

# APPENDIX B

## RESUMES

### SR 99 BORED TUNNEL ALTERNATIVE DESIGN-BUILD PROJECT

DRAGADOS USA – TUTOR PERINI – HNTB



## Appendix B – Resumes

The ability of any organization to succeed lies in the talent, experience and commitment of its members. The STP Team has chosen its top industry experts, who are recognized leaders in their fields of expertise and have a history of working successfully in team-based, fast-paced, execution-oriented environments. They are personally committed to the Project and share WSDOT's enthusiasm and passion for successfully completing this world-class tunnel.

STP Team Project Manager Alvaro Fernandez's more than 30 years of experience includes recent responsibility for the M-30 South Bypass South Tunnel Project in Madrid, a 2.25-mile, 49.25-foot-diameter, two-level, design-build highway tunnel in a highly populated city. Alvaro has strong leadership skills managing large, diverse, multidiscipline and multicontractor teams, and supporting owners'

rigorous objectives for cost, schedule, safety and quality. He is joined by individuals who bring a successful track record in:

- Managing tunnel and other highway and transportation capital improvement projects.
- Working in densely populated urban environments.
- Controlling cost, schedule, safety and quality on large, complex projects.
- Working effectively in team-based environmental with multiple interfaces.

As shown in this section, we have chosen the strongest possible group of professionals whose talent and experience are aligned with the SR 99 Bored Tunnel Project's needs and WSDOT's seven Goals and expressed requirements.

KEY PERSONNEL/POSITION	LARGEST TUNNEL DIAMETER (FEET)	LARGE PUBLIC WORKS PROJECT	DOUBLE-STACKED TUNNEL	COMPLEX GEOLOGIC ENVIRONMENT	PRESSURIZED FACE TBM	SEGMENTAL LINING	DEFORMATION COMPLIANCE	URBAN ENVIRONMENT
<b>Alvaro Fernandez</b> Project Manager	49.25	●	●	●	●	●	●	●
<b>Manuel Ruiz</b> Deputy Project Manager	39.37	●	●	●	●	●	●	●
<b>Richard Johnson, PE</b> Design Manager	21.5	●		●	●	●	●	●
<b>Samuel Estefania</b> Tunnel Design Manager	49.25	●	●	●	●	●	●	●
<b>Jerry Dorn, PE, SE</b> Tunnel Interior Structures Manager	63	●	●	●	●	●	●	●
<b>Jorge Vañó</b> Tunnel Systems Manager	49.25	●	●	●	●	●	●	●
<b>Francisco Trelles</b> Construction Manager	30.6	●	●	●	●	●	●	●
<b>Emiliano Rodríguez</b> TBM and Equipment Superintendent	49.25	●	●	●	●	●	●	●
<b>Evelio Ferreiro</b> Geotechnical Manager	49.25	●	●	●	●	●	●	●
<b>Ray Clouatre</b> Safety Manager	22	●		●	●	●	●	●
<b>Albert Dube</b> Project Quality Manager	21	●		●	●	●	●	●
<b>Bill Jordan</b> Environmental Manager	N/A	●		●				●
<b>Jamie Strausz-Clark</b> Community Liaison	N/A	●						●
<b>Tony Johnson</b> Subcontractor and Labor Manager	N/A	●						●

# Alvaro Fernandez

## *Project Manager*

### **YEARS OF EXPERIENCE:**

35

### **EDUCATION:**

BS, Civil Engineering, University of Madrid

### **SIGNIFICANT ACCOMPLISHMENTS:**

- More than 25 years of tunneling experience, including the M-30 South Bypass South Tunnel Project—one of the largest two-level bored tunnels in the world
- Project Director for eight tunnel projects totaling more than 25 miles in length
- Extensive experience in seismically active tunnel projects in densely populated urban areas
- Has managed three large-diameter design-build tunnel projects
- Implemented a community information and participation program on a large tunnel project to proactively affect budget and schedule

### **FIRM:**

Dragados

Alvaro Fernandez has more than 35 years of relevant experience in the construction of highway, mass transit and rail facilities including 25 years managing tunnel construction in densely populated urban and suburban areas. For the last 10 years, Alvaro worked on the construction of highway and subway facilities for the City of Madrid and Madrid Metro in Spain, which included the construction of the largest diameter highway tunnel in soft ground at that time and several new subway lines. Project elements included excavation of tunnels with earth pressure balanced (EPB) tunnel boring machines (TBMs), the construction of subway stations using the cut-and-cover method, and the construction of shafts and ancillary facilities.

He has managed projects constructed on sites with historical buildings more than 500 years old and aging utilities in the center of Madrid, a densely populated urban environment with a population of 2.9 million residents. Alvaro helped develop tunneling methodology and procedures to minimize ground settlement and other negative impacts to the city's infrastructure. Alvaro was also responsible for coordination efforts with City of Madrid and Metro officials, utility owners and operators, fire, police and city departments.

Alvaro brings 18 years of experience working in seismically active environments and in varying soil conditions, including soft ground, clay, sands, gravels and non-cohesive soil below the water table. His work includes installation and operation of state-of-the-art remote control monitoring systems, tail grouting, segments grouting, compaction grouting, buildings foundation grouting and underpinning, micropiles, and ground improvement from the face of the tunneling machine.

Alvaro has served as project director for eight tunnel projects with a total length of 25.3 tunnel miles ranging in diameter from 24 feet to 49 feet. These projects comprised four highway tunnels, three subway tunnels and one high-speed rail tunnel. The Madrid M-30 South Bypass South Tunnel project that had 2.25 miles of 49.25-foot-diameter soft ground tunnel excavated by EPB TBM; the Leganes section of the Metrosur Subway Line that had 4.4 miles of 30.77-foot-diameter of soft ground tunnel excavated by EPB TBM; the Madrid-Zaragoza High Speed Train, an 11.2-mile high speed train corridor; the Mar de Cristal-Campo de las Naciones Branch, 2.6 miles of 24.21 feet of subway tunnel with TBM; No. 10 Line, Lago-Principe, Pio Section, a 1.3-mile subway with TBM; the Green Rail Corridor, a 1.3-mile TBM tunnel for rail infrastructure; and the Villeseca-Mascaraque Section, a 25.5-mile rail and infrastructure project.

Alvaro has supervised management and construction teams of more than 300 people and been responsible for ensuring the safety of workers and the public, while meeting clients' goals and objectives. He is Manager of Subway and Underground Construction for Dragados' International Division. Alvaro is fluent in both English and Spanish.

## Relevant Experience

***M-30 South Bypass South Tunnel, Madrid, Spain.*** As Project Manager, Alvaro was responsible for construction of this \$446 million, 2.25-mile, 49.25-foot-diameter two-level design-build highway tunnel through clay and sandy soils connecting Santa Maria de la Cabeza Avenue to the southern bypass of the M-30 tunnel. Because the project constructed the tunnel in a densely populated urban environment, safety was paramount. Alvaro oversaw and enforced all agency and company goals related to safety for both the work environment and the general public, while supervising more than 300 people. Alvaro

supervised the receipt and assembly of the world's largest (at the time) EPB, open type TBM. The project completed the tunnel with a polypropylene precast tunnel liner and an inner fireproofing barrier. In addition, Alvaro ensured workers properly installed all required structural and civil work, electrical and lighting systems, and traffic control devices in the tunnel.

The completed tunnel provides three operating vehicle lanes on the upper level and one emergency vehicle lane on the lower level. Following the opening of the tunnel to traffic, Alvaro supervised completion of the work, including construction of new connector roads for the M-30 and the completion of the control building.

### ***Madrid Metro Leganes Section, Madrid, Spain.***

Alvaro was Site Manager for this design-build project supervising more than 200 people during the construction of this \$212 million, 4.4-mile subway line extension, including tunnels, subway infrastructure, track and facilities. The project excavated the tunnel using a 30.77-foot-diameter EPB/TBM through clay and sands. The construction of the TBM launch box and access shafts was a key feature of the project. Other features included support of excavation, installation of temporary decking, maintenance and protection of traffic and underpinning of buildings and structures in the area. Passing beneath several underground parking structures with a minimum overburden of 16.4 feet using ground improvement treatments with no relevant settlements presented a significant challenge. To protect buildings and structures, jet grouting, consolidation and compensation mortar grout was carried out throughout the alignment.

Because of the significant number of historic and other structures along the alignment, and to protect the public at the surface sites, Alvaro oversaw the implementation and coordination of a community participation and information program. The coordinated management and execution skills used





to resolve project challenges will be of great benefit to the SR 99 Bored Tunnel Project.

*Madrid Metro Mar de Cristal-Campo de las Naciones Extension, Madrid, Spain.* As Site Manager, Alvaro was responsible for supervising more than 150 people during the construction of a \$64.5 million, 2.6-mile subway design-build project, including the construction of tunnels, subway infrastructure, track and facilities, and two stations constructed by the cut-and-cover method. A 24.21-foot diameter TBM excavated the tunnels through clay and sands. Alvaro supervised the construction of the TBM launch box and access shafts, the installation of temporary decking for stability, maintenance and protection of traffic, and the underpinning of buildings and structures in the cut-and-cover areas. Alvaro was responsible for overseeing and enforcing all agency and company goals related to monitoring safety and risk throughout the project. He implemented a community information and participation program and developed proactive solutions so potential situations did not adversely impact the project's budget or schedule.

# Manuel Ruiz

*Deputy Project Manager*

**YEARS OF EXPERIENCE:**

35

**EDUCATION:**

BS, Civil Engineering, University of Madrid

**SIGNIFICANT ACCOMPLISHMENTS:**

- More than 25 years of tunneling experience, including the M-30 South Bypass South Tunnel Project—one of the largest two-level bored tunnels in the world
- Project Director for eight tunnel projects totaling more than 25 miles in length
- Extensive experience in seismically active tunnel projects in densely populated urban areas
- Has managed three large-diameter design-build tunnel projects
- Implemented a community information and participation program on a large tunnel project to proactively affect budget and schedule

**FIRM:**

Dragados

Manuel Ruiz has 28 years of experience, all as an employee of Dragados, in the construction of heavy civil infrastructure projects with an emphasis in large diameter bore tunnels (greater than 30 feet in diameter), including double stacked tunnels. For the past six years, he has been Project Manager on three main contracts with Barcelona Metro and Barcelona Metropolitan Railway for the construction of several new subway lines with diameters of 39.37 feet through densely populated urban areas of Barcelona. Responsible for the overall delivery and construction of the projects, Manuel has managed all components, including schedule, budget, safety, risk management, quality management and working with agencies to comply with environmental concerns. He has managed crews of more than 500 persons.

Manuel is thoroughly knowledgeable of operating logistics and challenges that require a continuously evolving risk and mitigation program. He has provided local municipalities and agencies with monitoring and data collection to assist in the developing policies and procedures in ground settling occurrences and prevention and state-of-the-art structure stabilization. Tunnel boring projects require specialized skill to design, manage, construct and produce a quality project in a safe manner for both the public and workers. Manuel has professionally demonstrated these skills through the large bore tunnel projects he has managed as Project Manager.

## Relevant Experience

***Barcelona Metro Line 9: Gorg-Station Sagrera, Barcelona, Spain.*** Manuel was Project Manager for this \$370.5 million, 7.46-mile, 39.37-foot-diameter double stacked extension to the Barcelona Metro subway system. Utilizing an earth pressure balance (EPB) tunnel boring machine (TBM), the project includes several stations and connections to existing rail systems, and the high speed rail that connects Madrid to the French border. Manuel's responsibilities included design delivery, contract administration, construction schedules, budget, safety, quality and environmental management. The Herrenknecht Group manufactured the EPB and TBM. A significant challenge on this project was the difficult ground conditions. The EPB TBM had to excavate through noncohesive soils under the water table achieving a maximum operation of 3 bar. These conditions required the cutterhead inspections to be done in hyperbaric conditions. The ground has very abrasive minerals, requiring several inspections of the cutterhead, and replacement of wear items by skilled divers. Additional measures were taken in the design and manufacturing of the EPB machine to accommodate the variable geotechnical and hydrogeological soil conditions, including excavating through 492.1 feet in rock conditions and groundwater infiltrations from the Llobregat and Besos rivers. With the EPB TBM passing beneath several historical and heritage buildings, monitoring ground settlement was a high priority of the project. The tunnel was excavated in heterogeneous water bearing soil together with variable soil conditions that made predicting the behavior of the TBM face, and ground consolidation causing settlements that occurred when pressure is transferred to water bearing soils. The project also included ventilation shafts, installation of track and catenary and architectural finishes.

***Barcelona Metro Line 9: Sagrera Shaft Station-Habaneras, Barcelona, Spain.*** Manuel was Project Manager for this \$309 million, 7.46-mile, 39.37-foot-diameter, double-stacked extension to the Barcelona Metro subway system. Utilizing an EPB TBM, the project includes several stations and connections to existing rail systems, and the high-speed rail that connects Madrid to the French border. Manuel's responsibilities included design delivery, contract administration, construction schedules, budget, safety, quality and environmental management. The Herrenknecht Group manufactured the EPB TBM. Difficult ground conditions were a significant challenge on this project. The EPB TBM had to excavate through noncohesive soils under the water table achieving a maximum operation of 3 bar. These conditions required the cutterhead inspections to be done in hyperbaric conditions. The ground has abrasive minerals, requiring several inspections of the cutterhead, and replacement of wear items by skilled divers. The project took additional measures in the design and manufacturing of the EPB machine to accommodate the variable geotechnical and hydrogeological soil conditions, including excavating through 492.1 feet in rock conditions and groundwater infiltrations from the Llobregat and Besos rivers. With the EPB TBM passing beneath several historical and heritage buildings, monitoring ground settlement was a high priority. The project excavated the tunnel in heterogeneous water-bearing soil together with variable soil conditions that made predicting the behavior of the TBM face difficult (ground consolidation can cause settlements when pressure is transferred to water bearing soils). The project also included ventilation shafts, installation of track, and catenary and architectural finishes.



***Barcelona Metropolitan Railway Line 3: Section Canyelles-Trinitat Nova, Barcelona, Spain.***

Manuel was Project Manager for construction and infrastructure improvements for a railway superstructure and overhead power works. The contractor executed this \$96.1 million, 1.14-mile tunnel project by conventional methods with shaft diameters of 59 feet and 78.7 feet and depths of 147.64 feet and 157.48 feet, respectively. Manuel was responsible for contract administration, delivery and management of all construction. He also managed safety, environmental and quality control for the project. The tunneling method included mechanical hammers in zones of soft saulo (a type of sand from the decomposition of granite), perforation and blast in hard saulo, and granite areas drilled with two automatic jumbo drilling machines guided by lasers.

The project constructed Roquetes Station and two lobbies by open-cast excavation. In addition, the project used the New Austrian Tunneling Method to excavate the 1,630.6-foot tunnel with a ceiling height of 37.2 feet.



# Richard Johnson, PE

## *Design Manager*

### **YEARS OF EXPERIENCE:**

28

### **EDUCATION:**

BS, Civil Engineering, University of Minnesota

### **SIGNIFICANT ACCOMPLISHMENTS:**

- 28 years of tunnel and engineering experience, including 11 years as a tunnel design manager
- Recommended splitting a Sound Transit University Link contract into two contracts to mitigate risk and reduce costs
- Completed design of a 9,330-foot bored/mined tunnel within aggressive 11-month schedule for Minneapolis-St. Paul International Airport Light Rail Transit Tunnel

### **PROFESSIONAL REGISTRATIONS:**

Professional Engineer: WA, MN

### **FIRM:**

HNTB

Rich Johnson serves as HNTB's Director of Bridge and Tunnel Design and brings 28 years of tunnel and engineering experience, including 11 years as a tunnel design manager. He has served in multiple roles as a contract lead, project director and design engineer for eight tunnel projects varying in length from 185 feet to more than 9,300 feet long.

Rich has served as project manager on several \$100+ million projects that required coordination of disciplines, technical studies, historic properties and environmental documentation. With more than two decades of structural experience, he has led a wide range of projects, including structural inspection and evaluations, evaluation of historic properties and design and construction of bored tunnels, cut-and-cover tunnels, and movable bridges, and short-, medium- and long-span bridges.

Additionally, Rich brings significant experience in managing multidiscipline design teams with an understanding of structures and geology interaction and impacts. Rich brings familiarity with relevant Washington State and federal regulations and procedures that include WSDOT Geotechnical Design Manual, WSDOT Transportation Structures Preservation Manual, WSDOT Bridge Design Manual, Federal Highway Administration (FHWA) Highway and Rail Transit Tunnel Inspection Manual, FHWA Highway and Rail Transit Tunnel Maintenance and Rehabilitation Manual, FHWA Technical Manual for Design and Construction of Road Tunnels/Civil Elements and National Fire Protection Association 502/Standard for Road Tunnels, Bridges, and Other Limited Access Highways.

## Relevant Experience

***Sound Transit, University Link U230 and University Link U215 Contracts, Seattle, WA.*** Design Manager for the University Link U230 Contract. He oversees 40 staff members on this \$160 million project for the final design of this 5,808-foot twin bored light rail transit tunnel running from Capitol Hill to downtown Seattle. Rich managed the geotechnical, structural, mechanical, electrical, civil and transit engineering disciplines, and administrative responsibilities.

The U230 Contract includes the support of excavation for the Capitol Hill Station, crossing at a shallow depth beneath I-5 in downtown Seattle and connection of the bored tunnels with an existing tunnel. This project originally incorporated what is now the U215 Contract. Rich, however, advised that separating the project work into two contracts would mitigate risk and reduce the overall cost. To date, both projects are on schedule and within budget.

On the University Link U215 Contract, Rich is the Contract Lead for the final design of four 60-foot-deep access shafts being constructed to allow demolition of certain portions of retaining wall foundations that will interfere with the boring operations of the earth pressure balance tunnel boring machines (TBM) for the U230 Contract. The access shafts are designed to supplement the structural capacity of the existing retaining wall once the foundations are fabricated. The shafts are designed to withstand a moderate level earthquake during construction and an operating level earthquake for the life of the structure.

Because of the over-consolidated clay, which is unique to the Seattle area, Rich and his team determined early in the project that contingency tiebacks should be utilized to mitigate risks during construction. The U215 project, at \$24 million, is scheduled to be completed in 2010.

***Minneapolis-St. Paul International Airport, Light Rail Transit Tunnel, Minneapolis, MN.***

Project Director for the preliminary/final design and construction services for this \$110 million, 9,330-foot-long bored/mined tunnel that carries light rail vehicles beneath the airport. While overseeing a team of 65 staff members, Rich coordinated the design among different design firms and offices, acted as the liaison between the project owner and third parties, and handled the coordination of adjacent design-build contracts.

The project completed the design within an aggressive 11-month schedule and resulted in a 775-sheet plan set and more than 1,500 pages of specification and geotechnical reports. Despite a one-month delay in the start of construction because of a delay in receipt of the Federal Transportation Authority's full funding grant agreement, the construction was completed one month ahead of schedule and in time for the 2004 winter holiday season.

The project used two mining methods in the design and construction that included an earth pressure balance TBM and an innovative technique that used a 25-foot thick limestone formation for overhead structural support while excavating the sandstone underneath. Through much of the project the team was boring the tunnel under active runways. To reduce the amount of time the team spent under the runways, boring operations took place 24 hours a day, seven days a week.

***Minneapolis-St. Paul International Airport, Airside Tunnels, Minneapolis, MN.***

Project Manager responsible for the preliminary/final design, construction services and management of 40 staff members. Rich oversaw the structural design and detailing for four vehicular traffic tunnels and one pedestrian traffic tunnel beneath various runways and taxiways at the airport. The project constructed these tunnels using the cut-and-cover technique and varied in length from 160 to 1,600 feet. The combined construction cost of this project was \$105

million. The tunnels are equipped with the requisite ventilation and fire protection/detection systems, as well as a unique and sophisticated waterproofing system as they are submerged within a perched water table. He also used a tiedown structural slab to resist buoyancy forces.

*Minnesota Department of Transportation, Silver Creek Cliff Tunnel, Two Harbors, Duluth, MN.* Design Engineer on this \$23.6 million project entailing a 50-foot-wide, 1,300-foot-long mined-rock tunnel through Silver Creek Cliff. The project included preliminary and final design of the tunnel, ventilation analysis, electrical/mechanical design, mechanical design and tunnel lining.

Originally this was to be a bridge project. During the preliminary engineering study, however, the design team discovered that because of alignment issues in this environmentally and aesthetically sensitive area, a tunnel would be better suited to replace a dangerous steep and narrow two-lane roadway on the side of the cliff. To accommodate horizontal sight distance, the design required extending the width of the highway. As part of the engineering team, Rich worked on the conceptual design of the bridge and tunnel, which included a comparison of structural alternatives, cost estimating, and structural design and detailing.

# Samuel Estefania

## *Tunnel Design Manager*

### YEARS OF EXPERIENCE:

36

### EDUCATION:

Civil Engineer, Universidad Politécnica de Madrid

Geologist, Universidad Complutense de Madrid

### SIGNIFICANT ACCOMPLISHMENTS:

- More than 70 miles of tunneling design and construction experience, including soft ground large bore projects using earth pressure balance tunnel boring machines
- Extensive experience working with Dragados in Spain, including the 49.25-foot-diameter Madrid M-30 South Bypass South Tunnel Project—one of the largest two-level bored tunnels in the world
- Extensive experience in monitoring building protection measures, including 3-D models to simulate the shape of the tunnel boring machines

### FIRM:

Intecsa-Inarsa

Samuel Estefania brings more than 36 years of experience in the design and construction of major civil works projects, with an emphasis in large bore (greater than 30 feet in diameter), double shield and cut-and-cover tunnels, including double stacked tunnels for highways, light rail and high speed rail projects. Samuel was project director for Spain's 49.25-foot Madrid Calle 30 Roadway, which is the largest diameter tunnel in the world. In the last 10 years, his experience includes more than 70 miles of tunnels, many with segmental gasket linings and eight that were constructed with earth pressure balance (EPB) tunnel boring machines (TBMs).

He has designed ventilation and emergency exit shafts as well as various tunnel systems, including fire, life safety and electrical requirements. Samuel has worked in seismically active environments and in varying soil conditions, including soft ground, granite and water-bearing soils. He has proactively addressed settlement issues and developed guidelines to ensure that historic and other buildings remain undisturbed.

Samuel has used jet and compensation grouting and mortar stabilization techniques to protect buildings, many with pile foundations above tunnel alignments. In addition, Samuel has installed inclinometers in diaphragm walls and tension devices to provide continuous real-time monitoring to ensure no building movement occurs.

Samuel has participated in integrated client teams and worked with local and national authorities on tunneling issues. He has extensive experience working with Dragados on tunneling projects in Spain giving him an intimate understanding of the company's construction techniques and requirements. Samuel is fluent in both English and Spanish.



## Relevant Experience

***Madrid Metro, Lines 5, 7, 10 and Metrosur Extensions, Madrid, Spain.*** Project Manager responsible for maintaining daily contact with the client and for monitoring building protection measures that included calculation models for each line.

At the beginning of this assignment, Samuel was responsible for calculating the segmental thickness, ring arrangement and reinforcement. The type of ring and the segment characteristics were decided at the beginning of the project and used throughout the extension. The segment thickness of 1 foot and the internal diameter of 27 feet allowed for a double track to be placed in the tunnel. The stations were individually designed and constructed by cut-and-cover methods.

Over the past 15 years, the Madrid Metro network has been dramatically extended and EPB TBMs were used for the first time. At any given time, up to nine 30-foot diameter EPB TBMs worked simultaneously on the extensions. The project excavated all of the new lines in a sedimentary basin filled by sands and clays. Anthropogenic fills exist throughout the extension and the alignment in the south included gypsum and gypso marls.

Tunneling in Madrid presents fewer challenges so the EPB TBM pressure measured generally lower than 1 bar; rather, the challenges arose due to the number of old buildings with piled foundations. Samuel oversaw preliminary settlement calculations using empirical and semi-empirical methods. Depending on ground conditions, resulting movements were lower than a given quantity; designers developed 3-D models to determine appropriate remedial measures.

Crossing the existing in-service metro lines with a gap of just a few feet presented another challenge. Due to the lack of space to perform protection walls, the project excavated shafts to perform compensation grouting, sometimes more than 150 feet in length.

Additionally, the project used steel ribs and lagging to strengthen some existing tunnels. When the new tunnel crossed under an existing tunnel with a bottom slab and gap too small to facilitate grouting pipes, the project established a self-supporting structure at the bottom with supports on both sides of the new line.

***Barcelona Metro Line 9, Barcelona, Spain.*** As Project Director, Samuel was responsible for the design of this \$225 million, 30-mile, double-stacked, 52-station addition to the Barcelona Metro. This extension runs in a congested urban environment and passed under numerous historic and heritage buildings. Barcelona, formed by soft soils with the water table at the surface, exists between the deltaic formations of two rivers. Due to the soil conditions and the high water level, the project used an EPB TBM to excavate the double-stacked tunnel with an internal diameter of 39.37 feet. Due to the soft soils and station depths, the project constructed cylindrical shaped shafts that required a shield diameter of 39.5 feet, a world record at the time.

Samuel designed the tunnel lining with seven precast reinforced concrete segments, each 1.31 feet thick and 5.9 feet long. The engineering rotated the rings in 13 different positions to allow the tunnel to make curves. Samuel oversaw the settlement monitoring program, including the identification of possible settlement issue locations. Once engineers identified settlement issues, they used 3-D models to simulate the shape of the EPB TBM as well as the pressure exerted at the face, along the shield and at the rear. In all cases, the project represented buildings with the foundations as well as the corresponding loads.

A damage chart plotted the results and accepted only negligible values. In the case of potentially severe settlement locations, the project adopted remedial measures, including building walls of mortar piles or using jet grouting or micropiles between the tunnel and the building to be protected. If the tunnel alignment was under the buildings making wall placement impossible, the project conducted

compensation grouting from nearby shafts. When crossing a structure on Ronda Litoral, a crowded avenue with heavy traffic, the project applied jacks to the structure to prevent settlement.

Engineers developed an extensive monitoring plan to control the soil and building reactions for the predicted movements. When the tunnel alignment followed an avenue, engineers placed a slab of unreinforced concrete on the top of the tunnel and supported it by lateral piles that allowed the contractor to use a greater pressure at the TBM's face.

Of critical concern was the Sagrada Familia Church located within 6 feet of the tunneling project. Engineers performed a special study to determine the best methods to protect the foundations during excavation. The project used several 3-D models to determine the optimal stabilization method, including any ground vibrations or movements. Engineers determined that a row of piles could be installed between the church foundation and the tunnel without impacting the church.

***Madrid M-30 South Bypass South Tunnel, Madrid, Spain.*** As Project Director, Samuel was responsible for the design of this \$446 million, 2.25-mile, 49.25-foot diameter twin tube, double-stacked highway tunnel. The tubes, one for each direction, included three lanes for both cars and trucks on the upper level and two emergency vehicle lanes on the lower level.

The project excavated the tunnel by two EPB TBMs in hard, over-consolidated clays. Samuel participated in the TBM design process, providing advice about the expected ground conditions in order to get the most suitable distribution of the tools in the cutter head. The precast concrete ring support was 23 inches thick and 6.5 feet long with a universal ring configuration with three bolts between segments of the same ring and four bolts between segments of adjacent rings.

Because of the existence of a significant number of historic and other buildings along the route, Samuel oversaw an extensive settlement monitoring program. Engineers identified key settlement locations and developed 3-D models to simulate the shape of the EPB TBM (truncated conical shape) as well as the pressure exerted at the face, along the shield, and when possible, at the rear.



# Jerry Dorn, PE, SE

## *Tunnel Interior Structures Manager*

### **YEARS OF EXPERIENCE:**

31

### **EDUCATION:**

BS, Civil Engineering, Washington State University

### **ADDITIONAL QUALIFICATIONS/ SIGNIFICANT ACCOMPLISHMENTS:**

- Experience with WSDOT and SDOT and working in complex urban environments with diverse stakeholders and local tribes
- Designed the Mt. Baker Ridge Tunnel multi-level integrated underground structures
- Developed design projects with complex construction staging requirements

### **PROFESSIONAL REGISTRATIONS:**

Professional Engineer: WA, MI, KY, SD, WI, MN

Structural Engineer: WA, ID, OR

### **FIRM:**

HNTB

Jerry is one of HNTB's leading structural engineers with extensive experience in the design and construction of complex roadway tunnel and bridge structures within urban settings. He has been responsible for conceptual design, final plans, and specifications preparation. He has worked within complex construction sequence and accelerated design requirements in high seismic areas.

Jerry's designed tunnel interior structures for the Mt. Baker Ridge Tunnel, the same role he will perform for the SR 99 Bored Tunnel Alternative Design-Build Project. He supervised the design, plan preparation and specifications on the associated ventilation and control buildings, which encompassed three separate fan rooms, emergency services, communication, ventilation, lighting and electrical control, and roadway portals.

Jerry is experienced in the design and review of all types of structural support systems, such as temporary shoring, U-sections, falsework and formwork.

Jerry brings more than 30 years experience working with WSDOT in the Puget Sound region and with the major cities of Seattle, Tacoma and Bellevue. His experience includes leading the structural design for the Tacoma Narrows Bridge and SR 16-24th Street Bridge, the South Park Bridge replacement and the Magnolia Bridge replacement.

From 2002 to 2006 he was an active member of the ACEC/WSDOT Bridge Committee, which establishes policy guidelines for WSDOT consultant coordination. While on the committee, he worked to define the bridge designer's role in determining environmental project requirements and developing appropriate environmentally sensitive structural solutions.

Jerry has been involved in coordination efforts with state and local governments, public stakeholders, American Indian tribes and public outreach.

## Relevant Project Experience

***SR 520 Pontoons Construction Design-Build Project, Grays Harbor, WA.*** Jerry is the Structural Lead for the \$367 million project that is part of the SR 520 Bridge Replacement and High Occupancy Vehicle Program to open a new, safer floating bridge across Lake Washington by 2014. The project includes designing and building a new pontoon construction facility in Grays Harbor, as well as designing and constructing 33 new pontoons and storing them until needed for the new bridge.

Jerry is overseeing the design work of the casting basin and modifications to the pontoons. WSDOT is preparing the pontoon designs and Jerry is providing constructor modifications to the proposed construction methods. He has worked with the casting basin designer to optimize the design providing a smaller, more efficient basin to cast and construct the pontoons. He serves on three Task Force groups—geotechnical, basin and pontoon construction—that meet weekly and include representatives from WSDOT, the design and construction teams, and subcontractors.

***Mt. Baker Ridge Tunnel and Interior Structures, Seattle, WA.*** As the Design Engineer on this \$60 million project, Jerry was responsible for the design and detail of the stacked drift tunnel liner, drilled shaft access pits, cast-in-place tunnel portal structure, the cast-in-place roadway frame and precast concrete panels for the interior structure. The 1,500-foot-long, 63-foot-diameter tunnel was part of a major 13-year WSDOT project with multiple phases that included the I-90 Seattle Lid.

Significantly, the work on this large diameter bored tunnel has many similarities to the SR 99 Bored Tunnel Alternative Design-Build Project, including

design of access pits and stacked roadway interior structures, which are similar in size, scope, design approach, structural analysis and tunnel systems.

***I-90 Seattle Lid Project, Seattle, WA.*** As the Project Engineer during the design phase of this major 10-year WSDOT project, Jerry was responsible for supervising the design, plan preparation and specifications for structural work on 2,000 feet of lidded roadway connecting to the Mt. Baker Ridge Tunnel, which included the transition to a stacked roadway configuration similar to the SR 99 Bored Tunnel Alternative Design-Build Project. He supervised the design, plan preparation and specifications on the associated ventilation and control buildings, which encompassed three separate fan rooms, emergency services, communication, ventilation, lighting and electrical control and roadway portals.

The project consisted of six contracts totaling more than \$190 million, and Jerry represented HNTB structures during the five-year construction of the I-90 Seattle Lid. He was responsible for the timely response to contractor's requests for information and WSDOT construction management questions. The design and construction of the I-90 Seattle Lid Project were similar to those of the proposed SR 99 Tunnel, including transitioning to double-stacked roadways, and numerous, complex interior structures in a seismically vulnerable, built-up urban area.

***Magnolia Bridge Replacement Project, Seattle, WA.*** As Project Manager for final design and engineering, Jerry provided the concept development, preliminary engineering and environmental documentation for replacing the existing 4,400-foot bridge. Located in a high seismic zone, the existing bridge was showing signs of deterioration and susceptible to collapse during a seismic event. The final design for this \$200 million, complex urban project included extensive computer modeling and design of a cast-in-place balanced cantilever concrete box along a curve. The construction staging was modeled using

time dependent properties of materials to accurately estimate the short- and long-term permanent stress distribution. The project required extensive coordination with the city, environmental agencies, the Port of Seattle and the BNSF railroad.

***South Park Bridge Replacement, King County, WA.*** Jerry was Bridge Manager for the concept design and final design of bascule piers and caissons. South Park Bridge is a double leaf bascule bridge in a high seismic zone with soft soils susceptible to liquefaction. The foundation concept consists of 75-foot deep sunken caisson built on a sand island. The final design included seismic time-history analysis to predict motion and final location of bascule piers.

***Tacoma Narrows Bridge Design-Build Project, Tacoma, WA.*** Jerry was Bridge Project Manager responsible for the independent check of the new Tacoma Narrows Suspension Bridge and the seismic retrofit of the 1950 Tacoma Narrows Bridge. He resolved independent check issues in the design and plans before bridge components were issued for construction.

***SR 16-24th Street Bridge, Gig Harbor, WA.*** As Bridge Project Manager, Jerry provided conceptual, preliminary and final design for the contractor of the 24th Street Bridge as part of the new Tacoma Narrows Bridge Design-Build Project. The project schedule was critical to complete the design and construction prior to the start of work on the suspension bridge anchorage. During the project, changes included bridge length, girder spacing, profile and width. As changes occurred, the team measured the changes against the fixed price to ensure that there was no net change in the contract delivery. Engineers accomplished changes with no change in task hours by making decisions and obtaining consensus early.

***Shaw Road Extension, Puyallup, WA.*** As Bridge Project Manager, Jerry was responsible for design of a new roadway and bridge over the BNSF railroad mainline track in Puyallup. The project included coordination with BNSF regarding the bridge layout and construction methods. The final design included a three-span prestressed girder bridge with the abutments designed to accommodate reinforced earth fill approaches. The foundations consisted of large diameter drilled shafts that engineers designed for liquefiable soils.

***Mountlake Terrace Station, Mountlake Terrace, WA.*** As Bridge Project Manager, Jerry was responsible for scheduling bridge staff, coordinating with the architect and roadway designers, supervising the geotechnical staff and developing multiple bridge concepts for this mid-freeway transit station and pedestrian bridge. The Sound Transit project included transit-only direct ramps to and from the station and I-5 freeway and a pedestrian bridge over the transit and interstate lanes connecting the station to the park-and-ride lots. The pedestrian bridge consists of prestressed girders with a steel framed roof. The concept study evaluated structure type, depth, span arrangements, materials, aesthetics and constructibility. The project followed WSDOT procedures for project development and met WSDOT Bridge Design Manual guidelines for work within WSDOT right of way.

***I-90 South Bellevue Seismic Retrofit, Bellevue, WA.*** As Project Manager, Jerry was responsible for the design of seismic retrofit for 17 units of T-girder structure, 11 units of concrete box structure and 12 units of slab structure of I-90 across the Lake Washington Slough. Curved structures and foundations of 100-foot-long piles through a peat bog complicated the analysis, resulting in a design consisting of 288 longitudinal and 194 transverse seismic restrainers and 195 bearing seat extensions.



# Jorge Vañó

## *Tunnel Systems Manager*

### YEARS OF EXPERIENCE:

18

### EDUCATION:

Industrial Electronics Technical Engineering in EUITI  
Alcoy, Polytechnic Valencia University, Spain

### SIGNIFICANT ACCOMPLISHMENTS:

- Design and integration of complete highway tunnel systems for 12 tunnels in Spain, including the M-30 South Bypass South Tunnel Project in Madrid
- Coordinated the successful completion of the M-30 tunnel installations under a compressed 33-month schedule
- More than 15 years tunnel system design and integration experience, including the M-40 Tunnel El Pardo, two .56-mile-long, three-lane highway tunnels

### PROFESSIONAL REGISTRATIONS:

Registered as Technical Industrial Engineer in Valencia Spain, with accreditation as an Electrical and Climate Installer

### FIRM:

Dragados

Jorge Vañó's 18 years of experience includes extensive design, development, installation, and commissioning of systems for more than 15 highway tunnels in Spain and other locations in Europe. His experience on three large-bore tunnels (the M-30 South Bypass South Tunnel, the Juan Carlos I Tunnel, and the Envalira Tunnel) included full transverse/semi-transverse ventilation systems that are directly relevant to the requirements of the SR 99 Bored Tunnel Project. As Tunnel Systems Manager on several projects, he has gained an in-depth understanding of intelligent transportation systems and the ability to coordinate the multiple disciplines required for successful implementation of these systems.

Jorge has simultaneously managed multiple contractors with diverse backgrounds and is skilled in supporting project and client management in the identification and resolutions of issues that could potentially affect the project cost and schedule. He has a strong record of identifying and implementing opportunities for cost savings on projects.



## Relevant Experience

***M-30 South Bypass South Tunnel, Madrid, Spain.*** Jorge was Tunnel Systems Manager for this 2.25-mile long, 49.25-foot-diameter double-stacked highway tunnel through the center of Madrid. He was responsible for detailed engineering and managing the execution of the mechanical, electrical, control, and plumbing installations for this tunnel bored beneath historic and urban residential and business areas. He worked closely with the Urban and Infrastructures Development Department of the Madrid City Council through all phases of the project, from specification phase to construction and from commissioning and testing to documentation turnover. His interface responsibilities included coordinating multiple department tunnel specification requirements for lighting, water, and urban landscaping. In addition, Jorge coordinated with two electrical distribution companies and the tunnel concession company.

The cross section of the tunnel is divided into three zones: the upper zone for air ventilation, middle zone for the roadway, and the lower zone for emergency vehicle access. The tunnel is fully equipped with ventilation, lighting, control and communications, closed circuit television, and electronic systems for traffic and incident detection as well as access control. Additionally, the tunnel shaft fire and life safety and ventilation requirements dictated that the shafts' diameter be large enough to allow for the vertical installation of all necessary equipment, thereby eliminating the need for any large underground chambers.

A key challenge for Jorge was coordinating the tunnel installations due to the magnitude of the work and the compressed schedule to complete the work in 33 months to meet the opening date of May 9, 2007. To meet this challenge, Jorge prepared detailed technical distribution drawings to adapt the general drawing of the project to the actual tunnel configuration. He worked with civil engineers to develop solutions to

ensure the systems would properly interface with each other and fit within the confines of the tunnel.

Another challenge was preparing the detailed design of the particle/gas air filter station plants to accomplish the air flow requirements in the event of a pressure drop and also filter efficiency. Filter plants are able to clean the tunnel exhaust airflow of 420 and 750 cubic meters per second in each ventilation shaft respectively.

Following the tunnel's opening, Jorge provided complementary tunnel installations for access control and computer monitoring for maintenance, completed the as-built documentation, and provided training courses for the maintenance company.

***Tunnel Juan Carlos I, Vielha, Spain.*** Jorge was Tunnel Systems Manager for this mountain tunnel that connects Vielha to Lerida. This 3.23-mile-long three-lane tunnel was constructed by explosive methods at more than 4,500-foot elevation. The tunnel includes a semi-transverse ventilation system, two ventilation buildings, a control center, and a multi-purpose building with vehicle parking, a mechanical workshop, and salt storage. The new Vielha Tunnel is connected to the old tunnel by 12 egress galleries spaced 430 yards apart. Jorge was responsible for installing the mechanical, electrical, plumbing, and the centralized computer control applications. In addition, Jorge provided technical coordination with the civil works for air ducts, sound attenuators, cable ducts, pipelines, and wall crossing section installations. He managed the installations for the technical and control center buildings outside of the tunnel, including climate, heating, electrical, and plumbing. Jorge also coordinated with the local power company for installation of the new high voltage electrical lines for the tunnel.

In 2005, after tunnel and galleries were connected and the operational buildings were constructed, the original tunnel was redesigned to establish systems redundancy. Redundant electrical energy distribution and fire extinction were added to the project. Jorge participated actively on this redesign project that was approved and constructed in 2006.

***Tunnel d'Envalira, Andorra.*** Jorge was Electrical Systems Manager for this mountain tunnel that connects Andorra la Vella (Andorra) and Pas de la Case (France). The 1.8-mile-long, two-lane tunnel was built at an elevation of 6,725 feet with conventional explosive construction methods. The tunnel included a semi-transverse ventilation system with two ventilation buildings and a control center building. Jorge was responsible for electrical and lighting systems under the supervision of a Tunnel System Manager, from the main contractor Joint Venture company FCC/NECSO. The tunnel required interface with two separate electrical companies, one for the Andorra southbound (FEDA), and another for the French side (SERCENSA), which required two separate installations, including generators on both sides and a 400V transformer for lighting and a 690V transformer for ventilation. Tunnel accesses and toll area lighting were also implemented according to the specifications of the Andorra Government, including requirement to withstand winds of 112 miles per hour. Jorge participated in the control system integration design and commissioning enhancing his system automation experience.

In addition to the above, a representative listing of Jorge's experience in designing, developing, installing, and commissioning tunnel systems includes:

- Design and development of road tunnel control system in Barranco de la Ballena, (Las Palmas de Gran Canaria, Spain).
- Design and development of road highway control system in Via Lagos (Brazil), for local traffic operation contractor.
- Design and development of road tunnel control system for La Laja Tunnel, (Las Palmas de Gran Canaria, Spain), for local joint venture.
- Design and development of road tunnel control system for Varosa y Régua Tunnels in Portugal, for local contractor SCUT Vias.
- Design of road tunnel control system for Gardunha and Gardunha II Tunnels, in Portugal, for local contractor Teixeira Duarte S.A.
- Design and development of road highway control system in BR116 Highway, in Brazil, for local contractor Concessionaria Rio Teresópolis.
- Design of road tunnel control system for Los Yébenes Tunnel (Toledo, Spain), for Sacyr/Cavosa joint venture.
- Design and development of road tunnel control system for Aguadulce/Roquetas de Mar Tunnels (Almería, Spain), for local building joint venture.



# Francisco Trelles

## *Construction Manager*

### **YEARS OF EXPERIENCE:**

37

### **EDUCATION:**

Technical Industrial Engineering, Universidad Politécnica de Madrid

### **SIGNIFICANT ACCOMPLISHMENTS:**

- Experience on 12 tunnels totaling more than 29 miles in length ranging in size from 18 to 30.6 feet in diameter
- More than 20 years of managing all facets of tunnel construction projects, including crews up to 200 people
- Extensive tunneling construction in heavily populated urban areas in various geologic conditions and beneath historic and heritage buildings
- Tunnel Construction Manager for the \$427 million design-build East Side Access Tunnel in New York

### **FIRM:**

Dragados

Francisco Trelles brings 37 years of experience in tunneling and underground projects, including earth pressure balance (EPB) tunnel boring machines (TBM) and conventionally excavated projects. He has worked on 12 tunnels, including eight highway tunnels, totaling 29 miles in length and ranging in size from 18 to 30.6 feet in diameter. He has supervised construction crews of up to 200 people constructing tunnels in heavily populated congested urban environments and in various geologic conditions, including hard rock, large rock, granite, clay, sands, cobble, alluvials and gravel.

Francisco has extensive experience in casting and installation of precast structures such as tunnel lining, segmental arches, and cast-in-place and precast roadways and structures. He understands the importance of minimizing construction impacts on surface buildings and structures, underground utilities, and foundations and adjoining structures.

Francisco's experience includes 21 years in management of all tunneling activities, including safety, contracts, subcontractors, quality control and assessment production scheduling, and risk and mitigation programs.

Francisco has experience working with various soil and structure stabilization techniques required for urban tunnel construction projects. On the Madrid Metro Line 7, the first 26 to 32 feet of underground excavation was made in alluvial soils. Below that, the project excavated the tunnel in a mix of soil conditions, including clay and plasters, with an overburden between 49 and 91 feet.

The project excavated the Line 7 tunnel under a significant number of historical and other buildings that could be impacted by the excavation. The project used several types of ground treatments

along all the alignment to prevent settlement issues. Additionally, the project used various ground treatments in the Line 7 underground extension, including mortar piles and micropiles columns, compensation shafts and pipe injection from the surface.

Engineers gathered ground settlement data, including settlement profiles and means to either mitigate damage to or otherwise protect utilities, buildings and street surfaces. They calculated ground settlements along the alignment prior to the project beginning and adjusted the parameters obtained in the excavations throughout construction. Teams monitored the ground settlements 24 hours a day during excavation. The maximum settlement reached was 0.4 inches in the tunnel crown, which was significantly lower than calculated prior to construction.

Francisco has an excellent safety record and plays a critical role in establishing, implementing and monitoring tunnel construction safety programs. In addition, he is experienced working with a wide variety of governmental agencies. He is working with the New York Metropolitan Transit Authority and has previously worked with the Madrid Metro Regional Department of Urban Planning and Transports, Madrid Transports Infrastructure, Barcelona Metro and Madrid Council to ensure that projects met each agency's requirements and regulations.

## Relevant Experience

**East Side Access Project, NY.** Francisco is Tunnel Construction Manager on this \$427 million design-build project responsible for the construction of a 4.72-mile, 22-foot-diameter subway extension from Queens to downtown New York City. Francisco is responsible for construction implementation and integration and contract management and supervised a 175-person staff. He helped create a launch chamber for the tunnel boring machines using a

controlled drill-and-blast method, then assembled and launched each 640-ton machine. Cast-in-place concrete sections were placed in the tunnel to create the lining.

Although engineers prepared an extensive geotechnical baseline report for the project, the team encountered ground that was more fractured than anticipated. This required slowing down the mining operations while additional rock support was installed. Francisco's team overcame this problem by installing lagging between ring steel and shotcreting to add structural support and traditional blocking operations.

Francisco's responsibilities have involved close coordination with the New York City Transit (NYCT) and Metro North railroads. While crossing beneath both NYCT and Metro North lines, often only a few feet separated the mining operations from the active tunnels. This necessitated a close coordination with both agencies to minimize impact to the riding public and to ensure no damage occurred to the existing infrastructure.

**Madrid Metro Line 7, Madrid, Spain.** Francisco was Tunnel Construction Manager for this \$404 million, 6.2-mile, 30.7-foot-diameter EPB TBM extension to the Madrid Metro subway system. Constructed in an urban environment with three separate segments, Francisco managed all construction segments with worker and public safety as the main goal of the operations.

An extraordinary amount of pedestrian and vehicular traffic near portals and shaft construction areas posed significant risks to the project. Francisco managed both the surface and tunnel operations by strictly enforcing planned procedures and guidelines resulting in a safe and productive work environment. He also managed the system integration consisting of traffic control and power. With mortar piles and micropile columns in place to monitor any settlement, the team completed the project with no impacts to surface





structures, including some historic buildings dating more than 500 years old. The geologic conditions of the project alignment included a mixture of soils from soft to clay to plaster.

*Madrid MetroSur Line 10, Madrid, Spain.*

Francisco was Tunnel Construction Manager for this \$339 million, 3.5-mile, 30.83-foot-diameter EPB TBM tunnel extension to the Madrid metro subway. The tunnel alignment was through a complex geologic environment in a densely populated urban environment. Mortar piles, jet grouting columns and ground consolidating methods were applied at all break in and break out zones. At the Hospital Station, one water line could not be diverted and critical stabilization methods were employed to ensure no settlement issues arose. Throughout the tunnel project, settlement ranges were all within contractual allowances, despite the challenging soil conditions.

# Emiliano Rodríguez

## *TBM and Equipment Superintendent*

### YEARS OF EXPERIENCE:

30

### SIGNIFICANT ACCOMPLISHMENTS:

- More than 37 miles of EPB TBM tunnel excavation experience in a variety of complex soil conditions
- Supervised hyperbaric interventions to perform cutterhead repairs by skilled divers on the Barcelona Metro extension projects
- Responsible for daily maintenance of the Madrid M-30 South Bypass South Tunnel TBM resulting in a 60.7 percent utilization rate

### PROFESSIONAL REGISTRATIONS:

Equipment Technician Certification, 1976

### FIRM:

Dragados

Emiliano Rodríguez has 30 years of experience in tunnel construction for highways, mass transit and rail in addition to civil work on the construction of bridges, viaducts and water projects. His expertise includes more than 37 miles of tunnel excavation in soft soils, rock, clays and gravel with earth pressure balance (EPB) tunnel boring machines (TBMs) and other technologies. He is an expert in all types of TBMs, including Mitsubishi-Robbins, Robbins-Grandori, Herrenknecht, Wirth and Lovat double shield TBMs, EPB monoshield and double shield TBMs, double-telescopic TBMs, and gripper-type TBMs. His experience includes constructing large bore, double-stacked tunnels in congested urban environments, such as the Madrid M-30 South Bypass South Tunnel and the Madrid Metro extension programs. His most recent experience is on Barcelona Metro Lines 9 and 10, where four track tunnels (two track levels) have been excavated with a 39.37-foot excavation diameter EPB TBM in difficult ground conditions with sand and clay soil and gravel under the water table. Emiliano has built solid relationships with multiple governmental and regulatory agencies, including Madrid Metro; Madrid Council; Administrador de Infraestructuras Ferroviarias, Railway Infrastructures, a state entity; and Barcelona Metro.

## Relevant Experience

*Barcelona Metro Lines 9 and 10 Extension (Gorg-Sagrera-Havaneras and Zona Franca- Campus Sud extensions), Barcelona, Spain.* Emiliano is the Tunnel Superintendent supervising a 180-person crew responsible for the operation and maintenance of a 39.37-foot diameter EPB TBM. The TBM has achieved a daily production rate of 47.73 feet and a maximum daily performance of 112.2 feet. A



major TBM challenge on this project is the difficult ground conditions for tunnel excavation. The tunnels have been excavated through alluvial deposits and sandy clay soil with gravel and boulders under the water table. The EPB TBM has excavated through non-cohesive soils achieving a maximum operation pressure of 3 bar. These conditions resulted in cutterhead checks conducted in hyperbaric conditions. Because the ground consists of abrasive minerals, several interventions to supervise the cutterhead and its tools have been carried out by skilled divers who specialized in these conditions. This \$800 million project includes the construction of a 7-mile, four-track tunnel to construct the new Barcelona Metro Lines 9 and 10. The project completed the first two segments of the extension on time and on budget, and the third segment is under construction.

***Madrid M-30 South Bypass South Tunnel, Madrid, Spain.*** As Tunnel Superintendent, Emiliano supervised a 150-person staff responsible for the operation and maintenance of the 49.25-foot diameter TBM, the largest EPB TBM in the world at the time. Emiliano coordinated all resources, subcontractors and the labor force into a cohesive team. Daily maintenance was performed to ensure optimum performance of the TBM, which achieved maximum daily excavation of 151 feet, average daily excavation of 60 feet, maximum monthly excavation of 1,015 yards, and average monthly excavation of 865 yards. The TBM utilization rate was 60.7 percent. This \$446.6 million, 2.25-mile, twin bore tunnel included three lanes of traffic on the upper level and two emergency lanes on the lower level. Emiliano supervised the operation and maintenance of the TBM tunnel including supervision of 150 staff.

***Madrid Metrosur Line 4 (Esperanza-Mar de Crista-Santa María segment), Madrid, Spain.*** As Tunnel Superintendent, Emiliano supervised a 120-person crew responsible for the operations and maintenance of a 30.77-foot-diameter EPB TBM. Emiliano coordinated all resources, subcontractors

and the labor force during construction of this \$212 million, 2.28-mile double track tunnel extension of the Madrid Metro in sand and clays. This was the one of the first uses of an EPB TBM in Spain resulting in a learning curve as crews gained knowledge of the machine's capabilities. The crews achieved an average daily TBM production rate of 54.12 feet.

***Madrid Metro Line 8 (Campo de las Naciones to Barajas Airport), Madrid, Spain.*** As Tunnel Superintendent, Emiliano supervised a 120-person team responsible for the operation and maintenance of a 30.77-foot diameter EPB TBM through clay and sandy soils. The TBM achieved an average daily rate of 52.5 feet, with a maximum daily performance rate of 128 feet. This \$122 million project included the construction of a 3.13-mile double track tunnel extending the Madrid Metro subway line to the Madrid International Airport. A precast concrete segment lining was installed in the tunnel. The extension included six stations and several pump and emergency shafts.

Because of the sand lens in this geologic area, water from aquifers posed additional challenges as substational groundwater seepage required additional water control and monitoring techniques. During the Madrid Metro Line 8 Extension, Emiliano assisted the owner in creating the "Unidad de Seguimiento y Auscultacion." This department defined the investigation techniques and instrumentation program requirements for the project and was the central repository for information obtained by the specialized companies performing this work. The construction contractors also reported actual site conditions in the tunnel and worked with the department to develop appropriate mitigation measures.

# Evelio Ferreiro

## *Geotechnical Manager*

### **YEARS OF EXPERIENCE:**

35

### **EDUCATION:**

Geological Sciences, Universidad Complutense de Madrid

### **SIGNIFICANT ACCOMPLISHMENTS:**

- Large-bore, double-stacked tunnel experience in a variety of soil conditions and with high water tables
- In-depth understanding of instrumentation systems and the means and methods to monitor and minimize deformations
- Recommended settlement mitigations measures that reduced deformations by more than 40 percent on the Barcelona Metro Line 9 Project

### **FIRM:**

Intecsa-Inarsa

Evelio Ferreiro has 35 years of experience as geologist and project manager for the design, construction and geotechnical characterization of major civil works projects with an emphasis in highway and rail tunnels. His experience includes double-stacked large bores greater than 30 feet in diameter and cut-and-cover tunnels in soft ground with segmental gasketed lining. Many of these tunnels have been mined with earth pressure balanced (EPB) tunnel boring machines (TBMs), including the Barcelona Line 9 Metro Extension and the Madrid M-30 South Bypass South Tunnel projects. In addition, he has worked on hydraulic and utility projects with smaller diameter tunnels. As Intecsa-Inarsa's Geotechnical Manager, he has been involved in all of the company's recent tunneling projects supervising geotechnical surveys of the alignments and the ground parameters used in the final tunnel design.

Evelio's geotechnical experience includes congested urban areas, such as Madrid, Barcelona, Bilbao and Sevilla in Spain. He brings an in-depth understanding of instrumentation systems and the means and methods to monitor and minimize deformations. He has conducted surveys to establish the current state of building foundations along tunnel alignments and implemented instrumentation monitoring systems to provide continuous deformation data. Evelio has worked with a variety of soils, including sands, clays, granite, gypsum and soft soils with high water tables.

His experience includes 11 years in seismically active environments, including Panama, Chile and Greece. He is a published author on seismic dangers, hydrogeology of volcanic land and geological-geotechnical studies of conduits in tunnels. He has been co-located in client organizations and has

worked with local and national authorities. He has extensive experience working with Dragados on tunneling projects in Spain giving him an intimate understanding of the company's construction techniques and requirements.

## Relevant Experience

### *Barcelona Metro Line 9, Barcelona, Spain.*

As Assistant Geologist, Evelio was responsible for developing the survey to provide geological and geotechnical profiles and assess the ground characterization. He performed calculations and monitored deformations along the alignment. The double-stacked tunnel was excavated in heterogeneous water-bearing soils with a 39.5-foot diameter EPB TBM.

The 30-mile-long Line 9 Extension is the longest urban connection in Europe with a common central section and two branch lines at either end. Of the 52 stations, 16 are interchanges with other forms of transport, other subway lines, regional railway lines and the local Renfe railway lines. Engineers designed the line to meet the transit needs of 90 million passengers per year in several densely populated areas. A significant geotechnical concern has been the ground characteristics that made it difficult to predict the behavior of the TBM face in regards to the existing foundations. Another challenge was the ground consolidation causing deformations that occur when TBM face pressure is transferred to water-bearing soils.

To meet these challenges, engineers installed mortar pile walls between the building and the diaphragm wall. Evelio was responsible for predicting potential deformation issues on the hundreds of buildings along the tunnel alignment. He identified and made calculations using semi-empirical methods to assess possible deformation issue locations. Once identified, he developed 3-D models to simulate the shape of the EPB (truncated conical shape) as well as the pressure exerted at the face, along the shield

and at the rear. All models represented the building foundations with the corresponding loads.

A damage chart plotted the results and accepted only negligible values. In the case of potentially severe deformation locations, the projected adopted remedial measures included building walls of mortar piles, jet grouting or micropiles between the tunnel and the building to be protected.

If the tunnel alignment was under the buildings making wall placement impossible, compensation grouting was done from shafts located in the vicinity. When crossing a structure on Ronda Litoral, a crowded avenue with heavy traffic, the project applied jacks to structures to prevent deformation. The team developed an extensive monitoring plan to control the soil and building reactions to the predicted movements.

Evelio conducted a survey to investigate the state of building foundations and identified the length of piled foundations along the route. When the pile length was greater than the tunnel depth, the team determined a new alignment. Generally, fracturation grouting was not an effective way to control the settlement of piled foundations. When the tunnel alignment followed an avenue, engineers placed a slab of unreinforced concrete on the top of the tunnel and supported by lateral piles that allowed the contractor to use a greater pressure at the TBM face. Another important feature was the ability to grout toward the shield holes, which reduced the total amount of settlements by a minimum of 40 percent.

### *Madrid M-30 South Bypass South Tunnel, Madrid, Spain.*

Evelio was an Assistant Geologist responsible for conducting a detailed ground conditions report that served as the basis for a settlement calculations report. He defined the parameters and made the calculations using FLAC 3-D technology. He recommended measures to protect existing buildings and utilities, including installing a barrier of improved soil between the excavation and the



tunnel. This barrier wall reduced the deformation profile, making it easier to proceed when the tunnel was located under a street with buildings on one or both sides.

Evelio implemented a continuous monitoring survey to detect any movement that could affect the excavation. Experience in urban sites showed that the data volume was too great to be handled and to derive new data to use in the future. The M-30, Madrid's inner ring road, is a 2.25-mile, 49.25-foot-diameter twin tube, doublestacked highway tunnel. The tubes, one for each direction, include three lanes for both cars and trucks on the upper level and two emergency vehicle lanes on the lower level.

Two EPB TBMs excavated the tunnel in hardcover, consolidated clays in a density populated urban area with a significant number of buildings. Significant improvements in the ability to grout at the face, along the shield and at the rear of the EPB TBM helped reduce deformation. In the past, a large percentage of deformations occurred along the shield and where gaps exist between the shield and the ground and at the rear between the ground and the segment.

By changing the makeup of the TBM, it was possible to grout through the shield, reducing the volume loss by 40 percent. Another important change was the improvement of grout mixes, including using quick setting mixes to reduce deformations. Evelio's geotechnical data was so thorough, the project encountered few unexpected ground conditions.

***Seville Metro Line 1, Seville, Spain.*** As an Assistant Geologist, Evelio was responsible for developing the survey to provide geological and geotechnical profiles and assess the ground characterization. He supervised the calculations and monitored deformations along the alignment. After reviewing the ground monitoring data, he analyzed the load requirements of the first tunnel after the project excavated the second one.

Because of the special characteristics of the Seville underground materials, Evelio was also responsible for designing the ground treatments along the entire alignment. The project placed jet grouting and micropiles columns in situ along the route and the client monitored the surface deformations 24 hours a day.

A significant challenge on this project was the alignment under the Guadalquivir River. It is 402 miles long, the second longest river in Spain, and drains into an area approximately 36,000 square miles. Because of the water flow and the material in the river basin, the project needed several special ground treatments to minimize the leakage when the tunnel was in service. Evelio conducted a permeability materials study and included the final treatments in the design of the tunnel.

Similar to the Barcelona Line 9 extension, of significant geotechnical concern were the ground characteristics that made it difficult to predict the behavior of the TBM face on the existing foundations. Another challenge was the ground consolidation causing deformations that occur when the TBM face pressure is transferred to water-bearing soils. Evelio managed the surveys and the laboratory tests to ensure complete knowledge of the ground in loading and unloading conditions.



# Ray Clouatre

## *Safety Manager*

### **YEARS OF EXPERIENCE:**

28

### **EDUCATION:**

AA, Business Management, U.S. Air Force

### **SIGNIFICANT ACCOMPLISHMENTS:**

- Experience in developing and executing safety program on large bore tunnels
- Coordinates hyperbaric interventions on the Brightwater West Project
- Provides safety, security and traffic control plans for projects in congested urban environments

### **PROFESSIONAL REGISTRATIONS:**

- Certified Safety and Health Specialist
- Certificate in Safety Management from the American Society of Safety Engineers Professional Safety Academy
- OSHA 500 Instructor and Instructor Trainer
- OSHA Authorized Construction Instructor
- American Safety and Health Institute First Aid and CPR Instructor
- Washington State Certified Flagger and Traffic Control Supervisor

### **FIRM:**

Frank Coluccio Construction Company

Ray Clouatre is the Safety Director for Frank Coluccio Construction Company and an accomplished safety and health manager, educator and consultant. He is adept at developing and managing programs; motivating managers, supervisors and employees; and communicating utilizing all forms of media. Ray manages the safety program, including tunnel safety, crane and operator certifications, air monitoring equipment maintenance, drug and alcohol testing, fleet management, hearing conservation, respirator program, tunnel and confined space rescue and all other safety, health and environmental programs.

He serves as competent person and teaches competent person training in excavation, tunnel, confined space and fall protection. He is responsible for conducting safety inspections, developing health and safety plans, and monitoring safe work activities.

Ray trains tunnel rescue teams, plans safety compliance for all tunnel projects, observes work on tunnel projects to ensure safety and compliance, and is on stand-by at critical work or work stoppages to ensure safety and provide rescue if needed. In addition, he visits and inspects each job site on a weekly basis and conducts accident and incident investigations.

Ray is an active member of the American Society of Safety Engineers, Puget Sound Safety Summit and the Seattle Vicinity Construction Safety Council. The Governor of Washington appointed Ray to the Tunneling, Mining and Aggregates Management Chair of the Washington Governor's Industrial Safety and Health Advisory Board; he also sits on the Construction Safety Panel of the same board.

## Relevant Experience

***Brightwater West Project, Shoreline, WA.*** Ray is Safety Manager for all safety aspects of this 4-mile, 15.2-foot diameter manned segmental earth pressure balance (EPB) tunnel boring machine (TBM) project, including ventilation, air monitoring, locomotive and rail safety, tunnel rescue team as well as all other regular safety programs. Ray is responsible for the hyperbaric interventions by coordinating the hyperbaric supervisor, physician, dive crews, airlock attendants and tunnel crews. He times and tracks all dives and decompressions, trains and manages the Mine Safety and Health Administration certified tunnel rescue team and the medical surveillance program. He is also responsible for tunnel ventilation and air monitoring.

***Sound Transit Railroad Tunnel from Capitol Hill to Pine Street, Seattle, WA.*** Ray is the Traffic Control Manager for this twin tunnel EPB TBM project in an urban Seattle location. He developed all safety, security and traffic control plans and participated in public relations programs. He serves as corporate safety oversight and provides assistance for the project safety and security manager.

***Alaskan Way Viaduct Utilities Relocation, Seattle, WA.*** Ray was responsible for safety on the utility relocation from the viaduct to a new underground location. This project is in the same location as the south portal of the proposed Alaska Way Tunnel. Project challenges included traffic, pedestrian, crane and overhead hazards. Ray developed a unique fall protection plan for the special platform suspended from the viaduct to allow both fall protection and large cable splicing. He also developed plans and supervised safety during excavation work in an energized substation.

# Albert Dube

## *Project Quality Manager*

### YEARS OF EXPERIENCE:

33

### SIGNIFICANT ACCOMPLISHMENTS:

- Developed, implemented and executed comprehensive QA/QC programs on complex large bore tunnel projects
- Extensive experience with tunneling projects in congested urban areas and adjacent to sports stadiums
- Responsible for oversight of offsite fabrication activities and establishing on-site testing laboratories

### PROFESSIONAL REGISTRATIONS:

- Certified Welding Inspector, American Welding Society
- Certified Concrete and Structural Steel and High Strength Bolting, International Conference of Building Officials
- Certified Level II Inspector in Mechanical, Civil, Welding, Electrical, Instrument and Controls, Costing, and Structural Street and High-Strength Bolting, American National Standards Institute 4.5.2.6 and American Society for Nondestructive Testing TC-1A

### FIRM:

Frank Coluccio Construction Company

Albert Dube has 33 years of experience in construction quality assurance/quality control (QA/QC), including eight years developing and implementing QA/QC programs for large bore tunnel projects. His experience includes congested urban construction projects adjacent to sports stadiums and historic downtown structures. He has an extensive and diversified background and knowledge in construction means and methods.

Albert's QA/QC experience includes complex civil infrastructure projects, including nuclear power plants, operating nuclear plant inspection and supervision, geothermal power plants and numerous public works projects. He has been responsible for quality programs on various building projects for the U.S. Navy and the Federal Law Enforcement Training Center now under the U.S. Department of Homeland Security. He is quality control manager for the new embassy compound construction project in Zambia, Africa.

## Relevant Experience

*Port Authority of Allegheny County, North Shore Connector Tunnel, Pittsburgh, PA.* As QA/QC Manager, Albert provided substantial support of excavation, including cement deep soil mixing/jet grouting and other support features for this \$156 million light rail transit tunnel. The project consisted of two 21-foot diameter cut-and-cover tunnels and an underground station shell. The project mined the tunnel with a slurry shield design tunnel boring machine (TBM).

This project was located in the downtown area adjacent to sports stadiums and under several elevated highways. The elevated highways required underpinning to build new support piers and remove the existing piers that interfered with the cut-and-cover tunnel alignment. The piers were cast using 6,500 psi concrete and post-tensioned in both directions.

The project used instrumentation extensively because of close proximity to many older downtown structures situated directly over the tunnel alignment. Albert developed the project specific QA/QC plan, developed all inspection procedures and documents, and coordinated all independent testing laboratory activities. He was responsible for all offsite fabrication and welding activities for the structural brazing used for support of excavation at all cut-and-cover tunnel locations.

***Portland West Side CSO Project, Portland, OR.***

As QA/QC Manager, Albert developed a project-specific QA/QC plan, inspection procedures and documentation for segment production, all concrete work and all mechanical and electrical installations. He hired and trained QC inspection personnel and the personnel who conducted the testing of the slurry used to support the face in the Slurry Shield TBM, which was one of the first ever used in the U.S.

The project consisted of 18,000 feet of 14-foot diameter tunnels with several shafts and a 220-million-gallons-per-day pump station. The team excavated shafts using a bentonite slurry to maintain the excavation and tremie concrete with end stops for each portion of the shaft walls. The project used primary and secondary panels to construct the shafts, including the deep pump station walls.

A jet grout curtain was established around the pump station excavation to mitigate ground water infiltration along with several dewatering wells.

The depth of the jet grout curtain, approximately 200 feet, was at the limits of jet grouting technology. The project also used stone columns to stabilize specific areas where the control building was located.

Engineers self-performed on-site bolted, gasketed segments for tunnel. The TBM was a slurry shield design. Albert monitored the day-to-day slurry laboratory activities, test reports and maintenance of laboratory equipment and maintained a Nonconformance Log to document deficiencies from the time of identification through disposition, repair/rework, documenting and closing out nonconforming reports. He was the Radiation Safety Officer for the project due to the nuclear density meters used on the project and completed a 40-hour Radiation Safety Course in 2003. Additionally, Albert was responsible for working through punch list items for the tunnels as well as the control building at the pump station location.

***MSP Light Rail Tunnel and Station, Minneapolis, MN.***

As QA/QC Manager, Albert developed a project-specific QA/QC plan for this \$110 million project to extend the light rail system into the Minneapolis-St. Paul International Airport. The project consisted of twin 21-foot diameter tunnels under the airport with a turnkey subway station under the airport terminal. The project constructed cut-and-cover tunnels at either end of the bored tunnels.

Albert was responsible for developing cold and hot weather concrete plans along with specific curing plans for cold weather conditions. He established an on-site grout testing laboratory and monitored the daily activities of the QC engineer performing the testing. He purchased the compressive strength testing machine and coordinated the calibration of the unit.





*Detroit River Outfall-2 (DRO-2), Detroit, MI.* As Senior Tunnel Inspector, Albert was responsible for daily observation and documentation of all contractor activities in the shaft, starter tunnel, TBM assembly and the segment production activities for this \$100 million project. This included daily report writing and weekly coordination meetings. The project consisted of a sinking caisson/drill and blast 300 feet deep, 40-foot diameter shaft, and six 10-foot diameter diffuser shafts under the Detroit River.

# Bill Jordan

## *Environmental Manager*

### **YEARS OF EXPERIENCE:**

16

### **EDUCATION:**

MS, Ecology, University of Texas at Arlington  
BA, Biology, University of Texas at Austin

### **SIGNIFICANT ACCOMPLISHMENTS:**

- Responsible for delivery of environmental assessments and associated permitting and ESA documentation for the \$1.5 billion I-405 Corridor Program
- Extensive coordination experience with local tribes regarding treaty fishing rights and cultural resource issues
- Completed emergency NEPA, SEPA, and permitting for the failure of a critical cross culvert under I-405 that nearly led to complete loss of the interstate roadway

### **PROFESSIONAL REGISTRATIONS:**

Certified Erosion and Sediment Control Lead (CESCL)

### **FIRM:**

HNTB

Bill Jordan brings 16 years of experience in environmental clearance, permitting, mitigation and construction compliance. His expertise includes National Environmental Policy Act (NEPA) and State Environmental Policy Act (SEPA) planning and processes, mobile source emission modeling and biological resources. He joined HNTB on the I-405 Corridor Program as Environmental Manager. Bill acts as WSDOT's Environmental Representative for the design-build projects along the I-405 corridor and is responsible for delivery of NEPA project clearance; federal, state and local permitting; and Endangered Species Act (ESA) documentation. His I-405 work has involved extensive coordination and interaction with local tribes regarding treaty fishing rights and cultural resources.

Bill is CESCL certified and is familiar with current environmental clearance and environmental construction compliance methods required by WSDOT.

Prior to joining the I-405 Corridor team, Bill worked for the Texas Commission on Environmental Quality and the Texas Department of Transportation (TxDOT). As program manager responsible for developing the Statewide Air Quality Implementation Plan, Bill led the regulatory design efforts for the Port of Houston, Port of Galveston and Port of Victoria air quality compliance and emission inventory efforts. A central concentration of the program included understanding site development and design and how these elements impacted the efforts to create the implementation plan.

As lead biologist for TxDOT, Bill helped to negotiate agreements with the U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department for timely project clearance. He modified the TxDOT

procedures to be more conducive to the federal and state requirements. These efforts led to quicker clearance of TxDOT projects. In addition, he was a liaison with the U.S. Army Corps of Engineers for expedited permit delivery for transportation projects. He interfaced with Corps personnel and TxDOT engineers for smooth and timely delivery of permits.

## Relevant Experience

***I-405 Corridor Program, King and Snohomish Counties, WA.*** As Environmental Manager for this \$1.5 billion program, Bill is responsible for delivery of environmental assessments and associated permitting and ESA documentation for the SR 520 to I-5 Improvement Project, the Bellevue Braids projects, and the Tukwila to Renton Improvement project. His I-405 Corridor Program work has included extensive involvement with local tribes concerning treaty fishing rights and cultural resources on the Tukwila to Renton Improvement project, the Bellevue Braids project, the 195th to SR 527 Auxiliary Lane project and current ongoing work with the Bellevue and Lynnwood Express Toll Lanes project. He has been responsible for environmental documentation, permit oversight and ESA compliance on three recent or ongoing design-build construction projects: the Kirkland Nickel, the Bellevue Nickel and the Renton Nickel. His responsibilities have included:

- ***Kirkland Nickel Design-Build Construction Compliance.*** Bill negotiated with the Washington Department of Fish and Wildlife regarding planting, wetland establishment and fish way weir compliance under Forbes Creek. In addition, he negotiated with the U.S. Army Corps of Engineers, the Washington State Department of Ecology, the City of Kirkland and King County.

- ***Bellevue Nickel Construction Compliance.*** Bill worked through the design-build process to accommodate just-in-time design decisions. This required quick and decisive permit negotiations with the various members of the Multi-Agency Permitting team. Bill maintained a good working relationship with this group in order to facilitate timely decisions. These permit modifications helped the design-build concept work in the state by providing for flexible and protective permits. This project also involved coordination with the Snoqualmie tribe regarding cultural resource issues.
- ***Renton Nickel Construction Compliance.*** Bill was instrumental in setting up the Environmental Compliance Plan for this third in a series of design-build WSDOT construction environmental compliance projects. This project had environmental challenges due to significant in-stream work and required extensive coordination with the Multi-Agency Permitting team, the Muckleshoot tribe along the I-405 corridor and the U.S. Fish and Wildlife Service.

The I-405 Corridor Program is a highly visible improvement project that has required Bill to participate in public outreach efforts for explanations of construction sequencing and environmental compliance methods.

***SR 520 Pontoon Construction Project, Grays County, WA.*** As Environmental Manager, Bill is providing acquisition assistance for permits for the casting basin located in Grays County, WA. He is providing the design-build team with a comprehensive understanding of WSDOT's policies and procedures for NEPA, SEPA, ESA, state and local permits, and environmental compliance. Bill will also be providing council and advice on

environmentally sensitive construction methods, sustainability, and cost-and time-saving opportunities within the design-build environment.

*Thunder Hills Emergency and Environmental Mitigation, King County, WA.* As Environmental Lead, Bill was responsible for completing the emergency NEPA, SEPA and permitting for the failure of a critical cross culvert under I-405 that nearly led to complete loss of I-405 access in the Renton area. The \$5 million project required immediate response to emergency permit issuance in order to stabilize the area and start an engineering solution to the failed culvert. Bill was responsible for site selection mitigation with the Muckleshoot tribe to reach an agreement on an appropriate fish passage project. Negotiations with the tribe, the Federal Highway Administration and the U.S. Army Corps of Engineers led to selection of a culvert that benefits fish, assists WSDOT in its long-term goals, and continues to foster the relationship the I-405 Corridor Program team has with the tribes.



# Jamie Strausz-Clark

## *Community Liaison*

### **YEARS OF EXPERIENCE:**

15

### **EDUCATION:**

MPP, Public Policy, Duke University  
BA, Political Science, University of California,  
San Diego

### **SIGNIFICANT ACCOMPLISHMENTS:**

- Designed and led award-winning community-based transportation management outreach program for King County Metro Transit
- Developed and implemented aggressive and focused community outreach plan for I-405 project
- Supported and updated emergency communications strategies and plans for City of Redmond and I-405 project

### **PROFESSIONAL REGISTRATIONS:**

Member, Association for Commuter Transportation  
Member, Women's Transportation Seminar

### **FIRM:**

PRR

Jamie Strausz-Clark has more than 15 years of experience in public affairs and outreach, environmental justice and transportation demand management (TDM). Her experience includes coordinating with traffic engineers and partnering with WSDOT and local governmental agencies and stakeholders to create and implement traffic management plans designed to minimize construction impacts on the traveling public and public events.

Throughout her career, Jamie has supported media outreach and relations and developed extensive relationships with media representatives. She served as the public information officer for the City of Redmond and was responsible for handling press relations and providing strategic communications guidance to department heads. She has partnered with WSDOT to create or update social media tools, blogs, photos, websites, fact sheets and e-mail updates.

Jamie has expertise in reader-friendly written communications. She also has thorough knowledge of National Environmental Protection Agency (NEPA), State Environmental Policy Act (SEPA), and many public agencies requirements for public outreach and consultation and communicating the effects of construction and operation on businesses, neighborhoods, social elements, and low-income and limited-English proficient populations.



## Relevant Experience

***King County Metro Transit, In Motion Link Light Rail Southeast Seattle Community-Based Transportation Demand Management, Seattle, WA.*** As Project Manager, Jamie oversaw a team of seven for this award-winning community-based transportation management outreach program. Facing a complete overhaul of the existing transit service, including the opening of Link Light Rail in southeast Seattle, King County Metro Transit engaged PRR to develop and implement an outreach program to encourage residents to try alternatives to driving.

Because southeast Seattle is one of the most culturally and linguistically diverse areas of Seattle, Jamie drafted a public outreach plan that included outreach to neighborhood groups, schools and English-as-a-Second-Language programs. She oversaw development of neighborhood-specific and culturally-appropriate marketing materials, including a map with travel options information available in six languages. By emphasizing the direct benefits of this transit overhaul, Jamie’s team engaged several immigrant/refugee organizations, dozens of local businesses, stakeholders and community leaders, and they were able to reach many more key audiences in the community. Although this project had extremely ambitious deadlines, Jamie was able to deliver the project on time and within budget by closely managing schedules and budgets and working with King County Metro Transit to make adjustments where it was possible without affecting program quality.

***WSDOT, SR 823/Selah Vicinity Intersection Improvements and South Wenas Road Extension, Selah, WA.*** The City of Selah and WSDOT designed a bypass from the main road through the downtown area, which involved widening and extending South Wenas Road, a small, unstriped road with a few

small businesses and multi-family housing. Because the project had the potential to adversely affect low-income and limited-English proficient populations, Jamie updated the public involvement plan to help the agencies better engage limited-English proficient residents and businesses. She also conducted a social, economic and environmental justice analysis of the project.

***WSDOT, I-405 Transportation Demand Management Marketing Services, Puget Sound, WA.*** As Project Manager, Jamie developed and executed marketing and outreach strategies to keep people and goods moving during construction. Her team developed the “Keep Moving” brochure highlighting WSDOT and King County Metro’s TDM services and distributed the resource to 102,000 households in the Kirkland area.

She developed an aggressive and focused outreach plan targeted at communities along the corridor, including research-based strategies for marketing to commuters, residents, employers and freight carriers throughout the county. Jamie worked with leaders and technical staff from WSDOT’s Public Transportation Division and Interactive Communications Division and the Puget Sound Regional Council’s Regional Traffic Operations Committee to develop the functional requirements for a regional traveler information portal that integrated traffic, transit, local arterial, rideshare, border, ferry and construction information into a user-friendly website.

In addition, she developed a strategy for implementing a South King County Transportation Network comprised of representatives from local jurisdictions, WSDOT, and King County Metro as the south county jurisdiction did not have a transportation management association that could serve as a direct conduit to businesses.

***WSDOT, I-405 Congestion Relief and Bus Rapid Transit, Puget Sound, WA.*** As Project Manager, Jamie was a senior member of the communications team responsible for developing strategies to inform, educate and engage residents, businesses and other stakeholders in corridor communities. She was responsible for managing communications and public outreach for projects in the Environmental Assessment process; providing strategic communications guidance to project managers; engaging in media relations and emergency communications; and managing and facilitating public meetings, hearings, and special events.

Jamie also managed public scoping open houses, interagency meetings and Environmental Assessment hearings for three I-405 projects. She supported the comment period by assisting the project team with developing messages and responses to particularly complicated or contentious questions. In addition, she brought in new organization and task management strategies, such as a new quality assurance and quality control approach to ensure every deliverable was reader friendly, on message and on point.

This project involved multiple multimodal improvement projects in various stages of planning, environmental analysis or construction. To help mitigate the complexity of this project Jamie co-located with WSDOT and the project team for 18 months. Her previous experience as a public information officer for the City of Redmond proved invaluable for this project as her training in emergency communications uniquely positioned her to effectively support and update emergency communications strategies.

***Tacoma Housing Authority Hillside Terrace Redevelopment Project, Tacoma, WA.*** As Principal-in-Charge, Jamie oversaw development and implementation of an outreach plan to engage residents and stakeholders of a public housing project in Tacoma. Residents were very low-income and

many were limited-English proficient seniors. Jamie designed and implemented community workshops that were culturally sensitive and engaging. She also oversaw development of community newsletters, an information kiosk and other outreach materials.

The project was somewhat controversial for residents, as many of them had fears about how the redevelopment would affect them, where they would live during construction, and whether they would be able to return when construction was over. Jamie's approach to public outreach was to build trust among residents by keeping the decision process transparent and listen, learn and report back.

The resulting conceptual design reflected the needs, preferences and vision of the community and Tacoma Housing Authority is moving forward with the next stage of design.

# Tony Johnson

*Subcontractor and Labor Manager*

**YEARS OF EXPERIENCE:**

25

**EDUCATION:**

BA, Journalism, Drake University, Iowa

**SIGNIFICANT ACCOMPLISHMENTS:**

- Mentors small and disadvantaged businesses to succeed in the construction industry
- Assisted 59 apprentices from Seattle Vocational Institute gain membership into trade unions and construction jobs.
- Has developed a network of relationships with Puget Sound Area DBE, WBE, MBS, and Native American subcontractors and apprentices

**FIRM:**

Johnson Construction & Consulting

As President of Johnson Construction & Consulting, Tony Johnson has 25 years of experience working as a Project Manager, Superintendent, and as an Owner's Representative. As a Project Manager, he has developed strong organizational skills in early preconstruction planning and cost and change order management during construction. As a Superintendent, his expertise includes preconstruction planning, developing, and managing the schedule through project closeout.

As a Project Manager and as Superintendent, Tony has assisted small and disadvantaged businesses succeed in the construction industry. He has mentored small businesses by providing help understanding the scope of work, schedules, and contract requirements. He provided assistance to subcontractors in preparing certified payroll, responding to change orders, and preparing and managing work packages to control labor production. He has helped disadvantaged subcontractors analyze bid results to evaluate and understand why their bids were higher and coached them on how to remain competitive and still include a fair overhead and profit margin.

Tony has strong people skills and mentors high school students, union apprentices, and women and minority subcontractors interested in construction and design. He is on the board of the American Council on Education mentoring program and recruits interested inter-city high school students into the program, which awards scholarships to the best students. He is also on the board of the Seattle Vocational Institute, which performs pre-apprenticeship training. As Superintendent on the Garfield High School project, Tony helped 59 apprentices from Seattle Vocational Institute get into the trade unions and get their first jobs in the construction industry. Many of them have gone on to become journeyman in their trades.

Tony has developed a network of relationships with DBE, WBE, MBE, and Native American subcontractors and apprentices. Tony offers support and assistance to many of these contractors invited to bid on projects and he continues to mentor them to help them find the right market to pursue work during competitive times.

## Relevant Experience

***Sound Transit University of Washington Station, Seattle, Washington.*** Tony is the Diversity Consultant for Hoffman Construction on the Sound Transit University of Washington Station project. He provides assistance in bid package strategies and finding interested DBE and small disadvantaged business subcontractors to participate in the project. Once the bid packages are established, Tony will work with the prime subcontractors to ensure they are aware of the DBE subcontractors interested in bidding with them. If the DBE firms are not successful bidders, Tony will work with the prime subcontractors to bid and negotiate scopes of work with SBE and DBE firms, to meet their project goals. It is important that these DBE and SBE firms learn to perform work at competitive rates. The negotiation will include developing work packages to help SBE and DBE firms set production targets. Using lessons learned from previous projects, Tony has helped small contractors become successful on his projects.

***6th and Lenora Apartments, Seattle, Washington.*** Tony is Project Superintendent for Lease Crutcher Lewis on this \$160 million, 24-story, twin tower project located in downtown Seattle. The project includes 114,435 square feet of underground parking on three levels, 58,559 square feet of retail and office space, and 558,400 square feet of residential space, including storage.

The podium base, levels 1-7, will include retail space

on the first floor, residential and storage on floors 2-6 with a 4,155 square foot common recreation pavilion between the towers on level 7. The 10,000 square foot towers start on level 7-24 with mechanical and elevator machine rooms on floors 25 and 26.

Tony participated in modeling of the structure using 4-D (Building Image Modeling) to find and resolve conflicts between curtain wall embeds, stud rails, PT (Post Tension) cables, and rebar. The final coordinated model will provide field installation drawings, including layout information for all embeds, inserts, and blockouts required in the floor slabs and walls.

Tony worked directly with the mechanical, electrical, and plumbing design-build team during preconstruction to ensure that the design was coordinated with the structural model to avoid delays during construction.

Preconstruction planning and scheduling of the 21-month duration construction phase was completed in the fall of 2009. Project is presently on hold indefinitely at the conceptual design phase.

***Garfield High School Addition and Renovation, Seattle, Washington.*** Tony was Project Manager during the presentation and preconstruction phase, with Lease Crutcher Lewis serving as general contractor and construction manager. He then became Superintendent during the construction phase. This \$88 million project included renovating this historic high school, while protecting and restoring historic elements such as windows, doors, main entry, and stairways. The project added a football field, two new gymnasiums, and a performing arts center. The project won the Associate General Contractors Grand Award for 2009 and the National Association of Industrial and Office Projects Public Project of the Year for 2009.

*Bellevue City Hall, Bellevue, Washington.* Tony began as Project Manager during the presentation and preconstruction phase, and then became Superintendent during the construction phase. This \$86 million project involved converting a telecommunications hub into a 619,000 square foot City Hall, Police/Fire Headquarters, 911 Emergency Center, and parking garage with a public park. Project included a two-story concourse with wood columns and curtain wall. The project was co-winner of National Association of Industrial and Office Projects public project of the year.

*University of Washington Law School, William H. Gates Hall, Seattle, Washington.* Tony was Project Manager for this \$58 million project to construct a new 198,000 square foot law school with offices, lecture halls, classrooms, courtrooms, and a law library. Four soaring architectural skylights in the southwest plaza provide daylight to the law library, which also includes modern features such as data ports and power at every seat. Textured brick adorns much of the exterior, which also include glazed aluminum curtain walls, tall vertical bay windows, and zinc wall panels and roofing. The building was designed to a very high 100-year-life standard.



# Josh Randall

*Assistant Deputy Project Manager*

**YEARS OF EXPERIENCE:**

45

**EDUCATION:**

BS, Civil Engineering, California State Polytechnic University, Pomona

**CERTIFICATIONS/TRAINING:**

California Community College Teaching Credential - Engineering

**SIGNIFICANT ACCOMPLISHMENTS:**

- Proven success in large design-build transit construction, including the BART to San Francisco International Airport Extension
- Expert in management of large, multiple, and concurrent construction contracts
- Expertise in pricing, negotiating, and settling change orders and claims

**PROFESSIONAL REGISTRATIONS:**

Professional Engineer: CA

**FIRM:**

Tutor Perini

Josh Randall has more than 45 years of experience in the construction industry covering all facets of general contracting, from public and private works to design-build projects. He has had overall responsibility of multiple major civil construction contracts built concurrently. Josh is highly skilled and knowledgeable in all phases of construction, including estimating, preconstruction, value engineering, subcontracting, field construction, cost control, scheduling, quality control, and overall contract administration. Josh has specific expertise in pricing, negotiating, and settling change orders and claims and he has a strong background in contract interpretation.

## Relevant Experience

*BART to San Francisco International Airport Design-Build Extension, CA.* Josh was Project Director for this \$710 million design-build project extending BART to the San Francisco International Airport, an 8.7-mile twin rail line extension. The project included 6.1 miles of cut-and-cover subway, 1.2 miles of aerial track, 1.4 miles at grade, two new stations, and the completion of another. It was constructed through cemeteries, five different cities, an endangered species habitat, and next to an active railroad.

*Los Angeles Metro Rail Red Line Subway System, Los Angeles, CA.* As Project Director for this \$800 million extension program, Josh was responsible for multiple major concurrent construction projects, including seven projects on Phase I and four projects on Phase II. He managed simultaneous underground tunneling and station projects, including the planning and supervision of engineering for the massive mining and tunneling

operations inherent to projects of this magnitude. Josh was responsible for approximately 100 salaried engineering and supervisory employees and 1,000 hourly craft employees. Josh provided oversight in preparing, negotiating, and resolving claims and labor negotiations. He also had responsibility for the quality control and scheduling departments.

This project included:

- Civic Center Station and tunnels (Contract A-141) – \$89 million
- Wilshire Alvarado Station – Phase I (Contract A-175) – \$32 million
- Union Station – Phase I (Contract A-135) – \$53 million
- Main yard and leads (Contract A-130) – \$39 million
- 7th and Flower Station – Phase II (Contract A-167) – \$31 million
- Wilshire Alvarado Station – Phase II (Contract A-187) – \$17 million
- Union Station – Phase II (Contract A-136) – \$34 million
- Normandie Station and Tunnels (Contract B-221) – \$94 million
- Wilshire/Western Station (Contract B-231) – \$60 million
- Line Section Wilshire Alvarado to Wilshire Vermont with pocket track (Contract B-201) – \$52 million
- Wilshire/Vermont Station Phase I (Contract B-211) – \$40 million
- Wilshire/Vermont Station Phase II (Contract B-215) – \$31 million
- Wilshire/Vermont Restoration and Landscape (Contract B-216) – \$4 million
- Vermont/Beverly Station (Contract B-241) – \$55 million
- Vermont/Sunset Station (Contract B-261) – \$56 million

- Vermont Tunnel Completion (Contract B-251) – \$16 million
- Segment 2 Ancillary Construction and Maintenance (Contract B-290) - \$23 million
- Air Handling Equipment (Contract B-745) – \$3 million
- Kaiser Entrance (Contract B-263) – \$8,361,737
- Hollywood/Highland Station & Tunnels (Contract C-0301) – \$78 million
- Universal City Station (Contract C0321) – \$60 million

*Muni Metro Turnback Project, City and County of San Francisco Engineering Department, San Francisco, CA.* Josh was Project Director for the construction of a combination of bored tunnels, cut-and-cover, and U-wall sections covering a distance of approximately 2,600 feet. The project consisted of driving, under compressed air, twin steel-lined tunnels by shove-jacking shields from an access shaft, formed by the excavation for a new ventilation structure. This extension to the existing light rail line was constructed in and around many historic San Francisco buildings that were built with unreinforced masonry foundations. The tunnels connected to the existing Embarcadero Station and connected to the existing Muni System. Tie-in platforms and maintenance walkways were also constructed.

Prior to joining Tutor-Saliba (a Tutor Perini company), Mr. Randall spent 8 years with Perini Corporation in various positions located in California, New York, and New Mexico. Earlier, he owned a testing laboratory, was Vice President and General Manager for McGaw Company, and was project manager/estimator for Granite Construction Company.