

Laser Scanning Pavement Auditing Survey, Northern Diversion Sewer Project, Melbourne

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SUMMARY

Melbourne Water is currently constructing a major tunnel as part of a 13km \$300 Million sewer upgrade project. A section of this operation has been excavated under the CityLink Tollway at Moreland Road in Pascoe Vale. Accurate deformation monitoring of the roadway pavements, freeway infrastructure and surrounding retaining walls during the construction phase was a vital quality assurance provision for all stakeholders on the project, and most notably for Melbourne Water as the overall tunnel asset owner and client. Monitoring of the tollway pavement surface was established by two processes pre and post construction; - Total station measurement to the highest specification as per VicRoads standards - High density laser scanning of the pavements and surrounds Concurrent total station and laser scan observations were conducted pre and post tunnel construction under the CityLink Tollway. Site control consisted of ground monuments and scan targets which were established on the site prior to the initial survey. Post construction surveys were generated from the same adopted marks to ensure consistency between pre and post construction surveys. Data acquired from total station observations and laser scanning were compiled and reduced for pre and post surveys. The laser scanning point cloud data was rectified by “noise reduction” to create a “clean” road surface. This smoothing reduction eliminated erroneous ambient signal reflection from passing vehicle movement, traffic safety bollards, site personnel etc. A terrain mesh was generated from the post construction survey point cloud dataset and the resulting DTM triangle file was exported from the laser scanner software to survey software and CAD for correlation with the pre construction survey dataset. The difference between the generated surfaces of the total station and laser scan surveys was determined to be typically within +/- 5 millimetres. With considerable confidence, Aurecon was able to report that there was no difference between the pre and post survey surfaces. Engineering and geotechnical specialists reviewed the survey data and made the subsequent assessment that there were no evident movement trends on site, and that the freeway assets were unaffected by the tunnelling construction activities. As a product of Aurecon’s dual instrument methodology approach, it is possible to acknowledge that laser scanning is a viable resource for pavement audit surveys for both accuracy and repeatability. Several advantages in using laser scanning are evident; - Laser scanning can be conducted with reduced traffic management disbursement costs and more importantly reduced OH&S risk and traffic flow reduction - Laser scanning captures a greater density of observations than conventional instrumentation whilst maintaining accuracy and repeatability specifications to VicRoads - Laser scanning captures peripheral data beyond the initial area of interest which can undergo further analysis at a future date.

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