

1.0 INTRODUCTION

The Brake Pad Partnership is a multi-stakeholder effort comprised of manufacturers, regulators, stormwater management agencies, and environmentalists working together to understand the impacts that may arise from brake pad wear debris generated by passenger vehicles on the environment. The BPP's efforts are aimed at developing an approach for evaluating potential impacts of copper from brake pads affecting water quality in the South San Francisco Bay as an example. Brake pad manufacturers have committed to adding this evaluation approach to their existing practices for designing products that are safe for the environment while still meeting the performance requirements demanded of these important safety-related automotive products.

The BPP's technical effort involves a set of interlinked laboratory, environmental monitoring, and environmental modeling studies to understand the transport and fate of copper from automobile brake pad wear debris in the environment. At the core of the BPP's effort are three environmental modeling studies: (1) Air Deposition Modeling—to predict how much brake pad wear debris is released and deposited in the study watershed, (2) Watershed Modeling—to estimate how much copper from the deposited wear debris washes into the storm drainage system and eventually reaches the waters of the South San Francisco Bay, and (3) Bay Modeling—to determine whether and, if so, to what extent copper from brake pad wear debris affects short- and long-term concentrations of copper in the Bay. The BPP study area encompasses 23 watersheds (BPP-modeled watersheds) that drain to the San Francisco Bay (Figure 1).

Land cover and land use data, such as road coverage and impervious areas, are required to complete these modeling efforts. Sustainable Conservation (2005) described the use of land cover and land use data for the BPP-modeling efforts, and recommended additional investigations to increase the understanding of the available data.

Road surface area is a parameter needed for modeling air emission, depositions and resuspension. URS developed initial road surface areas values for the BPP's study area using readily available information on road lengths and widths. Road length information was derived from the Environmental Systems Research Institute, Inc. (ESRI) U.S. Streets dataset (ESRI 2004), and road width estimates for each ESRI road category were based on professional judgment.

Following the development of the initial estimates, BPP requested URS use agency specific information to check the initial estimates. Furthermore, URS was to conduct an uncertainty analysis of the road surface area estimates by comparing the ESRI road network completeness and the URS road width estimates to local data sources. In order to perform such an analysis, URS consulted several local city and county public works agencies for more accurate or ground-truthed width data to compare to the initial URS estimates against. The analysis focused on only two of the nine ESRI road categories—major and local roads—because these two categories of roads cover over 90 percent of the total road mileage in the BPP study area. URS determined that these local data sources could be used to calculate more accurate mean widths and should be used in conjunction with the initial URS estimates.

Subsequently, instead of performing an uncertainty analysis on the initial URS width estimates, URS evaluated the variability within the width data provided by local agencies. A comparison between initial URS width estimates and width data reported by local agencies for major and local roads is also presented in this memorandum. The final set of road width estimates (and resulting road areas) was developed using local sources of data for major and local roads and the initial URS width estimates for other road categories.

2.0 ROAD WIDTH ESTIMATION

The U.S. Streets data contains detailed spatial information on streets, interstate highways, and major roads within the United States. The dataset is based on the 2000 Census TIGER/Line® files (U.S. Census Bureau 2000). The ESRI U.S. Streets data represents roads as lines, and does not contain

