnecessary costs. He estimates shared tanks would reduce costs about $4 million. Mr. Lombardo points out that, when the 30% contingency is factored, review assumptions regarding piping and shared tanks **add $15 million to $17.3 million unnecessarily** to the project (see Attachment 9, pp. 6-10)

- **Assumed 100% of effluent for a STEP/STEG project must be denitrified.** The Fine Screening report and tech memos assume this on the basis that 100% of the treated effluent must be disposed at Broderson leach fields during winter months. This is assumed even though much of the recycled water (at least 200 AFY at start up to increase in the future) would go to urban and ag reuse. These options require lower levels of nitrate treatment because crops and landscaping benefit from nitrogen in treated effluent. The assumption penalizes STEP/STEGs project by adding unnecessary costs for treatment. Also, review documents assume methanol (an expensive, manufactured carbon source) will be used in the denitrification process, and they include the GHGs produced in the manufacture of methanol in the AB 32 GHG analysis for STEP. Finally, review documents fail to evaluate alternatives to Broderson leach fields (e.g., more conservation, ag exchange, and urban reuse) which would greatly reduce the need to denitrify STEP effluent, while greatly increase project benefits on seawater intrusion.

- **Did not include the costs for sealing parts of the gravity system or design changes in cost estimates/comparisons.** Sealing the gravity system in high groundwater, a condition added to the project by the Planning Commission in August of 2009, is estimated to add 12% to the cost of pipe installation for these parts of the system. Also, $2.8 million has been added to project costs for additional design of the MWH gravity system (see SWRCB Credit Review cost estimates, Attachment 10 and below).

- **Did not adequately analyze the costs and impacts associated with significantly more inflow and infiltration (I/I) with a conventional gravity system**. The Fine Screening report (p. 1-9) points out that attempting to maintain a gravity system so that it has very low levels of I/I (similar to those of a fully sealed STEP/STEG system) will raise system costs, especially as the system gets older and leaks get worse (see Attachment 21, p.2). No doubt the Regional Board will expect the LOWWP to have very low I/I and exfiltration (leaks out) to keep overflows and contamination of the water supply to a minimum. The additional costs have not been added to project costs. (Note: With a conventional gravity system overflows and leaks out of the system are inevitable, especially as the system ages. Therefore, costs related to leaks will get more and more expensive.)

- **Did not adequately analyze and consider the effects of earthquakes and soil liquefaction on collection systems, despite the fact Los Osos is in an earthquake and soil liquefaction zone.** Earthquakes are likely to result in much greater damage and costs for proposed conventional gravity system than a small-pipe system (or that leaves some septic systems in place). Significant ground movement is much more likely to disrupt the flows in large, relatively rigid collection pipes, installed to exact gradients than smaller diameter, more flexible, sealed pipes of alternatives. Further, repairing lines and restoring operations is easier and less costly with small-pipe systems due to much shallower less costly installation. Further, STEP/STEG tanks allow use of the system (for extended periods with pumping), while a significant earthquake could cause shut down, backups, or major leaks in a conventional system that could result in an environmental, social, and economic disaster (e.g., if most of the system had to be repaired/replaced). The EIR did not address this issue putting off crucial analyses to the future (see Attachment 37).

- **Did not adequately analyze and consider vacuum technology despite its potential to address cost and on-lot concerns, and a specific recommendation by the NWRI in 2006 (see 2006 NWRI report, Item 3.2.3)** The Fine Screening omitted review of vacuum technology, and the Draft EIR included a very cursory review (see Attachment 7, pp. 1-2)

- **Did not accurately and adequately analyze and consider a decentralized option despite its potential to significantly reduce energy use and impacts** (see Attachments 7, pp. 4, 8-10 and Attachment 9).

- **Did not thoroughly and accurately calculate life cycle costs.** As noted above, costs have not been calculated for alternatives on an equivalent cost basis, which penalizes all alternatives other than a project using the MWH collection design. This factor, and other assumptions and omissions, results in small pipe options not receiving credit for substantially lower installation/construction costs, while being credited with higher-than-justified O&M costs. This drives up life cycle costs for these systems. On the other hand, review assumptions and omissions unfairly reduce construction and O&M costs of the proposed conventional gravity project. Comparisons in the latter also fail to consider the same, potentially more cost-effective, options using the Los Osos Sustainability Group's sustainable basin plan (see Attachments 5 & 8).

The following paraphrase the inaccurate claims made by officials and consultants at various times and in various documents (e.g., the Draft EIR & CDP).

Inaccurate claims—

- ***The gravity system is a sealed system and it will remain leak-free with good maintenance.*** It is well-known within the wastewater industry that it is not feasible to maintain a conventional gravity in a leak free condition or with I/I levels equivalent to sealed, small pipe systems (see

Attachment 21). The current design is called a “hybrid” system because 5% of connections will be low pressure units (with grinder pumps). It will also have some chemically welded sections. However, the system will likely be at least 80% conventional gravity piping. The *Fine Screening Report* states that sealing the entire system is the only way to achieve inflow and infiltration (I/I) rates similar to sealed systems, adding that chemically sealed gravity systems are very expensive and don’t have an established track record (see Attachment 21, p. 2). The report further points out I/I in gravity systems gets worse over time. Dr. Tchobanoglous, one of the foremost authorities on wastewater in the world said to Keith Wimer in a phone conversation that all communities and utilities with conventional gravity systems tolerate a level of leakage, focusing on the maintenance and repair of the worst problems, adding communities often to expand treatment facilities, rather repair the systems and stop the leaks because it is more cost-effective to expand treatment facilities than to repair pipes buried under infrastructure. Recent reports indicate that trillions of dollars will be required in the coming years to repair the nation’s failing gravity sewer systems. In 2006 a large storm in the Central Valley resulted in over a million of gallons of raw and undertreated sewage overflowing on to streets and polluting surface waters. In recent years there have been numerous overflows of conventional gravity system during wet weather conditions in the County of San Luis (see Attachment 40)

- ***The Montogomery, Watson, Harza (MWH) gravity collection system design is shovel ready; and/or using the design will save time, improve chances for stimulus funding, and/or reduce project costs.*** In actuality, the MWH design has required many changes, including a major change from the beginning (out-of-town treatment). The CDP requires it to have several other changes (e.g., redesign for conservation and relocation of pump stations). The State Water Resources Credit Review itemizes $2.8 million dollars for further system design, and the Board of Supervisors recently voted to award Carollo Engineers a $75,000 contract for design management. On the other hand, project costs for STEP and decentralized systems include design costs, and STEP project teams are willing to place caps on construction costs, in large part because small-pipe installation is more predictable and less likely to result in overruns (see Attachment 11, p.2).

  The threat of losing Stimulus Funding and grant money has been used several times in the process to justify excluding STEP from the process. In January of 2009, Supervisor Gibson and County Public Works Director Paavo Ogren convinced other Board members to approve sending only the MWH gravity system design forward for funding. One of the reasons given was that there was not enough time to complete the STEP design, even though Ripley Pacific had developed plan for Los Osos in 2006 that was peered reviewed by the NWRI (see the 2006 NWRI review on the SLO County LOWWP website). The County survey (on the County LOWWP website and excerpted below) also cite the potential to lose funding as a way STEP could raise project costs, and the Coastal Development Permit cites the potential loss of USDA funding as a reason to expedite approval of the project. Clearly, there has been ample time (many times over) to complete any further STEP design needed. The $16 million potential grant County officials said was available ($4 million was eventually awarded) is substantially less than the potential savings from a design-build process, including STEP and other project alternatives (see Attachments 8 & 11, e.g.,p.2)).

- ***The public voted for (and/or clearly showed their preference) for a conventional gravity system in the Community Survey.*** The survey had several misrepresentations about STEP, including its potential to delay grant funding (see below).

Bias in the Community Survey

Quote from Community Survey:

> "A STEP/STEG system might result in a lower overall project cost for property owners and residents but that is uncertain, especially considering the time required to design a new collection system and that further delays could jeopardize grant funding. Which do you prefer?"

This statement is obvious push polling, and supervisors noted the bias before they approved the elimination of STEP from the process shortly after the release of survey results. County officials distributed the survey mid 2009, and the first Coastal Commission hearing was in January of 2010, allowing plenty of time for the STEP design to be completed as needed. Furthermore, conditions added to the proposed project: more conservation (Redesign is needed to assure adequate flow and avoid blockage.), the requirement to chemically seal parts of system, and the condition to relocate some pump stations (added by the Planning Commission in August 2009 and the Coastal Commission in June 2010); require design changes that would not have been needed with a sealed, pressurized STEP project.

Attachment #12

Los Osos Wastewater Project
CCC Agenda Item #F14a
Speaker: Dana Ripley

Los Osos Wastewater Project Public Testimony
California Coastal Commission De Novo Hearing
June 11, 2010
Marina del Rey, CA

CCC Application: A-3-SLO-09-055/069

Public Commenter: Dana K. Ripley, PE
925-847-2086, ripac@comcast.net

Subject: Wastewater Project Costs/Affordability

Honorable Commissioners:

I am Dana Ripley, team leader for the Los Osos Wastewater Plan Update[1] prepared in 2006 for the Los Osos Community Services District. Our final report was completed in August 2006 and was validated by the National Water Research Institute in December 2006. Septic Tank Effluent Pump (STEP) collection is fundamental to the "2006 Update Plan" and is, in my opinion, fundamental to the long term success of the Los Osos wastewater project.

The process schematic of the 2006 Update Plan is very similar to the process schematic that I prepared for inclusion in the recently published "Water Reuse" textbook (McGraw Hill, 2007) as Figure 13-15. The caption of that figure reads:

> *Schematic flow diagram of comprehensive water reclamation and reuse plan incorporating STEP systems for low-, medium-, and high-density communities.*

A copy of this schematic is provided as Attachment A. It represents what I believe to be state-of-the-art in small community wastewater collection, treatment, and reuse whether constructed for a new development or for an existing community upgrading to central collection and treatment.

My testimony to the Commission today will focus on cost and affordability. CC staff recognizes the importance of affordability to Los Osos homeowners and businesses as follows:

> ***The affordability of the project has been and will continue to be a major concern for the residents of Los Osos[2].***

---

[1] Ripley Pacific Company, *Los Osos Wastewater Management Plan Update for the Los Osos Community Services District, San Luis Obispo County, CA, Wastewater Collection Treatment, Storage, and Water Recycling: Beneficial Reuse of Water and Nutrients.* Digital and hardcopy provided to CC-Santa Cruz staff on February 8, 2010.
[2] Application A-3-SLO-09-055/069 staff report, May 27, 2010, p.2

The single largest factor influencing affordability is obviously the project's construction cost. The estimated construction cost of the 2006 Update Plan prepared by our team is presented as Attachment B[3]. For comparison, San Luis Obispo County's latest cost estimate for the gravity-based system is presented as Attachment C[4].

Based on my review of the two construction cost budgets, assuming service to both developed and undeveloped properties and cost escalation to 2010 dollars, the cost difference between the two systems is at least $50 million. That is, the 2006 Ripley Update Plan cost utilizing STEP collection technology is at least $50 million less than the cost for the County's gravity-based collection, treatment, and reuse plan.

The actual cost difference between the two system alternatives could in fact be substantially greater than $50 million. For STEP construction, there is relatively low construction cost risk since excavations are shallow and impacts of unforeseen conditions can be mitigated easily. For this reason, the STEP contractor has offered a guaranteed maximum price cost basis to SLO County.

For gravity construction, however, construction cost risk is significantly higher due to deeper excavations and difficulty of dealing with unforeseen conditions such as high groundwater and archeological sites. The contractor will be required to fuse-weld at least 12% of the collection system and more if high groundwater is encountered beyond that already mapped. SLO County would be compelled to accept change orders for these unforeseen conditions which in essence provides for an open-ended contract, irrespective of what the winning competitive bid cost number is. Of course, the extent of change order costs cannot be known until project construction is complete.

I also note that the County's budget for Broderson leachfields does not include a redundant disposal option as recommended by the project hydrogeologist due to the uncertainty of winter dispersal capacity at that site[5]. The Broderson leachfield system is a $6.1 million line item that may need to be replicated at one or more other undetermined locations to provide sufficient winter dispersal capacity.

Based on the foregoing comments, it would be likely that the completed cost difference between the two systems could be substantially greater than the $50 million difference represented by the two attached budgets.

Even with the minimum $50 million cost difference, the Commission is faced with at least two issues inconsistent with the Coastal Act if the applicant's gravity collection system is constructed. First, Coastal Act Section 30604(g) states:

> *The Legislature finds and declares that it is important for the commission to encourage the protection of existing and the provision of new affordable housing opportunities for persons of low and moderate income in the coastal zone.*

---

[3] 2006 Ripley Update Plan, Table ES-5.
[4] San Luis Obispo County, from SWRCB Credit Review Checklist, April 23, 2010, Table 1.1.
[5] Spencer Harris, hydrogeologist, San Luis Obispo Planning Commission, June 30, 2009; "You'd better have capacity somewhere else."

A cost difference of this magnitude has a direct impact on affordability. A lower project construction cost will lessen the impact to low- and moderate-income residents living within the coastal zone.

Secondly, Coastal Act Section 30120 defines treatment works[6], as follows:

> *. . any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature to implement section 1281 of this title, or necessary to recycle or reuse water **at the most economical cost** over the estimated life of the works. .*

Consistency with this section of the Coastal Act would require that the most economical plan be implemented, irrespective of any technology preference by the project owner. The $50 million difference in the two estimates would likely preclude the gravity system as a viable alternative.

I am aware of the applicant's technology preference against STEP collection for reasons such as green house gas emissions, soil disturbance numbers, nitrogen removal, on-lot easements, and on-lot pumping. I believe that each of these issues can be resolved in favor of STEP collection given the opportunity in an open forum. It also must be reiterated that the STEP collection alternative was CEQA certified as environmentally superior in 2001, was determined to be a viable collection alternative in the current project EIR, and was intended to compete with gravity collection through the bidding process pursuant to the Proposition 218 assessment vote in 2007. Finally, the Request for Qualifications prepared by SLO County in December 2008 presented both gravity collection and STEP collection as accepted alternatives for interested design-build teams bidding on the Los Osos wastewater project.

Only with elevation of the STEP team into the competitive bidding process with guaranteed maximum bids can the $50 million cost differential presented above be ascertained one way or the other. The Commission should seek the assurance that the competitive bid process promised by the Proposition 218 vote will be preserved and that consistency with Coastal Act Sections 30120 and 30604 is upheld. Including this requirement as a permit condition today will not only assure Proposition 218 and Coastal Act consistency, but will assure that project timelines remain in place to "maximize the project's eligibility to receive funding support that can offset local costs" as urged by SLO County and your staff.

Thank you for your consideration of these cost and affordability issues, and I am available for questions.

/dr

---

[6] Definition of treatment works as set forth in Federal Water Pollution Control Act per Coastal Act Section 30120.

Water Reuse

Issues, Technologies, and Applications

Metcalf & Eddy | AECOM

Written by

Takashi Asano
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Mc Graw Hill

New York Chicago San Francisco Lisbon London Madrid Mexico City
Milan New Delhi San Juan Seoul Singapore Sydney Toronto

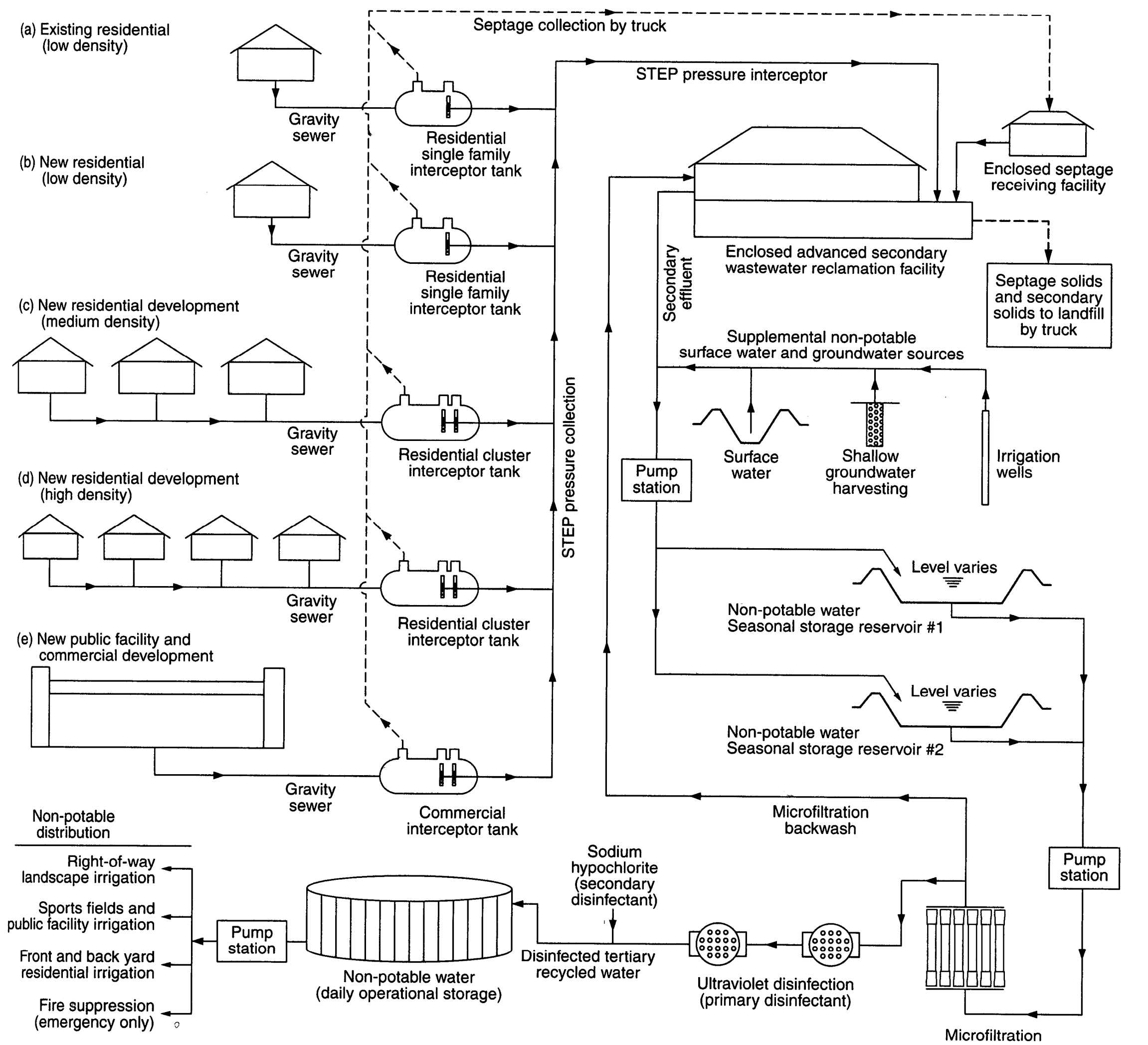

Figure 13-15
Schematic flow diagram of comprehensive water reclamation and reuse plan incorporating STEP systems for low-, medium-, and high-density developments. (Courtesy of D. Ripley, Ripley Pacific Company.)

of holding tanks. An analysis of a vacuum sewer system is shown on Fig. 13-16. Additional information on the design and operation of STEP systems can be obtained from AIRVAC (1989), U.S. EPA (1991), and Crites and Tchobanoglous (1998).

Hybrid Collection Systems

The use of a combination of two or more collection technologies is known as a hybrid collection system. For most applications where alternative collection systems are used, a combination of technologies may prove to be the most efficient design. Typically, a

Table ES-5 Cost Estimates for the Wastewater Management Plan Update with STEP/STEG Collection, Trickling Filter Treatment, Storage, Filtration, Disinfection, and Distribution of Recycled Water to Agricultural Customers

Basic Assumptions	**Scenario 1**	**Scenario 2**
Number of lots:	5,151	5,929
Flow of Wastewater, mgd:	1.30	1.50
Base Capital Costs	**$ millions**	**$ millions**
On-lot Costs	42.00	48.50
STEP Collection - ROW	16.00	19.70
WRF at Site D	19.50	22.50
Aesthetic Mitigation	0.50	0.50
Effluent Storage	4.25	4.90
Effluent Distribution	2.00	2.30
Groundwater Monitoring Wells	0.25	0.25
Subtotal Base Capital Cost	84.50	98.65
Land Costs		
Site D - 38 ac.	1.00	1.00
Reservoir Site #2	0.50	0.60
Subtotal Land Cost	1.50	1.60
Total Base Capital and Land Costs	**86.00**	**100.25**
Base Capital and Land Cost per Lot	**$16,696**	**$16,908**
Life Cycle Costs	**$ millions**	**$ millions**
Base Capital	84.50	98.65
Land	1.50	1.60
Total Capital Costs	**86.00**	**100.25**
Salvage Value - Land	0.42	0.45
Present Worth Capital Cost	**85.58**	**99.80**
O&M - Collection	0.45	0.52
O&M - WRF	1.00	1.10
O&M - Effluent Distribution	0.15	0.15
O&M - Groundwater Montioring	0.05	0.05
Subtotal O&M	**1.65**	**1.82**
Annualized Capital Costs, 6.625%, 20 yrs.	7.85	9.15
Total Annualized Costs	**9.50**	**10.97**
Total Annualized Costs per Lot - $/year	**$1,844**	**$1,851**
Total Annualized Costs per Lot - $/month	**$154**	**$154**

ITEM 1: Estimated Project Construction and Annual O&M Costs

1.1. PROJECT CAPITAL COST ESTIMATE

Total project cost estimate for the proposed project is summarized below. The average of the low and high range estimate for cost eligible for public financing is $166 million, which is the assumed total capital project cost financed with a combination of USDA and State Revolving Fund (SRF) loans.

Table 1.1 Total Project Capital Cost Estimate

	Average Estimate ($ M)	Notes
Collection System		1
Mobilization/Demobilization	$3.9	
Gravity Sewers and Force Mains	$29.2	
Manholes	$4.5	
Shoring and Dewatering	$5.1	
Duplex Pump Stations	$2.6	
Triplex Pump Stations	$1.2	
Pocket Pump Stations	$2.4	
Standby Power Facilities	$2.5	
Misc. Facilities	$3.3	
Laterals in Right-of-Way	$9.3	
Road Restoration	$5.2	
Homeowner On-Lot Facilities	$13.3	2
Out-of-Town Conveyance	$3.4	3
Total Collection System	**$85.7**	
Treatment Process		
Secondary Process	$19.6	4
Tertiary Filtration/Disinfection	$3.5	5
Total Treatment Process	**$23.1**	
Solids Processing		
Thickening	$1.0	6
Mechanical Dewatering	$2.0	7
Total Solids Processing	**$3.0**	
Recycled Water Reuse		
Water Conservation Program	$0.0	8
Broderson Pipe and Leachfield	$6.1	
Recycled Water Turn-outs	$1.8	9
Recycled Water Storage (50 af)	$0.8	
Total Recycled Water Reuse	$8.6	
Sub-Total Construction	**$120.3**	
10% Construction Contingency	$10.7	10
Total Construction Costs (April, 2007 dollars)	**$131.0**	
Cost Escalation (18.0%) to Mid-Point of Construction	$23.6	11

Table 1.1 Total Project Capital Cost Estimate

	Average Estimate ($ M)	Notes
Project Soft Costs		
Water Conservation Program	$5.0	12
Admin/Environmental Reports	$2.0	
Land - Treatment Site	$1.5	13
Environmental Permits/Mitigation	$2.8	
Design-Collection System	$2.8	
Design-Treatment Facility	$7.0	
Construction Management	$6.0	
Total Project Soft Costs	**$27.0**	
Total Capital Project Costs	**$181.6**	
Total Eligible Capital Project Costs	**$166.0**	

(1) Collection System estimates from Fine Screening Report (FSR), Table 3.17, except as noted.
(2) Homeowner On-Lot Facilities not eligible for project financing; owner financed.
(3) Conveyance estimate from Conveyance Tech Memo, Table 7, with no micro-tunneling.
(4) Secondary treatment estimate from FSR, Tables 4.9 & 4.19.
(5) Tertiary treatment estimate from FSR, Section 4.8 for full flow.
(6) Thickening estimate from FSR, Table 5.3.
(7) Dewatering estimate from FSR, Table 5.5.
(8) Included in Project Soft Costs; no escalation on Water Conservation Program.
(9) Average of range for estimated 10,000 to 15,000 linear feet of recycled water pipeline at $143/lf.
(10) Assume 10% construction contingency, less Howeowner On-Lot Facilities.
(11) FSR, Appendix C estimated construction cost escalation at 5%, per year, from April 2007 to June 2011, the estimated mid-point of construction. The estimated construction cost escalation has been revised to reflect recent economic developments and project delays. The Engineering News Report Construction Cost Index 20-Cities Average for February, 2010 is 8671 (10.05% increase over April, 2007). Adding an assumed 3% annual escalation from February, 2010 to an assumed mid-point of construction in June, 2012, the total escalation is 18.0%.
(12) Water Conservation Program budget of $5 M required per project Coastal Development Permit conditions.
(13) Land Costs are not eligible for State Revolving Fund loan financing.

Attachment #13

Engineer's Report

For the

San Luis Obispo County Wastewater Assessment District No. 1

County of San Luis Obispo
State of California

December 18, 2007

Prepared by:

Wallace Group
a California Corporation
612 Clarion Court
San Luis Obispo, California

WALLACE GROUP

TABLE OF CONTENTS

CHAIRPERSON

Jerry Lenthall, District 3

BOARD OF SUPERVISORS

James R. Patterson, Vice-Chairperson
District 5

Harry Ovitt
District 1

Bruce Gibson
District 2

K.H. Katcho Achadjian
District 4

COUNTY STAFF MEMBERS

Gail Wilcox
Assistant County Administrative Officer

Vicki M. Shelby
Chief Deputy Clerk of the Board

Warren R. Jenson
Chief Deputy County Counsel

R. Wyatt Cash
Assistant County Counsel

Noel King
Director of Public Works

Paavo Ogren
Deputy Director of Public Works

Dean Benedix, P.E.
Utilities Manager, Co-Assessment Engineer of Work

ASSESSMENT ENGINEER

Craig A. Campbell, P.E.
Wallace Group
a California Corporation

Attachment 13 Page 4

CERTIFICATES

1. I, the Clerk of the Board of Supervisors of the County of San Luis Obispo, hereby certify that the Assessment and Assessment Roll in this Engineer's Report, in the amounts set forth in each, with the Assessment Diagram attached, was filed with me on February, 26, 2008.

Julie L. Rodewald, Clerk of the Board of Supervisors

By: ______________________

2. I have prepared this Engineer's Report and do hereby certify that the amounts set forth in Column (2b) under Summary Cost Estimate on Page 4 hereof entitled "Assessment," and the individual amounts in the Assessment Roll herein, have been computed by me in accordance with the Resolution of Intention adopted by the Board of Supervisors of the County of San Luis Obispo on August 21, 2007, and by the order of the Board of Supervisors of the County of San Luis Obispo, adopted on December 18, 2007.

REGISTERED PROFESSIONAL ENGINEER
CRAIG CAMPBELL
No. 34405
Expires 9/30/09
CIVIL
STATE OF CALIFORNIA

By: ______________________ 2/21/08
Craig A. Campbell, P.E.
RCE No. 34405, Expires 09-30-09

REGISTERED PROFESSIONAL ENGINEER
DEAN R. BENEDIX
No. 37892
Exp. 3.31.09
CIVIL
STATE OF CALIFORNIA

By: ______________________ 2.22.08
Dean Benedix, P.E.
RCE No. 37892, Expires 03-31-09

3. I, the Clerk of the Board of Supervisors of the County of San Luis Obispo, hereby certify that the Assessment in this Engineer's Report, in the amounts set forth in Column (2b) was approved and confirmed by the Board of Supervisors on December 18, 2007, by Resolution No. 2007-494.

Julie L. Rodewald, Clerk of the Board of Supervisors

By: Vicki M. Shelby / Deputy Clerk

4. A Notice of Assessment was recorded and the Assessment Diagram was filed in the office of the County Recorder of the County of San Luis Obispo, California, on February, 27, 2008.

Julie L. Rodewald, Clerk of the Board of Supervisors

By: Vicki M. Shelby / Deputy Clerk

COUNTY OF SAN LUIS OBISPO, CALIFORNIA

ENGINEER'S REPORT

PURSUANT TO THE PROVISIONS OF DIVISION 12
OF THE STREETS AND HIGHWAYS CODE FOR THE
SAN LUIS OBISPO COUNTY
WASTEWATER ASSESSMENT DISTRICT NO. 1
IN THE COMMUNITY OF LOS OSOS

Pursuant to the provisions of the Municipal Improvement Act of 1913, being Division 12 of the Streets and Highways Code of the State of California, Article XIIID of the California Constitution, and the Proposition 218 Omnibus Implementation Act, and in accordance with the Resolution of Intention passed and adopted on August 21, 2007 by the Board of Supervisors of the County San Luis Obispo, Craig A. Campbell, P.E. duly-authorized representative of Wallace Group, a California Corporation, and Dean Benedix, P.E., Utilities Manager, San Luis Obispo County Public Works Department, submit herewith the report for the San Luis Obispo County Wastewater Assessment District No. 1, consisting of six parts as follows:

PART I

The **proposed assessment** of a portion of the costs and expenses of the proposed project in proportion to the estimated special benefits to be received by properties within the assessment district, respectively, from said improvements, is set forth upon the assessment roll filed herewith and made a part hereof.

The **assessment roll** also includes the "Assessor APN" for each parcel which is the Assessor's Parcel Number corresponding to each property within the Assessment District as recorded in the San Luis Obispo County Assessor's Office.

PART II

Preliminary plans of the proposed improvements consisting of wastewater project components and relevant wastewater technologies for collection, treatment, and disposal have been documented in the report entitled, "Viable Project Alternatives Fine Screening Analysis" dated August, 2007 (Fine Screening Report). The Fine Screening Report provides a substantial body of evidence that confirms the viability of the proposed project and the cost upon which an assessment can be based, and is therefore made a part hereof. The Fine Screening Report is on file in the Office of the County Engineer in the Department of Public Works.

PART III

A **general description** of the proposed project is attached hereto and made a part hereof.

PART IV

An **estimate of the cost** of the project, proposed improvements and of the cost of land, rights-or-way, and incidental project expenses is attached hereto and is made a part hereof.

PART V

The **assessment diagram** showing the exterior boundaries of the Assessment District, and each parcel of land within the Assessment District is attached hereto and is made a part hereof. The location of the properties corresponding to the Assessment Numbers shown on the attached assessment roll can also be found on the Assessment Diagram.

PART VI

A **description of the method of assessing costs** to the parcels in the Assessment District along with a list of parcels in the Assessment District and the assessments apportioned to those parcels (see Part I) is attached hereto and made a part hereof.

Dated this 21 day of February, 20 08.

2/21/08
Craig A. Campbell, P.E.
RCE No. 34405, Expires 09-30-09
Wallace Group, a California Corporation

REGISTERED PROFESSIONAL ENGINEER
CRAIG CAMPBELL
No. 34405
Expires 9/30/09
CIVIL
STATE OF CALIFORNIA

2-22-08
Dean Benedix, P.E.
RCE No. 37892, Expires 03-31-09
San Luis Obispo County Public Works Department

REGISTERED PROFESSIONAL ENGINEER
DEAN R. BENEDIX
No. 37892
Exp 3-31-09
CIVIL
STATE OF CALIFORNIA

PART I

PROPOSED ASSESSMENT AND ASSESSMENT ROLL

A. PROPOSED ASSESSMENT

WHEREAS, on August 21, 2007, the Board of Supervisors of the County of San Luis Obispo, California, pursuant to the provisions of the Municipal Improvement Act of 1913, adopted its Resolution of Intention for the construction of the public improvements more particularly therein described;

WHEREAS, said Resolution directed the undersigned to make and file a report presenting a general description of any works and appliances already installed and any other property necessary or convenient for the operation of the improvements, preliminary plans for the proposed construction, preliminary estimate of costs, maps and general descriptions of lands to be acquired, and diagram and assessment of and upon the subdivisions of land within the assessment district, to which Resolution and the description of said proposed improvements therein contained reference is hereby made for further particulars;

NOW, THEREFORE, the undersigned, by virtue of the power vested in me under said Act and the order of the Board of Supervisors of said County, hereby make the following assessment to cover the portion of the estimated costs of said acquisitions, work and improvements and the costs and expenses incidental thereto to be paid by the assessment district.

The amount to be paid for said acquisitions, work and improvements, and the expenses incidental thereto, has been determined by the County assessment engineer of work for build out of the community pursuant to Appendix A (attached). As described in subsequent sections of this report, only developed lots will be assessed in these proceedings, and therefore only a portion of the build-out project costs will be levied as special benefits as described in the following table:

SUMMARY COST ESTIMATE

	Total Estimated Cost for Build-out Condition	Special Benefit for Developed Lots Only (Costs Covered in this Assessment Proceeding)	
		As Preliminarily Approved	As Confirmed and Recorded
	(1)	(2a)	(2b)
Collection System Components			
Lateral Component	$ 10,956,000.00	$ 9,869,372.64	$ 9,834,912.54
Collector Component	52,341,045.00	44,621,635.16	44,444,719.54
Trunk Component	23,105,955.00	18,431,011.04	18,364,383.54
Subtotal	**$ 86,403,000.00**	**$ 72,922,018.84**	**$ 72,644,015.62**
Treatment/Disposal Component			
Wastewater Treatment Facility	$ 27,639,000.00	$ 22,046,894.86	$ 21,967,196.07
Effluent Disposal System	19,422,000.00	15,492,412.60	15,436,408.05
Treatment Facility Site	2,490,000.00	1,986,206.75	1,979,026.67
Subtotal	**$ 49,551,000.00**	**$ 39,525,514.21**	**$ 39,382,630.79**
Common Component			
Engineering/Administration/Legal Costs	$ 16,000,000.00	$ 12,762,762.00	$ 12,716,625.05
Permitting and Mitigation	2,490,000.00	1,986,204.84	1,979,024.77
Subtotal	**$ 18,490,000.00**	**$ 14,748,966.84**	**$ 14,695,649.82**
Total Project Special Benefits Costs	**$ 154,444,000.00**	**$127,196,499.89**	**$126,722,296.23**

Source: Table A.3 of "San Luis Obispo County Wastewater Assessment District No. 1, Determination of Special Benefits and Project Cost" memo dated August 16, 2007 by Dean Benedix, P.E., Assessment Engineer of Work (Appendix A to this Report)

And I do hereby assess and apportion said portion of said total amount of the cost and expenses of said project including acquisitions, work and improvements upon the several lots, pieces or parcels or portions of lots or subdivisions of land liable therefore and benefited thereby, and hereinafter number to correspond with the numbers upon the attached Assessment Diagram, upon each, severally and respectively, in accordance with the benefits to be received by such parcels, respectively, from the acquisitions and improvements, and more particularly set forth in the list hereto attached and by reference made a part hereof.

As required by said Act, an Assessment Diagram is hereto attached showing the assessment district and also the boundaries and dimensions of the respective parcels of land within said assessment district as the same existed at the time of the passage of said Resolution, each of which parcels having been given a separate number upon said Diagram.

Said assessment is made upon the parcels of land within the assessment district in proportion to the estimated special benefits to be received by said parcels, respectively, from said improvement. The diagram and assessment numbers appearing herein are the diagram numbers appearing on said diagram, to which reference is hereby made for a more particular description of said property.

Each parcel of land assessed is described in the within Assessment Roll by reference to its parcel number as shown on the Assessor's Maps of the County of San Luis Obispo for the fiscal year 2007-08 and includes all of such parcel excepting those portions thereof within existing public roads. For a more particular description of said property, reference is hereby made to the deeds and maps on file and of record in the office of the County Recorder of said County.

Notice is hereby given that serial bonds or term bonds or other financing instruments, to represent unpaid assessments and bear interest at the rate of not to exceed twelve percent (12%) per annum, or such higher rate of interest as may be authorized by applicable law at the time of sale of such bonds, will be issued hereunder in the manner provided by Division 10 of the Streets and Highways Code, the Improvement Bond Act of 1915, and the last installment of such bonds shall mature not to exceed thirty-nine (39) years from the second day of September next succeeding twelve (12) months from their date.

Under the Resolution of Intention, the requirements of Division 4 of the California Streets and Highways Code shall be satisfied with Part 7.5 of said Division 4, for which the following is presented:

1. The total amount, as near as can be determined, of the total principal amount of all unpaid special assessments and special assessments required or proposed to be levied under any completed or pending assessment proceedings, other than contemplated in the current proceedings is:

   $18,774,819.57

2. The total amount of the principal sum of the special assessments (the "Balance to Assessment") proposed to be levied in the current proceedings is:

   $ 126,722,296.23

3. The total amount of the principal sum of unpaid special assessments levied against the parcels proposed to be assessed, as computed pursuant to paragraph 1. above, plus the principal amount of the special assessment proposed to be levied in the current proceedings from paragraph 2. above is:

$ 145,497,115.80

4. It is the intention of the District to generate the remaining $27,721,703.77 on property not being assessed at this time in another assessment proceeding or through separate financing sponsored by the County of San Luis Obispo.

5. The total true value, as near as may be determined, of the parcels of land and improvements which are proposed to be assessed in the current proceedings, as determined by the full cash value of the parcels as shown upon the last equalized assessment roll of the County of San Luis Obispo is:

$ 1,108,806,467.00

Dated this 21 day of February, 2008.

2/21/08

Craig A. Campbell, P.E.
RCE No. 34405, Expires 09-30-09
Wallace Group, a California Corporation

REGISTERED PROFESSIONAL ENGINEER
CRAIG CAMPBELL
No. 34405
Expires 9/30/09
CIVIL
STATE OF CALIFORNIA

2.22.08

Dean Benedix, P.E.
RCE No. 37892, Expires 03-31-09
San Luis Obispo County Public Works Department

REGISTERED PROFESSIONAL ENGINEER
DEAN R. BENEDIX
No. 37892
Exp 3.31.09
CIVIL
STATE OF CALIFORNIA

B. ASSESSMENT ROLL

A list of names and addresses of the owners of all parcels, and the description of each lot or parcel within the County of San Luis Obispo Wastewater Assessment District No. 1 is shown on the last equalized Property Tax Roll of the San Luis Obispo County Assessor, which by reference is hereby made part of this report.

This list is keyed to the Assessor's Parcel Numbers as shown on the Assessment Roll, which includes the proposed amount of assessment apportioned to each lot or parcel and the parcel's assessment number. The Assessment Roll for the Assessment District is shown in a separately bound document which is on file with the Clerk of the Board; said material being too bulky to be bound with this Engineer's Report.

PART II

PRELIMINARY PLANS

Reference is hereby made to the body of evidence and summary cost information contained within the Fine Screening Report previously referenced and incorporated, which is on file in the Office of the County Engineer in the Department of Public Works; said material being too bulky to be bound with this Engineer's Report.

PART III

PROJECT DESCRIPTION

The proposed project consists of a community wastewater collection system and treatment facility, capable of collection, treatment and disposal of sanitary sewer waste which will make available wastewater treatment services needed to satisfy the mandate made by the Central Coast Regional Water Resources Control Board through Resolution No. 83-13, dated September 16, 1983.

PART IV

ESTIMATE OF COSTS

An estimate of the cost of the proposed improvements and of the cost of lands, rights-of-way, and incidental expenses is shown in "Table 1 – Estimate of Costs," which is reproduced from Appendix A. The estimated cost is based on a system sized to convey, treat, and dispose of wastewater under a build-out condition within the assessment district boundary. The special benefit conferred to developed properties, which is the subject of this assessment, is addressed in subsequent sections. As further described in Appendix A, the collection system cost is intended to be sufficient to fund either a gravity system or a STEP system.

Table 1
Estimate of Costs

	Total Estimated Cost for Build-out Condition	Special Benefit for Developed Lots Only (Costs Covered in this Assessment Proceeding)	
		As Preliminarily Approved	As Confirmed and Recorded
	(1)	(2a)	(2b)
Collection System Components			
Lateral Component	$ 10,956,000.00	$ 9,869,372.64	$ 9,834,912.54
Collector Component	52,341,045.00	44,621,635.16	44,444,719.54
Trunk Component	23,105,955.00	18,431,011.04	18,364,383.54
Subtotal	**$ 86,403,000.00**	**$ 72,922,018.84**	**$ 72,644,015.62**
Treatment/Disposal Component			
Wastewater Treatment Facility	$ 27,639,000.00	$ 22,046,894.86	$ 21,967,196.07
Effluent Disposal System	19,422,000.00	15,492,412.60	15,436,408.05
Treatment Facility Site	2,490,000.00	1,986,206.75	1,979,026.67
Subtotal	**$ 49,551,000.00**	**$ 39,525,514.21**	**$ 39,382,630.79**
Common Component			
Engineering/Administration/Legal Costs	$ 16,000,000.00	$ 12,762,762.00	$ 12,716,625.05
Permitting and Mitigation	2,490,000.00	1,986,204.84	1,979,024.77
Subtotal	**$ 18,490,000.00**	**$ 14,748,966.84**	**$ 14,695,649.82**
Total Project Special Benefits Costs	**$ 154,444,000.00**	**$127,196,499.89**	**$126,722,296.23**

Source: Table A.3 of "San Luis Obispo County Wastewater Assessment District No. 1, Determination of Special Benefits and Project Cost" memo dated August 16, 2007 by Dean Benedix, P.E., Assessment Engineer of Work (Appendix A to this Report)

The Board intends, pursuant to subparagraph (f) of Section 10204 of the 1913 Act, to authorize an annual assessment upon each of the parcels of land in the proposed Assessment District to pay various costs and expenses incurred from time to time by the County and not otherwise reimbursed to the County which result from the administration and collection of assessment installments or from the administration or registration of the improvement bonds and the various funds and accounts pertaining thereto, in an amount per year not to exceed six dollars ($6) per parcel, however, said amount may be subject to an inflation adjustment of up to 2% per year. This annual assessment shall be in addition to any fee charged pursuant to Section 8682 and 8682.1 of the Streets and Highways Code.

PART V

ASSESSMENT DIAGRAM

Properties located within the proposed Assessment District are within the prohibition zone established by the Central Coast Regional Water Quality Control Board, in the unincorporated community of Los Osos. The boundaries of the proposed assessment district, as established by the Board of Supervisors with its Resolution of Intention adopted on August 21, 2007, and incorporated herein by reference, do not include two subdivisions within the prohibition zone that have been exempted from collection by the Regional Water Quality Control Board. These subdivisions are commonly known as the Martin Tract and Bayview Heights.

The lines and dimensions of each lot or parcel within the Assessment District are those lines and dimensions shown on the maps of the Assessor of the County of San Luis Obispo for the year when this Report was prepared, and are incorporated by reference herein and made part of this Report. The Assessment Diagram for the Assessment District is shown in a separately bound document which is on file with the Clerk of the Board; said material being too bulky to be bound with this Engineer's Report.

PART VI

METHOD OF ASSESSMENT APPORTIONMENT

A. GENERAL DESCRIPTION OF METHOD

Parcels located within the prohibition zone established by the Central Coast Regional Water Quality Control Board in the unincorporated community of Los Osos are included in the proposed Assessment District, with the exception of properties that have been exempted from collection as noted in Part V. Previous assessment proceedings, including those most recently conducted by the Los Osos Community Service District, have served to establish the estimated build out potential of both developed and vacant properties within the assessment district. These previous proceedings are further described in the "Amended Engineer's Report for the Los Osos Community Services District Wastewater Assessment District No. 1" dated June 28, 2001, and in various engineering and administrative corrections by the CSD from June 2001 through August 2007. The special benefit to each parcel was previously assessed by assigning Benefit Units (BU) to each property for each of five components of the project as described below. One Benefit Unit is equivalent to one single family residence, often termed a dwelling unit equivalent or DUE. The same methods and assessment district boundary have been adopted for the current assessment. However, the primary difference in the current proceedings is the manner in which vacant and under-developed properties are assessed.

On July 17, 2007, the Board of Supervisors adopted a policy position with respect to undeveloped properties within the assessment district. The position of the County is that only developed properties, which are threatened with regulatory enforcement, will be assessed in the current proceedings. Properties are therefore to be assessed consistent with the existing level of development. The complete policy discussion is included herein as Appendix B. Given that the wastewater project described in the Fine Screening Report and associated cost estimates are configured for build-out of the community, the special benefit provided to developed properties should exclude the proportional share of the project cost assigned to either future development of vacant properties or further development of underdeveloped properties. This apportionment to developed properties was performed in the following manner:

- The total special benefits of the project, which includes adequate capacity for the build-out of properties within the assessment district, was estimated for each of five project components as described in Appendix A.

- The number of Benefit Units at build out, attributable to each of five project components, was determined in previous proceedings as described above. These build out Benefit Unit assignments were used for the purpose of apportioning the cost of each project component to each build out Benefit Unit. The value of each Benefit Unit was thereby established, based on build out of the assessment district.

- After obtaining the value of each Benefit Unit by project component, the same value was applied to existing development. The complete process is described in numerical detail below.

A summary of the project components and their relative total special benefit is provided as follows:

Collection System Components Special Benefit (Three Components)

Lateral Component:

Laterals are defined as individual service lines that extend from the main in the street to the property line. In a STEP/STEG system, the lateral component would include the publicly financed and owned collection system components that are located on each private property, such as the STEP/STEG tank, pump, and control panel. A total special benefit of **$10,956,000** was established for build-out as defined in Appendix A. A portion of this special benefit was allocated to developed properties for the current proceedings as summarized in Table 1.

Collector Component:

Collectors are defined as the localized sewer mains and pocket pump stations that convey water to trunks and regional pump stations. Some areas of the community, notably Bayridge Estates and Vista de Oro, have existing lateral and collector infrastructure as part of community septic systems. A total special benefit of **$52,341,045** was established for build-out as defined in Appendix A. A portion of this special benefit was allocated to developed properties for the current proceedings as summarized in Table 1.

Trunk Component:

This component includes larger gravity mains, force mains, pump stations, and standby power facilities that serve regional areas. During the previous assessment proceedings, the trunk component was determined to include 19.1% of the planned pipelines. This percentage will also be used for this assessment. Conveyance facilities required to pump wastewater to a treatment plant site if located east of Los Osos Creek would be included in this component. A total special benefit of **$23,105,955** was established for build-out as defined in Appendix A. A portion of this special benefit was allocated to developed properties for the current proceedings as summarized in Table 1.

Treatment/Disposal Component Special Benefit

This component includes the cost of the wastewater treatment facility, the effluent disposal system, and the wastewater treatment facility site.

Wastewater Treatment Facility:

The special benefits attributable to the wastewater treatment facility were determined based on a range of technologies that would form a functional Level 1 system, which would also fund a Level 2 project. A number of different combinations of treatment technology and sludge processing would be fundable at a cost less than or equal to the proposed special benefit. A total special benefit of **$27,639,000** was established for build-out as defined in Appendix A. A portion of this special benefit was allocated to developed properties for the current proceedings as summarized in Table 1.

Effluent Disposal System:

The special benefit associated with the effluent disposal system was determined by using the high range of the Level 1 cost estimate. It should be noted that a Level 2 project could also be completed for essentially the same cost. A total special benefit of **$19,422,000** was established for build-out as defined in Appendix A. A portion of this special benefit was allocated to developed properties for the current proceedings as summarized in Table 1.

Treatment Facility Site:

A total special benefit of **$2,490,000** was established for build-out as defined in Appendix A. A portion of this special benefit was allocated to developed properties for the current proceedings as summarized in Table 1.

Common Component Special Benefit

Project costs that are attributable to the entire project including engineering, administration, legal, permitting, and mitigation are included in this component.

Engineering, Administration, and Legal:

A total special benefit of **$16,000,000** was established for build-out as defined in Appendix A. A portion of this special benefit was allocated to developed properties for the current proceedings as summarized in Table 1.

Permitting and Mitigation:

A total special benefit of **$2,490,000** was established for build-out as defined in Appendix A. A portion of this special benefit was allocated to developed properties for the current proceedings as summarized in Table 1.

B. ASSESSMENT RATE CALCULATION

The above-referenced component costs were then apportioned to the number of Benefit Units assigned to each component for build-out of the assessment district. An example for the lateral component is provided below, and a summary for the remaining components is provided in Table 2.

Lateral Component calculation of cost per BU based on build-out

Project Special Benefits Costs = $10,956,000
Number of Current (or Build Out) Lateral BUs = 4,769
Cost per BU = $10,956,00 / 4,769 = $2,297.34

To obtain the total assessment for the current proceedings, the cost per BU was multiplied by the number of BUs based on the existing use of each developed parcel.

Lateral Component calculation of total assessment for developed properties

Cost per BU = $2,297.34
Number of Lateral BUs for developed parcels based on existing use = 4,281
Total Assessment for Lateral Component = $9,834,912.54

Table 2
Component Cost Calculation

Component	Project Special Benefits Cost	÷	No. of BUs for All Parcels Based on Build Out Use	=	Cost per BU	×	No. of BUs for Developed Parcels Based on Existing Use	=	Total for This Assessment
Lateral	$ 10,956,000		4,769.00		$ 2,297.34		4,281.00		$ 9,834,912.54
Collector	$ 52,341,045		5,745.47		$ 9,109.97		4,878.69		$ 44,444,719.54
Trunk	$ 23,105,955		6,734.72		$ 3,430.87		5,352.69		$ 18,364,383.54
Treatment/ Disposal	$ 49,551,000		6,734.72		$ 7,357.54		5,352.69		$ 39,382,630.79
Common	$ 18,490,000		6,734.72		$ 2,745.47		5,352.69		$ 14,695,649.82
Total	$154,444,000				$24,941.19				$126,722,296.23

Within the Assessment District, there are various land uses such as single family residence, multiple family residences, commercial retail property, open space, etc. The method of assigning BUs to each of these land uses is shown in "Table 3 - Benefit Unit (BU) Assignment Based on Existing Use." Table 3 lists each type of land use in the District and the BUs assigned thereto.

Residential Single Family and Residential Suburban (RSF & RS)

A parcel with an existing residence is assessed one (1) BU or one share in each of the five project components. Additional existing residences are also assessed one (1) BU.

Residential Multi-Family (RMF)

Improved parcels being used as Residential Multi-Family are assessed one (1) lateral component per property plus ¾ of one BU per apartment/condo for collector, trunk, treatment and disposal and common facilities. Less wastewater flow is expected from RMF parcels, thus the reduction in BU's from Single Family Residences. Improved parcels with an existing single residence are assessed one (1) BU.

Commercial (CR, CS, OP)

The County Land Use Ordinance permits a wide range of uses within these zones in particular, rendering an assessment based on land use impractical. For example, a commercial parcel may house a relatively low wastewater generating activity such as warehousing or a more intense user such as a restaurant or car wash.

To avoid conjecture regarding ultimate land use, commercial parcels being used as Commercial were assessed according to parcel size. Improved parcels up to 10,000 square feet were assessed the same as an occupied single family residence. Larger parcels are assessed at increasing increments of benefit units for each 10,000 square foot increment of land. For example, a 25,000 square foot lot is assessed at a full 2.50 BUs. In circumstances where the County Land Use Ordinance would permit the addition of a residential unit to the commercial use, the parcel size was still used as the basis for the assignment of benefit. Differences in commercial uses will be accounted for in varying monthly service charges.

Improved commercial parcels used for residential purposes are assessed the same as RSF or RMF parcels, based on existing use.

Open Space (OS)

These parcels are not developable by definition and, therefore, received no assessment.

Table 3
Benefit Unit (BU) Assignment
Based on Existing Use

Land Use Category	Benefit Units (BUs)				
	Lateral Component (BU)	Collector Component (BU)	Trunk Component (BU)	Treatment and Disposal Component (BU)	Common Facility Component (BU)
Residential Single Family and Residential Suburban (RSF & RS)					
Vacant Parcel	0	0	0	0	0
Improved Property with Existing Single Residence	1	1	1	1	1
Each Additional Existing Residence	1	1	1	1	1
Residential Multi-Family (RMF)					
Vacant Parcel	0	0	0	0	0
Improved Property with Existing Single Residence	1	1	1	1	1
Improved Property with Two or More Units	1	0.75/Unit	0.75/Unit	0.75/Unit	0.75/Unit
Condominiums					
Vacant Parcel	0	0	0	0	0
Existing Common Area	1	0	0	0	0
Each Existing Unit	0	0.75/Unit	0.75/Unit	0.75/Unit	0.75/Unit

Mobile Home Parks					
Vacant Parcel	0	0	0	0	0
Existing Park Common Area	1	0	0	0	0
Each Existing Space	0	0	0.50/Unit	0.50/Unit	0.50/Unit
Vista del Oro and Bayridge Estates Tracts					
Vacant Parcel	0	0	0	0	0
Improved Property with Existing Single Residence	0	0	1	1	1
Each Additional Existing Residence	0	0	1	1	1
Commercial (CS, CR, OP)					
Vacant Parcel	0	0	0	0	0
Occupied Business	1	1/10,000-sf	1/10,000-sf	1/10,000-sf	1/10,000-sf
Existing Residential Single Family Use	1	1	1	1	1
Existing Residential Multi-Family Family Use	1	0.75/Unit	0.75/Unit	0.75/Unit	0.75/Unit
Open Space (OS)					
Not Developable by Definition	0	0	0	0	0
Special Cases					
See Following Text					

Special Cases

Condominiums

Condominiums, although many times under separate ownership, represent special cases. Each unit has been assessed ¾ BU per unit in the same manner as apartments with the exception of the lateral component. In the case of condominiums, the common area has been assessed for a single lateral BU. The exception are condominium parcels in Monarch Grove, where are assessed zero (0) BUs (see explanation for Monarch Grove below).

Mobile Home Parks

Since mobile home spaces generate less wastewater than single family residences, they have been assessed ½ the rate of RSF housing. Each park has been assessed one lateral unit plus 0.5 BUs per space for each trunk, treatment and disposal, and common facility components.

Park Name	Assessment Number	Number of Spaces	Equivalent BUs
Morro Shores	2517	164	82.00
Daisy Hill	5221	139	69.50
Sea Oaks	5222	125	62.50
Sunny Oaks	6070	65	32.50
1259 2nd Street	0427	17	8.50

Schools

Schools have been assessed as special cases. There are three existing schools in the Assessment District. To determine the portion of the project special benefit costs each school is to bear, the anticipated wastewater flow from each school was considered. Based on wastewater load and flow factors, a total of 20.25 students per equivalent benefit unit (BU) was assigned. Therefore, each school has been assessed for one lateral component plus the number of equivalent BUs for each of the collector, trunk, treatment and disposal, and common facilities components based on the school's student population.

School Name	Assessment Number	Future Student Population	Equivalent BUs
Baywood Elementary	826	600	29.64
Sunnyside Elementary	4923	290	14.30
Monarch Grove Elementary	3887	475	23.50

Other Special Cases

Special Case	Asmt No.	Means of Assessing
Library	2520	Since the library is a special public facility that is not an intensive wastewater generator, it has been assessed on the same basis as a single family residence.
Fire Station	6061	This public facility has been assessed at 1.5 BUs to account for a more intensive use than a single family residence.
South Bay Community Center	6008	This meeting hall was confirmed to be active 7 days per week and was previously assessed based on EPA flow factors at 2.33 equivalent benefit units. A subsequent parcel merge revised the equivalent benefit unit assignment to 2.98.
Churches and Other Meeting Halls	Misc.	Churches and other known meeting halls are assessed as meeting halls in a similar manner to the Community Center, with an adjustment made for a reduced number of meeting days: 2.33 BUs x (2 mtg days)/7 days per week = 0.67 equivalent BUs. There are two parcels with single family residences which are assessed one (1) BU.

Morro Shores	2518	This unsubdivided, 58 acre parcel represented a special case in the previous assessment proceedings in Los Osos, and was assessed an equivalent BU of 273.25. However, this parcel is currently vacant and will, therefore, receive an assessment of zero.
Monarch Grove	Misc.	Although Monarch Grove is within the Assessment District, the properties within this subdivision will not be assigned any special benefit. The subdivision currently utilizes an on-site tertiary treatment facility under a separate permit with the Regional Water Quality Control Board.
Vista del Oro and Bayridge Estates Tracts	Misc.	The individual parcels do not have septic tanks. Wastewater flows through a gravity system to large septic tanks and community leach fields that are centralized for the two developments. The individual parcels have been included in prior assessment proceedings for the trunk, treatment/disposal and common components. This method will again be used for the current proceedings. The developments will utilize existing lateral and collection facilities.
Golf Course	2792	According to the Regional Water Quality Control Board, the property is connected to the Monarch Grove treatment facility and, therefore, will receive an assessment of zero.
Morro Palisades	5224	The Morro Palisades property will be used for disposal and will therefore receive no assessment.
Properties Outside the Urban Services Line (USL)		Sewer service to parcels outside of the Urban Services Line (USL) is not planned to be extended at this time. Therefore, such parcels have not been assessed.

To obtain the total assessment for each parcel, the Cost Per BU was multiplied by the BU assignment as described above. For example, a parcel with one (1) existing single family residence = $24,941.19.

Component	BU	x	Cost Per BU	=	Assessment
Lateral	1		$ 2,297.34		$ 2,297.34
Collector	1		9,109.97		9,109.97
Trunk	1		3,430.87		3,430.87
Treatment/Disposal	1		7,357.54		7,357.54
Common	1		2,745.47		2,745.47
Total			$ 24,941.19		$ 24,941.19

APPENDIX A

SAN LUIS OBISPO COUNTY
DEPARTMENT OF PUBLIC WORKS

Noel King, Director

County Government Center, Room 207 • San Luis Obispo CA 93408 • (805) 781-5252

Fax (805) 781-1229 email address: pwd@co.slo.ca.us

August 16, 2007

TO: Noel King, Director of Public Works

VIA: Paavo Ogren, Deputy Director of Public Works

FROM: Dean Benedix, P.E., Assessment Engineer of Work

SUBJECT: San Luis Obispo County Wastewater Assessment District No. 1, Determination of Special Benefits and Project Cost

BACKGROUND

On February 6, 2007, the Board of Supervisors approved a contract for Assessment Engineering services with the Wallace Group for the Los Osos wastewater project. The contract contemplates the completion of an Assessment Engineer's Report through the combined efforts of the County and the Wallace Group. Craig Campbell, P.E. of the Wallace Group and Dean Benedix, P.E., Utilities Manager for the County Public Works Department were selected to serve jointly as the Engineer of Work for the assessment proceedings. The Scope of Work to be completed by the County included the following items as described in Table 1 of the contract:

1. Determine the proportional special benefits for overall project components as described in Article 13D, Section 4a of the California State Constitution.

2. Provide a summary of the proposed project and estimated total cost as required by Section 10204 of the 1913 Act.

3. Provide a notice and ballot to each parcel in the assessment district as described in Article 13D.

This memorandum summarizes the information required in the first two scope items, and provides the basis for the preparation of an Assessment Engineer's Report that delineates the special benefit amount for each parcel within the assessment district.

ANALYSIS AND CONCLUSIONS

In accordance with Assembly Bill 2701 (Blakeslee), the County commissioned the preparation of an engineering analysis that identifies a range of viable project options for the Los Osos wastewater project. The report was prepared by Carollo Engineers and is entitled, "Viable Project Alternatives Fine Screening Analysis" dated August, 2007 (Fine Screening Report). The Fine Screening Report provides a substantial body of evidence that can be used to estimate the overall special benefits that would accrue to properties within the assessment district. The selection of specific project elements such as the treatment plant site and collection technology will occur in future phases of the project, following the County's due diligence period and a community survey. However, costs can be assigned to each project element that would allow for a reasonable range of alternatives while providing a complete and functional wastewater collection, treatment, and disposal system. The following guidelines were used to identify the proportional special benefits for each project element:

Special Benefit Guidelines

1. The Fine Screening Report identified a range of water supply benefits that could be achieved with the wastewater project. Given that properties inside and outside of the assessment district benefit from water supply enhancements, incremental project costs that relate to providing a water supply benefit beyond the current condition (Level 1 identified in the Fine Screening Report) are deemed general benefits.

2. The cost assigned to each component should be sufficient to fund a range of viable alternatives, but would not necessarily fund the most costly alternatives. This guideline would apply even if the most costly alternative can be determined to confer a special benefit consistent with its higher cost. As a result, the proposed assessed special benefit is expected to be less than the maximum special benefit which could be assessed given the body of evidence. If more costly alternatives are ultimately selected, other/additional sources of revenue would be required to supplement the proceeds of the assessment district.

3. The cost of the inclusion of additional treatment processes beyond secondary treatment, such as tertiary filtration, if determined necessary to achieve a level of water supply benefit beyond the current condition, would be a general benefit. The cost of providing advanced sludge recycling through composting or other means would also not be included as a special benefit.

4. Given that overall project costs for engineering, administration, and legal expenses would include some efforts relating to general benefits, the low range of these project costs will be utilized as the proposed special benefit.

5. The mid-point of the estimated cost of the treatment plant site will be utilized as the proposed special benefit.

6. Given the uncertainties associated with permit and mitigation costs and the need for a reasonable contingency, the high end of the permitting/mitigation cost range will be used as the proposed special benefit.

7. In the event project components are implemented that result in total costs less than the allocated special benefit for the project, the County shall then reduce the assessment levied to reflect the actual special benefits of the total project costs incurred for project construction and implementation.

General Benefits

Costs of general benefits are not included in the estimate of Special Benefits included herein for project component costs. General benefits are capital improvements, general services, operations and/or maintenance, other amenities and/or programs which benefit the public at large or are a general benefit to all properties within a designated area. Examples of such general benefits are:

1. Repayment of the $6.5 million dollar State Revolving Fund (SRF) loan used by the LOCSD to initiate construction on the former wastewater project. While the County does not know whether the California SRF program will be utilized to help fund the project, nor whether the Governor's signing message with his approval of Assemble Bill 2701 will be binding, any such costs shall not be paid utilizing the proposed assessments.

2. Biosolids treatment and disposal measures beyond that required for the baseline wastewater treatment project.

3. Inclusion of additional treatment processes beyond secondary treatment, such as tertiary filtration.

4. Preparation, processing and/or implementation of a Habitat Conservation Plan.

5. Mitigation of seawater intrusion beyond the impacts of the wastewater treatment project.

6. Preparation of a regional water resources plan.

Costs for implementation of any general benefit improvement, service, program or amenity is anticipated to be funded through grants and/or with other legally permissible supplemental funding sources.

Collection System Special Benefit

Pursuant to Guideline No. 2 above, the special benefit of the collection system was selected such that a range of collection system alternatives could be funded. In the current project selection strategy, the STEP and gravity alternatives would compete through the construction bidding phase using a competitive bid, design/build, and/or build/own/operate/transfer process. If gravity system bids are received near the high end of the cost range, it is unlikely that gravity will be competitive with STEP. For this reason, the allocated special benefits will be based on the low end of the gravity system cost range, which would also cover the cost of a STEP system.

Consistent with previous assessment proceedings in Los Osos, the collection system can be separated into three components, defined as follows:

<u>Lateral component</u>: Laterals are defined as individual service lines that extend from the main in the street to the property line. In a STEP system, the lateral component would include the publicly financed and owned collection system components that are located on each private property within appropriate public easements that will need to be established for ownership and maintenance by the County, including the STEP tank, pump, control panel, and appurtenant facilities.

<u>Trunk component</u>: This component includes larger gravity mains, force mains, pump stations, and standby power facilities that serve regional areas. During the previous assessment proceedings, the trunk component was determined to include 19.1% of the planned pipelines. This percentage will also be used for the current assessment. Conveyance facilities required to pump wastewater to a treatment plant site if located east of Los Osos Creek would be included in this component.

<u>Collector component</u>: Collectors are defined as the localized sewer mains and pocket pump stations that convey water to trunks and regional pump stations. Some areas of the community, notably Bayridge Estates and Vista de Oro, have existing lateral and collector infrastructure as part of their existing community septic systems.

Table A.1 on the following page summarizes the proposed special benefits for each component of the collection system. The costs were derived from the low range of the gravity collection system, as summarized in the Fine Screening Report.

Treatment, Disposal, Permit, and Administrative Project Costs

In addition to the three collection system components described above, two additional project components are required to complete a functional wastewater system as follows:

<u>Treatment/Disposal Component</u>: This component includes the cost of the wastewater treatment facility, the effluent disposal system, and the wastewater treatment facility site.

<u>Common Component</u>: Project costs that are attributable to the entire project including engineering, administration, legal, permitting, and mitigation are included in this component.

The special benefits attributable to the wastewater treatment facility were determined based on a range of technologies that would form a functional Level 1 system. A number of different combinations of treatment technology and sludge processing would be fundable at a cost less than or equal to the proposed special benefit. Table A.2 on the following page summarizes sample technologies that could be funded at a cost at or near the proposed special benefit. As indicated in Table A.2, a total special benefit of $27,639,000 is recommended for this element of the project.

The special benefit associated with the effluent disposal system was determined by using the high range of the Level 1 cost estimate, or $15,600,000 in 2007 dollars. It should be noted that a Level 2 project could also be completed for essentially the same cost. The total special benefit for effluent disposal, including inflation of 24.5%, is therefore estimated at $19,422,000.

Table A.3 summarizes the proposed special benefit for the treatment/disposal and common assessment components, and the total wastewater project:

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Table A.1 - Collection System Special Benefit and Component Allocation				Cost Allocation by Collection System Component	
Item Description	Low Range Construction Cost Estimate	Total Cost with Inflation 24.50%	Lateral Component	Collector Component 80.90%	Trunk Component 19.10%
Mob/Demob/GC's (split)	$3,700,000	$4,606,500		$3,726,659	$879,842
Gravity sewers / force mains (split)	$27,800,000	$34,611,000		$28,000,299	$6,610,701
Manholes (split)	$4,300,000	$5,353,500		$4,330,982	$1,022,519
Shoring and dewatering (split)	$4,800,000	$5,976,000		$4,834,584	$1,141,416
Duplex pump station (trunk)	$2,600,000	$3,237,000			$3,237,000
Triplex pump station (trunk)	$1,200,000	$1,494,000			$1,494,000
Pocket pump station (collector)	$2,400,000	$2,988,000		$2,988,000	
Standby power station (trunk)	$2,500,000	$3,112,500			$3,112,500
Misc facility requirements (split)	$3,200,000	$3,984,000		$3,223,056	$760,944
Laterals in right of way (lateral)	$8,800,000	$10,956,000	$10,956,000		
Road restoration (split)	$5,200,000	$6,474,000		$5,237,466	$1,236,534
Land and easement acquisition	No additional cost	N/A			
Overhead and profit	No additional cost	N/A			
Conveyance to out-of-town WWTF (trunk)	$2,900,000	$3,610,500			$3,610,500
Totals	$69,400,000	**$86,403,000**	**$10,956,000**	**$52,341,045**	**$23,105,955**

Notes: 1. Percentage split between trunk and collector from gravity main analysis performed by the LOCSD in the 2001 assessment district - applied to split items only.
2. Estimate of Inflation from Fine Screening Report, Appendix C

Table A.2 - Treatment System Special Benefit and Sample Projects					
System Description	Secondary Treatment Plant	Nitrification/Denitrification	Sludge Processing	Total Construction Cost Estimate in 2007 dollars	**Total Cost with Inflation 24.50%**
Oxidation ditch with sub-class B sludge processing and gravity collection system influent	$19,100,000	Additional facilities not required	$3,100,000	$22,200,000	$27,639,000
Pond system with full nitrification and denitrification facilities	$14,200,000	$7,400,000	Additional facilities not required	$21,600,000	$26,892,000
Biolac system with full dentrification facilities and sub-class B sludge processing from a STEP collection system	$13,700,000	$3,600,000	$2,000,000	$19,300,000	$24,028,500
Recommended Special Benefit for Wastewater Treatment System					**$27,639,000**

Notes: 1. Sub class B estimates include the cost for belt filter press dewatering
2. Estimate of inflation from Fine Screening Report, Appendix C

Table A.3: Special Benefits Summary for Treatment/Disposal and Common Components

Item Description	Proposed Special Benefits	Comments
Wastewater Treatment Facility (Secondary for Level 1 Disposal)	$27,639,000	Funds a range of secondary technology alternatives, not including tertiary treatment (see Table A.2)
Effluent Disposal System (Level 1)	$19,422,000	Water supply benefits beyond current conditions are general benefits
Treatment facility site	$2,490,000	Middle of cost range consistent with proposed guidelines
Total for Treatment/Disposal Component	**$49,551,000**	
Project costs including engineering, administration, and legal	$16,000,000	Low end of cost range consistent with proposed guidelines
Permitting and mitigation	$2,490,000	High end of cost range consistent with proposed guidelines
Total for Common Component	**$18,490,000**	
Total for Collection System Components from Table A.1	**$86,403,000**	
Total Project Special Benefits	**$154,444,000**	

APPENDIX B

COUNTY OF SAN LUIS OBISPO BOARD OF SUPERVISORS
AGENDA ITEM TRANSMITTAL

(1) DEPARTMENT Public Works	(2) MEETING DATE July 17, 2007	(3) CONTACT/PHONE Paavo Ogren, Deputy Director of Public Works (805) 781-5252

(4) SUBJECT
Consideration of Policy Direction on Proposition 218 Property Owner Votes for the Los Osos Wastewater Project

(5) SUMMARY OF REQUEST
Pursuant to Assembly Bill 2701 (Blakeslee), the County must conduct a Proposition 218 property owner vote to develop assessment funding for a community wastewater project if the County is going to implement the project. Distinguishing how project issues differ between developed versus undeveloped properties, and appropriate policy direction, is needed for overall project planning and development.

(6) RECOMMENDED ACTION
It is our recommendation that your Honorable Board adopt the proposed policy in Exhibit "A" regarding Proposition 218 Property Owner votes for the Los Osos wastewater project.

(7) FUNDING SOURCE(S) General Fund	(8) CURRENT YEAR COST N/A	(9) ANNUAL COST N/A	(10) BUDGETED? ☐ No ☒ Yes ☐ N/A

(11) OTHER AGENCY/ADVISORY GROUP INVOLVEMENT (LIST):
Central Coast Regional Water Quality Control Board, Los Osos Community Services District, Monarch Grove Homeowners Association, California Coastal Commission

(12) WILL REQUEST REQUIRE ADDITIONAL STAFF? ☒ No ☐ Yes, How Many? ______
☐ Permanent ____ ☐ Limited Term ____ ☐ Contract ____ ☐ Temporary Help ____

(13) SUPERVISOR DISTRICT(S) ☐ 1st, ☒ 2nd, ☐ 3rd, ☐ 4th, ☐ 5th, ☐ All	(14) LOCATION MAP ☐ Attached ☒ N/A	(15) Maddy Act Appointments Signed-off by Clerk of the Board ☒ N/A

(16) AGENDA PLACEMENT ☐ Consent ☐ Hearing (Time Est. ________) ☐ Presentation ☒ Board Business (Time Est. 45 MIN.)	(17) EXECUTED DOCUMENTS ☐ Resolutions (Orig + 4 copies) ☐ Contracts (Orig + 4 copies) ☐ Ordinances (Orig + 4 copies) ☒ N/A
(18) NEED EXTRA EXECUTED COPIES? ☐ Number: ________ ☐ Attached ☒ N/A	(19) BUDGET ADJUSTMENT REQUIRED? ☐ Submitted ☐ 4/5th's Vote Required ☒ N/A

(20) OUTLINE AGREEMENT REQUISITION NUMBER (OAR) N/A	(21) W-9 ☒ No ☐ Yes	(22) Agenda Item History ☐ N/A Date: June 12, 2007

(23) ADMINISTRATIVE OFFICE REVIEW

Reference: 07JUL-17-BB-1

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SAN LUIS OBISPO COUNTY
DEPARTMENT OF PUBLIC WORKS
Noel King, Director
County Government Center, Room 207 • San Luis Obispo CA 93408 • (805) 781-5252
Fax (805) 781-1229 email address: pwd@co.slo.ca.us

TO: **Board of Supervisors**

FROM: **Paavo Ogren, Deputy Director of Public Works** PO

VIA: **Noel King, Director of Public Works** NK

DATE: **July 17, 2007**

SUBJECT: **Consideration of Policy Direction on Proposition 218 Property Owner Votes for the Los Osos Wastewater Project**

Recommendation

It is our recommendation that your Honorable Board adopt the proposed policy in Exhibit "A" regarding Proposition 218 Property Owner votes for the Los Osos wastewater project.

Discussion

On January 1, 2007, Assembly Bill 2701 (Blakeslee) went into effect and transferred the sole authority to develop a community wastewater project in Los Osos from the Los Osos Community Services District (LOCSD) to the County. On October 3, 2006 your Board approved a $2.0 million appropriation from the General Fund budget for the Public Works Department to undertake efforts needed to conduct a Proposition 218 assessment vote of property owners, which was prescribed by AB 2701. At this time, it is necessary for your Board to consider which property owners may submit ballots pursuant to requirements of Proposition 218 so that the assessment engineer's report can be prepared for your consideration in the near future.

Staff is currently following the Board direction established on June 19, 2006. At that time, your Board adopted "key elements" of a legislative platform, which provided direction while AB 2701 was moving through the legislative processes of the State Assembly and State Senate – ultimately leading to approval by Governor Schwarzenegger on September 20, 2006. Also on June 19, 2006, your Board adopted project related policies for the Public Works Department to follow. Those policies are generally broad-based in nature. Now that the project's "Fine Screening" report has been released for public review, it is also important to begin considering more detailed project policies in anticipation of future steps.

At this time, identifying property owners who may submit ballots on the Proposition 218 vote is important to provide the assessment engineer with direction in preparing the assessment engineer's report. That report is required by Proposition 218, and it includes the method used to determine special benefits for properties and to calculate the assessments proposed on those properties. As with many issues with Los Osos, the topic is complex and involves legal, engineering, finance and regulatory issues associated with overall project efforts. A more detailed review of those issues is covered in the attached report entitled "Proposition 218 – A Property Owner Vote".

The following is a summary of the primary issues reviewed in the attached report and considered by staff while developing the recommended policies in Exhibit "A."

- AB 2701 stipulates that the County will conduct a Proposition 218 assessment vote of property owners.

- A community wastewater project benefits both developed and undeveloped properties.

    - Developed Properties:
        - The owners of developed property located within the "prohibition zone"[1] established by the Central Coast Regional Water Quality Control Board (Regional Water Board) are currently subject to, or threatened with, regulatory enforcement actions as a result of existing septic discharges.

    - Undeveloped Properties:
        - The owners of undeveloped property that remain within the prohibition zone are not subject to the same regulatory actions affecting owners of developed property but they are impaired from developing their property due to the non-existence of required wastewater infrastructure and other issues.

        - The existing Coastal Development Permit establishes specific conditions that must be satisfied before owners of undeveloped properties can develop their properties, even if the wastewater project is completed.

    - Allowing the owners of property responsible for discharging, and facing or threatened with regulatory enforcement action, to decide on the outcome of the Proposition 218 vote required by AB 2701 creates a direct relationship between those facing regulatory actions and those who decide on whether the County may proceed with development of a community wastewater project.

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1 See Attachment "A" to the attached report entitled "Proposition 218 – A Property Owner Vote"

- The result of the Proposition 218 vote by owners of developed properties is independent of providing service to undeveloped properties and in no way precludes the owners of undeveloped properties from participating in the wastewater project.

Several special cases also exist within the prohibition zone, which are further discussed in the attached report. While final direction on those cases is not needed at this time, staffs' recommendation included in Exhibit "A" includes allowing the individual owners of developed properties affected by those special cases to also cast ballots in the upcoming Proposition 218 vote. Your Board's final decision on those cases will be reflected in actions at the time that your Board is considering the assessment engineer's report and providing staff with direction to conduct the actual Proposition 218 vote, which is currently scheduled for August 28, 2007.

Other Agency Involvement/Impact

The Regional Water Board established the wastewater prohibition zone pursuant to Resolution No. 83-13, adopted on September 16, 1983. The Los Osos Community Services District currently operates wastewater facilities for the Bayridge Estates and Vista de Oro septage collection systems. The Monarch Grove Homeowners Association currently operates the Monarch Grove wastewater treatment facilities. The California Coastal Commission established permit conditions on the project. Numerous other agencies are involved in permitting and funding efforts.

Financial Considerations

The proposed policy recommendations do not have financial implications at this time. Instead, the policies recognize that the multiple steps and decisions by constituents with diverse interests will be needed for a County implemented wastewater project in Los Osos.

Results

The proposed policy recommendations would allow those owners of properties that are currently subject to, or threatened with, enforcement actions by the Regional Water Board to make the decision on whether they want the County to implement a community wastewater project on their behalf by supporting the Proposition 218 assessments that will be proposed in the near future for funding of a project.

Attachments: Exhibit "A" – Policy Recommendation regarding Proposition 218 Property Owner votes for the Los Osos wastewater project
Report entitled – "Proposition 218 – A Property Owner Vote"
Vicinity Map

File: 310.85.02

Reference: 07JUL17-BB-1

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Exhibit "A"
Los Osos Wastewater Project
Proposition 218 Property Owner Votes

1. That the Proposition 218 vote required by AB 2701 is conducted for developed parcels subject to, or threatened with, regulatory enforcement action by the Central Coast Regional Water Quality Control Board (Regional Water Board).

2. Staff shall prepare a report on options for undeveloped properties, both within the boundaries of the "prohibition zone" developed by the Regional Water Board, as well as undeveloped parcels outside of the prohibition zone but within the Los Osos Urban Services line, including but not limited to the following considerations:

    a. Wastewater infrastructure needed for those undeveloped parcels before they can be developed.

    b. Water supply infrastructure needed for those undeveloped parcels before they can be developed, which shall include consultation and possible development of conceptual terms of agreements with the water purveyors of Los Osos.

    c. Habitat Conservation Resource issues that may need to be resolved before those undeveloped parcels can be developed.

    d. General Plan issues that may need to be resolved before those undeveloped properties can be developed.

    e. Options for a second Prop 218 vote for owners of undeveloped parcels, including but not limited to the following:

        i. "Availability" assessments pursuant to the Uniform Standby Charge Procedures Act (Chapter 12.4 (commencing with Section 54984) of Part 1 of Division 2 of Title 5).

        ii. A "resource project" that would cover proportional special benefits for those undeveloped parcels, including wastewater infrastructure, water supply infrastructure, and/or habitat conservation resources that may be needed for those undeveloped parcels before they can develop.

    f. Options for development of wastewater and water supply infrastructure capacity for undeveloped parcels, and provisions for habitat conservation, with the imposition of development related fees which would be paid at the time of the development of those undeveloped parcels in lieu of a second Prop 218 vote.

    g. Other considerations that may be identified during the preparation of the report.

Proposition 218 – A Property Owner Vote

Summary

In November 1996, California voters approved Proposition 218 (Prop 218), commonly referred to as the "right to vote on taxes act." It is incorporated into the California State Constitution as Article XIIID, which establishes requirements for local agencies relating to property related assessments. Under the authority of Assembly Bill 2701 (AB 2701), the County of San Luis Obispo must propose assessments to support funding of the Los Osos wastewater project. If the Prop 218 vote is successful and authorizes the imposition of assessments, then AB 2701 establishes a "due diligence" period to provide the County with the opportunity to work on additional project details and determine whether the County Board of Supervisors will direct the implementation of a project.

The importance of the order of first, the Prop 218 vote and then second, the due diligence period includes the legislative recognition that a successful Prop 218 vote is not the only factor that could affect a successful project. Environmental review and permitting, which have always been envisioned during the due diligence process since prior to the approval of AB 2701, are some of the additional factors that have significant influence on public works projects. Nevertheless, the Prop 218 vote is an important "first step" because it will determine the answer to the single greatest question...

> Do Los Osos property owners want the County of San Luis Obispo to implement a community wastewater project?

Several requirements exist under Article XIIID, including the following:

> "An agency which proposes to levy an assessment shall identify all parcels which will have a special benefit conferred upon them <u>and</u> upon which an assessment will be imposed."

This is an especially important provision because it creates the question...

> Which parcels will the County propose to impose assessments upon?

On this matter, staff is recommending that your Board provide the following direction:

1. That the Proposition 218 vote required by AB 2701 is conducted for developed parcels subject to, or threatened with, regulatory enforcement action by the Central Coast Regional Water Quality Control Board (Regional Water Board).

2. Staff shall prepare a report on options for undeveloped properties, both within the boundaries of the "prohibition zone" developed by the Regional Water Board, as well as undeveloped parcels outside of the prohibition zone but within the Los Osos Urban Services line, including but not limited to the following considerations:

D-16

a. Wastewater infrastructure needed for those undeveloped parcels before they can be developed.

b. Water supply infrastructure needed for those undeveloped parcels before they can be developed, which shall include consultation and possible development of conceptual terms of agreements with the water purveyors of Los Osos.

c. Habitat Conservation Resource issues that may need to be resolved before those undeveloped parcels can be developed.

d. General Plan issues that may need to be resolved before those undeveloped properties can be developed.

e. Options for a second Prop 218 vote for owners of undeveloped parcels, including but not limited to the following:

    i. "Availability" assessments pursuant to the Uniform Standby Charge Procedures Act (Chapter 12.4 (commencing with Section 54984) of Part 1 of Division 2 of Title 5).

    ii. A "resource project" that would cover proportional special benefits for those undeveloped parcels, including wastewater infrastructure, water supply infrastructure, and/or habitat conservation resources that may be needed for those undeveloped parcels before they can develop.

f. Options for development of wastewater and water supply infrastructure capacity for undeveloped parcels, and provisions for habitat conservation, with the imposition of development related fees which would be paid at the time of the development of those undeveloped parcels in lieu of a second Prop 218 vote.

g. Other considerations that may be identified during the preparation of the report.

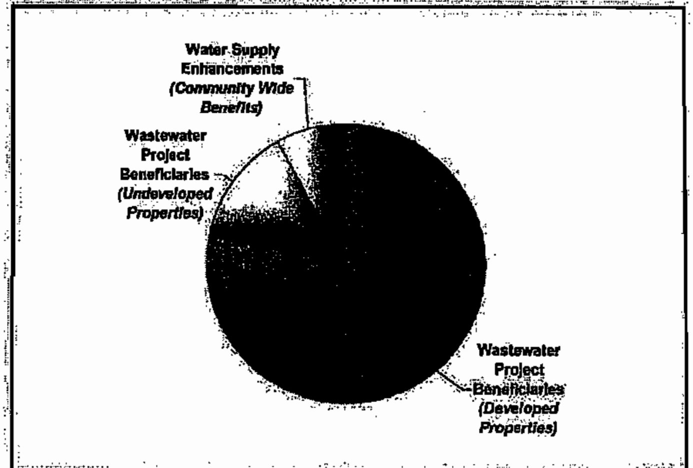
Discussion

The distinction between developed parcels and undeveloped parcels is important because the issues facing owners of developed parcels and the owners of undeveloped parcels are significantly different.

- Owners of developed parcels are subject to, or threatened with, significant enforcement actions. Staff recommendations are based on a policy position that the owners of the parcels subject to, or threatened with, enforcement action should make the decision on whether the County can proceed with the development of a community wastewater project under the authority of AB 2701.

- Owners of undeveloped parcels within the prohibition zone will need more than the development of wastewater infrastructure before they may develop their parcels. Although the proposal and imposition of wastewater "availability assessments" pursuant to Prop 218 may not require those other issues to be resolved, the water supply issue is a significant community-wide issue, including all undeveloped parcels, and separate treatment of undeveloped parcels is warranted from the public policy position that assessments should not be imposed on undeveloped parcels prior to resolution of infrastructure issues needed for those parcels to develop.

The adjacent chart illustrates the costs identified in the draft Fine Screening report prepared by the project team and their approximate relationship to overall benefits (special and general) of wastewater and water supply infrastructure. It is important to recognize that actual dollar amounts and percentages have been intentionally omitted from the chart since analysis has not been completed and the chart is intended for overall illustrative purposes only. It is also important to recognize that the water supply enhancements identified in the draft report only include those that could be directly developed with the wastewater project, which would be insufficient to mitigate existing sea water intrusion, nor would they be sufficient to meet water supply at build-out. Consequently, resolution of water supply needs for undeveloped parcels will require involvement with the water purveyors and is not the sole purview of the County – further limiting the County's ability to assure owners of undeveloped parcels that they can in fact develop once a community wastewater project is constructed and operational.



Coastal Development Permit (CDP) Requirements

The existing Coastal Development Permit from the California Coastal Commission for a Los Osos wastewater project, dated January 19, 2005 (Permit Application No.: A-3-SLO-03-113) includes some important conditions that relate to undeveloped parcels and are unrelated to the location of a treatment facility or the technologies utilized in treating and disposing of wastewater and related solids. The following list of those conditions is included in this report to substantiate the policy position of staff – i.e. that the development of a community wastewater project will not be sufficient for undeveloped properties to be developed, that additional issues will need to be resolved, and that those issues are not the sole purview of the County of San Luis Obispo. Since the

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coastal permit was issued to the Los Osos Community Services District, the references to the District may change to the County under a County implemented project. In addition, conditions may be subject to change.

CDP Condition #34

Prior to operation, the Los Osos Community Services District shall prepare and implement a comprehensive water management plan for the Los Osos groundwater basin that identifies management strategies for achieving a sustainable water supply. To prevent the wastewater treatment system from inducing growth that cannot be safely sustained by available water supplies, the District is prohibited from providing service to undeveloped parcels unless and until the Estero Area Plan is amended to incorporate a sustainable buildout target that indicates that there is water available to support such development without impacts to wetlands and habitats.

Notwithstanding any contrary provision of the Commission's regulations, including Section 13166, the District may apply for, and the Commission shall consider, an application for amendment to this permit condition at, or prior to the time that the treatment plant is operational, to authorize the District to issue Will Serve letters to properties that would otherwise qualify.

CDP Condition #76

Prior to providing wastewater treatment service to undeveloped parcels, the LOCSD, in coordination with the California Department of Fish and Game (CDFG), the US Fish and Wildlife Service (USF&WS), San Luis Obispo County and the California Coastal Commission shall prepare and implement a Habitat Conservation Plan (HCP) for the long-term preservation of habitat remaining with the Los Osos Greenbelt, including habitat remaining on individual vacant lots. The HCP shall:

- identify the habitat resources and the quality of those resources on the remaining vacant properties within the South Bay Urban Area and Los Osos Greenbelt;
- specify measures to avoid and minimize impacts to ESHA from buildout of the Service area, and to mitigate unavoidable impacts through acquisition, protection, and/or restoration of equivalent habitat within the planning area;
- implement such measures through one or more amendments to the Estero Area Plan that integrates the HCP, as approved by the US Fish and Wildlife Service and Department and Fish and Game, with LCP standards for development in the South Bay Urban Area. This LCP amendment must become fully effective, and all permits required by state and federal Endangered Species Acts shall be issued, before LOCSD makes any final commitment to provide wastewater treatment service to undeveloped properties.

The range of potential conservation programs to be considered in the HCP shall include, but not be limited to the following:

a) New development programs and standards that maximize preservation of sensitive biological resources in the Los Osos through:

   i) Transfer of development credits

   ii) Clustering

   iii) Avoidance of sensitive resources in site design

   iv) Changes in density and land use

   v) Incorporation of open space into the design of new development

b) Programs aimed at facilitating coordination among agencies and organizations involved in management and conservation/preservation of sensitive resources, including USF&WS, CDFG, California Coastal Commission, San Luis Obispo County, the LOCSD, MEGA, NEP, Land Conservancy of San Luis Obispo County, and others;

c) The creation of a land bank program to facilitate the purchase, restoration, and management of properties with high quality habitat within the Greenbelt, to be repaid over time from fees on new building permits; and,

d) Programs for the acquisition, restoration, and management of properties within the Greenbelt with significant habitat resources.

Notwithstanding any contrary provision of the Commission's regulations, including Section 13166, the District may apply for, and the Commission shall consider, an application for amendment to this permit condition at, or prior to the time that the treatment plant is operational, to authorize the District to issue Will Serve letters to properties that would otherwise qualify.

CDP Condition #82

No guarantees of Development Approvals. Approval of this permit, or any method of financing the project utilized by the LOCSD (e.g., the established assessment program), does not guarantee Coastal Commission or local government approval of any new or intensified uses within the service area. All new development proposals must be reviewed for consistency with the San Luis Obispo County certified Local Coastal Program (and/or the California Coastal Act, as applicable); such review shall consider, among other issues, the environmental impacts of the new development, including the impacts associated with the installation of lateral connections necessary to tie into the approved collection system. **WASTEWATER TREATMENT SERVICE SHALL ONLY BE PROVIDED TO DEVELOPMENTS THAT HAVE OBTAINED THE REQUIRED COASTAL DEVELOPMENT APPROVALS IN A MANNER CONSISTENT WITH SUCH APPROVALS.**

PRIOR TO THE ISSUANCE OF THE PERMIT, the permittee shall submit, for the Executive Director review and approval, the public notice to all property owners of record within the service area that includes a copy of this condition, and an explanation of its effect upon the ability to obtain wastewater treatment service for future development.

PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, said notice shall be mailed to all property owners within the service, or noticed in three local newspapers and included in public information handouts provided by the County.

Developed Properties – Special Cases

The policy recommendations included in this report are proposed to provide distinction between developed and undeveloped parcels, but do not at this time create a distinction between the types of developed parcels subject to regulatory enforcement actions, or special cases. Those issues will be specifically addressed in the assessment engineers' report. That report is required by Article XIIID of the Constitution, and it will be part of your Board's future consideration on the current project efforts leading to the Prop 218 vote. Nevertheless, it is noteworthy to provide preview of developed parcels within the prohibition zone that fall within special cases. Attachment "A" provides a vicinity map and identifies the following:

- Parcels currently served by the Monarch Grove Homeowners Association
- Parcels currently served by the Los Osos Community Services District
- Parcels within the Martin Tract and Bayview Heights Tract, which had not been included in previous wastewater project proposals, but are nevertheless subject to enforcement actions by the Regional Water Board.

Monarch Grove

Monarch Grove was approved on June 10, 1993. A condition of its development was the construction of a wastewater reclamation facility. The LOCSD has excluded the properties from proposed assessments, and had developed a separate agreement with the homeowners association to provide service to its properties.

LOCSD Service Areas – Vista de Oro and Bayridge Estates

The $6+ million in fines imposed by the Regional Water Board against the LOCSD were for compliance failures specifically relating to these two centralized septic systems. The individual property owners do not have septic tanks. Instead, wastewater flows through a gravity system to large septic tanks and leach fields that are centralized for those neighborhoods. The individual properties have been included in prior assessment districts, which is again anticipated for the upcoming Prop 218 vote under the authority of the County.

Martin Tract and Bayview Heights Tract

These tracts are unique within the prohibition zone from a regulatory standpoint. The average lot size exceeds one (1) acre and they have historically been excluded from assessment proceedings since, provided a community wastewater project is constructed, the Regional Water Board would not require connection of these properties. In 2000, by Order No. 00-12, the Regional Water Board approved some additional development within these tracts, subject to certain conditions, and exempted those recently developed parcels from future regulatory actions. The previously developed properties do not, however, have exemptions.

Discussions with staff of the Regional Water Board have indicated that future exemptions are being withheld pending development of a community wastewater project. As a result, parcels within the Martin and Bayview Heights tracts may benefit from the development of a community wastewater project, but whether that benefit is a "special benefit" of a wastewater project is a subject of your Board's future consideration.

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Attachment "A"

D-1 13

the plume of dust in this area; asks the Board to discontinue the issue of the sale of this property.

Thereafter, pursuant to the requirements of the Brown Act, County Counsel reports out on the items discussed during Closed Session as follows: No report required as no final action was taken and the Board goes into Open Public Session.

(SUPERVISOR K.H. 'KATCHO' ACHADJIAN IS NOW PRESENT.)

15 D-1 This is the time set for an update on the Los Osos Wastewater Treatment Project and (a) Business Item - consideration of policy direction on Proposition 218 Property Owner Votes for the Los Osos Wastewater Project; 2nd District.

Staff Report

Mr. Paavo Ogren: Public Works, presents the staff report; addresses the following: who will vote in the Proposition 218 election; the issue of developed versus undeveloped properties, Coastal Development Permit Conditions #34, #76 and #82 as they relate to the Los Osos wastewater project; provides a brief background on the project; discusses ensuring fairness to the undeveloped property owners; modifying their second recommendation to say within the "Urban Area" versus "Urban Services Line"; highlights the staff recommendations; addresses The Tribune article yesterday and responds to inaccuracies from that regarding: the August 28th is the date of hearing and ballots will go out after that day; vote is in proportion to the proposed assessments for the wastewater project and not in proportion to the assessed value of the property.

Board Members: address various comments, questions and concerns regarding: the various options for a 218 vote; how those that paid prior to the development of undeveloped properties will be reimbursed, with Mr. Ogren responding.

Mr. James Wilson: lives in Monarch Grove, questions whether his area should be included in the 218 vote.

Ms. Gewynn Taylor: speaks regarding a recent *Tribune* article by Bob Cutty regarding genocide and Los Osos should be added as a "social" genocide and explains.

Ms. Lacy Cooper: urges support for an election for a small bond to pay for an environmental study and explains.

Ms. Linde Owen: speaks to the need to do the CEQA process on two projects and explains; addresses the need to look at the water issues.

Mr. Bo Cooper: supports comments by Lacy Cooper regarding a bond issue; provides information and highlights the same citing various CEQA Statutes and Guidelines.

Mr. Steve Page: states he appreciates the staff position of separating the vote for residents versus vacant land owners and provides his views on the proposals.

Ms. Lisa Schicker: member of the Los Osos Community Services District Board(LOCSD), thanks Mr. Ogren for a good report today; asks how they will integrate the "fine screening report" and a 218 election; states she supports a successful 218 election.

Mr. Leon Goldin: stats he owns property within the prohibition zone; wants all information possible prior to any election; this will be a contested election and explains his concerns.

Dr. Mary Fullwood: thanks Supervisor Gibson and Mr. Ogren for their presentation at the Water Board; addresses her concerns to comments by Julie Tacker about this being "a train wreck."

Ms. Julie Tacker: property owner and member of the LOCSD, believes the advisory vote should be before the 218 election; addresses her concerns to comments in the staff report; addresses her concerns to pitting developed versus undeveloped property owners in this election.

Mr. Jeff Edwards: resident of Los Osos, doesn't believe developed and undeveloped properties should be treated differently; believes staff is in error saying that the Coastal Commission will drive this project and explains.

Mr. Phil Gray: urges the Board to not separate the vacant owners in a 218 election.

Mr. Jim Smith: agrees with Mr. Edwards and Mr. Gray's comments; believes vacant landowners should be included in the 218 election.

Mr. Dave Duggan: thanks Mr. Ogren for the report; speaks regarding the last Technical Advisory Committee's (TAC) meeting and his concern to discussions they were having.

Mr. Bruce Payne: addresses a recent meeting with Planning staff regarding future development in Los Osos.

Ms. Jerri Walsh: reads some of Mr. Margetson's comments, as he won't be able to finish in his three minutes, regarding Mr. Ogren's presentation to the Water Board.

Mr. Richard Margetson: concludes his comments regarding a recent Water Board meeting.

Mr. Al Barrow: addresses the need for an affordable project; provides a copy of a bill by Senator Don Perata regarding water storage.

Ms. Sandy Bean: presents a letter for the record and highlights her concerns regarding the 218 election.

Mr. Chris Allebe: questions if he doesn't vote how does that weight the election results; addresses his concerns to the 218 election.

Supervisor Gibson: responds to public comment and wants the focus today to be on who votes.

Mr. Ogren: responds to questions; addresses the weighting of a vote and not "pitting" developed versus undeveloped property owners in this process.

Supervisor Patterson: questions voting for something less than a full project, with Mr. Ogren responding.

Thereafter, on motion of Supervisor Bruce S. Gibson, seconded by Supervisor James R. Patterson, and on the following roll call vote:

AYES: Supervisors: Bruce S. Gibson, James R. Patterson, Harry L. Ovitt, K.H. 'Katcho' Achadjian, Chairperson Jerry Lenthall
NOES: None
ABSENT:None

the Board amends the second staff recommendation to say within the "Urban Area" versus "Urban Services Line"; adopts the policy in Exhibit A of the staff report dated July 17, 2007 regarding Proposition 218 Property Owner votes for the Los Osos Wastewater Project, as amended.

16 E-1 This is the time set for consideration of an Ordinance Amendment to Section 22.30.090 of the Land Use Ordinance to modify allowed horse densities; All Districts.

Staff Report

Supervisor Achadjian: presents the staff report; corrects the staff report to indicate this is a request to authorize processing of an amendment; states he

APPENDIX C

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL COAST REGION

RESOLUTION NO. 83-13

Revision and Amendment of Water Quality Control Plan by the Addition of a Prohibition of Waste Discharge from Individual Sewage Disposal Systems Within the Los Osos/Baywood Park Area, San Luis Obispo County

WHEREAS, the California Regional Water Quality Control Board, Central Coast Region (hereafter Regional Board), adopted the Water Quality Control Plan for the Central Coastal Basin (hereafter Basin Plan) on March 14, 1975; and,

WHEREAS, the Regional Board, after notice and public hearing in accordance with Water Code Section 13244, periodically revises and amends the Basin Plan to ensure reasonable protection of beneficial uses of water and prevention of pollution and nuisance; and,

WHEREAS, in protecting and enhancing water quality, the Basin Plan specifies certain areas where the discharge of waste, or certain types of waste, is prohibited; and,

WHEREAS, Article 5, Chapter 4, Division 7, of the California Water Code defines criteria for such prohibition areas (Section 13240 et seq.); and,

WHEREAS, Los Osos/Baywood Park is an unincorporated community, with a 1980 population of 10,933 persons located south of the City of Morro Bay, in San Luis Obispo County; and,

WHEREAS, current zoning will accommodate a population in excess of 27,000 people and an average residential lot size of about 6600 ft^2; and,

WHEREAS, on-site soil absorption or evapotranspiration systems are the sole means of wastewater disposal in the Los Osos/Baywood Park area; and,

WHEREAS, the Los Osos/Baywood Park area soil permeability is rapid and there are substantial areas with high groundwater; and,

WHEREAS, the majority of lots are too small to provide adequate dispersion of individual sewage disposal system effluent; and, WHEREAS, the San Luis Obispo County Environmental Health Department has provided documentation concerning the problem of liquid waste disposal in the Los Osos/Baywood Park area; and,

WHEREAS, the County of San Luis Obispo is preparing an environmental impact report (EIR) in accordance with the California Environmental Quality Act and a project report that identifies adverse environmental impacts from continued use of septic tanks in the Los Osos/Baywood Park area and discusses alternatives to existing wastewater management practices; and,

WHEREAS, "Los Osos-Baywood Park/Phase I Water Quality Management Study" cites conditions which constitute contamination and pollution as defined in Section 13050 of the California Water Code; and,

WHEREAS, chemical analyses of wells in Los Osos/Baywood Park indicates 38% of the shallow wells tested in the Phase I study, taking water from the Old Dune Sands deposits portion of the qauifer, contain nitrate concentrations which exceed State Health Department Drinking Water Standards of 45 milligrams per liter; and,

WHEREAS, bacterial analyses of 42 wells tested in the Phase I study resulted in 26 wells indicating total coliform in violation of State Health Drinking Water Standards, and 2 wells indicating fecal coliform in violation of Basin Plan limits for groundwater; and,

WHEREAS, surface water bacterial analyses tested in the Phase I study indicated total and fecal coliform levels exceeding Basin Plan recommended limits for water contact recreation (REC-1); and,

WHEREAS, a letter from the California Health and Welfare Agency, Department of Health Services, states their concerns regarding the high nitrate levels in the waters of Los Osos/Baywood Park area, and recommends adequate measures be taken to correct the nitrate problems to bring the waters into compliance with California Drinking Water Standards; and,

WHEREAS, a letter from the San Luis Obispo County Health Agency Director cites violation of the public health limit for nitrates and recommends elimination of shallow groundwater usage and adoption of a discharge prohibition; and,

WHEREAS, the Regional Board is obligated to include a program of implementation for achieving water quality objectives in its Basin Plan; and,

WHEREAS, present and anticipated future beneficial uses of Los Osos/Baywood Park creeks include recreation and aquatic habitat; and, WHEREAS, Los Osos Basin groundwaters are suitable for agricultural, municipal, domestic, and industrial water supply; and,

WHEREAS, a Regional Board staff report finds beneficial uses of Los Osos ground and surface waters are adversely affected by individual sewage disposal system discharges, there appears to be a trend of increasing degradation, and public health is jeopardized by occurrences of surfacing effluent; and,

WHEREAS, drafts of proposed revisions and amendments of the Basin Plan, prohibiting discharges from Los Osos/Baywood Park individual sewage disposal systems, have been prepared and provided to interested persons and agencies for review and comment; and,

WHEREAS, Regional Board staff has prepared documents and followed appropriate procedures to satisfy the environmental documentation requirements of both the California Environmental Quality Act, under Public Resources Code Section 21080.5 (Functional Equivalent), and the Federal Clean Water Act of 1977 (PL 92-500 and PL 95-217), and the Regional Board finds adoption of this prohibition area will not have a significant adverse effect on the environment; and,

WHEREAS, on September 16, 1983, in the San Luis Obispo City Council Chambers, 990 Palm Street, San Luis Obispo, California, after due notice, the Regional Board conducted a public hearing at which evidence was received pursuant to Section 13281 of the California Water Code concerning the impact of discharges from individual sewage disposal systems on water quality and public health; and,

WHEREAS, pursuant to Section 13280 of the California Water Code, the Regional Board finds that discharges of wastes from new and existing individual disposal systems which utilize subsurface disposal in the affected area will result in violation of water quality objectives; will impair beneficial uses of water; will cause pollution, nuisance, or contamination; and will unreasonably degrade the quality of waters of the State; and,

WHEREAS, the Regional Board finds the aforestated conditions in need of remedy to protect present and potential beneficial uses of water and to prevent pollution and nuisance.

NOW, THEREFORE, BE IT RESOLVED, that the <u>Water Quality Control Plan, Central Coastal Basin</u>, be amended as follows:

Page 5-66, after Item 7, following the legal description for Pasatiempo Pines (added by Resolution 83-09), insert the following prohibitions:

"8. Discharges of waste from individual and community sewage disposal systems are prohibited effective November 1, 1988, in the Los Osos/Baywood Park area, and more particularly described as:

"Groundwater Prohibition Zone

(Legal description to be provided for area prescribed by Regional Board).

"Failure to comply with any of the compliance dates established by Resolution 83-13 will prompt a Regional Board hearing at the earliest possible date to consider adoption of an immediate prohibition of discharge from additional individual and community seware disposal systems."

Discharges from individual or community systems within the prohibition area in excess of an additional 1150 housing units (or equivalent) are prohibited, commencing with the date of State Water Resources Control Board approval.

BE IT FURTHER RESOLVED, that the above area is consistent with the recommendations of the staff report as shown on "Attachment A."

BE IT FURTHER RESOLVED, that the Regional Board does intend standard exemption criteria, first paragraph of Page 5-67 of the Basin Plan, to apply to this action.

BE IT FURTHER RESOLVED, that compliance with the above prohibition of existing individual or community sewage disposal systems shall be achieved according to the following time schedule:

Task	Compliance Date
Begin Design	November 1, 1984
Complete Design	November 1, 1985
Obtain Construction Funding	December 1, 1985
Begin Construction	April 1, 1986
Complete Construction	November 1, 1988

BE IT FURTHER RESOLVED, that reports of compliance or noncompliance with schedules shall be submitted to the Regional Board within 14 days following each scheduled date unless otherwise specified, where noncompliance reports shall include a description of the reason, a description and schedule of tasks necessary to achieve compliance, and an estimated date for achieving full compliance.

BE IT FURTHER RESOLVED, the County will continue a monitoring program, approved by the Regional Board staff, that will monitor ground water quality within the prohibition boundaries as set forth in this resolution, and also a monitoring program which covers areas outside the prohibition boundaries but within the urban reserve line as shown in Attachment A.

BE IT FURTHER RESOLVED, that the Regional Board has determined this action will not have a significant adverse impact on the environment and the Executive Officer of the Regional Board is hereby directed to file a Notice of Decision to this effect with the Secretary of the Resources Agency.

BE IT FURTHER RESOLVED, that the State Water Resources Control Board is hereby requested to amend forthwith the Clean Water Grant Project Priority List to recognize the necessary structural solution for Los Osos/Baywood Park as a Priority "A" project.

BE IT FURTHER RESOLVED, that if the Board holds a hearing and adopts an immediate prohibition as described above, the prohibition is effective as of the date the Regional Water Quality Control Board adopts a prohibition of discharge from additional individual and community sewage disposal systems.

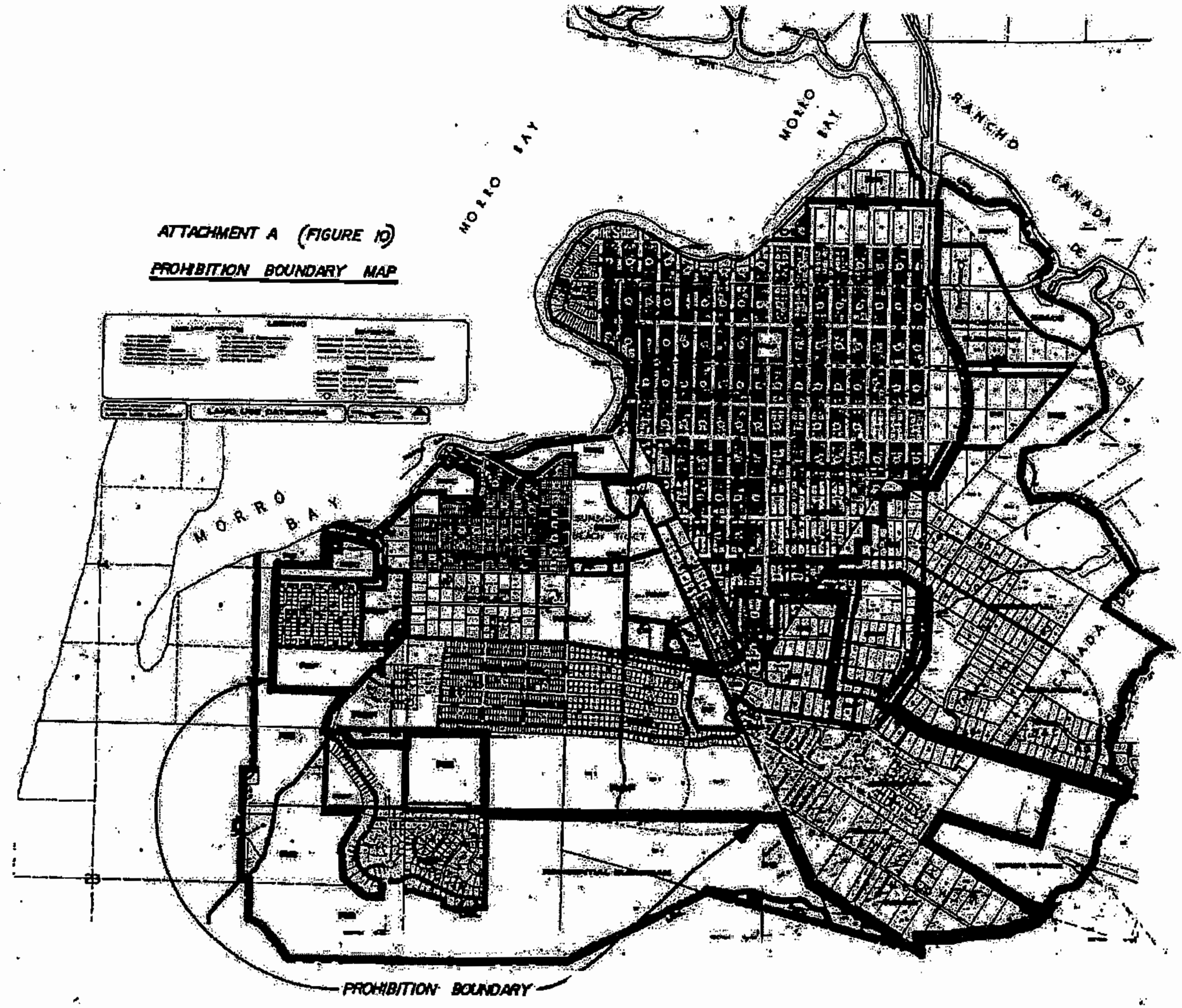
BE IT FURTHER RESOLVED, the Executive Officer of the Regional Board is hereby directed to submit this revision of the Basin Plan to the State Water Resources Control Board for approval pursuant to Section 13245 of the California Water Code.

BE IT FURTHER RESOLVED, upon approval by the State Water Resources Control Board, Chapter 5 of the Water Quality Control Plan is revised by the addition of the above prohibition.

I, KENNETH R. JONES, Executive Officer of the California Regional Water Quality Control Board, Central Coast Region, do hereby certify the foregoing is a full, true, and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, Central Coast Region, on September 16, 1983.

Kenneth R. Jones

Executive Officer


ATTACHMENT A (FIGURE 10)
PROHIBITION BOUNDARY MAP
MORRO BAY
MORRO BAY
MORRO BAY
RANCHO CANADA DE LOS OSOS
CANADA
PROHIBITION BOUNDARY

Attachment #14

From Staff Report October 5, 2010
SLO County Public Works Dept.
(see SLO County Website)

The most recent milestone, the approval of $87+ million in funding from the USDA Rural Development Program, is a significant benefit to the Project. It helps to reduce monthly costs of the Project. It likely eliminates the need to borrow construction funds from the long-term municipal debt market, which due to the current state of the national economy, is more restrictive and more costly than in 2006. The USDA approval also reduces the needed funding from the California State Water Board (SWB).

The USDA Letters of Conditions are attached. Recommendation #1 seeks your Board's ratification of the "Letter of Intent to Meet Conditions" which has been executed by staff and submitted to USDA under the authority of Resolution 2010-131, approved by your Board on April 27, 2010. Table "B" of the Project Status Update provides a list of the USDA pre-construction conditions.

Significant conditions established by USDA include the following requirements:

- Board approval of an ordinance establishing the Project's Rates and Charges (Service Charges). Recommendation #2 is proposed to comply with this condition and is discussed in the attached Project Status Update, Section 2.

- Award of the collection system construction contract(s) by August 30, 2011 under a design-bid-build contracting approach. Recommendation #3 is proposed to comply with this condition and will cancel the existing Design-Build contract procurement process for the collection system which is <u>not</u> <u>allowed</u> by USDA. Recommendation #4 is also proposed to comply with this condition by declaring the County's intent to request proposals for design services under a design-bid-build contract procurement process. Completing the Project design is discussed in Section 3 of the attached Project Status Update. *

  underlines were added by staff

- Approval of water reuse agreements - The Project conditions require agricultural and urban reuse, which in some cases will most likely require agreements with independent individuals and organizations. Outreach with Coastal San Luis Resource Conservation District and other organizations has been initiated and on-going. Upcoming efforts will emphasize voluntary participation, as previously reviewed by your Board, and stakeholder involvement will expand to include San Luis Coastal Unified School District and other property and business owners in the immediate future. This issue will be a focus of greater detail in the next Project Status Update to your Board.

In addition to complying with USDA requirements, the following items are provided for your Board's consideration.

Due Diligence Resolution

Consideration of a Due Diligence Resolution is required by AB 2701. The following is a list of pro and cons when considering immediate approval of the Due Diligence resolution (Recommendation alternative #5a). Alternatively, deferring the approval of the resolution (Recommendation alternative #5b) will help mitigate the listed "cons."

COMPLETING PROJECT DESIGN

Beginning in November 2008, the County initiated a formal "design-build" (DB) procurement process to contract for design and construction of the Project. The DB process included two separate efforts: a) the collection system and b) the treatment facilities. Other facilities, such as disposal facilities at the Broderson site and groundwater monitoring wells had been envisioned for the traditional design-bid-build project delivery methodology.

In April 2009, three teams were short-listed for each project component. One team has appealed their exclusion from the short-list for the treatment facilities. No appeals were filed on the collection system. The DB efforts were put on hold in August 2009, due to the appeals filed on the County Planning Commission's approval of the Project CDP, which occurred on August 13, 2009.

Staff is continuing to keep the treatment facilities DB efforts on hold due to several reasons, including the following:

- The duration to complete the treatment facilities is less than the collection system and is therefore not on the Project's critical path – no negative impacts on the Project schedule will result
- The USDA conditions only require initiation of collection system construction in August 2011
- Deferring treatment facility efforts until 2011, when interim funding is obtained, minimizes the budget adjustment included in Recommendation #6.

The USDA conditions do not allow DB contracting. Over the past couple of years of dialogue with representatives in USDA, including the national office in Washington DC, it is clear that varied opinions exist within USDA on DB contracting. Even if policy changes occurred at any time during the recent past, or today, the process for USDA to develop their contracting requirements would not be completed in the time needed to proceed with DB for the Project's collection system. In summary, USDA would need to develop an entire set of special provisions that local agencies must incorporate into contract documents (i.e. the plans and specifications), and they would do so through a national review process, even if only internal to the USDA. Consequently, the existing DB process for the collection system will not be able to proceed to the next step and the current DB process for the collection system must be cancelled.

These statements seem speculative. What does USDA say?

Completing the Collection System Design

Obtaining engineering services for design is a necessary step at this time in order to proceed with efforts on the collection system. Although a complete collection system design developed for the Los Osos Community Services District's (LOCSD) project exists, changes from the LOCSD project that are in the County's approved CDP, such as the out-of-town treatment site, requirements for sealed pipes in areas of high groundwater and a recycled water distribution system, will require re-design of approximately 10% of the collection system. The issue of professional engineering liability for the designs and specifications, which will be issued by the County, rather than the LOCSD, also requires retaining a qualified engineering firm to complete the collection system design and bid documents.

Since the engineering firms that were members of the short-listed DB teams were fully evaluated and determined to be highly qualified as part of the DB efforts, which included formal written Statements of Qualifications and interviews by a review team that was assembled in accordance with County Purchasing Policies, allowing these firms to respond to a Request for Proposals (RFP) for the collection system design will be the most efficient approach to solicit proposals from multiple qualified engineering firms.

Pending Board direction, an RFP and interview process will be completed, and staff will return to your Board with a recommendation for a professional engineering services agreement. The USDA, the funding agency for this portion of the project, has reviewed their guidelines relative to the recommended RFP process and concurs that the process meets their standards for professional services procurement.

This opens the door for MWH to receive contracts for design and possibly construction

Attachment #15

LOWWP Draft EIR Appendix K

Short-term Construction Impacts

GHG emissions generated from the construction phase of collection system of Proposed Project 1 were estimated for the on-road motor vehicles, off-road construction equipment, and GHG emissions associated with the creation of construction materials. Descriptions of on-road construction categories evaluated for GHG emissions are the same as described in Impact 5.9-C. The EMFAC 2007 model includes emission factors for CO_2 and NH_3. However, the model for off-road construction equipment, OFFROAD, does not include GHG emission factors; therefore an alternative method was used. The California Climate Action Registry (CCAR), in their General Reporting Protocol (CCAR 2008), recommends using fuel consumption data to determine CO_2 emissions. Other non-CO_2 emissions represent a minor portion compared to the CO_2 emissions. Since fuel consumption records were not available, fuel use was estimated using a formula provided by Food and Agriculture Organization of the United Nations (FAOUN 1992).

GHG emissions generated from the processing and production of construction materials, which are based on estimated demands at buildout, were determined by Carollo Engineering (Carollo 2008b). The construction material processes considered were the excavation and backfill processes for the septic tanks and the collection and conveyance systems. The construction materials for which material production (energy consumed for production processes) is evaluated are concrete, fiberglass, polyethylene lining, PVC piping, and low-density polyethylene tubing. Table 5.9-14 shows short-term construction GHG emissions.

Emissions presented in Table 5.9-14 represent a temporary source of GHG emissions. These temporary emissions are estimated to occur over a two-year period beginning in the year 2010. Since the requirements of AB 32 are that the State's total 2020 GHG emissions would be equal to or below the levels documented for the year 1990, the construction emissions of the collection system that is associated with Proposed Project 1 would not contribute annual GHG emissions to the future year 2020 inventory. Therefore, GHG emissions associated with the construction of the collection system of Proposed Project 1 would not hinder or delay the State's ability to achieve the year 2020 goals of AB 32. Thus, the construction activities associated with the collection system of Proposed Project 1 would result in a less than significant GHG impact.

Table 5.9-14: Construction GHG Emissions

System/Source	Metric Tons CO_2e per year			
	Project 1	Project 2	Project 3	Project 4
Collection				
On road vehicular	2,482,290	1,868,504	1,868,504	1,868,504
Off road equipment	408	382	382	382
Construction materials off-site	804	1,243	1,243	960
Collection Total	**2,483,503**	**1,870,129**	**1,870,129**	**1,869,846**

Biased assumption

At least twice this for 2-3 year construction.

Assumes 100% tank replacement. It will be substantially less w/ shared tanks and some use of existing tanks.

Attachment 15 Page 2

Table 5.9-14 (Cont.): Construction GHG Emissions

System/Source	Metric Tons CO_2e per year			
	Project 1	Project 2	Project 3	Project 4
Conveyance				
On road vehicular	361,361	363,495	363,495	393,944
Off road equipment	63	63	63	83
Conveyance Total	**361,424**	**363,558**	**363,558**	**394,027**
Treatment				
On road vehicular	490,602	492,661	492,661	490,478
Off road equipment	519	446	446	519
Construction materials off-site	2,115	3,043	3,043	3,095
Treatment Total	**493,236**	**496,150**	**496,150**	**494,092**
Disposal				
On road vehicular	981,492	981,809	981,809	981,928
Off road equipment	838	838	838	838
Disposal Total	**982,330**	**982,647**	**982,647**	**982,766**
GRAND TOTAL	**4,320,493**	**3,712,167**	**3,712,167**	**3,740,731**
Source: MBA 2008.				

STEP has lowest emissions for these components

About 6 million tons of CO2e w/ multi-year project

Almost all of the "disposal" emissions are from Broderson leach field construction. The LOSG plan eliminates Broderson leach fields, so it will substantially reduce GHG's.

Long-term Operational Impacts

Long-term operational GHG emissions for the collection system for Proposed Project 1 would come from on-road motor vehicle, energy usage, and the regular transfer of septage from septic tanks to the treatment plant by tanker truck.

On-road motor vehicle activity during continuous operation of the facility includes employee commute, maintenance trips, and septage hauling for Proposed Project 1. Estimates of GHG emissions from purchased and consumed electricity for the operation of the collection system were provided by Carollo Engineering (Carollo 2008b). GHG estimates from the operation of the collection system pump stations are based on the total annual energy demand. The annual energy demands were estimated for the collection pipelines and the pump stations for Proposed Project 1. Emission factors were from the CCAR's General Reporting Protocol (CCAR 2008).

Also included in the long-term operations of the collection system for Proposed Project 1 is the methane emissions from septic tank venting. Methane emissions are generated from the anaerobic biodegradation of domestic wastewater within septic tanks and are vented to the atmosphere, contributing to the total carbon footprint calculated for Proposed Project 1. Estimates of the annual methane emissions vented from septic tanks are included for the prohibition zone only at build-out. The approach used for calculating septic tank methane emissions are established in the 2006 IPCC

LOWWP EIR Appendix K

Guidelines for National GHG Inventories which is followed by the EPA as related by Carollo Engineering (Carollo 2008b).

Table 5.9-15 shows long-term operational GHG emissions associated with the proposed collection system of Proposed Project 1. As shown in Table 5.9-15, the total long-term GHG emissions associated with Proposed Project 1 would result in a net reduction of GHG emissions compared to the existing wastewater collection system. The implementation of the collection system under Proposed Project 1 would contribute to the annual reduction in GHG emissions. Therefore, GHG emissions associated with the operation of the collection system of Proposed Project 1 would not hinder or delay the State's ability to achieve the year 2020 goals of AB 32. The operation of the proposed collection system under Proposed Project 1 would contribute a net reduction in GHG emissions, thus, the operation of the proposed collection system would contribute to a beneficial impact on GHG emissions.

Assumes pumping every 5 years although not required and County average is every 10 years (see Attachments #16, 17)

Table 5.9-15: Operational GHG Emissions

Reduced with STEG units in a decentralized system.

Assumes 2x's methane (CO_2e) shown by recent studies.

System/Source	Metric Tons CO_2e per year			
	Project 1	Project 2	Project 3	Project 4
Collection				
On road vehicular	98,564	69,668	69,668	69,668
Energy usage	169	199	199	199
Septic tanks	624	0	0	0
Collection Total	**99,357**	**69,867**	**69,867**	**69,867**
Conveyance				
On road vehicular	20,945	20,945	20,945	20,945
Conveyance Total	**20,945**	**20,945**	**20,945**	**20,945**
Treatment				
On road vehicular	53,148	80,605	80,605	52,500
Energy Usage	425	541	541	493
Chemical Production off-site	356	14	14	356
Treatment Total	**53,929**	**81,159**	**81,159**	**53,349**
Disposal				
On road vehicular	0	0	0	0
Disposal Total	**0**	**0**	**0**	**0**
GRAND TOTAL	**174,231**	**171,971**	**171,971**	**144,161**
Current Operations	201,045	201,045	201,045	201,045
NET DIFFERENCE	**-27,654**	**-29,914**	**-29,914**	**-57,724**
Percent Reduction	*15.9%*	*17.4%*	*17.4%*	*40.0%*
Source: MBA 2008.				

Reduced w/ LOSG plan - no Brodeson leach fields, 100% reuse

Assumes 5-year pumping of septic systems, so this should be a net loss

Assumes 2x's methane (CO_2e) shown by recent studies.

For Broderson construction 73,000 yds. of soil have to be excavated and 45,000 yds. imported. It will require 9,000 round trips w/ heavy truck, about 36 per day for 250 days, for a total of almost 300,000 miles — the equivalent of a trip to the moon and part way back.

Air Quality/Climate Change Calculations

APPENDIX K-2

Project 1 Construction On-road Emissions

Employee Trips

System/Activity	Pro Code	# of Employees	Duration (yrs)	Work days/year	RT Mileage	RT* per Day	Total VMT/d	Total VMT/yr
Collection System - STEP/STEG	C	72	2.0	250	40	72	2,880	720,000
Raw Wastewater Pipeline	C	17	1.0	250	40	17	680	170,000
Disposal - Effluent and Plant Solids	D	8	0.5	250	40	8	320	80,000
Treatment Site	T	35	2.0	250	40	35	1,400	350,000
Storage	T	8	0.5	250	40	8	320	80,000
Asphalt	T	3	2.0	250	40	3	120	30,000
	TOTAL	*143*				*143*	*5,720*	*1,430,000*

EMISSIONS - SLO

Pounds per day ROG	CO	NO_x	PM_{10}	$PM_{2.5}$	Tons per quarter ROG	CO	NO_x	PM_{10}	$PM_{2.5}$
0.30	12.98	1.75	0.11	0.10	0.01	0.41	0.05	0.00	0.00
0.07	3.06	0.41	0.03	0.02	0.00	0.10	0.01	0.00	0.00
0.03	1.44	0.19	0.01	0.01	0.00	0.05	0.01	0.00	0.00
0.15	6.31	0.85	0.05	0.05	0.00	0.20	0.03	0.00	0.00
0.03	1.44	0.19	0.01	0.01	0.00	0.05	0.01	0.00	0.00
0.01	0.54	0.07	0.00	0.00	0.00	0.02	0.00	0.00	0.00
0.60	*25.77*	*3.47*	*0.22*	*0.20*	*0.02*	*0.81*	*0.11*	*0.01*	*0.01*

GHG - All

CO_2 tpy	NH_3 tpy	CO_2e MT/Y
807,998	44.3	733,848
190,777	10.5	173,270
89,778	4.9	81,539
392,777	21.5	356,731
89,778	4.9	81,539
33,667	1.8	30,577
1,604,774	*88.0*	*1,457,503*

Excavation Trips

Project Facility	Pro Code	Total yd^3 excavated ***	Total yd^3 Imported	Total yd^3 Exported	Total RT	Duration (yrs)	Work days/year	RT Mileage	RT per Day	Total VMT/d	Total VMT/yr
Collection System	C	322,000	32,200	64,400	19,320	2.0	250	33	38.6	1,275	318,780
Raw Water Conveyance	C	10,400	1,040	2,080	624	1.0	250	33	2.5	82	20,592
Treated Effluent Conveyance	C	15,100	1,510	3,020	906	0.5	250	33	3.6	120	29,898
Leachfield ****	D	73,000	0	45,173	9,035	1.0	250	33	36.1	1,193	298,144
Sprayfield	D	25,000	0	0	0	0.5	250	33	0.0	0	0
Wastewater Treatment Plant***	T	83,000	0	0	0	2.0	250	33	0.0	0	0
Solids Processing and Disposal	T	1,330	0	0	0	0.5	250	33	0.0	0	0
Seasonal Storage	T	77,000	0	0	0	0.5	250	33	0.0	0	0
	TOTAL	*606,830*	*34,750*	*114,673*	*29,885*				*80.9*	*2,670*	*667,414*

EMISSIONS - SLO

Pounds per day ROG	CO	NO_x	PM_{10}	$PM_{2.5}$	Tons per quarter ROG	CO	NO_x	PM_{10}	$PM_{2.5}$
0.57	5.47	26.44	0.72	0.66	0.02	0.17	0.83	0.02	0.02
0.04	0.35	1.71	0.05	0.04	0.00	0.01	0.05	0.00	0.00
0.05	0.51	2.48	0.07	0.06	0.00	0.02	0.08	0.00	0.00
0.54	5.11	24.73	0.67	0.62	0.02	0.16	0.77	0.02	0.02
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.20	*11.45*	*55.35*	*1.51*	*1.39*	*0.04*	*0.36*	*1.73*	*0.05*	*0.04*

GHG - All

CO_2 tpy	NH_3 tpy	CO_2e MT/Y
1,057,698	6.6	959,654
68,323	0.4	61,990
99,200	0.6	98,005
989,229	6.2	897,531
0	0.0	0
0	0.0	0
0	0.0	0
0	0.0	0
2,214,451	*13.9*	*2,009,180*

Construction Waste Trips

System/Activity	Pro Code	Total RT	Duration (yrs)	Work days/year	RT Mileage	RT per Day	Total VMT/d	Total VMT/yr
Collection System - STEP/STEG	C	8,000	2.0	250	33	16.00	528.0	132,000
Raw Wastewater Pipeline	C	20	1.0	20	33	1.00	33.0	660
Disposal - Effluent and Plant Solids	D	20	0.5	20	33	1.00	33.0	660
Treatment Site	T	50	2.0	25	33	1.00	33.0	825
Storage	T	20	0.5	20	33	1.00	33.0	660
	TOTAL	*8,110*				*20.00*	*660.0*	*134,805*

EMISSIONS - SLO

Pounds per day ROG	CO	NO_x	PM_{10}	$PM_{2.5}$	Tons per quarter ROG	CO	NO_x	PM_{10}	$PM_{2.5}$
0.24	2.26	10.95	0.30	0.27	0.01	0.07	0.34	0.01	0.01
0.01	0.14	0.68	0.02	0.02	0.00	0.00	0.00	0.00	0.00
0.01	0.14	0.68	0.02	0.02	0.00	0.00	0.00	0.00	0.00
0.01	0.14	0.68	0.02	0.02	0.00	0.00	0.00	0.00	0.00
0.01	0.14	0.68	0.02	0.02	0.00	0.00	0.00	0.00	0.00
0.30	*2.83*	*13.68*	*0.37*	*0.34*	*0.01*	*0.07*	*0.35*	*0.01*	*0.01*

GHG - All

CO_2 tpy	NH_3 tpy	CO_2e MT/Y
437,970	2.7	397,372
2,190	0.0	1,987
2,190	0.0	1,987
2,737	0.0	2,484
2,190	0.0	1,987
447,277	*2.8*	*405,816*

Materials Trips to/from Contractor's Yard

Materials Supplied	Pro Code	RT per year	Duration (yrs)	Work days/year	RT/1-way Mileage**	RT per Day	Total VMT/d	Total VMT/yr
Septic Tank - Fiberglass	C	145	2.0	145	172	1.00	172.0	24,940
Septic Tank - Aggregate Base	C	6	2.0	6	78	1.00	78.0	468
Piping - Collection	C	40	2.0	40	207	1.00	207.0	8,193
Piping - Conveyance	C	11	2.0	11	207	1.00	207.0	2,364
Lining - Polyethylene	T	1	2.0	1	331	1.00	331.0	331
Riprap	T	18	2.0	18	78	1.00	78.0	1,404
LDPE (2% Black C) Tubing	T	1	2.0	1	2,186	1.00	2,186.0	2,186
	TOTAL	*222*				*7.00*	*3,259.0*	*39,886*

Mileage in SLO County

RT/1-way Mileage**	Total VMT/d	Total VMT/yr
35	35.0	5,075
70	70.0	420
35	35.0	1,385
35	35.0	400
35	35.0	35
70	70.0	1,260
79	79.0	79
	359.0	*8,654*

EMISSIONS - SLO

Pounds per day ROG	CO	NO_x	PM_{10}	$PM_{2.5}$	Tons per quarter ROG	CO	NO_x	PM_{10}	$PM_{2.5}$
0.15	0.38	1.56	0.05	0.05	0.00	0.01	0.03	0.00	0.00
0.30	0.77	3.12	0.11	0.10	0.00	0.00	0.00	0.00	0.00
0.15	0.38	1.56	0.05	0.05	0.00	0.00	0.01	0.00	0.00
0.15	0.38	1.56	0.05	0.05	0.00	0.00	0.00	0.00	0.00
0.15	0.38	1.56	0.05	0.05	0.00	0.00	0.00	0.00	0.00
0.30	0.77	3.12	0.11	0.10	0.00	0.00	0.01	0.00	0.00
0.33	0.87	3.52	0.12	0.11	0.00	0.00	0.00	0.00	0.00
1.52	*3.94*	*15.98*	*0.56*	*0.51*	*0.00*	*0.01*	*0.05*	*0.00*	*0.00*

GHG - All

CO_2 tpy	NH_3 tpy	CO_2e MT/Y
119,351	4.9	108,367
2,240	0.1	2,034
39,208	1.6	35,600
11,314	0.5	10,272
1,584	0.1	1,438
6,719	0.3	6,101
10,461	0.4	9,498
190,877	*7.8*	*173,310*

Construction will likely take more than 2 years.

Draft EIR - Appendix K-2

→ truck miles to construct Broderson leach fields = 1.5 trips to the moon

Total vehicle miles ~ 3 million
6-7 round trips to the moon

Attachment #16

LOWWP TM: Septage Receiving Station Option
Final Draft April 2008

which is potentially the first operating year of the Los Osos treatment plant. If implementation of a five-year pumping requirement occurs sooner, there is no change to the amount of septage that would be hauled to the future Los Osos treatment plant. However, if implementation occurs at a later date, then the projections in this TM are likely greater than what would be transported to the septage receiving station.

Table 1 County Septic Pumping Statistics
Los Osos Wastewater Project Development
San Luis Obispo County

Item	Value
Number of Septic Tanks Countywide	30,000
New Septic Tank Installations	300 per year
Year 2007 Septage Pumped	3.7 million gallons
Number of Septic Tanks Pumped(1)	3,000 in 2007
Volume Pumped per Septic Tank(1)	1,200 gallons
Current Pumping Frequency	Once every 10 years
Basin Plan or AB 885 Pumping Frequency	Once every 5 years

Source: Liquid Waste and the Los Osos Waste Water Treatment Facility (Appendix A)
Note:
(1) Calculated value, not directly provided in memorandum.

Established frequency

Not required by 885 - Waiver proposes inspection every 5 years (see Attachment #17)

3.2 Current Septic Pumping Rates in Los Osos

Within the Prohibition Zone, there are currently 4,281 septic tanks serving homes, businesses, mobile home parks, and schools. At build-out, there will be 4,769 STEP/STEG septic tanks or sewer lateral connections within the Prohibition Zone. There are currently 605 developed parcels with septic tanks outside the Prohibition Zone. At build-out, this number will increase to 749 parcels with septic tanks.

Since one septic tank within Los Osos' Prohibition Zone can possibly serve multiple users like the different spaces within a mobile home park, this analysis calculated a different volume per septic tank for the Prohibition Zone from what was presented in Table 1. The volume per septic tank for the Prohibition Zone was greater than the County average because of the large septic systems and community leach fields that are present in this zone. Septic tanks located outside the Prohibition Zone used the same volume per septic tank calculated in Table 1.

In order to calculate a volume per septic tank for the Prohibition Zone, this analysis used the Benefit Units (BUs) calculation from the Engineer's Report for the San Luis Obispo County Wastewater Assessment District No. 1 (Engineer's Report) dated December 18, 2007 prepared by the Wallace Group. The Engineer's Report established that within the Prohibition Zone, even though there are 4,281 septic tanks, factoring in the multiple users

Attachment #17

Summary of Proposed
AB 885 Waiver from the SWRCB website
(downloaded 12/16/2010)

How will the proposed regulations and statewide waiver affect owners of existing septic systems?

- Owners must have their septic tanks inspected for solids accumulations every five years by a qualified service provider. Inspection cost ~$325.
- Owners with an onsite domestic well on their property must:
  - Have a state certified analytical laboratory analyze well water (groundwater) for specified constituents once every five years and report the results electronically to the State Water Board. Domestic well sampling and reporting costs ~$325.
- Owners whose existing septic systems are within 600 feet of a surface water body that does not meet water quality standards (impaired water body) will be subject to special requirements (more later).
- Owners will have to keep documentation to show that they are adhering to the regulations.

This would be much less w/ a project maintenance program.

How will the proposed regulations and statewide waiver affect owners of existing septic systems within 600 feet of an impaired surface water body?

- Where existing septic systems have been identified by a Regional Water Board to be contributing to the water quality impairment (pollution) of specific surface water bodies, owners of septic systems within 600 feet of the impaired surface water body will be required to:
  - Have a qualified professional determine whether the septic system is contributing to the impairment.
  - If so, retrofit the septic system with supplemental treatment ($45,000 approximate cost for a retrofit).
- Maps of impaired water bodies with septic system discharges are on the Water Board website.

How will the proposed regulations and statewide waiver affect the construction of new septic systems?

All requirements for existing septic systems will apply to new septic systems plus the following:

1. A qualified professional to perform a site assessment and design of all new septic systems, including determinations of seasonal high groundwater.
2. New systems to be constructed by a State licensed contractor or by the property owner.
3. New septic tanks to have effluent devices (filters) that retain solids in excess of 3/16 inches in diameter.

Attachment # 18

Attachment 18 Page 1

C. In 1995, a study issued in by the RWQCB titled "Assessment of Nitrate Contamination in Ground Water Basins of the Central Coast Region Preliminary Working Draft," illustrated significant increases in nitrate concentrations over time in both the lower and upper aquifers. According to a letter from the RWQCB on July 10, 1998, 107 monitoring wells with more than 1,100 data points were used in the construction of the contour maps included in the study. The RWQCB letter stated:

Monitoring data indicates much of the shallow groundwater in the most densely developed areas exceeds 45mg/l, the drinking water standard for nitrate. For this reason, many of the shallow water supply wells have been removed from service and demand shifted to the deeper aquifer. Dependence upon the deeper aquifer exacerbates the surface water problems because the community's water supply, formerly from the upper aquifer, is now drawn from the deeper aquifer and recharged (after use) to the upper aquifer causing ground water levels to rise and flood more septic systems. Increasing surface water impacts including: restriction of portions of shellfish harvesting areas because of rising bacteria levels: water surround the Los Osos area periodically do not meet bacteria standards for water contact recreation (such as swimming, wading, kayaking and small boat sailing): and the public is increasingly exposed to surface wastewater.

These issues can be addressed with water use-efficiency septic system, and storm-water mngmt. plans

This is not supported by water quality data since 2003 (see Attachment 23)

This study and letter prompted further action to address the issue of groundwater contamination.

1.2.4 - Los Osos Community Services District

In 1998, the community voted to establish a community services district with wastewater authority. The Los Osos Community Services District (LOCSD) developed a wastewater collection and treatment project with the treatment facilities located in the west-central portion of the community (referred to as the Tri-W site but referred to as the Mid-town site in this document). The LOCSD prepared an EIR for the project and certified the EIR on March 1, 2001. After receipt of a Coastal Development Permit (CDP) project construction started in 2005. In the fall of 2005, voters recalled a majority of the LOCSD board members in a special election and the new board immediately halted construction on the wastewater project. In August 2006, the LOCSD rescinded certification of the 2001 EIR Findings and filed for federal bankruptcy protection due to default on State grants and loans.

1.2.5 - Legislative Initiatives

After the recall and suspension of construction, California Assemblyman Sam Blakely attempted to resolve the dispute between the RWQCB and LOCSD. The efforts were to no avail. Assemblyman Blakely then proposed legislation. Assembly Bill (AB) 2701 was proposed to authorize transfer of wastewater authority from the LOCSD to the County of San Luis Obispo to proceed with implementation of a project to build a wastewater collection and treatment system for the Los Osos

Attachment 18 Page 2

final proposed project's potential environmental impacts and public comments before completing and certifying the Final EIR.

The septic system prohibition drives the project; environmental goals + objectives are secondary.

3.1.2 - Project Goals and Objectives

The primary goal of the LOWWP is to construct and operate a community wastewater collection, treatment and disposal system and, thereby, comply with the RWQCB's WDR Resolution 83-13. Eliminating discharges from onsite wastewater, as directed by the RWQCB, will also help accomplish the LOWWP's second primary goal: alleviating groundwater contamination, primarily nitrates, that has occurred at least partially because of the use of septic systems throughout the community.

One of the wastewater project's secondary objectives involves water resources issues. Water resources issues are important because of seawater intrusion that is contaminating the Los Osos groundwater basin. On March 27, 2007, the County Board of Supervisors certified a "evel of Severity (LOS) III for the community of Los Osos while adopting a Resource Capacity Study of the Los Osos groundwater basin. The LOS III determination is the highest determination of a resource problem under the County's Resource Management System. The wastewater project can be an important first step to solving water resource problems. While the primary purpose of the Los Osos Wastewater Project is to construct a community wastewater system and, thereby, to alleviate groundwater contamination, how that goal is met can create or hinder opportunities for the water purveyors to improve the local water resources.

Environmental objective is vague

83-13 limits alternatives for achieving these that have fewer impacts

To summarize, the specific objectives of the Los Osos Wastewater Project are:

- **RWQCB Waste Discharge Requirements.** Address the issues of water quality defined by the Waste Discharge Requirements (WDR) for discharge limits issued by the RWQCB.
- **Groundwater Quality.** Alleviate groundwater contamination—primarily nitrates—that has occurred at least partially because of the use of septic systems throughout the community.
- **Secondary Objectives**
  - a) **Water Resources.** Address water resource issues by mitigating the project's impacts on water supply and saltwater intrusion. Further, the wastewater project will maintain the widest possible options for beneficial reuse of treated effluent.
  - b) **Environmental Impacts.** Incorporate measures to minimize potential environmental impacts on the Los Osos community and surrounding areas, (including, but not limited to, habitat conservation, endangered species and habitat, air and water quality, greenhouse gas emissions, social and economic sustainability, wetlands and estuary preservation or enhancement, cultural resources protection, and agricultural land enhancements).
  - c) **Project Costs.** Meet the project water quality requirements while minimizing life-cycle costs and the related affordability impacts to residents.
  - d) **Regulatory Compliance.** Comply with applicable local, State, and federal permits, land uses, and other requirements including the Local Coastal Plan, Environmentall

Improvements to the estuary and ESHA are not listed.

These mitigation objectives are vague and the project doesn't achieve them.

Attachment # 20

From the LOWWP Draft EIR
(Available at http://www.slocounty.ca.gov/PW/LOWWP)

present Willow Creek conditions are shown in Appendix A (see Plate A2). The creek flows a small amount during most of the year that primarily supports dense riparian vegetation. Flows in Willow Creek are fed by rising groundwater but they do not reach the bay except when Los Osos Creek is flowing to the bay. * Willow Creek supplies Los Osos Creek and the estuary.

An unnamed drainage channel in the vicinity of the mobile home park, south of Los Osos Valley Road, reportedly flows seasonally through the oak preserve into Los Osos Creek in the vicinity of Los Osos Valley Road (TMG & TES, 1990).

Table 2 – Summary of Local Surface Water Features

SURFACE WATER FEATURE	SEASONALITY	SIZE OR RATE OF FLOW	SOURCE
LOS OSOS CREEK (AT LOS OSOS ROAD BRIDGE)	EPHEMERAL	1,630 TO 4,110 AFY	MORRO GROUP, 1990
WILLOW CREEK (ETO CREEK)	EPHEMERAL	438 AFY (DISCHARGE FROM PERCHED AQUIFER)	YATES & WILLIAMS, 2003
ETO LAKE	PERENNIAL	NA	NA
SWEET SPRING	PERENNIAL	292 AFY	MORRO GROUP, 1990
SWEET SPRING MARSH	EPHEMERAL	NA	MORRO GROUP, 1990
PECHO ROAD MARSH	EPHEMERAL	NA	MORRO GROUP, 1990
THIRD STREET MARSH	NA	APPROX. 2-5 GPM OBSERVED	MORRO GROUP, 1990
BAYWOOD POINT SPRING	NA	APPROX. 5 GPM	MORRO GROUP, 1990
BAYWOOD MARSH	NA	NA	MORRO GROUP, 1990
LOS OSOS CREEK ESTUARY	NA	SEVERAL SMALL OUTFLOW CHANNELS AT APPROX. 0.5 GPM	MORRO GROUP, 1990

Flows will be reduced to near zero with the project (see Page 4 of this attachment).

From the LOWWP Draft EIR, Appendix D-2
(Available at http://www.slocounty.ca.gov/PW/LOWWP)

Table 3 – Average Groundwater and LOWWP Effluent TDS Concentrations

WATER SOURCE	TDS (MG/L)
PERCHED AQUIFER	400[1]
CREEK COMPARTMENT	520[2]
UPPER AQUIFER SYSTEM	330[3]
EFFLUENT	620[4]

1 - MASS BALANCE CALCULATION BASED ON PRECIPITATION, IRRIGATION AND SEPTIC RETURN FLOWS
2 - C&A, 2005c, PART 2, PAGE 55, PAR. 2
3 - C&A, 2005a, TABLE 5 - AVERAGE CONCENTRATION FOR MONTH OF APRIL, 2005
4 - FINE SCREENING REPORT, SECTION 2.3.1.1

Nitrate

Sample results from previous basin study show that NO_3-N concentrations measured in dedicated monitoring wells range from less than 1 mg/l to 28 mg/l with an overall average of 10 mg/l (NO_3-N) (C&A, 2005a). The concentrations of NO_3-N contained in groundwater in the basin and the proposed effluent to be used for disposal within the basin are listed in Table 4 – Average Groundwater and LOWWP Effluent Nitrate Concentrations.

Table 4 – Average Groundwater and LOWWP Effluent Nitrate Concentrations

WATER SOURCE	NO_3-N (MG/L)
PERCHED AQUIFER	NA
CREEK COMPARTMENT	5 TO 10[1]
UPPER AQUIFER SYSTEM	10[2]
EFFLUENT	7[3]

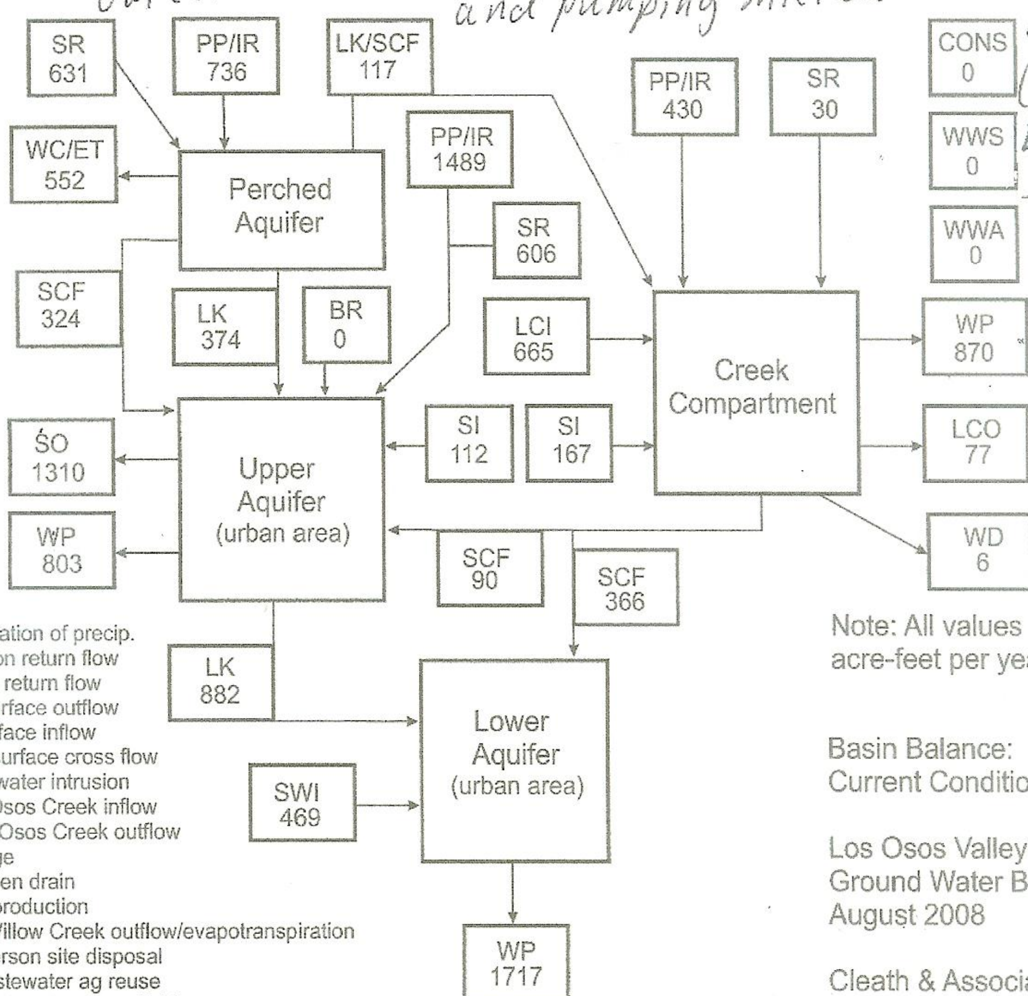
Average nitrate levels are at drinking water standards.

1 – YEATS AND WILLIAMS, 2003
2 - C&A 2005a, TABLE 5,
3 - FINE SCREENING REPORT, SECTION 2.3.1.1

There is an isolated area of low NO_3-N concentrations that is inferred to extend across the open space west of the South Bay Community Library where considerable

From Appendix C of
DEIR Appendix D-2

Current outflows to the ocean from the upper aquifer. This is needed to prevent sea water intrusion in the upper aquifer. outflows are reduced by 400 AFY w/ the project and pumping shifted to the upper aquifer (see Attachment 32 pp 3, 4)



Legend

PP = percolation of precip.
IR = irrigation return flow
SR = septic return flow
SO = subsurface outflow
SI = subsurface inflow
SCF = subsurface cross flow
SWI = sea water intrusion
LCI = Los Osos Creek inflow
LCO = Los Osos Creek outflow
LK = leakage
WD = Warden drain
WP = well production
WC/ET = Willow Creek outflow/evapotranspiration
BR = Broderson site disposal
WWA = wastewater ag reuse
WWS = wastewater spray field
CONS = water conservation

Note: All values in acre-feet per year

Basin Balance:
Current Conditions

Los Osos Valley
Ground Water Basin
August 2008

Cleath & Associates

DEIR Appendix D-2

These outflows are needed to prevent seawater intrusion in the upper aquifer (See p. 14 of Appendix D-2; also Attachment 4)

Table 8 – Current Basin Balance Conditions

COMPONENT OF WATER BUDGET	PERCHED AQUIFER	CREEK VALLEY AQUIFER	UPPER AQUIFER	LOWER AQUIFER
PERCOLATION FROM PRECIPITATION AND IRRIGATION	736	430	1,489	0
SEPTIC RETURN FLOW	631	30	606	0
SUBSURFACE OUTFLOW	0	0	- 1,310	0
SUBSURFACE INFLOW	0	167	112	0
LEAKAGE OR SUBSURFACE CROSS FLOW IN	0	117	788	1,248
LEAKAGE OR SUBSURFACE CROSS FLOW OUT	- 815	- 456	- 882	0
SEAWATER INTRUSION	0	0	0	469
LOS OSOS CREEK INFLOW	0	665	0	0
LOS OSOS CREEK OUTFLOW	0	- 77	0	0
WELL PRODUCTION	0	- 870	-803	-1,717
WARDEN DRAIN	0	- 6	0	0
WILLOW CREEK OUTFLOW AND EVAPOTRANSPIRATION	- 552	0	0	0
AQUIFER INFLOW	**1,367**	**1,409**	**2,995**	**1,717**
AQUIFER OUTFLOW	**- 1,367**	**- 1,409**	**- 2,995**	**- 1,717**

ALL TABLE QUANTITIES ARE IN ACRE-FEET PER YEAR

The flows are currently supporting Willow Creek, raparian habitat

A comparison of the septic return flow volumes in Tables 8 and 9 shows the reduction in this component in the hydrologic budget that is effectuated by the LOWWP. Roughly half of the recharge from septic system percolation is located over the perching clay layer while the remainder is located over the upper aquifer in areas not confined by the clay layer. As indicated by the reduction in this recharge component (see Table 9) the LOWWP effectively captures over 90 percent of the septage return flows within the Los Osos Basin.

A reduction in outflows from upper aquifer (141 AFY) increases likelihood of seawater intrusion. Outflows decrease by 400 AFY w/ more pumping from upper aquifer (see Attchmnt 32 pp. 3,4)

Table 10 – Viable Project Alternative 2b Basin Balance Conditions

COMPONENT OF WATER BUDGET	PERCHED AQUIFER	CREEK VALLEY AQUIFER	UPPER AQUIFER	LOWER AQUIFER
PERCOLATION FROM PRECIPITATION AND IRRIGATION	736	430	1,489	0
SEPTIC RETURN FLOW	36	30	44	0
SUBSURFACE OUTFLOW	0	0	- 1,169	0
SUBSURFACE INFLOW	0	166	107	0
LEAKAGE OR SUBSURFACE CROSS FLOW IN	0	103	719	1,205
LEAKAGE OR SUBSURFACE CROSS FLOW OUT	- 737	- 455	- 835	0
SEAWATER INTRUSION	0	0	0	352
LOS OSOS CREEK INFLOW	0	665	0	0
LOS OSOS CREEK OUTFLOW	0	- 60	0	0
WELL PRODUCTION (INCLUDES CONSERVATION)	0	- 870	- 803	- 1,557
WARDEN DRAIN	0	- 9	0	0
WILLOW CREEK OUTFLOW AND EVAPOTRANSPIRATION	- 35	0	0	0
BRODERSON INFLOW	0	0	448	0
AQUIFER INFLOW	**772**	**1,394**	**2,807**	**1,557**
AQUIFER OUTFLOW	**- 772**	**- 1,394**	**- 2,807**	**- 1,557**

ALL TABLE QUANTITIES ARE IN ACRE-FEET PER YEAR

Flows to Willow Creek are reduced by 517 AFY obviously causing as

Analysis of Water Supply Impacts

LOWWP Facilities Construction Impacts

The sewage collection system for each alternative is effectively the same with the exception of sewage pipeline route to the final location of the LOWWP. Each collection system alternative removes septic system effluent discharges from within the prohibition zone. After treatment to a secondary level, the effluent will be conveyed to spray fields proposed for location at the Tonini site and a leach field proposed for location at the Broderson property. During construction of pipelines, pump station, and treatment facilities shallow groundwater may be encountered that requires disposal.

elevations along the bay (C&A, 2000b). The lower rate would allow disposal that would restore shallow groundwater conditions but not require harvest wells to be used to drawdown the water table along the bay. A series of groundwater monitoring wells on the site and downgradient of the site will be installed to measure groundwater levels for the purpose of reducing the rate of disposal if necessary. However, the study speculated that at any discharge rate, there may be increased potential for liquefaction beneath residences immediately downgradient of the disposal area (C&A, 2000b).

Broderson leach fields are not certain to percolate effluent at the rate predicted.

To assess the potential for liquefaction impacts to occur, the LOCSD conducted another subsurface investigation in 2004. The study conducted cone penetrometer testing to obtain site specific subsurface data around the area of proposed effluent spreading and downgradient into the adjacent community. The results of the study indicated that the potentially liquefiable soils in the vicinity of the site consisted of unconsolidated loose dune sand deposits contained within the upper 5 to 10 feet bgs. The underlying Paso Robles Formation is weakly indurated and forms a dense soil that has a low potential for liquefaction or seismic settlement to occur as a result of the effluent disposal system and the estimated groundwater mounding beneath Broderson (Fugro, 2004). The LOCSD 2004 study also conducted confirmatory field percolation testing and a prototype percolation line pilot test to provide infiltration data for correlation with the previous 1997 County study, and conducted additional laboratory soil tests to provide data for a preliminary disposal system design.

To assess the potential impacts of effluent disposal at Broderson on the underlying groundwater quality, the LOCSD performed a water quality modeling study in 2003 (Y&W, 2003). The study simulated groundwater quality changes that would result from discharge of treated effluent with an average NO3-N concentration of 7 mg/l. The study concluded that while change would be gradual over time, the removal of septic system recharge in the prohibition area and the return of treated effluent with a reduced nitrate concentration to the Broderson site would result in a beneficial impact that will improve water quality.

Short-term Construction Impacts

The entire Broderson site consists of approximately 75 acres. The leach field area as designed would occupy a rectangular area covering approximately 8 acres and the remainder would be preserved as open-space. The leach field design includes excavation of leach line trenches to an average depth of 6.5 feet during construction and subsequently re-graded. The leach fields would consist of a 4-foot depth of gravel for drainage, covered by a geotextile fabric, and then there would be at least 2.5 feet of native soil backfill. The percolation piping would consist of 4-inch perforated PVC pipe laid with the perforations facing upwards, one foot below the geotextile fabric layer. If

Eight acres of ESHA will be destroyed and redisturbed every 5-10 years (leachfield material excavated and ground beneath disked).

Table 11 - Effluent Water Limitations from Previous Discharge Requirements (Order No. R3-2003-0007)

EFFLUENT LIMITATIONS			
CONSTITUENT	UNITS	MONTHLY AVERAGE	DAILY MAXIMUM
SETTLEABLE SOLIDS	MG/L	0.1	0.5
BOD*, 5-DAY	MG/L	60	100
SUSPENDED SOLIDS	MG/L	60	100
TOTAL NITROGEN (AS N)	MG/L	7	10

*Biological Oxygen Demand

The treatment facilities are being designed to produce an effluent that will have an average NO_3-N concentration of 7 mg/l and an estimated TDS concentration of 620 mg/l (Carollo, 2007b). The average nitrate concentration presently in the Los Osos Basin in the proximity of the prohibition zone groundwater is on the order of 10 mg/l (NO_3-N) (Y&W, 2003) and the average TDS concentration is approximately 330 mg/l (C&A, 2005c).

Effluent disposed at Broderson would have a positive affect on slowing the current conditions of seawater intrusion in the lower aquifer zones and flushing nitrate laden water from upper aquifer zones. The slow turnover rate of groundwater has been identified as the single most important basin characteristic affecting water-quality trends in the Los Osos Basin (Y&W, 2003). This occurs because the volume of groundwater in storage is relatively large compared to annual inflows and outflows. The result is that any action to decrease nitrogen loading (i.e., the LOWWP) will take a relatively long time to have an effect. As a result, nitrate concentrations in some deep wells may continue to increase for many years before the effect of septage removal reaches the lower aquifer system. Recent study has concluded that the shallow aquifer system may take on the order of three decades to equilibrate to a change in nitrate loading (Y&W, 2003). Regardless of the time frame required to realize a reduction in nitrate concentrations across the Los Osos Basin this impact is considered a beneficial impact to the basin.

It will take 30 years for nitrates to be reduced 1.7 mg/l.

To assess the impacts of TDS and NO3-N concentrations in the Los Osos Basin caused by effluent disposal at Broderson, a mass balance calculation was performed using septic return flows, precipitation, irrigation, subsurface cross flows and effluent disposed at Broderson at a rate of 448 AFY. The hydrologic budget

This statement is made prior to purveyors indicating they plan to treat the water for nitrates to increase use.

From the LOWWP Draft EIR, Appendix D-2
(Available at http://www.slocounty.ca.gov/PW/LOWWP)

summarized in Appendix C of this study was utilized for the purpose of comparing current conditions and conditions estimated for the viable project alternatives (C&A, 2008b). A summary of the mass balance calculation results is provided in Appendix D – Water Quality Mass Balance Summary. Combining the average effluent concentration of 7 mg/l with all the other nitrogen sources in the Los Osos Basin the average NO3-N concentrations in the upper aquifer after LOWWP completion will be approximately 8.3 mg/l, and is below the drinking water standard. The nitrate concentration calculation results are included in Table 12 – Summary of Upper Aquifer Nitrate Loading and Average Concentrations.

The resulting average TDS concentration calculated for the upper aquifer zones with the operation of Broderson is provided in Table 13 – Summary of Upper Aquifer Average Total Dissolved Solids Concentration. Both of these results indicate Broderson will provide a beneficial water quality impact on the Los Osos Basin.

Table 12 – Summary of Upper Aquifer Nitrate Loading and Average Concentrations

BASIN CONDITION	TOTAL SURFACE RECHARGE TO LOS OSOS BASIN (AFY)	TOTAL NITROGEN LOAD (TONS)	ESTIMATED AVERAGE CONCENTRATION (MG/L)
CURRENT	3,525	52.1	10.9
BRODERSON 448 AFY	3,337	37.9	8.3
BRODERSON 896 AFY	3,785	42.1	8.2

CONCENTRATION ESTIMATE WITH NO SUBSURFACE DENITRIFICATION FOLLOWING WASTEWATER DISPOSAL

Currently (2005) avg. = 10mg/l *(see Page 2 of this attachment).

Table 13 – Summary of Upper Aquifer Average Total Dissolved Solids Concentration

BASIN CONDITION	BRODERSON DISCHARGE (AFY)	TOTAL SALTS LOAD (TONS)	ESTIMATED AVERAGE CONCENTRATION (MG/L)
CURRENT	0	1,378	352
VPA 2a	448	1,073	296
VPA 2b	448	1,097	299
VPA 2a	896	1,450	343
VPA 2b	896	1,475	345

The Broderson disposal recharge can not mitigate potential impacts of reduced groundwater outflow that drains out of the upper aquifer A zone toward the Willow Creek drainage or directly into the bay. The annual drainage in the Willow Creek area will be reduced by the LOWWP to natural or above natural conditions prior to the Los Osos community development. Drainage will still occur, however the flow rates may be reduced to the present ephemeral surface flows. The potential impacts of the reduced groundwater discharge in this area of the Los Osos Basin could be realized along the riparian corridors of the drainage features. However, seasonal runoff and shallow groundwater are anticipated to provide sufficient water for use by the riparian vegetation established well before the Los Osos community was developed.

Potential impacts to Willow Creek and other habitat are acknowledged but not mitigated (i.e., the reduction of over 500 AFY of groundwater flows to ESHA)

Hydrogeologic Hazards

Potential hydrogeological hazards identified by this study are focused around the Broderson disposal site. Potential hazards include increased rising groundwater in the community at lower elevations around the bay, groundwater seepage from slope faces below the leach field, or liquefaction of soils between the site and the points of onshore and offshore discharge. Specific studies have been conducted to assess the potential for each of these impacts to occur.

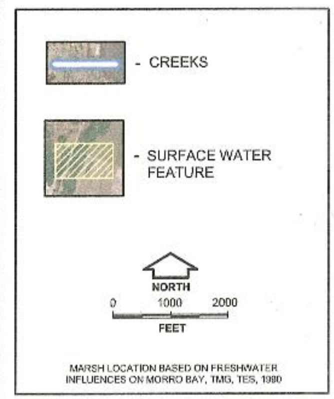
As previously mentioned, water level elevation changes in the vicinity of the site and across the Los Osos Basin in the upper aquifer zones were modeled as part of the project design study. The design capacity of 448 AFY was selected based on the ability of the aquifer system to receive this annual quantity of water without developing adverse conditions. The reduced design capacity alleviates hazards that could be caused by discharge at a higher rate. This rate reduces mounding beneath the site to eliminate the potential for groundwater to flow laterally and exacerbate saturated soil hazards near the bay. The design rate minimizes the potential for additional rising groundwater around the bay at lower elevations. While this condition presently exists in many low lying areas around the bay, the proposed disposal capacity at startup is designed to maintain existing conditions and not exacerbate this potential hazard. Liquefaction is a hazard that was specifically studied by the LOCSD to understand the potential for its occurrence (Fugro, 2004). The result of the field tests indicated that the potential was low because of the nature of the underlying geologic formation which was comprised of dense soils beneath the dune sands.

While project studies indicate that potential risk for these hazards is low, the occurrence of these potential impacts would be controlled during operation by the installation of a monitoring network at the Broderson site and downgradient within the residential community prior to initiating discharge. The groundwater monitoring network would allow direct observation of the changes in groundwater conditions and appropriate adjustments to the disposal operations can be made. In addition, if

From: Appendix A of DEIR
Appendix D-Z

October 2008
Project No. 07-016-01

HOPKINS
GROUNDWATER
CONSULTANTS



SURFACE WATER FEATURES
LOCATION MAP
Hydrogeological Impacts Analysis
LOWWP Draft EIR
San Luis Obispo County
Los Osos, California

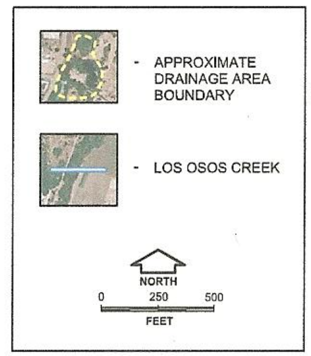
PLATE A1

DEIR, Appendix A
(of Appendix D-2)

October 2008
Project No. 07-016-01

HOPKINS
GROUNDWATER
CONSULTANTS

~500 AFY of groundwater will stop flowing to Willow Creek Drainage. These flows support Eto Lake, Los Osos Creek, (steelhead habit), and the estuary.



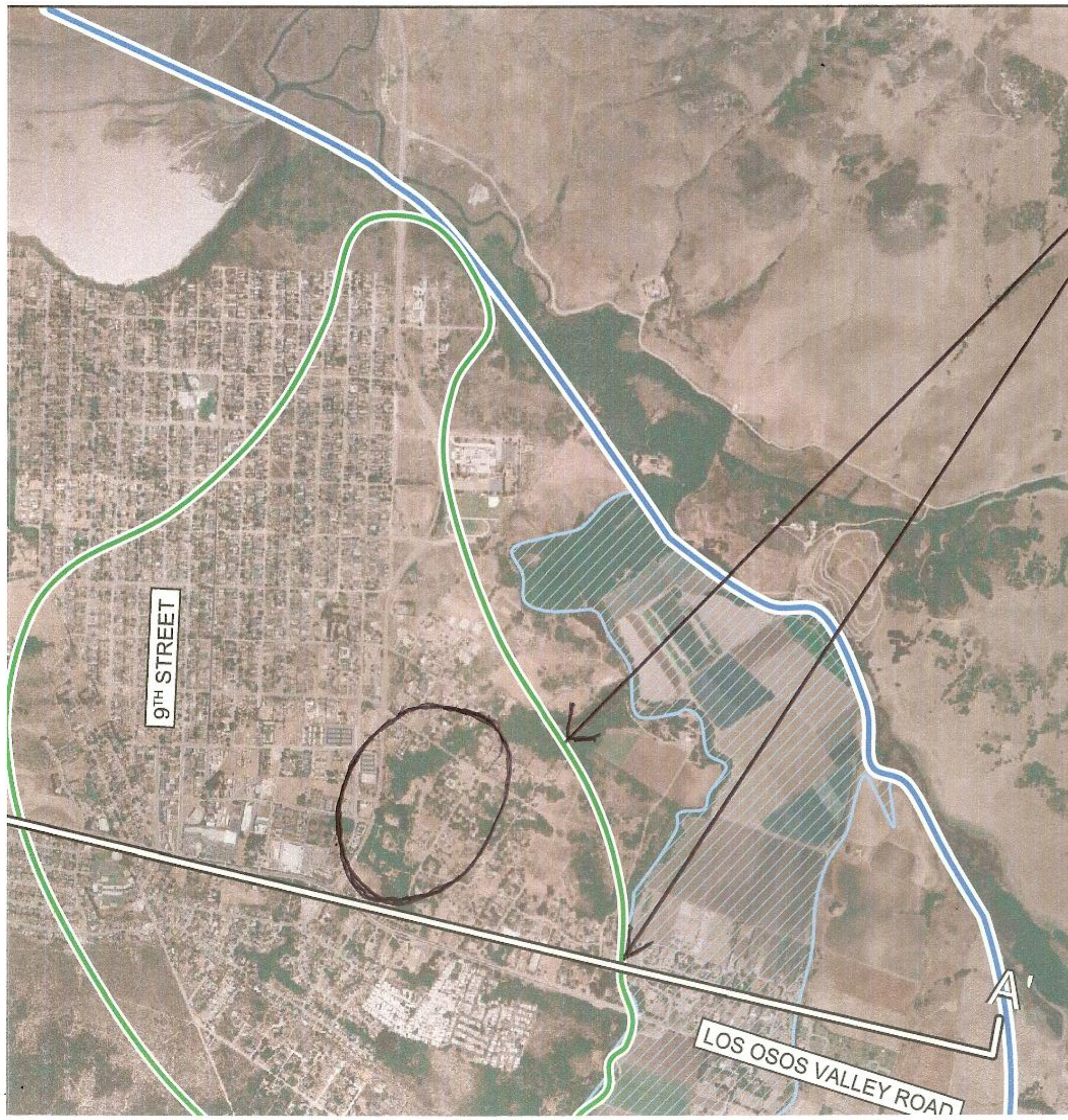
WILLOW CREEK DRAINAGE
Hydrogeological Impacts Analysis
LOWWP Draft EIR
San Luis Obispo County
Los Osos, California

PLATE A2

From: Appendix A of
DEIR Appendix D-2

HOPKINS
GROUNDWATER
CONSULTANTS

This shows the perched aquifer reaching E to Lake and L O Creek, suggesting greater impacts to this habitat than reported in the EIR.



- CROSS-SECTION LOCATION
- APPROXIMATE LOCATION OF PERCHING CLAY
- LOS OSOS VALLEY GROUNDWATER BASIN BOUNDARY
- CREEK VALLEY ALLUVIAL AQUIFER BOUNDARY (CREEK COMPARTMENT)

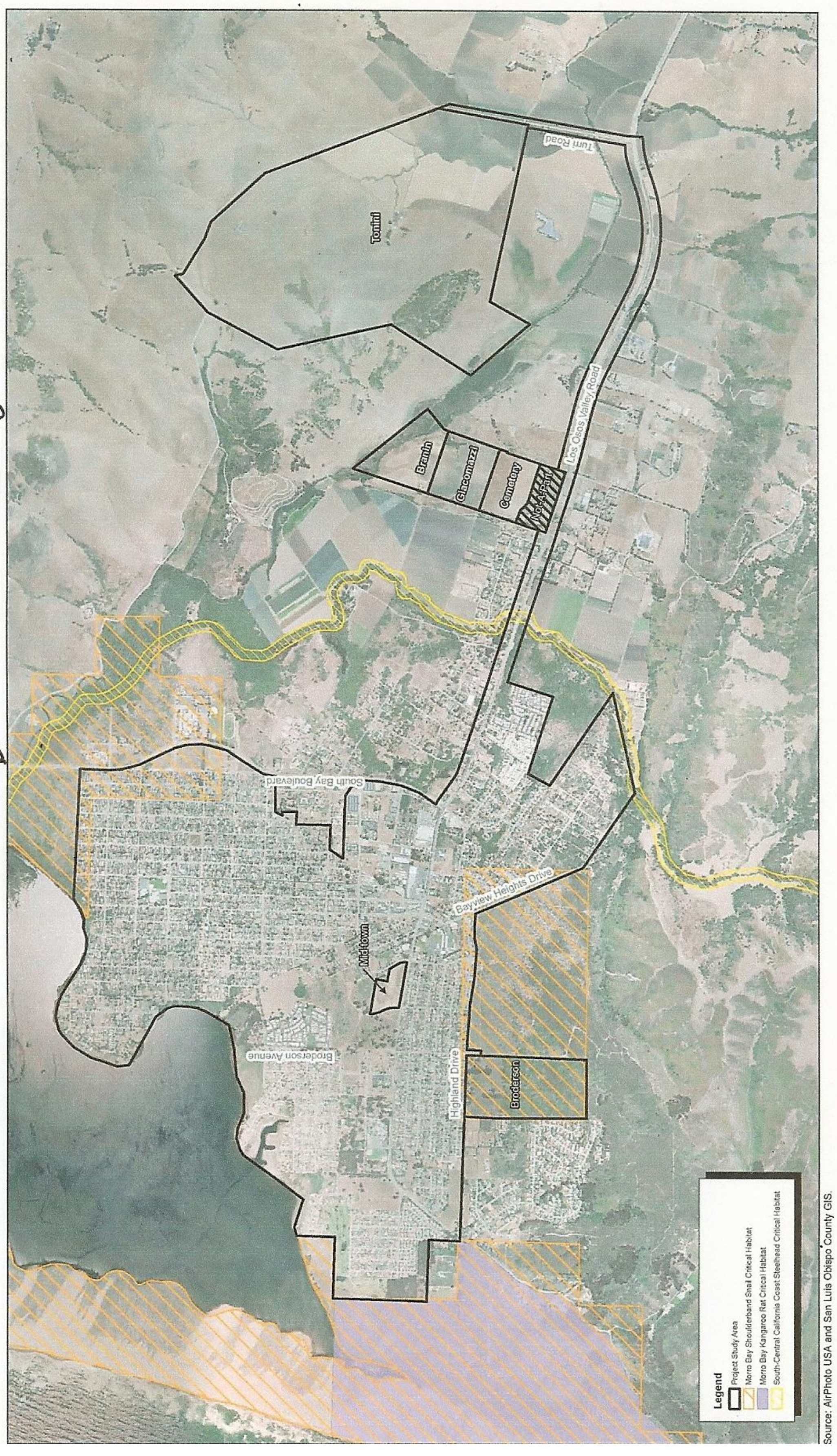
NORTH
0 1000 2000
FEET

The EIR states that impacts will be greatest on Willow Creek Drainage (circled) w/ the reduction of flows from the perched aquifer.

Attachment 20 Page 13

DEIR

Los Osos Creek and Los Osos Creek estuary are steelhead habitat.



Source: AirPhoto USA and San Luis Obispo County GIS.

02240002 • 11/2008 | 5.5-1_special_status_habitat.mxd

Exhibit 5.5-1
Special Status Species Habitat

COUNTY OF SAN LUIS OBISPO • LOS OSOS WASTEWATER PROJECT
ENVIRONMENTAL IMPACT REPORT

Table D6 - TDS Loading, UAS, Broderson (Current Conditions)

WATER SOURCE	TOTAL VOLUME (AFY)	CONCENTRATION (MG/L)	TOTAL LOAD (TONS)
SEPTAGE	606[1]	620[3]	511
PRECIPITATION	1,129[2]	0	0
IRRIGATION	360[2]	868[4]	425
LK/SCF[7] FROM PERCHED	698[1]	399[5]	379
LK/SCF[7] FROM CC[8]	90[1]	520[6]	64
TOTAL ANNUAL LOAD TO SYSTEM (TONS)			1,378.0
TOTAL VOLUME OF DISCHARGE TO GROUNDWATER (AFY)			2,883
ESTIMATED CONCENTRATION OF DISCHARGE TO GROUNDWATER (MG/L)			352

1 - CLEATH, 2008
2 - CALCULATED BASED ON TABLE 4 (YATES AND WILLIAMS, 2003)
3 - FINE SCREENING REPORT
4 - ESTIMATION BASED ON IRRIGATION WATER AT 330 MG/L TDS WITH 62 PERCENT ET AND 38 PERCENT PERCOLATION
5 - ESTIMATION FROM TABLE 1
6 - CLEATH, 2005c
7 - LEAKANCE/SUBSURFACE CROSS FLOW
8 - CREEK COMPARTMENT

Table D7 - TDS Loading, UAS, Broderson (VPA2a)

WATER SOURCE	TOTAL VOLUME (AFY)	CONCENTRATION (MG/L)	TOTAL LOAD (TONS)
SEPTAGE	44[1]	620[3]	37.1
PRECIPITATION	1,129[2]	0	0
IRRIGATION	360[2]	868[4]	424.9
LK/SCF[7] FROM PERCHED	634[1]	229[5]	197.4
LK/SCF[7] FROM CC[8]	51[1]	520[6]	36.1
BRODERSON	448[1]	620[3]	377.7
TOTAL ANNUAL LOAD TO SYSTEM (TONS)			1,073.1
TOTAL VOLUME OF DISCHARGE TO GROUNDWATER (AFY)			2,666
ESTIMATED CONCENTRATION OF DISCHARGE TO GROUNDWATER (MG/L)			296

1 - CLEATH, 2008
2 - CALCULATED BASED ON TABLE 4 (YATES AND WILLIAMS, 2003)
3 - FINE SCREENING REPORT
4 - ESTIMATION BASED ON IRRIGATION WATER AT 330 MG/L TDS WITH 62 PERCENT ET AND 38 PERCENT PERCOLATION
5 - ESTIMATION FROM TABLE 2
6 - CLEATH, 2005c
7 - LEAKANCE/SUBSURFACE CROSS FLOW
8 - CREEK COMPARTMENT

Attachment #21

San Luis Obispo County
Los Osos Wastewater Project Development

VIABLE PROJECT ALTERNATIVES

FINE SCREENING ANALYSIS

FINAL
August 2007

carollo
Engineers...Working Wonders With Water™

In association with Crawford Multari & Clark Associates

Cleath & Associates
Engineering Geology/Hydrogeology

The environmental and economic consequences of energy consumption will be given special consideration to develop projects where they are minimized. In Addition, options for individual homeowners to help mitigate the environmental and economic impact of the wastewater project include gray water systems, rain water catchment in existing septic tanks, water conserving landscape, and solar power to offset additional energy consumption.

1.3 FLOW PROJECTIONS

Estimates of the projected wastewater flows and loads were outlined in the Rough Screening Report. The load estimates have not changed, but the flows estimates have been further reviewed in this report due to increased estimates of Inflow/Infiltration. The estimate for the dry weather flow at buildout without conservation remains at 1.2 MGD.

Inflow/infiltration (I/I) estimates for the collection system alternatives were the main source of uncertainty in calculating the future treatment facility influent flow volume. If a STEP/STEG collection system is selected it is anticipated that there will be minimal I/I since the system is sealed and under pressure. If a gravity collection system is selected, only a system that was constructed of fusion-welded PVC piping could be operated with as little I/I as a STEP/STEG system. However, fusion welded PVC sewers are a new technology with little long-term operating history, and can be significantly more costly to install than traditional bell-and-spigot gravity sewers.

Properly installed bell-and-spigot sewers will be watertight at first, and then slowly lose their integrity as the surrounding soils shift, compressing the pipes, and compromising their seals at the joints. The water-tightness of a bell-and-spigot sewer can be preserved if a maintenance program is conducted on an ongoing basis to detect and repair leaks. This program would add to the cost of a gravity sewer compared to a STEP/STEG sewer with similar levels of I/I.

As discussed in the Rough Screening Report, previous studies used standard collection system textbook models[1] to estimate the I/I per mile per inch diameter of pipe of gravity sewer. The total predicted I/I of the system was divided by the estimated population in order to calculate the projected I/I per capita. During wet weather, a conservative estimate for a conventional system I/I of 17 gpcd was given, which corresponded to a total potential wet weather flow of 1.5 MGD for Los Osos. However, it was pointed out that the true value would probably be much lower due to the sandy soils in the region that tend to direct water past a pipe and trench, and due to the presumed water-tightness of a new collection system. Using the textbook models, Montgomery Watson Americas, Inc., anticipated that

* Note: The proposed gravity collection system is supposed to be chemically sealed in high ground water areas. This will reduce I/I. However, the system will still be over 80% conventional gravity subject to high volumes of I/I during wet weather (also exfiltration - leaks out of the system).

[1] From *Wastewater Engineering, Collection and Pumping of Wastewater*, Metcalf and Eddy (1981) and *Gravity Sanitary Sewer Design and Construction*, American Society of Civil Engineers (1982).

7 gpcd would be a more realistic estimate of wet weather I/I, corresponding to a total wet weather flow of 1.3 MGD for Los Osos.

Table 1.2 shows a range of infiltration factors developed for various manufacturing references and textbooks. The gravity sewer infiltration allowance used in this Fine Screening Report is greater than most of the rates suggested in these other references, and is therefore a conservative assumption.

Table 1.2 Gravity Sewer Infiltration References
Los Osos Wastewater Project Development
San Luis Obispo County

Source	Recommendation	Corresponding Infiltration for Los Osos
"Recommended Standards for Wastewater Facilities," Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997.	200 gpd/in-mi	77,000 gpd
"Installation Guide for PVC Sewer Pipe" PWPipe, March 2000.	50 gpd/in-mi	19,000 gpd
"Gravity Sanitary Sewer Design and Construction," American Society of Civil Engineers, 1982.	500 gpd/in-mi	190,000 gpd
"Wastewater Engineering; Collection and Pumping of Wastewater," Metcalf & Eddy, 1981.	530 gpd/acre(3)	318,000
"Civil Engineering Reference Manual", Michael R. Lindeburg, 2001.	200 gpd/in-mi or 10% of average flow	77,000 gpd or 120,000 gpd
Unibell - http://www.uni-bell.org/pubs/sample_sanitary_spec.pdf	<25 gpd/in-mi	<9,600 gpd
Infiltration Allowance for Viable Project Alternatives in Fine Screening Report (Gravity)		300,000 gpd

Notes:

1. Total of sewer = 254,000 linear feet; 8 in diameter.
2. Predominant value reported - many communities had much less.
3. Los Osos service area = 595 acres

In the Rough Screening Report, 1.3 MGD was identified as the likely wet weather flow for both STEP/STEG and gravity collection systems. However, it was recognized that because of the difference in a pressure tight joint system utilized for STEP/STEG, versus a gasketed bell and spigot joint system utilized for gravity collection system, that there is a higher potential for a gravity system to experience I/I flows over time than there is for a STEP/STEG system. As a result, the wet weather flow for the gravity collection system option was recalculated to be 1.5 MGD (at buildout). This was based on collection system textbook models and was consistent with the calculations previously used by previous studies prior to providing a reduction factor to account for the sandy soils of the area. *

The 1.5 MGD does not take into consideration conservation, however, which is a stated goal of the community for the project. With conservation practices, (i.e. toilet retrofit program and water efficient appliances in all new construction) it is estimated that the total flow can be decreased by at least 0.1 MGD. As a result, a likely scenario to anticipate would be that a portion of the increase in I/I flows for the gravity collection system would be offset by the implementation of conservation practices. Therefore, the wet weather flow used to size the wastewater treatment plant for the gravity collection system was 1.4 MGD (1.5 MGD wet weather flow with I/I minus 0.1 MGD of conservation). For sizing of wastewater treatment plant for the STEP/STEG system the reduction in flow due to the implementation of conservation would similarly apply. The wet weather flow used to size the wastewater treatment plant for the STEP/STEG collection was 1.2 MGD (1.3 MGD wet weather flow with minimal I/I, minus 0.1 MGD from conservation).

Gravity *

STEP *

1.4 BASIS FOR SCREENING OF ALTERNATIVES

Each of the component alternatives that passed through rough screening was investigated in greater detail for this Fine Screening Report. Cost is an additional element that will be used for screening in this report that was absent in the Rough Screening Report. Conceptual-level cost estimates have been prepared for the component alternatives to enable their comparison. The interdependency of the components (Figure 1.3) will also be used to examine and screen the component alternatives to a greater extent than was done in the Rough Screening Report. Seawater intrusion mitigation will also be considered, since as discussed in earlier, any project that worsens the current groundwater basin condition will be screened out of consideration. All viable projects were developed so they did not worsen the existing seawater intrusion problem.

Following the development of viable project alternatives, the County's project selection process will include a community-wide survey, workshops, and other community participation efforts so that final project decisions meet the needs and desires of the community to the greatest extent possible. In accordance with State and Federal laws, those additional work efforts and final project selection decisions will be completed concurrently with the environmental review efforts.

*Note; Although the proposed collection system will have some parts sealed, the CDP still assumes 300,000 gpd for I/I.

Table 2.3 Reuse/Disposal Considerations
Los Osos Wastewater Development Project
San Luis Obispo County

Disposal/Reuse Alternatives	Disposal Capacity (AFY) For Fully Developed Alternative[1]	Seawater Intrusion Mitigation Factor	Total Seawater Intrusion Mitigation (AFY)	Denitrification Likely Required (AFY)	Tertiary Treatment Likely Required (AFY)	Requires Purveyors' Participation
Spray Fields	1,190	0	0	No	No	No
Cemetery Reuse (in lieu)	50	0.1	5	Partial[2]	Yes	No
Urban Reuse (in lieu, large sites)	63	0.55	35	Partial[2]	Yes	Yes
Agricultural Reuse (in lieu)	460	0.1	46	Partial[2]	Yes	No
Agricultural Exchange	460	0.55	250	Partial[2]	Yes	Yes
Leachfields/Percolation Ponds without Harvest Wells (Broderson site)	448	0.22	100	Yes	No	No
Leachfields/Percolation Ponds with Harvest Wells (Broderson site)	896	<0.22[3]	<200[3]	Yes	No Not accurate.	Yes
Other Actions Influencing Seawater Intrusion Mitigation[4]						
Conservation[5]	160 (at buildout)	0.55	90	Much more is needed and possible		No
Harvest Water Exchange[6]	none	0.55	Up to 550[7]			Yes

Notes:
(1) The project is estimated to require a total disposal capacity of 960 AFY at current conditions and 1350 AFY at buildout, which can be reduced to 1,190 AFY with conservation.
(2) The NWRI report (2006) stated that effluent disposed by land application (i.e., spray irrigation) will not need to undergo nitrogen removal when applied at agronomic rates. However, application of high concentrations of nitrogen would exceed agronomic rates, so partial denitrification to between 10 and 20 mg/L N may be necessary.
(3) Harvesting water to prevent mounding when Broderson is used in excess of 448 AFY reduces the volume of water that percolates to the lower aquifer.
(4) These Other Actions are not reuse/disposal alternatives and therefore do not have an associated capacity.
(5) Conservation is assumed to be achieved through a toilet retrofit program financed by the wastewater project. Although it is not a disposal alternative, it provides an equivalent benefit to 160 AFY disposal capacity.
(6) Does not address wastewater disposal (capacity) and is therefore considered beyond the scope of the wastewater project.
(7) The total mitigation value of harvest water, urban reuse, agricultural exchange, conservation and any other activity that reduced production from the lower aquifer cannot exceed 550 AFY, which is the expected rate of seawater intrusion once septic flows are moved out of town.

Attachment #22

Sorrel Marks

COPY

LOS OSOS
NITRATE MONITORING PROGRAM

APRIL 2005
GROUND WATER MONITORING

Prepared for the

LOS OSOS COMMUNITY SERVICES DISTRICT

REGISTERED GEOLOGIST
SPENCER J. HARRIS
No. HG 633
CERTIFIED HYDROGEOLOGIST
EXP 10/31/05
STATE OF CALIFORNIA

June 2005

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(805) 543-1413

C A

CONCLUSIONS

Shallow ground water generally flows to the northwest toward the bay. On the east side of the basin, a portion of the shallow water moves toward Eto Creek and Los Osos Creek. The ground water flow pattern for April 2005 is similar to historical flow patterns. Water levels averaged 4 feet higher in April 2005, compared to October 2004, and were the shallowest since 1998 for most of the network monitoring wells

Water quality results at network wells for April 2005 indicate a decline in shallow ground water salinity compared to the results obtained in October 2004. NO_3-N and TDS concentrations in water collected from network wells across the basin decreased an average of 0.6 mg/l and 42 mg/l, respectively, over the last quarter. The number of monitoring network wells with water quality in excess of the NO_3-N drinking water standard of 10 mg/l has declined from 14 wells in October 2004 to 12 wells in April 2005. *

Water quality trends mostly involve seasonal fluctuations, with occasional long-term trends of increasing or decreasing salinity. Water quality trends are interpreted to indicate that general mineral concentrations in shallow ground water are close to equilibrium conditions under the current land uses and septic discharges, which have been relatively stable since the 1980's. *

Nitrates and other trace elements are at equilibrium in the upper aquife.

C11
3-5

DRAFT FINAL REPORT

SEA WATER INTRUSION ASSESSMENT
and
LOWER AQUIFER SOURCE INVESTIGATION
of the
LOS OSOS VALLEY GROUND WATER BASIN
SAN LUIS OBISPO COUNTY, CALIFORNIA

prepared for the

LOS OSOS COMMUNITY SERVICES DISTRICT

with grant funding provided by the

CALIFORNIA DEPARTMENT OF WATER RESOURCES

July 2005

CLEATH & ASSOCIATES
1390 Oceanaire Drive
San Luis Obispo, California 93405

much of the sea water mixing beneath the sand spit may have already been in place prior to any basin development.

Zone C hydraulic heads near the bay at Pecho Road have generally been in excess of 5 feet above sea level, based on static water level data from community supply well 30S/10E-13L1 (140 feet deep, drilled in 1955), except between 1989 and 1995, due to the effects of the late 1980's drought. Well 13L1 was placed on standby status in the late 1990's due to increasing nitrate concentrations, and is currently idle. Water levels at well 13L1 have generally been between 8 and 9 feet above sea level in recent years.

Zone C hydraulic heads have historically been in excess of 2.5 feet above sea level along the bay at Pasadena Drive except during severe drought, based on static water level data from community supply well 30S/11E-7N1 (84 feet deep, drilled in 1951). During and following the 1976-77 and 1987-1990 drought periods, static water levels in well 7N1 dropped to below sea level. Water levels in recent years have generally been between 5 and 6 feet above sea level at Well 7N1, which is still in active service.

In 1998, shallow water table monitoring wells were installed at Sea Pines golf course for wastewater discharge monitoring (RWQCB file review for Waste Discharge Order 93-82). Water levels at monitoring well MW3, on the west side of the golf course property, averaged 3.8 feet above sea level between October 2001 and July 2004, which is slightly lower than the hydrostatic requirements of the Ghyben-Herzberg relation (4.5 feet of head) to avoid sea water intrusion through a depth of 180 feet below sea level. As mentioned previously, however, the Ghyben-Herzberg relation would underestimate the depth to the sea water interface under ocean outflow conditions, and while the potential correction is negligible for relatively flat hydraulic gradients, it becomes significant as the outflow face is approached at the bay.

The Zone C sea water interface is currently estimated to be relatively stable onshore, with a potential for active intrusion beneath the sand spit, based on the observed hydraulic pressures and seaward hydraulic gradient. During extended drought periods, however, there is a potential for onshore sea water intrusion in Zone C, although no significant impacts to supply wells have been reported. One example of sea water intrusion near the bay was reported in a shallow well during the 1960's (DWR, 1972). The well (30S/10E-13B2) was only 20 feet deep, however, is interpreted to have been intruded by brackish water from the bay. *

The earliest water level information in Zone D near the bay is from well 30S/10E-13L4, drilled in 1977. The first water level reported in May 1977 at this well was equivalent to approximately 7 feet above sea level. Under hydrostatic conditions, this would theoretically maintain fresh water saturated sediments through approximately 280 feet below sea level (Zone D extends to 320 feet below sea level at well 13L4). The e-log of the test hole, however, indicated saline water beginning at approximately 520 feet below sea level. Therefore, either sufficient ocean outflow through the aquifer zones was present in 1977 to maintain an equivalent fresh water head of 13 feet at depth, or active sea water intrusion was occurring by 1977.

The upper aquifer is only relatively stable and subject to seawater intrusion

2005 SeaWater Intrusion Assessment

Creek. The Morro Group (1989, cross-section F-F', page B-5) also showed the aquitard outcropping along the west bank of Los Osos Creek, upstream of Los Osos Valley Road. A concurrent investigation by the U.S.G.S. (Yates and Wiese, 1988, cross-section A-A', pages 8, 9, and 16) identified and correlated continuous clay layers in two areas, one layer up to 20 feet thick between Los Osos Creek and downtown Los Osos, and the other layer 50 to 80 feet thick west of the north-south extension of Ninth Street.

A lower aquifer water level contour map for Fall 1984 was prepared based on the above historical interpretation by the Morro Group (1987 EIR, Volume II, Figure C-3.4). This map showed deep aquifer water levels below sea level from the coast through Ferrell Avenue. East of Ferrell Avenue, lower aquifer water levels were shown above sea level and increasing in elevation up to the invert level of the Los Osos Creek channel. Many of the wells on the east side of Ferrell Avenue used for preparation of the Fall 1984 lower aquifer water level contour map, however, have since been reinterpreted as upper aquifer wells.

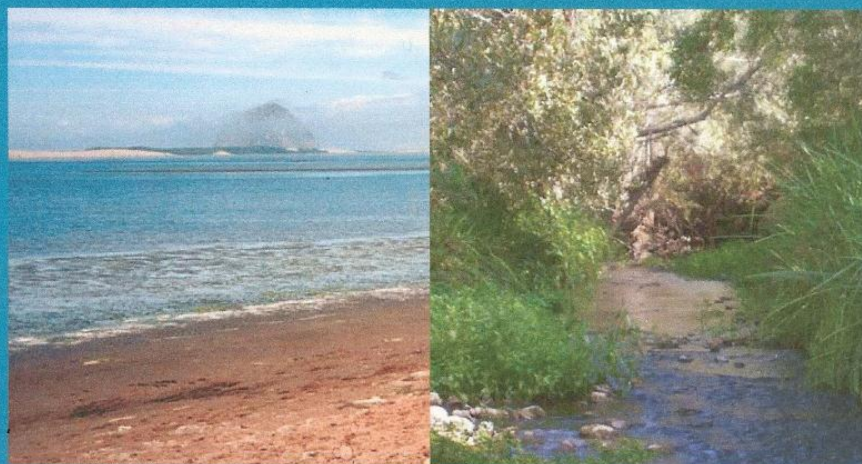
In the mid 1990's, the Morro Group prepared cross-sections for Metcalf & Eddy (unpublished) and a map of elevation contours on the base of the regional aquitard (EDA and Morro Group, 1997) that differed from the original 1987 EIR interpretation. Specifically, the perching clay that extends from Bayview Heights though downtown Los Osos was interpreted as separate from the regional aquitard. It was recognized that the perching clay (AT1 clay) outcrops along the banks of Los Osos Creek, while the regional aquitard subcrops further to the east beneath the creek valley alluvium. In fact, the perching clay had been previously studied during development of Bayridge Estates and correlated with the outcrops along Los Osos Creek (Wiese, 1974).

In 2001, Weber, Hayes & Associates investigated the perched aquifer beneath a portion of downtown Los Osos, and identified three discrete hydraulic zones, which they named Zones A, B, and C. The work by Weber, Hayes & Associates confirmed the existing interpretation regarding the depth of the perching clay, and the nomenclature for the aquifer zones was expanded by Cleath & Associates (2003) to include Zones D and E. The current interpretation of the regional aquitard structure on the east side, including the creek valley, is shown in Figure 21 (Detail of Hydrogeologic Cross-Section B-B').

Los Osos Creek Valley

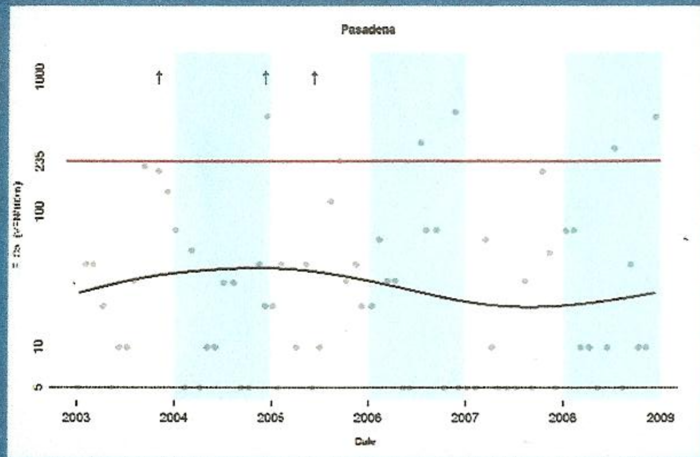
A main source of recharge to the lower aquifer has historically been considered to be Los Osos Creek and the creek valley sediments. The Morro Group (1987, 1989) focused on the upper creek valley as the most likely location for recharge from stream seepage, with supporting evidence from possible fracture conduits along the Los Osos fault near the juncture of Strand A and Strand B, from ground water mounding in the upper creek valley area, and from the former structural interpretation of the regional aquitard as absent east of the creek. Stream seepage had been measured in the upper creek valley during portions of 1986, and was estimated to average 1.1 acre-feet per day.

Attachment #23

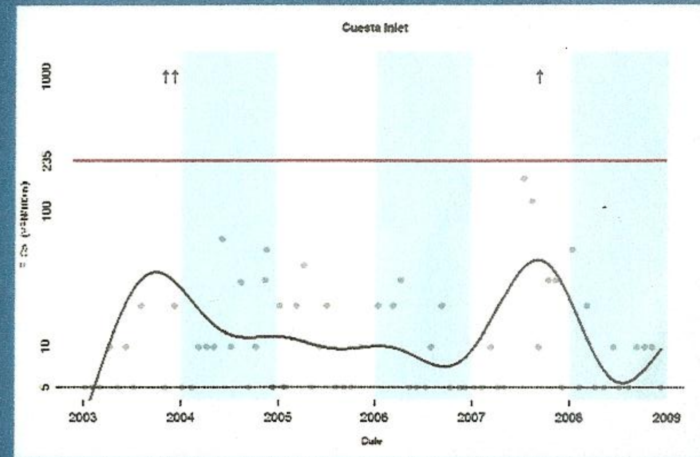


Data Share: Bacteria

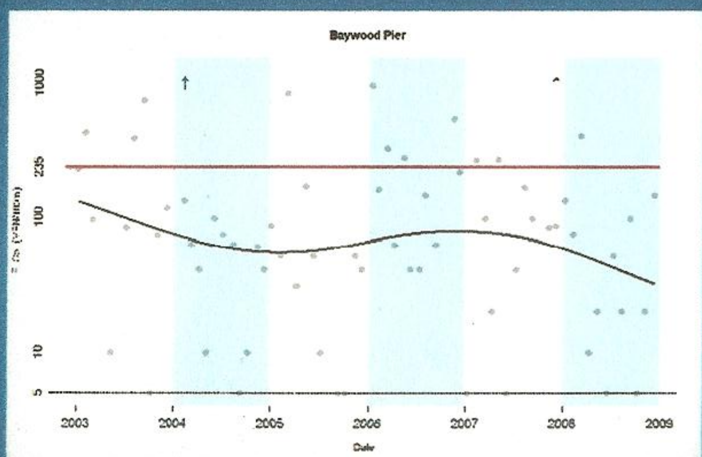
Morro Bay National Estuary Program
Volunteer Monitoring Program
September 15, 2009



Pasadena Point (PAS)



Cuesta Inlet (CIN)

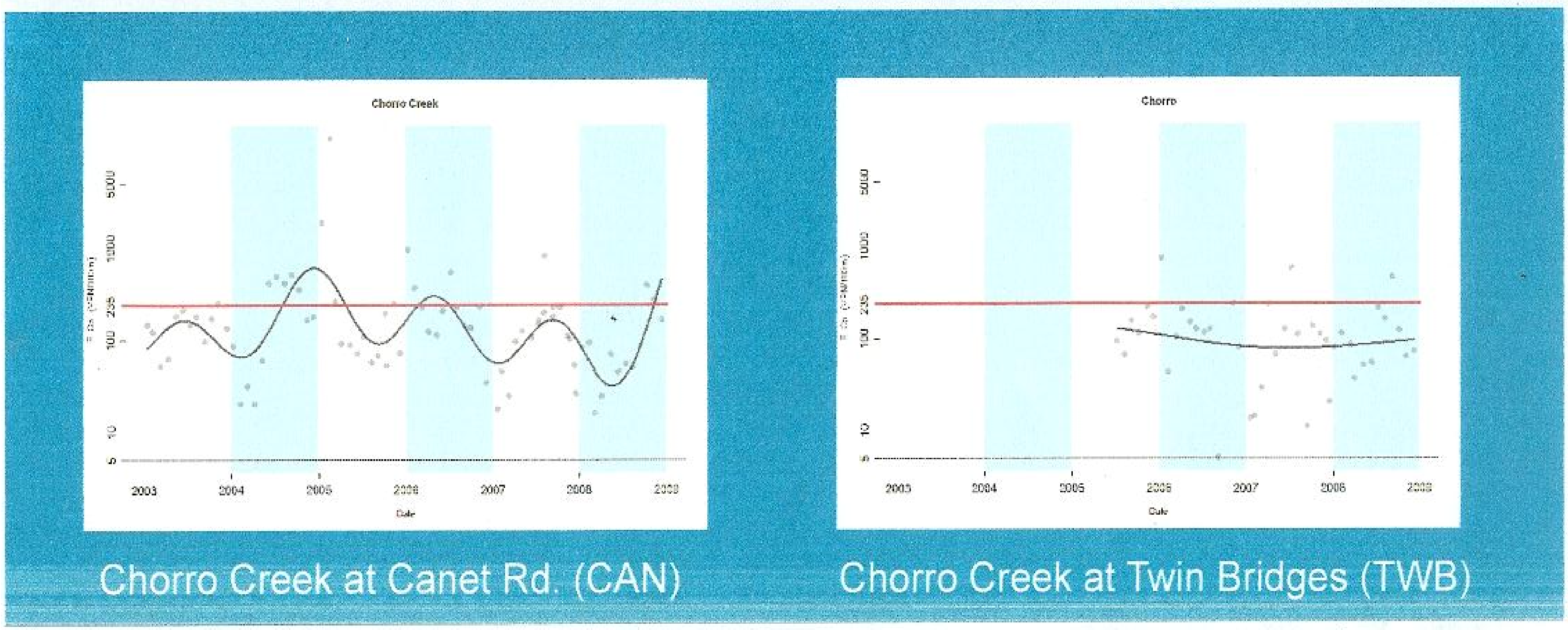


Baywood Pier (BAY)

Tests at sites near Los Osos show bacteria (E. Coli) counts below safe limits

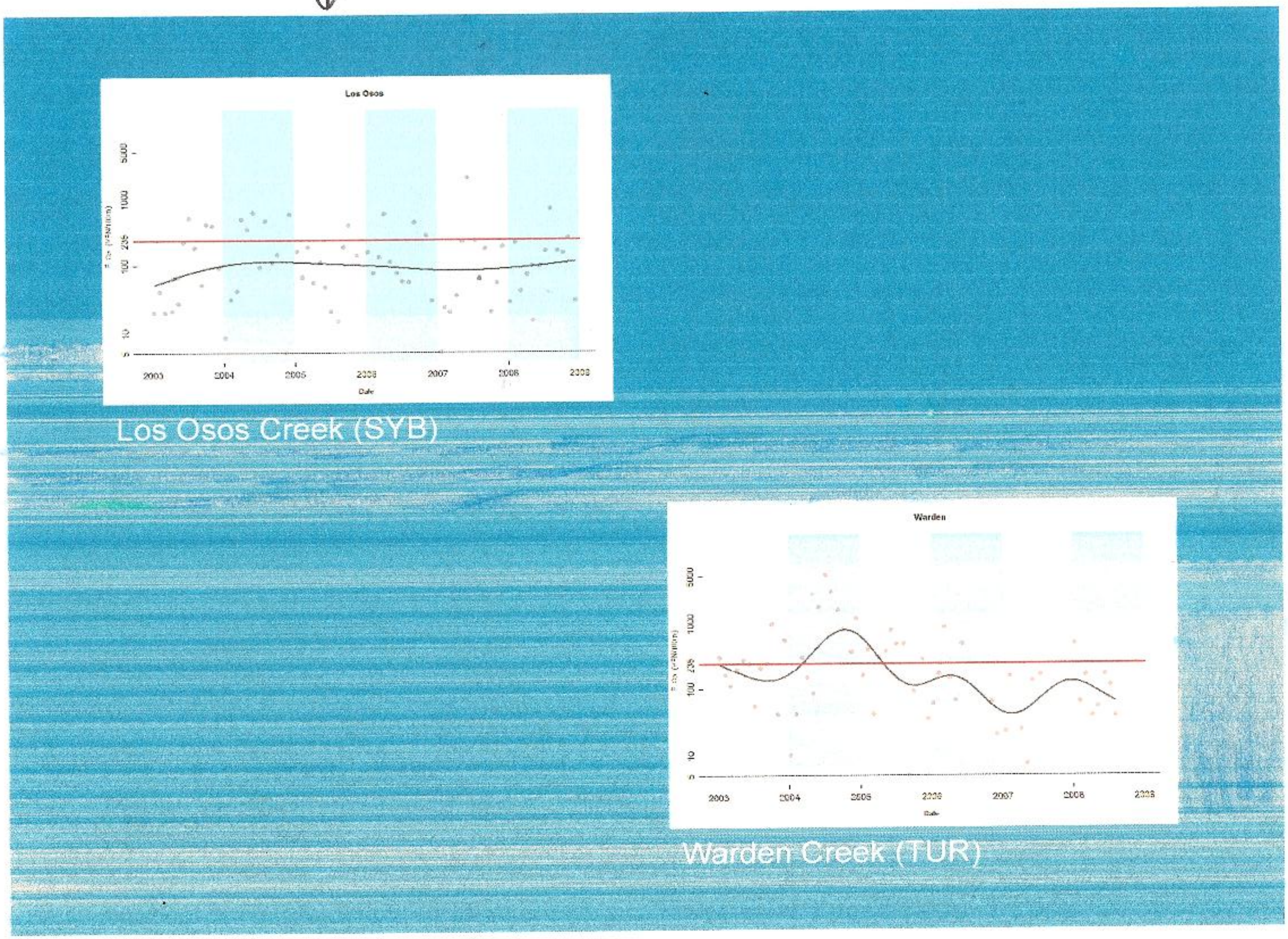
From the Morro Bay National Estuary Program (MBNEP) Voluntary Monitoring Program (VMP) "Data Share: Bacteria" September 15, 2009 http://www.mbnep.org/volunteer/summaries.php

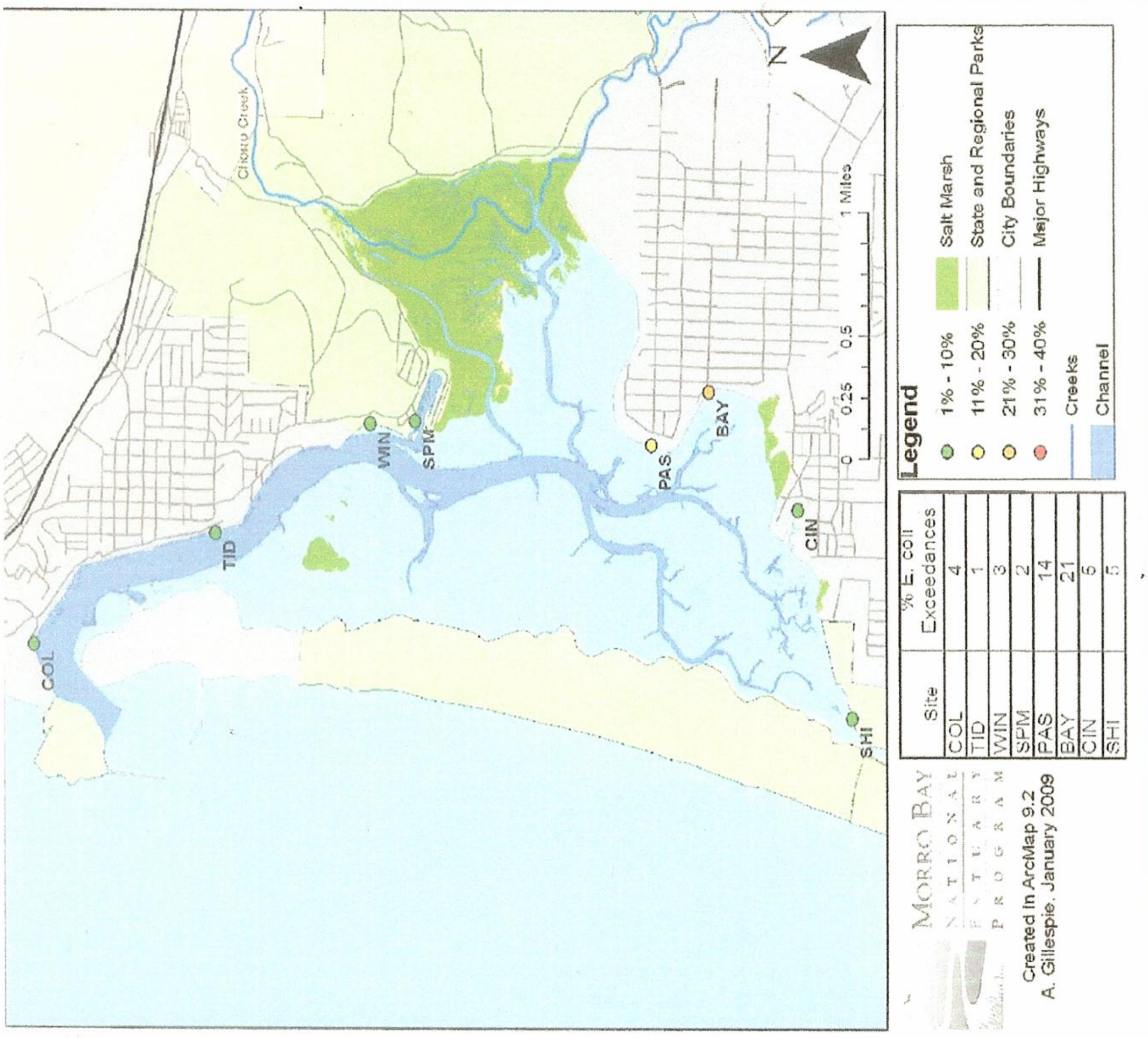
C12
2-14



Bacteria levels in creeks that enter the estuary are are higher than at sites near Los Osos (also see next page).

E. coli counts are higher in Lo Creek than at sites near Los Osos.

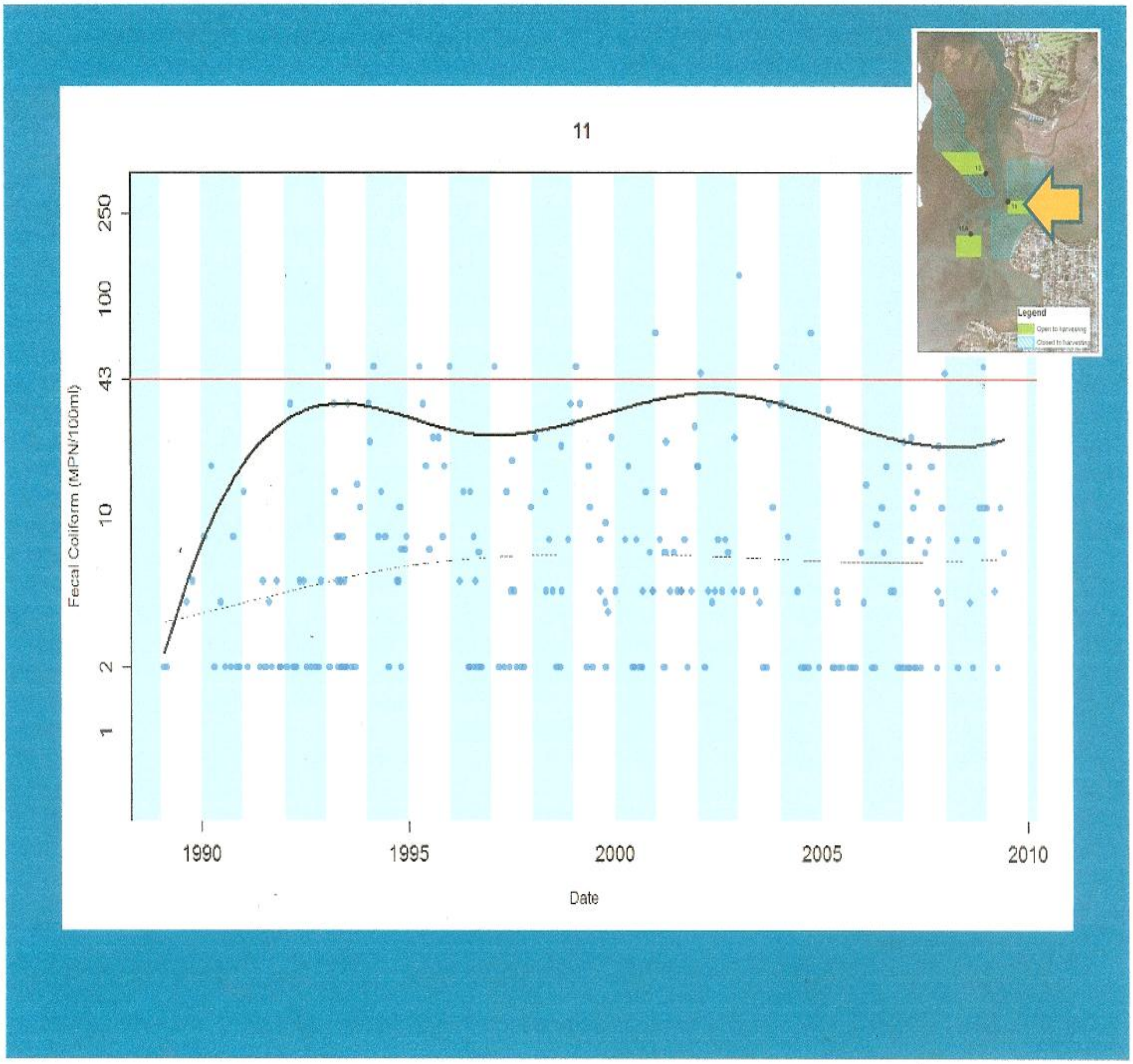




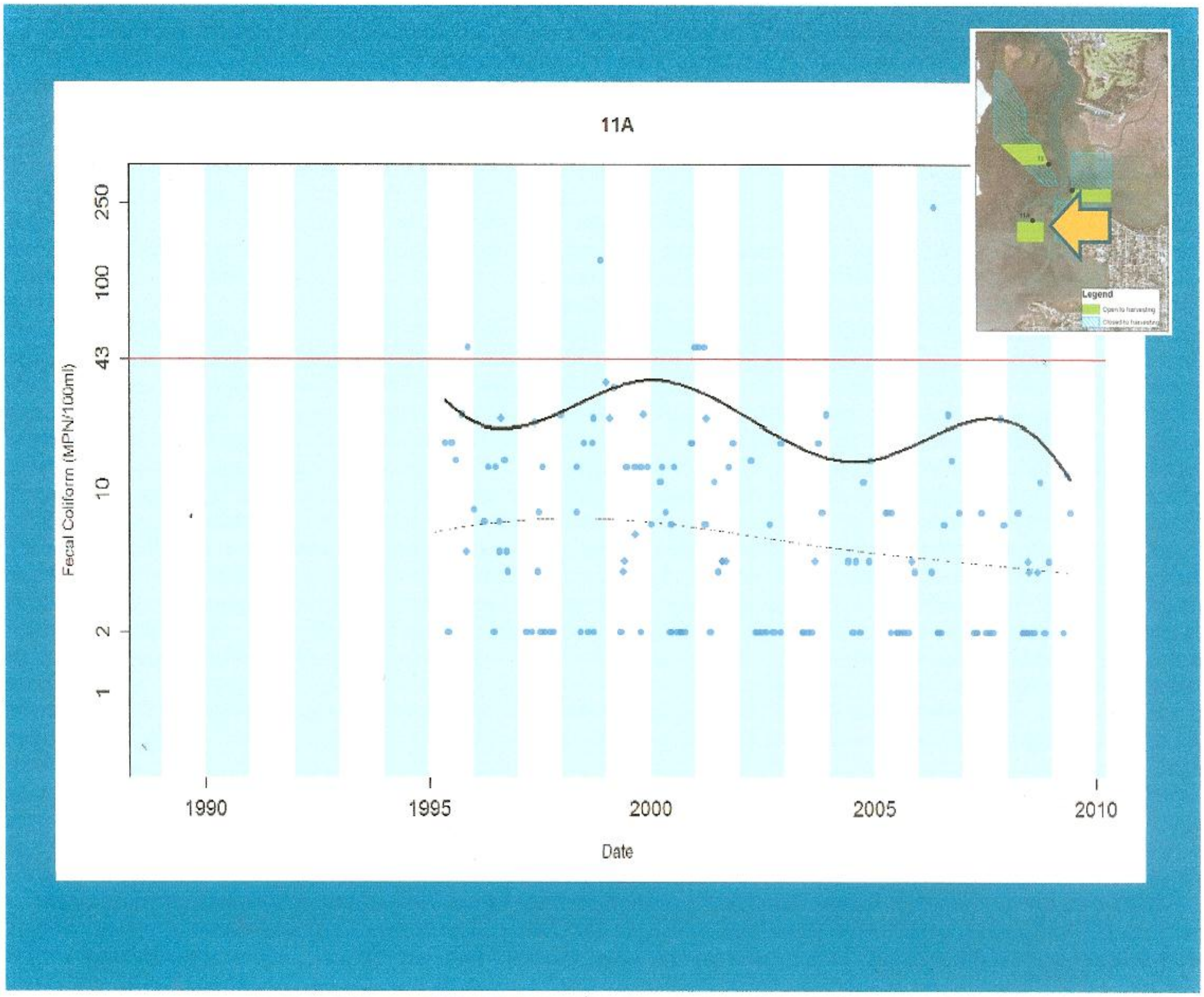
From the Morro Bay National Estuary Program (MBNEP)
Voluntary Monitoring Program (VMP) "Data Share: Bacteria"
September 15, 2009 http://www.mbnep.org/volunteer/summaries.php

Water Quality for Shellfish Growing Waters

- Two criteria must be met:
  - 90^{th} percentile of 30 samples must be less than 43 MPN/100 mL
  - Geomean of 30 samples must be less than 14 MPN/100 mL
- Indicator: fecal coliform



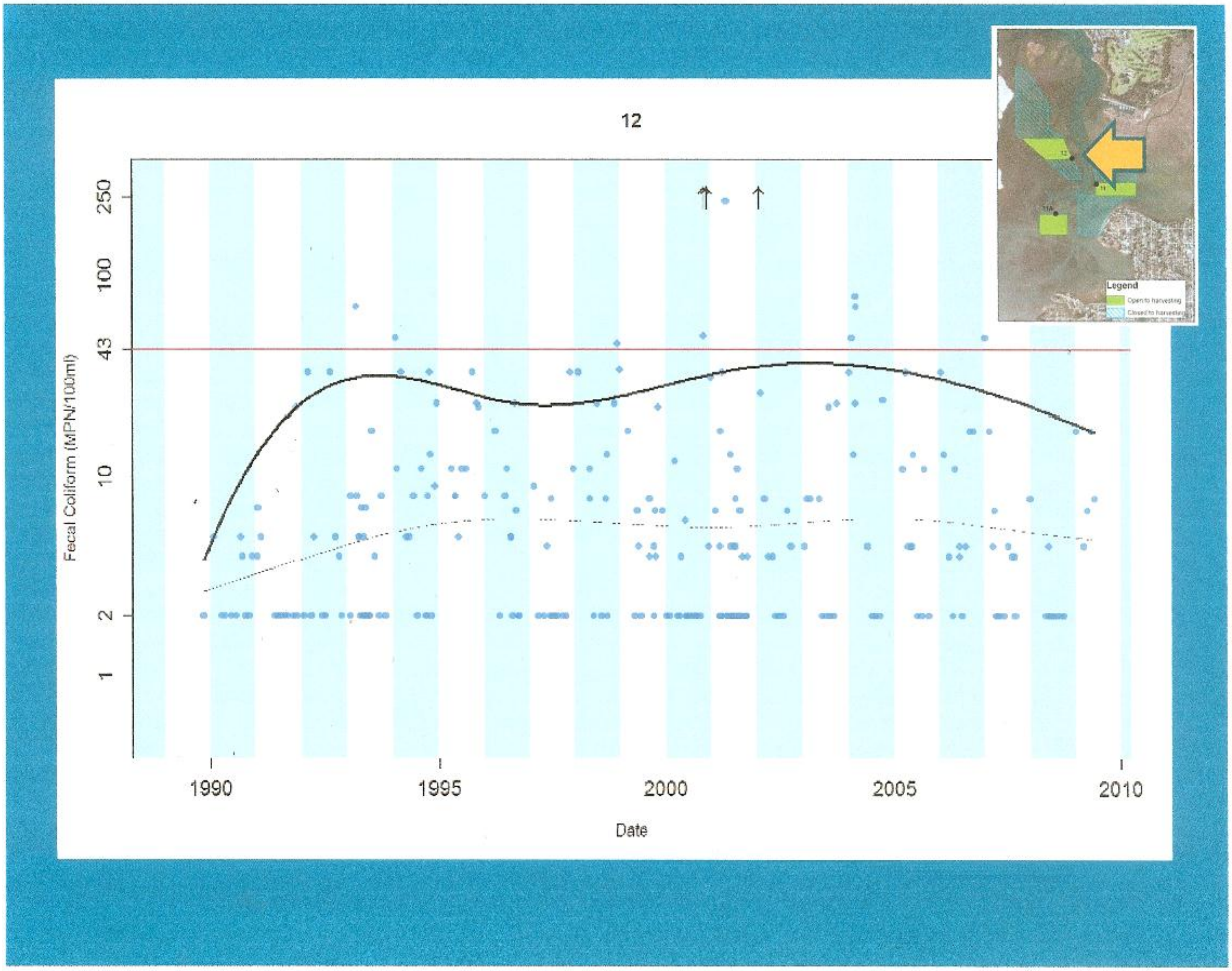
Fecal coliform tests have allowed shellfish harvesting near Los Osos at the three sites shown for at least 15 years. These charts show counts may be trending downward (see next two pages).



Counts appear to be dropping at the harvesting site most likely to be affected by Los Osos septic systems.

* Note that the latest readings show only one-fourth or so of the allowable limit.

Attachment 23 Page 9



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WATER QUALITY | SUSTAINABLE FISHERIES | INVASIVE SPECIES | FRAGILE HABITATS | CLIMATE CHANGE | MARINE ECONOMY

Water Quality Station Map

BM1 — T-Pier
35°22.251' N, 120°51.535' W

BS1 — Back Bay
35°20.029' N, 120°50.835' W

CM1 — Chorro and Los Osos Creeks
35°20.284' N, 120°49.950' W

CM2 — Chorro Creek (Retired 090521)
35°20.535' N, 120°49.691' W

MAP | INSTRUMENTS | PARAMETERS | GALLERY | LIVE DATA

home

people
leadership team
advisory committee
funding sources

initiatives
water quality
sustainable fisheries
invasive species
fragile habitats
climate change
marine economy
linkages

news & info
ecosystem overview
dashboard
in the news
downloads
links

CAL POLY
Center for Coastal Marine Sciences

Dashboard

Water Quality Monitoring — Live Data

Parameter	BM1 T-Pier	BS1 Back Bay	CM1 Creeks	Units
Date	26-Mar-2010	26-Mar-2010	26-Mar-2010	
Time	18:46:33	19:01:52	17:52:39	UTC
Temperature	12.1505	14.5557	- - -	°C
Salinity	33.4164	24.0513	- - -	&permil
Conductivity	3.85121	3.0299	- - -	S/m
Depth	1.28524	1.56805	- - -	db
Tide	0.06924	*	*	m
Oxygen	255.626	236.3	- - -	µMol/l
Oxygen Saturation	76.28	74.295	- - -	%
Chlorophyll	6.18126	0.857508	- - -	µg/l
Turbidity	23.0533	5.40461	- - -	NTU
Nitrate	21.8325	19.572	- - -	µMol/l
Nitrate	1.3537	1.2136	- - -	mg/l

These data are preliminary. Values displayed in green have been characterized as "good data." Values displayed in red are not within a reasonable range for the parameter. This may mean that the instrument is malfunctioning or fouling has distorted the measurement.

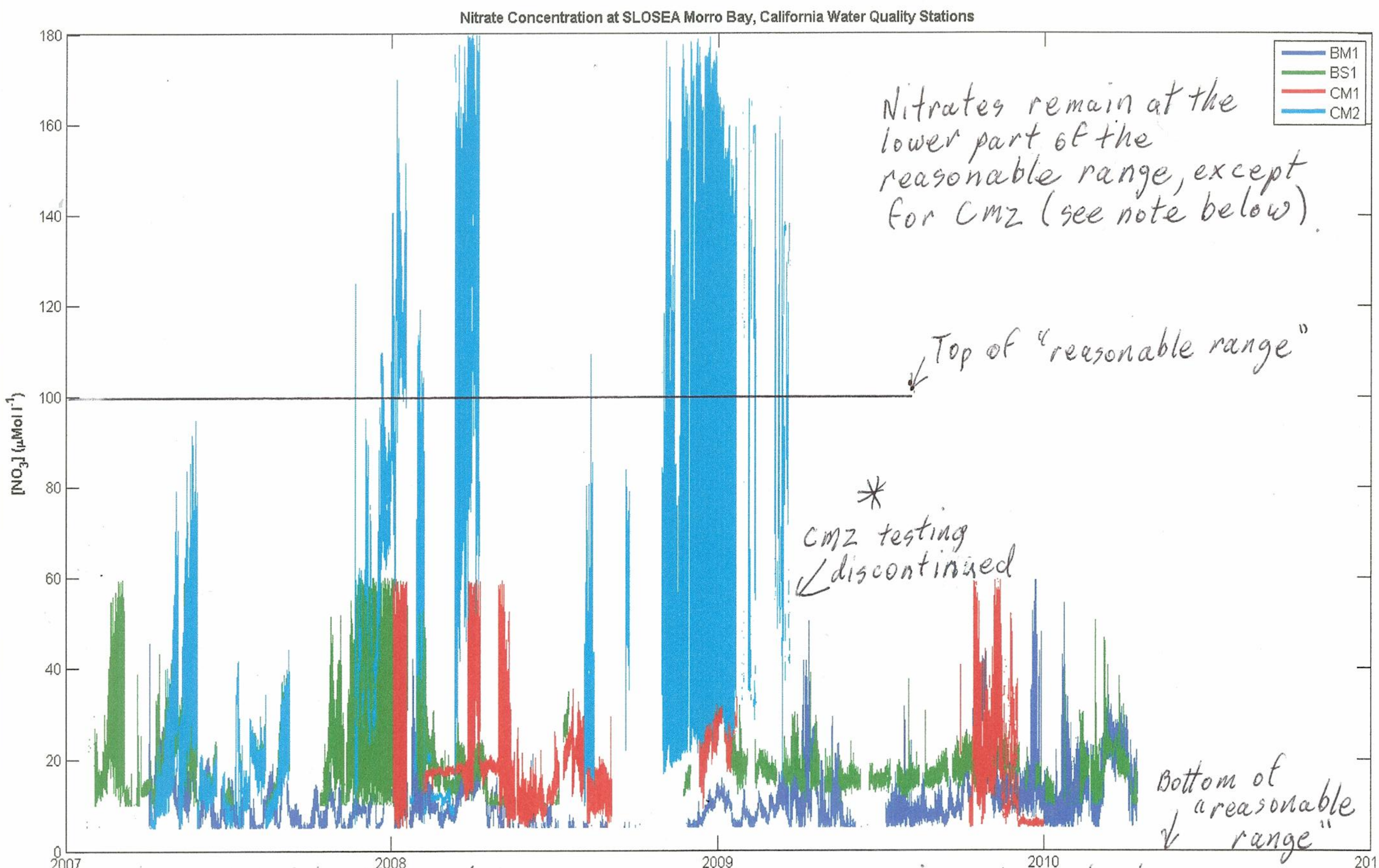
* — Tide values are not yet characterized relative to pressure for BS1 & CM1.

- - - — No data are available.

°C — degrees Celsius; ‰ — parts-per-thousand; db — decibars, approximately relative meters; µMol/l — micromoles per liter; µg/l — micrograms per liter via fluorescence at 470 nm; S/m — Siemens per meter; NTU — Nephelometric Turbidity Unit, not affected by Colored (Chromophoric) Dissolved Organic Matter; mg/l — milligrams per liter.

BS1 Live Meteorological Data

Parameter	SI Units	Imperial Units
Date	26-Mar-2010	
Time	18:42:22 UTC	
Air Temperature	14.09 °C	57.36 °F
Relative Humidity	50.98 %	
Dew Point	4.09 °C	39.37 °F
	22.66 km/h	14.08 mph



Note: High nitrate readings at CM2 appear to indicate high nitrates from a creek source. Nitrate spikes also appear to occur during winter months suggesting the cause is rain run off, these data do not support that nitrates from septic systems are a significant source of nitrates or that nitrates are a problem.

From: bzelenke@calpoly.edu
To: fjaunion@aol.com
Sent: 4/23/2010 11:19:32 A.M. Pacific Daylight Time
Subj: RE: Request

Hi Mr. Ausilio,

Per our phone conversation this morning (4/23/2010), the following are the lower and upper bounds used for each water quality variable on the Dashboard website (http://www.slosea.org/news/dash.php) to flag measurements as falling outside the reasonable range for the parameter:

Temperature = <5 or >30

Salinity = <5 or >35

Conductivity = <0.7031 or >4.7914

Depth = <0 or >10

Tide = <-2 or >10

Oxygen = <0 or >500

Oxygen Saturation = <0 or >150

Chlorophyll = <0 or >15

Turbidity = <0 or >50

Nitrate (micro-Mol/l) = <0 or >100

"Reasonable range" (100 micro-Mol/l is assumed to be below the safe limit.)

Nitrate (mg/l) = <0 or >7

Cheers,
Brian

Attachment #24

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January 13, 2010

Mr. Keith Wimer
Los Osos Sustainability Group
1101 14th Street
Los Osos, CA 93402

Subject: Review of Cleath-Harris Geologists' July 2009 Memorandum "Flow Model Conversion and Urban Area Yield Update" (Corrected Version February 4, 2010)

Dear Mr. Wimer:

I reviewed the subject report and compared the development and results of the SEAWAT model with the results of previous studies that characterized seawater intrusion and basin yield (Cleath & Associates 2003, 2005, 2006 and Michael Brandman Associates 2008). I also contacted Spencer Harris by telephone, and he was able to provide additional information and responses to our key questions and areas of concern.

Actions are urgently needed to prevent further seawater intrusion, and they should be accompanied with monitoring and contingency measures. Because basin yield is uncertain, an adaptive management approach is needed that recognizes this uncertainty and incorporates appropriate margins of safety to prevent further intrusion in the event the expected effectiveness of the initial actions prove incorrect.

The SEAWAT model represents a step forward in more than two decades of effort towards developing models and quantitative tools to evaluate groundwater yield and quality in the Los Osos basin. The SEAWAT model flow components retain the same basic inputs (recharge and pumping rates) as the earlier "equivalent freshwater head model" that was completed in 2008 and employed for the wastewater project environmental impact report (Michael Brandman Associates, 2008). Although the reports present calibration statistics comparing simulated and measured historical water levels and salinity concentrations, they do not indicate how those statistics translate into uncertainty (i.e., potential errors) in simulated future scenarios. In all scenarios considered, groundwater use is nearly equal to the estimated basin yield. Therefore, this uncertainty in simulation results translates into a direct risk of continued overdraft and further need to reduce demand, augment supplies, or both.

In the recent SEAWAT modeling, some of the sources of uncertainty affecting safe yield estimates include the following:

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1. The projected safe yield conditions are substantially different from the historical conditions used to calibrate the model in terms of the spatial distribution of groundwater extraction and recharge. Whenever a model is used to simulate conditions that deviate substantially from the calibration period, there is inherent uncertainty in the results. In this case, the "current conditions" safe yield scenario assumes that nearly two-thirds of the existing groundwater pumping from the lower aquifer (1,062 AFY) would be shifted to the upper aquifer. This change in annual upper and lower pumping rates represent a substantial redistribution of pumping stresses in the basin. While the model predicts that this increase in upper aquifer pumping can be implemented without incurring seawater intrusion, this upper aquifer pumping level has never been experienced in the basin historically nor have any of its effects been measured. Simulated pumping increases in the upper aquifer above the estimated safe yield resulted in simulated sea water intrusion at some wells (Spencer Harris, personal communication, January 5, 2010). Hence, little to no margin of error exists to accommodate the uncertainty in upper aquifer yield relative to the proposed pumping rate.

2. Recent salinity measurements in deep wells show that the model underestimates the rate of movement of the saltwater front. The chloride concentration in the Palisades well reached 250 mg/L in early 2009, indicating the seawater front advanced approximately 4,500 feet in 8 years since it first arrived at the Pecho well in 2001. In contrast, the SEAWAT model projected that the seawater front would move only about 2,000 feet over the next 50 years—less than half the distance in more than six times the period of time—as shown by Figures A-7 and A-5 of the subject memorandum. The main cause for this error is probably the assumption that the saltwater front advances uniformly through the entire cross-sectional area of the model. However in reality—as was described in the 2005 seawater intrusion report (Cleath and Associates 2005)—almost all groundwater flow is through sand lenses with relatively small cross-sectional area. For example, if permeable sand deposits comprise 10% of the basin deposits, the saltwater interface would advance approximately 10 times faster than the rate simulated by the model. Hence, fundamental uncertainty exists in the hydraulic connection between saltwater and individual wells, which translates into uncertainty in the rate of seawater advance and sustainable distribution of pumping between the shallow and deep zones. If monitoring data indicate that additional pumping shifts between the lower and upper aquifers are necessary to prevent seawater intrusion in the lower aquifer, it could exceed the ability of the upper aquifer to support production without inducing intrusion into the upper-aquifer.

3. There is uncertainty in the estimates of recharge (inflows) and pumping rates (outflows) specified as input to the model. The subject memorandum does not present the sensitivity of the yield estimate to the relative uncertainties in these flows. Specific flows that typically have relatively large uncertainty and could substantially influence the yield estimate for the Los Osos basin include:

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a. Some previous studies estimated that private domestic wells extract 180-200 AFY, with little to no increase in private pumping since 1985 (Yates and Wiese 1988; Woodward-Clyde Consultants 1997; San Luis Obispo County 2007; Cleath-Harris Geologists 2009). Other studies estimated substantially lower private pumping rates, in the range of 71-88 AFY (URS Corporation 2000; Cleath and Associates 2002; Yates and Williams 2003; Michael Brandman & Associates 2008). There was no systematic chronological shift from one estimate to the other, and details supporting these estimates were presented only minimally if at all. Therefore, it appears there is uncertainty of at least 100 AFY in the amount of private domestic pumping used in the SEAWAT model. Because private domestic pumpers compete with municipal purveyors for yield, a larger estimate of private domestic pumping would result in a reduction in the expected yield that is available to the water purveyors.

b. The soil moisture budget method used to estimate rainfall recharge includes a number of parameters that are not well quantified. Two parameters that can substantially affect the average annual recharge estimate are the rainfall-runoff coefficient and the depth of the root zone for various types of vegetation. In similar water balance studies, the range of uncertainty in these parameters has been shown to correspond to a +/- 40 % variation in estimated recharge (Yates and Wiese 1988; Yates, Feeney and Rosenberg 2005). This can translate directly into a similar uncertainty in estimated aquifer yield.

c. My understanding is that Willow Creek flows are not gauged, and the ET estimate for riparian vegetation is uncertain due to coastal fog effects and unknown "crop coefficients" for natural plant species. Uncertainty in creek flow and riparian ET estimates translate directly into uncertainty in the simulated leakage from the perched aquifer to the upper aquifer and, hence, similar uncertainties in estimated aquifer yield.

d. Streambed permeability influences the simulated quantity of flow between the stream and aquifer. For example, a low permeability can decrease the amount of percolation from high winter flows while having little effect on total groundwater discharge into the lower reaches of the creek. This would shift the simulated average annual net recharge from the creek, which contributes directly to the estimated aquifer yield. This source of uncertainty is further obscured by the use of steady-state simulations.

e. The model simulates a steady-state flow regime, which can underestimate seawater intrusion impacts. During droughts, water levels typically decline as a result of the reduction in rainfall recharge and corresponding increase

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in groundwater pumping, causing a relatively rapid advance of the saltwater interface. This could potentially contaminate key production wells and require that they be removed from service for a period of months or perhaps years. Even a temporary loss of pumping capacity could jeopardize the reliability of the community water supply system. Furthermore, the subsequent retreat of the saltwater interface when water levels rise during a sequence of wet years can be slower than the advance during droughts, because the rate of movement is driven more by the density difference between freshwater and seawater. So the average interface location under transient analysis might be farther inland than under steady-state analysis, possibly requiring a reduction in the estimate of basin yield.

4. Mitigation of impacts to riparian, marsh and aquatic habitats could require an allocation of basin yield that is currently not considered. The wastewater project's Draft Environmental Impact Report presented a biological analysis that overlooked one of the largest potential impacts, which is a substantial reduction in groundwater discharge to Willow Creek and wetlands in the Los Osos Creek estuary and along the Morro Bay shoreline (Michael Brandman Associates 2008). This impact results from the planned decrease in septic system percolation, not the increase in upper aquifer pumping. For example, current estimates indicate septic percolation recharge to the perched aquifer is presently about 631 AFY and groundwater outflow from the perched aquifer to streamflow and riparian ET along Willow Creek is 552 AFY. As a result of the proposed sewering, the septic system percolation decreases to 36 AFY and outflow to streamflow and riparian ET decreases to 35 AFY (a 93% reduction). Sewering would similarly decrease upper aquifer outflow to marshes around the perimeter of the urban area. If this impact is eventually evaluated and deemed to significantly impact Morro Bay shoulderband snail, steelhead trout or other sensitive species or habitats, some form of mitigation will be necessary. If mitigation includes replacement flows, that allocation of water could compete for basin yield with other water users. Thus, this issue is a source of uncertainty in the amount of yield available to water users.

The proposed management actions to address the saltwater intrusion problem do not increase basin yield, but shift the location of groundwater extraction. For example, pairing shallow and deep wells at major pumping locations provides the opportunity to adjust the proportion of water pumped from the upper and lower aquifers but it does not increase yield. Furthermore, there are limits to this strategy because of uncertainty in the capacity of the upper aquifer to support additional extractions and the possibility of seawater intrusion occurring in the upper aquifer.

Saltwater intrusion can severely affect Los Osos basin water quality, which presently is the sole source of potable water in the basin. Intrusion requires years to decades to reverse and remediate. Therefore, any prudent water management plan must include margins of safety that consider the uncertainty in estimated basin yield, monitoring,

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and an adaptive management strategy that includes contingency actions that can be implemented should the proposed plan not work.

Monitoring actions need to focus on the movement of the freshwater-saltwater interface in the upper and lower aquifers. Monitoring wells located between active upper aquifer production wells and Morro Bay, and lower aquifer production wells and the present interface location can detect the continued inland migration of saltwater before impacting production wells. Monitoring wells will be particularly important in the upper aquifer, where large changes in the water balance (decreased septic recharge and increased pumping) create an increased saltwater intrusion risk. Potential impacts of sewering on riparian, marshland and aquatic organisms along Willow Creek and bay fringe marshes should also be monitored with appropriate mitigation measures ready for implementation. Contingency measures can include any actions that decrease demand, increase overall basin yield, or decrease seawater intrusion.

In summary, there is substantial uncertainty in the basin yield. Because the consequences of saltwater intrusion are severe and difficult to reverse, I conclude that a responsible water management plan must incorporate margins of safety that consider the uncertainty in estimated basin yield. This can include proactive measures to prevent intrusion (such as water conservation) and should include a monitoring program to detect any continued saltwater intrusion and contingency actions to ensure Los Osos maintains a reliable water supply.

Sincerely,

Gus Yates

Eugene B. (Gus) Yates, PG, CHg
Senior Hydrologist
HydroFocus, Inc.

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References cited:

Cleath & Associates. July 2002. Safe yield analysis of the Los Osos Valley groundwater basin. San Luis Obispo, CA. Prepared for John L. Wallace & Associates, San Luis Obispo, CA.

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Attachment #25

STATE OF CALIFORNIA – NATURAL RESOURCES AGENCY ARNOLD SCHWARZENEGGER, GOVERNOR

CALIFORNIA COASTAL COMMISSION
CENTRAL COAST DISTRICT OFFICE
725 FRONT STREET, SUITE 300
SANTA CRUZ, CA 95060
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FAX: (831) 427-4877
WEB: WWW.COASTAL.CA.GOV

Th7b

Staff report prepared:	5/27/2010
Staff report prepared by:	Jonathan Bishop
Staff report approved by:	Dan Carl
Hearing date:	6/10/2010

COASTAL DEVELOPMENT PERMIT APPLICATION

Application number.........**A-3-SLO-09-055/069, Los Osos Wastewater Project (LOWWP)**

Applicant...........................San Luis Obispo County Public Works Department

Project description...........Construction and operation of a community sewer system, including a treatment plant, collection/disposal/reuse facilities, and all associated development and infrastructure.

Project location ....The unincorporated coastal community of Los Osos adjacent to Morro Bay in central San Luis Obispo County (with the treatment plant located at 2198 Los Osos Valley Road and other related infrastructure located throughout Los Osos).

File documents..................Administrative record for San Luis Obispo County coastal development permit (CDP) number DRC2008-00103; San Luis Obispo County certified Local Coastal Program (LCP).

Staff recommendation ......**Approve with Conditions**

A. Staff Recommendation

1. Staff Note

San Luis Obispo County's approval of a CDP for the proposed project in late 2009 was appealed to the Commission by multiple parties. On January 14, 2010, the Coastal Commission found that a substantial issue existed with respect to the grounds on which the appeals were filed, and the Commission took jurisdiction over the CDP application. Due to the manner in which the County acted on the CDP for the proposed project (an overall approval action followed by an amendment action to modify a portion of the project), there are two Coastal Commission appeal/application numbers associated with the proposed project, A-3-SLO-09-055 and A-3-SLO-09-069. However, there is only one proposed project, and these two applications have been combined as CDP application number A-3-SLO-09-055/069.

In its January 14, 2010 action, the Commission was generally satisfied with the core elements of the proposed project with respect to treatment plant siting, the gravity collection system, and the project's reuse concept overall. However, the Commission did direct staff to focus on seven main issue areas requiring additional clarification, correction, and/or potentially project changes to address LCP and Coastal Act requirements: 1) verification of wetland delineations; 2) mitigation requirements for the

Not a full de novo and Commission staff guaranteed approval of the CDP on January 25, 2010, four months prior to the de novo. (See the USDA LOWWP Environmental Report, pp. 71, 72, on the County LOWWP Website.)

These do not provide specific mitigation measures (e.g. mechanisms for restoring flows). Monitoring is not mitigation and the baseline flows should be measured before approval. Mitigation is not likely feasible and is not funded

On the Commission's question regarding the appropriate location for effluent disposal, including the manner in which these siting decisions might best help address groundwater issues (such as ongoing saltwater intrusion) and best promote health and sustainability of the underlying groundwater basin, Special Condition 5 requires the submission of a comprehensive Los Osos Basin Recycled Water Management Plan to the Executive Director for review and approval prior to issuance of the permit. As specified in Special Condition 5, this plan would require the County to ensure that the location and timing of the wastewater disposal component of the LOWWP project maximizes long-term ground and surface water and related resources (i.e., wetlands, streams, creeks, lakes, riparian corridors, marshes, etc.) health and sustainability, including with respect to offsetting seawater intrusion as much as possible within the Los Osos Groundwater Basin. The plan must include programs for recycled water reuse, water conservation, monitoring, and reporting, and it must include an adaptive management component. It would also require that any specific project components necessary for effective implementation of the plan, such as pipelines, leach fields, etc., be constructed prior to project operation. The plan may specifically provide for phasing as the LOWWP comes on-line. Most important, the monitoring and adaptive management required by the plan would allow the County to adjust the location and timing of wastewater disposal within the basin (including to address uncertainty in the current models, new circumstances, etc.) to the benefit of the groundwater basin and surface resources such as wetlands and riparian areas.

With respect to the question of how best to protect Willow Creek, Special Condition 5 also addresses this issue. In short, although the County would direct recycled water to the Bayridge leach field to offset existing septic flows that would cease with the project, there is some uncertainty that the amount of recycled water to be so directed would be sufficient in this regard. Special Condition 5 provides a specific mechanism for addressing this uncertainty, including through a monitoring plan designed to establish the baseline ecological requirements of Willow Creek (and other similar resources in the basin) and to provide for modifications in the location and timing of wastewater discharges to benefit Willow Creek (and other similar resources) should it be necessary. In short, the intent is to ensure that the project does not adversely impact such resources, instead that the appropriate siting of the project's wastewater disposal can be used to enhance these resources as much as possible.

With respect to the proposed construction staging area site, the Commission asked about the status of the site with respect to ESHA and alleged unpermitted development already occurring there and associated with the LOWWP. Staff, including the Commission's staff ecologist, visited the site in April 2010. The site was heavily disturbed and generally devoid of natural vegetation. As far as staff could deduce, and based on representations by the County, there had been some unpermitted development previously on the site, but that development was not associated with the LOWWP, and had been removed via County enforcement action as of the time of the site visit. With respect to ESHA, the site, like most of Los Osos, appeared to consist of sandy soils that could provide habitat for the shoulderband snail. However, the Commission's staff ecologist did not think the site had a high habitat value, and did not see an ESHA reason under this LCP to pursue a different construction staging area site. In other words, any Los Osos site that could serve the construction staging area function for the LOWWP will have ESHA issues for similar soil reasons, and using this site where the habitat was low value to non-existent was deemed appropriate under the LCP. Because the County had not proposed how the site would be addressed after construction staging was complete, staff recommends conditions to require the site to be returned to its current state or better following completion of the project as mitigation for using this site for a construction staging area.

Finally, in terms of the Commission's seventh identified issue, namely the need for specificity regarding septic tank decommissioning, it is clear that although the County's proposal generally describes the way in which septic tanks would be taken out of service and includes a County commitment to assist private landowners to reuse such tanks to optimize groundwater recharge, it appears possible that the County's CDP did not include sufficient specificity on how it would carry out this decommissioning project. Accordingly, conditions are included to ensure an appropriate tank decommissioning regime and reuse process, with the objective of reusing such tanks as much as possible to help with related groundwater and conservation problems.

Thus, staff recommends a series of conditions that help refine and better implement the proposed LOWWP. These conditions require revised plans showing revised treatment plant and pump station layout to avoid habitat issues, revised treatment plant access road to avoid agricultural impacts, and details on measures to be taken to ensure all project landscaping is limited to native and non-invasive species; a habitat management plan defining restoration, enhancement, management, and protection of the 80-acre Broderson site, the 12-acre Mid-Town (Tri-W) site, the roughly 8-acre habitat/buffer area at the Giacomazzi site, and a total of about an acre at the various pump stations sites (a total habitat management plan area of about 100 acres); agricultural easements (2:1) to address agricultural impacts at the treatment plant site and access to it; a septic system decommissioning plan to identify measures to appropriately decommission existing septic tank systems and to connect users to the approved project; a restriction on service to undeveloped Los Osos properties absent an LCP amendment that identifies appropriate and sustainable buildout limits; and an overall Los Osos basin recycled water management plan designed to ensure that the location of the wastewater disposal maximizes long-term ground and surface water and related resource (including wetlands, streams, creeks, lakes, riparian corridors, marshes, etc.) health and sustainability, including with respect to offsetting seawater intrusion as much as possible, through aggressive recycled water reuse, water conservation, monitoring, and adaptive management. The conditions also incorporate a methodology for future CDP amendment and for resolution of potential conflicts, and require the County to indemnify the Commission against 3rd party lawsuits.

As conditioned, staff believes that there is no feasible, less-environmentally damaging wastewater treatment project, including with respect to plant siting, and with respect to collection and effluent disposal methodologies and siting, as required by the LCP. In addition, the project has been conceived and designed to maximize the productive reuse of the effluent in the Los Osos basin, and to help improve groundwater health and sustainability. In short, the project as conditioned is a much needed and well-conceived beneficial coastal resource project that is essential to protect ground and surface waters in and near Los Osos, including the Morro Bay National Estuary and related habitats and resources, and to provide essential public services to the Los Osos area. Significant local and state resources have been dedicated towards addressing these needs over a period of more than 30 years, and environmental impacts and project alternatives have been thoroughly considered. The resultant project represents an

This statement is not supported by substantial evidence and the project's specific benefits do not outweigh its unavoidable adverse impacts. No analysis/comparision is provided.

types of projects that have brought a more finished facade to the area in more recent years, Los Osos continues to retain a small town look and feel that is firmly grounded in its historic roots.

Los Osos is located directly adjacent to Morro Bay, a designated State and National Estuary that is well known and recognized as one of the most important biologic and wetland resources in California's coastal zone.[5] Anchored by iconic Morro Rock, Morro Bay sustains a variety of distinct habitats as well as many sensitive plant and animal species. The Bay's rich resources support one of the state's largest waterfowl habitats, and it is an important stop on the Pacific Flyway attracting vast numbers of migrating birds to the area. Morro Bay also serves as an important nursery for both marine and anadromous fish, and provides a forage and resting area for marine mammals. The Bay also serves as a significant resource and home base for commercial and recreational fishing, recreational boating, and a diverse range of other water-oriented recreational opportunities. The Morro Bay watershed stretches inland to the foothills of the Santa Lucia Range, and a variety of coastal creeks and tributaries (including Los Osos, Warden, Chorro, and Morro Creeks) wend their way from the hills down through Los Osos and to Morro Bay. Los Osos' prime location along the back bay's frontage anchor its vitality directly to that of the Bay and its related resources, and visa versa.

Its location along the back Morro Bay environment also means that Los Osos is generally is located atop an ancient dune system formed by centuries of wind-blown sand coming from the southern end of the Bay. As a result, the terrain consists primarily of gently rolling hills and sandy soils. The sandy soils of Los Osos, its connection to the Bay, and its generally mild marine climate have combined to produce a unique coastal ecosystem that is home to a wide variety of adapted plant and animal species, some of which are found nowhere else in the world. These same landform attributes and others, such as varying depths to groundwater, also combine to confound wastewater treatment in Los Osos, almost all of which is based on the use of individual septic systems serving individual developed properties, and in some cases on larger septic systems serving multiple properties.

See Exhibit 1 for maps showing Los Osos and the surrounding area.

2. Project Background

Beginning in the early 1970's, the RWQCB and other health agencies began to raise environmental health and safety concerns regarding the use of septic systems in Los Osos.[6] In particular, the depth to groundwater in Los Osos was determined to be shallow enough in some areas to lead to inadequately treated septic discharges into ground and surface water, including due to flooding of leach fields in wet

This can be addressed by a decentralized system collecting from these areas.

5 Morro Bay was established as the first designated State Estuary in 1994, and it was accepted into the National Estuary Program shortly thereafter in 1995.

6 Septic systems handle sewage by separating the sewage solids from the sewage fluids. Solids are collected in septic tanks and eventually pumped out and disposed off-site, while fluids flow directly into on-site soil through septic leach fields. Thus, a septic system's efficiency in neutralizing the liquid waste is dependent on the ability of the soil to treat and disperse sewage pollutants. Key controlling factors for soil in this respect include its composition and the vertical distance between leach fields and groundwater. When septic systems fail, either by direct leakage or by clogged and/or inoperative leach fields, there is high potential for ground and surface water contamination. This points out that failing systems are the main concern, which can be addressed by a septic system management plan (never implemented in Los Osos).

Nitrate levels have stabilized in the upper aquifer at high drinking water standards, and purveyors will be treating the water for nitrates to allow more pumping from the aquifer. Conservation will also help remedy high groundwater.

weather,[7] thus leading to environmental degradation, including to adjacent Morro Bay (from both surface flow and lateral seepage of inadequately treated septic discharge) and to groundwater resources more generally.[8] Groundwater contamination issues were and are compounded by the fact that the Los Osos area obtains its potable water supply from local groundwater aquifers.

The RWQCB took a series of steps to address these concerns, beginning with adopting an interim Basin Plan in 1971 that included a provision prohibiting septic system discharges in much of Los Osos after 1974. In 1983, the RWQCB subsequently determined that the situation was worsening, and adopted a wastewater discharge prohibition for a portion of the Los Osos area known as the Prohibition Zone (see Exhibit 1), finding as follows:[9]

- *Previous studies (Brown and Caldwell, 1983) indicated that the quality of water derived from the shallow aquifer underlying the community was deteriorating, particularly as it relates to increasing concentrations of nitrates in excess of State standards.*
- *The current method of wastewater disposal by individual septic tank systems located in areas of high groundwater may be a major contributing factor to this degradation of water quality. And,*
- *Continuation of this method of waste disposal could result in health hazards to the community and the continued degradation of groundwater quality in violation of the Porter-Cologne Act.*

In 1988, the RWQCB also established a discharge moratorium that effectively halted all new construction and all major expansions of existing development until a solution to the septic tank pollution problem could be developed and implemented. Even so, the identified problems have continued. More recently, the RWQCB indicated as follows in 1998:[10]

Monitoring data indicates much of the shallow groundwater in the most densely developed areas exceeds 45 mg/l, the drinking water standard for nitrate. For this reason, many of the shallow water supply wells have been removed from service and demand shifted to the deeper aquifer. Dependence on the deeper aquifer exacerbates the surface water problems because the community's water supply, formerly from the upper aquifer, is now drawn from the deeper aquifer and recharged (after use) to the upper aquifer causing groundwater levels to rise and

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7 For example, in the low-lying Baywood Park area of Los Osos few of the septic systems can meet RWQCB criteria for separation between the bottom of a leach field and groundwater. In addition, many of the smaller lots in Los Osos are too small for leach fields, and as a result they utilize deeper seepage pits that also can lead to inappropriate discharge to groundwater.

8 Sewage contains a variety of constituents of significant concern to human and environmental health and safety, including primarily nitrates, bacteria (such as fecal coliform), and viruses. Excessive nitrate levels can lead to health problems and can also cause algal blooms in surface water, which consume large quantities of dissolved oxygen resulting in adverse impacts to aquatic life. Bacteria and viruses likewise pose potential health risks from direct contact with and ingestion of contaminants in surface and ground water, as well as through secondary consumption (e.g., eating contaminated shellfish).

9 RWQCB Resolution Number 83-13.

10 RWQCB letter dated July 10, 1998.

No algal blooms, harm to aquatic life, or human health problems are reported in the EIR or other docs. Shellfish havesting has been allowed near Los Osos for many years, and bacteria levels are within safe limits (see Attachment 23)

This statement is not supported by data and reports since 2003 (see Attachment 23).

flood more septic systems. Increasing surface water impacts including: restriction of portions of shellfish harvesting areas because of rising bacteria levels; waters around the Los Osos area periodically do not meet bacteria standards for water contact recreation (such as swimming, wading, kayaking and small boat sailing); and the public is increasingly exposed to surface wastewater.

There have been a series of attempts to address the identified ground and surface water pollution issues in Los Osos through construction and operation of a wastewater project. In the late 1980s and early 1990s, the County proposed a conventional wastewater collection and treatment project with a plant that would have been sited on rural agricultural land off Turri Road. In 1990, the Coastal Commission approved an amendment to the Estero Area Plan that would have allowed the Turri Road plant. The County subsequently abandoned the Turri Road plant site in favor of an alternative site, located at South Bay Boulevard and Pismo Avenue. In 1997, the County approved a CDP for that project and the County's action was appealed to the Coastal Commission.[11] The Commission conducted four public hearings on the project between 1997 and 1998, but ultimately did not take action on a CDP for the project, instead continuing it at least in part to allow the community an opportunity to pursue potential alternative wastewater projects, including alternative treatment plant sites.

In 1998 a local ballot measure formed the Los Osos Community Services District (LOCSD) and LOCSD pursued a new CDP for a conventional wastewater collection and treatment project with a plant that would have been sited in the middle of town along Los Osos Valley Road across from Ravenna Avenue (known as the "Tri-W" or "Midtown" site). In August 2002, the Commission approved an LCP amendment to allow a wastewater treatment and associated facilities as allowable uses on the Tri-W site.[12] In 2003, the County approved a CDP for the project and the County's action was appealed to the Commission. The Commission took jurisdiction over the CDP and ultimately approved the project with conditions in 2004.[13] In 2005, project construction commenced on the Tri-W site. In the fall of 2005, however, voters recalled a majority of the LOCSD board members in a special election and the new board immediately suspended construction on the wastewater project. The CDP subsequently expired, and to this date the Tri-W site remains the subject of active enforcement efforts at both the Commission and County levels.[14]

In 2006, wastewater authority for the Los Osos area was returned from LOCSD to the County,[15] and the County embarked on a long and inclusive local process that included evaluation of treatment plant siting, collection system approaches (e.g., STEP versus gravity flow), effluent disposal and reuse options, water supply, preservation of groundwater basins, protection of agriculture, and the protection

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[11] Appeal number A-3-SLO-97-040.

[12] LCP amendment number SLO-MAJ-3-01.

[13] CDP number A-3-SLO-03-113.

[14] Such efforts have focused to date on pursuing temporary site stabilization as opposed to permanent site restoration (i.e., to its pre-development condition) at least partially to allow the Tri-W site to be considered for potential wastewater treatment facility siting as part of the County's current efforts.

[15] Pursuant to Assembly Bill (AB) 2701 (Blakeslee).

following aspects of the development:

(1) The siting and visual appearance of treatment works within the coastal zone.

(2) The geographic limits of service areas within the coastal zone which are to be served by particular treatment works and the timing of the use of capacity of treatment works for those service areas to allow for phasing of development and use of facilities consistent with this division.

(3) Development projections which determine the sizing of treatment works for providing service within the coastal zone.

The commission shall make these determinations in accordance with the policies of this division and shall make its final determination on a permit application for a treatment work prior to the final approval by the State Water Resources Control Board for the funding of such treatment works. Except as specifically provided in this subdivision, the decisions of the State Water Resources Control Board relative to the construction of treatment works shall be final and binding upon the commission.

(d) The commission shall provide or require reservations of sites for the construction of treatment works and points of discharge within the coastal zone adequate for the protection of coastal resources consistent with the provisions of this division.

(e) Nothing in this section shall require the State Water Resources Control Board to fund or certify for funding, any specific treatment works within the coastal zone or to prohibit the State Water Resources Control Board or any California regional water quality control board from requiring a higher degree of treatment at any existing treatment works.

As a result, the Commission's review of a treatment work is limited to questions of siting and design, and appropriateness of service areas (including in terms development projections). Within this framework, it is important to recognize that there is a fairly expansive definition of what constitutes a "treatment work" for purposes of Section 30142. Specifically, Section 30120 of the Coastal Act states that treatment work shall have the same meaning as that set fort in the Federal Water Pollution Control Act. This Act[29] defines treatment work as follows:

A) The term treatment works means any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature to implement section 1281 of this title, or necessary to recycle or reuse water at the most economical cost over the estimated life of the works, including intercepting sewers, outfall sewers, sewage collection systems, pumping, power, and other equipment, and their appurtenances; extensions, improvements, remodeling, additions, and alterations thereof; elements essential to provide a reliable recycled supply such as standby treatment units and clear well facilities; and any works, including site acquisition of the land that will be an integral

[29] 33 U.S.C. Section 1292(2)(A-B).

part of the treatment process (including land used for the storage of treated wastewater in land treatment systems prior to land application) or is used for ultimate disposal of residues resulting from such treatment. (B) In addition to the definition contained in subparagraph (A) of this paragraph, treatment works means any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including storm water runoff, or industrial waste, including waste in combined storm water and sanitary sewer systems. Any application for construction grants which includes wholly or in part such methods or systems shall, in accordance with guidelines published by the Administrator pursuant to subparagraph (C) of this paragraph, contain adequate data and analysis demonstrating such proposal to be, over the life of such works, the most cost efficient alternative to comply with sections 1311 or 1312 of this title, or the requirements of section 1281 of this title. *

Thus, a treatment work includes the treatment plant, the collection system, and the disposal system, among other things. In this case, essentially the entirety of the proposed project is part of such a treatment work. As such, the Commission is within its purview to evaluate the proposed project in terms of siting, design, and service area per Section 30412. Of note, siting questions involve all aspects of siting and not just the treatment plant itself. In this context, the Commission's review appropriately extends to siting related to recycled water reuse and evaluation of such reuse components in terms of LCP and Coastal Act requirements. In addition, the Commission notes that the primary objective of Section 30142 as it applies here is to ensure that the Commission's review under the Coastal Act (and by extension the LCP) does not frustrate the programs of the State and Regional Boards in terms of the proposed wastewater treatment project. As of the date of this report, the Commission is not aware of any way in which the Commission's review to date, nor the analysis and conclusions of this report, would conflict in any way with the SWRCB or the RWQCB. On the contrary, the Commission has coordinated with the RWQCB on the proposed project, and, to the extent there is any such question, this report's analysis and conclusions are clearly supportive of the RWQCB's determinations and actions regarding wastewater issues and their appropriate resolution in Los Osos.

Finally, the standard of review for this project is the certified San Luis Obispo County LCP and the public access and recreation policies of the Coastal Act.

A. Environmentally Sensitive Habitat Area (ESHA)

As discussed below, the proposed project does not comply with LCP policies and ordinances protecting ESHA, as the project's impacts to ESHA, caused by the location of its various components, have not be adequately addressed by the County's proposal. Special conditions are needed to bring the project into conformance with the LCP in this respect.

1. Applicable Policies

The LCP has multiple overlapping provisions that protect ESHA in and around Los Osos, including the area's terrestrial habitats, certain wetlands, coastal streams and riparian habitat areas. One of the primary ways the LCP protects these areas is through avoidance and the use of setbacks/buffers. In addition, the way the LCP is structured is that to the extent more specific guidance and direction is provided in the

1233 AFY – 700 AFY = 533 AFY oversized

eventually redirecting the tertiary-treated effluent back into the basin at various points. This redirection of water flows, and specifically the location and timing of wastewater discharges, raises issues concerning the long-term integrity of the groundwater basin, whether and how seawater intrusion would be affected, and potential impacts to riparian areas, coastal streams, and wetlands that may currently depend on effluent flows from existing septic systems.

1.1 mgd – .625 mgd = .475 mgd over-sized

As approved by the County, the LOWWP facility would be designed with a capacity to treat a maximum average annual dry weather flow of approximately 1.1 million gallons per day (mgd) that assumes the successful implementation of a water conservation program expected to save between 150,000 and 330,000 gallons per day for the County-estimated build out population of 18,428 residents within the collection zone.[63] At estimated indoor water use rates of 66 gallons per day per capita, the approximately 12,500 people who currently live in the proposed project area would generate wastewater flows of 825,000 gallons per day. The project has a goal of reducing indoor water use to below 50 gallons per day per person which would equate to 0.92 mgd wastewater flows at the projected buildout population of 18,428.[64] If this goal is met or exceeded and/or if buildout population is less, the project would operate at a higher level of redundancy (i.e. excess capacity to meet demand).

	Estimated Indoor Water Demand (gpcpd)		Estimated Wastewater Generation (gpd)		Total AFY
	Current	With 25% Conservation	Current	With 25% Conservation	
Current Population (12,500)	66	50	825,000	625,000	700
Buildout Population (18,428)	66	50	1,216,248	921,400	1,032
Inflow and Infiltration	--	--	300,000	300,000	336
Total			**1,516,248**	**1,221,400**	**1,368**

As proposed by the County, the project will only be serving existing development in the short-run, as new development will not be allowed to hook up to the project until habitat and groundwater management planning is completed and incorporated into the LCP, in order to address issues related to the potential impacts of the new development facilitated by the new treatment capacity. Thus, the project will only have need for the disposal of approximately 700 AFY in its initial phase. *

The County's project includes tertiary filtration with ultraviolet disinfection designed to meet California Title 22 standards for tertiary recycled water. This non-potable recycled water will be reused within the community or on surrounding agricultural land overlying the groundwater basin by discharge through leach fields and through direct reuse for urban and agricultural irrigation. The proposed project's reuse program includes the following:

[63] Id (buildout note yet established per LCP, and could be lower).

[64] The County recognizes that there is some uncertainty with the estimated per capita water use; 66 gallons per day per capita (gpdpc) is somewhat lower than the average daily use implied by the 1,157 AFY of existing flow of septic into the proposed service area assumed by the hydrologic modeling of the project, which equates to 82 gpdpc.

- Recycled water storage at the treatment plant site, with a capacity of 50 acre-feet.
- A recycled water main running from the treatment plant site to reuse sites within the community.
- 8 acres of new leach fields at the Broderson site, with an annual capacity of 450 acre-feet.
- Use of the one-acre existing leach field in the Bayridge Estates sub-division, with an annual capacity of 33 acre-feet.
- Provision of approximately 130 acre-feet of recycled water to Los Osos schools, parks, golf course, and the cemetery.
- Provision of recycled water main turn-outs to adjacent farmlands, with annual reuse estimated to account for approximately 100 to 200 acre-feet.

In the short run, the County indicates that the approximate 700 AFY generated by the project will be directed to the Broderson site (448 AFY), Bayridge Estates (33 AFY), urban reuse (144 AFY), and agricultural irrigation (86 AFY) (see Exhibit 3).

Overall, the County-approved project includes numerous components to address the distribution of the recycled water generated by the project, including an overall requirement to beneficially discharge such water only within the Los Osos Groundwater Basin. Components of the proposed project addressing recycled water reuse include the following:[65]

97. Disposal of treated effluent shall be reserved for the following sites/uses in the Los Osos Groundwater Basin:

Broderson has less than 1/2 the seawater intrusion value of urban reuse and ag exchange.

a) Broderson (not to exceed 448 AFY on an average annual basis,)

b) Urban re-use with the urban reserve line (as identified in the Effluent Re-Use and Disposal Tech Memo, July 2008),

This limits reuse to a few large sites, so it is not consistent with this.

This should specify ag. exchange

c) Agricultural re-use overlying the Los Osos Groundwater Basin, and

d) Environmental reservations (not less than 10% of the total volume of treated effluent).

Total agricultural re-use shall not be less than 10% of the total treated effluent. Disposal shall be prioritized to reduce seawater intrusion and return/retain water to/in the Los Osos groundwater basin. Highest priority shall be given to replacing potable water uses with tertiary treated effluent consistent with Water Code Section 13550.

No amount of treated effluent may be used to satisfy or offset water needs that result from non-agricultural development outside the Urban Reserve Line of the community of Los Osos.

This promotes unsustainable development within the URL.

[65] Id (County conditions that are part of proposed project – see Exhibit 2).

Almost all septic tanks will have to be decomissioned, and this volunteer program is not likely to provide measurable benefits. The LOSG and SLO Greenbuild propose adding rainwater harvesting / LID options to a water-use efficiency program.

field, which currently serves the Bayridge neighborhood that would be connected to the new project. The existing septic tanks would be abandoned or repurposed (e.g., for on-site filtration and percolation of stormwater to the degree feasible and appropriate) and the leach field would be used for reclaimed water instead of septic tank leachate. During the summer, the majority of reclaimed water would be directed to urban and agricultural reuse (i.e., irrigation). The County's proposed urban reuse component is currently focused on existing turf areas at four schools, the community park, and the golf course. The proposed agricultural reuse component is currently focused on existing irrigated lands that draw from the Los Osos groundwater aquifer.

Although the project overall includes an important reuse program, there is some uncertainty surrounding the County's proposed siting of, and timing related to, its tertiary-treated wastewater discharges back to the Los Osos groundwater basin. The hydrologic modeling conducted in support of the County project is complex, and it is based on best available information and numerous modeling assumptions. The hydrologic model of the groundwater basin has four major components, and multiple flows in, out, and between these components. The components are the upper and lower aquifers, the creek compartment, and the perched aquifer. Major inputs include septic effluent, precipitation, and irrigation. Major outputs include well withdrawals from the upper and lower aquifers and the creek compartment, and flows out to the ocean. There are also significant cross-flows between the aquifers and the creek compartment. Exhibit 3 shows the modeled existing conditions and projected flows with the project.[66] The table below presented in the County response (Exhibit 3) summarizes the modeled flows.[67]

Aquifer	Budget Item (Basin IN/OUT)	Current Condition (AFY)	Project Scenario VPA 2b (AFY)
Perched Aquifer	Septic return (IN)	631	36
	Percolation of precipitation/Irrigation return (IN)	736	736
	Leakage/subsurface outflow to upper aquifer	698	634
	Leakage/subsurface outflow to creek compartment	103	103
	Willow Creek outflow/evapotranspiration (OUT)	552	35
Upper Aquifer	Septic return (IN)	606	44
	Percolation of precipitation/Irrigation return (IN)	1489	1489
	Subsurface inflow from creek compartment	187	182
	Subsurface inflow from Bayview Heights (IN)	112	107
	Broderson recharge (IN)	0	448
	Subsurface outflow to bay/ocean (OUT)	1310	1169
	Well production (OUT)	803	803
	Leakage to lower aquifer	882	835
Creek Compartment	Septic return (IN)	30	30
	Percolation of precipitation/Irrigation return (IN)	430	430
	Los Osos Creek inflow (IN)	665	665
	Subsurface inflow from bedrock (IN)	167	166
	Los Osos Creek Outflow (OUT)	77	60
	Warden drain (OUT)	6	9

The project decreases the outflow increasing the potential for seawater intrusion. (This does not factor in increased pumping from the upper aquifer—

66 According to the County, alternative VPA 2b most closely approximates the anticipated flow regime of the proposed project.
67 From Table 2 "Hydrologic Budget Summary June 2008" by Cleath and Associates (see Exhibit 3)

The Commission had specific data (Exhibit B of the Basin Update) confirming the acceleration of seawater intrusion.

This is much less currently.

	Well production (OUT)		870	870
	Subsurface flow to Urban Area upper aquifer		90	85
	Subsurface flow to Urban Area lower aquifer		366	370
Lower Aquifer	Sea water intrusion (IN)		469	352
	Well production (OUT)		1717	1557

The Commission's Staff Geologist, in his capacity as a California Certified Hydrogeologist, has reviewed the County's overall modeling effort and concluded that it is a reasonable characterization of the Los Osos groundwater condition. Although the basin is hydrologically complex and the modeling effort requires numerous assumptions concerning quantities that cannot be directly measured, the inputs are reasonable and conservative. Some inputs are indirectly measured by mass balance relations in water quality data. Others are derived at by assuming that the hydrologic system is more or less in balance, an assumption consistent with the more-or-less constant elevation of water levels in producing and observation wells since the 1970s. Nevertheless, because of the complexity of the system and the lack of information about the possible accelerating or deceleration of the advance of the seawater/freshwater front, the model must be regarded as only a best estimate of hydrogeologic conditions. Inaccuracies in these estimates could result in deviations from the expected groundwater resources available for sensitive habitats. As a means to address the inherent uncertainty in such enterprises, the Commission finds it necessary to require the submission of a comprehensive Los Osos Basin resource management plan to the Executive Director for review and approval prior to issuance of the permit. As specified in Special Condition 5, this plan would require the County to ensure that service area and timing of the wastewater disposal component of the LOWWP project maximizes long-term ground and surface water. resources health and sustainability (wetlands, streams, creeks, lakes, riparian corridors, marshes, etc,) including with respect to offsetting seawater intrusion as much as possible within the Los Osos Groundwater Basin. The plan must include programs for recycled water reuse, water conservation, monitoring, and reporting, and it must include an adaptive management. It would also require that any specific project components necessary for effective implementation of the plan, such as pipelines, leach fields, etc., be constructed prior to project operation. The plan may specifically provide for phasing as the LOWWP comes on-line. Most important, the monitoring and adaptive management required by the plan would allow the County to adjust the location and timing of wastewater disposal within the basin, to address uncertainty in the current models, new circumstances, etc. to the benefit of the groundwater basin and surface resources such as wetlands and riparian areas.

Special Condition 5 also provides a specific mechanism for addressing uncertainties related to the protection of Willow Creek. The County's models show that septic effluent makes a substantial contribution to inflow into the perched aquifer; unless it is returned to the perched aquifer after treatment the project will likely have an impact on water available for riparian and wetland (evapotranspiration) use and outflows to Willow Creek. By assuming that the hydrologic budget is in balance, the County estimate that outflows through evapotranspiration and outflow to Willow Creek amount to 552 AFY.[68] Under Project Scenario VPA 2b,[69] they estimate that the amount available will be

[68] Cleath and Associates (June 2008).
[69] Id (County proposed project).

This acknowledges that uncertainties make impacts to habitat and seawater intrusion impossible to predict.

Bayridge provides only 33 AFY, not nearly enough to replace 500 AFY.

only 35 AFY. Other losses to the aquifer (leakage to the upper aquifer and to the creek compartment) are expected to only decrease slightly; thus, a change in these discharges cannot be expected to make up for loss of septic effluent. While it is true that these calculations reflect the entire perched aquifer, and only a portion of it is thought to be available to riparian and wetland vegetation concentrated in the eastern part of the basin, significant reductions in groundwater availability are likely. ~~Accordingly,~~ * without significant new contributions (from, for example, the Bayridge leach fields) impacts could occur. Accordingly, the Commission finds that a monitoring plan is needed to establish the baseline ecological requirements of Willow Creek and to provide for modifications in the location and timing of wastewater discharges to benefit Willow Creek should it be necessary. In addition, and for similar reasons, such monitoring plan is required to address other hydrologically-affected resources in Los Osos as well. In short, the intent is to ensure that the project does not adversely impact such resources, and rather enhances these resources as much as possible.

Implementing the components of the Recycled Water Management Plan will also complement on-going efforts in Los Osos to address the large seawater intrusion program. Currently there is a group of parties, including water purveyors in Los Osos, working under the auspices of an Interlocutory Stipulated Judgment (ISJ) in the Los Osos Groundwater Basin to draft a Basin Management Plan. This ISJ Working Group recently released an update on the Basin that summarizes various goals of the group, the status of seawater intrusion, etc. Anticipated goals of the Basin Management Plan include addressing the future sustainable water supply for existing and future development, stopping seawater intrusion into the lower aquifer, managing contamination of the upper aquifer, and establishing a strategy for maximizing the reasonable and beneficial use of Basin resources. Notably, the recent update recognizes the importance of various wastewater discharge components of the LOWWP that would be governed by Special Condition 5, including the disposal at Broderson and Bayridge leach fields, indoor water conservation, and agricultural and urban reuse to addressing the needs of the Basin. The ISJ Working Group states:

> *The ISJ Working Group recognizes the above-listed LOWWP actions are crucial to mitigating the negative impacts with which the Los Osos community is faced and that implementation of these measure should be pursued as soon as possible.*

Finally, as also discussed in the public works finding, the service area and timing of wastewater disposal must not induce new growth inconsistent with other resource protection policies of the LCP. Thus, in addition to the requirement that the long-term integrity of the Los Osos groundwater basin be protected, Public Works policies 1 and 6 require that adequate public services be available for new development and that expanded public works facilities ensure the protection of coastal resources. These LCP requirements derive from Coastal Act sections 30250 and 30254, which are fundamental policies for assuring sustainable urban growth in the coastal zone. Therefore, similar to the proposed project (i.e., via incorporated County condition 86), Special Condition 6 prohibits the provision of wastewater service to undeveloped properties within the service area unless and until the Estero Area Plan is amended to identify appropriate and sustainable buildout limits, and any appropriate mechanisms to stay within such limits, based on conclusive evidence indicating that adequate water is available to support development of such properties without adverse impacts to ground and surface waters, including recommendations, if any, on changes necessary to achieve success. Necessary changes, including identified remediation steps, shall be completed per the timetable identified in any approved report, or within 30 days of report approval where no such timetable is specified.

The Habitat Management Plan shall be implemented concurrent with construction of the approved project, shall be directed by qualified restoration ecologists, and initial Habitat Management Plan implementation activities (including at a minimum initial planting and non-native/invasive plant removal pursuant to the Plan) shall be completed prior to commencement of operation of the approved project.

The Permittee shall undertake development in accordance with the approved Habitat Management Plan.

4. **Agricultural Property Protection.** PRIOR TO CONSTRUCTION OF THE TREATMENT PLANT, the Permittee shall submit evidence to the Executive Director for review and approval indicating that an agricultural conservation easement(s) burdening off-site agricultural property have been granted in perpetuity to the County or another qualifying entity approved by the Executive Director along with adequate funding to compensate for reasonable administrative costs incurred by the easement holder. The easement shall provide agricultural conservation acreage at a ratio of at least 2:1 for the loss of agricultural land associated with the approved project, shall apply to agricultural land within reasonable proximity of the project site that is of a quality that is reasonably similar to that of the agricultural land lost, and shall be submitted with evidence clearly showing and calculating the amount of agricultural land lost due to the project in closed polygons on site plans and all supporting documentation demonstrating compliance with the requirements of this condition.

On Page 5, CDP states "prior" to approval.

5. **Los Osos Basin Recycled Water Management Plan.** PRIOR TO CONSTRUCTION, the Permittee shall submit two copies of a Los Osos Basin Recycled Water Management Plan (Basin Plan) to the Executive Director for review and approval. The objective of the Basin Plan shall be to ensure that implementation of the project, including the sites designated for disposal of the treated effluent, is accomplished in a manner designed to maximize long-term ground and surface water and related resource (including wetlands, streams, creeks, lakes, riparian corridors, marshes, etc.) health and sustainability, including with respect to offsetting seawater intrusion as much as possible, within the Los Osos Groundwater Basin. The Basin Plan shall be structured so as to allow its programs to be developed, and any physical development underlying the implementation of such programs constructed, concurrent with construction of the approved project, and for it to be implemented concurrent with commencement of operation of the approved project. The Basin Plan may be structured to allow phasing if necessary to better achieve Basin Plan objectives. The Basin Plan shall include the following main components:

   a. **Recycled Water Reuse Program.** As reflected in County condition 97, the Recycled Water Reuse Program shall ensure that all tertiary treated recycled water is disposed of in locations within the Los Osos Groundwater Basin that will maximize its ability to meet Basin Plan objectives, where the highest priority for reuse shall be replacing existing potable water use with

This does not provide time-specific measurable and enforceable mitigations/performance objectives

Time frames for compliance and benefits from mitigations and the project are at some indefinite time in the future.

Timeframes and performance standards are too vague to ensure adequate and enforceable mitigation.

This does not ensure feasibility - adequate water or a means to dispense it.

recycled water use where feasible and appropriate, including with respect to both urban and agricultural reuse. The Reuse Program may include recycled water application at the Broderson leach field (not to exceed 448 afy on an average annual basis) and at the Bayridge leach field (approximately 33 afy or the amount shown to be necessary for maintaining Willow Creek and downstream resources in their pre-project state or better), but it shall prioritize beneficial reuse through (a) developing and installing recycled water connections and entering into delivery/use agreements with urban and agricultural property owners as much as possible, and (b) developing and installing other recycled water delivery systems, in both cases with a priority for locations where such beneficial reuse will go the furthest toward meeting Basin Plan goals.

b. **Water Conservation Program.** The Water Conservation Program required by the County project, which limits indoor water use to no more than 50 gallons per person per day on average within the Basin, shall be incorporated into the Recycled Water Management Plan. The Program shall be designed to help Basin residents to reduce their potable water use as much as possible through measures including but not limited to retrofit and installation of low water use fixtures and grey water systems. The Program shall include enforceable mechanisms designed to achieve its identified goals, including the 50 gallons per person per day target, and shall include provisions for use of the $5 million committed by the Permittee to initiate water conservation measures pursuant to the Basin Plan as soon as possible following CDP approval. The Permitee shall coordinate with water purveyors to the maximum extent feasible to integrate this conservation program with purveyor implemented outdoor water use reduction measures.

Monitoring and goal setting are not mitigation, and the language is too vague to ensure effective, timely mitigation.

c. **Monitoring Program.** The Monitoring Program shall be designed to quantitatively and qualitatively assess the effectiveness of the Basin Plan over time to ensure its objectives are achieved, and shall include: a baseline physical and ecological assessment of ground and surface water and related resources to be monitored; measurable goals and interim and long-term success criteria for those resources, including at a minimum clear criteria that demonstrate that the health and sustainability of Plan area resources are steadily improving over time including with respect to seawater intrusion; monitoring provisions, including identification of appropriate representative resource monitoring locations and data types (e.g., groundwater levels and quality; wetland, stream, creek, riparian, and marsh plant and animal abundance, hydrology, and water quality; etc.) and a schedule for proposed monitoring activities. The Monitoring Program shall also include measures to clearly document the manner in which recycled water is being reused and water is being conserved pursuant to the Recycled Water Reuse and Water Conservation Programs.

d. **Reporting and Adaptive Management Program.** Annual reports (two copies) documenting implementation and effectiveness of the Basin Plan shall be submitted to the Executive Director for review and approval by December 31st of each year that the project operates. Each report shall include all monitoring data (including documenting all recycled water reuse for the preceding year, all water conservation efforts and effects, and all resource changes identified), shall describe the progress towards achieving the success criteria of the plan, and shall make recommendations, if any, on changes necessary to better meet Basin Plan objectives and achieve

This does not require an adaptive management plan or measures to be in place - only reports (see next page).

Condition 87 provides for a plan.
This weakens 87 because it supercedes it. Not requiring plans and measures to be in place (e.g. Brederson back up) shows a lack of commitment to mitigation.

success. On the latter, the annual reports shall be premised upon the concept of adaptive management that responds to information developed and effects better understood over time in association with the project, and is intended to allow for project changes covered by this CDP, unless the Executive Director determines that a CDP amendment is necessary, through the annual report approval process provided that such changes result in better resource protection and better means to achieve Basin Plan objectives over the long-term. Changes, including identified remediation steps, shall be completed per the timetable identified in any approved annual report, or within 30 days of report approval where no such timetable is specified.

The Permittee shall undertake development in accordance with the approved Los Osos Basin Water Recycling Management Plan.

Could delay mitigation a year

6. **Wastewater Service to Undeveloped Properties.** Wastewater service to undeveloped properties within the service area shall be prohibited unless and until the Estero Area Plan is amended to identify appropriate and sustainable buildout limits, and any appropriate mechanisms to stay within such limits, based on conclusive evidence indicating that adequate water is available to support development of such properties without adverse impacts to ground and surface waters, including wetlands and all related habitats.

7. **Amendment.** All future changes to the approved project, including changes in service area, shall be processed as amendments to this CDP. Any such amendment shall clearly demonstrate the manner in which the amendment would lead to better coastal resource protection, including at a minimum the manner in which it would help to better achieve the goals and meet the success criteria of the approved Los Osos Basin Resource Management Plan (see special condition 5).

8. **Conflict Resolution.** Any differences, conflicts, and/or questions of interpretation between elements of the proposed project description and these conditions shall be resolved in favor of the these conditions and in the manner most protective of coastal resources as determined by the Executive Director.

9. **Liability for Costs and Attorneys Fees.** The Permittee shall reimburse the Coastal Commission in full for all Coastal Commission costs and attorneys fees (including but not limited to such costs/fees that are: (1) charged by the Office of the Attorney General; and (2) required by a court) that the Coastal Commission incurs in connection with the defense of any action brought by a party other than the Permittee against the Coastal Commission, its officers, employees, agents, successors and assigns challenging the approval or issuance of this permit, the interpretation and/or enforcement of permit conditions, or any other matter related to this permit. The Permittee shall reimburse the Coastal Commission within 60 days of being informed by the Executive Director of the amount of such costs/fees. The Coastal Commission retains complete authority to conduct and direct the defense of any such action against the Coastal Commission.

6. California Environmental Quality Act (CEQA)

This also shows the Commission's lack of commitment to mitigation and the project.

Section 13096 of the Commission's administrative regulations requires Commission approval of a coastal development permit or amendment to be supported by a finding showing the permit or permit amendment, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment. *

The County, acting as the lead CEQA agency, certified an Environmental Impact Report for this project on September 29, 2009. The County concluded that, with the incorporation of various avoidance, minimization and mitigation measures, the project would not have significant environmental impacts. The County incorporated such measures into the project proposal that it submitted to the Commission. Although the County's certification of its EIR was subject to legal challenge, those lawsuits have been resolved in the County's favor.

As described above, the proposed project has been conditioned to avoid adverse environmental impacts. Mitigation measures include submittal of revised plans showing revised treatment plant and pump station layout to avoid habitat issues, revised treatment plant access road to avoid agricultural impacts, and details on measures to be taken to ensure project landscaping is done using only native and non-invasive species; a habitat management plan defining restoration, enhancement, management, and protection of the 80-acre Broderson site, the 12-acre Midtown (Tri-W) site, the roughly 8-acre habitat/buffer area at the Giacomazzi site, and a total of about an acre at the various pump stations sites (a total habitat management plan area of about 100 acres); agricultural easements (2:1) and deed restrictions to address agricultural impacts at the treatment plant site; a septic system decommissioning plan to identify measures to appropriately decommission existing septic tank systems and to connect users to the approved project; a restriction on service to undeveloped Los Osos properties absent an LCP amendment that identifies appropriate and sustainable buildout limits; and an overall Los Osos basin recycled water management plan designed to ensure that implementation of the project maximizes long-term ground and surface water and related resource health and sustainability, including with respect to offsetting seawater intrusion as much as possible, through aggressive recycled water reuse, water conservation, monitoring, and adaptive management. These conditions will minimize all adverse environmental impacts. As conditioned, there are no feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse impact which the activity may have on the environment. Therefore, the Commission finds that the proposed project is the least environmentally-damaging feasible alternative and is consistent with the requirements of the Coastal Act to conform to CEQA.

The LO basin plan (Condition 5) defers mitigations and does not require maximum feasible mitigations.

It is possible to eliminate Broderson leach fields w/ more conservation (see Attachments 5 and 6).

STATE OF CALIFORNIA -- NATURAL RESOURCES AGENCY ARNOLD SCHWARZENEGGER, GOVERNOR

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F14a

Prepared June 8, 2010 (for June 11, 2010 hearing)

To: Commissioners and Interested Persons

From: Dan Carl, District Manager
Jonathan Bishop, Coastal Planner

Subject: STAFF REPORT ADDENDUM for F14a
CDP Application Number A-3-SLO-09-055/069 (Los Osos Wastewater Project)

The purpose of this addendum is to modify the staff recommendation for the above-referenced item. In the time since the staff report was distributed, additional clarifying information was identified and has been added to the findings and conditions of the staff report. These changes do not substantively affect the staff recommendation. Thus, the staff report is modified as shown below (where applicable, text in underline format indicates text to be added, and text in ~~strikethrough~~ format indicates text to be deleted):

1. Revise Findings on page 16 of the Staff Report as follows:

In this respect the Commission notes that there has been substantial local debate regarding whether to use a STEP or a gravity collection system, and to a somewhat lesser degree a question in some minds regarding treatment plant siting. The Commission does not believe that there is an LCP or Coastal Act need to revisit treatment plant siting in terms of an evaluation of alternative sites or to revisit the collection system debate between STEP and gravity. A detailed constraints and alternatives analysis was used to identify a gravity system as the least environmentally damaging feasible alternative collection system (see Viable Project Alternatives Rough Screening Report of March 2007 and Fine Screening Report of August 2007). A cost comparison between a STEP collection system and a gravity system is included in the Fine Screening Report for the wastewater project. The report found that the cost associated with construction of both collection systems were substantially the same. In addition, the project EIR includes a detailed analysis of both STEP and gravity systems with regards to resource impacts (see Final Environmental Impact Report, September 2009).

In terms of overall ground disturbance, the analysis concluded that the difference in ground disturbance quantities associated with STEP and a gravity system would not be significant. While a STEP system can be directionally drilled, thereby possibly avoiding the impacts associated with trenching or "deep" excavation, even that technique involves large amounts of ground disturbance. For example, directional drilling requires bore pits at both ends, receiving pits, and lateral service connections (most will need to be trenched). The installation of new STEP tanks also requires excavations (roughly 8 feet deep) that match the majority of the gravity system depth. Excavations for new STEP tanks would likely require substantial excavation areas confined to small front yard areas. Therefore, the STEP alternative provides minimal opportunity to avoid resources if they are located within these areas.

The issue of sludge production and biosolids hauling is also analyzed. The studies performed by the County estimate the gravity system will produce about 4,000 lbs of sludge per day (at buildout), whereas

A conventional gravity system as proposed has more difficulty avoiding resources due to deep, wide trenching, etc.

This is a biassed statement. (See Attachment 11 for a discussion of bias in favor of the proposed gravity system.)

The circled items are bias assumptions/ findings that tipped the scales toward the proposed gravity system. (See Attachment 11 for further discussion of bias.)

a STEP system would produce about 1,000 lbs per day (at buildout). For the gravity system this means there would be four truck trips per week (two loaded, two empty) hauling dewatered sludge to the landfill from the treatment plant. For the STEP system, sludge would be pumped from individual tanks at the rate of about 20 tanks per week, or 4 per day, trucked to the treatment plant, and then run through the full treatment system, dewatered, and then hauled to the landfill once or twice per week (but in smaller loads than with a gravity system). The timing of the hauling is established at once or twice per week, regardless of volume, because the sludge is still biologically active and has the capability to produce odors if not disposed of or treated further. Therefore, STEP would generate 2-4 trips per week to the landfill (loaded and empty), and 20 in town trips per day to collect sludge from STEP tanks in town. Although there is a reduction in sludge volume using a STEP collection system, there is also an increase in greenhouse gas emission. The reduction of sludge generation with the STEP system comes from the fact that at a pumping rate of once per five years, each tank will generate a bacterial colony that, after about year 3, breaks down some of the solids producing methane gas (a greenhouse gas), and releasing it to the atmosphere. Therefore, although there is an overall reduction in sludge volume, there is an increase in greenhouse gas emissions at each tank, and the sludge that is delivered to the treatment facility is relatively low in carbon relative to the nitrogen in the sludge. This is problematic because carbon is an important element in the de-nitrification process, and the County would need to add carbon to the sludge from the STEP tanks (likely in the form of methanol) to complete the de-nitrification treatment process, resulting in an additional increase in the carbon footprint from trucking in a carbon source. The County estimated the carbon footprint for these two project alternatives (assuming methanol was used as the additional carbon source to treat STEP (and storage pond) effluent) and found that a STEP system would produce greater amounts of greenhouse gas than a gravity system.

A common cause of sewer system overflows is due to the infiltration of groundwater and rainwater into sewer pipes, commonly referred to as inflow and infiltration (I/I). To address this issue, the County selected a "sealed system" using elastomeric/bell and spigot pipes which is not anticipated to leak under appropriate installation practices. According to the County, the materials used are subject to standards which specify zero leakage. However, the County also will use fusion welded or chemically sealed pipes and will do additional inspections in the field during construction to ensure proper installation in areas of high groundwater to further reduce I/I (see County condition 98, Exhibit 2). In other words, the project includes appropriate safeguards to address I/I. That said, it should be noted that any system, including pressurized systems, constructed in the field and subjected to various environmental factors, over time has some potential for failures of various kinds. According to the County, conservative design parameters for wastewater treatment plants include designing for infiltration, even when the potential for such flows to occur is low, and with modern operational requirements applied, will be insignificant. In short, the project recognizes I/I and takes appropriate precautions to protect coastal resources, including the Los Osos Groundwater Basin and Morro Bay, from potential I/I and sewer overflow impacts.

Issues have also been raised that additional increases in water conservation approved by the County (a roughly 25% reduction from current usage) would reduce the flows needed for proper gravity system function and may undermine efforts to balance the groundwater basin. However, the project is

The EIR and Fine Screening report allow for project flows to be 200 gallons per day more for the proposed gravity project than a STEP project. To suggest I/I will be insignificant is intentionally misleading.

conditioned to appropriately mitigate impacts related to reduced septic flows (see County conditions 88, 97, 101, and 103). In addition, County condition 111 requires the use of recycled water for typical routine flushing. Moreover, the concern that the use of treated effluent or potable water for system flushing is an unnecessary waste of water does not appear on point because all water that is sent through the wastewater system will be re-used within the Los Osos Basin, as required by the project conditions of approval. K the proposed project does not have an adequate reuse plan now. Several hundred acre feet of I/I will only

It is also fair to note a number of issues raised by the County related to feasibility of construction and operations. For instance, the County notes that STEP likely has higher in-lot costs (borne by the individual without benefit of public financing opportunities) for electrical hookups and yard restoration. Right-of-way issues can also be problematic, including because the RWQCB will require the County to own and operate all STEP tanks. To do that, the tanks must be accessible in the front yard and within a County-owned easement. Securing such easements may be difficult, and according to the County may result in substantial additional costs and delays. While every home currently has some sort of septic tank, there are areas where installing new tanks, even in the same spot as the existing tank, could be problematic from a space/size perspective. While it may be simple to install a STEP tank on a vacant, undeveloped property, doing so in a space already developed with a house can be much more difficult, especially with infrastructure present (other underground lines, overhead lines, fences, garages, concrete walks and patio space, etc.). In short, the County concluded that the process of the County managing and handling waste from over 4,000 individual STEP tanks, along with a wastewater treatment plant and disposal system, was fraught with potential operational and maintenance issues, and would not result in significant reduction of environmental impacts. In sum, there does not appear to be a significant difference in terms of coastal resource protection by switching to a STEP based collection system.

In addition to the extensive alternatives analysis of the STEP versus gravity systems, the County analyzed various alternatives for the treatment plant location. Technical Appendices B-1: Alternatives Development and Descriptions and B-2: Systems Component Evaluation, and the Fine Screening Report (Corollo Engineers 2007) and Rough Screening Report (Corollo Engineers 2007) summarize the process the County followed to identify the four alternative project locations analyzed in detail in the EIR, while dismissing other alternatives from further consideration. The four location alternatives evaluated in the EIR include: 1) Cemetery/Giacomazzi/Branin; 2) Giacomazzi; 3) Giacomazzi/Branin; and 4) Tonini.

Originally, the County selected the Tonini site as the preferred treatment plant location. All of the alternative sites analyzed included some impact to agricultural resources. However, due to significant visual resource impacts at the Tonini site, including a shift away from sprayfields as an effluent disposal option, the County ultimately selected the Giacomazzi site for the treatment plant. The Cemetary/Giacomazzi/Branin and the Giacomazzi/Branin alternatives were dismissed because use of these combined sites would convert more than one agricultural parcel to non-agricultural public facility use and unnecessarily fragment agricultural lands. The County found that the Giacomazzi site alone better avoided significant public viewshed impacts, better avoided sensitive wetlands and other ESHA's, better avoided known archaeological resources, and would better accommodate a treated effluent

compound the problem (how to use the water efficiently and effectively to mitigate for adverse impacts on seawater intrusion and habitat). Also pumping and treating I/I is a waste of money, energy, and other resources.

4. Revise Findings in the first full paragraph on page 63 as follows:

… As specified in Special Condition 5, this plan would require the County to ensure that the service area, location and timing of the wastewater disposal component of the LOWWP project maximize~~s~~ long-term ground and surface water, and resource~~s~~ health and sustainability (wetlands, streams, creeks, lakes, riparian corridors, marshes, etc.~~,~~), including with respect to offsetting seawater intrusion as much as possible within the Los Osos Groundwater Basin.

5. Revise Paragraph 2 on page 64 as follows:

Implementing the components of the Los Osos Basin Recycled Water Management Plan will also complement on-going efforts in Los Osos to address the large seawater intrusion program. Under Special Condition 5, the Los Osos Basin Recycled Water Management Plan must be prepared by persons known to the Executive Director to be experienced with and expert in the fields of knowledge applicable to the Los Osos Basin Recycled Water Management Plan components (e.g., groundwater monitoring and assessment components must be prepared with input from licensed and certified hydrologists), should be prepared in coordination with all Los Osos area water purveyors to the maximum degree possible, must be accompanied by all supporting documentation regarding Los Osos Basin Recycled Water Management Plan components (including assumptions and data underlying its methodologies, assessment criteria, and related measures), and must include enforceable mechanisms designed to ensure its successful implementation (e.g., legal agreements, ordinances, etc.). Currently there is a group of parties, including water purveyors in Los Osos, working under the auspices of an Interlocutory Stipulated Judgment (ISJ) in the Los Osos Groundwater Basin to draft a Basin Management Plan. This ISJ Working Group recently released an update on the Basin that summarizes various goals of the group, the status of seawater intrusion, etc. (see Exhibit 4, pgs 138 through 167 of 318). Anticipated goals of the Basin Management Plan include addressing the future sustainable water supply for existing and future development, stopping seawater intrusion into the lower aquifer, managing contamination of the upper aquifer, and establishing a strategy for maximizing the reasonable and beneficial use of Basin resources. Notably, the recent update recognizes the importance of various wastewater discharge components of the LOWWP that would be governed by Special Condition 5, including the disposal at Broderson and Bayridge leach fields, indoor water conservation, and agricultural and urban reuse to addressing the needs of the Basin. The ISJ Working Group states:

> *The ISJ Working Group recognizes the above-listed LOWWP actions are crucial to mitigating the negative impacts with which the Los Osos community is faced and that implementation of these measure should be pursued as soon as possible.(Los Osos Groundwater Basin Update, ISJ Working Group, pg.5, May 4, 2010).*

6. Cite the Los Osos Valley Scenic Corridor areawide standard as an applicable Public Views LCP policy on page 77 as follows:

> *B. Irish Hills Scenic Backdrop Critical Viewshed and Los Osos Valley Road Scenic Corridor. The Irish Hills Scenic Backdrop Critical Viewshed and the Los Osos Valley Road Scenic*

This language limits the responsibility of the County and Commission to mitigate for the project.

Attachment #26

SLO Green Build

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March 7, 2010

Final Condition 99

Regarding: Recommended permit language for Condition 99, submitted by SLO-COAT, SLO Coalition of Appropriate Technology, a program of SLO Green Build. (See below) The overarching objective is to provide a comprehensive basin wide conservation plan, which includes;

1. Goal and timeline
2. Organizational structure
3. Financial sources and obligations
4. Strategies and steps

Within one year of the adoption of a due diligence resolution by the SLO Board of Supervisors electing to proceed with the Los Osos wastewater project, the applicant shall implement a water use efficiency (conservation) program within the Prohibition Zone of Los Osos.

The applicant shall implement the following **organizational structure**;

The applicant shall partner with an existing not for profit organization (SLO Green Build) that shall have an all-volunteer board of trustees that will provide the administrative framework for the program. The not for profit shall assist the County in applying for grants, managing the program's funding, and employing staff and coordinating sub contractors.

In conjunction with the not for profit, the applicant shall form a non government organization made of a collaboration of groups representing local citizens, non-profits, stakeholders, water purveyors and land owners. The joint effort of the NGO shall be to facilitate a comprehensive conservation program as part of a basin wide plan.

The program shall rely on a network of committees to move the program forward and give direction in a democratic manner. An Executive Committee shall provide the general policy direction for the program, monitors its activities, assesses its progress, and approve grant requests. The Executive Committee shall be comprised of stakeholders including private citizens and representatives from government agencies, other not for profits, businesses and water purveyors. The Executive Committee shall be advised by an Implementation Committee, which shall include representatives from several agencies and community organizations whereby review and recommendations are primarily based on science and technology.

The Program shall conduct a Conservation Summit to receive input and incorporate ideas of stakeholders and to signal the formation of an Executive Summary that defines the goals of the conservation plan. Through a list of priory of problems and coinciding solutions, an implementation plan shall designate responsibilities of working committees, public involvement and volunteer activates, government responsibility, and necessary purveyor actions.

The applicant will provide no less than 5 million dollars of project funding towards the conservation program. Grant funding shall be pursued and maximized by applying a portion of program funding as matching funds to leverage grants. Volume pricing strategies, rebates, Federal Stimulus money (e.g., for green projects), and low-cost loans shall be applied to lower costs and increase program efficiencies.

The applicant shall assist the not for profit and NGO in implementing the following **strategies**;

The program shall be implemented with an ordinance and include outdoor water use efficiency measures as well as indoor measures. It shall be part of a basin wide plan. An integrated indoor and outdoor element and basin wide plan are required to assure safe mitigation for project impacts on sea water intrusion and environmentally sensitive habitat.

The program shall establish a credible, verifiable base line of current potable water use based on total production of groundwater within the Prohibition Zone as of January 2010. This verifiable baseline will be used to measure progress toward the following program targets.

Program Targets:

- a 25% minimum reduction in overall potable water use within the Prohibition Zone within the first two years after program implementation
- a 30% reduction in overall potable water use within the Prohibition Zone within 5 years of program implementation
- all of the above reductions shall be applied to reduce the pumping causing seawater intrusion

The program shall include the following general components/measures:

- a priority implementation schedule beginning with the highest intensive users, including Class II
- water auditing services to maximize funding and program effectiveness
- on-site leak detection and repair
- education and outreach for property owners and professionals (recommended quarterly basis) using the most effective methods (e.g., water auditor one-on-one contact with property owners and training seminars for professionals)
- Incentives to achieve goals of the condition more rapidly (e.g., rebates, reduced material and installation costs, etc)

The program shall include installation of a range of the most cost-effective and resource efficient water saving retrofits (appliances, fixtures, and devices) and outdoor water use:

- Rainwater harvesting through landscape design and vessel containment (e.g., rain gardens, bioswales, other LID technologies, cisterns)
- high efficiency toilets, washers, faucet aerators, shower heads, on demand water heaters, recalculating pumps and irrigation emitters.
- Xeriscape and drought tolerant native species gardening.
- Greywater systems (e.g., laundry to landscape)
- Smart controllers for indoor and outdoor water use

Other means and methods shall be considered if they can be shown to be more resource efficient or cost effective. When evaluating what is cost effective, costs shall be measured or compared to the cost of desalination and imported water costs as well as other potential future water rates if seawater intrusion is not stopped.

The program shall provide test case studies for the installation of emerging technologies or practices. (e.g., composting toilets and urine sequestration)

The costs for implementing tiered rate structures, metering, system leak detection and repair (off-site) shall not be covered by program funding. Nevertheless, a requirement to implement these measures shall be included in a basin-wide plan, and the water savings from these measures shall be counted toward the targets of this plan.

The program shall include a steeply tiered monthly maintenance fee for wastewater process and treatment that is directly related to water consumption and acts as an incentive to conserve.

The program shall include criteria and a process for tracking the success of the overall program and program components (e.g., green and innovative strategies) as a model for basin stewardship to apply to other coastal communities. A yearly report shall be sent to the Director of the Coastal Commission.

The plan shall be incorporated into the basin-wide management plan provided for in CDP Conditions. The Executive Director of the Coastal Commission shall review and approve the plan prior to implementation.

Sincerely,
SLO Green Build

Attachment #27

Monthly Sewer and Sewer-Water Cost Estimates for Single-Family Homeowners (Revised 1/15/2011)

(Prepared by Keith Wimer using LOWWP documents and current water rates—see Attachments A-E)
(Attachments F-H provide LOWWP affordability information.)

Small Household (1Person)

	1st 218	Rts & Chrgs Ord/218	On-lot	Tot. Sewer	Tot. Sewer-Water
Small Household (1) Low On-lot Costs	$105 (A)	$63.93(B) and up*	$19.83 (C)	**$189 and up***	**$211-219** (D,E) **and up***
Small Household (1) Avg. On-lot Costs	$105 (A)	$63.93(B) and up*	$48.36 (C)	**$217 and up***	**$239-248** (D,E) **and up***
Small Household (1) High On-lot Costs	$105 (A)	$63.93(B) and up*	$132.51(C)	**$301 and up***	**$323-332** (D,E) **and up***

Average Household (2.5 People)

	1st 218	Rts & Chrgs Ord/218	On-lot	Tot. Sewer	Tot. Sewer-Water
Avg. Household (2.5) Low On-lot Costs	$105 (A)	$86.55(B) and up*	$19.83 (C)	**$211 and up***	**$242-253** (D,E) **and up***
Avg. Household (2.5) Avg. On-lot Costs	$105 (A)	$86.55(B) and up*	$ 48.36 (C)	**$240 and up***	**$270-281** (D,E) **and up***
Avg. Household (2.5) High On-lot Costs	$105 (A)	$86.55(B) and up*	$132.51(C)	**$324 and up***	**$355-365** (D,E) **and up***

Large Household (6 People)

	1st 218	Rts & Chrgs Ord/218	On-lot	Tot. Sewer	Tot. Sewer-Water
Lg. Household (6) Low On-lot Costs	$105(A)	$139.33(B) and up*	$19.83 (C)	**$264 and up***	**$327-333** (D,E) **and up***
Lg. Household (6) Avg. On-lot Costs	$105(A)	$139.33(B) and up*	$48.36 (C)	**$293 and up***	**$356-361** (D,E) **and up***
Lg. Household (6) High On-lot Costs	$105(A)	$139.33(B) and up*	$132.51(C)	**$377 and up***	**$440-445** (D,E) **and up***

*Sewer and water rates assume <u>conservation</u> use (Indoor conservation = 50 gallons per person per day. Outdoor conservation = 25 gallons per household per day.) Therefore, costs are not likely to be much lower than estimated, but could be higher with more water use. Also, sewer rates are based on indoor use. However, the County plans to use total water use for two winter months (e.g., January and February) to determine annual sewer rates. Therefore, any outdoor water use during those months would raise sewer rates. (Also see "Notes" next page.)

Notes

"Monthly Sewer and Sewer-Water Cost Estimates for Single-Family Homeowners"
(Revised 1/15/2011), K. Wimer

1. The County estimates on-lot costs will be from $1500 to $10,000 "and up" (see *SWRCB Financial Assistance Credit Review*, p. 23—see Attachment C). Monthly costs are calculated as a percentage of financed average on-lot cost of $3,650. These costs will vary by site. **When Elaine Watson contacted several contractors that do sewer hook ups, every one said costs would be substantially higher than County estimates.**

2. The range of water costs represents current LOCSD customer costs versus Golden State Water Company (GSWC) customer costs (see Attachments D & E). **A 48.5 % increase is pending for Golden State customers, which takes effective as of January 1, 2011, if approved. The increase would add roughly $15, $20, and $33 respectively to "Small, Average, and Large Household" costs. The protest period for the rates and charges increase is open until January 26, 2011 (see Application # A.10-01.009 and Advice Letter No. 1429-W on the GSWC website, or call GSWC 1-800-999-4033 for more information). Also, purveyors are in the process of developing a management plan to address seawater intrusion, so water costs will likely go up significantly in the next few years to pay for system upgrades/changes.**

3. Total average monthly costs to pay project capital costs (second and third columns of "Average Household") are slightly lower in these estimates than County estimates ($191.55 per month vs. $194 per month—see Attachment A). This is possibly because the County is using a higher average household factor (e.g., 2.6 to 2.7). Therefore, the above calculations are conservative. **Cost overruns during project construction could add significantly to project capital costs and total monthly costs for individual households.**

4. The above estimates do not calculate potential project cost reductions from undeveloped property owners contributing to sewer costs (see Attachment B). This is for two reasons: 1) the serious seawater intrusion problem makes future development uncertain, and 2) undeveloped property owners are likely to pay sewer costs via development fees (if building occurs); thus, any cost reductions will be spread out over many years and likely offset by increasing sewer and water costs (see 1-3 above).

5. Atlanta, Georgia is widely cited as having the highest sewer-water costs. Currently, Atlantans' average sewer-water bill is $120.82, expected to go up to $151.92 by 2012. By 2014, Los Osos water-sewer costs will easily be double Atlanta's and may be closer to triple. (For Atlanta water-sewer costs see "Atlanta water, sewer rates among the nation's highest" in the Atlanta Journal-Constitution, by searching "highest sewer rates" or going to http://www.ajc.com/news/atlanta/atlanta-water-sewer-rates-154647.html.

Attachment A

LOWWP Flier 11/2010

Project Costs and Financing

Project Cost Estimates

The Project – which includes collection, treatment and treated effluent disposal – is estimated to cost $166M. Private property "on-lot" costs are additional and will be different for each property owner depending on existing septic systems and landscaping

The Project will be financed largely through low interest loans provided by public agencies such as the USDA and the State Water Board. We continue to pursue additional grants to reduce the level of borrowing.

To date, we have received commitments for a $83M loan and $4M grant from the USDA. This loan will be repaid over 40 years at an interest rate of 3.25%.

We have applied for the balance of financing through the State Revolving Fund (SRF) program of the State Water Board. SRF loan terms will be finalized once the service charge ordinance has been established. We are also pursuing other grant opportunities through the State Water Board program and other avenues, such as Integrated Regional Water Management (IRWM) grants administered by the California Department of Water Resources.

The loans will be repaid with two sources of revenue collected from properties connected to the Project – **property assessments** and **service charges**.

Property Assessments

In 2007, owners of **developed properties** approved total assessments of $127M for construction of the Project. Owners can pay their assessment in a lump some (and a few already have). Most property owners will pay over time as part of their property tax bills, and we currently estimate that a single family home assessment will cost about $1,260 per year (equivalent to $105/month).

Undeveloped properties were not assessed in 2007, because their ability to develop and connect to the Project was not assured due to existing water and habitat issues. The County continues to work to resolve these issues. Existing Project strategies adopted by the Board of Supervisors includes establishing a $27M assessment (or equivalent connection fees) for vacant parcels before the Project is completed in 2014. When new development is possible, **vacant properties will pay their share of Project costs before development occurs.** The County efforts to pursue assessments on undeveloped properties is a costs sharing strategy to "mitigate affordability issues" (per AB 2701)

Service Charges

Wastewater service charges will cover the loan repayments (also called unsecured debt) not covered by property assessments. Service charges will also include an amount necessary to pay for the operation, maintenance and repair of Project facilities, including normal administrative and other costs.

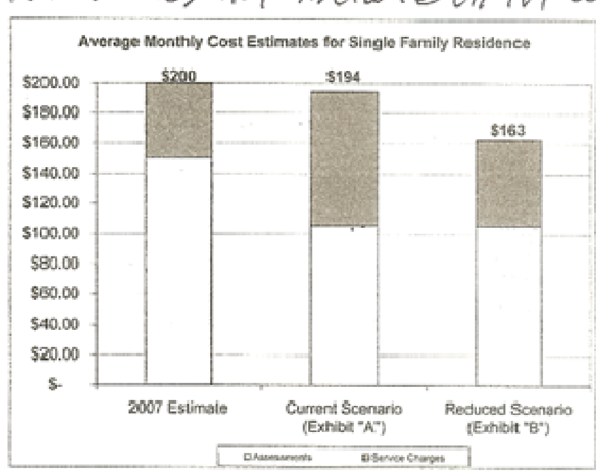
Total Monthly Cost

Avg. cost

The total wastewater system cost (assessments plus service charges) is shown in the bar graph. In 2007, we estimated that the average total household cost would be $200/month. Under the "current scenario" assumptions, we now estimate the average cost to be $194/month. When vacant properties are assessed, service charges will automatically drop and the "reduced scenario" average cost will be $163/month.

We should note that existing multi-family and mobile homes will have significantly lower costs than single family homes. For example, mobile homes would have total costs less than $100/month under either scenario.

*This does not include on-lot costs.



Attachment B

LOWWP Flier 11/2010

Rates and Charges ("Service Charges")

The Service Charges Ordinance

The proposed service charges include a flat rate (minimum charge) and a variable portion based on the indoor water usage of each residence (which creates wastewater flows). The flat rate amount is related to construction loan repayment and the variable portion is related to operating costs. The variable component will allow residents who conserve water to reduce their service bills.

There are two rate structures in the service charges ordinance, listed as Exhibits "A" and "B."

- Exhibit "A" shows the initial rates needed to meet funding requirements under the current scenario.
- Exhibit "B" shows an automatic rate reduction that would occur when the Board of Supervisors has directed the collection of assessments or connection fees from undeveloped properties.
- **No service charges will actually be collected before the Project is operating in 2014.**

2.5 occupants (5 units) = #86.50/mo.

Protests

Property owners who are subject to the service charges and wish to protest the charges may mail or deliver their written protests to the County at County Clerk/ Recorder's Office, Attn: Clerk of the Board, 1055 Monterey St. Suite D120, San Luis Obispo, CA 93408 in a manner that ensures receipt by the County no later than the close of the public hearing on December 14, 2010. Property owners may also present or withdraw written protests at the hearing on December 14, 2010. The formal legal notice was mailed on October 29, 2010 and can be found on the Project website.

Service Charges Facts

- The California State Constitution specifies the procedures for approving an ordinance to establish the wastewater system service charges (Article XIII D, Prop. 218).
- Funding agencies require the adoption of the service charges ordinance now, before they will approve final funding.
- **State law does not allow the collection of service charges until the Project is operating; no sooner than 2014.**
- Establishing assessments or connection fees for undeveloped properties will trigger the automatic reduction in service charges.

All examples assume conservation usage - 50 gallons per person per day

Wastewater Service Charges (Monthly Equivalent)

Exhibit "A" Rates

Monthly Usage (Units)	Typical Occupants	Single Family	Multi Family	Mobile Home	Non-residential
0 (Min. Charge)		$48.85	$36.64	$24.44	$61.13
2	1	$63.93	$51.72	$39.52	$76.21
4	2	$79.01	$66.80	$54.60	$91.29
6	3	$94.09	$81.88	$69.68	$106.37
8	4	$109.17	$96.96	$84.76	$121.45
10	5	$124.25	$112.04	$99.84	$136.53
12	6	$139.33	$127.12	$114.92	$151.61

(Not the maximum charge, depends on usage

Exhibit "B" Rates

Monthly Usage (Units)	Typical Occupants	Single Family	Multi Family	Mobile Home	Non-residential
0 (Min. Charge)		$17.19	$12.90	$8.60	$21.51
2	1	$32.27	$27.98	$23.68	$36.59
4	2	$47.35	$43.06	$38.76	$51.67
6	3	$62.43	$58.14	$53.84	$66.75
8	4	$77.51	$73.22	$68.92	$81.83
10	5	$92.59	$88.30	$84.00	$96.91
12	6	$107.67	$103.38	$99.08	$111.99

Note: one (1) unit = 748 gallons

8.3. USER CHARGES

User charges will fund the remaining project capital costs not covered by the property assessments, as well as annual operations, maintenance, and replacement costs. The user charges rate schedule for the project is based on a calculation of user type, flows, and loads according to the Revenue Program Guidelines for the State Revolving Fund loan program. The calculations were originally developed by Tuckfield & Associates for the previous Los Osos Community Services District project in 2004. The revised rate schedule reflects current costs estimates and reduced flows expected with implementation of the water conservation program that is required in the Coastal Development Permit. The following table is a summary of the user charge rate schedule by user group and revenue category. The complete user charge revenue tables are provided in Attachment B-Item 8.

Table 8.7 Summary of User Charges Revenue Requirements by User Group

User Group	# of Accts	Variable O M & R	Fixed O M & R	Capital Replace. Fund	Debt Service	Debt Service Reserve	Total Annual Revenue	Avg. Monthly Revenue
Single Family	4289	$446,099	$1,416,592	$158,306	$606,109	$60,342	$2,687,449	$52.22
Multi Family	809	63,115	200,421	22,397	85,753	8,537	380,224	39.17
Mobile Home	542	28,201	89,553	10,008	38,317	3,815	169,893	26.12
Low-load Non-Resid	147	16,950	53,826	6,015	23,030	2,293	102,115	57.89
Med-load Non-Resid	5	633	2,462	204	866	100	4,265	71.08
High-load Non-Resid	17	8,008	32,385	2,521	10,969	1,310	55,194	270.56
Special User (septage)	749	1,994	9,759	549	2,752	382	15,436	1.72
Totals	6558	$565,000	$1,805,000	$200,000	$767,796	$76,780	$3,414,575	$43.39

8.4. PROPERTY OWNER FINANCED ON-LOT COSTS

There are 4,281 existing septic systems serving individual or multiple users that must be abandoned and the users connected to the collection system laterals in the right-of-way. Individual property owners are responsible for these improvements and costs related to all work that is necessary on their private property to abandon existing septic systems. Costs are expected to vary greatly by individual property, and are estimated in the Fine Screening Report from less than $1,500 to $10,000 or more. The average cost per property, or septic system abandonment, is estimated at $3,650 and assumed to be owner financed with a home equity line of credit or other commercial loan. Financing costs would average $48.36 per month, at an assumed 9.5% interest rate for a 10 year term. Debt service for these costs are the responsibility of each property owner and their individual lender and are not included in the estimated project revenue requirements.

Attachment D

LOS OSOS COMMUNITY SERVICES DISTRICT
BI-MONTHLY WATER RATES
EFFECTIVE JULY 1, 2010

MINIMUM CHARGE		CCF	AMOUNT	CCF	AMOUNT	CCF	AMOUNT
CCF	AMOUNT	38	$192.00	81	$428.50	124	$665.00
0 units	$35.00	39	$197.50	82	$434.00	125	$670.50
1.25/CCF		40	$203.00	83	$439.50	126	$676.00
1	$36.25	41	$208.50	84	$445.00	127	$681.50
2	$37.50	42	$214.00	85	$450.50	128	$687.00
3	$38.75	43	$219.50	86	$456.00	129	$692.50
4	$40.00	44	$225.00	87	$461.50	130	$698.00
5	$41.25	45	$230.50	88	$467.00	131	$703.50
ADDITIONAL $2.35/CCF		46	$236.00	89	$472.50	132	$709.00
6	$43.60	47	$241.50	90	$478.00	133	$714.50
7	$45.95	48	$247.00	91	$483.50	134	$720.00
8	$48.30	49	$252.50	92	$489.00	135	$725.50
9	$50.65	50	$258.00	93	$494.50	136	$731.00
10	$53.00	51	$263.50	94	$500.00	137	$736.50
ADDITIONAL $4.00/CCF		52	$269.00	95	$505.50	138	$742.00
11	$57.00	53	$274.50	96	$511.00	139	$747.50
12	$61.00	54	$280.00	97	$516.50	140	$753.00
13	$65.00	55	$285.50	98	$522.00	141	$758.50
14	$69.00	56	$291.00	99	$527.50	142	$764.00
15	$73.00	57	$296.50	100	$533.00	143	$769.50
16	$77.00	58	$302.00	101	$538.50	144	$775.00
17	$81.00	59	$307.50	102	$544.00	145	$780.50
18	$85.00	60	$313.00	103	$549.50	146	$786.00
19	$89.00	61	$318.50	104	$555.00	147	$791.50
20	$93.00	62	$324.00	105	$560.50	148	$797.00
ADDITIONAL $5.50/CCF		63	$329.50	106	$566.00	149	$802.50
21	$98.50	64	$335.00	107	$571.50	150	$808.00
22	$104.00	65	$340.50	108	$577.00	151	$813.50
23	$109.50	66	$346.00	109	$582.50	152	$819.00
24	$115.00	67	$351.50	110	$588.00	153	$824.50
25	$120.50	68	$357.00	111	$593.50	154	$830.00
26	$126.00	69	$362.50	112	$599.00	155	$835.50
27	$131.50	70	$368.00	113	$604.50	156	$841.00
28	$137.00	71	$373.50	114	$610.00	157	$846.50
29	$142.50	72	$379.00	115	$615.50	158	$852.00
30	$148.00	73	$384.50	116	$621.00	159	$857.50
31	$153.50	74	$390.00	117	$626.50	160	$863.00
32	$159.00	75	$395.50	118	$632.00	161	$868.50
33	$164.50	76	$401.00	119	$637.50	162	$874.00
34	$170.00	77	$406.50	120	$643.00	163	$879.50
35	$175.50	78	$412.00	121	$648.50	164	$885.00
36	$181.00	79	$417.50	122	$654.00	165	$890.50
37	$186.50	80	$423.00	123	$659.50	166	$896.00

Conversion:
CCF is defined as 100 cubic feet which is equal to 748 gallons
Average Daily Usage - usage x 748 gallons ÷ 60 days = average daily usage
Suggested Usage - 50 gallons / day / person in household

Attachment E

GOLDEN STATE WATER COMPANY
630 E. FOOTHILL BLVD. - P. O. BOX 9016
SAN DIMAS, CALIFORNIA 91773-9016

Revised Cal. P.U.C. Sheet No. 5762-W*

Canceling Revised Cal. P.U.C. Sheet No. 5658-W*

Schedule No. LO-1-R

Los Osos District

RESIDENTIAL METERED SERVICE

A 48.5% increase in rates and charges and will be effective as of Jan. 1, 2011 if approved by the CPUC.

APPLICABILITY
Applicable to all residential metered water services provided to single-family residential customers.

The protest period is within 20 working days of Dec. 29, 2010. (See Golden State Water Co. website)

TERRITORY
Unincorporated areas south of the city of San Luis Obispo in the vicinity of Los Osos, San Luis Obispo County.

RATES

Quantity Rates:

First 800 cu. ft. per 100 cu. ft.	~~$ 3.310~~	3.519
Next 600 cu. Ft., per 100 cu. ft	~~$ 3.692~~	4.047
Over 1,400 cu. ft., per 100 cu. ft.	~~$ 4.246~~	4.654

Service Charge:

	Per Meter Per Month
For 5/8 x 3/4-inch meter	$ 20.05
For 3/4-inch meter	30.10
For 1-inch meter	50.15
For 1-1/2 inch meter	100.00
For 2-inch meter	161.00
For 3-inch meter	301.00
For 4-inch meter	502.00
For 6-inch meter	1,003.00
For 8-inch meter	1,605.00
For 10-inch meter	2,307.00

The Service Charge is a readiness-to-serve charge applicable to all metered service and to which is added the charge for water computed at the Quantity Rates.

SPECIAL CONDITIONS

1. All bills are subject to the reimbursement fee set forth on Schedule No. UF.

2. Effective May 1, 2008, pursuant to Decision No. 08-01-043, a surcharge of $0.040 per Ccf will be applied to all metered customer bills excluding customers that are receiving the CARW credit. This surcharge will offset the CARW credits and CARW administrative program costs recorded in the CARW Balancing Account.

3. As authorized by the California Public Utilities Commission, a one-time surcredit of $1.54 is to be applied to customers bills on the effective date of Advice Letter 1410-WB. This surcredit will refund the balance recorded in the Temporary Interest Rate Balancing Account, as of May 31, 2010.

4. As authorized by the California Public Utilities Commission, an amount of $0.2038 per Ccf is to be added to the Quantity Rate until the balance in the "WCMA" is fully recovered, approximately 12 months, beginning on the effective date of Advice Letter 1365-WA. This surcharge will recover the net revenue loss as a result of the Governor's declared drought on June 4, 2008.

5. As authorized by the California Utilities Commission, an amount of $0.309 per Ccf for Tier 1, $0.365 per Ccf for Tier 2 and $0.408 for Tier 3 is to be added to the quantity rate through April 21, 2011 12-Months from the effective date of Advice Letter 1389-WA on April 22, 2010. This surcharge will recover the Under collection in the WRAM/MCBA Balancing Accounts as of December 31, 2009. (N) (N) (N) (N)

These increases have been added per a GS representative

ISSUED BY
R. J. SPROWLS
President

Advice Letter No. 1389-WA
Decision No. 09-05-005

Date Filed: November 2, 2010
Effective Date: November 12, 2010
Resolution No. ____________

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

8.1. RECOMMENDATIONS FOR ADDRESSING AFFORDABILITY CHALLENGES

3-4X's over afford-ability levels and could be higher because median income is likely to have dropped (see ERS/USDA data attached)

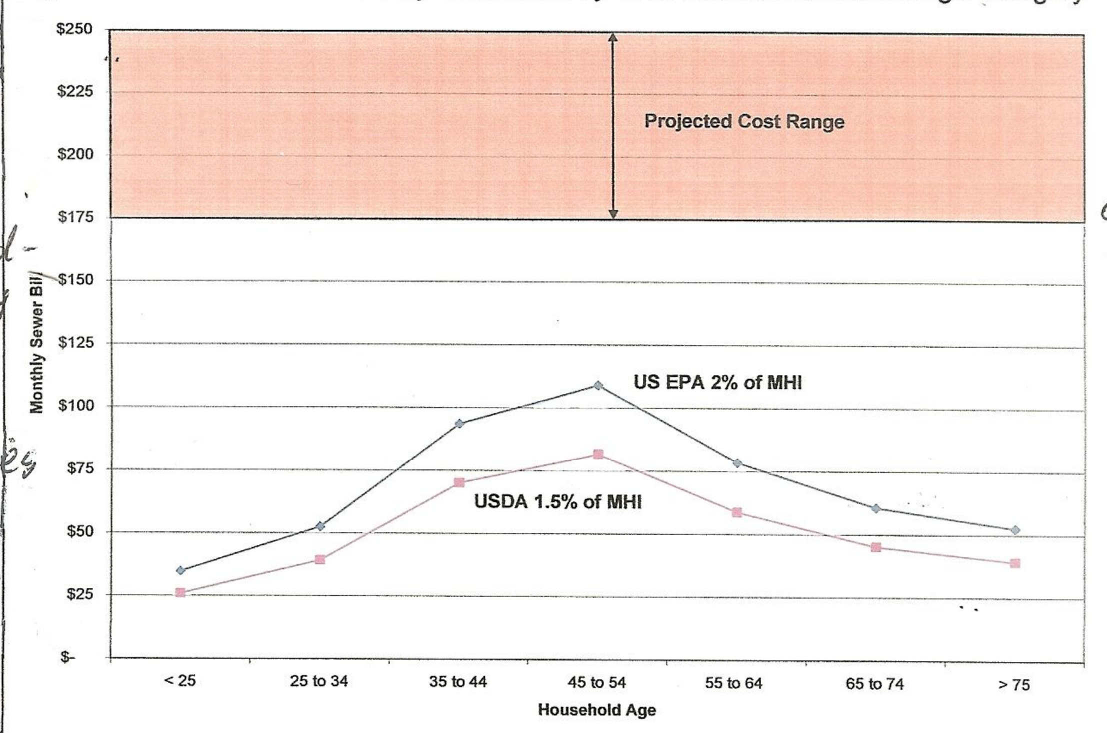
MHI ≈ $46,558 (see next page)

Project affordability has been a major challenge for the project since planning efforts began in 1983, following the Regional Water Quality Control Board's mandate to cease septic tank discharges in the majority of Los Osos. The lack of existing wastewater infrastructure requires that the community construct all of the necessary facilities for collection, treatment, and effluent reuse or disposal at one time. The large capital expenditure, plus ongoing operational costs and individual on-lot connection costs result in a total project cost that far exceeds any affordability standard in the moderate income community of Los Osos.

Financing — About $240 currently (Avg. household, avg. on-lot costs)

The County has evaluated project affordability as part of its overall project planning and feasibility review. Without financial assistance, the total project costs are projected to exceed $250 per month for a typical, single family residence, which is more than 6% of the median household income (MHI) on an annual basis. The costs will be especially challenging for Los Osos where 33% of households receive Social Security income (50% higher than the statewide average), an indicator of fixed-income retirees.

Figure 8.1. Los Osos Affordability Thresholds by 2000 Census Household Age Category



About 5X's over afford-ability levels For families with median incomes 65 and older and 34 and younger - about 10% of incomes.

ITEM 3: Median Household Income (MHI) for the Project Service Area

3.1. ECONOMIC DEMOGRAPHICS

The community of Los Osos is a predominantly residential community of 14,251 residents (U.S. Census 2000) located along the central Coast of California on the southern edge of Morro Bay in San Luis Obispo County. It is combined with Baywood Park to form the Census designated place of Baywood-Los Osos. There is a small business district concentrated over just a few blocks along Los Osos Valley Road on the southeast side of the town, with several additional shops servicing the Baywood section of Los Osos. The remaining sections of town are almost entirely residential. There is no heavy or light industry within Los Osos.

Employment status for the active members of the labor force is provided in Table 3.1. In Year 1999, there were 11,538 residents aged 16 years or older; 7,250 (68%) of which were active within the labor force.

Table 3.2 provides statistical data on Year 1999 income per household within the community of Los Osos. Median household income is shown as **$46,558**. A total of 190 families and 1,205 individuals were living below the poverty level in Year 1999.

These numbers are likely to be higher.

Table 3.1 Employment Status – Los Osos, CA[1]

Occupation	Number	Percent
Management, professional, and related occupations	2,660	38.4
Service Occupations	1,258	18.2
Sales and office occupations	1,657	23.9
Farming, fishing, and forestry occupations	73	1.1
Construction, extraction, and maintenance occupations	654	9.4
Production, transportation, and material moving occupations	629	9.1
Armed Forces	28	0.2
Unemployed	291	2.5
Total	**7,250**	**68**

[1] U.S. Bureau of the Census, Census 2000

Table 3.2 Household Income – Los Osos, CA[1]

Income Range	Number	Percent
Households	5,908	100
Less than $10,000	296	5.0
$10,000 to $14,999	322	5.5
$15,000 to $24,999	793	13.4
$25,000 to $34,999	791	13.4
$35,000 to $49,999	914	15.5
$50,000 to $74,999	1,269	21.5
$75,000 to $99,999	792	13.4
$100,000 to $149,000	484	8.2
$150,000 to $199,999	100	1.7
$200,000 or more	147	2.5
Median Household Income	**$46,558**	--

[1] U.S. Bureau of the Census, Census 2000

For about 23% of households average sewer costs ($240) are over 12% of household income and high sewer costs ($377) are over 18% — more than 6-9x's affordability levels.

This number is likely to be lower (see ERS/USDA report attached)

Attachment H

USDA United States Department of Agriculture
Economic Research Service
The Economics of Food, Farming, Natural Resources, and Rural America

Briefing Rooms

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- Food & Nutrition Assistance
- Food Sector
- Natural Resources & Environment
- Policy Topics
- Research & Productivity
- Rural Economy
- Trade & International Markets

Rural Income, Poverty, and Welfare: Income and Nonfarm Earnings

Median household income fell significantly in both rural and urban areas between 2007 and 2008, reflecting the effects of the national economic recession that started in December 2007. After adjusting for inflation, the money income of the typical nonmetro household fell by 3.3 percent, compared to a 3.7-percent drop in metro areas. In nonmetro areas, median household income in 2008 was about the same as it had been in 2000, while in metro areas it has fallen to about $4,000 below its 2000 level. Median household income in nonmetro areas now stands at 78.7 percent of the metro median, although the generally lower cost of living in rural areas may narrow this gap in real terms.

* Median incomes dropped since 2000.

Total per capita income in 2008—including all cash income as well as the cash value of in-kind public assistance benefits such as food stamps and medical services—is likewise lower for nonmetro than metro residents. However, nonmetro residents receive more transfer payments (see also the chapter on transfer payments), in large part reflecting the higher Medicare and Medicaid expenses associated with an older population.

Household money income by residence, 2000-08 (2008 dollars)

Year	Nonmetro		Metro		Nonmetro as percentage of metro (%)
	Median household income ($)	Change from previous year (%)	Median household income ($)	Change from previous year (%)	
2008	40,785	-3.3*	51,853	-3.7	78.7
2007	42,176	3.1	53,823	-0.4	78.4
2006	40,892	-1.3	54,052	1.1	75.7
2005	41,429	NA	53,462	NA	77.5
2004	NA	NA	NA	NA	NA
2003	41,105	-0.9	53,921	-0.5	76.2
2002	41,498	1.6	54,195	-1.5	76.6
2001	40,864	0.7	54,993	-1.6	74.3
2000	41,145	NA	55,873	NA	73.6

*Indicates a statistically significant change in median income, at the 90-percent confidence level.
NA = Not available.
Note: Estimates for 2004 are not available because the definition of metropolitan areas changed during the course of that year. The post-2004 estimates reflect the new metro/nonmetro definitions.
Source: Calculated by ERS using data from the Annual Social and Economic Supplement (ASEC) to the Current Population Survey, U.S. Census Bureau.

Sources of per capita income, 2008

Attachment #28

stamped copy

attachments 1-16

December 13, 2010
San Luis Obispo County Board of Supervisors
County Government Building
San Luis Obispo, CA

Subject: Protest of proposed rates and charges ordinance and Proposition 218 assessment for APN 038-072-041, property address: 1101 14th Street, Los Osos, CA 93402

Dear Supervisors:

We are protesting the rates and charges ordinance, and the Proposition 218 assessment on our property (APN 038-072-041) per "Notice of Public Hearing On Ordinance To Impose Sewer Service Charges in the Service Area of the Los Osos Wastewater Project" sent to us in a letter dated October 28, 2010, from the County of San Luis Obispo Public Works Department. We are protesting for the following reasons:

1. **The LOWWP does not mitigate for what are sure to be devastating social and economic impacts on homeowners and businesses in Los Osos.**
   - Monthly sewer costs for single-family homeowners will average **$240** and can go to **$380** and above depending on water use.
   - Monthly sewer-water costs will average about **$260-$270** and can go to about **$410-480** and above.
   - Sewer-water costs don't include projected increases to water costs for management measures currently planned by water purveyors, which **could easily add $50 or more to average bills,** making **average bills over $300** and **bills for families of 6 or more $400-500** per month.
   - Using 2000 median household income (MHI) data, project documents show average sewer costs **exceed affordability** levels by **200-1000% percent**—hitting young families and elderly the hardest, with costs exceeding affordability by 1000% and 700% respectively.
   - **In 2000,** the median household income **(MHI)** in the prohibition zone was **$46,500,** and USDA statistics show the **MHI had dropped 3.7% between 2000 and 2008**.
   - For about **25% of families** (with incomes below $12,999) average sewer costs are over 12% of income **(6 times higher than affordability levels)** and high sewer costs are over 18%, **(9 times higher than affordability levels)**.
   - **Atlanta** is cited as the having the **highest** sewer-water **rates**, with **$120** per month, projected to rise to **$150** per month by **2012**. **Los Osos water-sewer rates will most likely be ~~triple~~ (2 X's) the next highest rates in the country.**

We are sure these costs will have extreme financial hardships on our family and our friends' families. Besides us, our mother, son's family, and brother's family own homes in the prohibition zone of Los Osos. Our mother lives on a fixed income, and we soon will be on fixed incomes, along with Keith's brother and his wife, and many people we know. We are certain many families will lose there homes unless specific cost mitigations are provided, and we are sure people should not lose their homes over a sewer. We further believe there are safeguards in the law to prevent this from happening, which have not been observed or applied in this process.

The County apparently adds an inflationary factor to the MHI, in order to state that 75% of families have "moderate/high" incomes (defined as above federally established median incomes of $32,400-$40,400) (see USDA Environmental Report, p. 72, Attachment #5). However, due to the severe downturn in the economy, the percentage of families below the median is more likely to be 40-50% (see SRF Credit Review, p. 7, Attachment #8)). This means the project exceeds affordability levels for about half the community by at least three times (300%)—and, by more than 10 times (1000%) for the lowest income families.

At the Townhall Meeting on November 29, 2010, the only potential relief County officials mentioned that seemed promising was a Community Development Block Grant (CDBG). The County has not been successful in obtaining other grants (see USDA Engineering Report, p. 118). CDBG grants might provide somewhere in the neighborhood of $200,000 or so, if received. This provides only about $38 annually for each single family homeowner (or "benefit unit") and about $100-$125 annually for families below median income levels (assuming 5000 families and 25-40% are below those levels). Thus, CDBG money does virtually nothing to offset sewer costs from a low of $185 to over $400 per month for single family homeowners (see our estimates using LOWWP documents).

The combined sewer costs under various scenarios should have been provided in the ordinance notice, the Town Hall flier, and the ordinance itself for decision makers and the public to make informed decisions on this ordinance. Further, a thorough analysis of the social and economic impacts on the community and businesses must be done—with specific mitigations in place prior to approval of an ordinance (or any further development of the project)—or the project is sure to lead to a social and economic disaster.

2. **The project apparently has several significant unfunded costs that will require future rates and charges assessments, adjustments, or other funding.** These include the following:
   - **A replacement for Broderson leach fields if they fail or don't work up to standards.** The County plans to start these up slowly and monitor them. If monitoring shows they will destabilize homes, or not mitigate for seawater intrusion, the project provides no funded back up measures. Back measures would be several millions of dollars, not counting permitting, etc.
   - **A feasible means to replace 400-500 AFY of groundwater that the EIR says will stop flowing to Willow Creek, which supplies Eto Lake, Los Osos Creek (a steelhead habitat) and the estuary.** The previous project had multiple leach fields and harvest wells, not funded in this project. These would be several millions of dollars, if they are even feasible.
   - **Adequate collection system maintenance to reduce inflow and infiltration to levels that will prevent overflows to the estuary (i.e., a SSMP and measures that meet these standards).** The Fine Screen report states that this will add costs to the system, and additional O&M costs have not been included in estimates since the Fine Screening first presented them (without the augmented maintenance) (see Attachments #7 & #8).
   - **Ag exchange wells.** CDP Condition 5 and project Condition 97 say recycled water use measures will be prioritized to mitigate for seawater intrusion. Ag exchange (with a mitigation factor of .55) is needed to do this since ag inlieu has only a .01 factor. Ag exchange requires installing wells at a cost of about $1 million, according to the Fine Screening report (see Appendix A, Table 1-A).

- **Roads:** The staff report for the LOWWP Update October 2010 indicates not enough money will be in the project budget to pay for road repair once, $2 million borrowed from the general funds roads budget is reimbursed). (see Attachment #10).

3. **The project has no mechanisms to ensure future costs will be kept in check.** Once this ordinance and assessment is approved (if it is), costs could continue to escalate ad infinitum and it will be too late to turn back. Keith provided specific contracting strategies to contain costs in May, and asked for a reply but did not receive one (see Attachment #11). Further, Supervisor Gibson has said there will be no caps on costs. The Santa Ysabel project in Los Osos, a County Public Works project, is 500% over budget. Ten years later, the two-year project is only half complete. This shows the potential for catastrophic overruns unless specific measures are in place to prevent this from happening.

4. **A thorough life-cycle cost comparison of all alternatives on an equivalent cost basis has not been done, and must be done in order to select the most cost-effective option. and current cost comparisons show a consistent bias toward the most expensive collection system—a conventional gravity collection system with some sealed components.** The NWRI said a cost comparison of alternatives should be provided on an equivalency basis, but this was never done. The differences in contingency factors applied to alternatives resulted in many misleading statements that the costs of a STEP system and the proposed conventional gravity system are "substantially" the same, when they are not. We've attached a list of some of the biases in the review and a statement by Dana Ripley, the designer of a STEP system for Los Osos that a STEP project would be $50 million less (see Attachment #13). A centralized STEP and decentralized STEP/STEG system both would be much more cost-effective. A decentralized project, using cluster systems, e.g., like the Pio Lombardo, Inc., Scenario 2—see LOWWP Decentralized TM), but with measures that maximize conservation and reuse, as recommended by the Los Osos Sustainability Group (LOSG) would reduce costs, energy use, and benefits to environmental, social, and economic systems at $40 million, or so, less based on project documents (if bias assumptions are removed). This option—which has not been evaluated—would do more to protect and maintain the water supply and other resources, with much less risk to the basin, community, and finances (see LOSG Sustainable Basin Plan, Attachment #14, and "Alternative projects are more cost effective…," Attachment 15).

5. **The design-build process was abandoned for the collection system (the most costly component of the project) but it is needed for every project component to ensure the most cost effective project is selected.** Your Board and County staff indicated all components of the project would be subject to a design build process maximize competition and to keep costs as low as possible, also to resolve concerns over review bias. This would have allowed decision makers and the public see actual costs and designs to determine which was most cost-effective and desirable—but this did not happen. Based on expert statements and project documents, we believe this Board decision added $50 million to the project costs (see Attachments #13-#15).

   A design-build process should still be conducted; however, it should be conducted by the Design-Build Institute of America to maximize competition, minimize costs, and ensure fairness. Teams representing various technologies and options (including a decentralized option and pump and treat option) should be encouraged to provide whole-system solutions that maximize benefits to the water supply, community, and local economy, at the least risk to resources. Project design criteria should be set to maximize the sustainability of resources, i.e., reduce contamination from all sources of nitrates, seawater, etc., at the lowest possible life-cycle costs (i.e., targeting community affordability levels). Contracts should include caps on costs and incentives to come in under bid amounts and completion time estimates. Other valuable options would be grant application and maintenance services.

6. **Thorough cost-benefit and risk analyses of project alternatives have not been done.** These are necessary, in light of changing basin and project conditions, to ensure the project selected does more good than harm, e.g., ensure the project does not make seawater intrusion worse). Available evidence supports that the approved project could easily do more harm than good, making the basin less sustainable and wasting a large sum of public funding in the process. This could lead to an environmental, social, and economic disaster. Thus, we do not believe the current project is worth the costs or risks.

   The tremendous unavoidable environmental and economic impacts from construction, in addition to the project's extremely serious potential environmental impacts, including its potential to cause seawater intrusion in the upper aquifer and harm habitat, per reviews by Eugene Yates and others, we've presented to the Board and other officials several times); outweigh the project's modest and uncertain benefits to the groundwater and the unsubstantiated (at best minor) benefits to the estuary.

   The DEIR does not set an objective for the project to improve estuary water or say that it will, while estuary water quality is within safe ranges and has been for years per NEP and SLOSEA reports. Furthermore, nitrates have reached equilibrium in the upper aquifer per a 2005 water quality report by Cleath-Harris and Associates. Nitrates in the upper aquifer average high drinking water standards now (10 mg/l per the EIR), and the project is estimated to reduce nitrates (the primary water quality objective of the project) by only 1.7 mg/l over 30 years. This estimate is not certain because it is based on basin modeling with uncertainties. Furthermore, purveyors are planning to treat the water for nitrates once it is pumped in the future. A "pump and treat" process is more cost effective for treating nitrates than a wastewater project. Several officials and official documents, including Supervisor Gibson and the Coastal Development Permit (CDP) for the project have said that the project is urgently needed to stop serious harm of the estuary. We have seen no evidence to support this, but we have seen evidence that the project could make seawater intrusion worse and harm habitat, in part, because the CDP defers mitigation calling for monitoring to address major potential groundwater impacts, (e.g., to the upper aquifer and to Willow Creek). Rather than defer mitigation, analyses should have been done to resolve substantial uncertainties per expert recommendations, various alternatives should have been reviewed, and specific mitigations (that ensure net benefits and maximize protection of resources) should have been required as conditions—which did not happen. As a result, it is not certain mitigation measures are adequate or even feasible to avoid net adverse impacts from the project.

   A decentralized project, we believe, provides the greatest benefits at the least cost, and simply treating the water for nitrates in lieu of a wastewater project may provide similar benefits, in conjunction with basin-wide water-use efficiency, septic system management, salt & nutrient management, and stormwater management plans. Implementing these management plans, with a decentralized project (including one that leaves some septic systems in place within the prohibition zone, possibly in a phased approach) could provide greater water supply-quality benefits with much less impact and risk to environmental, social, and economic resources. The accelerating seawater intrusion is much more likely to destroy the basin than nitrates. A project that minimized disruption to hydrologic regimes is necessary to minimize impacts and risks, while maximizing benefits.

7. **A feasible basin plan that ensures seawater intrusion will be reversed and the basin will be a sustainable sole-source water supply for the existing community has not been developed, reviewed, and approved**. Consequently, it cannot be assumed the basin will be a sustainable water supply for the community, or a wastewater project will provide long-term benefits. The ISJ working group (the County and water purveyors) was supposed to produce a management plan to address seawater intrusion, which we have not seen. (It was first supposed to be out by January of 2010, then by December of 2010, and now by spring of 2011.) Also, purveyors have control over only two-thirds of the water pumped in the basin, so the plan cannot not effectively address seawater intrusion because private well use must also be managed. The LOSG recommended that the County implement a basin-wide plan, in conjunction with the Regional Water Board, per LCP Watershed Policy 5, but supervisors declined to do so and the Coastal Commission did not require it. A plan and ordinance that sets the specific objective of reversing sweater intrusion within a few years, emphasizing water-use efficiency, is essential to sustaining the basin and ensuring any wastewater project is worth the money spent. Also, the potential costs of a purveyor basin management plan, and a County plan and ordinance (if implemented) must be factored in to analyses of project's social and economic impacts to determine alternative feasibility and appropriate mitigations. Eugene Yates supports further analysis and consideration of a wider range of options, given changes in basin and project conditions (see Yates reviews previously submitted). This has not been done.

8. **The lack of adequate information (as cited above), unresolved questions about project impacts (adverse and beneficial), inadequate analysis and no mitigations for social and economic impacts, inadequate review of alternatives to determine whether the project will do more good than harm and the most cost-effective, least risky options—also the fact citizens have been threatened with Water Board enforcement action if a project is delayed—all make the rates and charges assessment ordinance invalid.** Citizens cannot be expected to make decisions in their best interests under these circumstances.

We protest this ordinance and assessment, and request that you require the above analyses and processes to identify the most cost-effective project, which maximizes benefits while minimizing impacts and risks to environmental, social, and economic resources—ensuring scarce public funding is well spent.

Sincerely,

Keith Wimer
1101 14th Street, Los Osos, CA 93402

Attachments #1-#16 (30 pages)

RECEIVED
JULIE L. RODEWALD
COUNTY CLERK-RECORDER.
DEC 14 2010
BY____________
DEPUTY

Letter of Protest

SLO County Clerk/Recorders Office
1055 Monterey St. Suite D120
San Luis Obispo, CA 93408

I protest the San Luis Obispo County proposed Ordinance to impose Sewer Service Charges for the Los Osos Wastewater Project.

Property Owner Name Elizabeth W Weimer

Address 1101 14th St Los Osos CA 93402

APN # 038,072,041

X [signature] Date 12/8/10
Signature of Property Owner

RECEIVED
JULIE L. RODEWALD
COUNTY CLERK-RECORDER

DEC 14 2010

BY ____________
DEPUTY

#1 [handwritten initials]

Monthly Sewer and Sewer-Water Cost Estimates for Single-Family Homeowners

(Prepared by Keith Wimer using current water rates and LOWWP documents—see attached.)

	1st 218	Rts & Chrgs Ord/218	On-lot	Tot. Sewer	Tot. Sewer-Water
Low Water Use & Low On-lot Costs	$105	$63.93	$14.76	**$184**	**$ 202 -211**
Avg. Water Use & Avg. On-lot Costs	$105	$86.55	$ 48.36	**$240**	**$261-272**
High Water Use & Avg. On-lot Costs	$105	$139 and up	$48.36	**$292**	**$323-354**
High Water Use & High On-lot Costs	$105	$139 and up	$132.00	**$376**	**$407-438**

Notes:

1. Low Water Use assumes a one-person household using 50 gpcd (2 units) with on-lot costs of $1500. The range represents LOCSD costs vs. Golden State Water Co. costs.
2. Average Water Use assumes a 2.5-person household using 50 gpcd (5 units) and on-lot costs of $3,650, the average on-lot costs per the SRF Credit Application (p. 23—see attached)
3. High Water Use assumes a 6-person household using 50 gpcd (12 units) with on-lot costs of $10,000. **Water costs can be much higher depending on use, leakage, etc.**
4. Finance costs for low and high on-lot costs ($1500 and $10,000) are calculated as a percentage of finance costs for average on-lot costs, per the SRF Credit Application, p. 23—see attached).
5. **Elaine Watson contacted several contractors regarding on-lot costs, and everyone of them said costs would be substantially higher than County estimates.**
6. Total average capital costs (first and second columns of "average water use") are slightly lower than County estimates of ($191. 55 vs. $194) million, likely because a higher average household factor (e.g., 2.6 to 2.7) was used. Therefore, these calculations are conservative.
7. **Purveyors are currently developing a management plan to address seawater intrusion that will raise water costs significantly.**
8. **These estimates do not calculate potential reductions with undeveloped property owners contributing to sewer costs, for two reasons: 1) the serious seawater intrusion problem makes future development unlikely, and 2) undeveloped property owners are likely to pay sewer costs as development fees, so additional project funding will be spread out over many years. Any potential reduction in existing homeowner costs will most likely be offset by increasing sewer and water costs.**
9. Atlanta is widely cited as having the highest average sewer-water costs. Currently, Atlantans' average sewer-water bill is $120.82, expected to go up to $151.92 by 2012. By 2014, Los Osos water-sewer rates will easily be double Atlanta's rates and may be more than triple. (For Atlanta rates see "Atlanta water, sewer rates among the nation's highest" in the Atlanta Journal-Constitution, by searching "highest sewer rates" or going to http://www.ajc.com/news/atlanta/atlanta-water-sewer-rates-154647.html.

LOWWP Flier 11/2010

#2 (p.1 of 2)

Project Costs and Financing

Project Cost Estimates

The Project – which includes collection, treatment and treated effluent disposal – is estimated to cost $166M. Private property "on-lot" costs are additional and will be different for each property owner depending on existing septic systems and landscaping

The Project will be financed largely through low interest loans provided by public agencies such as the USDA and the State Water Board. We continue to pursue additional grants to reduce the level of borrowing.

To date, we have received commitments for a $83M loan and $4M grant from the USDA. This loan will be repaid over 40 years at an interest rate of 3.25%.

We have applied for the balance of financing through the State Revolving Fund (SRF) program of the State Water Board. SRF loan terms will be finalized once the service charge ordinance has been established. We are also pursuing other grant opportunities through the State Water Board program and other avenues, such as Integrated Regional Water Management (IRWM) grants administered by the California Department of Water Resources.

The loans will be repaid with two sources of revenue collected from properties connected to the Project – **property assessments** and **service charges**.

Property Assessments

In 2007, owners of **developed properties** approved total assessments of $127M for construction of the Project. Owners can pay their assessment in a lump some (and a few already have). Most property owners will pay over time as part of their property tax bills, and we currently estimate that a single family home assessment will cost about $1,260 per year (equivalent to $105/month).

Undeveloped properties were not assessed in 2007, because their ability to develop and connect to the Project was not assured due to existing water and habitat issues. The County continues to work to resolve these issues. Existing Project strategies adopted by the Board of Supervisors includes establishing a $27M assessment (or equivalent connection fees) for vacant parcels before the Project is completed in 2014. When new development is possible, **vacant properties will pay their share of Project costs before development occurs.** The County efforts to pursue assessments on undeveloped properties is a costs sharing strategy to "mitigate affordability issues" (per AB 2701)

Service Charges

Wastewater service charges will cover the loan repayments (also called unsecured debt) not covered by property assessments. Service charges will also include an amount necessary to pay for the operation, maintenance and repair of Project facilities, including normal administrative and other costs.

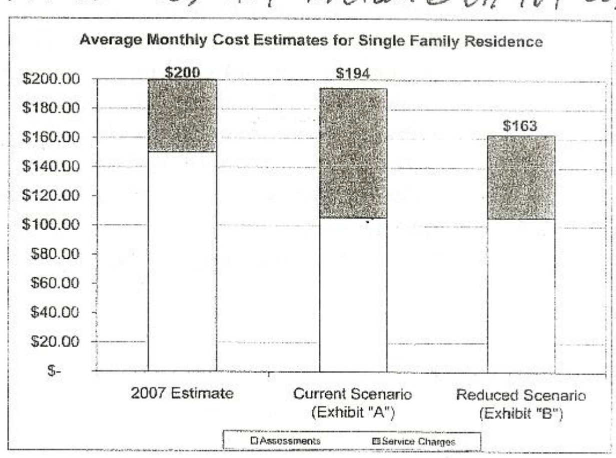
Total Monthly Cost

Avg. cost

The total wastewater system cost (assessments plus service charges) is shown in the bar graph. In 2007, we estimated that the average total household cost ~~would~~ be $200/month. Under the "current scenario" assumptions, we now estimate the average cost to be $194/month. When vacant properties are assessed, service charges will automatically drop and the "reduced scenario" average cost will be $163/month.

We should note that existing multi-family and mobile homes will have significantly lower costs than single family homes. For example, mobile homes would have total costs less than $100/month under either scenario.

*This does not include on-lot costs.



LOWWP Flier 11/2010

#2 (p.2 of 2)

Rates and Charges ("Service Charges")

The Service Charges Ordinance

The proposed service charges include a flat rate (minimum charge) and a variable portion based on the indoor water usage of each residence (which creates wastewater flows). The flat rate amount is related to construction loan repayment and the variable portion is related to operating costs. The variable component will allow residents who conserve water to reduce their service bills.

There are two rate structures in the service charges ordinance, listed as Exhibits "A" and "B."

- Exhibit "A" shows the initial rates needed to meet funding requirements under the current scenario.
- Exhibit "B" shows an automatic rate reduction that would occur when the Board of Supervisors has directed the collection of assessments or connection fees from undeveloped properties.
- **No service charges will actually be collected before the Project is operating in 2014.**

Service Charges Facts

- The California State Constitution specifies the procedures for approving an ordinance to establish the wastewater system service charges (Article XIII D, Prop. 218).
- Funding agencies require the adoption of the service charges ordinance now, before they will approve final funding.
- **State law does not allow the collection of service charges until the Project is operating; no sooner than 2014.**
- Establishing assessments or connection fees for undeveloped properties will trigger the automatic reduction in service charges.

Protests

Property owners who are subject to the service charges and wish to protest the charges may mail or deliver their written protests to the County at County Clerk/Recorder's Office, Attn: Clerk of the Board, 1055 Monterey St. Suite D120, San Luis Obispo, CA 93408 in a manner that ensures receipt by the County no later than the close of the public hearing on December 14, 2010. Property owners may also present or withdraw written protests at the hearing on December 14, 2010. The formal legal notice was mailed on October 29, 2010 and can be found on the Project website.

Minimum rate; assumes 50 gpcd

Wastewater Service Charges (Monthly Equivalent)

Exhibit "A" Rates

Monthly Usage (Units)	Typical Occupants	Single Family	Multi Family	Mobile Home	Non-residential
0 (Min. Charge)		$48.85	$36.64	$24.44	$61.13
2	1	$63.93	$51.72	$39.52	$76.21
4	2	$79.01	$66.80	$54.60	$91.29
6	3	$94.09	$81.88	$69.68	$106.37
8	4	$109.17	$96.96	$84.76	$121.45
10	5	$124.25	$112.04	$99.84	$136.53
12	6	$139.33	$127.12	$114.92	$151.61

Not the maximum rate

Exhibit "B" Rates

Monthly Usage (Units)	Typical Occupants	Single Family	Multi Family	Mobile Home	Non-residential
0 (Min. Charge)		$17.19	$12.90	$8.60	$21.51
2	1	$32.27	$27.98	$23.68	$36.59
4	2	$47.35	$43.06	$38.76	$51.67
6	3	$62.43	$58.14	$53.84	$66.75
8	4	$77.51	$73.22	$68.92	$81.83
10	5	$92.59	$88.30	$84.00	$96.91
12	6	$107.67	$103.38	$99.08	$111.99

Note: one (1) unit = 748 gallons

#48 (p.1 of 2)

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

8.1. RECOMMENDATIONS FOR ADDRESSING AFFORDABILITY CHALLENGES

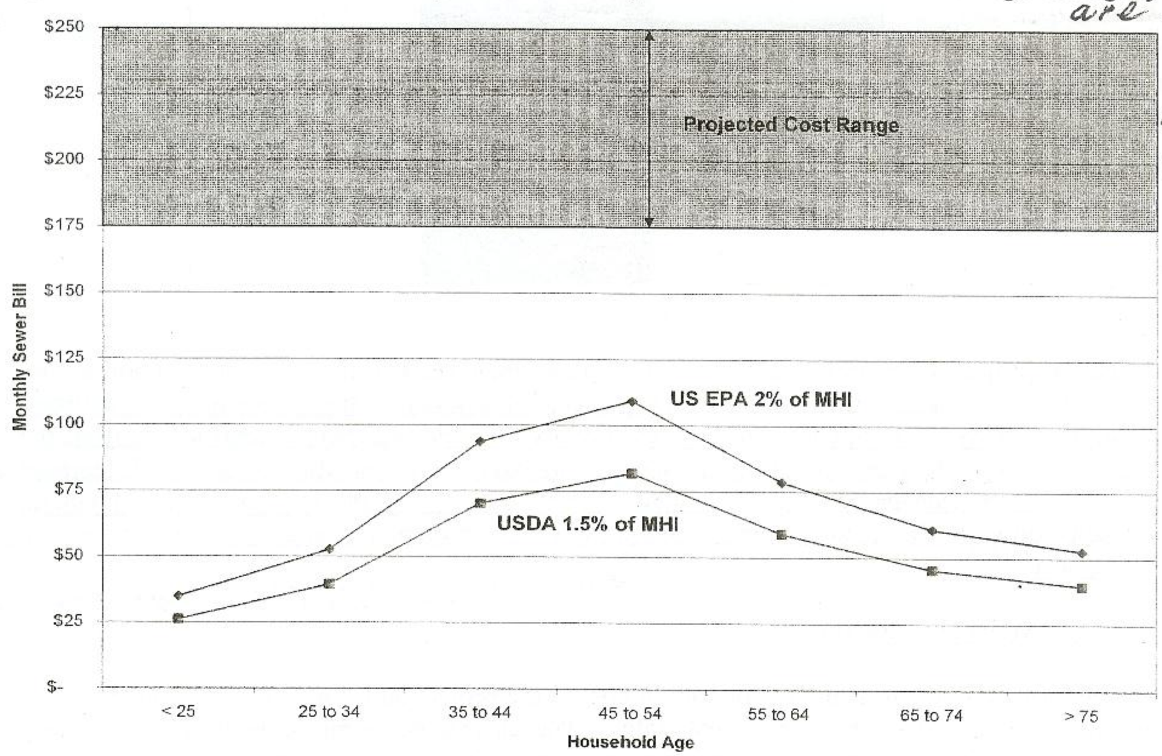
Project affordability has been a major challenge for the project since planning efforts began in 1983, following the Regional Water Quality Control Board's mandate to cease septic tank discharges in the majority of Los Osos. The lack of existing wastewater infrastructure requires that the community construct all of the necessary facilities for collection, treatment, and effluent reuse or disposal at one time. The large capital expenditure, plus ongoing operational costs and individual on-lot connection costs result in a total project cost that far exceeds any affordability standard in the moderate income community of Los Osos.

Financing — Adjusted to about $240 under current scenario.

The County has evaluated project affordability as part of its overall project planning and feasibility review. Without financial assistance, the total project costs are projected to exceed $250 per month for a typical, single family residence, which is more than 6% of the median household income (MHI) on an annual basis. The costs will be especially challenging for Los Osos where 33% of households receive Social Security income (50% higher than the statewide average), an indicator of fixed-income retirees. *

Could be higher currently because median incomes are likely to have dropped (see ERS/USDA data attached)

Figure 8.1. Los Osos Affordability Thresholds by 2000 Census Household Age Category



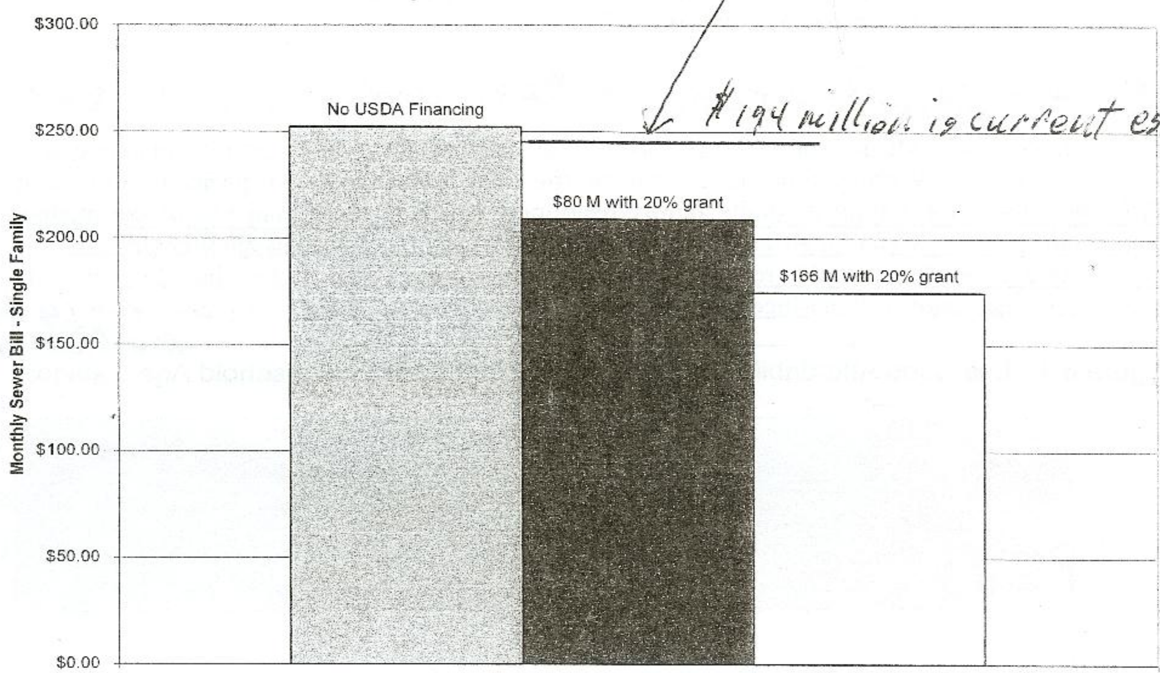
Attachment 28 Page 12

#4 (p. 2 of 2)

The overall affordability impact of the project can be greatly reduced with favorable financing from the USDA Rural Development Program. USDA financing of $80 million, that includes a 20% grant component, will reduce the estimated costs for a typical single family residence by approximately $43 per month. A project that is fully funded by the USDA, including a 20% grant component, would reduce costs by an estimated $77 per month. This is more than a 30% savings over the estimated project costs without financial assistance and a substantial benefit to the community.

4.5% grant for $4 million was provided, not $16 million

Figure 8.2 Benefits of Favorable USDA Financing



Mitigating project affordability impacts with USDA financing is only a first step in addressing the challenge. The County is also seeking financial assistance from several other sources, including extended term loans from the State Revolving Fund program, federal grants from the Water Resources Development Act, and state grants from the Proposition 50 and 84 Integrated Regional Water Management funds. Finally, the County is seeking to implement a financial assistance program for disadvantaged individuals in the community who are unable to afford the project costs.

These have not materialized

Collection System Contracting

Construction contracting is the major capital cost of the project and it may be possible to realize significant savings over the current estimates. The current economic downturn has severely affected the California construction industry resulting in a highly competitive bidding climate.

#5 JR

CCC. On January 16, 2010, [sic] the Commission determined that a substantial issue was raised by the appeal. Consequently, the final determination of the project's consistency with the California Coastal Management Program will not occur until the Commission takes further action on the CDP. Nevertheless, for purposes of related federal consistency review of the federal agency (USDA) continuing to fund the project, we have determined that the funding decision may appropriately be separated from and may precede the final CDP action, and that the ultimate CDP action will fully address any issues raised over the project's protection of coastal resources and consistency with the CCMP"

The project is considered consistent with the California Coastal Management Program for federal funding purposes and the Commission's final decision on the CDP will, by definition, confirm this finding.

3.8 Socio-Economic Issues/Environmental Justice

This section addresses any potential socio-economic and environmental justice concerns by describing the affected environment, environmental consequences and any potential mitigation measures that may be necessary to avoid or minimize any effects caused by the LOWWP. The completed form RECD 2006-38, "Civil Rights Impact Analysis Certification" is attached in Appendix C, C-109.

3.8.1 Affected Environment

This section addresses affected environmental resources associated with socio-economic issues and environmental justice.

3.8.1.1 Socio-Economic Issues

According to 2007 demographic data for Los Osos, 14,635 residents live within the Community of Los Osos. Income levels based on Federal Housing and Urban Development Department standards are defined as: very low income (up to $20,200), lower income (from $20,200 to $32,300), median income (from $32,400 to $40,400), and moderate income ($40,500 to $48,500). Minority individuals are considered members of those races that are non-white. Table 3.8-1 shows the demographic data for the community. As shown, households with low incomes represent 24.6 percent of the community, while minority populations represent 15.6 percent of the community.

If median and below is defined a "low" 40% - 50% of Los Osos families would fall into "low" category (see p. 7 SRF Credit Review attached).

Table 3.8-1 Demographic Information for the Community of Los Osos.

Income		Race	
Low	Moderate/High	White	Minority
24.6%	75.4%	88.4%	15.6%

Note:
3.5 mile radius encompassing and centered on the residential component of the community, based on County of San Luis Obispo Interactive GIS Mapping 2007

? (see note)

Attachment 28 Page 14

#6

USDA United States Department of Agriculture
Economic Research Service
The Economics of Food, Farming, Natural Resources, and Rural America

Briefing Rooms

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- Diet, Health, & Safety
- Farm Economy
- Farm Practices & Management
- Food & Nutrition Assistance
- Food Sector
- Natural Resources & Environment
- Policy Topics
- Research & Productivity
- Rural Economy
- Trade & International Markets

Rural Income, Poverty, and Welfare: Income and Nonfarm Earnings

Median household income fell significantly in both rural and urban areas between 2007 and 2008, reflecting the effects of the national economic recession that started in December 2007. After adjusting for inflation, the money income of the typical nonmetro household fell by 3.3 percent, compared to a 3.7-percent drop in metro areas. In nonmetro areas, median household income in 2008 was about the same as it had been in 2000, while in metro areas it has fallen to about $4,000 below its 2000 level. Median household income in nonmetro areas now stands at 78.7 percent of the metro median, although the generally lower cost of living in rural areas may narrow this gap in real terms.

*

Median incomes dropped since 2000.

Total per capita income in 2008—including all cash income as well as the cash value of in-kind public assistance benefits such as food stamps and medical services—is likewise lower for nonmetro than metro residents. However, nonmetro residents receive more transfer payments (see also the chapter on transfer payments), in large part reflecting the higher Medicare and Medicaid expenses associated with an older population.

Household money income by residence, 2000-08 (2008 dollars)

Year	Nonmetro		Metro		Nonmetro as percentage of metro (%)
	Median household income ($)	Change from previous year (%)	Median household income ($)	Change from previous year (%)	
2008	40,785	-3.3*	51,853	-3.7	78.7
2007	42,176	3.1	53,823	-0.4	78.4
2006	40,892	-1.3	54,052	1.1	75.7
2005	41,429	NA	53,462	NA	77.5
2004	NA	NA	NA	NA	NA
2003	41,105	-0.9	53,921	-0.5	76.2
2002	41,498	1.6	54,195	-1.5	76.6
2001	40,864	0.7	54,993	-1.6	74.3
2000	41,145	NA	55,873	NA	73.6

*Indicates a statistically significant change in median income, at the 90-percent confidence level.
NA = Not available.
Note: Estimates for 2004 are not available because the definition of metropolitan areas changed during the course of that year. The post-2004 estimates reflect the new metro/nonmetro definitions.
Source: Calculated by ERS using data from the Annual Social and Economic Supplement (ASEC) to the Current Population Survey, U.S. Census Bureau.

Sources of per capita income, 2008

Final Fine Screening Report
Aug. 2007

#7 (p. 1 of 2)

The environmental and economic consequences of energy consumption will be given special consideration to develop projects where they are minimized. In Addition, options for individual homeowners to help mitigate the environmental and economic impact of the wastewater project include gray water systems, rain water catchment in existing septic tanks, water conserving landscape, and solar power to offset additional energy consumption.

1.3 FLOW PROJECTIONS

Estimates of the projected wastewater flows and loads were outlined in the Rough Screening Report. The load estimates have not changed, but the flows estimates have been further reviewed in this report due to increased estimates of Inflow/Infiltration. The estimate for the dry weather flow at buildout without conservation remains at 1.2 MGD.

Inflow/infiltration (I/I) estimates for the collection system alternatives were the main source of uncertainty in calculating the future treatment facility influent flow volume. If a STEP/STEG collection system is selected it is anticipated that there will be minimal I/I since the system is sealed and under pressure. If a gravity collection system is selected, only a system that was constructed of fusion-welded PVC piping could be operated with as little I/I as a STEP/STEG system. However, fusion welded PVC sewers are a new technology with little long-term operating history, and can be significantly more costly to install than traditional bell-and-spigot gravity sewers.

Properly installed bell-and-spigot sewers will be watertight at first, and then slowly lose their integrity as the surrounding soils shift, compressing the pipes, and compromising their seals at the joints. The water-tightness of a bell-and-spigot sewer can be preserved if a maintenance program is conducted on an ongoing basis to detect and repair leaks. This program would add to the cost of a gravity sewer compared to a STEP/STEG sewer with similar levels of I/I.

Attempting to keep leaks to very low levels, especially over time, is very costly.

As discussed in the Rough Screening Report, previous studies used standard collection system textbook models[1] to estimate the I/I per mile per inch diameter of pipe of gravity sewer. The total predicted I/I of the system was divided by the estimated population in order to calculate the projected I/I per capita. During wet weather, a conservative estimate for a conventional system I/I of 17 gpcd was given, which corresponded to a total potential wet weather flow of 1.5 MGD for Los Osos. However, it was pointed out that the true value would probably be much lower due to the sandy soils in the region that tend to direct water past a pipe and trench, and due to the presumed water-tightness of a new collection system. Using the textbook models, Montgomery Watson Americas, Inc., anticipated that

[1] From *Wastewater Engineering, Collection and Pumping of Wastewater*, Metcalf and Eddy (1981), and *Gravity Sanitary Sewer Design and Construction*, American Society of Civil Engineers (1982).

Final File Screening Report #7 (p. 2 of 2)
Aug. 2007

3.2.3 O&M Cost

3.2.3.1 Gravity Collection System

Table 3.19 shows the estimated O&M costs for a gravity collection system. The estimated O&M includes labor, power, and equipment maintenance. The Basis of Cost Evaluation Technical Memorandum is included in Appendix C.

Table 3.19 Estimated O&M Costs for Gravity Collection System
Los Osos Wastewater Project Development
San Luis Obispo County

Item	Units	Quantity	Unit Price ($)	Annual O&M ($)
Labor	Hrs/year	4,160[1]	40[2]	170,000
Power	Kwh/year	500,000[3]	0.12[2]	60,000
Equipment Maintenance/Replacement	%/year	2	Pump Station Power Facility and Misc Facility Requirements Construction Cost	250,000
TOTAL O&M COST[4]				$480,000

2007 estimate

Notes:
(1) Based on 2 full-time employees and 2,080 hours per year.
(2) From Basis of Cost Evaluation Technical Memorandum.
(3) Based on energy required to convey 1.4 mgd to an out-of-town treatment facility.
(4) Septic hauling costs for homes outside of the Prohibition Zone are not included.

3.2.3.2 STEP/STEG Collection System

Table 3.20 shows the estimated O&M costs for a STEP collection system.

3.3 ENVIRONMENTAL/PERMITTING CONSIDERATIONS

Collection system analysis is for two types; conventional gravity and STEP/STEG. Both collection systems include over 45 miles of pipelines in most streets and approximately 5,000 lateral lines to collected properties. Gravity also includes pump/lift stations, and power standby facilities. Both systems require abandonment of existing septic systems. STEP/STEG includes installation of new septic systems at each collected property. The environmental issues are divided between the two systems.

3.3.1 Gravity Collection System Considerations

- Roadway disruptions during construction for up to two weeks for each block requiring sewer mains. Traffic is rerouted and access to individual homes is constrained. Careful noticing will be required.

#8 (p. 1 of 2)

1.2. OPERATIONS AND MAINTENANCE (O&M) COSTS

2010

The following tables show estimated O&M costs for labor, power, and equipment maintenance/replacement. Total project O&M costs are summarized in Table 1.7. Additional reserves for capital replacement costs for short-lived assets (15 years or less) are estimated at $200,000 per year. Details of short-lived asset replacement costs are provided as Attachment A-Item 1. The cost basis for the collection system was developed in the Fine Screening Report.

Table 1.2 Estimated Annual O&M Costs for Gravity Collection System

Item	Units	Quantity	Unit Price ($)	Annual O&M ($)
Labor	Hrs/year	4,160(1)	40(2)	170,000
Power	Kwh/year	500,000(3)	0.12(2)	60,000
Equipment Maintenance/Replacement				200,000
TOTAL O&M COST(4)				**$430,000**

Notes:
(1) Based on 2 full-time employees and 2,080 hours per year.
(2) From Basis of Cost Evaluation Technical Memorandum.
(3) Based on energy required to convey 1.4 mgd to an out-of-town treatment facility.
(4) Septic hauling costs for homes outside of the Prohibition Zone are not included.

This should have increased w/ maintenance designed to reduce leaks to very low levels, and it will increase over time — thus, it appears to be under-funded.

Annual O&M costs for each of the treatment alternatives were developed in the Fine Screening Report and estimated for the following categories based on BioTran© modeling of unit process requirements.

- Labor
- Power
- Maintenance/ Equipment Replacement
- Allowances—Includes chemicals and screenings and grit disposal where applicable
- Unit cost curves for tertiary treatment per MGD

Table 1.3 Estimated Annual O&M Costs for Treatment Process

Item	Units	Quantity	Unit Price ($)	Annual O&M ($)
Labor	Hrs/year	5,200	60(1)	310,000
Power	Kwh/year	900,000	0.12(2)	110,000
Equipment Maintenance/Replacement				75,000
Allowances				50,000
Tertiary Filter O&M				100,000
TOTAL O&M COST				**$645,000**

Notes:
(1) Labor costs are based on an average $60 hourly rate, including direct and indirect costs.
(2) Power costs based on $0.12 per kWh electrical rate.

#8 (p.2 of 2)

ITEM 3: Median Household Income (MHI) for the Project Service Area

3.1. ECONOMIC DEMOGRAPHICS

The community of Los Osos is a predominantly residential community of 14,251 residents (U.S. Census 2000) located along the central Coast of California on the southern edge of Morro Bay in San Luis Obispo County. It is combined with Baywood Park to form the Census designated place of Baywood-Los Osos. There is a small business district concentrated over just a few blocks along Los Osos Valley Road on the southeast side of the town, with several additional shops servicing the Baywood section of Los Osos. The remaining sections of town are almost entirely residential. There is no heavy or light industry within Los Osos.

Employment status for the active members of the labor force is provided in Table 3.1. In Year 1999, there were 11,538 residents aged 16 years or older; 7,250 (68%) of which were active within the labor force.

Table 3.2 provides statistical data on Year 1999 income per household within the community of Los Osos. Median household income is shown as **$46,558**. A total of 190 families and 1,205 individuals were living below the poverty level in Year 1999.

Likely to be more

Table 3.1 Employment Status – Los Osos, CA[1]

Occupation	Number	Percent
Management, professional, and related occupations	2,660	38.4
Service Occupations	1,258	18.2
Sales and office occupations	1,657	23.9
Farming, fishing, and forestry occupations	73	1.1
Construction, extraction, and maintenance occupations	654	9.4
Production, transportation, and material moving occupations	629	9.1
Armed Forces	28	0.2
Unemployed	291	2.5
Total	**7,250**	**68**

[1] U.S. Bureau of the Census, Census 2000

If incomes below the MHI are defined as "low," 40-50% are in the "low" category (see USDA environmental report, p. 12 attached)

Table 3.2 Household Income – Los Osos, CA[1]

Income Range	Number	Percent
Households	5,908	100
Less than $10,000	296	5.0
$10,000 to $14,999	322	5.5
$15,000 to $24,999	793	13.4
$25,000 to $34,999	791	13.4
$35,000 to $49,999	914	15.5
$50,000 to $74,999	1,269	21.5
$75,000 to $99,999	792	13.4
$100,000 to $149,000	484	8.2
$150,000 to $199,999	100	1.7
$200,000 or more	147	2.5
Median Household Income	**$46,558**	--

[1] U.S. Bureau of the Census, Census 2000

Likely to be less (see ERS/USDA data report for 2008 attached).

LOWWP Rates and Charges Ordinance #9

in the same manner and at the same time as ordinary County ad valorem taxes are collected as specifically set forth in Health and Safety Code section 5473 and Chapter 3.22 of the San Luis Obispo County Code, and are subject to the same penalties and the same procedures and sale in case of delinquency as provided for such taxes.

SECTION 7: Direct Billing. If for any reason the full amount of any sewer service charges are not collected in accordance with the provisions of Section 6 of this Ordinance, the sewer service charges, or the portion thereof not appearing on the tax roll, will be collected by direct billing of the property owner, as provided in this Section. The provisions of this Section will also apply to sewer service charges accruing after a new connection to the County's wastewater facilities, in which case the annual charge will be prorated over the period of time from the date of the new connection to the end of the fiscal year.

A. Billing. The County will ascertain the amount of each sewer service charge applicable to such property and will mail to the owner after the date any sewer service charges become due and payable, a bill for the sewer service charges that are then due and payable. The bill will be mailed to the person or persons listed as the owner on the last equalized assessment roll of the County of San Luis Obispo at the address shown on the assessment roll, or to the successor in interest and/or the lessee of such owner, if the name and address of any successor in interest or lessee is known to the County. Each bill will contain a statement that a delinquency in payment for sixty (60) days constitutes a lien on the parcel against which the charge is imposed and that when recorded the lien will have the force, effect and priority of a judgment lien for three (3) years unless sooner released or otherwise discharged. Failure of the County to mail any bill or failure of owner to receive such a bill does not excuse the owner from the obligation of paying sewer service charges for premises owned by him or her. *

B. How Payable. Each sewer service charge to be collected by direct billing is due and payable in full at the time of billing or at the time specified in the bill.

C. Delinquency Date of Sewer Service Charges. Each sewer service charge is delinquent if not paid on or before the thirtieth (30th) day of the month following the date upon which the sewer service charge became due and payable.

D. Penalties for Non-Payment of Sewer Service Charges – Lien. Whenever a delinquency occurs for non-payment of sewer service charges, a penalty of ten (10) percent attaches to the charges, and for each month that any portion of the charges remain delinquent, a further penalty of one and one-half (1-1/2) percent of the unpaid charge is added.

SECTION 8: This ordinance shall take effect and be in full force and effect thirty (30) days after its passage and before the expiration of fifteen (15) days after passage of this ordinance, it shall be published once with the names of the members of the Board of Supervisors voting for and against the ordinance in a newspaper of general circulation published in the County of San Luis Obispo, State of California.

Impacts on Other Funds / Other County Work LOWWP Oct. 2010 update (Staff report)

The Budget adjustment recommends a corresponding reduction in the General Fund contribution to Roads. The following is a summary of the Project's preliminary funding:

#10

	From the County General Fund	From the County General Fund via reductions in General Fund Contributions to Roads	From the General Fund via Reductions in Services to Special Districts
Prior Approvals	$6,000,000	$1,250,000	$200,000
Current Recommendation	0	$750,000	0
Total	$6,000,000	$2,000,000	$200,000.

When this is reimbursed, will there be enough money to restore roads?

The increase in the Project budget and the corresponding reduction in General Fund contributions to Roads will not negatively impact the pavement management projects that are recommended for current Board approval (also on the agenda for October 5, 2010). In addition, Pavement Management funds of approximately $3.0 M will be available for the 2011 Pavement Management spring contract. A table listing Roads priorities for the Pavement Management system is included at the end of this section. Since interim funding can be anticipated in 2011, the reduction in General Fund support for Roads will be replenished in 2011.

At previous Project updates, staff had verbally indicated that the reimbursement of funds, once re-appropriated to Roads, will need to include serious consideration for allocation to Los Osos. The level of deferred maintenance for Los Osos has been significant while the LOCSD went through its project efforts, and during the past four years since the approval of AB 2701. In addition, the County's Roads fund cannot expect the wastewater Project alone will repave all the roads impacted by the collection system. The issue of proper road repair after installation of the Project's collection system is the same one encountered when utilities (such as the Gas Company) do work in public rights of way. Clearly no project should be required to do more than its share to repair roads that have deteriorated because maintenance has been deferred. Public Works staff is analyzing the nexus and proportionality issues to determine an appropriate plan for financing and executing the rehabilitation of roads in Los Osos.

In order to address the Project's impacts on County Roads, and the Project's physical and/or financial requirements to mitigate the impacts is currently being evaluated by the Transportation and Roads staff within the Department. The additional funding that should be provided by the Roads fund, to ensure that the roads are restored after the Project is complete, is also being evaluated. *

#11 JR

Recommended LOWWP Cost Containment Measures

From K. Wimer letter to Board of Supervisors, May 17, 2010, "Subject: Questions/concerns relating to escalating LOWWP project costs and the Rates and Charges Proposition 218 Assessment process approved by your Board on April 27, 2010"

Please identify which of the following cost reduction/containment measures will be put into place (and why a particular measure will not be implemented, if it will not).

1. A cap on project costs at contractor bid amounts (i.e., no change orders) (This helps assure bids are truly competitive, i.e., what you see is what you get.)
2. A performance bond for 100% of the cost of a particular project component (e.g., the collection system component) to complete construction of the component if contractors fail to perform.
3. A performance metrics that requires contractors to meet high standards of performance, which includes rigorous testing and inspection procedures for installation and materials.
4. Technical and delivery performance incentives, which reward or penalized a contractor for performing above or below established baseline performance levels. (We've attached an incentive structure used by Northrop Grumman to encourage both technical and timeline performance.)
5. A warranty for 5-10 years on all materials and workmanship (or a maintenance contract for the same period of time).
6. A cap on County administration costs upfront.
7. An independent audit/review (initially and ongoing) to assure project expenditures and timelines stay on track (and waste is kept to a minimum).
8. Contractors are allowed to submit design-build proposals that integrate more than one project component (e.g., collection, treatment, and recycled water reuse) to reduce administration/design costs and promote innovative designs and solutions.
9. Montgomery Watson Americas is excluded from the bidding process. A New Orleans Inspector General's report is reason enough to exclude the firm from the RFP process (e.g., with a condition excluding companies with certain types of complaints filed against them).
10. STEP/STEG is allowed to compete in the design-build bidding process.

Attachment #29

LCP Coastal Watershed Policy #1: "Preservation of Groundwater Basins" "The long-term integrity of groundwater basins within the coastal zone shall be protected. The safe yield of the groundwater basin, including return and retained water, shall not be exceeded except as part of a conjunctive use or resource management program which assures that the biological productivity of aquatic habitats are not significantly adversely impacted."

LCP Environmentally Sensitive Habitat Policy #2 "As a condition of permit approval, the applicant is required to demonstrate that there will be no significant impact on sensitive habitats and that proposed development or activities will be consistent with the biological continuance of the habitat.

LCP Coastal Watershed Policy #3: "Monitoring of Resources"
In basins where extractions are approaching groundwater limitations, the county shall require applicants to install monitoring devices and participate in water monitoring management programs.

LCP Coastal Watershed Policy #5: "Los Osos Groundwater Management"
The county Planning and Engineering Departments should work with communities, property owners and the Regional Water Quality Control Board to develop and implement a basin-wide water management program for the Los Osos groundwater basin which addresses:
-existing and potential agricultural demand
-urban expansion in relation to water availability
- groundwater quality
-possible need for alternative liquid waste disposal
-protection of aquatic habitats including coastal waters, streams and wetlands.
The Resource Management System of the Land Use Element provides a framework for implementing this policy and an interim alert process for timely identification of potential resource deficiencies, so that sufficient lead time is allowed for correcting or avoiding a problem."

LCP Environmentally Sensitive Habitat Policy #7: "Coastal wetlands are recognized as environmentally sensitive habitat areas. The natural ecological functioning and productivity of wetlands and estuaries shall be protected, preserved and where feasible, restored."

Attachment #30

http://www.werf.org/AM/Template.cfm?Section=Climate_Change&TEMPLATE=/CM/ContentDisplay.cfm&CONTENTID=15260

Study Finds Methane Emissions from Septic Systems Lower than Previous Estimates

View the Report

Evaluation of Greenhouse Gas Emissions from Septic Systems (DEC1R09)

Findings from a recently completed WERF research study show that greenhouse gas (GHG) emissions from septic tanks may be significantly lower than previous estimates. The project, *Evaluation of Greenhouse Gas Emissions from Septic Systems* (DEC1R09), found that emission rates for methane were roughly half of current estimates outlined under the Intergovernmental Panel on Climate Change's (IPPC's) Guidelines for National Greenhouse Gas Inventories.

Although the wastewater sector is not a major source of GHG emissions, the project's findings are of significant interest to the wastewater treatment community. Prior estimates by the U.S. Environmental Protection Agency, which relied on assumptions under the IPPC's GHG inventories, suggest that 80 percent of the wastewater sector's methane emissions are from septic systems. However, the IPPC methodology assumes that all wastewater carbon in anaerobic systems converts to methane, and that all methane produced enters the atmosphere. This runs counter to prior findings on GHG emissions from septic systems, leaving the actual levels of methane production in question.

This research effort, led by a team from the University of California-Davis, collected more accurate data on GHG emissions from septic tank systems, focusing on methane emissions from conventional septic tanks. Researchers collected gas samples using flux chambers to capture gases from the tank contents, and applied field methods to determine the rate of GHG emission rates from tanks, vents, and soil dispersal systems. Greenhouse gases, methane and carbon dioxide, were found in emissions from the septic tank, while carbon dioxide and nitrous oxide were observed in the system vents but not above ground through the soil dispersal system.

The CO2 equivalent GHG emission rates from septic tank systems (see table below) were determined using either the flux chamber or mass balance methods and were found to be relatively low compared to U.S. EPA estimates for a citizen of an industrialized country (about 23.2 ton CO2e/capita•year).

The project, which collected thousands of data points, is the largest study to date of GHG emissions from septic systems. Although these findings are significant, they are not new. The project uncovered literature that is consistent to the U.C. Davis study, some of it going back to as early as 1910. For more information on this project, contact WERF Program Director Lauren Fillmore.

Attachment #31

United States Environmental Protection Agency

EPA841-R-10-002
May 12, 2010

Guidance for Federal Land Management in the Chesapeake Bay Watershed

Chapter 6. Decentralized Wastewater Treatment Systems

Nonpoint Source Pollution
Office of Wetlands, Oceans, and Watersheds
U.S. Environmental Protection Agency

Chapter 6. Decentralized Wastewater Treatment Systems

Contents

1 Nitrogen-Reduction Implementation Measures

The U.S. Environmental Protection Agency (EPA) recommends protecting surface waters in the Chesapeake Bay watershed from nitrogen (N) discharged by decentralized wastewater treatment systems by using N-reduction technologies and enhanced system management.

Implementation Measures:

D-1. Specify the following risk-based, N-removal performance levels for all new and replacement individual and cluster systems:

- 20 milligrams per liter (mg/L) total nitrogen (TN) standard* for all new subdivisions and commercial and institutional developments and all system replacements throughout the Chesapeake Bay watershed.
- 10 mg/L TN standard* for all new developments and all system replacements in sensitive areas—i.e., between 200 and 1,000 feet of the ordinary high water mark of all surface waters, or between 200 and 500 feet of an open-channel MS4.
- 5 mg/L TN standard* for all new developments and system replacements in more sensitive areas—i.e., between 100 and 200 feet of the ordinary high water mark of all surface waters, or between 100 and 200 feet of an open-channel MS4.
- 100-foot setback from surface waters and open channel MS4s for all effluent dispersal system components.

> * Effluent standards can be met by either system design or performance, as verified by third-party design review or field verification. Except in sandy or loamy sand soils, a 5 mg/L N reduction credit is given when using time-dosed, pressurized effluent dispersal within 1 foot of the ground surface and more than 1.5 feet above a limiting soil/bedrock condition.

D-2. Ensure wastewater treatment performance effectiveness and cost efficiency by using cluster systems with advanced N-removal technology sufficient to meet the standards specified above for all newly developed communities and densely populated areas.

D-3. Sustain treatment system performance in perpetuity through management contracts with trained and certified operators for all advanced N-removal systems, and responsible management entity (RME) operation and maintenance (O&M) for all cluster and nonresidential systems. RMEs include sanitation districts, special districts, and other public or private entities with the technical, managerial, and financial capacity to assure long-term system performance.

D-4. Preserve long-term treatment system performance with management practices designed to protect system investments, by doing the following:

- Conducting GIS-based inventories of all individual and cluster (i.e., decentralized) wastewater systems in all areas that drain into the Chesapeake Bay or its tributaries. Inventory information includes system location (i.e., latitude/longitude), type, capacity, installation date, owner, and relevant information on complaints, service (including tank pump-out), repairs, inspections, and dates. Inventory data is stored electronically in a format amenable for use in watershed studies, system impacts analyses, and supporting general management tasks. EPA offers *The Wastewater Information System Tool* (TWIST) (USEPA 2006) as a free resource for managing that information in a user-friendly database. Health departments, state agencies, RMEs and others can adapt, amend, or otherwise modify TWIST without restriction or obligation.
- Requiring inspections for all systems on a schedule according to wastewater type, system size, complexity, location, and relative environmental risk. At a minimum, qualified inspectors inspect all systems at least once every 5 years and inspect existing systems within sensitive areas at least once every 3 years. Inspect advanced treatment systems, cluster systems, and those serving commercial, institutional, or industrial facilities at least semiannually and manage such systems under an O&M agreement or by an RME. Inspections are consistent with EPA management guidelines for individual and cluster systems. A service professional or other trained personnel conducts routine monitoring of all systems, and periodic effluent sampling for cluster and nonresidential systems, on the basis of system type, operating history, manufacturer's recommendations, and other relevant factors.
- Repairing or replacing all malfunctioning systems when discovered, with new or replacement technologies capable of meeting the N-removal standards specified above.
- Requiring reserve areas for installing a replacement soil dispersal system that is equal to at least 100 percent of the size of the original effluent

dispersal area. Treatment systems using effluent time-dosing (i.e., not demand-dosing) to the soil can have reserve areas equal to at least 75 percent of the total required drainfield area. Systems with pressurized drip effluent dosing or shallow pressurized effluent dispersal and those with dual drainfields operated on active/rest cycles (i.e., alternating drainfields) can have reserve areas equal to at least 50 percent of the original required dispersal area.

D-5. Remove nitrate in subsurface effluent plumes that enter surface waters by using effective, low-cost technologies such as permeable reactive barriers (PRBs). PRBs are low-cost, pH-controlled trenches filled with sand and a degradable carbon source, such as sawdust, shredded newspaper, or wood chips, designed to intercept groundwater plumes and reduce the TN concentration via denitrification.

2 Introduction and Background

Individual on-site and cluster (*decentralized*) wastewater systems treat household and commercial wastes in suburban, exurban, and rural areas throughout the Chesapeake Bay watershed. The Chesapeake Bay Program (USEPA 2009) estimates that about 25 percent of the homes in the watershed—2.3 million total—rely on these systems, which disperse treated effluent to the soil. EPA predicts that decentralized system installations will increase over the next 20 years by about 35 percent (i.e., 800,000 new systems), eventually reaching 3.1 million (USEPA 2009).

Nearly all the solids and phosphorus (P) discharged from decentralized wastewater systems are retained by the soil, through physical filtration, adsorption, and precipitation processes (USEPA 2004), although release of P into the environment is a concern in sandy soils under certain conditions, especially with poor vertical separation distance with groundwater (Bussey 1996). However, N in wastewater is ultimately converted to nitrate upon infiltration into aerobic soils, a stable, soluble, and highly mobile form of this nutrient that negatively affects groundwater and surface water quality. For those reasons, in this guidance EPA focuses on implementation measures to reduce N.

Decentralized wastewater systems contribute approximately 12.5 million pounds of N to the Chesapeake Bay annually, or about 4.5 percent of the total load. According to current Chesapeake Bay nutrient loading models, most of the N load from such systems—about 60 percent—comes from the Potomac and Susquehanna river drainage areas within Pennsylvania, Virginia, and Maryland. With 800,000 new systems predicted over the next 15 years, significant reductions in N loads from new and existing systems are needed.

The Chesapeake Bay nutrient and sediment reduction goals include decreases in current and future pollutant loads from decentralized treatment systems. A new generation of “hardware and software”—treatment technologies and management practices—are needed to achieve the reductions. This section describes those technologies, management practices, and associated implementation measures. Implementation measures for achieving the reductions include installing treatment units with optimal N-removal capabilities in sensitive areas near surface waters; using standard N removal systems in other areas; and ensuring that all treatment systems are appropriately operated, maintained, and managed. The measures encompass a range of treatment technologies, planning and performance considerations, and management actions needed to address N export from decentralized systems.

The implementation measures described in this chapter support two primary goals for addressing N inputs to the Chesapeake Bay from these systems:

- Prevent further impairment of the Chesapeake Bay by significantly reducing N levels in wastewater from new residential, commercial, and institutional developments using decentralized systems
- Reduce N inputs to the Chesapeake Bay from existing individual and cluster wastewater systems by replacing malfunctioning systems with better-performing technologies and by managing all systems to ensure long term performance

Implementation measures to achieve those goals include repairing or replacing malfunctioning systems, targeting high-risk systems in sensitive areas for replacement with advanced treatment units, clustering replacement systems where possible to implement better-performing and more efficient community treatment facilities, inspecting all systems throughout the Chesapeake Bay watershed, and installing PRBs where technically and economically feasible to reduce N concentrations in targeted effluent plumes. Those approaches are based on more than 2 decades of research and field studies on decentralized system applications.

Key findings on system performance, effects on groundwater, and the opportunities presented by next-generation treatment technologies are summarized in the *Final Report for the La Pine National Decentralized Wastewater Treatment Demonstration Project* (Rich 2005), a joint effort of EPA and other federal, state, and local agencies:

> The groundwater investigations have found significant existing nitrogen pollution and the 3-D model has predicted extensive future contamination of the aquifer. The model also predicted, based on the field performance of denitrifying systems in the project, that contamination could be slowed or stopped using onsite wastewater treatment technologies, and that, as the region is retrofitted with denitrifying technologies, the existing contamination would be flushed from the groundwater system via existing natural discharge points.
>
> The field test program, in addition to identifying systems that can remove a large proportion of the nitrogen in residential wastewater, found that conventional systems are not protecting the aquifer from nitrate contamination. Conventional systems that were previously thought to denitrify up to 50% of the nitrate discharged from septic tanks were found to achieve significantly less denitrification when process and environmental variables were accounted for.

The La Pine Project, EPA's Environmental Technology Verification (ETV) program, the National Sanitation Foundation standards program, and other research efforts across the country have identified and tested a number of denitrifying wastewater systems and found that performance varies considerably. However, some systems do perform optimally in removing TN from the effluent—e.g., to concentrations lower than 5 mg/L—and others are capable of N effluent levels in the 10 and 20 mg/L range.

Higher treatment performance levels are needed in sensitive areas to protect or restore surface water quality. Research and field studies confirm that effluent plumes with elevated nitrate levels move laterally over long distances—i.e., greater than 300 feet in unconfined, sandy aquifers (Walker et al. 1972; Robertson and Cherry 1992). N concentrations in effluent plumes are affected by soil oxygen levels, soil composition, plant uptake, labile carbon content, travel distance, rate of movement, mixing, and other factors. The measures specified in this chapter include descriptions of treatment and dispersal systems that can meet the performance standards needed to protect the Chesapeake Bay and its tributaries and include more stringent treatment levels in sensitive areas near waterbodies. Such measures are consistent with efforts in the states that have already been adopting treatment zone setbacks and treatment standards to address N and other pollutants in coastal areas (Joubert et al. 2003).

3 Nutrient-Reduction Processes for the Decentralized Wastewater Sector

Nutrients—primarily P and N—are usually present in significant levels in domestic and commercial wastewater. Nutrient treatment and removal involve processes that occur either in treatment system components or in the receiving environment, as summarized below.

3.1 Nitrogen

N is the primary pollutant of concern along the coastal areas of the eastern United States, including the Chesapeake Bay. N discharges are a concern both as a drinking water contaminant (nitrate) and as an aquatic plant nutrient, particularly in N-sensitive surface waters and nearshore marine waters. N is not readily or consistently removed in conventional individual and cluster soil-based systems because conventional soil-discharging systems are not designed to remove N, and most soils have a limited capacity to retain or remove N. Organic N in wastewater is generally converted to ammonium N in the septic tank. Ammonium N is quickly nitrified as the wastewater infiltrates the aerobic soil. Nitrate-N is stable, soluble, and highly mobile in the subsurface environment. Biological denitrification of the nitrate is usually limited because the soil is often aerobic near the ground surface and usually has very little organic carbon, which is required by heterotrophic denitrifying microorganisms. Therefore, where N removal is required for dispersal, pretreatment that achieves both nitrification and denitrification is usually necessary before the wastewater is dispersed to the soil.

3.2 Nitrogen Pretreatment

Many reasonably priced natural and mechanical pretreatment systems, specifically designed for individual and cluster systems, are available today. The most popular example of such systems is the recirculating media filter, with timed pressure-dosing effluent dispersal. The filter media is typically sand, gravel, textile or peat. A portion of the filtered effluent is recycled back to the septic tank (or pump/recirculating tank) and filter several times before discharge. Denitrification is supported by the low-oxygen, high-carbon environment that exists in the recirculating tank. The systems are able to consistently remove an average of 50 percent or more of the TN in the septic tank effluent—reducing the TN from a typical influent range of 40–50 mg/L for single family homes to 15–20 mg/L (Otis 2007; USEPA 2002a; Jenssen and Siegrist 1990; Higgins et al. 2002; Smith et al. 2008; Rich et al. 2003).

To achieve TN levels of 3–5 mg/L and lower, an additional denitrifying unit process is usually installed to augment the pretreatment system. To sustain a denitrification process capable of high levels of N removal, the nitrified effluent from the pretreatment process must be exposed to a reactive carbon source in a low-oxygen environment before discharge. For larger installations, methanol, acetic acid, molasses, or other organic chemicals are added to the anaerobic reactor. However, the cost of building, operating, and maintaining an external chemical feeding system, coupled with the cost of chemicals, power for a feed pump, controls, and chemical storage increase N-removal expenses substantially.

Carbon sources are not equal in terms of O&M requirements. For example, methanol is very sensitive to under- or over-dosing, and thus requires special attention to ensure that the system is monitored enough to control dosing for optimal N-removal and biochemical oxygen demand control. By contrast, sawdust and newspapers need to be replaced only when effluent N breaks through (i.e., the denitrification capacity of the sawdust or newspaper has been exhausted).

Proprietary denitrifying units, which avoid the need for additional feed pumps, controls, and chemicals, are now available. Such units include a slowly degradable organic material in the reactor tank that can last several years. Field testing has documented TN effluent concentrations of 3–5 mg/L and even lower (Smith et al. 2008; Lombardo et al. 2005).

Further N removal occurs in the soil, particularly when pretreated effluent is dispersed uniformly via alternating dose/rest cycles. Plant uptake of N, soil oxygen levels, carbon sources, temperature, and residence time are key factors in N-removal levels during this final stage of treatment, which are estimated in the 50 percent reduction range (Long 1995; Otis 2007). Additionally, some soils contain sufficient labile carbon to denitrify effluents regardless of the method of dispersal (Anderson 1998; Gold et al. 2002; Starr and Gillham 1986; Bushman 1996; Hiscock et al. 1991). Other important variables could include seasonal use (Postma 1992), in-stream processes, including the matrix through which the groundwater enters nearby surface waters (Birgand 2000; Stewart and Reneau 1984), and the distance from the source to the receiving surface waters (Stacey 2002). One study from the U.K. (Hiscock et al. 1991) estimates that average groundwater carbon content would account for removal of 3 mg/L of nitrate.

3.3 Phosphorus

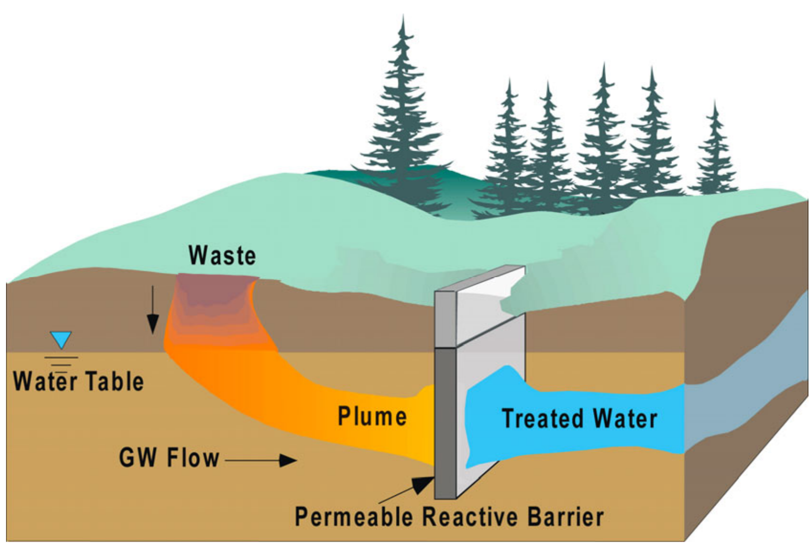
Approximately 20 to 30 percent of the P in wastewater is removed in septic tanks (Lombardo 2006). P removal in soil effluent dispersal systems is achieved primarily by mineral precipitation. The process involves sorption and complex biogeochemical mechanisms that rely on dissolved P mineralization with iron, calcium, and aluminum (Tyler et al. 2003; Stone Environmental 2005; Lombardo 2006). The stability of those processes is influenced by pH, redoximorphic conditions, and the chemistry of aluminum and iron. The soil's capacity to remove P is significant both spatially and temporally. Sorption can be reversible—as with sands, or relatively permanent, as in soils high in iron oxides.

In general, most regions of the Chesapeake Bay watershed have soils that retain high levels of P from decentralized systems. Areas where soil-based, P-removal rates are low include highly permeable soils, such as sands, loamy sands, and soils very high in gravel. In areas with sufficient soil P-removal capacity, saturation fronts of P move only inches or less per year. Wastewater system designers maximize P-removal rates by locating the infiltration system in medium- to fine-textured soils that are as far from surface waters as possible, and extending the infiltration system along the topographic contour of the installation site. Also, uniform dosing and resting dispersal by pressure or drip distribution will optimize P removal in the soil by increasing the contact time between the effluent and the soil.

If native soils are not amenable to adsorption removal, other adsorption methods are available (Stone Environmental 2005; Dimick et al. 2006; USEPA 2002a). Although some P can be removed by pretreatment systems that contain high concentrations of adsorptive elements or by biological P removal, soil adsorption is by far the most common and least expensive means of removal. Where soils are inadequate for P removal, mound systems that use more appropriate soil (possibly imported) might be required. System use over time slowly reduces the capacity of the soil to remove P.

3.4 Permeable Reactive Barriers

Specific types of PRBs have been developed to remove nitrate from groundwater plumes that would otherwise adversely affect surface water quality. PRBs consist of a trench filled with a degradable carbon source (e.g., sawdust, newspaper) and are sited to intercept high-nitrate groundwater plumes (WE&T 2009) before they enter surface waters (Figure 6-1). As the plumes pass through the low-oxygen, carbon-rich barrier, bacteria break down nitrate molecules to use the oxygen for cell respiration. In areas where receiving waters are already eutrophied, the trenches provide immediate relief by removing nitrate from the incoming groundwater. Addressing the source of the high-nitrate plume (i.e., densely sited septic systems) would also produce results, but any measureable effects would likely take several years



Source: USEPA 1998

Figure 6-1. PRB conceptual approach.

because of slow effluent plume movement in most soils and could be more expensive and require more maintenance than installing PRBs.

PRBs are typically installed as long, narrow trenches perpendicular to the incoming plume and parallel to the shoreline. The most effective ones for removing nitrate from plumes are filled with a carbon-based media mix that controls for changes in pH. Such systems have been successfully demonstrated in North America and Europe (Vallino and Foreman 2008; Robertson and Cherry 1995; Lombardo et al. 2005; USEPA 1998). Costs range from about $5,000 to $15,000 per equivalent dwelling unit (i.e., in the plume sourcing area), depending on soils, geology, depth to groundwater, subsurface hydrology, construction access, existing infrastructure, and other factors. Zero valent iron, now used for some industrial wastewater treatment applications, has been studied as a nutrient-removal media in PRBs and other system components. Obstacles with this technology include reduction of nitrate to ammonia rather than N gas and relatively high costs (Cheng 1997). New variations of this technology hold promise for removing some of these obstacles (Lee et al. 2007).

3.5 System Configuration

As noted above, a certain level of treatment process sophistication and soil discharge technique (e.g., pressure dosing, drip dispersal) are required for optimum N removal. Their cost in terms of both hardware and management needs can be significantly mitigated through the use of cluster systems that treat wastewater from multiple homes or businesses. Cluster systems, also called community or distributed systems, have become extremely popular in areas where high levels of wastewater treatment are required, where space is too limited for on-site conventional soil-discharging systems, and local funding capacity precludes conventional sewage collection and treatment (see Section 4.6).

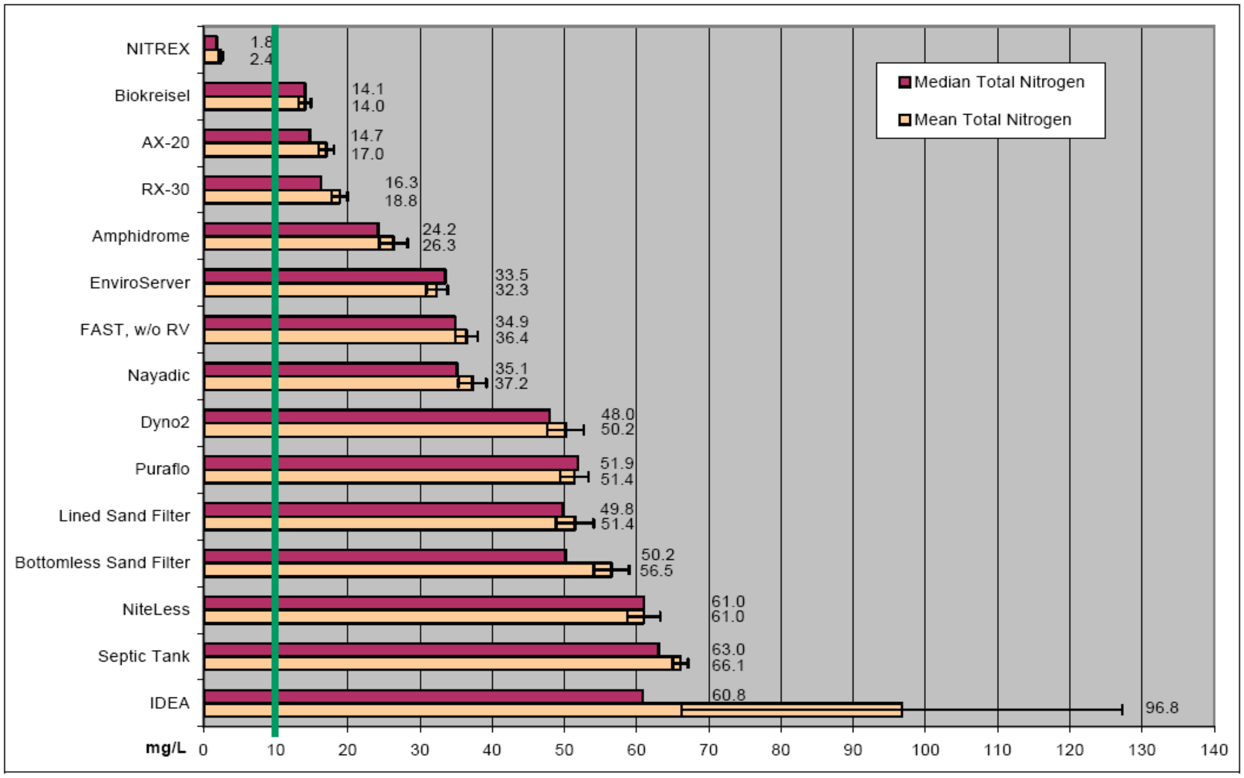
It should be noted that soil-discharging wastewater systems that have the capacity to serve 20 or more people per day are defined by EPA as Class 5 underground injection wells and are therefore subject to permitting and other requirements for large-capacity septic systems under the federal Safe Drinking Water Act. Further, any decentralized system that accepts waste other than sanitary wastewater (such as industrial waste) is an Underground Injection Control (UIC) Class 5 Injection Well. UIC regulatory information for large-capacity septic systems is posted at http://www.epa.gov/safewater/uic/class5/types_lg_capacity_septic.html.

4 Treatment Technologies and Costs

Key considerations in treatment system selection are wastewater flow, strength (i.e., biochemical oxygen demand), the presence of nonconventional organic or inorganic constituents, the sensitivity of the receiving environment, and the capacity of system managers to operate and maintain it over the long term. Given those factors, both the *selection* and ongoing *use* of a specific technology is driven by management considerations. For example, wastewater characterization and assessment of the receiving environment are planning-level activities that result in establishing performance standards, which begin to identify the narrow range of treatment technology options and related design considerations. Once a specific system is selected, construction oversight, operation, inspection, maintenance, and residuals removal—all management program elements—become paramount in ensuring perpetual performance.

The La Pine Decentralized Wastewater Demonstration Project (Rich 2005) has provided some of the most comprehensive field data on the performance of various system types. The project—funded by EPA and supported by the Deschutes County, Oregon, Environmental Health Division; Oregon Department of Environmental Quality; and the U.S. Geological Survey—monitored system performance between 1999 and 2005 (see Figure 6-2 and Table 6-1). System performance was found to be affected by a number of variables, but in general the level of analysis provides insight on the range of pollutant removal that can be expected from the various system types. The figure and table that follow summarize key data from the project; detailed performance results, system descriptions, and other information are available in the final project report (Rich 2005).

The subsections that follow discuss the main classes of treatment system technologies. The final section of this chapter summarizes management program elements that support the implementation measures provided at the beginning of this chapter. Table 6-2 provides examples of biological N-removal performance from the literature for a variety of technologies. Table 6-3 contains details on specific treatment systems described in the subsections below.



Source: Rich 2005.

Figure 6-2. Effluent TN concentrations for systems tested in the La Pine Project.

Table 6-1. System components and type classifications for Figure 6-2

System component/type	General classification
Septic Tank	Primary treatment vessel
Lined Sand Filter	Attached growth, sand media
Bottomless Sand Filter	Attached growth, sand media
AdvanTex AX-20	Attached growth, textile media
AdvanTex RX-30	Attached growth, textile media
Puraflo	Attached growth, peat media
Dyno2	Attached growth, gravel media, wetland polishing
Amphidrome	Attached growth/suspended growth hybrid
Biokreisel	Attached growth/suspended growth hybrid
EnviroServer	Attached growth/suspended growth hybrid
FAST Bio-Microbics	Attached growth/suspended growth hybrid
IDEA	Suspended growth
Nayadic	Suspended growth
NiteLess	Suspended growth with add-on anoxic filter
NITREX	Add-on anoxic filter

4.1 Conventional Systems

Conventional treatment systems featuring septic tanks and soil infiltration systems are the most commonly used wastewater treatment technologies. The soil dispersal system facilitates aerobic treatment, degradation, filtration, and adsorption of contaminants not treated or retained by the septic tank. However, N removal is somewhat limited, with TN concentrations before soil application typically in the 40–50 mg/L range. In sandy soils with little organic content, high oxygen levels, and poor downgradient mixing, N concentrations can remain high even after several hundred feet of effluent plume movement (Walker et al. 1973; Robertson and Cherry 1992; Cogger 1988; Joubert et al. 2003). Given the low N removal rates of conventional systems (i.e., averaging 20 percent TN removal; Otis 2007; Smith et al. 2008; Jenssen and Siegrist 1990), they are no longer appropriate for use in new communities or densely developed areas in the Chesapeake Bay watershed.

4.2 Land/Vegetative Treatment Systems

Land treatment systems, such as spray irrigation systems, are permitted in some places but have not been widely used because of their large land area requirements (USEPA 2000). In general, such vegetative treatment systems have shown poor performance with regard to N removal. However, in recent years, significant advances have been made. The Living Machine, a proprietary decentralized wastewater treatment system has been used successfully for large-capacity applications, such as schools. While the system delivers advanced N removal, it relies on multiple treatment processes including anaerobic and aerobic reactors, a clarifier, and an *ecological fluidizer bed* (USEPA 2002b), which drive up the cost. Eco-machines are similar in concept to The Living Machine and are capable of advanced N removal. Costs for both of these technologies make sense for only fairly large-capacity applications. They are not practical for individual residential systems but could be useful for cluster and large system applications.

4.3 Suspended Growth Systems

Suspended growth systems, such as activated sludge-based aerobic treatment units (ATUs), are generally effective in nitrifying septic tank effluent. Denitrification is somewhat limited, but can be aided by process controls (e.g., recirculation) and effluent dispersal via time-dosing into the upper soil horizon (Stewart 1988). Aerobic units that feature aeration that periodically stops and starts show improved denitrification. Sequencing batch reactors, which first fill and then draw, in alternating aerobic/anoxic cycles in a single tank might also meet the 20 mg/L recommended effluent limit for areas more than 1,000 feet from surface waters in the Chesapeake Bay watershed, when effluent is dispersed to the soil via time-dosed pressure application (Washington State Department of Health 2005). Capital costs for conventional on-site suspended growth systems range from $7,500 to $15,000 per equivalent dwelling unit

(EDU), with O&M expenses of $400 to $800 per EDU per year when all suggested O&M tasks are performed (Tetra Tech 2007).

N removal in larger cluster applications of suspended growth systems (i.e., > 200 homes) can be enhanced by incorporating a membrane bioreactor process (MBR) unit, which screens wastewater through very small pore-size filters. MBRs are more common to centralized treatment facilities because of operating costs and economy of scale issues. However, individual home-sized and small cluster units are beginning to be developed for the U.S. market (e.g., BioBarrier, ZeeWeed; WERF 2006). The high-quality effluent provides opportunities for treated water reuse. Cost and performance data for individual and small cluster applications of MBRs are not widely available and are likely to vary greatly. Energy costs, particularly to operate the pumping components, are often significant, especially in smaller system applications (USEPA 2007).

4.4 Attached Growth Aerobic Systems

These systems (sometimes called trickling filters or media filters) use natural aeration instead of mechanical, produce less sludge for disposal, and require less power and O&M than the suspended growth units in performing the same tasks. All the systems listed in Table 6-3 are varieties of attached growth system types. Like suspended growth systems, attached growth treatment units also require a recirculation step to meet more stringent TN-removal objectives. Commercially available systems come in lightweight packages and employ lightweight media for easy installation. They also require about 20 percent less physical footprint than typical trickling filters. When properly loaded and operated, they can produce very high nitrification levels that must be followed by a denitrification step to exceed the typical 50 percent N-removal rate. Attached growth systems are also often quite stable compared with suspended growth processes, which might be important, particularly for decentralized systems serving periodically or seasonally used facilities. On-site capital costs are slightly higher in general than the suspended growth ATUs ($10,000–$16,000 per EDU), but O&M costs are significantly less, e.g., about $200–$300 per EDU per year (USEPA 2010; Tetra Tech 2007).

N removal in attached growth media filters can be optimized through internal treatment system process controls. Single-pass media filters—sand filters, textile filters, peat systems, mounds, and other packed media bed units—achieve excellent nitrification levels but generally do a poor job with denitrification unless some, or all, of the effluent passes through a carbon-rich, low-oxygen environment after the nitrification stage. That can be accomplished by recirculating a portion of the effluent back to the septic tank or a pump tank, or by adding a denitrification unit to the system, or both. Media filters have a long record of excellent performance, with nitrification rates as high as 95 percent (Otis 2007; Smith et al. 2008; USEPA 2002a). The treatment process is stable year-round and can be employed through either custom-built, nonproprietary engineered systems or commercial units that can be installed in a single day. Capital costs for single-pass filters range from $5,500 to $13,000 per EDU, with O&M expenses of $200 to $400 per EDU per year (USEPA 2010; Tetra Tech 2007).

Recirculating media filters have been in use for many years and feature high nitrification rates with about 50–70 percent TN reduction. The systems recycle part of the effluent back to the septic tank or the recirculating tank, where the anoxic environment and available carbon facilitate denitrification processes. Design considerations include the ratio of effluent recirculated and the configuration of the recycle plumbing, i.e., ensuring that the recycled effluent is discharged to a tank location with low oxygen and some carbon. TN effluent concentrations can be as low as 10 mg/L, which can be further reduced in the soil by using time-dosed, pressure-drip effluent dispersal. Engineered systems and proprietary units are widely available and can serve single homes or large subdivisions. Capital costs for recirculating systems range from $9,500 to $20,000 per EDU, with O&M expenses of $350 to $600 per EDU per year (USEPA 2010; Tetra Tech 2007; Washington State Department of Health 2005).

4.5 Add-On Anoxic Filters with a Carbon Source

Optimal denitrification can be achieved by passing nitrified effluent through a low-oxygen, carbon-rich environment before soil dispersal. Engineered and proprietary systems featuring add-on anoxic filters with an external carbon source (e.g., methanol, sawdust, newspapers) have performed successfully in single-home and cluster applications. For example, at least one commercially available product (NITREX) regularly produces effluent with N concentrations of less than 5 mg/L (Heufelder et al. 2007, see also Figure 6-2 and Table 6-2). Others claim to have similar systems with comparable performance, although, to date, independent field verification is lacking. NITREX relies on a passive nitrate remediation biofilter unit that uses a processed wood by-product as the filter medium. Other system designs discussed above can approach that level when paired with time-dosed, shallow pressurized dispersal. Capital costs for add-on denitrification systems range from $3,500 to $7,000 and more per EDU, with O&M expenses of less than $100 per year (Washington State Department of Health 2005). Note that those are added costs and do not include costs for the septic tank, nitrification process unit, or soil dispersal system—just the add-on component.

Table 6-2. Examples of biological N removal performance from the literature

Technology examples	TN removal efficiency (%)	Effluent TN (mg/L)
Suspended growth		
Aerobic units w/ pulse aeration	25%–61%[a]	37–60[a]
Sequencing batch reactor	60%[b]	15.5[b]
Attached growth		
Single-Pass Sand Filters (SPSF)	8%–50%[c]	30–60[c]
Recirculating Sand/Gravel Filters (RSF)	15%–84%[d]	10–47[d]
Multi-Pass Textile Filters (AdvanTex AX20)	64%–70%[e]	3–55[e]
RSF w/ Anoxic Filter	40%–90%[f]	7–23[f]
RSF w/ Anoxic Filter & external carbon source	74%–80%[g]	10–13[g]
RUCK system	29%–54%[h]	18–53[h]
NITREX	96%[i]	2.2[i]

Source: Adapted from Washington Department of Health 2005

Notes: Overall performance can vary, depending on system configuration and other factors. For detailed descriptions of treatment processes and technologies, see http://www.psparchives.com/publications/our_work/hood_canal/hood_canal/n_reducing_technologies.pdf.

a. California Regional Water Quality Control Board 1997; Whitmeyer et al. 1991

b. Ayres Associates 1998

c. Converse 1999; Gold et al. 1992; Loomis et al. 2001; Nolte & Associates 1992; Ronayne et al. 1982

d. California Regional Water Quality Control Board 1997; Gold et al. 1992; Loomis et al 2001; Nolte & Associates 1992; Oakley et al. 1999; Piluk and Peters 1994; Ronayne et al. 1982

e. NSF International 2009

f. Ayres Associates 1998; Sandy et al. 1988

g. Gold et al. 1989

h. Brooks 1996; Gold et al. 1989

j. Rich et al. 2003

4.6 Composting Toilet Systems

Composting toilet systems that contain and treat toilet wastes can reduce watershed N discharges significantly, because such wastes account for 70–80 percent of the TN load in domestic wastewater. Composting systems have been used successfully in both private and public facility settings. Like all systems, they require appropriate design and ongoing maintenance. A graywater treatment system is needed if the facility generates sink, laundry, or other graywater, therefore adding to the cost. Capital costs for composting systems (and excluding the cost of graywater systems) range from $2,500 to $10,000, with O&M expenses of $50 to $100 per year (USEPA 1999). The single-house viability of such systems depends on local codes and the owner's attitude, though acceptance and use of composting systems is increasing because of improved designs, performance, and lower maintenance requirements. The systems are more frequently used in public settings, such as parks and campgrounds.

4.7 Cluster Treatment Systems

Generally, cluster systems collect wastewater from multiple houses through low-cost sewerage and treat and disperse the effluent to soil-based dispersal systems similar to on-site systems. Many homes and businesses can be served by a single treatment facility. Most cluster systems feature septic tanks on each building lot; collection piping that operates via gravity, vacuum, or pressure; a treatment facility with attached growth process units; and a soils-based dispersal field for the effluent. Add-on anoxic denitrification filters can be included. Effluent is typically dispersed to the soil under pressure (e.g., pressure, drip, time or demand dosing) to assure uniform application throughout the larger drainfield. Collection technologies include grinder pump systems, which macerate and transport all sewage; effluent sewers, such as the septic tank effluent pump (STEP); the septic tank effluent gravity (STEG) collection system; and vacuum systems.

Advanced treatment systems can facilitate local reuse of the treated effluent for toilet flushing, irrigation, industrial purposes, or just be used to replenish aquifers. The cost of a cluster collection system varies significantly according to the number of users, collection system logistics, treatment facility design, land availability, materials, labor costs, and other factors. Cluster systems can achieve economies of scale to provide high levels of treatment at costs significantly less than individual systems and centralized sewer systems. New cluster systems generally range from $10,000 to $18,000 per EDU in non-urbanized areas of new development, with higher costs for retrofits in urban areas, depending on the treatment technology used (USEPA 2010; Tetra Tech 2007). Replacement and retrofit systems have similar costs, but collection system installation can drive costs higher. An RME with the technical, financial, and managerial capacity to ensure viable, long-term, cost-effective performance is essential for cluster system applications. Total system annual O&M costs range from $450 to $750 per EDU per year (Tetra Tech 2007).

4.8 Soil Dispersal Systems

Gravity-based, soil dispersal systems generally include conventional perforated pipe, laid in stone-filled trenches or purchased with Styrofoam beads surrounding the pipe and wrapped in netting; and gravelless, open-bottomed leaching chambers. N removal in the soil increases when effluent is dispersed in a time-dosed manner (i.e., dose/rest cycle) in the uppermost soil horizon (i.e., within one foot of the ground surface). Time-dosed, pressure-drip dispersal in the top 12 inches of soil has been credited with a 50 percent reduction in Tennessee (Long 1995), making the option an important feature for achieving the performance standards recommended in this chapter. As in all effluent dispersal systems, maximizing the separation distance between effluent application and restrictive soil boundaries (e.g., hardpan, bedrock, perched water tables, seasonal high water tables) improves performance.

Another effluent-dispersal strategy that improves performance is the use of alternating soil dispersal fields. Most conventional systems continuously load drainfields with effluent, resulting in a gradual reduction of the soil's capacity to treat effluent over time. Alternating drainfields that are used for 6 months then rested for 6 months improves the performance of the soil dispersal system and should be favored over conventional drainfields. Such systems require relatively low additional investment and can greatly extend the life of the soil dispersal system (Noah 2006). Maintenance programs for such systems should be designed and implemented in concert with the local health department or RME to ensure that flow-diversion devices are operated on schedule. Because this strategy applies to conventional septic drainfields, this recommendation applies primarily to areas of new development outside sensitive areas and subdivisions.

4.9 Effluent Reuse

Reusing treated wastewater system effluent can significantly reduce N discharge to the environment. Many of the technologies suggested for advanced decentralized wastewater treatment in the Chesapeake Bay watershed can, with adaptations, be used to produce reclaimed water for beneficial reuses, including aquifer recharge, landscape irrigation, toilet flushing, fire protection, cooling and other nonpotable indoor and outdoor purposes (USEPA 2004). When reclaimed water is used for irrigation, reuse can offset potable water demand by augmenting supply while sequestering nutrients in vegetative matter and offsetting fertilizer use (WERF 2010). Reclaimed water technologies generally include recirculating filtration systems and membrane bioreactors, amended with disinfection systems (most commonly, chlorination or ultraviolet disinfection or both), online monitoring systems, on-site storage, and sometimes specific chemical feed systems for conditioning treated effluent to meet water quality demands for specific reuses (e.g., pH adjustment for cooling water). Nonreactive dye injection is sometimes required by building codes for reclaimed water to be used indoors. Costs for decentralized reclaimed water systems are highly context-specific and dependent on the intended reuse application, system size, and local or state regulatory requirements (WERF 2010) but can be assumed to add 50 percent to the costs of a more traditional decentralized system.

Table 6-3. Products that have completed the EPA ETV process for N reduction in domestic wastewater from individual homes, as of May 2005

System name	Technology	Description of process	Performance	Cost
Waterloo Biofilter® Model 4-Bedroom Waterloo Biofilter Systems, Inc. 143 Dennis St.: PO Box 100, Rockwood, Ontario Canada N0B 2kO http://www.nsf.org/business/water_quality_protection_center/pdf/Waterloo-VS-SIGNED.pdf	Fixed film trickling filter.	The biofilter unit uses patented lightweight open-cell foam that provides a large surface area. Settled wastewater from a primary septic tank is applied to the surface of the biofilter with a spray distribution system. The system can be set up using a single pass process (without any recirculation of biofilter treated effluent) or can use multi-pass configurations. The ETV testing results were generated by returning 50% of the biofilter effluent back to the primary compartment of the septic tank.	It averaged 62% removal of TN with an average TN effluent of 14 mg/L over the 13-month testing period. Earlier testing of this product in a single pass mode demonstrated that it could produce a 20–40% TN reduction.	$13,000–$17,000 for total system installation. The Waterloo Biofilter unit only would cost approximately $7,000.
Amphidrome™ Model Single Family System: F.R. Mahony & Associates, Inc. 273 Weymouth St. Rockland, MA 02370 http://www.nsf.org/business/water_quality_protection_center/pdf/Amphidrome_VS.pdf	Submerged growth sequencing batch reactor (SBR) in conjunction with an anoxic/equalization tank and a clear well tank for wastewater treatment	The bioreactor consists of a deep bed sand filter, which alternates between aerobic and anoxic treatment. The reactor operates similar to a biological aerated filter, except that the reactor switches between aerobic to anoxic conditions during sequential cycling of the unit. Air, supplied by a blower, is introduced at the bottom of the filter to enhance oxygen transfer.	It averaged 59% removal of TN effluent of 15 mg/L over the 13-month testing period at the Massachusetts Alternative Septic System Test Center (MASSTC).	$7,500 for unit only. The manufacturer estimates it would cost $12,000–$15,000 for a complete installation.
Septitech® Model 400 System Septitech, Inc. 220 Lewiston Road Gray, ME 04039 http://www.nsf.org/business/water_quality_protection_center/pdf/SeptiTech_VS.pdf	Two-stage fixed film trickling filter using a patented highly permeable hydrophobic media	Clarified septic tank effluent flows by gravity into the recirculation chamber of the SeptiTech unit. A submerged pump periodically sprays wastewater onto the attached growth process and the wastewater percolates through the patented packing material. Treated wastewater flows back into the recirculation chamber to mix with the contents. Treated water flows into a clarification chamber and is periodically discharged to disposal unit (drainfield, drip irrigation, etc.)	Averaged 64% removal of TN with an average TN effluent of 14 mg/L over the 12-month testing period at MASSTC.	$11,000 for SeptiTech unit includes shipping and installation. The manufacturer estimated that a total system with pressure distribution drainfield would cost approximately $20,000.

Table 6-3. Products that have completed the EPA ETV process for N reduction in domestic wastewater from individual homes, as of May 2005 *(continued)*

System name	Technology	Description of process	Performance	Cost
Bioclere™ Model 16/12 Aquapoint, Inc. 241 Duchanine Blvd. New Bedford, MA 02745 http://www.nsf.org/business/water_quality_protection_center/pdf/Bioclere-VS-SIGNED.pdf	Fixed film trickling filter.	Septic tank effluent flows by gravity to the Bioclere clarifier unit from which it is sprayed or splashed onto the fixed film media. Treated effluent and sloughed biomass are returned to the clarifier unit. A recirculation pump in the clarifier periodically returns biomass to the primary tank. Oxygen is provided to the fixed film by a fan located on the top of the unit.	Averaged 57% removal of TN with an average TN effluent of 16 mg/L over the 13-month testing period at MASSTC.	$7,500 for unit itself. Price for total system would need to include primary septic tank, Bioclere unit and disposal option, with costs in the range of $12,000–$15,000. The manufacturer recommends use in clusters to reduce per home costs and facilitate maintenance. Experience with a 27-home cluster resulted in costs of $6,800– $8,000 per home.
Retrofast 0.375 System: Bio-Microbics 8450 Cole Parkway Shawnee, KS 66227 http://www.nsf.org/business/water_quality_protection_center/pdf/Biomicrobics-FinalVerificationStatement.pdf	Submerged attached-growth treatment system, which is inserted as a retrofit device into the outlet side of new or existing septic tanks.	The RetroFAST 0.375 System is inserted into the second compartment of the septic tank. Air is supplied to the fixed film honeycombed media of the unit by a remote blower. Alternate modes of operation include recirculation of nitrified wastewater to the primary settling chamber for nitrification. Intermittent use of the blower can also be programmed to reduce electricity use and to increase nitrification.	Averaged 51% removal of TN with an average TN effluent of 19 mg/L over the 13-month testing period at MASSTC.	Product and installation cost for the Retrofast 0.375 System ranges is estimated to be $4,000–$5,500 depending on existing tankage. That cost includes the FAST unit, blower, blower housing and control panel. The local representative for Bio-Microbics units believes costs could be as low as $3,500 for multiple units.
Recip® RTS-500 System: Bioconcepts, Inc. P.O. Box 885 Oriental, NC 28571-0885 http://www.nsf.org/business/water_quality_protection_center/pdf/Bioconcepts_Verification_Statement.pdf	Fixed film filter	This is the newest product to complete Environmental Technology Verification (ETV) Program testing. It is a patented process developed by the Tennessee Valley Authority (TVA) and uses a fixed film filter medium contained in two adjacent, equally dimensioned cells. Timers on each of the two reciprocating pumps control the process.	Averaged 58% removal of TN with an average TN effluent of 15 mg/L over the 12-month testing period at MASSTC.	Very limited experience with this single-family unit. The unit built for ETV testing was a prototype. The cost per unit, by itself, is estimated to be $8,000–$10,000. Cost of the septic tank and disposal unit would be extra and the cost would depend on site conditions. Conservatively, cost for a total system could be $11,000–$15,000.

Source: Adapted from Washington Department of Health 2005

5 Wastewater Planning and Treatment System Management

The previous section describes N-removing individual or cluster wastewater system technologies, system configurations, and effluent dispersal options. This section describes management considerations that are essential for optimizing treatment system selection, sizing, performance, and long-term use, such as inventory systems, wastewater planning, performance standards, siting and installation guidelines, operation, inspection, maintenance, and residuals handling. The management tasks described in this section are paramount for reducing nutrient inputs to the Chesapeake Bay because they establish the framework for selecting and using specific treatment systems in particular locations. For example, advanced cluster systems are the best approach for protecting and restoring the Chesapeake Bay when considering wastewater facilities for new subdivisions and replacing significant numbers of malfunctioning systems in existing subdivisions.

The following subsections summarize key management program elements viewed as important for controlling the input of nutrients and other pollutants to the Chesapeake Bay. EPA has provided extensive guidance, case studies, resources, references, and links on these management program topics (USEPA 2005, 2010). Specific, detailed information on each topic below is provided in EPA's (2005) *Handbook for Managing Onsite and Clustered (Decentralized) Wastewater Treatment Systems,* available online at http://cfpub.epa.gov/owm/septic/septic.cfm?page_id=289.

5.1 Public Education and Involvement

Decentralized wastewater management programs require public support. The success of such programs will depend on how well homeowners, system service providers, and other stakeholders are involved in the development process. Unless people understand the need for a management program, there is little chance it will be adopted. Once in operation, the program must keep the community engaged, involved, and informed. Managers should give special consideration to explaining the need for new requirements for system upgrades, inspections, or other performance measures.

EPA has partnered with a variety of nonprofit organizations involved in decentralized wastewater management to improve public education, outreach, and involvement through development of informational materials, technical products, and training programs. Links to these partner organizations and the educational, technical, and other resources they provide are provided at http://cfpub.epa.gov/owm/septic/septic.cfm?page_id=260. EPA maintains a repository of print, radio, and TV public service announcements and other materials specifically pertaining to septic system education in its Nonpoint Source Outreach Toolbox, online at http://www.epa.gov/nps/toolbox/.

5.2 Planning

Planning can be used to integrate management strategies for areas served by both centralized and decentralized wastewater treatment facilities, serve as the basis for ordinances and subdivision regulations, and synchronize the community growth plan in harmony with the water and wastewater infrastructure investments. Integrating wastewater planning functions provides better long-term management of facilities and can help local officials deal with a number of needs such as sewer overflows, National Pollutant Discharge Elimination System effluent limitations, total maximum daily loads (TMDLs), and antidegradation requirements. For example, integrated planning can minimize problems associated with competition for infiltration areas between wastewater and stormwater management facilities in new developments, and is useful in anticipating and preventing adverse water quality effects. Variables to consider during the planning process include wastewater flows, proximity and uses of nearby water resources, landscape topography, hydrology, hydrogeology, soils, environmentally sensitive areas, infrastructure system options and locations, population densities, and need and potential for clustering treatment or reuse facilities.

EPA supports a wide range of water resource planning and management functions through programs such as the Clean Water Act section 319 nonpoint source management program, the Clean Water Act 305(b) assessment reports, TMDLs, wellhead and source water protection programs, watershed planning initiatives, coastal management, National Estuary Program, wetlands protection programs, water quality standards, continuous planning processes under section 303(e), water quality management processes under section 205(j) and 604(b), the Clean Water State Revolving Fund, and so on. Ideally, the planning and management activities supporting decentralized wastewater treatment would be integrated, or at least coordinated, with these and other water resource programs, many of which the states operate.

5.3 Performance Requirements

Performance requirements for systems are necessary to minimize the risks they pose to health and water resources. Performance requirements specify objectives for each wastewater management system, which can include physical, chemical, and biological process components. Performance compliance is based on pollutant-removal estimates for the various system components (e.g., septic tank, suspended-growth or fixed-film reactors, lagoons, wetlands, soil, disinfection), verified by periodic field inspections and sampling. Performance can be measured via numeric or narrative criteria. Numeric criteria reflect time-based, mass loadings or pollutant-concentration limits designed to protect sensitive water resources. Pollutants commonly targeted in performance requirements include nutrients, bacteria, oxygen demand, and solids.

5.4 Recordkeeping, Inventories, and Reporting

System inventories provide the nuts and bolts for on-site management. Basic system information—location, type, design capacity, owner, installation, and servicing dates—is essential to an effective program. The best record-keeping programs feature integrated electronic databases with field unit data entry (i.e., using a handheld personal digital assistant), save-to-file computer assisted design drawings, and user-specified reporting formats, and GIS-based spatial data management and user interface systems.

5.5 Financial Assistance and Funding

Financial assistance might be needed to (1) develop or enhance a management program; (2) provide support for constructing and modifying wastewater facilities; and (3) support operation of the program. Funding for program development and operation is often available from public and private loan or grant sources, supplemented by local matching funds. It can also be derived from some form of resource sharing among management program partner organizations such as planning departments or health and water resource agencies. Developing an RME and financing for constructing and operating facilities require larger investments that might come from grants and loans or public-private partnerships. Long-term operating costs are usually borne by system users through payment of fees and assessments.

5.6 Site Evaluation

Evaluating a proposed site in terms of its environmental conditions, physical features, and soil characteristics provides the information needed to size, select, and locate an appropriate wastewater treatment system. Regulatory authorities issue installation permits on the basis of the information collected and analyses performed during the site evaluation. Prescriptive site evaluation, design, and construction requirements are based on experience with conventional septic tank/soil dispersal systems and empirical relationships that have evolved over the years. A soil analysis to a depth of 4 to 6 feet using a hand auger, drill rig, or a backhoe pit, rather than a simple percolation test, provides a better approach for assessing soils, seasonal water table fluctuations, and other subsurface site features. Performance-based approaches require a more comprehensive site evaluation. Site evaluation protocols can include some presently employed empirical tests, specific soil properties tests and soil pits to characterize soil horizons, mottling, and a variety of other properties. Modeling groundwater and surface water impacts of multiple systems in defined areas (e.g., stream subwatershed) can help to further refine performance requirements and related system site and design considerations.

5.7 System Design

Decentralized wastewater treatment system design requirements focus on protecting public health and water resources. However, systems should also be affordable and aesthetically acceptable. Prescriptive codes that specify standard designs for sites meeting minimum criteria simplify design reviews, but limit development options and the potential for efficiently meeting performance requirements. Where management programs rely on the state code for design, there might not be any need for special review procedures for alternative system designs. However, in sensitive environments where performance codes are employed, there is a need to include allowances for alternative designs even if they only expand the number of prescriptive system choices and site parameters for sites that do not meet the conditions for conventional systems. Design considerations should address the potential implications of water conservation fixtures, effects of different pretreatment levels on hydraulic and treatment performance of soil-based systems, and the O&M requirements of different pretreatment and soil dispersal technologies.

5.8 Construction/Installation

Poor installation can adversely affect performance of both conventional and advanced systems that rely on soil dispersion and treatment. Most jurisdictions allow installation or construction to begin after issuance of a construction permit, which occurs after the design and site evaluation reports have been reviewed and approved. Performance problems linked to installation/ construction are typically related to soil wetness during construction, operation of heavy equipment on soil infiltration areas, use of unapproved construction materials (e.g., unwashed aggregate containing clay or other fines), and overall construction practices (e.g., altering trench depth, slope, length, location). The effects of improperly installed soil-based systems generally occur within the first year of operation in the form of wastewater backups. Some improper construction practices might not be as evident and could take years to manifest themselves in the form of degraded groundwater or surface water. The regulatory authority or other approved professionals should conduct inspections at several stages during the system installation process to ensure compliance with design and regulatory requirements.

5.9 Operation and Maintenance

O&M is important for all wastewater treatment systems, especially those that rely on components that are difficult to remedy if damaged—such as a soil dispersal system. Most system user information includes building awareness of inputs that might affect treatment processes, such as strong cleaners, lye, acids, biocides, paint wastes, oil and grease, and the like. Gravity-flow, soil-infiltration systems require little O&M beyond limiting inputs to normal residential wastes, cleaning effluent screens/filters, and periodic tank pumping (e.g., every 3 to 7 years). Systems employing advanced treatment technologies and electromechanical components require more intensive O&M attention, e.g., checking switches and pumps, measuring and managing sludge levels (important for all systems), monitoring and adjusting treatment process and system timers, checking effluent filters, monitoring effluent quality, and maintaining disinfection equipment. Operators and service technicians should be trained and certified for the types of systems they will be servicing; services should be logged and reported into a management tracking system, such as EPA's TWIST (USEPA 2006), so that long-term performance can be tracked. The use of a dial-up modem or Internet-based monitoring equipment can improve operator efficiency and performance tracking when large numbers of systems are involved.

5.10 Residuals Management

Septic tanks contain settleable solids, fats, oils, grease, and other residuals that require periodic removal. The primary objective for septage management is to establish procedures for handling and dispersing the material in a manner that protects public health and water resources and complies with applicable laws. Approximately 67 percent of the estimated 12.4 billion gallons of septage produced annually in the United States is hauled to publicly owned treatment works or other facilities for treatment, while the remaining 33 percent is applied to land. Federal regulations (under Title 40 of the *Code of Federal Regulations* Part 503) and state/local codes strive to minimize exposure of humans, animals, and the environment to chemical contaminants and pathogens that are often present in septage. Residuals management programs should include tracking or manifest systems that identify sources, pumpers, transport equipment, final destination, and treatment or management techniques.

5.11 Training and Certification/Licensing

A variety of professionals and technicians including planners, regulators, designers, installers, operators, pumpers, and inspectors, are all involved in some aspect of a decentralized wastewater management program. Training, along with certification or registration, provides system owners and users with competent service providers and promotes professionalism among the industry. Service providers need to have a solid working knowledge of treatment processes, system components, performance options, O&M requirements, and laws/regulations. Universities, colleges, technical schools, agency-sponsored training programs, regional/local workshops, or formal/informal apprenticeship programs can provide such training. Service providers should have extensive and detailed knowledge of their own service areas and a general grasp of other related activities (e.g., planning or site evaluation). Service providers should pursue opportunities for cross-training, joint accreditation/certification, and sharing of training resources wherever possible.

5.12 Inspections and Monitoring

Perhaps the most significant shortcoming in existing management programs is the lack of regular inspections and performance monitoring. Area-wide monitoring regimes include testing groundwater and surface waters for indicators of substandard treatment, such as the presence of human fecal bacteria and excess nutrients. All systems need to be inspected, at an interval defined by the technological complexity of system components, the receiving environment, and the relative risk posed to public health and valued water resources. The best approach is to establish an inspection regime and schedule on the basis of the system's relative reliance on electromechanical components combined with health and environmental risk. Less effective surrogate approaches include, in order of descending effectiveness (1) requiring comprehensive inspections at regular intervals; (2) third-party inspections at the time of property transfer; (3) inspections only as part of complaint investigations.

5.13 Corrective Actions and Enforcement

A decentralized wastewater management program should be enforceable to assure compliance with laws and to protect public health and the environment. Management agencies should have the legal authority to adopt rules and assure compliance by levying fines, fees, assessments, or by requiring service providers to respond to system malfunctions. Program administrators should emphasize those tools that encourage compliance, rather than punishment. It also helps to have the support of the courts to implement an effective enforcement program. To assure compliance, management agencies typically need authority to do the following:

- Respond promptly to complaints
- Issue civil and criminal actions or injunctions
- Provide meaningful performance inspections
- Condemn systems or property
- Issue notices of violation (NOVs)
- Correct system malfunctions

- Implement consent orders and court orders
- Restrict real estate transactions
- Hold formal and informal hearings
- Issue fines and penalties

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Attachment #32

15). Tech Memo
"Flow Model Conversion and Urban Area Yield"
Cleath-Harris Geologists, Inc.
July 29, 2009

CHG

A sustainability test is performed on the steady-state results. If the chlorides at a producing purveyor well exceeds 250 mg/l due to sea water intrusion, the yield is assumed to be unsustainable. Simulations are run until a sustainable yield is achieved. The optimum yield solution is reached when the difference between sustainable and unsustainable yield is reduced to approximately 50 acre-feet. Using this methodology, the updated yield for the basin under current conditions is shown below in Table 2.

This allows water supply to degrade and is not consistent with the Clean Water Act.

Table 2
Basin Safe Yield Estimate - Current Conditions

Basin Area	Basin User	Yield (AFY)
Urban Area	Purveyor wells	2,100
	Sea Pines Golf Course	100
	Rural Residential (East side)	125
Creek Valley	Rural Residential (creek valley)	75
	Creek Valley (ag irrigation wells)	800
Basin Total		3,200

The overall basin yield estimate under current conditions (assuming no creek valley surplus water development) is 3,200 acre-feet per year. After subtracting 1,100 AFY in agricultural irrigation, private domestic use, and golf course irrigation, the purveyors have an estimated 2,100 AFY of sustainable yield. This is comparable to the current level of community demand, which has averaged approximately 2,040 AFY over the last five years (attached).

Balancing the basin, however, requires a significant redistribution of pumping between the upper and lower aquifers. These aquifers are not independent, and yield values should be interpreted accordingly. More lower aquifer yield can be obtained at the expense of upper aquifer yield, and vice-versa.

For the balanced basin simulation of current conditions listed in Table 2, the upper aquifer yield is 1,700 AFY and the lower aquifer yield is 1,500 AFY (basin-wide). The distribution of upper aquifer versus lower aquifer yield varies across the basin, however, with most of the lower aquifer yield in the East side and creek valley. For purveyor wells in the urban area, the yield distribution for a current conditions balanced basin is 1,490 AFY upper aquifer and 620 AFY lower aquifer.

One hypothetical optimum solution for urban area purveyor well production that mitigates sea water intrusion under current conditions is given below in Table 3. Figures showing seawater intrusion at 50 years, 500 years, and steady state, with chemographs for representative wells are attached. A hydrologic budget flow diagram is also attached. Note that 55 AFY of sea water intrusion continues to enter the basin, where it dilutes to below 250 mg/l chloride before reaching active production wells.

Chloride levels allowed to rise in some wells - not a true safe yield.

Table 3
Potential Purveyor Well Production under Current Septic Conditions

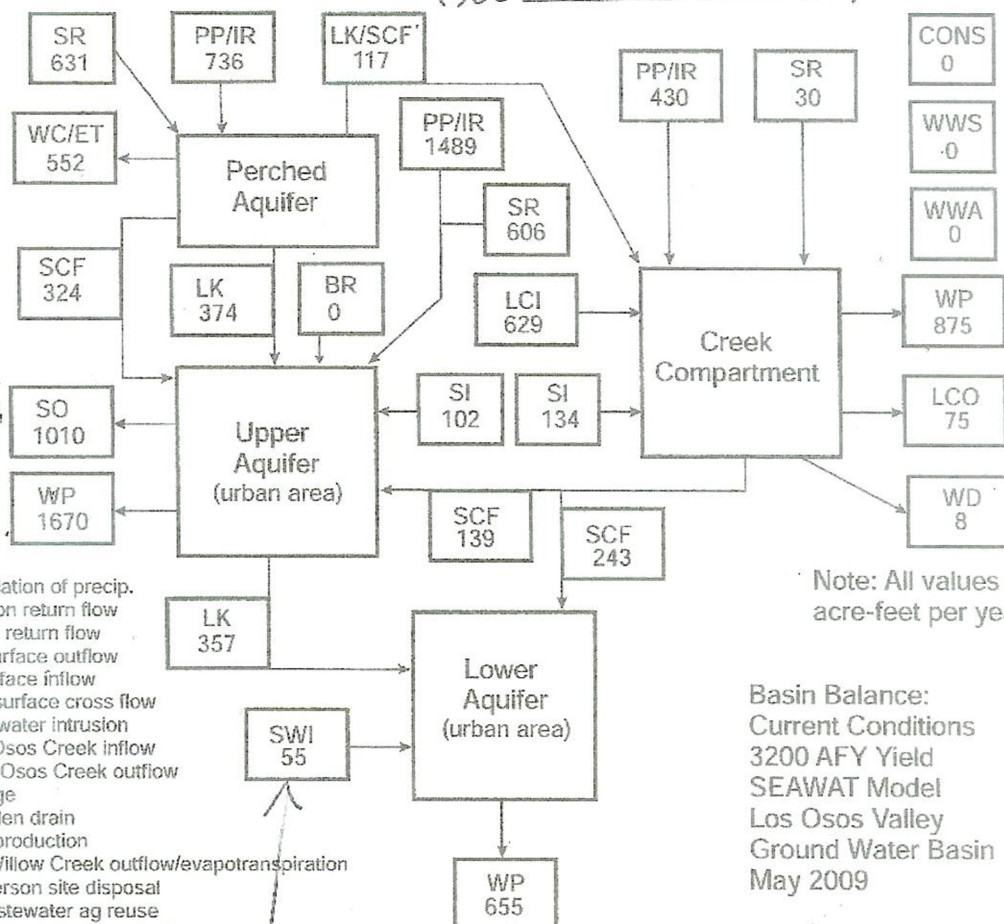
Purveyor	Well	Production (AFY)
GSWC	Upper Aquifer	740
	Lower Aquifer	310
	GSWC TOTAL	1,050
	Upper Aquifer	650
	Lower Aquifer	300
	LOCSD TOTAL	950
S&T	Upper Aquifer	100
PURVEYOR TOTAL		2,100

Note: Other optimum yield pumping distributions are possible. The actual distribution of well production would be subject to purveyor agreement.

Wastewater Project Conditions Yield

The same methodology was applied to the wastewater scenarios. Two wastewater scenarios have been simulated: Spray Field only and a VPA2b. Results of the wastewater project conditions yield simulations are shown below in Table 4.

Outflows to ocean decrease w/ increased pumping, increasing likelihood of seawater intrusion. Current outflows w/o the project are estimated to be 1310 AFY (see Attachment 20, p.3)



Legend

PP = percolation of precip.
IR = irrigation return flow
SR = septic return flow
SO = subsurface outflow
SI = subsurface inflow
SCF = subsurface cross flow
SWI = sea water intrusion
LCI = Los Osos Creek inflow
LCO = Los Osos Creek outflow
LK = leakage
WD = Warden drain
WP = well production
WC/ET = Willow Creek outflow/evapotranspiration
BR = Broderson site disposal
WWA = wastewater ag reuse
WWS = wastewater spray field
CONS = water conservation

Note: All values in acre-feet per year

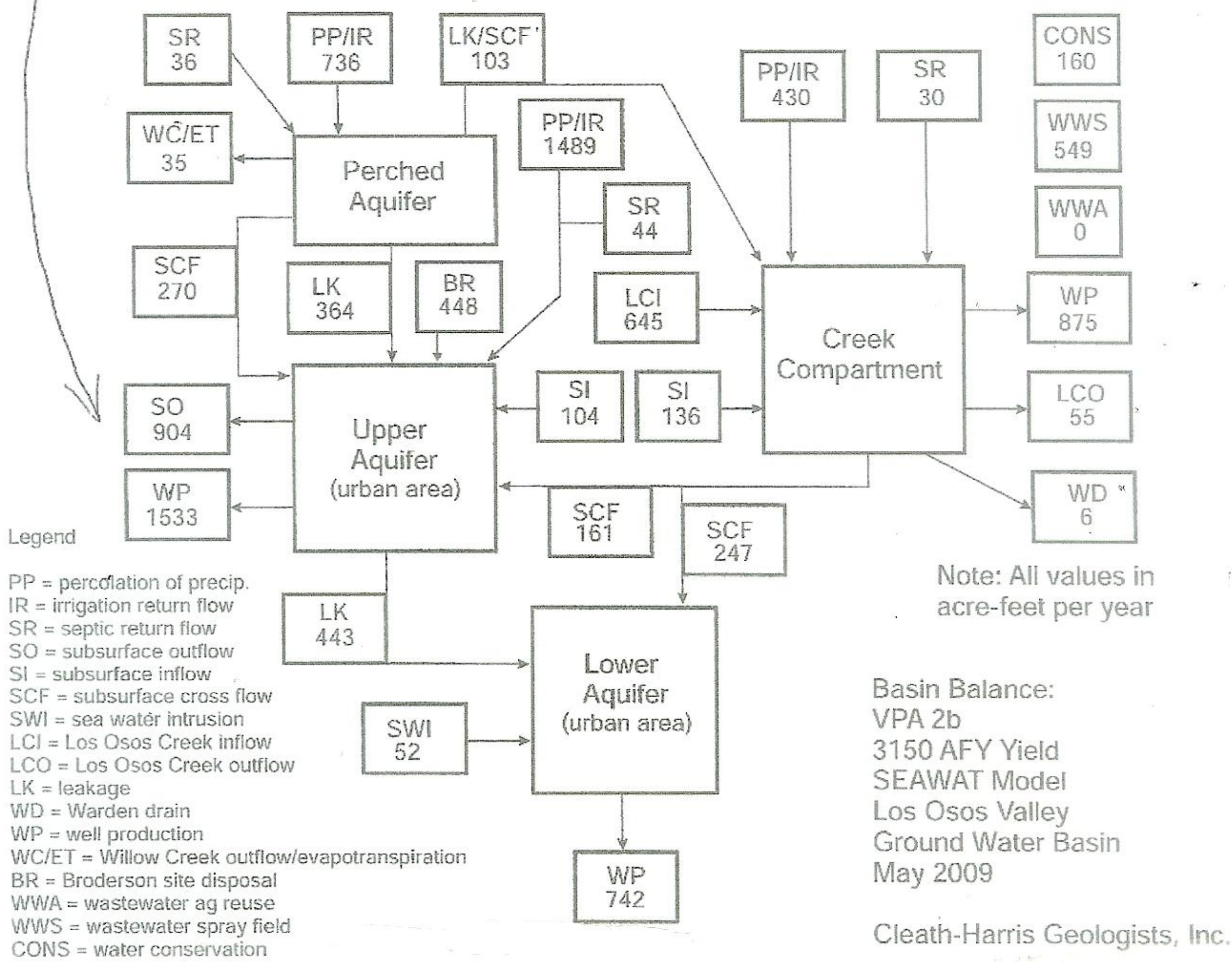
Basin Balance:
Current Conditions
3200 AFY Yield
SEAWAT Model
Los Osos Valley
Ground Water Basin
May 2009

Cleath-Harris Geologists, Inc.

Seawater intrusion continues

Safe yield must be under 600.

Outflows to ocean are reduced 400 AFY with increased upper aquifer pumping and the project. (See Attachment 20 p. 3 for current estimated flows.)



Attachment #33

DEIR

Reduced use for 2 years as the leach-fields are tested

annual application rate not exceed 448 AFY. Exceeding this rate could cause the water table to rise near the bay front and require installing harvest wells downstream to keep the water table from rising unacceptably.

Broderson leach fields

When the LOWWP is first completed and begins operation, the estimated total treated effluent will be approximately 200 AFY less than the total treated effluent forecast at buildout. This will allow the LOWWP flexibility to apply about 250 AFY to the leachfield and monitor the effects on the groundwater using the monitoring wells that have already been installed.

The Broderson site would be accessed by a gravel road that extends south from the end of Broderson Avenue as shown on Exhibits 3-6 through 3-9. The site would require fencing to limit public access since the treated effluent would meet secondary but not the more stringent Title 22 tertiary standards for recycled water. The 8-acre active leachfield area at the Broderson site would be excavated to an average depth of 6.5 feet during construction, backfilled with a 4-foot layer of gravel for drainage, and then covered by geotextile fabric. Final cover would consist of a minimum of 2.5 feet of native soil backfill. The percolation piping would consist of 4-inch perforated PVC pipe laid approximately one foot below the geotextile fabric layer, with the perforations facing upwards. If the pores beneath the leachfield become clogged over time, the leachfield would be excavated and the ground beneath it would be ripped or disked. The estimated frequency of ripping ranges between 5 and 10 years (Appendix B, Project Description Data, and Carollo April 2008b).

5-10 year re-excavating and ripping

Sprayfields

Sprayfield disposal is the practice of spraying effluent on land to dispose of the water through evapotranspiration and percolation. Sprayfield disposal, which requires secondary treatment, would be operated to maximize evaporation and minimize runoff. This would entail spraying only during the daytime and collecting any tailwater (runoff) that does occur and returning it to the sprayfields for reapplication. Disposal would occur through evapotranspiration (ET), or through both evapotranspiration and percolation. The estimated capacity for sprayfield land that is suitable for both ET and percolation is 4.8 AFY per acre, and the estimated capacity for sprayfield land that is suitable for ET only is 3.0 AFY per acre. Approximately 175 acres of sprayfield are expected to be needed for Proposed Projects 1 through 4 and the actual split between land that is suitable for ET and percolation and land that is suitable for ET only will be determined as part of the design process.

The two effluent disposal options of sprayfields and the Broderson leachfield, plus water conservation would provide sufficient capacity for the 1,290 AFY of effluent that are projected for the LOWWP at buildout as shown in Table 3-5. During the wet winter months, the sprayfields would not be active. If the daily treated effluent flow exceeds the Broderson leachfield capacity, the effluent could be stored in the 46-acre pond until spring after the wet weather and high runoff periods are over.

Treated effluent from the treatment facility would be pumped to the Tonini property through a pressurized pipeline known as the treated effluent conveyance system. The irrigation lines to the

Attachment 33 Page 2

FEIR

- Project Design Feature 5.3.A-5 has been modified to indicate that the nearest sprayfield sprayheads would be located at least 100 feet from the upper extent of the wetland. Spray heads near the 100-foot buffer zones will have a 180-degree or smaller spray range focused inward towards the sprayfield so that no direct spray reaches the buffer zones.
- Project Design Feature 5.3.A-6 specified that berms would be constructed parallel to existing onsite drainages; they have been deleted from the project description because the lower application rates associated with ET and the protection provided by the 100-foot buffer zones make them unnecessary.

Creek Crossings

The Preferred Project creek crossing locations will be the same as those anticipated for Proposed Project 4, but the open cut installation has been eliminated. As shown in Exhibit Q.3-1, the raw wastewater and treated effluent conveyance pipelines will cross Los Osos Creek and several other drainages under Los Osos Valley Road and Turri Road. The existing pipe sleeve through the south side of the Los Osos Valley Road bridge across Los Osos Creek will be used for the 12-inch treated effluent conveyance pipeline. Conventional pipe hangers will be used to suspend the 14- to 16-inch raw wastewater conveyance pipeline from the north side of the Los Osos Valley Road bridge across Los Osos Creek. Similarly, conventional pipe hangers will be installed to suspend the raw wastewater and treated effluent pipelines across the Turri Road bridge crossing of Warden Creek.

Exhibit Q.3-2 provides more detail on the creek crossing locations on the Tonini WWTP and sprayfield site. These creek crossings will be constructed using open cuts and placing at least 5 feet of cover over the raw wastewater pipelines and at least 3 feet of cover over the treated effluent pipelines.

Broderson Leachfield Refinements

Hydrogeologists on the LOWWP team have continued to develop the Broderson leachfield effluent disposal program. The operational plan, groundwater monitoring program and surface stormwater runoff plans have been developed further as discussed below.

Operational Plan

Beginning at least 24 hours before forecasted storm events, which primarily occur during the wet winter season, all of the LOWWP treated effluent will be directed to the wet weather storage ponds and/or the Broderson leachfields. During dry weather, the majority of the treated effluent will be directed to the Tonini sprayfields with lesser amounts conveyed to the Broderson leachfields. The planned operational scenario at Broderson is to operate the disposal leachfields at a rate of up to 800,000 gallons per day (gpd), disposing of a maximum of 448 ac-ft of effluent at Broderson during the entire year. At 800,000 gpd, which is equivalent to 3.1 gpd per square foot of active leachfield area, the fields would be operating at less than 2 percent of the maximum tested infiltration rate of 180 gpd per square foot of leachfield area (Cleath and Associates 2000). For the first two to three

Different from DEIR

FEIR

years of operation, LOWWP operators expect to limit total disposal at Broderson to 200 AFY to verify the results of the various hydrogeological studies. This can be accomplished because the community is not at buildout.

Less than in DEIR.

Monitoring Wells

The plan for Broderson leachfield groundwater level monitoring is to install five vadose-zone (shallow) monitoring wells, each one consisting of three piezometers clustered in a single 10-inch borehole. As shown in Exhibit Q.3-1, two of the wells are immediately below the leachfield, a third is between the leachfield and Highland Avenue, and the last two are in the right-of-way on Highland Avenue. These five vadose zone cluster wells (15 individual piezometers) are for monitoring potential perched water lenses up to 40 feet deep. In addition, existing deeper monitoring wells will allow the LOWWP operators to monitor development of the primary mound which will develop on the regional clay aquitard.

In addition, there will be a need to monitor development of the primary mound which will develop on the regional clay aquitard. These deeper monitoring wells are already in place. (Cleath and Associates, 2009) The groundwater monitoring program will also monitor project impacts on surface water features using the extensive number of existing water quality monitoring and water supply wells throughout the Los Osos community.

Stormwater Runoff

Project Design Feature 5.7.B-2 specified that berms would be constructed around the Broderson leachfields in locations where they would allow potential effluent runoff during storm events to be captured and allowed to infiltrate. This project design feature has been deleted from the project description because the treated effluent discharge rates will prevent effluent from surfacing at the Broderson site. During and after the initial leachfield construction and periodic rehabilitation of portions of the leachfields, , Best Management Practices will be used to control surface erosion from the site until the revegetation process is complete.

Water Conservation Measures

The Preferred Project's water conservation measures were derived from the Los Osos Community Services District 2000 Urban Water Conservation Plan (LOCSD 2000). With a target 10 percent per capita water demand reduction and a corresponding 10 percent wastewater generation reduction by 2020, the LOWWP's primary water conservation measure is requiring bathroom retrofits with low-flow fixtures , including toilets, prior to connecting to the new sewer. Additional water conservation will be obtained through a public education program and promoting high-efficiency appliances. If a 10 percent water conservation rate is not obtained with the existing water conservation measures, then the LOWWP would implement additional water conservation measures in coordination with the water purveyors to achieve the target conservation rate.

c. Recycled Water Reuse: Recycled wastewater will be reused within the community or surrounding agricultural land overlying the groundwater basin according the approved conditions of the Coastal Development Permit. It will either be discharged through leachfields or directly reused for urban or agricultural irrigation. The reuse program will consist of the following:

- 50 acre-feet of storage at the treatment plant site
- A recycled water main running from the treatment plant site, through the adjacent agricultural area, to reuse sites within the community
- 8 acres of leachfields at the Broderson site, with an annual capacity of 450 acre-feet
- Utilize one acre of existing leachfieds in the Bayridge Estates sub-division with an annual capacity of 33 acre-feet
- Provide approximately 130 acre-feet of recycled water to Los Osos schools, parks, golf course, and cemetery
- Provide recycled water main turn-outs to adjacent farmlands and develop reuse agreements for approximately 100 to 200 acre-feet per year

This does not provide for 200–250 AFY less water going to Broderson for 2–3 years as they are tested – (see pp. 1-3 of this attachment)

This plan will not mitigate seawater intrusion and also supply ground water flows to habitat (200–500 AFY) (see Attachment 20).

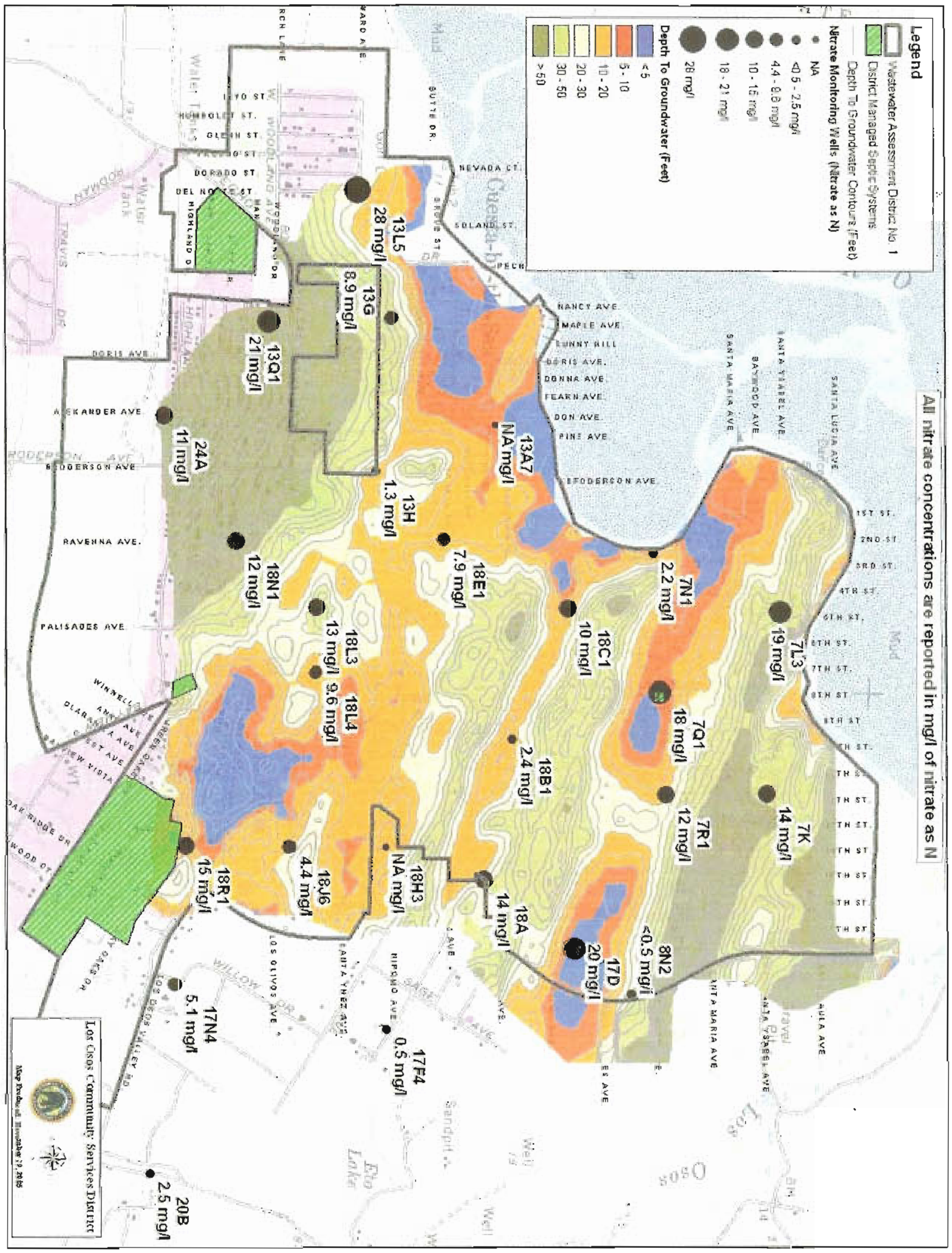
The approved reuse program includes capacity to meet the flows from existing development that will connect to the system at project start-up. Connection of additional users, from currently undeveloped property, is specifically prohibited in the Coastal Development Permit, until certain conditions are met. These conditions include the requirement to develop a habitat conservation plan for Los Osos, develop a water management plan, and update the Local Coastal Plan to incorporate the habitat and water plans. Reuse capacity for the additional flows associated with new development is not necessary at project start-up, due to these conditions. The Coastal permit conditions effectively require a water management plan to identify the most beneficial reuse alternatives for the additional flows associated with new development, prior to any new connections to the system. The layout of the recycled water reuse sites is provided in Figure 4.1 (Project Diagram).

d. Water Conservation Program: A water conservation program will be implemented with residential and commercial fixture retrofits, appliance rebates, education, and water efficiency audits. The goal of the conservation program is to reduce indoor use by over 25% to 50 gallons per capita per day. The water conservation program will result in decreased demand on system facilities such as pump stations and treatment works, increase the operating life of the facilities, and increase operational flexibility.

This is not measurable

However I/I at 300,000 gpd will offset the benefit of conservation (see Attachment 25, p. 9)

Attachment # 34


All nitrate concentrations are reported in mg/l of nitrate as N
Legend
Wastewater Assessment District No. 1
District Managed Septic Systems
Depth To Groundwater Contours (Feet)
Nitrate Monitoring Wells (Nitrate as N)
NA
<0.5 - 2.5 mg/l
4.4 - 8.8 mg/l
10 - 16 mg/l
18 - 21 mg/l
28 mg/l
Depth To Groundwater (Feet)
< 5
5 - 10
10 - 20
20 - 30
30 - 50
> 50
13L5 28 mg/l
13G 8.9 mg/l
13Q1 21 mg/l
24A 11 mg/l
13A7 NA mg/l
13H 1.3 mg/l
18E1 7.9 mg/l
18N1 12 mg/l
7N1 2.2 mg/l
18C1 10 mg/l
7L3 19 mg/l
18L3 13 mg/l
18L4 9.6 mg/l
7Q1 18 mg/l
18B1 2.4 mg/l
7R1 12 mg/l
7K 14 mg/l
18H3 NA mg/l
18J6 4.4 mg/l
18R1 15 mg/l
18A 14 mg/l
8N2 <0.5 mg/l
17D 20 mg/l
17N4 5.1 mg/l
17F4 0.5 mg/l
20B 2.5 mg/l
Los Osos Community Services District

Attachment #35

Condition 20 of previous Los Osos project

Los Osos Wastewater Treatment Facility
Groundwater Level Monitoring and Management Plan
Per Coastal Development Permit condition 20

Introduction
Individual on-site septic systems artificially augment a naturally occurring supply of freshwater to existing wetlands located in the community of Los Osos. Ending their use as a consequence of the Wastewater Project may alter the extent and composition of existing wetlands.

Wetlands in Los Osos are located mostly along the fringe of Morro Bay and composed of freshwater, brackish and saltwater plant and animal species. The boundaries among these (ie, the composition of the wetlands) change from year to year as a result of weather and other natural factors. For example, reduced rainfall can lower freshwater inflow. Winds can increase erosion from wave action and increase aeolian deposition along the Bay edge. Other variables affecting these wetlands include changes to the Bay bathymetry due to subsidence, earthquakes, changes to sea level, and deposition of sediments from alluvial sources.

Wetlands and riparian resources in Los Osos in 2003 are shown on Figure 1. There are several freshwater springs in the Los Osos area which support wetlands. The most notable is Sweet Springs located north of the intersection of Ramona and Fourth Street.

To provide a context for considering the potential effects of septic tank use on wetlands resources in Los Osos, it is useful to compare the extent of such resources as they existed prior to the widespread use of septic tanks with current conditions in which there are as many as 5,000 such systems. Figure 2 is an aerial photograph of Los Osos taken in 1949 showing wetlands along the Bay fringe, Sweet Springs, and along Los Osos Creek. Two things are worth pointing out on the 1949 image. First, it is clear that extensive wetlands were present in Los Osos before significant urbanization and the use of septic systems. Second, although changes to the composition of the wetland species from 1949 to 2003 are difficult to assess, a comparison of the aerial extent of these resources (Figure 3) reveals that wetlands have decreased significantly due to urbanization.

Changes to the Groundwater Regime
The process of decommissioning 4,751 septic systems within the Prohibition Zone is expected to occur over two periods of six months or more as the collection lines become available for service. Assuming 250 working days per year, about 20 systems per day will be taken out of service (assuming contractor service is available). Thus, the lowering of groundwater levels will occur gradually and will be spread throughout the Prohibition Zone.

Eventually all of these septic systems will be taken out of service and their contribution to the groundwater regime will be replaced by the effluent disposal system which calls for the bulk of treated wastewater (about 800,000 gallons per day) to be re-introduced at the Broderson property and another 400,000 gallons per day distributed to disposal leach fields located on Santa Maria Avenue, Pismo Street and elsewhere (see Figure 4).

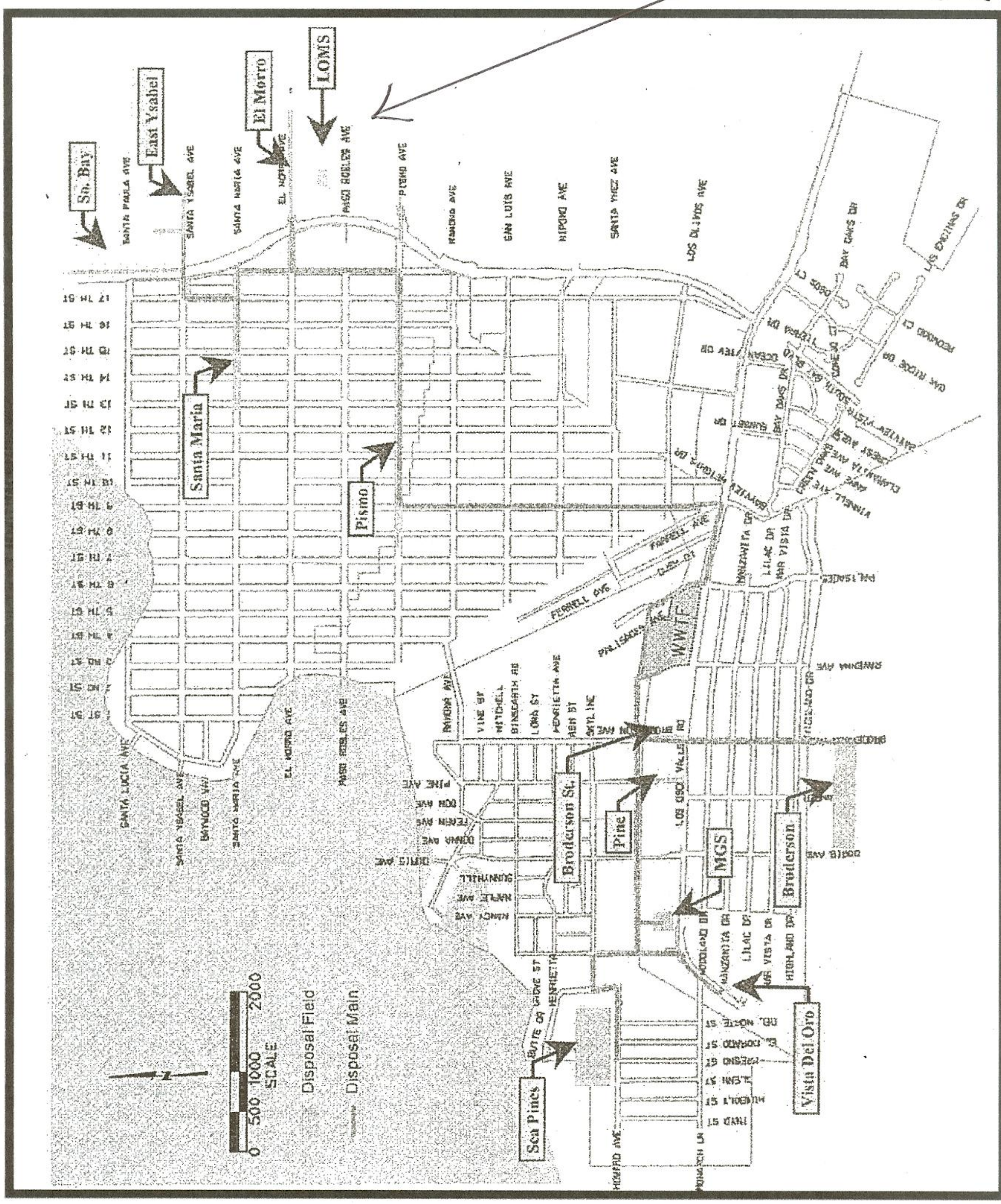
The groundwater model prepared for the project predicts that it will take about 18 months for groundwater levels to begin to rise again downslope from the Broderson disposal field in the vicinity of Morro Bay.

About $\frac{1}{2}$ of this (400,000 gpd) will be going to Broderson with this project.

These are not part of the current project.

Figure 4 – Wastewater Disposal System

Leach fields were located near Willow Creek and Los Osos Valley Creek with the prior project.



Condition 20
(Prior project)

brackish and salt water species could be affected. Again, these changes, if any, are expected to be small and temporary.

Wetlands could also be affected by changes to the re-charge regime of the upper aquifer. The Wastewater Project will change the way in which water is re-introduced to the upper aquifer from the decentralized use of on-site septic systems to a more centralized system of disposal leach fields. Once groundwater levels return following septic system decommissioning, the monitoring and management program is designed to maintain stable groundwater levels at about five feet of depth in the shallowest areas of town. Another consequence of the disposal system is that recharge will actually increase on the west side of town (east of the so-called Strand B of the Los Osos fault) from the current conditions, and decrease on the east side. This could result in an increase in freshwater wetlands along the Bay fringe to the west. Overall, the net change in wetlands along the Bay fringe is expected to be slight and difficult to distinguish from natural variation.

With respect to Sweet Springs, it should be noted that this is an artesian well fed by water introduced upslope that travels underground and emerges at the spring. Sweet Springs existed long before the urbanization of Los Osos and the widespread use of septic systems. Therefore, the decommissioning of septic system is not likely to have a significant adverse effect on the Spring and surrounding vegetation.

Other Wetland Areas – Los Olivos/Mountainview Area/Eto Creek

Other wetland and riparian resources exist in the community of Los Osos near the intersection of Mountain View Avenue and Los Olivos. Septic system decommissioning is not expected to affect groundwater levels in this area to the same extent as low-lying areas along the Bay fringe because the existing septic systems on properties surrounding these wetlands will remain in operation, being outside the Prohibition Zone. Nonetheless, these areas will be subject to the same temporary lowering of groundwater levels as experienced on the west side of the Strand B 'fault'.

Los Osos Creek

At present, most of the wastewater returned to the groundwater basin from septic systems east of the so-called Strand B of the Los Osos fault flows toward Morro Bay. However, a sizeable portion flows east toward Los Osos Creek due primarily to the pronounced "mound" of groundwater that has been mapped in the vicinity of Pismo Avenue and 14th Street (see Figure 6). Generally, the higher groundwater causes areas east of 15th Street to flow toward the Creek where the freshwater helps support riparian and wetland vegetation in that area.

Not provided with this project

The disposal locations on Santa Maria Avenue and Pismo Avenue and El Moro Avenue were chosen in part to help ensure that quantity of treated wastewater reintroduced to the basin maintains balance between the east and west sides of the 'fault'. Note that these disposal sites are estimated to have a total capacity of about 320,000 gallons per day. Assuming 300 gallons per day of wastewater per single family residence, this is roughly equivalent to 1,066 dwelling units which is well in excess of the number of units east of 15th Street and south of El Moro Avenue. This suggests that these disposal lines will approximately maintain existing subsurface flows toward Los Osos Creek, (albeit through a less dispersed method than individual septic systems).

320,000 = 358 AFY
The current project disposes 33 AFY at at Bayridge Estates located further from the site.

LOWWP

DEVELOPMENT PLAN / COASTAL DEVELOPMENT PERMIT DRC2008-00103
EXHIBIT B - CONDITIONS OF APPROVAL

Approved Development

1. This approval authorizes construction and operation of a community-wide sewer system for the portion of Los Osos described in Resolution No. 83-13 issued by the Regional Water Quality Control Board (see Attachment 1) and as described by application materials, supplemental materials made a part of the record, and shown in the EIR, including:

   a. A wastewater treatment facility, including all appurtenant structures, landscaping and site access to be located on the Giacomazzi site (APN 067-011-022);
   b. A wastewater collection system, including lateral lines from individual structures to the street, connection lines at each property, sewer mains, back-up power facilities and pump stations;
   c. Construction staging areas;
   d. Wastewater disposal facilities, distribution lines for urban and agricultural re-use, and monitoring wells;
   e. Wastewater sludge handling facilities at the wastewater treatment plant to enable the hauling of sludge to a disposal, recycling facility or co-generation facility;
   f. Primary staging areas at East Paso Robles Street including minor and temporary staging areas in the project area including the Giacomazzi site;
   g. Construction activities associated with the installation of approved facilities, including dewatering operations;
   A program for the mitigation of direct impacts to habitat for endangered species and agricultural resources;
   Construction of an underground pump station located at 3rd Street and the intersection of Paso Robles Avenue (unimproved), within 75' of a coastal wetland;

   Harvest wells; excluded

   j. Construction of harvesting wells and their associated piping and facilities are NOT authorized by this approval; and
   k. A water conservation program allowing a maximum water usage of 50 gallons per day / person for indoor water usage.

2. Except as otherwise required by the conditions of this permit, all development shall be substantially consistent with the site plan attached as Attachment 2, as well as with all final architectural elevations, color boards and landscape plans to be reviewed and approved by the Planning Director.

3. All development shall be consistent with the conditions contained herein. Prior to final design / layout of the East Paso Robles Avenue pump station and the Doris Avenue / Lupine Street pump station, the applicant shall provide verification to the satisfaction of the Planning Director, that the required 75 foot wetland setback will be met with the redesign / layout of said pump stations.

4. The approved service area for the wastewater treatment facilities corresponds to the area shown on the Service Area Map attached (see Attachment 1)
   Future additions to the wastewater treatment service area shall require a separate coastal development permit, and must be preceded or submitted concurrently with an Local Coastal Plan (LCP) amendment that incorporates the proposed service area expansion within the Urban Service Line designated by the LCP.

5. No Guarantees of Development Approvals. Approval of this permit, or any method of financing the project utilized by the County (e.g., the established assessment program), does not guarantee County approval of any new or intensified uses within the service area. All new development proposals must be reviewed for consistency with the San

Attachment #36

Global NEST Journal, Vol 7, No1, pp 43-60, 2005

NEW DISINFECTION BY-PRODUCT ISSUES: EMERGING DBPS AND ALTERNATIVE ROUTES OF EXPOSURE

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ABSTRACT
This paper discusses current issues with drinking water disinfection by-products (DBPs), which include emerging (unregulated) DBPs that can be formed at greater levels with alternative disinfectants (as compared to chlorine) and routes of human exposure (which include inhalation and dermal exposure studies, in addition to ingestion). Health effects driving DBP research include the recently observed reproductive/developmental effects (including spontaneous abortion) observed in epidemiologic studies, as well as the discrepancy between the types of cancer observed in animal studies for regulated DBPs (mostly liver cancer) and the types of cancer observed in human epidemiologic studies (mostly bladder cancer). Emerging DBPs discussed in this paper include iodo-acids, bromonitromethanes, iodo-trihalomethanes (THMs), brominated forms of MX, bromoamides, a bromopyrrole, and nitrosodimethylamine (NDMA) and other nitrosamines. Recent toxicity studies have revealed that several of these DBPs are more genotoxic (in isolated cells) than many of the DBPs currently regulated, and new occurrence data have revealed that many of these DBPs can, in some cases, be present at levels comparable to regulated DBPs. Of the alternative disinfectants, chloramination appears to increase the formation of iodo-acids, iodo-THMs, and NDMA and other nitrosamines, relative to chlorine. Preozonation appears to increase the formation of halonitromethanes.

KEY WORDS: Disinfection by-products, DBPs, drinking water, emerging, exposure

1. INTRODUCTION

Providing microbially safe drinking water is an important public health issue, and the use of chemical disinfection in the 20th century is rightly regarded as a major public health triumph in that regard. However, chemical disinfection has also produced an unintended health hazard—the potential for cancer and other reproductive/developmental effects that may be linked to chemical disinfection by-products (DBPs) produced during disinfection. Chemical disinfectants are effective for killing harmful microorganisms in drinking water, but at the same time, disinfectants are also powerful oxidants and oxidize the organic matter and bromide/iodide naturally present in most source waters (rivers, lakes, and many groundwaters), forming DBPs. Chlorine, ozone, chlorine dioxide, and chloramines are the most common disinfectants in use today, and each produces its own suite of chemical DBPs in drinking water (Richardson, 1998). Most developed nations have created regulations or guidelines to control DBPs to minimize consumers' exposure to hazardous DBPs, while at the same time, maintaining adequate disinfection and control of targeted pathogens. Despite much research on DBPs over the last several years, we have only been aware of them since the early 1970s. In 1974, Rook reported the identification of the first DBPs--

Analysis and removal of emerging contaminants in wastewater and drinking water

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Abstract

1. Introduction

Until the beginning of the 1990' non-polar hazardous compounds, i. e. persistent organic pollutants (POP) and heavy metals, were in the focus of interest and awareness as priority pollutants, and consequently were part of intensive monitoring programs. Today, these compounds are less relevant for the industrialized countries since a drastic reduction of emission has been achieved due to the adoption of appropriate measures and elimination of the dominant pollution sources.

However, the emission of so-called "emerging" or "new" unregulated contaminants has emerged as an environmental problem and there is a widespread consensus that this kind of contamination may require legislative intervention. This group is mainly composed of products used in large quantities in everyday life, such as human and veterinary pharmaceuticals, personal care products, surfactants and surfactants' residues, plasticizers and different industrial additives. The characteristic of these contaminants is that they do not need to be persistent in the environment to cause negative effect since their high transformation/removal rates can be compensated by their continuous introduction into environment. One of the main sources of emerging contaminants are untreated urban wastewaters and wastewater treatment plant (WWTP) effluents. (Fig. 1). Most current WWTP are not designed to treat this type of substances and the high portion of emerging compounds and their metabolites can escape elimination in the WWTP and enter the aquatic environment via sewage effluents.

The partial or complete closing of water cycles is an essential part of sustainable water resources management and the increasing scarcity of pristine waters for drinking water supply and increasing consume of water by industry and agriculture should be countered by the efficient and rational utilisation of resources. One of the options is

Attachment #37

Attachment 37 Page 1

Table 5.4-2 (Cont.): Geology Proposed Mitigation Measures

Project(s)	Proposed Mitigation Measure(s)- Project-Specific	Effects After Incorporation of Mitigation Measures
1, 2, 3, and 4	Implementation of Mitigation Measure 5.4-B1 is required.	Less Than Significant
5.4-C: The project may expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving seismic-related ground failure, including liquefaction.		
1, 2, 3, and 4	**5.4-C1:** Prior to approval of the improvement plans for the proposed facilities that are part of the collection system and at the treatment plant site, a geotechnical report that addresses liquefaction hazards shall be prepared and approved by the County of San Luis Obispo. The geotechnical report shall state the recommended actions for the collection system and treatment plant site so that potential impacts from seismically-induced liquefaction would be reduced to less than significant.	Less Than Significant
1, 2, 3, and 4	**5.4-C2:** Prior to approval of improvement plans, an Emergency Response Plan (ERP) shall be prepared as part of the operation and maintenance plan for the proposed collection system. The ERP shall recognize the potential for liquefaction, seismic hazards and ground lurching to impact the pipeline or other proposed facilities, and specific high hazard areas shall be inspected for damage following an earthquake. "Soft Fixes" shall be incorporated in the ERP. Soft Fixes typically consist of having a plan in-place to address the hazards, such as can be achieved by storing supplies and equipment for repair.	Less Than Significant
	Implementation of Mitigation Measures 5.7.B.1, 5.4-C1 and 5.4-C2 are required.	Less Than Significant
5.4-E: The project could result in substantial soil erosion or the loss of topsoil.		
1, 2, 3, and 4	**5.4-E1:** Prior to the approval of grading plans for each facility, erosion control measures shall be incorporated into the grading plans to minimize the potential for erosion or loss of top soil during grading to the satisfaction of the County of San Luis Obispo.	Less Than Significant
1, 2, 3, and 4	**5.4-E2:** Prior to the approval of grading plans for each facility, vegetation/landscaping shall be provided on the graded cut and fill slopes to reduce the long-term potential for soil erosion or loss of topsoil to the satisfaction of the County of San Luis Obispo.	Less Than Significant
1, 2, 3, and 4	**5.4-E3:** Prior to the approval of grading plans for each facility, the plans shall provide for the control of surface water away from slopes to the satisfaction of the County of San Luis Obispo.	Less Than Significant
5.4-F: The project could be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.		
1, 2, 3, and 4	**5.4-F1:** Prior to approval of the improvement plans for the proposed facilities, a geotechnical report that addresses the potential for lateral spreading, ground subsidence, and ground lurching and provides measures to reduce potential impacts to less than significant shall be prepared and approved by the County of San Luis Obispo.	Less Than Significant

this report/assessment crucial to decision-making is deferred, so the severe potential adverse impact is not mitigated and a finding of NSI is not justified. This shows a bias toward the gravity collection system that will have much greater impacts than STEP in an EQ.

Repairing EQ damage will be infeasible. The impacts / risks are not analyzed and mitigations are not funded.

Attachment # 38

Los Osos Upper Aquifer Water Quality Characterization by Cleath & Assoc. June 2006

Discussion of emerging contaminants

Three compounds from the PPCP suite were reported in ground water samples (triclosan, sulfamethoxazole, and carbamazepine). Triclosan is an antibacterial chemical found in detergents, soaps, mouthwash, toothpaste, cosmetics, and many other products. Sulfamethoxazole is a human antibiotic that is commonly combined with another antibiotic, trimethoprim, and used to treat urinary infections. Carbamazepine is an anti-seizure drug use to treat a variety of physical and mental disorders.

Trace amounts of triclosan were reported in one of the equipment blanks and in ground water collected from well 18F1. Sulfamethoxazole was reported in all five ground water samples. Carbamazepine was reported in three of the five ground water samples (13Q1, 7Q1, and 17E9).

Three compounds from the hormones and steroids suite were reported in ground water samples, cholesterol, stigmasterol, and sitosterol. Cholesterol is an ubiquitous animal and plant sterol (a subclass of steroids) and a lipid present in body tissues and plant membranes. Stigmasterol and sitosterol are plant sterols that are included in some dietary supplements to reduce blood cholesterol levels. Cholesterol was reported in all five ground water samples and all three blanks. Stigmasterol was reported in water from well 13F1 and 17E9, and in the distilled water blank. Sitosterol was reported in water from all five wells and in two of the three blanks.

* N-Nitrosodimethylamine (NDMA) was reported in ground water collected from wells 13Q1 and 7Q1 at levels exceeding the notification level but below the response level. NDMA is a byproduct of ion-exchange water treatment and chlorine, ozone, or chloramine disinfection.

These are caused by treatment processes.

DISCUSSION

Ground water samples were collected from five wells tapping the upper aquifer of the Los Osos ground water basin. Two of the five wells tested (13Q1 and 7Q1) tap the top portion of the upper aquifer and three wells (13F1, 17E9, and 18F1) tap the bottom portion being considered for community water supply development. Two hundred individual constituents were analyzed in each of the ground water samples collected, 74 of which are regulated by the State of California through primary and secondary drinking water standards, and 10 through action levels of notification and response.

The primary drinking water standard for nitrate was exceeded in the water samples for four of the five wells (well 18F1 was the exception). Secondary drinking water standards for iron and manganese were exceed in water collected from well 30S/11E-7Q1, and for manganese in water from well 30S/10E-13F1. Color and turbidity standards, and the lead action level were also exceeded in water from well 30S/10E-13F1, however, these are interpreted to be due to inactive facilities rather than aquifer contamination. Consumer notification levels for formaldehyde were exceeded in two wells (13F1 and 7Q1), and for NDMA in two wells (13Q1 and 7Q1). The formaldehyde detections were very close the laboratory reporting limits, and sampling using more sensitive analytical methods would be recommended in the future.

CONCLUSIONS

The following conclusions are based on the analytical results of Task 3 water quality characterization:

- Nitrate remains the primary regulated contaminant of concern in upper aquifer water, and is the only contaminant detected in excess of a primary (health-based) drinking water standards.

- With the exception of nitrate concentrations, and iron and manganese concentrations locally, the constituents in upper aquifer ground water tested during Task 3 meet California State requirements for domestic use. Color and turbidity concentrations measured in excess of secondary drinking water standards at one of the wells are interpreted to be related to inactive well facilities, and not the aquifer.

These can be reduced w/ public education

NDMA is a by-product of the treatment process. (eg. chlorine) so it will get worse w/ the project.

- Evidence of wastewater influence ~~on upper~~ aquifer water is not restricted to salt loading, and is indicated based on detections of NDMA and two PPCPs in multiple wells. NDMA was not reported in the deeper portions of ~~the upper~~ aquifer ~~which are~~ being considered for domestic use. The concentrations of NDMA in the top portion of the aquifer are above the consumer notification level, but below the response level at which discontinued use of the source is recommended by the State.

- Use of the upper aquifer for a community drinking water supply is not without potential risks, based on the documented wastewater influence. The monitoring and treatment requirements for domestic use of upper aquifer water may not be restricted to California Code of Regulations Title 22 constituents, but would include consideration of emerging contaminants such as NDMA, sulfamethoxazole and carbamazepine.

REFERENCES

Cleath & Associates, 2001, Drinking Water Source Assessment and Protection (DWSAP) program appendices for LOCSD wells, May 2001.

Cleath & Associates, 2005, Water Management Plan for the Los Osos Valley Ground Water Basin, July 2005 Draft.

Cleath & Associates, 2006, Task 3 Water Sampling Plan for Upper Aquifer Water Quality Characterization, Los Osos Valley Ground Water Basin, March 9, 2006.

Daughton, C.G., 2001, "Pharmaceuticals in the Environment: Overarching Issues and Overview," in Pharmaceuticals and Personal Care Products in the Environment: Scientific and Regulatory Issues, Daughton, C.G. and Jones-Lepp, T. (eds.), *Symposium Series 791*; American Chemical Society: Washington, D.C., 2001, pp. 2-38).

THE UNIVERSITY OF IOWA

HYGIENIC LABORATORY
Iowa's Environmental and Public Health Laboratory
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Iowa City, Iowa 52242-5002
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www.uhl.uiowa.edu

Appendix D of June 2006 Cleath Water Quality Study

May 16, 2006

Mr. Spencer Harris
Cleath & Associates
1390 Oceanaire Drive
San Luis Obispo, CA 93405

Natural sources

Dear Mr. Harris:

This letter is being sent to you to offer my interpretations and opinions regarding two sets of groundwater samples that your company submitted to our laboratory for analysis for pharmaceuticals, personal care products, antibiotics, hormones, and sterols. It is my understanding that the intent of this testing was to assess whether septic systems are impacting water quality for an aquifer that is being proposed for use as drinking water.

Cholesterol (a steroid that can come from plant or animal origin) was detected in all submitted samples. This is normal. The amounts observed are not considered elevated. Sitosterol (a plant steroid) was observed in all samples. Amounts less than 500 ng/mL are not uncommon for clean water sources and laboratory blanks. Two samples showed levels of approximately 2000 ng/mL which is considered higher than normal. Stigmasterol (a plant steroid) was detected in two samples, but at levels that were low and not of concern. Coprostan-3-ol (a steroid formed in the digestive systems of humans and other mammals) is a good indicator of fecal contamination. It was not observed in any sample. The presence of plant steroids at low concentrations should not be unexpected as water that is moving through the soil to underground aquifers will come in contact with vegetation from which the steroids can be leached. *

Contaminated sample

Carbamazepine (an anti-seizure drug) was detected in three of five Los Osos water samples. Sulfamethoxazole (a human antibiotic) was detected in all five Los Osos samples. Trace amounts of triclosan (an antibacterial used in liquid hand soaps) was detected in the last Los Osos sample that was submitted, but it is possible it could be due to handling contamination. *

I am not a toxicologist so it is difficult to give a perspective regarding whether the presence of carbamazepine and sulfamethoxazole at sub part-per-billion (ppb) levels creates any health risk for a consumer who is using this water for drinking and cooking on a daily basis. These chemicals are present at a very low level. The USEPA has set maximum contaminant levels (maximum allowable concentration for a given chemical in drinking water) for select contaminants of concern in drinking water. The maximum contaminant levels are presented for a few select environmental contaminants so that you can compare the concentration of carbamazepine and sulfamethoxazole to these chemicals which are known to be harmful if injested in large enough amounts: atrazine (3 ppb), carbon tetrachloride (5 ppb), 2,4-D (70 ppb), polychlorinated biphenyls (0.5 ppb), PAHs (0.2 ppb). Considering that these two chemicals are registered for use as human pharmaceuticals, it is

USEPA or USFDA have any guidelines regarding safe levels for these emerging contaminants in drinking water.

The presence of these two pharmaceuticals is an indication that there is a source(s) of contaminants that has leached, or is presently leaching, into the groundwater source. These chemicals will only be found in human wastewater sources. They do not occur naturally nor are they used in agriculture. The two detected pharmaceuticals are highly soluble in water and do not have a tendency to bind in soil, as many organic chemicals do. Considering that these pharmaceuticals have been found at low levels in most of the groundwater samples that you submitted, it is likely there are other chemical contaminants present in the water as we only tested for a select group.

It is very difficult for me to make an assessment regarding overall water quality and safety based on the testing data that we have. In my opinion, what has been found so far is not alarming * but at the same time clearly indicates that some contamination of the water has occurred. Additional testing for other potential chemical contaminants should be considered if you have not already done so.

Please contact me if you would like to discuss the results or the need for any future testing. The University Hygienic Laboratory is certified for most EPA drinking water methods for inorganic and organic chemicals, microbiological organisms, as well as customized tests such as the pharmaceuticals and sterols/hormones.

Sincerely,

John D. Vargo, Ph.D.
Program Manager
Environmental Health
319-335-4478
john-vargo@uiowa.edu

Attachment # 39

EPA/600/R-01/034
December 2000

Exfiltration in Sewer Systems

by

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and
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Order No. 8C-R551-NASX

Project Officer

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Abstract

This report was submitted in fulfillment of Order No. 8C-R551-NASX by Environmental Quality Management, Inc. and Camp, Dresser & McKee of Cincinnati, Ohio under the sponsorship of the United States Environmental Protection Agency. This report covers the period from September 1998 to February 2000 and work was completed in April 2000.

The study focused on the quantification of leakage of sanitary and industrial sewage from sanitary sewer pipes on a national basis. The method for estimating exfiltration amounts utilized groundwater table information to identify areas of the country where the hydraulic gradients of the sewage are typically positive, i.e., the sewage flow surface (within pipelines) is above the groundwater table. An examination of groundwater table elevations on a national basis reveals that the contiguous United States is comprised of groundwater regions (established by the U.S. Geological Survey) which are markedly different. Much of the northeastern, southeastern, and midwestern United States has relatively high groundwater tables that are higher than the sewage flow surface, resulting in inflow or infiltration. Conversely, a combination of relatively low groundwater tables and shallow sewers creates the potential for widespread exfiltration in communities located in the western United States.

This report presents information on typical sewer systems, identifies and assesses the factors that cause or probably cause exfiltration, presents commonly used and advanced corrective measures and their costs for dealing with exfiltration, identifies technology gaps, and recommends associated research needs and priorities. This report also examines urban exfiltration, including a case study of Albuquerque, New Mexico.

(See Attachment 21 p. 2)

As the system ages, these problems get worse. Because the cost of the proposed system is so high, people will be unable and unwilling to pay what it costs to keep leaks at low levels.

Chapter 1
Introduction

1.1 Background

Many municipalities throughout the United States have sewerage systems (separate and combined) that may experience exfiltration of untreated wastewater from both sanitary and combined sewers. Sanitary sewer systems are designed to collect and transport to wastewater treatment facilities the municipal and industrial wastewaters from residences, commercial buildings, industrial plants, and institutions, together with minor or insignificant quantities of ground water, storm water, and surface waters that inadvertently enter the system. Over the years, many of these systems have experienced major infrastructure deterioration due to inadequate preventive maintenance programs and insufficient planned system rehabilitation and replacement programs. These conditions have resulted in deteriorated pipes, manholes, and pump stations that allow sewage to exit the systems (exfiltration) and contaminate adjacent ground and surface waters, and/or enter storm sewers. Exfiltration is different from sanitary sewer overflows (SSOs). SSOs are overflows from sanitary sewer systems usually caused by infiltration and inflow (I/I) leading to surcharged pipe conditions. SSOs can be in the form of direct overflows to receiving water, street flooding, and basement flooding; whereas exfiltration is not necessarily caused by excess I/I and is merely caused by a leaking sewer from its inside to its surrounding outside.

Overflows are caused by I\I.

Untreated sewage from exfiltration often contains high levels of suspended solids, pathogenic microorganisms, toxic pollutants, floatables, nutrients, oxygen-demanding organic compounds, oil and grease, and other pollutants. Exfiltration can result in discharges of pathogens into residential areas; cause exceedances of water quality standards (WQS) and/or pose risks to the health of the people living adjacent to the impacted streams, lakes, ground water, sanitary sewers, and storm sewers; threaten aquatic life and its habitat; and impair the use and enjoyment of the Nation's waterways.

Causes health risks and harm to habitat.

1.2 Objectives

Although it is suspected that significant exfiltration of sewage from wastewater collection systems occurs nationally, there is little published evidence of the problem and no known attempts to quantify or evaluate it on a national basis. Accordingly, the objectives of this

Chapter 2
Identification and Assessment of Causative Factors and Health/Environmental Impacts

2.1 Causative Factors

A search for publications regarding exfiltration of sewage from wastewater collection systems did not locate any exfiltration-specific discussion of unique/causative factors because most factors which cause inflow/infiltration are identical to those associated with exfiltration (i.e., they both occur through leaks in pipes, depending on the relative depth of the ground water).

Factors that contribute to exfiltration include:

* • size of sewer lines
- age of sewer lines
- materials of construction (sewer pipe, point/fitting material, etc.)
- type and quality of construction (joints, fittings, bedding, backfill)
- depth of flow in the sewer

Geological conditions that contribute to exfiltration include:

* • groundwater depth (in relation to sewer line/depth of flow of sewage) ←
- type of soil
- faults

The proposed sewer will not be sealed in locations where it is above the groundwate

Climate conditions that influence exfiltration include:

- average frost line in relation to sewer depth
- average rainfall, which helps determine groundwater depth

In a typical exfiltrating sanitary sewer system, with the groundwater level below the sewage flow surface, exfiltration can occur in several areas. Figure 2-1 schematically represents these exfiltration sources, including defective joints and cracks in the service laterals, local mains, and trunk/interceptor sewers. The level of ground water and the depth of flow in the sewer will influence the extent of exfiltration rates, since the pressure differential

Attachment # 40

The following is a partial list of sewer overflows in San Luis Obispo County in the past two years showing that conventional gravity sewers are a significant cause of pollution, especially during wet weather when high levels of inflow and infiltration surcharge the system.

Raw Sewage Spill Closes Local Beach

Jan 8, 2009 at 2:40 AM PST

Environmental Health Services has issued a precautionary beach closure in Shell Beach after a raw sewage spill.

Sewage Spill Prompts Warning

Jan 20, 2010 at 9:23 AM PST PISMO BEACH –

A sewer main backup Tuesday afternoon caused an overflow of about 700 gallons of raw sewage to spill in Pismo Beach. The spill occurred on Baker Avenue and flowed down to Naomi Avenue, and eventually entering the storm drain on Seacliff Drive in the Shell Beach area. City crews...more repaired the sewer main and are working to disinfect the spill area. As a precaution, County Environmental Health Services is advising the public to avoid ocean water contact along the beach area below the spill.

Health Officials Are Looking Into Sewage Spill in SLO

Feb 3, 2009 at 10:48 PM PST

30,000 gallons of sewage was released out of a sewer pipe at 7:00 a.m. Tuesday morning at Orcutt Road and Lawnwood Drive.

Beach Advisory Lifted After Sewage Spill

Feb 4, 2009 at 8:45 PM PST

Health officials have lifted an advisory at Avila Beach, following the sewage spill they feared by they feared may have contaminated the water.

Sewage Spill

Feb 14, 2009 at 11:11 PM PST

A sewage spill into the Cayucos creek.

Sewage Spill Behind Atascadero City Hall

Jan 20, 2010 at 5:36 PM PST

Atascadero-

According to a news release issued by the County of San Luis Obispo, the City of Atascadero experienced a sewer main blockage and overflow today at 9:50 AM. The overflow of approximately 25,000 gallons of raw sewage came out of a sewer manhole located behind the City of Atascadero's...more Government Center/City Hall, and then flowed into a storm drain that empties into Atascadero Creek. City crews had repaired the sewer main by 11:30 AM and then disinfected the spill area.

Major sewage spills in San Luis Obispo County

December 19, 2010

Health officials are warning the public to stay away from San Luis Obispo Creek, Arroyo Grande Creek, Meadow Creek, Oceano Lagoon and places where the creeks drain into the ocean because of two wee

The catastrophic failure of a six inch pump line at the San Luis Obispo Reclamation Plant on Prado Road on Saturday evening resulted in the release of about 15,000 gallons of sewage into San Luis Obispo Creek.

A second sewage spill occurred when the effluent pump at the South San Luis Obispo Sanitation District failed. As a result, clogged sewage lines caused the release of an unknown quantity of sewage.

The plant is currently using a large diesel power pump in place of the failed effluent pump. "Sewer lines are backed up and sewage is bubbling out of manhole covers," said John Wallace, the district's adm

The San Luis Obispo County Health Agency said that contact or ingestion of the contaminated waters is likely to make one sick.

County supervisors call emergency meeting

December 27, 2010

The San Luis Obispo County Board of Supervisors will have an emergency meeting Tuesday, Dec. 28 at 9 a.m.

Tuesday's meeting, scheduled to last only 45 minutes, is intended for county staff to update the supervisors on recent storm damage and actions taken to restore roads and other local infrastructure.

The supervisors will also be asked to extend the Proclamation of Local Emergency issued by county administrator Jim Grant on Dec. 21. County code requires the supervisors to review the situation every two weeks once an emergency has been declared.

San Luis Obispo South County Sanitation District (SSLOCSD) have allegedly under-reported the amount of raw sewage spilled during recent rainstorms in an effort to protect an agency already being accused of firing whistleblowers.

On December 18, a sewage spill of between 110,000 gallons to approximately one million gallons occurred when the influent pumps at the plant failed. Critics contend the failure could have been avoided if the Oceano plant had repaired a failing electrical system.

Sewage Spill in San Luis Creek

Posted: Jan 02, 2011 6:55 PM PST

Updated: Jan 02, 2011 6:55 PM PST 1.2.11

SAN LUIS OBISPO- San Luis Obispo County Officials are warning people to stay out of San Luis Creek. A sewage spill was reported this afternoon near Windsor Boulevard and Shammel Park. A waste water system that was overloaded by excessive rain caused the 15,000 gallon spill. People are being advised to also stay out of Chorro Creek, Morro Bay Estuary and Morro Bay. Sport shellfish harvesting in the estuary is also prohibited until further notice.

Updated: Feb 03, 2011 7:30 PM PST

MORRO BAY - It's safe to eat shellfish again.

The San Luis Obispo County Public Health Department has lifted the quarantine on recreational sport-harvesting of bi-valve shellfish... including clams, mussels and scallops. The ban was put in place on December 21st and covered the entire bay, from Morro Rock to the southern end of the bay. On Sunday December 19th, following heavy rain, a tree fell on an above ground sewer line at Cuesta College.... causing a dangerous health threat.

The broken line allowed 50,000 gallons of sewage to spill into Chorro Creek, which empties into the Morro Bay Estuary. Eating contaminated shellfish can make a person very sick with viruses and bacteria.ally vulnerable to these waterborne pathogens.

THE FOLLOWING OCCURRED BETWEEN ABOUT DECEMBER 1, 2010 AND DECEMBER 30, 2010

MORE SEWAGE LEAKS OCCUR DURING THE STORM

Even more sewage was released into the water ways around the county during Monday's storm. In San Luis Obispo, 1,000 gallons spilled into San Luis Creek at the intersection of Pismo and Toro streets. In Morro Bay, about 500 gallons were released into a storm drain at Main and Nassau Streets. In Pismo Beach, 750 gallons spilled into a storm drain at Morro and Ocean streets. And in Avila Beach 2,500 gallons was spilled from a lift station at First Street and San Miguel Avenue. The total is just less than 5,000 gallons of raw sewage released into the four cities.

TREE FALLS ON SEWER LINE, CLOSING CUESTA COLLEGE

The Cuesta College campus closed yesterday due to a sewage spill. A tree on the adjacent Camp San Luis toppled Sunday and damaged a bridge over Chorro Creek and severed the college's sewer line. The severed line was tapped and turned off. The college maintenance and operations department is working with Camp San Luis personnel to repair the line. There are no students on campus and a reduced number of staff is working due to winter break.

PUBLIC HEALTH DEPARTMENT: STAY OUT OF THE OCEAN

The San Luis Obispo County Public Health Department says to stay out of ocean water for at least three days after significant rainstorms. Rainstorm runoff is known to transport high levels of disease causing organisms such as bacteria and viruses originating from the watershed. These organisms carried into the ocean can cause skin, respiratory, and intestinal problems. People with compromised immune systems, plus the very young and elderly age groups are especi
Shellfish Quarantine Lifted

Attachment #41


LOWWP
Substantial issues

Local Coastal Plan

Coastal Watershed Policy #1:

"The long-term integrity of groundwater basins within the coastal zone shall be protected…"

LCP Environmentally Sensitive Habitat Policy #7

"…The ... productivity of wetlands and estuaries shall be protected, preserved and where feasible, restored."

- Project removes about 1000 AFY of recharge from the basin (septic system return flows)

- Replaces it with ??? AFY of recharge (or reduced pumping to offset recharge, via conservation, etc.)

Adverse Impacts of the LOWWP

- Increase seawater intrusion (SWI) in the lower aquifer.
- Lead to SWI in the upper aquifer.
- Destroy environmentally sensitive habitat (wetlands and creeks) by cutting off flows.

Substantial Issue #1

These is no contingency plan for the Broderson leach fields--the main mitigation for groundwater impacts.

Broderson leach fields

The EIR states Broderson will mitigate for the project's impacts on the upper zones (will not harm wetlands, marshes, and springs along the bay), the upper aquifer (will not cause SWI), the lower aquifer (will not increase SWI).

Broderson not sure to work

... groundwater monitoring wells on the site and downgradient ... will be installed ...for the purpose of reducing the rate of disposal if necessary. ... at any discharge rate, there may be increased potential for liquefaction beneath residences (DEIR, Appendix D-2, p. 32)

If Broderson doesn't work

"You'd better have capacity somewhere else…" (Spencer Harris, Project Hydrogeologist, Planning Commission Hearing, 6/30/09)

Substantial Issue #2

Conditions 99, 6, and 97 do not implement time-specific conservation and reuse plans

Condition 99 (Conservation)

"Within one year of adoption of a due diligence resolution by the Board of Supervisors, electing to proceed with a wastewater project, a water conservation program shall be developed …

Conservation—the surest and most cost effective way to mitigate for SWI

Approximate forward progress of SWI in the lower aquifer since 1970's

Source: AirPhoto USA, Hopkins Groundwater Consultants, San Luis Obispo County GIS Data, and MBA GIS Data.

Michael Brandman Associates

NORTH

2,000 1,000 0 2,000
Feet

02240002 • 11/2008 | 5.2-2_surface_water_features.mxd

Exhibit 5.2-2
Los Osos Surface Water Features

COUNTY OF SAN LUIS OBISPO • LOS OSOS WASTEWATER PROJECT
GROUNDWATER QUALITY AND WATER SUPPLY EXPANDED ANALYSIS SECTION

Planning Commission Condition 99

(Changed by Board of Supervisors at the Appeal Hearing, 9/29/09)

Original Condition 99 had

- implementation language
- up-front funding
- specific incentives for early-participation.

"… Upon final approval of the Los Osos Waste Water Project (LOWWP) including any appeals to the Board of Supervisors and/or the California Coastal Commission, the applicant shall implement a water conservation program..."

"…we have to establish a water conservation program but that … program could in fact have…a multiple year implementation schedule…" "…we spend the $5 million in five years or ten years or twenty years…"

Paavo Ogren, Public Works Director,
LOWWP Appeal Hearing, 9/29/90

(No specific timeline for meeting the 50 gpcd target, or plan for how it will be accurately measured.)

Condition 6

Does not implement a time-specific plan for Ag Re-use

"… Prior to providing tertiary treated water for agricultural uses the applicant shall develop a *Recycled Water Management Plan for Agricultural Re-use…*

Condition 97 (Recycled Water Use)

Does not implement a time-specific plan for recycled water use

Condition 97--Disposal of treated effluent shall be reserved for the following sites/uses in the Los Osos Groundwater Basin:

a. Broderson (not to exceed 448 AFY on an average annual basis),

b. Urban re-use within the urban reserve line (as identified in the Effluent Re-Use and Disposal Tech Memo, July 2008),

c. Agricultural re-use overlying the Los Osos Groundwater Basin,

d. Environmental reservations (not less than 10% of the total volume of treated effluent).

Condition 97 (cont.)

Total agricultural re-use shall not be less than 10% of the total treated effluent. Disposal shall be prioritized to reduce seawater intrusion and return/retain water to/in the Los Osos groundwater basin. Highest priority shall be given to replacing potable water uses with tertiary treated effluent consistent with Water Code Section 13550.

No amount of treated effluent may be used to satisfy or offset water needs that result from non-agricultural development outside the Urban Reserve Line of the community of Los Osos.

Other problems with Condition 97

- **Doesn't specify the best SWI mitigation measures**
  - Ag exchange—.55 mitigation factor
  - Urban Reuse—.55
  - Broderson leach fields—.22
  - Ag reuse—.10
- **Limits urban reuse.** TM limits urban reuse to a few sites (less than 100 AFY); Water Code Section 13550 refers to more uses.
- **Habitat not prioritized.**
- **Induces growth.** No recycled water use should be used to offset development—RCS Level III of Severity.

Substantial Issue #3

Conditions 87, 88, and 101 will not protect and maintain environmentally sensitive habitat

Impacts on Willow Creek, Eto Lake, Los Osos Valley Creek

Appendix D-2 of the DEIR

"The Broderson leach fields… can not mitigate potential impacts of reduced …outflow … toward Willow Creek … or directly into the bay. … **(p. 41)**

Significant impacts will occur to Willow Creek, Eto Lake, Los Osos Valley Creek

Source: AirPhoto USA, Hopkins Groundwater Consultants, San Luis Obispo County GIS Data, and MBA GIS Data.

Michael Brandman Associates

NORTH

2,000 1,000 0 2,000 Feet

Exhibit 5.2-2

Los Osos Surface Water Features

02240002 • 11/2008 | 5.2-2_surface_water_features.mxd

COUNTY OF SAN LUIS OBISPO • LOS OSOS WASTEWATER PROJECT

GROUDWATER QUALITY AND WATER SUPPLY EXPANDED ANALYSIS SECTION

About 400 Acre Feet of water will not flow to Willow Creek Drainage and other ESHA

Table 2 of Appendix D-2 of DEIR—Summary of Local Surface Water Features

Surface water feature	Seasonality	Size or rate of Flow	Flow Source
LOS OSOS CREEK (AT LOS OSOS ROAD BRIDGE)	EPHEMERAL	1,630 TO 4,110 AFY	MORRO GROUP, 1990
WILLOW CREEK (ETO CREEK) (DISCHARGE FROM PERCHED AQUIFER)	**EPHEMERAL**	**438 AFY**	**SOURCE YATES & WILLIAMS, 2003**
SWEET SPRING	PERENNIAL	FLOWS 292 AFY	MORRO GROUP, 1990
SWEET SPRING MARSH	EPHEMERAL	NA	MORRO GROUP, 1990
PECHO ROAD MARSH	EPHEMERAL	NA	MORRO GROUP, 1990
THIRD STREET MARSH	NA	APPROX. 2-5 GPM OBSERVED	MORRO GROUP, 1990
BAYWOOD MARSH	NA	APPROX. 5 GPM	MORRO GROUP, 1990
BAYWOOD MARSH	NA	NA	MORRO GROUP, 1990
LOS OSOS CREEK ESTUARY	NA	SEVERAL SMALL OUTFLOW CHANNELS AT APPROX. O.5 GPM	MORRO GROUP, 1990

What happens to Willow Creek

"…outflow…is anticipated to decline by a few hundred feet… There will be a certain amount of drying up…reverting back to predevelopment"

(Spencer Harris, Project Hydrogeologist, Planning Commission Hearing, 6/30/09)

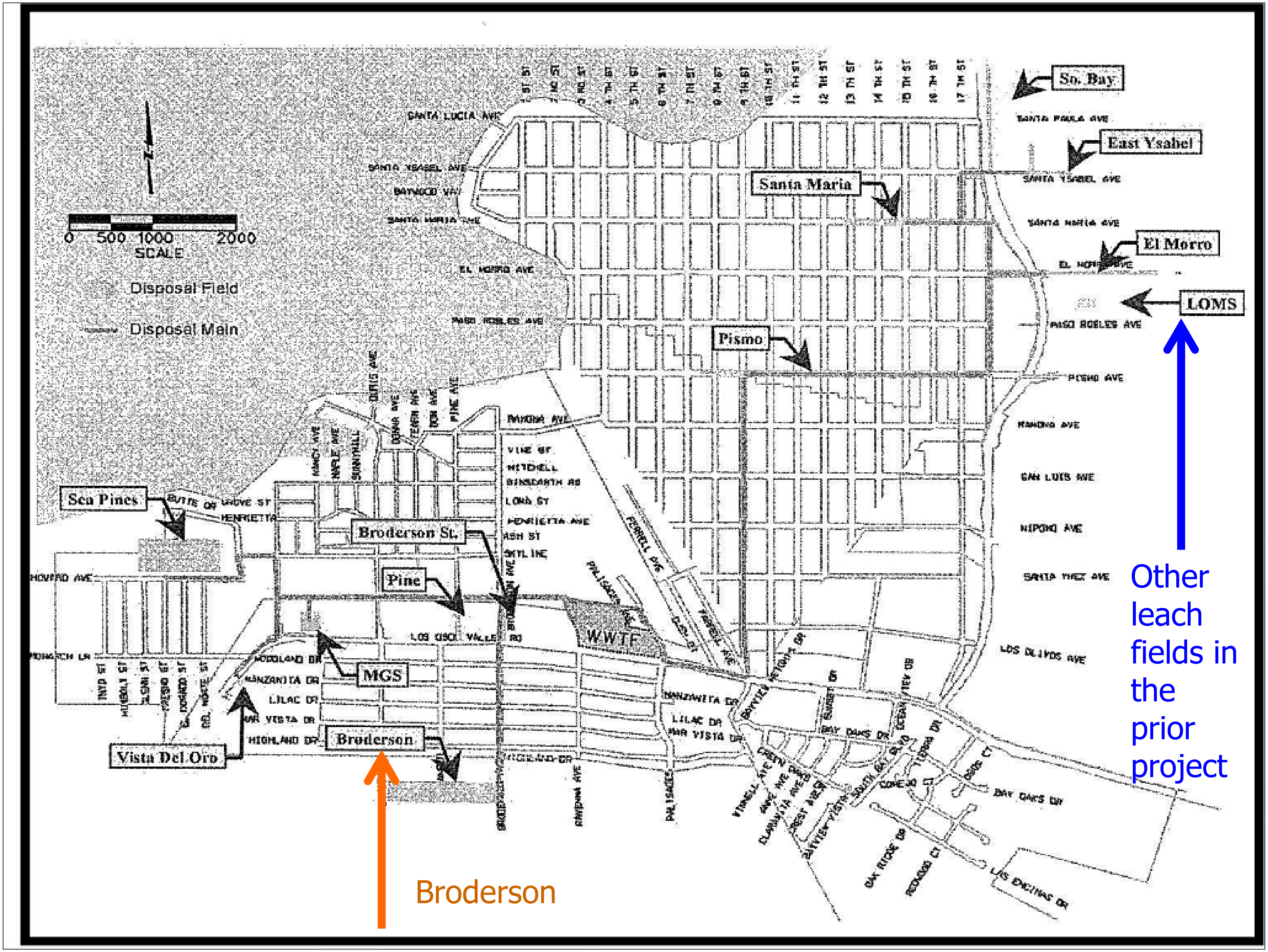
Condition 87

Implements a "Groundwater Level Monitoring and Management Program"

May not be feasible

Condition 87 Rolls over Condition 20, but…

- The prior project had multiple leach fields and harvest wells to assure flows to habitat
- The LOWWP has no multiple leach fields or harvest wells


So. Bay
East Ysabel
Santa Maria
El Morro
LOMS
Pismo
Sea Pines
Broderson St.
Pine
WWTF
MGS
Vista Del Oro
Broderson
0 500 1000 2000
SCALE
Disposal Field
Disposal Main
Other leach fields in the prior project
Broderson

Condition 88

Does not implement actual measures

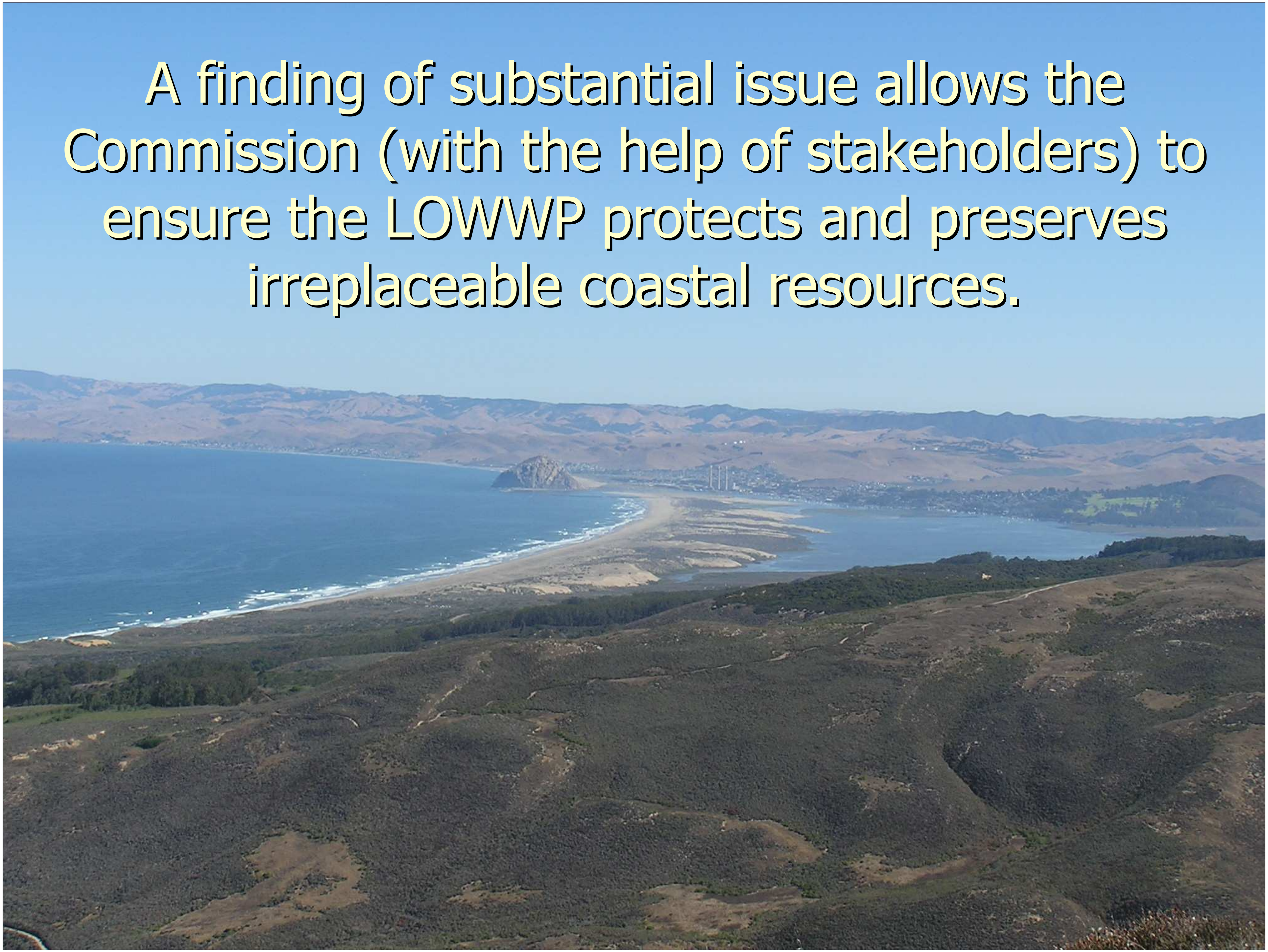
A voluntary program will not supply adequate flows to wetlands and creeks

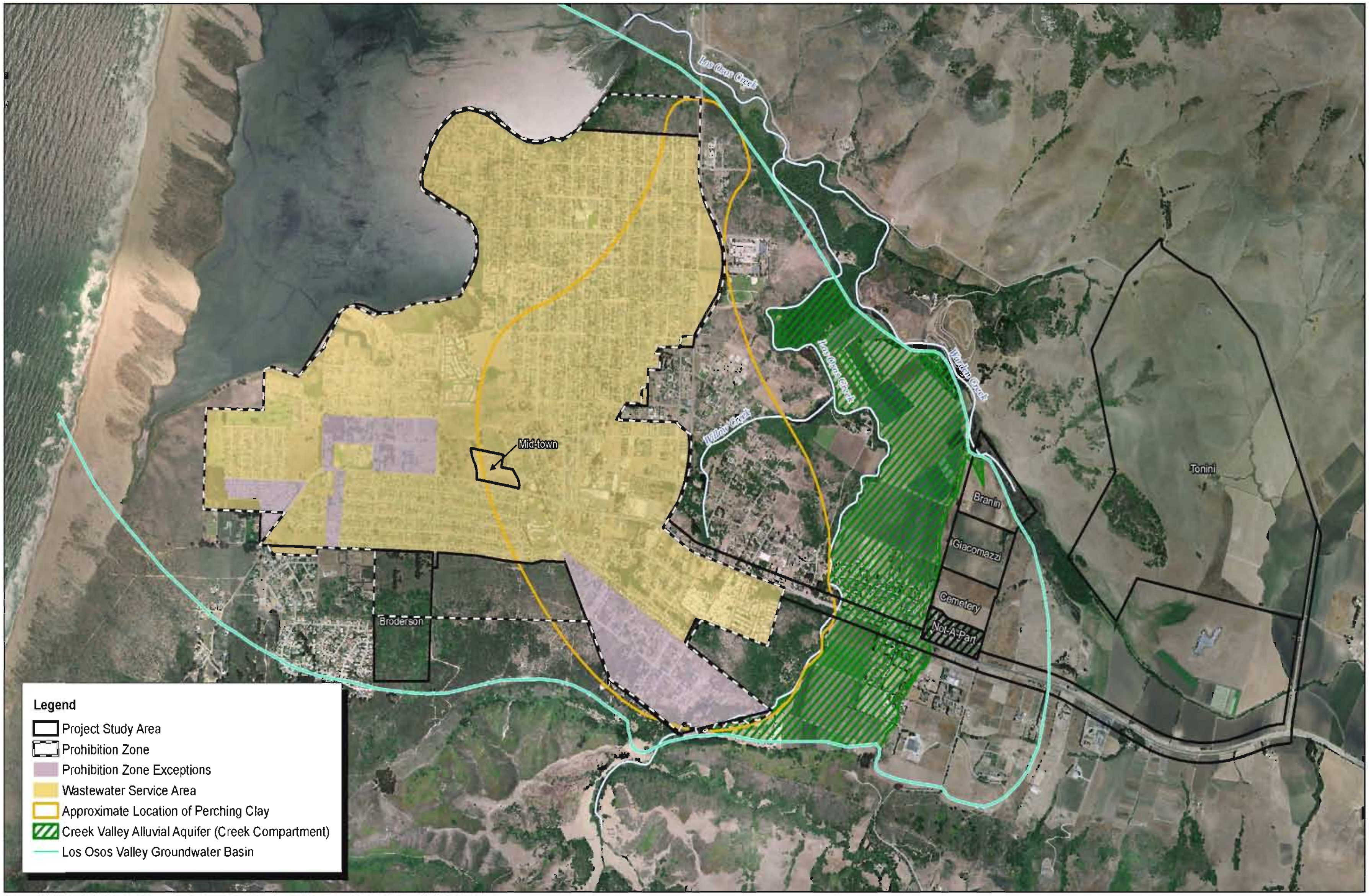
Condition 88 "… the County shall evaluate and, where appropriate, assist property owners in the implementation of opportunities to re-use existing septic tank effluent disposal systems (e.g., leach fields) to filter and percolate stormwater runoff."

Condition 101

33 AFY will not mitigate for about 400 AFY of reduced flows

Condition 101--"The applicant shall utilize the existing Bayridge leach field…to dispose of approximately 33 acre feet per year of treated effluent … The applicant shall consult with the (LOCSD) …to ensure all …concerns are addressed."


A finding of substantial issue allows the
Commission (with the help of stakeholders) to
ensure the LOWWP protects and preserves
irreplaceable coastal resources.



Source: AirPhoto USA, Hopkins Groundwater Consultants, San Luis Obispo County GIS Data, and MBA GIS Data.

Michael Brandman Associates

NORTH

2,000 1,000 0 2,000 Feet

02240002 • 11/2008 | 5.2-1_groundwater_basin.mxd

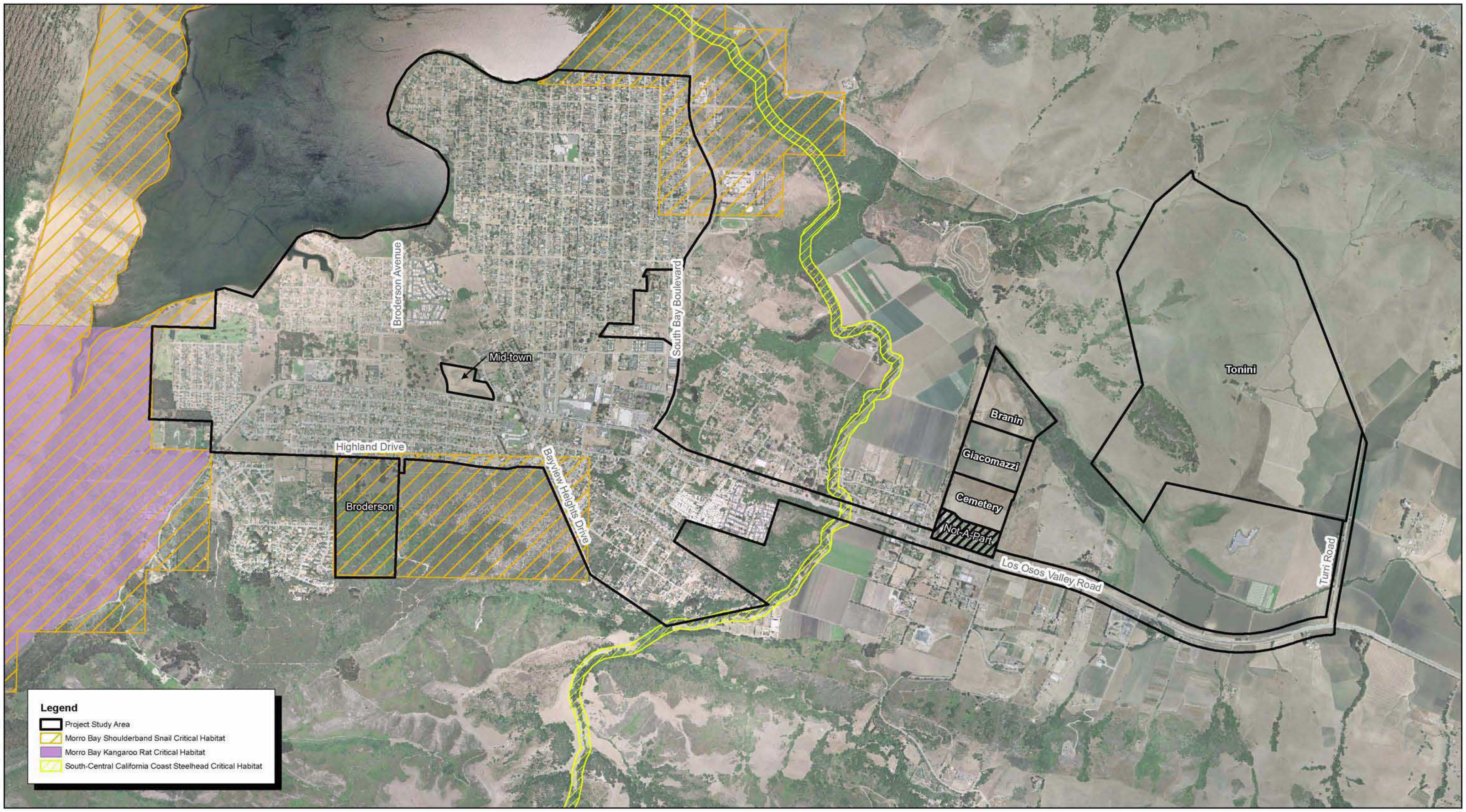
Exhibit 5.2-1
Los Osos Groundwater Basin

COUNTY OF SAN LUIS OBISPO • LOS OSOS WASTEWATER PROJECT
GROUDWATER QUALITY AND WATER SUPPLY EXPANDED ANALYSIS SECTION

Other problems with Broderson Leach Fields

- Destroys habitat.
- Costly and energy intensive.
- Likely to be abandoned in the future. (It is really a recharge strategy and permitting will get more strict.)
- Could lead to over pumping of upper aquifer. (Upper aquifer only "relatively stable.")
- Over reliance on Broderson means use of less effective strategies for stopping SWI.

Los Osos Creek is designated steelhead habitat



Source: AirPhoto USA and San Luis Obispo County GIS.

Michael Brandman Associates

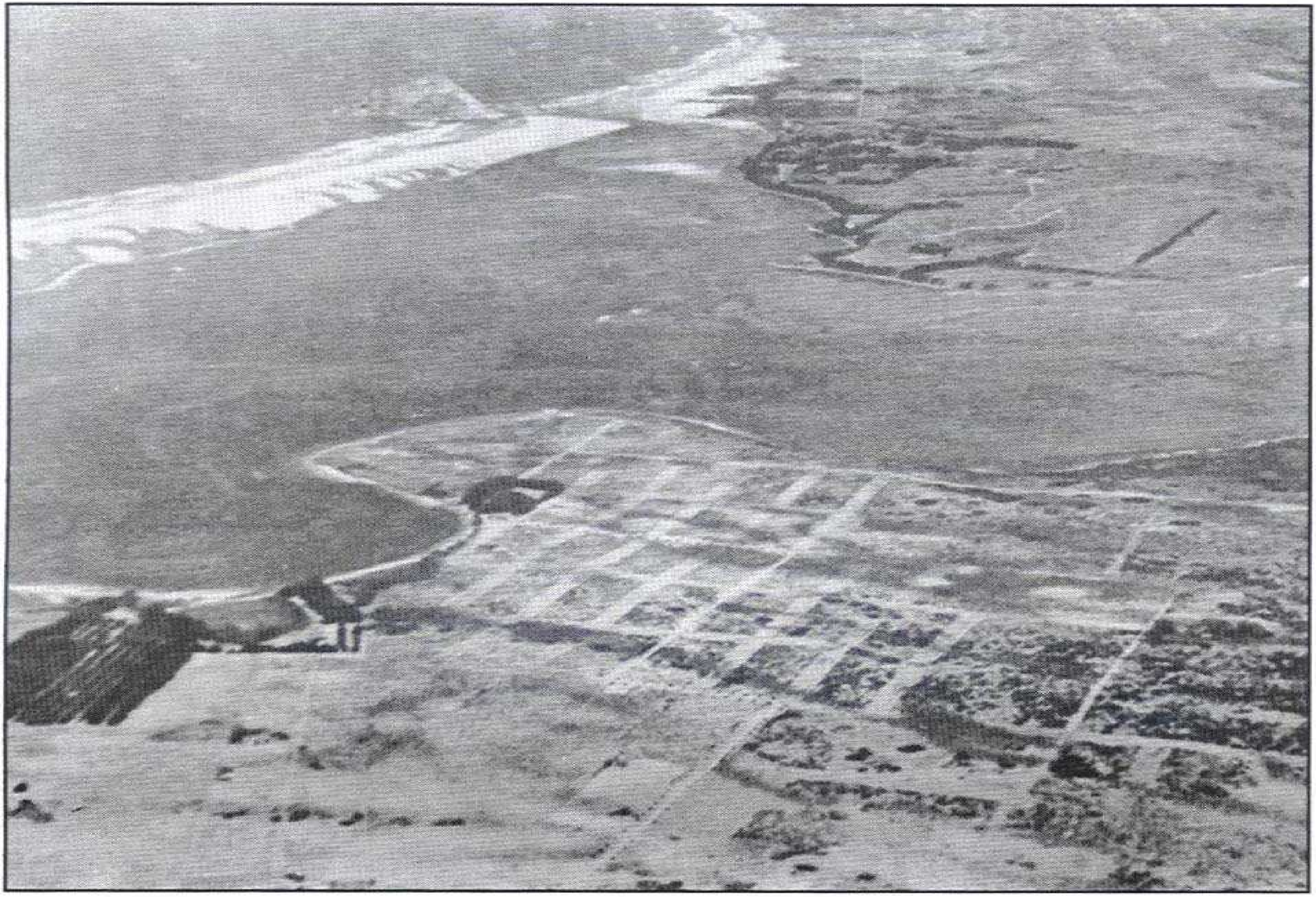
NORTH

2,000 1,000 0 2,000 Feet

02240002 • 11/2008 | 5.5-1_special_status_habitat.mxd

Exhibit 5.5-1
Special Status Species Habitat

COUNTY OF SAN LUIS OBISPO • LOS OSOS WASTEWATER PROJECT
ENVIRONMENTAL IMPACT REPORT



A great aerial view of Estero Bay, Los Osos - Baywood Park peninsula, and Morro Bay before the causeway and jetty were built. Photo was taken in the 1930s by Richard Otto.

Attachment # 42

Stanford Report, May 20, 2010

Stanford scientists confirm that polluted groundwater flows from coastal septic systems to the sea http://www.stanford.edu/group/knowledgebase/cgi-bin/2010/09/10/from-septic-system-to-the-sea-tracking-groundwater-pollution

Stanford University researchers have tracked a plume of polluted groundwater from a septic system to one of California's top recreational beaches. The results may be an important step in improving coastal wastewater management in the United States.

Courtesy of Nick de Sieyes

BY DANIEL STRAIN

Faulty septic systems have long been blamed for polluting some of California's most popular beaches. Yet few scientific studies have established a direct link between septic systems and coastal contamination.

Now, in the first study of its kind, Stanford University researchers have tracked a plume of polluted groundwater from a septic system to one of Northern California's top recreational beaches. The researchers say their findings could be an important step toward improving wastewater management in coastal communities throughout the United States.

"The flow of groundwater directly to the ocean is very hard to measure," said Alexandria Boehm, associate professor of civil and environmental engineering at Stanford. "We hope that this work will raise awareness of the importance of groundwater as a source of pollution, and that coastal communities will look at this source when considering conservation efforts."

Since 2008, Boehm and her Stanford colleagues have been studying the flow of groundwater from a large septic system at Stinson Beach, a favorite destination of swimmers and surfers about 20 miles north of San Francisco that's managed by the National Park Service. The study is supported by an Environmental Venture Projects grant from Stanford's Woods Institute for the Environment.

Stinson Beach is relatively clean compared with other California coastal sites, such as Malibu and Rincon Beach, where high levels of bacterial contamination have been blamed on failing septic systems. Efforts in these communities to make the costly switch to sewer-based plumbing have proved contentious.

At Stinson Beach, the Stanford team has worked closely with local and federal agencies to educate the public on the pros and cons of septic systems and develop a consensus on how to improve groundwater quality.

Groundwater pollution

In septic systems, wastewater drains from toilets and sinks into an underground tank, then through porous pipes in a leach field, where surrounding sand filters out bacteria and other pathogens. Microbes in the dirt break down organic and inorganic wastes, such as nitrogen.

"In conventional septic systems, wastewater treatment tends to be inefficient for certain contaminants," said Nick de Sieyes, an engineering graduate student working with Boehm. "As a result, untreated sewage can end up polluting nearby groundwater."

Prior to this study, scientists had never observed in detail a plume of contaminated groundwater flowing from a septic system to the sea. To track groundwater pollution at Stinson Beach, the research team obtained a permit from the National Park Service to install a network of 120 monitoring wells near a large septic system close to a beach parking lot that collects wastewater from nearby homes and public toilets.

The wells were placed in parallel rows on the beach separating the septic system from the ocean – a distance of several hundred yards. This network of wells allowed researchers to collect groundwater samples and assess the degree of contamination flowing from the septic system through the beach and out to sea.

Mixed results

The results were encouraging in one respect, de Sieyes said. Tests revealed low concentrations of fecal indicator bacteria – microbes that are used by health officials to evaluate water quality for beach closures.

"The septic system appeared to be treating fecal indicator bacteria to a relatively high degree, so the chance of triggering a water-quality advisory in the surf zone during our study was low," he said.

Although few microbes made it out of the leach field alive, the scientists discovered a plume of nitrogen-enriched groundwater flowing through the sand toward the ocean. Studies have shown that excess nitrogen can cause harmful blooms of phytoplankton and other algae that choke off oxygen in coastal waters.

In previous experiments at Stinson Beach, Boehm and her colleagues recorded a spike in phytoplankton following a period of nitrogen-rich groundwater discharge. And in subsequent laboratory experiments, Stinson Beach groundwater proved to be a good meal for algae.

"In the lab, we induced small phytoplankton blooms in ocean water by adding just a little bit of fresh groundwater from this site," de Sieyes explained. "In communities like Stinson Beach, whatever doesn't get treated in the beach is ultimately going to flow into the ocean."

Fixing the plumbing

Many California communities have switched to conventional sewer systems as an alternative for treating wastewater. But septic-to-sewer conversions are pricey and encourage development, Boehm said. Wastewater plants are also energy hogs, de Sieyes added.

"Because septic systems rely on naturally occurring bacteria in the ground to do the cleaning, they're much more energy efficient," he said.

But septic system technology hasn't evolved much since the 1950s, Boehm added, so new systems may have to be designed to treat wastewater to a higher degree before it is discharged to a leach field.

"If there was a better, cheaper, more efficient onsite treatment technology, I'm sure the Stinson Beach community would be interested in it," de Sieyes said.

The research team has presented its findings to the National Park Service and at public meetings, and it has worked closely with the Stinson Beach County Water District. Even before the study began, the water district had taken big steps to green its shores, de Sieyes said, by establishing eco-friendly rules for installing new septic systems, including restrictions on how close to shore they can be built.

"The local water district and the community as a whole deserve a great deal of credit for tackling this issue head on," he said.

"Our results will provide valuable insight into the fate and transport of contaminants from septic systems along the California coastline and elsewhere," Boehm said. "Predicting where, when and what magnitude of environmental pollution can be expected will help guide regulators in deciding which coastal settings are appropriate for septic systems."

Other Stanford collaborators on the Environmental Venture Projects grant are law Professor Deborah Sivas and Woods Institute Senior Fellows Scott Fendorf, professor of environmental Earth system science, and Rosemary Knight, professor of geophysics.

Daniel Strain is a science-writing intern at the Woods Institute for the Environment at Stanford University.

Daily news email

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