Comments on: National Pollutant Discharge Elimination System (NPDES) General Permit for Discharges of Storm Water Associated with Construction and Land Disturbance Activities

CBIA Coalition's Technical Comments: Executive Summary

The California Building Industry Association and its coalition members identified in our legal comments (herein, "The Commenting Parties") are principal stakeholders in the process to issue a revised General Construction Permit. We support the Board's efforts to improve the permit such that its implementation results in improved environmental outcomes. Many of our concerns and issues have been addressed as we have worked cooperatively with your staff. However, we still have remaining concerns about a number of aspects of the Draft General Construction Order (Draft Order).

As stated above, we support several features of the Draft Order, and believe that these proposed changes can improve water quality objective for construction sites throughout the State. In particular, we support, in concept, the implementation of a risk-based approach and the use of numeric action levels (NALs). In these comments, we have also provided some recommendations for how we believe these aspects of the Draft Order could be improved.

The Draft Order also contains some components that we do not support. For example, our detailed scientific analyses indicate that the information necessary to support a numeric effluent limit (NEL) does not yet exist. We have provided recommendations for a data collection program that could be implemented to assess the feasibility of NELs and to gather the information that would be needed to calculate defensible and scientifically appropriate NELs. We are also concerned that the Order, as currently drafted, could greatly increase the duties and responsibilities of the Regional Boards and create a significant amount of uncertainty for both public and private sector entities operating under the terms of the Order.

From a technical perspective, the Commenting Parties believe that the Draft Order should focus on protecting receiving water quality via a pro-active approach for controlling pollutants from construction site discharges. This approach would emphasize enhanced planning, implementation, inspection, and maintenance of a hierarchy of complementary Best Management Practices (BMPs) with the goal of minimizing runoff, sediment and pollutant transport into storm water.

The General Construction Permit that will be adopted should set forth pollutant control standards that will clearly enhance storm water pollution prevention plans (SWPPPs) to assure that construction projects will implement a comprehensive system of BMPs that include measures from all four categories: runoff controls, erosion controls, sediment controls, and non-storm water management controls. Field research, laboratory research, and evaluation of drainage, sediment and erosion control technologies have generally shown that each are highly effective in controlling construction site pollutants, including soil loss and sediment delivery.

Based on the collective experience of the construction industry at construction sites throughout California and the U.S. and based on available scientific information, we believe that the majority of sites can be well protected with good Storm Water Pollution Prevention Plan (SWPPP) design, with more diligent and proper design, application, and maintenance of all BMPs, as well as use of a "hierarchy of complementary BMPs" from the four categories identified above. This pro-active approach is one that contractors can successfully implement if given appropriate permit-driven regulations supported by the Clean Water Act (CWA).

In order to achieve this goal, the Draft Order should be revised to assure that the following five major objectives are accomplished at every construction site:

- Minimize exposed areas to those that can be effectively controlled and provide erosion control practices on all disturbed areas during the rainy season;
- Provide properly designed drainage facilities to control concentrated flows and, where possible, reduce runoff volumes;
- Provide sediment control practices to complement erosion controls around the perimeter of the construction site and at all internal inlets to the storm drain system during the rainy season;
- Reduce the tracking and migration of sediment off-site all year; and
- Properly control the use of building materials and solvents, fuels, fertilizers, pesticides, coatings, and sealants (etc.) and sources of other types of pollutants that may be present during the construction process.

The "Bridge Approach"

Even though we have data and information proving that BMPs can and do improve water quality, this information is limited in the range of conditions it characterizes, and data describing overall site performance are very limited. For example, we have limited information on how BMPs perform over a range of hydrologic conditions, soil types, and when BMPs are used in combination or in series. Our knowledge of receiving water conditions is also limited. As detailed in these comments, we believe that the State Water Resources Control Board (SWRCB) lacks the scientific data to support the effluent quality standard included in the proposed Order.

The Commenting Parties also understand that the SWRCB or Board would prefer inclusion of a numeric compliance measure in the next construction storm water general permit. While we are mindful of the pressure to adopt a numeric effluent limit (NEL) standard in this current permit, we maintain that a "best management practices" (BMP) approach to managing and regulating storm water runoff, coupled with the use of numeric action levels (NALs), is the only numerical approach that can be supported with information and data available at this time. The coupled BMP/NAL approach would serve as a "bridge" to future permits that may incorporate additional numeric measures when there are data to support these additional measures. The BMP/NAL approach would also serve to bring all construction sites to the same standard of water quality protection, while allowing for site-specific data collection and study that would improve an operator's understanding of local site conditions. The "Bridge Approach" necessitates a more comprehensive and well-designed program of data collection that would evaluate the feasibility of NELs and collect data that could be used to support their development. This "bridge approach" is designed to work in the following way:

<u>Step 1. No Numeric Effluent Limit For Sediment or pH.</u>
As discussed herein, currently available data are insufficient to allow calculation of NELs. NELs should not be included in the proposed order.

Step 2. Propose A Uniform Action Level To Be Used Statewide As A Starting Point For Measuring BMP Performance. The Draft Order includes provisions for calculation of a site-specific numeric action level (NAL). However, the calculation process proposed for deriving NALs is uncalibrated and untested, and has not been used to calculate site-specific action levels; it may not be appropriate for construction related activities. An alternative would be to choose an Action Level that is obviously "beyond the norm" or that clearly indicates an "upset value" as suggested by the Blue Ribbon Panel (BRP). This value should be derived with stakeholder input and should represent a "consensus value." California homebuilders and contractors believe the best approach to managing levels of construction site sediment is through the adoption of BMPs. To demonstrate the value of BMPs, we support action levels (ALs) that would be used statewide as follows:

- The AL would be used as a trigger to initiate additional BMP inspections, maintenance, and upgrades, and to trigger study of site run-on or natural background conditions;
- Results of actions taken related to the AL would be recorded on-site; and
- AL results would be reported in summary (annual or project-end) format only.

Step 3. Proposed Data Collection Program.
In order to provide a bridge between the current permit and the next storm water permit, we believe that an AL data collection program conducted during the upcoming permit term would provide critically needed information to aid the Board in determining what provisions should be included in subsequent permits.

Such a data collection program would include the following components:

- The program would be a joint venture between the SWRCB and the regulated community, and include the participation of the environmental community in the development of the plan and the review of the results;
- The regulated community would work with the SWRCB in choosing an independent contractor to conduct the program; a Blue Ribbon Panel or a similar structured forum could be established to oversee the program;
- Data would be gathered anonymously (i.e., mask site location/name in reported results, etc.);
- Data to be gathered would include effluent and receiving water quality, site characteristics, BMP characteristics, storm characteristics, receiving water characteristics;
- Data would be gathered for a representative range of sites (all risk categories, regions, soil types, receiving water risk);
- A work plan would be carefully designed to gather information to support the next permit (data requirements will be determined by whether ALs or NELs are the ultimate goal); and
- Data would be gathered to address specific technical issues in the proposed order, as follows:
    - To calibrate and validate MUSLE and RUSLE approaches (to determine the appropriateness for inclusion in the next permit term);
    - To determine BMP effectiveness at actual sites; and
    - To assess inter- and intra-storm water quality variability.

A summary of the proposed "Bridge Approach" is provided below.

Numeric Performance Standards “Bridge” Approach

Proposed Permit Requirements	Proposed “Bridge” Approach	Future Outcomes
Sediment Action Level requires that permittees meet new site-specific NALs set without calibration or validation that may not be applicable to construction activities. Establishes a narrow pH NAL.	Proposes a statewide benchmark or NAL (level to be determined) as a performance tool. Contractors participate in a statewide data collection program designed to establish necessary data for uniform sediment content standard.	Serves both to improve water quality and to lead to a better understanding of BMP effectiveness and to determine the utility of a sediment content storm water runoff management standard.
Sediment Numeric Effluent Limits (NELs) establish a statewide limit (1000 NTU) that is not technically supported.	No NELs now. Design a statewide data collection program to establish necessary data for appropriate sediment content and pH standards.	If feasible based on data collected during the current permit term, develop NELs and design storm conditions for future permits.
PH NEL establishes a statewide limit (<6.0 or >9.0) that is not technically supported.		

We support the State’s efforts to protect and improve water quality through high standards for construction site compliance. Furthermore, as we have presented to you in workshops and discussed with you during several meetings, our industry is willing to work with the State to address the deficiencies in the technical foundation of this Draft Order as written. We also stand ready to assist in crafting appropriate curricula and training programs for construction storm water control practitioners working within our industry and for the governmental entities responsible for permit enforcement.

A summary of our principal concerns follows, and is organized according to the 12 significant changes and additions identified in the Draft Fact Sheet, with a separate section that addresses Dr. Wolff’s questions presented at the May 7, 2008 Storm Water Workshop and other outstanding issues. Detailed support for these comments is provided below.

I. Technology-Based Numeric Action Levels

The Commenting Parties do not oppose action levels (ALs) in theory because properly derived ALs can support a General Permit that emphasizes enhanced and more focused implementation of BMPs proven to be effective in construction site water quality control. However, we are concerned with how ALs are established and with how they fit into the overall structure of the General Permit. We recommend that the SWRCB consider alternatives to the current AL proposal, and/or perform additional studies to evaluate and refine the proposed ALs. Specifically, the ALs for pH and turbidity should consider natural conditions and receiving water quality and be used to identify obvious problems.

In addition, we note that the ALs for sediment are derived using the MUSLE approach for a two-year storm. We suggest that the ALs should also be applied using a design storm and/or design storm intensity, as meeting ALs for some pollutants (e.g., sediment and turbidity) during very large storm events will be exceedingly difficult.

As detailed in these comments, we believe that NELs cannot be appropriately developed at this time. In lieu of NELs, the SWRCB may wish to consider an action level "ceiling" that would trigger enhanced site response and/or additional study to evaluate why an AL was exceeded.

As written, the Draft Order also requires that an exceedance of an AL be submitted to the SWRCB as a public record. Per the Draft, exceedances of ALs are not violations and thus this information should not be available to the public to be misconstrued. We recommend that any actions taken in response to an AL exceedance be recorded on site and any AL exceedances would be submitted in an annual or project end report.

II. Technology-based Numeric Effluent Limitations

As detailed in these comments, we are not opposed to numeric effluent limitations (NELs) in principle, but believe they must be developed using a scientifically defensible dataset and appropriate methodology, following guidelines established by the United States Environmental Protection Agency (USEPA). Our research and experience indicates that appropriate data are not available, either to describe variations in water quality under different conditions (e.g., hydrologic conditions, soil type, slopes) or to describe the performance of BMPs, either singly or in combination, over a wide range of conditions (e.g., to assess whether appropriate deployment of BMPs can achieve the proposed NELs across the wide range of conditions experienced on construction sites). We assert that ALs may be appropriate in the interim and should be used to gain additional knowledge about storm water runoff from construction sites and about BMP performance. ALs will also provide a basis for site reassessment and additional BMPs, as necessary. The Commenting Parties support a well-designed program of data collection to evaluate the feasibility of NELs and to gather data upon which to base refinements to numeric measures (both ALs and, if feasible, NELs).

We are opposed to the inclusion of NELs in the current permit, and note that, in addition to the considerations above, several other parameters must be evaluated before NELs are appropriate for use in the construction permit. For example, a design storm and/or design storm intensity should be specified with any NEL, and how the NELs would be used to assess site compliance should also be specified. There are many examples of NPDES permits where design storms are incorporated, including permits issued to combined sewer systems.

We understand that SWRCB staff believes that exceedances of NELs would constitute chronic (not acute) violations for the purposes of determining mandatory minimum penalties. However, the Draft Order is structured so that multiple violations could occur from a single site during a single storm event, particularly for long duration or large storms and from sites with multiple discharge points. The potential for multiple violations under these circumstances is independent of site size or impact to receiving waters. Therefore, the financial penalties could be "open ended" for many sites. This is especially true if there is no design storm. The current structure of the Draft Order could therefore lead to inequities in the regulation of construction site discharges.

As detailed by the state-commissioned Blue Ribbon Panel (BRP or Panel), NELs are "not likely feasible for construction sites unless chemical addition is permitted." As detailed in Section II. of our comments below, we believe that the SWRCB has not sufficiently addressed the reservations of the Panel, has not sufficiently considered storm water variability or natural background receiving water conditions, has not provided sufficient analysis to justify the proposed NELs, and includes no provision for a design storm or intensity. Many parts of the State have highly erosive soil conditions, and receiving waters in those areas are naturally and normally turbid (i.e., exceeding the proposed NEL for turbidity) during storm events. Similarly, pH values can exceed the proposed limits on occasion under natural conditions. We are unaware of any evidence or research that indicates that the NELs in the draft permit can be achieved in those regions and under those conditions, even with appropriate and responsible BMP deployment. In summary, we believe that the inclusion of NELs is inappropriate at this time, and that the Board should follow established protocols for BAT/BCT analysis prior to establishing NELs and should collect additional data to support NEL development.

III. Risk-based Permitting Approach

The Commenting Parties understand the intent and potential benefit of a risk-based permitting approach, and support such an approach in principle. However, we have several reservations about the current proposal. Most importantly, the risk evaluation process fails to recognize the significant risk reduction that can and does occur through the proper design and use of erosion control and other "source reduction" control measures. The proposed risk evaluation process is complex and unclear, and may require expertise that many practitioners (including some currently certified practitioners with extensive storm water expertise) do not have. Finally, the proposed approach appears to be biased to classifying sites as high risk, particularly as evaluated through the receiving water worksheet. We have conducted an extensive evaluation of the proposed risk evaluation process, and include details of that evaluation and recommendations for modifying the risk evaluation approach in these comments.

IV. Minimum Requirements Specified

The Draft Order specifies minimum BMPs and requirements that were previously only required as elements of the SWPPP or were suggested by guidance. However, beyond specifying additional minimum BMPs, the Draft does not clearly emphasize a pro-active and comprehensive approach to planning, implementation, inspection, and management of complementary BMPs, including construction site erosion and sediment control. Overall the Draft Order should emphasize construction phase planning and design, implementation, inspection, and maintenance of a pro-active approach for protecting sites with a hierarchy of complementary BMPs to reduce pollutant discharges from construction sites.

The Draft Order also requires that dischargers "implement appropriate controls throughout the all stages of construction to address air deposition issues." We find this requirement overly broad and ambiguous. The Order needs to include a definition of "air deposition issues" as well as clarification as what constitutes "appropriate controls." Board staff should also ensure that these "controls" do not overlap with regulations already in place by the Air Quality Management Districts.

V. Project Site Soil Characteristics Monitoring and Reporting

The Draft Order requires all dischargers to monitor and report the soil characteristics at the project location. The primary purpose of this requirement is to provide better risk determination and eventually better program evaluation. The Draft Order requires an analysis of the fines content of site soils but this information is not used in the calculations in the Draft Order. Site soil evaluations are also used in the RUSLE equation, which is used to determine the project's risk level, and in the MUSLE equation, which is used to calculate site-specific NALs. These equations are not appropriate for these purposes, and we suggests alternatives to the RUSLE/MUSLE approach and refinements to the parameters used.

VI. Effluent Monitoring and Reporting

The Commenting Parties strongly support the concept of a well-designed uniform program of representative third-party data collection for providing information to answer specific questions, such as site-wide BMP performance, potential future development of NELs, etc. Such a data collection program would provide uniformity in collection methods, better study design, and would facilitate the integration of results into a report or larger study that could be used to advance the program. Effluent self-monitoring and reporting has been used in the past as a means to determine permit compliance and also to gather general data for the SWRCB's programs. Based on past experience with the General Industrial Permit, we are concerned that the data collection proposed in the current permit will not be useful in terms of advancing our understanding of the characteristics of runoff from construction sites or the performance of BMPs. It is also unclear to use that effluent monitoring of all discharges for all storm events would be cost-effective versus required visual observations of runoff and BMP inspections. Effluent monitoring will be particularly difficult on large sites and on long linear sites, where there may be many discharge points. We are also concerned about the relatively vague requirements for data collection for non-visible pollutants.

VII. Receiving Water Monitoring and Reporting

The Draft Order would require some Risk Level 2 and Risk Level 3 dischargers to monitor receiving waters. However, it is unclear how these receiving water data will be evaluated and used within the program, or for future program development. We are concerned that, unless the program goals are clearly articulated and incorporated into the permit, data collection will not provide useful information to the overall program. For example, as discussed in Section II. above, receiving water pH and turbidity can vary widely based on different natural soils and precipitation characteristics, within a single storm event, and even between storm events, making the meaningful interpretation of analytical results from individual grab samples exceedingly difficult. There is also the difficulty of knowing how pollutant contributions from any particular site compare to contributions from the rest of the watershed, and whether the receiving waters at the sampling point would be "well-mixed."

The Commenting Parties circulated a lengthy questionnaire to their members, and results were used to assess various components of the Risk Determination Worksheet (Attachment A of the Draft Order). Several members raised questions regarding the proximity of a site to receiving waters and expressed concerns about safely accessing the receiving waters to conduct monitoring. We are concerned about the improper use of receiving water data as an indicator of whether a construction discharge has caused or contributed to a receiving water quality exceedance, given the many forensic challenges inherent in connecting discharge and receiving water quality monitoring. Particularly in large watersheds, discharges from a construction site may flow many miles within a storm drain system, and co-mingle with discharges from many other land use types, prior to entering the receiving water. We believe that it is questionable that the requirement to conduct bioassessment monitoring should be tied to individual construction sites, as it would be in all but a very few cases impossible to determine if the construction site was the source of the effects on the resident biota.

For these reasons, we recommend that the SWRCB re-design the overall monitoring program to more clearly support the long-term goals and objectives of the program, and that all receiving water monitoring be conducted either via a well-designed third-party data collection effort or as part of existing regional monitoring efforts.

VIII. New and Re-development Storm Water Performance Standards

The Commenting Parties believe that the impact to California's rivers and streams from hydromodification caused by uncontrolled new development and redevelopment projects is an important issue. However, we support the removal of all hydromodification requirements from the Draft Order for the following reasons: (1) the General Construction Permit is not the appropriate mechanism for regulating post-construction hydromodification impacts; (2) the standards as proposed are not sufficiently protective and/or, in some cases, unnecessary or overly protective; and (3) the standards as proposed are too broad to be implemented and do not address the range of elements that scientific literature indicates is required to manage hydromodification impacts comprehensively. Because many projects undergo a multi-year design and entitlement process well before a construction permit application is filed (and because many projects that will be built in the next five to ten years are already well into or through that process), regulation of post-construction impacts via a construction permit is not appropriate nor the best way to accomplish the State's goals. We do recommend that the permit include some language that indicates that hydromodification impacts both pre-construction and post-construction be addressed during the California Environmental Quality Act (CEQA) process using appropriate, technically accepted methods and/or meet the requirements established under the local MS4 permit.

IX. Rain Event Action Plan

The Draft Order requires sites to develop and implement a Rain Event Action Plan (REAP) that must be prepared within 48 hours prior to any likely precipitation event, and that is designed to protect all exposed portions of the site. The concept of a Rain Event Action Plan (REAP) is fundamentally sound. However, we recommend three changes to the Draft Order to improve the utility of a REAP. First, we suggest that the SWRCB use quantitative precipitation forecasts (QPF), which provide the probability that a specific quantity of rain will occur in the immediate future, instead of the probability of precipitation (POP), which specifies the probability of occurrence of a rain event that will produce 0.01" of rain. There are many days where the forecast is for inconsequential rain amounts at a low probability using the POP approach. Second, we request that the Draft Order clarify the phases of construction when a REAP would be required. The Commenting Parties believe that the REAP should be required for all stages of construction, not just for the grading and land development phase, as implied by the Attachment G to the Draft Order. Third, the use of a forecast 48-hours in advance of an event is too long, and we recommend providing for a 24-hour notice instead.

X. Site Photographic Self Monitoring and Reporting

The Commenting Parties do not support the use of self-recorded photographic records for construction site reporting under any circumstances. The utility of such an approach is questionable given the subjective nature of photographic evidence (when, where, context) and the speculative interpretations that can be drawn from observational evidence. When inspections occur during a project, local or State or Federal authorities have the authority to photo-document construction activity.

XI. Annual Reporting

The Draft Order requires that Annual Reports be submitted no later than February 1, even though February is in the middle of the rainy season, when implementation and inspection and management of discharge pollutant controls will require maximum time and significant effort. It is more appropriate to require submittal of annual reports in July or August, concurrent with the annual compliance certification and to record activities occurring during the current and prior year's wet weather months.

XII. Certification/Training Requirements for Key Project Personnel

We support the SWRCB's efforts to create baseline program curricula for SWPPP preparers, SWPPP implementers, and SWPPP inspectors, including industry personnel responsible for SWPPP preparation and implementation/inspection, and regulatory staff responsible for document review and in-field inspections. However, the Draft Order should clearly state that all personnel responsible for SWPPP implementation, including municipal and state water board regulatory inspectors, attend a State Water Board-sponsored or approved Qualified SWPPP Practitioner Training Course.

XIII. Additional Issues

At the May 7, 2008, CGP workshop, Board Member Wolff posed three questions to workshop attendees. As discussed throughout these comments, the Commenting Parties have given these questions careful consideration and has relied upon available research and experience in preparing answers to them. Our summary responses are provided below.

1) *The permit attempts to balance the need for simplicity and transparency with the need to sensitively address widely different physical conditions across sites. In what parts of the draft permit do you think complexity is most and least valuable?*

   We believe that the proposed risk evaluation and NAL calculation processes are overly complex, and has made several suggestions for alternatives and/or refinements to the process. In particular, the Commenting Parties suggest that the SWRCB should consider alternatives to the RUSLE and MUSLE approaches used to assess risk and determine NALs. Alternative approaches may include use of RUSLE2 or the Water Erosion Prediction Program (WEPP). A further alternative to NALs may include the use of a single NAL number that would be used during the current permit term to further our understanding of storm water runoff from construction sites and the effectiveness of BMPs. This number would be set "beyond the norm" or an "upset value" as recommended by the BRP.

   The Commenting Parties also believe that the proposed effluent and receiving water monitoring program is unnecessarily complex, and that it will yield data that do not further the goals of the program. As described in these comments, we support a well-designed program of third-party data collection and assessment.

   Finally, we believe that additional complexity well beyond the State's efforts to date would be warranted in any approach to developing NELs. NELs should be developed to consider local conditions (e.g., steepness, soil type, natural sediment loads) and receiving water conditions (e.g., type of channel, habitat characteristics and sensitivity). NELs should also be developed with a design storm or design hydrologic conditions.

2. *Our scientific understanding of when and where a management practice is best is limited. Self monitoring for compliance will not necessarily increase our understanding due to variations between practitioners and for other reasons. Are you interested in creating a scientifically valid database on management practice performance via rigorous third party 'random' monitoring in lieu of self-monitoring and at least partially paid for by permittees?*

   As detailed throughout these comments, we support a well-designed and centralized program of data collection, which would be designed to address specific questions and to support the SWRCB's goals for the permit. The Commenting Parties believe that the proposed effluent and receiving water monitoring approach proposed in the draft permit is overly complex, and believe that it will not yield useful information that will advance the construction storm water program. We believe that the integrated data collection program would be a partnership, or joint venture, between the SWRCB and the regulated community, and should be conducted by an independent contractor with review and input by the environmental community. We also think that an expert panel with a structure similar to the BRP could be useful in overseeing the effort. Data collection should occur over a representative range of site types and construction phases, in all risk levels, regions, soil types, and over a range of hydrologic conditions. Parameters that should be included in the data collection program should include, at a minimum, site characteristics, BMP characteristics, storm characteristics, and receiving water characteristics. Water quality parameters should include pH, total suspended solids (TSS) or suspended solids concentration (SSC), and turbidity.

3. *Ignoring the numbers and how they are calculated, do you think that the tiered compliance structure of the permit is a desirable or undesirable feature? By tiered structure we mean action levels 'backstopped' by higher numeric effluent limits that are intended to simplify enforcement against egregious violations.*

   The Commenting Parties do not oppose the use of NELs in principle, but believe that they should be fully technically and scientifically supported, and should be accompanied by a design storm (or other design hydrologic condition) and should be developed to consider background conditions. We do not believe that the State currently has the information necessary to successfully develop, implement, or defend NELs.

   We believe that ALs, which are non-enforceable numeric measures that would trigger BMP reviews, inspections, maintenance and a review of natural and background conditions at the site, are the appropriate numeric measure for this permit and to advance the goals of the program. We recommend that these be set following the guidance set forth in the BRPR as a value that is obviously "beyond the norm."

Other Issues

The Commenting Parties are concerned that the requirement to electronically file PRDs within 100 days of permit adoption is unnecessarily onerous. As detailed in these comments, this requirement imposes a significant burden on the industry and may not be feasible, given the training and certification requirements of the permit. We suggest that the Board either grandfather in sites already covered by the current permit or phase in requirements over a longer timeframe.

We are also concerned about the open-ended nature of the Regional Board and public review process. Although permit coverage begins 14 days after PRDs and associated fees are received by the State Board, those documents remain open for public review and comment for the life of the project. As discussed in these and the accompanying legal comments, this creates significant uncertainty for both public and private sector entities operating under the terms of the Order.

Summary

We trust the SWRCB will address our technical comments and revise the approach of the general construction permit to focus on receiving water quality and to emphasize enhanced and pro-active planning, implementation inspection and management of BMPs, including erosion source control measures. During the period that such a permit is in place (five years), the SWRCB, working with the Commenting Parties and other principal stakeholders, should conduct the necessary scientific studies and data gathering that are necessary to create the next five-year General Permit that continues to advance the goals of the SWRCB and the Clean Water Act.

TABLE OF CONTENTS

Our detailed comments and recommendations are provided below and are organized according to the sections as provided in the Fact Sheet at pages 17-18.

I. Technology-Based Numeric Action Levels (ALs)

The Draft Order includes ALs for pH and turbidity (Section IV. at p. 9). These ALs are to be used to evaluate effluent monitoring data, and if exceeded would trigger BMP evaluations and reporting requirements. Exceedances of ALs could also trigger additional storm water controls.

The Commenting Parties support ALs in principle and believe that properly derived ALs can support and provide additional quantitative evaluation measures for a General Permit that emphasizes enhanced implementation of BMPs. We believe that this approach will prove to be effective in managing the quality of storm water in runoff from construction sites. However, we have concerns with how ALs have been established and with their role within the overall structure of the Draft Order. We recommend that the SWRCB perform additional studies to evaluate and refine ALs. Specifically, the ALs for pH and turbidity should consider natural conditions and receiving water quality, and should be developed using appropriate methods to preclude adverse effects on beneficial uses.

The Commenting Parties also recommend that ALs be implemented with a design storm, design rainfall intensity, or other hydrologic criteria such that ALs are not expected to be met during extreme events. We support the concept of a "ceiling" in lieu of NELs, provided that it is not used to determine permit compliance.

1. The Draft Order establishes ALs for pH as less than 6.5 or greater than 8.5. These limits were derived by calculating one standard deviation above and below the mean pH of runoff from CALTRANS sites (Fact Sheet, p. 49).

The proposed AL is set too narrowly and will not identify "upset values." Setting an AL at plus or minus one standard deviation from the mean is not an appropriate metric. This method for establishing the AL assumes that the available pH data are normally distributed, which is an assumption that should be tested prior to using this method. If data are normally distributed, a range of plus or minus one standard deviation would include 68.2% of the data in the dataset that was used to calculate the AL. This would mean that, of all data used to establish the AL, about 31.8% would trigger an AL exceedance and require subsequent action. The 2006 Blue Ribbon Panel Report (BRPR or Report) at p. 8 stated that an AL should be established to indicate an "upset value, which is clearly above the normal observed variability." ALs established using one standard deviation above and below an assumed mean clearly are not upset values.

The proposed AL is based on a small dataset that is not fully representative of conditions throughout the state. The Caltrans data used to establish the ALs for pH were taken from six of the Caltrans Districts and may not be representative of conditions throughout the State. The SWRCB should not assume that the available Caltrans data come from a single statewide "population." Indeed, the Caltrans datasets show important differences from region to region and site to site. Typical storm water data show very large site-to-site differences and high year-to-year and storm-to-storm variability. Such data do not fit a normal or lognormal distribution, particularly in the behavior of their higher percentiles (as pointed out, for example, in Statistical Approaches to Estimating Mean Water Quality Concentration with Detection Limits, R.H.Shumway, R.S. Azari, and M. Kayhanian (2002)). Combining small data sets that happen to be available for some set of sites, such as the Caltrans data, is an inappropriate basis for determining NALs and NELs. As discussed in Section II., it appears that the Caltrans dataset is constructed of sample data from approximately 20 construction sites; it also appears that the pH data from these sites do not support the inference that they were drawn from a common population. Rather, the Caltrans data appear to indicate that pH data from each site should be characterized by separate and distinct distributions, and that pH in construction site runoff varies from location to location.

ALs should be developed in consideration of site and receiving water characteristics. As suggested by the SWRCB's Blue Ribbon Panel (BRP) of experts, in establishing an AL for pH, the SWRCB should consider a site's climate region, soil condition, and slopes, and natural background conditions (e.g., vegetative cover) as appropriate and as data are available. Because soil alkalinity varies by region, regional factors may have an important influence on local pH levels of storm water runoff. The SWRCB should evaluate whether or not receiving water pH varies regionally, and take this information into account to set regionally appropriate ALs, rather than establishing blanket ALs that apply uniformly across the state regardless of local conditions. (See discussion on p.23 of "General Construction Permit: Action Levels and Numeric Effluent Limits Analysis; Recommendations for Alternatives," Flow Science Incorporated, March 31, 2008 (NAL/NEL Analysis Report).)

Rain water may fall below the proposed AL range. Data collected by the U.S. Geological Survey (USGS) indicate that rain in California has a long-term average pH that varies between 5.3 and 6.0, depending upon location (see http://water.usgs.gov/nwc/NWC/pH/html/ph.html). For individual storms, pH values as low as 4.5 have been observed (see, e.g., http://nadp.sws.uiuc.edu/ads/2003/CA45.pdf and related reports). If storm water runoff includes water that has not had significant contact time with soil or earth, it is possible for runoff pH values to be similarly low.

The pH in receiving waters may fall above the proposed AL range. In addition, some areas of the State include alkaline soils, and pH in runoff from these soil types may be higher than average values. In some streams, natural receiving water pH ranges as high as 8.9 (e.g., See Trinity River data from California Data Exchange Center (CDEC), in the NAL/NEL Analysis Report at p. A-20). These factors should be examined in detail and taken into account in establishing any ALs for pH. Since construction activities typically *increase* the pH of storm water, the SWRCB should consider establishing only an *upper* limit for the pH NAL.

> ***Recommendation:*** The SWRCB should initiate a data collection program to compile a dataset of construction runoff that is representative of all areas and soil types in the state. The commenting parties have not identified a currently available suitable dataset, and support the collection of data using a uniform data collection approach (See also our discussion in Section VII., Monitoring and Reporting) to support the refinement of NALs. If the standard deviation approach is used, the SWRCB should test the assumption of normality for pH values. Data from different regions or soil types should be grouped and evaluated individually to determine how local conditions influence the pH of construction site runoff. If data are observed to be normally distributed, the ALs should be established using at least two standard deviations, but such that pH values that are outside the ALs that are caused by natural conditions are not considered an exceedance of the ALs for pH.

2. For turbidity, the Order proposes that the NALs are site specific and are to be calculated by the discharger using the Modified Universal Soil Loss Equation (MUSLE) (Williams 1977 as described in Fifield 2004).

The MUSLE equation is as follows:

$$T = 95(Q_p * V)^{0.56}(K)(LS)(C)(P)$$

Where:

T = Sediment yield for specific storm event (tons)
Q_p = Peak flow for specific storm event (cubic ft. per second)
V = Volume of specific storm event (acre-feet)
K = soil erodibility factor
LS = length-slope factor
C = cover factor (erosion controls)
P = management operations and support practices (sediment controls)

The MUSLE is untested and uncalibrated for deriving ALs for construction site runoff. The MUSLE is based on USLE (Wischmeier and Smith 1978), and transforms USLE by replacing the long-term annual rainfall erosivity with runoff estimates for each storm event.

The USLE equation is as follows:

$$A = R\ K\ L\ SC\ P$$

Where:

A = the average annual soil loss
K = soil erodibility factor
LS = length-slope factor
C = cover factor (erosion controls)
P = management operations and support practices (sediment controls)

The USLE is an empirical model derived from numerous runoff-plot data (where a plot had an area of a few square meters) in order to estimate gross soil erosion, not sediment yield (Boomer 2008; Trimble and Crosson 2000). In addition, the use of the USLE-based models such as MUSLE to predict sediment effects on stream water quality as the SWRCB does in the draft permit is inappropriate, and several experts have warned against this practice (see, e.g., Boomer et al. 2008; Slaymaker 1993; Trimble and Crosson 2000).

Sediment yield is not always proportional to runoff. In the MUSLE, estimated runoff is expressed as '$95(Q_p * V)^{0.56}$' and is correlated with sediment yield. Boomer et al. (2008) and Garen and Moore (2005), however, show no correlations between estimated runoff and observed sediment yields. The very basic assumption of the MUSLE model that sediment yield is proportional to runoff volume cannot be supported. Thus, estimated runoff cannot be directly translated into sediment yields.

The model of plot (a few square meters) scale should not be applied to a field or catchment scale. When the application of the USLE-based models is extended from a plot to a field or catchment scale, discrepancies between estimated and measured sediment yields occur. For instance, predictions made using the models exceeded observed sediment yields by more than **100%**, and the models failed to differentiate between catchments with higher sediment yields and those with lower sediment yields for 78 catchments of the Chesapeake Bay watershed and 23 catchments monitored by USGS (Boomer et al.

2008). Similar results were observed in a study conducted in 98 catchments across Europe (Van den Berg et al. 1998).

This discrepancy between model estimates and observed sediment yields is due primarily to the fact that the USLE based equations predict the amount of soil moved "on a field," not necessarily the amount of soil moved "from a field" (National Research Council 1986). In other words, sediment transport processes such as overland flow and infiltration hydraulics are significantly more important than the plot-scale erosion rates, which cannot capture these processes (Boomer et al. 2008). The USLE-based models do not account for landscape complexities that influence sediment transport and delivery when the scale increases to a field that is larger than a plot.

In addition, the "K," "L," "SC," and "P" factors are given universally across a field even though the factors may vary within the field. For instance, the LS factor that is assigned in the equation (p. 49 the Fact Sheet) is universal across an entire area. This does not account for the fact that erosion and deposition can vary depending on flow direction and the degree of slope decline (Boomer 2008).

The original USLE was developed to help farmers minimize topsoil loss on agricultural lands (Wischmeier and Smith 1978). Subsequent revision and recalibration were carried out in order to incorporate broader landscape and terrains than agricultural fields. For instance, revised USLEs (RUSLE1 and RUSLE2) were recalibrated to incorporate a broader set of land cover classes (Renard et. al. 1997). The MUSLE was revised to predict an event-based soil loss. The USLE was not intended to be used for stream water quality. The recalibration was conducted, however, using thousands of plot-scale (a few square meters) data. The extension of the plot scale to a field and a catchment scale is inappropriate.

For these reasons, the models may be used to predict soil moved 'on' a plot but should not be used to predict soil moved 'from' a field to a waterbody.

The Universal Soil Loss Equation (USLE) (Wischmeier and Smith 1978) attempts to predict soil erosion by water. However, the National Research Council found that "it only presumes to predict the amount of soil moved on a field, not necessarily the amount of soil moved from a field" (National Research Council 1986).

The concerns of several authors are quoted below:

> *Some sediment is presumed to be deposited by wind on the field, or downslope of the field along fencerows or in woods, or along streams as alluvium. In reality, not nearly enough is known about this sediment delivery process, and using it for analysis is a continuing problem in fluvial geomorphology. However, many investigators have termed the output of the USLE as "removed from the land" (Trimble and Crosson 2000).*
>
> *The effects of sediment transport processes are predominantly more important than the plot-scale erosion rates (Boomer et al. 2008).*
>
> *The predictions are based on plot-scale mechanisms, namely the effects of rainfall energy on soil detachment given the plot's surface characteristics. When the scale is increased from a plot to a hill slope or catchment, additional processes such as*

overland flow and infiltration hydraulics become increasingly important to controlling sediment transport and delivery (Boomer et al. 2008).

In addition*, the USLE predicts long-term (>20 yr) annual average soil erosion rates, a much longer time than the brief extreme events that often dominate sediment discharge events (Jordan et al., 1997).*

Several alternatives to the MUSLE approach used to derive NALs should be evaluated. According to Michael Harding and George Foster, both experts in the field of sediment transport, "The RUSLE2 is state of the art erosion prediction technology specifically designed for the applications described in the permit document…In conjunction with RUSLE2, an improved approach would be establishment of erosion/sediment control limits in terms of sediment loss per unit area or sediment loss from the project. These values would be set based on local site conditions… including impact on water quality and harm to protected species."

At present, it appears that the MUSLE approach proposed in the Draft Order is not calibrated for use at construction sites and may not be suitable for this application. The SWRCB should consider alternatives, such as the RUSLE2 model discussed above, or the Water Erosion Prediction Program (WEPP). Alternately, the SWRCB could specify a single NAL, as described below, that would be used as a tool for further study and to advance the goals of the program via additional data collection and analysis.

NALs should be applied with a "design storm." As specified in the risk evaluation worksheet procedures (see, e.g., p. 49 of the Fact Sheet), the SWRCB proposed to use a 2-year, 24-hour storm event to derive NALs for sediment using the MUSLE approach. As detailed above, it is unclear that the MUSLE approach is appropriate for estimating the quality of construction site runoff; it is even less clear that the approach is valid for this purpose for very large storm events. For this reason, the NAL should not be applied to storm events larger than the design hydrologic condition.

The SWRCB should consider a uniform NAL value. As proposed by the Commenting Parties in the "bridge approach," the SWRCB may wish to use a simple uniform value as an NAL. That value should be carefully selected so that it identifies "bad actors" or "upset values," as described by the Blue Ribbon Panel. A non-enforceable NAL would be used to gauge the performance of construction sites and BMPs throughout the state, and would probably reveal regional or conditional differences in storm water quality from one watershed to another, or from one construction site to another. If a uniform NAL is used in the permit, it should trigger a review of site BMPs, and, as necessary, BMP maintenance and upgrades to improve water quality. If the NAL appears to be unattainable, exceedances should trigger additional study and/or data collection, which would be used to address questions regarding the natural or background conditions within the watershed or at the construction site, or questions regarding the quality of any run-on to the site. The NAL in this sense would be a learning tool, and permittees would be required to submit evaluations of the NAL performance of their site in their annual reports.

Recommendation: At present, it appears that the MUSLE approach proposed in the draft permit is not calibrated for use at construction sites and may not be suitable for this application. The State Board should consider alternatives, such as the RUSLE2 or WEPP models. Alternatively, the SWRCB could specify a single NAL, as described above, that would be used as a tool for further study and to advance the goals of the program via additional data collection and analysis.

II. Technology-Based Numeric Effluent Limitations (NELs)

1. This Draft Order includes NELs for pH and turbidity in all discharges all risk levels (Section IV. at p. 10).

The NELs in the proposed order are considered to be technology-based effluent limitations ("TBELs"). Typically, TBELs are established following the procedures of the USEPA. To establish pollutant control guidelines or measures based upon either the BAT or the BCT standards requires a rigorous assessment of several factors, which are set forth in the CWA and USEPA's implementing regulations. 33 U.S.C. § 1314(b)(2)(B); 40 C.F.R. § 125.3(d); and 51 Fed. Reg. 24974 (July 9, 1986) (explaining how EPA determines BCT)

In order to properly establish effluent limitations under either BAT or BCT, EPA typically:

(i) gathers extensive information on the industry (through questionnaires, sampling and monitoring, literature reviews, and other methods);

(ii) performs detailed qualitative and quantitative analyses of this information;

(iii) develops sets of proposed control options for the industry;

(iv) estimates the effluent reductions, costs, economic impacts, and environmental effects of those options;

(v) shapes the options into a proposed set of limits;

(vi) explains the proposed limits in a Federal Register publication and additional supporting documents;

(vii) reviews comments on the proposed limits; and

(viii) incorporates those comments into a final regulation (again with considerable supporting documentation).

The SWRCB should follow the BAT/BCT requirements. As detailed below, it does not appear that the SWRCB has followed such a process in establishing the NELs proposed in the current draft permit. The Commenting Parties have conducted an extensive review of the data available within California and of literature regarding runoff from construction sites and do not believe that sufficient data exist to support NEL development at this time. For this reason, and as detailed below, we recommend that the SWRCB institute a comprehensive, well-designed program of data collection to collect the necessary data and to evaluate the feasibility of establishing NELs for construction site discharges.

The proposed NEL process appears to treat different sites inequitably. We note that exceedances of NELs would be considered a permit violation and would trigger mandatory minimum penalties (MMPs). SWRCB staff have indicated that they believe that exceedances of turbidity would be considered chronic, not acute, and thus would only trigger MMPs after a fourth exceedance, at a Regional Board's discretion. However, we note that samples are required to be taken multiple times if a storm is longer than 12 hours in duration, and to be collected from each point where water leaves the site. Thus, it appears to be possible to incur multiple violations during a single storm and from a single site. Further, the exceedances would be considered violations regardless of the impact on a receiving water. This could result in disproportionate and unintended consequences. For example, there may be many discharge points from a long, linear construction project, or from a smaller site situated at the confluence of several drainages; even if the volume of water leaving these projects is small, the projects could incur a large number of violations. At the same time, a very large construction site having a single discharge point would potentially have a much larger impact on receiving water quality but a much less significant likelihood of incurring multiple violations.

The SWRCB should specify a "design storm" for any NELs that are developed and implemented in the permit. Finally, the SWRCB's Draft Order does not include a "design storm" or other hydrologic condition, above which the NELs would not apply. In extreme events, sediment transport from all types of land uses and within receiving waters typically increases dramatically. The pH of storm water discharges may also be affected by very large storm events. The BRP recommended that a design storm be specified for any numeric measures implemented in storm water permits.

2. The Draft Order includes NELs that specify that the pH of storm water discharges must remain between 6.0 and 9.0. It also indicates that the pH NELs are applicable only at projects that exhibit a "high risk of high pH discharge." (Section I.12. at p.3).

The procedures used to develop the proposed NEL for pH should be evaluated further. The pH NEL values were derived by "calculating three standard deviations above and below the mean pH of runoff from highway construction sites in California" (Caltrans study (2002)) (p. 53 of Fact Sheet). We have been unable to replicate this analysis, as the data upon which the analysis were based are apparently no longer available from the authors of the Caltrans study (personal communication with Kevin Murphy (CSUS Office of Water Programs) on June 5, 2008). Therefore, we request that SWRCB staff make the data used in their derivation of the NEL for pH available. The Fact Sheet also states that "proper implementation of BMPs should result in discharges that are within the range of 6.0 to 9.0 pH units" and references SWRCB staff's reliance on best professional judgment (BPJ) equivalent to BAT and BCT (Fact Sheet, (p. 50). The calculation procedure used by the SWRCB assumes that the data in the dataset used to derive the NELs for pH are normally distributed. The assumption that data are normally distributed should be tested. In any case, a valid statistical analysis of storm water data across a representative set of sites cannot treat all the data as coming from a single population with a single mean and a single sigma characterizing the distribution. Different sites yield substantially different data distributions.

Thus, the SWRCB should establish that the dataset used for deriving this limit is representative of conditions throughout the State.

The times when the pH NEL is applicable should be clarified. Section I.12. at p.3 of the Order states that "This General Permit includes a NEL for pH that applies only at projects that exhibit a high risk of high pH discharge." A "high risk of high pH discharge" can occur during the complete utilities phase, the complete vertical build phase, and any portion of any phase where significant amounts of materials are placed directly on the land at the site in a manner that could result in significant alterations of the background pH of any discharges. The fact that the pH NEL is applicable only during these times is not clear throughout the permit.

In some watersheds, background pH may exceed the proposed NEL values. Available receiving water data throughout California, available from the California Data Exchange Center, indicate that pH exceeds 9 relatively frequently. For instance, pH values from the Klamath River[1] range from 7.2 to

[1] Measurements are from a water quality station in the Klamath River basin in Del Norte County (station KKY at 41.5100° N 123.9781° W).

11.1, and pH values of storm runoff at San Diego Creek[2] ranges from 5.6 to 9.5. Additional information can be found in the NAL/NEL Analysis Report at Appendix A.

The pH of rain water is below the proposed NEL values. As detailed in Section I, the pH of rain water is typically below 6. Thus, rain water that has not had sufficient contact time with soil may exhibit pH values below the lower limit of the proposed NEL. For this reason, and because construction activities typically result in increases in storm water pH, the SWRCB should consider specifying only an upper bound for pH ALs and NELs.

> ***Recommendation:*** NELs for pH are premature unless and until they are developed to consider local or regional variations in receiving water quality and soil alkalinity. As detailed above, NELs for pH should be deleted from the permit, and ALs should be used instead. If the SWRCB wishes to implement an NEL for pH in the future, it should undertake a well-designed program of data collection to gather the information necessary to derive statistically representative, and scientifically appropriate, NELs for pH.

3. This Draft Order sets the turbidity NEL at 1000 NTU (Section IV. B. 1.b. at p. 10) and states that this level was developed using an ecoregion-specific dataset developed by Simon et. al. (2004) and Statewide Regional Water Quality Control Board Enforcement Data. It further states that "A 1:3 relationship between turbidity (expressed as NTU) and suspended sediment concentration (expressed as mg/L) is assumed based on a review of suspended sediment and turbidity data from three gages used in the USGS National Water Quality Assessment Program…" (at p.53).

The proposed NEL for turbidity is not supported technically. According to the Draft Order, a turbidity NEL of 1000 NTU was developed using Simon et al. (2004) and construction site ACL data with the assumption of a 1:3 ratio for NTU: SSC (Section III. B. 4.d.ii. at p.53). However, the use of the Simon et. al. study is inappropriate, as the data points collected are too few in number to be statistically representative of runoff from construction sites and are also not representative of background conditions, and finally, the assumption of a 1:3 ratio has no scientific basis.

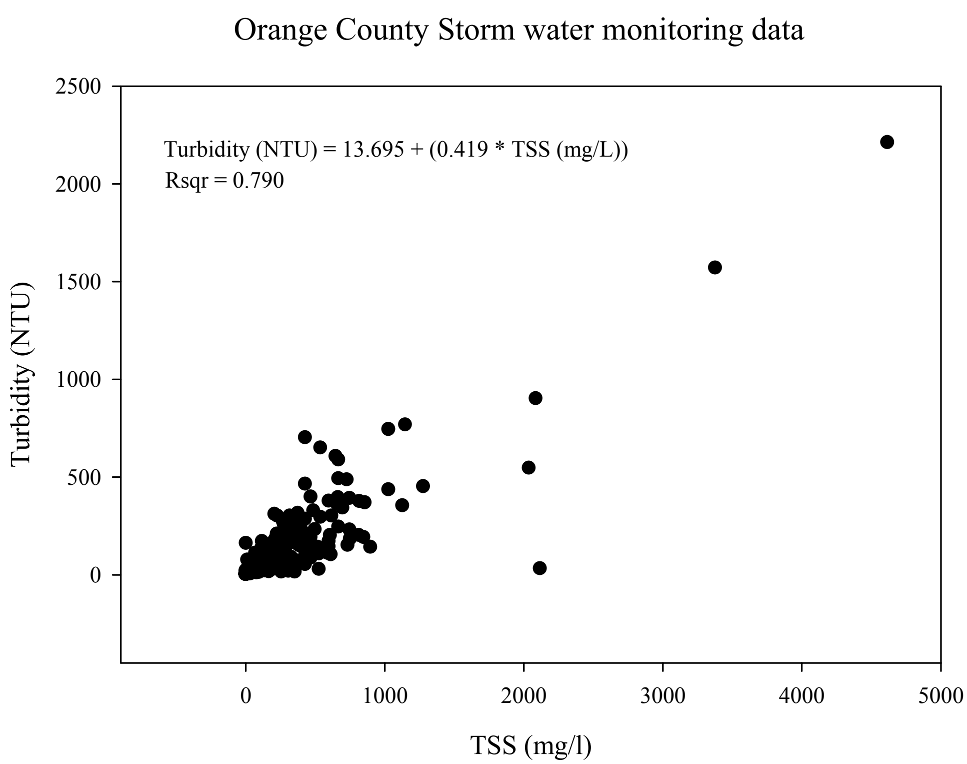
First, Simon et al. (2004) estimated SSC for the 1.5-year flow event ($Q_{1.5}$). The authors clearly state that $Q_{1.5}$ is used to "*define long-term transport conditions*" and that $Q_{1.5}$ is "*the discharge or range of discharges that transports the largest proportion of the annual suspended-sediment load over the long term.*" (Simon et al. at pp.243-245). Thus, a SSC estimate using $Q_{1.5}$ is inappropriate as it does not represent the brief extreme storm events that generate high suspended sediment in natural streams. As indicated on page 56 of the Fact Sheet, there are two major ecoregions (6 and 14) where the median 1.5-year SSC concentrations indicate a highly erosive environment. SSC concentrations in these ecoregions (1530 and 5150 NTU, respectively) would almost certainly exceed the NEL for turbidity. These ecoregions account for more than 40% of the land area in California, and indicate that it may be very difficult to comply with the proposed NEL for turbidity in large portions of the state.

Second, a total of four data points collected at four different sites in the ACL data are too few in number to make any estimation. These sites are all located within a single region of the state and were not selected to be representative of background or reference conditions.

[2] Measurements are from a water quality station at Newport Bay watershed in Orange County (station WYLSED at 33-40-53N 117-48-34W).

Third, the assumption of a 1:3 ratio for NTU: SSC has no scientific basis. Numerous studies have examined the ratio between suspended solids concentration and turbidity, mostly using total suspended solids concentrations (TSS). Although several authors have attempted to correlate turbidity measurements with the gravimetric measurements of TSS (Schroeder et al. 1981; Schubel et al. 1978; Schubel et al. 1979), a consistent relationship has not been established. Correlations are generally site-specific and may change over the course of a year, although not in a consistent fashion (Manka 2005). The suspended sediment-turbidity relationship shifts between the rising and falling limbs of the hydrograph, meaning that the ratio will differ at different times during a storm event. (Knighton 1998). Variability in the NTU-TSS correlations can be attributed to differences in size, composition, and refractive index of particles (Earhart 1984). For dilute solutions, there appears to be a linear relationship between the amount of light scattered and the amount of suspended material, but when TSS levels are high, light cannot penetrate the sample and will distort the turbidity reading (Schubel et al. 1978).

Orange County storm water monitoring program[3] has been collecting TSS and turbidity data in storm runoff for years. Available data are from 599 samples that were collected from 21 storm water monitoring stations across four watershed (i.e., Newport Bay, San Diego Creek, Santa Ana River, and Westminster) in Orange County from October 2000 to May 2006. The Orange County storm water data show that the NTU:TSS relationship1:0.03 to 1:71, depending on different stations and different storm events, indicating that the assumption that a 1:3 relationship exists between turbidity and SSC is suspect and represents a serious oversimplification. The linear regression analysis of the Orange County Data shows the regression of "Turbidity (NTU) = 13.7 + (0.42* TSS(mg/L))', which is roughly translated to 1:14 NTU:TSS (Figure1).



[3] http://www.ocwatersheds.com/StormWater/documents_damp_pea.asp

Figure 1. Relations between turbidity and total suspended solids (TSS) in storm water runoff in Orange County, CA: N=601.

These considerations also apply to SSC. Ankcorn (2003) attempted to estimate the ratio for turbidity (NTU) and SSC using USGS data at two streams in Gwinnet County, Georgia. The ratio shown in the Figure 2. is far from 1:3.

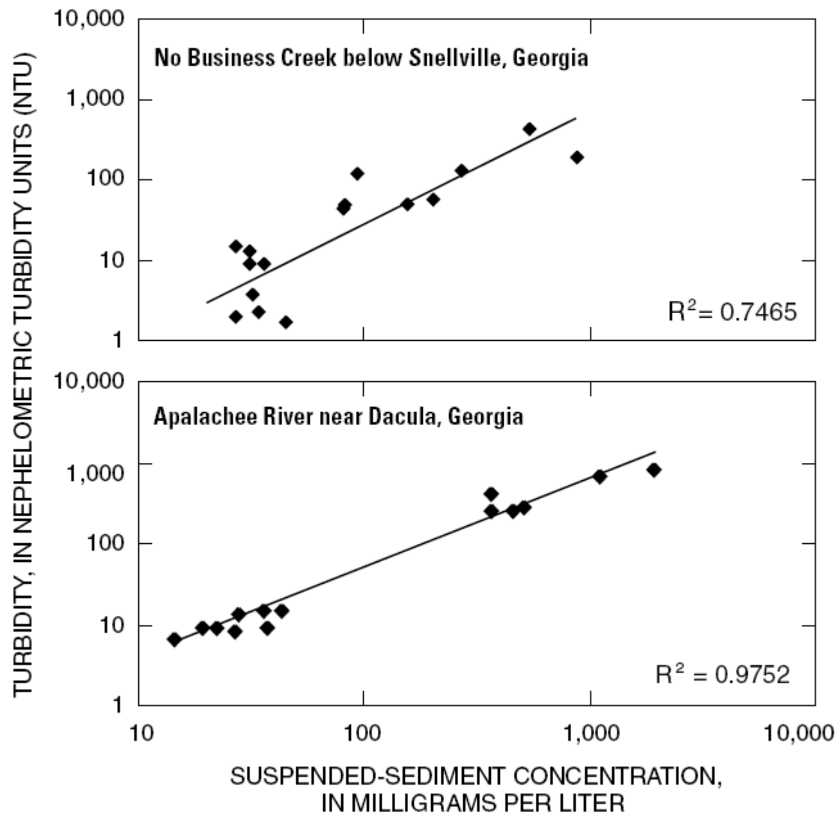


Figure 2. Relation between turbidity and suspended-sediment concentration for two urban streams located in Gwinnett County, Georgia. Source (Ankcorn 2003)

Finally, in Section III.B.4.d.ii (p.58), the Board states that "[t]he results of the review of the Simon et. al. (2004) dataset and construction site ACL data suggest that an appropriate turbidity numeric effluent limit may fall in the range of 500 to 1650 NTU. It also bears mentioning that turbidimeters commonly used for field measurement tend to have an effective measurement range of 0-1000 NTU. So to keep this parameter and the costs of compliance as low as possible, we have determined, using our BPJ, it is most cost-effective to set the numeric effluent limitation for turbidity to be 1000 NTU." We note that the cost of a turbidity meter appears to be the only discussion of the economic impacts of the permit. Nonetheless, the cost of a turbidity meter is irrelevant to the derivation of an appropriate NEL. An appropriate limit must be based on sound, scientifically defensible data that are representative of the conditions likely to be encountered at construction sites throughout the state, and upon the BAT/BCT considerations provided by USEPA.

Background turbidity levels frequently exceed the proposed NEL, even in runoff from undeveloped land. A turbidity NEL of 1000 NTU does not represent the range of natural background turbidity. Yoon and Stein (*in print*) assessed the range of natural background conditions for total suspended solids in storm water runoff from 22 natural open-space sites spread across southern California's coastal watersheds. Sites were selected to represent a range of conditions and were located across six counties and twelve different watersheds: Arroyo Sequit, Los Angeles River, San Gabriel River, Malibu Creek, San Mateo Creek, San Juan Creek, Santa Ana River, San Luis Rey River, Santa Clara River, Ventura River, and Calleguas Creek watersheds. Data were collected from a total of 30 storm sampling-events during two wet seasons between December 2004 and April 2006. The data from Yoon and Stein study were collected in watersheds with more than 95% undeveloped area and with no or minimal impact from development. Thus, this dataset presents valuable insight on natural background levels of TSS. Table 1 shows descriptive statistics of data from multiple stations. Raw data (i.e., grab samples) that have not been flow-weighted are neither normally nor log-normally distributed. As the data indicates, the variability in TSS is quite large. For instance, TSS levels in samples collected from tributaries located within the Santa Clara River watershed in Ventura County range from 2 to 103,000 (mg/l). If the1:3 ratio is accepted, the natural range of turbidity in the Santa Clara River watershed can range up to 34,000 NTU with the assumption of 1:1 ratio for TSS:SSC. Although it is difficult to convert TSS to SSC, TSS tends to be negatively biased from 25 to 34 percent with respect to SSC (Glysson et al. 2001; Gray et al. 2000). This means the natural background turbidity could reach values larger than 34,000 NTU (i.e., 42,500). For additional detail, please refer to the NALs/NELs Analysis Report (Flow Science, 2008) at Appendix A.

Table 1. Statistical summary of TSS (mg/l) levels in receiving water in undeveloped areas of southern California by watershed during storm events; source Yoon and Stein (*in print*)

	Size	Range	Max	Min	Median	25%	75%
pH	41	1.6	8.5	6.9	7.8	7.1	8.1
TSS	212	103000	103000	0	22	4	170
Cu	212	132	132	0	2	1	8
Pb	212	102	102	0	0	0	3
Zn	209	596	596	0	6	3	22

Size= number of data points; Range = Max – Min; Min = minimum; Max = maximum; 25%=25th percentile; 75%=75th percentile

TSS concentrations in runoff from undeveloped watersheds were also observed to vary significantly during individual storm events, with peak concentrations of TSS hundreds of times higher than non-peak concentrations (see Figure 3 below) (Stein and Yoon, 2007). Stein and Yoon (2007) also showed that TSS levels in natural, undeveloped watersheds were significantly higher than at typical developed watersheds in southern California (see Figure 4 below).

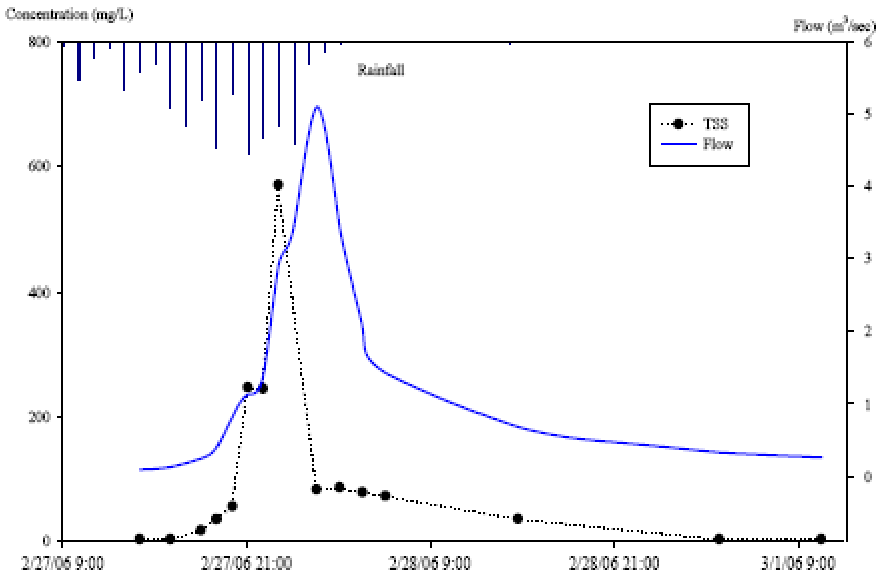


Figure 3. Change in TSS concentration over the course of a storm event at Bear Creek, a tributary to North Fork Matilija, CA; From Stein and Yoon (2007)

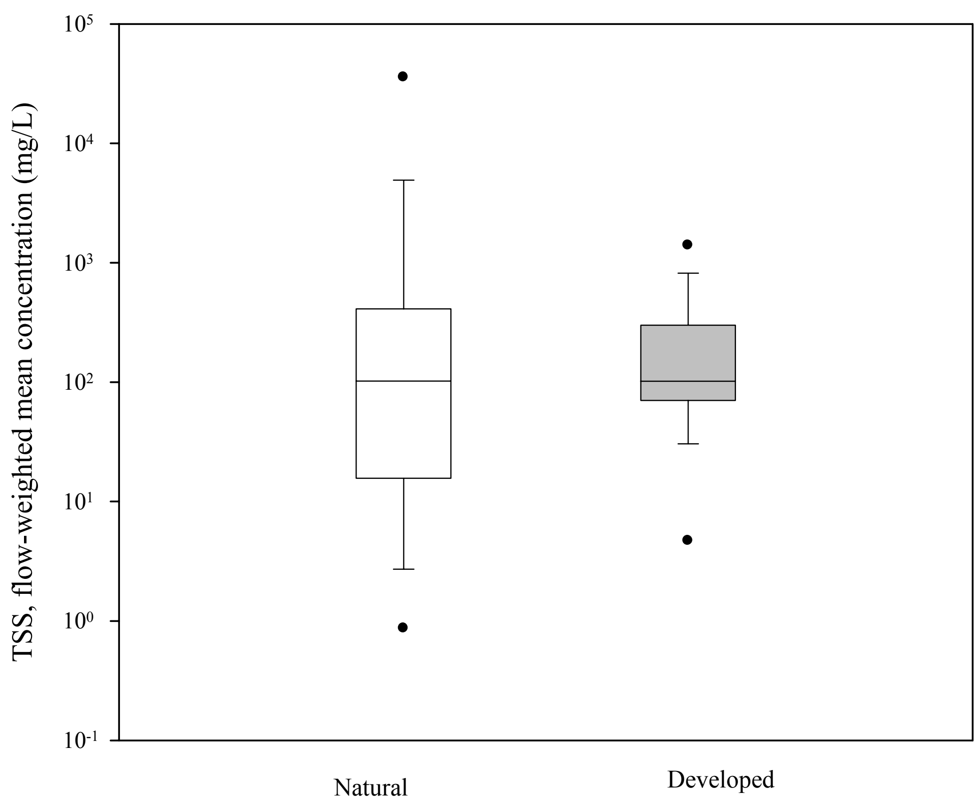


Figure 4. Comparison of wet weather flow-weighted concentrations of total suspended solids (TSS) between natural and developed catchments. The white boxes represent natural catchments, and the gray box represents data from developed catchments. The Y axis is in log scale; From Stein and Yoon (2007).

Any NEL should be derived in consideration of natural background levels. The proposed NEL does not appear to be calculated to consider natural background conditions. As currently written, receiving water quality is only considered if receiving water monitoring is required following an NEL exceedance. Natural background turbidity and/or TSS levels in storm water runoff vary considerably, both within different areas of the site and in response to different storm conditions (e.g., rainfall intensity, rainfall amount, antecedent conditions). Thus, it makes little sense to adopt a single NEL for turbidity that is applied uniformly throughout the state. Rather, NELs for turbidity should be established after consideration of receiving water conditions. As indicated in the BRPR at p.16 "… it is important to consider natural background levels of turbidity or TSS in setting Numerical Limits or Action Levels for construction activities. The difficulty in determining natural background concentrations/levels for all areas of the state could make the setting of Numeric Limits or Action Levels impractical from an agency resource perspective."

> ***Recommendation:*** We recommend that the SWRCB evaluate available data to determine natural, background turbidity levels throughout the state, and to evaluate the storm conditions under which high background turbidity levels occur naturally. We recommend that the SWRCB not require discharges to be "cleaner" (i.e., to have a lower turbidity or suspended sediment concentration) than natural water quality.

Turbidity in developed areas frequently exceeds the proposed NEL. Even in developed watersheds, turbidity levels have been observed to range up to tens of thousands of NTU, with peak turbidity levels occurring around or at peak channel flow rates. Turbidity data for a number of streams are available on the California Data Exchange Center (CDEC) web site (See http://cdec.water.ca.gov); a summary of turbidity data available from the CDEC site is provided in Table 2.

Table 2. List of CDEC Stations with Turbidity Data

River Basin	Station	ID	Duration	Start Date	End Date
DELTA	BARKER SLOUGH PUMPING PLANT (KG000000)	BKS	HOURLY	6/1/1989	present
			DAILY	6/1/1989	present
	CLIFTON COURT (KA000000)	CLC	HOURLY	3/10/1988	present
			DAILY	3/10/1988	present
	CORDELIA PUMPING PLANT (KG002111)	CPP	DAILY	3/1/1993	present
			HOURLY	3/1/1993	present
	HARVEY O BANKS PUMPING P (KA000331)	HBP	DAILY	6/29/1988	present
			HOURLY	6/29/1988	present
EAST BAY	DEL VALLE CHECK 7 (KB001638)	DV7	DAILY	6/7/1994	present
			HOURLY	6/7/1994	present
FEATHER R	FEATHER RIVER NEAR GRIDLEY	GRL	HOURLY	3/4/2003	present
KERN R	CAL AQUEDUCT CHECK 29 (KA024454)	C29	DAILY	1/1/1990	present
			HOURLY	1/1/1990	present
KINGS R	CAL AQUEDUCT CHECK 18 (KA014321)	C18	DAILY	5/7/1990	8/14/2002
			HOURLY	5/7/1990	8/14/2002
	CAL AQUEDUCT CHECK 21 (KA017226)	C21	DAILY	6/1/1990	present
			HOURLY	6/1/1990	present
MOJAVE R	CAL AQUEDUCT CHECK 41 (KA030341)	C41	DAILY	6/1/1993	present
			HOURLY	6/1/1993	present
	CAL AQUEDUCT CHECK 66 (KA040341)	C66	DAILY	7/15/2003	present
			HOURLY	7/15/2003	present
SACRAMENTO R	BALLS FERRY BRIDGE	BSF	HOURLY	2/2/1990	present
	BEAR CK AB HOLSTEN CYN NR RUMSEY	BRK	EVENT	1/11/2000	3/1/2006
	BIG CHICO CREEK NEAR CHICO	BIC	HOURLY	10/18/1999	present
	BUTTE CREEK NR CHICO	BCK	HOURLY	10/18/1999	1/1/2005
	CLEAR CK AT SOUTH BONNEVIEW	CCR	HOURLY	11/16/1998	present
	DEER CREEK NR VINA	DCV	HOURLY	10/1/1998	2/14/2007
	JELLYS FERRY	JLF	HOURLY	10/27/1998	present
	KESWICK	KWK	HOURLY	11/13/1989	present
	MCCLOUD RIVER ABOVE SHASTA LAKE	MSS	HOURLY	11/13/1989	present
	PIT RIVER NEAR MONTGOMERY CREEK	PMN	HOURLY	5/16/1990	present
	PRISONERS POINT	PPT	HOURLY	3/2/2006	present
	SACRAMENTO R AT HOOD	SRH	HOURLY	3/20/2007	present
	SACRAMENTO R AT RED BLUFF DIVERSION DAM	RDB	HOURLY	11/13/1989	present
	SACRAMENTO RIVER AT BEND BRIDGE	BND	HOURLY	10/10/1989	present
	SACRAMENTO RIVER AT DELTA	DLT	HOURLY	11/13/1989	present
	SHASTA DAM	SHD	HOURLY	9/1/1990	present
	SPRING CREEK POWERHOUSE	SPP	HOURLY	6/22/1998	present
	WEAVER CREEK NEAR WEAVERVILE	WVC	HOURLY	11/28/2000	1/1/2003
SAN JOAQUIN R	CAL AQUEDUCT CHECK 13 (KA007089)	C13	HOURLY	7/2/1991	present
	CAL AQUEDUCT CHECK 13 (KA007089)		DAILY	7/2/1991	present
	PACHECO PUMPING PLANT (SLR00000)	PPP	HOURLY	7/3/1989	present
			DAILY	7/3/1989	present
	ROUGH AND READY ISLAND	RRI	EVENT	11/13/2001	1/1/2007
	SAN JOAQUIN R MCCUNE STATION NR VERNALIS	SJR	EVENT	1/20/2005	present
SANTA ANA R	DEVIL CANYON HEADWORKS (KA041288)	DVC	HOURLY	3/4/2003	present
			DAILY	3/4/2003	present
SANTA CLARA R	CASTAIC LAKE OUTLET (CAS00000)	CSO	HOURLY	1/1/2000	present
			DAILY	1/1/2000	present
SF BAY	TERMINAL TANK (KB004207)	TTK	HOURLY	11/1/1992	8/19/2002
			DAILY	11/1/1992	8/19/2002
	VALLECITOS TURNOUT	NBV	DAILY	3/6/2002	present
			HOURLY	3/31/2002	present
TRINITY R	RUSH CREEK NEAR LEWISTON	RCL	HOURLY	3/15/2001	present
	TRINITY RIVER BELOW LIMEKILN GULCH	TLK	HOURLY	3/15/2001	present

Sediment concentrations and loads should not be altered significantly with respect to background levels. In unhardened channels, water that is "cleaner" (contains less sediment) than natural background water is referred to as "hungry water," which can often cause downstream erosion. Erosion of bed sediments is a function of channel slope, stream velocity and shear stress, and characteristics of the bed material (see, e.g., Garcia and Parker, 1991; Parker and Anderson, 1977; Brownlie, 1983). Two competing forces, aggradation and degradation, describe the deposition of materials to a stream bed and the erosion of materials from a stream bed; when overlying water is "too clean," erosion dominates over deposition, and net erosion occurs. Importantly, it is often the coarse fraction of a sediment load (fine sand and coarser) that participates in these reactions, as fine sediments will remain in suspension longer and tend not to settle, particularly during high flow events. Retention basins and ATS will remove the coarse fraction and some of the fine fraction, and thus may increase the rate of downstream erosion if discharge sediment concentrations are lower than natural sediment concentrations in the receiving water. (See also Section VI.)

In water bodies where turbidity levels are naturally variable and may be high, aquatic organisms appear to be adapted to ambient, naturally high turbidity levels. Moderate turbidity levels appear to be beneficial to fish in estuaries by affording protection from predators in those shallow, food-rich estuaries. Turbidity gradients may also provide a navigational aid to fish entering estuaries (Bruton, 1985; Gregory, 1998; Row and Dean, 1998). The ratio of fish prey per predator was found to be higher at a river with turbidity levels below 1 NTU than in a river with turbidity levels of 27-108 NTU (Gregory, 1998).

Several studies have shown the negative impact of decreased turbidity in relation to the decline of pelagic fish in the Delta. In the Sacramento River and San Joaquin River Delta, pelagic organism abundance has declined dramatically. Studies on pelagic organism decline (POD) are on-going, but early data indicate that decreased turbidity (increased water clarity) is one of the measures that has been correlated to the decline of Delta smelt. Numerous studies have shown a correlation between a change in the turbidity of Delta water and a change in native fish populations; these studies also show the adaptability of Delta smelt to highly turbid water (Nobriga et al., 2005). Feyrer and Healer (2003) sampled 11 sites in the southern Delta from 1992-1999 and noted that native species (tule perch, Sacramento sucker, Hysterocarpus traski, and Catostomus occidentalis) were associated with conditions of high river flow and turbidity, while the majority of non-native species were associated with either warm water temperature or low river flow conditions. The study also showed that a decrease in turbidity can have an adverse impact on native fish populations that are adapted to naturally high turbidity levels. Several dischargers in the area have included action plans to increase flow and turbidity during the summer in order to increase the amount of habitat for Delta smelt by maximizing the physical habitat area and supporting the food web (see Pelagic Fish Action Plan, March 2007, by the California Department of Water Resources and the California Department of Fish and Game).

As discussed above, it appears that sediment concentrations are often naturally high in certain environments, and that turbidity may fill an important ecological role. In fact, reducing turbidity below natural levels can cause harm, both to channel morphology and to the ecosystem. For these reasons, the SWRCB must consider natural and background receiving water conditions before establishing NELs for turbidity.

Any NEL should be derived in consideration of natural background levels. The proposed NEL does not appear to be calculated to consider natural background conditions. As currently written, receiving water quality is only considered if receiving water monitoring is required following an NEL exceedance. Natural background turbidity and/or TSS levels in storm water runoff vary considerably, both within different areas of the site and in response to different storm conditions (e.g., rainfall intensity, rainfall amount, antecedent conditions). Thus, it makes little sense to adopt a single NEL for turbidity that is applied uniformly throughout the state. Rather, NELs for turbidity should be established after consideration of receiving water conditions. As indicated in the BRPR at p.16 "… it is important to consider natural background levels of turbidity or TSS in setting Numerical Limits or Action Levels for construction activities. The difficulty in determining natural background concentrations/levels for all areas of the state could make the setting of Numeric Limits or Action Levels impractical from an agency resource perspective."

> ***Recommendation:*** We recommend that the SWRCB evaluate available data to determine natural, background turbidity levels throughout the state, and to evaluate the storm conditions under which high background turbidity levels occur naturally. We recommend that the SWRCB not require discharges to be "cleaner" (i.e., to have a lower turbidity or suspended sediment concentration) than natural water quality.

NELs should not apply at all times. The BRPR (p. 17) also states that the SWRCB should consider whether numeric limits would apply at all sites or only those with significant disturbed soil areas (e.g., active grading, un-vegetated and/or un-stabilized soils). A site could meet certain conditions to be considered "stabilized" for the runoff season and thus would not have to monitor for NELs. In addition, the SWRCB should develop a "design storm" or design hydrologic conditions that would specify when NELs would apply.

There is no evidence regarding whether or not proper deployment of BMPs could achieve the proposed NELs. We conducted a comprehensive literature survey and found little quantitative information on the performance of BMPs at construction sites. There is little available information on variations in BMP performance with soil type, rain intensity, or when BMPs are used in series or in combination. Most BMP test data is from laboratory settings, where a single BMP is applied or deployed on a small plot of test soil; rainfall is then simulated on that plot. Results from these tests typically measure the total amount of soil lost from the plot, and rarely has water quality in plot runoff been measured. Additionally, construction sites are typically complex and may involve the use of several types of BMPs simultaneously. Plot tests have not accounted for this level of complexity. Finally, as noted above, soil conditions and erosivity vary significantly in different regions of the state, and there is no evidence to indicate that properly deployed and well-designed BMPs can meet the proposed NELs in those areas of the state that are naturally highly erosive.

> ***Recommendation:*** As detailed above, it is important that discharges from construction sites do not have turbidity levels that are either significantly above or significantly below natural background turbidity levels. In several watersheds in the state, turbidity routinely exceeds the proposed NEL of 1000 NTU during storm events; in these watersheds, an NEL of 1000 NTU would be inappropriate.
>
> The SWRCB should follow the BCT requirements for deriving a TBEL. Our data review indicates that insufficient data currently exist to support a proper BCT analysis. For this reason, we recommend that the SWRCB initiate a well-designed program of data collection to support an

evaluation of the feasibility of developing an NEL in the future. Data collection should include a careful evaluation of whether any proposed NEL is achievable using BMP technologies under a wide range of hydrologic and site conditions. In the interim, it may be appropriate to specify an AL "cap" or "ceiling" provided that number is used to advance the program and not to determine permit compliance.

If NELs are to be developed for future permits, the SWRCB should also develop and specify an accompanying "design storm" or other hydrologic conditions.

If a site meets certain conditions and is considered to be "stabilized" for the wet season, the permittee should not have to monitor for NELs.

4. The Draft Order also establishes turbidity NELs of 10 NTU for Daily Flow-Weighted Average and a 20 NTU for Any Single Sample discharges from an ATS at Section IV. B. 2.a. of the Draft Order (p.11). The Fact Sheet (p. 58) cites the BRPR as saying that ATS can "consistently produce a discharge less than 10 NTU…"

The Commenters have prepared a detailed analysis of ATS. The report entitled "Evaluation of Active Treatment Systems (ATS) for Construction Site Runoff (Geosyntec Consultants, April 11, 2008)" is attached as Appendix B. This report examines the technical and fiscal impacts of employing a ATS on construction sites in relation to existing regulations in Washington and the proposed requirements outlined in the Preliminary Draft Construction Permit.

ATS should only be used where receiving waters or habitat is dependent upon low turbidity. At p. 17 in the BRPR, the Panel states that SWRCB should set NELs that consider the site's climate region, soil condition, and slopes, and natural background conditions (e.g., vegetative cover) as appropriate and as available data allow. With ATS, discharge quality is relatively independent of these conditions. In fact, ATS could result in turbidity and TSS levels well below natural levels. As noted above, effluent turbidity that is "too low" (i.e., far lower than natural turbidity levels) can cause downstream erosion in natural channels. This effect would be especially pronounced where the construction site discharge is a large fraction of the water in the stream. When turbidity or TSS is too low in a discharge, downstream scouring of stream channels will occur, increasing stream hydromodification. A turbidity value of 10 NTU is very low, and is lower than observed storm event turbidity levels in all streams for which data have been reviewed (see Table 2). See also discussion in Section VI. Additionally, establishment of turbidity limits at 10 or 20 NTU for ATS, and application of ATS systems where receiving waters are more turbid than this, could constitute "pollution" as defined by the federal Clean Water Act. See 33 U.S.C. § 1362(19), which defines "pollution" as the "man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water."

The quality of water discharged from ATS may vary more than would be allowed by the proposed NELs for turbidity for ATS. As discussed in Appendix B, the efficiency of coagulants can vary from site to site. For example, the coagulant efficiency of chitosan is greatly influenced by the source and properties of clay particles in the raw water (Haung and Chen, 1996). The test results in Appendix B show individual samples of ATS effluent had turbidity values that ranged up to 45 NTU.

Polymers used in ATS may result in toxicity in receiving waters. According to the BRPR (p. 15), the SWRCB should to take into account the long-term effects of chemical use, operational and equipment failures or accidental releases. As shown in Appendix B, toxicity may occur when relatively low concentrations of coagulant are present in ATS effluent with low turbidity. The release of low concentrations of coagulant may occur when too much coagulant is used or when power failures or other events cause an unexpected or premature discharge from the ATS.

> ***Recommendation**:* The Order should specify that ATS should only be used when necessary to protect sensitive receiving waters, such as spawning habitat. ATS should not be allowed where inappropriate, and the permit should not require sediment from a discharge to be reduced to below natural levels. The SWRCB should not require effluent to be treated to levels that are "cleaner" than natural background levels during storm events. As detailed in Section III. (Risk-based Permitting Approach), the current risk evaluation structure may encourage the use of ATS, even where receiving water conditions do not justify its application; we recommends that this be corrected by recognizing the risk reductions afforded by other BMP technologies.

5. Attachment E. of the Draft Order states either that a residual chemical test method shall be used to confirm that residual coagulants are not present in discharges from ATS, or that ATS be operated in a "batch" mode and that acute toxicity tests must be performed on all discharges from an ATS.

Residual chemical tests as specified in the Draft Order may not be feasible. The Draft Order requires that toxicity testing be done for flow-through ATS effluent utilizing a residual chemical test with a detection limit which is 10% of the Maximum Allowable Threshold Concentration (MATC), which is defined as the geometric mean of the No Observed Effects Concentration (NOEC) and the Lowest Observed Effect Concentration (LOEC), although alternative forms of determining MATC appear to be allowed. At this time, it is unknown if any residual chemical tests can meet that criteria. This concern was also raised by the regulated community at the workshop on May 7, 2008.

Acute toxicity tests will not produce analysis results prior to discharge. In the case that residual tests are not available, the discharger is required to initiate acute toxicity testing prior to discharge. Because the test methodology for acute toxicity is a 96-hour test, results would not be available before discharge.

The Commenting Parties are also concerned about the laboratory capacity to run a large quantity of tests at the same time (e.g., if several contractors will be submitting samples from the same storm event, or if ATS use with coagulants for which residual chemical test methods are not available enter widespread use). Currently, only 18 commercial DHS-ELAP certified laboratories in the State can perform acute toxicity testing. Of these 18 labs, 10 are located in Northern California counties (Amador (1), Shasta (1) Sonoma (1), Contra Costa (4), Mendocino (1), Yolo (1), Santa Cruz (1), and eight laboratories are located in Southern California (Ventura County (2), Orange County (3), Imperial (1), San Diego (2)).

ATS effectiveness will vary based on system design, selected coagulant, and other site-specific conditions. Coagulant/flocculent dosing will vary with ambient soil characteristics. Additional research is required on the varying types of soils and components that will affect ATS effectiveness prior to implementation of this requirement. (See also Appendix B.)

> ***Recommendation**:* As discussed above, the Order should specify that ATS should only be used when necessary to protect sensitive receiving waters, such as spawning habitat, and the SWRCB should not require effluent to be treated to levels that are "cleaner" than natural background levels during storm events. The SWRCB may also wish to consider additional data collection as

part of a comprehensive third-party data collection process in order to characterize ATS performance and to evaluate residual chemical and toxicity test results.

III. Risk-Based Permitting Approach

This Draft Order established a four-level risk calculation, where only the lowest three levels are covered under this General Permit. While we understand the intent and potential benefit of the risk-based permitting approach, we have several significant concerns with the approach as proposed. First and most importantly, the risk evaluation process fails to recognize the significant risk reduction that can and does occur through the proper design and use of erosion control and other "source reduction" measures. We believe that it makes far more sense to control the sources of sediment (i.e., to minimize the amount of sediment entering storm water) than to chemically treat storm water (i.e., to remove sediment once suspended in storm water). Second, the proposed risk evaluation process is extraordinarily complex, and may require expertise that many practitioners do not have. Finally, the current risk-based permitting approach does not appear to be properly calibrated or tested, and includes several measures to evaluate risk that are not appropriate. While we are not categorically opposed to a risk-based permitting approach, the current risk evaluation proposed in the preliminary draft is not adequate and should not be used.

To evaluate the risk approach included in the Draft Order, the Commenting Parties and its consultants created a Builder Survey (survey form included in Appendix C), which was distributed to our members to solicit detailed information about specific projects. This information was used to calculate the site-specific risk level for approximately 15 projects. The information provided by the our members has also been used to formulate these comments. Detailed results of the risk evaluations conducted by our consultants can be found in Appendix C.

The Draft Order requires that the discharger complete Attachment A: Risk Determination Worksheet in order to determine whether their site is a Risk Level 1 site, Risk Level 2 site, Risk Level 3 site, or Risk Level 4 site. The risk evaluation is divided into two components, sediment risk and receiving water risk, which are discussed in turn below.

1. Attachment A includes an evaluation of the "sediment risk" from a construction site.

The RUSLE approach is uncalibrated and unvalidated for the purpose of assessing site risk. The sediment risk evaluation utilizes the RUSLE, which has not been calibration or validated for the purpose of assessing site risk. As detailed in Section I., the Commenting Parties has several concerns with the use of USLE-based approaches to assessing water quality impacts due to sediment in runoff from construction sites. Also as detailed in that section of these comments, we recommend the evaluation of several alternatives to the proposed RUSLE approach.

The sediment risk factor worksheet appears to be adequately calibrated. The detailed site-specific risk evaluations (see Appendix C) indicate that most sites would fall into the medium and high sediment risk categories; relatively few sites fall into low or extreme risk categories.

The "R" factor requires more explanation and is bound to return questionable values. The R factor is a rainfall factor that is a function of site location and the time of year during which construction activities would occur. The Draft Order requires builders to use the following website to calculate the R

Factor: http://ei.tamu.edu/. The website was updated in 2003, and currently offers no maintenance or support. For many projects, construction is staged in several phases, and each phase may produce a different R Factor.

Our members found evaluation of the "K" factor difficult, and it is not intended to apply to construction site soils. Members who completed the builder survey found the recommended web site difficult to navigate. In addition, information for 48% of the state is unavailable on the NRCS web site, thus necessitating site-specific data collection for sites in these areas. In addition, the NRCS values do not apply to construction site soils and do not represent substrate soils, which may be exposed during the course of construction. The NRCS website has K Factors for both whole soil and rock free soil; it was assumed that the whole soil would be the best predictor because it is considered to represent the subsurface soils. Furthermore, the K Factor is also seasonal because it is based on the antecedent moisture content, and therefore, may change several times within the course of a single construction project.

The "LS" factor is inadequately specified and difficult to derive for large or complex sites. The LS factor combines the hillslope-length factor (L) and the hillslope-gradient factor (S) as a measure of potential soil loss from a site. The risk worksheet specifies that the value provided should be a weighted average by area for all slopes. For large or complex sites, however, it is difficult to derive this factor, and the factor is an important determinant of the sediment risk for a given site. In Table 2 of the Draft Order, a maximum sheet flow length is assigned to various percentage slopes. There are only three categories, and the first category covers the slope range from "0-25%", where a maximum 20 ft. of sheet flow length is allowed. This one category of "0-25% slope" in Table 2 covers virtually 99+% of all land where building is feasible. Both Attachment A, the spreadsheet for risk, and Attachment C, the spreadsheet for turbidity, have tables for choosing various sheet flow lengths (the L/S Tables). These Tables list 17 different length ranges, from <3 feet, up to 1000 feet. Only five of the 17 choices are less than 20 feet, and there is no choice that is exactly 20 feet, which is the prescribed length in the Draft Order for all land with 0-25% slope.

Alternatives to the RUSLE models should be evaluated. As detailed in Section I. of these comments, both the RUSLE2 and WEPP models should be considered as alternatives to the proposed RUSLE approach.

Credit should be given for BMPs applied to minimize erosion. As currently formulated, the sediment risk factor worksheet calculates the risk of erosion from construction sites *without BMPs*. Well-designed BMPs can and do reduce the risk of soil mobilization significantly, and credit should be given (i.e., risk levels reduced) in response to planned BMP and source minimization practices. We note that risk reduction points are allowed when sites use ATS to treat discharges; this "credit" is provided in the receiving water risk factor worksheet. The risk determination worksheet currently fails to recognize effective risk reduction measures, such as erosion controls and technologies that could effectively reduce the risk posed by a specific construction site. As detailed throughout these comments, source control should be preferred, whenever possible, to chemical or electrical treatment, and source and erosion control efforts should be recognized in the risk reduction framework through the allowance of credits.

> ***Recommendation:*** The RUSLE approach employed in the sediment risk factor worksheet should be calibrated and validated using data from actual construction sites.

Because the RUSLE approach was not designed to address water quality in construction site runoff, and because several updated methods have become available, the SWRCB should consider alternatives to the RUSLE approach, such as RUSLE2 and WEPP.

As detailed in Appendix C, the SWRCB should update data sources to support the RUSLE equation.

Credit for ATS, as well as for other BMPs, should be moved to the sediment risk factor worksheet, as they affect the likelihood that sediment will be mobilized by storm flows at a site and are not a function of the receiving water or receiving water characteristics. We recommend that credits be given for factors such as specific erosion control measures, special types of projects (e.g., infill or below ground sites where water must be pumped out). Adjustments should also be made to recognize that the risk of sediment mobilization changes with project phasing, and some project phases are less risky than others.

2. Attachment A of the Draft Order includes an evaluation of the "receiving water risk" from a construction site.

Comments on the receiving water risk factor worksheet are provided for each question in the worksheet, as detailed below.

Receiving Water (RW) Risk Factor Worksheet

A) Watershed Characteristics

A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? If answer is "yes," the project is automatically a high receiving water risk project - proceed to "Combined" worksheet. For help with impaired waterbodies please check the attached worksheet or visit the link below:

The terms "direct discharge" and "indirect discharge" should be clarified. Direct and indirect discharge should be in the glossary of the Draft Order. Definitions should contain language to illustrate that direct means project discharges directly to the waterbody, or through a MS4; indirect means that the project discharges directly to an upstream tributary, within a specified distance, or transported without co-mingling with other sources of runoff, of an impaired waterbody.

The terms "receiving water" and "sensitive receiving water" should be clarified. It is unclear how "receiving water" is defined and whether it would include the MS4 or storm drain system. The Risk Determination Worksheet (Attachment A) likewise requires a discharger to determine how proximate their site is to a "sensitive" receiving water, and it is unclear how "sensitive receiving water" are defined.

> ***Recommendation:*** Please define the terms "sensitive receiving water," "direct discharge," and "indirect discharge" in the Glossary.

The presence of a 303(d) listing should not, by itself, trigger additional risk points. If a TMDL has been adopted to address the sedimentation problem that triggered the listing, and if the TMDL requirements and targets are being met, additional risk points should not accrue. A discharger could be required to submit data to substantiate that a TMDL is being met.

The SWRCB should clarify this question and indicate that risk points do not accrue if the project is upstream of a 303(d)-listed water body where a TMDL has been implemented and is being met.

The fact that a project may drain to a water body that is 303(d)-listed for sediment should not automatically mean that a site is considered a high receiving water risk project. Rather, points should be accumulated, using an appropriately calibrated point scale, and the receiving water risk worksheet should be completed to determine a site's receiving water risk level.

A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of COLD or SPAWN?

Much of the state's area drains to waters designated COLD or SPAWN. See URS Analysis at Appendix C.

B) Site Characteristics

B.1. Is the disturbed area more than the floodprone width[1] or 500 ft (whichever is greater) from sensitive receiving water and discharge is captured and/or attenuated, settled, percolated, or infiltrated allowing for suspended solids reduction prior to entering sensitive receiving water. [2] [1] Floodprone width is the width at twice the bankfull depth. [2] Requires a minimum of 100 ft. of flow through a vegetated buffer prior to discharge.

This questions appears to grant credit only if a project is located upstream of a "sensitive receiving water," and does not appear to grant credit to projects that are non upstream of such a water body. Credit should be allowed for projects not within proximity of a sensitive receiving water. Finally, the term "sensitive receiving water" should be defined. A potential definition could specify that a "sensitive receiving water" is defined as a waterbody (or area) that is 303(d) listed; an ASBS (area of special biological significance); listed with a beneficial use of COLD, SPAWN or RARE.

B.2. Is the **channel stability index** greater than 10? *(use Channel Stability Index Ranking Worksheet)*

- As detailed in Appendix C, dischargers found it difficult to complete the channel stability index worksheet, and completion of the worksheet may require expertise that some practitioners, even those with the requisite certifications and significant experience, do not have. The requirement to evaluate channel stability appears to introduce a level of complexity to the risk evaluation that is unwarranted and unnecessary.

B.3. Discharge within water body (WB): Is construction activity located within the sensitive receiving water body? (Please note: other permits and agreements may be required.)

- By additing risk points for projects within a "sensitive receiving water body," projects that are necessarily located within the water body may be discouraged. Such projects could include stream and/or wetlands restoration, or removal of engineered structures. We do not believe that this is the SWRCB's intent, and suggest that this feature of the risk evaluation worksheet should be adjusted as appropriate. We also note (as above) that the term "sensitive receiving water body" requires definition.

B.4. Will the project utilize an Active Treatment System (ATS) operated in compliance with this General Permit to treat ALL the discharges from the site?

Credit should be allowed for multiple types of sediment control BMPs. By not allowing points on the Risk Determination Worksheet for using other types of BMPs, the State is giving undue preference (and perhaps unintended) to ATS. Allowing credit only for ATS implementation essentially ignores the proven effectiveness of implementing well-designed and properly installed and maintained source controls (including appropriate project planning and phasing and erosion controls) on a project specific basis in conjunction with sediment controls and drainage controls to minimize erosion and effectively reduce off-site sediment transport. Source controls and sediment controls do not carry the risk of toxic discharges associated with the ATS approach supported by the Draft Order. Further, source controls and sediment controls, unlike ATS, can be tailored to meet changing site conditions, construction phase, and to take into account local weather and rainfall patterns and local receiving water conditions.

If credit is given for ATS, credit should be allowed for other control measures as well. For example, credit should be allowed for BMP systems, provided site readiness and inspection is provided before, during, and after rainfall events. As detailed in Section II, active treatment is needed only in situations requiring extraordinary water quality protection, such as direct discharge into a water body that is not naturally turbid, and that is (a) 303(d)-listed for sediment or turbidity but where controls implemented pursuant to a TMDL are ineffective, or (b) contains sensitive habitat, such as known salmonid spawning areas.

Erosion controls are very effective if properly installed and maintained. (See further Appendix D of our comments to the Preliminary Draft Construction Permit submitted in May 2007.). Existing research has predominately used total volume of soil loss when an erosion control product is applied compared to bare soil under similar conditions (soil type, slope length and steepness, and rainfall simulation) as an effectiveness indicator and has shown that soil losses can be highly controlled (up to 95% or more retention). However, these studies have not typically evaluated total suspended solids (TSS) concentrations or turbidity levels that can be achieved. There are a few studies (Horner, as stated in testimony to the BRP, September, 2006) that have evaluated TSS concentrations for single BMPs. However, data on site-wide TSS and/or turbidity data from a variety of construction sites in various locations throughout the State are lacking. It is recommended that the State work with the regulated community to develop a monitoring program to fill these critical data gaps on both individual BMP performance as well as overall site performance with well-designed and implemented BMPs in a wide variety of conditions, including soil types, topography, climate regions, etc.

Finally, the "credits" that are given for ATS and deployment of appropriate BMPs properly belong in the sediment risk evaluation worksheet, as they relate to the risk of sediment mobilization and transport from a given site, and are somewhat independent of receiving water risk. As discussed above, use of ATS to reduce sediment levels to below naturally occurring values could itself introduce risk.

Receiving water risk score appears biased high. SWRCB indicated that they expected a uniform distribution of risk levels in sites across the state. Both the site-specific evaluations and statewide evaluations of the receiving water risk score appear biased high, with most sites falling in the high risk category. The bias seems to result from the yes/no questions and the point values assigned to them. For example, the receiving water risk evaluation process generates 50 different possible scenarios, and of those, only 5 different scenarios can be classified as Medium risk, without the use of ATS, and only 1 scenario can be classified as Low risk, without the use of ATS. See Appendix C. These results are at odds with contractor expectations based on years of experience in managing runoff from construction sites. Because the receiving water risk score appears biased high, we recommend recalibration of the receiving water risk scores. We also recommend reformulation of the risk evaluation process, as detailed in Appendix C.

> ***Recommendation:*** The SWRCB should subtract points for well-designed BMPs and erosion control measures. This factor should be moved to a "credit" portion of the sediment risk evaluation worksheet, and points should be determined for various control measures. These points would be subtracted from the overall risk score to determine the overall risk posed by a project with well-designed and implemented BMPs. It might be possible to include ATS within this framework, as a risk reduction measure that could be given more points, but only to the extent that ATS would be required for receiving water protection in extraordinary circumstances. In any case, the risk evaluation worksheet should be well-calibrated and sensitivity analyses should be performed to ensure that it appropriately assigns risk to a project.

> ***Recommendation:*** The risk evaluation worksheet should provide a means to encourage stream restoration and other construction projects conducted for the benefit of the environment, or that result in a net environmental benefit.

> ***Recommendation:*** In no case should discharges from construction sites be required to reduce sediment loads to below the levels that occur naturally in the receiving water.

3. Most risk scores appear to be RL2 or RL3. We identified no RL1 or RL4 sites.

> ***Recommendation:*** We request that the SWRCB provide additional detail to describe how the point values were selected for each of the measures in the risk evaluation worksheet, plus calculations for sites that are representative of the range of construction sites in the State. We also request that the SWRCB conduct a sensitivity analysis to determine the effect of assigning different point values to the existing parameters, and to determine the effect on risk of the addition of additional parameters and allowance of "credits." Finally, as detailed in Appendix C, we recommend that the SWRCB evaluate alternative approaches to the current risk evaluation process that would streamline and simplify the process, as well as improve its performance.

IV. Minimum Requirements Specified

The Draft Order specifies minimum BMPs and requirements that were previously only required as elements of the SWPPP or were suggested by guidance. However, beyond specifying additional minimum BMPs, the Permit does not clearly emphasize a pro-active and comprehensive approach to planning, implementation, inspection, and management of complementary BMPs, including construction site erosion and sediment control. Overall the Permit should emphasize project planning and design, implementation, inspection, and maintenance of a pro-active approach for protecting sites with a hierarchy of complementary BMPs to reduce pollutant discharges from construction sites, instead of highlighting and giving priority to extensive monitoring requirements, ALs, NELs, and ATS.

1. The Draft Order specifies more minimum BMPs and requirements that were previously only required elements of the SWPPP or were suggested by guidance (pp. 7-19).

Overall the permit should do a better job at emphasizing project planning, implementation, inspection, and maintenance of a pro-active approach for protecting sites with a hierarchy of complementary BMPs to reduce pollutant discharges from construction sites, instead of highlighting and giving priority to extensive monitoring requirements, ALs, NELs, and ATS. The permit should clearly emphasize that the SWPPP should contain, and a project must implement, a system of BMPs that include measures from all four BMP categories: runoff controls, erosion controls, sediment controls, and non-storm water management controls. Both field and laboratory research and evaluation of drainage, sediment and erosion control technologies shows that they are individually highly effective in controlling soil loss and sediment delivery. These data are illustrated in Appendix D of our comments to the Preliminary Draft Construction Permit submitted in May 2007. "Comparison of Erosion and Sediment Control Best Management Practices (BMPs) Utilizing the Results of Rainfall Simulation Testing at the San Diego State University Soil Erosion Research Laboratory (SERL)," which includes data from the Caltrans Soil Stabilization of Temporary Slopes study (1999) and the Caltrans Erosion Control Pilot Study (2000).

The majority of sites can be well protected with effective SWPPP design and site planning and diligent, proper application and maintenance as well as use of a "hierarchy of complementary BMPs" from the four categories identified above. This pro-active approach is one that contractors can successfully implement if given appropriate permit-driven guidelines and is one that is supported by the Clean Water Act.

The storm water provisions of the Clean Water Act require the implementation of BMPs to control and abate the discharge of pollutants in storm water discharges from construction sites utilizing the best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT). In order to achieve this goal with respect to the discharge of sediment from construction sites, the following five major objectives should be accomplished at every construction site:

- To minimize exposed areas and provide erosion control practices on disturbed areas during the rainy season;
- To provide properly designed drainage facilities to control concentrated flows;
- To provide sediment control practices around the perimeter of the construction site and at all internal inlets to the storm drain system during the rainy season;
- To reduce the tracking of sediment off site all year; and
- To reduce wind erosion all year.

However, stating these objectives alone in a permit does not provide the desired degree of specificity and guidance for the designer and contractor to decide when and what types of erosion and sediment control practices are needed, and how much erosion and sediment control is enough.

> ***Recommendation:*** Additional language with more specific design criteria applicable to all sites is suggested below. In addition, suggestions for "Enhanced Measures" for high risk sites (e.g., those that drain directly to water bodies that are 303(d) listed for sediment constituents and where TMDL-implemented controls are ineffective, or those that drain to other water quality sensitive areas as determined by the local jurisdiction) are provided below with comments in our discussion on ATS in Section VI. of our comments to the Preliminary Draft Construction Permit submitted in May 2007.

2. Finding 24 indicates that the Permit "recognizes five distinct phases of construction" (Section I. of the Draft Order (p. 5)).

The Permit needs to recognize that not all projects include all phases, particularly infill redevelopment projects. For example, a project that is completely contained (say a basement construction within a city block) where no water can be discharged without pumping should not face the same set of requirements as an open site that drains to a surface water. In addition, for many redevelopment projects, much of the area may have been previously paved. Runoff from sites where surfaces can be predominantly impervious throughout construction require a different set of BMPs. For example, perimeter controls and inlet protection are generally paramount, whereas erosion and sediment control, with the exception of fugitive dust practices may be of lesser concern.

3. Section VII. of the Draft Order (p.14), Project Planning Requirements, requires quantitative analysis of sediment transport risk and soil particle size analysis.

Section VII. limits project planning to quantitative analysis of sediment transport risk and soil particle size analysis. This section illustrates the Draft Order's apparent emphasis on ATS and numeric limits. (See also comments on Sections II. and VI.)

> ***Recommendation:*** Section VII. should emphasize good erosion and sediment control planning instead of just requiring risk and soil analyses. Key elements in good erosion and sediment control planning include:
>
> - Minimize disturbance in accordance with the BCT standard and retain natural vegetation in undisturbed areas;
> - Time and phase construction to minimize soil exposure in accordance with the BCT standard, particularly near sensitive areas;
> - Minimize concentrated flows and divert runoff away from slopes or critical areas;
> - Minimize slope steepness and slope length (e.g., by using benches, terraces, or diversion ditches);
> - Utilize channel linings or temporary structures in drainage channels to reduce runoff velocities;
> - Keep sediment on site in accordance with the BCT standard by using sediment basins, traps or sediment barriers; and
> - Inspect sites frequently and correct problems promptly.

Although many of these elements are project implementation requirements, they must be considered during the project planning and design phase to be successfully implemented.

4. Much of the language in Section VIII., Project Implementation Requirements, (pp. 15-27) related to site controls is potentially confusing, and does not clearly convey requirements that are protective of the environment and that can be implemented on construction sites. The following are examples:

(a) Section VII.B.2. (at p. 16) states that “All Risk Level dischargers shall provide effective soil cover for inactive areas and all finished slopes, open space, utility backfill, and completed lots.”

The permit should reference guidance to be developed on a statewide basis that provides an approach and suite of techniques for temporary soil stabilization. The document should provide guidance for temporary stabilization based on slope, soil type, season, region of the state, and anticipated duration of inactivity and should go above and beyond information provided in the current CA BMP Manuals. Dry season requirements should be based predominately on wind erosion control requirements. The SWPPP Developer and contractor should be given a broad choice of practices and the guidance should not be limited to a list that might not reflect current science and technological developments. However, more targeted guidance would aid the selection and implementation of effective stabilization techniques.

This guidance may be a possible task for CASQA’s revision of the CA BMP Handbook or for the building industry. Caltrans has guidelines for *Protection by Temporary Soil Stabilization and Temporary Sediment Controls* (Caltrans Construction Site BMP Manual 2003) that could be used as a starting point, supplemented by erosion and sediment control effectiveness research.

(b) Section VIII. C. 1. (p. 16) indicates that “For all Risk Levels, the discharger shall evaluate the quantity and quality of runon and runoff through observation and sampling. The discharger shall effectively manage all runon, all runoff within the site and all runoff that discharges off the site. Runon from off site shall be directed away from all disturbed areas.”

The term “effectively manage” is vague. The following language is suggested: “Drainage for concentrated flows (run on and run off) shall be designed to control erosion, to return flows to their natural drainage courses, and to prevent damage to downstream properties. Concentrated flows shall be contained and/or conveyed in erosion-resistant structures (e.g., vegetated swales, rip rap lined channels) to the point of off-site discharge.

(c) Section VIII. D. 1. (p.16) states that “For all Risk Levels, the discharger shall establish and maintain effective perimeter controls and stabilize all construction entrances/exits sufficient to control erosion and sediment discharges from the site.

This requirement is really a good housekeeping measure, and as such, should be moved to Section F. with the following suggested as a language change: “For all Risk Levels, the discharger shall stabilize all construction entrances/exits sufficient to control sediment discharges from the site.”

We also suggest adding an addition section to Section VII. (Project Planning Requirements) and referenced in Section VIII. (Project Implementation Requirements) referencing/requiring that sites implement an overall approach for good erosion and sediment control that uses a system of complementary BMPs.

5. Section VIII. D. 2. of the Draft Order (p. 16) requires: "For all Risk Levels, on sites where sediment basins are to be used, the discharger shall, at a minimum, design sediment basins according to the method provided in Attachment D." Attachment D provides a sediment basin sizing method using an "apparent effectiveness" approach that should allow for a 80% reduction of suspended soil particles having a diameter of 0.02 mm or larger.

Attachment D or the Fact Sheet should provide the basis for the proposed sediment basin sizing methodology. Attachment D should also provide guidelines that optimize basin effectiveness and improve performance of traditional sediment basins. Enhanced sediment basins would be a much more cost effective method to improve sediment control than the widespread use of ATS.

> ***Recommendation:*** The SWRCB should further evaluate and enhance design requirements outlined in Attachment D to better address settling velocity of sediment particles and enhance overall effectiveness of temporary sediment basin design for all sites. For example, the methodology should reference and provide documentation for the basis of development of the empirical method proposed (i.e., "Apparent Effectiveness" equation) and specifically provide corresponding design guidance. In addition, the methodology should provide additional guidance regarding outlet sizing and basin configuration (e.g., length to width ratio and appropriate inlet and outlet placement to eliminate "short circuiting") in order to optimize detention time, promote a maximum flow length within the basin, and control effluent flows.

6. Section VIII. I. 2. of the Draft Order (p.21), Inspection, Maintenance, and Repair, states: "The discharger shall perform inspections and observations weekly, and at least once each 24-hour period during extended storm events, to identify BMPs that need maintenance to operate effectively, that have failed or that could fail to operate as intended."

As previously stated, one of the basic problems seen at construction sites is the proper application and maintenance of BMPs, and improved inspection requirements will facilitate compliance. However, weekly inspections by a qualified SWPPP practitioner during the dry season are not necessary.

> ***Recommendation:*** We recommend that inspections be conducted by a qualified practitioner during the dry season at most on a bi-weekly basis, or less frequently, with the inspection frequency to be determined based upon site risk. In addition, more frequent inspections could be carried out by site personnel who are trained by a qualified practitioner (e.g., the qualified practitioner would design an inspection program and inspection forms, and would train site operators). Weekly inspections during the dry season are especially burdensome for small sites. Inspections should be conducted by the SWPPP developer (a qualified professional) at critical project phases (e.g., after initial BMP installation, prior to clearing and grubbing and general grading, and between subsequent phases identified in the SWPPP) to confirm that the site is protected and to identify potential BMPs issues associated with phase transitions.
>
> ***Recommendation:*** The Draft Order should present requirements for sites with a justifiably higher sediment risk (due to both erosion potential and receiving water impacts) to implement routine and enhanced source control and sediment control BMPs. Suggestions for routine and enhanced control practices are as follows:
>
> • Require that erosion control practices be provided on disturbed areas during the rainy season. In order to address the timing of implementation of these measures, the permit should specify

that all disturbed areas that will not be re-disturbed for a certain length of time (e.g., 20 days) shall be provided with erosion control measures within a certain length of time (e.g., 14 days) from last disturbance. The erosion control practices should achieve and maintain a specified minimum soil coverage (e.g., 70 to 90 percent of the soil being treated shall be covered) until the permanent vegetation or other permanent stabilization provides the intended long-term erosion control function at the site. In addition, more guidance should be provided through the California BMP Handbooks or other appropriate mechanism to for minimum erosion and sediment controls based on slope, season, and anticipated duration of inactivity. Dry season requirements should be based predominately on wind erosion control requirements.

• Enhanced practices for Risk Level 3 sites include increased BMP inspection and maintenance requirements (e.g., requiring inspection by the SWPPP preparer/engineer or qualified inspector at the time of BMP installation and at specified frequencies during the wet and dry seasons); voluntary limitations (not prohibitions) on wet weather grading and limiting the area of disturbance to the area that can be effectively controlled during wet weather. Requirements should be flexible enough to allow the SWPPP preparer to specify appropriate limitations including wet weather grading restrictions or limiting disturbed area.

• Require that on-site drainage facilities for carrying concentrated flows be designed to control erosion and to prevent damage to downstream properties.

• Require that sediment control practices be provided around the down gradient perimeter of the construction site and at all internal inlets to the storm drain system during the rainy season. These sediment control measures may include filtration devices (such as silt fences, sediment check devices, and inlet filters) and/or settling devices (such as sediment traps or basins). Filtration devices that are designed for sheet flow shall be installed and maintained properly in order to perform effectively. Sediment traps or basins shall be designed and maintained in accordance with requirements of the California General Construction Permit. Enhanced practices to consider for high risk sites include enhanced sediment basin controls such as the addition of baffles or other controls required to meet water quality objectives on a site-specific basis. Enhanced sediment basin controls should target portions of the site that cannot be effectively controlled by standard proactive erosion and sediment controls described above and not necessarily required throughout a site.

The standard principles of proactive and effective construction site erosion and sediment control identified above are consistent with the current erosion and sediment control manuals. However, these principles are not necessarily implemented appropriately at all construction sites due to a lack of permit specificity and design guidance. Additionally, these requirements would be relatively easy for a designer to specify, a contractor to implement, and a resident engineer, site superintendent, or site inspector to evaluate and enforce in the field.

The Draft Order also requires that dischargers "implement appropriate controls throughout the all stages of construction to address air deposition issues." We find this requirement overly broad and ambiguous. We assume that this requirement is intended to address fugitive dust and not control of constituents arriving to a construction site via atmospheric deposition, but this is unclear. The Order needs to include a definition of "air deposition issues" as well as clarification as what constitutes "appropriate controls." Board staff should also ensure that these "controls" do not overlap with regulations already in place by the Air Quality Management Districts.

V. Project Site Soil Characteristics Monitoring and Reporting

The Draft Order requires all dischargers to monitor and report the soil characteristics at the project location. This primary purpose of this requirement is to provide better risk determination and eventually better program evaluation.

Although data collection to specify the fraction of fines less than 0.02mm in diameter is required by the permit, those data do not appear to be used within the permit. Section VII.B. of the permit requires use of test method ASTM D-422 so that the percentage of particles less than 0.02 mm in diameter can be determined. This requirement is imposed regardless of the condition of downstream water bodies, and regardless of natural water quality. The requirement is also imposed uniformly throughout the site, and regardless of whether the project activities will occur during the wet or dry season. This requirement appears to be a carry-over from a previous draft of the permit, as this information is not used within the risk evaluation or other components of the permit.

Site soils characterization is also required to support the RUSLE and MUSLE equations. Specific details on the site-specific soils characteristics that are needed to support the RUSLE and MUSLE components of the proposed permit are discussed in Sections I and III. As detailed in those sections, we recommend additional evaluation of and adjustments to the soils factors used in these equations.

> ***Recommendations:*** The requirement to characterize site soils using ASTM D-422 should be eliminated from the permit. If SWRCB staff wish to evaluate site soils using this test method to support future program goals, such data collection should be part of a centralized, well-designed data collection program.

See recommendations in Sections I. and III. for specific suggestions regarding the soil characterization parameters used in the RUSLE and MUSLE approaches.

VI. Effluent Monitoring and Reporting

The Draft Order requires effluent monitoring and reporting for pH and turbidity in storm water discharges. This monitoring is to be used to determine compliance with the NELs and evaluate whether NALs included in the General Permit are exceeded. The permit also requires discharges from ATS to be monitored and compared to NELs for turbidity and to evaluate if coagulant residual concentrations are below levels that may cause toxicity.

1. The frequency of effluent monitoring is dependent upon site risk level. Risk level 1 sites are required to collect one sample per storm event. Risk Level 2 and 3 sites are required to collect one sample beginning the first hour of any new discharge, and one sample during the first and last hour of every day of normal operations for the duration of the discharge event. Risk Level 3 sites have the additional option to conduct continuous discharge sampling at any point where sample results exceed the turbidity NEL.

Monitoring requirements may be difficult to achieve for sites with multiple discharge points. Several types of sites may have multiple discharge points – e.g., long linear sites, or sites located within multiple drainage divides. Even relatively simple sites may have multiple discharge points. Significant time, and additional personnel and sampling equipment, may be required to meet the draft order's proposed effluent sampling requirements.

Sampling multiple discharge points may result in a "multiple jeopardy" situation. As discussed in Section II., exceedances of NELs would be considered "chronic" exceedances for the purposes of determining mandatory minimum penalties (MMPs). We note that samples are required to be taken multiple times if a storm is longer than 12 hours in duration, and to be collected from each point where water leaves the site. Thus, it appears to be possible to incur multiple violations during a single storm and from a single site. Further, the exceedances would be considered violations regardless of the impact on a receiving water. This could result in disproportionate and unintended consequences. For example, there may be many discharge points from a long, linear construction project, or from a smaller site situated at the confluence of several drainages; even if the volume of water leaving these projects is small, the projects could incur a large number of violations. At the same time, a very large construction site having a single discharge point would potentially have a much larger impact on receiving water quality but a much less significant likelihood of incurring multiple violations. Also, permittees may elect to direct storm water discharges to a single discharge location, which could result in changes to natural drainage patterns and times of concentration during construction, resulting in additional harm to receiving waters but minimizing a site's potential to have multiple violations.

It is unclear how additional samples, not required by the permit, would be treated by the Water Boards. Dischargers may wish to collect additional samples to conduct special studies to evaluate site practices or BMP performance generally. The permit does not discuss this type of sample collection, and it is unclear if samples taken for these purposes would or could be used to assess compliance with the permit.

The Commenting Parties support a centralized, well-designed program of data collection to support program goals. As detailed in Section II., we believe that NELs should not be included in the permit, as sufficient data on effluent and receiving water quality do not exist to support their development at this time. To evaluate the feasibility of NELs, and to develop NELs in the future should it prove feasible to do so, we recommend that the SWRCB institute a well-designed program of data collection. Specific recommendations for the data collection program are included in the description of the "bridge approach."

> ***Recommendation:*** The SWRCB should allow sites with multiple discharge points to composite samples, or average turbidity and pH measurements made using handheld field monitoring devices, so that a single water quality result would be reported per storm event for compliance purposes.
>
> We recommend that the permit language be modified to allow dischargers to conduct special studies or to collect additional data for the purposes of evaluating their site practices or BMP performance generally. Suggested language follows: "Data collected more frequently than required by the permit, if used for general study of effectiveness or temporal and spatial variations in constituent concentrations or loads from the site, or if collected at locations internal to the site and not at designated outfalls, shall not be used for compliance purposes and shall not be required to be reported to any regulatory agency."

We support the concept of a program for a third-party collected dataset, which would provide uniformity in collection methods, better study design, and integration of results into a report or format that could be used to advance the program.

1. Section G. of Attachment B (p. 11), describes exceptions to visual observations and sampling collection.

As detailed in Sections I. and II. of these comments, ALs and NELs should not apply during extreme storm events or rainfall intensities. Designing BMPs to control and treat all storms would be cost-prohibitive (See Dr. Sunding's Economic Analysis) and the "return on investment" declines significantly as treatment system sizes are increased to handle the largest storm events. In addition, the largest events occur infrequently.

Recommendation: We recommend that an exception for sampling should be allowed when the storm event has exceeded the design capacity of the BMPs. As currently written in the Draft Order, for an ATS system, this would be a 10-year 24 hour storm. For other types of BMPs, the Order should indicate that compliance is not expected for very large storms or extreme hydrologic conditions. Note that hydrologic criteria for dischargers from ATS would differ from criteria for discharges from other types of BMPs. We recommend that the SWRCB address the issue of a design hydrologic condition, taking into account CEQA and economic considerations.

2. Section I. 16. (p. 4) of the Draft Order states "Exceedances of the turbidity NEL are a violation of this General Permit and dischargers shall electronically provide notification of the violation and comply with any Regional Water Board enforcement action."

It is our understanding that the public has access to electronically submitted information and we request that the SWRCB address the situation where the exceedance becomes public knowledge, but culpability has not been determined.

Recommendation: NELs should be entered into public record only upon the Regional Board's determination of culpability.

3. Attachment B, Section E. 4.b. (p. 5) requires monitoring of "Non-visible pollutant parameters (if applicable) - parameters indicating the presence of pollutants identified in the pollutant source assessment required in Section VII.F. 5. of the General Permit (the discharger shall modify its CSMP to address these additional parameters in accordance with any updated SWPPP pollutant source assessment"...)

Non-visible pollutant monitoring requirements are overbroad and unclear. This provision is vague, overly broad, and could potentially greatly expand the monitoring program beyond the constituents already required to be monitored. Potentially, this provision could require monitoring for every material found on site. The Draft Order provides no justification why such an extensive and potentially expensivemonitoring program is required. Furthermore, we cannot determine the water quality benefit that would be gained from imposing such an extensive monitoring program. Nor is it clear how this data will be used.

Recommendation: The SWRCB should modify the language on p. 5 of Attachment B to specify that monitoring of non-visible pollutants is required only when the discharger has reason to believe that an actual release of materials has occurred, and that this material has been transported within or from the site via storm water.

VII. Receiving Water Monitoring and Reporting

1. This Draft Order requires Risk Level 2 dischargers to monitor receiving waters when there is an exceedance of the NELs. Risk Level 3 dischargers are required to monitor receiving waters at all times.

It is unclear how, or if, receiving water monitoring data collected pursuant to this program will be used. We are concerned that unless the program goals are clearly articulated and incorporated into the permit, data collection will not provide useful information to the overall program. For example, as discussed in Section I. above, receiving water pH and turbidity can vary widely based on different natural soils and precipitation characteristics, within a single storm event, and even between storm events, making the meaningful interpretation of analytical results from individual grab samples exceedingly difficult. We are also very concerned about the improper use of receiving water data as an indicator of whether a construction discharge has caused or contributed to a receiving water quality exceedance, given the many forensic challenges inherent in connecting discharge and receiving water quality monitoring. We recommend that the SWRCB revisit the receiving water monitoring and reporting program design after addressing the other outstanding technical issues discussed in this technical memorandum, and that the SWRCB design a monitoring program that more clearly supports the long-term goals and objectives of the program.

Receiving water monitoring may in some cases be difficult or impossible to conduct. As noted in Section III., many of the builders responding to our Builder Survey had difficulty identifying the receiving waters to which their sites drained, or the locations where the drainage entered the receiving water. This concern applies particularly to construction sites that are located a great distance from receiving waters, or that drain via storm drains or other systems that also receive discharges from other land areas and land use types. Others noted that they had no access to receiving waters, or that sampling receiving waters during storm events would be unsafe. It will also be challenging to determine who should report an exceedance in the case where storm water from multiple builders discharges into a common drainage area/receiving water. Further, many discharges are both temporally and spatially distant from the relevant receiving water, making a determination of whether a discharge has “caused or contributed to” an exceedance of receiving water objectives very difficult.

Receiving water monitoring will yield little information about the impact of construction sites on receiving water quality. The requirement to monitor receiving water quality both upstream and downstream of the point where a site’s discharge enters the receiving water will yield little information on the impact of the specific discharge on the receiving water. This is especially the case for sites in large watersheds, for sites not immediately proximate to the receiving water, and for sites that drain to receiving waters via storm drain systems.

Bioassessment monitoring should not be required by the permit. As discussed above, it is difficult to determine if discharges from a construction site caused ot contributed to a receiving water exceedance. Linking construction site discharges to effects on resident biota is even more difficult. In all but a very few cases, it will be impossible to determine if discharges from a construction site were the source of effects on resident biota.

> ***Recommendation:*** The permit should eliminate requirements that permittees conduct receiving water monitoring. Rather, receiving water monitoring should be conducted pursuant to a centralized, well-designed program of data collection overseen by the SWRCB. Similarly, bioassessment data should not be required to be collected pursuant to this permit. They would more properly be collected as part of a well-designed third-party data collection effort, or pursuant to regional monitoring programs.

2. Section I.26. (p. 5) of the Draft Order states that "This General Permit requires all dischargers to comply with applicable water quality standards for receiving waters. Dischargers are responsible for determining the receiving waters potentially impacted by their discharges, and for complying with all applicable water quality standards. Where a receiving water has a more stringent standard, a NEL stated in this permit may not be the most restrictive applicable requirement."

This provision of the permit appears to imply that dischargers should be responsible for calculating NELs for water quality constituents not specifically governed by this Draft Order. This is inappropriate, and places an undue burden on dischargers to perform the job responsibilities of the SWRCB.

> ***Recommendation:*** As an alternative to monitoring receiving water, the Permit should require a review of receiving water data at the permit application stage to help establish appropriate ALs and/or NELs on a regional, or site-specific basis.

> ***Recommendation:*** The SWRCB should consider alternatives such as limiting sampling of receiving waters to waters that are impaired for turbidity/sedimentation.

3. Section V.3. (p. 11) of the Permit states that "Storm water discharges and authorized non-storm water discharges shall not cause foam at discharge locations."

Natural sources of foam should be allowed. The presence of organic compounds in storm flows may cause foaming. Dischargers should not be held responsible for abating natural sources of foam.

> ***Recommendation:*** Insert language that allows for "naturally" occurring foam.

4. Section II. J. of the Fact Sheet (p. 28) discusses TMDLs and Waste Load Allocations stating that Dischargers located within the watershed of a 303(d) impaired water body, for which a TMDL has been adopted by the Regional Water Board or USEPA, may be required by a separate Regional Water Board action to implement additional BMPs, conduct additional monitoring activities, and/or comply with an applicable waste load allocation and implementation schedule. If a specific waste load allocation has been established that would apply to a specific discharge, the Regional Water Board must adopt a Draft Order requiring specific implementation actions necessary to meet that allocation. In the instance where an approved TMDL has specified a general waste load allocation to construction storm water discharges, but no specific requirements for construction sites have been identified in the TMDL, dischargers shall consult with the state TMDL authority http://www.waterboards.ca.gov/tmdl/tmdl.html to confirm that adherence to a SWPPP that meets the requirements of the General Permit will be consistent with the approved TMDL.

The State Board should address implementation of TMDL requirements in permit via a statewide policy. The translation of TMDL allocations into storm water permits is difficult and has been the subject of much discussion. We believe the SWRCB should develop clear policy or guidance for use by Regional Water Boards to describe how TMDL requirements would be implemented via NPDES permits or WDRs.

> ***Recommendation***: The SWRCB should develop policy or guidance to specify how TMDL allocations are to be implemented via NPDES permits, including permits for construction site discharges.

5. Section V. 4. (p.11) of the Draft Order states that "Storm water discharges and authorized non-storm water discharges shall not disrupt the pre-project equilibrium flow and sediment supply regime. In cases where the pre-project flow and sediment supply regime is not in equilibrium, project related activities shall not impede the natural channel evolution process."

It is not clear what is meant by "pre-project." SWRCB staff indicated at the May 2008 workshops that "pre-project" referred to the condition of a site immediately prior to the start of construction activities, and was not intended to mean a natural site condition if such a condition did not exist immediately prior to construction. We note that the remainder of this requirement is insufficiently specified to be implementable. There are many measures of It is not clear what projects this applies to (within an MS4?)equilibrium flow and sediment supply regime, and it may not be possible or even desirable to match pre-project conditions.

Recommendation: As discussed below, we recommend that the SWRCB delete this and other post-project hydromodification requirements from this permit. Specific recommendations for addressing these issues are provided in Section VIII. below.

VIII. New Development and Re-Development Storm Water Performance Standards

The Commenting Parties believe that (1) the inclusion of post-construction requirements in a general permit that covers construction activities is not the appropriate mechanism for regulating post-construction hydromodification impacts; (2) the standards as proposed are not sufficiently protective and/or, in some cases, unnecessary or overly protective; and (3) the standards as proposed are too broad to be implemented and do not address the range of elements that scientific literature indicates is required to manage hydromodification impacts comprehensively.. (See also Appendix D, "Evaluation of Post-Construction Hydromodification Requirements Contained in the Preliminary Draft General Construction Permit," Geosyntec Consultants, March 2008).

Because many projects undergo a multi-year design and entitlement process well before a construction permit application is filed (and because many projects that will be built in the next five to ten years are already well into or through that process), regulation of post-construction impacts via a construction permit is not appropriate nor the best way to accomplish the State's goals. We do recommend that the permit include some language that indicates that hydromodification impacts both pre-construction and post-construction be addressed during the California Environmental Quality Act (CEQA) process using appropriate, technically accepted methods and/or meet the requirements established under the local MS4 permit.

The Fact Sheet (p. 39) states that "The permit requires dischargers to replicate the pre-project runoff water balance (for this permit, defined as the amount of rainfall that end s up as runoff) for the smallest storms up to the 85th percentile storm event (or the smallest storm event that generates runoff, whichever is larger). Contemporary storm water management generally routes these flows directly to the drainage system, increasing pollutant loads and potentially causing adverse effects on receiving waters."

Replicating pre-project runoff volume will not necessarily improve water quality or channel erosion impacts. The permit seems to call for the replication of pre-project rainfall-runoff volume from a site under post-project conditions. However, meeting this requirement alone would not necessarily meet the goals of improving runoff water quality or reducing channel erosion. Even if the volume is the same coming off a developed site, the runoff could exhibit different water quality than under pre-project conditions. For example, sediment loads in many cases are lower in post-developed conditions. Therefore, the same volume of runoff could, with no associated sediment load, increase downstream erosion. Furthermore, even if the volume of runoff is the same as pre-project conditions under post-project conditions, if the distribution of that volume has changed—e.g., such that flow rates stay moderately high for a longer duration than under pre-project conditions—post-project conditions could intensify channel erosion problems (and receiving water sediment concentrations). Thus, addressing runoff volume does not, in itself, necessarily address water quality and erosion problems.

The Fact Sheet further explains (at p.40) that "The permit emphasizes runoff reduction through on-site storm water reuse, interception, evapotranspiration and infiltration through non-structural controls and conservation design measures…Employing these measures close to the source of runoff generation is the easiest and most cost-effective way to comply with the pre-construction water balance standard."

On-site runoff reduction (i.e., "Low Impact Design", or LID) will not necessarily keep runoff volume and distribution the same as pre-project conditions. (See Appendix D., p. 25.) On-site storm water reuse techniques may achieve *some* of the runoff volume necessary to achieve compliance with the permit requirement for maintaining post-project runoff volume at pre-project levels, but in many cases it is unlikely that such measures can do all that is needed to keep post-project runoff volume to the required pre-project level. It is unclear to what extent these measures will affect the distribution of runoff from the site, which is a key parameter relating to downstream channel erosion. Furthermore, modeling the effect of these small-scale on-site storm water reduction features is difficult and unproven, so it will be difficult to gage how successful such measures would be for a given site design. It is not at all clear to us that the Board's proposed "Attachment F" ("New and Re-development Performance Standard Spreadsheet") methodology will be an accurate way of accounting for the effect of small-scale on-site storm water reduction features on runoff volume, let alone distribution. However, such features will improve (to some extent) problems with reduced infiltration and base-flow in receiving water streams. However, in some cases, LID practices in areas with well draining soils below the LID features could increase infiltration over natural conditions, as LID measures will not contain the same volume of duff and soils available for evapotranspiration. Therefore, in cases where LID can successfully manage surface runoff volume changes, the amount of infiltration may increase significantly and potentially cause other hydromodification impacts (such as stream changes).

Continuing on page 40 of the Fact Sheet, the SWRCB states that "A dominant paradigm in fluvial geomorphology holds that streams adjust their channel dimensions (width and depth) in response to long-term changes in sediment supply and bankfull discharge (1.5 to 2 year recurrence interval)."

The fluvial geomorphic concept of "bankfull" discharge cited in the Fact Sheet is not an appropriate paradigm for most southwestern systems. The notion of "bankfull" discharge was developed primarily through study of East Coast streams with flow regimes that fluctuate more gradually than most stream systems in the southwestern U.S. Southwestern systems tend to be much "flashier", i.e., they vary on a much smaller timescale. This more rapid variation in flow rates makes it very difficult to calculate and apply bankfull discharge based approaches in southwestern systems. It is unclear to the Commenting Parties the extent to which the Construction permit requirements rely on this notion of bankfull discharge, but regardless it should be treated with caution for southwestern stream systems.

In addition, although SWRCB Staff have stated that post-construction requirements would be implemented only for projects outside of MS4-regulated areas, the language in the permit is not consistent and implies that all projects must comply with the vague requirements of the permit.

Recommendations: We recommend that the SWRCB remove the post-construction requirements and language from the Draft Order and implement these requirements via statewide requirements for municipal systems.

IX. Rain Event Action Plan

1. The permit incorporates requirements that dischargers develop a Rain Event Action Plan (REAP) 48 hours prior to a "likely" storm event. A REAP would specify the actions to be taken on site to minimize water quality impacts during a storm event.

We believe that a REAP requirement is fundamentally sound; however, as presented in the Draft Order, the trigger for enacting the plan needs modification as do the parameters describing when the plan is needed.

It is unclear when a REAP would be required. It is unclear if the REAP is only to be used during the grading and land development phase, as indicated in Attachment G to the draft order, or throughout the various stages of construction.

> ***Recommendation:*** We recommend that the REAP should be revised periodically to reflect discrete project phases, rather than only during the grading phase.

2. This Draft Order requires Risk Levels 2 and 3 to develop and implement a REAP, which is designed to protect all exposed portions of a site within 48 hours prior to any "likely" precipitation event. Section X.2. (p. 24) of the Draft Order states that "The discharger shall develop and implement a Rain Event Action Plan (REAP) designed to protect all exposed portions of the site within 48 hours prior to any likely precipitation event. A likely precipitation event is any weather pattern that is forecasted to have a 50% or greater chance of producing precipitation in the project area. The discharger shall obtain likely precipitation forecast information from the National Weather Service Forecast Office (e.g., by entering the zip code of the project's location at http://www.srh.noaa.gov/forecast)."

Section III.B. 4. of the Fact Sheet (p. 47) contains similar requirements, stating that "This General Permit requires dischargers to develop and implement a REAP designed to protect all exposed portions of their site within 48 hours prior to any likely precipitation event. The REAP requirement is designed to ensure that the discharger has adequate materials, staff, and time to deploy erosion and sediment control measures that are intended to reduce the amount of sediment and other pollutants generated from the active site. A REAP shall be developed when there is a 50% or greater forecast of precipitation in the project area. The National Oceanic and Atmospheric Administration (NOAA) define a chance of precipitation as a probability of precipitation of 30% to 50% chance of producing precipitation in the project area[4]."

The POP is an inappropriate trigger for requiring REAP preparation. The draft order requires that a REAP be prepared 48 hours in advance of a predicted event with a 50% probability of precipitation ("POP") (i.e., 50% chance of 0.01" of rain). A POP is a prediction that 0.01" of rain may occur in the forecast area. However, a storm event with 1/100 of an inch of depth is unlikely to produce runoff. Further, NOAA defines a POP of 60-70% as indicating a "likely" rain event; POP values of 30-50% indicate a "chance" of scattered rain. Thus, the requirement to prepare a REAP for a 50% POP value may result in many "false alarms." An alternative measure would be a "quantitative precipitation forecast" or "QPF," which provides the probability that a predicted event will generate a specific quantity of rainfall, typically 0.10 or 0.25 inches. A rain event of this magnitude is much more likely to generate runoff, and the QPF is routinely forecast and available online.

> ***Recommendation:*** We recommend that the SWRCB utilize the Quantitative Precipitation Forecast (QPF) to trigger REAP preparation. If the SWRCB continues to use a POP, we recommend that the SWRCB evaluate the accuracy of POP forecasts, and the probability that a POP of 50% will produce measurable runoff. We also request that the SWRCB evaluate different thresholds (e.g., a POP of 60-70%, which NOAA defines as "likely" precipitation).

The use of forecasts 48 hours in advance of an event is too long. The Draft Order's requirement to "protect all exposed portions of the site within 48 hours prior to any likely precipitation event" is overly stringent. First, the requirement to protect "all" exposed portions of the site could effectively shut down most projects for 48 hours before an anticipated rain event. Second, 48 hours is too long; a properly operated site can be prepared for a rain event with 24 hours notice, and 24 hours notice will also provide a more accurate forecast. The requirement to prepare a site 48 hours in advance of a rain event could potentially shut down sites two days before a "chance of rain," resulting in lost construction time and making scheduling extremely difficult.

> ***Recommendation:*** CBIA recommends that the word "all" be removed from this clause within the draft order. CBIA also recommends that when the REAP is triggered, inspections should be required to confirm that BMPs have been installed properly, to identify any repairs to existing BMPs that may be required, and to identify any additional BMPs to be installed before a rain event.
>
> The need for a REAP should be triggered 24 hours (not 48 hours) in advance of the appropriate forecast conditions.

X. Site Photographic Self Monitoring and Reporting

This Draft Order requires all projects to provide photographs of their sites at least once quarterly if there are rain events causing a discharge during that quarter. The purpose of this requirement is to help

[4] http://www.crh.noaa.gov/lot/severe/wxterms.php

Regional Water Board staff prioritize their compliance evaluation measures (inspections, etc.). In addition, this reporting will make compliance related-information more available to the public.

The CBIA does not support the use of self-recorded photographic records for construction site reporting under any circumstances. The utility of such an approach is questionable given the subjective nature of photographic evidence (when, where, context) and the speculative interpretations that can be drawn from observational evidence. When inspections occur during a project, local or State or Federal authorities have within their power the ability to photo-document construction activity.

> ***Recommendation:*** The requirement to provide photographic self-monitoring and reporting should be removed from the Permit.

XI. Annual Reporting

The Draft Order states that "this General Permit requires all projects that are enrolled for more than one continuous three-month period to submit information and annually certify that their site is in compliance with these requirements. The primary purpose of this requirement is to provide information needed for overall program evaluation and pubic information." (p.18). In Section III.B.1. viii. of the Fact Sheet, February 1 is cited as the due date for said reports.

It is inappropriate to require submission of annual reports during the rainy season. The Draft Order requires that Annual Reports be submitted in February even though February is in the middle of the rainy season, when implementation and inspection and management of discharge pollutant controls will require maximum time and significant effort. It is more appropriate to require submittal of annual reports in July or August, concurrent with the annual compliance certification, and to record activities occurring during the current and prior year's wet weather months.

> ***Recommendation:*** The Permit should be modified to require submittal of annual reports in July or August concurrent with the annual compliance certification and to record activities occurring during the current and prior year's wet weather months.

XII. Certification/Training Requirements for Key Project Personnel

1. Section IX.A., (pp. 22-24) of the Permit requires that key personnel (e.g., SWPPP preparers, inspectors, etc.) have specific training or certifications to ensure their level of knowledge and skills are adequate to ensure compliance.

We support the SWRCB's efforts to create baseline program curricula for SWPPP preparers, SWPPP implementers, and SWPPP inspectors, including industry personnel responsible for SWPPP preparation and implementation/inspection, and regulatory staff responsible for document review and in-field inspections. All persons responsible for SWPPP preparation and SWPPP implementation, including building industry personnel and regulatory staff (municipal and state water board inspectors) must have received the same level and extent of training using common program curricula.

> ***Recommendation:*** The Permit should clearly state that all personnel responsible for SWPPP implementation, including municipal and state water board regulatory inspectors, attend a State Water Board-sponsored or approved Qualified SWPPP Practitioner Training Course.

XIII. Other Comments

In Section VI. 2. and 6. of the Draft Order states that all "existing dischargers shall electronically file their PRDs no later than 100 days after the adoption date" and that "existing dischargers shall make and implement necessary revisions to their SWPPP and Monitoring Program to reflect the changes in this General Permit in Accordance with Section IX., Storm Water Pollution Prevention Plan, and Attachment B, Monitoring Program and Reporting Requirements, in a timely manner but no later than 100 days after permit adoption".

Currently, there are approximately 20,000 construction site dischargers that have been issued a WDID number in California (Greg Gearheart communication to stakeholders May 7, May 21, and June 4, 2008). We have contacted multiple SWPPP preparers in California to estimate the potential cost of updating SWPPPs to the provisions of the Permit, and costs range anywhere from $2500 to $10,000 per SWPPP. Given this range, the estimated cost to the building industry in California to update SWPPPs to the proposed content standards ranges between $50 and $200 million dollars. Furthermore, this massive updating effort would translate into preparing more than 200 SWPPPs per day for the 100-day change-over period, which would place a tremendous labor burden on an already strained and contracted labor force. An area that is also overlooked and not considered in the Permit is the necessary training and cost of providing training to industry practitioners responsible for jobsite compliance in accordance with new Permit provisions and updated SWPPP responsibilities.

> ***Recommendation*:** All existing construction projects in California subject to the General Construction Permit and that have been issued WDID numbers up to and until the date of permit adoption will be exempt from filing new Permit Registration Documents (PRDs) and will be subject to regulation under the existing State Water Board Order No. 99-08-DWQ until a Notice of Termination is filed and received by the State Water Resources Control Board. Commencing on the date of permit adoption, all new dischargers will be subject to Section VI. 2 (a) of the Permit.

The following terms are omitted or poorly defined in the Fact Sheet and/or the Draft Order. The SWRCB should define or clarify the definition of these terms that were omitted from Attachment L:

"[A]ir deposition issues" and " appropriate controls," as used in VIII.F.6.

"First Draft Order Stream" as used at footnote 11 at VIII. H.4. (p.21), is defined as "a stream with no tributaries." We suggest that a definition be based upon blue line streams on USGS topo maps.

"Permit Registration Documents (PRD)" as used throughout the Fact Sheet and Permit.

"Receiving Water" and "Sensitive Receiving Waters,"as used throughout the Fact Sheet and Permit.

"Surface Waters of the U.S." as used throughout the Fact Sheet and Permit.

"Significant amounts of materials" as used in I.12. (p. 3 of the Draft Order).

REFERENCES CITED

Ankcorn, P.D. 2003. Clarifying turbidity--the potential and limitations of turbidity as a surrogate for water-quality monitoring; Proceedings of the 2003 Georgia Water Resources Conference. 2003 Georgia Water Resources Conference, University of Georgia, Athens, Georgia.

Boomer, K.B., Weller, D.E., and Jordan, T.E. 2008. Empirical Models Based on the Universal Soil Loss Equation Fail to Predict Sediment Discharges from Chesapeake Bay Catchments. J Environ Qual, **37**: 79-89

Bruton, M.N., 1985. The effects of suspensoids on fish. Hydrologia. 125(1):221-241.

Brownlie, W.R., 1983. Flow depth in sand-bed channels. Journal of Hydraulic Engineering 109(7):959-990.

Caltrans, 2002. Caltrans Construction Sites Runoff Characterization Study. http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-02-055.pdf.

California Department of Water Resources, and California Department of Fish and Game. 2007. Pelagic Fish Action Plan, March 2007 (http://www.water.ca.gov/deltainit/docs/030507pod.pdf).

Earhart, HG. 1984. Monitoring total suspended solids by using nephelometry Journal Environmental Management 8(1):81-86.

Feyrer, F., and Healey, M.P. 2003. Fish community structure and environmental correlates in the highly altered southern Sacramento-San Joaquin Delta Journal Environmental Biology of Fishes **66**: 123-132.

Fifield, J.S. 2004. Designing for Effective Sediment and Erosion Control on Construction Sites. Forester Communications-2nd Edition, Santa Barbara, CA.

Garcia, M. and G. Parker, 1991. Entrainment of bed sediment into suspension. Journal of Hydraulic Engineering, 117(4):414-435.

Garen, D.C., and Moore, D.S. 2005. Curve number hydrology in water quality modeling: uses, abuses, and future directions1. Journal of the American Water Resources Association, **41**: 377-388.

Glysson, G.D., Gray, J.R., and Schwarz., G.E. 2001. A Comparison of Load-Estimate Errors Using Total Suspended Solids and Suspended-Sediment Concentration Data. Proceedings of the World Water and Environmental Congress, Orlando, FL, p. 10.

Gray, J.R., Glysson, G.D., Turcios, L.M., and Schwarz, G.E. 2000. Comparability of Suspended-Sediment Concentration and Total Suspended Solids Data, U.S. Geological Survey, Office of Surface Water.

Gregory, R.S., 1998. Turbidity Reduces Predation on Migrating Juvenile Pacific Salmon. Transactions of the American Fisheries Society.127:275–285

Haung, C., and Y. Chen, 1996. Coagulation of Colloidal Particles in Water by Chitosan. J. Chem. Tech. Biotechnology. 66:227-232.

Knighton, D. 1998. Fluvial forms and processes, a new perspective.
Arnold Publishing.London, United Kingdom. 383 pages.

Manka, P. 2005. Suspended sediment yield in tributaries of Elk River, Humbolt County, California, Master's thesis. Department of Natural Resources, Humboldt State University, Arcata, California.

National Research Council, 1986. Soil Conservation; Assessing the National Resources Inventory National Academy Press, Washintong, DC.

Nobriga, M. L., F. Feyrer, R. D. Baxter, and M. Chotkowski. 2005. Fish community ecology in an altered river Delta: spatial patterns in species composition, life history strategies and biomass. Estuaries. Vol. 28, No. 5, p. 776–785

Parker, G., and A.G. Anderson, 1977. Basic principles of river hydraulics. Journal of the Hydraulics Division, Proceedings of the American Society of Civil Engineers (ASCE), 103(HY9):1077-1087.

Renard, K.G., Foster, G.R., Weesies, G.A., McCool, D.K., and Yoder, D.C. 1997. Predicting soil erosion by water: A guide to conservation planning with the Revised Universal Soil Loss Equation (RUSLE) U.S. Gov. Print. Office, Washington, DC

Row, D.K. and Dean, T.L., 1998. Effects of turbidity on the feeding ability of the juvenile migrant stage of six New Zealand freshwater fish species. New Zealand Journal of Marine and Freshwater Research. 32:21-29

Schubel, J. R., H. H. Carter, R. E. Wilson, W. M. Wise, M. G.Heaton, and M. G. Gross. 1978. Field investigations of nature, degree, and extent of turbidity generated by open-water pipeline disposal operations. Technical report D-78-30. US Army Engineer Waterways Experiment Station, Vicksburg, MI. 245 pp. + appendices.

Schubel, J. R., H. H. Carter, and W. M. Wise. 1979. Shrimping as a source of suspended sediment in Corpus Christi Bay (Texas). Estuaries 2(3):201-203.

Schroeder, W. W., G. G. Crozier, and E. C. Blancher. 1981. Comparison of suspended total solids gravimetry to laboratory in situ nephelometric measurement. Estuaries 4(3):292.

Shumway, R.H, Azari, R.S. and M. Kayhanian. Statistical Approaches to Estimating Mean Water Quality Concentration with Detection Limits, (2002). Environmental Science and Technology 36:3345-3353

Simon, A., Dickerson, W., and Heins, A. 2004. Suspended-sediment transport rates at the 1.5-year recurrence interval for ecoregions of the United States: transport conditions at the bankfull and effective discharge? Geomorphology, **58**: 243-262.

Slaymaker, O. 1993. The sediment budget of the Lillooet River basin. Physical Geography **14**.

Stein, E.D. and V.K. Yoon. 2007. Assessment of water quality concentrations and loads from natural landscapes. Southern California Coastal Water Research Project. Costa Mesa, CA.

Trimble, S.W., and Crosson, P. 2000. Land Use: U.S. Soil Erosion Rates--Myth and Reality. Science, **289**: 248-250.

Van den Berg, M., Birnbaum, L., Bosveld, A.T., Brunström, B., Cook, P., Feeley, M., Giesy, J.P., Hanberg, A., Hasegawa, R., Kennedy, S.W., Kubiak, T., Larsen, J.C., Leeuwen, F.X.v., Liem, A.K., Nolt, C., Peterson, R.E., Poellinger, L., Safe, S., Schrenk, D., Tillitt, D., Tysklind, M., Younes, M., Waern, F., and Zacharewski, T. 1998. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. Environ Health Perspect **106**: 775-792.

Wischmeier, W.H., and Smith, D.D., 1978. Predicting rainfall erosion losses: a guide to conservation planning In: U.S. Dept. of Agriculture ed. Science and Education Administration, p. 58.

APPENDIX A

General Construction Permit: Action Levels and Numeric Effluent Limits Analysis Recommendation of Alternatives

APPENDIX B

Evaluation of Active Treatment Systems (ATS) for Construction Site Runoff

Appendix C

Analysis of Draft General Construction Permit Risk Factors Report

Appendix D

Evaluation of Post-Construction Hydromodification Requirements Contained in The Preliminary Draft General Construction Permit