



KITTELSON LLC

FORENSIC TRANSPORTATION ENGINEERING

HERMANUS J STEYN, PR.ENG., P.E.
PRINCIPAL ENGINEER

EDUCATION

- B.Eng. in Civil Engineering, University of Stellenbosch South Africa, 1991

PROFESSIONAL STATUS: LICENSES

- Professional Engineer, South Africa, No. 970148
- Professional Engineer, State of Oregon, No. 72517
- Professional Engineer, State of Washington, No. 43046
- Professional Engineer, State of Idaho, No. 13284
- Professional Engineer, State of Utah, No. 7104957-2202
- Professional Engineer, State of California, No. C 75331
- Professional Engineer, State of Montana, No. 58579
- Professional Engineer, State of Tennessee, No. 122758

PROFESSIONAL ASSOCIATIONS

- Institute of Transportation Engineers (ITE), Member
- Women's Transportation Seminar, Member
- Transportation Research Board (TRB), Geometric Design Committee AFB10, Chair (2018-2020)
- TRB, Performance Effects of Geometric Design Committee AKD10, Co-Chair (Current)

PROFESSIONAL EXPERIENCE

SENIOR PRINCIPAL ENGINEER, KITTELSON & ASSOCIATES, INC.

2001 – Present

Conducted transportation impact analyses for future developments dealing with safety issues, access management, and on-site circulation for a variety of developments. For these analyses, managed the projects, coordinated with project teams, provided input to site plan circulation, determined new traffic associated with development, determined future growth, assigned new traffic from development to the transportation system, conducted existing and future traffic operations analysis, determined off-site improvements, documented findings in report, and testified at public hearings for project approvals.

Prepared a variety of transportation studies for all types of roadways—from local streets to freeways. On such projects, managed the projects, coordinated with project multidisciplinary teams, conducted existing and future traffic operations analysis. Further, developed preliminary transportation improvements (i.e., horizontal functional layouts accounting for vertical alignments) considering impacts to natural resources, constructability, phased implementation opportunities, intersection traffic control, and cost estimating in establishing the appropriate improvements. In closing, prepared technical memorandums and reports to document findings, as well as testified at city council and/or county board of commissioners for study adoptions.

Managed numerous design-related projects, served as engineer of record, and provided quality assurance/quality control (QA/QC) on many transportation improvement projects. On these projects, prepared final roadway, traffic signal (new and modifications), detector (loops, video, radar) and interconnect (fiber) plans, roadway signing, pavement markings, street lighting and traffic control (maintenance of traffic) plans based on various state and local agency design standards. On projects featuring these engineering aspects, prepared special provisions for standard specifications, and engineering estimates; assembled construction documents for bidding purposes; as well as provided office support inspection during construction.

On a national level, currently serves as the co-chair of the Transportation Research Board (TRB) Performance Effect of Geometric Design Committee, AKD10.

CHIEF ENGINEER, BKS CONSULTING ENGINEERS PTY. LTD. SOUTH AFRICA

1993 – 2000

Responsible to design all multidiscipline elements associated with subdivisions, such as three-dimensional (3D) on-site grading (e.g. balancing earthworks), stormwater drainage (inlet placement and number), waterlines, sewer lines, power, and telephone, as well as developing project specifications and estimates. Assembled construction documents for bidding purposes, evaluated potential contractors' bids, recommended preferred contractors, and then provided construction supervision of the design elements responsible for.

Participated in traffic operations studies (e.g., master planning) by collecting data in the field (e.g., observing non-motorized and motorized user behavior), processing data for analyses (e.g., developing spreadsheets), conducting traffic operations analyses, developing preliminary roadway layout designs to address the operational needs, and then consider constructability and developed phased implementation strategies.

Responsible for the roadway design components on numerous multidiscipline engineering transportation projects, coordinating with other disciplines, developing 3D models for roadways (horizontal, profile, and cross section), prepared roadway, stormwater, traffic control design plans, developed specifications and quantifies for estimates, as well as engineering estimates. For these projects, also responsible for assembling construction documents for bidding purposes, evaluating potential contractors' bids; recommending preferred contractors, and then provided construction supervision of the design elements, responsible for. In addition, served fulltime on a construction site for 12 months during the construction of a large divided highway project through a mountain pass.

ACADEMIC COURSES TAUGHT

- 2007 – 2013: Senior Design Class, University of Portland
- 2012 – 2013: Capstone Project, Portland State University
- 2018 - 2019: Fundamental Engineering Classes, University of Portland

EXPERT WITNESS ACTIVITIES

Assisted attorneys in private practice, insurance companies, and government attorneys, in tort cases filed in the states of Washington, and Oregon. Analyzed roadway design and the design and operation of traffic control devices, including traffic signals, to determine if their presence or absence contributed to or caused an accident.

SELECTED PUBLICATIONS/MANUALS/GUIDES

NATIONAL PUBLICATIONS:

NCHRP Report 707: Guidelines on the Use of Auxiliary Through Lanes at Signalized Intersections

Kittelton & Associates, Inc. (Kittelton) was the prime contractor for this project which produced guidelines for the operational analysis, safety analysis, and design of auxiliary through lanes (ATLs) at signalized intersections. Hermanus was the geometric Design Task Leader and prepared design guidelines to assist practitioners in determining key design variables for ATLs. The final report includes recommendations for incorporating the ATL operational models within the Highway Capacity Manual and conforms with current standards and guidance in the Manual on Uniform Traffic Control Devices and the AASHTO Greenbook.

FHWA Alternative Intersections/Interchanges Informational Guides

Kittelton led a team to develop four alternative intersection information guides for the following forms: Displaced Left-Turn Intersection, Restricted-Crossing U-Turn Intersection, Median U-Turn Intersection, and Diverging Diamond Interchange. Kittelton coordinated with national topic area experts to develop material to augment and expand upon prior FHWA published alternative intersection and interchange reports. A key focus is applying research results addressing multimodal users, traffic operations, and safety performance for each intersection forms. Kittelton created and delivered two webinars to help educate practitioners and professionals in making decisions about using these types of alternative intersections, including how to assess these types of facilities in areas of geometric design, operations, safety, and multimodal considerations. Hermanus was the lead author for the Displaced Left-Turn Intersection Informational Guide, as well as peer reviewed Geometric Design; Signal, Signing, Markings, and Lighting; and Construction and Maintenance chapters of the other guides.

FHWA Accelerating Roundabout Implementation in the US

Roundabouts have been demonstrated both in research and in practice to be proven options for intersection design, and their safety and operational performance in many cases is superior to other alternatives. Federal Highway Administration (FHWA) has included roundabouts as one of nine proven countermeasures. Kittelton conducted research for FHWA on seven time-critical topics as impediments to use of roundabouts in the United States as part of this project:

- Assessment of rectangular rapid flashing beacons for addressing accessibility of multilane roundabouts;
- Assessment and potential recalibration of the HCM 2010 capacity model for roundabouts using a new set of national data;
- Development of air quality and noise predictive tools for roundabouts; and
- Analysis of fatal and severe injury crash patterns at roundabouts.
- Evaluation of geometric parameters for trucks
- Assessment of crosswalk location and design
- Assessment of traffic control device treatments at multilane roundabouts.

Kittelton staff served as the overall technical Principal Investigator and leader of the capacity, accessibility, and safety tasks, with contract management from Virginia Tech Transportation Institute and leadership on other tasks from ITRE. Hermanus led the “Forensic Analysis and Investigation of Severe Crashes at Roundabout” task that included a detailed analysis of fatalities throughout the US and a quantitative assessment of injuries of two State Departments of Transportation. In addition, he was actively involved with the evaluation of geometric parameters for trucks.

NCHRP Report 926: Guidance to Improve Pedestrian and Bicycle Safety at Intersections

Kittelton was a member of the National Cooperative Highway Research Program (NCHRP) research team to develop guidance for transportation practitioners for improving pedestrian and bicycle safety at intersections through design and operational treatments. We conducted an exhaustive literature review and practitioner outreach effort to understand the current state of the practice in designing intersections for pedestrians and bicyclists. We also collected available data from cities and states across the United States to analyze safety performance of different treatment types. A central component of the research is to review and analyze the operational and safety performance of protected intersections. Kittelson led the design and execution of the protected intersection analysis, including video data collection and reduction at two protected intersections (Berkeley, California and Salt Lake City, Utah), as well as a comparison site for each intersection. The results of this analysis will inform protected intersection design and implementation guidance nationwide. As Kittelson's project principal, Hermanus provided guidance for the overall approach and conducted quality review of the final report.

STATE /LOCAL AGENCY GUIDANCE:

Bicycle Facility Design Toolkit: Washington County, OR

Hermanus served as Project Principal for an effort to develop a Pedestrian and Bicycle Design Toolkit that will serve as a resource for selecting and designing appropriate non-motorized facilities along roads throughout Washington County, OR. At the start of the project, the County was unprepared to adopt the best practices for pedestrian and bicycle facilities that have emerged over the last five years as their road standards could not accommodate them. The Bicycle Design Toolkit describes an agreed-upon set of roadway conditions that will support new pedestrian and bicycle treatments for a variety of users. Kittelson's technical work included developing a decision matrix for choosing when to consider a variety of new treatments such as sidepaths or cycletracks and developed typical cross sections that incorporate off-street paths or tracks in the right-of-way. As part of the culminating effort, Hermanus facilitated an extensive stakeholder engagement program and conducted staff training on use of the Toolkit. As a follow-up, Hermanus co-authored a White Paper that provides summaries of literature that document the trade-offs of reducing lane width and provides empirical support for small variations from standard widths based on decisions that balance mobility targets, safety goals, and design user needs of each roadway.

Vancouver Bicycle Planning and Design Guide: Vancouver, WA

Kittelton developed the Bicycle Planning and Design Guide that provides a summary of current design guidance and research related to bicycle facility selection and design as well as a discussion of current research on vehicular lane widths and their impacts on safety, operations and various user types. The guide is divided into three parts that provides guidance for the following:

- Bicycle facilities and network needs
- Applying appropriate vehicle lane widths based on context
- Applying principles in the design process in Vancouver

This guidance is intended to assist City of Vancouver planners and engineers with selection of appropriate street designs now and in the immediate future and embracing their Complete Streets policy. This project was completed through the City's On Call contract, where Hermanus serves as the Contract manager. For this work order, he integrated his national experience in the preparation of guides and manuals and served as the Project Principal.

Montana Department of Transportation Road Design Manual

Hermanus led the team and was an author for the new updated Montana Department of Transportation (MDT) Road Design Manual. Kittelson developed a table of contents for the new Road Design Manual;

developed white papers on key road design topics for consideration in the new Road Design Manual; developed an annotated outline for the new Road Design Manual; and wrote a sample draft chapter for the new manual. Kittelson then led workshops with MDT staff to gather input and work collaboratively to generate design material that reflects current design research, updated project development processes, and best practices for road design. One key component of the update was, to incorporate a performance-based road design approach into the road design project development process that enables designers to make informed decisions about the performance tradeoffs. Key new and updated chapters in the manual include, Road Design Policies and Procedures (i.e., Performance Based Design), Multimodal Design Considerations, and Urban Design Considerations.

Oregon Department of Transportation: Blueprint for Urban Design

Hermanus led and managed the Urban Design Initiative for Oregon Department of Transportation (ODOT) that establishes new urban design guidance and standards throughout the state. The first phase of the project included an audit of ODOT manuals as they relate to urban design, as well as conducting stakeholder outreach activities. The second phase included; developing three topical memorandums addressing key urban design challenges (i.e., Bicycle Facility Design Selection, Pedestrian Crossing Spacing, and Target Speed), providing an implementation plan of how to update ODOT Manuals to integrate urban design, and preparing a “bridging document” (titled, *Blueprint for Urban Design*) that establishes key urban design principles for the state by referencing best practices and tying ODOT manuals together (design, operations, and safety). Hermanus also conducted stakeholder outreach and led the development of training material for urban design guidelines training to agency staff throughout the state.

Metro Designing Livable Streets and Trails

Hermanus guided efforts to update Metro’s street design guides to reflect current best practices and provide guidance on a performance-based design approach for regional streets and trails. The new *Designing Livable Streets and Trails* guide provides the linkage between the Greater Portland region’s policies and vision for implementing streets based on land uses by defining project outcomes, the functions of the streets to support the communities and the intended outcomes, establishing design principles and elements to support the functions, and providing a performance-based design decision-making framework that gives practitioners the flexibility to develop community-based solutions.

PROFESSIONAL DEVELOPMENT COURSES TAUGHT

- 2-day Geometry Design Course
- 2-day Traffic Signal Design Course
- 2-day Applied Roundabout Design Course
- 1-day Safety Oriented Workshop
- 1-day Pedestrian Facility Design Training
- 1-day Bicycle Facility Design Training
- 2-hour Roundabout Workshops
- 2-hour Pedestrian Crossing Workshops
- 2-hour Road Safety Audit (RSA) Workshops
- One-day workshop for Intersection Design for Pedestrians and Bikes through Initiative for Bicycle and Pedestrian Innovation (IBPI)

SELECTED PRESENTATIONS/WEBINARS

Construction of a 14.0-km Divided Highway Through a Mountain Pass in South Africa. Institute of Transportation Engineers (ITE), Quad Conference. 2004.

Efficiency of Dual Lefts Turning into Short Receiving Lanes – A Case Study. Institute of Transportation Engineers (ITE). 2007. / Transportation Research Board (TRB), 2008.

Pedestrian Crossings. Transportation Education Series. 2010.

Going Green by Flashing Yellow – Evaluation of Protected/Permissive Flashing Yellow Arrow Left-Turn Phasing. Institute of Transportation Engineers (ITE). Western District Annual Meeting. 2011. / Transportation Education Series. 2012.

Road Safety Audit, Mt. Hood Highway (Hwy. 26) (Mile Post 47.0 to 54.3). Institute of Transportation Engineers (ITE), Western District Annual Meeting. 2011.

NCHRP Report 707: Guidelines on the Use of Auxiliary Through Lanes at Signalized Intersections. National Cooperative Highway Research Program (NCHRP), TRB, National Research Council. 2012.

FHWA Road Safety Audit Process and Project Applications. Transportation Education Series. 2011. / American Public Works Associations (APWA), Oregon Chapter. 2012.

Washington County Bicycle Facility Design Toolkit. Central Oregon Series on Transportation. 2017. 2013.

Interchanges in an Urban Environment. Transportation Education Series. 2013.

OR 213: I-205 to Redland Road Crossing (Jughandle) Project. TRB, Alternative Intersections & Interchange Symposium. 2014.

Displaced Left Turn Intersection Informational Guide. Federal Highway Administration (FHWA). 2014

Integrating Design through 3D Technology. Transportation Education Series. 2016.

Talking Freight Seminar Series; Accommodating Trucks in Innovative Design Intersections and Interchanges. FHWA. 2016

Montana Department of Transportation (MDT) Road Design Manual (RDM) Update: Incorporating Performance-Based Design. TRB International Access Management Conference. 2016. / Montana Joint Engineering Conference. 2016.

TOPR 34: Accelerating Roundabout Implementation in the United States. FHWA. 2017

Performance-Based Design and Improving the Geometric Design Process. TRB. 2017

Impacts of Connected Vehicles/Autonomous Vehicles (CV/AV) on Multi-modal Geometric Design. American Society of Landscape Architects. 2017.

Roundabout Constructability. ASCE/SLOCOG Roundabout Seminar. 2017 / Central Oregon Series on Transportation. 2017

Creating a 21st Century Design Standard Manual. American Public Works Associations (APWA), Oregon Chapter. 2018.

FHWA Information Alternative Intersections/Interchanges Guides, Oregon Department of Transportation (ODOT) DOT/ American Council of Engineering Companies (ACEC). Technical Brown Bag Session. 2018/ Central Oregon Series on Transportation. 2018

Intersection Control Evaluation. American Public Works Associations (APWA), Oregon Chapter. 2018.

Optimizing Lane Widths, Institute of Transportation Engineers (ITE). 2018

Transportation Design for Community Outcomes | Policymakers' Forum and Technical Workshop, Portland Metro. 2019

Road Safety Audits – Engineering Investigative Science. American Public Works Associations (APWA), Oregon Chapter. 2019.

Complete Streets Training Workshops. Florida Department of Transportation. 2019.

Speed Management Training Workshop. Florida Department of Transportation. 2020.

Roundabout Intersection improvement (Lake & Everett), American Society of Civil Engineers (ASCE) Washington, 2021.

Complete Street Design Update (focusing on protected intersections), Washington County Oregon, 2021.