202 Street Bus Rapid Transit Project

HIGHWAY 1 & 202ND STREET INTERCHANGE | LANGLEY, BC

Canadian Consulting Engineering Awards 2013

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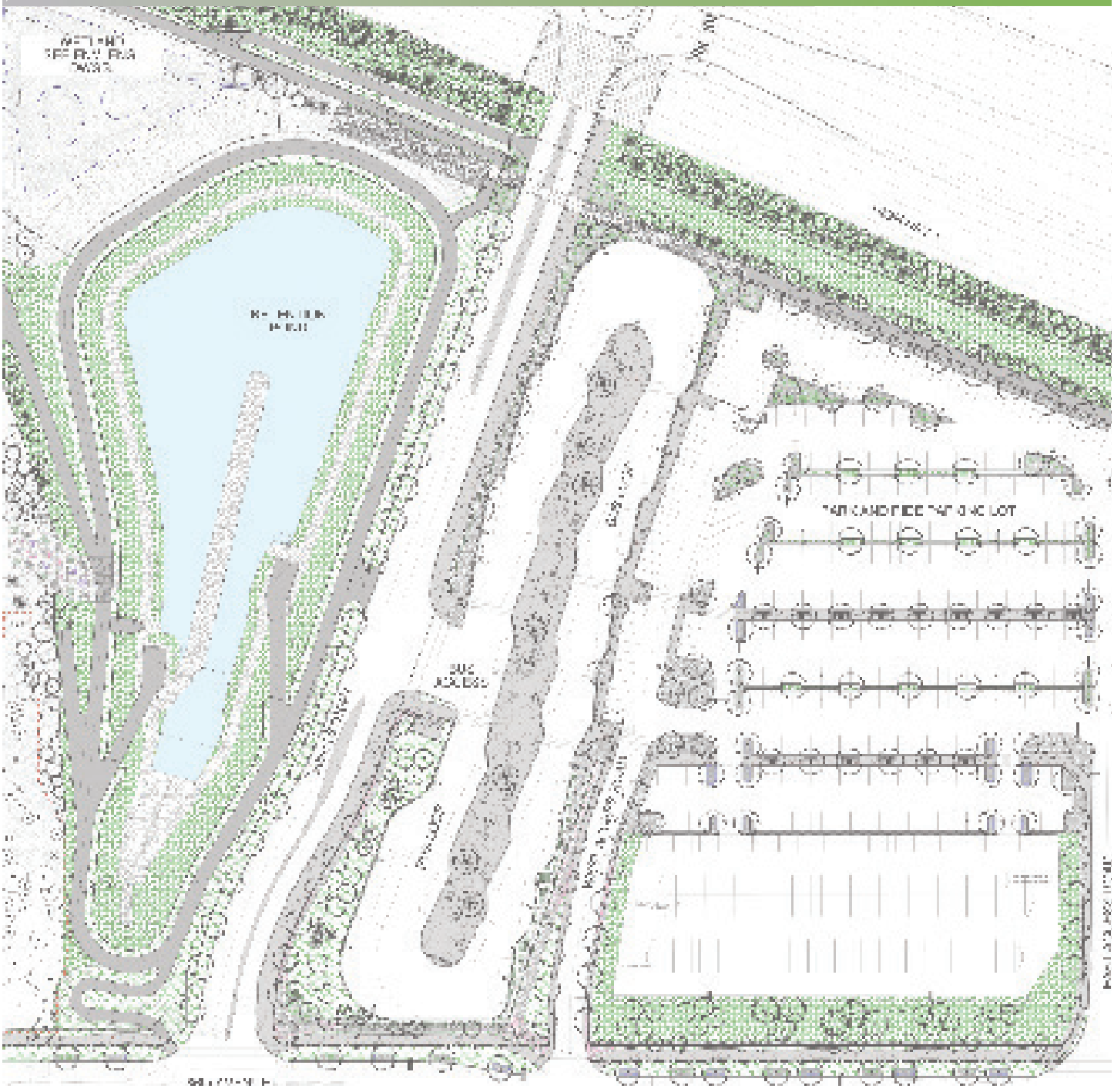
OFFICIAL ENTRY FORM CONFIRMATION RECEIPT



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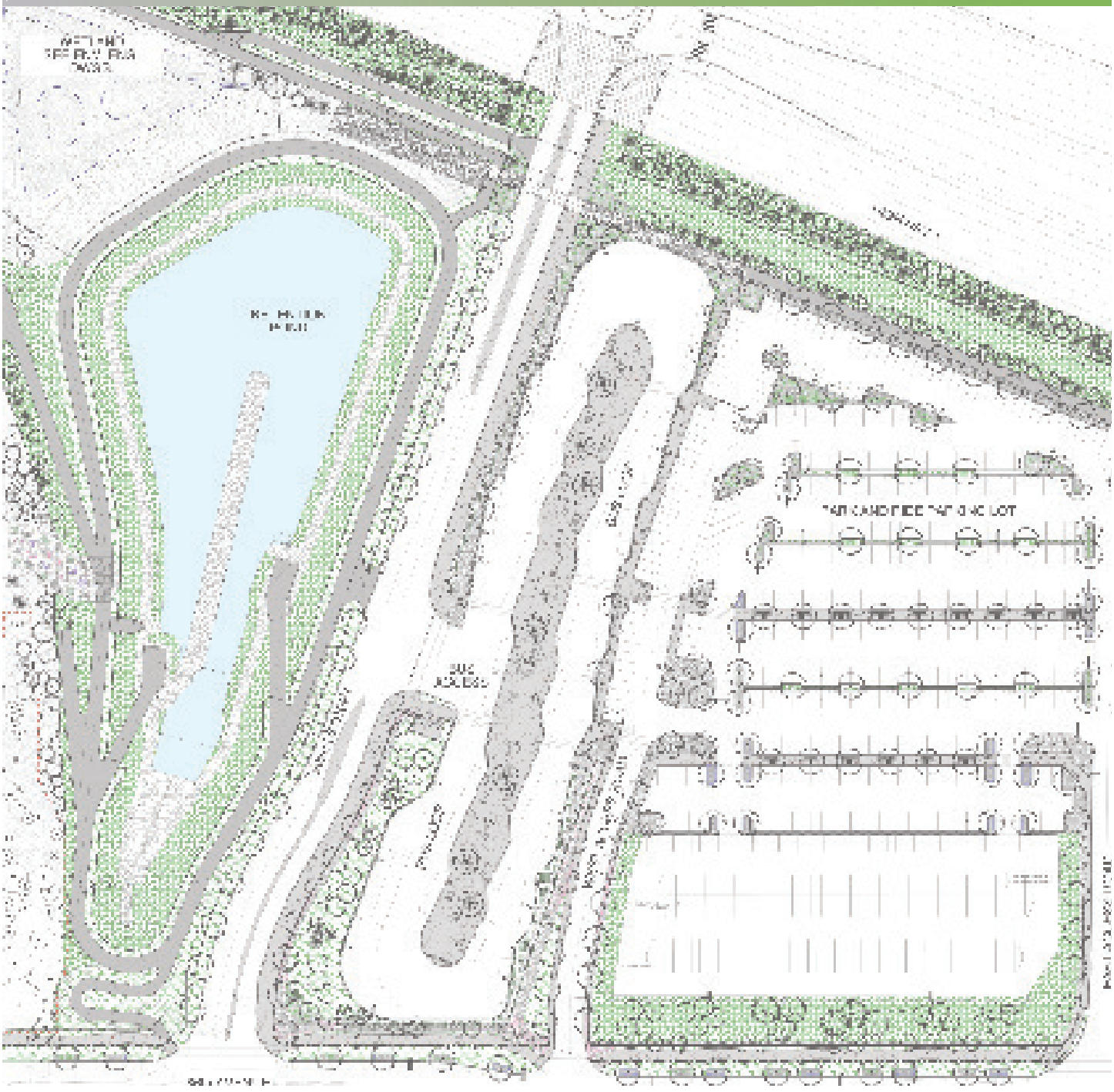
ENTRY CONSENT FORM



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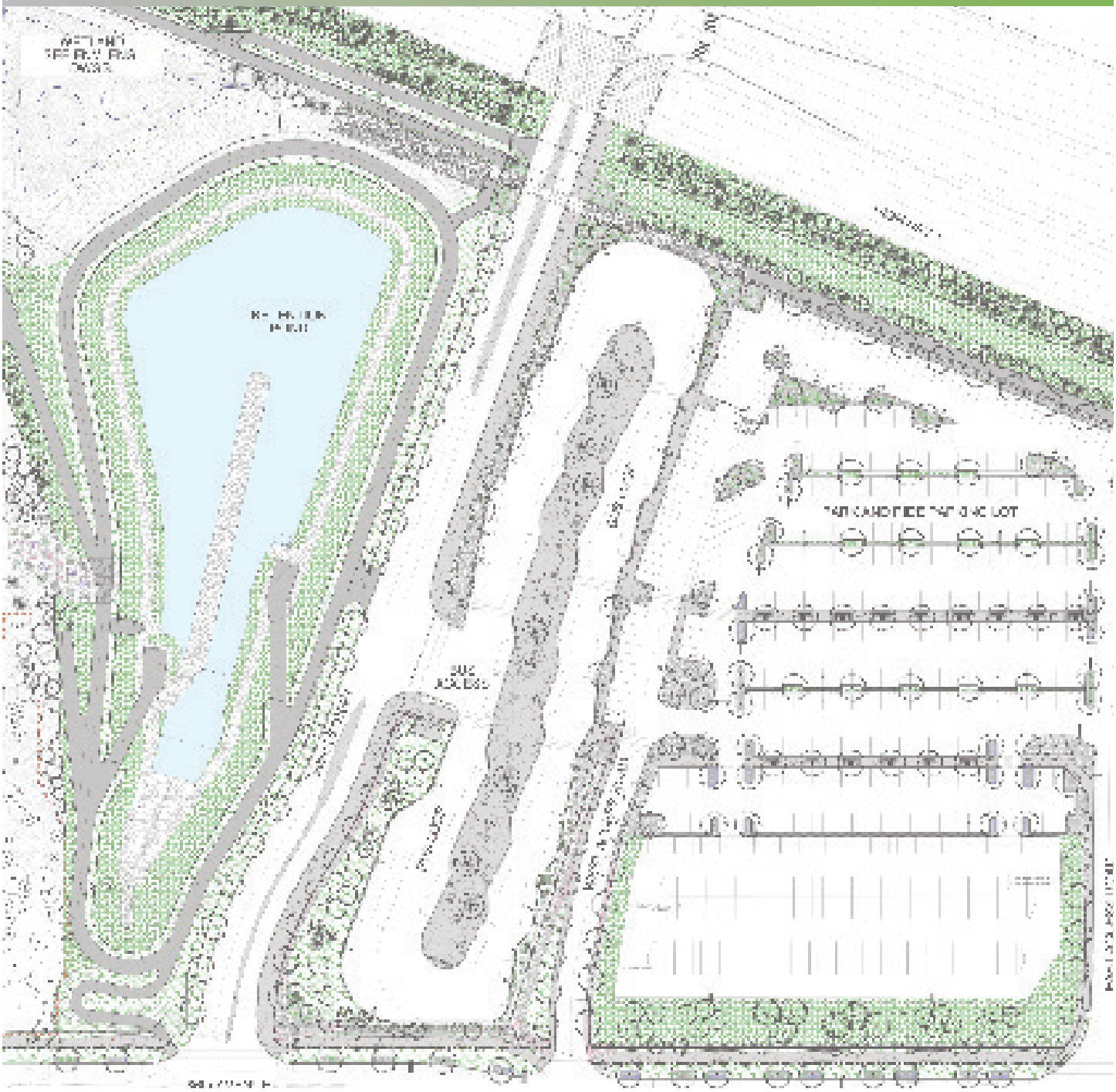
FULL PROJECT DESCRIPTION



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EXECUTIVE SUMMARY

The 202 Street BRT Project created the first scheduled bus transit over the Port Mann Bridge since 1986. The collaborative consultant team employed value engineering and innovative solutions to deliver the project in time for the opening of the new bridge. Commuters can park at the new eastern terminus in Langley and ride ExpressBus to SkyTrain to downtown Vancouver in less than one hour total travel time – thereby improving traffic conditions and reducing greenhouse gases.

" TransLink is pleased to support engineering innovation and the type of team collaboration between client and consultant that was instrumental to the success of this project. "

- Margaret Gibbs, P.Eng., Project Manager II, TransLink & Simon Li, P.Eng., PTOE, M.Eng., Senior Transportation Engineer, Coast Mountain Bus Company (from a jointly signed letter received in support of the 202 Street Bus Rapid Transit Project ACEC-BC 2013 Awards submission).

A new dawn rises as TransLink's new ExpressBus service (No.555) uses the freeway westbound onramp en route to cross the new Port Mann Bridge.

Installation of hot asphalt upon the multi-use path atop the retention pond.

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INNOVATION

Structures

The Trans Canada Highway structures overpassing 202 Street are 20m wide x 34m long bridges for the eastbound and westbound highway alignments founded upon piles driven 28 to 41 metres into very compressible soils. Box girders act compositely with a reinforced concrete deck. The bridges are considered 'Economic Sustainability Route Structures' which are designed for a 75 year service life. The four earthquake intensities defined in the Seismic Design Criteria were individually applied to different structural elements for individual function, while maintaining a cost-effective overall design.

April 2013 - Highway overpass structures with 202 Street roundabout below; new multi-use path in foreground.

The Carvolth Transit Exchange and Park & Ride south of the highway includes retaining walls built tight to property lines to maximize the number of parking stalls, and a 7-span pedestrian overpass crossing 202 Street, linking the Township of Langley trails with Carvolth Exchange. The original concept of the Park & Ride called for 20,000m^3 of lightweight EPS fill, which the design team eliminated by lowering the final grade and applying preload, for significant cost savings.

ITS

The 202 Street Bus Rapid Transit Project included significant deployment of Intelligent Transportation Systems (ITS) as an extension of the Trans Canada Highway infrastructure. These systems provide a significant improvement to the monitoring of highway traffic conditions and aid in managing incidents along this segment of the highway which improves safety and efficiency.

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Hydrology

A new 25,000m³ stormwater retention pond impounds runoff from the Carvolth Exchange and Park & Ride and releases at a rate similar to undeveloped conditions, while protecting the adjacent red-coded watercourse Latimer Creek. It will accommodate runoff from future nearby developments in the surrounding Carvolth Neighbourhood. A 4,200m³ permanent pool component maximizes flow-through time, capturing sediment before flowing into Latimer Creek. Floating contaminants, including hydrocarbons, are removed by an oil-water separator between the Carvolth Exchange and Park & Ride and the pond. Developed with DFO, a low-flow outfall releases stored water during dry periods at a slow, relatively consistent flow rate to the downstream channel similar to the characteristics of a vegetated upstream area.

A new 108-metre long two-chamber buried detention box culvert at the west end of the project provides permanent sediment control of Highway 1 runoff, before releasing water into Latimer Creek.

Environment

The consultant team and DFO developed a new wetland habitat which incorporated the design of a unique water recharge method that receives stormwater runoff from the Park & Ride after it percolates through subgrade gravels.

April 2013 - Retention Pond looking south; 202 St in left background. The pond was constructed to be hydrologically functional one year prior to project completion.

April 2013 - Wetland habitat with multi-use path, new Highway 1 approach fill and riparian planting zone.

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COMPLEXITY

The project was delivered for the Transportation Investment Corporation, the BC Ministry of Transportation & Infrastructure, TransLink, and the Township of Langley (under development permit) using various contracts and contract methods. The team applied various standards to different components of the project and submitted for approvals to various permitting authorities. DFO joined the team for one focused period. The consultant team accommodated diverse and often competing design requirements with novel solutions to exceed mandated objectives for water quality, stream integrity, constructability, ongoing maintenance and long-term community plan servicing.

The project site has historically challenging ground conditions where sensitive soils are vulnerable to long-term and variable settlement. An existing 1200mm water main and ToL sanitary main run through the site. The right-of-way was restricted by existing developments, and the consultant team effectively resolved the challenge of accommodating the expanded highway and new HOV lanes within the existing property.

An aggressive project schedule drove the design of the bridge approach embankments, precluding surcharge preloads. The new embankments were designed to a 'zero net load' criteria requiring sub-excavation of existing grades. Near the bridge piers, the existing highway granular embankments were substantially replaced with EPS to eliminate potentially significant seismic loads on the piled foundations. The team designed unique precast barrier units to accelerate production and facilitate construction within the restricted right-of-way.

Design of the underground stormwater storage vault system overcame numerous design challenges including a complex hydrotechnical analysis involving intersecting drainage systems and tailwater influenced by the existing 200 Street Detention Pond.

October 28, 2010 - Westbound piles splicing, looking west from atop north side pre-cast EPS perimeter foundation.

January 26, 2011 - Aerial looking north. Westbound lanes under construction including EPS approach fills and pier caps. All traffic detoured to south side of right of way.

September 12, 2012 - Carvolth Exchange aerial view; looking north. Highway traffic using both eastbound and westbound alignments. 202 St alignment curbed and graded; Carvolth Exchange and Park & Ride 40% complete.

SOCIAL & ECONOMIC BENEFITS

The newly constructed Carvolth Transit Exchange has created a new and convenient public transit hub for Langley residents. With direct access to Highway 1, the RapidBus service reduces travel time for commuters between Langley and downtown Vancouver to less than one hour. More than 3,400 people will use this service in morning peak hour by 2031, reducing greenhouse gases by up to 15,000 tonnes per year (or by 33%) by 2020, a significant and positive environmental impact.

As population and employment continue to grow in the South of Fraser, Northeast sector and Fraser Valley, the Carvolth Exchange will support the travel demands for the economic growth of this community. In addition, the transit plan provides a link to several neighbourhoods, from Metro Vancouver to the west, Abbotsford and Chilliwack to the east, Maple Ridge and Pitt Meadows to the north and Langley to the south. This new transit hub is the centerpiece for the Carvolth Neighbourhood – a planned neighbourhood to be fully developed by the year 2040. The addition of a dependable and convenient transit service for travel to downtown Vancouver will enable users to avoid city-centre parking and reduce the high density of vehicles in the city.

Healthy people create economic health, and the new access for pedestrians, cyclists, and visitors encourage an active and healthy lifestyle. With a diverse increase in transportation choices, commuters will benefit from the ease of travel and thereby support the environmental, economic and social sustainability intentions of the 202 Street BRT Project.

January 28, 2013 - Retention pond fully operational and multi-use path enjoyed by public; looking north.

April 2013 - One of the two large bus shelters (open face concept for Vancouver weather) with new power distribution box for entire site behind at Carvolth Exchange. Tactile yellow handicap pad in foreground, new retaining wall and Park and Ride in background.

ENVIRONMENTAL IMPACT

The area for the 202 Street BRT Project provided opportunity to enhance the neighbouring Latimer Creek watershed – a fish-bearing creek with moderate wildlife Species at risk values, including the Red-legged Frog and Pacific Water Shrew. The team improved the Latimer Creek crossing of Highway 1 to provide fish passage for the first time in over 40 years. The consultant team designed a new and sustainable wetland habitat upstream, providing summer and winter rearing habitat for juvenile salmonids.

The wetland was designed and constructed immediately north of the water quality (retention) pond and connected to Latimer Creek by a short open channel. The wetland provides 1,576m² of new aquatic and 2,086m² of new riparian habitat. Wetland water levels are maintained via a small, fish-passable concrete weir across the Latimer Creek mainstem. The weir backwaters a short section of Latimer creek at the designed wetland, and is adjustable such that wetland water levels can be fine-tuned to optimize habitat functionality.

A unique and innovative drainage design developed collaboratively with DFO harvests some of the stormwater runoff from the Park & Ride area, by a drainage system that filters runoff through the base gravels and then conveys it into the wetland. This secondary water source improves wetland water quality by providing flow to the wetland that would otherwise be unavailable through backwatering alone. Water runoff from the larger retention pond is conveyed into Latimer Creek upstream of this weir and thus is also a source to help recharge water in the wetland habitat.

August 9, 2012 - Amphibious salvage at the habitat pond.

April 2013 - Wetland habitat looking west with storm water harvest inflow in foreground.

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MEETING CLIENT'S NEEDS

The 202 St BRT Project principally provides an eastern terminus for non-stop highway bus service linking Langley with the SkyTrain via the new Port Mann Bridge. This sustainable initiative has created the first reliable transit over the bridge since 1986 and provides future connectivity to other Fraser Valley communities around Langley. Commuters can now park at 202 Street and ride ExpressBus to SkyTrain and on to downtown Vancouver in less than one hour total travel time.

New ITS systems improve traffic safety and efficiency via the Ministry's new fibre optic network. CCTV cameras provide video monitoring of highway traffic to the Regional Transportation Management Centre, and still images to the public via the Ministry's DriveBC website. New seismic monitoring equipment provides real-time feedback of seismic events.

Stormwater runoff from Highway 1 and the new Carvolth Exchange were designed to function in concert with the Township's system. A 108-metre long underground detention box with 1,000 m^3 capacity and 500 m^3 storage volume in oversized pipes now meter flow rates and control sediment prior to entering the Township's nearby detention pond and then into red-coded Latimer Creek.

With the newfound efficiency of the new 202 Street and transit exchange, TransLink has a new central hub for transit in the northern part of Langley. This central hub will support the future Township of Langley's Carvolth Neighbourhood and also currently provides new multi-use paths and pedestrian overpass which expand the Township's pedestrian and cyclist pathway network.

March 20, 2011 - 202 St at Highway 1 looking south toward Trans Canada Highway. Eastbound traffic detour in place; Westbound lanes under construction including EPS approach fills and westbound overpass structure. Original wetland visible on south side of TCH.

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January 1, 2012 - Aerial looking northeast with 202 Street BRT project in foreground and township of Langley and British Columbia coastal mountains in background.

December 3, 2012 – Aerial looking southward from above 202 Street. Photo captured first weekday in operation, and 2 months after opening, park and ride lot is 70% full. New wetland (bottom right of larger retention pond) expands and improves upon previous wetland.

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