Richard Lanyi, P.Eng., FCSCE

President, Senior Railway Engineer

LANYI RAIL SOLUTIONS LTD

Richard has over 42 years of experience in the railway industry. He provides senior technical advisory services related to railway engineering and operational matters. Richard's experience ranges from rail line route studies to freight and passenger rail corridor expansion projects, and from rail yards and terminals to ports and other transloading facilities. He has successfully managed large multi-discipline railway projects involving planning, design, material procurement, and construction and project management. Richard is a career "Railroader" who has held senior technical and managerial positions for two North American Class 1 Railways (CN Rail and CP Rail) as well as Stantec's Rail Sector Lead responsible for business and resource development, project leadership and management, and senior technical advisory services.

Richard specializes in the development of rail yard/terminal and linear rail corridor projects. His wealth of development experience and extensive network of Railway Specialists bring a large body of experience and relevant "lessons learned" knowledge. These lessons are based on a "quadruple bottom line" approach involving technical excellence, operational functionality, feasible economics, and social and environmental acceptance. Richard focuses on understanding operational requirements, both locally and network wide, prior to delving into the engineering aspects of a project, where form must follow function.

Richard's "hands on" experience covers all aspects of railway engineering and operations. He is a trusted advisor to his railway clients and understands the importance of safety and the need to plan and execute the work with minimal disruption to train service. Richard has a proven track record of leadership ability and a reputation as a "driver" who is results oriented. He has managed and delivered infrastructure projects as an owner, as well as a consultant, this includes alternative project delivery methods.

Richard has been a member of AREMA for over 30 years and was a founding member of AREMA Committee 10 Bridge Inspection and Maintenance. He is currently a member of Committee 16 Economics of Railway Engineering and Operations and chairs a Subcommittee on Railway Operations. Richard is a Fellow of the Canadian Society for Civil Engineering and a former member of their Board of Directors.

QUALIFICATIONS

Diploma in Pure & Applied Sciences, John Abbott College (CEGEP), Montreal, Quebec, 1978

Bachelor of Science in Civil Engineering (Co-op Program), University of Waterloo, Waterloo, Ontario, 1982

Professional Engineer #25484, Engineers & Geoscientists British Columbia

Professional Engineer #24208, Association of Professional Engineers and Geoscientists of Saskatchewan

Professional Engineer #100166054, Professional Engineers Ontario

Registered Member #38561, Association of Professional Engineers and Geoscientists of Alberta

MEMBERSHIPS

Member, American Railway Engineering and Maintenance-of-Way Association (AREMA)

Member, AREMA Committee 16 – Economics of Railway Engineering and Operations, Chair of Railway Operations Subcommittee

Fellow, Canadian Society for Civil Engineering

SPECIALIZATIONS

Linear rail corridor capacity expansions

Rail yard and terminal developments

Integrated transportation studies

Railway operations analyses and studies

Railway track and bridge structure projects

Railway economic studies

PROJECT EXPERIENCE

Railway Corridors and Route Studies

East Central Shortline Feasibility Study, Alberta

Special Areas and Oyen Development Corp., Oyen Regional Rail Company Inc., and the Canada Infrastructure Bank are collaborating to advance a preliminary technical and economic feasibility study to investigate the development of a short line rail system in east central Alberta which can provide access for land locked resources to domestic and global markets utilizing portions, or all of, CN's previously abandoned Oyen, Drumheller, and Stettler Subdivisions. Two routes have been identified for study, Route 1 would reconnect Oyen to Lyalta providing the potential to re-establish a previously abandoned economic corridor directly connecting Saskatoon and Calgary. Route 2 would connect Oyen to Camrose providing access to CN's major classification yard in Edmonton. Richard provided senior railway technical advisor services to the overall team, developed Shortline railway operating plans for each route including requirements for interchanges with CN, sidings, and transload facilities; assessed line capacity for Shortline manifest service and potential CN intermodal service; and assisted with the development of rail revenue models and carload estimates.

Enhancing Alberta's Supply Chain Resiliency and Logistics Capabilities, Alberta

Alberta's Recovery Plan has identified an emerging opportunity to leverage the Province's logistic infrastructure hubs to further enhance Alberta's position as an innovative hub that moves people in and out of the province and facilitates the flow of goods. The importance of supply chain resiliency to support these goals is critical. Alberta's Investment and Growth Strategy included a commitment to identify and address strategic transportation, infrastructure, talent gaps and industry supply chain barriers that deter investment into principal and enabling sectors. Richard provided information and recommendations to the Province for government actions required to strengthen Alberta's supply chain resiliency, and its competitiveness in the growing logistics sector, specifically related to railway transportation services. This included identifying Alberta's supply chain risks, assessing the resiliency of Alberta supply chain networks involving railway transportation, and examining Alberta's current and future logistics capacity challenges.

Alberta Economic Corridor Task Force Support, Alberta

Western Premiers collectively agreed to further explore the concept of economic corridors as strategic infrastructure aimed at getting Canadian goods, services, and natural resources to market while creating jobs. Alberta's Recovery Plan included creation of a task force to work with industry and other orders of government on advancing the goal of national and regional energy and resource corridors. As part of this support Richard led the assessment of rail capacity in the province and made recommendations regarding whether these corridors are sufficient for Alberta's demand. This assessment included an independent review of current rail capacity and the growth plans of the major rail companies (CN and CP).

CN Mainline Upgrade Study North of Prince George, Northern BC

Increased business opportunities in the BC Northeast corridor of CN's network require additional investment to set the stage for additional capital investments to increase the capacity of the line and improve service. Richard provided input into the assessments of Engineering works required on CN's network in North-eastern BC. These Engineering works focused on speed and tonnage capacity initiatives involving horizontal and vertical track geometry, bridge upgrades, and natural hazard mitigations, as well as upgrade order of magnitude cost estimates.

* denotes projects completed with other firms

Western Canada Alternative East-West Rail Corridor Study, Western Canada
Richard completed a high-level study regarding the development of alternative railway routes through northern regions of the four (4) Western Provinces as a means of providing railway access between ports on Hudson Bay and Canada's West Coast utilizing a combination of existing, abandoned, and new railway line routes.

CP Rail Mainline Capacity Expansion Projects*, Western Canada
Richard has been the Railway Lead for numerous corridor expansion projects. This has included over 15 new siding, siding extension, and double tracking projects involving over 50 Km of new track. Engineering services included geomatics, geotechnical investigations, track and bridge design, and construction administration and supervision in the field. To facilitate the delivery of multiple projects, Richard assembled a Program Management team to handle project management and administration requirements. Richard was active in the development of preliminary designs and construction staging plans, as well as, the review of final designs and support during construction.

CN Rail Mainline & Capacity Expansion Projects*, Western Canada
Richard has been the Railway Lead for several corridor expansion projects. This has included expansion of yards and terminals, bridge projects, and environmental studies and regulatory approvals. Engineering services have included geomatics, geotechnical investigations, track and bridge design, and engineering support during construction.

Yancoal Potash Rail Route Study*, Saskatchewan
Yancoal required preliminary designs for 2 potential railway routes connecting their proposed potash mine site to both CN and CP mainlines. Richard led the route study efforts and provided coordination with both rail carriers. Designs were developed based on minimizing grades and overall route length, while avoiding unsuitable ground conditions, minimising at-grade crossings, and minimizing impacts and land acquisition requirements from local land owners. Up to three options were developed for each route, with lengths of up to 30 km.

International Pipeline – Spur Track Design*, Alberta Industrial Heartland
This project involved 5 Km of new spur track connecting CN's Scotford Yard, in the Alberta Industrial Heartland, to IPL's new Polyethylene plant in the region. Richard overviewed the development of preliminary design, which included numerous crossings for high pressure gas lines, local road crossings, and allowance for service connections to Shell Oil and Keyera Energy. Designs were completed to CN standards. Richard also provided liaison services with CN Marketing and Engineering.

Metrolinx Bowmanville Expansion*, GTA, Ontario
As part of their initiative to increase passenger rail capacity in the GTA, Metrolinx is developing new infrastructure connecting existing Oshawa Station, on the Lakeshore East Corridor, to Bowmanville. This project includes a connecting track from the existing GO Oshawa Station to CP's Belleville Subdivision. From there, the new GO track will run along the south side of the CP corridor for approximately 20 Km. The GO/CP connection will utilize the existing GM Spur corridor, including the existing bridge over Highway 401. It will also include a new station south of the CP corridor. The CP corridor expansion component will include 3 new stations, 15 grade separation upgrades, and 9 at-grade crossing upgrades. Richard served as the Senior Project Manager and Design Manager for preliminary designs, involving the development of stations, civil works, roadways, track, and bridge designs, project schedules, and cost estimates.

* denotes projects completed with other firms

Metrolinx Stouffville GO Stations DB Pursuit*
GTA, Ontario
As part of their Regional Express Rail initiative to increase passenger rail capacity in the GTA, Metrolinx was developing new infrastructure along the Stouffville Corridor. Part of this development includes the expansion of two existing Stations, one new Station, and a new rail over road grade separation at Steeles Avenue. Richard was the senior technical advisor for Rail for the Prime Consultant who were teamed with the Kiewit/Bird JV Construction Team. Richard was involved in a support role to the Design Manager involving the development of project agreements, project schedules, and design costs. He was also been engaged in establishing design QA/QC plans and providing technical assistance to the Grade Separation and Track Design Technical Leads.

Metrolinx Highway 401/409 Tunnel*,
Preliminary Design, GTA, Ontario
To accommodate additional GO traffic and the new UP Express service, 2 additional tracks were required along the Kitchener Subdivision between Kipling Avenue and the Islington overpass. The original project scope involved an expanded Kipling station and new platform configurations at one end, a new 2 track tunnel under Highways 401 and 409 ramps in the middle, and the existing Islington overpass at the other end. The project also accommodated relocation of the existing CN industrial lead south of Kipling. As the project Railway Lead during preliminary design, Richard led teams of planners and engineers through the development of early design solutions.

Northern Alberta Rail Study*, Northern Alberta
Richard provided technical direction into this feasibility study of a proposed rail line servicing the Oil and Gas sector in Northern Alberta. This study involved two separate alignments of over 100 km of new rail line, as well as, several track carrying structures, including 2 long river structures across the Athabasca and Clearwater Rivers. Also included was an initial evaluation of Environmental constraints and development of a framework for future development, as well as, a cost estimate and project implementation plan.

Northern British Columbia Rail Study*,
Northern BC
Richard provided technical direction into this feasibility study of a proposed rail line connecting CN's BC North Line to the Ports of Stewart (CAN) and Hyder (US). This study involved two separate alignments of over 300 km of new rail line, as well as, several track carrying structures, and protection sheds through this mountainous region. Also included was an initial evaluation of Environmental constraints and development of a framework for future development, as well as, a cost estimate and project implementation plan.

Winnipeg BRT Stage 2 P3/DB Pursuit*
Winnipeg, Manitoba
This project involved the extension of the existing Winnipeg BRT system by another 8 km. The new alignment has significant interfacing with CN's Rivers Subdivision mainline, the Portage Junction Wye connection, and the Letellier Subdivision branchline. The project included 3 new railway bridges and the demolition of an existing 3 track mainline structure. Trackwork included mainline and branchline relocations, as well as reconfiguration of the Portage Junction Wye to facilitate of line new bridge construction. Worling with the Graham Construction and Ellis Don Joint Venture, Richard led teams of railway bridge and track designers in developing innovative solutions to save construction costs.

Alderon Iron Ore Rail Line Feasibility Study and Preliminary Rail Design*,
Newfoundland and Labrador
Richard provided technical direction and technical review into this feasibility study of a proposed rail spur servicing the proposed iron ore mine near Labrador City. The study also

* denotes projects completed with other firms

included development of a unit train loading facility at the mine site and unloading facility at the downstream Port of Pointe Noire. Richard also provided technical direction and review of the preliminary designs for all railway aspects of the project, including operation plans, cost estimates, schedules and technical reports.

Labrador Railway Constraints Study*, Newfoundland and Labrador
The Province of Newfoundland and Labrador required evaluation of existing railway capacity issues in support of future iron ore demand in the Labrador Trough. Richard supported capacity analyses and provided recommendations for staged capacity increase based on incremental forecasts in demand. Richard provided technical direction on the project and review of project deliverables.

Iron Ore Rail Line Feasibility Study*, Peru
Richard provided technical direction into this feasibility study of a proposed rail line connecting iron ore reserves within the interior of Southern Peru to port facilities at San Juan de Marcona, nearly 600 km away, crossing the Andes mountains at a peak elevation of 4.5 km. Richard led teams in both Canada and Peru to provide the end product of an investor-grade feasibility report. The project developed a preferred route over mountainous terrain, evaluated new railway infrastructure and rolling stock requirements, developed a railway operating plan, and established capital and operating cost estimates in support of a 30-year operations financial analysis.

Conceptual Rail Route Analysis*, Saskatchewan
Richard provided technical oversight into the conceptual study for establishing potential rail routes for connecting a proposed new mine to existing CN and CP railway networks. The project involved identifying and evaluating alternative routes as well as evaluating options to upgrade existing railway branch lines, and the building of new railway infrastructure to service the proposed new mine.

Circle Drive South – Design Build – Ring Road Expansion*, Saskatoon, Saskatchewan
Acting as Owners Engineer on this $300M highway/railway design build project, Richard's responsibilities included development of technical terms of reference, technical evaluation of proposal submissions, and liaison with both CN Rail and CP Rail. The rail component of the project includes the design and construction of three railroad bridges over the proposed four lane highway, several at grade rail crossing relocations, and temporary rail detours to facilitate bridge construction. Richard led the development of technical requirements for track, structures and signals, as well as coordination with both major railways (CN and CP). Richard also led teams of technical specialists concerning the review of technical and pricing submittals during the RFP stages, as well as teams of technical specialists to review the Contractor's detailed designs, along with technical support during all aspects of railway construction, and/or construction impacts to existing railway operations.

Canadian Pacific Railway (CPR) Montana Subdivision Mainline Relocation*, Alberta
This project involved the relocation of Highway 4 which necessitated 4 km of mainline relocation of CPR's Montana Subdivision in Milk River. Railway engineering components of the project included track alignment design, including grading and drainage; grade crossing assessment, design and regulatory approvals; design of a new steel railway bridge to current CP Rail standards; track material procurement; and track construction supervision. Richard assisted with the procurement of track materials and supervision of track construction.

* denotes projects completed with other firms

CN Long Siding Projects (2006-2008)*
Western Canada
Richard was responsible for planning, design, construction and project management services for over 50 long siding capacity expansion projects in Western Canada. He led teams of transportation planners; engineering designers; surveyors; geotechnical, hydrotechnical and environmental engineers. During construction he overviewed grade, signals, structures and track contracts, construction supervisors; and materials procurement specialists. He interacted with railway operations and transportation personnel regarding the planning and execution of work blocks, work trains and movement of OCS cars. He also developed and managed integrated schedules involving design, construction (grades, signals, structures and track), property acquisition, and materials procurement, including second hand rail and tie relay programs.

CN Western Region Mainline Capacity Evaluation*, Western Canada
Richard managed a team of transportation planners, operations and engineering personnel involved with the analysis of existing daily train traffic volumes and line segment capacity limitations. He summarized the supply and demand characteristics of all core mainline routes in Western Canada. He also identified existing bottlenecks on these core routes and developed a multi-year plan to upgrade line capacity to suit existing and future demand.

Rail Yards and Terminals

Railway Terminal Development Projects*
Richard has worked with dozens of clients in the industrial and mining sectors in developing railway terminal engineering and operations plans. Richard typically leads teams of environmental/regulatory specialists, as well as, surveyors, geotechnical, grading, drainage and track design engineers in preparation of the site plans to suit the specific requirements of each site and operations. He has also incorporated materials handling, process design and building services groups in development of the entire terminal, based on client needs. These projects typically commence with the development of concept site and operations plans for railway approvals. Richard's extensive railway engineering and operations background, and knowledge of CN and CP's specific requirements, assist clients in minimizing their development costs, while focusing on safety, and the most efficient and economical solutions which suit both client and railway.

Port of Vancouver Roberts Bank Terminal 2*
Vancouver, BC
This project involves the preparation of 30% design plans and procurement documents for a 2.4 Million TEU capacity container terminal at Roberts Bank, BC. As the Owners Engineer's Rail Lead, Richard lead a team of railway engineering and operations specialists in supporting this project. Challenges include facilitating the relocation of existing Westshore Coal terminal tracks to make room for proposed new roads and overpasses; as well as, developing workable solutions for inbound and outbound lead tracks at the congested east (mainland) connection. Richard worked with the Port of Vancouver in reviewing proposed terminal rail operations to ensure the proposed storage and loading/unloading yards have sufficient capacity and can accommodate the proposed traffic flows. Richard also led static and dynamic railway operations simulations related to integrated operations with Westshore Coal and Deltaport Intermodal terminals, including liaison with CN, CP, BNSF, and BC Rail. Other responsibilities included the preparation of DB procurement documents for Rail to ensure that the owner's requirements are well defined in terms of operations, constructability, quality, safety and service.

* denotes projects completed with other firms

Fairview Intermodal Terminal – Phase 2, Stage 1B Expansion – Prince Rupert, BC
DP World's next stage of capacity expansion at the Fairview Intermodal Terminal involves increasing throughput capacity to 1.8 Million TEU's involving the expansion of their rail yard and container storage facilities. It also involves the relocation of about 1 kilometre of CN mainline, as well as, accommodation for CN locomotive fuelling and railcar repair tracks. As the Rail Lead for the development of a reference concept design, Richard led the assessment of several rail yard concepts in collaboration with DP World project planners and Engineers, as well coordination with CN regarding the relocation of their mainline.

Fibreco Terminal Expansion Planning Study, North Vancouver, BC
Fibreco Export Inc. is one of the largest wood biomass handling terminals in the world enhancing their terminal operations to expand the export of agricultural products to Europe and Asia. Fibreco's efficient rail delivery logistics, dry bulk storage, and loading processes are integral to providing a high level of value-added service for their customers to ensure a low cost and efficient supply chain from source to vessel. Strategically located on the north shore of Burrard Inlet in North Vancouver, B.C. they have efficient rail access within Canada with convenient marine access to international markets. Richard provided senior railway engineering and operational advisory services in this expansion study whose objective was to double terminal throughput. He led the creation of alternative rail yard layouts with expanded railcar capacity, as well as, contributed to the terminal operations analyses completed to assess potential throughput capacities of these various terminal layouts.

Ashcroft Inland Port Terminal Master Planning, Ashcroft, BC
Ashcroft Terminal is an inland port strategically located outside Vancouver's congested Lower Mainland to help shippers, manufacturers, and producers prepare their commodities for import or export. Richard completed assessments of existing terminal services and site constraints and developed concepts to expand existing services, accommodate new warehouse tenant facilities, expand the existing intermodal container yard and container storage capacity, as well as the provision of roadway access to CN's adjacent intermodal yard. Richard also evaluated concepts for the development of a new CP siding within the vicinity of the terminal.

Camino Multi-modal Terminal Master Plan, Long Sault, ON
The Camino Multi-modal Terminal is strategically located between CN's Kingston Subdivision mainline and Highway 401 between Montreal and Toronto. It will service warehousing facilities involving the transloading of intermodal containers and carload commodities. The master plan includes an inbound/outbound staging yard to support CN's hook and haul manifest service, an intermodal yard, a carload transload yard, and direct rail access to some warehousing. A future expansion has also been developed which would accommodate unit train service to the terminal. Richard developed rail yard layouts, yard operating plans, trackwork cost estimates, and provided liaison services for CN's Marketing and Business Development teams.

Covenant Energy Bio-Fuel Transload Terminal, Estevan and Lloydminster, Saskatchewan
Covenant Energy is looking to develop bio-fuel (diesel) from canola oil. Transloading terminals will receive canola oil and offload it for processing. The refined diesel product will then be loaded into tank cars for shipping to customers. Richard developed conceptual terminal layouts and proposed rail yard operating plans for proposed transload terminals

* denotes projects completed with other firms

at both locations. The Estevan terminal was design to accommodate CP service only, whereas the Lloydminster terminal was design to accommodate service from both CN and CP. The rail terminal will be comprised of two yards, one for receiving and offloading canola oil, and a second for loading and departing diesel.

NorthernNations Cooperative Transload Terminal Plans, Western Canada
The NorthernNations Cooperative are developing a process for loading undiluted bitumen into containers for shipping overseas by ship to potential customers. Richard has developed conceptual rail yard plans at various locations in Western Canada which would accommodate the receipt of undiluted bitumen by truck, then loaded into bag filled containers, then loaded onto intermodal railcars for shipping to port terminals. These rail yards were developed to accommodate inbound/outbound staging tracks for railway service, loading of container cars, as well as, storing railcars.

KiwiRail Palmerston North Regional Economic Hub/Terminal Master Planning*
Palmerston North, NZ
Richard was responsible for developing the Master Plan for this strategic intermodal transload Hub. In support of creating economic growth in south central North Island, this facility was designed to accommodate inbound / outbound storage tracks, a marshalling yard, intermodal container terminal, freight forwarding facilities, log loading and fuel transloads, as well as, railcar and locomotive maintenance and railway engineering maintenance facilities. Richard work with KiwiRail in developing improved network and terminal operations efficiencies, as well as, site selection evaluation for this strategic facility

CN McBain Intermodal Terminal*
Edmonton, Alberta
Richard worked with CN on several improvements within their McBain Intermodal Terminal in Edmonton, AB. These improvements were developed with the intention of improving the operational through put of the facility. Richard worked with CN to define the scope of these projects for funding approval, then overviewed engineering designs and supported the construction efforts with survey and materials testing. Improvements to the terminal include Chassis Parking area, Rolled Compacted Concrete Pad Expansions, Track Expansions, and Redesign of Terminal Entrance. Each of these projects has allowed CN to improve the operation to increase productivity and volumes moving through the terminal.

CN Lynton Yard Expansion*
Fort McMurray, Alberta
CN's Lynton Yard has existed since 1905 and has seen sporadic development over the years. With the increased demand for resources in the Fort McMurray area, the rail yard has seen exceptional growth. This in turn has led to several development projects within the Lynton Yard. In order to meet the needs of existing projects and forecasted growth, CN required development a storm water management plan. Richard worked with CN to determine how storm water containment could be placed in future development to maximize the development potential of the rail yard space. Within this terminal Richard was also engaged in design a new fuel transloading facility, and trackwork for crude and sulphur transloads.

Athabasca Upgrader - Preliminary Design, Alberta Industrial Heartland*
This project involved plant infrastructure preliminary design for Total's oil upgrader in Fort Saskatchewan, Alberta, including grading, roads, rail and drainage design. The rail yard is designed for 3 separate loadout facilities (Coke,

* denotes projects completed with other firms

Sulphur and LPG) to accommodate a daily production involving 150 cars. The railway plant includes approximately 12 miles of track. Apart from alignment design, Richard developed railway logistics plans which included recommendations for custody transfer weighing and car indexing for each loadout facility. As Senior Engineer for Track Design, Richard provided technical guidance regarding alignment design, rail yard layout and logistics planning.

Sulphur Terminal Rail Yard Design*,
Bruderheim, Client: Alberta Sulphur Terminals
Richard provided senior reviews of railyard operations/logistics plans, preliminary and detailed design track alignments and railyard layouts. This terminal included a 44 car/day loadout facility for inbound molten sulphur. A separate rail loop to accommodate 110-car outbound loaded unit trains. Railcar storage and maintenance facilities were also studied, and recommendations provided regarding future expansion.

Canadian Methanol Pre-Feasibility Study*,
Chetwynd and Kitimat, BC
This project involved the development of an upstream production facility/terminal in Chetwynd, BC, and a downstream transload (rail to ship) facility in Kitimat, BC. Richard was the Rail Lead on the project responsible for upstream/downstream rail yard designs and operating plans, as well as, the capacity assessment of CN's rail operations between terminals. Richard oversaw the development of cost estimates and implementation plans for all Rail facilities, and provided railway liaison services between the client and CN. Project deliverables included estimations of fleet size for railcars, as well as, requirements for railcar storage. Operating plans were developed to accommodate upstream plant production, as well as, intermediate rail service and downstream ship schedules.

Railway Structures

Port of Vancouver Pitt Meadows Grade Separation Projects, Vancouver, BC
The Port of Vancouver is engaged in improving road and rail traffic flows throughout the Lower Mainland. Richard provided senior technical railway advisory and railway liaison services related to grade separations of Kennedy Road and Harris Road across CP's Cascade Subdivision. Harris Road is intended to be a rail over road design involving numerous roadways, utility, and property constraints, and railway operations logistical issues. Richard has supported the development of railway detours and constructability reviews focused on minimizing impacts to CP's operations.

Holly Frontier Sinclair, Petro-Canada Refinery Railway Bridge Safety Management Plan
Oakville, ON
Responsibility for operations, inspections, and maintenance management of railway infrastructure along the one-mile spur track connecting the Petro-Canada Refinery in Oakville to CN's mainline has recently been transferred to Holly Frontier Sinclair from CN. As owners and operators, Holly Frontier Sinclair require a Railway Bridge Safety Management Plan to be compliant with Transport Canada regulations. Lanyi Rail Solutions Ltd. In collaboration with Veresk Inc. prepared a draft safety management plan in consultation with existing refinery safety and operating policies and documented safety plans.

CN Skeena 87.2 Bridge Expansion*
Prince Rupert, BC
CN has been expanding capacity along their BC North Line from Prince George to Prince Rupert. The existing six span single track bridge (Zanardi Rapids) has been a local constraint to numerous new port developments in the Prince Rupert region. Richard was engaged as the senior technical advisor supporting preliminary and detailed design involving the expansion of

* denotes projects completed with other firms

up to 3 new tracks/bridges. Challenges involved construction of new substructures within a 25-foot tidal zone into, and on top of, fractured rock foundation conditions. Richard provided input into assessment of existing site conditions, concept designs, and constructability considerations.

Metrolinx South Blair Grade Separation*, GTA, Ontario

South Blair Street was originally an at-grade crossing of 2 GO mainlines, 2 CN Kingston Sub mainlines, and a CN industrial lead to the south. The project involved the lowering of South Blair below these 5 tracks, as well as, 4 additional tracks, including the new lead to the Whitby Rail Maintenance Facility. Richard acted as the Railway Lead and Engineer of Record for the project which involved completion of preliminary and detailed design of the new multi-track grade separation; as well as, 50 MPH detour tracks for both GO and CN. Richard was intimately involved in the development and evaluation of structural options for the new structures, including the use of a longitudinal secant pile shoring wall between CN and GO tracks, as well as, the development of construction staging plans and track detours. Poor ground conditions in the area required the use of soil preloading along the north side of the corridor. Richard was involved with incorporating this construction sequencing into the project and developing a track monitoring procedure to ensure safe mainline railway operations at all times. His personal relationships with local CN engineering staff and their Bridges and Structures Group helped move this project along efficiently and cost effectively.

Metrolinx Georgetown South Bridges*, GTA, Ontario

This project involved the widening of 3 existing railway bridge structures to accommodate multiple new tracks over Kipling Avenue, Martin Grove Avenue and Highway 27; as well as, the design of retaining walls under Highway 427 to allow for the new UP Express tracks. Richard acted as the Project Manager during the design phase, and Railway Lead on the project which involved completion of preliminary and detailed design, preparation of tender documents, and construction administration and supervision. Richard's experience helped resolve several challenges involving construction in a confined urban environment. Many of these involved working around existing and relocated utility services, utilizing temporary shoring techniques to minimize work space, and planning the work utilizing daily evening work blocks while minimizing disruptions to daytime GO and CN traffic.

CP Bridge 14.58 Windermere Span Replacements*, British Columbia

The original bridge was an 8-span open deck Half Deck Plate Girder structure crossing the Kootenay River, supported on concrete piers and abutments, founded on timber piles. These steel spans were over 100 years old and in need of replacement. Rick led a team of bridge engineers and hydrotechnical specialists to develop options for replacement while minimizing impacts to the busy mainline coal traffic on this rail line. CP selected to utilize innovative span removal and launching technology to complete the work. Rick led plans for detailed design and construction staging and overviewed the progress of the work during construction.

CN VIA Expansion - Kingston West Subdivision – Rail Bridges, Multiple Sites*, Ontario

CN desired to add a third track along approximately 64 km (40 miles) in the Kingston West Subdivision to provide more capacity for VIA Rail passenger train traffic. Part of the overall project modifications to existing structures along the north side of the existing track, adjacent to existing structures. The project involved detailed design and tendering for five bridges, environmental assessments/approvals, and a third of the

* denotes projects completed with other firms

geotechnical services for the effort. The bridge types ranged from double voided box, precast prestressed concrete spans to ballasted steel beams. The bridge designs were performed in compliance with CN requirements and relevant chapters of the AREMA Manual of Practice. Rick provided technical support and peer reviews to ensure a quality-controlled product was delivered.

Brandon Eastern Access, Brandon*, Manitoba
Client: Ministry of Infrastructure and Transportation
Preliminary design for a new double track railway bridge over a proposed four lane highway identified that a rail detour was the most cost-effective way to construct the new railway bridge. Operational requirements required the design of a double track diversion to Canadian Pacific Railway's Carberry main line. Works included construction of subgrade, sub-ballast, ballast, and track. It also involved the addition of a new track over an existing double track bridge, as well as, reconfiguration of the existing CTC signals. Richard was responsible for preliminary and detailed track designs and technical specifications. He also provided planning and coordination with Canadian Pacific Railway regarding track and signals design and construction, and oversaw preparation of final documents for tender and construction.

CN System Engineering - Bridges & Structures
Assistant Chief Engineer (2001 – 2005)*
As Assistant Chief Engineer, Richard's team of railway Bridge Engineering Specialists were responsible for setting corporate standards and developing annual plans and budgets related to inspections, testing and monitoring, load rating, design, construction, and maintenance of all of CN's greater than 10,000 bridges and structures across the network, throughout Canada and the US. Richard led the development of CN's in house computerized asset inspection and management systems for bridge & culvert structures. These systems allowed for consistent methodology for inspecting, documenting, prioritizing and planning maintenance across the entire CN System (Canada & US). Richard also led and participated in the training of railway bridge engineers, bridge crews, and inspectors related to bridge inspection and construction safety programs.

CP's Annual Bridge Replacement & Rehabilitation Programs (1996 – 1999)*
As Senior Structural Engineer, Richard was responsible for detailed design of new and replacement structures, preparation of repair details and procedures for existing bridges, detailed bridge inspections, and preparation of inspection reports, and bridge load ratings.

Passenger Rail/Transit

Metrolinx Whitby Rail Maintenance Facility*
P3/DB, GTA, Ontario
In the Greater Toronto Area (GTA), moving commuters to their jobs and home again is essential and GO Transit does that effectively and efficiently. Part of that efficiency lies in careful management and maintenance of their fleet at sites like the Whitby Rail Maintenance Facility (WRMF). Richard was involved with providing railway design services for the WRMF project as part of the prime consultant role to Bird-Kiewit in Joint Venture. Richard was involved as a Technical Advisor to the Track Design Team, and also provided support to the development of the Design QA Program.

Edmonton North LRT Preliminary Track Design*, Edmonton, Alberta
Client: City of Edmonton
This project involves 3.2 km of new LRT double track design through the heart of Edmonton's city centre. The new rail line runs from the existing underground Churchill Station to the Northern Alberta Institute of Technology. Portions of the alignment include a tunnelled section, an in-street section and a complex connection to the existing underground network.

* denotes projects completed with other firms

Richard provided senior engineering and project management support to the design team for this project whose estimated construction value is over $800M CDN.

Calgary West LRT DB Pursuit*,
Calgary, Alberta
This Design/Build pursuit involved 8km of light rail extension for the City of Calgary that included six stations. The cost of the West LRT line was valued at $1.4 billion. Richard was the Track Design Lead responsible for horizontal and vertical alignments, as well as, special trackwork designs to meet Calgary LRT specifications. The scope of this trackwork included the construction of 8km of double track LRT, 3 direct fixation diamond crossovers, 1 ballasted crossover, 1 ballasted turnout, and 5 road level crossings.

South Light Rail Transit*,
Edmonton, Alberta
Richard led the Owner's Engineer Rail Team in support of this 3 km segment of Light Rail Transit construction. Richard provided senior technical advisory services, particularly on critical field issues, and resolved process or operational issues that affected communications between track designers, the Rail Contractor, and the Project Management Office.

Lagos Blue Line LRT*,
Lagos, Nigeria
Richard was Technical Director responsible for preliminary design, capital cost estimates, and preparation of design/build tender documents. The work included 27 km of roadbed, drainage and trackwork, 4 km of guideway, 5 double track bridge structures, and 10 stations.

* denotes projects completed with other firms