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COMPUTER GRAPHICS FOR NOISE AND AIR MODELING

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Traffic noise prediction models [1] in the United States have evolved to a point where they almost always require a three dimensional (x,y,z) coordinate system data base [2] to spatially locate roadway, receivers, barriers, and topographic features. Because mainframe computer versions of these models are capable of utilizing large amounts of core, it is not uncommon for as many as 3,000 independent coordinate points to be used in one execution (run).

This great number of coordinate points often causes two serious problems. First is the inclusion of undetected coding errors as the user transfers data from the map to coding form to the computer file. Second, the user may suffer disorientation, and lose the intuitive "feel" for the project; the project will in effect become a mass of numbers. The user will then have lost the opportunity to apply engineering judgement. It is simply important that the user maintain intuitive knowledge and control of the project.

To solve these problems, the authors have developed a series of interactive computer graphics programs to plot the coordinate data. These programs are called VUPLOT, and are useful for highway air quality prediction programs as well. The noise programs may be used to plot plan or profile views of a highway configuration, as in Figures 1 and 2, respectively. In addition, one version of the noise plotting program will type a roadway segment contribution to a particular receiver directly on the segment (see Figure 3).

REFERENCES

[1] T.M. Barry and J.A. Reagan, "FHWA Highway Traffic Noise Prediction Model," FHWA-RD-77-108, USDOT, FHWA, Wash., D.C., (1978)

[2] W. Bowlby, et al. (ed.), "Noise Barrier Cost Reduction Procedure STAMINA 2.0/OPTIMA: User's Manual," FHWA-DP-58-1, USDOT, FHWA, Wash., D.C., (1982)

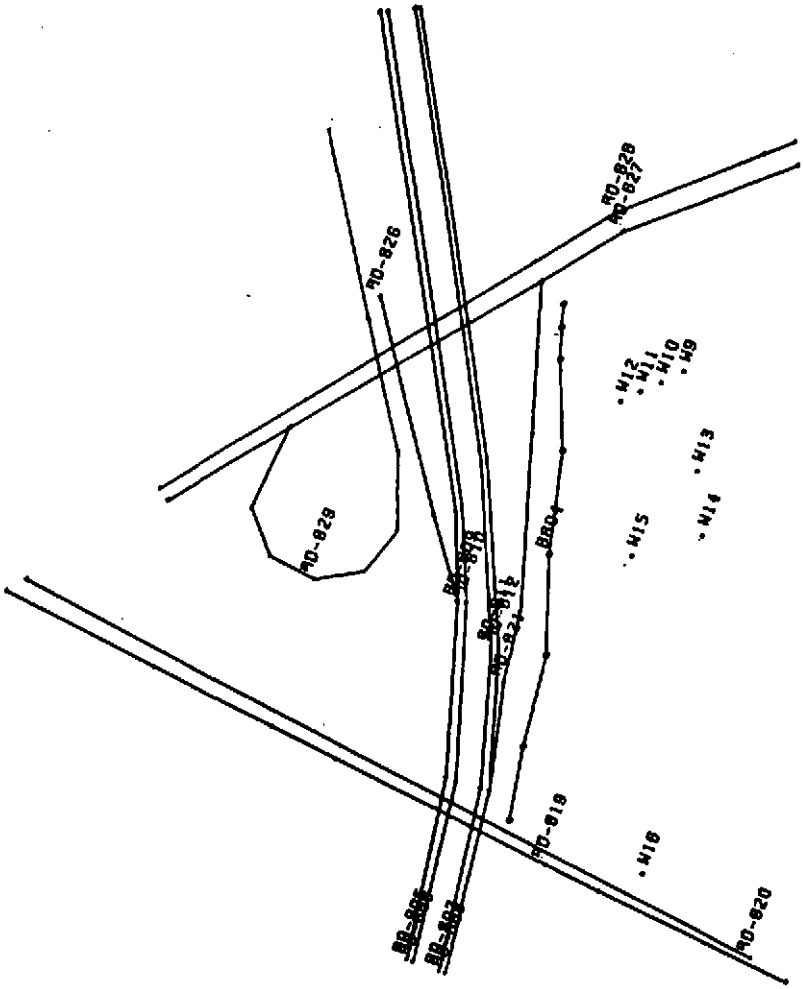

Fig. 2. Plan view plot of a typical highway interchange using the Vanderbilt VUPLOT package.

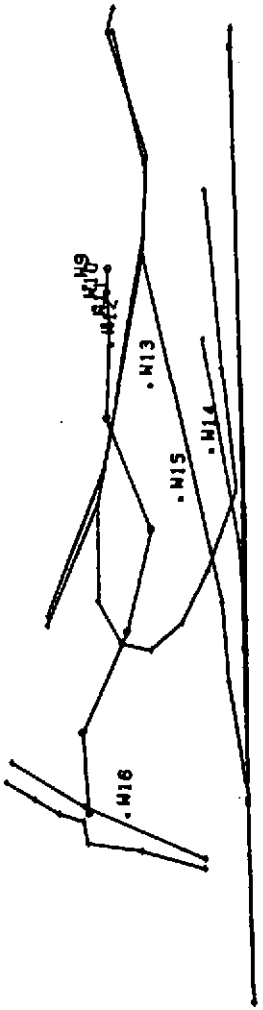

Fig. 3. Profile view plot of the same highway interchange as in Figure 2.

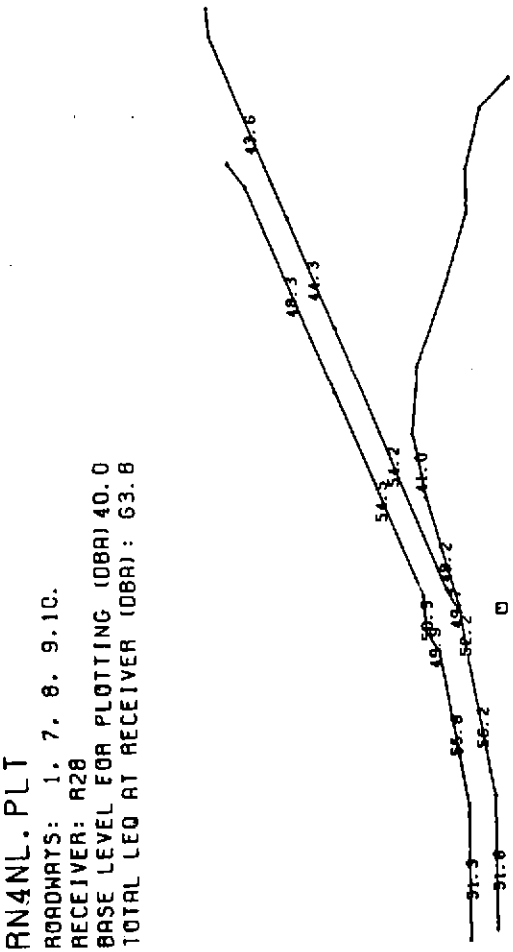

Fig. 4. Plan view plot showing roadway segment noise level contributions at a particular receiver (R28).