

<b>Project Name:</b>	North Highway Connector	<b>Client:</b>	City of Red Deer c/o Stantec Consulting Ltd.
<b>Location:</b>	Red Deer, AB	<b>Type:</b>	Geotechnical, Construction Monitoring, Quality Assurance
<b>Consulting &amp; Testing</b>	\$500,000 to date	<b>Project Budget:</b>	\$125 Million



The City of Red Deer is constructing an 8 km long bypass expressway around the east side of the City. The project has been divided into multiple phases to be built over a span of twenty to thirty years. The ultimate six lane roadway will include bridges over the CN Rail Line and the Red Deer River; and will make allowances for several grade separation interchanges at major intersections with new and existing arterial roads. The first phase of project is the North Highway Connector (NHC) in the northeast quadrant of the City. The NHC section crosses the river valley and connects Highway 11A with 30th Avenue. Preliminary NHC construction has been completed for the road embankment, bridge abutments and buried utility trunks. The two bridges and the final roadway will be built in the next 2 to 5 years. ParklandGEO has performed or project managed a wide range of services for this project including:

- a Phase 1 Environmental Site Assessment for the entire 8 km road allowance. The Phase 1 ESA led to an environmental clean up program for an old City Landfill located in the vicinity of the proposed west river bridge abutment, ParklandGEO personnel supervised and documented the clean-up;
- a detailed geotechnical investigation and assessment program consisting of over 150 boreholes, bedrock coring at 8 locations for bridge piers and a deep utility river crossing, Cone Penetration Testing and a geophysical survey of the river crossing (seismic refraction, electrical imaging, ground penetrating radar);
- a detailed stability analysis of two 35 m high slopes for both the east and west river valley escarpments. The proposed road alignment crossed the footprints of two large historical landslide sites. The slope on west escarpment was actively moving and required a major slope rehabilitation program designed to allow construction of bridge foundations and abutments for the CN Rail overpass located about half way up on the slope face. Slope monitoring was undertaken on the both escarpment during construction to protect adjacent property and local services;



- detailed stress/ pore pressure/settlement analysis and an associated wick drain design for safe construction of 15 to 18 m high embankments at the toe of the east and west escarpment slopes. Pore pressure monitoring was undertaken during construction for embankment fills at both slopes to assess construction impacts and verify foundation stability. This monitoring required installing 20 pneumatic piezometers, 10 slope indicators, and 10 settlement plates;
  - stability analysis and design review for several mechanically stabilized earth (MSE) retaining walls and a temporary shoring wall design.
- a gravel assessment of the east river flood plain which was an operating open pit gravel mine; and preparation of a Borrow Management Plan providing a wide ranging review of available fill materials (quantity and rated quality) from sources located across the City and the surrounding Red Deer County;
  - geotechnical recommendations, design and design input for a future six lane 8 km roadway; a future 200 m long bridge spanning over the Red Deer River; and a future MSE wall supported bridge for the CN Rail overpass. Foundation design input and inspections of subgrade improvement and bearing for footings supporting a pre-cast concrete wildlife crossing structure in the road embankment east of the river;
  - geotechnical assessment and inspections of the horizontal directional drill installation of three major trunks crossing the Red Deer River, a conventional open trench trunk installation up the east river valley escarpment including the odor management facility built into the mid slope area.
  - Quality assurance materials testing for the in-fill of the old landfill, the new road embankments, the roadway/pavement for the 40<sup>th</sup> Avenue underpass at the west bridge abutment, backfill for the wildlife crossing structure, MSE structures, the east trunk trenches and the odor management facility. Quality assurance included over 3000 field density tests and 50 proctors on fill material for the project.

The North Highway Connector project was awarded the **2014 CEA Showcase Award of Excellence** for the Transportation Infrastructure Category by the Consulting Engineers of Alberta.

