As part of our long-term partnership with the Department, we commit $8.0 million to the research, development and implementation of transportation technologies for the Project. To date, we have researched possibilities with our technology partners at the Southwest Research Institute, one of the oldest and largest non-profit applied research and development organizations in the U.S., and have estimated what the “road of the future” may look like. The V2I technology, an investment of $3.0 million during the Design-Build phase, will serve as the backbone of our Intelligent Transportation System (ITS) and the platform to launch our proposed technology enhancements (See 4.3.1). By advancing the design of technology infrastructure early in the Project, we will work with the Department to expand our technology enhancements, dedicating the remaining $5.0 million during the first five years after Service Commencement to develop and pilot advanced technologies.

A. DESCRIPTION OF THE TOLL LANE SYSTEMS

Toll Collection Methodology and Schematic Plan
As part of our focus on technology, we designed a modern toll collection methodology that revolves around a fault tolerant and highly accurate system designed for the long-term. A Project-specific architecture will be developed that will be coordinated with the Department’s and regional ITS architecture.

ELECTRONIC TOLL AND TRANSPORTATION MANAGEMENT SYSTEM APPROACH
The ETMM system was designed to exceed the Technical Requirements, maximize operational and maintenance efficiency, and reduce costs through continuous improvement and innovation. Our ETMM system will work with the Department’s systems, transferring data securely via a network communications system. In addition, we will follow the FHWA systems engineering process during the design and development of the ITS/Traffic Management System (TMS).

<table>
<thead>
<tr>
<th>LONG-TERM PARTNERSHIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>As part of our long-term partnership with the Department, we commit $8.0 million to the research, development and implementation of transportation technologies for the Project. To date, we have researched possibilities with our technology partners at the Southwest Research Institute, one of the oldest and largest non-profit applied research and development organizations in the U.S., and have estimated what the “road of the future” may look like. The V2I technology, an investment of $3.0 million during the Design-Build phase, will serve as the backbone of our Intelligent Transportation System (ITS) and the platform to launch our proposed technology enhancements (See 4.3.1). By advancing the design of technology infrastructure early in the Project, we will work with the Department to expand our technology enhancements, dedicating the remaining $5.0 million during the first five years after Service Commencement to develop and pilot advanced technologies.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Improved Tolling Operations through Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our tolling design emphasizes the maintenance of the system to improve tolling operations and enhance the safety of maintenance personnel. The design features that align with maintenance objectives include, but are not limited to:</td>
</tr>
<tr>
<td>» Full-sized walk-in DMS in lieu of front-access DMS</td>
</tr>
<tr>
<td>» Simplified signage for Toll &amp; Driver Information (T&amp;D) sign locations</td>
</tr>
<tr>
<td>» Consolidation of network access points to simplify preventative and remedial maintenance</td>
</tr>
</tbody>
</table>

ETTM DESIGN APPROACH
The viability of an information system that collects tolls and manages traffic rests in its capability to perform accurately and reliably in an evolving technology environment.

FIGURE 4.2.7.2 Principals of our ETMM Design
The principals of our ETMM design to deliver a highly accurate and reliable system include:

- **Fairness**
  Accuracy of toll operations is pivotal to protect the interests of rule-following customers. In a complex environment with a mix of transponder and video-based violation transactions, dynamically priced tolls, and HOV enforcement, our design will ensure fairness for all customers.

- **Flexibility**
  The system’s architecture will use a modular approach allowing the system to adapt to a variety of business rules and external interfaces.

- **Scalability**
  The initial system functionality will not constrain the future scalability of the system or hinder its ability to incorporate evolving processes or requirements.

- **Quality**
  High-quality source code (containing as many lines of code as the Hubble Telescope) will serve as the foundation on which all subsequent code will be added. Clearly documented code will be maintained efficiently using a proven Quality Assurance process over the course of the long-term agreement.

A schematic plan showing tolling points, locations of ITS equipment, including cameras, DMS signs, traffic monitoring stations and lane marking points is provided in the Appendix - Proposer’s Schematics.
Preliminary ETTM Facilities and Equipment Approach

<table>
<thead>
<tr>
<th>Design Differentiator</th>
<th>Benefit to the Department</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technology Lifecycle:</strong> Field devices can rapidly become obsolete; the expected lifecycle of these devices vary, and field units are susceptible to weather, vehicle damage and other damaging occurrences. Our design consolidates devices on a single structure or single location to the extent possible. Each structure/location will be easily accessible by maintenance personnel to replace or repair devices, effectively extending the lifespan of the devices.</td>
<td>Locating devices on the roadside will allow maintenance activities to be performed without requiring the closure of a General Purpose Lane or interruption to the WMATA facility.</td>
</tr>
<tr>
<td><strong>Traffic Conditions:</strong> We will monitor the traffic conditions on the Express Lanes with a high level of scrutiny. Probe data is unreliable and not sophisticated enough for this sensitive operation. Our design places vehicle detectors every half mile. Microwave vehicle detectors are reliable technologies that transportation agencies have used successfully for more than two decades.</td>
<td>The information gathered by the detectors will provide accurate and reliable data of the Express Lanes operations as well as the General Purpose Lanes.</td>
</tr>
<tr>
<td><strong>Facilities:</strong> We will build a centralized facility to support administration, traffic management, incident response, maintenance and tolling operations based on successful deployments across the globe.</td>
<td>Consolidation will make coordination and communication with the Department convenient and efficient.</td>
</tr>
<tr>
<td><strong>Hardware and Software:</strong> Our software development methodology leverages ISO 9001 (renewed and updated to the new standard BS EN ISO 9001:2000) Quality Management System and the Capability Maturity Model Integration (CMMI) that has resulted in receipt of a CMMI Level 3 Recognition. Our practices are also based on ISO-12207, as well as the guidelines of the Institute of Electrical and Electronics Engineers (IEEE).</td>
<td>Process-drive methodology will ensure standard integration practices, supporting easy interoperability and maximum data security.</td>
</tr>
</tbody>
</table>

Secure Network Communications

Please see page 78.

B. DYNAMIC TOLLING PLAN

Our tolling system is the main portal between roadway customers and our customer service resulting in a customer-centric ETTM system. Our customer relationship management approach is based on three primary components:

» Interaction Channels will support the customer’s interaction with the system across different communication channels to provide customers with a consistent experience regardless of the selected access channel (Website, Native Phone Application, etc.)

» Customer Service and Contact Management will provide all the capabilities needed to support customer service requests (complaints, information requests) and correspondent Back Office System (BOS) processes (Invoice Management)

» Customer and Account Management is responsible to manage information to support BOS processes, such as customers with user registration, user vehicles, personal info, commercial offer, account adjustments and other related entities

**Leveraging Our Tolling Experience**

I-66 Express Mobility Partners will leverage Cintra’s centralized tolling knowledge base as a result of their world-wide toll operations to deliver an industry-leading design.

» We will apply similar strategies that were used on the 407ETR concession to provide a more customer-friendly, reasonable atmosphere.

» We will apply lessons from Cintra’s experience collecting tolls on the Chicago Skyway and its complete interoperability with the 22 million E-ZPass customers on Cintra’s Indiana Toll Road concession.
Approach to Congestion Pricing and Methodology

The ETTM system will be capable of dynamic tolling to optimize traffic flow and speeds in the Express Lanes. Toll rates will respond to changes in traffic conditions to provide customers with the highest value in terms of travel time and reliability.

ITS sensors in both the Express Lanes and General Purpose Lanes will collect speed and volume data to determine the current traffic conditions. The data will be processed using a Cintra-developed sophisticated toll algorithm used on their dynamically tolled projects in the Dallas/Fort Worth area. The tolling algorithm is tuned and optimized based on traffic simulations for each Project, with results feeding the Toll Setting Module (TSM). The toll rates produced by the TSM fluctuate based on the current traffic conditions in order to keep traffic moving above 55 mph. Once the toll rates are established, they are posted on a dynamic message sign to communicate the toll rate and estimated travel times to customers, with the ability to change up to every three minutes.

A predictable and accurately invoiced experience for each driver is imperative for a successful Express Lanes project. The toll rates displayed when a vehicle passes under the sign will be the toll rates charged to that customer at the toll gantry, if there is any question with regard to the actual rate posted, through using a time-travel offset calculation, the Central System, described in Figure 4.2.2.7-5, will assign the lowest posted rate for that time period in order to ensure customer satisfaction. The system is built to favor the customer.

Dynamic Tolling Experience

Cintra and Meridiam currently operate express lanes for the North Tarrant Express and the LBJ Express with dynamic tolling in five-minutes increments. The dynamic tolling system implemented has successfully managed the congestion on these corridors and enhanced customers’ experiences traveling through the Dallas/Fort Worth area. The Project will benefit from Cintra’s eight years of lessons learned on these projects by the time the Project opens.

Dynamic Tolling Coordination with the Department’s Plans and Programs

Our ETTM system, which includes the ITS and Network Communication System (NCS), will interface with the Department’s statewide ITS system, increasing the efficiency and safety of the local, regional, and statewide road network. The ETTM system and related concept of operations is designed to work in conjunction with the Department, adjacent operators and the area’s traffic management centers. The systems will be interoperable with the Department’s system to provide the requisite information needed from the network and roadside equipment to implement the Department’s traffic management approach for the region.

In coordination with the Department, we will provide live feed on travel speeds and required data, allowing for synchronized communication with travelers of the broader network. A live feed from the I-66 Traffic Operations Center will provide the Department with information from the vehicle detectors, automated vehicle identification (AVI) systems and CCTV systems, which receive tolling data from our electronic toll collection systems. These systems will readily interface with the Department to coordinate data with the Department’s plans and program for transportation in Northern Virginia.

Center-to-Center (C2C) communications, specifically the NTCIP 2306 standard (NTCIP 2306 “Application Profile for XML Message Encoding and Transport in ITS Center-to-Center Communications (NTCIP-C2C XML”) will be the communications method with the Department and other ITS systems. This standard allows transportation agencies and traffic center managers to specify communications interfaces for information encoded in XML between a Traffic Management Center and external centers. The actual C2C message content is defined in other standards, such as the TMDD. A server will be established at the I-66 Traffic Operations Center for the exchange of traffic information including real-time traffic data, event data and CCTV images.
Discount programs for users of the Express Lanes

Discount programs for Express Lanes are currently being evaluated and will be finalized after the Project is operational. The discounts being considered include a variety of metrics, such as trip length, frequency, destination and duration. Our system will be capable of setting toll rates independently for each segment-direction to accommodate the potential discount programs.

Successful Discount Programs

Cintra created a discount program on the North Tarrant Express and LBJ Express project. The discounts offer customers 75 percent off tolls to travel during certain times outside of the peak period. This type of discount program encourages people to shift their commutes to less congested periods, maximizing throughput of the corridor. A similar concept may be considered for the Project's Express Lanes after the opening of the Project, if traffic data proves that the discount will maximize throughput.

C. DESCRIPTION OF THE ETTM SYSTEM

CONFIDENTIAL AND PROPRIETARY INFORMATION REDACTED
ETTM Schematic Plan
A schematic plan and layout showing the locations of ETTM equipment, including cameras, DMS signs, traffic monitoring stations and lane marking points is in the Appendix - Proposer’s Schematics.

System Monitoring and Connection to Traffic Management Centers for Interoperability
Interoperability between the Express Lanes systems and the Department’s Traffic Management Center starts with the strong, reliable design previously described. Our approach to maintaining interoperability continues with a Maintenance Online Management System (MOMS) and Advanced Traffic Management System (ATMS).

MOMS will be implemented to automatically detect failures, sending an alarm in the event of component failure, performance degradation, or any other potential issues that might adversely affect the operation or performance of the ETTM Equipment. MOMS is further described in section 4.3.2.1.

An integrated ATMS software will efficiently support the four operational areas: 1) Travel and Traffic Management; 2) Emergency Management; 3) Information Management; and 4) Maintenance and Construction Management to provide the following benefits:
- Single application interface for the devices and controls
- Capability to use congestion, events and device status together to manage traffic operations
- Single application interface to the Department’s system

The ATMS is further described in section 4.3.2.1.

Approach to Coordinating Information with the Department/other ETTM Systems
Please see section 4.2.2.7 b. ii.
4.2.2.8 TRAFFIC ENGINEERING

A. GUIDE SIGNING SCHEMATIC

FIGURE 4.2.2.8-1 Guide Signing Benefits

- Our Operational Guide Signing Schematic, included in the Appendix - Proposer’s Schematics, ensures user understanding and integrates with the network.
- Signage will be created from high-reflective sheeting to optimize lighting.
- Panels will be placed to provide maximum advance information to the road user.
- Line of sight analysis was completed to confirm drivers have time to read signs.
- Integration with Existing and Future Network
- All efforts to retain existing compliant signage were considered.
- Signage is used near the road in previously cleared areas to maintain visibility.
- Overhead structures were designed to allow for the addition of future sign panels.
- All signage provides a consistent message from interchange to interchange.

B. STRIPING, LIGHTING AND SIGNALIZATION

FIGURE 4.2.2.8-2 Stripping and Pavement Markings Benefits

- Our approach to stripping and pavement markings considers benefits for durability, driver assistance, and reduced maintenance costs.

   Approach to Stripping and Pavement Marking
   1. Type B, Class VI longitudinal pavement markings per TxDOT memo 21.01
   2. Transverse markings with an epoxy-resin material provide maximum durability
   3. Route shield pavement markings on all ramps of I-495 interchange
   4. E-ZPass logo pavement markings designed for all Express Lane entrance ramps
   5. Snow-powable pavement markers on longitudinal pavement markings
   6. Flexible delineators separate the GP and Express Lanes reduce maintenance
   7. Contrast markings on bridge decks and other concrete pavements.

FIGURE 4.2.2.8-3 Lighting Design Benefits

- Our lighting approach is based on providing travelers with continuously lit roadway, interchanges, signage, sidewalks and Share-Use Paths.

   Lighting Design Benefits
   1. Energy Efficient
   2. Low Maintenance
   3. Light Trespass
   4. Maximum Lighting
   5. Pedestrian Lighting
   6. Illuminance

FIGURE 4.2.2.8-4 Signalization Approach

Our approach is based on optimizing traffic signal timing to maintain a smooth flow of traffic, and strategically locating signal equipment to simplify maintenance efforts and maximize safety. All new signalized intersections are fully actuated to ensure efficient signal operations in peak and off-peak times.

1. University Boulevard Corridor
   - Signal timings and operations will be optimized to ensure traffic flows efficiently into the new Park & Ride facility and to the new Express Lanes ramps. New signals will be provided at:
   - University Blvd. and I-66 Express Lanes Intersection with trail crossing indications
   - University Blvd. and Park & Ride Facility entrance
   - University Blvd. and Route 29 with new turn lanes
   - University Blvd. and Washington Rd. with new turn lanes
   - Heathcote Blvd. and Route 29 with an additional southbound left turn lane to Route 29

2. Sudley Road (Route 234)
   - There are four existing signalized intersections in a half mile stretch on Sudley Road from Bullis Road to Balls Ford Road. At the intersection of Balls Ford Road and Sudley Road, an additional eastbound left turn lane from Balls Ford Road to northbound Route 234 will be added to improve the intersection’s operation.

3. Route 28 and Braddock Road Intersection
   - The traffic signal will control three different traffic movements:
   - From Braddock Road to Walney Rd or to Route 28 SB
   - From Walney Rd to either Braddock Road or to Route 28 SB
   - From Route 28 NB to either Braddock Road or to Walney Road

4. Stringfellow Road and I-66 Express Lanes Ramps
   - Existing signal is modified for entrance to the EB Express Lanes
   - The WB Express Lanes will have access to Stringfellow Rd.

5. Monument Drive and I-66 Express Lanes Ramps
   - Existing traffic signal is modified for an additional exit from the EB Express Lanes and an entrance onto the WB Express Lanes
   - Full access from and into I-66 EB and WB Express Lanes will be available

6. Chain Bridge Road
   - Designed with two signalized intersections to control exiting movements from the GSP and a third to control movements of the Express Lanes

7. Vaden Drive
   - Ramps will be signal controlled to ensure queues do not hinder mainline operations
   - The signalized intersections will be coordinated with intersections at Saintsbury Drive and Country Creek Rd. to ensure traffic flows near the Vienna Metro Station

8. Nutley Street (Route 243)
   - The DDI configuration will use two traffic signals to ensure efficient operations:
   - The existing westbound to northbound ramp creates a weaving section. This movement is eliminated with a stop controlled lane for westbound off ramp, allowing access to northbound Route 243 lanes without several lane changes
   - The signalized intersections will communicate with the adjacent signals at Saintsbury Drive / Sewnrs Lane and Virginia Center Boulevard / Marshall Rd.
   - The interchange will provide grade separated pedestrian crossings for high-volume movements so that pedestrians can cross under Route 243.
4.2.2.9 CAPITAL ASSET FACILITIES

A. BUILDINGS AND FACILITIES

I-66 Express Mobility Partners will establish one consolidated O&M Facility close to the roadway, with quick access to on-ramps in both directions and near the center of the alignment. This will provide strategic advantage while performing O&M activities and allow for quick response times, especially during emergencies and inclement weather. It also provides an easy to find location for any customers that would like to visit the customer service center, also located in this facility.

<table>
<thead>
<tr>
<th>Facility Features</th>
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</thead>
<tbody>
<tr>
<td><strong>Features of the Maintenance Facility:</strong></td>
</tr>
<tr>
<td>» Vehicle Storage/ Maintenance Bays</td>
</tr>
<tr>
<td>» Workshop Area</td>
</tr>
<tr>
<td>» Shipping/Receiving/ Parts Storage</td>
</tr>
<tr>
<td>» Bulk Materials Storage</td>
</tr>
<tr>
<td>» Meeting Rooms/ Offices</td>
</tr>
<tr>
<td><strong>Features of the Administrative Facility:</strong></td>
</tr>
<tr>
<td>» Meeting Rooms/Offices</td>
</tr>
<tr>
<td>» IT Personnel Room/Labs</td>
</tr>
<tr>
<td>» Traffic Operations Center</td>
</tr>
<tr>
<td>» Network Control Center</td>
</tr>
<tr>
<td>» Computer Server Room</td>
</tr>
<tr>
<td>» Electrical Room</td>
</tr>
<tr>
<td>» Mechanical/Storage Room</td>
</tr>
</tbody>
</table>

The facility will encompass a broad range of spaces to support our effective maintenance program:
» Storage, repair, and maintenance of vehicles, equipment, and related roadway materials such as guardrail, attenuators, signs, illumination, etc.
» Maintenance of buildings, backup generators, stormwater drainage systems and landscaping
» Storage of sand, salt, asphalt, rock, and pesticides
» Storage of any wastes generated on site
» Bulk storage of sediment, litter and debris generated by road maintenance activities

B. COMMUNITY IMPACT

To minimize the facility impact on surrounding communities, the O&M facility will be preferably located in an industrial region. Noise barrier walls will also be installed around the facility to prevent the noise from spreading to adjoining neighborhoods.

The O&M Facility will be LEED V 2.2 Silver certified to demonstrate our commitment to protecting the environment. LEED Silver certification will be achieved through operational performance and sustainability goals.

Figure 4.2.2.9-2 Traffic Operations Center

Our Traffic Operations Center will provide a streamlined visual display of real-time travel and weather-related conditions, as well as important data from the ATMS roadway devices and subsystems. HMI graphics will provide an interface for monitoring and controlling assets such as message signs, vehicle detection systems, and a CCTV system.
4.2.2.10 AESTHETIC AND LANDSCAPING PLAN

A. PRELIMINARY AESTHETIC AND LANDSCAPING PLAN

Our Preliminary Aesthetic and Landscape Plan (PALP) is included in the Appendix - Proposer's Schematics. To facilitate an integrated design process with the Department and the community, the PALP will be used as a starting point to develop the final Corridor Aesthetic Plan (CA Plan).

Our PALP has been inspired by recent projects close to the Project area in the “Mosaic District” in Merrifield. In accordance with the Technical Requirements, we anticipate that the PALP and the resulting CA Plan will have variations based on locality preferences and input from key stakeholders. Further described below, we will conduct the Design Public Hearing to present proposed alternatives and seek input from the different communities, the Department and stakeholders to prepare the CA Plan.

B. ADDITIONAL AESTHETIC ITEMS

Additional aesthetic items are included in our Preliminary Aesthetic and Landscape Plan.

C. COORDINATION WITH THE DEPARTMENT/STAKEHOLDERS

The Lead Contractor will develop a Corridor Aesthetic Plan based on a Context Sensitive Solution (CSS) design approach. CSS addresses equally: safety, mobility, and the preservation of scenic, aesthetic, historic, environmental and other community values. It involves a collaborative, interdisciplinary approach in which citizens of the immediate area are part of the Design-Build Team.

Our team has routinely utilized CSS principles to ensure that projects are in harmony with communities and preserve the character of the project area while developing the design and accomplishing the project’s goals. CSS principles were incorporated at the very beginning of the design stage and will play an important role in shaping all design decisions.

Design Charrettes & Public Meetings

Design charrettes are often an effective tool for generating design solutions while integrating the ideas and interests of a diverse group of people. Public meetings can range from large-scale public meetings to smaller community meetings with the main goal to present Project updates and gain feedback from the public, ensuring public input at all stages.

I-66 Express Mobility Partners will conduct the Design Public Hearing in collaboration with the Department to present proposed alternatives and seek input from the community on aesthetic conceptual alternatives. We will prepare all materials necessary for the Design Public Hearing including: 3D renderings of interchanges, critical structures, key visual impact areas, and a video animation showing traffic movements and sequence of construction. The team will also create menu boards where the public will select design elements and aesthetics that they feel reflect the area best. The meeting will be structured to include breakout sessions where community members can participate in a design charrette to modify the alternatives. The results of the outreach will be available to the public and incorporated into our team’s decisions. A successful public outreach plan will show that communities, stakeholders and travelers were heard and their input included throughout the process.

FIGURE 4.2.2.10-1 Sample Aesthetics
Refer to the Appendix - Proposer’s Schematics for the PALP.
4.2.3 DESIGN-BUILD QUALITY MANAGEMENT

**Design-Build Quality Management Approach**

I-66 Express Mobility Partners’ Design-Build Quality Management approach is part of the foundation of our approach to the entire Project because quality is a requirement for every management, design and construction activity. More than a requirement, quality is embedded in our team members’ corporate cultures resulting in an experienced Quality Management Team.

The Project will benefit from a thorough Quality Management approach that includes:

- A two-phased process including quality management and inspection and testing with different levels of control: Quality Control (Lead Contractor), the Independent Quality Assurance Firm (IQAF) and the owner verification testing.
- Comprehensive and independent quality control and quality assurance functions that cover all work performed.

**Design-Build Quality Assurance Team**

Michelle Roberts, as Quality Assurance Manager, will apply her 14 years of experience performing quality control, quality assurance and construction management on major civil engineering projects in Northern Virginia to the Project.

This experience includes five VDOT projects and provides her with an in depth knowledge of VDOT QA/QC processes, VDOT standards and specifications, and all aspects of Quality Control and Quality Assurance to ensure design and construction compliance.

**Design-Build Quality Control Team**

Esteban Trigueros, as Lead Contractor Quality Control Manager, is responsible to develop and implement the Construction Quality Management Plan (CQMP) and Bob Gray, as the Design Manager, will develop and implement the Design Quality Management Plan (DQMP).

Esteban and Bob will report to Miguel Angel Alonso, the Lead Contractor’s P3 Project Manager and together they will facilitate open lines of communication across all levels of the Quality Management Team and Construction Team.

**A. DESIGN QUALITY MANAGEMENT**

The Design Quality Management Plan (DQMP) will be part of the QMSP and will include processes that:

- Facilitate design document consistency
- Track design deliverables, directives, and requests for information
- Schedule buildable units in a logical order consistent with the sequence of construction
- Define the monthly progress reporting of production status and planned review schedules
- Describe the interfaces with Department representatives for design acceptance
- Detail the QA/QC operational procedures and the Independent Assurance and Verification program

**QA and QC Functions/Reporting Relationships and Responsibilities**

Bob Gray, as Design Manager, will work with the Discipline Leads to assign design packages to individual disciplines, and assign necessary technical staff. The quality control functions will be performed by the Discipline Leads and Design QC Team (See 4.1.1). The Lead Contractor’s Quality Control Manager will provide an added layer of Design QC to review constructability and as a participant in all Design-Build TWGs. Quality Assurance functions will be performed by the Design QA Manager, who is independent of the Discipline Leads and the Design QC Team.

Design deliverables will go through a rigorous quality control and quality assurance process, shown in Figure 4.2.3-1, to ensure compliance, constructability, maintainability and safety. All drawings, specifications, studies, reports and deliverables will be subject to an internal review prior to any milestone submittal. Design staff will perform interdisciplinary reviews by technical and management staff to provide coordination and uniformity among the entire design. The Design QC Team will perform formal and documented coordination reviews at pre-determined times on each submittal. The Lead Contractor will verify that all submittals meet contract requirements.
The Design Quality Assurance Manager will also verify that design work packages are in conformance with the Agreement and the DQMP prior to submittal by performing an audit. Documented evidence of these reviews will be provided to ensure compliance including audit reports and written approval from the Design Manager certifying he approved the submittal, as shown in Figure 4.2.3-1.

Department and Federal Oversight
Our quality management system has proven effective to reduce the amount of Department oversight needed. However, we encourage the Department’s involvement during quality management as part of the overall design process. If the Department chooses to participate in design oversight reviews, the Design Manager will provide the Department with draft design plans for review and approval prior to initiation of construction activities on the Project.

The Department may also choose to participate in our weekly Technical Work Groups for direct communication between the Department and our Design Team. In accordance with the DQMP, the Department will provide Over-the-Shoulder Reviews to provide instant feedback to our designers. We recognize that the Department and FHWA have the right to inspect and provide technical services to ensure compliance.

B. CONSTRUCTION QUALITY
Our approach includes effective in-field quality procedures and a state-of-the-art quality management software. Together, they form a system that will ensure high quality results and that materials and workmanship conform to approved plans and specifications. All construction will be closely inspected in accordance with an Inspection and Test Plan that provides instructions for construction processes, quality control requirements, acceptance criteria and an inspection schedule. Upon completion of a construction activity, the Quality Manager will verify fulfillment of all contract requirements, witness the inspections, and verify its successful completion.

We empower our Construction Quality Control Inspectors and Technicians to stop work in a non-conformance event and immediately review corrective/preventive actions of nonconformities.

FIGURE 4.2.3-1 Internal Design Review Process
Our construction quality management system also includes subcontractors who undergo a rigorous quality orientation before starting on the Project. Our policies and specific quality practices for a particular feature of work are reviewed at Pre-Event meetings to ensure all workers understand the requirements.

**Quality Management Software**

One of the primary differentiators of our quality management program is our process-driven approach that organizes all design, construction, inspection, and testing activities into a single quality management software. This approach has revolutionized our quality team because it integrates field activities with inspection and testing activities:

- **Activity Coordination:** Thousands of geo-coded processes will be built to account for each construction, inspection and test activity. When a step is complete, it is marked in real-time using the tablet-enabled feature. Inspectors are then alerted to begin their inspection. The software also communicates with third-party laboratories to trigger their activities.

- **Non-Conformance:** The software implements hold points or witness points. When a step in the process fails its inspection, the software will issue a warning with a GPS location of the failure to alert the foreman and relevant quality personnel. When a deficiency is identified, a Non-Compliance Report (NCR) will be issued. The software links traceability data to the NCR such as location, pictures, references to tests, inspection numbers. The NCR will remain an open record until the item identified has been inspected or retested and is shown to meet the quality requirements.

- **Document Control:** The quality management software serves as the central location for the Issued for Construction set. As drawings or specifications are updated, our quality department will update the software with the revised drawing. The software also links specific drawings with respective processes so that as foreman and inspectors are working through a process, they have an immediate link to the drawings needed.

- **Quality Planning:** The software creates daily look-ahead reports that are used at the beginning of the workday to document what needs to be completed. With a continuously up-to-date status on completed activities throughout the corridor, both quality and schedule teams review these daily reports and distribute to crews as part of our schedule management approach.

**Acceptance Testing and Inspections**

Quality Assurance Inspections and Testing will be completed by RK&K, the Independent Quality Firm. The CQMP will set forth inspection and testing to verify conformance with the released-for-construction plans, specifications and approved shop drawings. It will include procedures for material sampling and testing, and processes for: random test locations, tracking and processing material samples, and review and approval of test records.

**Department Oversight**

Our quality management system has proven effective to reduce the amount of Department oversight needed. However, an opportunity for their involvement is participation with weekly Technical Work Groups. Another means is the Department’s interface with the document control software to share documents and deliverables such as submittals, quality documents/reports and checklists, Requests for Information (RFI), and other correspondence.

---

**FIGURE 4.2.3-2  Quality Management Software**

<table>
<thead>
<tr>
<th>Seq No.</th>
<th>Activities</th>
<th>Note</th>
<th>QC</th>
<th>QA</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>2.0 Drill Shaft Embedment</td>
<td></td>
<td>Yes No N/A</td>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>2.1 Founding material. Check the diameter and the total length of the drilled shaft according to the plans.</td>
<td>JEH-07/10/2014 05:13:25PM Hold</td>
<td>Yes</td>
<td>SRO-07/07/2014 09:13:33AM Hold</td>
<td>Yes</td>
</tr>
</tbody>
</table>
4.2.4 ROW ACQUISITION & UTILITY MANAGEMENT APPROACH

A. ROW ACQUISITION

I-66 Express Mobility Partners will apply Cintra’s successful ROW acquisition approach and the experience from our local consultant, Bowman Consulting Group Ltd. (Bowman), to maintain quality and extreme sensitivity to all stakeholders, the Department, property owners, and relocation displacees. Cintra completed the ROW acquisition and relocation process on three large-scale infrastructure projects in the U.S. totaling 721 parcels. Bowman’s key staff have negotiated approximately 409 parcels, and prepared 450 appraisals per the Department’s requirements.

Our parcel database was created with extensive analysis of the 161 properties identified in the RFP Plans for acquisition. We analyzed the ROW footprint to reduce impacts on 20 individual parcels, which eliminated nine parcels from acquisition and reduced the total acquisition area by 4.65 acres. (This does not include drainage easements per the Technical Requirements.) Two major achievements of this analysis are: avoiding three residential relocations as depicted in Figure 4.2.4-2 and avoiding impacts to wetlands at the Park & Ride and Stormwater Management facilities.

ROW Acquisition and Relocation

We will perform all ROW-related processes in coordination and conformity with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act or URA), and all current amendments to the Uniform Act. All current Department regulations, policies and procedures as set forth in the Technical Requirements, the VDOT Right of Way Manual of Instructions and VDOT Utility Manual of Instructions, as well as IIM-LD-243 and Chapter 12 of the VDOT Survey Manual will be followed. Other Federal, State, and local laws, where applicable, will also be observed. We will also certify that all total and partial takes have been identified through submission of the RW300/301 checklist.

FIGURE 4.2.4-1 ROW Approach Highlights

TABLE 4.2.4-1 ROW Optimization of the RFP Plans

<table>
<thead>
<tr>
<th>Parcel No.</th>
<th>RFP Area (SF)</th>
<th>I-66 EMP Area (SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20105</td>
<td>11,817</td>
<td>3,502</td>
</tr>
<tr>
<td>20106</td>
<td>22,365</td>
<td>Eliminated</td>
</tr>
<tr>
<td>20107</td>
<td>22,370</td>
<td>Eliminated</td>
</tr>
<tr>
<td>20108</td>
<td>23,148</td>
<td>20,861</td>
</tr>
<tr>
<td>30301</td>
<td>12,606</td>
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</tr>
<tr>
<td>30402</td>
<td>2,561</td>
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</tr>
<tr>
<td>30405</td>
<td>10,466</td>
<td>8,591</td>
</tr>
<tr>
<td>30406</td>
<td>15,574</td>
<td>9,791</td>
</tr>
<tr>
<td>30423</td>
<td>119,886</td>
<td>44,007</td>
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<tr>
<td>30721</td>
<td>5,972</td>
<td>4,195</td>
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<tr>
<td>30722</td>
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<td>30724</td>
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<tr>
<td>30727</td>
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<td>30728</td>
<td>1,867</td>
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<td>30729</td>
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</tr>
<tr>
<td>30730</td>
<td>662</td>
<td>Eliminated</td>
</tr>
<tr>
<td>30731</td>
<td>86</td>
<td>Eliminated</td>
</tr>
</tbody>
</table>

FIGURE 4.2.4-2 Major ROW Optimization

The southeast quadrant of the I-495 Interchange was optimized to eliminate three residential relocations.
in order for the Department to issue a Notice to Commence Acquisition. Our ROW acquisition and relocation approach will be implemented by ROW Manager, Dennis Sedlachek, SR/WA, R/W-RAC in partnership with the Department, local officials and the Office of the Attorney General.

Led by Dennis Sedlachek, SR/WA, RW-RAC and his ROW Team, we will begin with a kick-off meeting where we outline goals and expectations, define roles and responsibilities, and establish protocols and management processes. We will continue to hold ROW Technical Work Groups, and meet on a scheduled and as-needed basis throughout the Project to review status, resolve issues, and plan for upcoming right-of-way acquisition activities.

Our ROW Team will co-locate with or near the Department's ROW team to expedite any ROW project status meetings, document submittals, and review processes. The Department's ROW and Utilities Management System (RUMS) will be used to organize key ROW dates and costs, and share them with the Department. Our ROW Team includes an Acquisition Service Provider highly familiar with RUMS.

Our approach to managing the process includes developing a Project-specific ROW Acquisition and Relocation Plan in compliance with all procedural aspects of the Technical Requirements that details the program and demonstrates a reasonable and orderly workflow. Our Acquisition and Relocation Plan will be in compliance with the VDOT ROW and Survey Manuals before submittal to the Department for approval to reduce the amount of generated comments during the Department's review and expedite the approval process. The submittal will be independently verified for conformance with all stated requirements.

A key feature of our approach includes preparing pre-acquisition, acquisition, relocation, and condemnation packages in advance. By preparing packages in advance of the final determination of the path forward, we are able to expedite the ROW process that would occur if a property owner does not agree to the acquisition terms, while still observing statutory timing requirements. We will limit the number of parcels requiring condemnation requests to the Department based on proven quality control and assurance plans, extensive shareholder and property owner communication and information exchange plans, as well as our commitment to negotiating settlements with the property owners.
4.2.4 ROW ACQUISITION & UTILITY MANAGEMENT APPROACH

**Expediting the Condemnation Process**

A key feature of our approach includes preparing pre-acquisition, acquisition, relocation, and condemnation packages in parallel and in advance. This approach provides an up to 90-day schedule improvement of the condemnation process that would occur if a property owner does not agree to the acquisition terms.

We will successfully communicate, facilitate negotiations, schedule, and attend parcel purchase closings to ensure acquisition by deed. If unavoidable, we will prepare final offer letters to purchase and, if an owner rejects the final offer, submit the VDOT Condemnation Package and assist the Department through the entire ROW process. The quick-take procedure will be used, when available, to expedite the process. Our relocation agents will contact displaced persons and businesses to help determine special needs for comparable replacement housing, provide housing and commercial market information, and assist displaced persons with relocation to decent, safe and sanitary replacement housing as per the Uniform Act.

**LOWEST SCHEDULE RISK**

**Property Owner Rights**

Our team has established quality control and quality assurance plans that sequence and identify responsibilities for all ROW acquisition and relocation activities and submittals to promote the protection of property owner rights. We will perform continuous quality assurance reviews of operating procedures for effective quality management for the entire right-of-way process and compliance verification with all federal, state and local property owner safeguards, policies, procedures and laws. Reviews documented by checklists, comments and issue-resolution plans form the basis for quality documentation. Right-of-Way Manager, Dennis Sedlachek, SR/WA, R/W-RAC, and his team will review this documentation to evaluate where improvements can enhance work products and processes.

**Additional measures our team will implement to protect property owners include providing a personal acquisition agent and a different personal relocation agent. This strategy ensures objectivity and compliance with federal, state and local laws and regulations. Dennis and our quality control reviewers are particularly conscientious in preventing actual or apparent coercive action towards property owners, such as advancing the time of condemnation or deferring negotiations, condemnation or deposit of funds to induce agreement on the price.**

**INTEGRATING ROW ACTIVITIES INTO THE SCHEDULE TO AVOID DELAYS**

I-66 Express Mobility Partners will partner with the Department to expedite acquisitions—particularly with the complex, high-risk parcels that may be required for critical path activities. During the RFP phase, our ROW schedule study was evaluated against our design and construction schedule for efficient construction sequencing and to accommodate the parcels with extended acquisition processes. This study identified 22 parcels that will require additional time to make ready for construction (complex parcels) and all 22 have been accommodated with extended acquisition time in the construction schedule. The study was also able to minimize ROW acquisition risk as it relates to property acquisition on the critical path for construction. In total, only twelve parcel acquisitions lie on the critical path.

**VDOT-Certified Acquisition Service Providers and Appraisers**

I-66 Express Mobility Partners will secure the services of Bowman and their VDOT-certified acquisition appraiser to evaluate the properties to be acquired and prepare reports on VDOT appraisal forms. Bowman’s key staff have negotiated approximately 409 parcels with a ROW acquisition budget of $152.8 million, and prepared 450 appraisals per the Department’s requirements. VDOT projects their team has completed ROW acquisition services include:

- I-495 HOT LANES PPTA Project, Fairfax County
- 10th Street Project, Roanoke Virginia
- Route 620 Project, Culpepper VA
- Route 1/123 Interchange Project, Woodbridge, Virginia
- Route 229 Improvements Project, Culpeper VA
- Route 29/ Route 666 Interchange Project, Culpeper VA

**POSITIVE IMPACT**

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COMMUNICATION PROCESS
Our ROW professionals are experts at working with property owners and potential relocation displacees to develop a thorough understanding of their concerns and needs while communicating the ROW Plan. We understand this is often a difficult experience and work hard at developing these constructive relationships focused on identifying solutions that support the property owners and potential relocation displaced persons while meeting the needs of the Project. Our process will facilitate the orderly relocation of displaced persons based on time frames not less than those provided by the Uniform Act.

One of the keys to this successful acquisition process and possession occurs during the inspection and ROW mapping phase. Our team will begin by contacting property owners and potential relocation displaced persons to explain the acquisition and relocation process. We will make sure they understand the process and have the opportunity to ask questions and provide input.

Our ROW acquisition group is a fully integrated member of the team. Through close communication between the property owners and design and construction teams, we will achieve a complete understanding of the property owner impacts and the Project’s ROW requirements. Any identified property owner impacts that can be minimized through our expert design and construction techniques will then be implemented. This results in a more expeditious and quality-controlled acquisition process because it facilitates less right-of-way design changes, as typically endured later within a traditional right-of-way acquisition process, and creates a highly effective communication and collaboration environment with property owners.

ROW Acquisition Schedule
Our ROW Team prepared an extensive ROW parcel identification, cost estimate, and schedule study with the support of an experienced local certified acquisition firm, Bowman. Bowman’s success with the acquisition process in the Commonwealth and their VDOT-certified acquisition appraiser will contribute to an accelerate schedule.

ROW acquisition and relocation is the most time-critical of the Early Works activities. Our ROW Team will institute an experienced and successful local acquisition consultant (Pre-qualified and listed on Department’s website) to support and perform the ROW acquisition and relocation processes and identify the most critical parcels requiring acquisition and/or displacement special assistance, so that these parcels can be continually prioritized early and throughout the project to prevent schedule delays.

B. UTILITIES
I-66 Express Mobility Partners provides an expert team familiar with the local utility companies and an understanding of the critical nature utility coordination will play in achieving our accelerated schedule. In addition to their role as a ROW consultant, we have also selected Bowman to lead the Utility Management Team based on their staff’s experience working with the local utility companies to achieve aggressive construction schedules, which includes the I-495 HOT Lanes Project. With Bowman involved in both ROW and utilities, our team reduces risks associated with the coordination effort between these critical scopes. For example, the enclosed Utility Plan Schematics in the Appendix - Proposer’s Schematics show interdependent features of work including utility easements, stakeholder coordination and betterments.

FIGURE 4.2.4-4 Utilities Approach Highlights
Utility Manager, Richard Bennett, served as VDOT’s State Utilities Engineer and Director of Right-of-Way and Utilities during his 37 years with VDOT. Since then, he led utility coordination on complex projects such as the Virginia side of the Woodrow Wilson Bridge and I-495 Capital Beltway HOT Lanes.

MORE THAN 57 UTILITY CONFLICTS AVOIDED
We will implement a systematic seven-step process for utility coordination to support our accelerated schedule:

1. **Evaluate Existing Information**: We have performed extensive preliminary research to quantify utility impacts and develop accurate cost estimates that enable us to provide the maximum amount of scope.

2. **Identify Impacts**: Each existing utility has been reviewed against our design to check for conflicts. We identified more than 330 facilities located along the corridor, the possible impacts and developed an adjustment concept (adapt, protect in place or relocation) to ensure compatibility with the design.

3. **Meet with Utility Owners**: Our efforts to date have included conversations with Verizon, Dominion, and the Fairfax and Prince William counties utility departments, among others. Through this process, we acquired data on facility locations, easements, materials and construction/inspection requirements.

4. **Avoid Impacts**: After identification and determination of the utility relocation, we will evaluate the economic and schedule aspects of designing around the utility. The Utility Management Team has assisted the Design Team to develop a conceptual design that avoids or minimizes more than 57 conflicts. This collaboration will continue to eliminate conflicts and enhance the schedule.

5. **Adapt, “Protect in Place” or Relocation Solutions**: Most utility lines that run parallel to the roadway and are within the ROW are planned to be relocated outside of the footprint within a utility corridor. Utility lines within the ROW that provide the Department or WMATA services will be accommodated within the ROW and relocated as a part of the proposed design. Measures to protect utilities to be kept in place will be designed in coordination with the Utility Owner.

6. **Coordination Design/Relocation with Utilities**: Our team will continue the coordination effort with each utility owner and develop additional impact avoidance measures post-award. Throughout construction, we will coordinate weekly with utility owners to focus on schedule, requirements, resource allocation and problem-resolution to facilitate utility avoidance or relocation.

7. **Verify Relocation/Protect in Place Complete**: Once the relocation or protection measures are complete, our inspection team will verify compliance with the requirements and agreements.

**Identifying, Verifying And Documenting Utilities**

Our Utility Management Team thoroughly examined the existing utility information provided in the RFP, researched existing as-built utility records, conducted visual site investigations of the overhead electrical distribution and underground utility markers, and completed initial utility owner interviews to identify, verify and document subsurface utilities. This due diligence was conducted to verify the accuracy of the RFP with respect to the existing utility infrastructures to minimize utility conflicts. The results were documented in an existing utility strip map and a Utility Matrix, which documents detailed information and relocation and mitigation measures. During the Early Works phase, the Utility Management Team will continue the Subsurface Utility Engineering (SUE) investigation to determine the horizontal alignment of each line (level B SUE) and vertical locations at specific locations considered sensitive to design or construction. The Utility Management Team will locate and label the critical overhead and underground utility crossings in the field with markers.

**Utility Relocation Timelines**

The Utility Matrix provided pertinent information to develop utility relocation or protection timelines to support our accelerated schedule. Our schedule is informed by the 28 utility owners and the 330 potential conflicts points that could impact a timely completion of the Project. Where possible, we scheduled a majority of the utility relocations to occur before construction begins to alleviate schedule risks. We bundled utility coordination and construction activities by Project area and by utility type to focus our efforts on completing the design and schedule/stage adjustment/relocation to stay off the schedule’s critical path.
Communication and Planning with Utility Owners

Our approach to planning with Utility Owners is based on early and often communication to minimize utility disruptions and reduce schedule and cost impacts. During the RFP Phase, as part of the stakeholder meetings organized by the Department, we interviewed the major Utility Owners in Table 4.2.4-2 to discuss our proposed utility solutions. We documented their answers in a standard questionnaire to gain insight regarding their concerns and expectations.

Our Utility Management Team will continue to meet with all Utility Owners after Project Award to discuss design revisions, utility owner’s expectations, and schedules, including what will be accomplished by Utility Owners. New easements, utility enhancements (betterments), overhead-to-underground crossings, and associated estimates and schedules will be finalized. We will review the standard three-party Utility Agreement based on the Master Utility Agreement to discuss the standard language, and contrast the agreements for owner-managed work versus agreements for work we will manage.

Another planning effort that will be coordinated with each Utility Owner will be the selection of pre-approved utility owner designers. Once the preliminary roadway, drainage and structure plans are available and conflicts have been confirmed, we will distribute the plans to the selected utility design firms. For utility relocations that our team will manage directly, we will consult with the firms prequalified by the Utility Owner and select a firm for the relocation design. For relocations managed by the Utility Owner, we will coordinate with the Utility Owner’s design firm and provide the design files. From there, coordination with Utility Owners will include:

» Review and verification of the utility relocation design and specifications
» Reviewing each cycle of plan submittals and scheduling comment resolution
» Conducting coordination meetings to advance to final sealed plans
» Preparing estimates to support the relocation work as identified in the plans
» Determining the cost responsibility eligibility ratios
» Securing permits and approval for construction from any applicable state and federal agencies

<table>
<thead>
<tr>
<th>Utility Owner</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominion Virginia Power</td>
<td>Dominion has numerous overhead crossings that may be affected by the widening and addition of soundwalls. They will adjust as needed with their own forces. Their primary concern was the impact to the underground conduits and conductors dedicated to WMATA. Significant coordination will be required to maintain the existing service and construct and energize the replacement facility.</td>
</tr>
<tr>
<td>Verizon</td>
<td>Verizon’s primary concerns were the crossings that involve many conduits at Stringfellow (8), Route 50 (15), Waples Mill (9), Chain Bridge (12) and Gallows Road (8) with the number of large copper cables ranging up to 2700 pairs and fiber optic cables as large as 864 fibers. We have avoided these facilities where possible and will stage bridge construction to minimize relocation timeframes.</td>
</tr>
<tr>
<td>Fairfax County Water and Sewer</td>
<td>Both the Water Authority and Sanitary Sewer department provided system mapping of their facilities and as-built plans of many crossings. Discussions included the requirement to maintain service and the likely need for bypasses to relocate connections.</td>
</tr>
<tr>
<td>Prince William County Service Authority</td>
<td>The Authority provided system mapping of their facilities and as-built plans of many crossings. Discussions included the requirement to maintain service and the likely need for bypasses to relocate connections on larger lines.</td>
</tr>
<tr>
<td>Telecommunication Companies</td>
<td>System mapping and cable sizes were obtained from many of the certificated telecommunication providers that cross the corridor. This assisted in identifying the extent of the various conflicts.</td>
</tr>
</tbody>
</table>
» Producing assemblies which may include a utility joint use acknowledgment, plans, specifications, ROW maps, owner commitment letters, abandonment letters and easement documents
» Soliciting bids from contractors for work to be performed on behalf of the utility Owners
» Conducting preconstruction meetings to establish safety, environmental and traffic control plans
» Verifying the construction, produce the as-built drawings, and file the quitclaims

Utility Relocation & Protection Methods

During construction, our crews will carry detailed utility plans and the Utility Matrix into the field, allowing for instant evaluation of proposed field changes. All field operations will utilize the “Miss Utility” service to identify and verify existing utilities prior to excavation and perform ‘soft digs’ near sensitive utilities.

We comply with each Utility Owner’s protect-in-place preferences whether it is a concrete slab over the utility line, encasing or other methods. This will be discussed and finalized during the Utility Agreement negotiations. We have planned for measures based on our previous experience with each Utility Owner. All protect in place methods will start with the following to ensure the exact location of utilities: field marking the location, vertical test pits to expose and flag the facility, hand excavation if work is within two feet of the utility, and review of any protective coating prior to backfilling. If the test pit or subsequent field excavation reveal an unexpected condition, such as additional utilities or multiple pipe joints, the crews will notify the Utility Management Team and discontinue work until the condition has been resolved.

Typically, utility lines that run parallel to the roadway and are within the ROW are relocated outside of the footprint of the widened road within the utility corridor. Our utility relocation methods include: detailed design of relocated facility, plan coordination and approval with Utility Owner, assignment to a Contractor, inspections during construction, coordination of tie-in, and final acceptance of relocated facility.

Utility Protection and Relocation

**Utility Protection:** There are 12 major gas or petroleum pipeline crossings which will be protected during construction with encasing. Where retaining walls or soundwalls are constructed over the crossings, the foundation will straddle the utility line to clear the casing and prevent additional loads on the pipe.

**Utility Relocation:** Several overhead electrical distribution circuit crossings will be relocated due to the increase in the roadway’s section. The conceptual relocation plan is to parallel the I-66 ROW for a span and then cross at a narrower point. This will avoid the need to go underground and bore under I-66.

Demonstrated Experience

On the Walney Road Widening and Bridge Replacement project for VDOT, Allan Myers effectively coordinated with more than 10 utility owners to relocate all of the utilities that were in the middle of the road widening. The utility relocation effort on this project was significant, with 70% of the schedule reliant on the utility relocation scope of work. Similar strategies that were used on this project will be applied to our utility relocation approach for the Project.

Minimizing/Managing Utility Conflicts

During the RFP Phase, the design and Utility Management Team has developed conceptual solutions shown in the Utility Plan Schematics to mitigate or avoid impacts to existing utilities. When a utility conflict was determined unavoidable, our team developed protect-in-place concepts, relocation strategies or adjustment solutions in accordance with the Technical Requirements, Land Use Permit Regulations and the Utility Manual of Instructions.

These solutions will be reviewed and updated after Project Award at weekly Joint Utility Coordination and Construction Meetings (JUUCM) between our Utility Management Team, the Utility Owners, pre-approved utility designer, the Department, the Design Manager, Construction Manager, Project Scheduler and Traffic Manager and others from the Design-Build Team. These meetings will further develop solutions to conflicts that are economical and practical.

To effectively manage utility conflicts, all utility conflicts have been integrated into the construction
schedule with proper logic so that time critical activities can be identified and communicated internally and externally to Utilities Owners and the Department. The durations and overall timing of the construction activities will be reviewed with the Utility Owners and revised as needed after approval of final Utility Relocation Plans. Where possible, we have scheduled a majority of the utility relocations to occur before construction begins to alleviate schedule risks and provide clear work zones for these critical activities. Additionally, our analysis included bundling utility coordination and construction activities by Project area and by Utility Type to focus our efforts on completing the design and schedule/stage adjustment/relocation to stay off the schedule’s critical path.

**Utility Work Responsibilities**

**TABLE 4.2.4-3 Cost Responsibilities**

A three-party agreement will be executed between I-66 Express Mobility Partners, the Department and Utility Owners to establish a clear line of responsibility for the work.

<table>
<thead>
<tr>
<th>Utility</th>
<th>Cost Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>County or Municipal Facilities</td>
<td>Developer</td>
</tr>
<tr>
<td>Department-owned Facilities</td>
<td>Developer</td>
</tr>
<tr>
<td>WMATA Facilities</td>
<td>Developer</td>
</tr>
<tr>
<td>Investor-owned Facilities with prior rights</td>
<td>Developer</td>
</tr>
<tr>
<td>Investor-owned Facilities in ROW without rights</td>
<td>Utility Owner</td>
</tr>
<tr>
<td>Telecommunication Facilities in Department conduit</td>
<td>Utility Owner</td>
</tr>
<tr>
<td>Certificated Telecommunication Providers</td>
<td>Developer/Utility Owner (depending on age)</td>
</tr>
<tr>
<td>Cell Tower</td>
<td>Tower Owner and Co-Locates</td>
</tr>
<tr>
<td>Betterments</td>
<td>Utility Owner</td>
</tr>
</tbody>
</table>

We will present the Utility Schematics to illustrate the existing utilities impacted by the Project. We will also review the Utility Owner records to identify any inconsistency. New easements, utility enhancements (betterments), overhead to underground crossings, and associated estimates and schedules will be discussed to establish the disposition and the cost sharing percentages.

**Negotiating with Utility Owners**

I-66 Express Mobility Partners will leverage our team members’ experience with utility coordination and in particular, the Utility Owners involved in this Project, by building strong partnerships and open lines of communication with all Utility Owners. We have conducted preliminary meetings with Utility Owners and outlined communication methods to ensure an ongoing productive relationship. To negotiate utility adjustment agreements, we will provide the standard three-party Utility Agreement to the Utility Owners to discuss the standard language, and contrast the agreements for owner-managed work versus agreements for work we will manage.

**FIGURE 4.2.4-5 Minimizing and Managing Utility Conflicts**

**Nutley Road Interchange**

The design was refined to avoid a major conflict with the existing cell tower. The ramp to I-66 WB was shifted to miss the compound and its various telecommunications buildings. Without this change, the relocation would have required 12 months of additional time.

**Gallows Road Bridge**

ATC 017 includes an alternate travel route from I-66 EB to I-495 SB to avoid the relocation of the existing Gallows Road TPSS. The proposed ramp saves time on the schedule that would be needed to relocate and test the TPSS.
4.3.1 OPERATIONS AND MAINTENANCE MANAGEMENT

The core of our Operations and Maintenance (O&M) approach is fostering a long-term partnership with the Department and stakeholders, ensuring the durability of the asset and achieving the status of the most technologically advanced corridor in the world. We have designed and plan to implement numerous Project enhancements that are dually focused on future advancements in the transportation industry and providing a unique customer experience. We will analyze and develop these enhancements with the Department during our 50-year partnership:

» Technology Enhancements that will make the I-66 corridor the benchmark for future infrastructure developments with our commitments detailed in Table 4.3.1-1 and Figure 4.3.1-1

» CONFIDENTIAL AND PROPRIETARY INFORMATION REDACTED

» Innovative O&M Strategies that reduce maintenance costs to the Department, extend the Project's service life at handback and ensure a sensible approach to toll collection

Technology Enhancements

I-66 Express Mobility Partners commits $8.0 million to the research, development and implementation of transportation technologies for the Project. The Dedicated Short Range Communication technology, an investment of $3.0 million during construction, will serve as the backbone of our Intelligent Transportation System and the platform to launch our proposed technology enhancements (Table 4.3.1-1). The remaining $5.0 million will be dedicated during the first five years after Service Commencement to develop and pilot advanced technologies. Successful pilots will be permanently implemented on the Project. To help allocate these funds to the most innovative technology, we have an exclusive commitment to work with the Intelligent Transportation Division of the Southwest Research Institute (SwRI), one of the largest non-profit applied research and development organizations in the U.S. We also encourage the Department's Virginia Center for Transportation Innovation and transportation researchers in the region, including the Virginia Transportation Institute, to jointly collaborate.

<table>
<thead>
<tr>
<th>TABLE 4.3.1-1 Technology Enhancements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ITS Equipment Innovations</strong></td>
</tr>
<tr>
<td>Dedicated Short Range Communication (DSRC)</td>
</tr>
<tr>
<td>DSRC technology will allow vehicles to &quot;connect&quot; with each other (V2V) and with infrastructure (V2I) via two-way, high-data wireless communications. It currently serves as the foundation for Autonomous Vehicle technology.</td>
</tr>
<tr>
<td><strong>Pilot Programs</strong>*</td>
</tr>
<tr>
<td>Automated HOV Enforcement</td>
</tr>
<tr>
<td>Cameras will identify the number of occupants in a vehicle. If the transponder setting doesn't match the number of occupants, the system will capture the vehicle's license plate and send an alert via SMS or email.</td>
</tr>
<tr>
<td>Virtual Road Signs</td>
</tr>
<tr>
<td>With the capabilities of the DSRC system, road signs will be presented to drivers virtually via in-vehicle displays.</td>
</tr>
<tr>
<td>Mayday Alerts</td>
</tr>
<tr>
<td>Roadside equipment will sync with connected vehicles so vehicles can request assistance through nearby roadside equipment or other connected vehicles.</td>
</tr>
<tr>
<td>Lane Mapping</td>
</tr>
<tr>
<td>We will equip connected vehicles with a lane model event management subsystem that identifies potential road obstructions based on a change in the expected lane configuration and sends an alert to the driver and operations team.</td>
</tr>
<tr>
<td>Wrong Way Driver Detection</td>
</tr>
<tr>
<td>The connected vehicle systems will include the ability to detect wrong way drivers using information reported to the vehicle from connected roadside equipment.</td>
</tr>
<tr>
<td>Connected Maintenance Vehicles</td>
</tr>
<tr>
<td>Our connected maintenance vehicles will be capable of identifying regions of pavement that require immediate maintenance, observing trends in pavement conditions and comparing road surfaces for statistical/quantitative assessment.</td>
</tr>
<tr>
<td>Unmanned Aerial Vehicle (UAV) Incident Response</td>
</tr>
<tr>
<td>Completely unmanned UAVs will safely launch from pre-determined locations, allowing responders to receive information quickly from multiple vantage points quickly.</td>
</tr>
</tbody>
</table>

*The Pilot Programs will be subject to the Department’s approval and any applicable legal restrictions.
Dedicated Short Range Communication (DSRC) Technology

DSRC technology will support making I-66 the most advanced Vehicle to Infrastructure (V2I) connected corridor in the world. Connected vehicles will serve as key steps in the evolution to Autonomous Vehicles, however this technology also has more immediate impacts that improve road safety and increase mobility. The V2I functionality of the I-66 corridor will be designed and implemented into the core fabric of the Project as an integral part of the roadway operations. In collaboration with SwRI, one of the pioneers of V2I, we will also be able to run a set of Pilot Programs to test applications we consider highly relevant for the I-66 corridor. These pilots will help justify the type of applications that will be supported by the V2I infrastructure.

Automated HOV Enforcement

HOV enforcement zones will be enhanced with an automated system that uses video and other analytics to identify the number of occupants in a vehicle. If the setting on the transponder doesn’t match the number of occupants, the system will take a snapshot of the vehicle’s license plate and send an alert to a pre-determined distribution via SMS or email and queued for manual violation confirmation.

Cameras can also be mounted to police vehicles and programmed to recognize recurring HOV violators as officers are moving with the traffic. The cameras will search vehicles within the immediate vicinity of the officer’s vehicle and upon detection of a vehicle that is on the violators list, the officer will be notified of the violator and violators.

Wrong Way Driver Detection and Alert

Through the use of the DSRC technology, connected vehicles and in-vehicle displays, road signs can be presented to drivers virtually on their in-vehicle display. Image processing will identify the visual elements of the road sign, and provide a digital representation of it on the in-vehicle display.

This system will regularly update the display with virtual signs throughout the driver’s route. For signs that are applicable for long stretches, the information will remain on-screen for the entire time that the connected vehicle is traveling in that area. This enhancement will increase the level and quality of travel-related information.

Wrong Way Driver Detection and Alert

Through the use of the DSRC technology, connected vehicles and in-vehicle displays, road signs can be presented to drivers virtually on their in-vehicle display. Image processing will identify the visual elements of the road sign, and provide a digital representation of it on the in-vehicle display.

This system will regularly update the display with virtual signs throughout the driver’s route. For signs that are applicable for long stretches, the information will remain on-screen for the entire time that the connected vehicle is traveling in that area. This enhancement will increase the level and quality of travel-related information.

Connected Vehicle Maintenance

The timely detection and repair of roadway surfaces is a distinguishing factor for managed corridors. Most methods for detection of poor road conditions rely on manual surveying, which is limited by the availability of resources and frequency of surveying.

Our connected maintenance vehicles can use the DSRC technology, communication protocols and available hardware to identify regions of pavement that require immediate maintenance, observe trends in pavement conditions over time and compare road surfaces for statistical or quantitative assessment.

Unmanned Aerial Vehicle (UAV)

UAVs will be able to respond to incidents to the extent allowed by the FAA or any other governing body. The UAVs will launch from pre-determined locations almost immediately upon notice of a traffic incident, allowing responders to receive information quickly from multiple vantage points, including close range, with High Definition Zoom cameras providing an additional level of effectiveness over that of CCTVs. By using incident detection software in correlation with autonomously flown UAVs, the pilot would attempt to provide higher visibility on an incident in a quicker timeframe than a dispatch marked vehicle. The control center operator would have limited controls to flight patterns, but would have full ability to operate the camera including, pan, tilt and zoom, and have designated, safe crash sites in case of malfunction.

LANE MAPPING

Software tools will enable connected vehicles to collect vehicle BSMs and convert them into a high-fidelity, lane-level model of the local roadway structure. These algorithms utilize the behavior of vehicles, as evidenced by their driven paths, to infer the details of lane structure, which have the potential to change due to a construction lane closure, a collision, or an obstruction caused by other debris. When the lane model event management subsystem identifies potential road obstructions, it will send an alert to the driver and traffic control team.

APPLICATION OF VIRTUAL SIGNS

Through the use of the DSRC technology, connected vehicles and roadside equipment, at which point they are relayed through the connected vehicle subsystem to the Advanced Traffic Management System (ATMS) for additional processing and generation of alarms.

Mayday Alerts

Through DSRC equipment in connected vehicles and roadside equipment, connected vehicles can alert our traffic control team if they need any assistance through the use of a Mayday Alert. Mayday Alerts will allow vehicles to generate messages requesting assistance such as “Accident,” “Flat Tire,” “Stalled Vehicle,” etc.

These messages can be sent directly to a nearby roadside equipment or spread it to other connected vehicles until they are in range of roadside equipment, at which point they are relayed through the connected vehicle subsystem to the Advanced Traffic Management System (ATMS) for additional processing and generation of alarms.
CONFIDENTIAL AND PROPRIETARY INFORMATION REDACTED
CONFIDENTIAL AND PROPRIETARY INFORMATION REDACTED
4.3.1 OPERATIONS AND MAINTENANCE MANAGEMENT

Innovative O&M Strategies

We have developed the following O&M strategies that will lower maintenance costs, improve toll collection services and extend the service life of the corridor, further reducing the Department’s future maintenance costs.

**TABLE 4.3.1-3  Innovative O&M Strategies**

<table>
<thead>
<tr>
<th>Innovative O&amp;M Strategies</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LONG-TERM PARTNERSHIP</strong></td>
<td>Winter Operations: I-66 Express Mobility Partners will be responsible for winter operations on the Express Lanes, saving the Department approximately $20 million in direct costs through the Operation Period. As part of our in-house winter operations, we will implement cost saving measures such as salt brines (anti-icing) and DLA Application, which reduce the amount of materials needed to manage snow and ice, lowering annual winter maintenance expenses. (See 4.3.2.1)</td>
</tr>
<tr>
<td><strong>REQUIREMENT EXCEEDED</strong></td>
<td>Enhanced Service Life at Handback: At the completion of the Operating Period, we will hand back the facility with a remaining service life of 30 years to reduce future Department costs. This will be accomplished through a number of innovative O&amp;M strategies throughout the term as well as a robust Handback Maintenance Works Program, which includes resurfacing the pavement on the General Purpose Lanes. (See 4.3.2.4)</td>
</tr>
<tr>
<td>Maintenance Management Information System (MMIS): Our MMIS facilitates an organized and efficient approach to scheduling, monitoring, implementing and reporting on maintenance activities, which contributes to fewer unnecessary maintenance expenses throughout the Operating Period and a better lifecycle because of a systematic preventative maintenance approach. (See 4.3.2.3)</td>
<td></td>
</tr>
<tr>
<td><strong>POSITIVE IMPACT</strong></td>
<td>User Safety Enhancements: We have implemented a number of strategies to reduce the likelihood of incidents throughout the corridor, which will lower O&amp;M costs and extend the service life of assets along the corridor. Safety strategies include enhanced wayfinding signage, wrong way detection systems, thicker pavement striping, rumble strips and a wet pavement accident prevention program, among others. (See 4.3.2.1)</td>
</tr>
<tr>
<td>UAVs for Bridge Inspections: Using UAVs instead of manned vehicles to conduct bridge inspections will reduce O&amp;M expenses while reducing traffic management requirements to conduct inspections and increasing the accuracy of inspection with high resolution and infrared images. (See 4.3.2.3)</td>
<td></td>
</tr>
<tr>
<td><strong>POSITIVE IMPACT</strong></td>
<td>Smart Cushion Attenuators: Smart Cushion Attenuators require less maintenance to repair after a crash (30-45 minutes versus three hours for other attenuators) and can withstand more crashes than other attenuators. With fewer repairs, the elimination of spare parts needed and a longer lifecycle, this strategy reduces future maintenance costs. (See 4.3.2.1)</td>
</tr>
<tr>
<td>Improved Bridge Design: Our bridge design follows the Department’s joint-less philosophy to reduce the maintenance required for joints and lower long-term O&amp;M expenses. Bridge joints are eliminated or minimized as the design permits. In addition, precast prestressed concrete girders are proposed where possible by span arrangement and length, which minimize long-term maintenance of the superstructure longitudinal members. (See 4.2.2.6)</td>
<td></td>
</tr>
<tr>
<td><strong>SUPERIOR CUSTOMER CARE</strong></td>
<td>Address Correction Software and Skip-Tracing: These technologies will reduce the likelihood for invoices to be returned as “undeliverable” and avoid the situation where customers never receive an invoice resulting in a costly collections process. (See 4.3.2.2)</td>
</tr>
</tbody>
</table>
A. PRELIMINARY OPERATIONS MANAGEMENT PLAN

The Operations Management and Maintenance Management Plan will be implemented by the Chief Operating Office (O&M Manager) and the Maintenance/Incident Response Manager supported by our Maintenance crews.

B. PRELIMINARY MAINTENANCE MANAGEMENT PLAN

<table>
<thead>
<tr>
<th>Operations Processes and Procedures</th>
<th>Maintenance Processes and Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Electronic Document Management System will organize monthly and annual O&amp;M reports required by the Department.</td>
<td>- Daily, monthly, quarterly and specialty inspections will be conducted in accordance with the Technical Requirements including inspections of the Shared Assets and condition monitoring.</td>
</tr>
<tr>
<td>- Electronic Toll and Traffic Management (ETTM) system will monitor all Project elements and integrate with the Department’s system.</td>
<td>- Our inspection program will identify any defects that present a hazard in accordance with the inspection standards, and remedy or repair them within the time periods dictated in Attachment 4.5 Performance Requirements.</td>
</tr>
</tbody>
</table>

TABLE 4.3.1-4 Operations Processes and Procedures

<table>
<thead>
<tr>
<th>O&amp;M Organization Primary Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Reviews, approves, and manages Maintenance of Traffic (MOT) plans.</td>
</tr>
<tr>
<td>- Supports incident and emergency response with efficient and documented information flow.</td>
</tr>
<tr>
<td>- Reviews inspection reports for compliance with the performance requirements.</td>
</tr>
</tbody>
</table>

TABLE 4.3.1-5 Maintenance Processes and Procedures

<table>
<thead>
<tr>
<th>O&amp;M Kick-Off Meeting</th>
<th>Incident Management</th>
<th>Winter Operations</th>
<th>Traffic Management</th>
<th>Handback</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>This meeting will discuss communication protocol and review any O&amp;M issues with the Department.</td>
<td>We will communicate with the Department and other agencies about incidents. Information on closures, diversions and anticipated clearance timescales will be shared.</td>
<td>- Our Traffic Operations Center will coordinate with the Department’s regional Traffic Management Centers to share travel time information and regional throughput strategies.</td>
<td>- Monthly meetings starting six months before Handback will facilitate information exchange, operational knowledge, and resolution disclosure around questions raised.</td>
<td>- The Department will inspect the Shared Assets and maintenance of the General Purpose Lanes.</td>
<td>- New policies and procedures will be shared and discussed.</td>
</tr>
</tbody>
</table>

FIGURE 4.3.1-4 O&M Organization Primary Responsibilities

FIGURE 4.3.1-5 Operations and Maintenance Interfaces with the Department

TECHNICAL PROPOSAL

100
C. APPROACH TO OPERATIONS AND MAINTENANCE

TABLE 4.3.1-6  Approach to Operations and Maintenance

<table>
<thead>
<tr>
<th>Project Phase</th>
<th>Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to Service Commencement</td>
<td>Well in advance of construction completion, we will move into our permanent O&amp;M facility including the Maintenance Yard, Maintenance Facility and Traffic Operations Center. At this time, we will determine if additional staff are needed to support the O&amp;M team. The staff will immediately begin the required training and orientation process. Our full suite of cutting edge technology will be established and running. Proprietary technology systems will be tailored to specifically match the Project. The GIS profile will be loaded into our system to ensure data management of the complete asset.</td>
</tr>
<tr>
<td>Transition from Design-Build Phase to Operating Period</td>
<td>Upon completion of construction, the O&amp;M team will take full control of the right-of-way (ROW) from the Lead Contractor. As demonstrated in section 4.1.5, our organization is designed with overlapping personnel from one phase to the next.</td>
</tr>
</tbody>
</table>
| Following Service Commencement | Our approach to O&M following Service Commencement aligns the Department’s interests with our own to deliver an efficient, safe and reliable transportation system. Elements of our approach will include:  
  - Implementation of Best Practices: Self-performing the work and applying best practices gained from similar tolled O&M contracts will minimize the learning curve and reduce Project cost.  
  - Transparency: At this point in the Project, it is imperative that we carry out established communication and coordination plans for partnering with the Department to ensure a successful Project.  
  - Contingency Planning: We will manage the Project risks and create contingency plans and training that result in rapid response to unexpected operational situations.  
  - Cradle-to-grave Mindset: We will integrate design, construction and O&M inputs while designing assets based on lifecycle considerations resulting in lower O&M contingencies and lower O&M costs thus providing the best value for money for the Department.  
  - Local Jobs: We will hire locally and subcontract certain elements to Disadvantaged Business Enterprises (DBE); Small, Women-owned, and Minority-owned (SWaM) Businesses and specialty firms. |

TABLE 4.3.1-7  Owner Satisfaction

Cintra and Meridiam have received four comprehensive owner evaluations on the LBJ Express and North Tarrant Express projects.

<table>
<thead>
<tr>
<th>Comprehensive Evaluation</th>
<th>Exceptional</th>
<th>Very Good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality/Technical (6 subcategories)*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timeliness (4 subcategories)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost Control (2 subcategories)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business Relations (5 subcategories)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

“I would recommend TxDOT hire this contractor in the future?  
Strongly Agree ✓ | Agree ✓ |  

“Developer made a smooth transition to Operations and Maintenance, due to the highly effective communication skills of the Chief Operations Officer and his staff. COO was consistently responsive and cooperative with TxDOT, the IE, cities within the NTE corridor, and the public. Developer proactively coordinates with adjacent active construction projects...” - Scott Hall, TxDOT Project Manager

“Developer is very good at responding to maintenance/repair items within the allotted response time required...and immediately notifies TxDOT and the IE when repairs are completed. Developer is always available and responds to questions and requests in a timely manner. Cooperation with cities within the NTE Corridor is exemplary.” - Scott Hall, TxDOT Project Manager

“LBJ/G public relations team has done a good job in keeping the traveling public and other stakeholders informed ... They have an efficient system in place for tracking and responding to customer complaints. The maintenance team has provided courtesy patrol services to stranded motorists in a commendable fashion.” - Kenny Krishnan, P.E. - TxDOT Project Manager

* One evaluator did not respond to this category.
4.3.2.1 ROADWAY OPERATIONS

FIGURE 4.3.2.1 Roadway Operations Highlights

100% CCTV COVERAGE OF THE CORRIDOR
20 MINUTE INCIDENT RESPONSE TIME
24/7 FIELD PATROLLER AVAILABILITY

APPROXIMATELY $20 MILLION DEPARTMENT SAVINGS WITH TRANSFER OF EXPRESS LANES WINTER OPERATIONS

24/7 Traffic Operations Center: Our Traffic Operations Center will monitor the corridor, weather and traffic conditions using CCTV, motor vehicle detectors, microwave and bluetooth readers, and support field and courtesy crews while keeping the Department informed.

» 100% CCTV Coverage: A network of full pan-tilt CCTV cameras will provide 100 percent coverage of the roadway and provide remote monitoring from the Traffic Operations Center, allowing us to quickly detect, evaluate and respond efficiently to every kind of incident.

» Road Weather Information Systems: Protocols with weather stations will allow us to receive prompt notifications regarding weather events. Road weather information systems will be deployed to detect fog, ice and flooding, facilitating prompt user alerts and quick response.

» Expedited Response: We commit to 20-minute emergency response from notification of an emergency to dispatching crews. This exceeds VDOT’s Turnkey Asset Maintenance Services 30-minute peak hour requirement.

» 24/7 On-Demand Support: Our staff will be available 24/7 to minimize the impact of incidents. Our field patrollers will offer emergency gasoline, help with tire changes and provide other assistance. SOS phones will be located every quarter mile and a phone line will be monitored 24/7, providing users an efficient way to solicit help.

» Complete Preparation: We will provision emergency trailers with arrow boards, emergency signs, traffic control devices for detours, absorbent materials for minor spills, first-aid kits and safety flares, ensuring that the required equipment and materials will be easily accessible.

» Towing Service: Our patrollers will move incidents or accidents to the nearest shoulder. With consent from the motorist and the Virginia State Police, disabled vehicles will be towed from the scene to suitable “Drop-Sites” near the Project. A “Drop-Site” is any location to which the Developer can tow (and leave) the disabled vehicle, and where the motorist can safely make arrangements.

A. DETECTION AND RESPONSE TO EMERGENCIES, WEATHER, ACCIDENTS, AND INCIDENTS

The primary objective of our Operations Plan is to ensure the safety of the traveling public. This objective is accomplished with our established procedures to continuously improve, mitigate, respond to and recover from events:

» Training and Pre-planning: Our O&M team considers, plans, addresses and trains for all likely natural and manmade events or situations that can become incidents or emergencies.

» Clear Responsibilities: An I-66 Express Lanes-specific Incident Management Plan will identify responsible personnel and describe the process for managing roadway incidents including the required traffic control.

» Communication Channels: Hazardous weather conditions, traffic incidents and other road safety alerts will be displayed on dynamic message signs well in advance of user decision points. Information will also be disseminated via websites and social media networks.
Immediately upon arrival at the scene, we will secure the area around the incident with traffic control measures, eliminate hazards to other road users, and support law enforcement, emergency responders and other agencies. We will maintain traffic control as needed and continue with debris clearing until the emergency is addressed. Immediately after the incident, we will assess the road for damage, make any imminent repairs, and schedule any permanent repairs.

The Project will include a variety of dynamic message signs, vehicle detector sensors, CCTV cameras and control systems. We will implement proven procedures that will enable the Traffic Operations Center to monitor and manage traffic in the Express Lanes, and interface with the Department’s Traffic Management Center to increase the efficiency and safety of the local, regional road and statewide network. Our ETTM system will include incident detection and management to minimize congestion and safety concerns for unplanned events.

**Hazardous Weather**

<table>
<thead>
<tr>
<th>Winter Operations Expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>APPROVED ATC</strong></td>
</tr>
</tbody>
</table>

Mobility Partners to provide winter operations for the Express Lanes. The implementation of this ATC will have two significant advantages for the Department:

- **Direct Cost Savings**: A cost analysis was conducted, taking into consideration the future periodic snow and ice removal costs. The estimated direct savings for the Department are estimated to exceed $20 million over the Operating Period.

- **Risk Allocation**: With this ATC, the Department will be released of the Express Lanes’ snow and ice removal risk. In addition, the Department will avoid any liability arising from damages caused by its contractor during the snow/ice removal operations.

The main components of our winter operations approach include:

- **Winter Preparation**: The preparations for the winter season begin immediately after the previous winter season ends. Equipment will be evaluated through the MMIS and repairs, enhancements or purchases will be scheduled. All the equipment maintenance activities will be complete by the early Fall. Materials required for the forthcoming season will be determined in the Spring to ensure the optimum price, and stock-piled well ahead of the start of winter season. Seasonal maintenance crews will be hired prior to the start of each winter season.

- **Crew Dispatching**: Our Traffic Operations Center will use road cameras and dispatching capabilities to support winter crews. It will also communicate with the Department to exchange information, inform drivers via variable message signs and offer the Department support and resources during extreme events. In advance of any hazardous weather, our expert “storm team” will manage the corridor efficiently and safely throughout the storm. We will conduct after-storm debriefings to discuss incidents and areas of improvement.

- **Brine and Direct Liquid Application**: A liquid salt brine will be used before an anticipated snowfall as an anti-icing measure. This application has proven to increase the performance of solid chemicals and abrasives, improve road surface conditions and allow for safer travel. During the beginning of winter seasons, the Direct Liquid Application (DLA) preparation will be first, as these applications can typically address most early winter events. We will monitor weather and roadway conditions and determine the appropriate application of DLA, according to the Department’s requirements. Defined specifications for vendors and quality assurance audits of anti-icing materials will ensure environmental compliance.

- **Snow and Ice Removal**: Given the limited space on both sides of the Express Lanes and the lack of a physical barrier between the Express lanes and the General Purpose Lanes, snow removal will be planned carefully to ensure efficiency and safety. Our Plow Operators will pile snow removed on the inside shoulder temporarily to minimize the impact on the General Purpose Lanes traffic operations; snow piles on the inside shoulder will be removed timely to ensure Express Lane user safety and to minimize potential impact on WMATA operations.
4.3.2.1 ROADWAY OPERATIONS

B. LIAISING AND HANDLING EMERGENCY SERVICES

This high-speed, high-volume project requires quick and effective incident response to ensure the safety of the traveling public while also properly interfacing with emergency services providers. To incorporate lessons learned and best practices that will enhance the effectiveness of our plans and procedures, we consider existing plans and protocols successfully implemented on other tolling or Express Lanes concessions and modify them appropriately to meet the needs of the Project.

In order to ensure a prompt response to accidents or other events, we propose to centrally locate the O&M Facility and Maintenance Yard along the corridor. Our ATMS will be integrated with local first responders, providing instant notification and shortening the response time. The flow chart depicted in Figure 4.3.2.1-2 outlines specific interfaces between our personnel, the Department and emergency responders.

TABLE 4.3.2.1-1 Notification Procedures

<table>
<thead>
<tr>
<th>Responsible Party</th>
<th>Procedure Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public and Agency Notifications</strong></td>
<td></td>
</tr>
<tr>
<td>Director of Corporate Affairs and Public Information</td>
<td>We will manage traffic control related to an emergency and coordinate with Governmental agencies when the emergency impacts other roads outside the Project. When detour routes are required due to an emergency, and upon notification by the Department or other agencies, we will maintain the portions of the detour route within the Project. In case of possible area evacuations, we will coordinate the preparation along the Project with the Department and Government Agencies.</td>
</tr>
</tbody>
</table>

| **Motorists/Traveling Public Notifications** |
| Maintenance Manager and COO (O&M Manager) | I-66 Express Mobility Partners will use the ATMS and dynamic message signs to provide road users with relevant information including information on behalf of the Virginia Department of Emergency Management (VDEM). Traffic management messages related to the safety of motorists and road workers will be applied within five minutes of the detection and classification of an incident. |

| **VDOT Notifications** |
| COO (O&M Manager) | Incident information including the character and severity of the incident will be entered into VA Traffic within five minutes of an occurrence. We will notify the Department’s designated Contact Person immediately upon occurrence of all major incidents/events and immediately upon road closure for all road closures exceeding one hour. Upon road reopening, we will notify the Department again. |

| **Police/Emergency Personnel Notifications** |
| Incident Response Manager and COO (O&M Manager) | We will coordinate with the Department’s North Regional Office, Traffic Management Centers and other first responder stakeholders to develop incident management plans. All information obtained during an emergency situation will be coordinated through the I-66 Traffic Operations Center until the on-site supervisor arrives at the scene to support law enforcement and emergency services. |
C. TRAFFIC MANAGEMENT AND OPERATION OF ETTM SYSTEMS

Our ETTM procedures will contain protocols for traffic management and Intelligent Transportation System (ITS) operations. The ITS will perform functions within four areas: travel and traffic management, emergency management, information management, and maintenance and construction management.

Operations Systems

MAINTENANCE ONLINE MANAGEMENT SYSTEM

The ITS will be monitored by the Traffic Operations Center and supported by the Maintenance Online Management System (MOMS). MOMS will automatically detect field device failures. Upon detection of a failure, MOMS will automatically create tickets, assign a priority level and alert the Traffic Operations Center. Tickets will be tracked by the Maintenance Manager and the Maintenance Supervisor until the failure is resolved. High-priority tickets will be immediately referred to field technicians.

ADVANCED TRAFFIC MANAGEMENT SYSTEMS

Our Traffic Management Plan will reduce traffic congestion and its negative impacts on motorists. Using CCTV cameras, the Traffic Operations Center will identify congestion spots, dispatch courtesy patrols and implement traffic alleviation procedures to minimize congestion impacts such as stranded motorists, accidents and incidents, and abandoned vehicles. Our Traffic Management Plan will be integrated with our Communications Plan to keep drivers informed about closures, delays and other facts that might impact their travel plans. We will use our Project website, dynamic message signs, opt-in text messaging and social media to share information.

Maximizing Mobility and Throughput

Traffic congestion relief will improve multi-modal mobility of the corridor and maximize person-throughput. To support these objectives:

- We developed ATCs (see 4.2.2.1) to address future traffic demands, increase throughput and improve accessibility to Metro stations and Park & Rides
- We will coordinate strategies with transit providers and Park & Rides such as a marketing campaign that will educate commuters about how Park & Ride vehicles use the Express Lanes for shorter travel times

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D. ACCIDENT ANALYSIS AND IMPROVEMENTS TO USER SAFETY

The Facility Maintenance/Incident Response Manager will lead the O&M team in safety, traffic control and accident analysis shown in Figure 4.3.2.1-3. Continuously improving safety for users is the most important aspect of vehicular accident pattern analysis. The COO, with the support of our Facility Maintenance / Incident Response Manager, will initiate and monitor measures to prevent possible recurrence of incidents. For areas where frequent accidents are occurring, we will construct additional infrastructure such as attenuators, barriers, and warning signs.

Should accidents occur due to user driving habits, we will develop additional safety initiatives to improve user safety. These measures will be implemented, documented and integrated as a distinct module within the Incident Management Plan and will be audited by the Health, Safety, Environmental and Quality Manager as part of our quality and continuous improvement process. Infrastructure elements that have been included to enhance user safety are shown in Figure 4.3.2.1-4.

E. APPROACH TO POLICING THE ROADWAY

As previously described in 4.3.2.1.b, field patrollers and O&M crew members will assist with traffic control during an incident. A network of full pan-tilt CCTV cameras will ensure 100 percent coverage of the roadway and provide remote monitoring from the Traffic Operations Center, allowing us to quickly detect, evaluate and respond efficiently to every kind of incident and preserve the safest conditions possible on the roadway.

Our ATMS unifies traffic operations and simplifies system use by combining control of incidents, alarms, and other situations along with response plans into a single interface. The “Automatic Incident Response” feature provides visual confirmation of incidents by location, queuing of commands with a multi-level priority scheme for implementation of multiple, simultaneously active plans, and automatic or manual e-mail and SMS notification integration to maximize our efficiency when policing the roadway.

Additionally, our Traffic Operations Center will be equipped with an incident response system that is integrated with the local first responders’ systems. The system will automatically notify Traffic Operations Center personnel when first responders have activity within the corridor, and reversely, it will notify local authorities if I-66 Express Mobility Partners has an incident.

**FIGURE 4.3.2.1-3** Vehicular Accident Pattern Analysis

1. **IDENTIFY**
   - Report incident with details in Incident Log

2. **ANALYZE**
   - Evaluate cause and severity (near misses, low or high consequences)
   - Classify as “minor,” “major” or “critical”

3. **MITIGATE**
   - Provide remedial and preventative measures

4. **MONITOR**
   - Conduct safety audits
   - Apply best practices
   - Record effectiveness of solution

**FIGURE 4.3.2.1-4** Traffic Control Center
Enhancing User Safety

**Accident Investigation and Prevention (AIP) Studies and Wet Accident Reduction**

Lessons learned from accident investigation and prevention (AIP) studies have been implemented to offer significant safety benefits. AIPs will be implemented to analyze changing traffic conditions during the concession term. Based on the historic number of accidents along the facility, I-66 Express Mobility Partners has already started this process by identifying “hot spots” such as weaving areas before the Express Lanes exits or after the entrance ramps. In addition, we will implement a Wet Accident Reduction Program to improve safety during wet conditions by identifying locations with known high occurrences of wet accidents. Friction testing at these locations will allow us to take necessary short- and long-term measures to improve friction on sections that may not offer adequate friction during wet conditions.

**Exit: Chain Bridge Road**

**Oakton Post Office**

**Oak Marr Golf Complex**

**Fairfax County Courthouse**

**US General Services Administration (GSA)**

**Smart Cushion Attenuators**

To improve safety at complicated interchanges, we will install Smart Cushion Attenuators at exit ramps against the traditional REACTs and SHORT-TRACCs attenuators. During peak hours, the I-495 General Purpose Lanes are congested, causing traffic on the extended roadway network. Slower traffic can cause motorists to decelerate suddenly, causing an incident. Smart Cushion Attenuators absorb crash impacts better and contribute to less impact force on vehicle occupants and reduced risk of injury.

**Impact Reduction:** They reduce the severity of incidents by absorbing crash impacts.

**Ease of Maintenance:** These attenuators require 30-45 minutes to repair and restore which is significantly less than the three hours required to repair and restore other attenuators, resulting in a reduced impact to traffic during repairs.

**Wayfinding Signage**

To exceed the signage requirements, we will design, install and update signage along the corridor that eases navigability for users and provides supplementary wayfinding signage. Wayfinding signage will be installed well before entering the Express Lanes to clearly direct travelers. Once in the Express Lanes, additional signage (with destination information and major cross streets) will help guide drivers towards appropriate exits from the Express Lanes system. A slightly modified graphic language and signage will be used for the Express Lanes from the style used for the General Purpose Lanes to facilitate navigability and build trust with drivers. We will supplement our signage package with wayfinding signs that identify critical roadways connecting to I-66, points of interest, commercial/entertainment venues, critical facilities, such as fire stations and hospitals, and academic institutions. In addition, potential opportunities for temporary or changeable special event/marketing signage will be identified and implemented.

**Enhanced Clarity and Navigability:** The supplemental signage with destination information will provide better wayfinding to drivers while minimizing information overload and confusing signage using a staggered signage approach.

**Improved Customer Service:** Our signage approach will contribute to improving the Department’s brand identity and providing travelers with a memorable experience.

**Pavement Striping**

**Rumble Strips**

Drivers using exit ramps throughout the corridor will be required to considerably decelerate as they approach an intersection’s traffic light. The ramp design takes into consideration this deceleration and provides more than sufficient stopping distances. To enhance user safety and reduce safety risks, I-66 Express Mobility Partners will also install rumble strips immediately after exiting the Express Lanes and another before the traffic light. (The eastbound Express Lanes exit ramp at Chain Bridge Road is a sample location.)

**Incident Mitigation:** Rumble Strips will warn users of upcoming traffic lights and help them safely decelerate, minimizing collisions at the interchange.

**Wrong Way Detection System**

Vehicles wrongly entering roadway exit ramps is one of the most serious traffic hazards on urban roadways. Studies have shown that installing wrong way vehicle detection systems can help turn more than 67 percent of drivers around before they enter the roadway. I-66 Express Mobility partners will install wrong way detection systems at all exit ramps (the eastbound Express Lanes exit ramp at Chain Bridge Road is a sample location). The system will include radar detectors, flashing beacons, audible alerts, CCTV Cameras and small dynamic message signs to complement standard signage.

**Incident Mitigation:** The system avoids safety incidents.

**Early Detection and Resolution:** The system enables early detection of wrong way entrants and helps in prompt rectification of the issue.
4.3.2.2 EXPRESS LANES TOLLING OPERATIONS

A. DESCRIPTION OF THE EXPRESS LANES TOLLING OPERATIONS

I-66 Express Mobility Partners’ tolling operations focuses on two primary components: customer service and the technical O&M activities required for the tolling system. By elevating customer service to the top of our priorities during the Operating Period, our technical O&M activities will be driven by the motivation to enhance the customer experience.

Based on our relevant previous experience, our team members have perfected each of these components, which will result in a tolling operations program that maximizes system performance and focuses on the user-experience. We understand that we need to earn each customers’ business by supplying safe, convenient, time-definite travel and rapid follow-up service when needed.

Approach to Customer Service

To achieve our goal of developing the I-66 corridor as the most technologically advanced roadway in the world, I-66 Express Mobility Partners commits to delivering world-class customer service. Congestion will be managed, the roadway and its systems will be properly maintained, and the number of HOV and toll violations will be reduced and readily resolved.

Our commitment to customer service extends to all elements of the customer experience and includes:

» $500,000 dedicated to customer service enhancements during the first five years of operations
» Effective and traveler-friendly corridor layout
» Third-party customer service benchmarking
» Violation prevention and multiple payment options
» Customer-friendly violation processes
» Call center best practices, Omni-Channel benchmarking, customer service performance tracing and training

CUSTOMER SERVICE BENCHMARKING

I-66 Express Mobility Partners will use customer service benchmarking to monitor and improve customer satisfaction. It will include over-the-phone surveys performed by an independent third party to learn customer preferences and areas of improvement. The benchmarking data will influence how we choose to spend the $500,000 that has been dedicated to improve customer service and relationships. The results will help determine the root causes of any variances identified and create action plans to resolve the variance.

FIGURE 4.3.2.2-1 High Levels of Customer Satisfaction

We are committed to achieving industry-leading customer experience levels on the Project by integrating the unique aspects that make the 407ETR, North Tarrant Express, LBJ Express and many others so successful.

407ETR Customer Benchmarking Results

Customer Satisfaction (very satisfied %)

First Contact Resolution %

North Tarrant Express and LBJ Express

Would you say that your impression of the road itself (ML+GPLL) is Favorable or Unfavorable?

NTE: % Favorable

LBJ: % Favorable
PREVENTING VIOLATIONS THROUGH OUTREACH
I-66 Express Mobility Partners will implement a proactive outreach initiative to educate and communicate with customers, advising them of how modern tolling systems work and how to avoid violations issues. Potential outreach efforts that will be performed are shown in Figure 4.3.2.2-2. The Project website will also provide relevant information about the tolling system, costs, routes, and customer service outlets in addition to payment and account management services. I-66 Express Mobility Partners will combine our outreach efforts with a fair approach to toll violations, striving to reduce the occurrence of violations and resolve violations in a convenient manner.

FIGURE 4.3.2.2-2 Potential Outreach Efforts
Proactive Outreach Methods to Educate Customers
» Email Blasts
» Open Houses / Tele-Town Halls
» Social Media
» Direct Mailers / Newsletters
» Press releases
» In-person Briefings
» Guest spots on news programs
» Telephone Hotline
» Corporate social responsibility projects
» Memberships in Chambers of Commerce
» Participation in community organizations

VIOLATION RESOLUTION AND ACCESS TO PAY
We will focus on making the collection process easy for the customer through a payment channel which focuses on easy ways to pay violations for the unbanked and underbanked. This will reduce the collections burden on customers without a debit account, or little to no credit, among other financial challenges. Barring any inability to come to terms with the patent holder or other legal obstacle, the payment channel we will offer will provide proven collection techniques like carrier billing through cell phone providers or at pay-in-person locations like grocery stores or other multi-site retail outlets. This will allow customers to make payments for their tolls violations prior to initiating the collections process. We will integrate this payment channel into the Central System (See 4.2.2.7) and connect it to the Department’s system.

LONG-TERM PARTNERSHIP
We propose to operate this feature for five years from the start of operations. We can also support the Department to offer this payment channel to its other tollroads in Virginia.

Supporting Financial Hardship
According to the Pew Research Center in 2013, 6.5 percent of adult Virginians were classified as unbanked (increasing from 4.8 percent in 2009), another 19 percent underbanked (increasing from 15.8 percent in 2009), and over 12 percent had exceeded their credit limit, yet 92 percent still have cell phones. By capitalizing on high levels of cell phone market penetration, customers could pay via alternate locations or a carrier billing option.

Cintra implements a Financial Hardship Program on the 407 ETR for qualifying customers who are in Plate Denial and owe in excess of $1,000. This program is available to those who cannot afford to pay their outstanding charges in full, are experiencing financial difficulties and require plate renewal. The program provides an opportunity to renew plates sooner through initiating a payment plan in which unpaid toll balances are typically paid within 18 months.

IMPROVED COLLECTION PROCESS
We commit to reduce the number of travelers that reach collections and to simplify the collections process for the violator. Our process includes beneficial features for the customer such as making payment easier for those without credit cards. Upon reaching the end of the third-party collection cycle, we will issue a summons for each violator per Virginia law. The number and frequency of violations served will be in accordance with industry best practices and designed not to overburden the courts.

REQUIREMENT EXCEEDED
As an alternative (if approved by the Department), I-66 Express Mobility Partners will hire justices to proceed over group violation hearings at its own expense with on-site collections agents willing to negotiate final amounts owed prior to adjudication. These hearings would adhere to Virginia statutes and to best practices used in the toll industry. The resulting benefit to customers and to the court system is fewer judicial resources, and a faster, more convenient adjudication process.
CONFIDENTIAL AND PROPRIETARY INFORMATION REDACTED
Approach to Technical Operations and Maintenance

Further described in section 4.2.2.7, our ETTM system differs from most commercial systems because it was designed by Cintra’s operations and system experts, incorporating lessons learned and best practices from operating Cintra’s concessions worldwide.

As a result, the ETTM system supports a reliable, controlled, customer-focused practice through its functional design. This design solution was developed to effectively manage operations with traceability throughout the entire collection cycle, from acquisition to reconciliation and posting. Our reliable O&M procedures mirror the transaction cycle to:

» Open and operate the Express Lanes with reduced risk
» Operate in a highly predictable manner
» Maintain a high level of uptime
» Provide excellent customer service and a quality driving experience
» Maximize throughput with state-of-the-art technology and continuous improvement

Our procedures for maintaining continuous 24/7 year-round operations and performing maintenance activities are consistent with standard highway management practices, ISO 27000 practices, and the requirements of the Comprehensive Agreement. In addition, each O&M activity will be coordinated with the Department, the Virginia Department of Public Safety, law enforcement and other first responders when needed for O&M activities such as vehicle recovery, clearance services, technical issues, and operational reconciliation in a predictable manner.

TOLLING O&M PROCEDURES

I-66 Express Mobility Partners knows how to plan and implement effective tolling O&M programs that are preventative and focused on the user-experience.

<table>
<thead>
<tr>
<th>Proven Processes and Demonstrated Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our tolling O&amp;M procedures for the Project have been carefully chosen from similar projects that have achieved positive results. Bringing these proven procedures will reduce risk to the Department and customers.</td>
</tr>
<tr>
<td>Our team members have opened similar facilities and understand the importance of opening without customer issues. Applying our experience to the Project will result in reduced likelihood of operational setbacks.</td>
</tr>
</tbody>
</table>

To ensure the high quality delivery of our O&M procedures, we will create and implement a Quality Manual to define the approach and responsibilities. It will include quality procedures to define who, what, when and how; measurement analysis to define continuous improvement measures; and records and audits to verify quality processes. The following describes our procedures, experience and benefits in relation to monitoring system performance, performing O&M service for the Central System and Field Systems.

O&M Procedure: Monitoring Performance

I-66 Express Mobility Partners’ approach to achieving the required toll system performance is to monitor critical components of the delivery with proactive, thorough processes that are built into the heart of the ETTM system. Further described in section G, our operational approach includes four key steps: 1. Design and deploy a compliant ETTM system 2. Maintain the ETTM System 3. Monitor the system continuously to ensure performance 4. Incorporate the data from monitoring the system for continuous improvement

<table>
<thead>
<tr>
<th>Automatic, Proven Approach for System Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our system monitoring approach will ensure that our system is implemented properly, monitored autonomously, and operated by experts that achieve results consistently and improve over time.</td>
</tr>
</tbody>
</table>
4.3.2.2 TOLLING OPERATIONS

O&M Procedure: Central System
Cintra has identified 238 processes related to the operations of the ETTM system. To standardize our approach to operate the Central System on the Project, more than 100 procedures have been created to address these processes, 70 of which have been identified as critical to operations and are ready for the Project. Throughout the Operating Period, these processes and procedures will be used to communicate with the Department to ensure smooth toll operations, accurate transaction reconciliation, and accurate reporting.

Proven Central System and Organization
Our Toll Operations and ITS suborganization has experience working with the Central System from previous express lanes concessions. This means our team will have the procedures in place at the opening of the Project to reduce risk, meaning no surprises for the Department and customers.

Automated Monitoring
Automated monitoring will enhance our team’s performance and allow the Project to advance technologically and operate at full capacity more often. This proven technology will allow our team to identify issues quickly and resolve them to comply with the Comprehensive Agreement.

O&M Procedure: Tolling Field System
ITS and traffic management system elements will be monitored by the Traffic Operations Center and supported by a MOMS. Further explained in 4.3.2.1.c, MOMS will automatically detect failures in field devices.

Upon detection of a failure, MOMS will automatically create tickets, assign a priority level (high, medium or low) to them, and alert the Traffic Operations Center. These tickets are tracked until the failures have been resolved. Our Toll Operations and ITS suborganization (See 4.1.1), as well as the corporate O&M support team, is very familiar with MOMS and the related processes and procedures used to identify, raise, and resolve issues detected. Cintra has successfully implemented and maintained automatic failure detection and alerts using MOMS and Advanced ITS/ETC MOMS on the North Tarrant Expressway and LBJ Express in Dallas, with requirements similar to the Project. Cintra has achieved a 99.99 percent functional availability of its ITS components on its concessions in Texas with the same O&M approach that will be implemented on the Project.

B. LIMITS OF PROPOSED TOLL SEGMENTS
Although tolls will be assigned independently from a toll segment, the Express Lanes will have three toll segments in both directions. The toll segments are the same as the Project segments, shown in Figure 4.3.2.2-5. Each toll segment will have several designated entrance and exit locations, depending on the density of cross streets. (Refer to the Tolling and ETTM Systems Schematics in the Appendix - Proposer’s Schematics for details regarding access points.)
C. LOCATION OF TOLL GANTRIES
There are 25 toll gantries along the corridor. The gantry system was designed to ensure every movement on the Express Lanes is captured at least by one gantry and to provide sufficient flexibility of the toll rates that can be charged. (Refer to the Tolling and ETTM Systems Schematics in the Appendix - Proposer’s Schematics.)

D. DECLARATION ZONE LOCATIONS
The Project will not contain dangerous physical declaration zones on the roadway. Customers will be able to declare their vehicles HOV immediately prior to traveling below a gantry with the E-ZPass Flex transponder. Section F. provides additional information regarding HOV declaration and enforcement.

E. ENFORCEMENT ZONES
There are six one-way enforcement zones (three westbound and three eastbound) and three two-way enforcement zones. (Refer to the Tolling and ETTM Systems Schematics in the Appendix - Proposer’s Schematics.)

F. ENFORCEMENT EQUIPMENT
Our tolling system has been properly designed and will be continuously maintained to provide violation enforcement lights at gantry locations, HOV enforcement zones, and reading of E-ZPass Flex transponders or other similar approved devices. Our HOV enforcement approach includes manual enforcement design to catch violators on the fly and automated systems to allow enforcement of repeated HOV offenders.

Manual HOV Enforcement System
Officer-based visual enforcement, will use downstream, centrally located enforcement zones to maximize an officer’s efficiency and decrease right-of-way usage by providing a single enforcement area for a cluster of tolling points. The Toll Zone will collect the transaction data, including HOV declaration by the customer. For HOV vehicles, the tag ID will be sent downstream to an Enforcement Zone and a visual indication will be given to the officer as the tag is read again. The officer will then use standard enforcement practice to stop the vehicle and access the available HOV transaction information such as location, time, vehicle class, and an image. This will allow the officer to issue a citation for the offense.

Automated HOV Enforcement System
Cintra is currently testing an automated HOV enforcement system in real-time with live traffic on the LBJ Express project. Based upon the results of this pilot, the technology could be implemented on the I-77 project in Charlotte in the near future allowing for a mature system to be deployed on the Project. The Automated HOV Enforcement System helps issue violations to multiple-offense HOV violators. When an offender is added to a multiple-offense HOV violators list, an OCR camera mounted to police vehicles will be able to recognize violators as officers are moving with the traffic. The cameras will search vehicles within the immediate vicinity of the officer’s vehicle, and upon detection of a vehicle that is on the violators list, the officer will be notified of the violator and violations.
G. PERFORMANCE MONITORING

We will maximize toll system performance by monitoring critical components of the system with proactive and thorough processes that are built into the heart of the ETTM system. Our operational approach will ensure that the Express Lanes system and the ETTM system are functioning, accurate and highly reliable with the following measures:

1. Design and Deploy a Compliant System: The design of our system and our toll system integrators will ensure a thorough testing methodology to confirm the toll system can accurately set and collect the tolls, and automatically monitor itself once operational, providing automated system health checks to our Tolling Operations and ITS suborganization.

2. Maintain the System: All devices in the ETTM system will be integrated with and monitored by MOMS, further described in 4.3.2.1.c. MOMS supports automated fault detection and provides alerts to rapidly identify performance issues and alerts our Tolling Operations and ITS suborganization.

3. Monitor Continuously to Ensure Performance: We will establish operational policies and procedures that allow constant data capture and reporting on system performance, allowing quick adjustments to ensure compliance with the performance measures. The ETTM system will automatically measure and report on many performance metrics, including those required by the Comprehensive Agreement.

4. Incorporate the Resulting Feedback: Subject matter experts will review the performance metrics and provide input that allows our Tolling Operations and ITS suborganization to make continuous improvements. This approach will ensure the system is up-to-date with technology advancements.
4.3.2.3 ROUTINE MAINTENANCE

A. MAINTENANCE YARDS AND FACILITIES

Please see section 4.2.2.9, Capital Asset Facilities for the required information.

B. SPECIALIZED EQUIPMENT

TABLE 4.3.2.3-1 Specialized Equipment

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roadway/Landscape Equipment</td>
<td></td>
</tr>
<tr>
<td>Tar Repair – Crack Pro 260</td>
<td>1</td>
</tr>
<tr>
<td>Tractor – Kubota M9540HD-1</td>
<td>1</td>
</tr>
<tr>
<td>Rotary Cutter – John Deere HX15</td>
<td>1</td>
</tr>
<tr>
<td>Gooseneck Trailer Tandem – Dually 205 Tdgn</td>
<td>1</td>
</tr>
<tr>
<td>Street Sweeper – Challenger</td>
<td>1</td>
</tr>
<tr>
<td>Dump Trucks – Frht</td>
<td>2</td>
</tr>
<tr>
<td>Trailer Mounted Z-Boom Genie – TZ-34-2106</td>
<td>1</td>
</tr>
<tr>
<td>Backhoe Case – 580N</td>
<td>1</td>
</tr>
<tr>
<td>Compact Excavator Case – CX55</td>
<td>1</td>
</tr>
<tr>
<td>Compact Track Loader Case – TV380 with Auger Drive Belltec H-300</td>
<td>1</td>
</tr>
<tr>
<td>Cold Planer – Bradco HP600</td>
<td>1</td>
</tr>
<tr>
<td>Hose Kit/Skid Steer Frame – Belltec H-300</td>
<td>1</td>
</tr>
<tr>
<td>Dirt Bit – Belltec</td>
<td>1</td>
</tr>
<tr>
<td>Scrap Grapple Bucket – Bradco</td>
<td>1</td>
</tr>
<tr>
<td>Angle Sweeper Broom – QC</td>
<td>1</td>
</tr>
<tr>
<td>Hydraulic Breaker Stanley – MB05</td>
<td>1</td>
</tr>
<tr>
<td>MIG Welder – Bobcat</td>
<td>1</td>
</tr>
<tr>
<td>Solar Trailer Wanco – Wtlmb</td>
<td>1</td>
</tr>
<tr>
<td>Power Washer Hotsy – Carlson</td>
<td>1</td>
</tr>
<tr>
<td>Traffic Management</td>
<td></td>
</tr>
<tr>
<td>Utility/Sign Trailer (10-foot)</td>
<td>2</td>
</tr>
<tr>
<td>Truck-Mounted Attenuator</td>
<td>2</td>
</tr>
<tr>
<td>Arrow Boards (Pull Type) Diesel</td>
<td>3</td>
</tr>
<tr>
<td>Dynamic Message Board</td>
<td>2</td>
</tr>
<tr>
<td>Skid Steer Post Hole Digger, 12-inch</td>
<td>1</td>
</tr>
<tr>
<td>Maintenance Crew/Facility</td>
<td></td>
</tr>
<tr>
<td>Pickup Trucks – Ford F-150, F-250, F-350</td>
<td>6</td>
</tr>
<tr>
<td>Fiber Tester and Fiber Splicing Kit</td>
<td>1</td>
</tr>
<tr>
<td>Vibratory Tam</td>
<td>1</td>
</tr>
<tr>
<td>Winter/Snow</td>
<td></td>
</tr>
<tr>
<td>Dump Truck and Spreader – 2013 Ford F-750</td>
<td>1</td>
</tr>
<tr>
<td>Combination Spreader/Plower + Truck</td>
<td>4</td>
</tr>
<tr>
<td>Plow – Monroe MP36R10-ISCT</td>
<td>2</td>
</tr>
<tr>
<td>Spreader for ice on the roadway</td>
<td>1</td>
</tr>
</tbody>
</table>

FIGURE 4.3.2.3-1 Routine Maintenance Highlights

C. SUPPLY MANAGEMENT AND SPARE PARTS

I-66 Express Mobility Partners will carefully monitor and plan inventory to ensure the maintenance facility is fully stocked with spare parts and materials required for immediate repair of defects that could impact user safety. The inventory will include at a minimum: attenuator parts, guardrail spares, ITS components, signage and other equipment. Our advanced MMIS software will be used to develop and maintain a continuously updated spare parts inventory. It will include detailed information for each element including serial number, name, date of installation, historic and current maintenance records, nomenclature, location, available spare part quantities and other useful data. The MMIS will record asset locations using a Geographic Information System (GIS) to efficiently establish and manage the supply of spare parts.

D. TRAFFIC MANAGEMENT DURING MAINTENANCE

We will develop and implement a Traffic Management Plan, under the O&M Plan to ensure effective traffic control and management during maintenance work. The Traffic Management Plan will detail phasing, traffic control methods, anticipated lane shifts, closures, travel demand strategies and the impact on access.
The Traffic Management Plan will include cyclical self-monitoring and performance analysis to identify areas of improvement. Knowledge gained during the Design-Build phase will be applied during the Operating Period. Specific objectives of the plan include:

» **Safety of motorists, pedestrians and bicyclists:**
  The safety of users, pedestrians, bicyclists and workers will be paramount to effective maintenance work. We will maintain access for public safety vehicles and emergency routes throughout the corridor. Our 24/7 courtesy patrollers will be on-site and able to respond to incidents within 20 minutes. In areas with complex traffic management and/or a high rate of accidents, courtesy patrollers will be staged adjacent to these areas to further improve roadway safety.

» **Scheduling closures:** We will schedule lane closures in compliance with the Technical Requirements. Maintenance activities requiring traffic control will be performed during off-peak times, including during the night, to ensure minimal impact to users. A staggered maintenance work schedule will facilitate better coordination of maintenance activities with the Department and other authorities, which will result in minimal delays and discomfort to users.

» **Stakeholders and adjacent properties:** The Traffic Management Plan will be integrated with the Communications Plan to ensure protocols are established for keeping stakeholders and users aware of maintenance activities. We will avoid ramp closures at consecutive intersections and avoid lane closures during holidays or special events to further minimize disruption. We will ensure maintenance work that could potentially impact an adjacent property is addressed to deliver the lowest impact and keep access available at all times.

### E. INSPECTION / TESTING

Inspections will be governed by our Inspection and Test Plan, which is a component of the Maintenance Management Plan. After periods of inclement weather or other events that may cause accelerated deterioration, we will intensify the inspection patrols.

Inspections will be integrated in to the MMIS to coordinate the inspection activities, identify and categorize the defects, schedule maintenance repairs, track progress and thoroughly monitor asset condition on a continual basis. The MMIS, through a combination of planned maintenance tasks and a robust inspection regimen, will help to monitor and maintain asset performance effectively.

#### FIGURE 4.3.2.3-2 Types of Inspections (at a minimum)

- **Daily Inspections**
  - We will perform visual inspections from daily roadway inspection routes.

- **Monthly and Semi-Annual Inspections**
  - We will assign teams responsible for inspecting roadway elements, such as randomly selected auditable sections and drainage inspections.

- **Detailed Inspections**
  - The Facility Maintenance Manager will perform inspections of Project elements such as pipes and channels, pavement markings, and walls on a monthly basis.

- **Quarterly Audit Inspections**
  - The Facility Maintenance Manager and, at least annually, the Specialist Inspector will inspect the auditable sections that are randomly selected.

- **Specialist Inspections**
  - Specialists will be engaged for certain inspections performed on structures and bridges (using National Bridge Inspection System), electrical (signs/communications) and roadway (pavement condition using automated survey equipment).

- **Connected Maintenance Vehicles**
  - Connected maintenance vehicles will be capable of identifying regions of pavement that require immediate maintenance, observing trends in pavement conditions and comparing road surfaces for statistical/quantitative assessment.

#### Condition Monitoring and Inspections

The Cintra-led 407 Express Toll Route concession spends more than $1 million annually on inspections including rideability, deflectometry and visual inspection of structural members. Additionally, an independent auditor conducts random reviews and confirms the 407 Express Toll Route meets the performance-based requirements of the concession agreement and Ministry of Transportation (MTO) safety standards. Random audits are conducted across an entire section of the highway and reviewed bi-weekly with detailed results reported to the MTO. In 2015, 99.8 percent of independent auditor inspections met technical and safety requirements, as well as 100 percent of bridge inspections.
In addition to our in-house certified inspection specialists, I-66 Express Mobility Partners will hire external certified specialists to perform inspections of roadway pavements, bridge structures and other elements in accordance with the Department's standards and specifications. Inspection Reports submitted to the Department for review will include reports from internal and external specialists to confirm the inspections process is contributing to enhancement of the roadway.

**Innovative Bridge Inspections**

As part of our focus on innovative technology, I-66 Express Mobility Partners will discuss with the Department the benefits of using drones in compliance with FAA regulations to perform bridge inspections. The complex system of bridges along the corridor pose safety challenges and traffic interruptions. The major benefits include:

» Improved safety for inspection personnel
» Reduced impacts to the traveling public
» Enhanced detail with high resolution and infrared images

**Identification, Classification and Rectification of Defects and Failures**

As described earlier in this section, a comprehensive inspection program will be developed and implemented to precisely identify and categorize the O&M defects that may arise during the Operating Period. This will help to monitor the conditions of the diverse infrastructure elements constituting the Project effectively and address the concerns that may arise through a structured maintenance campaign. The identified defects, the reactive maintenance plans developed to resolve the issues and the progress on these planned tasks will be thoroughly recorded and monitored through the MMIS. I-66 Express Mobility Partners will record defects in the MMIS within one day and all other recording requirements will be complete in the MMIS within five days of completion or occurrence of the relevant activity.
F. AS-BUILT, INSPECTIONS AND MAINTENANCE RECORDS
The MMIS will serve as the single software system for maintaining accurate as-built records and records of inspections and maintenance activities. The Electronic Document Management System will be incorporated into the MMIS to ensure document control procedures are executed. Further, all results of the inspections mentioned previously will be recorded in the MMIS. As-built DGN drawing files will be incorporated into the MMIS and linked with geospatial information to provide precise detail about each infrastructure element.

G. TRAINING PROGRAM
A Project-specific training program will be required for all operations and maintenance personnel. The training program will cover topics for different positions, including procedures and operations related to job-specific tasks, equipment and software, environmental management, safety and quality. Training will be required for both direct hire and subcontractor personnel. Specialist training will be provided for personnel conducting inspections and severe weather/emergency response.

Our O&M personnel will attend an annual training workshop for all concessions operated across North America, Europe and around the globe. This will result in an effective transfer of lessons learned and best practices from other similar tolled infrastructure projects. The workshop will focus on knowledge sharing, information exchange and innovative idea generation. Together, personnel will develop action plans for implementing industry best management practices.

H. CONSTRUCTION TO MAINTENANCE TRANSITION
Our approach to transitioning from construction to maintenance will ensure:
- A smooth transition to maintenance activities while minimizing disruptions to roadway users
- Continuous and safe operations of the Project
- Compliance with I-66 Express Mobility Partners’ obligations
- Coordination of efforts with neighboring transportation facilities
- A clear maintenance strategy that maintains the serviceability of the Project

FIGURE 4.3.2.3-4  Example MMIS Linked with Geospatial Information
Leadership continuity across phases will ensure that a long-term perspective is applied to the Project at both the corporate and individual level. By incorporating O&M personnel during the Design-Build phase, we will ensure that O&M concerns are addressed during design and construction.

A Transition and Coordination Plan will be developed and implemented to streamline the transition process. Elements of this plan include:

- **Coordination with VDOT O&M Personnel**: Coordination meetings will be held prior to Service Commencement to define a transition timeline, discuss the Asset Condition Survey and perform a joint review of maintenance responsibilities.

- **Coordination with Emergency Responders**: We will schedule meetings with all towns/cities along the Project and emergency responders to inform them of the transition, and provide our 24-hour contact number. The Department’s participation will ensure coordination of all parties.

- **O&M Facility**: A fully-operational O&M Facility will be established prior to Service Commencement. All equipment will be procured in advance including trailers, tractors and trucks, among others.

- **Training**: Our O&M personnel will complete training before Service Commencement which will include emergency response procedures, incident management, environmental and safety training, and classes on our standard operating procedures. The maintenance personnel will be closely monitored during the first few weeks of work to provide on-the-job training.

- **Contractors**: We will finalize contracts with local contractors to perform the maintenance tasks which will not be performed in-house.

### I. PLAN AND APPROACH TO MAINTENANCE ACTIVITIES

Our overall maintenance goal is proper maintenance of each component, cost efficiency extending the useful life, and ensuring that all assets meet technical performance and Handback requirements. This will be accomplished with coordinated routine maintenance plans and renewal plans.

### Routine Maintenance

**Requirement Exceeded**

I-66 Express Mobility Partners will set more stringent standards for routine maintenance than what is required in Attachment 4.5 and the Department’s Maintenance Rating Program (MRP). This will enable our team to provide an increased level of maintenance service that will never be less than the baseline requirements. It will also ensure smooth operations of the roadway and ensure all performance requirements are met. Aspects of routine maintenance that will include more stringent standards include:

- Roadway Maintenance
- Slopes and Vegetation Maintenance
- Litter and Debris Control
- Storm water and Drainage Repairs
- Bridges Routine Service Repairs
- Information Technology Systems
- Lighting and Electrical
- Traffic Guidance
- Roadway Safety Components
- Buildings Ordinary Maintenance

### Lifecycle Maintenance/Major Maintenance

A clearly delineated Life Cycle Maintenance Plan will be implemented as a key aspect of successful operational performance of the roadway and approach to improving residual life and meeting Handback requirements. Custom renewal plans will be developed for diverse infrastructure elements dependent on anticipated useful life and asset condition (newly constructed, existing or reconstructed). Refer to section 4.3.2.4 for more information on our Life Cycle Maintenance Plan.

### Recycling Program to Benefit the Environment

I-66 Express Mobility Partners will implement a recycling program for debris picked up from the Express Lanes, such as tires and metal; as well as waste generated from maintenance activities, such as concrete, asphalt, gravel, rigid plastics, lumber, metals, plastic, etc. This recycling and reuse of materials can yield economic and significant environmental benefits.
J. MAINTENANCE MANAGEMENT INFORMATION SYSTEM (MMIS)

FIGURE 4.3.2.3-5  Key Features of the Maintenance Management Information System

<table>
<thead>
<tr>
<th>ASSET MANAGEMENT SYSTEM</th>
</tr>
</thead>
</table>

The MMIS coupled with Cintra’s cost management system, Toll Highway Operating and Reporting System (THORS), will serve as the backbone of our asset management system. In addition to the MMIS described below, THORS will capture historic maintenance activities and provide benchmarking cost and repair data from Cintra’s similar global tolled concessions all around the world, resulting in more accurate work plans and budgets.

- **INVENTORY MANAGEMENT**
  - Integrated infrastructure and equipment inventory module for simplified tracking
  - Tracks physical features of capital assets (area, material, etc.) that require maintenance
  - Tracks equipment that require maintenance (control center, roadside, communications, spare parts, etc.)

- **MAINTENANCE TASKS/FREQUENCY**
  - Tracks maintenance tasks for a particular asset in comparison to the performance requirements
  - For emergency work orders, the tasks and their durations will be assessed based upon the problem occurring
  - For equipment and software, the manufacturer’s service manual will be followed for tasks and frequency

- **WORK SCHEDULE**
  - Lists all quarterly maintenance requirements with annual and five-year work plans for each asset
  - Used to identify work load peaks and valleys, where balancing, overtime and/or part-time help is needed
  - Serves as a basis for preparing and issuing scheduled work orders and for preparing the maintenance budget

- **WORKLOAD BALANCING**
  - Reduces the extreme demands of personnel and provides a more even work load
  - Results in efficient use of human resources, reduced administrative paperwork and improved efficiency
  - Options include shifting work to non-peak periods and assigning part-time personnel for peak periods

- **WORK ORDERS**
  - Provide information on what, where, when, how long and by whom maintenance is to be carried out
  - Prepared from inventory data (physical features) and task
  - Coordinates inspections, categorizes defects, schedules repairs, tracks progress and monitors asset condition

- **MAINTENANCE BUDGET**
  - Collects labor, equipment and material costs to complete all work identified in the work schedule
  - Monitors the actual expenditures against the budget for the year
  - Updated yearly using forecast labor rates and material and service contract costs

- **RELIABILITY AND MAINTAINABILITY**
  - Summarizes cost and maintenance activities of equipment to determine reliability and maintainability
  - Analyzes the annual and five-year maintenance costs and repair history to identify any potential defects
  - Organizes vendors to resolve any issues related to reliability and maintainability

- **REAL-TIME TRAFFIC INFORMATION**
  - Collects traffic data to monitor traffic patterns and predict traffic events
  - Shares data with the Department to analyze traffic growth, and to plan for future transportation improvements
  - Assists the Department to schedule routine and major maintenance campaigns for the General Purpose Lanes

Successfull planning and execution of routine and renewal maintenance work.
4.3.2.4 MAINTENANCE WORK

Our approach to maintenance work is described in section 4.3.2.3. The following addresses our approach to developing a Life Cycle Maintenance Plan and Major Maintenance to be undertaken during the Term to ensure Handback requirements are met.

A. HANDBACK REQUIREMENTS

At the completion of the Operating Period, I-66 Express Mobility Partners will provide the Department with a functional system with all assets having a remaining service life of 30 years. This will be accomplished by ensuring durability of the asset during the design phase when the COO will be co-located with the Design-Build team to maximize durability for the pavement, structures and drainage elements. During the Operating Period, crews and field patrollers will complete daily inspections that address the durability of the entire roadway.

To accomplish an upgraded Express Lanes and General Purpose Lanes at Handback with an enhanced residual life, we will implement a robust Handback Maintenance Works Program to ensure the asset is returned to the Department in a safe and operable condition, and exceeds the Technical Requirements. Our detailed approach to Handback maintenance activities is shown in Table 4.3.2.4-1.

Further, our Residual Life Methodology Plan will be submitted to the Department before the end of the Operating Period, and Residual Life Inspections and Testing will be conducted within the last five years of the concession term.

### Table 4.3.2.4-1 Handback Maintenance Works Program

<table>
<thead>
<tr>
<th>Element</th>
<th>Work Treatments</th>
<th>Years</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavement</td>
<td>Complete reconstruction of the main lanes and shoulders</td>
<td>2060-2066</td>
<td>Renews functional characteristics and provides a remaining life of 30 years</td>
</tr>
<tr>
<td>General Purpose Lanes</td>
<td>Pavement resurfacing of the main lanes and shoulders</td>
<td>2064-2066</td>
<td>10-year remaining service life</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ensures renewed functional characteristics</td>
</tr>
<tr>
<td>Structures</td>
<td>Full deck replacement and repainting</td>
<td>2062-2066</td>
<td>Renewed structural and functional capacity</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Smooth surface with reduced road noise and enhanced skid resistance</td>
</tr>
<tr>
<td>Bridge Decks (Express Lanes Structures and Shared Structures)</td>
<td>Total replacement</td>
<td>2062-2066</td>
<td>Prevents water and debris from infiltration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Provides smooth and safe riding surface</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Restores superstructure support system</td>
</tr>
<tr>
<td>Miscellaneous Structures</td>
<td>Beam and concrete repairs</td>
<td>2062-2066</td>
<td>Improved service life</td>
</tr>
<tr>
<td>Retaining Walls</td>
<td>MSE wall restoration</td>
<td>2065-2066</td>
<td>Improved service life</td>
</tr>
<tr>
<td>Drainage</td>
<td>Culvert repairs</td>
<td>2065-2066</td>
<td>Prevents drainage deterioration</td>
</tr>
<tr>
<td>Road Assets</td>
<td>Complete refurbishment or replacement and incorporation of new technologies and materials</td>
<td>2066</td>
<td>Improved residual life</td>
</tr>
</tbody>
</table>
A comprehensive transition plan and a set of maintenance conditions for the various infrastructure elements will guide the maintenance team to ensure residual life and Handback requirements are met.

B. PRELIMINARY LIFE CYCLE MAINTENANCE PLAN

I-66 Express Mobility Partners will leverage its experience with similar Life Cycle Maintenance Plans and incorporate lessons learned into the formulation of the Life Cycle Maintenance Plan. It will be updated annually with scheduled tasks to reflect and address inspection report findings. The Life Cycle Maintenance Plan will illustrate the detailed processes for major maintenance and will form the basis for repairing, replacing, renovating all assets and components of the Project. Table 4.3.2.4-2 outlines I-66 Express Mobility Partners’ preliminary Life Cycle Maintenance Plan describing Major Maintenance to be undertaken.

<table>
<thead>
<tr>
<th>TABLE 4.3.2.4-2</th>
<th>Preliminary Life Cycle Maintenance Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Element</strong></td>
<td><strong>What</strong></td>
</tr>
<tr>
<td>Pavement</td>
<td>Wearing course renewal</td>
</tr>
<tr>
<td></td>
<td>Provisional mill and replacement of intermediate HMA course</td>
</tr>
<tr>
<td>Bridge Deck</td>
<td>1. Diamond grinding*</td>
</tr>
<tr>
<td></td>
<td>2. Concrete deck sealing*</td>
</tr>
<tr>
<td>Bridge Expansion Joints</td>
<td>Joint resealing/ replacement*</td>
</tr>
<tr>
<td>Bridge Bearings</td>
<td>Replace bearing components*</td>
</tr>
<tr>
<td>Miscellaneous Structural Elements</td>
<td>1. Beam repair</td>
</tr>
<tr>
<td></td>
<td>2. Slab repair*</td>
</tr>
<tr>
<td></td>
<td>3. Concrete repairs*</td>
</tr>
<tr>
<td>Retaining Walls</td>
<td>MSE Walls repairs</td>
</tr>
<tr>
<td>Drainage Repair</td>
<td>Culvert Repair</td>
</tr>
<tr>
<td>Road Assets</td>
<td>Signage, Median Lighting, Guardrail, Painting, Maintenance Facility, Attenuators, Other</td>
</tr>
<tr>
<td>ETTM</td>
<td>ETCS, Back Office System, Traffic Management System</td>
</tr>
<tr>
<td></td>
<td>ITS and Network Communication</td>
</tr>
</tbody>
</table>

*higher frequency/quantity of repairs depending on age and condition of structures
4.3.3 OPERATIONS AND QUALITY MANAGEMENT

O&M Quality Management will be established, monitored and maintained through an ISO-compliant Quality Management System that will help ensure compliance with performance criteria. Our operations for the 407ETR, 407 East Extension Phase 1 and Chicago Skyway have achieved ISO 9001 certification.

Our Quality Manager will function independently from the O&M teams and will provide quality assurance for the O&M work. This role will provide ongoing audit and reporting functions on both in-house and subcontracted services. This role will ensure consistency in the delivery of services, customer satisfaction and continuous improvement. Our O&M Quality Management Plan will establish our self-monitoring process for performance of O&M work and will focus on “Right First Time Delivery.”

Our corporate quality management teams will provide an added layer of quality oversight for the Project. They will audit the quality processes in place to verify compliance with the established quality protocols and make any necessary corrections or improvements indicated. We will engage an independent engineering firm to monitor our O&M performance as an additional level of quality control.

A. APPROACH TO OPERATIONS QUALITY MANAGEMENT

Our corporate cultures are one of continuous improvement. Annually, we establish quality objectives at every organizational level that contribute to providing a safe and quality roadway.

---

**TABLE 4.3.3-1** QA/QC Functions

<table>
<thead>
<tr>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality Assurance</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Quality Control</td>
</tr>
</tbody>
</table>
Our Quality Manager reports to the Developer’s P3 Project Manager (CEO) and is fully independent of the production of the work. Our corporate quality management team will also provide oversight to the Project and will conduct annual audits to confirm the quality assurance function is properly implemented in the field.

The Quality Manager will submit monthly reports of the quality and environmental inspections and tests performed, results of inspections and tests, and occurrences and resolution of any non-conformance reports (NCR) to the Department and the independent engineer. Regular, joint review meetings will be held with the Department and the independent engineer to review compliance with the performance requirements including maximizing public safety, reliability and roadway availability. If necessary, we will update O&M plans to achieve project goals.

**TABLE 4.3.3-2  O&M Quality Reports**

<table>
<thead>
<tr>
<th>Report</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incident Reports</td>
<td>The report will identify the nature of the incident, time, date, location, parties involved, and actions taken, and it will include details for any traffic control in place at the time of the incident.</td>
</tr>
<tr>
<td>Non-Conformance Reports (NCR)</td>
<td>Any action observed that fails to meet the required quality standards will be documented with an NCR prepared by the Quality Manager. Resolutions will be proposed by I-66 Express Mobility Partners, submitted to the Department for approval, and tracked until they reach satisfactory resolution. Items will be reviewed for systemic causes, with the root problem corrected. Copies of the NCR and its resolution will be provided to the Department.</td>
</tr>
<tr>
<td>Traffic Reports</td>
<td>Traffic Reports will summarize traffic volumes on a daily, weekly, and monthly basis.</td>
</tr>
<tr>
<td>Maintenance Work Reports</td>
<td>Each maintenance work report will include information on the inspections conducted (date and type), material defects or damage identifies, including the date, infrastructure component, and details of material defect or damage, and the maintenance work completed. A Quality Conformance Summary will be provided to demonstrate the results of the inspection programs, summarize the internal quality audit, and list the non-conformities detected in the quality controls and audits related to O&amp;M activities.</td>
</tr>
</tbody>
</table>

B. APPROACH TO MAINTENANCE QUALITY MANAGEMENT

Similar to operations quality management, the approach to maintenance quality management is based on our continuous improvement program, which is embedded into our corporate culture. Our process requires that our field teams review items identified during maintenance inspections for systemic causes and correction of the root problems. Correction strategies may include training or retraining, adjustment of process and procedures, identification of new sources for materials and other actions as required to effect changes. For maintenance, our quality control function is handled by the Maintenance Manager and shift supervisors. They will assign all work tickets, confirming with the need for the task/proposed solution, and review the quality of the completed work prior to signing and closing the ticket.

Our Maintenance Online Management System will automatically detect failures in field devices, generate repair tickets, assign a priority level (high, medium or low) and alert the Traffic Operations Center. The tickets generated are tracked until the failures have been resolved and closed by a supervisor sign-off.

**O&M Quality Awards**

In 2009, 407 Express Toll Route received the President’s Award for Excellence, granted by IBTTA, considered the highest accolade in the concession industry.

The Federal Highway Administration (FHWA) uses the LBJ Express quality management plan as an example for best practices.
**FORM B-4**

**KEY PERSONNEL RESUME FORM**

**Brief Resume of Key Personnel anticipated for the P3 Project.**

<table>
<thead>
<tr>
<th>a. Name &amp; Title:</th>
<th>Miguel Angel Alonso, Design-Build Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. P3 Project Assignment:</td>
<td>Lead Contractor’s P3 Project Manager</td>
</tr>
<tr>
<td>c. Name of Firm with which you are now associated:</td>
<td>Ferrovial Agroman Canada</td>
</tr>
<tr>
<td>d. Years’ experience: With this Firm</td>
<td>21 Years</td>
</tr>
<tr>
<td></td>
<td>Years With Other Firms</td>
</tr>
<tr>
<td><strong>Ferrovial Agroman Canada – Design-Build Manager (2011 – 2016)</strong></td>
<td></td>
</tr>
<tr>
<td>General responsibilities:</td>
<td>Oversaw the design and construction of 407 East Extension Phase 1 (Toronto, Ontario, Canada $743 M)</td>
</tr>
<tr>
<td>General responsibilities:</td>
<td>Executive in charge of complex transportation infrastructure projects including: M-203 Roadway (Madrid, Spain $66.4 M) Valdemoro West Bypass (Madrid, Spain $33.8 M); Las Rozas bridge (Las Rozas, Spain $9.8 M)</td>
</tr>
<tr>
<td>General responsibilities:</td>
<td>Oversaw the design and construction of complex transportation infrastructure projects including: AP-36 Motorway (Madrid, Spain $504 M); R-4 Ringroad (Madrid, Spain $627 M); and M-45 O’Donnell Axis to N-IV (Madrid, Spain $140 M)</td>
</tr>
<tr>
<td>e. Education:</td>
<td>Universidad Politecnica de Madrid, Spain, BS Civil Engineering, 1994</td>
</tr>
<tr>
<td>f. Active Registration:</td>
<td>Year First Registered/ Discipline/ Registration #: N/A</td>
</tr>
<tr>
<td>g. Document the extent and depth of your experience and qualifications relevant to the P3 Project.</td>
<td></td>
</tr>
</tbody>
</table>

**407 EAST EXTENSION PHASE 1, DBFM, TORONTO, ONTARIO – FERROVIAL AGROMAN CANADA**

**Project Highlights:** 407 East is a 30-year contract DBFM contract for 22 miles of limited access toll highway including new infrastructure (roadway, overpasses and underpasses), reconstruction of existing assets, highway widening, and demolition of existing traffic structures. 407 has similar environmental and urban challenges, including extensive traffic management required. The construction value is $743 M.

**Role:** Design Build Manager (2011-present). Miguel Angel’s responsibilities include planning the proposed work, devising the construction plans, directing and supervising all construction personnel and construction related activities. He directs all segment managers responsible for the structural and roadway components, higher-level discipline managers such as quality, environmental, health and safety, and traffic management and a total workforce of over 700 people. He ensures that the teams adhere to the work schedule and established standards, as well as cost-control and resource management provisions. He oversees all subcontracted work through the respective project managers and chief surveyors responsible.

**Impact on the Project:** Miguel Angel oversaw the relocation of all utilities in the project and the coordination with the Regional Municipality of Durham, City of Pickering, Town of Ajax, Town of Whitby and City of Oshawa, as well as with all utility owners. Miguel Angel manages the environmental management team for the acquisition of all work-specific environmental permits for each watercourse crossing. Watercourse crossings and creek realignments were a major part of this project (approximately 31 of them), since completion of these crossings was a critical constraint to the earthmoving schedule. Another critical component was traffic management, specifically the Highway 401 realignment and new interchange. Miguel Angel, in coordination with his traffic management team, devised and coordinated all traffic controls. He ensured that all lane-closure processes, communications (signage and flag-persons) and safety protocols adhered to the OTM and the traffic management plan. He also oversaw the implementation of a staged approach to the tie-in of the realignment of Highway 401 to accommodate the high traffic volumes and multiple lanes.

**Client reference:** Jeff Stapleton, Senior Project Manager, Infrastructures Ontario (IO) 416.327.9735 jeff.stapleton@infrastructureontario.ca
**AP-36 Motorway, ATALAYA, MADRID, SPAIN – FERROVIAL AGROMAN, SA**

**Project highlights:** 124 miles of toll highway that connects Madrid to the south of the country and is subject to major traffic. There are 10 interchanges distributed all along the Ocaña-La Roda highway. The stretch in which Miguel Angel worked measured 110 miles, approximately 200 structures, four service areas, four rest areas two maintenance and conservation areas and six toll areas. The construction value was $504 M.

**Role:** Project Manager (2005-2007). Miguel Angel was responsible for adapting the construction management plans, determining labor and material requirements, coordinating all subcontractors, and ensuring that the work was carried out in accordance to the plans and client’s criteria. He was responsible for monitoring progress and ensuring that the work adhered to the schedule, as well as drawing up cost-estimates, staffing and reviewing the contractual conditions. Miguel Angel oversaw a construction team comprised of over 400 individuals carrying out self-performed and subcontracted work. His management team included a safety manager, a quality manager, an environmental manager, a project controls manager, a communications manager and segment managers. These individuals had teams of their own who were indirectly overseen by Miguel Angel.

**Impact to the Project:** Traffic management and coordination with adjacent communities was critical as the highway connects the major urban city of Madrid to the south of the country and is subject to major tourist traffic. He oversaw the implementation of complex traffic management plans, which contributed to the success of the project on time and without major traffic disruptions. Miguel Angel also oversaw the implementation of a communications strategy designed to keep the public informed of all construction activities. This strategy included the implementation of signs, radio messages, the creation of public information centers and the establishment of a toll-free line for customer concerns, feedback and/or complaints. Miguel Angel led the successful mitigation of all environmental concerns throughout construction of the highway and successful coordination and consultation with the owner for design optimizations proposed by the design team.

**Client Reference:** Rufino del Rio Aparicio, Director of Spain, Cintra Infraestructures +34.91.4185678 rdelrio@cintra.es

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**Radial 4 (R4) Highway, MADRID, SPAIN – FERROVIAL AGROMAN, SA**

**Project highlights:** The Radial 4 Highway includes 59 miles of limited access highway improving mobility to and from Madrid, Spain. The Radial 4 section was 33 miles of new design and construction. The M50 section was 21 miles of design and construction of three-lane and four-lane segments in high-volume and dense urban area (AADT > 100,000). The construction value was $627 M.

**Role:** Design Build Manager (2001-2005). Miguel Angel led the design and construction of the project including nine major interchanges, 73 underpasses, 80 overpasses and 22 bridges (four million square feet of bridge deck) and an approximately one mile cut-and-cover tunnel. The M50 interchanges are considered some of the largest and most complex interchanges in Europe.

**Impact to the Project:** Ferrovial Agroman performed design and construction in-house with its own technical office staff. The Spanish Institute of Chartered Civil Engineers awarded the project the Acueducto de Segovia award for technical importance, collaboration in urban planning, innovative solutions in environmentally sensitive areas and cooperation with scientific institutions for the protection of the environment and cultural rights. The heavily populated Madrid metropolitan area demanded carefully planned traffic management plans and well organized construction sequencing. Most of the project was constructed in three phases with complex staging required where the alignment intersected or tied into existing roadways and adjacent high-speed railway. Ferrovial developed a unique box-jacking strategy to minimize impacts to existing railways. Utilizing the strategy in two locations, rail traffic along the Madrid-Barcelona railway line was maintained at all times.

**Client Reference:** Jose Angel Tamariz Martel, Chief Executive Officer and President at 407 International 905.264.4489 jtamariz@cintra.es

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h. For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment.

Miguel is an at-will employee, currently serving as DB Manager on 407 East project which achieved substantial completion and is currently in close-out. He is available to the Project as a full-time employee at any time.
**FORM B-4**

**KEY PERSONNEL RESUME FORM**

**Brief Resume of Key Personnel anticipated for the P3 Project.**

<table>
<thead>
<tr>
<th>Name &amp; Title</th>
<th>P3 Project Assignment</th>
<th>Firm Name &amp; Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Javier Gutierrez, VP Asset Management for Cintra US</td>
<td>Developer’s P3 Project Manager</td>
<td>Cintra</td>
</tr>
<tr>
<td><strong>Years’ experience:</strong> With this Firm</td>
<td></td>
<td><strong>Cintra – Vice President, Asset Management (2015 – Present)</strong></td>
</tr>
<tr>
<td>10 Years</td>
<td></td>
<td>Javier oversees the operations and construction of all of Cintra’s North American assets. He also coordinates with the Business Development Department during the procurement phase to organize and develop effective proposals. Javier also ensures that best practices are implemented on all of Cintra’s North American assets and provides strategic planning and support for all of Cintra’s US concessions.</td>
</tr>
<tr>
<td><strong>Cintra – Chief Executive Officer – SH 130 (2010 – 2015)</strong></td>
<td></td>
<td>Javier served as the overall leader for the planning, financing, design, construction and O&amp;M. He was involved throughout the Procurement Phase and continued his leadership through construction, which was completed ahead of schedule.</td>
</tr>
<tr>
<td><strong>Cintra – Chief Executive Officer – AP-36 Highway (2009 – 2010)</strong></td>
<td></td>
<td>Javier managed the overall performance of the commercial and financial aspects of the facility including design, construction and ROW acquisition; management of client and stakeholder relations; and coordination with regulatory agencies to drive environmental improvements.</td>
</tr>
<tr>
<td><strong>Cintra – Chief Operating Officer (O&amp;M Manager) – Indiana Toll Road (2006 – 2009)</strong></td>
<td></td>
<td>Javier was responsible for managing the O&amp;M facility, subcontractors and the equipment and vehicle fleet; overseeing the O&amp;M scope of work; and coordinating with stakeholders and local agencies to ensure safe and effective highway traffic movement.</td>
</tr>
<tr>
<td><strong>Dragados – Planning and Technical Director – AP-7 Highway (2003 – 2005)</strong></td>
<td></td>
<td>Belen was responsible for leading Cintra’s commercial negotiations with Departments of Transportation worldwide during the RFP stage; coordination of the teams involved in the proposal effort (legal, project finance, financial analysis, D&amp;B, and O&amp;M), business strategy, proposal budget, due diligence, risk analysis, quality, schedule and detailed proposal submittal.</td>
</tr>
<tr>
<td><strong>Education:</strong> Name &amp; Location of Institution(s)/Degree(s)/Year/Specialization</td>
<td></td>
<td><strong>IESE Business School (Madrid, Spain) Management Development Program (PDD), 2009</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Instituto de Empresa Business School (Madrid, Spain), Corporate Finance Program, 2005</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>London Business School (London, UK), Corporate Finance Evening Program, 2002-2003</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Universidad Politécnica de Madrid (Madrid, Spain), MS Civil Engineering, 1995</strong></td>
</tr>
<tr>
<td><strong>Active Registration:</strong> Year First Registered/ Discipline/ Registration #:</td>
<td></td>
<td><strong>N/A</strong></td>
</tr>
<tr>
<td><strong>G. Document the extent and depth of your experience and qualifications relevant to the P3 Project.</strong></td>
<td></td>
<td><strong>SH 130 SEGMENTS 5 &amp; 6, DBFOM (REVENUE RISK), AUSTIN, TEXAS – CINTRA</strong></td>
</tr>
<tr>
<td><strong>Project highlights:</strong> Total Project Value: $1.4 billion. The scope involves 40 miles of a new four-lane highway and 17 miles of continuous frontage roads along with 72 bridges, 3 interchanges, and river and railroad crossings. The concession is also responsible for O&amp;M of the newly constructed structures for 50 years. Substantial completion was achieved in October 2012.</td>
<td></td>
<td><strong>Role:</strong> (Chief Executive Officer (2010-2015). Javier’s responsibilities during the Procurement Phase included working closely with the Bid Manager as the project neared Commercial and Financial Close to assure the most successful start to the project. During the Implementation Phase, Javier was the main point of contact with the Sponsors. As a main point of contact, he successfully brought together the various stakeholders to assure the public and communities surrounding the project were satisfied. He also was responsible for assuring the concession’s continued compliance with the Project Agreement. Javier’s leadership was crucial in accomplishing the:**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Completion of acquisition of 300 ROW parcels</td>
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<td></td>
<td></td>
<td>- Completion of construction ahead of schedule</td>
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<tr>
<td></td>
<td></td>
<td>- Implementation of all-electronic open road toll system</td>
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<tr>
<td></td>
<td></td>
<td>- Start-up of the concession company’s O&amp;M function and transition to operations phase (O&amp;M actually began in 2009 while construction was still underway)</td>
</tr>
</tbody>
</table>
Javier was also responsible for all hiring decisions for the consortium and closely monitored the evolution of the project and its financial status, reporting to the Board of Directors. Javier will provide the same leadership on the George Massey Tunnel Replacement to ensure Massey Infrastructure Partners meets the Authority’s expectations.

**Impact on the Project: Successfully interfaces with the client and stakeholders:** During construction, Javier liaised between stakeholders and the lead contractor. Javier directed the concession company staff to analyze potential flood plain issues identified by a municipality and coordinated with TxDOT, and liaised with the lead contractor to address it to the satisfaction of the stakeholders. He also worked closely with TxDOT and FHWA to improve mobility by revising the original highway configuration and adding capacity at key entrance ramps, with no impact on the construction schedule. Javier also established fluid communication with the local cities and counties’ Police, and Fire and Rescue divisions to provide joint services during emergency and accident response situations; with TxDOT to provide a seamless tolling transition between the two adjacent projects SH130 Segments 1-4 and SH130 Segments 5 and 6.

**Client reference:** TxDOT. Beau Buchanan, P.E., Project Manager. Phone: (210) 610-4805, Email: beau.buchanan@txdot.gov

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**AP-36 HIGHWAY (AUTOPISTA MADRID-LEVANTE), DBFOM (REVENUE RISK), MADRID, SPAIN—CINTRA**

**Project highlights:** Total Project Value: $763 million. It consists of three sections each with two lanes in each direction and lengths of 78 miles, 15 miles and 19 miles, respectively. Substantial completion achieved in July 2006.

**Role:** (Chief Executive Officer (2009-2010). Javier was responsible for construction, right-of-way acquisition, finance, administration and stakeholder relations and reported to the concession’s Board of Directors on the project’s status. Javier’s responsibilities also included management of client and stakeholder relations; coordination with regulatory agencies to drive environmental improvements, including replanting native species, improvements to the hydraulic system, and a new program to reduce noise and light pollution.

**Impact on the project: Coordinating with Stakeholders and Local Agencies:** Javier’s role on this project required extensive coordination with the Sponsors and stakeholders to ensure the project addressed all the issues of the community. Javier successfully managed all stakeholders and developed a project approach that successfully addressed the needs of the community.

**Client reference:** Ministry of Public Works and Transport (Government of Spain). Mr. Isidoro Picazo Varela, Director of the Highways Division Albacete. Phone: +34 967 213 882, Email: ibpicazo@fomento.es

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**INDIANA TOLL ROAD, DBFOM (REVENUE RISK), INDIANA, USA—CINTRA**

**Project highlights:** Total Project Value: $4.25 billion. The project involves widening of approximately 16 miles of existing highway from 2+2 to a 3+3 lane limited access facility, reconstruction of 24 bridges and two diamond interchanges, under live traffic, with rail road running parallel to both sides of the project for about 1.2 miles. Additional project components include rehabilitation of existing structures including deck, steel beams, and concrete substructures. O&M scope included, 156 miles, 265 bridges, eight major interchanges, five rest areas, two truck-only parking areas, five maintenance yards and 10 salt silos for winter maintenance accounting for over 90cm of snow per year, managing interfaces with operators of existing adjacent facilities to ensure safe and efficient mobility of traffic on the highway network, implementing ITS systems, and rehabilitation needs for the existing 50+ year old bridge structures.

**Role:** (Operations Director (2006-2009). As the Chief Operating Officer, Javier was responsible for managing the significant O&M scope of work. This included the management of the O&M team during the long and cold winters intensified by nearby Lake Michigan bringing more than 90cm of snow each year. Javier also was responsible for:

- Oversight of the lead contractor’s, Ferrovial Agroman, delivery of the $250 million capacity expansion project.
- O&M of 700+ lane-miles and 250+ structures.
- Capital maintenance of 50+ year old highway.
- Courtesy roadway services/incidence response.
- Management and direction of the in-house and locally- sourced fleet of personnel and equipment

**Client reference:** Indiana Finance Authority. Kendra York, Director, Crowe Horwath LLP (former Public Finance Director of the State of Indiana, Indiana Finance Authority). Phone: (317) 689-5527, Email: Kendra.York@crowehorwath.com

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h. For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment. Javier is an at-will Cintra employee and her current position has no mandatory duration limit. He is available to join the P3 Project as a full-time employee at any time.

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Virginia Department of Transportation
Transform 66 P3 Project
Final RFP Addendum #2 September 12, 2016
### FORM B-4

**KEY PERSONNEL RESUME FORM**

### Brief Resume of Key Personnel anticipated for the P3 Project.

| a. Name & Title: | Michelle Roberts, PE, CCM |
| b. P3 Project Assignment: | Quality Assurance Manager (Lead Quality Manager) |
| c. Name of Firm with which you are now associated: | RK&K, LLP |
| d. Years’ experience: | With this Firm 2 and Years With Other Firms 12 Years |

#### RK&K, LLP - Construction Manager (August 2014-Present):
Supervises Construction Management (CM) and Inspection staff and serves Construction Manager for RK&K on various projects in Northern Virginia. Responsible for QA/QC, staff assignments and all aspects of construction management.

#### ATCS, PLC - Project Controls Manager (January 2014-June 2015):
Responsible for cost estimating, constructability, CPM scheduling, review and analysis. Also responsible for QA/QC, providing field direction to both the inspection team and the contractor, preparing correspondence, managing project budgets, reviewing daily work activities and staffing requirements, running meetings and preparing minutes.

#### Corman Construction, Inc - Project Manager, Estimator, Senior Project Engineer, Project Engineer, Engineer (Jul 2002 – Sept 2012):
Prepared budgets, CPM schedules and managed entry level engineers for multi-million dollar contracts. Worked with the Owner’s team to assure quality workmanship, interacted with superintendents to assist with field technical issues, and supervised engineers on daily activities, planning and scheduling. Provided concrete quality control oversight and monitored erosion and sediment control.

| e. Education: Name & Location of Institution(s)/Degree(s)/Year/Specialization: | Bachelor of Science in Civil Engineering – Tufts University 2002 |
| f. Active Registration: Year First Registered/ Discipline/ Registration #: | Virginia Professional Engineer #45850 ATSSA Intermediate Work Zone Traffic Control (Exp 5/31/19) |
| | District of Columbia Professional Engineer # PE0905941 Flagger (Exp 5/31/19) |
| | Maryland Professional Engineer #39475 VDOT Pavement Markings (Exp 12/31/20) |
| | Certified Construction Manager (CMAA) #3504 VDOT Slurry Surface (Exp 12/31/20) |
| | OSHA 10-hour Safety Training (Issued 9/29/14) VDOT Flagger (3/31/16) |
| | Nuclear Gauge Safety (10/8/17) VDOT Surface Treatment (12/31/20) |
| | GRIT (Exp 10/31/17) VDOT Pavement Marking (12/31/20) |
| | VDOT Deq Erosion and Sediment Control Inspector (Exp 2/26/17) VDOT Hydraulic Cement Concrete Field (12/31/20) |
| | VA DEQ Storm Water Management Program Administrator (Exp 2/6/17) VDOT Asphalt Field I & II (12/31/20) |
| | ACI Concrete Field Technician Level I (Exp 12/4/19) |
| g. Document the extent and depth of your experience and qualifications relevant to the P3 Project. | Michelle is a civil engineer with over 14 years of experience on major civil engineering projects, including interstate roadway and bridge, water/wastewater and sewer projects, performing quality control, quality assurance, construction management and project controls in the Northern Virginia Region. Experience in construction inspection techniques and knowledgeable in VDOT processes for QA and QC on design-build and P3 projects. She is knowledgeable in VDOT standards and specifications, fully VDOT certified and experienced in project controls, contract administration, including schedule review, budget tracking and reporting, FHWA Work Order preparation, and all aspects of Quality Control and Quality Assurance to ensure contractor compliance. |

#### VDOT, I-95 Telegraph Road Interchange Improvement, Alexandria, VA ($236.3 Million)

**Role:** Senior Project Engineer (Nov 2007 – Dec 2009). Responsible for contractor crew’s quality, preparing budgets, project CPM schedules, and managing staff for a contract on interstate I-95/I-495 in Northern VA. She worked with the Owner’s team to ensure quality workmanship, interacted with superintendents to assist with field technical issues, and supervised engineers on daily activities, planning, and scheduling. Michelle performed project buyout for both subcontractors and major material suppliers, including negotiating prices and terms of contracts. She maintained the submittal logs, daily cost, and production logs; reviewed shop drawings for accuracy and compliance with the contract drawings and specifications; coordinated subcontractors and suppliers; developed and maintained the paving and finish grade operations; and scheduled and maintained the daily cost production graphs for structural crews. Michelle developed and maintained a grading spreadsheet that was updated with each grading hold point and
 ensured that all required thicknesses and tolerances were met. This eliminated rework that had previously been a problem due to errors in grade calculations. Addressing the large overruns of excavation quantities, Michelle handled the daily tracking of all additional quantities and working with the Owner’s representatives to review field conditions and agree to quantities to ease the work order process.

**Client reference:** Jalal Masumi, VDOT Project Manager 703-259-2215

**VDOT, Route 1 Tie-In to Woodrow Wilson Bridge and Urban Deck – VA-4, Alexandria, VA ($62.7 Million)**

**Role:** Project Office Engineer (Jan. 2003–Sept. 2004): Michelle was responsible for performing the office engineering task to maintain all project costs and the contractor’s baseline and monthly schedule. Responsibilities included coordinating with subcontractors and suppliers, scheduling, and monitoring erosion and sediment controls. Michelle was assigned to concrete quality control management, and also maintained the submittal log and daily cost and production logs. Michelle reviewed contract documents and provided all relevant information to field crews and superintendents and ensured that all quality requirements were met for each operation. She also composed RFIs/RFCs for contract ambiguities and worked with Owner’s representatives to resolve issues.

**Client reference:** Jalal Masumi, VDOT Project Manager 703-259-2215

**DDOT, Frederick Douglass Bridge South Over Capitol Street Over Anacostia River, Design-Build, Washington, DC ($33.8 Million)**

**Role:** Senior Project Engineer (Sept. 2006-Feb. 2008). Responsible for working with the Owner’s team to ensure quality workmanship, interacting with superintendents to assist with field technical issues, and supervising engineers on daily activities, planning, and scheduling. Michelle also oversaw the Office Engineer and Project Scheduler, and was responsible for maintaining the submittal log and daily cost and production logs, coordinating subcontractors and suppliers, performing cost estimating reports and constructability reviews, and performing scheduling. For the design-build portion, Michelle was responsible for working with the design engineers to develop a design that provided a low cost solution that still met the intent of the contract and minimized any impact to the schedule. Part of this project required the replacement of the existing joints across length of the bridge. The original MOT plans showed closing a lane of traffic at a time and replacing the joints in pieces. A series of weekend closures were proposed that allowed the contractor to replace each joint across the width of the bridge, thus providing a higher quality product, reducing traffic impact to the traveling public by working off peak hours and shortening the overall duration of impact.

**Client reference:** Said Cherifi, said.cherifi@aecom.com

**VDOT Northern Virginia District Wide On-Call Contract IV**

**Role:** Project Manager/Construction Inspection Coordinator (August 2014-June 2016). Responsible for providing CM and inspection staff on a task order basis for various roadway and bridge projects throughout Northern Virginia. Schedules and attends inspector interviews, reviews timesheets for correct charges, and reviews daily reports. Performs QA of RK&K and subconsultant staff and coordinates task orders. Michelle worked with VDOT, the consultant staff and the contractors to make recommendations and solve project issues. Relevant projects:

**VDOT – I-66 Spot Improvements, Section 2 – Arlington/Falls Church, VA:** Construction Inspection Coordinator for this $22.5 million contract to create an auxiliary lane on I-66 Westbound as well as provide various improvements to the road. Responsibilities included management of inspection staff, review of project documentation of construction in the field and coordination with the project team to review field issues and provide VDOT recommendations for resolution.

**Telegraph Road Widening from S. Van Dorn Street to S. Kings Highway, VDOT NOVA District Wide, Fairfax County, VA:** Construction Manager responsible for providing construction management and QA/QC inspection services for this $12M project. Her responsibilities included working closely with the client and contractor; overall administration of contract; providing direction and support for the inspection team on field issues; coordinating and evaluating field changes and plan revisions; coordinating all change management tracking devices; coordination of all utility relocations and issues; and performing schedule and claims analysis.

**Client reference:** Melvin Harvey VDOT Area Construction Engineer 703-259-3234

For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment.

Ms. Roberts is an at-will employee, currently serving as a Project Manager in RK&K’s CM and inspection group. Her current assignments include oversight of RK&K’s CM and inspection contracts and 30 CM and inspection staff in NOVA. She is available full time for this project beginning October 1, 2016.

**Exchange rate:** 1 EUR = 1.1063 USD and 1 CAD = 0.76485 USD (June 28, 2016)
FORM B-4

KEY PERSONNEL RESUME FORM

**Brief Resume of Key Personnel anticipated for the P3 Project.**

<table>
<thead>
<tr>
<th>a. Name &amp; Title:</th>
<th>Thomas Heil, P.E., Design-Build Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. P3 Project Assignment:</td>
<td>Responsible Charge Engineer</td>
</tr>
<tr>
<td>c. Name of Firm with which you are now associated:</td>
<td>Allan Myers (Myers)</td>
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<tr>
<td>d. Years’ experience:</td>
<td>With this Firm 3 and Years With Other Firms 26 Years</td>
</tr>
</tbody>
</table>

**Allan Myers – Design Manager (2012-Present)**

Thomas leads Myers’ DB efforts from pursuits to receipt of “approved for construction” plans and transitions projects into construction. For some projects (Walney Road and Rolling Road) he serves as DBPM and will continue providing oversight and management through construction close-out. He works closely with the designer of record, construction personnel, and estimators to ensure schedule commitment and budget compliance, design consistency with the project’s contractual/technical requirements, contract administration and QA/QC management through coordination and oversight of the QAM, CM and QM construction manager.

**RK&K – Director, Transportation (2008-2012)**

Thomas managed RK&K’s Fairfax office which served the transportation needs of VDOT, NOVA counties, cities, and other local, state and federal clients. His responsibilities included client coordination, design plan development, resolving design/project challenges, stakeholder coordination/outreach and ensuring all pre-construction work products met strict client quality standards and guidelines. Of note, he served as Project Manager and primary client liaison for the VDOT L&K and Traffic Engineering and FCDOT Planning and Design On-call. He and his team completed many VDOT NOVA projects including Route 7 TCL PE design requiring coordination with FHWA, NVRPA and Loudoun County/Leesburg and Vienna Metro Access PE Study requiring coordination with Fairfax Board of Supervisor, FCDOT, WMATA and local stakeholders.

**RK&K – Environmental Associate (2002-2008)**

Thomas was responsible for company-wide environmental support, serving as the environmental subject matter expert and preparing/supporting NEPA documents (CE’s, EA’s and EIS’s) and environmental permitting efforts throughout the company. As an example, his team worked in support of DelDOT in the preparation/approval of the Wilmington Waterfront and Indian River Environmental Assessments.


See Woodrow Wilson Bridge and Interchange Reconstruction project in section g below.

**RK&K – Project Engineer (1993-1997)**

Thomas was responsible for drainage and stormwater manager design for roadway and transit capital improvement projects. He worked closely with other engineering disciplines to develop constructible design plans that addressed erosions and sediment control provisions, minimized wetlands and waters of the US impacts, and supported environmental documents and permit efforts by others.

| e. Education: Name & Location of Institution(s)/Degree(s)/Year/Specialization: |
|---------------------------------|---------------------------------|
| University of Maryland, College Park, MS Civil Engineering (Water Resources), 1996 |
| University of Maine, Orono, BS Civil Engineering 1986 |

| f. Active Registration: Year First Registered/ Discipline/ Registration #: |
|---------------------------------|---------------------------------|
| 1994 / Professional Engineer (Virginia) / 044111 |
| 2015 / DBIA / (Pending) |

<table>
<thead>
<tr>
<th>g. Document the extent and depth of your experience and qualifications relevant to the P3 Project.</th>
</tr>
</thead>
</table>

**WALNEY ROAD BRIDGE WIDENING AND WIDENING DB PROJECT, FAIRFAX COUNTY, VIRGINIA – ALLAN MYERS**

**Project highlights:** Construction Value: $11.3 million. DBPM on VDOT DB project. ROW acquisition oversight. Utility relocations, contract management, Quality (QA/QC) management, third-party coordination.

**Role:** Design-Build Project Manager (March 2014-present) As DBPM, Mr. Heil is the main point of contact with VDOT and is focused on contract administration, design and construction issue resolution, quality management, and stakeholder outreach/coordination including County Supervisors, traveling public, local residents and utilities. The project design was completed in December 2014 and VDOT issued “approved for construction” plans in February 2015 for the roadway and March 2015 for the bridge.

**Impact on the Project:** Successful utility relocation: began in December 2014 and continues with several utilities with relocation efforts. The roadway detour was successfully implemented in April 2015 with less than 10 public...
For Key Personnel required to be on Final RFP Addendum #2 September 12 2016

Transform 66 P3 Project

Virginia Department of Transportation

- 2 - Volume 1 to Request for Proposals

Instructions to Proposers

Heil

comments received on the detour. **Bridge demolition**: was completed in April 2015 and foundation installation (pre-drilled driven piles) completed in May 2015. Remaining bridge construction and roadway construction north to Mariah Court will continue through September 2015, the detour will be lifted and construction will be completed in December 2015. As construction progresses, Thomas continues to focus on utility relocations and contingency planning for utilities not moved by the schedule date, bridge foundation conflicts with the still present utilities, contract dispute resolution, and roadway construction efforts.

**Client reference**: Arif Rahman, VDOT, Project Manager, 703-259-1940, MD.Rahman@VDOT.Virginia.gov

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**WOODROW WILSON BRIDGE AND INTERCHANGE RECONSTRUCTION: ALEXANDRIA, VA TO OXON HILL, MD – RK&KB/URS JV**

**Project highlights**: Construction Value: $2.4 billion. VDOT DB project. Permitting/environmental, Regulatory Agency coordination, design optimization/impact minimization, geotechnical concerns, third-party coordination.

**Role**: Environmental Manager (October 1997 to May 2002). Owners representative responsible for all natural resource aspects of reconstruction of the main bridge and four interchanges. His NEPA responsibilities included supporting FHWA in preparation of a Draft and Final SEIS, environmental summaries, CE's and reevaluations. Mr. Heil led all efforts (Owner and Design Consultants) associated with permitting, wetland/stream mitigation, Section 7 ESA Consultation, Section 4(f) / 106 treatment, potential construction staging areas, and dredge material disposal.

**Impact on the Project: Effective environmental management**: Development of natural systems field data including Waters of the US (including wetlands) delineations and coordination with USACE, submission of an expedited Joint Permit Application, and a Supplemental EIS that focused on addressing seven significant issues raised by USACE following the EIS publication. He and his team conducted biological assessments, mitigation site studies and evaluations, assessed potential staging/storage areas, and completed assessments of known historic resources. **Successful permitting**: Through facilitating the design/permit approach with FHWA, VDOT, MSHA, Design Consultants, and USACE, he and his Team were able to submit an expedited permit and work cooperatively with USACE and all regulatory agencies to secure Individual Permit approval three months early.

**Client reference**: Nick Nicholson, formerly VDOT Proj. Manager (202) 775-3352, ronaldo.nicholson@parsons.com

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**VDOT I-81 TRUCK CLIMBING LANES DB, ROCKBRIDGE COUNTY, VIRGINIA – RK&K**

**Project highlights**: Construction Value: $74.5 million. VDOT DB project including interstate widening, water quality permitting and construction environmental compliance.

**Role**: Design-Build Environmental Manager (March 2008-December 2011) He served as the design-build environmental manager, subconsultant to the lead design firm (AECOM), reporting to the Design Manager.

**Impact on the Project: Effective environmental Management**: As environmental issues were a schedule critical component, he developed risk mitigation strategies with both the DBPM / CM. He was responsible for all project related permitting efforts including Agency coordination through VDOT’s IACM, Section 404/401 Joint Permit Application, coordination and approval (12 months of NTP), SWPP and VSMP/ESC approval. He prepared the project’s environmental compliance plan and during construction he responded to CM information requests, completed independent compliance inspections and provided the QAM with environmental support. His integration with the entire DB Team, including VDOT, helped to minimize construction related environmental impacts, expedite permit approval, and allowed the construction to begin three months ahead of schedule.

**Client reference**: Scott Hodge, PE, AECOM, DB Design Manager, 540-857-3322, Scott.Hodge@aecom.com

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**ROUTE 7 WB TCL PE AND DB BRIDGING DOCUMENT: LOUDOUN COUNTY, VIRGINIA – RK&K**

**Project highlights**: Construction Value: $32 million. VDOT NOVA DB project, prepared RFP bridging documents, roadway widening/capacity, structures/bridge. Complex TMP/MOT and third-party coordination.

**Role**: Design Project Manager (May 2009-December 2010) As design project manager, he managed the design through location approval and FI/RW plans, design concepts/coordinaton with NVRPA for the re-aligned WO&D Trail through the Rte. 9 Interchange and assisted VDOT with outreach to local HOAs/ County / Leesburg.

**Impact on the Project: Design management**: Following location approval, he and his team prepared the RFQ Bridging Documents in support of VDOT. The resulting DB project was bid and awarded in October 2013 for $27.9M. **Cost savings**: His direct management and relationships with VDOT helped to facilitate local/County project support, Park Authority, and developed DB bridging documents that resulted in a 10% project cost savings.

**Client reference**: James Zeller, VDOT, Program Manager, 703-259-3220, James.Zeller@VDOT.Virginia.gov

h. For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment. Thomas is an at-will Allan Myers employee. He is available to join the P3 Project as a full-time employee at any time.
**FORM B-4**

**KEY PERSONNEL RESUME FORM**

<table>
<thead>
<tr>
<th>Brief Resume of Key Personnel anticipated for the P3 Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Name &amp; Title: Robert (Bob) Gray, P.E.</td>
</tr>
<tr>
<td>b. P3 Project Assignment: Design Manager</td>
</tr>
<tr>
<td>c. Name of Firm with which you are now associated: Janssen &amp; Spaans Engineering, Inc. (JSE)</td>
</tr>
<tr>
<td>d. Years’ experience: With this Firm 9 and Years With Other Firms 22</td>
</tr>
<tr>
<td>Janssen &amp; Spaans Engineering, Inc. – Vice President/Senior Project Manager (2006 – Present)</td>
</tr>
<tr>
<td>e. Education: Name &amp; Location of Institution(s)/Degree(s)/Year/Specialization: Purdue University, Lafayette, Indiana, BS Civil Engineering, 1984</td>
</tr>
<tr>
<td>f. Active Registration: Year First Registered/ Discipline/ Registration #: Registered Professional Engineer, Civil, Virginia, 049221, 2011 (and eight other states plus Canada)</td>
</tr>
<tr>
<td>g. Document the extent and depth of your experience and qualifications relevant to the P3 Project.</td>
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</tbody>
</table>

**HIGHWAY 407 EAST EXTENSION PHASE 1, TORONTO, ONTARIO – JSE**

**Project highlights:** $650 million (construction value). This project is an extension of the existing 407E toll road with the addition of a more than 10-mile, four-lane regional divided highway (West Durham Link) between 401 and 407. Including six interchanges, this project is situated in a greenfield with limited borrow sources. Roadway profiles and pond construction are designed to balance the earthwork with consideration of unsuitable excavated soils. The project includes two high-speed, fully directional interchanges with five partial cloverleaf interchanges. The adjacent area is environmentally sensitive with wetland and endangered species considerations. Drainage design includes mitigation for water discharge temperature and quality to minimize affects to endangered fish species.

**Role:** Lead Design Manager (2012–Present). The design team consisted of nearly 100 engineers and technicians. Bob’s project responsibility was to lead and coordinate the design of the bridges, highways, streets, drainage, detention, lighting, ITS, signing, markings, traffic signals, traffic maintenance, utility coordination and relocations and environmental mitigation. Bob directed the design of the detention ponds to assure their proper design, coordinating the designs with the client to ensure that there were no construction issues. Bob led regular interdisciplinary meetings to keep the team informed and the team used a drawing sharing system similar to building information modeling (BIM) to coordinate the design. All facets of the project were electronically modeled in real space for each discipline. Each discipline then reviewed their design against the other disciplines’ models to check for conflicts. The models were critical to reviewing the utility relocation plans for clearances from the project features.

**Impact on the Project:** Bob met with the owner and contractor to ascertain the requirements and confirm they were included in the reports. Bob developed a utility master plan for the adjustment of all utilities on the project. The master plan indicated the current location of the utility and the disposition of the utility if it should be adjusted or remain in place. Bob coordinated with a specialty subconsultant who interfaced with the utilities companies, construction and design team. Bob reviewed all relocation plans for design clearance. Bob also incorporated all commitments and requirements of the Environmental Assessment into the final design. Examples of sustainability measures include minimizing earthworks and eliminating the need for watercourse realignments.

**Client reference.** Calvin Curtis, Project Manager, Ministry of Transportation of Ontario Phone: 416-235-5442, Email: calvin.curtis@ontario.ca

**LBJ EXPRESS MANAGED LANES, DALLAS, TEXAS – JSE**

**Project highlights:** 2.1 billion (construction value) This highly complex 4.5-mile-long segment of a 13.3-mile managed toll lane project involved all transportation project disciplines from the basics of road and bridge design to intelligent transportation system, lighting, tolling and traffic control. Roadway geometry was very complex due to the limited space available for the multiple ramps between the various roadways. The project required intensive interdisciplinary coordination of the multiple components to minimize conflicts and facilitate construction.

**Role:** Design Manager (2010–2012). Bob led the design team of more than 150 engineers and technicians who produced the plans for this project. His leadership resulted in a coordinated effort among the various design disciplines, the construction team and the environmental team. He directed the discipline managers in the design and quality control process. The schedule was constantly tracked and resources were adjusted to meet the demanding
project dates. Bob and his team collaborated closely with the contractor (Ferrovial Agroman) on the development of a cost-effective, efficient maintenance of traffic plans and construction phasing that met the technical requirements while providing adequate room for construction and accommodating vehicular traffic including detours for pedestrian traffic. The team developed more than 2,500 maintenance of traffic plan sheets and 11 major construction packages with more than 150 maintenance of traffic subphases.

**Impact on the Project:** Bob was co-located with the design-build team to facilitate a close working relationship, quick response and efficient resolution to the project challenges. He led design management, including bridge, highway, drainage, utility design in addition to lighting, signing, markings, waterlines, sanitary sewers, pumping stations and retaining walls. His direct input on the design of construction techniques and the fire safety system resulted in significant cost savings. Bob managed a $17.5 million design budget and was the engineer of record for all civil drawings for the project. He led the development of numerous value engineering concepts. One of the most significant involved changing the initial four-level interchange to a three-level design resulting in reduced traffic disruption, improved constructability and a shorter schedule by six months.

**Client reference.** Maurice Pittman, former TxDOT Project Manager, Phone: 214-668-4188, Email: Maurice_pittman@hotmail.com

**I-90 INDIANA TOLL ROAD, ADDED TRAVEL LANES, LAKE COUNTY, INDIANA – JSE**

**Project highlights:** $250 million (construction value) This project consisted of 1.7 miles of highway and the Broadway viaduct, a 4,000-foot-long bridge which was widened, reconstructed and adjusted horizontally and vertically to meet superelevation and vertical clearance requirements. The design also included the reconstruction of the diamond interchange at Broadway along with the lighting, signals and signage.

**Role:** Design Manager (2006–2008). As the project manager, Bob led a team and provided plan and profiles, construction details, maintenance of traffic plans, pavement markings, erosion control details, retaining wall designs, drainage design, cross sections, interchange details, and bridge design plans. The design effort included interchange reconfiguration with new traffic signals and signing.

**Impact on the Project:** Bob directed the major challenge of salvaging, adjusting and widening the existing 4,000-foot-long viaduct. His concept of adding new center piers to the structure corrected the load capacity issues of the structure and also provided the needed construction platform at the centerline of the structure for the jacking of the structure.

**Client reference:** Brian Shattuck, Highway Engineer, INDOT, Phone: 317-847-3969, Email: bshattuck@indot.IN.gov

**U.S. 31 REALIGNMENT, HOWARD COUNTY, INDIANA – JSE**

**Project highlights:** U.S. 31 is a high-speed (75 mph) realignment of a congested highway around Kokomo, Indiana. Project included six miles of mainline highway, two diamond interchanges, and 13 bridges. Drainage design is critical to the project due to area flooding. The design met strict discharge limits by utilizing inline detention in the roadside ditches.

**Role:** Project Manager (2008–2010). Bob managed the road, bridge and drainage design teams having over 20 engineers and technicians reporting to him.

**Impact on the Project:** Bob developed the complex inline detention design. This effort included developing solutions that kept the drainage system within the project’s footprint to eliminate the need to acquire additional right-of-way.

**Client reference:** Tim Muench, Project Manager (retired), INDOT, Phone: 317-232-5245, Email: tmuench@indot.IN.gov

h. For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment.

Highway 407 East Extension Phase 1, Lead Design Manager, through December 2015
Brief Resume of Key Personnel anticipated for the P3 Project.

<table>
<thead>
<tr>
<th>a. Name &amp; Title:</th>
<th>Peter “Jason” Sipes, O&amp;M Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. P3 Project Assignment:</td>
<td>O&amp;M Manager</td>
</tr>
<tr>
<td>c. Name of Firm with which you are now associated:</td>
<td>Cintra</td>
</tr>
<tr>
<td>d. Years’ experience:</td>
<td>With this Firm 8 and Years With Other Firms 15 Years</td>
</tr>
<tr>
<td><strong>Cintra – O&amp;M Manager – LBJ Express, Dallas-Fort Worth, Texas (2010 – Present)</strong></td>
<td></td>
</tr>
<tr>
<td>Jason is responsible for managing design, construction, tolling, operation and maintenance (O&amp;M) resources to ensure cost-effective operation. He has established and overseen OPEX and CAPEX budgets as well as short- and long-term maintenance and renewal plans. Jason is also experienced in Dynamic Pricing Toll Collection Systems, Intelligent Transportation Systems (“ITS”) and other business systems implementation and working directly with clients and roadway users in all matters related to O&amp;M.</td>
<td></td>
</tr>
<tr>
<td><strong>Cintra – Technical Manager – Austin, Texas (2007-2010)</strong></td>
<td></td>
</tr>
<tr>
<td>Among other responsibilities, as Technical Manager, Jason managed and provided technical support for all design and construction aspects of the projects, provided technical advice and support in the LBJ Express and NTE 1&amp;2 project, implementation &amp; procurement of extensive O&amp;M resources, including equipment, vehicles, materials and staff, to ensure cost-effective operation, he reviewed and assisted in the development of O&amp;M budgets as well as short- and long-term maintenance and renewal plans.</td>
<td></td>
</tr>
<tr>
<td><strong>Atkins Global (PBS&amp;J) – Senior Project Manager – Austin, Texas (2000-2007)</strong></td>
<td></td>
</tr>
<tr>
<td>Senior project manager for three greenfield toll road projects ($3.4 billion): SH 45N, Loop 1 and SH 130.</td>
<td></td>
</tr>
<tr>
<td>e. Education:</td>
<td>Name &amp; Location of Institution(s)/Degree(s)/Year/Specialization:</td>
</tr>
<tr>
<td><strong>University of South Carolina, South Carolina, MBA, 1999</strong></td>
<td>Purdue University, Indiana, BS Construction Engineering and Management, 1992</td>
</tr>
<tr>
<td>f. Active Registration:</td>
<td>Year First Registered/ Discipline/ Registration #: Professional Engineer, Texas (#96389), Florida (#59501)</td>
</tr>
<tr>
<td>g. Document the extent and depth of your experience and qualifications relevant to the P3 Project.</td>
<td></td>
</tr>
</tbody>
</table>

**LBJ EXPRESS, DBFOM (REVENUE RISK), DALLAS-FORT WORTH, TEXAS – CINTRA**


**Role:** O&M Manager (2010-Present). His responsibilities include preventative, routine and life-cycle maintenance, incident response and management, operation of in-house control center, ensuring that Ferrovial Agroman’s design and construction considers O&M aspects, management of $40 million contract with IT and toll collection systems integrator Kapsch, and management of all O&M resources including employees, equipment and the maintenance yard. He is responsible for the O&M budget and for defining and executing annual, mid-term and long-term plans for the maintenance and improvement of the facility throughout its life.

**Impact on the Project:** Best-in-Class Management Capabilities: Jason manages 49 employees (eight control center operators, 12 maintenance technicians/patrollers, four engineers with design, construction and life-cycle experience, 10 technicians responsible for ITS installation and maintenance, 13 staff reviewing video and pictures captured at toll gantries and two professionals responsible for O&M QA/QC, environmental mitigation and safety management. He also manages 100 pieces of equipment. Startup of Operations: Jason began O&M for the project shortly after commercial close from a temporary facility. Under his leadership, the O&M organization was built up from scratch including the construction of a state-of-the-art $10 million building with a 28,000 square foot maintenance yard. Best-in-Class Control Center: Jason manages the 24/7 control center, a state-of-the-art facility interconnected with the North Texas Regional ITS Structure and the Texas Department of Transportation, with CCTV access to the entire project. Patrollers and incident responders available 24/7 are dispatched from the control center. As a result of this consolidated effort, Cintra’s average incident response time is eight minutes. Optimal Long-Term Solutions: Jason worked with Ferrovial Agroman on value engineering to ensure O&M aspects were integrated into the design and construction. Improved Entry/Exits Radii: Geometrics of several curves were improved to minimize the risk of trucks tipping over. Reduced Green Landscape: Hardscape and enhanced aesthetics were designed and built to replace green areas to, ultimately, minimize the exposure of the workforce to...
mowing activities along the high-speed corridor. Larger and Accessible Drainage: the size of culverts was increased over the contractual minimum requirements to mitigate the risk of flooding of the lowered lanes and to facilitate access for maintenance and cleaning. Exceeding Requirements: Jason championed and led the installation of a $2.0 million radio system on the lowered lanes sections. The system works to ensure that emergency responders (police, fire and rescue) do not lose communication at the lowest points. This system was not required by the contract, but was implemented as a solution that benefits both stakeholders and shareholders. Effective O&M Quality and Safety Management: Jason carries out frequent internal quality and safety audits. Safety meetings are conducted for the LBJ Express workforce every month. He also works with an independent consultant that audits the LBJ Express safety processes and procedures annually. He also works with an independent engineer, reporting to the Texas Department of Transportation, to carry out two full-project inspections annually. Since the start of operations in 2010, the LBJ Express has not received a single O&M noncompliance penalty. Public Outreach/Communications: Jason works with the Public Information Coordinator to represent the interests of the project at formal and informal public meetings. He is involved with all aspects of outreach which led to the project receiving PR Daily’s Corporate Responsibility award for Best Stakeholder Communication, 2012.

Client reference: TxDOT. Renee Lamb, DFW Strategic Project Office Director. Phone: 817-201-0440, Email: renee.lamb@txdot.gov

NTE 1 AND 2, DBFOM (REVENUE RISK), DALLAS-FORT WORTH, TEXAS – CINTRA


Role: (Technical Manager (2007-2010)). Jason served as Technical Manager responsible for providing technical support for all design, construction and operations aspects of the project. Jason provided technical oversight and supported implementation and procurement of extensive O&M resources for the project. Jason reviewed and assisted in the development of O&M budgets as well as short and long-term maintenance and renewal plans. Additionally, Jason prepared technical aspects of the Project Management Plan including O&M procedures.

Impact on the project: Pavement and Infrastructure: Jason assisted in the development of a cost-effective program regarding major maintenance and renewals of existing assets during the concession period. He implemented approaches that ensured reliable speeds and the safety of the traveling public. Jason helped to ensure proper signal timing was implemented for the corridors 19 intersections, along with providing input for the overall traffic management plan. Best in Class Control Center: Since 2010 and until recently, Jason supported the NTE 1 and 2 with incident management from LBJ Express’ control center.

Client reference: TxDOT. Renee Lamb, DFW Strategic Project Office Director. Phone: 817-201-0440, Email: renee.lamb@txdot.gov

SH-45, DBFOM (REVENUE RISK), AUSTIN, TEXAS – ATKINS GLOBAL (PBS&J)

Project highlights: SH-45, Loop 1 (MoPac) and SH-130 (Segments 1 & 4) are three greenfield all-electronic toll projects framed in the Central Texas Toll System (CTTS) adding 65 mile and total project values for US$3.4 billion.

Role: (Senior Project Manager (2000-2007)). Jason served as Senior Project Manager for the three projects providing management and project oversight as representative to various stakeholders and bond market for 16.7 miles of the turnpike’s 65-mile toll road system, and coordinated quality management efforts.

Impact on the project: He provided oversight for 10 design projects consisting of 10 section consultant engineering teams and three ROW acquisition firms. He coordinated efforts for all phases of post-design production and quality control management which included activities such as: project cost estimates, environmental issues, schematic development, ROW process, PS&E, utility relocations, permitting, construction coordination, finance (project cash flow and financial model), CPM scheduling (production and construction), document control, etc.

Client reference: Timothy Weight, P.E., Director of Turnpike Construction, Texas Department of Transportation, Phone: 512-832-7010, Email: timothy.weight@txdot.gov

I. For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment.

Jason is an at-will Cintra employee and his current position has no mandatory duration limit. He is available to join the P3 Project as a full-time employee at any time.
**FORM B-4**

**KEY PERSONNEL RESUME FORM**

<table>
<thead>
<tr>
<th>Brief Resume of Key Personnel anticipated for the P3 Project.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Name &amp; Title: Dennis Sedlachek, Vice President of Right of Way North America, Cintra</td>
</tr>
<tr>
<td>b. P3 Project Assignment: I-66 Express Mobility Partners’ (Developer) Right of Way Manager</td>
</tr>
<tr>
<td>c. Name of Firm with which you are now associated: Cintra</td>
</tr>
<tr>
<td>d. Years’ experience: With this Firm 9 and Years With Other Firms 21 Years</td>
</tr>
<tr>
<td>Please list chronologically (most recent experience first) your employment history, position, general responsibilities, and duration of employment for the last fifteen (15) years.</td>
</tr>
<tr>
<td>Dennis Sedlachek, SR/WA, R/W-RAC, brings nearly 30 years of experience in real estate and right of way services including seven years managing right of way programs for large DOTs’ highway projects.</td>
</tr>
<tr>
<td>Cintra – Vice President of Right of Way North America, Austin, Texas (2010 – Present)</td>
</tr>
<tr>
<td>Responsible for all right of way strategy managing all aspects of negotiations, environmental assessments, relocation assistance programs, preparation of condemnation suits, property management activities, and acquisitions of the projects developed by Cintra in the US such as: NTE 35W, LBJ Express and NTE 1&amp;2.</td>
</tr>
<tr>
<td>Cintra – Vice President of Right of Way – SH 130, Austin, Texas (2007 – 2010)</td>
</tr>
<tr>
<td>Responsible for all right of way strategy managing all aspects of negotiations, environmental assessments, relocation assistance programs, preparation of condemnation suits, property management activities, and acquisitions of Cintra-developed SH 130 project.</td>
</tr>
<tr>
<td>Directed the activities and evaluated the performances of all ROW personnel in WSA’s Austin and Dallas, ROW offices. He performed business development with state and local public agencies for ROW services. Carried out all ROW activities for projects such as: US 380 &amp; the Loop 12 Northwest Highway, SH 71 (Airport Toll Road Expansion) IH 35, US 183, US 290, SH 21 and SH 142 and Kansas City Southern Railroad in Shreveport, LA.</td>
</tr>
<tr>
<td>MLS Land Services, Inc. – Vice President Right of Way Services (2002 – 2004)</td>
</tr>
<tr>
<td>Responsible for the development of business opportunities while directing ROW service projects. Private contractor/consultant on TxDOT TTA staff for the Southwest Parkway project and completed ROW acquisition on Pflugerville Parkway project (Pflugerville, Texas).</td>
</tr>
<tr>
<td>Broadwing Communications – Senior Right of Way Supervisor (1997 – 2002)</td>
</tr>
<tr>
<td>Responsible for the supervision and acquisition of ~40 public utility substations under eminent domain with zero condemnations; implemented and provided project leadership on schedules on all assignments.</td>
</tr>
<tr>
<td>c. Education: Name &amp; Location of Institution(s)/Degree(s)/Year/Specialization:</td>
</tr>
<tr>
<td>University of Nebraska (Omaha, Nebraska). Bachelor of Science General Administration, 1985</td>
</tr>
<tr>
<td>f. Active Registration: Year First Registered/ Discipline/ Registration #:</td>
</tr>
<tr>
<td>2000, Real Estate Broker (Texas), Registration #: 0508636</td>
</tr>
<tr>
<td>2000, Member of International Right of Way Association, Registration #: 848135</td>
</tr>
<tr>
<td>2004, Senior Right of Way Professional (SR/WA), Registration #: 5099</td>
</tr>
<tr>
<td>2013, Right of Way Relocation Assistance Certification Program (R/W-RAC), Registration #: 848135</td>
</tr>
<tr>
<td>g. Document the extent and depth of your experience and qualifications relevant to the P3 Project.</td>
</tr>
<tr>
<td>(List at least three (3), but no more than five (5) relevant projects* for which you have performed a similar function.)</td>
</tr>
<tr>
<td>PROJECT #1: NTE 35W, DBFOM (revenue risk), Fort Worth, Texas – Cintra</td>
</tr>
<tr>
<td>-Role, Responsible for all right of way strategy designed to achieve all the acquisitions and relocation needed for the implementation of NTE 35W project: 102 parcels acquired, 112 relocation displaces, 18-, 21- and 24 months schedules. Dennis was able to complete 100% of acquisitions and relocations within 22 months.</td>
</tr>
</tbody>
</table>
- **Impact on the project.** Construction schedule on-time: Despite some of the transactions being scheduled to be completed in 24 months, Dennis was able to complete 100% of the acquisitions and relocations within 22 months.

- **Client reference.** Don C. Toner, Jr., SR/WA, Right of Way Project Delivery Director, Texas Department of Transportation (TxDOT). Phone No.: (512) 531-5904, E-mail: don.toner@txdot.gov.

**PROJECT #2: US-460 CORRIDOR IMPROVEMENTS, DBF, Suffolk, Virginia – Ferrovial Agromán**

- **Project highlights:** Total Project Value: US$ 1.4 billion. Design-Build-Finance
- **Role.** Mr. Sedlachek started the ROW Technical Working Group for US-460 Mobility Partners (Ferrovial Agroman and Allan Myers), he appointed Mr. Kevin Szatmary as ROW Manager who served as the main point of contact with VDOT’s ROW specialists, Jean Rella (current Right of Way Special Projects Manager in VDOT) and Les Griggs (Right of Way Project Manager for VDOT). Mr. Sedlachek advised and directed Kevin Szatmary for: title search services, appraisal, appraisal review, acquisition negotiations, relocation assistance and advisory services and property management. Mr. Sedlachek applied all U.S. DOT and FHWA regulations and policies, while working under all local regulations of the Commonwealth of Virginia and VDOT: the “VDOT Right of Way Manual of Instructions” and “VDOT Utility Manual of Instructions”. He is familiar with the current versions of “ILM-LD-243.10” and Chapter 12 of the “VDOT Survey Manual”. In addition, Mr. Sedlachek managed the process to select the ROW Consultant firms for the project: Bowman Consulting and Volkert, Inc.

- **Client Reference:** n/a

**PROJECT #3: NTE 1&2, DBFOM (revenue risk), Dallas-Fort Worth, Texas – Cintra**

- **Project highlights.** Total Project Value: US$2.0 billion. Dynamic pricing all-electronic managed lanes. AADT: 175,000. Reconstruction of an existing roadway. Substantial completion achieved in October 2014 (nine months ahead of schedule). Maintenance concurrent with construction since December 2009.
- **Role.** Responsible for all right of way strategy designed to achieve all the acquisitions and relocation needed for the implementation of NTE 1&2 project: 299 parcels acquired, 259 relocation displaces, 18-, 21- and 24 months schedules. Despite some of the transactions being scheduled to be completed in 24 months, Dennis was able to complete 100% of acquisitions and relocations within 22 months.

- **Impact on the project.** Commissioning ahead of schedule: Dennis’ success in the right of way acquisition process led the project to be opened in October 2014, nine months ahead of the contracted completion date.

- **Client reference:** Don C. Toner, Jr., SR/WA, Right of Way Project Delivery Director, Texas Department of Transportation (TxDOT). Phone No.: (512) 531-5904, E-mail: don.toner@txdot.gov.

**PROJECT #4: SH 130, DBFOM (revenue risk), Austin, Texas – Cintra**

- **Project highlights.** Total Project Value: US$1.3 billion. Four-lane, 41-mile divided, toll highway bypassing a heavily-congested stretch of I-35 in Texas.
- **Role.** Responsible for all right of way strategy designed to achieve all the acquisitions and relocation needed for the implementation of SH 130 project: 320 parcels acquired, 175 relocation displaces, 21- month schedule. Dennis was able to complete 100% of acquisitions and relocations within the 21-month scheduled.

- **Impact on the project.** Construction schedule on-time: Dennis was able to complete 100% of acquisitions and relocations within the scheduled 21 months, helping the project be delivered according to schedule.

- **Client reference:** Don C. Toner, Jr., SR/WA, Right of Way Project Delivery Director, Texas Department of Transportation (TxDOT). Phone No.: (512) 531-5904, E-mail: don.toner@txdot.gov.

**PROJECT #5: US-380 & LOOP 12 NORTHWEST HIGHWAY EXPANSION, DB, Dallas, Texas – WSA**

- **Project highlights.** The project consisted of building a new four-lane roadway and concrete hike and bike trail and sidewalk while realigning intersections and traffic signals, requiring acquisition of 17 parcels.
- **Role.** Dennis appraised negotiated, acquired, leased back, cost-estimated and completed all proceedings needed to implement the US-380 & Loop 12 Northwest Highway Expansion project.
- **Client reference.** Gus E. Cannon, Right of Way Acquisition Contracts Manager, Texas Department of Transportation (TxDOT). Phone No.: (512) 416-2852, E-mail: gus.cannon@txdot.gov.

h. For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment. Dennis is an at-will Cintra employee and his current position has no mandatory duration limit. He is available to fulfill his duties on the P3 Project as an employee at any time.
Brief Resume of Key Personnel anticipated for the P3 Project.

a. Name & Title: Esteban Trigueros
b. P3 Project Assignment: Lead Contractor Quality Control Manager
c. Name of Firm with which you are now associated: Ferrovial Agroman
d. Years’ experience: With this Firm 12 and Years With Other Firms 12 Years

Ferrovial Agroman US Corp. Quality Assurance and Quality Control Manager (September 2007 – Present): Quality Manager on $950M SH 130 Segments 5 and 6 and $1.4B US 460 Corridor Improvements projects. As Quality Manager, Esteban was responsible for ensuring the quality program is effectively implemented, and that subconsultant and construction subcontractor work adheres to quality standards.

Ferrovial Agroman Chile, S.A. Quality Assurance and Quality Control Manager (June 2000 – August 2006): Quality Manager on multiple contract segments of the Highway Ruta 5 in Santiago, Chile where as Quality Manager, Esteban was responsible for ensuring the quality program is effectively implemented, and that subconsultant and construction subcontractor work adheres to quality standards.

e. Education: Name & Location of Institution(s)/Degree(s)/Year/Specialization:
   Bachelor of Science in Geology, Universidad Complutense de Madrid, Spain

f. Active Registration: Year First Registered/ Discipline/ Registration #:

g. Document the extent and depth of your experience and qualifications relevant to the P3 Project.
   Esteban is a senior quality manager with more than 24 years professional experience in the quality control and quality assurance management of major transportation projects with particular expertise in large, complex, design-build highway contracts under fast-track schedules. Esteban has served as the DB Quality Manager for one of the largest projects in TxDOT’s history where he had overall responsibility for the quality control and quality assurance during the design and construction phases on the first P3A project in Texas, making him uniquely qualified for his proposed role. He has experience with implementing the ISO 9001 QMS. Esteban has managed multiple quality departments consisting of inspection / testing personnel, inspector/ CM field training, procedure development, and constructability reviews and auditing. He is experienced in the inspection of typical highway construction activities. Esteban will verify the design quality program is effectively implemented, and ensure that design subconsultant and construction subcontractor work adheres to VDOT quality standards. Currently, Esteban is developing Quality Management Plans and serving as quality systems advisor for P3 projects related to Ferrovial Agroman’s Southeast regional office.

US 460 Corridor Improvements, Petersburg to Suffolk, VA ($1.4B)

Project Highlights: The $1.4B project, a four-lane, 55-mile, divided, limited-access highway, will facilitate freight movement to and from the ports of Virginia and was envisioned as primary hurricane evacuation route. Anticipated construction elements included: nine interchanges and 75 bridges. Bridge length ranges from 225 to over 1,500 feet. Role: Quality Manager (2012 – 2014). As Quality Manager, Esteban he was involved since the start of the Project. He developed several of the Project Development Plans (group of 11 plans that were to manage/control the entire design and construction phases), specifically those directly related to quality such as: the Quality Management Plan (QMSP), Design Builder Management Plan (DBMP), Design Quality Management Plan (DQMP), and the Construction Quality Management Plan (CQMP). These plans met the VDOT compliance standards and were approved for use by VDOT.

Client Reference: Philip Rinehart, Project Manager, VDOT (757) 337-5915 philip.rinehart@vdot.virginia.gov

SH 130 Segments 5 & 6, Austin to Seguin, TX ($950M)

Project Highlights: The $950 M project is a four-lane, 40-mile, divided, limited access, all electronic open road toll highway constructed on a new terrain in central Texas bypassing a heavily congested stretch of IH 35. The construction consisted of 72 new bridges including three major interchanges and seven direct connectors. This project was the first P3 in Texas. Role: Quality Manager (Nov 2007 – Dec 2012). Esteban was involved beginning in procurement phase. He developed the QMP that consisted of both a Construction Quality Management Plan and Design Quality Management Plan. The QMP met the TxDOT compliance standards and
was accepted for use by TxDOT. Esteban was responsible for implementation and administration of the QMP during design and construction stages. He was responsible for managing all quality processes and systems including ensuring that all workmanship and materials are in compliance with the project contract.

**Client reference:** Frank Holzmann, PE, Program Director, TxDOT (210) 610-4804 frank.holzmann@txdot.gov

**Highway Ruta 5 segments Santiago-Talca and South Access, Santiago, Chile ($605M)**

**Project Highlights:** Santiago to Talca segment: conversion of 165 miles of roadway into a dual carriageway, constructing new highway and refurbishing part of the existing roadway. South Access to Santiago segment: highway between Santiago and Rancagua, with 47 miles of new construction: 10 miles with three mainlines and 37 miles with two mainlines each direction. The two segments are valued at $605M. **Role:** Quality Manager (2011 – 2007). Ferrovial managed the design and construction of five road segments of this highway. Esteban served as the Quality Manager for two of those five segments. As Quality Manager, Esteban developed the quality management system and was responsible for its implementation. He was responsible for overall design, construction and lifecycle quality of the project, implementing quality planning and training, and managing the team’s quality management processes. Esteban supervised five quality engineers, two surveyors and 22 laboratory technicians.

**Client reference:** Victor Roco Herrera, Laboratory Director Roadway Department, Chilean Ministry of Transportation +562-2-449-6154 victor.roco@mop.gov.cl

**Highway Autovia Huelva-Ayamonte, Segment: Aljaraque-Lepe Spain ($160M)**

**Role:** PROINTEC Construction Quality Manager (1998 - 2000). Esteban was the Construction Quality Manager for this Prointec project from 1998 to 2000. This project involved the construction of 17 miles of new four-lane highway with three interchanges along the section. He was responsible for overall construction quality of the projects, implementing quality planning and training, and managing all the quality teams for the project, and establishing the team’s quality management processes.

**Tollway Autopista del Sol Segment: Estepona- Benalmadena Spain ($382M)**

**Role:** PROINTEC Construction Quality Manager (1996 - 1998). Esteban was the Construction Quality Manager for this Prointec project from 1996 to 1998. This project involved the construction of 42 miles of new four-lane tollway with three major interchanges and five junctions along the section. He was responsible for overall construction quality of the projects, implementing quality planning and training, and managing all the quality teams for the project, and establishing the team’s quality management processes.

h. For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment.

Esteban is an at-will employee, currently developing Quality Management Plans and serving as quality systems advisor for P3 projects related to Ferrovial Agroman’s Southeast regional office. He is available to the Project as a full-time employee at any time.
**FORM B-4**

**KEY PERSONNEL RESUME FORM**

**Brief Resume of Key Personnel anticipated for the P3 Project.**

<table>
<thead>
<tr>
<th>a. Name &amp; Title:</th>
<th>J. Derek Ivie, CWB</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. P3 Project Assignment:</td>
<td>Lead Contractor’s Environmental Compliance Manager</td>
</tr>
<tr>
<td>c. Name of Firm with which you are now associated:</td>
<td>Ferrovial Agroman</td>
</tr>
<tr>
<td>d. Years’ experience:</td>
<td>With this Firm 3 and Years With Other Firms 8 Years</td>
</tr>
</tbody>
</table>

**Ferrovial Agroman US Corp. Environmental Compliance Manager (December 2013 – Present):**  
Environmental Compliance Manager responsible to ensure and manage environmental compliance with all environmental commitments during design and construction of two projects: North Tarrant Express Segments 1 & 2 ($1.5B) TxDOT and I-77 HOT Lanes project ($450M), NCDOT.

**VRX (May 2008 – November 2013):**  As Senior Environmental Scientist within the VRX, Inc. Environmental Group, Derek was responsible for monitoring construction activities for various clients to ensure comprehensive compliance with environmental commitments resulting from environmental documentation and associated federal clearance documents, as well as all applicable local, state, and federal environmental laws.

**US Army Corps of Engineers, Operations Division, Lead Natural Resource Specialist (May 2005 – May 2008).**  As Natural Resource Specialist with the U.S. Army Corps of Engineers, Derek responsible for the environmental management of more than 36,000 acres of government waters and lands. These efforts included identification, assessment, management, and protection of natural resources located on public land, as well as compliance with federal programs including wetlands and other waters of the U.S., cultural resources, and threatened and endangered species. Derek maintains good working relationships within the U.S. Army Corps of Engineers and other federal and state agencies. Responsibilities included activities associated with the management, protection, and enhancement of the natural resources endemic to the Post Oak Savannah and Blackland Prairies regions of Texas.

<table>
<thead>
<tr>
<th>e. Education:</th>
<th>Name &amp; Location of Institution(s)/Degree(s)/Year/Specialization:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelor of Science in Wildlife and Fisheries Sciences, Texas A&amp;M University, College Station, TX</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>f. Active Registration:</th>
<th>Year First Registered/ Discipline/ Registration #:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISA-Certified Arborist, TX-3778A, 2010</td>
<td>Basic Wetlands Delineation, Wetlands Training Institute, 2011</td>
</tr>
</tbody>
</table>

| g. Document the extent and depth of your experience and qualifications relevant to the P3 Project. |

Derek is an expert in wetland delineations, and stormwater compliance and construction plan review. While with North Tarrant Toll Authority, he prepared the environmental compliance chapter of the NTTA’s Environmental Manual, authored the NTTA’s storm water compliance procedures (ENV-3.1) and Quality Management Systems procedures relating to the control of environmental non-conformance. Derek brings experience coordinating with regulatory agencies such as TCEQ, TDLR, TDA, TPWD, EPA and USFWS.

**I-77 HOT Lanes, Charlotte, North Carolina ($450M)**  
**Project Highlights:** 26-mile roadway project that will connect a metropolitan area in the northern part of Charlotte with residential areas near Lake Norman. The new road runs between the junction with I-277 in Charlotte and NC-150 in Iredell County. The project includes managed lanes that operate on a variable toll system. The construction value is $450M.

**Role:** Environmental Compliance Manager (ECM) (March 2015 – Present) responsible to ensure and manage environmental compliance with all environmental commitments during design and construction of the first NCDOT P3. Derek developed the CEPP, Vegetation Management Plan, Environmental Protection Training...
### North Tarrant Express Segments 1 & 2, Fort Worth, Texas ($1.4B)

**Project Highlights:** The $1.4B 13.3-mile DBM project includes rebuilding the IH 820 and SH 121/SH 183 corridor. The construction consists of 84 bridges of 3.8 million square feet of deck area. The construction value is $1.4B.

**Role:** Environmental Compliance Manager (Dec 2013 – March 2015) responsible to ensure and manage environmental compliance with all environmental commitments, including permits and regulatory requirements. He managed the implementation of CEPP and the project Environmental Management System. He managed environmental impacts of the project including noise and air impacts, water quality, Section 404 Permits, hazardous materials, biological resources, storm water compliance, and cultural resources issues. He managed the scope development, work, and contract implementation of all environmental sub-contractors (including erosion control, sod/seeding, asbestos abatement, spill response and cleanup, environmental site assessments, etc) to facilitate project compliance. After arriving on the NTE project, environmental NCRs dropped from approximately ten in the two months prior to my arrival to zero for the remainder of the project. The project received ARTBA’s 2014 Globe Award in the Major Highway ($100 million or greater) category for environmental excellence.

**Client Reference:** Rodger Rochelle, Director of Technical Services, NCDOT, 919-707-6601 rdrochelle@ncdot.gov

### I-635 LBJ Express Managed Lanes, Dallas, Texas ($2.1B)

**Project Highlights:** $2.1B complex DBFOM project constructing approx. 15 miles of typical section including six managed (tollled) lanes, eight general purpose (non-tolled) lanes, and frontage roads. LBJ has more than 90 bridges and two major connections with two interstate highways.

**Role:** Environmental Compliance Manager (Sept 2010 – Dec 2013). Derek was employed by VRX, contracted by Ferrovial Agroman as the Lead Contractor to develop and implement the CEPP for the project. He served as environmental compliance inspector, water quality specialist, natural resource biologist and environmental trainer. He was responsible for preparing and managing the SW3P, evaluation of construction impacts to waters of the U.S. and permitting impacts, Hazardous Materials Manager coordination to implement the Hazardous Material Management Plan and daily environmental compliance inspections to ensure that construction is in accordance with government approvals and federal, state and local laws. Derek implemented the Environmental Protection Training Program, 1,000 workers received environmental training. He coordinated with several agencies, including TxDOT, USACE, USFWS and TCEQ. Contaminated soils and groundwater were identified during Phase II environmental investigations. In lieu of transporting contaminated media offsite for disposal, Derek coordinated with the TCEQ to allowed onsite re-use of certain soils and obtained a permit from the City of Dallas that allowed the discharge of groundwater into the city’s sanitary sewer system. After confirming multiple MBTA protected nests along the corridor, Derek worked closely with construction to phase work around active nests, maintaining environmental compliance without impacting construction.

**Client Reference:** Renee Lamb, Project Manager, TxDOT 817-201-0440 renee.lamb@txdot.gov

### For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment.

Derek is an at-will employee, currently serving as Environmental Compliance Manager on I-77 HOT Lanes project in Charlotte, North Carolina. He is available to the Project as a full-time employee at any time.
**FORM B-4**

**KEY PERSONNEL RESUME FORM**

<table>
<thead>
<tr>
<th>Brief Resume of Key Personnel anticipated for the P3 Project.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Name &amp; Title: Sven Kottwitz, Senior Investment Director, Meridiam</td>
</tr>
<tr>
<td>b. P3 Project Assignment: P3 Project Finance Lead</td>
</tr>
<tr>
<td>c. Name of Firm with which you are now associated: Meridiam</td>
</tr>
<tr>
<td>d. Years’ experience: With this Firm 5 Years With Other Firms 11 Years</td>
</tr>
</tbody>
</table>

**Meridiam – Senior Investment Director (2010 – Present)**
Mr. Kottwitz is a senior investment director with Meridiam leading the development of North American P3 projects in all sectors of interest to Meridiam. He has led projects in the US, Canada and across Europe ranging from traffic concessions to availability payment structures.

**HSBC – Associate Director (2006 – 2010)**
From 2009-2010, Mr. Kottwitz was responsible for coverage of oil & gas, power, utilities, mining and transport infrastructure for sub-Saharan Africa based in Johannesburg, South Africa. From 2006 to 2009, Mr. Kottwitz was in London providing advisory and lending to infrastructure projects for public and private clients. During this time he had assignments in the UK, Ireland, Germany, Abu Dhabi and Russia in multiple sectors.

**CIT – Vice President (2003 – 2006)**
Mr. Kottwitz was active in financial advisory, investing equity, and senior and mezzanine debt lending on power, transport, defense and stadium projects in Europe.

**Deloitte – Manager (1999 – 2003)**
Financial advisor to public and private sector clients in water, defense, power and transport sectors.

<table>
<thead>
<tr>
<th>e. Education: Name &amp; Location of Institution(s)/Degree(s)/Year/Specialization:</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of London, Birkbeck College, MSc, 1998, Economics</td>
</tr>
<tr>
<td>Durham University, University College, BA (Hons), 1997, Business Economics</td>
</tr>
<tr>
<td>UK Chartered Accountant (ACA), 2001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>f. Active Registration: Year First Registered/ Discipline/ Registration #: Registered as Chartered Accountant in the UK since 2001</th>
</tr>
</thead>
</table>

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<tr>
<th>g. Document the extent and depth of your experience and qualifications relevant to the P3 Project.</th>
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</thead>
</table>

**LAGUARDIA CENTRAL TERMINAL (LIMITED REVENUE RISK), DBFOM, NEW YORK, NEW YORK – MERIDIAM**

**Project Highlights:** Total project value greater than $3 billion. Preferred Bidder Status. Limited revenue risk. The P3 project includes the design, construction, financing and maintenance of a new terminal and the removal of the current central terminal building at La Guardia airport in Queens, New York, with no reduction in service throughout the project term. This landmark project is center of attention with the US Vice President and the governor of New York taking a keen interest in the delivery of a central piece of New York City’s transport infrastructure, and will be a model for other airport developments in the US market.

**Role:** As Project Director and Finance Lead, Mr. Kottwitz’s leadership was crucial in structuring the financial and legal elements of this landmark project. Multiple novel elements of this project had to be evaluated, structured and explained to lenders and rating agencies, to ensure a compliant and financeable bid could be delivered. Mr. Kottwitz represented Meridiam and the consortium at finance meetings and commercial negotiations of various aspects of the project.

**Impact on the Project:** Mr. Kottwitz’s leadership in achieving indicative investment grades from rating agencies and structuring a demonstrably deliverable financial structure was critical to the team being named Preferred bidder on this landmark project.

**Client reference:** Laurie Spencer; Port Authority of New York and New Jersey; Manager, Alternative Project Delivery; (T) 1 (212) 435-4635; lspencer@panynj.gov
NTE 35W, DBFOM (REVENUE RISK), FORT WORTH, TEXAS – MERIDIAM


**Role:** As the Project Lead for Meridiam for NTE 35W, Mr. Kottwitz led negotiations and worked closely with Carlos Gonzales and Ricardo Bosch of Cintra to structure the financing. As Project lead Mr. Kottwitz provided financial and technical oversight, as well as co-leadership of all commercial negotiations with the public sector owner, drop down subcontractors and lenders.

**Impact on the Project:** Mr. Kottwitz’s project management expertise was instrumental to the project’s successful close. A financing structure was secured that combined a long-term TIFIA loan in amount of $531 million, $274 million of PABs and $430 million in equity. Due to the PABs and TIFIA financing, negotiations included rating agencies, underwriters, Federal DOT (as lender) and TxDOT. Mr. Kottwitz co-led the team to receiving investment grade ratings for both Bonds and TIFIA with a rating of Baa3 from Moody’s and BBB- from S&P.  The team’s efforts led to a 4x oversubscription of the bonds.

**Client Reference:** John Munoz, Vice President of CDM Smith (formerly Deputy Director, Finance Division, TxDOT) Phone: 512-652-5320, Email: munozjp@cdmsmith.com

E-18 MOTORWAY, DBFOM (AVAILABILITY PAYMENT), FINLAND – MERIDIAM

**Project Highlights:** Total Project Value $562 million; Financial Close in December 2011; Currently in operation

**Role:** Mr. Kottwitz led Meridiam’s involvement in developing and finalizing a fully compliant, binding proposal for this $562 million road project and, upon award, took an active role in the negotiations with the client by leading financial, commercial and legal structuring of the project. The financing involved a range of private banks providing multiple debt tranches and structures, alongside 2 multi-lateral agencies, the Nordic Investment Bank and the European Investment Bank.

**Impact on the Project:** As Project lead Mr. Kottwitz provided financial and technical oversight, leadership of all commercial negotiations with the public sector owner, drop down subcontractors and lenders. Mr. Kottwitz financial expertise was critical in securing $300 million of short and long term debt which includes a commercial bank, European Investment bank, and the Nordic Investment Bank. Of note was a special loan instrument able to finance inflationary effects during construction to match the requirements of the specific project agreement with the Finnish state.

**Client Reference:** Jukka Hietaniemi; Finnish Transport Agency; Project director; +358 400 422 251; jukka.hietaniemi@fta.fi

NOTTINGHAM EXPRESS TRANSIT, DBFOM (MIXED PAYMENT), UNITED KINGDOM – MERIDIAM

**Project Highlights:** Total Project Value GBP920 Million; Financial Close in December 2011; in operations; Hybrid Structure of availability and fare-box revenues. The project involves taking over the existing line with rolling stock, and building 2 new lines with associated new rolling stock.

**Role:** Mr. Kottwitz led Meridiam efforts in developing, negotiating and closing the financial structure and contractual framework of this GBP920 million project which achieved Commercial and Financial Close on December 15th 2011. Responsible for leading the financial structuring efforts for the project on behalf of the six-strong sponsor group and representing Meridiam on all legal and commercial aspects.

**Impact on the Project:** From preferred bidder, Mr. Kottwitz provided leadership in structuring the financial and legal elements of the project during the on-going difficult market conditions where debt lending capacity was limited. With his strong relationships in the lending markets, he gave a group of commercial banks including BBVA, BTMU, CA CIB, and RBS the confidence to provide long-term debt (18 years) alongside the European Investment Bank to a partial demand risk project which includes taking over an existing tram line system with its associated rolling stock.

**Client Reference:** Chris Deas, Nottingham Express Transit (City of Nottingham), NET 2 Project Director, +44 115 876 4205, chris.deas@nottinghamcity.gov.uk

h. For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment. N/A
**Brief Resume of Key Personnel anticipated for the P3 Project.**

<table>
<thead>
<tr>
<th>a. Name &amp; Title:</th>
<th>Carlos Gonzalez, Project Finance Director for North America</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. P3 Project Assignment:</td>
<td>P3 Project Finance Lead</td>
</tr>
<tr>
<td>c. Name of Firm with which you are now associated:</td>
<td>Cintra</td>
</tr>
<tr>
<td>d. Years’ experience:</td>
<td>With this Firm 7 and Years With Other Firms 18 Years</td>
</tr>
<tr>
<td><strong>Cintra – Project Finance Director for North America (2013 – Present)</strong></td>
<td>General responsibilities include: structuring and negotiating financing and refinancing for projects in the U.S. and Canada through combinations of syndicated loans, bonds and equity, crafting of documentation and presentations to rating agencies, structuring, documenting and negotiating with bond underwriters and banks during the bid and closing phases, communications and negotiations with lenders, supporting the financial analysis team and Cintra’s internal equity investment approval process.</td>
</tr>
<tr>
<td><strong>Cintra – Senior Project Finance Manager (2008 – 2013)</strong></td>
<td>General responsibilities included: participating in structuring and negotiations of financing for infrastructure projects in North America, Europe and Latin America markets.</td>
</tr>
<tr>
<td><strong>Iridum Concesiones de Infraestructuras – Project Finance Manager (2005 – 2008)</strong></td>
<td>General responsibilities included: Carlos was involved in all procurement processes, submitted all financial documents and participated in the project’s financial closings.</td>
</tr>
<tr>
<td>e. Education:</td>
<td>Name &amp; Location of Institution(s)/Degree(s)/Year/Specialization:</td>
</tr>
<tr>
<td>Instituto de Empresa (Madrid, Spain), Executive Management Program, 2012</td>
<td>CFA Institute (USA), Chartered Financial Analyst – Level 1, 2004</td>
</tr>
<tr>
<td>Instituto of Advanced Finance (Madrid, Spain). Advanced Program in Market Valuation, 2003</td>
<td>University of San Diego, California (USA), BA Business Administration/Finance, 1996</td>
</tr>
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<td>f. Active Registration:</td>
<td>Year First Registered/ Discipline/ Registration #: N/A</td>
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</table>

**I-77 MANAGED LANES, DBFOM (REVENUE RISK), CHARLOTTE, NORTH CAROLINA – CINTRA**


*Role:* Carlos was in charge of raising financing for this project, including, but not limited to, negotiation with lenders and relationships with rating agencies and underwriters to secure financing through Private Activity Bonds. Carlos was responsible for structuring the financial solution and negotiating lender term sheets prior to bid submission, which resulted in the Project being awarded and financially closed.

*Impact on the Project: Securing diverse financing sources, oversubscription of PABs:* Carlos worked closely with underwriters Citigroup and Goldman Sachs to organize two roadshows in New York and Boston to subscribe an amount of $100 million in PABs. These efforts resulted in an oversubscription of five times the offering.

*Investment grade:* Carlos Gonzalez led all relationships, presentations and delivery of information and documentation to the two rating agencies charged with providing ratings for this project. The project was rated BBB- by Fitch and BBB by DBRS, both “investment grade.”

*First rating of DBRS for a demand risk project in the US.* I-77 was the first US demand risk project to obtain a rating from the agency DBRS. Carlos led the roadshow with bond investors, being able to generate enough demand (5x oversubscription) with the challenge of DBRS being a new agency to these investors. *Flexibility and innovation:* Due to a debt funding shortfall, Carlos and his team had to work closely with NCDOT to complete funding of the project, resulting in an extra equity disbursement from Cintra and virtually a neutral effect for the client, making Financial Close of the project possible. After commercial close, TIFIA, which was expected to finance 33 percent of project costs, reduced their proportion to 29 percent, which resulted in a funding gap of approximately $26 million. As a result, Cintra, in partnership with the lead
contractor, Ferrovial Agroman, and NCDOT, reached an agreement to streamline some small portions of the construction scope in order to (1) reduce construction costs and (2) lower operating costs for the developer. Ultimately, the equity members invested additional equity to close the funding gap. This creative solution, saved NCDOT over $20 million, even though Cintra was not under contractual obligation to do so.

Client reference: NCDOT. Rodger Rochelle, Director of Technical Services. Charlotte (North Carolina). Phone: 909-707-6601, Email: rdrochelle@ncdot.gov

HIGHWAY 407 EAST PHASE 2, DBFOM (AVAILABILITY PAYMENT), TORONTO, ONTARIO – CINTRA


Role: Carlos was in charge of structuring the project finance, negotiating, drafting of documentation and presentations to rating agencies, structuring, documenting and negotiating with bond underwriters during the bid and closing phase, communications and negotiations with lenders, supporting the financial analysis team and support in Cintra’s internal approval process for the request of the needed equity.

Impact on the Project: Securing diverse financing sources, oversubscription of PABs. Carlos raised $82 million in Series A (long-term) bonds and $200 million in Series B (short-term) bonds. Carlos worked closely with two underwriters, Royal Bank of Canada and Toronto Dominion Bank, to organize two roadshows, Toronto and Montreal, 13 one-to-one meetings with institutional investors, and a National Call to subscribe $282 million in bonds. These efforts resulted in an oversubscription of 3x the offering; in addition, Carlos raised a short-term revolving bank loan of $182 million. Investment grade: Carlos led conversations with rating agencies to get the project rated as “investment grade” by Moody’s (A3) and DBRS (A low). Innovative financial solutions: Instead of using a customary short-term senior debt facility, he was able to obtain, from four senior lenders (two local and two international), $182 million through a Senior Revolving Construction Facility, the total aggregated draws amounted $307 million, which significantly saved costs of structuring fees and commitment fees. Moreover, in order to minimized the negative carry of the bonds, Carlos led the purchased of a Structured Deposit Note with local bank.

Client reference: Infrastructure Ontario. Divya Shah, Senior Vice President Transaction Finance. Toronto, (Ontario), Canada. Phone: 416-326 8848, Email: divya.shah@infrastructureontario.ca

NTE 35W, DBFOM (REVENUE RISK), FORT WORTH, TEXAS – CINTRA


Role: Working together with Meridiam’s Sven Kottwitz, also a proposed Project Finance Lead for the I-66 Project, Carlos co-led all presentations to financiers and rating agencies, assisted with coordination and development of the financial model, and coordinated the lenders’ due diligence.

Impact on the Project. Securing diverse financing sources: Carlos secured a financing structure that combined long-term TIFIA loan in the amount of $531 million, $274 million from PABs and $430 million in equity. Investment grade: Carlos’ efforts helped achieve an investment grade rating. The bonds received ratings of Baa3 from Moody’s and BBB- from S&P. Working closely with underwriters: Carlos worked with four underwriters, J.P. Morgan. Bank of America Merrill Lynch, Barclays and Estrada Hinojosa & Company, Inc., to subscribe the $274 million of PABs, organizing two roadshows, in New York and Boston. Oversubscription of bonds: Carlos’ efforts resulted in a 4x oversubscription.

Client reference: TxDOT. John Munoz, Vice President of CDM Smith (formerly Deputy Director, Finance Division, TxDOT) Phone: 512-652-5320, Email: munozjp@cdmsmith.com

h. For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment.

N/A
# Brief Resume of Key Personnel anticipated for the P3 Project.

<table>
<thead>
<tr>
<th><strong>a. Name &amp; Title:</strong></th>
<th>Ricardo Bosch, Project Director for North America Business Development</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>b. P3 Project Assignment:</strong></td>
<td>P3 Project Finance Lead</td>
</tr>
<tr>
<td><strong>c. Name of Firm with which you are now associated:</strong></td>
<td>Cintra</td>
</tr>
<tr>
<td><strong>d. Years’ experience:</strong></td>
<td>With this Firm: 12 Years With Other Firms: 18 Years</td>
</tr>
</tbody>
</table>

**Cintra - Project Director for North America Business Development (2013 – Present)**

Responsible for leading the efforts of Cintra’s new business opportunities through procurement processes as well as through corporate mergers and acquisitions operations in Canada, U.S. and Mexico.

**Cintra - Global Head of Project Finance (2011 - 2013)**

Responsible for leading the structuring and negotiation of financing for infrastructure projects in North America, Europe and Latin America markets.

**Cintra - Project Finance Director North America (2007 – 2011)**

Responsible for developing, structuring and negotiating financing for projects in the U.S. and Canada.

**Cintra - Project Finance Manager (2005 – 2007)**

Responsible for developing, structuring and negotiating financing for projects in Europe and Latin America.

**Cintra – Project Finance Manager – Chile (2003-2005)**

Responsible for Finance manager for the Cintra-held portfolio of five concessions in Chile, with a total invested value greater than $1.4 billion.

**Sergio Merino y Cia – Senior Financial Advisor (2001-2003)**

Responsible for the review and the analysis of the financial model to issue a bond for two highways in Chile.

<table>
<thead>
<tr>
<th><strong>e. Education:</strong></th>
<th>Name &amp; Location of Institution(s)/Degree(s)/Year/Specialization:</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Exeter (Exeter, UK), MSc Finance and Management, 2001</td>
<td></td>
</tr>
<tr>
<td>Universidad de Chile, Santiago (Chile), MSc Engineering, 1997</td>
<td></td>
</tr>
<tr>
<td><strong>f. Active Registration:</strong></td>
<td>Year First Registered/ Discipline/ Registration #: N/A</td>
</tr>
<tr>
<td><strong>g. Document the extent and depth of your experience and qualifications relevant to the P3 Project.</strong></td>
<td></td>
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</table>

## L-77 MANAGED LANES, DBFOM (REVENUE RISK), CHARLOTTE, NORTH CAROLINA – CINTRA

### Project highlights:

### Role:
Ricardo supervised the bid management including strategy, risk analysis, schedule, financial modeling, financial structuring, and negotiations with NCDOT until Financial Close.

### Impact on the Project: Securing diverse financing sources:
Ricardo supervised all the financial close of the Investment grade: Ricardo signed off on the most important commercial decisions, resulting in optimized risk sharing with the client, which led rating agencies to assign an “investment grade” rating for this $632 million project. Both bonds and TIFIA loan received ratings BBB- from Fitch and BBB from DBRS.

### Client Reference:
NCDOT. Rodger Rochelle, Director of Technical Services. Phone: 909-707-6601, Email: rdrochelle@ncdot.gov

## NTE 35W, DBFOM (REVENUE RISK), FORT WORTH, TEXAS – CINTRA

### Project highlights:

### Role:
Responsible for the development and structure of the financing through a combination of syndicated loans, federal loans, tax-exempt financing, bonds and equity.

### Impact on the Project: Investment grade:
Ricardo worked with Carlos Gonzalez (proposed Finance Lead) and the two rating agencies tasked with rating the project. Both bonds and TIFIA loan received: Baa3 from Moody’s and BBB- from S&P.

### Client Reference:
John Munoz, Vice President of CDM Smith (formerly Deputy Director, Finance Division, TxDOT) Phone: 512-652-5320, Email: munozjp@cdmsmith.com
HIGHWAY 407 EAST PHASE 1, DBFOM (AVAILABILITY PAYMENT), TORONTO, ONTARIO – CINTRA


Role: Ricardo and his team structured the financing at the proposal stage and its implementation post-RFP through financial close. He directed the consortium in gathering the private equity for the project, holding negotiations, and securing the long and short-term bonds and short-term loan for the project.

Impact on the Project: Securing diverse financing sources: Ricardo and his team negotiated the deal involving multiple debt sources including long-term bonds, USD$91 million, a mixture of senior short-term bonds, USD$342 million and a senior construction facility of USD$228 million repaid with the milestone payments. He led all the internal procedures for the approval of Cintra’s equity (and contingent equity) disbursement of USD$12 million (project’s total equity: USD$24 million). Investment grade: Ricardo was directly involved in all negotiations with lenders, rating agencies and all financing, contracts achieving investment grade ratings for the bonds (S&P: A-, DBRS: A –low-) for this project granted by Infrastructure Ontario (IO).

Client reference: Martin Lavoie, Vice President & Director, Debt Capital Markets, Desjardins Securities. (Formerly Manager, Project Finance, IO). Phone: 416-8671594, Email: martin.lavoie@vmd.desjardins.com

LBJ EXPRESS, DBFOM (REVENUE RISK), DALLAS-FORT WORTH, TEXAS – CINTRA


Role: Ricardo directly designed all the project finance structure. He led the team’s presentations to financiers and rating agencies, coordinated development of the financial model, and coordinated the lenders’ due diligence.

Impact on the Project: Securing diverse financing sources: Ricardo led the project towards financial close. He raised secured $615 million from a tax-exempt bond issue (PABs), $850 million senior debt (TIFIA) and led all the internal procedures for the approval of Cintra’s equity disbursement $339 million (of a total needs of equity of $665 million). Investment grade: Ricardo carried out all conversations and presentation with lenders, underwriters and rating agencies, by clearly explaining the project’s risk profile. He was a key to the project achieve investment grade for both bonds financing (Fitch: BBB-, Moody’s: Baa3) and TIFIA (Fitch: BBB-).

Client reference: TxDOT. John Munoz, Vice President of CDM Smith (formerly Deputy Director, Finance Division, TxDOT) Phone: 512-652-5320, Email: munozjp@cdmsmith.com

NTE 1&2, DBFOM (REVENUE RISK), DALLAS-FORT WORTH, TEXAS – CINTRA


Role: Ricardo designed all the project finance structure. He led the team’s presentations to financiers and rating agencies, coordinated development of the financial model, and coordinated the lenders’ due diligence.

Impact on the Project: Securing diverse financing sources: Ricardo led the project towards financial close. He raised $400 million from a tax-exempt bond issue (PABs), $650 million senior debt (TIFIA) and led all the internal procedures for the approval of Cintra’s equity disbursement $277 million (of a total needs of equity of $489 million). Investment grade: Ricardo led all conversations and presentations with lenders, underwriters and rating agencies, by clearly explaining all the risk sharing of the project. He was a key to the project achieve investment grade for both bonds financing (Fitch: BBB-, Moody’s: Baa2) and TIFIA (Fitch: BBB-, Moody’s: Baa3).

Client reference: TxDOT. John Munoz, Vice President of CDM Smith (formerly Deputy Director, Finance Division, TxDOT) Phone: 512-652-5320, Email: munozjp@cdmsmith.com

b. For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment.
### Brief Resume of Key Personnel anticipated for the P3 Project.

<table>
<thead>
<tr>
<th>a. Name &amp; Title</th>
<th>Conor C. Kelly, Managing Director, Rubicon Infrastructure Advisors (Proposer Financial Advisor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. P3 Project Assignment</td>
<td>P3 Project Finance Lead</td>
</tr>
<tr>
<td>c. Name of Firm with which you are now associated</td>
<td>Rubicon Infrastructure Finance (“Rubicon”)</td>
</tr>
<tr>
<td>d. Years’ experience: With this Firm</td>
<td>4 and Years With Other Firms 18 Years</td>
</tr>
<tr>
<td>e. Education: Name &amp; Location of Institution(s)/Degree(s)/Year/Specialization</td>
<td>Scotia Capital (Part of the Bank of Nova Scotia) – Managing Director, Head of Global Infra Finance (International) &amp; Head of Global Infra Investments (August 2008 – March 2011) Mr. Kelly founded Scotia Capital’s international infrastructure advisory and lending business. He had overall responsibility for all of Scotia Capital’s infrastructure advisory and lending activities for all international markets. Mr. Kelly managed a team of 20 professionals from New York and established infrastructure teams in London, Singapore, Sao Paulo and Mexico.</td>
</tr>
<tr>
<td>f. Active Registration: Year First Registered/ Discipline/ Registration #:</td>
<td>DEPFA Bank PLC – Managing Director and Head of Infrastructure, Americas (January 99 – August 08) Mr. Kelly founded DEPFA’s Americas infrastructure advisory and lending business. He sponsored and led DEPFA’s first business expansion outside of Europe when he established the bank’s Americas infrastructure business in 2003 and grew the team to 18 professionals generating annual revenue of c. US$100 million. At the time of Mr. Kelly’s departure from DEPFA in 2008, its Americas advisory practice was recognized as the leading “buy-side” infrastructure financial advisor in North America (source: IJ) and was instrumental in the development of the P3 market in both the U.S. and Canada. DEPFA was actively involved as advisor or lead arranger in groundbreaking infrastructure transactions including the 495 Capital Beltway in Virginia, Golden Ears P3 project in BC, A30 Edmonton Ring Road, Chicago Skyway privatization and the Pocahontas Parkway P3 in Virginia.</td>
</tr>
<tr>
<td>h. Project highlights:</td>
<td>DEPFA Bank PLC – Managing Director and Head of Infrastructure, Americas (January 99 – August 08) Mr. Kelly founded DEPFA’s Americas infrastructure advisory and lending business. He sponsored and led DEPFA’s first business expansion outside of Europe when he established the bank’s Americas infrastructure business in 2003 and grew the team to 18 professionals generating annual revenue of c. US$100 million. At the time of Mr. Kelly’s departure from DEPFA in 2008, its Americas advisory practice was recognized as the leading “buy-side” infrastructure financial advisor in North America (source: IJ) and was instrumental in the development of the P3 market in both the U.S. and Canada. DEPFA was actively involved as advisor or lead arranger in groundbreaking infrastructure transactions including the 495 Capital Beltway in Virginia, Golden Ears P3 project in BC, A30 Edmonton Ring Road, Chicago Skyway privatization and the Pocahontas Parkway P3 in Virginia.</td>
</tr>
<tr>
<td>l. I-69 DBFOM P3 PROJECT, INDIANA – RUBICON</td>
<td>I-69 DBFOM P3 PROJECT, INDIANA – RUBICON Rubicon acted as the financial advisor to Isolux Infrastructure Netherlands and PSP Investments, the winning private sector consortium of the I-69 Section 5 availability based P3 project. I-69 Section 5 consists of the design, construction, upgrading, financing, operating and maintaining approximately 21 miles of existing State Road 37 between Bloomington and Martinsville, Indiana to an interstate highway under a 35 year concession after substantial completion. The total project size was $292 million ($252 million of debt and $40 million of equity). The project reached commercial close in April 2014 and financial close in July 2014.</td>
</tr>
<tr>
<td>m. Role:</td>
<td>I-69 DBFOM P3 PROJECT, INDIANA – RUBICON Rubicon acted as the financial advisor to Isolux Infrastructure Netherlands and PSP Investments, the winning private sector consortium of the I-69 Section 5 availability based P3 project. I-69 Section 5 consists of the design, construction, upgrading, financing, operating and maintaining approximately 21 miles of existing State Road 37 between Bloomington and Martinsville, Indiana to an interstate highway under a 35 year concession after substantial completion. The total project size was $292 million ($252 million of debt and $40 million of equity). The project reached commercial close in April 2014 and financial close in July 2014.</td>
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<td>n. Impact on the Project:</td>
<td>I-69 DBFOM P3 PROJECT, INDIANA – RUBICON Rubicon acted as the financial advisor to Isolux Infrastructure Netherlands and PSP Investments, the winning private sector consortium of the I-69 Section 5 availability based P3 project. I-69 Section 5 consists of the design, construction, upgrading, financing, operating and maintaining approximately 21 miles of existing State Road 37 between Bloomington and Martinsville, Indiana to an interstate highway under a 35 year concession after substantial completion. The total project size was $292 million ($252 million of debt and $40 million of equity). The project reached commercial close in April 2014 and financial close in July 2014.</td>
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<tr>
<td>o. Client Reference:</td>
<td>I-69 DBFOM P3 PROJECT, INDIANA – RUBICON Rubicon acted as the financial advisor to Isolux Infrastructure Netherlands and PSP Investments, the winning private sector consortium of the I-69 Section 5 availability based P3 project. I-69 Section 5 consists of the design, construction, upgrading, financing, operating and maintaining approximately 21 miles of existing State Road 37 between Bloomington and Martinsville, Indiana to an interstate highway under a 35 year concession after substantial completion. The total project size was $292 million ($252 million of debt and $40 million of equity). The project reached commercial close in April 2014 and financial close in July 2014.</td>
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**Key Personnel Resume Form**

*Instructions to Proposers*
concession contract granted by VDoT. The total project value was c. US$1,936 million comprising US$349m of equity, US$589m of PABs, US$589m of TIFIA financing and US$409m of VDOT grants. The 495 Express Lanes project procurement commenced in 2005 and reached Financial Close in December 2007. Key attributes include: The 495 Express Lanes was the very first dynamic tolling managed lanes project in the USA; the first utilization of Virginia’s new PPTA authority; the first use of PAB financing for a transportation project in the US; the first use of a “bank enhanced” capital markets floating rate note for a P3 transportation project; and financial close was reached under the backdrop of the worst credit crisis in modern history. This required the financial advisor to completely rework its plan of finance and method of financial execution over a 4-week period when the credit insurance (monoline) market collapsed.

**Role:** Mr. Kelly led the financial advisory team that developed the project from the development stage through financial close. Mr. Kelly’s role included: (i) assisting in concession contract negotiations with VDoT and its advisors, (ii) assisting in EPC contract negotiations between Transurban, representing the concessionaire, and Fluor Enterprise, (iii) development of the project plan of finance, and (iv) leading the DEPFA financial advisory team that developed the project financial model. Mr. Kelly was subsequently hired while at Rubicon to sell the 495 Express Lanes’ minority shareholder’s equity interest in this project and also the I-95 Express Lanes. Financial close on this particular M&A assignment was reached in June 2014.

**Impact on the Project:** As a result of Mr. Kelly’s involvement, the financial advisory team led the rating agency process that resulted in securing two investment grade rating, led the negotiating teams for securing the bank LC’s, led the bond underwriter selection process and negotiated terms with the investment banks, developed finance sections of the Bond Offering Statement, developed the project hedging strategy and oversaw financial close and the satisfaction of all CPs to financial close.

**Client Reference:** Mr. Michael Kulper, IFM (formerly President of Transurban North America) (tel: 1 212 784 2440, Michael.kulper@ifminvestors.com). Ms. Barbara Reese, formerly CEO VDoT and Mr. Declan McManus, Partner, KPMG, (+1 512 391 4909, declammcmansus@kpmg.com).

**POCAHONTAS PARKWAY ASSOCIATION SR895 (“PPA”) – DEPFA**

**Project highlights:** DEPFA acted as exclusive financial advisor to the Transurban Group in the acquisition of PPA. The PPA acquisition by the Transurban Group was the first true P3 transportation concession that VDoT entered into in 2006. The project involved the acquisition of an existing 63-20 not-for-profit corporation that had designed, developed, financed and operated and maintained 8.8 miles of road that connects the I-95 in Chesterfield County with Interstate 295 at the south of the Richmond International Airport in Henrico County. The project also included the plan, design, construction, operation and maintenance of the 1.6 mile connector road to Richmond Airport. The PPA acquisition was funded through a $408 million investment grade rated senior secured bank facility, a $150 million subordinated TIFIA credit facility which was provided to repay a portion of the senior bank debt and finance the Richmond Airport connector and $195million of equity. The PPA procurement process commenced in the summer of 2005 and reached financial close in June 2006. The project was innovative in the following ways: (i) first acquisition of 63-20 not-for-profit corporation by a private investor, (ii) changed TIFIA legislation to facilitate the refinancing of existing debt to allow for the construction of the Richmond Airport Connector and installation of new tolling equipment, (iii) facilitated the development of the TIFIA credit program and a new template for TIFIA financing of P3 transportation projects in the US; and (iv) paved the way for new VDoT PPTA authority and the first true toll road concession with the private sector that VDoT had entered into (PPA served as the template for the 495 and I-95 managed lane projects).

**Role:** Mr. Kelly originated the investment opportunity, identified and selected the equity partner and presented the investment idea to VDoT’s CEO (Barbara Reese). Mr. Kelly’s role included: (i) led the financial advisory team that secured equity, senior bank debt and subordinated TIFIA financing, (ii) negotiated the concession agreement with VDoT and its advisors, (iii) ran a competitive process to select the preferred project finance bank lenders and negotiated all term sheets and credit agreements, and (iv) oversaw the successful financial close of the project and satisfaction of all CPs.

**Impact on the Project:** In addition to successfully achieving financial close, Mr. Kelly’s role on the project helped to negotiate the TIFIA credit terms and he provided expert advice to facilitate the changing of TIFIA legislation. He also secured two investment grade ratings for the senior debt.

**Client Reference:** Mr. Michael Kulper, IFM (formerly President of Transurban North America) (tel: 1 212 784 2440, Michael.kulper@ifminvestors.com). Barbara Reese, formerly CEO VDoT and Mr. Declan McManus, Partner, KPMG, (+1 512 391 4909, declammcmansus@kpmg.com).

For Key Personnel required to be on-site full-time until final acceptance, provide a current list of assignments, role, and the anticipated duration of each assignment. N/A