



MEMORANDUM

Date: June 8, 2007

To: Maria Levario, TCA

From: Scott Taylor, RBF

Subject: **Updated Evaluation of Philip Williams and Associates Report Entitled, "Final Report, Potential Toll Road Impacts on San Mateo Creek Watershed Processes, Mouth Morphology and Trestles Surfing Area" dated January 2006**

Per your request, we have summarized our review of the above-captioned report with respect to the information and studies developed in support of the SOCTIIP and the Preferred Alternative. The following reflects our comments to the questions raised in the Philip Williams Associates (PWA) report. The PWA report was attached to the Shute, Mihaly & Weinberger January 12, 2006 comments on the Final SEIR.

The PWA study generally questions some of the conclusions drawn in the South Orange County Transportation Infrastructure Improvement Project (SOCTIIP) Final Environmental Impact Report (EIR) and technical studies/supporting documents based on the opinion that the studies lack sufficient detail or additional study is needed to draw conclusions regarding the impacts of the roadway and the effectiveness of the mitigation.

The EIR supporting documentation was completed using generally accepted engineering practice and standard of care with methods and procedures using sufficient detail to assess the impacts and the effectiveness of the proposed mitigation measures. The analysis in the EIR is detailed enough to determine the preliminary sizing requirements for the Extended Detention Basins and the required locations of the basins. A more detailed assessment of the roadway and drainage system to more closely model actual conditions is neither possible nor warranted. The final geometry (horizontal and vertical alignment) of the roadway will be determined during the upcoming geometric approval drawing phase. The analysis in the EIR and supporting documentation is sufficient to identify potential impacts and to ensure the proposed mitigation measures are effective.

Specific Comments and Responses

The PWA study bases the majority of their comments on two fundamental issues:

- The EIR does not analyze the impacts at a ‘subwatershed’ scale, and:
- Potential increases in fine to medium texture sediment may reduce the transport of cobbles to the ocean thereby adversely impacting the surfing resource.

Impacts at a Sub-watershed Scale

The PWA study notes that impacts to subwatersheds are much greater than the impact to the San Mateo watershed in terms of changes in imperviousness and resulting potential changes in hydrology. The study indicates that changes in watershed imperviousness over about 10% have been shown to create instability in downstream creek reaches. The study concludes that, “From the simplistic analysis used, it is not possible to determine either where these impacts will occur, or how significant they will be.”

In fact, the Runoff Management Plan Technical Report (RMP) does identify the potential for changes in hydrology associated with the addition of imperviousness (Section 2.5.4.3) and proposes mitigation for the changes. The analysis has been developed at both a watershed and sub-watershed scale. This is confirmed by the fact that the proposed detention basins are sub-watershed rather than watershed scale mitigation features.

The PWA study appears to ignore the strategy described in the RMP whereby non-roadway flows will be conveyed under the roadway alignment and discharged through an engineered energy dissipater device as appropriate (Section 2.4.3.1 and Section 2.5.4.3). Detention basins will be located along the alignment serving identified sub-watersheds to mitigate for roadway runoff water quality as well as changes in runoff flow and volume from the addition of roadway impervious surface. The RMP notes that, “...the estimated increases in peak discharge and erosive runoff volume under project conditions will be mitigated at *each discharge location.*” [emphasis added]

The PWA report notes that the types of BMPs used, “...are not adequate to prevent the destabilization of downstream channels,” and cites a 1979 reference by McCuen. Historically, some detention structures have been shown to exacerbate downstream erosion in channels. However, such facilities were designed for flood control purposes only, and did not incorporate elements to mitigate hydromodification effects. Erosion will not occur downstream of the extended detention basins, as detailed in the EIS/SEIR since potential hydromodification impacts will be considered in their design. First, where appropriate, the final design of the proposed detention basins will be completed using continuous discharge simulation to match the flow duration curves before and after the project for return periods up to and including the dominant discharge. It is appropriate to match flow duration curves at discharge locations where runoff peak flow and volume have changed as compared to the existing condition. Detention basins analyzed and designed with this procedure can effectively mitigate hydromodification effects (SCVURPPP, 2004) and the associated potential for an increase in streambed scour.



Detailed analysis of the proposed detention basins was not included in the RMP since the potential impact and the appropriate mitigation had been identified, and further study would not lead to the determination of any further impact. The PWA report notes that the Rational Method, used in RMP, is not adequate to fully characterize how runoff and stream flow will change for actual rainstorms that occur over time. While the Rational Method does not fully characterize stream course hydrology, it does provide an adequate proxy to identify potential impact and required mitigation from the project. Final design of the detention basins, including continuous rainfall simulation as described above, will be conducted based on the approved geometric roadway drawings.

In conclusion on this issue, the impacts at the subwatershed level have been adequately assessed and appropriate mitigation selected, including engineered energy dissipation devices and detention focused on hydromodification mitigation. These mitigation measures will ensure that there is not an increase in erosion potential at the sub-watershed scale due to changes in the watershed or sub-watershed hydrology or hydraulic characteristics.

Potential Change of Sediment Composition

The second fundamental issue discussed in the PWA study relates to the opinion that the composition of the sediment discharge in San Mateo Creek will be altered with increases in fine to medium texture sediment from the scour of sub-watersheds thereby reducing the transport of cobbles to the ocean and impacting the surfing resource. This assertion is supported by alleging that there will be increased erosion at the sub-watershed scale (discussed above) at culvert outlets, that mitigation measures such as detention basins will be less effective than anticipated and that re-vegetation of disturbed areas will be inadequate.

The authors of the PWA study agree that the mitigation measures proposed for the Corridor, "...should limit erosion and reduce flow peaks from the road project." And then temper this statement by saying, "However, [cut and fill slope vegetation, bio-swales and detention basins] typically do not perform as well as expected in erosion-prone Mediterranean landscapes..." This statement is presented without reference or justification. The design of the proposed project mitigation facilities is based on numerous research studies throughout the US and particularly in southern California. Specifically, the California Department of Transportation (Caltrans) recently completed a prototype level study of bio-swales and detention basins that served as the basis for the project mitigation proposals (Caltrans, 2004). The assertion that the proposed mitigation measures will not perform well is also apparently based on a field review of existing cross culverts along Cristianitos Road. The existing cross-culverts reviewed in the PWA study show degradation of the channel downstream of the crossings.

RBF Consulting (RBF, 2006) reviewed the 'Site 2' culvert cited in the PWA report and found that the culvert was inadequately designed in that there was no mitigation for peak flow and volume reduction, and inadequate energy dissipation at the culvert outlet.



Effective cross culvert design requires considerable analysis and in many cases the construction of engineered energy dissipation devices to avoid downstream erosion. In the past, prior to contemporary water quality requirements, many rural road crossings were designed without the benefit of either detailed analysis or the installation of engineered erosion protection. In contrast, the SOCTIIP alternatives have been designed with a state-of-the-art runoff management system.

The PWA report indicates that the project erosion and sediment control features, "...are unlikely to control the runoff of fine sediment from road cut and fill areas during events such as the 2-year flow..." The roadway cut and fill areas will be revegetated, in most cases with native plants, and monitored to ensure adequate coverage. Accordingly, the discharge of fine sediments from these areas can reasonably be expected to be no greater than for adjacent natural areas. The report further states that, "These events will exceed the planned capacity of the sediment settling basins..." In fact, as noted in Section 2.5.4.3 of the RMP, for the standard condition, runoff from slopes is collected in a separate system for discharge to the cross culverts, bypassing the water quality detention basins. The water quality basins have been designed to serve the impervious pavement area only. Thus, the allegation of increases in fine sediments downstream in a two-year storm event is incorrect.

Finally, the PWA report notes that the cobble feature in the near-shore area is the most important element supporting the surf resource at trestles. The report speculates that the cobbles were placed in the surf zone either by active or historic transport from San Mateo Creek, eroding bluffs, or discharge from San Juan Creek or remnant flood plain deposits, or ancient deposits from San Mateo Creek. The Corridor cannot impact historic cobble transport, nor can it impact transport from eroding bluffs or ancient floodplain deposits in the nearshore area since it is located upstream of these formations.

Geosoils (2006a,b) investigated the source of the cobbles and found that they primarily originate from the easterly portion of the San Mateo Creek watershed. Therefore, it can be concluded that the primary source of the cobbles to the nearshore is current and historic transport from San Mateo Creek. RBF Consulting (2004) prepared a sediment analysis for San Mateo Creek focusing on the potential for a significant change in the sediment supply from San Mateo Creek to San Onofre State Beach and the Trestles surfing area as a result of the construction of the project. The study found that changes in sediment transport of the creek were insignificant, comparing the before and after project conditions. The PWA report generally does not dispute this conclusion but focuses instead on the potential for the project to change the composition of the total sediment discharge - including more fine-grained fractions at the expense of cobble size fraction. As discussed above, the project will not be a source for an increase in fine-grained sediment discharge to San Mateo Creek and therefore will not change the delivery of cobbles to the Trestles surf area.

In summary, the PWA study does not alter the conclusions of the SOCTIIP EIS/SEIR or the supporting documents. This information was incorporated into the information presented to the F/ETC Board of Directors in January and February 2006.



References

Caltrans, "BMP Retrofit Pilot Program, Final Report," Division of Environmental Analysis, CTSW-RT-01-050, January, 2004.

Geosoils, Letter to Ms. Maria Levario, "Preliminary Clast (Cobble Fraction) Provenance Study, Lower San Mateo Creek, in Conjunction with the South Orange County Transportation Project, Orange County, California"

Geosoils, Letter to Ms. Maria Levario, "Additional Discussion of Surfing Resources in the Vicinity of San Mateo Creek and Potential Impacts of the Toll Road, Orange County California,"

RBF Consulting, "Memorandum, *Potential Toll Road Impacts on San Mateo Creek Watershed Processes, Mouth Morphology and Trestles Surfing Area, Final Report*, prepared by Phillip Williams and Associates, Ltd., dated January 11, 2006."

RBF Consulting, "SEDIMENT CONTINUITY ANALYSIS Lower San Mateo Creek South Orange County Transportation Infrastructure Improvement Project," September, 2004.

Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), "Hydromodification Management Plan Report", November, 2004 www.scvurppp.org.

