

LOCAL AGENCIES OF THE NORTH DELTA

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SENT VIA EMAIL (bdcpccomments@icfi.com)

BDCP/WaterFix Comments
P.O. Box 1919
Sacramento, CA 95812

RE: Comments on Bay Delta Conservation Plan and California Water Fix Partially Recirculated Draft Environmental Impact Report/Supplemental Environmental Impact Statement

Dear Lead Agencies:

These comments are submitted on behalf of the Local Agencies of the North Delta (“LAND”). LAND is a coalition of reclamation and water districts in the northern geographic area of the Delta.¹ As local agencies in the areas most impacted by the significant and unavoidable environmental and other impacts of the BDCP, including the diversion and degradation of our primary water supply and conversion of our farmland to other uses, our member agencies have been active stakeholders in the Bay Delta Conservation Plan and California Water Fix (“Tunnels”) planning process since 2008. Four LAND member agencies are also cooperating agencies under the National Environmental Policy Act (42 U.S.C., § 4221 (“NEPA”)), and provided early consultation with the federal lead agencies regarding local impacts and mitigation. Due to the numerous deficiencies in the BDCP/Tunnels Partially Recirculated Draft Environmental Impact Report/Supplemental Environmental Impact Statement (“RDEIR/S”) and other related documents, a broad coalition of stakeholders, including LAND, agree that the documents must be substantially revised and recirculated for public review before any action may be legitimately taken on the Tunnels.

¹ LAND member agencies cover approximately 118,000 acres of the Delta. Current LAND members include Reclamation Districts 3, 150, 307, 317, 349, 407, 501, 551, 554, 556, 744, 755, 813, 999, 1002, 2111, 2067 and the Brannan-Andrus Levee Maintenance District. Some of these agencies provide both water delivery and drainage services, while others provide only drainage services. These districts also assist in the maintenance of the levees that provide flood protection to homes and farms.

I. PROCEDURAL ISSUES PERTAINING TO PUBLIC REVIEW PROCESS

LAND objects both to the failure to make comments on the 2013 Draft Bay Delta Conservation Plan and Associated Draft Environmental Impact Report/Environmental Impact Statement (2013 “BDCP” and “DEIR/S”) available to the public,² and the failure to provide responses to comments as required under the California Environmental Quality Act (Pub. Resources Code, §§ 21000 et seq. (“CEQA”); CEQA Guidelines, § 15088) and NEPA (40 C.F.R. 1503.4). The public disclosure purposes of CEQA and NEPA are not met when lead agencies actively frustrate public review by limiting access to the comments of others and unnecessarily delaying responses to comments. At the very least, an index of changes made in response to comments should have been provided with the RDEIR/S to assist in public review of the document.

It is noted that many exhaustive comment letters were submitted in 2014 and are being submitted now by other entities explaining in detail their concerns about the legal and scientific adequacy of the Tunnel documents. The comments in this letter do not attempt to catalogue all defects in the documents. LAND incorporates by reference all other comments that pertain to the protection of the unique cultural, agricultural and environmental values of the Sacramento San Joaquin Delta.

LAND’s prior comments submitted in 2014 are relevant to the WaterFix (“Alt. 4A), except where the specific elements are no longer contained in Alt. 4A. The lead agencies are in the best position to determine the applicability of LAND’s prior comments to Alt. 4A since no responses to our July 29, 2014 letter, or even an index of the changes made pursuant to comments, has been provided. We request responses to all of our prior comments as they pertain to Alt. 4A, in addition to these comments and the attached expert reports.

² Access to these comments was made possible not by the lead agencies, but by a non-profit river advocacy group, Friends of the River, which obtained the comments through public records requests and posted them on its own website at: <http://www.friendsoftheriver.org/site/PageServer?pagename=bdcpcments>.

II. COMMENTS ON RDEIR/S

RDEIR Section 4: New Alternatives

Reason for Changes to the Project

The RDEIR/S claims that changes to the project are being made in response to public comments. (RDEIR/S, pp. 4.1.2 to 4.1.4.) The changes to Alternative 4 (“Alt. 4” or “BDCP”) made to create Alt. 4A, however, are not fully responsive to concerns voiced in LAND’s prior comment letters or anything that has occurred during the last eight years of the process; LAND is unaware how the changes included in Alt. 4A respond to particular public comments, nor are any specifics discussed in the RDEIR/S. While the dramatic reduction in the scope of planned restoration alleviates some concerns regarding the massive scale of conversion of farmland to habitat and other impacts to agricultural operations, for instance, the change away from a commitment to meet the habitat plan conservation goals in the long term is also concerning. Operations of the South Delta pumps under Section 7 of the Endangered Species Act (“ESA”) (see 16 U.S.C. §§ 1531, 1536) does not provide local communities much hope that such an approach will have any better results in the North Delta if diversions are constructed here. The Central Valley Project (“CVP”)/State Water Project (“SWP”) continued to violate even the weakened water quality standards that were applicable this year because of the drought. These same communities would live at the whim of the CVP/SWP’s irresponsible operations if diversions are built in the North Delta.

In summary, the changes to Alt. 4A appear to be undertaken for reasons independent of public comments on the DEIR/S, namely that Alt. 4 could not meet the minimum legal standards applicable to Habitat Conservation Plans (“HCP”) and Natural Community Conservation Plans (“NCCP”). The numerous calls for consideration of other ways to meet water supply needs without constructing new diversions on the Sacramento River have gone unheeded since the inception of the BDCP in 2006, a process prematurely premised on the supposed need for a canal (later Tunnels). Moreover, with no responses to the public comments provided in 2014, it is nearly impossible to locate the instances in which public suggestions were incorporated into the project and/or RDEIR/S. Thus, it is entirely inaccurate for the RDEIR/S to now claim that project changes were made in response to public comments to “reduce many of these impacts and ease the burden on the environment and Delta communities.” (RDEIR/S, p. 4.1-4.) The most destructive part of Alt. 4 remains intact (the Tunnels), which “would be constructed and maintained identically to those proposed under Alternative 4.” (RDEIR/S, p. 4.1-4.) As a result, impacts of this project remain significant and unacceptable.

Deficiencies in Project Description of Alt. 4A

Alternative 4A is not properly analyzed in the context of CEQA/NEPA, as the elements of other prior alternatives (such as the HCP/NCCP and its habitat) are not carried forward in 4A, but the text repeatedly conflates these elements in the descriptions of impacts/effects for Alt. 4A. The purported environmental analysis provided for Alt. 4A relies on the analysis completed for the prior BDCP (Alt. 4), and attempts to state that prior analysis is sufficient to understand the impacts of the Alt. 4A on the environment. Instead, the analysis conflates the potential benefits of habitat creation from Alt. 4 with the reduced impacts of just constructing the Tunnels. The results provide neither an accurate environmental analysis nor even a coherent description of the project impacts.

For illustration, in the case of the water quality analysis for the new Alt. 4A, a supplemental document is appended as Appendix B, Supplemental Modeling Results for New Alternatives, B.1 Alternative 4A CALSIM II Sensitivity Analysis (p. B-2.), again focusing on wet years, and differences between averages, and which still relies on uncited analyses developed in the prior Appendix 5A Modeling Technical Appendix, as well as the new Draft Technical Memorandum, DCP EIR/EIS Water Quality Sensitivity Analysis (June 21, 2015, by CH2M HILL). Appendix B further attempts to explain why the wrong model, with serious material defects, using limited water years, *still showed significant exceedances*. (See RDEIR/S, App. B, Table B.2-1 (Surface Water Summary Table for Alternative 4A); see also p. B-47 and Table B-4 (Period Average Change in Boron Concentrations ($\mu\text{g/L}$) for Alternative 4A Scenario H3 ELT Relative to Existing Conditions and the No Action Alternative ELT), at. p. B-73.) Even with those errors, the model was still used inappropriately to assume future conditions without any technical justifications: “Even though the sensitivity analyses were performed at LLT, the factors identified to explain modeled salinity exceedances at LLT are expected to be valid similarly at Early Long-term (ELT) conditions.” (RDEIR/S, App. 8H, p. 3.) Those analyses relied on all of the original errors in the modeling identified by LAND in its previous comments (see also comments by Contra Costa Water District and others) and simply made a few minor modifications based on the removal of CM2 and the habitat geometry. In any case, the analysis provided is simply intended to compare between alternatives and not determine the actual environmental impacts. The distinctions between the various Alt. 4, Alt. 4A and various operating scenarios are virtually indecipherable in the detailed analysis; this discussion must be reorganized, clarified and reanalyzed in a manner that the differences are apparent for purposes of understanding their environmental impacts.

Bulbouts, the setting back of levees required when projections into the river create elevated flood heights (stages) are also inadequately described in the RDEIR/S. Bulbouts were described informally in the Steering Committee process and then defined slightly more clearly in the BDCP Fish Facilities Technical Team process when the intakes were wholly within the river. More recently, bulbouts have been identified by the California Department of Water Resources (“DWR”) engineering staff as not needed for the intakes proposed for Alt. 4A. LAND formally requested documentation to support the assertion that flood stages would not change as a result of the on-bank intake structures supported by the modelling data in NEPA cooperator meetings. To date the DWR has never provided any technical information to substantiate these claims. Moreover, the wetland delineations submitted to the U.S. Army Corps of Engineers include the bulbout areas on the opposite banks from the project intakes.³ LAND strenuously objects to bulbouts and the potential project impacts from these features on the environment, levee maintenance, public safety, agricultural operations and transportation. Bulbouts have not been adequately analyzed in the RDEIR/S.

Operational Description Deficiencies

The preferred alternative (4A) is not clearly or fully described in the RDEIR/S. The technical information required to assess the project’s complex physical infrastructure is missing and the important technical details, although known to DWR, beyond the basic project details such as intake geometry and distances between facilities are absent. Therefore it is very difficult to assess the physical environmental project impacts in what is really a program-level perspective. However, more detailed project information is found in DWR’s Conceptual Engineering Report (July 1, 2015) (“2015 CER”).⁴ For example, the 2015 CER states: “The MPTO/CCO must be able to deliver up to 9,000 cfs at the low water level in the Sacramento River.” (2015 CER, p. 1-1.) Thus, DWR has designed the infrastructure to take the full 9,000 cfs volume from the Sacramento River under the low-flow conditions, contrary to the operations information and environmental analysis in the RDEIR/S. Such operation would require completely different water quality and river stage analyses, among other impacts.

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https://s3.amazonaws.com/californiawater/pdfs/5n2mg_Complete_Final_CA_Water_Fix_USACE_404_Permit_Application.pdf

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<https://www.dropbox.com/s/muwls2e08jkb4du/Cncptl%20Engnr%20Rprt%207.1.15.pdf?dl=0>.

The description of Alt. 4A operations curiously excludes certain components of existing CVP/SWP operations as well as actions required to be undertaken under the 2008 and 2009 Biological Opinions. The description of project operations in the RDEIR/S states that the Alt. 4A does not include certain California EcoRestore elements, such as Fremont Weir Operations. (RDEIR/S, p. 4.1-6.) This omission is concerning, since operation of the Fremont Weir will divert water from entering the Delta through the Sacramento River. The bulk of the actions contemplated by EcoRestore are required to be undertaken by the Biological Opinions issued in 2008-2009 for operation of the South Delta diversions. While the operations plan for Alt. 4A shown in Table 4.1-2 includes operations of the South Delta diversion facilities as well as the Delta Cross Channel, which are part of the 2008-2009 Biological Opinions, the Fremont Weir operations are omitted. All of the actions contained within the requirements of the Biological Opinions should have been included as part of Alt. 4A operations.

Continued Reliance on Undisclosed Water Transfers to Operate the North Delta Diversions

LAND previously commented on the omission of disclosure and analysis regarding the BDCP's plan to rely on water transfers to meet flow and water quality requirements necessary to operate the project. Those concerns remain. The RDEIR/S fails to disclose what transfers are necessary for the project and the amount of increased transfers that would occur as a result of the Tunnels. Without providing any details, the Alt. 4A operations description states that spring outflow for Longfin Smelt would be provided by water purchases for willing sellers. (RDEIR/S, p. 4.1-6.) The Alt. 4 BDCP analysis describes ultimately ramping up to 1.3 million acre feet of water transfers (RDEIR/S, App. D, pp. D.3.83 to 85.); it is unclear to what extent these water transfers are contemplated under Alt. 4A. Tunnels proponent Kern County Water Agency has indicated its plans to meet spring outflow requirements with Proposition 1 funded water purchases. (KCWA RDEIR/SDEIS draft Comment Letter, October 30, 2015, p. 3.) Use of these funds to meet regulatory requirements is specifically prohibited. (Wat. Code, §§ 79709(c), 79710(a), 79753(b).) The Tunnels proponents cannot plan on securing freshwater flows to meet any of the existing compliance obligations of the state and federal water projects (SWP/CVP.)

Water transfers result in myriad environmental impacts, including groundwater depletion, loss of agricultural crops, reduction in wildlife habitat and other impacts. Moreover, the state's water accounting system does not monitor critical streamflow data that would be necessary to perform accurate accounting of water transfers, making "gaming the system" a real risk. The location of new, northern SWP/CVP diversions will by definition increase water transfers from north to south bypassing the Delta. There will

be tremendous demand to attempt to use the Tunnels for more transfers, and there will be pushback against letting flows bypass the new diversions. As these impacts will occur as a result of the project, they must be analyzed in the RDEIR/S. If the project relies on transfers or will facilitate additional transfers, those facts must be disclosed and analyzed; the RDEIR/S fails to do so.

Implementation Structure is Entirely Absent

LAND has previously commented on the BDCP Chapter 7 Governance structure proposed under Alt. 4, pointing out its inadequacy with respect to addressing local impacts during and after project construction. Now, with Alt. 4A, there is no governance structure at all, and the implementation will apparently be carried out by the SWP and CVP contractors via the Delta Conveyance Facility Design and Construction Enterprise. The existence of “Environmental Commitments” (“ECs”) (RDEIR/S, App. 3B) does nothing to allay these concerns. As described in this and other comment letters, the impacts on local communities will be severe, including interruption and degradation of drinking and irrigation water supplies, interruption of access to farms and homes, damages to roads, homes and other structures from subsidence induced by dewatering, and structural or other damages from excessive construction noises and vibrations. LAND is disappointed that its prior suggestion to create a local concerns and claims alternative dispute resolution process to address these issues is not included in the RDEIR/S. The Government Tort Claims Act is entirely inadequate and too slow to adequately address the scope and scale of the readily foreseeable impacts to local communities and agricultural operations. The absence of any plan to address these localized impacts indicates not only a complete disregard for the burdens and significant environmental and other impacts the project would put on local communities, but also is an abrogation of CEQA and NEPA’s most basic mitigation requirements.

New Reverse Flows are Caused by the Project, Not Ameliorated by It

One of the main talking points of the project proponents is that reverse flows will be lessened by the addition of diversion points in the North Delta. Yet the Tunnels would create reverse flows anew in the North Delta. In particular, as a result of the project, Georgiana, Sutter and *Steamboat Sloughs will experience increases in reverse flows, increasing salinity and* hindering fish migration. The project does not restore a more natural flow regime for the Delta. The project simply brings reverse flow problems to the north Delta.

Mitigation Deficiencies

LAND submitted detailed comments regarding deficiencies in the approach to mitigation in 2014. Those errors have not been corrected. Instead of strengthening mitigation measures to meet minimum legal requirements, the RDEIR/S includes basically the same “optional menu” approach to mitigating even the most serious water quality impacts. (See, e.g., WQ MIT-11.) Moreover, with the BDCP now abandoned, some of the prior conservation measures are now called ECs, in addition to the ECs that were included in the DEIR/S. While the RDEIR/S attempts to show how these ECs will help reduce impacts, no enforcement mechanism is provided, and the ECs are not included in the Executive Summary’s list of mitigation measures, though there is a promise to include them at a later date. Such information is necessary to informed decisionmaking and must be included in the RDEIR/S.

Feasible Alternatives to Tunnels Still Left Off the Table

LAND’s prior comments and other comments have described in detail the failure of the lead agencies to consider a reasonable range of alternatives to carry out the project objectives and purpose. LAND continues to disagree, in particular, with the failure of the lead agencies to consider alternatives that include maintaining and improving the existing infrastructure, including the existing levee system and South Delta diversion facilities. We note that the BDCP’s 2007 Points of Agreement including a commitment to:

Modifications to existing south Delta facilities to reduce entrainment and otherwise improve the State Water Project’s (SWP) and Central Valley Project’s (CVP) ability to convey water through the Delta while contributing to near and long-term conservation and water supply goals will also be evaluated. This approach may provide enhanced operational flexibility and greater opportunities for habitat improvements and fishery protection.

Unfortunately, there has been no follow through on this issue, and Alt. 4 includes no improvements to the South Delta pumps to reduce take of imperiled fish.

Additionally, LAND notes that there are now major similarities between Alt. 4A and the Peripheral Canal, which was rejected in 1982. To illustrate this point, LAND revised a BDCP document entitled, “BDCP: A 21st Century Strategy” to include a fourth column for the currently proposed Alt. 4A. (See Exhibit A.) A slightly updated version of the Peripheral Canal is not a 21st Century Strategy.

RDEIR/S Section 4.3.1/DEIR/S Chapter 5 - Water Supply

The water supply analysis is misleading and fails to represent the recent actions by the project proponents to gain more water yield in drought periods at the State Water Resources Control Board (“SWRCB”),⁵ create dams in the Delta to divert water to the export pumps, reoperation of the Delta Cross-Channels, as well as the routine use of emergency exemptions to lower water quality standards. (RDEIR/S, Section 5.3.1.1 Quantitative Analysis of SWP and CVP Water Supply Impacts, p. 5-2, lines 23-42 and 5-3 lines 1-9.) Each of these common modifications to operations have significant project-level environmental effects as well as cumulative impacts, which have to be described and modeled in the RDEIR/S. The RDEIR/S has further failed to identify the additional water supply for the new mitigation requirements defined for Alt. 4A for its habitat, which consumptively uses almost double of the water demand by Delta crops.⁶ The RDEIR/S assumes that water use for restoration is the same as agriculture, which is simply wrong, uncited, and not supported by science. (RDEIR/S, Section 5.3.1.2 Project- and Program-Level Components, p. 5-3, lines 10-19.) In fact, as explained in LAND’s prior comments, water demand for riparian and open water habitat is about twice as high as average agricultural water demand.

RDEIR/S Section 4.3.2/DEIR/S Chapter 6 - Surface Water

Please see LAND’s prior comments on surface water impacts. As explained previously, modeling for Alt. 4 cannot substitute for modeling for Alt. 4A. Additionally, LAND continues to be concerned that the resulting effects of surface water changes from operation of the proposed diversions have not been adequately analyzed with respect to impacts on agricultural operations in the Delta. Moreover, mitigation for these impacts remains inadequate.

RDEIR/S Section 4.3.3/ DEIR/S Chapter 7 - Groundwater

The groundwater impacts analysis fails to fully analyze how the project will “Alter Local Groundwater Levels” in any clear manner that would provide for an understanding of the groundwater impacts or thresholds. The Impact GW-1 focuses almost entirely on the direct impacts on wells, which are critical, but a small part of the agricultural water supply balance in the North Delta. (RDEIR/S, Section 7.3.3.9 Alternative 4 – Dual

⁵ <http://www.sacbee.com/news/state/california/water-and-drought/article24683440.html>

⁶ <http://www.water.ca.gov/landwateruse/anlwuest.cfm>

Conveyance with Modified Pipeline/Tunnel 28 and Intakes 2, 3, and 5 (9,000 cfs; Operational Scenario H), p. 7-10, lines 19-20.) The RDEIR/S describes potential project impacts on wells, with only indirect and inferential language regarding the main form of groundwater use and management in the Delta: drainage systems.

For Delta agriculture, the groundwater table is often controlled through local management of drainage (both by gravity using control gates, as well as by drain sumps and pumps), as well as through the application of surface water from perimeter pumps and siphons. (See LAND's previous comments describing this system.) The two systems are directly related, as surface water and groundwater are continuously substituted in this system. These interrelated impacts should have been analyzed in concert for the purposes of the RDEIR/S. The drainage system, which is how groundwater and surface water reconnect, is only incompletely described by the RDEIR/S in Impact GW-4: *During Construction of Conveyance Facilities, Interfere with Agricultural Drainage in the Delta*. The analysis fails to describe, then analyze, how these two systems, groundwater and surface water, work in concert and are managed at the farm gate scale, and then managed collaboratively at the local island scale within the Delta.

Changing groundwater elevations, either by lowering them with groundwater pumping for construction dewatering, or cutting off the seepage through cutoff walls at the intakes, or at shafts, etc. as the project proposes, will have both direct and indirect impacts on Delta homes, farms and drainage districts. The project can even impact surface water supply and drainage systems in ways that have significant effects in combination where the individual effect may appear insubstantial. For example, lowering a local water table by 5 feet may not affect a drinking water well that is isolated and used at a low rate. (See RDEIR, App. A, Figure 7-27 (showing groundwater levels diminished by dewatering).) Lowering the same water table at an area with multiple wells in a narrow belt, as it is common along the levees, can significantly increase the size of the cone of depression created by the aggregate of the wells and lead to intermittent water supplies and burning out pumps through excessive cycling. This is exacerbated where all of the wells are taking water from the same sandy lens, which is typical. The RDEIR/S fails to even describe the pump damage as an impact, even though replacing those pumps can be economically catastrophic to poor rural residents. The project places the burden of demonstrating that the pumping impacts on their drinking water wells and pump damage was caused by the project on those least able to make that claim. This is a classic environmental justice issue by which a project fails to analyze its impacts at the local, project level, and fails to mitigate for a readily foreseeable project impact. The only analysis provided is exclusive to drinking water quality impacts. (RDEIR/S, App. A, p. 28-13.)

In a parallel illustration, lowering that same water table 3 feet might not affect those same drinking water wells, but could require significantly (dozens to hundreds of acre-feet per farm) more river water pumping to maintain irrigation on a field, which was reliant on underseepage, a very common scenario. In the Delta, it is very common to have water from the levees or even adjacent islands essentially percolate up into the neighboring fields. (DWR, 2014.) When that water is cut off, a farmer has to place new pumps in the river, a massive economic cost with extensive permitting timelines, replace pumps, or run pumps for far longer. In this case, the environmental impacts include the need to spend more money to pump over the levee, greater energy use and carbon emissions, and greater loss to evaporation from having to use above ground systems to replace the highly efficient seepage. This is yet another obvious and common situation in the Delta, ignored in the environmental analysis.

In a final illustration, lowering the same water table 3 feet changes the drainage system elevations (hydraulic head) and could result in the loss of drainage capacity from one field to the next. This directly affects the beneficial reuse of agricultural water from one field from one river intake to the next field downgradient, which would have otherwise received the recharge of the non-consumptively used water for growing crops or salt control. Drainage within an island can be understood as a series of miniature ship locks, each lock holding the water table to maintain the next, but each entirely reliant on inches of relative height to control that water, rather than feet.

Where the RDEIR/S does analyze its potential groundwater dewatering impacts, ignoring the scenarios described above, the analysis is confusing and poorly supported. For example the RDEIR/S states that: “Tunnel shafts are assumed to be constructed using slurry diaphragm walls, . . . is not anticipated to result in significant impacts to surrounding groundwater as the dewatered zone will be hydraulically isolated from the surrounding aquifer system.” (Section 7.3.3.2 Alternative 1A – Dual Conveyance with Pipeline/Tunnel and 3 Intakes 1–5 (15,000 cfs; Operational Scenario A), p. 7-3 lines 6-40.) This analysis inaccurately describes the process for building the walls; the isolation only occurs after the excavation and slurring is complete, which requires lowering the groundwater table for the length and width of the excavation. Only after that dewatering is completed, is the interior area isolated. A correct environmental analysis would identify how much dewatering would occur for the installation of the slurry walls and then identify how much volume of water would not be pumped in this scenario. No such analysis is provided. Even the limited information that is presented cannot be verified, since no substantive details are provided.

Additionally, this slurry diaphragm wall is a new project feature with its own environmental impacts that are not properly analyzed. The heavy equipment needed to excavate the wall, and place the slurry is not described. The analysis fails to identify how many excavators and cranes each location will require, nor is there any description as to the number of dump trucks, tons of steel and tons of slurry used at each location. It also does not identify what kind of slurry and its source(s). Nor can this information be inferred from the total depth, area or perimeter, since none of this information is provided.

Finally, the project impacts to the riparian zone from the groundwater depletion is never identified. Cutoff walls can isolate riparian vegetation from the groundwater and simply kill it. The RDEIR/S must analyze these biological resources impacts as well.

Groundwater Modeling

In addition to the grossly out of date model parameters used in the RDEIR , the groundwater data now are so far out of date (variable dates, but generally 1962-2003) that it can no longer be used with any reliability. Use of this data biases the results, particularly since the last 4 years of the drought are not included. This error biases the effects by using the wettest years and ignoring the drought and the overall trend to drier years. The analysis should use the entire period of the record and provide a supplemental analysis of trends of the last two decades. The analysis also uses exceptional projections for sea level rise when it suits the analysis to minimize the environmental effects from the project, but uses narrow and old data that predate current trends when it suits other arguments. (RDEIR/S, Sections 7A.1 Introduction and 7A.2 Modeling Objectives p. 7A-1, lines 3-33.) In order to realistically understand the potential project impacts on local, sole-source drinking water wells, the RDEIR/S must use contemporary information and current water table information influenced by the drought and the complex local hydrogeology.

Moreover, the modeling tool used was a regional analysis tool and not a site-specific model. No local shallow water table data, such as the local well elevations and their response to the drought, or site specific geology describing the complex local sand layers and under channel stratigraphy, are provided. (DWR 2014.) The Delta is unique for its complex groundwater interactions, which do not meet (nor do regional models ever intend to assess) the standard assumptions of groundwater models.⁷ For *other* projects in

⁷ http://www.water.ca.gov/environmentalservices/docs/frpa/Prospect_Island_Ryer_Island_Data_Analysis_Summary_Memo_Report_Final_ReaderView_6_19_14.pdf

the same area, DWR does not fully understand the need to collect and analyze site-specific data for project-scale hydrogeological impacts. For instance, DWR completed an extensive study in 2014 for a restoration project on Prospect Island. (DWR 2014.) It is important to note that despite this study, empirical observation identified that unexpected and non-linear impacts resulted from groundwater elevation changes over large distances.⁸ The RDEIR/S should build on best available geology and calibrated with current local well data in order to assess the project impacts on the local water tables. The provided programmatic-level analysis fails to have any reasonable predictive power for defining water table impacts at the intakes. This entire section must be reanalyzed in order to understand the project's impact on groundwater.

Finally, the mitigation is based on several factors, including the modeled radius of impact, which has an additional defect: it appears that Mitigation Measure GW-1 is not intended to apply to the wells that are impacted beyond the arbitrarily selected distance of 2,600 feet. (RDEIR, App. A, Section 7.3.3.2 Alternative 1A – Dual Conveyance with Pipeline/Tunnel and 3 Intakes 1–5 (15,000 cfs; Operational Scenario A, p. 7-3, lines 37-38 and p. 7-4, lines 9-13).) So it appears that wells that are impacted outside of that radius do not receive the mitigation, despite the RDEIR/S's failure to analyze the current groundwater conditions or geology at a project-site specific scale. (RDEIR/S, App. A, Section 7.3.3.2 Alternative 1A – Dual Conveyance with Pipeline/Tunnel and 3 Intakes 1–5 (15,000 cfs; Operational Scenario A, p. 7-4, lines 19-21).)

A curious caveat is provided repeatedly in the analysis: “It should be noted that the forecasted impacts described above reflect a worst-case scenario as the option of installing seepage cutoff walls during dewatering was not considered in the analysis.” (See, e.g., RDEIR, App. A, p. 7-4.) It would seem that the mitigation measure should be applied to the project from the outset, as part of an avoidance strategy. Instead, the mitigation approach places the burden of proof of project impacts from the reduction of groundwater levels on the environment, the adjacent landowners and agricultural water users.

The impacts caused by the dewatering of the intakes, the intermediate forebay and the tunnel access all suffer from the same failure of technical analysis of the nature and extent of the environmental impacts, and the failure to adequately mitigate those impacts under all construction scenarios.

⁸ http://deltarevision.com/maps/islands_floods_levees/ryer-1996flood-no.pdf

RDEIR/S Section 4.3.4/RDEIR/S Chapter 8 - Water Quality

Modeling Concerns

LAND has previously commented on water quality impacts and continues to have grave concerns regarding the water quality impacts of this project. The RDEIR/S excuses for continuing to rely on a broken model to predict water quality effects of the project are inadequate. (See RDEIR/S, App. 8H, Attachment 1 TM, p. 5.) As has been previously explained, factors such as use of a truncated period of record, and unreasonable assumptions regarding the ability to meet water quality standards, make the modeling of little use. References to the expectation of adjustments to CVP/SWP operation to meet delta standards are also contradicted by experience. (See RDEIR/S, App. 8H, Attachment 1 TM, p. 5.) For instance this year, the CVP and SWP repeatedly violated water quality standards that had already been weakened by the SWRCB in response to CVP/SWP requests pursuant to the drought. The record refutes any assumption in the analysis of water quality that assumes actions will be taken by the CVP/SWP to meet Delta standards.

As a result of supposed “sensitivity analyses” the RDEIR/S has downgraded several water quality impacts that were previously characterized as significant and unavoidable and or adverse to less than significant. Yet the mitigation has not been improved. Adding to the confusion, Chapter 31 still shows Impact WQ-11, effects on electrical conductivity concentrations resulting from facilities operations and maintenance still shows for conclusions after mitigation significant and unavoidable and or adverse. (RDEIR/S, App. A, p. 31-3.) But the executive summary shows Impact WQ-11 as less than significant and not adverse. (RDEIR/S, p. ES-44.)

Microcystis - Blue Green Algae

The project fails to fully analyze or even articulate the full range of impacts to human health and the environment from the *reduction in flow* as it relates to blue-green algae (cyanobacteria). Ostensibly, the Sacramento Regional Wastewater Plant was required to reduce its loading of ammonia (and associated forms), nitrogen and phosphorous by implementing new, advanced treatment for its waste discharged to the Sacramento River at Freeport. One of the stated reasons provided by the Tunnel proponents, the SWP/CVP Contractors, for these requirements was to reduce the potential of algal blooms in the Delta. (Alameda, 2010.)

First identified in the Sacramento-San Joaquin River Delta in 1999, blooms of blue-green algae (cyanobacteria) have spread for miles throughout the Delta as a result of warmer temperatures and low flows (Berg and Sutula, 2015). This threat appears to increase as the drought goes on (Berg and Sutula, 2015). The proposed project will create essentially permanent drought conditions in the Delta, defeating the significant reductions in effluent by the new treatment facility completed at great cost to the taxpayers, by withdrawing up to half of the water from the Sacramento River. Granted some of that waste water and its nutrients will be exported, as it is currently, but the beneficial dilution effects and significant mixing zones that existed from Freeport to the South Delta would no longer occur because up to half of that flow will be missing.

The project's impacts associated with, and related to, blue-green algae in general and cyanobacteria specifically, *none of which are identified*, include lower flows, longer residence times as a result of those lower flows, Delta Cross-channel operational impacts (lowering flows further in the Sacramento River sloughs and Cache Slough complex). There is a brief and non-specific analysis for potential impacts associated with riparian and tidal habitat creation (providing locally increased nutrients). (RDEIR, App. A, p. 28-16 (Environmental Justice).) The project's contributions to flow and nutrient impacts, and the consequential impacts on aquatic and terrestrial species and human health are ignored, and instead what limited analysis exists is solely and incorrectly focused on the equivocal nature of the nutrient data and their relationship to the blooms of a single species, *Microcystis aeruginosa*.

Cyanobacteria thrive in warm water; every 10 degree C rise in temperature prompts a growth rate increase of 1-4 times. (Berg and Sutula, 2015, p. 32.) Higher temperatures also prompt higher levels of toxins. (Brutemark, 2015.) Lower flows also increase their blooms because lower flows reduce water column mixing. (Berg, 2015, p. 44.) Increased salinity levels (up to 10 parts per trillion) do not discourage these organisms; rather they appear to survive in brackish water. (Berg, 2015, p. 22.) Blooms of cyanobacteria also reduce the dissolved oxygen content in a water body, and block sunlight needed by other living organisms. (Berg, 2015.) For this reason, cyanobacteria's rise was investigated as a potential aspect of the pelagic organism decline in the Delta. (P. W. Lehman, 2005.) These are the very same conditions that the project will create by taking up to half of the flow from the Sacramento River.

The current, and likely exacerbated by the project, spread of cyanobacteria presents public health issues because potent toxins found in many strains of cyanobacteria cause symptoms in both animals and humans, ranging from vomiting, rashes, headaches, and diarrhea to liver failure and even death. (Office of Environmental Health Hazard Assessment, 2009; U.S. EPA, 2015.) The International Agency for

Research on Cancer lists the toxin found in cyanobacteria as possibly carcinogenic to humans. (Cogliano, 2010.) Similar to mercury and other bioaccumulative toxins, cyanobacteria toxins are known to build up in the bodies of fish and shellfish; it also can contaminate food crops when present in irrigation water. (Cogliano, 2010, p. 357-358.) The project appears likely to create the perfect storm of aquatic toxicity – algal blooms and elevated mercury, which when combined, contaminates drinking water and fish.

Particularly concerning, is the fact that the presence of cyanobacteria toxins, notably microcystins, can shut down drinking water supplies. Toledo residents received a “do not drink or boil” advisory for their water (boiling water infused with microcystins will not render the contaminant harmless) when a cyanobacterial bloom near Toledo’s drinking water intake on Lake Erie caused microcystin spikes in 2014. (U.S. EPA, 2015, p. 14.) A species related to the cyanobacteria that contaminated Ohio drinking water has been detected in the Delta, *Microcystis aeruginosa*. (Kurobe, 2013.) Traditional methods of killing algae, such as algaecide, can actually increase the presence of the cyanobacteria toxin, which releases upon the death of the organism. (U.S. EPA, 2015, p. 41.) Conventional water treatment systems do not remove the toxins; therefore, U.S. EPA recommends that drinking water systems affected by a cyanobacteria bloom change the location of their intakes, purchase water from a neighbor, or add expensive additional treatments such as reverse osmosis. (U.S. EPA, 2015, pp. 41-43.) The degree of impact on human health and drinking water supplies from the project’s impacts on blue-green algae is not adequately assessed or mitigated in the RDEIR/S.

RDEIR/S Section 8.1.3.18 Microcystis (p. 8-45 lines 15-42 and p. 8-46, lines 1-22) is the only detailed analysis on only one form of blue-green algae, *Microcystis*, and yet fails to discuss the baseline and the drought conditions in any meaningful way, and entirely ignores the project’s relationship to flow, nutrients and environmental impacts. The analysis instead looks at a single dimension of algal dynamics, nutrient availability and ratio, and states that the data for nutrients are equivocal. Juxtaposing the current RDEIR/S analysis with the CVP/SWP Contractors’ 2010 comments on Sacramento Regional County Sanitation District’s wastewater discharges, the data on algal bloom relationships appear to have gone from certain to uncertain when the Tunnels are the source of the impact. (Alameda, 2010.)

The RDEIR/S identifies that: “changes in TSS and turbidity levels within the Delta under the project alternatives could not be quantified,” yet asserts that despite removing thousands of tons of sediment from the river, and removing much of the flow that keeps sediment in suspension, turbidity levels “are expected to be similar under the project alternatives to Existing Conditions and the No Action Alternative.” (App. A,

Section 8.3.1.7 p. 8-82, lines 18-20.) This is simply idle speculation, not analysis, given the facts presented in the following sections.

The RDEIR/S analysis is adamant that water column clarity is critical: “High water clarity is also considered a pre-requisite for *Microcystis* bloom formation (Lehman et al. 2013.)” Yet, blooms have been increasing over time, and found throughout the Delta, including Sacramento and Suisun Bay. (RDEIR/S, Section 8.3.1.7, p. 8-82, lines 17-18 and 8.3.1.8 (San Francisco Bay), p. 8-85, lines 12-17.) Sacramento even had a recent (October 5, 2015) death of a dog in the Sacramento River at a public beach directly attributed to cyanobacteria.⁹ Per the Sacramento Bee article, the Sacramento County environmental health division chief said he expects more blue-green algae events if the state’s four-year drought continues: “That’s because droughts create more pockets of slow-moving warm water in rivers, a situation that triggers more algal blooms.” The identical conditions created or exacerbated by the proposed project.

The RDER/S fails to consider the readily-available literature provided by the CalEPA’s Office of Environmental Health Hazard Assessment (“OEEHA”), which documents these issues in great detail:

Many cyanobacteria species produce a group of toxins known as microcystins, some of which are toxic;
Upon ingestion, toxic microcystins are actively absorbed by fish, birds and mammals;
People swimming, waterskiing, or boating in contaminated water can be exposed to microcystins;
Microcystins may also accumulate in fish that are caught and eaten by people;
Finally, pets and livestock have died after drinking water contaminated with microcystins.¹⁰

In addition, OEEHA identifies that “Animal poisonings have even occurred under environmental conditions considered unfavorable to cyanobacteria blooms such as cold lakes with low nutrient levels.” (*Ibid.*) Moreover:

⁹ <http://www.sacbee.com/news/local/environment/article38250372.html>
¹⁰ <http://oehha.ca.gov/ecotox/documents/Microcystin031209.pdf>

Microcystins are toxic to fish at concentrations as low as a few micrograms per liter ($\mu\text{g/L}$) or possibly even fractional $\mu\text{g/L}$. Finally, Blooms of cyanobacterial species that produce microcystins and/or anatoxin-a have coincided with the deaths of ducks, gulls, songbirds, pheasants and hawks, as well as several other bird species. The severity of such bird kills have ranged from a few individuals to several thousand birds per incident.

(*Ibid.*)

The OEEHA report identifies that it is not just one genus, *Microcystis*, but several, that create the toxins. People, agricultural and domestic animals, birds and fish are at direct and acute risk. The risk to fish is exceptionally high. And that conditions that are not classically considered favorable can still lead to toxicity sufficient to kill even mammals. Finally, because of its stability, the toxin can be exported out of the Delta into San Francisco Bay.

Finally, the only analyses of changes to water operations and creation of tidal and floodplain restoration areas that change water residence times within Delta channels, and increases in Delta water temperatures is a table by which the reader is apparently required to make his or her own determination, and no data on temperature at all. Even those tabularized data come with a caveat: “The data do not represent the length of time that water in the various subregions spends in the Delta in total, but do provide a useful parameter with which to compare generally how long algae would have to grow in the various subregions of the Delta.” (RDEIR/S, Section 8.3.1.7, p. 8-82, p. 31-43.) A parameter that has no documented correlation to bloom formation is used to somehow come to a conclusion that there is no impact. Even if there were a Delta regional correlation, the mechanics of algal bloom formation are local and based on site-specific conditions and this ‘qualitative evaluation’ could not provide any predictive or explanatory information to support the environmental analysis.

Notwithstanding any ambiguity which may or may not be associated with historic nutrient levels and ratios, the project has direct impacts on flows by removing up to half of the Sacramento flow; it also directly manipulates the remaining flows within the Delta through operation of the Delta Cross Channel, which directs the flows to the east; and, then through operations of the South Delta pumps, which control regional circulation. The new Tunnels intakes (and the mitigation habitat) will also remove sediment, which allows for more light to enter the water column and exacerbates algal growth. Finally, created mitigation habitat provides elevated nutrients, which locally affect nutrients and their ratios.

Where blue-green algae are mentioned in relationship to water quality, it is not in terms of the project's impacts on nutrients and algae, but only that they can be a nuisance for drinking water and industrial uses. (RDEIR/S, App. A, Section 8.1.3.10 Nitrate/Nitrite and Phosphorus, p. 8-22, lines 27-30.) Chapter 11, Fish and Aquatic Resources fails to mention any negative potential effect on those resources from changes in algal distribution and occurrence associated with project impacts; where contaminants are mentioned in terms of biological effects, cyanobacterial toxins are not included. Moreover, the mitigation measures identified for the other contaminants will not work for the microorganisms and/or their toxins. (RDEIR, App. A, Section 11.1.4, p. 11-36, lines 21-22; Section 11.3.5.3, p. 11-175, lines 18-19.)

Ironically, the Water Quality, Chapter 8, points generically to the Chapter 11, Fish and Aquatic Resources for project alternative effects on algae. (RDEIR/S, App. A, Section 8.3.1.7 Constituent-Specific Considerations Used in the Assessment, p. 8-64, lines 20-22.) However, as noted above, there simply is no such analysis in that Chapter.

As most Delta agriculture is reliant on pumping directly from rivers and sloughs, toxic and non-toxic aquatic plants can lead to many potential problems as a result of direct and indirect environmental conditions exacerbated or created by the project both in the near term and cumulatively. Removing up to half of the flow of the Sacramento river and concentrating that effect in a narrow corridor profoundly changes the lower channel flow (velocity), as well as the dilution and the mixing of nutrients. These project-caused conditions either amplify natural conditions that are suitable for toxic and non-toxic aquatic plants or creates the tipping point for bloom expression. As a result, in-Delta Water supply intakes downstream of the proposed Tunnels are likelier to have reduced efficiency or be clogged by filamentous algae and hyacinth (*Eichhornia crassipes*), which flourish in lower flow conditions, can contain off-flavors that could affect wine grape and other specialized crops, can contain the toxins that would harm or kill livestock, and potentially harm crop economic values, regardless of its actual toxicity.^{11 12} (Lopez et al. (2008), p. 13-17.) These potential impacts to agriculture must be analyzed.

Even if we accept the RDEIR/S's biased analysis, water clarity both in the far North Delta and far South Suisun is already sufficient to support the toxic blooms that already exist, as are the temperature and nutrients that support blue-green algal needs.

¹¹ <http://www.sfgate.com/news/article/Pesty-Plant-Clogging-River-Delta-Hyacinth-3009475.php>

¹² <http://www.capradio.org/articles/2013/11/26/stockton-taking-on-channel-clogging,-invasive-hyacinth-problem/>

The RDEIR/S must analyze project-related impacts to blue-green algal, and *Microcystis aeruginosa* communities, their dynamics, and their impacts on human health and the environment under current and cumulative conditions. The failure to seriously examine this significant water quality impact renders the RDEIR/S inadequate.

RDEIR/S Section 4.3.7/DEIR/S Chapter 11 - Fish and Aquatic Resources

Feasible/Practicable Improvements to South Delta Facilities Continue to be Ignored

LAND previously commented regarding the need for the project alternatives to include improvements to the South Delta Pumps to reduce entrainment. CCWD, Metropolitan Water District of Southern California and other SWP contractors have conducted a draft feasibility study, which has still not been released, indicating that at a cost of approximately \$200 million dollars, such an improvement could prevent take of a significant number of fish and larvae in the South Delta. No change in response to this study or LAND's prior comments is evident in the RDEIR/S. These comments therefore focus on the experimental nature of the new screens proposed for the North Delta.

New North Delta Fish Screens are Completely Experimental and Cannot be Assumed to be Effective

The 2011 *BDCP Fish Facilities Technical Team Technical Memorandum* observed that, "There is a high level of uncertainty as to the type and magnitude of impacts that these new diversions will have on covered fish species that occur within the proposed diversion reach."¹³ With respect to these new diversions, the project must design first and then test the design. Instead, the plan appears to be to construct and operate, and then hope for the best. This is unacceptable as described below.

The Tunnels' intakes and screens design was not completed at the project level and is insufficient to assess if even the limited analysis that was provided is correct. The analysis fails to adequately identify under what conditions and to what extent physical contact by fish on the screen face, impingement, entrainment and predation reduction activities would impact each fish species. Each of these impacts would still occur if the project was designed and maintained appropriately. Unfortunately, there is no indication in the analysis that either the project design and or the mitigation described will be appropriate other than unsubstantiated assertions.

¹³ http://baydeltaconservationplan.com/Libraries/Current_Documents/Final_FFTT_Tech_Memo_07_15_2011.sflb.ashx

For example, the RDEIR/S describes that these complex and experimental systems as if they will work as theoretically postulated and that there is no need to describe or assess their installation, operation, and facility maintenance impacts on the environment. This is simply wishful thinking and an indication of how unrealistic and unsupported the analysis really is. While CEQA and NEPA do not require every detail of a project to be known, it does require that the environmental impacts are fully disclosed, which in this case they clearly are not. These details are also essential to the C/ESA permitting process.

The design is critical to ensure fisheries protections and not duplicate the massive fish injury and mortality that exists with the current South Delta Pumps and which will still occur at those pumps. (See also prior LAND comments). The project should be fully modeled using 3-D Computational Fluid Dynamics (“CFD”), then tested in a physical test chamber to avoid design errors. Then the system should be tested upon the construction of the first intake in-situ to individually tune the plate angles and baffling. For the environmental analysis to be adequate, using CFD, the project needs to identify how one facility will work at its “low-flow” condition (300 cfs) and then through the full range at high export (3,000 cfs), at varying water stages associated with the 4 water year classes and the full range of North Delta tides. Then it should complete the same modeling for the combination of the three intakes. The project screens must maintain the appropriate design fish screen criteria along the entire face of each screen. *Otherwise the project will have massive and uncontrolled fisheries impacts contrary to the RDEIR/S conclusions.*

The studies described above are not studies for their own sake, or trivial technical details that can be worked out later. These studies would define and demonstrate the fundamental mechanics of the purported protection of the fishery promised by the project, and without this supporting analysis, there simply no evidence that the fish protection would work as stated. It is not clear how and under what conditions the project *could* operate the facility and achieve the appropriate approach and sweep velocities, over that screen length and height, and during high tides. The intake facilities would be located in an area that already has flow reversals, and would induce its own additional flow reversals depending on the sequencing and other operations of the pumps and the tidal cycle. The failure to disclose the intake facility operation plans masks significant environmental impacts both to fisheries and neighboring agricultural intakes.

In addition, redesign of the intermediate forebay and pumping system now relies on gravity for certain flows. The lack of pumps near the screen face means that pump control over the screens is now essentially lost. Flow controls are then only provided by hydraulically inefficient and coarse-control valve structures, with suction developed over

35 miles away. It appears that dynamic flow control baffling at the screen face is critical to maintain fine-scale velocities, particularly in light of tidal flows. Yet, despite pointing these problems out to project engineering staff in the NEPA cooperators process, the engineers did not think that any screen control was required.

By failing to provide the actual design, the project is not disclosing direct physical impacts on agricultural intakes and fisheries, and further fails to identify how it will avoid, minimize or mitigate for significant environmental impacts. DWR has no positive fish barrier screens on the South Delta Pumps and has limited experience in the management and cost of complex fish screen systems. If the intakes have to be redesigned, the economic costs would be massive, and the impacts to the fisheries significant from the expanded construction period. Retrofitted intake systems would be exceptionally expensive and likely not to be nearly as effective as those developed from the ground as a functional system. At best, DWR has proposed a massive experiment on the fisheries of the Delta without disclosing the actual environmental risks and economic costs. If any experiment on the fragile Delta should happen, it should be at the last failed experiment, the South Delta Pumps, not in the unexploited North Delta.

RDEIR/S Section 4.3.10/DEIR/S Chapter 14 - Agricultural Resources

Water Quality Impacts

LAND previously provided detailed comments on the agricultural impacts of Alt. 4. Even with the significant reduction in habitat creation, impacts on agricultural resources in and near the Delta will be massive. Impacts stem from converting farmland for project facilities (3,909 acres Important Farmland), degradation of surface and groundwater supplies, changing of local water levels, disruption of farms and farm access, and interference with farm infrastructure, among other impacts. Construction impacts will occur over an estimated 14-year period.

With respect to water quality impacts, the RDEIR/S discloses that salinity would be significantly higher and exceed the standard on twice as many days as without the project. (RDEIR, App. A, p. 14-17 (14% of days exceeded under Not Action Alt. increasing to 28-29% of the days).) The new analysis of Alt. 4A indicates a 5% increase in salinity from existing conditions at the Emmaton compliance point, concluding that water quality impacts are less than significant with implementation of mitigation. (RDEIR/S, p. 4.3.10-4.) As discussed above and in other comments, the RDEIR/S continues to rely on faulty modeling of water quality impacts and cannot be relied upon.

The faulty mitigation measures to address impacts to agriculture remain largely the same as the DEIR/S, and do not meet minimum standards, including those pertaining to specificity, enforceability and effectiveness.

In any case, the project will clearly bring more salt water into the north Delta, which has historically had very high quality water. The RDEIR/S indicates that changes in water quality “could be addressed with real time operations of the SWP and CVP.” (App. A, p. 14-18.) LAND is not aware of any history of the SWP and CVP reducing water diversions without a clear requirement to do so; this year, the CVP and SWP continued to exceed even the relaxed water quality standards that applied as a result of SWRCB Temporary Urgency Change Permit processes.

Mitigation

Unfortunately, the RDEIR/S still does not clearly disclose the impacts to agriculture from the project or improve the previously advanced “menu of unenforceable options with no performance standards” approach. This is entirely inadequate under applicable law. (See prior comments on 2013 DEIR/S.) Though there is no new or improved analysis on which to comment, a few key concerns regarding development of a credible approach to assessing and mitigating agricultural impacts are listed below.

- Use of conservation easements for loss of farmland has questionable value in the Delta. While farmland easements are feasible mitigation for farmland conversion, they are typically placed where there is a threat of development. In the Delta, land uses are already largely constrained to the existing small Delta heritage communities and farming. Thus, imposition of an easement does not prevent future growth.
- Mitigation for agricultural impacts should be in the vicinity of the impact. Delta farmland has unique values that cannot be replaced with farmland elsewhere in the region/state.
- The limitations in the ability of conservation easements to mitigate the significant agricultural impacts has led to an interesting discussion about alternative mitigation approaches – such as the Agricultural Land Stewardship Approach – those discussions have not yet yielded what could be considered adequate mitigation. In some cases, there is simply no way to mitigate for the crushing impacts of the project; yet, the project is still required to mitigate to the extent feasible.

- Any plan to require certain management practices for development of wildlife values cannot be contained within an easement, which by definition *limits* activities but cannot *require* them. A management plan, with separate terms and funding may be entered to if certain farming practices are necessary. While easements are typically permanent, a management plan could be for a term of years acceptable to the farmer.
- With respect to areas managed for wildlife purposes, a floating pool concept should be considered that would allow the locations to occasionally change (within a set sub-area), which would allow farmers more flexibility to participate in the program while maintaining some flexibility in the future to make different management decisions.
- Limiting cropping choices, though it may serve conservation goals, does not create a benefit to agriculture that can be counted as mitigation.
- Typically, layering of agricultural and wildlife easements is not acceptable. When cropping and other management options are limited by such an agreement, mitigation for the project's impacts to agriculture are not occurring and cannot be counted. In the context of the Delta, it is difficult to see how management plan for wildlife could at the same time help conserve farmland. This is due to the strong land use protections at the local and regional level in the Delta.
- The holder of any agricultural easements should be local land trusts with a connection to the community. While larger entities may have some oversight role, existing land trusts should take a significant role in the program.
- Any successful easement and/or management program would need to be integrated into some form of project governance in order to ensure the stated goals are reached and coordinate the programs with other project activities. As noted above, there is no governance structure associated with Alt. 4A.

In sum, much additional work would be necessary to develop adequate analysis or mitigation of the project's impacts to agriculture. It is unfortunate that the RDEIR still does not address the agricultural impacts of the project. As the largest contiguous area of Prime Farmland in the state, protecting Delta agriculture should be a higher priority.

Agricultural Weed Impacts

Invasive weed impacts to agriculture are briefly discussed in the RDEIR/S as they relate to temporary construction impacts, as well as CM 13. (RDEIR/S, App. A, Section 12.1.4, p. 12-709.) However, the project operations are likelier by far to exacerbate the weed conditions over the long term and require new analysis and significant new mitigation. This impact to agriculture is mentioned in passing in Chapter 14. Agriculture (p. 14-8.) for “operations” but never adequately described or mitigated for the project operational impacts to agriculture. Water hyacinth is never mentioned at all in Chapter 12. Water hyacinth is yet another weed that would be exacerbated by the operationally created permanent drought conditions of the post-project Delta, and has its own implications for Delta environmental quality. Water hyacinth in the Delta is exacerbated in drought due to the lack of flushing flows, which cause mats of the plant to build up without being flushed out of the channels. (Ksander 2005; Cohen et al. 2004.) The spread of water hyacinth poses a threat to human health and safety because it supports human and wildlife disease carrying mosquitoes. This is because mats of water hyacinth act provide a breeding ground where they cannot be reached by predators. (Department of Boating and Waterways 2002.) In addition, the weeds could obscure submerged hazards, such as large trees common to the Delta that could damage boats and hurt passengers. (Coetsee 2015.) These impacts need to be discussed in each of the relevant sections and cross-referenced in Chapters 12, 15, 16, 25 and 28 respectively.

Water hyacinth also causes direct economic harm. In the last drought, 1985-86, the Army Corps of Engineers found that Delta marina operators had lost an estimated \$600,000 [\$1,570,594.06 in today’s dollars according to the Consumer Price Index inflation calculator]. (USACE 1985.) More recently, mats of water hyacinth reduced the ability of commercial boats to navigate at night from the Port of Stockton resulting in delays in cargo deliveries that cost importers at least \$200,000 in additional rental fees. (Coetsee 2015.) Finally, the weed chokes pumping state and federal export facilities, including those at the Delta Mendota Canal, the Tracy Pumping Plant, and the California Aqueduct near Clifton Court Forebay. (USACE 1985.) As a result, the federal and state governments have spent millions in an effort to eradicate the weed. Finally, the secondary effect of the presence of water hyacinth in large numbers significantly contributes to water loss. The invasive weed contributes to the consumption of water via evapotranspiration (Et- water loss), causing water loss at between 3.2 and 6.0 times greater than simple evaporation of open water. (Cohen et al. 2004.) This weed also profoundly affects the ecology of the Delta, (Toft et al. 2003), leading to another loss of water associated with the proposed water operations of the project, not analyzed in the RDEIR/S.

Chapter 22 - Air Quality and Greenhouse Gases

Air Quality

LAND retained an air quality expert, Dr. Pless, to conduct a technical review of the significantly revised air quality impact analyses in the RDEIR/S; these comments are attached as Exhibit B.¹⁴ The comments prepared by Dr. Pless on the DEIR/S focus on the health risks caused by the project among other issues. Dr. Pless' observations regarding the information provided by the RDEIR/S is summarized below:

The lead agencies fail to make determinations of significance for project construction despite for some pollutants in several air districts because the air districts did not establish quantitative thresholds of significance. The lack of established thresholds of significance does not relieve the lead agencies of their statutory obligation under CEQA to determine whether the project's impacts are significant and to impose feasible mitigation measures and/or alternatives. Given the enormity of emissions during the 14-year construction period for the project, the lead agencies must rely on their own careful judgment based to the extent possible on scientific and factual data in determining whether a project's impacts are significant. At least one air district (SJUAPCD) pointed this flaw out to the lead agencies, but this comment was ignored. (Dr. Pless, Comment III.B.)

The health risk assessment only determines health risks for sensitive receptors located between 3,000 feet and 6,000 feet from the construction footprint and ignores all receptors who are located within or within 3,000 feet of the construction footprint. The RDEIR/S provides no justification for excluding existing sensitive receptors inside of or within 3,000 feet of the construction footprint; these sensitive receptors exist and will experience *the highest health risks associated with project construction emissions*. These sensitive receptors have a right to know how their health would be impacted. By eliminating a large number of sensitive receptors from the analysis, they are not even afforded the minimal benefits of Mitigation Measure AQ-16, which would "provide individuals residing in areas where construction activities associated with the BDCP would create [diesel particulate matter] concentrations in excess of air district cancer risk thresholds the opportunity to relocate either temporarily during the construction period or permanently, at the discretion of the affected individuals." (Dr. Pless, Comment IV.C.)

¹⁴ Please provide written responses to Dr. Pless's comments.

The health risk assessment fails to identify significant health hazards due to exposure of sensitive receptors to localized particulate matter concentrations resulting from Project construction emissions in the Yolo-Solano Air Quality Management District (“YSAQMD”) because it fails to take into account background concentrations of these pollutants. The YSAQMD established as a threshold of significance a violation of an ambient air quality standard for particulate matter. Thus, the question is not whether Project PM10 and PM2.5 emissions by themselves would result in a violation of an ambient air quality standards but rather whether the Project’s contribution of PM10 and PM2.5 concentrations in addition to existing background conditions would result in a new violation or contribute significantly to an existing violation of an ambient air quality standard. (Dr. Pless, Comment IV.E.)

The approach to mitigation of air quality impacts is wholly inadequate. Among other defects, Dr. Pless identified the following concerns:

- The ECs and Mitigation Measures proposed by the RDEIR/S to reduce project construction impacts to less than significant levels are inadequate to ensure that project construction emissions would not exceed estimated levels. (Dr. Pless, Comment V.A and V.B).
- The lead agencies improperly defer the development of mitigation measures (Comment V.C) thereby removing them from public review.
- The lead agencies’ “good faith efforts” to enter into development agreements with the affected air districts and the proposed contingency measures in case the “good faith efforts” are not successful fail to demonstrate that project impacts would be reduced to less than significant levels as claimed by the RDEIR/S. (Dr. Pless, Comment V.D.)

Additionally, with respect to the organization and reviewability of the RDEIR/S, Dr. Pless suggested that the RDEIR/S be recirculated to provide one complete document that revises all sections and incorporates all updated analyses rather than incorporating by reference the numerous files that make up the DEIR/S, RDEIR/S, and errata. Dr. Pless noted that it is virtually impossible for the public to understand this highly complex document by having to refer back to previous documents and across multiple appendices and sections. Reorganization, a table of contents in every chapter, an indication of which alternative is addressed on every page, and improved formatting would help this document better inform the public of the environmental impacts of the project.

*Greenhouse Gas Emissions*¹⁵

LAND retained an air quality consulting firm, SCS Engineers, to conduct a technical review of the greenhouse gas (“GHG”) impact analyses in the RDEIR/S; these comments are attached as Exhibit C.¹⁶ The RDEIR/S concludes that the project’s GHG emissions from construction would be significant, but can be mitigated to less than significant levels. (RDEIR/S, ES-100 (AQ-21).) Project construction will result in emissions of more than three million metric tons of carbon dioxide equivalent (“CO₂e”) during fourteen years of construction; this is equal to adding 633,000 new passenger cars, or about a five percent increase in total cars on the road. The RDEIR/S goes on to conclude the operational energy demand for the project – estimated to be 1,405 gigawatt hours (“GWh”) per year – will result in less than significant GHG emissions and requires no mitigation. Notably, an average power plant produces about 1,000 GWh per year.

The RDEIR/S relies heavily on implementation of DWR’s Climate Action Plan (“CAP”), which is not framed as mitigation, to mitigate for both construction and operational GHG impacts. (RDEIR/S, ES-100, 4.3.18-14.) According to the RDEIR/S, because DWR’s adopted CAP anticipates that DWR will rely on cleaner sources of power in the future, DWR entity-wide emissions would decrease to below the GHG emissions reduction trajectory by 2041, and the 2050 GHG reduction goal would be met. The CAP projects an increase in GHG emissions of more than 500,000 metric tons of CO₂e when the project pumps begin operation in 2024. This increase in emissions is well above the GHG emissions trajectory in the CAP and RDEIR/S and exceeds the designated GHG emissions reduction trajectory by 260,000 metric tons of CO₂e.

In any case, the RDEIR/S concludes that because DWR’s entity-wide GHG emissions are projected to meet 2050 reduction goals, and because project implementation would not affect DWR’s established reduction goals, GHG emissions are not significant, and no mitigation is required. The conclusion that the Project operations would not result in significant GHG emissions is unsupported in light of the GHG emissions likely to result from the electricity demand from massive pumps included in the project. The power used to pump water must be generated somewhere by some facility or combination of facilities. Typically, this generation is from fossil fuels, resulting in significant GHG emissions from combustion. Even in the case of obtaining carbon-free power (e.g., hydro, wind, solar), DWR’s use of that carbon-free power

¹⁵ These comments also relate to Energy Impacts, discussed in RDEIR/S, Section 4.3.17 and Chapter 24.

¹⁶ Please provide written responses to SCS Engineers’ comments.

removes it from the California energy grid where it can no longer be used to offset other GHG emissions, thereby increasing GHG emissions. Since the energy requirements of the project are so large, the project effectively adds GHG emissions from power plants.

While CEQA allows lead agencies to rely on compliance with existing plans for GHG mitigation, neither the CAP or Mitigation Measure AQ-21 includes enforceable conditions. In particular, there are no monitoring or enforcement conditions for project GHG emissions to ensure that the reduction anticipated in the CAP will actually occur, and that GHG reductions in one area will not simply be displaced by increases elsewhere in the utility grid. There is no guarantee that the CAP will ultimately result in no net GHG emissions.

According to the RDEIR/S, the project's massive construction emissions will be reduced to less than significant levels by Mitigation Measure AQ-21 (GHG Mitigation Program). As explained by SCS, Mitigation Measure AQ-21 is flawed and does not sufficiently require consistency with California GHG reduction goals. Mitigation Measure AQ-21 requires the project to develop and implement a GHG mitigation program to reduce GHG emissions to "net zero". Yet the purchased GHG offsets are not required to be consistent with California GHG reduction goals and policies, and could be potentially be re-used to mitigate for other projects. Moreover, there is no means to ensure that the anticipated reductions under the CAP relied upon to ensure reduced emissions from power sources will actually occur. Yet the RDEIR/S assumes that due to compliance with the CAP, impacts will be less than significant.

While the RDEIR/S refers to a "gravity-based" system, the project creates tremendous new electricity demands in order to operate. These energy demands will occur for the life of the project and will result in increased GHG emissions, as explained in the SCS report. The RDEIR/S' reliance on the CAP, which has no mechanism for enforcement, to make a less than significant impact determination, is thus erroneous. With respect to GHG emissions during project construction, the RDEIR/S is similarly flawed, as it relies on development of a future plan that includes measures that are "nonexclusive, untested, and of unknown efficacy." (See *Communities for a Better Environment v. City of Richmond* (2010) 184 Cal.App.4th 70, 93.) Feasible and enforceable mitigation measures are available to mitigate to the project's significant GHG impacts but have not yet been required. With a project as large and energy intensive as the Tunnels, it is essential that the lead agencies properly disclose and mitigate the GHG impacts, which the RDEIR/S fails to do.

RDEIR/S Appendix D, Consistency with Delta Plan

The RDEIR/S attempts to show the Tunnels' consistency with the Delta Plan in Appendix G, since the Tunnels would not be automatically incorporated into the Delta Plan as was contemplated for the BDCP. The Tunnels are clearly a covered action that would be subject to consistency review. Even as weak as the Delta Plan is in carrying out the Coequal goals expressed in the 2009 Delta Reform Act, the Tunnels could never be consistent with it. For instance, the RDEIR/S for the tunnels fails to provide any showing that it was developed according to the Delta Council's adopted Best Available Science policy. (Cal. Code Regs., tit. 23, §§ 5002, 5001, subd. (ff) and Appendix 1A.) The deep flaws the project's adaptive management approach have been addressed by LAND and others.

Appendix G discusses the alleged consistency of *other actions being taken outside of the Tunnels project* as evidence of consistency with Delta Plan policies and regulations pertaining to reduced reliance on the Delta. The question in a consistency process, however, will pertain to the project under review, not other actions. (Wat. Code, § 85225.) Appendix G also refers to ECs as means to demonstrate consistency with the Delta Plan. Yet as discussed previously, it is entirely unclear whether ECs will be undertaken as part of Alt. 4A.

Perhaps least convincing of all is the argument that the *possibility* of developing an Agricultural Lands Stewardship Program to help mitigate for the significant impacts of the project on agriculture from land conversion, water supply and other impacts somehow demonstrates "respect for local land use" under Delta Plan Policy 2. (Cal. Code Regs., tit. 23, § 5011.) As discussed above, this alternative mitigation for agricultural impacts is currently little more than a possibility, and has not been developed into an actual mitigation measure. Certainly, locating the Tunnels and associated facilities by force on private and public lands in the Delta that are already in other uses is not respectful of local land uses.

It is for these reasons that the Tunnels proponents are busily working to amend the Delta Plan to permit an eventual determination of consistency. Whether these changes to the Delta Plan can be made consistent with the mandates of the 2009 Delta Reform Act remains to be seen. In any case, the information provided in Appendix G clearly shows that the Tunnels are not consistent with the Delta Plan.

III. CONCLUSION

Thank you for considering these comments, and we hope they help lead to a more productive discussion about how to address state-wide needs without completely sacrificing Delta communities, agriculture and environment. These documents still do not reflect a good faith effort at full disclosure or a hard look at the Tunnels project. Such an approach would lead to better solutions than the Alt. 4A “Delta Not Fixed” project. The Delta is a place, not just plumbing, and this project has consistently focused on plumbing over place, to everyone’s detriment. In any case, we remain willing to work in good faith with the lead agencies and others toward an acceptable approach to managing Delta water and other resources.

Very truly yours,

SOLURI MESERVE
A Law Corporation

By: 
Osha R. Meserve

BSK Associates
Engineers & Laboratories

By: 
Erik Ringelberg

cc: David Murillo, Regional Director, Mid Pacific Region, U.S. Bureau of Reclamation (dmurillo@usbr.gov)
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Mark Cowin, Department of Water Resources (mark.cowin@ca.water.gov)

EXHIBIT LIST:

Exhibit A: Peripheral Canal, BDCP and Tunnels Comparison Table
Exhibit B: Dr. Pless’ Comments on Air Quality Impacts, October 29, 2015
Exhibit C: SCS Engineers’ Comments on Greenhouse Gas Impacts, October 29, 2015

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EXHIBIT A

The Tunnels: A 21st Century Strategy?

| SPECS, OPERATIONS, AND WATER MANAGEMENT*¹ | | | |
|--|--|--|--|
| | Peripheral Canal | BDCP* | Tunnels/WaterFix Alternative 4A |
| Conveyance | 43 miles of above-ground, open channel with approx. 1,000-foot right-of-way width. Turnouts along canal to provide water releases for water quality | 35 miles, gravity-based underground tunnels | 35 miles, partially “gravity-based” underground tunnels Minimum operational Electricity demand: 1,405 gigawatts-hours (GWh) per year Construction energy demand: 2,132 GWh electricity and 104 million gallons of diesel and gasoline |
| Conveyance type | Fully isolated, with no through Delta operations | Dual conveyance, allowing for through-Delta operations and more flexibility to maintain in-Delta water quality | Dual conveyance, from 50-100% through existing South Delta pumps. Alleged flexibility to maintain in-Delta water quality, if the SWP/CVP so choose |
| Capacity | 21,800 cfs | 9,000 cfs (tentative) | 900 cfs minimum diversion at all times and 9,000 cfs maximum diversion capacity |
| Number of Intakes | 1 | 3 | 3 |
| Number of fish screens | 1 (addressing salmon and striped bass only) | 3 (advanced technology; comprehensive goal to protect more fish species) | 3 experimental fish screens in North Delta with a goal to protect listed fish species; No fish screens or other improvements in South Delta to reduce entrainment of fish |
| Performance standards for fish screens | Yes | Yes | Yes, but untested |
| Potential agricultural land impact (for conveyance only) | Approximately 6,600 acres | Approximately 2,400 acres** | Approximately 3,909 acres Important Farmland |
| Regulatory Controls | Avoid jeopardy to native endangered species through the Federal Endangered Species Act, policy directive from Natural Resources Agency to restore species, and balance for beneficial uses under the State Water Resources Control Board | Legally conserve and contribute to the recovery of native fish and wildlife species through the Natural Community Conservation Planning Act, and balance for beneficial uses under the State Water Resources Control Board | Avoid extinction of fish (jeopardy) and other native threatened and endangered species through the Federal Endangered Species Act, policy directive from Natural Resources Agency to restore species, and “balance” for beneficial uses under the State Water Resources Control Board. |
| Habitat conservation planning to ensure that ecological health influences operations over time | No – HCP not added to federal law until 1982 | Yes | No |
| Natural Community Conservation Planning to sustain and restore species and their habitat | No – state law not enacted until 1991 | Yes | No |

* A final decision on the proposed conveyance facility awaits the completion of regulatory and environmental review and public input consideration.

** Additional acres of agricultural land would be impacted due to disposal of dirt and material during construction. The Peripheral Canal proposal did not quantify such materials in detail.

¹ All but the fourth column of this Table regarding Alt. 4A was produced by the proponents of the BDCP/Water Fix in a document entitled: “BDCP: A 21st Century Strategy.”

EXHIBIT B

Pless Environmental, Inc.

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BY EMAIL

October 29, 2015

Osha Meserve
Soluri Meserve
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osha@semlawyers.com

Re: Comments on Partially Recirculated Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement for Bay Delta Conservation Plan/California Water Fix

Dear Ms. Meserve,

Per your request, I reviewed the Partially Recirculated Draft Environmental Impact Report/Supplemental Environmental Impact Statement ("PRDEIR/SDEIS") for the Bay Delta Conservation Plan/California Water Fix ("BDCP/CWF" or "Project") published for review by the U.S. Department of the Interior, Bureau of Reclamation ("Reclamation"), the U.S. Department of Fish and Wildlife Service ("USFWS") and the U.S. Department of Commerce, National Oceanographic and Atmospheric Administration, National Marine Fisheries Service ("NMFS") as the lead agencies for compliance with the National Environmental Policy Act ("NEPA") and the California Department of Water Resources ("DWR") as the lead agency for compliance with the California Environmental Quality Act ("CEQA").¹

My review focuses mostly on the impacts of Alternative 4A on air quality under CEQA, but my comments are equally applicable to the corresponding NEPA review and all comments with respect to methodologies and assumptions used by the PRDEIR/SDEIS are equally applicable to all other action alternatives. I previously commented on the Draft Environmental Impact Report/Draft Environmental Impact

¹ Reclamation, USFWS, NMFS, DWR, PRDEIR/SDEIS, Bay Delta Conservation Plan, Alameda, Contra Costa, Sacramento, San Joaquin, Solano, and Yolo Counties, California, August 19, 2015; http://baydeltaconservationplan.com/2015PublicReview/PublicReviewRDEIRSDEIS/PublicReviewRDEIRSDEIS_Links.aspx.

Statement (“DEIR/DEIS”).² Comments that were not or not adequately addressed by the PRDEIR/SDEIS are incorporated below.

My qualifications as an environmental expert include a doctorate in Environmental Science and Engineering from the University of California Los Angeles. I am a court-recognized expert and have prepared comments and testimony on air quality, public health and global climate change in the environmental review process of numerous projects under CEQA and NEPA and the federal and state Clean Air Acts, including a number of large-scale development projects and specific plans (*e.g.*, the Los Angeles World Airports Expansion Master Plan, the City of Sacramento Railyards Specific Plan, and the City of Vacaville General Plan). My résumé is attached to this letter.

I. Project Description

In addition to the No Action Alternative, the PRDEIR/SDEIS purports to analyze the environmental impacts of 18 action alternatives which are variations of conservation plans that differ primarily in the location, design, conveyance capacity, and rules that would determine the operation of conveyance facilities implemented under BDCP Conservation Measures CM-1 and CM2–CM11. For instance, the alternatives range from the proposed construction of one 3,000-cubic feet per second (“cfs”) intake to five such intake facilities, representing a range of north Delta conveyance capacities from 3,000 cfs to 15,000 cfs. The operational rules also include varying requirements for Delta outflow and river flows in the south Delta. The range of alternatives also includes different amounts and types of habitat restoration and enhancement.³ In addition to substantive revisions to the analyses presented in the DEIR/DEIS, the PRDEIR/SDEIS provides analyses of three new action alternatives, Alternative 4A, the new Preferred Alternative under CEQA, and Alternatives 2D and 5A.

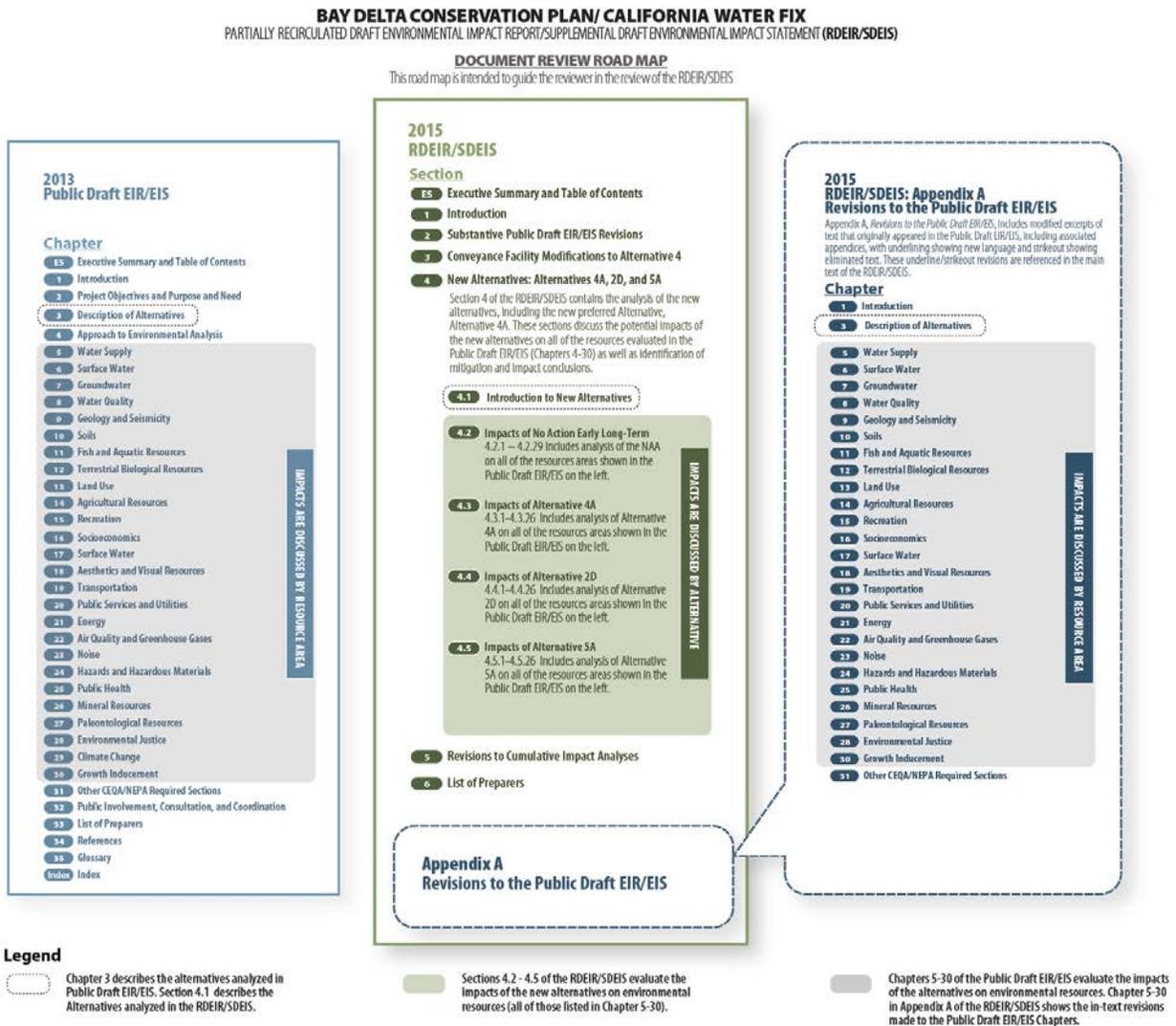
II. The PRDEIR/SDEIS Is Impenetrable and Frustrates Public Review and Is Not Adequately Supported

Instead of providing a complete revised document that incorporates the new alternatives, the lead agencies chose the format of a partially recirculated document which further complicates the already challenging review (*see* Comment II.A) by providing the analysis of environmental impacts under the three new action

² Pless, Pless Environmental, Inc., Letter to Osha Meserve, Soluri Meserve, Re: Comments on Draft Environmental Impact Report/Environmental Impact Statement for Bay Delta Conservation Plan, July 24, 2014 (“2014 Pless DEIR/DEIS Comments”).

³ DEIR/DEIS, p. 3-2.

alternatives (4A, 2D, and 5A) in Chapter 4 of the main body of the PRDEIR/SDEIS and relegating to Appendix A revisions to the environmental impact analyses (Chapters 5 through 30) for the other 15 action alternatives. This presentation requires the reviewer to constantly go back and forth between the main body of the PRDEIR/SDEIS, the revised chapters and their respective revised appendices in PRDEIR/SDEIS Appendix A, and the DEIR/DEIS for sections, appendices and figures that were not revised. Apparently recognizing that this presentation is far from intuitive, the lead agencies provide a *Document Review Road Map*, shown below.



I note that the *Document Review Road Map* fails to refer to the new PRDEIR/SDEIS Appendices B through G. Further confounding review is that not all sections that should have been revised or amended (e.g., the PRDEIR/SDEIS does not provide figures illustrating DWR total emissions of greenhouse gases for Alternatives 4A, 2D, and 5A or revised figures for the other 15 action alternatives).

Further, not all revised chapters and appendices in Appendix A are provided as redline strikeout (e.g., Chapter 22, *Air Quality and Greenhouse Gases* and Appendix 22C). In addition, the PRDEIR/SDEIS changed some heading numbering within the revised Chapters (e.g., the *Air Quality and Greenhouse Gases* Cumulative Analysis, formerly Chapter 22.3.3.17, is now Chapter 22.3.4). Finally, the lead agencies posted errata to the document on August 8, September 23, and October 13, 2015. In sum, the presentation of the PRDEIR/SDEIS unnecessarily complicates review of what was already impenetrable document.

II.A The PRDEIR/SDEIS's Discussion of Air Quality and Greenhouse Gas Impacts Is Lengthy, Confusing, Repetitive and Internally Redundant

The BDCP/CWF would be constructed within parts of three air basins, the Sacramento Valley Air Basin ("SVAB"), the San Joaquin Valley Air Basin ("SJVAB"), and the San Francisco Bay Area Air Basin ("SFBAAB") which are under the jurisdiction of four air districts, the Yolo-Solano Air Quality Management District ("YSAQMD"), the Sacramento Metropolitan Air Quality Management District ("SMAQMD"), the Bay Area Air Quality Management District ("BAAQMD"), and the San Joaquin Valley Air Pollution Control District ("SJVAPCD"). For each of the now 18 action alternatives, the PRDEIR/SDEIS evaluates the significance of emissions of criteria pollutants – reactive organic gases ("ROG") and nitrogen oxides ("NOx"), which are both ozone precursors, carbon monoxide ("CO"), particulate matter equal to or smaller than 10 micrometers ("PM10"), particulate matter equal to or smaller than 2.5 micrometers PM2.5, and sulfur dioxide ("SO₂") – diesel particulate matter ("DPM"), carbon dioxide-equivalent ("CO_{2e}") greenhouse gases ("GHG"), and odors by affected air district under NEPA and CEQA.⁴

I previously commented that Chapter 22 *Air Quality and Greenhouse Gases* in the DEIR/DEIS is impenetrable due to its highly repetitive structure and lack of effective formatting.⁵ The PRDEIR/SDEIS did not change this approach. In fact, the PRDEIR/SDEIS Appendix A, Chapter 22 *Air Quality and Greenhouse Gases*, has grown from 408 to 514 pages (without appendices) due to inclusion of eight new impact analyses and remains in what looks like a 10 point font size for the body text; the PRDEIR/SDEIS's analyses of *Air Quality and Greenhouse Gases* for the three new alternatives, Chapters 4.3-18 (Alternative 4A), 4.4-18 (Alternative 2D, and 4.5-18 (Alternative 5A) add another 19 to 21 pages each. The sheer length of these chapters, their monotonous, indistinct formatting, and repetitive and internally redundant

⁴ DEIR/DEIS, Table 22-86, p. 22-226.

⁵ 2014 Pless DEIR/DEIS Comments, Comment IV.A.

structure frustrate public review and defeat the public disclosure requirements of CEQA and NEPA.

Specifically, the PRDEIR/SDEIS's presentation of *Effects and Mitigation Approaches* in Appendix A, Chapter 22, Section 22.3, and PRDEIR/SDEIS, Chapter 4, Section 4.3-18 (Alternative 4A), 4.4-18 (Alternative 2D), and 4.5-18 (Alternative 5A), follows the same structure for each of the 18 action alternatives for presenting:

- a) Summary of methodology.
- b) Presentation of emission estimates in tables (criteria pollutants from electricity consumption, construction, and operation and maintenance).
- c) Discussion of *NEPA Effects* and *CEQA Conclusions* including applicable mitigation measures for each of the following impacts:

Impact AQ-1: Generation of *Criteria Pollutants* in Excess of the **SMAQMD** Regional Thresholds during Construction of the Proposed Water Conveyance Facility

Impact AQ-2: Generation of *Criteria Pollutants* in Excess of the **YSAQMD** Regional Thresholds during Construction of the Proposed Water Conveyance Facility

Impact AQ-3: Generation of *Criteria Pollutants* in Excess of the **BAAQMD** Regional Thresholds during Construction of the Proposed Water Conveyance Facility

Impact AQ-4: Generation of *Criteria Pollutants* in Excess of the **SJVAPCD** Regional Thresholds during Construction of the Proposed Water Conveyance Facility

Impact AQ-5: Generation of *Criteria Pollutants* in Excess of the **SMAQMD** Regional Thresholds from Operation and Maintenance of the Proposed Water Conveyance Facility

Impact AQ-6: Generation of *Criteria Pollutants* in Excess of the **YSAQMD** Regional Thresholds from Operation and Maintenance of the Proposed Water Conveyance Facility

Impact AQ-7: Generation of *Criteria Pollutants* in Excess of the **BAAQMD** Regional Thresholds from Operation and Maintenance of the Proposed Water Conveyance Facility

Impact AQ-8: Generation of *Criteria Pollutants* in Excess of the **SJVAPCD** Regional Thresholds from Operation and Maintenance of the Proposed Water Conveyance Facility

Impact AQ-9: Exposure of Sensitive Receptors to *Localized Particulate Matter* in Excess of **SMAQMD's** Health-Based Concentration Thresholds

Impact AQ-10: Exposure of Sensitive Receptors to *Localized Particulate Matter* in Excess of **YSAQMD's** Health-Based Concentration Thresholds

- Impact AQ-11:** Exposure of Sensitive Receptors to *Localized Particulate Matter* in Excess of **SJVAPCD's** Health-Based Concentration Thresholds
- Impact AQ-12:** Exposure of Sensitive Receptors to *Localized Particulate Matter* in Excess of **BAAQMD's** Health-Based Concentration Thresholds
-
- Impact AQ-13:** Exposure of Sensitive Receptors to *Health Hazards from Localized Carbon Monoxide*
-
- Impact AQ-14:** Exposure of Sensitive Receptors to *Health Hazards from Diesel Particulate Matter* in Excess of **SMAQMD's** Chronic Non-cancer and Cancer Risk Assessment Thresholds
- Impact AQ-15:** Exposure of Sensitive Receptors to *Health Hazards from Diesel Particulate Matter* in Excess of **YSAQMD's** Chronic Non-cancer and Cancer Risk Assessment Thresholds
- Impact AQ-16:** Exposure of Sensitive Receptors to *Health Hazards from Diesel Particulate Matter* in Excess of **BAAQMD's** Chronic Non-cancer and Cancer Risk Assessment Thresholds
- Impact AQ-17:** Exposure of Sensitive Receptors to *Health Hazards from Diesel Particulate Matter* in Excess **SJVAPCD's** Chronic Non-cancer and Cancer Risk Assessment Thresholds
-
- Impact AQ-18:** Exposure of Sensitive Receptors to *Coccidioides immitis (Valley Fever)*
-
- Impact AQ-19:** Creation of Potential *Odors* Affecting a Substantial Number of People during Construction or Operation of the Proposed Water Conveyance Facility
-
- Impact AQ-20:** Generation of *Criteria Pollutants* in Excess of Federal *De Minimis* Thresholds from Construction and Operation and Maintenance of the Proposed Water Conveyance Facility
-
- Impact AQ-21:** Generation of *Cumulative Greenhouse Gas Emissions* during Construction of the Proposed Water Conveyance Facility
- Impact AQ-22:** Generation of *Cumulative Greenhouse Gas Emissions* from Operation and Maintenance of the Proposed Water Conveyance Facility and Increased Pumping
-
- Impact AQ-23:** Generation of *Cumulative Greenhouse Gas Emissions* from Increased CVP Pumping as a Result of Implementation of **CM1**
-
- Impact AQ-24:** Generation of *Regional Criteria Pollutants* from Implementation of **CM2-CM11**
- Impact AQ-25:** Exposure of Sensitive Receptors to *Health Hazards from Localized Particulate Matter, Carbon Monoxide, and Diesel Particulate Matter* from Implementation of **CM2-CM11**
- Impact AQ-26:** Creation of Potential *Odors* Affecting a Substantial Number of People from *Particulate Matter* from Implementation of **CM2-CM11**

Impact AQ-27: Generation of Cumulative Greenhouse Gas Emissions from Implementation of CM2-CM11⁶

The PRDEIR/SDEIS provides no discussion why, contrary to the remainder of Chapter 22 *Air Quality and Greenhouse Gases*, the order of impacts analyzed for the four air districts was changed from YSAQMD (1), SMAQMD (2), BAAQMD (3), and SJVAPD (4) in the DEIR/DEIS to SMAQMD (1), YSAQMD (2), BAAQMD (3), and SJVAPD (4), further complicating public review. Further, the renumbering of impacts by the PRDEIR/SDEIS turns a direct comparison with impact discussions in the DEIR/DEIS into a hunt for the corresponding impacts.

Because there are no indications which alternative is discussed on a respective page, it is easy to lose sight of the alternative under review when scrolling through a PDF document or thumbing through a printed document. This is not helped by errors in the document that incorrectly label impacts (*e.g.*, p. 22-234 incorrectly labels Alternative 2B Impact AQ-5 as AQ-6; p. 22-261 incorrectly labels Alternative 3 Impact AQ-5 as AQ-6). Because of this repetitive structure, which analyzes each of the 27 impacts separately for each and every one of the 18 action alternatives and follows more or less the same outline within each impact discussion, the PRDEIR/SDEIS, contains a multitude of recurring statements and sometimes whole paragraphs (where “X” stands for any of the 18 action alternatives):

Electricity consumption

- Construction and operation of Alternative [X] would require the use of electricity, which would be supplied by the California electrical grid. Power plants located throughout the state supply the grid with power, which will be distributed to the Study area to meet project demand. Power supplied by statewide power plants will generate criteria pollutants. Because these power plants are located throughout the state, criteria pollutant emissions associated with Alternative [X] electricity demand cannot be ascribed to a specific air basin or air district within the study area and it cannot be determined whether the air pollutant emissions associated with electricity generation would degrade air quality in a specific air basin or air district within the Study area. Criteria pollutant emissions from electricity consumption, which are summarized in Table [] for Alternative [X] ..., are therefore provided for informational purposes only and are not included in the impact conclusion.

⁶ The formatting (bold, italic, and underline, separating line) is not found in the Draft EIR/EIS and is provided here to facilitate which analyses address similar impacts.

Construction

- Construction activities would generate emissions of ozone precursors (ROG and NO_x), CO, PM₁₀, PM_{2.5}, and SO₂. Table [] summarizes criteria pollutant emissions that would be generated in the BAAQMD, SMAQMD, SJVAPCD, and YSAQMD in pounds per day and tons per year. Emissions estimates include implementation of environmental commitments (see Appendix 3B, *Environmental Commitments*). Although emissions are presented in different units (pounds and tons), the amounts of emissions are identical (i.e., 2,000 pounds is identical to 1 ton). Summarizing emissions in both pounds per day and tons per year is necessary to evaluate project-level effects against the appropriate air district thresholds, which are given in both pounds and tons (see Table []).
- As shown in Appendix 22B, Air Quality Assumptions, construction activities during several phases will likely occur concurrently. To ensure a conservative analysis, the maximum daily emissions during these periods of overlap were estimated assuming all equipment would operate at the same time – this gives the maximum total project-related air quality impact during construction. Accordingly, the daily emissions estimates represent a conservative assessment of construction impacts. Exceedances of the air district thresholds are shown in underlined text.

Operation

- Operation and maintenance activities under Alternative [X] would result in emissions of ROG, NO_x, CO, PM₁₀, PM_{2.5}, and SO₂. Emissions were quantified for both ELT and LLT conditions, although activities would take place annually until project decommissioning. Future emissions, in general, are anticipated to lessen because of continuing improvements in vehicle and equipment engine technology.
- Table [] summarizes criteria pollutant emissions associated with operation of Alternative [X] in the BAAQMD, SMAQMD, and SJVAPCD in pounds per day and tons per year (no operational emissions would be generated in the YSAMQD). Although emissions are presented in different units (pounds and tons), the amounts of emissions are identical (i.e., 2,000 pounds is identical to 1 ton). Summarizing emissions in both pounds per day and tons per year is necessary to evaluate project-level effects against the appropriate air district thresholds, which are given in both pounds and tons (see Table 22-8).

Health Risk

- Diesel-fueled engines, which generate DPM, would be used during construction of the proposed water conveyance facility. These coarse and fine particles may be composed of elemental carbon with adsorbed materials, such as organic compounds, sulfate, nitrate, metals, and other

trace elements. The coarse and fine particles are respirable, which means that they can avoid many of the human respiratory system's defense mechanisms and enter deeply into the lungs. DPM poses inhalation-related chronic non-cancer and cancer health threats.

These statements (which, by no means constitute an exhaustive list), repeated word for word for each alternative, could have simply been incorporated into a summary text that applies to all alternatives to reduce the overall length and improve accessibility of Chapter 22 *Air Quality and Greenhouse Gases*.

Another example of the internally redundant organization of this chapter: only nine of the 18 action alternatives (Alternatives 1A, 2A, 2B, 2C, 2D, 4A, 5A, 6A, and 6C) would construct permanent features in all air four districts. For the nine alternatives that would not have impacts in one or more air districts (Alternatives 1B, 1C, 3, 4, 5, 6C, 7, 8, and 9), the PRDEIR/SDEIS provides the following repetitive discussion of operational impacts where "X" stands for any of these 9 alternatives and "Y" stands for Impacts AQ-5 and SMAQMD, AQ-6 and YSAQMD, AQ-7 and BAAQMD, and AQ-8 and SJVAPCD:

Impact AQ-[Y]: Generation of Criteria Pollutants in Excess of the YSAQMD Regional Thresholds from Operation and Maintenance of the Proposed Water Conveyance Facility

NEPA Effects: Alternative [X] would not construct any permanent features in the YSAQMD that would require routine operations and maintenance. No operational emissions would be generated in the [Y]. Consequently, operation of Alternative [X] would neither exceed the [Y] thresholds of significance nor result in an adverse effect to air quality.

CEQA Conclusion: Operational emissions generated by the alternative would not exceed YSAQMD's thresholds of significance. This impact would be less than significant. No mitigation is required.

This entire discussion, repeated word-for-word for each of the nine action alternatives without activities in the respective air districts, could have simply been replaced by a summary table in a strategic location indicating that an analysis of impacts is not applicable for these alternatives.

In other words, the presentation of the methodology and impacts for each alternative is often redundant and could have been considerably shortened by consolidating repetitive information, *e.g.*, in introductory paragraphs to and/or in summary tables before the alternative-specific discussion in PRDEIR/SDEIS Appendix A, Chapter 22, Section 22.3 *Determination of Effects*. In fact, providing summary tables instead of repetitive discussions would go a long way towards

shortening the *Air Quality and Greenhouse Gases* section, which consists of a total of 573 pages,⁷ and towards helping to orient the reader and provide a more readily accessible discussion. Despite this overly lengthy presentation, the PRDEIR/SDEIS fails to adequately discuss impacts. (See Comments III and IV.)

I understand that the analyses of *Air Quality and Greenhouse Gases* in PRDEIR/SDEIS Appendix A, Chapter 22, and PRDEIR/SDEIS Chapters 4.3.18, 4.4.18, and 4.5.18, were intentionally structured to be consistent with other sections of the EIR/EIS⁸; however, I suggest that the lead agencies rethink the organization of this section (and other similarly problematic sections) and carefully assess whether a more streamlined internal organization wouldn't be more practical and make the document more readily accessible for public review in order to understand impacts associated with BDCP/CWF alternatives and proposed mitigation measures. In addition, the document could be vastly improved by using more distinctive formatting as a visual aid for the various levels of headings and mitigation measures (currently the only difference in the heading formatting is font size and indented text for mitigation measures; the latter is inconsistently applied throughout the chapter). To enhance readability, I also suggest including a header on each page indicating the alternative under review.

II.B The PRDEIR/SDEIS's Analyses of Air Quality and Greenhouse Gases Are Not Adequately Supported

The BDCP/CWF website, which posts the PRDEIR/SDEIS, appendices, and other supporting documents, fails to provide the following supporting documentation that forms the basis for estimates of air pollutant and greenhouse gas emissions presented in the PRDEIR/SDEIS:

- Spreadsheets used to calculate electrical energy demand (Table 21-9) and fuel use (Table 21-10) for construction of the water conveyance facilities, as described in PRDEIR/SDEIS, Appendix A, Chapter 21, Section 21.3.1;
- Spreadsheets used to calculate criteria pollutant and greenhouse gas emissions from heavy-duty off-road equipment, marine vessels, locomotives, on-road vehicles, road dust, helicopters, fugitive dust from earth moving, fugitive ROG from paving, electricity usage, and concrete batching during construction per the emission calculation

⁷ (514+19+21+19) = 573.

⁸ Personal communication Petra Pless with Laura Yoon, ICF International, July 18, 2014.

- methodology described in the PRDEIR/SDEIS, Appendix A, Appendix 22A, Section 22A.1;
- Spreadsheets used to calculate criteria pollutant and greenhouse gas emissions from operation and maintenance activities and electricity usage per the methodology described in PRDEIR/SDEIS, Appendix A, Appendix 22A, Section 22A.2;
 - Spreadsheets used to calculate health risks, as described in the PRDEIR/SDEIS, Appendix A, Appendix 22C; and
 - Dispersion modeling files (AERMOD) for PM10, PM2.5 and DPM concentrations as described in PRDEIR/SDEIS, Appendix A, Appendix 22C.

As I commented previously on the DEIR/DEIS⁹, access to this documentation is integral to any meaningful review of the air quality, health risk and greenhouse gas analyses presented in Chapter 22 of the PRDEIR/SDEIS; without this documentation, proper review and verification of the Project's impacts on air quality and associated health risks and global climate change, as quantified and presented by the PRDEIR/SDEIS, are not possible and the reviewer has to accept presented results at face value.

In my extensive experience with the public review process under NEPA and CEQA, this documentation is routinely provided in appendices and in the few cases it was unintentionally omitted was supplied upon request without delay. It is not acceptable that an environmental review document of this magnitude (several Gigabytes of information on tens of thousands of pages) that analyzes a long-term project with implications as far-reaching and impacts as severe as the BDCP/CWF does not provide this essential information to the public and the reviewing agencies, including the affected air districts.

I understand that your office requested this supporting documentation on August 11, 2015. Some files were provided about a month later; however the spreadsheets supporting the health risk assessment were not provided until September 28, 2015. I note that none of the provided Excel spreadsheets are functional, *i.e.*, all equations and crosslinks were removed, thereby unnecessarily hampering review. Since all equations and crosslinks between spreadsheets can be re-established with enough patience and time, provided that all assumptions are laid out in detail, I find that the consulting firm's stated concerns regarding functionality and proprietary reasons¹⁰ are not reasonable. In my experience, fully functional spreadsheets are

⁹ 2014 Pless DEIR/DEIS Comments, Comment II.

¹⁰ Personal communication Meserve/Laura Yoon, ICF International, July 15, 2014, and Email from Shay Humphrey, ICF International, to Osha Meserve, Soluri Meserve, RE: Air Quality Modeling Documents

normally provided upon request by interested reviewers (only sometimes requiring a confidentiality agreement). In any case, even though review of the provided files was hampered by delay in receiving a limited amount of information, making it unnecessarily time-consuming, I have identified several issues of concern, as discussed below.

III. The PRDEIR/SDEIS Analysis of Project Impacts on Air Quality due to Project Construction Is Inadequate

The PRDEIR/SDEIS provides substantially revised analyses of construction emissions in Appendix A, Chapters 22.3.3.2 through 22.3.3.16 (Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, 9) and Chapter 4, Sections 4.3.18 (Alternative 4A), 4.4.18 (Alternative 2D), and 4.5.18 (Alternative 5A), which are supported by Appendices 22A, 22B, 22C. My comments below focus on Alternative 4A, which would generate the same construction emissions as Alternative 4.¹¹

III.A The Discussion of Significant Impacts due to Criteria Pollutant and Precursor Emissions Presented by the PRDEIR/SDEIS Is Inadequate

The PRDEIR/SDEIS provides summary tables with criteria pollutant and precursor emission estimates for construction for each alternative and for each air district compared to the respective air district's quantitative significance thresholds (where significant impacts are underlined).¹² These emission estimates include the implementation of *Environmental Commitments* (see Appx. 3B). In addition, the PRDEIR/SDEIS provides summary tables for modeled increases in PM₁₀ and PM_{2.5} concentrations resulting from construction emissions for each alternative and for each air district compared to the respective air district's quantitative significance thresholds.¹³ For each alternative, the PRDEIR/SDEIS then goes through the NEPA and CEQA impacts for each of the above-summarized 27 impacts (AQ-1 through AQ-27) and identifies which pollutants would exceed applicable air district thresholds and would therefore be considered significant, typically in just one sentence that provides little to no additional information beyond that provided in the summary tables or prior

Re: BDCP/CA Water Fix PRDEIR/SDEIS, September 11, 2015 ("The formulas and overall set-up are an ICF-model that ICF uses for multiple projects and represents ICF intellectual property, therefore the spreadsheets are provided in a hardcoded format.").

¹¹ See PRDEIR/SDEIS, Chapter 4, Section 4.3.18, p. 4.3.18-1.

¹² For example: PRDEIR/SDEIS, Table 22-99, Criteria Pollutant Emissions from Construction of Alternative 4 (lbs/day and tons/year).

¹³ For example: PRDEIR/SDEIS, Table 22-101, Alternative 4 PM₁₀ and PM_{2.5} Concentration Results in SMAQMD.

discussions. The PRDEIR/SDEIS fails entirely to put significant impacts into perspective; in other words, it provides no discussion of the severity of the resulting impacts or a discussion of the impacts in the context of the respective air basin's existing air quality.

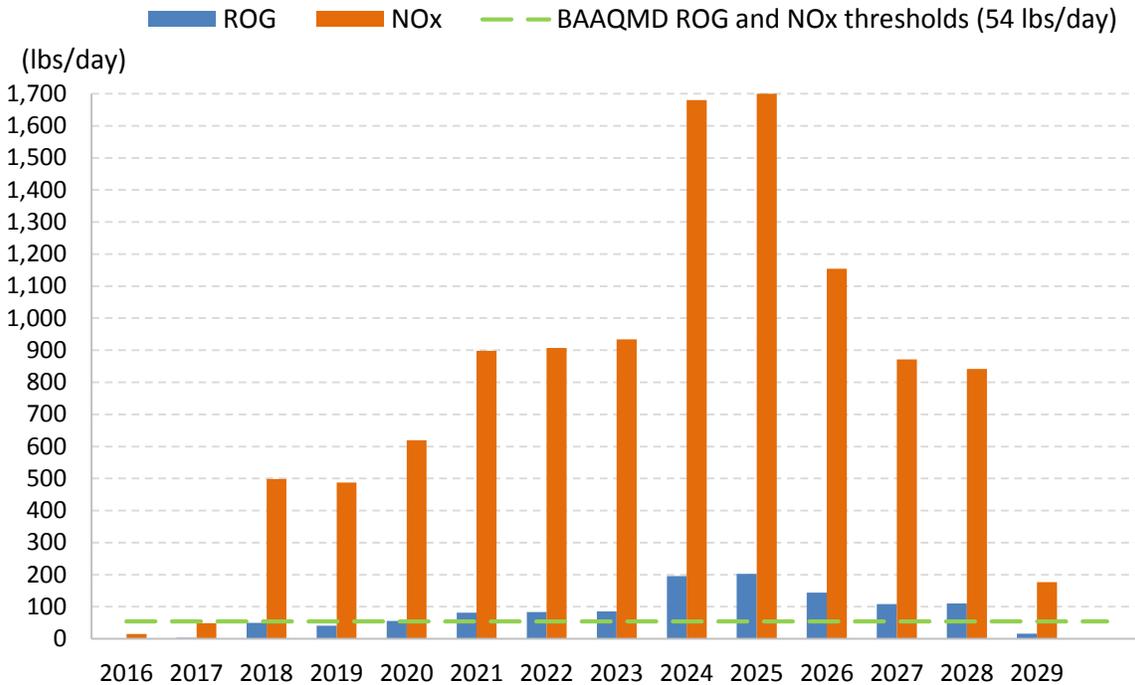
As an example: For impacts resulting from construction of Alternative 4/4A in the San Francisco Bay Area Air Basin under the BAAQMD's jurisdiction, the PRDEIR/SDEIS simply states that emissions would exceed the respective significance threshold for ROGs in the years 2020 through 2028 and for NO_x during the years 2018 through 2029.¹⁴ The PRDEIR/SDEIS makes no effort to put emissions of these ozone precursors into context with respect to the federal and state ozone non-attainment status of the region. Review of PRDEIR/SDEIS Appendix A, Chapter 22, Table 22-99 shows that maximum daily emissions of ROG during Alternative 4/4A construction would be up to 203 lbs/day in 2025, exceeding the BAAQMD's daily significance threshold for ROG of 54 lbs/day **by 276%**;¹⁵ maximum daily emissions of NO_x during Alternative 4/4A construction would be up to 1,700 lbs/day in 2025, exceeding the BAAQMD's daily significance threshold for NO_x (54 lbs/day) **more than 30 times, or by 3048%**.¹⁶ Figure 1 below illustrates the enormity of ROG and NO_x emissions within the San Francisco Bay Area Air Basin over the 14-year construction phase of Alternative 4/4A (2016 through 2029) in comparison to the BAAQMD's significance thresholds for these pollutants of 54 lbs/day.

¹⁴ PRDEIR/SDEIS, p. 4.3-18-2 and Appendix A, Chapter 22, p. 22-294.

¹⁵ Alternative 4 BAAQMD Year 2025: (203 pounds ROG/day) / (54 pounds ROG/day) - (1) = **2.76**.

¹⁶ Alternative 4 BAAQMD Year 2025: (1700 pounds NO_x/day) / (54 pounds NO_x/day) - (1) = **30.48**.

Figure 1: Alternative 4/4A maximum daily ROG and NOx construction emissions in BAAQMD (including *Environmental Commitments*) compared to BAAQMD’s CEQA daily construction significance thresholds for ROG and NOx



Data from: PRDEIR/SDEIS, Appx. A, Chapter 22, Table 22-9

Construction emissions of ROG and NOx shown in the above chart include the mitigating effects of the *Environmental Commitments*¹⁷ laid out in PRDEIR/SDEIS, Appendix 3B. (For a discussion of the PRDEIR/SDEIS’s unrealistic approach regarding their effectiveness see PRDEIR/SDEIS, Appendix A, Chapter 22, see Comment V.) Figure 1 illustrates just how enormous construction emissions of the ozone precursors ROG and NOx would be under Alternative 4/4A and by how much these already mitigated emissions (by *Environmental Commitments*) would exceed the quantitative thresholds of significance thresholds established by the BAAQMD.

For all impacts due to criteria pollutant and precursor emissions from construction or operation and maintenance found to be significant, the PRDEIR/SDEIS simply finds – without any quantitative analysis and feasibility analysis whatsoever – that the implementation of proposed mitigation measures (beyond *Environmental Commitments*) would result in less than significant impacts.¹⁸ As discussed in Comment V, these findings are not supported.

¹⁷ *Environmental Commitments* should be included as mitigation measures in the Mitigation Monitoring and Reporting Plan to make them enforceable.

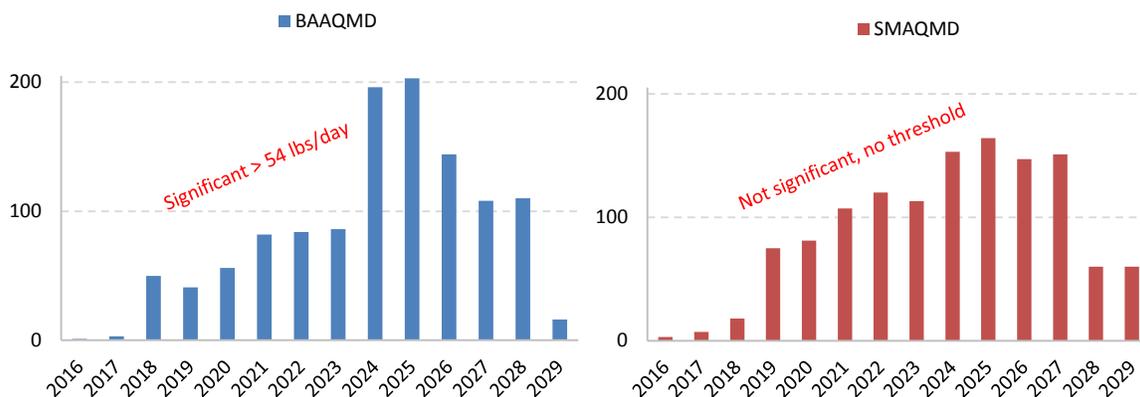
¹⁸ See PRDEIR/SDEIS, pp. ES-97 and ES-98.

III.B The Lack of Quantitative Mass Thresholds of Significance Established by Air Districts Does Not Excuse the Lead Agencies from Making Findings of Significance

The PRDEIR/SDEIS estimates maximum daily and annual emissions of criteria pollutants and precursors from construction and determines their significance based on the respective quantitative mass thresholds of significance for construction established by the affected air districts (Impacts AQ-1 through AQ-4). All emission estimates account for implementation of the *Environmental Commitments* described in Appendix 3B.

If an air district did not establish or recommend a quantitative mass threshold of significance for construction for a specific pollutant, the PRDEIR/SDEIS simply concludes that emissions of that pollutant would not exceed the respective air district's significance thresholds and, consequently, makes a determination of less than significance for that pollutant. For example, the PRDEIR/SDEIS does not find significant ROG emissions in the SMAQMD despite emission estimates being on the same order of magnitude as in the BAAQMD (see Figure 2) and the despite the fact that both air basins are designated nonattainment with the federal and state ambient air quality standards ("NAAQS" and "CAAQS") for ozone.¹⁹

Figure 2: Alternative 4/4A maximum daily ROG construction emissions in BAAQMD and SMAQMD (lbs/day) (including *Environmental Commitments*)



Data from: PRDEIR/SDEIS, Appx. A, Chapter 22, Table 22-9.

This approach is not satisfactory. Air districts develop thresholds of significance for construction to address the impacts of *short-term* construction projects on the respective airshed's air quality, not the impacts of a massive construction project that spans three air basins and requires 14 years of construction. Therefore, the massive

¹⁹ PRDEIR/SDEIS, Appx. A, Chapter 22, Table 22-4.

amount of construction required for the Project and the enormous emissions over 14 years cannot be treated like a regular short-term construction project, where mitigation is only required when emissions exceed a quantitative mass threshold of significance established by an air district.

Air basins are not airtight bodies; rather emissions occurring in one air basin often affect the air quality in downwind air basins. For example, ozone precursors can be transported a long way before ozone is formed in a downwind area. (Transport may also have a significant contribution on the impacts of other pollutants such as fine particles.) As shown in Figure 3, ozone and ozone precursor emissions originating in the San Francisco Bay Area Air Basin frequently travel into the Sacramento Valley Air Basin and the San Joaquin Valley Air Basin and contribute to the poor air quality throughout Northern California.

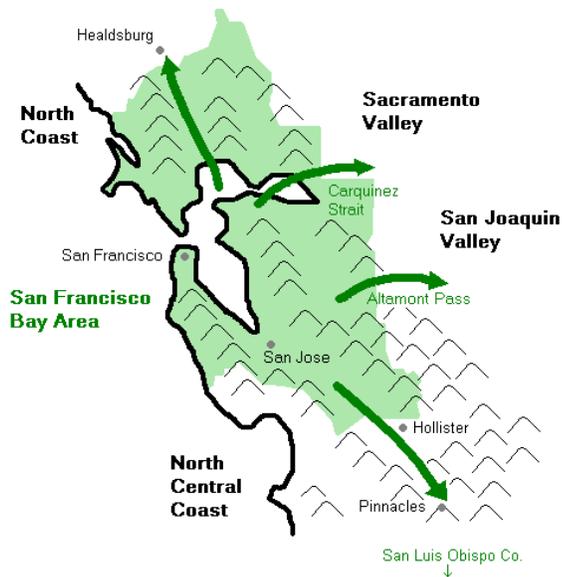


Figure 3: San Francisco Bay Area Air Basin
(from: CARB, Ozone Transport: 2001 Review, Regional Transport Summaries;
<http://www.arb.ca.gov/aqd/transport/summary/transportsummary.doc>
(hereafter "CARB 2001 Ozone Transport Review")

The reverse happens when north winds blowing through the Broader Sacramento Area turn westward and carry pollutants to the eastern part of the San Francisco Bay Area Air Basin. Under such conditions, while infrequent, violations of ambient air quality standards can be significantly impacted by pollutants transported from the Broader Sacramento Area.²⁰ On days when the north wind carries pollutants from the Broader Sacramento Area into the northern San Joaquin Valley, afternoon breezes from the west may then push polluted air from the valley into the Sierra Nevada foothills. On such days, the transport contribution can be shared between the

²⁰ CARB 2001 Ozone Transport Review, p. 25.

Sacramento Valley Air Basin, the northern San Joaquin Valley Air Basin and the San Francisco Bay Area Air Basin, as shown in Figure 4.

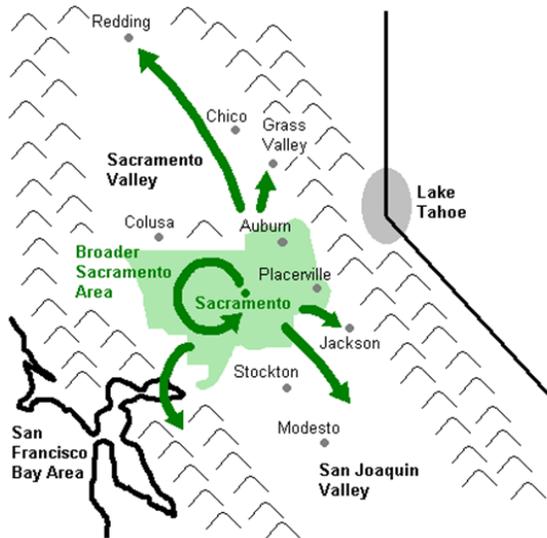


Figure 4: Sacramento Valley Air Basin: Broader Sacramento Area
(from: CARB 2001 Ozone Transport Review)

Similarly, under certain conditions, winds blowing from the south and southwest can carry pollutants from the northern San Joaquin Valley Air Basin towards Sacramento, as shown in Figure 5.

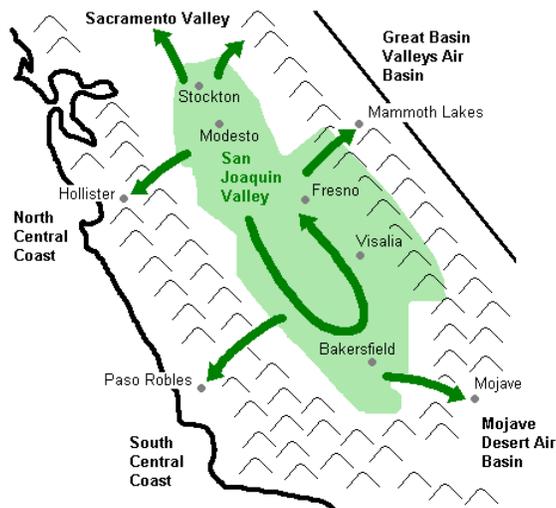


Figure 5: San Joaquin Valley Air Basin
(from: CARB 2001 Ozone Transport Review)

Under the California Clean Air Act, when emissions from one region contribute to violations of ambient air quality standards in a downwind area, the upwind area

shares responsibility for controlling those emission sources.²¹ Thus, the lack of quantitative thresholds of significance established or recommended by a local air district does not indicate that Project construction emissions would not result in significant impacts on air quality and does not relieve the lead agencies of their statutory obligation under CEQA to determine whether the Project's impacts are significant and to impose feasible mitigation measures and/or alternatives. In the absence of established thresholds and standards, lead agencies must rely on their own careful judgment based to the extent possible on scientific and factual data in determining whether a project's impacts are significant.²²

Here, the lead agencies could have either developed their own thresholds of significance, relied on the most stringent thresholds of significance established by any of the affected air districts, or, for ozone, provided transport modeling. In any case, the lead agencies must require all feasible mitigation for all phases no matter in which air district emissions occur.

III.C The PRDEIR/SDEIS Substantially Underestimates Fugitive Emissions of Particulate Matter

The PRDEIR/SDEIS presents estimates of PM10 and PM2.5 and models resulting concentrations in ambient air to assess health risks. The PRDEIR/SDEIS's emission estimates substantially underestimate emissions.

III.C.1 Fugitive Dust Emissions from Wind Erosion Are Not Accounted For

The Project would require grading of about 5,500 acres of land, cut-and-fill of more than 20 million cubic yards of soil, and excavation of about 5.7 million cubic yards of soil.²³ These activities would increase the surface material available for entrainment and would greatly increase the potential for windblown dust. Wind erosion of graded surfaces and storage piles during Project construction can be expected to be substantial and will contribute to the very high PM10 and PM2.5 concentrations frequently measured in the affected air basins, which are all in nonattainment of one or more particulate matter ambient air quality standard.²⁴ These windblown fugitive dust emissions during the 14-year construction period will hinder the affected air districts' compliance with or progress towards compliance with the ambient air quality standards for these pollutants. The PRDEIR/SDEIS acknowledges that windblown dust

²¹ See, for example, CARB 2001 Ozone Transport Review, p. 3.

²² CEQA Guidelines §§15064(b), 15064.7.

²³ From workbook 'MPTO_Grading_ec_NF.xlsx,' spreadsheet 'Quantities' provided by ICF International.

²⁴ PRDEIR/SDEIS, Appx. A, Chapter 22, Table 22-4.

would contribute to particulate matter emissions²⁵, yet, it does not estimate PM10 and PM2.5 emissions from wind erosion of graded surfaces or storage piles.

Emissions from wind-blown fugitive dust from graded surfaces can be estimated, for example, based on methodology developed by Maricopa County Air Quality Department (“MCAQD”) in Arizona.²⁶ I estimated emissions of fugitive windblown dust during Project construction based on emission factors for disturbed soil established by MCAQD, disturbed Project acreage, and information about the amount of time during a year certain wind speeds are exceeded in the area, and assuming a of 300 acres, as shown in Table 1.

Table 1: Fugitive dust PM10 emissions due to wind erosion from disturbed soil

| Wind speed bin (mph) | 12-15 | 15-20 | 20-25 | 25-30 | 30-35 | Total |
|--|----------|----------|----------|----------|----------|--------------|
| Disturbed soil PM emission factor^a (ton/acre/5-min) | 5.44E-05 | 1.69E-04 | 5.14E-04 | 1.24E-03 | 2.57E-03 | |
| Percent of time in wind speed bin^b (%/year) | 17.0% | 8.2% | 1.0% | 0.0% | 0.0% | 26% |
| Number of 3 or 5-minute periods/year in wind speed bin (#/year)^c | 175,200 | 105,120 | 105,120 | 105,120 | 105,120 | |
| PM10 Emissions (ton/year) | | | | | | |
| 100 acres disturbed | 0.41 | 0.32 | 0.10 | - | - | 0.83 |
| 500 acres disturbed | 2.05 | 1.58 | 0.50 | - | - | 4.13 |
| 1000 acres disturbed | 4.10 | 3.16 | 1.01 | - | - | 8.26 |
| 2000 acres disturbed | 8.19 | 6.31 | 2.02 | - | - | 16.52 |

- a Maricopa County Air Quality Department, 2008 PM10 Periodic Emissions Inventory for the Maricopa County, Arizona, Nonattainment Area, Revised June 2011, Appendix 4. Windblown Dust Emission Estimation Methodology
- b From: Western Regional Climate Center - Desert Research Institute for Black Diamond, CA, for October 1, 2010 through October 31, 2015; <http://www.raws.dri.edu/cgi-bin/rawMAIN.pl?caCPOP> (see attached printout)
- c Number of 5-minute periods/year in wind speed bin = (365 days/year) × (24 hours/day) × (60 minutes/hour) / (3 or 5 minutes)

Table 1 shows that windblown PM10 emissions have the potential to contribute significantly to the air districts’ threshold of significance for this pollutant depending on the extent of the disturbed acreage throughout a year. Thus, the PRDEIR/SDEIS substantially underestimates PM10 emissions from Project construction.

²⁵ PRDEIR/SDEIS, Appx. 22C, p. 8.

²⁶ Maricopa County Air Quality Department, 2008 PM10 Periodic Emissions Inventory for the Maricopa County, Arizona, Nonattainment Area, Revised June 2011, Appendix 4. Windblown Dust Emission Estimation Methodology; https://www.maricopa.gov/aq/divisions/planning_analysis/docs/Reports/2008/08_PM10_PEI_Entire.pdf.

Particulate matter emissions from wind erosion of storage piles, which would further increase the above emissions, can be estimated based on methodology developed by the U.S. Environmental Protection Agency (“EPA”), *Compilation of Air Pollutant Emission Factors* (“AP-42”), Chapter 13.2.4 *Aggregate Handling and Storage Piles*.²⁷

III.C.2 *Earthmoving Particulate Matter Emissions Are Underestimated*

The PRDEIR/SDEIS estimates particulate matter emissions from bulldozing, grading, and earthmoving (loading) based on factors from CalEEMod, AP-42, and the South Coast Air Quality Management District assuming a 61% reduction efficiency for all activities. This factor originates with the Western Regional Air Partnership Handbook and represents the emission reduction efficiency for watering during site grading and does not apply to earthmoving activities. Furthermore, the loading factors already include the effects of watering as they were determined for 12% and 40% soil moisture; the latter already includes the effects of watering. Finally, the PRDEIR/SDEIS treats earthmoving activities as if they occur only once per unit material handled. This underestimates emissions as earthmoving for cut-and-fill activities typically involve several steps: loading of material onto storage piles, loading material onto trucks, and unloading material from trucks.

IV. The PRDEIR/SDEIS Assessment of Health Risks Is Inadequate and Fails to Identify and Adequately Mitigate Significant Health Risks

The PRDEIR/SDEIS discusses the results of a revised health risk assessment for emissions from construction of the water conveyance facilities in Chapter 4 (new action alternatives 4A, 2D, and 5A) and Chapter 22 (all other alternatives). The revised health risk assessment (provided in Appendix 22C) reflects implementation of the modified *Construction Equipment Exhaust Reduction Plan* as well as changes to on-road vehicle and helicopter emissions. The assessment of health risks for the various alternatives provided by the PRDEIR/SDEIS is inadequate and its findings are not supported.

IV.A The Health Risk Assessment for Project Construction Emissions Fails to Follow Recommended Methodology for Dispersion Modeling and, as a Result, Fails to Characterize Spatial Extent of Health Risks

All four affected air districts consulted for the health risk assessment modeling protocol recommended dispersion modeling for health risks based on a receptor grid

²⁷ EPA, AP-42, Chapter 13.2.4 *Aggregate Handling and Storage Piles*;
<http://www3.epa.gov/ttnchie1/ap42/ch13/final/c13s0204.pdf>.

with varying spacing, as summarized in Appendix A *Modeling Protocol* to Appendix 22C:

BAAQMD: “For cases with emissions from short stacks or vents and a close property line, a receptor spacing of 10 meters may be sufficient.”

SMAQMD: “SMAQMD recommends that the spacing of a receptor grid be 10 meters. Discrete receptors shall be added to ensure that specific nearby sensitive receptors are represented in the model.”

YSAQMD: “If receptors are greater than 500 feet from the site, YSAQMD is not too concerned with modeling. For less than 500 feet, setup receptor grids with 10 meter spacing.”

SJVAPCD: “For Cartesian receptor grid: 25-meter spacing on the facility boundary:

- 25-meter spacing from Facility Boundary to 100
- 50-meter spacing from 100 to 250 meters
- 100-meter spacing from 250 to 500 meters
- 250-meter spacing from 500 to 1000 meters
- 500-meter spacing from 1000 to 2000 meters

Leland Villalvazo (SJVAPCD) also suggested looking at receptors up to 2 kilometers.”²⁸

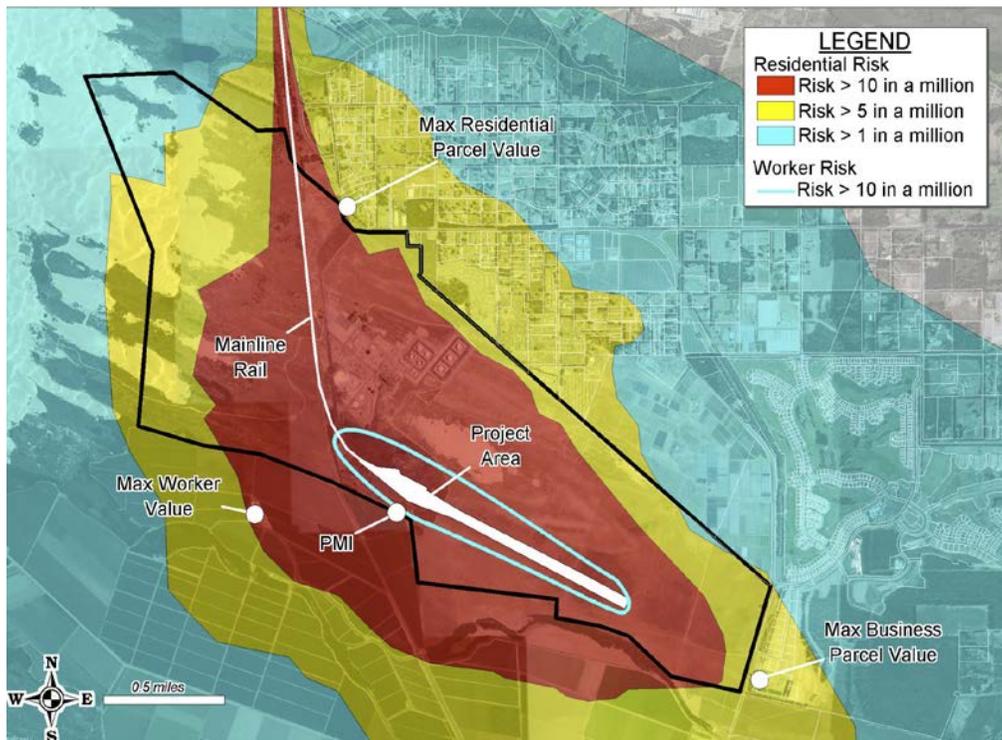
Ignoring the air district guidance to establish receptor grids as well as discrete receptors, the PRDEIR/SDEIS instead opted to only identify 12,874 discrete Cartesian receptors within the 2 kilometer buffer area of construction emission sources, but outside of the construction footprint.²⁹ This approach has the drawback that health risks are only established at the specific identified existing discrete receptors and information about the spatial extent of health risks is not provided. This could be important for public disclosure purposes and also for new projects that may be constructed concurrently with the Project such as new residential homes, schools, parks, places of worship, and other sensitive receptors.

Health risk assessments typically model receptor grids in order to determine the spatial extent of health risks around a project site which can be visually illustrated in so-called isopleth maps. An isopleth is a line drawn on a map through all points of equal value of some measurable quantity; in this case, chronic and carcinogenic health risk and PM10 and PM2.5 concentrations. Figure 6 shows an example of such an isopleth map, which clearly shows the extent of cancer risks around the project site.

²⁸ PRDEIR/SDEIS, Appx. 22C, p. A-4.

²⁹ PRDEIR/SDEIS, Appx. 22C, p. A-4.

Figure 6: Example isopleth map illustrating cancer risk



From: San Luis Obispo County, Draft Environmental Impact Report, Phillips 66 Company Rail Spur Extension and Crude Unloading Project and Vertical Coastal Access Project Assessment, SCH #2013071028, November 2013, p. 4.3-49 (PMI = point of maximum impact ("PMI")); [http://www.slocounty.ca.gov/Assets/PL/Santa+Maria+Refinery+Rail+Project/Draft+EIR-Phillips+66+Rail+Spur+Extension+Project+\(November+2013\)/4.3+Air+Quality+and+Greenhouse+Gases.pdf](http://www.slocounty.ca.gov/Assets/PL/Santa+Maria+Refinery+Rail+Project/Draft+EIR-Phillips+66+Rail+Spur+Extension+Project+(November+2013)/4.3+Air+Quality+and+Greenhouse+Gases.pdf).

The preparation of isopleth maps is not only typical for stationary sources but also for construction projects, for example, construction of the San Francisco-Oakland Bay Bridge.³⁰

When only modeling discrete Cartesian receptors in the absence of a receptor grid, isopleths cannot be drawn and health risks can only be identified for the modeled discrete receptors. This approach fails to disclose the spatial extent of health risks from Project construction. The lack of modeling for a receptor grid also precludes properly implementing guidance for health risk assessments and likely results in a substantial

³⁰ See U.S. Department of Transportation Federal Highway Administration, The State of California Department of Transportation, and United States Coast Guard, Draft Environmental Impact Statement, San Francisco - Oakland Bay Bridge, East Span Seismic Safety Project on Interstate 80 between Yerba Buena Island and Oakland in San Francisco and Alameda Counties, Appendix D, Potential Cancer Risk Isopleths by Part and by Category; http://www.arb.ca.gov/ch/communities/ra/westoakland/documents/appendixd_final.pdf.

underestimate of cancer risks for a number of receptors. (See Comment IV.D.) Further, since the RDEIR/SDEIS does not provide a map showing the location of the discrete receptors it considered, it is impossible to verify whether health risks were actually modeled for all sensitive receptors. I recommend that the lead agencies provide maps as well as a table with addresses identifying all sensitive receptors included in the dispersion modeling for each alternative and for each air district.

IV.B The Health Risk Assessment for Project Construction Emissions Fails to Adequately Present Modeled Health Risks

The revised health risk assessment in Appendix 22-3C provides 58 summary tables for the 10 sensitive receptors within each affected air district who would experience the highest chronic and carcinogenic health risks and the highest PM10 and PM2.5 concentrations. The location of the respective 10 sensitive receptors is given in Universal Transverse Mercator (“UTM”) coordinates, as shown in the following excerpted table for chronic and carcinogenic health risks for Alternatives 4 and Alternatives 1C, 2C, and 6C in the BAAQMD.

Table 22. Alternative 4 Chronic and Carcinogenic Health Risk Results in BAAQMD

| x | y | Chronic Hazard Quotient | Cancer Risks per Million |
|--------|---------|-------------------------|--------------------------|
| 623495 | 4187453 | 0.0017 | 5 |
| 624946 | 4186023 | 0.0013 | 4 |
| 626972 | 4186446 | 0.0013 | 4 |
| 626993 | 4186446 | 0.0013 | 4 |
| 626961 | 4186410 | 0.0012 | 4 |
| 627002 | 4186425 | 0.0012 | 4 |
| 623149 | 4188720 | 0.0012 | 4 |
| 626819 | 4186350 | 0.0012 | 4 |
| 626937 | 4186383 | 0.0012 | 4 |
| 627013 | 4186407 | 0.0012 | 4 |

x, y = universal transverse Mercator coordinates

Table 47. Alternative 1C, 2C, and 6C Chronic and Carcinogenic Health Risk Results in BAAQMD

| x | y | Chronic Hazard Quotient | Cancer Risk per Million |
|--------|---------|-------------------------|-------------------------|
| 619931 | 4201595 | 0.006 | 18 |
| 620287 | 4194440 | 0.006 | 18 |
| 620354 | 4195129 | 0.006 | 17 |
| 620286 | 4194466 | 0.005 | 16 |
| 620281 | 4194867 | 0.005 | 16 |
| 620743 | 4198374 | 0.005 | 16 |
| 620329 | 4194438 | 0.005 | 16 |
| 620284 | 4194843 | 0.005 | 16 |
| 620323 | 4195661 | 0.005 | 16 |
| 620605 | 4196781 | 0.005 | 16 |

x, y = universal transverse Mercator coordinates

This presentation is meaningless to the general public who wishes to understand the potential health risks they would experience due to Project construction emissions.

Specifically, a location in UTM coordinates without any graphical presentation on a map (or listing of an address) means nothing to affected sensitive receptors and the general public cannot be expected to translate these coordinates to a location on a map to find out whether they would be affected or not.

Further, the presentation of only those 10 sensitive receptors within each affected air district who would experience the highest chronic and carcinogenic health risks and the highest PM10 and PM2.5 concentrations fails to disclose the significance of impacts for other sensitive receptors where carcinogenic health risks would exceed the significance threshold of 10 in one million as seen in the excerpted table for Alternatives 1C, 2C, and 6C in the BAAQMD. While the PRDEIR/SDEIS acknowledges that “186 receptor locations were found to exceed the BAAQMD’s significance threshold for cancer risk” and indicates that these exceedances are “due to the proximity of a large track [sic] home development”³¹ it fails to disclose the addresses (or UTM coordinates) of the affected receptor locations. This approach defeats the main purpose of CEQA, which is to provide adequate information to the public to understand the consequences of a project. (I note that unlike the health risk assessment provided by the DEIR/DEIS, the PRDEIR/SDEIS revised health risk assessment in Appendix 22C does not provide a complete list of impacts for all modeled receptors.³²)

To mitigate these significant health risks, the PRDEIR/SDEIS proposes implementation of Mitigation Measure AQ-16, which would “provide individuals residing in areas where construction activities associated with the BDCP would create DPM concentrations in excess of air district cancer risk thresholds the opportunity to relocate either temporarily during the construction period or permanently, at the discretion of the affected individuals.”³³ However, without disclosure of the specific addresses of the affected sensitive receptors, this mitigation measure is a hollow promise and fails to ensure that impacts are mitigated to a less than significant level. I recommend that the lead agencies specifically identify and notify all sensitive receptors modeled to experience significant health hazards prior to adopting the Final EIR/EIS.

IV.C The Health Risk Assessment for Project Construction Emissions Fails to Identify Significant Health Risks for All Sensitive Receptors

In addition to the above problems, the PRDEIR/SDEIS does not model health risks for all affected discrete sensitive receptors. Specifically, Appendix 22-3C, provides

³¹ PRDEIR/SDEIS, p. 22-162.

³² See DEIR/DEIS, Appx. 22C, Appendix B: BDCP Sensitive Receptor Modeling Results.

³³ PRDEIR/SDEIS, Mitigation Measure AQ-16, p. 22-84.

the following explanation regarding which sensitive receptors were taken into account for dispersion modeling and determination of health risks:

For each alternative, the sensitive receptors evaluated using the AERMOD model was removed if located within an alternative's construction footprint. Modeled receptors were evaluated for their potential to exceed air district significance thresholds with receptor locations analyzed at a minimum of 3,000 feet from a project feature. Pollutant concentrations and health risk were estimated for each of these receptors.³⁴

In other words, the PRDEIR/SDEIS health risk assessment only determines health risks for discrete receptors located between 3,000 feet and 6,000 feet (2 kilometers) from the construction footprint and ignores all receptors who are located within or within 3,000 feet of the construction footprint. The PRDEIR/SDEIS provides no justification for this approach.

Consequently, instead of determining health risks for all 12,874 discrete sensitive receptors within the 2 kilometer buffer area of construction emission sources (outside of the construction footprint) it identified,³⁵ the RDEIR/SDEIS modeled only 11,368 discrete receptors.³⁶ Thus, the RDEIR/SDEIS failed to assess health risks for a total of 1,506 sensitive receptors within the 2 kilometer buffer area of construction emission sources (outside of the construction footprint) and who knows how many inside the construction footprint. I note that the DEIR/DEIS did not exclude receptors within 3,000 feet of the construction footprint.³⁷

There is simply *no reason* to exclude existing sensitive receptors inside of or within 3,000 feet of the construction footprint as these sensitive receptors exist and will experience the highest health risks associated with Project construction emissions. These sensitive receptors have a right to know how their health would be impacted.

As an example, Table 2 shows two locations which were excluded from the RDEIR/SDEIS's assessment of health risks and which be exposed to significant cancer

³⁴ PRDEIR/SDEIS, Appx. 22-3C, pp. 15-16, *emphasis* added.

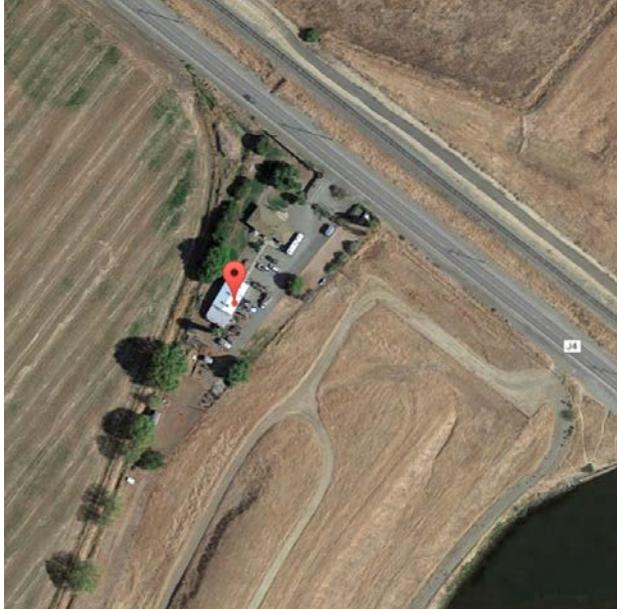
³⁵ PRDEIR/SDEIS, Appx. 22C, p. A-4.

³⁶ Determined as discrete UTM coordinates from Excel workbook BDCP_Compiled_Calculations.xlsx' provided by ICF International.

³⁷ DEIR/DEIS, Appx. 22C, p. 12. ("For each alternative, the number of sensitive receptor locations evaluated using the AERMOD model was reduced using the following approach. First, receptor locations were removed if located within an alternative's construction footprint. Then, any receptor locations beyond 2 kilometers from the construction boundary were also removed from AERMOD. Two kilometers represents the maximum distance from construction areas where pollutant concentrations would potentially generate significant impacts.")

risks, *i.e.*, cancer risks in excess of the BAAQMD's 10 in one million significance threshold.

Table 2: Location of sensitive receptors within BAAQMD with significant cancer risk due to emissions from construction of Alternative 4/4A^a

| Sensitive Receptor Address Latitude, Longitude UTM Coordinates | | Cancer Risk (in one million) |
|---|--|------------------------------|
| Two residences at 7720 Byron Hwy Byron, CA 94514 37.812734, -121.580870 624924.45, 4185991.66 and 37.813168, -121.580505 624945.54, 4186023.04 |  | 13 |
| Residences on Hammer Island 15503 Kelso Rd Discovery Bay, CA 94505 For example: 37.816630, -121.557435 626971.59, 4186445.66 and 37.816835, -121.557159 626993.43, 4186446.45 |  | 11 |

UTM coordinates and cancer risks from workbook 'BDCP_HRA_Compiled_Calculations.xlsx,' spreadsheet 'PTO,' provided by ICF International.

Thus, the PRDEIR/SDEIS fails as an informational document under CEQA and NEPA. I note that not one of the consulted air districts recommended *not assessing* health risks within the construction footprint, and all air districts specifically recommended evaluating health risks for nearby receptors. Further, by eliminating this large number of sensitive receptors from the analysis, they are not even afforded the minimal benefits of Mitigation Measure AQ-16, which proposes to “provide individuals residing in areas where construction activities associated with the BDCP would create DPM concentrations in excess of air district cancer risk thresholds the opportunity to relocate either temporarily during the construction period or permanently, at the discretion of the affected individuals.”³⁸

IV.D The Health Risk Assessment’s Determination of Carcinogenic Risk from Project Construction Emissions Is Inconsistent with Guidance and May Substantially Underestimate Carcinogenic Health Risks for Some Sensitive Receptors

The PRDEIR/SDEIS determines carcinogenic health risks from inhalation of diesel particulate matter (“DPM”) based on methodology developed by the Office of Environmental Health Hazard Assessment (“OEHHA”) for the preparation of health risk assessments. Based on OEHHA’s 2015 Guidance Manual,³⁹ inhalation cancer risk due to exposure to diesel particulate matter is calculated as follows:

$$\begin{aligned} \text{Cancer risk} &= C_{\text{air}} \times [\text{inhalation cancer risk for unit concentration exposure}] \\ &= C_{\text{air}} \times \{[\text{BR}/\text{BW}] \times A \times \text{EF} \times 10^{-6} \times \text{CPF} \times \text{ASF} \times \text{ED}/\text{AT} \times \text{FAH}\} \end{aligned}$$

where

| | | | |
|---------------------|---|---------------------------|---|
| Dose _{air} | { | C_{air} | = concentration of DPM in air ($\mu\text{g}/\text{m}^3$) |
| | | $\{\text{BR}/\text{BW}\}$ | = breathing rate normalized to body weight (L/kg/day) |
| | | A | = inhalation absorption factor (unitless) |
| | | EF | = exposure frequency (unitless) |
| | | 10^{-6} | = microgram to milligram and liter to cubic meter conversion |
| | | CPF | = DPM cancer potency factor $(\text{mg}/\text{kg}/\text{day})^{-1} = 1.1$ |
| | | ASF | = age sensitivity factor (unitless) |
| | | ED | = exposure duration (years) |
| | | AT | = averaging time (years) |
| | | FAH | = fraction of time spent at home (unitless) |

The PRDEIR/SDEIS calculates inhalation cancer risk from exposure to diesel particulate matter emissions from construction based on a unit concentration exposure

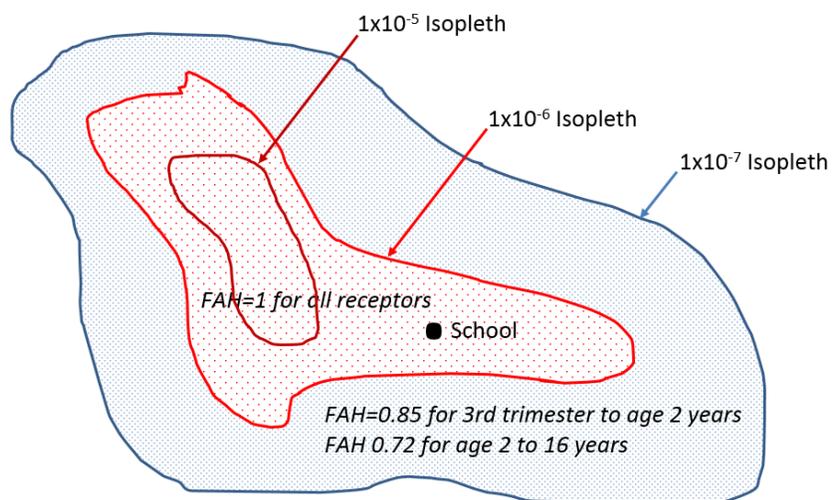
³⁸ PRDEIR/SDEIS, Mitigation Measure AQ-16, p. 22-84.

³⁹ OEHHA, Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments, February 2015;

http://oehha.ca.gov/air/hot_spots/2015/2015GuidanceManual.pdf.

($1 \mu\text{g}/\text{m}^3$) multiplied by the respective modeled concentrations of diesel particulate matter in air for the various alternatives and scenarios. At first glance, the revised health risk assessment presented in PRDEIR/SDEIS Appendix 22-3C⁴⁰ appears to follow OEHHA's 2015 Guidance Manual; however, review of the spreadsheets supporting the health risk assessment shows that the PRDEIR/SDEIS does not appear to incorporate OEHHA's recommendation to use a more conservative fraction of time at home (FAH) of 1 for all child age groups (3rd trimester, 0<2 years, and 2<16 years) if a school is located within the 1×10^{-6} (or greater) isopleth (1 in one million (or greater)).⁴¹ The PRDEIR/SDEIS's health risk assessment does not indicate whether any schools were modeled with a cancer risk of 1×10^{-6} or greater, which would require recalculation and increase cancer risk estimates for all sensitive receptors within that isopleth. Figure 7 illustrates conceptually which sensitive receptors would be affected.

Figure 7: Conceptual map for area with school within 1×10^{-6} cancer risk isopleth requiring re-calculation of cancer risk for all sensitive receptors inside 1×10^{-6} cancer risk isopleth based on FAH=1 (area dotted red)



Accounting for the more conservative FAH of 1 for all sensitive receptors within the 1×10^{-6} cancer risk isopleth, the DPM unit concentration ($1 \mu\text{g}/\text{m}^3$) cancer risk increases from 610 in one million to 785 in one million (see attached Tables A-1 and A-2), or by a factor of 1.29.⁴² Thus, the PRDEIR/SDEIS may substantially underestimate cancer risks for areas where schools are located within the 1×10^{-6} cancer risk isopleth. Because the PRDEIR/SDEIS did not provide isopleth maps, it is unclear how many areas may be affected by this methodological error.

⁴⁰ See PRDEIR/SDEIS, Appx. 22-3C, p. 18.

⁴¹ OEHHA 2015 Guidance Manual, footnote to Table 8.4, p. 8-5.

⁴² $(785/610) = 1.287$.

IV.E The Health Risk Assessment's Determination of Health Hazards due to Exposure of Sensitive Receptors to Localized Particulate Matter Concentrations Resulting from Project Construction Emissions Is Inadequate

The PRDEIR/SDEIS determines the significance of health hazards due to localized PM10 and PM2.5 concentrations in ambient air based on 24-hour and annual concentration thresholds of significance established or recommended by the affected air districts (Impacts AQ-9 through AQ-12). Only three of the four air districts have developed specific health-based concentration thresholds for *incremental increases* of PM10 and PM2.5 in the ambient air due to Project emissions, the SMAQMD, the BAAQMD, and the SJVAPCD; the YSAQMD considers a violation of an ambient air quality standard for PM10 and PM2.5 to be significant.⁴³

Because modeled 24-hour and annual concentrations of PM10 and PM2.5 in the YSAQMD are below the respective ambient air quality standards for all alternatives, the PRDEIR/SDEIS concludes that localized particulate matter concentrations would not result in significant human health impacts. This discussion fails to take into account the background concentrations of PM10 and PM2.5. The question is not whether Project PM10 and PM2.5 emissions *by themselves* would result in a violation of an ambient air quality standards but rather whether *the Project's contribution of PM10 and PM2.5 concentrations in addition to existing background conditions* would result in a new violation or contribute significantly to an existing violation of an ambient air quality standard.

Table 3 summarizes modeled PM10 and PM2.5 concentrations for Alternative 4/4A in the YSAQMD, background concentrations in the YSAQMD, and applicable ambient air quality standards.

⁴³ See PRDEIR/SDEIS, Appx. 22C, Table 6.

Table 3: Modeled PM10 and PM2.5 concentrations for Alternatives 4/4A in YSAQMD compared to NAAQS, CAAQS and SMAQMD incremental significance threshold

| | PM10 ($\mu\text{g}/\text{m}^3$) | | PM2.5 ($\mu\text{g}/\text{m}^3$) | |
|--|-----------------------------------|-------------|------------------------------------|-------------|
| | Annual | 24-hour | Annual | 24-hour |
| Maximum modeled concentration ^a | 0.6 | 2.5 | 0.01 | 0.4 |
| National background ^b | 18.4 | 53.1 | 10.1 | 50.5 |
| Total | 19.0 | 55.6 | 10.11 | 50.9 |
| NAAQS | 150 | - | 12 | 35 |
| State background ^b | 19.2 | 92.3 | 10.1 | 40.2 |
| Total | 19.8 | 94.8 | 10.11 | 40.6 |
| CAAQS | 50 | 20 | 12 | - |
| SMAQMD incremental significance threshold ^c | 1 | 2.5 | 0.6 | - |
| Significant? | no | YES | no | - |

- a From: PRDEIR/SDEIS, Appx. A, Chapter 22, Table 22-51.
- b From: PRDEIR/SDEIS, Appx. A, Chapter 22, Table 22-3.
- c From: PRDEIR/SDEIS, Appx. A, Chapter 22, Table 22-101.

As shown, Project construction emissions would contribute to existing violations of the 24-hour PM10 CAAQS and the 24-hour PM2.5 NAAQS. The lead agencies must determine whether these contributions to existing violations are significant. Since the YSAQMD has jurisdiction over part of the Sacramento Valley Air Basin, it makes sense to use the SMAQMD's incremental significance threshold for assessing the significance of these pollutant concentration increases. As shown, the maximum modeled 24-hour concentration of PM10 in the YSAQMD for Alternatives 4/4A is $2.5 \mu\text{g}/\text{m}^3$ equivalent to the SMAQMD's incremental significance threshold of $2.5 \mu\text{g}/\text{m}^3$ and should, thus, be considered a significant contribution to existing violations of the state ambient air quality standard for 24-hour PM10 in the YSAQMD's airshed and will impede the air district's progress towards compliance with the CAAQS.

For other alternatives, this finding is even more pronounced. For example, the maximum modeled 24-hour concentration of PM10 in the YSAQMD for Alternatives 1C, 2C, and 6C is $8.7 \mu\text{g}/\text{m}^3$, which exceeds the SMAQMD's incremental significance threshold of $2.5 \mu\text{g}/\text{m}^3$ by a factor of more than 3.⁴⁴

IV.F The Health Risk Assessment Fails To Account for Health Risks from Diesel Particulate Matter Emissions from Project Operation and Maintenance

The PRDEIR/SDEIS only provides a health risk assessment for the construction phase of the Project; however, the operational phase of the Project would also generate emissions of diesel particulate matter. For example, maintenance of the water

⁴⁴ PRDEIR/SDEIS, Appx. A, Chapter 22, Table 22-51.

conveyance facilities would require diesel-powered backhoes, dump trucks, cranes, loaders, and water trucks. Further the water conveyance facilities would have backup generators on site.⁴⁵ Diesel-fired backup generators have to be tested on a regular basis to ensure that they are available in case of a grid outage. Emissions from these testing events, which would occur over the lifetime of the Project, can be substantial. I recommend that the lead agencies model health risks from Project operation and maintenance and add them to the health risks from Project construction.

V. The Environmental Commitments and Mitigation Measures Proposed by the PRDEIR/SDEIS to Reduce Project Construction Impacts to Less than Significant Levels Are Inadequate

The PRDEIR/SDEIS relies on two approaches to mitigate significant air quality and greenhouse gas impacts: a) *Environmental Commitments* that are included in various plans (*Construction Equipment Exhaust Reduction Plan, DWR Construction Best Management Practices to Reduce Greenhouse Gas Emissions, Fugitive Dust Control*) and b) air district-specific *Mitigation Measures* (AQ-1a, AQ-1b, AQ-3a, AQ-3b, AQ-4a, AQ-4b, AQ-9, AQ-16, AQ-21, AQ-24, and AQ-27) for impacts that were found to be significant despite implementing the *Environmental Commitments*. While substantially improved over the measures presented by the DEIR/DEIS, the *Environmental Commitments* fail to ensure that Project construction emissions would not exceed estimated levels and the proposed *Mitigation Measures* fail to ensure that significant Project construction emissions would be reduced to less than significant levels. Moreover, there does not appear to be any mechanism for enforcement of *Environmental Commitments*.

V.A Construction Equipment Exhaust Reduction Plan for Off-Road Heavy-Duty Engines

The PRDEIR/SDEIS's emission estimates assume that all off-road heavy-duty engines greater than 50 horsepower would have emission rates equivalent to model year 2013.⁴⁶ Yet, this is not required by the *Construction Equipment Exhaust Reduction Plan*; instead, it requires that "equipment used to construct project facilities *achieve fleet-wide average criteria pollutant emissions rates for equipment greater than 50 horsepower that are equivalent to the use of a model year 2013 fleet.*"⁴⁷ This requirement does not ensure that Project construction emissions will not exceed the PRDEIR/SDEIS's estimates. Specifically, a fleet-wide average emission rate does not ensure that fleet-wide daily and annual emissions do not exceed estimated levels because it does not take into account

⁴⁵ For example, PRDEIR/SDEIS, pp. 3-4, 3-19, 3-36, 3-50, 23-70, 3C-36, and 3C-38.

⁴⁶ PRDEIR/SDEIS, Appx. 22A, p. 22A-16.

⁴⁷ PRDEIR/SDEIS, Appx. 3B, p. 3B-34.

the level of activity (*e.g.*, hours of operation) for each equipment nor the number of equipment operating during a specific phase, year, or Project component construction. For example, during the site grading phase when only a small number of equipment operates on site, scrapers operating at a high level of activity could substantially increase emissions above those estimated based on Tier 3 equipment because only a small number of construction equipment could “offset” these higher emissions. This could result in substantially higher daily emissions and, thus, substantially higher short-term impacts on air quality than estimated by the PRDEIR/SDEIS.

V.B Construction Equipment Exhaust Reduction Plan for Marine Vessels and Locomotives

The PRDEIR/SDEIS’s emission estimates rely upon and the *Construction Equipment Exhaust Reduction Plan* requires the use of marine vessels with EPA certified Tier 3 or newer engines and the use of diesel tunneling locomotives with EPA certified Tier 4 or newer engines.⁴⁸ The PRDEIR/SDEIS contains no discussion of the availability of such engines and, thus, the feasibility of this measure.

V.C The PRDEIR/SDEIS Improperly Defers Development of Mitigation Measures

I previously commented on the DEIR/DEIS’s improper deferral of developing mitigation measures.⁴⁹ The PRDEIR/SDEIS did not rectify this problem but instead continues to defer development of the following mitigation measures into the future:

Mitigation Measures AQ-1a, AQ-1b, AQ-3a, AQ-3b, AQ-4a, and AQ-4b: Undertake a “good faith effort” to enter into a contract with the respective affected air district to develop a mitigation program that would mitigate and offset emissions to net zero for emissions in excess of General Conformity *de minimis* thresholds (where applicable) and to quantities below applicable CEQA threshold for other pollutants⁵⁰ *or* develop an alternative or complementary mitigation program that would achieve the same;

Mitigation Measure AQ-19: Prepare a land use sequestration analysis;

⁴⁸ PRDEIR/SDEIS, Appx. 3B, p. 3B-35.

⁴⁹ 2014 Pless DEIR/DEIS Comments, Comment IV.1.

⁵⁰ According to the PRDEIR/SDEIS, p. 22-289, “the phrase “for other pollutants” is intended to apply to other alternatives, where associated impacts to other pollutants may exceed thresholds other than NOx.”

Mitigation Measure AQ-21: Develop and implement a GHG mitigation program to reduce construction related GHG emissions to net zero; and

Mitigation Measure AQ-24: Develop an air quality mitigation plan (“AQMP”) to ensure air district regulations are incorporated into future conservation measures and associated project activities.

In order to find that significant impacts would be reduced to a less than significant level, the feasibility and efficacy of mitigation measures must be evaluated and mitigated emissions must be quantified. Here, the PRDEIR/SDEIS does neither. Instead, the PRDEIR/SDEIS simply assumes that its proposed mitigation measures would achieve their stated purpose.

V.D Proposed Good Faith Efforts to Enter Into Mitigation Agreements and Alternative Contingency Measures Fail to Support Findings of Less than Significance after Mitigation

In order to mitigate the significant impacts on air quality resulting from ozone precursor emissions during Project construction in the SMAQMD/Sacramento Valley Air Basin, the BAAQMD/San Francisco Bay Area Air Basin, and the SJVAPCD/San Joaquin Valley Air Basin, the PRDEIR/SDEIS proposes Mitigation Measures AQ-1a, AQ-3a, and AQ-4a, which are intended to reduce emissions to net zero (0) for emissions in excess of General Conformity *de minimis* thresholds and to quantities below the BAAQMD’s applicable CEQA thresholds of significance. Each of these mitigation measures requires that the DWR undertake a “good faith effort” to enter into a development mitigation agreement with the respective air districts in order to reduce criteria pollutant emissions through the creation of offsetting reductions of emissions occurring within the respective air basins. The PRDEIR/SDEIS identifies the preferred means of undertaking such offsite mitigation as the payment of offsite mitigation fees.⁵¹ These “mitigation measures” as proposed are inadequate.

As discussed, the PRDEIR/SDEIS improperly defers analysis of the feasibility of its proposed mitigation measures to achieve the stated goals of reducing emissions to less than significance. Over the several years it took to develop the PRDEIR/SDEIS, the lead agencies could (and should) have developed a mitigation plan in cooperation with the respective air districts and quantified the emission reductions that can potentially be achieved. In fact, the SJVAPCD commented specifically:

As stated in the District’s comment letter issued on July 5, 2013 for the Administrative Draft EIR/EIS the District would like to reiterate its

⁵¹ Draft EIR/EIS, p. 22-236.

recommendation. Rather than expressing a non-enforceable commitment to a “good faith effort” to mitigate criteria pollutants, the District recommends that DWR commit to entering into a development mitigation contract prior to finalizing the EIR/EIS. This would allow DWR to fully disclose to the public the extent of the actual mitigation proposed. Therefore the project proponent or DWR should engage in discussion with the District to adopt a voluntary Emission Reduction Agreement (VERA) prior to the finalization and certification of the environmental document.

...

The District recommends the mitigation for the BDCP be carried out via Mitigation Measure 4a (i.e, entering into a VERA with the District) and thus the District recommends that the applicant commit to entering into a VERA instead of committing into a good faith effort to do so.⁵²

Instead, the PRDEIR/SDEIS proposes contingency Mitigation Measures AQ-1b, AQ-3b and AQ-4c in case DWR should be unable to enter into what they regard as satisfactory agreements with the respective air districts *or* enter into an agreement with the respective air districts but find themselves unable to meet the performance standards. These contingency mitigation measures identify a number of potential off-site projects to reduce emissions in the respective air basins including:

- Alternative fuel, low-emission school buses, transit buses, and other vehicles.
- Diesel engine retrofits and repowers.
- Locomotive retrofits and repowers.
- Electric vehicle or lawn equipment rebates.
- Electric vehicle charging stations and plug-ins.
- Video-teleconferencing systems for local businesses.
- Telecommuting start-up costs for local businesses.⁵³

Most of these projects would overlap with CARB’s and the air districts’ existing programs such as the California Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (“HVIP”) HVIP;⁵⁴ the SJVAPCD’s ChargeUp! program,⁵⁵ Clean Green

⁵² SJVAPCD, Letter to Ryan Wulff, NMFS, Project: Draft Environmental Impact Report/Environmental Impact Statement for the Bay Delta Conservation Plan, District CEQA Reference No: 20130329 and 20140155, June 12, 2014, pp. 2-3.

⁵³ For example, RDEIR/SDEIS, Appx. 22C, pp. 22-301 to 22-302 for Alternative 4 and SJVAPCD.

⁵⁴ HVIP; <http://www.californiahvip.org/default.aspx>.

⁵⁵ SJVAPCD, ChargeUp!; <http://valleyair.org/grants/chargeup.htm>.

Yard Machines program,⁵⁶ Drive Clean! rebate program,⁵⁷ E-Mobility program,⁵⁸ Hybrid Voucher program,⁵⁹ Off-Road Replacement program,⁶⁰ Ag-pump Replacement program,⁶¹ Forklift program,⁶² Tractor Replacement program,⁶³ Off-road Repowers program,⁶⁴ Proposition 1B: Goods Movement program,⁶⁵ Locomotive program,⁶⁶ and Class 5 & 6 On-Road Trucks program,⁶⁷ to name just a few. In other words, the contingency mitigation measures rely on the same programs that would be incorporated if the DWR entered into development mitigation programs with the air districts, except they would not be under their oversight and it is doubtful that they would be effective.

The SJVAPCD, for example, points out that measures developed outside of the air district's oversight cannot be relied upon to achieve the intended results:

On the contrary, mitigation efforts performed by others, outside the District's oversight, have generally come up far short in quantity of emissions reductions generated, and in verifiability of those reductions, leaving the CEQA Lead Agency vulnerable to legal action.⁶⁸

Other agencies have required project proponents to enter into agreements before certification of project or even during review. For example, the Hydrogen Energy California Project, a proposed power generation and fertilizer production facility in the San Joaquin Valley currently under review before the California Energy Commission, has entered into a VERA with the San Joaquin Valley Air Pollution Control District

⁵⁶ SJVAPCD, Clean Green Yard Machines; <http://valleyair.org/grants/cgym.htm>.

⁵⁷ SJVAPCD, Drive Clean! Rebate Program; <http://www.valleyair.org/grants/driveclean.htm>.

⁵⁸ SJVAPCD, E-Mobility; <http://www.valleyair.org/grants/emobility.htm>.

⁵⁹ SJVAPCD, Hybrid Voucher Program; <http://valleyair.org/grants/hybridvoucher.htm>.

⁶⁰ SJVAPCD, Off-road Replacement; <http://valleyair.org/grants/offroadreplacement.htm>.

⁶¹ SJVAPCD, Ag-pump Replacement; <http://valleyair.org/grants/agpump.htm>.

⁶² SJVAPCD, Forklift Replacement; <http://valleyair.org/grants/forklift.htm>.

⁶³ SJVAPCD, Tractor Replacement Program; <http://valleyair.org/grants/tractorreplacement.htm>.

⁶⁴ SJVAPCD, Off-road Repowers; <http://valleyair.org/grants/offroadrepowers.htm>.

⁶⁵ SJVAPCD, Proposition 1B: Goods Movement; <http://valleyair.org/grants/prop1b.htm>.

⁶⁶ SJVAPCD, Locomotive Program; <http://valleyair.org/grants/locomotive.htm>.

⁶⁷ SJVAPCD, Class 5 & 6 On-Road Trucks; <http://valleyair.org/grants/onroadtrucks.htm>.

⁶⁸ SJVAPCD, Letter to Ryan Wulff, NMFS, Project: Draft Environmental Impact Report/Environmental Impact Statement for the Bay Delta Conservation Plan, District CEQA Reference No: 20130329 and 20140155, June 12, 2014, pp. 2-3.

("SJVAPCD") for about \$1.2 million to mitigate 16.7 tons/year of NOx emissions.⁶⁹ The funding provided under the VERA was required by the SJVAPCD to satisfy CEQA mitigation requirements and will support the air district's Emission Reduction Incentive Program which, for example, provides assistance to replace older agricultural equipment.

VI. Conclusion and Recommendation

Despite the substantial revisions to the air quality section including the health risk assessment, the PRDEIR/SDEIS fails to adequately disclose the air quality impacts of the project. Moreover, the significant impacts that are disclosed are insufficiently mitigated.

I suggest that the PRDEIR/SDEIS for the Project be recirculated to provide one complete document that revises all sections and incorporates all updated analyses rather than incorporating by reference the numerous files that make up the DEIR/DEIS, PRDEIR/SDEIS, and errata. It is virtually impossible for the public to understand this highly complex document by having to refer back to previous documents and across multiple appendices and sections. Reorganization, a table of contents in every chapter, an indication of which alternative is addressed on every page, and improved formatting would go a long way to making this document better serve its intended purpose, *i.e.*, to inform the public of the environmental impacts of the BDCP/CWF. I realize that an environmental document that deals with a project as complex as the BDCP/CWF is necessarily complicated, however, it does not have to be this byzantine.

Among the hundreds of often very complex CEQA documents I have reviewed, the PRDEIR/SDEIS is probably the most voluminous while providing the least amount of useful information per page.

Please call me at (415) 492-2131 or e-mail at petra.pless@gmail.com if you have any questions. While I have tried my best to include current weblinks to all documents

⁶⁹ SJVAPCD, Hydrogen Energy California Power Plant Project, Mitigation Agreement 20130092 and Voluntary Emission Reduction Agreement 20130026; available at http://www.energy.ca.gov/sitingcases/hydrogen_energy/documents/others/2013-04-26_SJVUAPCD_Mitigation_Agreement_TN-70496.pdf. (Previously submitted as Exhibit 38 to 2014 Pless DEIR/DEIS Comments.)

cited in my comments, if you have trouble retrieving any of these documents or if no weblink is provided, I will gladly make those documents available upon request.

With best regards,

A handwritten signature in black ink, appearing to read 'Petra Pless', with a stylized flourish above the name.

Petra Pless, D.Env.

Table A-1

| Constru ction Year | Total Dose x Potency x CRAF | 3rd Trimester | | | | | | | | | | 0 to 2 | | | | | | | | | | 2 to 9 | | | | | | | | | | 9 to 16 | | | | | | | | | |
|--------------------------|--------------------------------------|---------------|-----|---|-----|-----|----------|-------|-----|------|-----------------------------|--------|-----|---|------|-----|----------|-------|-----|------|-----------------------------|--------|-----|---|-----|-----|----------|-------|-----|-----|-----------------------------|---------|-----|---|-----|-----|----------|-------|-----|-----|-----------------------------|
| | | ED | EF | A | DBR | ASF | CF | AT | CPF | FAH | Dose x Potency x CRAF | ED | EF | A | DBR | ASF | CF | AT | CPF | FAH | Dose x Potency x CRAF | ED | EF | A | DBR | ASF | CF | AT | CPF | FAH | Dose x Potency x CRAF | ED | EF | A | DBR | ASF | CF | AT | CPF | FAH | Dose x Potency x CRAF |
| 1 | 1.16E-04 | 0.25 | 350 | 1 | 361 | 10 | 1.00E-06 | 25550 | 1.1 | 0.85 | 1.16E-05 | 0.75 | 350 | 1 | 1090 | 10 | 1.00E-06 | 25550 | 1.1 | 0.85 | 1.05E-04 | 0.75 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.10E-05 | | | | | | | | | | |
| 2 | 1.40E-04 | | | | | | | | | | | 1 | 350 | 1 | 1090 | 10 | 0.000001 | 25550 | 1.1 | 0.9 | 1.40E-04 | | | | | | | | | | | | | | | | | | | | |
| 3 | 5.59E-05 | | | | | | | | | | | 0.25 | 350 | 1 | 1090 | 10 | 0.000001 | 25550 | 1.1 | 0.9 | 3.49E-05 | 0.75 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.10E-05 | | | | | | | | | | |
| 4 | 2.80E-05 | | | | | | | | | | | | | | | | | | | | | 1 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.802E-05 | | | | | | | | | | |
| 5 | 2.80E-05 | | | | | | | | | | | | | | | | | | | | | 1 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.802E-05 | | | | | | | | | | |
| 6 | 2.80E-05 | | | | | | | | | | | | | | | | | | | | | 1 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.802E-05 | | | | | | | | | | |
| 7 | 2.80E-05 | | | | | | | | | | | | | | | | | | | | | 1 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.802E-05 | | | | | | | | | | |
| 8 | 2.80E-05 | | | | | | | | | | | | | | | | | | | | | 1 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.802E-05 | | | | | | | | | | |
| 9 | 2.80E-05 | | | | | | | | | | | | | | | | | | | | | 1 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.802E-05 | | | | | | | | | | |
| 10 | 2.80E-05 | | | | | | | | | | | | | | | | | | | | | 1 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.802E-05 | | | | | | | | | | |
| 11 | 2.80E-05 | | | | | | | | | | | | | | | | | | | | | 1 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.802E-05 | | | | | | | | | | |
| 12 | 2.52E-05 | | | | | | | | | | | | | | | | | | | | | 0.25 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 7.006E-06 | 0.75 | 350 | 1 | 745 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 1.819E-05 |
| 13 | 2.42E-05 | | | | | | | | | | | | | | | | | | | | | 1 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.425E-05 | | | | | | | | | | |
| 14 | 2.42E-05 | | | | | | | | | | | | | | | | | | | | | 1 | 350 | 1 | 861 | 3 | 0.000001 | 25550 | 1.1 | 0.7 | 2.425E-05 | | | | | | | | | | |

6.10E-04 TOTAL Cancer Risk for 1 ug/m3 DPM
 610 TOTAL Cancer Risk in One Million for 1 ug/m3 DPM

"Dose x Potency x CRAF" shown is for a unit concentration exposure (1 ug/m3)
 95th percentile DBR values used (OEHA 2012)

- ED Exposure Duration (years)
- EF Exposure Frequency (days/year)
- A Inhalation Absorption Factor (unitless)
- DBR Daily Breathing Rate (L/kg-BW-day)
- ASF Age Sensitivity Factor or Cancer Risk Adjustment Factor (unitless)
- CF Unit Conversion Factor
- AT Averaging Time (days) = lifetime duration (70 years)
- CPF Cancer Potency Factor (mg/kg-d) (CPF for DPM is 1.1)
- FAH Fraction of Time at Home

Black Diamond California

Latitude : 37° 57' 00" N
 Longitude : 121° 53' 04" W
 Elevation : 1600 ft.
 Report Generated on: Oct.
 29, 2015

Start Date : Oct. 1, 2015
 End Date : Oct. 31, 2015
 # of Days : 31 of 31
 # obs : poss : 685 of 744

Sub Interval Windows
 Start End
 Date Jan. 01 Dec. 31
 Hour 00 23

Mean Wind Speed

Percent of Hourly Observations

Greater than or equal to initial interval value and Less than ending interval value.

| Range mph | Hour of day (L.S.T.) | | | | | | | | | | | | | | | | | | | | | | | | All Hrs | | |
|-----------------|----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------|-----------------|-----------------|------------|-----|-----|
| | <u>1</u> am | <u>2</u> am | <u>3</u> am | <u>4</u> am | <u>5</u> am | <u>6</u> am | <u>7</u> am | <u>8</u> am | <u>9</u> am | <u>10</u> am | <u>11</u> am | <u>12</u> pm | <u>1</u> pm | <u>2</u> pm | <u>3</u> pm | <u>4</u> pm | <u>5</u> pm | <u>6</u> pm | <u>7</u> pm | <u>8</u> pm | <u>9</u> pm | <u>10</u> pm | <u>11</u> pm | <u>12</u> pm | | | |
| 0 to 1 | 3.4 | | | | | | | | | | | | | | | | 3.6 | | | | | | | | | 0.3 | |
| 1 to 2 | | | | 3.4 | 10.3 | 3.4 | 3.4 | | | | | | | | | 7.1 | | | | | | | | | | 3.4 | 1.3 |
| 2 to 3 | 3.4 | 3.4 | 3.4 | 6.9 | 3.4 | 13.8 | 13.8 | 3.4 | | 3.4 | | | | | | | 3.6 | 7.1 | 7.1 | 7.1 | | | 3.6 | 6.9 | 3.8 | | |
| 3 to 4 | 3.4 | 6.9 | 6.9 | 3.4 | 10.3 | 6.9 | 13.8 | 10.3 | | 6.9 | 6.9 | 7.1 | 10.7 | 7.1 | 14.3 | | 7.1 | 10.7 | | | | | 3.6 | 6.9 | 6.0 | | |
| 4 to 5 | 6.9 | 6.9 | 6.9 | 3.4 | | 13.8 | 3.4 | 10.3 | 10.3 | 6.9 | 10.3 | 10.3 | 14.3 | 21.4 | 10.7 | 10.7 | 10.7 | 3.6 | | | | 3.6 | 7.1 | | 7.2 | | |
| 5 to 6 | 10.3 | | 6.9 | 6.9 | 6.9 | 13.8 | 3.4 | 10.3 | 13.8 | 13.8 | 10.3 | 3.4 | 3.6 | 14.3 | 14.3 | 3.6 | 3.6 | | | 7.1 | 14.3 | | | | 6.7 | | |
| 6 to 7 | 3.4 | 20.7 | 10.3 | 10.3 | 6.9 | 3.4 | 17.2 | 10.3 | 24.1 | 6.9 | 6.9 | | 7.1 | 7.1 | 3.6 | 3.6 | 3.6 | 7.1 | 3.6 | 3.6 | 10.7 | 3.6 | 7.1 | 10.3 | 8.0 | | |
| 7 to 8 | 10.3 | 10.3 | 20.7 | 17.2 | 17.2 | 6.9 | 3.4 | 6.9 | 10.3 | 6.9 | 3.4 | 13.8 | 3.6 | 7.1 | | | 7.1 | 14.3 | 14.3 | 7.1 | 10.7 | 14.3 | 10.3 | 9.1 | | | |
| 8 to 9 | | 6.9 | 6.9 | 6.9 | 10.3 | 6.9 | 13.8 | 20.7 | 6.9 | 6.9 | 13.8 | 6.9 | 10.7 | 14.3 | 3.6 | 3.6 | 3.6 | 10.7 | 14.3 | 10.7 | 7.1 | 10.7 | 14.3 | 10.3 | 9.2 | | |
| 9 to 10 | 13.8 | 6.9 | 6.9 | 17.2 | 6.9 | 3.4 | 3.4 | 6.9 | 3.4 | 10.3 | 10.3 | 10.3 | 7.1 | | 3.6 | | 3.6 | 10.7 | 7.1 | 10.7 | 17.9 | 3.6 | 7.1 | 6.9 | 7.4 | | |
| 10 to 11 | 17.2 | 10.3 | 6.9 | | 6.9 | 6.9 | 3.4 | | 10.3 | 13.8 | 20.7 | 24.1 | 3.6 | 3.6 | | 7.1 | 10.7 | 10.7 | 10.7 | 14.3 | 7.1 | 10.7 | 3.6 | 6.9 | 8.8 | | |
| 11 to 12 | 3.4 | 10.3 | 6.9 | 6.9 | 6.9 | 3.4 | | | 10.3 | 3.4 | 10.3 | 6.9 | 10.7 | 3.6 | | 14.3 | 3.6 | 7.1 | 3.6 | 10.7 | 17.9 | 7.1 | 10.3 | 6.6 | | | |
| 12 to 13 | 17.2 | 3.4 | 3.4 | 10.3 | | 3.4 | 6.9 | 6.9 | | 6.9 | | 3.4 | 7.1 | 3.6 | 7.1 | 7.1 | 10.7 | 14.3 | 7.1 | 10.7 | 7.1 | 14.3 | 14.3 | 6.9 | 7.2 | | |
| 13 to 14 | 3.4 | 3.4 | 6.9 | 3.4 | 6.9 | 13.8 | 10.3 | 6.9 | | 6.9 | 10.3 | 3.4 | 3.6 | 14.3 | | 10.7 | | 7.1 | 10.7 | 3.6 | 3.6 | | 10.7 | 10.3 | 6.3 | | |
| 14 to 15 | | 6.9 | 3.4 | | 3.4 | | | 3.4 | 3.4 | | | 3.4 | 3.6 | 7.1 | 3.6 | 3.6 | 7.1 | 7.1 | | 7.1 | 3.6 | | | 6.9 | 3.1 | | |
| 15 to 16 | | | | | | | | | 3.4 | | | | 10.7 | 7.1 | 14.3 | 7.1 | | 3.6 | 3.6 | 3.6 | 7.1 | 7.1 | | | 2.8 | | |
| 16 to 17 | | | | | | | | | | | | | | 3.6 | 14.3 | 7.1 | 7.1 | | | | 3.6 | 3.6 | 3.6 | | 1.8 | | |
| 17 to 18 | | | | | | | 3.4 | | 3.4 | 3.4 | 3.4 | 3.4 | | | 3.6 | 7.1 | 3.6 | | 3.6 | | | | 3.6 | 3.4 | 1.8 | | |
| 18 to 19 | | | | | | | | 3.4 | | 3.4 | | | 3.6 | 3.6 | 3.6 | 3.6 | | | | | | | | | 0.9 | | |
| 19 to 20 | 3.4 | | 3.4 | | | | | | | | | 3.4 | 3.6 | | | 3.6 | 3.6 | | | | | | | | 0.9 | | |
| 20 to 21 | | | | | | | | | | | | | | 3.6 | 7.1 | 3.6 | | | | | | | | | | 0.6 | |
| 21 to 22 | | | | | | | | | | | | | | | | | | | | | 3.6 | | | | | 0.1 | |
| 22 to 23 | | 3.4 | | | | | | | | | | | | | | | | | | | | | | | | 0.1 | |
| 23 to 24 | | | | 3.4 | | | | | | | | | | | | | | | | | | | | | | 0.1 | |
| 24 to 25 | | | | | 3.4 | | | | | | | | | | | | | | | | | | | | | 0.1 | |
| Total # obs. | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 29 | 685 | |
| Average mph | 8.4 | 8.4 | 8.0 | 7.9 | 7.5 | 6.6 | 6.8 | 7.5 | 7.9 | 8.3 | 8.8 | 9.0 | 9.4 | 10.0 | 10.8 | 10.8 | 9.6 | 9.1 | 8.8 | 8.6 | 9.2 | 9.4 | 9.1 | 8.7 | 8.7 | | |

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Data are subject to further review and editing. Please refer any questions to the Western Regional Climate Center.

EXHIBIT C

SCS ENGINEERS

October 29, 2015
File No. 01215159.00

MEMORANDUM

TO: Osha Meserve, Soluri Meserve

FROM: Patrick S. Sullivan, SCS Engineers
John Henkelman, SCS Engineers

SUBJECT: Greenhouse Gas Analysis for Bay Delta Conservation Plan/California WaterFix

SCS Engineers (SCS) has reviewed the greenhouse gas (GHG) analysis prepared for the proposed Bay Delta Conservation Plan/California WaterFix Alternative 4A (Project). The GHG analysis was performed to demonstrate that the GHG emissions from the proposed Project would result in “no net increase” in GHG emissions and therefore be less than significant for purposes of the California Environmental Quality Act (CEQA). SCS has performed many GHG analyses for purposes of permitting, mandatory reporting, verification, CEQA and other requirements. The resumes of Patrick Sullivan and John Henkelman are provided as an attachment.

The documents reviewed include the following:

- *Bay Delta Conservation Plan RDEIR/SDEIS*, July 9, 2015 (RDEIR/S)
- *California Department of Water Resources Climate Action Plan*, May 2012

CONSTRUCTION GHG EMISSIONS

Table 22-111 states that the Project will result in the emission of GHG more than three million metric tons of carbon dioxide equivalent (CO_{2e}) from construction. This quantity is equivalent to several years of operational emissions, and greater than GHG significance thresholds in the air quality districts where the Project will occur. The RDEIR/S states these GHG emissions are equal to 633,000 typical passenger cars. These three million metric tons of GHG emissions represent more than a half of a percent of the total statewide GHG emissions goal for 2020 from a single project.

Mitigation Measure AQ-21 (MM AQ-21) proposed the mitigation of these GHG emissions through the implementation of a GHG Mitigation Program. However, MM AQ-21 is flawed and does not sufficiently require consistency with California GHG reduction goals.

ELEMENTS OF MM AQ-21

The RDEIR/S concludes that the Project would result in the generation of 3 million metric tons of CO_{2e} without mitigation and that any increase would be significant. To reduce GHG



emissions to below significant levels, the RDEIR proposes MM AQ-21. This mitigation measure requires the Project proponents to develop and implement a GHG mitigation program to reduce GHG emissions to net zero.

MM AQ-21 requires that proponents develop a mechanism to quantify, fund, implement, and verify emission reductions associated with the strategies used to reduce GHG emissions. Reductions are required by MM AQ-21 to be quantifiable, verifiable, enforceable, and additional (i.e. they would not occur without support of purchased offset credits). As part of MM AQ-21, the Project proponents will prepare annual reports stating the GHG emissions from construction, elements of GHG reduction project funding, emission reductions achieved, cumulative reductions, and the total emission reductions remaining to reduce GHG emissions to net zero.

MM AQ-21 also outlines strategies and the RDEIR discusses the reduction potential of these strategies. One of the strategies is the purchase of carbon offsets from existing standards or from independently developed protocols. The existing standards listed in the RDEIR include GHG reduction strategies approved by the California Air Resources Board (CARB) for inclusion as part of the Cap and Trade (C&T) Program under Assembly Bill 32 (AB32). The mitigation measure also states it could potentially use offset credits from “Other-California Based Offsets,” “United States Based Offsets,” and “International Offsets (e.g., clean development mechanisms [under the Kyoto Treaty]).”

GHG OFFSETS BACKGROUND

GHG offsets are a critical element of the MM AQ-21, based on which the GHG evaluation indicates the Project would result in net zero GHG emissions. The concept behind a GHG offset is that a project developer creates GHG emission reductions above and beyond what is considered to be “business as usual” (BAU), meaning that the GHG reduction would not have occurred in the absence of the GHG reduction project. For a GHG reduction offset to be generated for use in the CARB C&T program, the reduction must be *real, additional, quantifiable, permanent, verifiable, and enforceable*. The GHG reduction registries that may create GHG offsets under the C&T program, Climate Action Reserve¹ (CAR), the American Carbon Registry² (ACR), and the Verified Carbon Standard³ (VCS), also adhere to similar principles when creating their GHG offset protocols.

The “Real” requirement for eligible offsets means that reductions must result from demonstrable action and the methodology used to quantify that reduction must account for appropriate GHG emission sources, sinks, and reservoirs. “Real” assures that GHG emissions generated by GHG offset projects is accounted for and that projects emitting more GHG than they reduce do not generate offsets.

¹ Climate Action Reserve Program Manual (CAR October 2011)

² American Carbon Registry Standard v4.0 (ACR January 2015)

³ VCS Program Guide (October 2013)

Offset “additionality” means that the GHG reduction activity must produce a result better than BAU. The activity cannot be the normal practice. For example, destruction of ozone depleting substances (ODS) by governments is common practice but that destruction is not commonplace for commercial or industrial facilities. Thus, destruction of ODS is not additional when the ODS is sourced from a government but it is additional when the ODS comes from a company facility.

Quantifiable, verifiable, and enforceable assure that the GHG reduction can be measured, that a third party can confirm the quantification, and that CARB can hold a party liable for performing the GHG offset activity if necessary. These principles provide assurance that GHG reductions are calculated accurately and the supporting data have been reviewed by CARB and a third party verifier.

The principles of real, additional, quantifiable, permanent, verifiable, and enforceable are critical to achieving the goal of reducing GHG in the atmosphere. The need for these assurances is highlighted by problems with some markets and programs, such as the Clean Development Mechanism (CDM) and Chicago Carbon Exchange (CCX), which have suffered from a lack of confidence in the legitimacy of the generated GHG reduction offsets.

CARB currently allows GHG reduction credits for forest projects, livestock projects, ozone depleting substance (ODS) projects, and mine methane capture (MMC). CARB has proposed the adoption of a rice cultivation project type. The livestock, ODS, and MMC projects achieve GHG reduction through the destruction of gases with a high potential for global warming (methane or ODS). For forest projects, the carbon reduction occurs by setting aside forested land where trees remove carbon from the atmosphere and store it as wood and plant material.

When the GHG offset developer wishes to make the offsets available for purchase on the market, the developer uses a third-party verifier to confirm that the project meets program requirements and that reductions have been accurately quantified. The offset registry (CAR, ACR, or VCS) then issues the offsets to the developer. If the protocol was one of those eligible under the C&T regulation, those offsets are traded in the CARB offset market and used for regulatory compliance under the C&T regulation. If those GHG offsets are not generated under a C&T protocol, as apparently allowed by the inclusion of credits sourced from “Other-California Based Offsets,” “United States Based Offsets,” and “International Offsets,” those offsets are traded through environmental offset brokers. Non-C&T GHG offsets can be retired at the request of the offset holder to remove those offsets from the market, thereby finalizing the GHG reduction.

FLAWS IN USE OF OFFSET CREDIT STRATEGY

SCS agrees that the use of the AB32 offset credits from the C&T program would yield real GHG reductions that are consistent with California GHG policies, such as the AB 32 GHG Scoping Plan, most recently updated in 2014; however, there is no such guarantee that other California, United States, or International offsets used by the Project proponent would be consistent with California GHG policies and goals under AB32.

To be consistent with state GHG policy, the offsets should meet California GHG reduction goals and be required to be real, additional, quantifiable, permanent, verifiable, and enforceable. The offsets purchased to meet mitigation requirements should also be thereafter retired and removed from circulation. As written, MM AQ-21 also allows the credits to be sold again, allowing those same offsets to be used again as mitigation on other projects, resulting in double-counting of potential reductions.

Though MM AQ-21 requires that the GHG offsets be obtained from a registry that demonstrates that the offset will result in real, additional, quantifiable, permanent, verifiable, and enforceable GHG offsets, since the language allows the GHG offsets to be sold after acquisition, the measure does not provide any assurance that the Project GHG emissions will be net zero or less than significant. Furthermore, by allowing the Project proponent to develop its own protocol, MM AQ-21 could allow for the use of GHG credits from projects that are inconsistent with CARB GHG policies or fail to meet the goals of quantifiable, verifiable, enforceable, and additional reductions. MM AQ-21 must include standards for determining that all GHG offsets from outside the C&T program are consistent with goals under AB32 such as the use of only registry-approved protocols that have been adopted by CARB or third party verification to registry standards by an accredited GHG verifier, including verification that reductions are consistent with CARB policy. Also, all offsets used must be retired to ensure the reductions are permanent.

Finally, offset credits in the C&T program are intended for use as part of regulatory compliance. They are not intended to be used as part of a measure to reduce project-level GHG emissions. If all GHG emissions from construction were to be offset using compliance offsets, it would remove ten percent of the available credits from the market. The impact of removing such a large fraction of the available offset credits from the market is unknown, but would be likely to have significant market impacts.

PROJECT BOUNDARIES ARE NOT RIGOROUS AND ARE POORLY DEFINED

MM AQ-21 does not sufficiently define the boundaries (time and location) that will be used to determine GHG emission reductions from mitigation measures such as Strategy 10, the development of biomass waste digestion and conversion facilities. SCS does not believe that such strategies are consistent with CARB policies toward AB32. The CAR has had a protocol for GHG emission reductions from composting and waste digestion since 2010, but CARB chose not to adopt those protocols into the C&T offset program. SCS believes they were not adopted because they are not consistent with CARB policies since they generate offsets based on GHGs that would have been generated at a future date.

ANALYSIS OF GHG FROM ELECTRICITY USE IS INSUFFICIENT AND POORLY DEFINED

The RDEIR/S states that the Project will create the demand for an additional 1,405 gigawatts-hours (GWh) of additional electricity demand. This power will have to be obtained by

Department of Water Resources (DWR) and is greater than the annual generation of many power plants (e.g. single or double turbine natural gas power plants, which typically generate less than a 1,000 gigawatts per year). The RDEIR/S indicates that the DWR has developed a Climate Action Plan (CAP). That CAP projects an increase in GHG emissions of more than a 500,000 metric tons of CO₂e when the Project pumps begin operation in 2024. This increase in emissions is well above the GHG emissions trajectory in the CAP and RDEIR and exceeds the designated GHG emissions reduction trajectory by 260,000 metric tons of CO₂e.

The RDEIR indicates that the DWP entity-wide emissions would decrease to below the GHG emissions reduction trajectory by 2041, and the 2050 GHG reduction goal would be met. The RDEIR concludes that because entity-wide GHG emissions are still projected to meet 2050 reduction goals, and because the implementation would not affect SWR's established reduction goals, GHG emissions are not significant, and no mitigation is required.

The conclusion that the Project would not result in significant GHG emissions is not reasonable in light of the GHG emissions resulting from the electricity demand from massive pumps included in the Project. The power used to pump water must be generated somewhere by some facility or combination of facilities. Typically, this generation is from fossil fuels, resulting in significant GHG emissions from combustion. Even in the case of obtaining carbon-free power (e.g. hydro, wind, solar), DWR's use of that carbon-free power removes it from the California energy grid where it can no longer be used to offset other GHG emissions. That carbon-free power is no longer available and other entities will have to obtain power from carbon-emitting sources, indirectly but foreseeably creating a GHG emission increase. Since the energy requirements of the Project exceed the generation capacity of many power plants, the Project effectively adds GHG emissions from power plants.

Finally, the CAP does not create enforceable conditions. Without enforceable conditions, there is no guarantee that the CAP will result in no net GHG emissions. Thus, there are no monitoring or enforcement conditions for Project GHG emissions to ensure that this reduction will actually occur and will not simply be displaced by increases elsewhere in the utility grid.

CONCLUSIONS

The GHG analysis used to support the determination that the Project will be net zero and less than significant under CEQA is insufficient for the following reasons:

- The GHG offsets proposed as a mitigation measure are not required to be consistent with California GHG reduction goals and policies and could be re-used for other projects.
- The RDEIR/S justifies a conclusion that Project-level GHG emissions are not significant based on an entity-level CAP without an enforceable mechanism.
- The RDEIR/S concludes that GHG emissions from power consumption are not significant despite the fact that the Project requires more power than many power plants can generate.

Attachment: Resumes

PATRICK S. SULLIVAN, CPP, REPA

Education

BA – Harvard University, Biology/Ecology, 1989

Professional License/Certifications

Approved Lead Verifier under California Air Resources Board (CARB) AB 32 Greenhouse Gas (GHG) Program
South Coast Air Quality Management District, Certified Permitting Professional (No. A-1716)
Registered Environmental Property Assessor, No. 519692, National Registry of Environmental Professionals

Professional Affiliations

Solid Waste Association of North America (SWANA): Vice Chairman of Landfill Gas (LFG) Division
Air and Waste Management Association (AWMA); Vice Chairman, Mother Lode Chapter
Technical Advisory Group; Cal Recycle, LFG
Technical Advisory Group, CARB, AB 32 Landfill Methane Rule
Waste Industry Air Coalition (WIAC); Co-Chairman
California Biomass Collaboration; Executive Board
Solid Waste Industry Group in California
Solid Waste Industry for Climate Solutions (SWICS), Co-Chairman
Society for Risk Analysis

Professional Experience

Mr. Sullivan has over 24 years of experience in the area of environmental engineering, specializing in solid waste-related issues. He is the Managing Director of SCS Engineers' (SCS) consulting and engineering operations within the Southwestern United States; the largest of all of SCS's engineering business units. He also serves as the Practice Leader for SCS's Solid Waste Practice in the same region. Mr. Sullivan is the National Partner for SCS's companywide Air Quality and GHG programs. He also oversees SCS's company-wide Risk Assessment program and one of the national experts on risk assessment and toxic exposure issues for solid waste facilities. Mr. Sullivan is a company Senior Vice President and Principal-in-Charge for compliance and permitting projects for related to solid waste facilities as well as related engineering services. SCS has published over 25 technical papers in industry journals and publications and presented at over 35 conferences, seminar, and workshops.



Because of this expertise, Mr. Sullivan has been the Principal-in-Charge and/or lead technical expert on a variety of projects related to solid waste facility investigations, risk assessments, LFG management, air quality and GHG, as well as other environmental issues at landfills and solid waste facilities.

Air Quality

Title V Permit Applications and Documentation for Industrial Facilities and Landfill Sites. Mr. Sullivan has been involved with over 100 Title V permitting projects, including Title V compliance reporting for over 75 facilities.

New Source Review (NSR)/Prevention of Significant Deterioration (PSD) Permit Applications and Documentation for Industrial Facilities and Landfill Sites. Mr. Sullivan has been involved with over 50 NSR/PSD permitting projects for various types of industrial facilities. This includes permitting for over 30 landfill expansions in California and over 30 energy facilities.

New Source Performance Standard (NSPS) Applicability Reviews and Compliance Activities. Mr. Sullivan has overseen the completion of NSPS Tier 1 and 2 emission rate studies and reports, LFG system (GCCS) design plans, surface emission monitoring plans, and other documentation for over 100 landfills under the NSPS program, including NSPS compliance reporting for over 75 landfill sites. In addition, Mr. Sullivan has worked on NSPS compliance activities for various other sources, including boilers, incinerators, engines, turbines, etc.

National Emission Standards for Hazardous Air Pollutants (NESHAPs)/Maximum Achievable Control Technology (MACT) Compliance Activities. Mr. Sullivan has been involved with over 75 NESHAPs/MACT projects for various regulated sources, including development of Startup, Shutdown, and Malfunction (SSM) plans and various other compliance documents. This has included landfills and various industrial facilities, such as aerospace facilities, boilers, incinerators, engines, etc.

Development and Teaching of Training Courses for Air Quality and GHG Compliance at over 40 Seminars. Compliance and regulatory issues that have been taught included Title V, NSPS, NESHAPs/MACT, NSR/PSD, Urban Air Toxic Strategy (UATS), Tailoring Rule, federal GHG reporting rule, and related state and local requirements.

Regulatory Advocacy for the Landfill Industry on the NSPS Rule, Title V Operating Permit Programs, NESHAPs rule, and other regulations, where landfills are included as a regulated source. Mr. Sullivan has developed industry comments and negotiated with the agencies on behalf of the industry.

Preparation of Numerous Local Air District, State, and Federal Permitting Documents for the installation of air pollution control devices and industrial equipment, including boilers, cooling towers, air strippers, wastewater treatment plants, biogas collection systems and flares, biogas and recovery plants, and various industrial systems. Mr. Sullivan has managed over 100 state or local air permitting projects for landfills.

Permitting, Compliance, and Due Diligence Projects for over 35 Renewable Energy Projects throughout the United States. Some of these projects have also included registration of GHG credits, facilitation of trades for GHG credits, and development of methodologies for estimation of GHG reductions as well as all of the air quality and GHG permitting tasks. Mr. Sullivan has permitted over 30 biogas to energy and biomass plants across the country.

Air Quality, GHG, and Risk Assessment Sections of Environmental Impact Reports (EIRs) for approximately 35 landfill expansions, new landfills, transfer stations, other solid waste facilities, and various commercial/industrial projects in California, including evaluations of health risks, air quality, GHG, and/or odors. This has included the preparation of a variety of California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) documentation.

Air Quality Solid Waste Assessment Tests (SWATs) for various landfill sites in California.

Air Sampling and Source Testing for Various Emitting Devices, including sampling for volatile organic compounds (VOCs), criteria pollutants, particulate heavy metals, and asbestos fibers. Oversight of sources testing at over 75 landfill sites and development of a database of landfill source tests for use in the work of the WIAC.

Mr. Sullivan has completed air permitting and compliance activities for the following types of industrial facilities:

- Solid waste incinerators.
- Biomass energy plants.
- Landfills.
- Recycling facilities and transfer stations.
- LFG recovery plants.
- Cement and asphalt plants.
- Chemical manufacturing facilities.
- Aerospace facilities.
- Jewelry manufacturing facilities.
- Sand and gravel facilities.
- Electronics facilities.
- Site remediation projects.
- Paint and solvent manufacturing plants.
- Boat manufacturing plants.

Completed Landfill Air Quality Services in the Following Air Districts in California and States: San Joaquin Valley Air Pollution Control District (APCD), Bay Area Air Quality Management District (BAAQMD), South Coast AQMD, Sacramento Metropolitan AQMD, San Diego County APCD, Yolo-Solano AQMD, Feather River AQMD, Kern County APCD, Ventura County APCD, Santa Barbara County APCD, Shasta County APCD, Antelope Valley APCD, Mojave

Desert AQMD, Placer County APCD, North Coast Unified AQMD, Butte County APCD, and El Dorado County APCD. States of Nevada, Oregon, Washington, Hawaii, Arizona, Idaho, Montana, New Mexico, Colorado, Utah, Texas, Ohio, Pennsylvania, Illinois, Kansas, Oklahoma, and several others.

Landfill Gas

Principal-in-Charge for Design, Bidding Support, and Construction Oversight for LFG Control System, Highway 59 Landfill, Merced County, CA. The system was initially designed to prevent LFG migration and provide corrective action for groundwater impacts. The system successfully remediated LFG migration and brought the facility in compliance with Resource Conservation and Recovery Act (RCRA) Subtitle D requirements. Currently, Mr. Sullivan oversees the operations and maintenance (O&M) of the LFG system. Recently, Mr. Sullivan oversaw the design and construction quality assurance (CQA) for a major expansion of the existing LFG system to meet federal and state air quality and GHG requirements. In addition to the LFG services, Mr. Sullivan has completed a variety of air quality and GHG tasks for the project, including permitting and compliance reporting as well as closure design and groundwater corrective action.

Principal-in-Charge, Completion of Various LFG Engineering/Construction Oversight and Groundwater Services, Various Waste Management, Inc. (WM) Landfills. Landfill sites have included Bradley, Simi Valley, Columbia Ridge, DADS, Lancaster, Redwood, Lockwood, Antelope Valley, Rio Rancho, Butterfield, Northwest Regional, Anderson, and El Sobrante. Engineering tasks have included design of wellfield expansions, new blower/flare stations, header upgrades and replacements, groundwater monitoring and reporting, groundwater corrective action plans, as well as a variety of air quality services.

Principal-in-Charge, LFG Engineering, American Avenue Landfill, Fresno County, CA. SCS first developed a LFG master plan for the site. Upon completion of the conceptual plan, Mr. Sullivan oversaw the completion of the engineering design, including preparation of formal plans and specifications for bidding for the original and one expansion to the LFG system. Bid assistance was provided to the County as well as construction management and CQA services. The County expanded SCS's contract to include O&M of the LFG system as well as design of two subsequent phases of LFG system expansion. In addition to the LFG services, Mr. Sullivan has completed a variety of air quality and GHG tasks for the project.

Principal-in-Charge, Completion of LFG Planning and Engineering for Various Republic Services (Republic's) Landfills. Landfill sites have included Otay, Sycamore, Vasco Road, West Contra Costa Sanitary, Foothills, Tower Road, ECDC, Wasatch, Ox Mountain, Wasatch, and Central Landfills. Engineering tasks have included design of wellfield expansions, new blower/flare stations, and header upgrades and replacements as well as CQA. Under SCS's direction, SCS upgraded Republic's LFG Master Plans and prepared a LFG remediation plan to address LFG migration issues. In addition to the LFG services, Mr. Sullivan has completed a variety of air quality and GHG tasks for the projects.

Principal-in-Charge, Planning, Design, and Construction Oversight for LFG System at Recology's Landfills, California. Project Director and Manager for the planning, design, and construction oversight for an expansion to the LFG system at Recology's Pacheco Pass, Ostrom Road, and YSDI Landfills to address air quality requirements, LFG migration, and groundwater impacts. These projects were completed on a design-build basis. In addition to the LFG services, Mr. Sullivan has completed a variety of air quality and GHG tasks for Recology landfills.

Principal-in-Charge, Completion of LFG Planning and Engineering for Waste Connections, Inc.'s (WCI's) Landfills. Sites have included Chiquita Canyon, Fairmead, Potrero Hills, Cold Canyon, LRI, and Avenal Landfills. Engineering tasks have included design of wellfield expansions, new blower/flare stations, and header upgrades and replacements as well as CQA. SCS has upgraded WCI's LFG Master Plans and developed long-term cost estimates for LFG system expenditures. In addition to the LFG services, Mr. Sullivan has completed a variety of air quality and GHG tasks for the sites.

Principal-in-Charge, Various Other LFG Planning or Engineering Projects throughout California, Arizona, Nevada, Oregon, and Colorado, including Stanislaus County's Geer and Fink Road Landfills, Butte County's Neal Road Landfill, Sunnyvale Landfill, L&D Landfill, Sacramento County's Kiefer Landfill, Madera County's Fairmead Landfill, Yolo Central Landfill, as well as various other smaller closed landfill sites. Many of these projects included engineering design, CQA, and/or design-build of LFG system expansions.

CEQA/NEPA Analyses

CEQA Air Quality Analysis and Toxics Risk Assessment, Proposed Expansion to Fink Road Landfill, Stanislaus County, CA. As part of an EIR for a proposed expansion to the Fink Road Landfill in Stanislaus County, California, SCS completed an air toxics risk assessment, which evaluated the potential human health impacts due to current and future exposures from the project. The risk assessment was part of a larger air quality analysis completed for the expansion EIR. The analysis included an evaluation of health risk due to diesel exhaust from heavy equipment and refuse hauling vehicles at the landfill. As part of this project, SCS also researched the conversion of refuse hauling fleets to alternative fuels in order to generate ERCs for CEQA mitigation measures.

CEQA Air Quality Analysis and Toxics Risk Assessment, Salinas Valley Solid Waste Authority Landfill Project, Monterey County, CA. SCS completed air quality and risk assessment sections of a large EIR being prepared for long-term refuse collection and disposal options for the Salinas Valley Solid Waste Authority's Regional Landfill Project. The project included three landfills and 10 transfer stations, which were combined into four different project scenarios. The project included emissions estimates, air dispersion modeling, and risk calculations. The analysis included an evaluation of health risk due to diesel exhaust from heavy equipment and refuse hauling vehicles at the landfills and transfer stations, which were part of the project.

CEQA Mitigation Measures Development and Implementation for El Sobrante Landfill, Corona, CA. SCS was enlisted to develop a series of mitigation measures for fugitive dust emissions from landfill construction and operations at the El Sobrante Landfill in Corona, California. SCS also developed an implementation plan for the CEQA Mitigation Monitoring and Reporting Program (MMRP), which was required as part of the approval of the EIR. SCS is currently doing ambient monitoring for particulate matter less than 10 microns (PM10) levels and working with the SCAQMD to develop a long-term strategy to reduce dust emissions.

Landfill Risk Assessment, Closure and Post-Closure Development BKK Landfill, West Covina, CA. As part of an EIR for proposed closure and post-closure development of the Class III portion of the BKK Landfill, SCS completed a risk assessment that evaluated the potential human health impacts due to current and future exposures to contaminants in LFG and other environmental media. The risk assessment was part of a larger air quality analysis completed for the EIR. Through reasonable risk estimates, SCS was able to demonstrate that the proposed development of the landfill (i.e., golf course and Business Park) could occur without causing adverse health effects above CEQA significance levels.

CEQA Air Quality/GHG Analyses and Toxics Risk Assessments and Air Permitting, Proposed Landfill Expansions. Projects included expansions to the Newby Island, Forward, Crazy Horse, Johnson Canyon, Jolon, Fairmead, Keller Canyon, Redwood, Altamont, and various other landfills. As part of EIRs for the proposed expansions, SCS completed an air quality impact analyses that included risk assessments evaluating the potential human health impacts due to current and future exposures to contaminants from the project. The risk assessments were part of larger air quality analyses completed for the expansion EIRs. The projects included emissions estimates, air dispersion modeling, GHG evaluation, and risk calculations.

Landfill Investigation and Risk Assessment

Landfill Investigation, LFG Engineering, Human Health Risk Evaluation and Impact Assessment, Proposed Residential Developments, Adjacent to the Otay Landfill, Chula Vista, CA. Project activities at the site have included an evaluation of LFG migration, LFG engineering and testing, air quality permitting and compliance, soil and LFG sampling and analysis, human health risk assessment and nuisance/odor evaluation, CEQA assistance, operations and maintenance of the LFG collection and control system, and other landfill engineering and construction services. The risk assessment and odor/nuisance analysis was completed to support residential development adjacent to the landfill.

Environmental Investigations and Risk Assessment at the Former BKK Main Street Landfill in Los Angeles County. This landfill is a closed site that may have received both hazardous and non-hazardous wastes; it is currently occupied by two golf courses and other commercial and residential developments and is being considered for additional redevelopment. Project work at this facility has included completion of soil vapor surveys, installation and monitoring of LFG migration probes, LFG sampling/analysis, oversight of cover and subsurface soil and groundwater sampling, completion of a human health risk assessment, CEQA assistance, and negotiations with regulatory agencies. The site is currently being considered for listing on the

National Priorities List (NPL) as a potential Superfund site. Oversight of the landfill is provided by EPA Region IX, Department of Toxic Substance Control (DTSC), and the Los Angeles County landfill local enforcement agency (LEA).

LFG Assessment, Cover Maintenance, and Monitoring, Cogen Kramer Landfill, Los Angeles, CA. The site is located adjacent to residential development and two County correctional facilities have been developed on landfill property. Project tasks include LFG assessment, installation of LFG migration probes, emergency cover repair and ongoing cover maintenance, preparation of LFG and cover assessment work plan, regulatory liaison with the Los Angeles County LEA, Cal Recycle, and the South Coast AQMD. In addition, methane monitoring is conducted associated with the use of one of the closed jail facilities for TV and movie productions.

Environmental Monitoring and Postclosure Care, Cal-Compact Landfill, Carson, CA. The site is a former hazardous waste landfill that is being considered for redevelopment. The site is currently under the oversight of the DTSC. Project tasks have included LFG assessment, LFG engineering, design of methane protection systems, and development of a LFG monitoring program. In addition, Mr. Sullivan currently oversees the completion of post-closure care services at the site, including LFG monitoring, LFG system operations and maintenance (O&M), groundwater sampling and analysis, cover maintenance and repair, site security, storm water sampling/analysis and inspections, and regulatory liaison.

LFG Assessment, Cover Maintenance, and Monitoring, Lane Road Disposal Site, Irvine, CA. The site is located adjacent to residential development and has been redeveloped into a golf course. Project tasks have included LFG assessment, including methane testing in nearby homes, installation of LFG migration probes, cover repair and ongoing cover maintenance, preparation of LFG assessment and cover maintenance plan, regulatory liaison with the Orange County LEA, Santa Ana Regional Water Quality Control Board (RWQCB), CIWMB, and SCAQMD. SCS also completed the design and installation of LFG collection and control system to prevent migration onto residential properties.

Burn Dump Investigation in San Joaquin County, CA. As part of this project, Mr. Sullivan provided technical oversight for investigations of a burn dump site, which included soil investigations, trenching investigations to determine extent of refuse, LFG migration assessment, waste sampling/analysis, hazardous waste determination, and other project tasks. The project site was slated for residential development; therefore, all project elements we completed in consideration for this type of development.

Investigation, Risk Assessment, and Remediation Kaiser Ventures Inc. Facilities, Fontana, CA. For the former Kaiser Steel plant in Fontana, Remedial Investigation (RIs)/Feasibility Studies (FSs), Remedial Action Plans (RAPs), and Remedial Designs were prepared for three on-site operable units under DTSC's oversight. Mr. Sullivan was responsible for a number of individual soil, groundwater, surface water, and waste investigations at the Kaiser site, including treatability studies, risk assessments, RAPs, and hydrogeological studies, storm water pollution prevention plans, and spill prevention, control, and countermeasure (SPCC) plans. These projects included investigations of two landfill sites, with both hazardous and non-hazardous wastes, including

soil, waste materials, hazardous waste, groundwater, and surface water issues. The site has been redeveloped into the California Speedway, a NASCAR race track.

Investigation, Risk Assessment, and Remediation Feasibility Study, Mission Bay Landfill, San Diego, CA. For this site, Mr. Sullivan managed a significant forensic investigation and site assessment of the former landfill site, which is located next to a river, bay, and amusement park and is used heavily for recreational purposes. This work has included investigations of extent of refuse, cover thickness, LFG composition and migration, soil, surface water, groundwater, and other environmental media associated with Mission Bay. The field investigations will be followed by a risk assessment, and given the highly visible and public nature of the landfill project; focus on risk communication will be of primary importance. Ultimately, several candidate risk-based remediation methods applicable to the site will be identified with typical costs associated with each method. This project included interface with the San Diego County APCD, RWQCB, LEA, and DTSC.

Landfill Engineering, LFG Migration Assistance, and Human Health Risk Assessment, Geer Road Landfill, Modesto, CA. Mr. Sullivan has managed and been involved with a variety of project at the Geer Road site including closure design and CQA services, cover repair, LFG engineering, air quality compliance, human health risk assessment, LFG system O&M, LFG and groundwater monitoring, as well as acted as an expert witness in defending the landfill against a citizen lawsuit. Project work was under the jurisdiction of the landfill LEA and RWQCB.

Odor Evaluations

Air Quality and Odor Analysis for proposed municipal solid waste (MSW) landfill and composting operation in Mariposa County, CA.

Air Quality and Odor Analysis, including ambient air testing and air dispersion modeling, for MSW landfill, composting facility, and materials recovery facility (MRF) in Placer County, CA.

Air Quality and Odor Analysis, including air dispersion modeling, for MSW landfill in Chula Vista, CA.

Odor Analysis for proposed MRF in San Bernardino County, CA.

Odor Analysis for an MSW landfill expansion in Kings County, CA.

Odor Analysis for an MSW landfill expansion in Santa Clara County, CA.

Compliance Review and Odor/Air Quality Impact Assessment for existing composting operation in San Diego, CA, which is adjacent to a proposed residential development.

Development of Expert Report and review of opposing experts' work on air quality and odor analyses of a composting facility in Adelanto, CA.

Air Quality Permitting and Compliance, including Odor Analyses, for landfills and composting facilities in Vacaville, Milpitas, and Novato, CA.

Feasibility Analysis, Best Available Control Technology (BACT) Cost-Effectiveness Analysis, and Hydrogen Sulfide Testing for the evaluation of sulfur removal technologies as odor control for LFG-derived odors for 10 landfill sites.

Odor analyses as part of the air quality sections of over 10 EIRs for landfill expansions.

Management of numerous LFG design projects related to odor control of LFG emissions.

Litigation Support

- **Expert Witness Experience:**
 - Last 4 years
 - Crane et al vs. County of Merced. Expert report and deposition and trial testimony.
 - Brian Kahn vs. The Dewey Group. Expert deposition and trial testimony
 - Tommy McCarty, et. al., vs. Oklahoma City Landfill, LLC. Expert report and deposition.

Litigation Support and Preparation of Expert Report in Defense of a Landfill Company in Pittsburgh, PA, which was sued under the third-party provisions of the federal Clean Air Act. Project tasks including emissions estimation, regulatory applicability review, and preparation of an expert report. The case was settled in favor of our client.

Litigation Support as part of a CERCLA Cost Recovery Action Filed by a Group of PRPs Against Various Municipalities and Public Agencies that Disposed Refuse at a Mixed Hazardous and Municipal Solid Waste Landfill in California. Project tasks included review of depositions, evaluation of industrial and hazardous waste disposed in the landfill, and development of a draft report on the contribution of the various PRPs to contamination in the landfill. Our clients were successful in the litigation.

Litigation Support in Defense of a Landfill Company in San Antonio, Texas Against Enforcement Action Brought by the State of Texas. Project tasks including emissions estimation, odor assessment, and air modeling. The case was settled in favor of our client.

Litigation Support in a Lawsuit Filed by a Landfill Owner/Operator in New Mexico Versus the State Environmental Agency with Respect to Air Quality Permitting for Landfills. The case included litigation support and preparation of expert reports.

Litigation Support and Expert Testimony as Part of a Toxic Tort Litigation filed by a Local Residence Against a County-owned Closed Landfill in Modesto, CA. Project tasks included a

site investigation, risk assessment, groundwater evaluation, and expert testimony (deposition and trial). The case was settled with minimal damages for our client.

Litigation Support and Expert Testimony as Part of a Toxic Tort Litigation filed by a Local Residence against a County-owned Active Landfill in Merced, CA. Project tasks included a LFG assessment, site investigation, risk assessment, groundwater evaluation, and expert testimony (deposition and trial). The case was ruled in favor of our client.

Litigation Support and Expert Testimony in Defense of a Nuisance Claim and a CERCLA Cost Recovery Action Filed Against an Electronic Relay Manufacturing Facility in Los Angeles, CA. Project tasks included a remedial investigation, feasibility study, remedial design, remedial action, risk assessment, and expert testimony (deposition only). The first case was settled with insurance coverage; the second case was settled for de minimis contribution from our client.

Litigation Support in Defense of a CERCLA Cost Recovery Action Filed Against an Electronic Relay Manufacturing Facility in Azusa, CA. Project tasks included a review of documents and preparation of a technical response to U.S. EPA's proposed settlement offer.

Litigation Support and Expert Testimony as Part of a Toxic Tort Litigation Filed by a Plaintiff Group against a Large Aerospace Company in Burbank, CA. Project tasks included emissions estimation, air dispersion modeling, air toxics risk assessment, and expert testimony before arbitration judge. The case was settled in favor of our clients.

Litigation Support and Preparation of an Expert Report as Part of a Toxic Tort Litigation in Defense of a Metal Heat Treating Facility in Phoenix, AZ. Project tasks included emissions estimation, air dispersion modeling, and air toxics risk assessment. The case was settled in favor of our client.

Litigation Support and Expert Testimony as Part of a Nuisance Lawsuit Filed by the Current Owner of a Screw Manufacturing Facility against the Former Owner in Santa Fe Springs, CA. Project tasks included a site investigation, compliance audit, evaluation of on-site disposal of waste oil, and expert testimony before an arbitration judge.

Litigation Support as Part of an Insurance Claim Filed by an Aerospace Facility Against Its Insurance Carrier in Natick, MA. Project tasks included review of soil vapor data, vadose zone modeling, determination of the vapor-phase plume, and preparation of exhibits to be used in court. Our client was successful in the litigation.

Litigation Support in Defense of a Nuisance Claim and a CERCLA Cost Recovery Action Filed Against a Steel Mill in Fontana, CA. Project tasks included a remedial investigation, feasibility study, remedial design, remedial action, risk assessment, and assistance in the cross-examination of opposing experts. The case was settled in favor of our client.

Litigation Support in two Lawsuits Where Contractors Were Unwittingly Exposed to Asbestos during Building Demolition after the property owners claimed that the buildings did not have asbestos-containing materials.

Litigation Support as Part of a Property Damage Filed by the Property Owner Against its Former Tenant at a Plastic and Rubber Manufacturing Plant in Ontario, CA. Project tasks included a site investigation, remediation, risk assessment, and expert testimony (deposition only).

Mr. Sullivan's litigation experience includes the following Proposition 65 cases in California. These cases include preparation of exposures and risk analyses and participation in settlement conferences:

- Litigation support for a defendant in a Proposition 65 lawsuit concerning exposure to methylene chloride in a silk flower cleaner.
- Litigation support for a defendant in a Proposition 65 lawsuit concerning exposure to dichlorobenzene and toluene in a bicycle tire repair kit.
- Litigation support for a defendant in a Proposition 65 lawsuit concerning exposure to lead in PVC grips and handles for various tools and equipment.
- Litigation support for a defendant in a Proposition 65 lawsuit concerning exposure to lead in cosmetics.
- Litigation support for a defendant in a Proposition 65 lawsuit concerning exposure to chromated copper arsenate in treated wood used for children's playground equipment.
- Litigation support for a defendant in a Proposition 65 lawsuit concerning the exposure to various pollutants emitted from landfills and other solid waste facilities in California (six total facilities).

Greenhouse Gas

CARB, Approved Lead Verifier or Internal Senior Reviewer

- Alameda Municipal Power¹
- Biggs Municipal Utility¹
- Cal Portland Company – Mojave Plant²
- Cal Portland Company – Colton Plant²
- California Steel Industries
- City of Lompoc¹
- City of Roseville, CA¹
- City of Ukiah, Electric Utilities Division¹
- City of Victorville¹
- Collins Pine Company
- JP Morgan Chase Bank¹
- Kinergy¹
- Lodi Electric Utility¹
- Metropolitan Water District¹
- Orange County Sanitation District
- Pacific Ethanol¹
- Port of Oakland¹
- Port of Stockton, CA¹
- Riverside Wastewater Treatment Plant
- San Francisco Hetch Hetchy Water & Power¹

- Corn Products
- Georgia Pacific
- Gridley Electric Utility¹
- Healdsburg Electric Department¹
- Hilmar Cheese Company
- Imperial Irrigation District¹
- Imperial Irrigation District – Coachella Gas Turbines
- Imperial Irrigation District – El Centro Generating Station
- Imperial Irrigation District – Niland Gas Turbines Plant
- Imperial Irrigation District – Rockwood Gas Turbines
- Truckee Donner Public Utility District¹
- Temple Inland University of California at Davis
- University of California at Irvine
- University of California at Santa Cruz
- University of California at San Diego
- Western Area Power Authority¹

¹ Verification includes electrical/fuel transactions.

² Verification included process emissions (landfill, wastewater treatment, geothermal, or other process emissions).

³ Verification includes oil and gas emissions.

Climate Action Reserve (CAR) GHG Project Reduction Services

Landfill Protocol

- Dalton-Whitfield Regional Solid Waste Management Authority
- L & D Landfill
- Larimer County Landfill Electric Generation Project
- Hay Road Landfill Feasibility Study
- Montana-Dakota Utilities Billings Landfill
- YSDI Landfill Feasibility Study Central Landfill, Citrus County, Florida
- Raleigh County Solid Waste Authority
- Pendleton County Landfill
- Eagle Point, Wolf Creek, and Stones Throw Landfills Project

Organic Waste Composting (OWC) Protocol

- American Organics OWC
- Grover Environmental Products
- Jepson Prairie Organics
- South Valley Organics

AB32 Mandatory Reporting. Completed State of California Mandatory GHG reporting under AB32 for the following general stationary combustion facilities:

- Altamont Landfill
- Bradley Landfill
- CalEnergy Geothermal Plants City of Fresno Wastewater Treatment Plant
- El Sobrante Landfill
- G2 Ostrom Road
- Kirby Canyon Landfill
- Mid-Valley Landfill
- Penrose Landfill Gas Conversion, LLC
- Redwood Landfill
- San Bernardino County Solid Waste Mgmt. - MVSL
- Simi Valley Landfill
- Sunnyvale WWTP Toyon Landfill Gas Conversion, LLC

GHG Compliance for Landfills. Completed GHG compliance services for over 75 landfills related to the AB32 mandatory reporting rule, AB32 landfill methane rule, and federal “Tailoring” rule for GHG.

U.S. EPA GHG Reporting Rule. Management and oversight for over 250 U.S. EPA GHG mandatory reporting rule projects for landfills.

GHG Emissions Inventory and Verification of Creditable GHG Reductions. Performed GHG emissions inventory services, verification of creditable GHG reductions, and development of GHG management plan under CEQA for Kern County Waste Management Department, California.

GHG Consulting. Provided GHG consulting services for Sacramento County, Los Angeles County, City of Carlsbad, City of Alameda, and the City of Palo Alto and virtually all of the major solid waste companies. Acted as the primary consultant supporting the membership of the SWICS group. As part of this effort, Mr. Sullivan has developed protocols for landfill GHG emission estimates and lead SWICS advocacy efforts on the proposed AB 32 early action rule for landfills.

GHG Emissions Inventory and Certification of Donated GHG Reductions (to make event GHG neutral), Super Bowl, Houston, TX.

Certification of Donated GHG Reductions (to make event GHG neutral), Winter Olympics, Salt Lake City, UT.

GHG Inventory and CCAR Reporting for Republic Services, Inc. Under Mr. Sullivan’s direction, SCS prepared an entity-wide GHG inventory for Republic’s solid waste operations and facilities in California. In addition, SCS completes federal GHG reporting for all Republic landfills nationally.

SWICS Group. Involvement with the leadership of the SWICS group. As part of this effort, Mr. Sullivan has developed protocols for landfill GHG emission estimates and led SWICS advocacy efforts on the proposed AB32 early action rule for landfills, cap and trace, as well as the AB32 and federal GHG mandatory reporting rules.

Private Waste Company GHG Consulting. Provided GHG consulting for all of the large private waste management companies.

Development of GHG Guidance Document. Developed the guidance document titled, *“Technologies and Management Options for Reducing Greenhouse Gas Emissions from Landfills,”* under contract to the California Integrated Waste Management Board (CIWMB).

Publications and Presentations

- Sullivan, Patrick S., and Zbozinek, Jasenka V., *Exposure Assessment and Toxic Distribution Modeling In Toxic Tort Litigation: Air and Soil Pathways*, Seminar Proceedings, Phoenix Chapter of the State of Arizona Bar Association, One-Day Technical Meeting, November 1996.
- Sullivan, Patrick S., and Lister, Kenneth H., *Use of Screening Level Risk Assessment for Risk-Based Corrective Action*, Conference Proceedings, Association for the Environmental Health of Soils, 7th Annual West Coast Conference on Contaminated Soil and Groundwater, Oxnard, California, February 1997.
- Sullivan, Patrick S., Nuno, Julio A., and Lister, Kenneth H., *The Use of Risk-Based Corrective Action in Site Mitigation Projects*, Conference Proceedings, Environmental Engineering Conference, Canadian Society of Civil Engineers/American Society of Civil Engineers (CSCE/ASCE), Edmonton, Alberta, July 1997.
- Albert, Lon, Kubis, Elizabeth L., and Sullivan, Patrick S., *Ongoing Challenges of Emission Inventories at Municipal Solid Waste Landfills*, Conference Proceedings, Emission Inventory Conference, Air and Waste Management Association (AWMA), Raleigh-Durham, North Carolina, October 1997.
- Kubis, Elizabeth L., Rankin, Sue, and Sullivan, Patrick S., *Strategic Planning for Landfill Gas and Air Quality Compliance at Municipal Solid Waste Landfills*, Conference Proceedings, 28th Annual SWANA Western Regional Symposium, South Lake Tahoe, Nevada, April 1999.
- Pierce, Jeffrey L., and Sullivan, Patrick S., *NSPS, NESHAPs, NSR, and Title V: The Impact of Federal Air Quality Regulations on Landfill Construction and Operation*, Conference Proceedings, 28th Annual SWANA Western Regional Symposium, South Lake Tahoe, Nevada, April 1999.
- Sullivan, Patrick S., *A Practical Approach to Clean Air Act Compliance for Landfills*, Presentation at the Annual WASTECON Conference, Reno, Nevada, October 1999.
- Sullivan, Patrick S., *The Use of Methane Gas from Landfills as an Alternative Fuel Source*, Presentation at the U.S. Conference of Mayors/Municipal Solid Waste Management Association Fall Summit, San Jose, California, November 1999.
- Sullivan, Patrick S. (lead author: Risk Assessment section), *Environmental Site Characterization and Remediation Design Guidance*, American Society of Civil Engineers (ASCE) Manuals and Reports on Engineering Practice No. 99, ASCE, Reston, Virginia, 1999.
- Michels, Mike, and Sullivan, Patrick S., *Actual LFG Emissions Lower than EPA Estimates*, Conference Proceedings, National Solid Waste Management Association (NSWMA)/

Environmental Industries Association (EIA) Waste Tech 2000 Conference, Orlando, Florida, March 2000.

Sullivan, Patrick S., and Michels, Mike, *The Time Is Now for Changes to the AP-42 Section on Landfills*, Conference Proceedings, 23rd Annual SWANA Landfill Gas Symposium in La Jolla, California, March 2000.

Sullivan, Patrick S., *U.S. EPA's Urban Air Toxics Strategy*, Conference Proceedings, Conference Proceedings, 10th Annual Technical Conference, Air and Waste Management Association (AWMA) Golden Empire Chapter, Golden West Section, Bakersfield, California, March 2000.

Mezzacappa, David, and Sullivan, Patrick S., *Air Quality Pre-Construction Permits for Municipal Solid Waste Landfills*, Conference Proceedings, 9th Annual SWANA Landfill Symposium in Austin, Texas, June 2000.

Sullivan, Patrick S., *Risk Characterization in Site Characterization and Remediation Design*, Conference Proceedings, Convergence 2000 Environmental Engineering and Pipeline Engineering Conference, American Society of Civil Engineers (ASCE), Kansas City, Missouri, July 2000.

Nuno, Julio A., and Sullivan, Patrick S., *Site Characterization*, Presentation at Convergence 2000 Environmental Engineering and Pipeline Engineering Conference, ASCE, Kansas City, Missouri, July 2000.

Sullivan, Patrick S., *Getting Down to Cases: Just What Is a Bioreactor Landfill*, MSW Management, July/August 2000.

Sullivan, Patrick S., and Stege, G. Alexander, *An Evaluation of Air and Greenhouse Gas Emissions and Methane Recovery from Bioreactor Landfills*, MSW Management, September/October 2000.

Green, Roger B., Vogt, W. Gregory, and Sullivan, Patrick S., *Comparison of Emissions from Bioreactor and Conventional Landfills*, Conference Proceedings, Annual SWANA WASTECON Conference, Cincinnati, Ohio, October 2000.

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- Sullivan, Patrick S., and Caponi, Frank R., *Air Quality Compliance for Landfill Gas to Energy Projects*, Conference Proceedings, 25th Annual SWANA, 25th Annual Landfill Gas Symposium, Monterey, California, March 2002.
- Sullivan, Patrick S., Huff, Raymond, and Tinker, Amy, *Human Health Risk Assessment Issues for Landfills*, Conference Proceedings, 25th Annual SWANA Landfill Gas Symposium in Monterey, California, March 2002.
- Sullivan, Patrick S., *Update on Air Quality Permitting and Compliance Issues for MSW Landfills*, Presentation at the 31st Annual SWANA Western Regional Symposium, South Lake Tahoe, Nevada, May 2002.
- Walsh, James, and Sullivan, Patrick S., *NSPS and Other Clean Air Act Issues—Recent Development and Workarounds*, Proceedings of the SWANA WASTECON Conference, Long Beach, California, October 2002.
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Clarke, Steve, and Sullivan, Patrick S., *Estimating the Trend in NMOC Generation and Emissions After Closure of MSW Landfills*, Conference Proceedings, 27th Annual SWANA Landfill Gas Symposium, San Antonio, Texas, March 2004.

Huff, Raymond H., and Sullivan, Patrick S., *Air Quality and Odor Impacts from Landfill-Related Emissions*, Conference Proceedings, Water Environment (WEF) and AWMA Odor and Air Emissions 2004, Bellevue, Washington, April 2004.

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Sullivan, Patrick S., *The Role of LFGTE in California's RPS and the California Biomass Collaborative*, Presentation at the 8th Annual U.S. EPA LMOP Conference and Project Expo, Baltimore, Maryland, January 2005.

Sullivan, Patrick S., *Where Should I Put My Organic Waste: Bioreactor Landfill or Composting Facility*, Conference Proceedings, NSWMA/EIA Waste Expo, Las Vegas, Nevada, May 2005.

Sullivan, Patrick S., *LFG and Development on and Adjacent to Landfills in California*, Presentation at the 34th Annual SWANA Western Regional Symposium, San Luis Obispo, California, May 2005.

Sullivan, Patrick S., *Comparison of Air, Health, and Odor Impacts from Landfills vs. Composting*, Presentation at the Annual SWANA WASTECON Conference, St. Louis, Missouri, September 2005.

Sullivan, Patrick S., *LFG and Air Quality Aspects of Bioreactor Landfills*, Presentation at the Annual Technical Meeting, SWANA Evergreen Chapter, Yakima, Washington, October 2005.

Sullivan, Patrick S., *LFG Issues During Post-Closure Development of Landfills*, Presentation at the California Integrated Waste Management Board's Post-Closure Land Use Symposium, Stockton and Ontario, California, February 2006.

Leonard, Michael L., Huff, Raymond H., and Sullivan, Patrick S., *Unique Solutions to Complex LFG Migration Problems*, Conference Proceedings, 29th Annual SWANA Landfill Gas Symposium, St. Petersburg, Florida, March 2006.

Sullivan, Patrick S., *Current Status of Air Quality Regulations in the Solid Waste Industry*, SWANA Arizona Landfill Seminar, Phoenix, Arizona, May 2006.

Sullivan, Patrick S., et al., *Fugitive Dust Modeling with AERMOD for PM10 Emissions from a Municipal Solid Waste Landfill*, Proceeding of Guidelines on Air Quality Models; an AWMA Specialty Conference, Denver, Colorado, September 2006.

Sullivan, Patrick S., *CNG, LNG, and Other Fuels from LFG*, Presentation at 4th Annual Forum CA Biomass Collaborative, Sacramento, California, March 2007.

Sullivan, Patrick S., et al., *Field Comparison of Landfill Gas Collection Efficiency Measurements*, Conference Proceedings, 30th Annual SWANA Landfill Gas Symposium, Monterey, California, March 2007.

Sullivan, Patrick S., *Update on Major Air Quality Regulations Affecting Landfills*, Conference Proceedings, 30th Annual SWANA Landfill Gas Symposium, Monterey, California, March 2007.

Sullivan, Patrick S., *Landfill Management Practices for Reducing GHG Emissions*, Presentation for the California Integrated Waste Management Board (CIWMB) Strategic Policy Development Committee Public Workshop, Sacramento, California, May 2007.

- Sullivan, Patrick S., *Mitigation of Unique LFG Migration Issues*, Conference Proceedings, SWANA WASTECON Conference, Reno, Nevada, October 2007.
- Sullivan, Patrick S., *SWICS Landfill GHG Inventory Methodology*, Presentation for SWANA WASTECON Conference Landfill Gas Division Meeting, Reno, Nevada, October 2007.
- Sullivan, Patrick S., *Air Quality Issues Affecting Landfills in California*, Presentation at SWANA Sierra Chapter Board Meeting, Fresno, California, January 2008.
- Sullivan, Patrick S., *GHG Programs in California and their Impacts on MSW Landfills*, Conference Proceedings, 31st Annual SWANA Landfill Gas Symposium, Houston, Texas, March 2008.
- Sullivan, Patrick S., *Air Quality Issues Affecting Landfills in California*, Presentation SWANA Gold Rush Chapter Board Meeting, Monterey, California, April 2008.
- Sullivan, Patrick S., *Practicalities of Implementing and Permitting a Landfill Methane Project*, Presentation for the California Climate Action Registry (CCAR) Climate Action Reserve Workshop on California Landfill Methane Projects, Los Angeles, California, April 2008.
- Sullivan, Patrick S., *Air Quality Issues for Composting Facilities*, Presentation at the 38th Annual SWANA Western Regional Symposium, Seaside, California, May 2009.
- Huff, Raymond H., and Sullivan, Patrick S., *Carbon Footprint and Impact of Biosolids*, Presentation at CWEA's "Government Affairs: Global Climate Issues" Specialty Conference for the Cities of Whittier and Roseville, California, June 2008.
- Huff, Raymond H., and Sullivan, Patrick S., *GHG Credit Trading*, Presentation at CWEA's "Government Affairs: Global Climate Issues" Specialty Conference for the Cities of Whittier and Roseville, California, June 2008.
- Sullivan, Patrick S., *The New World of GHG Emissions for Landfills*, Presentation for SWANA Landfill Symposium, Palm Springs, California, June 2008.
- Sullivan, Patrick S., *Quantification Methods for GHG Emissions from Landfills*, SWANA E-Session, October 2008.
- Sullivan, Patrick S., *AB 32 Climate Change Issues Impacting Landfills in California*, Presentation at Rural Counties' Environmental Services Joint Power Authority Board and Technical Advisory Meeting, Sacramento, California, December 2008.
- Sullivan, Patrick S., *Greenhouse Gas Regulations, Programs, and Reporting*, Presentation to Clark County Department of Air Quality and Environmental Management, Las Vegas, Nevada, January 27, 2009.

- Sullivan, et al., *New LFG Monitoring Requirements in California: More Stringent and Expensive*, Conference Proceedings, 32nd Annual SWANA Landfill Gas Symposium, Atlanta, Georgia, March 2009
- Sullivan, Patrick S., *Operational and Financial Impacts of CARB's New Early Action Rule for Landfills*, Presentation at the 38th Annual SWANA, Western Regional Symposium, Palm Springs, California, April 2009.
- Sullivan, Patrick S., *Estimating Your Landfill's Carbon Footprint*, Presentation at the NSWMA/EIA Waste Expo in Las Vegas, Nevada, June 2009.
- Sullivan, Patrick S., *CARB's New Early Action Rule for Landfills: Beyond NSPS and into the Climate Change World*, Presentation for SWANA WASTECON Conference, Long Beach, California, September 2009.
- Sullivan, Patrick S., *Global Setting: Waste Management's Response to Climate Change*, Presentation for SWANA WASTECON Conference, Long Beach, California, September 2009.
- Sullivan, Patrick S., *AB 32/Scoping Plan Impact on Solid Waste Industries and Local Governments*, Presentation at the Southern California Waste Management Forum Annual Conference, Ontario, California, November 2009.
- Sullivan, Patrick S., *Meeting EPA's Mandatory GHG Reporting Requirements*, NSWMA Webinar, December 2009.
- Sullivan, Patrick S., *General Overview of EPA's Mandatory GHG Reporting Rule for Landfills*, Presentation at the SWANA Oregon Chapter, Winter Forum, January 2010.
- Sullivan, et al., *The Impact of Federal Climate Change Legislation and Regulation on The Solid Waste Industry*, Conference Proceedings, 33rd Annual SWANA Landfill Gas Symposium, San Diego, California, March 2010.
- Sullivan, Patrick S., *Comparison of Landfilling and Organic Waste Diversion in Terms of Air Quality and GHG Impacts*, Presentation at the 39th Annual SWANA Western Regional Symposium, San Luis Obispo, California, April 2010.
- Sullivan, Patrick S., *The Importance of Landfill Gas Capture and Utilization in the U.S.*, Columbia University, Earth and Engineering Center, Council for the Sustainable Use of Resources (SUR), April 2010.
- Sullivan, Patrick S., *Federal Mandatory Reporting Rule (MRR) and Tailoring Rule for Greenhouse Gas (GHG)*, Presentation at Waste Connections, Inc., Meeting, Copper Mountain, Colorado, August 2010.

- Sullivan, Patrick S., *The Confusing Maze of State and Federal Greenhouse Gas (GHG) Reporting Programs*, Presentation for SWANA WASTECON Conference, Boston, Massachusetts, August 2010.
- Van Kolken Banister, Amy, and Sullivan, Patrick S., *LFG Collection Efficiency: Debunking the Rhetoric*, MSW Magazine, Elements 2011 Issue, September 2010.
- Sullivan, Patrick S., *Tailoring Talk*, Waste Age, February 2011.
- Sullivan, Patrick S., *Not Another GHG Regulation—The Impact of the Tailoring Rule on Landfills*, Presentation for 34th Annual SWANA Landfill Gas Symposium, Dallas, Texas, March 2011.
- Sullivan, Patrick S., *When Can Co-Located Facilities be Considered Separate Sources for Air Compliance Purposes the Concept of Common Control*, Presentation for 34th Annual SWANA Landfill Gas Symposium, Dallas, Texas, March 2011.
- Sullivan, Patrick S., *GHG Regulatory Overload*, Presentation for 40th Annual SWANA Western Regional Symposium, Seaside, California, May 2011.
- Sullivan, Patrick S., *Comparison of Air Quality and GHG Impacts from Organic Waste Disposal*, Presentation for AWMA Golden West Chapter Annual Technical Conference, Bakersfield, California, May 2011.
- Sullivan, Patrick S., *Comparison of GHG Emissions Methodologies for Landfills*, Presentation for AWMA Annual Conference, Orlando, Florida, June 2011.
- Sullivan, Patrick S., *Air Modeling for LFG Projects*, Presentation for SWANA WASTECON Conference, Nashville, Tennessee, August 2011.
- Sullivan, Patrick S., *Impacts from Organic Waste Management*, AWMA Mother Lode Chapter Meeting, Sacramento, California, September 2011.
- Sullivan, Patrick S., *The Effects of New Air Modeling Standards on Landfill Gas Projects*, Presentation for 35th Annual SWANA Landfill Gas Symposium, Orlando, Florida, March 2012.
- Sullivan, Patrick S., *The Impact of the GHG Tailoring Rule on Title V and PSD Permitting for Landfills*, Regulation Week e-Seminar, April 2012.
- Sullivan, Patrick S., *Clean Air Act Update*, Conference Proceedings, Waste Expo, Las Vegas, Nevada, April 2012.
- Sullivan, Patrick S., *Air Quality Requirements for Composting Facilities are Changing—Are You Ready?*, 41st Annual SWANA Western Regional Symposium, April 2012.

- Sullivan, Patrick S., *The Effects of New Air Modeling Standards on Landfill Gas Projects*, SWANA E-Session, May 2012.
- Sullivan, Patrick S., et al., *Defending Landfills Accused of Landfill Gas Impacts on Neighboring Properties*, Paper and Presentation for SWANA WASTECON Conference, Washington, D.C., August 2012.
- Sullivan, Patrick S., et al., *Lessons Learned from the First Two Years of Compliance with the Federal GHG Mandatory Reporting Rule*, Paper and Presentation for 36th Annual SWANA Landfill Gas Symposium, Las Vegas, Nevada, March 2013.
- Sullivan, Patrick S., *Why Won't They Just Stop? More Changes to the Air and GHG Regulations for Landfills*, 42nd Annual SWANA Western Regional Symposium, San Luis Obispo, California, April 2013.
- Sullivan, Patrick S., et. al., *LFG Rules and Regulations Committee Update*, Panel Presentation at SWANA WASTECON Conference, Long Beach, California, September 2013.
- Sullivan, Patrick S., *The Implications of California Air Regulations on Composting Facilities*, Presentation at the U.S. Composting Council Annual Conference, Oakland, California, January 2014.
- Sullivan, Patrick S., et al., *Lessons Learned from California Landfill Methane Rule Reporting*, Presentation at the 37th Annual SWANA Landfill Gas Symposium, Monterey, California, March 2014.
- Sullivan, Patrick S., et al., *Update on Federal Air and GHG Regulations Affecting Landfills*, Published in *Waste Advantage* magazine, Volume 5, Number 3, March 2014.

JOHN HENKELMAN

Education

B.S., Chemical Engineering, University of Nevada, June 2002

Professional Licenses and Registrations

Engineer-in-Training (EIT)

Professional Affiliations

Air and Waste Management Association (AWMA)

Certifications

OSHA 40-Hour Hazardous Waste Operator

Professional Experience

Mr. Henkelman has 12 years of experience as a chemist and engineer. His duties have included air dispersion modeling using several regulatory models, including AMS/EPA Regulatory Model (AERMOD), Industrial Source Complex Short Term 3 (ISCST3), Screen 3, AERSCREEN, and Areal Locations of Hazardous Atmospheres (ALOHA). He has used modeling results in risk assessments, accidental release planning, permit applications, and environmental impact assessments. He has written workplans for and performed sampling of soil vapor, landfill gas, soil, and water. He has assisted with compliance and permitting under the Clean Air Act. He has assisted in greenhouse gas reporting and verification under the California Climate Action Registry, The Climate Registry, and California's Mandatory greenhouse gas reporting regulation. He also has experience in manufacturing that includes production scheduling, quality assurance, quality control, product development, and health and safety.

Select project experience includes the following:

Modeling for Permitting of Newby Island Sanitary Landfill, Milpitas, CA: Support included dispersion modeling using a screening model (SCREEN3) used in support of an Environmental Impact Report (EIR) and California Environmental Quality Act (CEQA) report. Modeling included all major emission sources at the site. Model results were used to evaluate human health risk and National Ambient Air Quality Standards (NAAQS) compliance.

Modeling for Permitting of Forward Landfill, Manteca, CA: Modeling included dispersion modeling using a complex model (AERMOD) used in support of an EIR and CEQA report. Modeling included all major emission sources at the site. Model results were used to evaluate human health risk and NAAQS compliance.

Modeling for Permitting of Fairmead Landfill, Madera, CA: Modeling included dispersion modeling using a complex model (AERMOD) used in support of an EIR and CEQA report.

Modeling included all major emission sources at the site. Model results were used to evaluate human health risk and NAAQS compliance.

Modeling Evaluation for Avenal Landfill, Avenal, CA: Evaluation included dispersion modeling used in an EIR and CEQA evaluation. Modeling was completed using ISCST3. Model results were used to evaluate human health risk.

Modeling Evaluation for Central County Landfill, Petaluma, CA: Evaluation included dispersion modeling used in an EIR and CEQA evaluation. Modeling was completed using CAL3QHCR. Model results were used to evaluate human health risk.

Modeling Evaluation for East Los Angeles Transfer Station, East Los Angeles, CA: Evaluation included dispersion modeling used in an EIR and CEQA evaluation. Modeling was completed using SCREEN3. Model results were used to evaluate human health risk and NAAQS compliance.

Modeling Evaluation for West Artesia Material Recovery Facility, Compton, CA: Evaluation included dispersion modeling used in an EIR and CEQA evaluation. Modeling was completed using SCREEN3. Model results were used to evaluate human health risk and NAAQS compliance.

Assisted in Health Risk Assessment for a Former Plastic Bottle Manufacturing Facility, Toluca, Mexico: The assessment included developing a soil vapor sampling plan, collecting soil vapor samples, developing exposure scenarios for soils and soil vapor, developing toxicity criteria, and developing exposure parameters.

Assisted in a Focused Health Risk Assessment for a Former Aerospace Research Facility, Los Angeles, CA: The assessment included developing exposure scenarios for groundwater and indoor air, developing toxicity criteria, and developing exposure parameters.

Assisted in a Health Risk Assessment for Former Industrial Sites in Southern California: The sites were being developed for residential use. The assessment included developing exposure scenarios for soil vapor and modeling risk using the Johnson Ettinger model.

Assisted in the Development of Copper and Cyanide Cleanup Levels for Surface and Air, San Marcos, CA. Development included focus on exposure scenarios, toxicity criteria, and exposure parameters. Chronic health hazard-based cleanup levels for both contaminants were developed for future residential and commercial use of the facility.

Assisted in the Development of Health Based Beryllium Cleanup Levels for Surfaces, Kansas City, MO: Development included defining exposure scenarios, toxicity criteria, and exposure parameters. Cleanup levels were based on increased cancer risk for commercial workers.

Assisted in the Development of Contaminant Cleanup Levels for Soil Gas throughout California: Development included defining exposure scenarios, toxicity criteria, and exposure parameters. Cleanup levels were based on both increased cancer risk and chronic health effects.

Assisted in a Health Risk Assessment for an Asbestos Landfill, Copperopolis, CA: Assessment included developing emission rates of asbestos, modeling dispersion of asbestos emissions using the Industrial Source Complex Short Term 3 (ISCST3) model to determine downwind concentrations, developing exposure scenarios for outdoor air, developing toxicity criteria, developing meteorological data, and developing exposure parameters.

Performed Soil Vapor Surveys, including Sample Location Selection, Sample Collection, and Sample Analysis throughout California and Oregon: Surveys were performed in support of vapor intrusion risk assessments.

Modeling for Permitting of Kirby Canyon Landfill, Morgan Hill, CA: Support included dispersion modeling using screening and complex models (ISCST3, AERMOD, and SCREEN3) for permitting of flares and potential engines. Modeling results were used to determine human health risk.

Modeling for Permitting of Tri-Cities Landfill, Fremont, CA: Support included dispersion modeling using screening and complex models (ISCST3 and SCREEN3) for permitting of flares and potential engines. Modeling results were used to determine human health risk.

Modeling for Permitting of McCommas Landfill, Dallas, TX: Support included dispersion modeling using a screening model (SCREEN3) in support of a permit application for flares. Modeling results were used to determine NAAQS compliance.

Modeling for Permitting of Hay Road Landfill, Vacaville, CA: Modeling included dispersion modeling using a complex model (AERMOD) used in support of an EIR and CEQA report. Modeling included all major emission sources at the site. Model results were used to evaluate human health risk and NAAQS compliance.

Review of Modeling for Redwood Landfill, Novato, CA: Review included dispersion modeling completed for Prevention of Serious Deterioration (PSD) evaluation of flares and engines for a landfill gas to energy (LFGTE) project using AERMOD. Model results were used to determine human health risk.

Reviewed Air Toxics Health Risk Assessments for Los Angeles Unified School District (LAUSD), Los Angeles, CA: Review included emission calculations, air dispersion modeling using ISCST3, risk and exposure criteria selection, and risk calculation. Also reviewed hazardous material accidental release scenarios.

Reviewed Air Toxics Risk Assessment of a Quarry, Novato, CA: Review of the assessment performed by another firm included emissions calculations, modeling, and risk evaluation.

Review concluded that the emission calculations were fundamentally flawed and that the quarry may pose a significant health risk to nearby residential areas.

Evaluated Emissions from Vehicles using Emfac2007 for Various Sites in California:

Emissions calculations have been used in fleet emission calculations and health risk assessments.

Assisted in the Permitting of Industrial Facilities Throughout California: Permitting included developing appropriate emission factors, calculating emissions, and preparation of permit application materials. Permitted facilities have included several landfills, transfer stations, and a lumber factory.

Prepared New Source Performance Compliance Standards (NSPS) Tier 2 Reports for 10 Landfills, CA: Preparation included creating a workplan for the sample collection, collecting samples at the landfills, calculating emissions, and writing the report which was submitted to regulators.

Evaluated Greenhouse Gas Regulations for Landfills and the Steel Industry, Pittsburg, CA: Evaluation included investigation of current and future legislation and regulations regarding greenhouse gasses.

Performed Analysis for Best Attainable Control Technology (BACT) for composting operations, Novato, CA: Analysis included evaluating the effectiveness and cost of several control technologies.

Specialized Training

Completed 2-Day Training Course for ISCST3 and AERMOD: Course included model selection, meteorological data processing, source and receptor parameters selection, and terrain processing.