

An aerial photograph of a large bridge and highway interchange at dusk. The bridge has a white, flat roof and is supported by tall, grey, A-frame pylons. A bright light is visible on the top of one of the pylons. Below the bridge, there are multiple lanes of traffic, including cars and trucks, moving through the interchange. In the background, a city skyline is visible under a twilight sky with orange and blue hues. The overall scene is a wide-angle shot showing the scale of the infrastructure project.

BRIDGE ENGINEERING AND DESIGN PORTFOLIO

From initial design to on-site execution, we partner with you to navigate challenges as they arise. Our collaborative and proactive approach ensures that your project stays on track with timely, effective solutions tailored to your specific needs.

FIRM INTRODUCTION

Founded in 2003, Innova Technologies, Inc. was founded by Mr. Carlos Banchik after leading the structural design team with another company for the 2.8-mile Las Vegas Monorail project from Bally's Hotel to the Sahara Hotel. Sister company, Innova Transportation, LLC, was formed in 2017 to focus on monorail, automatic people mover (APM), and other specialty transportation projects.

Innova Transportation is an award-winning, multi-disciplined engineering firm that offers a collaborative approach to structural design, construction support, monorails, and APM transportation projects for clients worldwide. Core competencies include structural engineering, construction engineering and transportation engineering. Innova Transportation is licensed to practice engineering in all 50 U.S. states, Washington D.C., and the U.S. Virgin Islands.

Headquartered in Las Vegas, Nevada the firm also has offices in Cairo, Egypt; São Paulo, Brazil; Monterrey, Mexico; and Santiago de los Caballeros, Dominican Republic. Innova Transportation possesses 55 total employees; 33 Las Vegas-based professionals; 37 degreed engineers, four with Ph.D., 13 MSCE, 20 with BSCE degrees, and one BSME. Innova's employees have wide-ranging structural and civil experience.

Our culture promotes teamwork, quality, fun, integrity, and accountability. In every project that Innova undertakes, our principles are encouraged, verified, and reinforced. We believe that by following and supporting these values at every level of our company, ensures that our clients and their respective projects receive the best customer service and product. Innova's mission is to create an integrated approach, from concept to construction, at home and around the world. In doing so, we hope to build cohesive and mutually beneficial relationships with our clients.

Innova Transportation has garnered worldwide recognition for innovation and outstanding contributions in engineering. These include awards 2024 Top Places to Work, Las Vegas Review-Journal; 2024 Big 5 Egypt Impact Award for The Monorail & The Light Rail Transit (The Green Transportation Network of the New Administrative Capital), The Smart City Initiative of the Year 2024; 2023 Big 5 Egypt Impact Award Infrastructure Project of the Year, Innova Transportation 2022 Finalist in Nevada Business Magazine Awards, 2021 Infrastructure Project of the Year by The Big 5 Egypt Impact Award, 2017 Award of Merit, Metro Line 15 Monorail located in São Paulo, Brazil by the Post-Tensioning Institute, 2013 Nevada Family-Owned Businesses Wave of the Future Award by Nevada Business Magazine, and 2012 Top Business by Diversity.com as one of the leading entrepreneurs in the United States.

TRANSPORTATION CIVIL - STRUCTURAL SERVICES

- Civil Engineering/Alignment
- Civil Structure System Interface
- Monorail Bridges
- Railways and High Speed Rail (HSR) Bridges
- Highway and Pedestrian Bridges
- Automatic People Movers
- Bridge Foundation Services
- Construction Observation
- Precast Construction Design
- Construction Methods and Support

AREAS OF COMPETENCY INCLUDE:

- Planning Studies
- Conceptual Design
- Preliminary and Detailed Civil & Structural Engineering
- Constructability Reviews
- Beam and Emergency Walkways Shop Drawings
- Emergency Walkways, Safety and Evacuation Assistance
- Power and Systems Interface Assistance
- Material Science Durability / Environmental Studies
- Precast Beam Production Assistance
- Forensic Analysis
- Maintenance Engineering
- Structural Survey and Observation Reports
- Scanning guideway beam using Innova's Beam Measuring Device®

LIFE CYCLE SERVICES

The Innova team provides services that allow owners and clients to develop projects through the full infrastructure life cycle from inception through the operational life of the facility.



FROM CONCEPT TO CONSTRUCTION

Innova Transportation is hands-on and proactive from concept to construction. Team brainstorming with contractors and consultants on project design concepts, construction methods and costs, and other project influences often times provides an approach to resolve scheduling or budgetary concerns before the project is designed. This has been our successful and practical approach.



PLANNING AND ENGINEERING

Innova assists Owners and Developers during the planning and concept phases of a project by developing conceptual guideway horizontal/vertical alignments, column/foundation locations, optimal span lengths, station locations and terminal facilities planning - Operations, Maintenance, and Storage Facilities (OMSF). This conceptual planning allows owners/developers to develop order of magnitude estimates to plan their funding.

During subsequent phases of program development, Innova provides preliminary engineering by refining the conceptual alignments and structural configuration to develop preliminary plans for the owner/developer to program the project, interact with utility agencies, review right-of-way impacts, review guideway/station interfaces and develop preliminary safety and evacuation routes. We then provide final engineering design of the guideway, substructure, foundations, emergency walkways and interface details at the stations and OMSF.

Innova has developed proprietary software and algorithms to automate portions of the design and planning process. These automations include guideway beam layout and quantities; pier placement; layout of the emergency walkway system and the production of shop drawings for precast prestressed guideway beams.

CREATIVE SOLUTIONS

Innova Transportation focuses on innovation and creativity. Utilizing over 150 years of combined experience in engineering and construction solutions, Innova's engineers are empowered to think outside-the-box and solve your project's complexities.

CORE VALUES

Innova Transportation is driven by its commitment to its clients and employees with its core values: Integrity, Teamwork, Accountability, Quality, and Fun.

STRATEGIC PARTNERSHIPS

Innova Transportation builds and fosters win-win partnerships to forge cohesive and longstanding relationships. We are all stakeholders in each other's success.

APPROACH TO PROJECTS

On active projects or supporting proposals in this field, the Innova team provides services that help our clients through all the developmental stages of a project: from inception, to preliminary and final design, to construction assistance, and later, maintenance services. The idea is to incorporate our clients' construction and operation experience into the design of newer infrastructure projects.

To achieve this goal, Innova has worked with vehicle suppliers, provided numerous support services for ongoing projects, as well as continuing to provide structural assessment and support for existing infrastructure such as for the Las Vegas Monorail.

PROJECT EXPERIENCE



Cairo Monorail Projects

– Delivery of overall civil-system coordination, structural design and construction observation of typical mainline and depot guideways, and shop drawings for two projects 97 km (60 miles) in total monorail in Cairo, Egypt. For Alstom Innovia 300 trains.



Las Vegas Monorail Mandalay Bay Extension

– Innova provided alignment and structural design for the elevated guideway structures for the extension of the existing project. The project was canceled during the Covid 19 Pandemic.



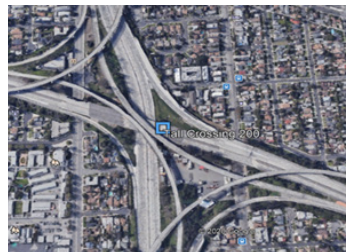
São Paulo Monorail, Silver Line 15

– Innova managed civil alignment, profiles, structural designs for guideway beams, and emergency walkways for Alstom Innovia 300 trains, encompassing full-length emergency egress provisions on elevated platforms.



Panther Creek Bridge

– Innova analyzed a 170-foot steel arch bridge, meeting specs. Innova provided geometric and stress data for CALTRANS-designed bridge's Construction Sequencing and Geometric Control Plan through five construction phases. Image: Google.



Sepulveda Transit Corridor (STC)

– Innova provided the preliminary alignment and structural design for the monorail options using the BYD SkyRail vehicle. Three different alignments were studied for the 15 mile corridor along I-405 from the Expo Line in the south, over the Sepulveda Pass, to the Van Nuys Metrolink Station in the Valley. Image: Google Maps.



San Ysidro Land Port of Entry (SYLPOE)

– The SYLPOE project expanded the POE with new lanes. Innova assisted Beck Steel with Erection and Cable Stressing Plan Engineering. Erecting the primary canopy steel required a falsework platform for cable connection and load distribution.

PROJECT EXPERIENCE



I-515/I-215 Henderson Interchange – Innova is providing engineering services in support of the National Environmental Policy Act (NEPA) process, including bridge type selection and preliminary structures plans. Image: Google Maps.



Symphony Park Pedestrian Bridge – Innova reviewed GCW Engineering's pedestrian bridge project, which connects downtown Las Vegas to Symphony Park, reducing traffic congestion. The 150-foot-long bridge, elevated 30 feet above the Railroad, is made of prefabricated steel trusses and integrates into City Hall's parking garage structure with elevators and stairs.



I-15/Tropicana Ave. Interchange – Innova is providing structural support for this project, assisting with technical provisions, bidder questions, addenda, and bid proposals. Innova also designed box culvert structures for the Tropicana Wash and Tropicana Outlet Channel. Image: Google Maps.



RTC Slimline Bus Shelters – Innova helped with Slimline Shelters at 140 Las Vegas Valley bus stops, coordinating with five agencies including Nevada Department of Transportation (NDOT). They also handled permits for 12 NDOT roadways. The shelters, only 12 inches wide, are anchored to thickened sidewalks, meeting the 4-foot access width required by PROWAG despite being designed for a 5-foot width.



Yerba Buena Island Exit Ramp – Innova provided Golden Gate Contractors with integrated shop drawings for a complex curved ramp from Yerba Buena Island to I-80 towards San Francisco, detailing concrete, rebar, and post-tensioning to preempt construction clashes. This project showcases Innova's expertise in modeling complex construction scenarios to help contractors develop effective construction plans and solutions. Image: Google Maps.



I-11 Henderson Interchanges Aesthetic Structures – Providing structural design and plan development for landscape and aesthetic structures at three (3) interchanges along I-11 at Wagonwheel Drive, Horizon Drive, and College Drive. They consist of structural steel, reinforced concrete stand-alone structures, steel image panels, and gabion walls. Image: Google Maps.

RELEVANT PROJECT EXPERIENCE

2021 – Sepulveda Transit Corridor, Los Angeles, CA. Innova is on the Los Angeles SkyRail Express (LASRE) team. The monorail scope includes a tunnel portion, a possible electric bus connector, or a Sky Shuttle Automated People Mover connector.

2019 – Cairo Monorail – 6th of October & New Capital City, Cairo, Egypt. Alignment, structural engineering, beam shop drawings. and construction observation for 97 km (35 stations) new monorail system to the transit systems in the city.

2019 – I-405 Monorail, Los Angeles, CA. Alignment and preliminary structural engineering for a 21-mile alignment along the I-405 corridor from LAX Airport to the San Fernando Valley as a part of a preliminary design, build, operation, and maintenance team.

2019 – Miami Beach Monorail, Miami, FL. Alignment and preliminary structural engineering.

2019 – Panama Monorail Segment 3. Preliminary structural engineering for design-build proposal for 24 km project from Panama City to Nuevo Arraijan including crossing the Panama Canal.

2018 – Salvador Brazil. Assembled a team of Brazilian professionals and companies that successfully bid a project to replace an LRT line in the City of Salvador with an urban grade monorail system. Innova's tasks included providing alignment assistance and review of the proposed 24 km monorail system.

2018 – Rod El Farag Cable Stayed Bridge. Team Members designed a cable stayed bridge that spans a range of 120-300m for this bridge in Cairo Egypt.

2017 – 2019 – Las Vegas Monorail – West Expansion Project. Provided technical assistance to the Owner during the proposal phase and final structural and alignment design of a 1.2-mile extension, Las Vegas Monorail Co.

2017 – Inglewood Monorail, Inglewood, CA. Provided preliminary alignment and structural recommendations.

2017 – New Administrative Capital Monorail, Egypt. Provided technical assistance for the preparation of the proposal to the general contractor, Orascom Construction Industries.

RELEVANT PROJECT EXPERIENCE

2015 – China Monorails. Created design criteria for the development of monorail in different regions of China. Designed guideway beams for a test track in Wuhu, China.

2015 – 6th of October Monorail Proposal, Cairo, Egypt. Alignment and preliminary structural engineering for the contractor, Orascom Construction Industries.

2014 – Arequipa Monorail Proposal, Peru. Alignment and preliminary structural engineering for the contractor, Queiroz Galvão.

2013 – Bombardier Transportation Standard Package. Production of standard structural drawings for use in preliminary monorail development.

2013 – Kerala Monorails Proposals, India. Alignment and preliminary structural engineering for the contractor, Afcons Ltd.

2012 – King Abdulla Financial District, Saudi Arabia. Innova performed an assessment of the project for long span beams and emergency walkways for the contractor, Saudi Oger Ltd.

2006 – Las Vegas-Victorville High Speed Train Studies. Provided alignment and civil engineering design assist to the developer of the project, Transmax.

2006 – Las Vegas Monorail Extension to the Airport Studies. Prepared alignments and structural support for the project.

2004 – Seattle Monorail Extension. Participated on a team to extend the existing Seattle Monorail including structural design tasks.

2003 – Las Vegas Monorail Co. Structural Engineering support to operator. These tasks continue to this date.



STATE OF THE ART SOFTWARE

To support the development of the firm, Innova spends a considerable amount of resources on state-of-the-art software and training personnel to operate it. Monorail design is performed using finite element time-dependent analyses utilizing either RM-Bridge or SOFiSTiK. Both programs allow the user to model the vertical and horizontal geometry to the highest level of specificity and allow for moving loads in both the vertical and horizontal directions. The time-dependent effects due to creep and shrinkage are considered for the life of the structures. The load combinations consider the concomitant forces due to all relevant load paths. This enables the designer to completely track the different loads, without oversimplifying them; and is conducive to an accurate design, that is not overly conservative. Other, more appropriate, software is used in the design and development of emergency walkways, and shop drawing creation. Some specialty software has been developed through years of monorail design experience that automates tasks and reduces errors.

The Innova engineering team is proficient in 3-D structural modeling, time-dependent analysis, Finite Element Analysis, and Push-over analysis. Innova has also invested in and developed several proprietary software subroutines that allow us to automate design and analysis very quickly.

Due to the geographical diversity of our clients, Innova provides our employees with the tools to collaborate via the internet and telephone such as Microsoft Teams, GoTo Meeting, Bentley ProjectWise, and Autodesk Docs. Our team is proficient in most Autodesk and Microstation software. Many of our tasks require higher-order analysis and the Innova staff routinely achieves this using SAP2000, RISA, and SOFiSTiK software, among others.





Cairo Monorails - New Capital Line

MULTI-DISCIPLINARY PROJECTS: IN-DEPTH KNOWLEDGE

Alignment and Profile Engineering

- Mainline horizontal and vertical alignment developed per Rolling Stock Design Construction Interface Manuals (DCIMs)
- Depot horizontal and vertical alignment developed per Rolling Stock Design Construction Interface Manuals

Guideway Design and Coordination

- Basis for design and 1:1000 or 1:2000 drawings with centerline of guideway alignment.
- Determination of column, station, and special structure locations with precise construction coordinates for column beam supports, ensuring no conflicts with existing structures or utilities.

Vehicle Performance and Compliance

- Creation of tables specifying civil allowable maximum speeds.
- Optimization of vehicle performance through calculation of minimum super-elevations and spiral lengths.
- Peer review of structures to verify compliance with design criteria for people mover and monorail systems

Structural and Environmental Engineering Support

- Provision of geotechnical and environmental design support across projects.
- Development of Structural Design Criteria with local collaboration, integrating international and local standards for reinforced and prestressed concrete guideway structures.
- Preparation of calculations and drawings in accordance with specified design codes.
- Conceptual design and modeling of straight and curved guideway frames using advanced time-dependent software, ensuring accurate load and structural performance analysis.
- Detailed calculations and drawings for typical switches and long-span structures.
- Design of temporary supports for guideway construction, ensuring stability during various construction phases.
- Creation of shop drawings for the accurate fabrication of precast concrete guideway beams.
- Provision of support and quality control to local engineers during construction document preparation.
- Development of comprehensive designs and shop drawings for emergency walkways.

CARLOS BANCHIK, PE

CEO & CHAIRMAN



MEng, Civil Engineering
University of California Berkley, California, 1988

BS, Civil Engineering
Universidad Nacional de Salta, Argentina, 1984

Licensed: NV, CA, OH, WA, AZ, HI, ID, CO, IL

Affiliations:

International Monorail Association (IMA), Past-President
Structural Engineers Association of So. Nevada, Member
American Society of Civil Engineers (ASCE), Member
American Concrete Institute (ACI), Member
Post-Tensioning Institute (PTI), Member
American Segmental Bridge Institute (ASBI), Member

Mr. Banchik has 35+ years structural engineering experience on a broad range of project types including design and construction techniques of horizontal and vertical structures, mechanical, electrical, and hydraulic basic designs requirements and operations. He is also experienced on writing proposals, design specifications, design criteria, construction procedures, and operations manuals.

Metrorrey Monorail, Monterrey, Mexico

Principal in Charge — Metrorrey, officially known as the Metrorrey Mass Transit System, is a Metro district that oversees two Rapid Transit Monorail (MRT) systems in Monterrey, Nuevo León, Mexico. The initial phases of the project consist of 32 kilometers (20 miles) of new tracks and 25 new stations. Innova is involved in the alignment and structural design of the main track elements, including prefabricated substructure elements, emergency and service walkways, observation, and construction engineering. System provider: CRRC.

Santiago de los Caballeros Monorail, Santiago, Dominican Republic

Principal in Charge — The project consists of a 15 km 14-station monorail being built by FITRAM (Fund for the Development of Mass Transit in the Dominican Republic) operating under fast-track authority. Innova, as the main prime civil designer is providing mainline and depot alignment and profiles, structural designs, emergency walkways, beam shop drawings, and construction observation. The project is slated to start operations in 2024. System Supplier: Alstom Group

Cairo Monorail – 6th of October & New Capital City, Cairo, Egypt

Principal in Charge — Cairo's expanding metro system includes a 97 km monorail, featuring two lines: a 43 km route from Giza to the 6th of October City in the west and a 54 km line connecting Cairo to the New Capital City in the east. Innova is responsible for design and construction support, with 3300 spans, 900 structures, 16 switches, and 35 stations. Emergency walkways run the entire length with cross-over bridges and stairs. The project, awarded in 2019, involves Alstom (Bombardier), Arab Contractors, and Orascom Construction. Mr. Banchik manages alignment layout, structural design, and shop drawings for the mainline guideway elements. System Supplier: Alstom Group

Sepulveda Transit Corridor, Los Angeles, CA

Principal in Charge — This project is for the LA Metro proposal phase of the Sepulveda Transit Corridor. The Los Angeles Sky Rail Express (LASRE) Team is now one of the remaining teams that are moving forward with up to four Predevelopment Agreement Phases to determine the final solution that Metro will take to the final design. Innova is on the LASRE team which proposes a monorail system along the I-405 corridor with multiple options that include a tunnel portion, a possible electric bus connector, or a Sky Shuttle Automated People Mover connector. System Supplier: BYD N. America.

Bangkok Pink and Yellow Line Monorail Project, Bangkok, Thailand

Principal in Charge — The task is to deliver the following: a review of guideway beam interfaces to the M&E system, a review of the casting method, a review of installation methods, a review of QA/QC and supervision procedures at the casting yard, review QA/QC plus a review of supervision procedures of installation at sites for the first 200 beams, and provision of training of BTS Infrastructure and Development personnel for the previous tasks. System Supplier: Alstom Group.

Las Vegas Monorail West Extension Project, Las Vegas, NV

Principal in Charge — The Las Vegas Monorail Extension consists of developing an updated one-mile section of monorail guideway including a fatigue-resilient 300-foot-long steel box beam design and a track switch. The design was completed and verified by the authority having jurisdiction and the project is awaiting funding. System Supplier: Alstom (Bombardier) Transportation.

São Paulo Expresso Tiradentes (SPET) Monorail Project, São Paulo, Brazil

Principal in Charge — The project was originally a 24 km monorail project between Vila Prudente to São Mateus and Tiradentes in São Paulo Brazil. The project extends subway Line 2-green Line to the eastern outskirts of São Paulo. There are two phases, the first one to São Mateus, a transportation hub east of São Paulo, and the second one to Tiradentes. The first 13 km of the guideway are completed and operational. The Joint Venture that produced the project was composed of Alstom (Bombardier) Transportation, Queiroz Galvão, and OAS, two large civil Brazilian conglomerates. At its peak construction, the project mobilized more than 1500 people. System Supplier: Alstom (Bombardier) Transportation.

Kahului Airport Tran, Kahului, HI

Principal in Charge — The project consists of a 2500 ft long automated people mover between the airport terminal and the Consolidated Car Rental Facility. Mr. Banchik was in responsible charge of the alignment and structural design of civil and mechanical components. There were numerous creative applications developed with the System Supplier like track stops at the maintenance facility that required special design for the overtravel buffer and steel guideway beam; shop drawings of the bogie for the trains; highly innovative expansion joints between the rail structure and the car rental facility. System Supplier: Schwager Davis Inc. San José, CA.

Salvador Line 3 Monorail, Bahia, Brazil

Principal in Charge — The 19.2 km (11.9 mi) Orange Line will connect Bairro do Comércio to Ilha de São João with 21 stations and is expected to carry 172,000 daily passengers. The Green Line will be 4.1 km (2.5 mi) with four stations, connecting São Joaquim to the Salvador Metro's Acesso Norte station. Mr. Banchik was part of a team assembled by the System Supplier to assess the feasibility of converting an LRT RFP into a monorail line. The line is innovative in that it will integrate sections of town long divided by an existing rail line and will provide access to marginal areas to Salvador's mass transit system. Innova is a consultant to the System Supplier reviewing alignment, structural elements, logistics, and construction observation. System Supplier: BYD Brazil.

China Monorails, Proposal, and Development

Principal in Charge — The monorail market in China has seen substantial growth in recent years. Several projects are currently in the development or construction phase. Line 8 in Shenzhen allowed Innova to prepare an alignment, design criteria, preliminary design, and quantities for 24 km of the dual guideway. This guideway alignment was both elevated and a tunnel to adapt to the topographical requirements of the area. The Wuhu monorail project includes the design of a sample precast concrete beam to give contractors a chance to see the unique characteristics of monorail construction. A test track near the maintenance facility is being used to test the performance of the trains according to Chinese requirements. System Supplier: Alstom (Bombardier) Transportation.

Kerala Monorail Proposal, Kerala, India 2013

Principal in Charge — Two different alignments were proposed in the Kerala, India area. The 21km Trivandrum alignment and the 13km Kozhikode alignment were prepared to provide a dual monorail system for residents. Innova prepared the alignments, completed the preliminary structural design, and assisted with the preparation of the bill of quantities to allow for a final estimate and proposal. Mr. Banchik the coordination on the complete project. System Supplier: Alstom (Bombardier) Transportation.

LAURA THOMPSON, PE

VICE PRESIDENT



BS, Civil Engineering
Washington University, 1994

Bachelor of Arts, Pre-Engineering/Liberal Art
Albertson College of Idaho, 1994

Licensed: Registered Civil Engineer: Colorado and Montana

Ms. Thompson has 30+ years of experience in the design of transportation projects around the world. As a transportation structures engineer, Laura's expertise includes preliminary to final structural design, construction assistance, alignment reviews, communication with multinational teams, and coordination with multiple stakeholders. She is familiar with structures for monorail, vehicles, and light rail; pedestrian bridges; retaining walls; and drainage structures.

Metrorrey Monorail, Monterrey, Mexico

Sr. Project Manager and Project Director — Metrorrey, officially Sistema de Transporte Colectivo Metrorrey, is a Metro district overseeing two MRT (Monorail rapid transit) systems in Monterrey, Nuevo León, Mexico. The project consists of 41 kilometers (25 mi) of new track and 41 new stations to be built by 2027. INNOVA is participating in the alignment and structural design of the mainline guideway elements, including precast substructure elements. System Supplier: CRRC.

Santiago de los Caballeros Monorail, Santiago, Dominican Republic

Sr. Project Manager — The project consists of a 15 km 14-station monorail being built by FITRAM (Fund for the Development of Mass Transit in the Dominican Republic) operating under fast-track authority. Innova, as the main prime civil designer is providing mainline and depot alignment and profiles, structural designs, emergency walkways, beam shop drawings, and construction observation. The project is slated to start operations in 2024.

Cairo Monorail – 6th of October & New Capital City, Cairo, Egypt

Sr. Project Manager — Cairo's expanding metro system includes a 97 km monorail, featuring two lines: a 43 km route from Giza to the 6th of October City in the west and a 54 km line connecting Cairo to the New Capital City in the east. Innova is responsible for design and construction support, with 3300 spans, 900 structures, 16 switches, and 35 stations. Emergency walkways run the entire length with cross-over bridges and stairs. The project, awarded in 2019, involves Alstom (Bombardier), Arab Contractors, and Orascom Construction. Ms. Thompson communicates directly with the Civil Works Joint Venture to incorporate their preferred construction practices with the design methodology. System Supplier: Alstom Group

Sepulveda Transit Corridor, Los Angeles, CA

Project Director — Ms. Thompson worked on the team to provide initial structural requirements for the LA Metro proposal phase of the Sepulveda Transit Corridor. The Los Angeles Sky Rail Team is now one of two teams that are moving forward with up to four Predevelopment Agreement Phases to determine the final solution that Metro will take to a final design. The LASRE team is proposing a monorail system along the I-405 corridor with multiple options that include a tunnel portion, a possible electric bus connector, or a Sky Shuttle Automated People Mover connector. Ms. Thompson is leading the structural design team for the structures required in this highly seismic region along with supervising the alignment corridors. System Supplier: BYD.

Bangkok Pink and Yellow Line Monorail Project, Bangkok, Thailand

Sr. Project Engineer — The task is to deliver the following: a review of guideway beam interfaces to the M&E system, a review of the casting method, a review of installation methods, a review of QA/QC and supervision procedures at the casting yard, review QA/QC plus a review of supervision procedures of installation at sites for the first 200 beams, and provision of training of BTS Infrastructure and Development personnel for the previous tasks. System Supplier: Alstom Group.

Las Vegas Monorail West Extension Project, Las Vegas, NV

Project Director — The Las Vegas Monorail Extension consists of developing an updated one-mile section of monorail guideway including a fatigue-resilient 300-foot-long steel box beam design and a track switch. The design was completed and verified by the authority having jurisdiction and the project is awaiting funding. System Supplier: Alstom (Bombardier) Transportation.

São Paulo Expresso Tiradentes (SPET) Monorail Project, São Paulo, Brazil

Project Director — Ms. Thompson provided the Structural Design Criteria to evaluate the effect of local codes on the concrete structures, structural modeling using time-dependent finite element analysis software and design for structural elements, supervision of design drawing development, and preparation of Bill of Quantities for verification with GC's obtained values. System Supplier: Bombardier Transportation.

People Mover Projects, Various

Sr. Project Manager — The task Innova is to deliver are the following: a review of guideway beam interfaces to the M&E system, a review of the casting method, a review of installation methods, a review of QA/QC and supervision procedures at the casting yard, review QA/QC plus a review of supervision procedures of installation at sites for the first 200 beams, and provision of training of BTS Infrastructure and Development personnel for the previous tasks. System Supplier: Bombardier Transportation.

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Arequipa Monorail Proposal

Sr. Project Manager — This 20.2km project consisted of extensive alignment coordination to create the most cost-effective solution for the needs of this community. Ultimately, a 4.6 km dual guideway was proposed from the airport into the city center, with a 15.6km single guideway ring around the city. Structural design, including seismic considerations, was completed to allow for a complete Bill of Quantities preparation to create an accurate estimate and proposal. System Supplier: Bombardier Transportation.

DR. AHMED FARGHAL MAREE, PhD, PE. ENV SP

VICE PRESIDENT



PhD, Civil and Environmental Engineering (Structural)
University of Nevada, Reno, 2018

MSc, Structural Engineering,
Ain Shams University, Cairo, Egypt, 2012

BSc, Civil Engineering (Structural)
Ain Shams University, Cairo, Egypt, 2007

Licensed: NV, CA, OH, WA, AZ, HI, ID, CO, IL

Affiliations:

Earthquake Engineering Research Institute (EERI), Member

American Society of Civil Engineers (ASCE), Member

American Concrete Institute (ACI), Member

Canadian Precast/Prestressed Concrete Institute (CPCI), Member

Dr. Maree has been working in the structural design field since 2007. He has participated in various tasks, such as the design of reinforced concrete box girder and steel plate girder bridge decks, conventional and post-tensioned bent cap beams, monorail columns and pile shafts, structural details and connections, plate girder steel bridge supporting monorail guide-way beams, and monorail switch buildings. In addition, he has wide experience in building design including post-tensioned flat slabs and beams, structural analysis and design of reinforced concrete buildings, steel structures, and both shallow and deep foundation design.

Metrorrey Monorail, Monterrey, Mexico

Sr. Project Director — Metrorrey, officially known as the Metrorrey Mass Transit System, is a Metro district that oversees two Rapid Transit Monorail (MRT) systems in Monterrey, Nuevo León, Mexico. The initial phases of the project consist of 32 kilometers (20 miles) of new tracks and 25 new stations. Innova is involved in the alignment and structural design of the main track elements, including prefabricated substructure elements, emergency and service walkways, observation, and construction engineering. System provider: CRRC.

Santiago de los Caballeros Monorail, Santiago, Dominican Republic

Sr. Project Engineer — The project consists of a 15 km 14-station monorail being built by FITRAM (Fund for the Development of Mass Transit in the Dominican Republic) operating under fast-track authority. Innova, as the main prime civil designer is providing mainline and depot alignment and profiles, structural designs, emergency walkways, beam shop drawings, and construction observation. The project is slated to start operations in 2024. System Supplier: Alstom Group.

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Project Director — Cairo's expanding metro system includes a 97 km monorail, featuring two lines: a 43 km route from Giza to the 6th of October City in the west and a 54 km line connecting Cairo to the New Capital City in the east. Innova is responsible for design and construction support, with 3300 spans, 900 structures, 16 switches, and 35 stations. Emergency walkways run the entire length with cross-over bridges and stairs. The project, awarded in 2019, involves Alstom (Bombardier), Arab Contractors, and Orascom Construction. Mr. Maree is the on-site project manager overseeing the day-to-day design activities and coordinating the tasks with the design team and the construction joint venture team. System Supplier: Alstom Group.

Sepulveda Transit Corridor, Los Angeles, CA

Sr. Project Manager — This project is for the LA Metro proposal phase of the Sepulveda Transit Corridor. The Los Angeles Sky Rail Express (LASRE) Team is now one of the remaining teams that are moving forward with up to four Predevelopment Agreement Phases to determine the final solution that Metro will take to the final design. Innova is on the LASRE team which proposes a monorail system along the I-405 corridor with multiple options that include a tunnel portion, a possible electric bus connector, or a Sky Shuttle Automated People Mover connector. System Supplier: BYD N. America.

Las Vegas Monorail West Extension Project, Las Vegas, NV

Sr. Project Engineer — Participated in structural analysis, design, and detailing for Las Vegas Monorail West Expansion Project. Dr. Maree participated in various tasks, such as the design of post-tensioned guide-way beams and bent caps, structural analysis, and design of reinforced concrete frames, columns, and pile shafts. Also, he performed the analysis and design of a monorail switch structure.

São Paulo Expresso Tiradentes (SPET) Monorail Project, São Paulo, Brazil

Sr. Project Engineer — Performed reanalysis and design of beams with defects during construction. The problems raised were due to a shortage in the existing tie reinforcements in the bent cap that was presented in the drawings. Strengthening techniques were designed and proposed to the contractor.

Cairo Monorail Proposal

Project Engineer — Participated in structural analysis, design, and detailing for different elements of the monorail systems including guide-way beams, bent cap beams, columns, pile shafts, structural details, and connections. Prepared a bill of quantities for the preliminary tendering stage.

R&D for Ultra-High-Performance Concrete (UHPC) Based Repair Solution of Steel Bridge Girders

Principal Investigator — Worked in a production lab environment carrying out structural engineering research focused on bridges and developing research work plans and executing the plans while also coordinating with technicians and fellow lab researchers. A half-scale experimental steel plate girder was fabricated and tested as a proof of concept to assess the performance of utilizing UHPC on the top flange of the steel bridge girder. This project was performed at the New York State Department of Transportation (NYS-DOT) and testing was carried out at the Federal Highway Administration (FHWA) Labs.

R&D for Anchorage Zones of Post-tensioned Box Girder Bridge

Research Engineer — Conducted extensive field monitoring, experimental work, and analytical studies on anchorage zone performance of post-tensioned box girder bridges. This project was executed for the California Department of Transportation (CALTRANS). A field investigation was performed for four bridges by implementing measurement devices to monitor the flow of forces during the stressing of the box girders. Experimental work included four half-scale specimens to determine the capacity of the general zone at the end of a box girder. Advanced non-linear finite element verification using TNO-DIANA was developed based on the results obtained from both field monitoring and experimental work. The developed realistic model was used to understand the behavior of anchorage zones, determine the actual safety margin during construction, estimate minimum requirements for elements' dimensions, and calibrate the adequacy of existing amounts of reinforcement. Design guidelines for the anchorage zone of post-tensioned box girder bridges were developed.

DANIEL KONEVKY, PE

VICE PRESIDENT



MSc, Structural & Earthquake
University of California, Los Angeles, 2014

BS, Civil Engineering
Universidad Nacional de Tucumán, 2011

Licensed: NV, CA, OH, WA, AZ, HI, ID, CO, IL

Affiliations:

Structural Engineers Association of So. Nevada, Member

American Society of Civil Engineers (ASCE), Member

Graduate Fellowship: Fulbright Commission, the Argentine Presidential Award to Support Master's studies in the United States

Mr. Konevsky is experienced in a broad range of structural design projects and software development. He is particularly proficient in the investigation, adaptation, and application of the seismic methodology to existing structures; structural modeling using a plethora of different kinds of structural engineering software, mass production of shop drawings, and automated production methodologies.

Metrorrey Monorail, Monterrey, Mexico

Sr. Project Manager — Metrorrey, officially Sistema de Transporte Colectivo Metrorrey, is a Metro district overseeing two MRT (Monorail rapid transit) systems in Monterrey, Nuevo León, Mexico. The project consists of 41 kilometers (25 mi) of new track and 41 new stations to be built by 2027. Innova is participating in the alignment and structural design of the mainline guideway elements, including precast substructure elements. System Supplier: CRRC.

Santiago de los Caballeros Monorail, Santiago, Dominican Republic

Project Director — The project consists of a 15 km 14-station monorail being built by FITRAM (Fund for the Development of Mass Transit in the Dominican Republic) operating under fast-track authority. Innova, as the main prime civil designer is providing mainline and depot alignment and profiles, structural designs, emergency walkways, beam shop drawings, and construction observation. The project is slated to start operations in 2024. System Supplier: Alstom Group.

Cairo Monorail – 6th of October & New Capital City, Cairo, Egypt

Sr. Project Engineer — Two alignments totaling 97 km were awarded in 2019 after many years of effort with a team consisting of Alstom, Arab Contractors, and Orascom Construction. Mr. Konevsky is leading many of the design tasks including the expansion joints, intel design, temporary beam support structures, finite element analysis of structures for design and review of designs produced by others, and the assessment of the quality of the guideway beams and their camber control and impacts on Train-Structure Interactions. System Supplier: Alstom Group.

Bangkok Pink and Yellow Line Monorail Project, Bangkok, Thailand

Sr. Project Engineer — The task is to deliver the following: a review of guideway beam interfaces to the M&E system, a review of the casting method, a review of installation methods, a review of QA/QC and supervision procedures at the casting yard, review QA/QC plus a review of supervision procedures of installation at sites for the first 200 beams, and provision of training of BTS Infrastructure and Development personnel for the previous tasks. System Supplier: Alstom Group.

Las Vegas Monorail West Extension Project, Las Vegas, NV

Sr. Project Engineer — The Las Vegas Monorail Extension consists of developing an updated one-mile section of monorail guideway including a fatigue-resilient 300-foot-long steel box beam design and a track switch. The design was completed and verified by the authority having jurisdiction and the project is awaiting funding. System Supplier: Alstom (Bombardier) Transportation

São Paulo Expresso Tiradentes (SPET) Monorail Project, São Paulo, Brazil

Project Director — The project was originally a 24 km monorail project between Vila Prudente to São Mateus and Tiradentes in São Paulo Brazil. The project extends subway Line 2-green Line to the eastern outskirts of São Paulo. The first 13 km of the guideway are completed and operational. Mr. Konevsky is working on the extensions of the project. The Joint Venture that produced the project was composed of Alstom (Bombardier) Transportation, Queiroz Galvão, and OAS, two large civil Brazilian conglomerates. At its peak construction, the project mobilized more than 1500 people. System Supplier: Alstom (Bombardier) Transportation.

Kahului Airport Tran, Kahului, HI

Project Manager — The project consists of a 2500 ft long automated people mover between the airport terminal and the Consolidated Car Rental Facility. Mr. Banchik was in responsible charge of the alignment and structural design of civil and mechanical components. There were numerous creative applications developed with the System Supplier like track stops at the maintenance facility that required special design for the overtravel buffer and steel guideway beam; shop drawings of the bogie for the trains; highly innovative expansion joints between the rail structure and the car rental facility. System Supplier: Schwager Davis Inc. San José, CA.

Miscellaneous Tank Projects

Sr. Project Manager — Mr. Konevsky oversees reviewing tank designs for a national tank manufacturer. He developed automated checks for seismic and wind-imposed loads, overturning, and sliding effects. He oversees the designs considering material specifications and capacities, considering the state codes and regulations where the tank will be located.

Park MGM Hotel and Casino Concert Hall, Las Vegas, NV

Sr. Project Engineer — A 16,000-seat Arena built within the Park MGM Hotel and Casino. Innova provided the design of the miscellaneous steel for the steel fabricator. Mr. Konevsky successfully designed and coordinated complicated steel stairs inside this renowned building with the steel fabricator, the Engineer of Record, and the contractor on this project.

JOSE BERNARDO LÔBO, PE

PROJECT MANAGER



Master of Science (MSc), Structural Engineering
Instituto Superior Técnico - Lisbon, Portugal, 2000

BS, Civil Engineering
Instituto Superior Técnico - Lisbon, Portugal, 1994

Licensed: Registered Civil Engineer
Senior Member of the Portuguese Order of Engineers - No. 37168.

Professional Publications:

Vila Prudente -Cidade Tiradentes Monorail Project by Carlos Banchik and Marcos Beier. ABECÉ Structural Engineering Meeting. São Paulo Brazil. October 2011.

National Structural Concrete 2000, "Strapping the Pillars in Seismic Zones (EC8)" - 2000

National Structural Concrete 2000: "Consequences of the Pillar of Robust Criterion - Beam Slender (EC8)" - 2000

Mr. Lôbo has 28 years of experience as a project manager for structural projects, including monorails. His experience is very diverse, as he has performed independent quality checks and project management reviews. Mr. Lôbo also provides code reviews and develops project scopes as needed.

Santiago de los Caballeros Monorail, Santiago, Dominican Republic

Senior Project Engineer — Metrorrey, officially known as the Metrorrey Mass Transit System, is a Metro district that oversees two Rapid Transit Monorail (MRT) systems in Monterrey, Nuevo León, Mexico. The initial phases of the project consist of 32 kilometers (20 miles) of new tracks and 25 new stations. Innova is involved in the alignment and structural design of the main track elements, including prefabricated substructure elements, emergency and service walkways, observation, and construction engineering. System provider: CRRC.

Cairo Monorail – 6th of October & New Capital City, Cairo, Egypt

Senior Project Engineer — Two alignments totaling 97 km were awarded in 2019 after many years of effort with a team consisting of Alstom, Arab Contractors, and Orascom Construction. Mr. Lôbo is working with the design of structural elements by leading the design effort for the project engineers developing specialized automated routines for typical and non-typical monorail structures. Mr. Lôbo is working also on the Train-Structure-Interaction effort by Innova with the train supplier. System Supplier: Alstom Group.

São Paulo Expresso Tiradentes (SPET) Monorail Project, São Paulo, Brazil

Sr. Project Engineer — The project was originally a 24 km monorail project between Vila Prudente to São Mateus and Tiradentes in São Paulo Brazil. The project extends subway Line 2-green Line to the eastern outskirts of São Paulo. There are two phases, the first one to São Mateus, a transportation hub east of São Paulo, and the second one to Tiradentes. The first 13 km of the guideway are completed and operational. The Joint Venture that produced the project was composed of Alstom (Bombardier) Transportation, Queiroz Galvão, and OAS, two large civil Brazilian conglomerates. At its peak construction, the project mobilized more than 1500 people. System Supplier: Alstom (Bombardier) Transportation.

Las Vegas Monorail Extension Proposal

Senior Project Engineer — The existing Las Vegas Monorail was completed in 2 phases. The first phase consisted of 2 stations with approximately 1 mile of dual elevated guideway in 1995. The second phase followed with 5 additional stations, approximately 4.5 miles of additional dual guideway, and a single guideway tail track to an operations and maintenance facility in 2003. The third phase was developed and took the Southern end of the monorail farther South and then cross to the West side of Las Vegas Boulevard, The Strip, arriving at a station at the Mandalay Bay Hotel Casino. The design was completed and verified by the authority having jurisdiction and the project is awaiting funding. Mr. Lôbo provided a detailed design of 300 foot long, highly curved, long-span structure, and provided a critical review of other system components. System Supplier: Bombardier Transportation.

King Abdullah Financial District (KAJD) Monorail

Sr. Project Engineer — A fully integrated public transit monorail system to connect the different areas of the KAFD in Riyadh, Saudi Arabia. Six stations are primarily set in connection to a public attractor building. Integrated skywalk system to connect the buildings. Provided numerous alternative long-span monorail structure concepts. Mr. Lobô provided an analysis of the long-span structures and the wind displacement of structures at stations. System Supplier: Bombardier Transportation.

Lisconcebe, LCW S.A.

Project Manager (Viaducts, Bridges) — Implementation of the Bridge Gala and the structural design for the rehabilitation, retrofit, and strengthening of the Viana do Castelo road and rail bridge. Additionally, it includes the foundations and structural design for two bridges associated with the A7 Highway in Ribeira da Pena-Vila Pouca de Aguiar, Portugal: the bridge over the river Bóco and EN206, and the bridge over the river Torno and EN206.

PROMAN

Design Engineer — The project involved the comprehensive design verification and forensic engineering of various maritime structures. This includes the design verification of drydock structures at the Rio Grande Shipyard in Rio Grande do Sul, Brazil, and at the Estaleiro Enseada do Paraguaçu Shipyard in Maragogipe, Bahia, Brazil. Additionally, the project encompassed forensic engineering for the damaged marina structures at Marina Do Lugar De Baixo on Madeira Island, Portugal.

Maubertec

Design Engineer — The foundation and structural design for two significant bridges in São Paulo, Brazil. This includes the design work for the Laguna Bridge and the Itapaiuna Bridge, ensuring both structures meet the necessary engineering standards for safety and functionality.

Bouygues Travaux Publics

Design Engineer — Structural design and seismic analysis for the LNG tanks regarding the Dunkerque LNG Terminal Transshipment Project Dunkerque, France.

LUCAS DE OLIVEIRA BERNARDI MOREIRA

SENIOR PROJECT MANAGER



Master's Degree, Finance
IBMEC, 2008

BS, Civil Engineering
FUMEC University, 2004

Licensed: Registered Civil Engineer: Brazil

Mr. Bernardi joined Innova Technologies after completing 7 years of field engineering in the Sao Paulo Expresso Tiradentes monorail project, where he performed field engineering tasks in the precast yard and the field. He has intimate knowledge of the quality assurance and quality control programs for monorail projects. He also brings Innova a wealth of knowledge related to construction engineering, logistics, and retrofit operations including measures to avoid them.

Metrorrey Monorail, Monterrey, Mexico

Construction Services Director — Metrorrey, officially known as the Metrorrey Mass Transit System, is a Metro district that oversees two Rapid Transit Monorail (MRT) systems in Monterrey, Nuevo León, Mexico. The initial phases of the project consist of 32 kilometers (20 miles) of new tracks and 25 new stations. Innova is involved in the alignment and structural design of the main track elements, including prefabricated substructure elements, emergency and service walkways, observation, and construction engineering. System provider: CRRC.

Santiago de los Caballeros Monorail, Santiago, Dominican Republic

Construction Services Director — The project consists of a 15 km 14-station monorail being built by FITRAM (Fund for the Development of Mass Transit in the Dominican Republic) operating under fast-track authority. Innova, as the main prime civil designer is providing mainline and depot alignment and profiles, structural designs, emergency walkways, beam shop drawings, and construction observation. The project is slated to start operations in 2024. System Supplier: Alstom Group

Cairo Monorail – 6th of October & New Capital City, Cairo, Egypt

Construction Services Director — Two alignments totaling 97 km were awarded in 2019 after many years of effort with a team consisting of Alstom, Arab Contractors, and Orascom Construction. Mr. Bernardi is directing construction observation work on-site in Cairo, providing quality control for the civil works, emphasizing the precast concrete guideway beams. Using his extensive knowledge from previous monorail projects, he has been a vitally important asset to the entire construction team. System Supplier: Alstom Group.

Sepulveda Transit Corridor, Los Angeles, CA

Senior Project Manager — This project is for the LA Metro proposal phase of the Sepulveda Transit Corridor. The Los Angeles Sky Rail Express (LASRE) Team is now one of the remaining teams that are moving forward with up to four Predevelopment Agreement Phases to determine the final solution that Metro will take to the final design. Innova is on the LASRE team which proposes a monorail system along the I-405 corridor with multiple options that include a tunnel portion, a possible electric bus connector, or a Sky Shuttle Automated People Mover connector. System Supplier: BYD N. America.

Bangkok Pink and Yellow Line Monorail Project, Bangkok, Thailand

Sr. Project Engineer — Innova's task was as follows: Review the beam guide interfaces for the M&E system, and review GWB casting and installation methods. Review QA/QC and supervision in the precast yard, review QA/QC and on-site installation supervision for the first 200 beams, training the operator, and BTS Infrastructure and Development team, for previous tasks. Mr. Bernardi was the project engineer on-site for this project and performed all activities and field reviews. System Supplier: Alstom Group.

Las Vegas Monorail West Extension Project, Las Vegas, NV

Sr. Project Engineer — The Las Vegas Monorail Extension was to develop an updated one-mile section of the monorail guideway including a fatigue-resilient 100-meter-long steel box beam design and a track switch. The design was completed and verified by the authority having jurisdiction and the project is awaiting funding. As the project engineer for this project, Mr. Bernardi prepared numerous documents related to quality control and precast operations. System Supplier: Bombardier Transportation.

São Paulo Expresso Tiradentes (SPET) Monorail Project, São Paulo, Brazil

Field Engineer — Responsible for assisting with casting operations, and responsible for Quality Control and Quality Assurance on the project. As a field engineer, he directly controlled retrofit operations on the project and was in close contact with Innova Technologies personnel. He prepared estimates, and QA/QC tables interfaced directly with the superintendent of the project. He successfully interfaced with vehicle supplier Bombardier and with Owner Metro São Paulo.

Santa Barbara Engenharia S.A.

Field Engineer (2007 – 2011) — Worked on the construction of the Salobo copper mine in Carajás/Brazil. The Salobo Mining Project is the largest Vale copper mine and went into operation in 2012. The mine has a capacity of 100,000 tons of concentrated copper per year. Mr. Bernardi also worked in constructing a hospital for immediate care in Belo Horizonte, Minas Gerais State.

DR. Khaled Mohamed Hilal Riad, PhD

HEAD OF STRUCTURAL DESIGN DEPARTMENT



PhD, Civil Engineering (Structural), The Institute of Construction Engineering (IKI), Kassel University, Germany, 2006

MSc, Structural Engineering, Ain Shams University, Cairo, Egypt, 2001

BSc, Civil Engineering (Structural), Ain Shams University, Cairo, Egypt, 1997

Licensed: Registered Consultant Engineer for Reinforced Concrete Structures in Egyptian Engineers Syndicate

Registered Engineer in Dubai Municipality - Unlimited License

Dr. Riad has been working in the structural design field since 1997. He has participated in various structural design tasks for building, bridges, and tunnels. He has also a wide academic experience as an associate professor at Faculty of Engineering, Ain Shams University, where he is involved in teaching and conducting research work in the areas of reinforced and prestressed concrete and assessment and strengthening of structures. He has conducted many seminars and short courses on different aspects of structural engineering. He gained extensive experience in finite element analysis with various software including SAP2000, ETABS, CSI-Bridge, and SOFISTIK.

Cairo Monorails Project, Cairo, Egypt

Senior Design Consultant — Two alignment totaling 95km were awarded in 2019 after many years of effort with a team consisting of Alstom, Arab Contractors, and Orascom Construction. The Cairo Monorails Project consists of precast concrete guideway beams used for a monorail system in a highly urban environment. Much of the alignment is designed along major highways and moves between the median of existing roadways to the shoulders to avoid large highway crossings or accommodate stations and then returns to the medians.

Santiago de los Caballeros Monorail, Santiago, Dominican Republic

Senior Design Consultant — The project consists of a 15 km 14-station monorail being built by FITRAM (Fund for the Development of Mass Transit in the Dominican Republic) operating under fast-track authority. Innova, as the main prime civil designer is providing mainline and depot alignment and profiles, structural designs, emergency walkways, beam shop drawings, and construction observation. The project is slated to start operations in 2024. System Supplier: Alstom Group

Metrorrey Monorail, Monterrey, Mexico

Senior Design Consultant — Metrorrey, officially Sistema de Transporte Colectivo Metrorrey, is a Metro district overseeing two MRT (Monorail rapid transit) systems in Monterrey, Nuevo León, Mexico. The project consists of 41 kilometers (25 mi) of new track and 41 new stations to be built by 2027. Innova is participating in the alignment and structural design of the mainline guideway elements, including precast substructure elements. System Supplier: CRRC

Metrorrey Monorail Extension, Monterrey, Mexico

Senior Design Consultant — Metrorrey selected to extend the monorail system mentioned below, before the design and construction of the initial phase was complete. Innova is the only member to be on both teams and is responsible for the superstructure design of the extension to both Lines 4 and 6. System Supplier: CRRC.

LIST OF BRIDGES AND TUNNELS PROJECTS

Bridge at interchange of Al-Takhassossy Street with Al-Emam Soud Road, Al-Riyadh – KSA. [Budget (US\$): 25 million USD]	2022
Road Alfarag Cable Stayed Bridge, Cairo, Egypt. [Budget (US\$): 60 million USD]	2017
Ismailia – Port-Said Road Bridges, Ismailia, Egypt. [Budget (US\$): 30 million USD]	2017
Faied Bridge, Ismailia, Egypt [Budget (US\$): 7 million USD]	2016
Trough T1, Jahra Road, Kuwait, Kuwait, [Budget (US\$): 20 million USD]	2015
Souq Al-Hegira Bridge, Mecca, KSA. [Budget (US\$): 20 million USD]	2015
Trough T1, Jahra Road, Kuwait, Kuwait, [Budget (US\$): 20 million USD]	2015
Souq Al-Hegra Bridge, Mecca, KSA. [Budget (US\$): 20 million USD]	2015
Bridge at interchange of Cairo-Alex (km 68). Desert Road with Regional Ring Road, Cairo, Egypt. [Budget (US\$): 6 million USD]	2015
Bridge at interchange of Cairo-Alex (km 39). Desert Road with Regional Ring Road, Cairo, Egypt. [Budget (US\$): 7 million USD]	2015
Bridge at interchange of King Abdul-Aziz road with Al-Emam Soud Road, Al-Riyadh, KSA. [Budget (US\$): 30 million USD]	2014
Bridge and Tunnel at interchange of Al-Thumama Road with adjacent to the west of the airport Road Al-Riyadh, KSA. [Budget (US\$): 35 million USD]	2014
Alkebash Road Bridge, Luxor, Egypt. [Budget (US\$): 3 million USD]	2014

WILSON MOY, PE

SENIOR STRUCTURAL ENGINEER



ME, Structural Engineering
University of Florida, 1995

BS, Civil Engineering
Georgia Institute of Technology, 1993

Licensed: CO, IL, TX, UT, NV

Wilson has over 27 years of structural engineering experience and has served as engineer-of-record, task lead, project engineer, or owner's representative during his career. Wilson has worked on multi-level interchanges, grade separation structures, elevated light rail stations, tram stations, pedestrian structures, traffic structures, light rail structures, retaining walls, and drainage structures. Wilson has experience with preliminary designs, feasibility studies, final designs, seismic analysis, independent checks and peer reviews, construction support services, and owner's representative structural reviews.

Metrorrey Monorail, Monterrey, Mexico

Sr. Structural Engineer — Metrorrey, officially known as the Metrorrey Mass Transit System, is a Metro district that oversees two Rapid Transit Monorail (MRT) systems in Monterrey, Nuevo León, Mexico. The initial phases of the project consist of 32 kilometers (20 miles) of new tracks and 25 new stations. Innova is involved in the alignment and structural design of the main track elements, including prefabricated substructure elements, emergency and service walkways, observation, and construction engineering. System provider: CRRC.

Santiago de los Caballeros Monorail, Santiago, Dominican Republic

Sr. Structural Engineer — The project consists of a 15 km 14-station monorail being built by FITRAM (Fund for the Development of Mass Transit in the Dominican Republic) operating under fast-track authority. Innova, as the main prime civil designer is providing mainline and depot alignment and profiles, structural designs, emergency walkways, beam shop drawings, and construction observation. The project is slated to start operations in 2024. System Supplier: Alstom Group.

Cairo Monorail – 6th of October & New Capital City, Cairo, Egypt

Sr. Structural Engineer — The metropolitan area of Cairo is adding a 100 km new monorail system to the transit systems in the city. Two lines are currently in design-build with a 44 km line from Giza to the 6th of October City west of Cairo, and another 55 km providing a connection from Cairo to the New Capital City east of Cairo. Innova is responsible for the alignment design, and structural design of the guideway superstructure, pier caps, columns, steel emergency walkway, switch structures, and construction assistance with precast operations and erection. There are 3300 spans, 900 structures, 16 switches, and 35 stations. The emergency walkways will be installed along the entire length of the guideway with numerous cross-over bridges and stairs to stations and the ground. The two alignments were awarded in 2019 after many years of effort with a team consisting of Alstom (Bombardier), Arab Contractors, and Orascom Construction.

Sepulveda Transit Corridor, Los Angeles, CA

Sr. Structural Engineer — This project is for the LA Metro proposal phase of the Sepulveda Transit Corridor. The Los Angeles Sky Rail Express (LASRE) Team is now one of the remaining teams that are moving forward with up to four Predevelopment Agreement Phases to determine the final solution that Metro will take to the final design. Innova is on the LASRE team which proposes a monorail system along the I-405 corridor with multiple options that include a tunnel portion, a possible electric bus connector, or a Sky Shuttle Automated People Mover connector. System Supplier: BYD N. America.

Fort Worth Trinity Railway Express, Ft. Worth, TX (with a previous firm)

Engineer of Record – Mr. Moy was the engineer of record for a cut & cover pedestrian tunnel at the Fort Worth T&P Station. The T&P Station served as the terminal station for the Trinity Railway Express (TRE). Mr. Moy was also a project engineer for a 5-span horizontally curved commuter railroad bridge adjacent to the T&P Station. The commuter railroad bridge crossed over E. Lancaster Avenue. The bridge is comprised of five 84-ft long curved spans. Tangential piers and abutments are supported on spread footings.

Link Light Rail South 154th Street Station, Tukwila, Sound Transit, Tukwila, WA (with a previous firm)

Project Engineer – Mr. Moy was the project engineer for the design of an elevated light rail station which was the terminus for the initial light rail line. This multi-level light rail structure is comprised of post-tensioned straddle bents supporting a post-tensioned segmental box girder guideway. The structure has general plan dimensions of approximately 370 ft by 110 ft with bent spacings of 80 ft, 78 ft, and 52 ft. The structure was founded on drilled shafts and spread footings. The structure also features many pedestrian and architectural elements such as stairwells, escalators, elevators, roof truss, and pedestrian platforms. This light rail station briefly served as the south terminus for the initial portion of the Sound Transit Light Rail project until the Airport-link was designed and constructed.

T-REX Design-Build Project, CDOT and RTD, Denver, CO (with a previous firm)

Structural Design Lead – T-REX (Transportation Expansion) Project was a \$1.5 billion multi-modal design-build project that widened portions of interstate I-25 and I-225 corridor and also added double track light rail along those corridors. Mr. Moy was the structural design lead for structures within the I-25 and I-225 interchange.

Jackson Hole Mountain Resort Tram Replacement Project, Jackson Hole, WY (with a previous firm)

Project Engineer – The project engineer responsible for the structural design of the lower terminal of the aerial tram at the Jackson Hole Ski Resort. Overall plan dimensions of the lower concrete terminal structure are approximately 75 feet long by 50 feet wide. The terminal structure served as the pedestrian access facility as well as the tram cable support structure. The project was delivered under a design-bid-build contract.

Mr. Moy served as the Engineer of Record for four bridges within the I-25/I-225 Interchange, three of which supported Light Rail Transit (LRT).

These include the SB I-25 to NB I-225 flyover bridge (Bridge 33), a 10-span curved structure with steel plate girders and a post-tensioned integral pier cap at one of the interior piers. The NB LRT Over SB I-225 to SB LRT bridge (Bridge 83) is a 3-span single-track direct fixation LRT bridge featuring a reinforced concrete integral pier cap at an interior pier. The SB I-225 LRT to SB LRT over Ulster Street bridge (Bridge 81) is a 3-span single-track, non-redundant, 2-girder ballasted LRT bridge. Lastly, the I-225 LRT over Ulster Street bridge (Bridge 75) is a 3-track, 3-span ballasted LRT bridge.

DR. WALAA GALAL ELTAHAWY, PhD, EI, ENV SP

PROJECT ENGINEER – GEOTECHNICAL COORDINATOR



PhD, Civil and Environmental Engineering
University of Nevada, Reno, 2018

MSc, Geotechnical Engineering
Ain Shams University, Cairo, Egypt, 2013

BSc, Civil Engineering (Structural)
Ain Shams University, Cairo, Egypt, 2007

Licensed: NV, EGYPT

Awards and Recognition:
Graduate Research Assistantship, University of Nevada, Reno (Funded by NSF), Jan. 2015 – Dec. 2018.

International student award, OISS (Office of International Students and Scholars), University of Nevada, Reno, Fall 2014 till Fall 2018.

Dr. Eltahawy has been working in the geotechnical design field since 2007. She has participated in various tasks, such as soil-structure interaction and foundation design, analysis and design of retaining structures, analysis of soil lab testing and prepare technical reports, determination of pile capacity including steel and well as concrete piles and develop advanced geotechnical 3D models using Plaxis 3D. In addition, she has developed considerable experience in Civil Engineering software, such as AutoCAD, SAP2000, ETABS, PLAXIS 2D and 3D and OPENSEES.

Metrorrey Monorail, Monterrey, Mexico

Sr. Project Engineer – Geotechnical Coordinator — Metrorrey, officially known as the Metrorrey Mass Transit System, is a Metro district that oversees two Rapid Transit Monorail (MRT) systems in Monterrey, Nuevo León, Mexico. The initial phases of the project consist of 32 kilometers (20 miles) of new tracks and 25 new stations. Innova is involved in the alignment and structural design of the main track elements, including prefabricated substructure elements, emergency and service walkways, observation, and construction engineering. System provider: CRRC.

Santiago de los Caballeros Monorail, Santiago, Dominican Republic

Sr. Project Engineer – Geotechnical Coordinator — The project consists of a 15 km 14-station monorail being built by FITRAM (Fund for the Development of Mass Transit in the Dominican Republic) operating under fast-track authority. Innova, as the main prime civil designer is providing mainline and depot alignment and profiles, structural designs, emergency walkways, beam shop drawings, and construction observation. The project is slated to start operations in 2024. System Supplier: Alstom Group.

Cairo Monorail – 6th of October & New Capital City, Cairo, Egypt

Sr. Project Engineer – Geotechnical Coordinator — Two alignments totaling 97 km were awarded in 2019 after many years of effort with a team consisting of Bombardier, Arab Contractors, and Orascom Construction. Eltahawy worked on the structural design of depot structures as well as coordinating geotechnical tasks with the design team and the construction joint venture team. System Supplier: Bombardier Transportation.

Sepulveda Transit Corridor, Los Angeles, CA

Sr. Project Engineer – Geotechnical Coordinator — This project is for the LA Metro proposal phase of the Sepulveda Transit Corridor. The Los Angeles Sky Rail Express (LASRE) Team is now one of the remaining teams that are moving forward with up to four Predevelopment Agreement Phases to determine the final solution that Metro will take to the final design. Innova is on the LASRE team which proposes a monorail system along the I-405 corridor with multiple options that include a tunnel portion, a possible electric bus connector, or a Sky Shuttle Automated People Mover connector. System Supplier: BYD N. America. Dr. Eltahawy was in charge of the coordination of the geotechnical information with the Geotechnical subconsultant

Supported Pit Excavations for Structures in New York

Sr. Geotechnical engineer – Performing analysis and design of permanent and temporary shoring systems used to support shallow and deep excavations for several residential and official buildings. New York City is a very crowded area, well designed shoring system should be used to ensure that neighboring buildings will remain safe.

New Main Brine Intake Pumping Station at the Dead Sea (Jordan)

Geotechnical engineer – Participated in analysis, design, and detailing for piles used to support this intake station. The soil formation in this area is very special and complex due to the high concentration of salts which dissolves with fresh water leaving cavities behind.

Telal El Alamein – North Coast - Egypt

Geotechnical engineer — Participated in analysis, design, and detailing for retaining walls. This project has a fancy landscape with buildings on different levels to have a sea view. The retaining walls are used to support soil and building foundation.

R&D for Fundamental Dynamics and Performance Assessment of Three-Dimensional Seismic Isolation

Research engineer — Worked on National Science Foundation (NSF) funded project to develop a three-dimensional isolation system that can prevent damage to buildings from both horizontal and vertical ground shaking. Parameters affecting dynamic response for 3D seismic isolation were studied. Quarter-scaled Linear Spring damper was designed and tested under both cyclic loading and earthquake displacement histories. A proposed control strategy was introduced to simulate the semi-active behavior. The performance of flexible buildings with conventional and 3D isolation systems under 3D ground excitations was studied.

R&D for Numerical Analysis of Deep Excavations in Soft Clay

Research engineer — Worked on performing numerical analysis to investigate the behavior of deep excavations in soft clay formations, especially the deformation aspects. A plane strain finite element numerical model using PLAXIS was developed to simulate and analyze the soil-structure interaction problem of deep excavation. A field case history for deep excavation was back analyzed. A comparison between the numerically predicted response and the monitored response was presented to assess the adequacy of the adopted numerical modeling.

STEPHEN CUPP, PE

SENIOR CIVIL ENGINEER



BS, Civil Engineering
University of Nevada, Las Vegas 2001

Licensed: NV

Mr. Cupp is very proficient in the design and creation of transportation structures and alignment drawings, grading plans, utility and roadway plans and profiles, striping plans, utility plans, cross sections, detail sheets, and program automation.

Metrorrey Monorail, Monterrey, Mexico

Sr. Civil Engineer — Metrorrey, officially known as the Metrorrey Mass Transit System, is a Metro district that oversees two Rapid Transit Monorail (MRT) systems in Monterrey, Nuevo León, Mexico. The initial phases of the project consist of 32 kilometers (20 miles) of new tracks and 25 new stations. Innova is involved in the alignment and structural design of the main track elements, including prefabricated substructure elements, emergency and service walkways, observation, and construction engineering. System provider: CRRC.

Santiago de los Caballeros Monorail, Santiago, Dominican Republic

Sr. Civil Engineer — The project consists of a 15 km 14-station monorail being built by FITRAM (Fund for the Development of Mass Transit in the Dominican Republic) operating under fast-track authority. Innova, as the main prime civil designer is providing mainline and depot alignment and profiles, structural designs, emergency walkways, beam shop drawings, and construction observation. The project is slated to start operations in 2024. System Supplier: Alstom Group.

Cairo Monorail – 6th of October & New Capital City, Cairo, Egypt

Sr. Civil Engineer — Two alignments totaling 97 km were awarded in 2019 after many years of effort with a team consisting of Alstom, Arab Contractors, and Orascom Construction. Mr. Cupp is leading the alignment designer for both alignments including vertical and horizontal design, production of beam shop drawings, and supporting additional automation efforts. The alignment design includes complications due to many unknown utilities and crossing structures that were built after the project started with little coordination between the reviewing agencies for conflicts. System Supplier: Alstom Group.

Sepulveda Transit Corridor, Los Angeles, CA

Sr. Civil Engineer — Mr. Cupp has been involved with the preliminary design of numerous Sky Shuttle Automated People Mover projects at various locations including Newark Airport, LaGuardia Airport, the Sepulveda Transit Corridor, and others. This has included working closely with the vehicle designers to provide a stringent Basis for the Design document to ensure that the structure provided meets the tight tolerances necessary for the quality operations of the systems. System Supplier: BYD.

Bangkok Pink and Yellow Line Monorail Project, Bangkok, Thailand

Sr. Civil Engineer — The task is to deliver the following: a review of guideway beam interfaces to the M&E system, a review of the casting method, a review of installation methods, a review of QA/QC and supervision procedures at the casting yard, review QA/QC plus a review of supervision procedures of installation at sites for the first 200 beams, and provision of training of BTS Infrastructure and Development personnel for the previous tasks. Mr. Cupp was the Project Engineer for the project in charge of the alignment reviews. System Supplier: Alstom Group.

Las Vegas Monorail West Extension Project, Las Vegas, NV

Sr. Civil Engineer — Mr. Cupp provided the horizontal and vertical alignment design. Span layouts were chosen to optimize structural requirements while also avoiding all known utility, traffic, or other conflicts. The use of micro and macro programs extracted exact information to show GCs the precise construction tolerances needed for monorail construction. The design was completed and verified by the authority having jurisdiction and the project is awaiting funding. System Supplier: Bombardier Transportation.

Kahului Airport Tran, Kahului, HI

Sr. Civil Engineer — The project consists of a 2500 ft long automated people mover between the airport terminal and the Consolidated Car Rental Facility. Mr. Banchik was in responsible charge of the alignment and structural design of civil and mechanical components. There were numerous creative applications developed with the System Supplier like track stops at the maintenance facility that required special design for the overtravel buffer and steel guideway beam; shop drawings of the bogie for the trains; highly innovative expansion joints between the rail structure and the car rental facility. System Supplier: Schwager Davis Inc. San José, CA.

Egypt Monorail Proposal, Cairo, Egypt

Sr. Civil Engineer — Mr. Cupp provided the preliminary preparation of horizontal and vertical alignment for both the New Capital and the 6th of October Alignments for the proposal phase. Span layouts were optimized to minimize substructure requirements while also avoiding known utility, traffic, etc. System Supplier: Bombardier Transportation.

Arequipa Monorail Proposal, Arequipa, Peru

Sr. Civil Engineer — This 20.2km project consisted of extensive alignment coordination to create the most cost-effective solution for the needs of this community. Ultimately, a 4.6 km dual guideway was proposed from the airport to the city center, with a 15.6 km single guideway ring around the city. Mr. Cupp provided the horizontal and vertical alignment design. System Supplier: Bombardier Transportation.

ANGUS ANDERSON

CAD MANAGER



Associate of Applied Science
Computer-Aided Drafting Technology
ITT Technical Institute, 1996

Mr. Anderson has 27 years of design experience and is responsible for CAD design and detailing a variety of projects at Innova. His proficiency in Revit and AutoCAD provides the versatility to work on building and transportation projects.

Cairo Monorails Project, Cairo, Egypt

CAD Manager — Two alignments totaling 97 km were awarded in 2019 after many years of effort with a team consisting of Bombardier, Arab Contractors, and Orascom Construction. Mr. Anderson is leading the drafting of the project. The majority of the details have been created in 3 dimensions utilizing Revit to check for conflicts in highly congested reinforced concrete members. He is responsible for the drafting of the Emergency Walkways, Alignment Support, Profiles, Cross Sections, and Depot Layout. System Supplier: Bombardier Transportation.

Sepulveda Transit Corridor, Los Angeles, CA

CAD Manager — This project is for the LA Metro proposal phase of the Sepulveda Transit Corridor. The Los Angeles Sky Rail Express (LASRE) Team is now one of the remaining teams that are moving forward with up to four Predevelopment Agreement Phases to determine the final solution that Metro will take to the final design. Innova is on the LASRE team which proposes a monorail system along the I-405 corridor with multiple options that include a tunnel portion, a possible electric bus connector, or a Sky Shuttle Automated People Mover connector. System Supplier: BYD N. America.

Clean Solutions for Omaha (CSO), Omaha, NE

Preparing Topo Surveys for multiple projects throughout Nebraska for local municipalities and the Nebraska Department of Roads using AutoCAD Civil 3D 2015, Bentley Geopak/Power Geopak.

I-15 South Design-Build – Silverado Ranch Blvd. to Tropicana Ave.

Sr. Structural Designer/CAD Manager/Production Manager — Provided CAD support for the engineering and cost estimates for the widening of I-15 from Silverado Ranch Boulevard to Tropicana Avenue. Prepared plans for 26 bridge structures, retaining walls, sound walls, and roadway design. Coordinated plan generation and delivery. Developed project Structural CAD Standards used by the design team.

Las Vegas Beltway — Decatur to North 5th Street

Lead Structural CAD Detailer/CAD Manager - Responsible for the development of structural plans for bridges and retaining walls at Aviary Way overcrossing CC-215 and Aliante Parkway Interchange.

Boulder City Bypass, Boulder City, NV

Lead Structural CAD Detailer/CAD Manager — Involved in the preliminary design and later the design-build of this new freeway. Responsible for plans preparation for bridge and wall structures and structural CAD staff management.

Virginia Street Bridge Replacement Project, Reno, NV

Sr. Structural Designer/CAD Manager — Responsible for the structural detailing and plans preparation of a unique hybrid rigid frame and unbraced tied-arch bridge across the Truckee River, which replaced the historic two-span earth-filled concrete arch structure and provides a larger hydraulic opening to prevent flooding. The bridge was designed for both heavy truck and future light rail loading. The bridge is a hybrid of a tied-arch and a rigid frame to minimize the depth of the arches to limit the visual mass of the bridge. This hybrid structure also serves to keep the structure depth at 3' -6" to meet 2 feet of freeboard above the 100-year flood elevation. Numerous aesthetic enhancements were incorporated into the bridge and adjacent floodwalls.

I-15 North Design-Build – US 95 to Craig Road, Las Vegas, NV

Sr. Structural Designer/CAD Manager — Lead for Structural CAD detailing, plan production, structures quantities, and cost estimates. Prepared plans for two bridge widenings at I-15 over Las Vegas Wash, the widening of Craig Road over I-15, and modifications to retaining walls at the Cheyenne Avenue interchange.

Las Vegas Monorail – Proposed Extension from MGM to McCarran Airport

Lead Structural CAD Detailer/CAD Manager — Responsible for structural plans preparation during the preliminary alignment phase and final design of foundations and columns for a proposed station within the new Terminal 3 parking garage.

Las Vegas Beltway – Sahara to Charleston, Las Vegas, NV

Structural CAD Detailer — Prepared plans for two bridges at CC-215 over Summerlin Centre Parkway. The bridges are two-span post-tensioned concrete box girders on reinforced concrete columns with spread footing foundations.

Hacienda Road over I-15, Las Vegas, NV

Structural Detailer — Prepared plans for the new bridge over the I-15 widening and later for the widening of this bridge. The bridge is a four-span continuous welded steel plate girder structure

Las Vegas Wash Channel, Las Vegas, NV

Structural Detailer — Prepared plans for several segments of the Las Vegas Wash and its Western Tributary. Structures included rectangular and trapezoidal concrete channels, confluence structures, box culverts, and miscellaneous drainage structures.

DEISE BROWN

SENIOR DESIGNER



Bachelor of Architecture and Urbanism
Federal University of Juiz de Fora, Brazil, 2005

Autocad Drafting Certification
Federal University of Juiz de Fora, Brazil, 2005

Mrs. Brown is responsible for CAD design and detailing a variety of projects at Innova. Her proficiency in Revit and Autocad provides the versatility to work on building and transportation projects.

Metrorrey Monorail, Monterrey, Mexico

Sr. Designer — Metrorrey, officially known as the Metrorrey Mass Transit System, is a Metro district that oversees two Rapid Transit Monorail (MRT) systems in Monterrey, Nuevo León, Mexico. The initial phases of the project consist of 32 kilometers (20 miles) of new tracks and 25 new stations. Innova is involved in the alignment and structural design of the main track elements, including prefabricated substructure elements, emergency and service walkways, observation, and construction engineering. System provider: CRRC.

Santiago de los Caballeros Monorail, Santiago, Dominican Republic

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Cairo Monorail – 6th of October & New Capital City, Cairo, Egypt

Sr. Designer — Two alignments totaling 97 km were awarded in 2019 after many years of effort with a team consisting of Bombardier, Arab Contractors, and Orascom Construction. Ms. Brown is the leading detailer for the project. The majority of the details have been created in 3 dimensions utilizing Revit to check for conflicts in highly congested reinforced concrete members. System Supplier: Bombardier Transportation.

Sepulveda Transit Corridor, Los Angeles, CA

Sr. Designer — This project is for the LA Metro proposal phase of the Sepulveda Transit Corridor. The Los Angeles Sky Rail Express (LASRE) Team is now one of the remaining teams that are moving forward with up to four Predevelopment Agreement Phases to determine the final solution that Metro will take to the final design. Innova is on the LASRE team which proposes a monorail system along the I-405 corridor with multiple options that include a tunnel portion, a possible electric bus connector, or a Sky Shuttle Automated People Mover connector. System Supplier: BYD N. America.

Las Vegas Monorail West Extension Project, Las Vegas, NV

Sr. Designer — The Las Vegas Monorail Extension was to develop an updated one-mile section of the monorail guideway including a fatigue-resilient 300-foot-long steel box beam design and a track switch. The design was completed and verified by the authority having jurisdiction and the project is awaiting funding. She performed all detailing for the entire project, including structural steel, reinforced concrete, inserts, and more. Three-dimensional renderings were created for the owner's use when talking to landowners of adjacent properties.

São Paulo Expresso Tiradentes (SPET) Monorail Project, São Paulo, Brazil

Sr. Designer — The project was originally a 24 km monorail project between Vila Prudente to São Mateus and Tiradentes in São Paulo Brazil. The project extends the subway line 2-green line to the eastern outskirts of São Paulo. There are two phases, the first one to São Mateus, a transportation hub east of São Paulo, and the second one to Tiradentes. The first 13 km of the guideway have been completed, with the monorail between the first two stations, Vila Prudente and Oratorio, currently operational. The Joint Venture that produced the project was composed of Bombardier Transportation, Queiroz Galvão, and OAS, two large civil Brazilian conglomerates. Mrs. Brown worked on all phases of the project preparing Autocad and Revit drawings. System Supplier: Bombardier Transportation.

Kahului Airport Tran, Kahului, HI

Sr. Designer — The project consists of a 2500 ft long automated people mover between the airport terminal and the Consolidated Car Rental Facility. Mr. Banchik was in responsible charge of the alignment and structural design of civil and mechanical components. There were numerous creative applications developed with the System Supplier like track stops at the maintenance facility that required special design for the overtravel buffer and steel guideway beam; shop drawings of the bogie for the trains; highly innovative expansion joints between the rail structure and the car rental facility. System Supplier: Schwager Davis Inc. San José, CA.

China Monorails, Proposal, and Development

Drafter — Mrs. Brown met the AutoCAD needs of a monorail test track being built in the Anhui Province. The Wuhu monorail project included the design of a sample precast concrete beam to give contractors a chance to see the unique characteristics of monorail construction. This test track near the maintenance facility was designed to test the performance of the trains according to Chinese requirements. Beam Supplier: Doright Railway Equipment Company.

Kerala Monorail Proposal, Kerala, India 2013

Drafter — Mrs. Brown was the drafter for the team working on several monorail proposals. The two projects required alignment coordination, determination of station locations, and preparation of a bill of quantities. System Supplier: Bombardier Transportation.

Las Vegas Monorail Extension Proposal

Drafter — The existing Las Vegas Monorail was completed in 2 phases. The first phase consisted of 2 stations with approximately 1 mile of dual elevated guideway in 1995. The second phase followed with 5 additional stations, approximately 4.5 miles of additional dual guideway, and a single guideway tail track to an operations and maintenance facility in 2003. The third phase, currently in development, will take the Southern end of the monorail farther South and then cross to the West side of Las Vegas Boulevard, The Strip, arriving at a station at the Mandalay Bay Hotel Casino. This phase will include one additional station and approximately 1 mile of additional dual guideway. Innova is working for the owner, Las Vegas Monorail Corporation, to create the alignment, locate columns, and complete the preliminary design for this extension. This extension includes a highly curved section where a long span is required due to traffic and utility conflicts below. Mrs. Brown was in charge of the CAD needs for this project. System Supplier: Bombardier Transportation.



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