Design-Build Experiences in Canada

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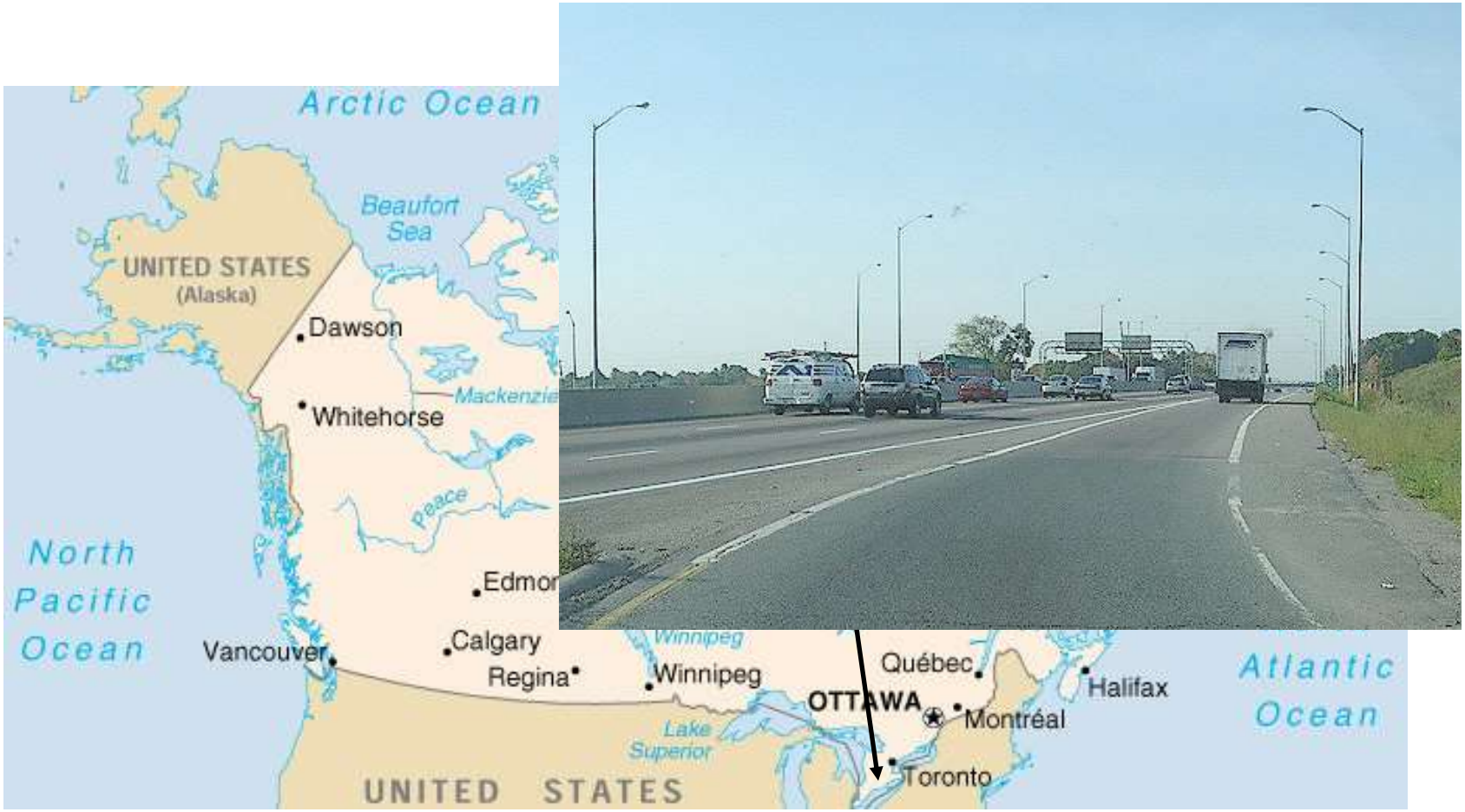
An Employee-Owned Company

Presentation Overview

- Overview history of design/build process
- Canadian experience over the past 15 years
- Examples of the “good” the “bad” and the “ugly”
- How can design/build work for you?
- Owner, designer, contractor and maintenance perspectives
- Design/build in public/private partnerships
- Value added possibilities

Queen Elizabeth Way



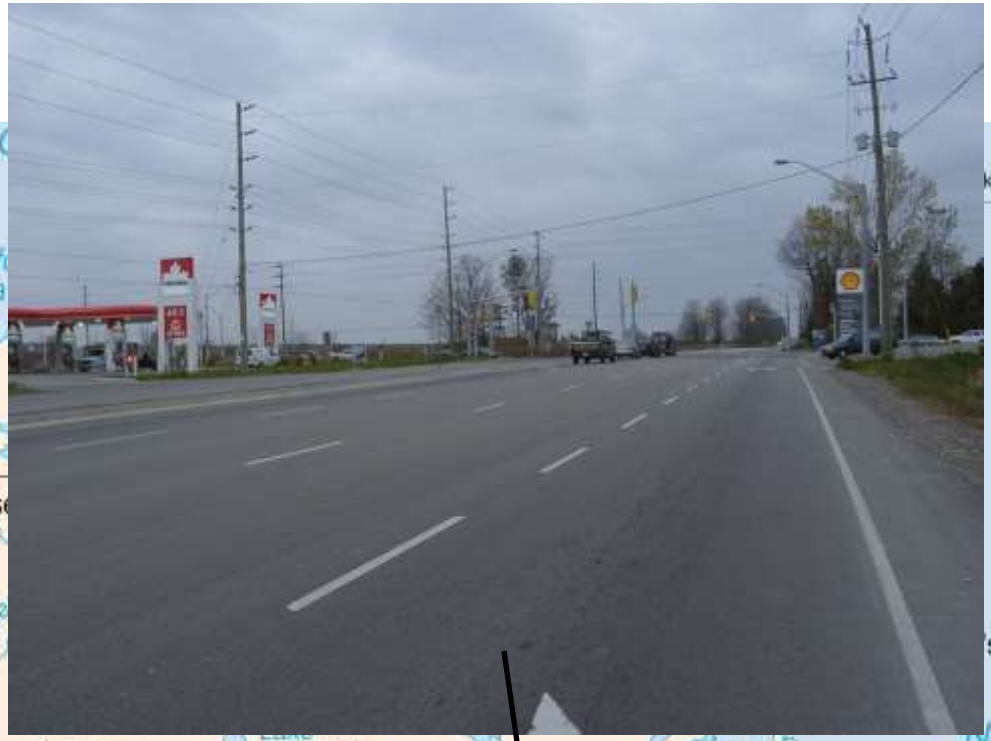
Queen Elizabeth Way Project Details

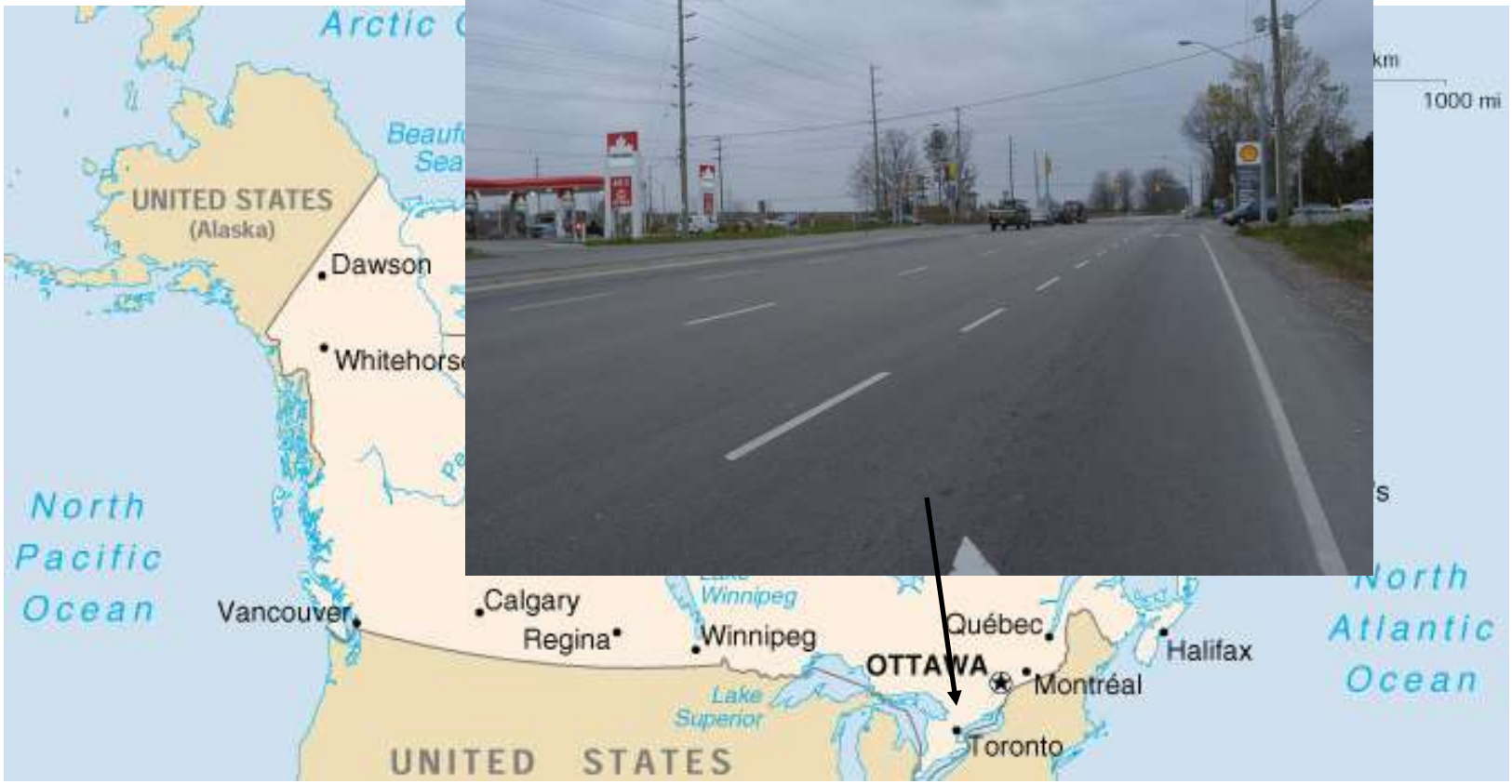
- Reconstruction (1992) of 4 lane rural controlled access highway to 6 lane urban cross section (15 miles)
- Project value ~ $ 100 million (design/build)
- Consortium of 2 major engineering designers and 2 contactors
- Engineers – 5 percent equity each
- Contractors – 45 percent equity each
- Engineers share design by discipline
- Contractors share work horizontally – one doing demolition and grading, one doing granulars and paving

Queen Elizabeth Way Good, Bad and Ugly

- Good:
  - Integration of construction and design
  - Rapid design and construction
  - Ability to adapt and be very dynamic
- Bad:
  - Two hats for engineers with equity
  - Construction split led to may disputes and blame
- Ugly
  - Contractor animosity and differing styles
  - Several legal battles still not yet resolved

Highway 47/48 Intersection





Highway 47/48 Intersection Project Details

- Reconstruction and widening of a highway intersection
- Project value ~ $ 1 million
- Design/build
- Project let to permit smaller contractors and engineers to bid
- Project won by a large local contractor
- Project very straight forward

Highway 47/48 Intersection Good, Bad and Ugly

- Good:
  - Small D/B project allowed smaller contractors to bid
  - Easier for owner to administer
  - Relatively straight forward project
- Bad:
  - Smaller contractors still had trouble putting together a D/B team
  - Straight forward project left little room for innovation
- Ugly:
  - No real cost advantage for owner
  - Higher costs for D/B team not recovered

Highway 407 - ETR

Highway 407 ETR Project 1 Details

- Green field construction of 4 and 6 lane freeway (60 miles)
- Project value ~ $ 1 billion (design/build)
- Project 1 – 1996-1998
  - Consortium of 2 major engineering designers and 3 major contactors (plus multiple subcontractors)
  - Engineers share design by discipline
  - Contractors share work by discipline and horizontally – one doing grading and granular placement, one doing granular materials and paving and one doing bridges
- Owner hires independent engineer (police)

Highway 407 ETR Good, Bad and Ugly

- Good:
  - Rapid design and construction
  - Large project and potential for value engineering
  - Owner provided $ 1 million for design to 3 teams
- Bad:
  - Initial DBOO changed to owner finance D/B
  - Construction split led to may disputes and blame
  - Team hands tied to existing specifications
- Ugly
  - Owner “police” stymied innovation
  - Internal quality plans often circumvented

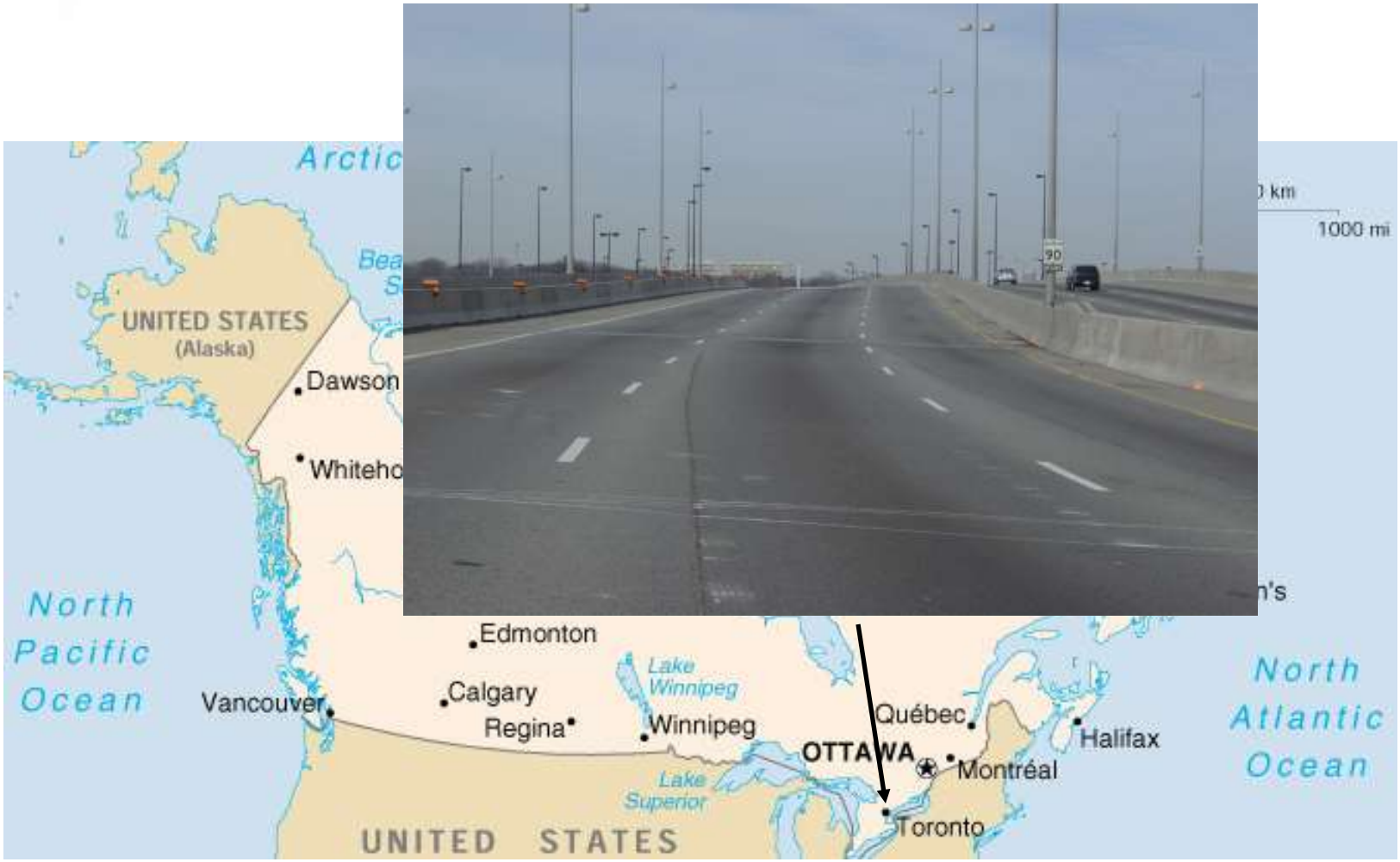
Highway 407 ETR Project 2 Details

- Green field construction of 4 and 6 lane freeway (25 miles)
- Project value ~ $ 400 million + buyout ($3.1 billion)
- Project 2 – 2000-2002 (DBOO – 99 year lease)
  - Spanish/Canadian engineering consortium
  - All design and construction subcontracted locally
  - Private - therefore little government involvement
  - Owner and builder from the same company
- Owner provides public safety overview only
- Independent safety audit completed by PEO

Highway 407 ETR Good, Bad and Ugly

- Good:
  - Very rapid design and construction
  - Very experienced international management team
  - Significant freedom for value engineering
  - Very little “red tape”, decisions rapid and final
- Bad:
  - Sometimes ownership led to conflicts
  - Focus on speed, quality typically “just” acceptable
- Ugly
  - Private sector owners significantly “squeezed” the local engineers and contractors

Toronto Humber Bridges



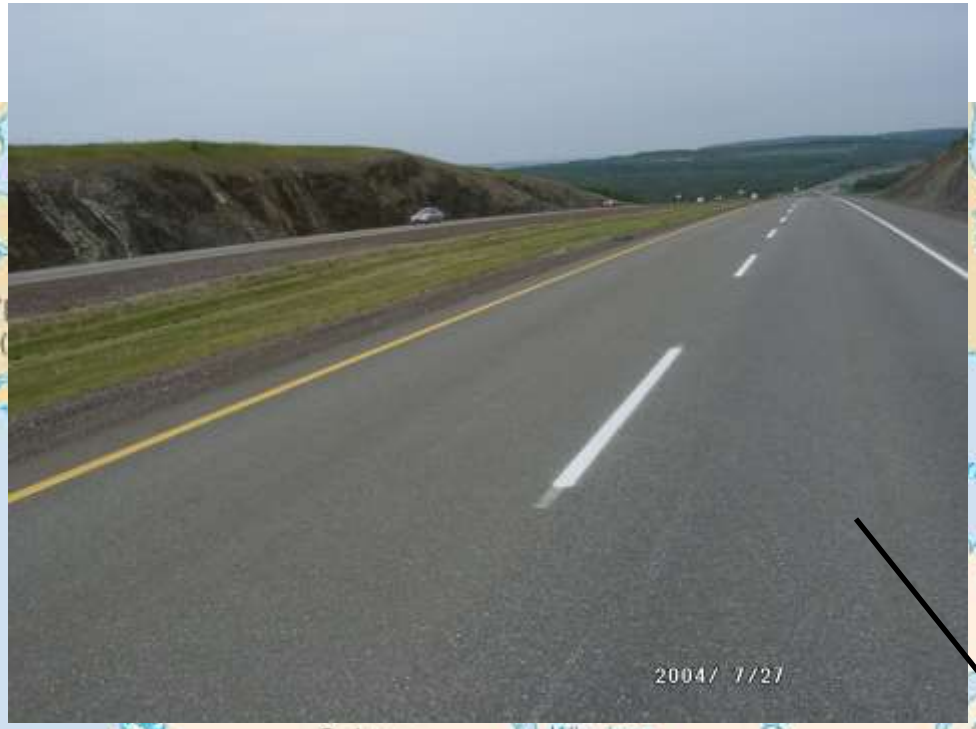
Toronto Humber Bridges Project Details

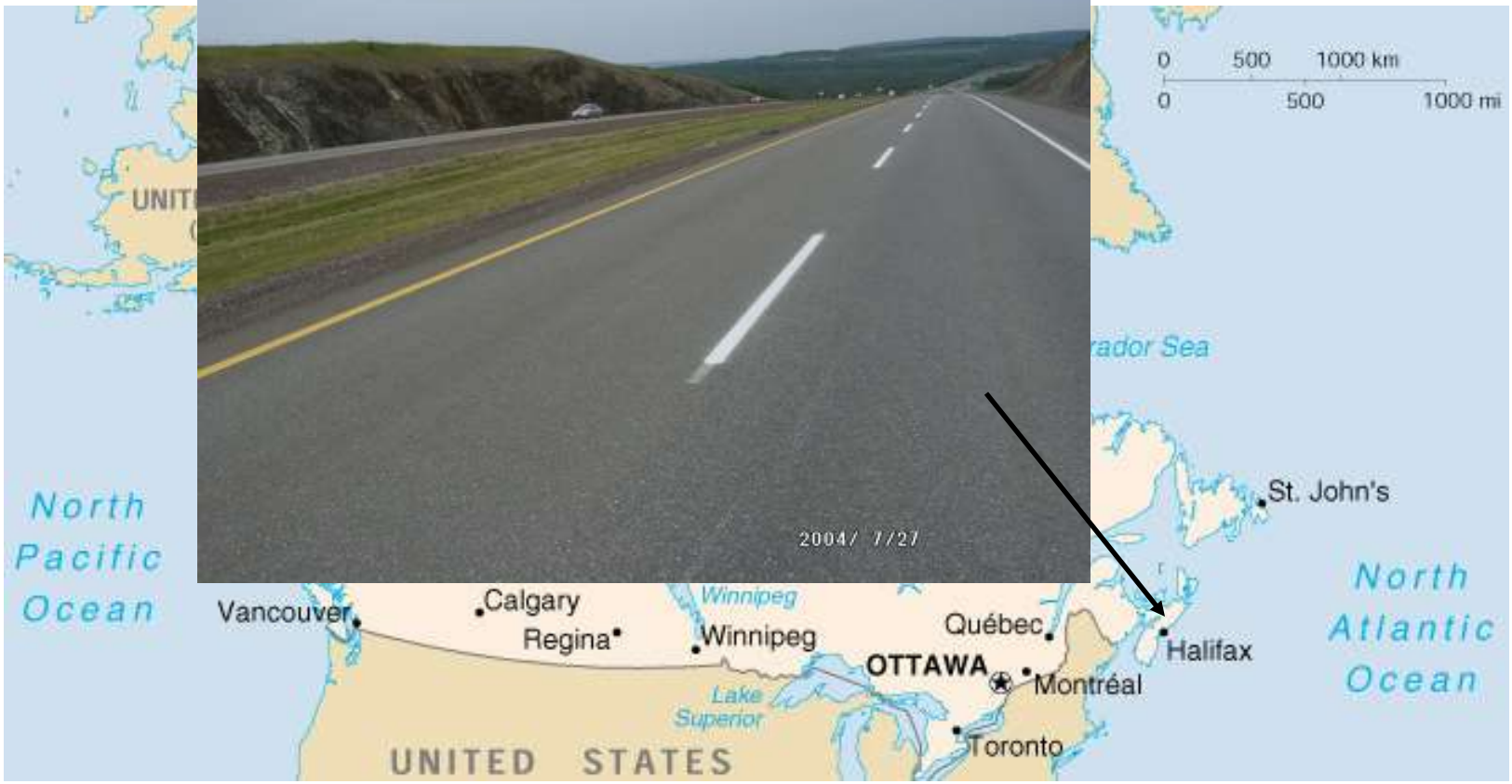
- Replacement of 2 river bridges
- Project value ~ $ 75 million (design/build)
- Project completed 1998-1999
  - Replacement of two bridges along the main access roadway to downtown Toronto
  - AADT in excess of 125,000
  - Incentive contract for reduced construction time
- Owner takes a “hands off” approach

Toronto Humber Bridges Good, Bad and Ugly

- Good:
  - Very rapid design and construction
  - Won by very experienced contractor
  - Expected three year project completed in 14 months
  - Significant reduction in user delay
  - Owner paid $ 5 million bonus
- Bad:
  - Nothing
- Ugly
  - Nothing

Highway 104 Cobiquid Pass





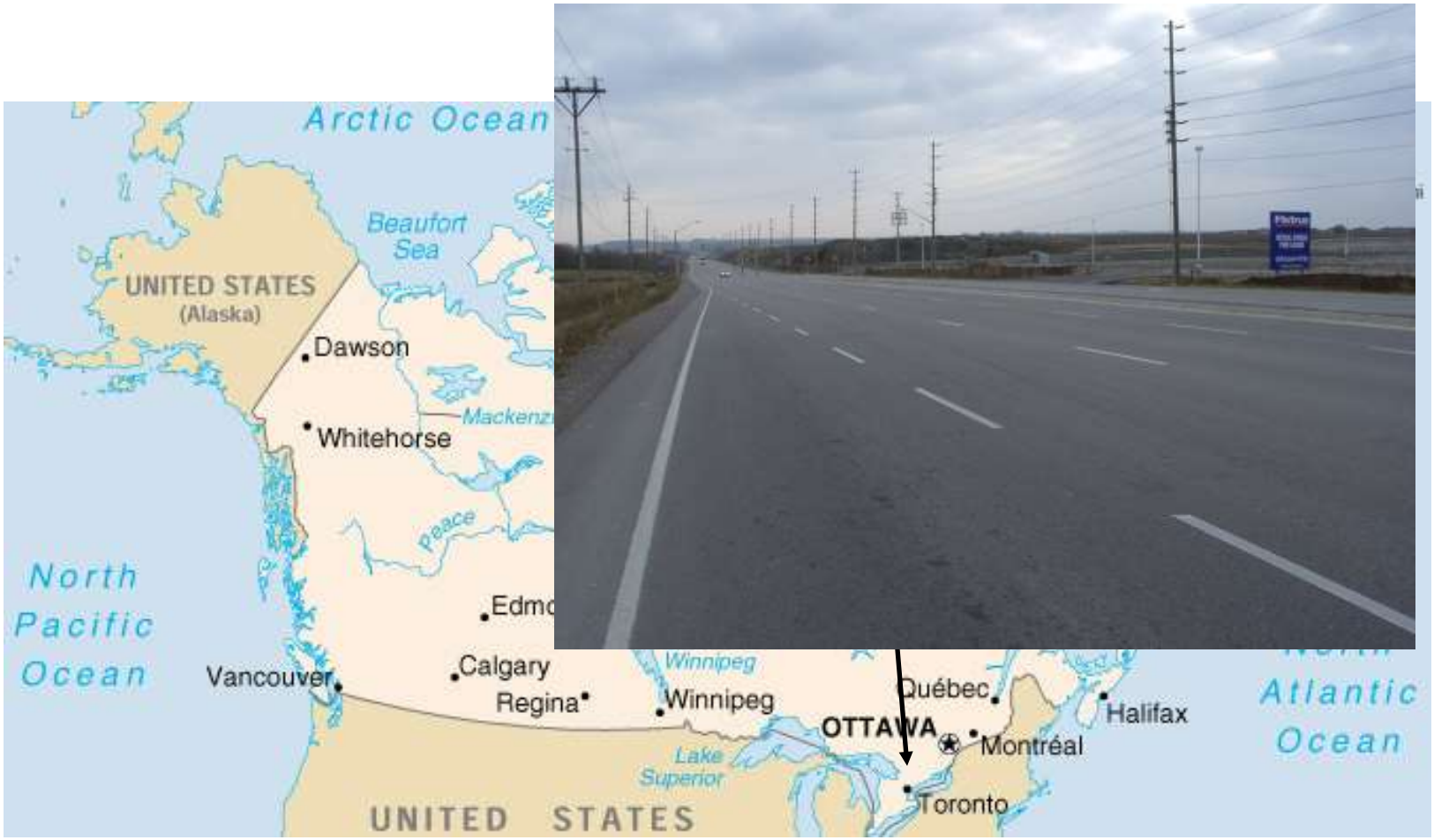
Highway 104 Project Details

- Green field 4 lane rural highway (60 miles)
- Design/build
- Project value ~ $ 100 million
- Consortium led by 2 major “imported” contractors and two local contractors
- Engineering led by one “imported” engineer and two local engineering firms
- Road financed by owner tolls

Highway 104
Good, Bad and Ugly

- Good:
  - Significant “partnering” with the owner
  - Owner and builder “experts” left to come to technical agreements which were ratified by the owner and builder senior representatives
  - Project split vertically with each contractor and engineer responsible for the design of a longitudinal section
  - Common pavement designer for entire project
  - Opportunity for owner to “upgrade” specifications
- Bad and Ugly:
  - Nothing really, perhaps limited local participation

Green Lane – York Region



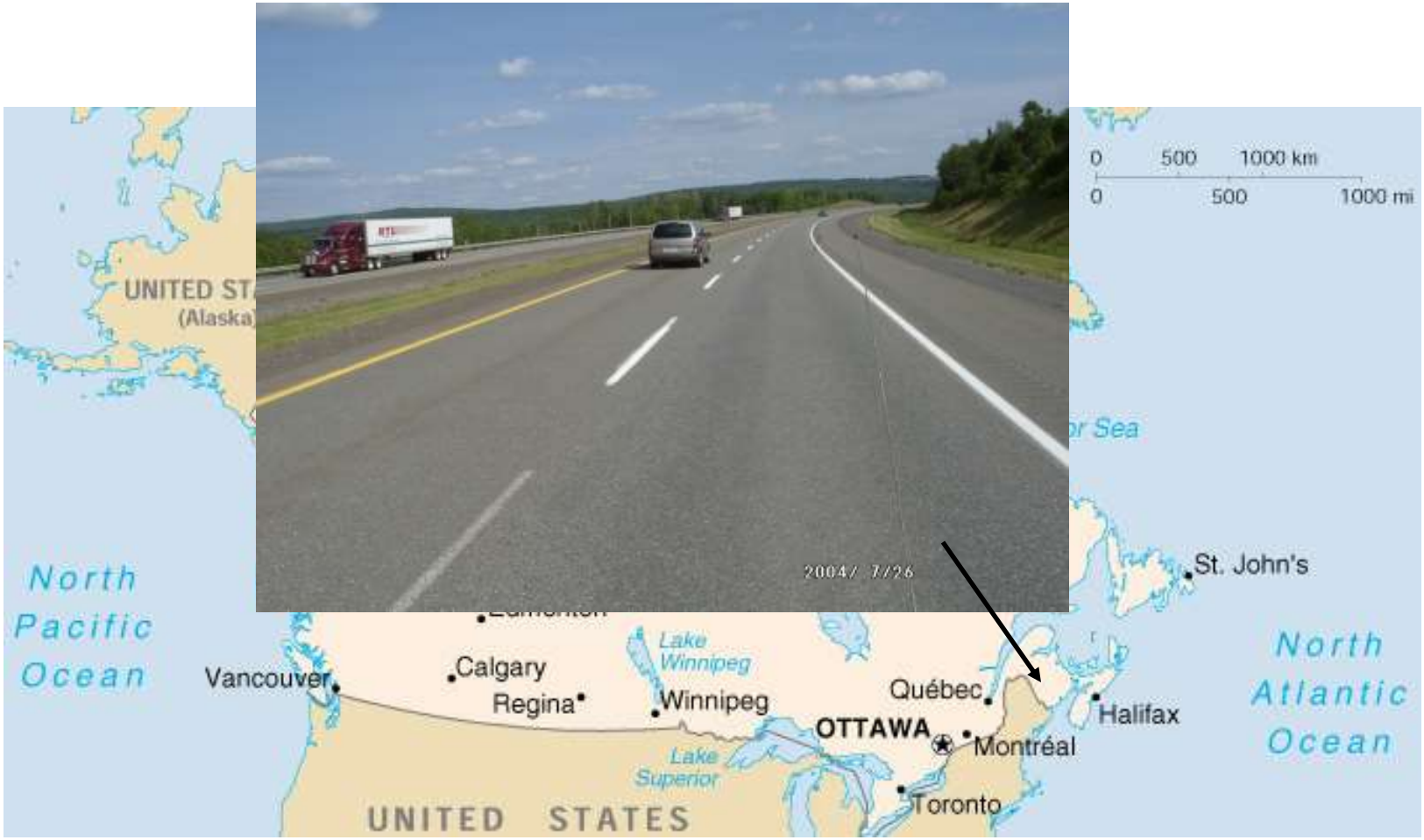
Green Lane – York Region Project Details

- New construction of 4 lane roadway (5 miles)
- Design/build
- Project value ~ $ 10 million increased to $ 15 million
- Construction 1999 - 2000
  - Water main and sanitary added after award
  - One contractor
  - Subcontracted engineering and quality control
- Owner hires firm to put together the D/B package
- Owner provides independent review

Green Lane – York Region Good, Bad and Ugly

- Good:
  - Rapid design and construction
- Bad:
  - Owner ran project like it was conventional
  - Continuous owner interference
- Ugly
  - Owner inexperienced in evaluating bid quality
  - Pavement design selected too thin
  - Contractor quality plan not followed
  - Resulted in independent review of entire D/B Process

Moncton - Fredericton Highway



Moncton – Fredericton Highway Project Details

- Green field development – 4 lane rural (120 miles)
- Design/build/own/operate (25 years)
- Construction from 1998 to 2000
- Project value ~ $400 million + concession
- Initially toll booths changed to shadow toll
- One major contractor (financier) + 2 major “imported” engineers and some local engineers
- Several fair sized local contractors
- Engineering joint venture and construction joint venture
- Project team provided both QA and QC

Moncton – Fredericton Highway Good, Bad and Ugly

- Good:
  - Rapid design and construction
- Bad:
  - EJV and CJV frequently at odds
- Ugly
  - Owner unwilling to be creative and adopt design and construction improvements and VE
  - Some internal disputes regarding costs
  - Contractor sued the engineers
  - Major dispute over the quality of and existing roadway section to be taken over

Design-Build
Confederation Bridge

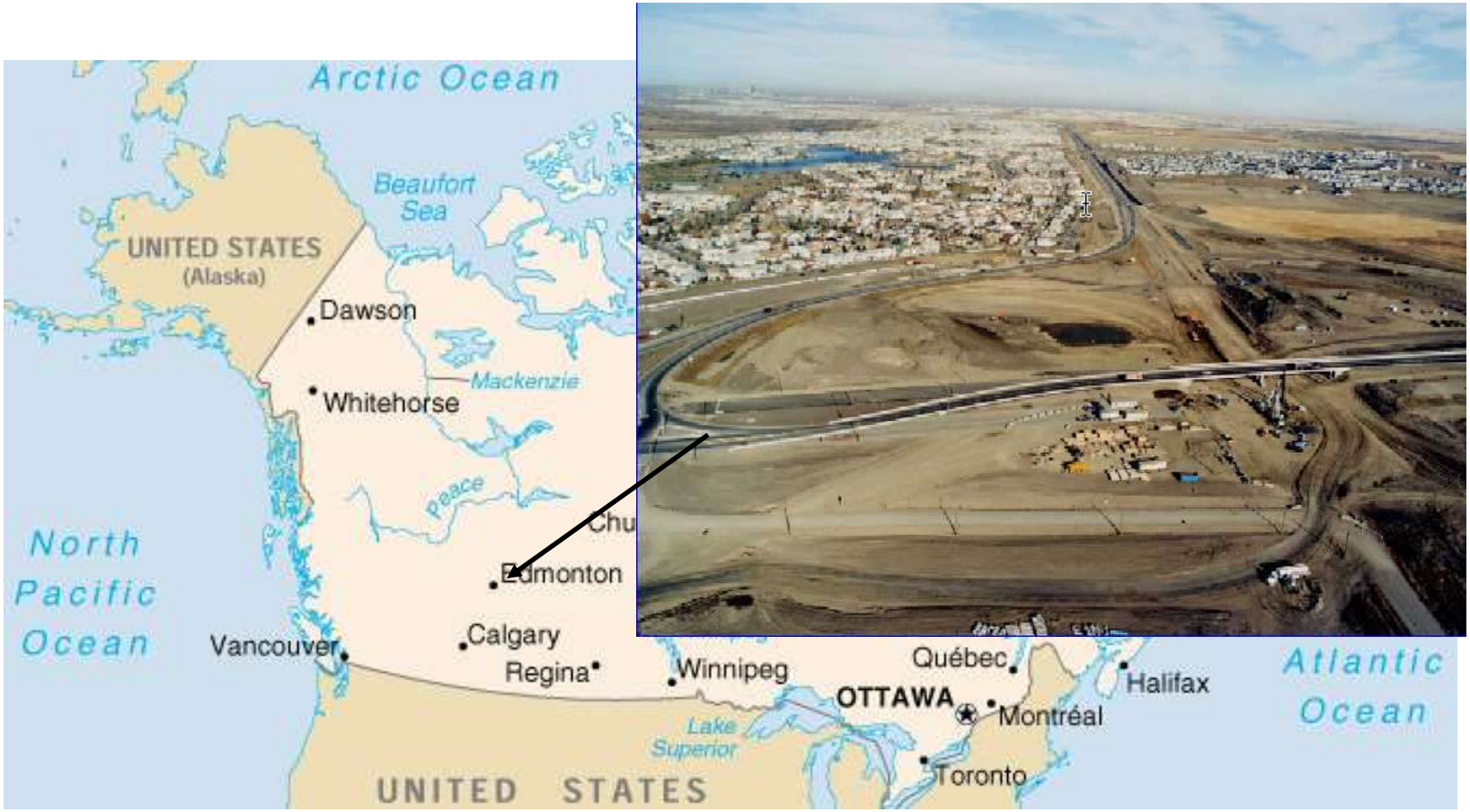
Confederation Bridge Project Details

- Construction of a 15 mile bridge crossing over the Northumberland Straight between NB and PEI
- Federal government design/build project
- Constructed 1996 to 1998
- Project value ~ $1 billion
- One major contractor and an engineering joint venture
- Set up as a CJV and EJV

Confederation Bridge Good, Bad and Ugly

- Good:
  - Excellent cooperation amongst the designers and constructors
- Bad:
  - Lack of use of local construction and engineering firms
- Ugly
  - Early failure of bridge deck surfacing system caused in part by focus on significant liquidated damages
  - Owner focus on schedule, not quality

Anthony Henday Highway



Anthony Henday Highway Project Details

- Green field development of 4 and 6 lane highway (15 miles)
- Design/build/operate (25 years)
- Construction start – March 2005
- Project value ~ $ 600 million including concession
- Consortium of contractors and engineers (no equity)
- Shadow tolls and concession period based on life or number of equivalent single axle loads (traffic component)

Anthony Henday Highway Good, Bad and Ugly

- Good:
  - Significant government consultation with industry over the request for proposal and design details
  - Three stage RFP process (two technical and one financial submission)
  - Project won by local contractors
- Possibly Bad:
  - Lack of significant local engineering representation but significant imported engineering experience
- Ugly
  - Too early to tell

Sea to Sky Highway

Sea to Sky Highway Project Details

- Reconstruction, widening and rehabilitation of an existing highway (120 miles)
- High profile – improvements for 2010 winter Olympics
- Design/build/operate (20 years)
- Project value ~ $ 700 million
- Construction to commence in 2005
- Large international consortia bidding the project
- Operations payments linked to safety and highway availability
- Difficult construction conditions through mountainous terrain

Sea to Sky Highway Good, Bad and Ugly

- Good:
  - 3 teams provided with $ 1.5 million honorarium
  - Project team (ours) divided project vertically
  - One safety, one geotechnical and one pavement designer for the entire project (consistency)
- Bad:
  - Owner lack of understanding of D/B process
- Ugly
  - Extremely frequent owner modification of the RFP
  - Frequent owner required “proposal” meetings
  - All teams likely spent twice the honorarium costs

Ways to Make D/B Work

- Hire an expert to “interpret” the owners requirements and develop the terms of reference
- Keep the projects to a reasonably large size (suggest no less than $ 10 million, preferably >$ 50 million
- Promote the use of local “talent”
- Use end performance specifications
- Select specific and clear performance criteria
- Make the builder responsible for the work
- Pay an honorarium commensurate with the value of the work
- Promote innovation

Primary Benefit of D/B

- Projects are completed in much shorter time frame and reduced user impact
- Integration of design and construction tends to promote efficiency
- Significant reduction in red tape and approval times
- Promotes local talent and international competitiveness
- Typically results in value engineering savings