



JOSEPH D. MARSH, P.E.

Career Summary:

The President of Wi-Skies, LLC, Joe brings over nineteen years of diverse engineering experience, with a focus on roadway lighting. Mr. Marsh is heavily involved with the Illuminating Engineering Society (IES), which sets the lighting design criteria most agencies adopt and is currently Chair of the Roadway Lighting Committee and is leading the international effort to change the existing policy regarding daytime lighting in tunnels. His strengths are leadership, sensible application of technical knowledge and project delivery, where he has consistently overseen many large-scale projects simultaneously while delivering superior quality work. In addition to his diverse lighting background, Joe has worked on several cutting-edge ITS projects, ranging from design to installation to integration and debugging. Mr. Marsh has repeatedly demonstrated his diversity as an electrical engineer who can oversee the design of any lighting, ITS, electrical, pump station, traffic signal, signing, pavement marking or airport electrical project.

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Education:

- ◆ B.S. Electrical & Computer Engineering - Valparaiso University, 2001

Professional

Engineering Licenses:

- ◆ Alabama #32331-E
- ◆ Arizona #62614
- ◆ Colorado #55752
- ◆ District of Columbia #907313
- ◆ Florida #73630
- ◆ Georgia #036491
- ◆ Illinois #062-061654
- ◆ Indiana #10810174
- ◆ Iowa #22626
- ◆ Kentucky #34872
- ◆ Louisiana #36940
- ◆ Maryland #42563
- ◆ Michigan #6201312127
- ◆ Minnesota #59750
- ◆ Mississippi #20726
- ◆ Missouri #2012026655
- ◆ North Carolina #040673
- ◆ Ohio #84932
- ◆ Pennsylvania #90197
- ◆ South Carolina #29699
- ◆ Tennessee #115448
- ◆ Texas #110975
- ◆ Wisconsin #43228-6
- ◆ Virginia #0402049887

Professional Societies:

- ◆ Chair of IES Roadway Lighting Committee

Project Summary:

Project Manager for Georgia DOT Lighting Design-on-Request Services. Joe has operated as an extension of GDOT staff as an in-house consultant to the GDOT Lighting Group for the past seven years, assisting them with many of their daily initiatives. As GDOT's lighting subject matter expert, Mr. Marsh frequently makes or provides guidance on both small and large decisions frequently. Often physically located at GDOT headquarters to offer his expertise, Joe assists GDOT in several significant tasks such as revising and maintaining Chapter 14 of the Design Policy Manual, reviewing and revising pay items and specifications, and identifying and developing design standards to be adopted by GDOT. He also led the effort to develop an LED Specification for the Department's use and provided guidance in their quest to adopt a statewide Light Loss Factor (LLF) for LED technologies. Joe reviews many projects submitted to the Lighting Group for approval, providing comments and approval as warranted. He has been instrumental in assisting the Department in enhancing the Department's policies as well as providing design guidance for photometrics and plans submitted for approval. Joe's expertise has been called upon by the group to assist in daily challenges the group faces, such as providing lighting recommendations for programmed projects, providing cost estimates for new and existing lighting installations (for repair) which are often provided directly to the Chief Engineer. Joe's unique ability to succinctly communicate direct answers and solutions to sometimes complicated problems in a timely manner continues to best serve the Department and public, creating essential continued growth of the Lighting Group.

Project Manager for Iowa DOT Non-Design-on-Request Services. Joe's role with Iowa DOT is similar, where he is in the process of overhauling the Department's lighting policy, standards, specifications and pay items as necessary to bring them more current. He also provides design reviews from other firm designs and development of lighting master plans and retrofit projects. He has provided several large-scale LED retrofit designs, developed the LED specification and evaluated many short tunnels for experimental installation stemming from his work with the short tunnel research. He shares his experiences with other state agencies and municipalities to assist the Iowa DOT lighting program move to the front of the line on many relevant issues.

Project Manager for Tennessee DOT Roadway Lighting Design Services. Joe holds a key role with Tennessee DOT, where he is in the process of overhauling the Department's lighting policy manual, specifications and standard drawings. Much of this work is essential due to evolving technologies and national recommended practice, but also due to debatable language and directive within the existing policies that put the Department at risk for design-build efforts. Joe's experience on the other side of the table provides invaluable insight to improved contract language which would be difficult to debate in the future. This work also includes adding several standard drawings in an effort to streamline the design and construction work throughout the state.

Senior Electrical Engineer for Illinois DOT Design-on-Request Services. Joe assists the Illinois DOT Lighting and Mechanical Division with high-end policy reviews and modifications and guidance on significant decisions regarding policy. He assists IDOT in several high-level tasks such as revising Chapter 56 of their Bureau of Design and Environment Manual and the LED specification, reviewing designs and identifying and developing design standards to be adopted by IDOT. He is researching several topics, such as the possibility of allowing over 5% voltage drop for LED technologies and researching high mast tower cost savings and lowering device alternatives. Joe also developed the DOT's Intersection Design Guide, which encapsulates the practical approach to many of the recommendations found in IES' RP-8, DG-19 as well as the AASHTO Roadway Lighting Design Guide. This guide was pushed to the IES Intersection sub-committee, of which he is sub-chair in, and subsequently adopted on the international level.



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Project Manager for I-285 at I-20 East Interchange Lighting (GDOT) Wi-Skies is designing the lighting at the I-285 interchange with I-20 on the east side of the loop as part of GDOT's Major Mobility Investment Program (MMIP). As part of a massive design-build effort, the interchange is being reconstructed to improve traffic flow throughout the interchange as well as adjacent interchanges. These improvements include increased entrance and exit ramps for all interchanges as well as the main interchange itself, which includes the addition of several flyover ramps as well as increased roadway width. Most of the interchange area will be lit using high mast towers, however, because of the elevation differences between the mainline and some the flyover ramps, supplemental conventional lighting is necessary on the taller flyover ramps. Full photometric analysis including all roadway elevations along with the tower heights based on actual proposed cross-section elevations were done throughout the project to verify lighting criteria was met. The cross-sections were also analyzed to determine where any existing towers may be re-used based on the local grade. Due to the increased roadway widths, ROW constraints coupled with both structural and noise wall obstructions, placement of high mast towers was difficult or impossible to place, leading to extensive coordination with the roadway and bridge designers to accommodate. Spill lighting analysis was done at the ROW in certain quadrants where residential properties were prevalent. These residential properties in some quadrants, along with dense forestation in other quadrants, also limited the service point locations to power the very large electrical load, which resulted in extensive coordination with the local power company. Joe is responsible for developing the complete lighting design for the entire 2.8 miles of interchange lighting, including photometric calculations, installation details, voltage drop calculations and cost estimates.

Project Manager for I-35 NEX Central Design-Build Lighting Quality Control (TXDOT) The Texas Department of Transportation (TxDOT) is expanding approximately 19.5 miles of interstate highway I-35 in Bexar, Comal, and Guadalupe Counties, Texas. The I-35 design-build project involves the construction of two non-toll 15-mile-long elevated bridges between the I-35 main lanes and frontage roads. The elevated lanes will provide one high occupancy vehicle lane and two general-purpose lanes in each direction. In addition to the elevated lanes on either side of I-35, the mainline lanes of I-35 will be widened for the addition of two general-purpose lanes. The project also includes revisions to ramps and frontage roads to transition the elevated lanes and connectors with the existing highways. Wi-Skies has the distinctive opportunity to provide quality control and design oversight for lighting of the entire project, which encompasses the entire 19.5 miles of the interstate. Our role includes conversing with three design firms and the overall PM to make sure uniform lighting is provided throughout the project. Multiple drawing packages need to be reviewed and TXDOT specific lighting requirements must be adhered to. The complexity of this layout of highway makes it imperative the lighting is designed correctly and the lighting on the pavement is uniform so that motorists navigating this stretch of extremely busy highway can do so safely and effectively.

Project Manager for I-285 at I-20 West Phase 1 Lighting Study for GDOT As part of GDOT's Major Mobility Investment Program (MMIP), the existing I-285 interchange with I-20 on the west side of the loop is being reconstructed to improve traffic flow throughout the interchange as well as adjacent interchanges. These improvements include increased entrance and exit ramps for all interchanges as well as the main interchange itself, some of which include eliminating weaving areas and replacing them with dedicated throughway tunnels. This work will be accomplished through a design-build effort, which will be awarded at a later date. Wi-Skies role in this project is to provide the Phase 1 engineering study and oversee and approve the lighting aspects of the final design and construction of the project. The Phase 1 study includes developing a conceptual lighting layout for the entire project, which consists mostly of high mast lighting throughout the interchange, as well as other areas that have conventional lighting and delving into whether expanding the lighting limits is warranted, based on sub-standard conditions, crash data or other conditions. There are also twenty-four underpass structures which need to be evaluated for potential daytime lighting. Joe is responsible for developing a final report which will provide the conceptual lighting design, including photometric calculations, cost estimates as well as any potential conflicts or obstacles the design-build team may encounter during final design and construction, which will be provided as part of the bid documents.

Project Manager for Light Pole Inspection and Deficiencies for City of Sunny Isles Beach, FL Wi-Skies was brought in to inspect approximately 130 decorative teardrop light poles installed along Collins Ave (A1A), which were recently installed as part of an FDOT project. Unfortunately, much of the electrical work done by the contractor was not done in accordance with FDOT specifications or the plans and the Construction Engineering Inspection (CEI) group did not catch the mistakes, which resulted in the failure of all of the lights within months of being turned over to the City. Most of these issues were related to the fact that the contractor did not use outdoor rated cabling throughout the project and utilized indoor rated transformers to power festoon outlets near the top of the pole. Our primary responsibility was to inspect the lighting system and identify the critical issues for a different contractor to provide an expedited repair. Providing documentation for potential litigation is one of our secondary functions on this project. The contractor also drilled the poles with holes to mount externally mounted transformers near the pole base, which put into question the structural integrity of the poles, especially given the 150 MPH wind zone area the poles resided in. After working with the pole manufacturer, however, it was determined that the holes did not impact the structural integrity and the warranty was still valid. Joe oversaw the entire project, including the physical inspection of many of the light poles and adjoining handholes and developing the report for the City.

Project Manager for Effingham County Roundabouts Lighting Design Effingham County, GA is developing plans for eight total roundabouts throughout a business development area. These roundabouts will increase travel speeds through the area, as well as decrease the seriousness of traffic accidents at some of the intersections. Each of the eight roundabout sites require lighting, both within the roundabout circle, but also at each crosswalk, along each approach leg, in accordance with IES standards. Joe is responsible for the rapid delivery of multipole design packages for the eight roundabouts including photometric calculations, coordinating service point locations, performing voltage drop calculations and developing plans.

Project Manager for Pensacola, FL Fuel Farm ST Engineering at Pensacola airport is installing a fuel farm to provide a site to offload and re-fill fuel from planes before and after maintenance activities performed at the site. Joe is developing electrical and site lighting plans to provide power to the fuel farm, which is powered by a 15 horsepower pump, which will be fed from a new panel being installed

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as part of this project, which will be sub-fed from an existing panelboard within the building. Additionally, a new covered building for other maintenance activities is being constructed, in which outlets and lighting are being provided.

Project Manager for Carolina Crossroads Phase 1 Design-Build for South Carolina DOT SCDOT is designing improvements along the interstate corridor of I-20/26/126 which includes system interchanges at I-20/I-26 and I-26-I/126 in Lexington and Richland Counties in five phases, of which this is the first. These improvements are proposed to increase mobility and enhance traffic operations by reducing existing traffic congestion within the I-20/26/126 corridor, while accommodating future traffic needs. The corridor's approximately 14 miles of mainline interstate include I-26 from Exit 101 - Broad River Road (US 176) to east of the Saluda River, I-20 from the west of the Saluda River to west of the Broad River, and I-126 from I-26 to east of the interchange with Colonial Life Blvd. Joe is overseeing the full continuous lighting design along the interstates, the interchanges and includes lighting for Colonial Life Blvd and Greystone Blvd. both north and south of the interchanges. The design includes both high mast towers along the interstate and interchanges as well as conventional roadway lighting along the ramps and side streets. Every effort has been made to minimize spill lighting to the residential areas on the side streets. Joe was also responsible for powering lighting on fourteen overhead signs throughout the project. As this scope was added during construction, it required revisions to the lighting plans as well.

Project Manager for Sandy Springs, GA Roswell Rd RTA Lighting. Wi-Skies is responsible for developing lighting plans for 2.35 miles of Roswell Rd as part of their Road Transit Access program. The highly commercial corridor begins at Meadowbrook Dr and ends at Northwood Dr and includes intersections with Windsor Parkway, Glenridge Dr and Lake Placid Dr. The lighting requires the use of their decorative fixtures (Type A and Type C), placed dependent on their location to driveways, entryways and intersections as visible identifiers both during daytime and nighttime. Photometric calculations were conducted to verify all lighting design criteria is being met along all sidewalks along the corridor. Joe was responsible for all photometric and voltage drop calculations, conduit and cable plans and installation details.

Project Manager for Carolina Crossroads Phase 2 Design-Build for South Carolina DOT SCDOT is designing improvements along the interstate corridor of I-20/26/126 which includes system interchanges at I-20/I-26 and I-26-I/126 in Lexington and Richland Counties in five phases. These improvements are proposed to increase mobility and enhance traffic operations by reducing existing traffic congestion within the I-20/26/126 corridor, while accommodating future traffic needs. The corridor's approximately 14 miles of mainline interstate include I-26 from Exit 101 - Broad River Road (US 176) to east of the Saluda River, I-20 from the west of the Saluda River to west of the Broad River, and I-126 from I-26 to east of the interchange with Colonial Life Boulevard. Phase 2 of the design includes the design of I-20 as well as a new Diverging Diamond Interchange at Broad River Road (US 176). The lighting design includes both high mast towers along the interstate and interchange as well as conventional roadway lighting along the side streets, with an effort to minimize spill lighting to the residential areas on the side streets. Joe was also responsible for powering lighting on seventeen overhead signs throughout the project. As this scope was added during construction, it required revisions to the lighting plans as well.

Project Manager for Lighting for SR 146 from SR 1 to Lakeview Rd (GDOT) This project encompasses the reconstruction and widening of over two miles of SR 146, which includes a total of three roundabouts. Each of these roundabouts requires full lighting, including both horizontal illuminance calculations for the roundabout area, but also vertical illuminance calculations along each of the crosswalks. There is also a segment of SR 146 which will be lit between two of the roundabouts due to their proximity to each other. Joe is leading the entire lighting design effort by overseeing the photometric calculations, coordinating service point locations, performing voltage drop calculations and developing plans.

Project Manager for Johns Creek Parkway at Lakefield Dr Roundabout Lighting (City of Johns Creek, GA) This quick response project involves the replacement of an existing intersection with a new roundabout to reduce the severity and frequency of crashes at the busy intersection. Joe is responsible for the lighting design effort by overseeing the photometric calculations, performing voltage drop calculations and developing plans. This includes the evaluation of the existing lighting along both intersecting roads, as well as tying into the existing electrical systems.

Project Manager Designer for Enbridge Energy – Straits of Mackinac Tunnel Boring Enbridge Energy is looking to bore a 4 mile utility corridor under Lake Michigan. As part of the tunnel bore project, Enbridge is adding to their Mackinac south facility. These proposed additions have caused concerns with the neighboring properties and owners; The Headlands International Dark Sky Park and the local indigenous tribes. Wi-Skies has been tasked with quality control and design oversight, to insure that IES and other applicable guidelines are met. This would be to both identify the minimum light levels necessary for construction activities, but also minimize any sky glow as a direct result of the lighting. Joe is responsible for overseeing the review of all documentation, providing a final report with his findings and creating 3D renderings to help with the approval process.

Project Manager for City of Albany Lighting at Traffic Signal Upgrades. The City of Albany, GA is upgrading sixteen intersections throughout their downtown corridor as part of a traffic enhancement and beautification project. As part of this work, they are installing decorative lighting onto these traffic signal poles, for which Wi-Skies is responsible for. Given the luminaire locations are dictated by the traffic signal locations (by MUTCD), the challenge is meeting intersection lighting requirements with these limitations. It is our responsibility to provide luminaires to maximize the lighting delivered where it needs to be within the intersection while also meeting the aesthetic objectives of the project. Joe is responsible for the photometric design, voltage drop calculations and the development and delivery of the final lighting plans.

Project Manager for I-26 Widening Between MM 85-101 for SCDOT Sixteen miles of I-26 are being expanded to accommodate an additional lane in each direction from mile post 85 to 101 north of Columbia, South Carolina. As part of the project, two interchanges are being revised which include full lighting design which Wi-Skies is responsible for designing. Additionally, Wi-Skies will design and

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implement a new state of the art Weigh-In-Motion (WIM) system in the northbound direction. Joe is responsible for all lighting design, including photometric and voltage drop calculations, plan development, cost estimates and specifications. He is also responsible for the WIM design, implementation and verification.

Project Manager for Sea Island at Frederica Roundabout (Glynn County, GA) The County is replacing the existing major intersection at Sea Island and Frederica with a roundabout to improve traffic flow. Wi-Skies is tasked with providing new lighting at this intersection and working with Glynn County to establish lighting standards for the island; both conventional and decorative. Joe is responsible for all lighting plans, including calculations.

Project Manager for Lighting for US 701 over Cape Fear River – North Carolina DOT The existing 1250' long bridge over Cape Fear River was being reconstructed when lighting was added to the project. As one side of the bridge was already constructed, all four lanes of traffic had to be lit from only one side of the bridge, posing a challenge. We developed a solution using horizontal mounted Type IV fixtures, which were able to meet photometric requirements. As the project was under construction, the lighting design had to be completed in a matter of only a few weeks, complete with light pole mounting details as part of the revised bridge plans.

Project Manager for Woodruff Road Bypass – Greenville, South Carolina (SCDOT) Wi-Skies is providing a complete lighting design for the Woodruff Road Bypass project, which spans a total of six miles of roadway. Woodruff Road is a highly traveled roadway and experiences extreme congestion during peak travel times. SCDOT is proposing a parallel route to bypass the overly crowded Woodruff Road. The roadway contains ten total roundabouts with four travel lanes with a decorative median for most of the route, along with both a sidewalk and multiuse path. As an additional challenge, this roadway intersects a railroad and crosses under transmission lines. Wi-Skies will be responsible for the lighting the entire parkway limits including photometric calculations, service point coordination, voltage drop calculations, conduit routing, and lighting plan development.

Project Manager for Langford Parkway (SR 166) Lighting Replacement. Langford Parkway is a major thoroughfare which connects I-285 to I-85 north of the Atlanta airport in the southwest side of the city. The corridor was originally built as an urban collector, but over time has become an access control freeway with entrance and exit ramps. However, urban curb still exists in portions of the roadway and the lighting was installed based on the original urban collector setting and subsequent setbacks. Because of this, most of the lighting installed on the outside of the roadway is within unprotected clear zone and subject to frequent knock-downs. As the entire 6.5 mile corridor is continuously lit, this results in a lot of maintenance. To properly address this situation, coupled with inadequate lighting, the recommendation was made to provide a new lighting system through the corridor which will increase pole setbacks coupled with barrier protection as warranted. This new lighting system will also replace and upgrade the existing lighting along the median wall, where applicable. As the corridor was untouched for decades, full survey, LIDAR and SUE is necessary, which Joe is coordinating the effort on through our sub-consultant. Joe is also responsible for the entire stand-alone lighting plan set, including plan development, photometric and voltage drop calculations, specifications and cost estimates. The entire electrical system, including service point locations, cabling and conduit except for that within the barrier walls for the lighting system will be replaced as part of this project.

Project Manager for Lighting for SR 120 from SR 141 to Peachtree-Industrial (GDOT) The reconstruction and widening of over 2.5 miles of this major thoroughfare is substantial and comprises of several large intersections and a roundabout. As part of the project, a multi-use path is being installed along one side of the roadway and a sidewalk will be installed on another, both of which will be properly lit, along with the roadway. Due to narrow ROW and presence of many utilities, this presents many interesting underground and overhead challenges throughout the project. The project spans two cities and ranges from commercial to residential, making the lighting objectives quite different. In-depth analysis is necessary to make sure lighting does not end up where it is not desired, such as in the sensitive residential areas, while also meeting the recommended values for the wide roadway. Mr. Marsh is leading the entire lighting design effort by overseeing the photometric calculations, putting together documents for multiple Cities and DOT review, coordinating service point locations, performing voltage drop calculations and developing plans.

Project Manager for ITS and Lighting for I-285 WB Auxiliary Lane Design-Build Project for GDOT A 1.25 mile long auxiliary lane is being constructed along I-285 westbound between Roswell Rd and Riverside Dr as part of an advance project for a larger scale future project. This project will extend an existing bridge over Long Island Dr, which will impact the existing lighting underneath the bridge, which is being replaced and re-spaced. Additionally, the existing Mt Vernon bridge over I-285 will be replaced and relocated 25' east to minimize construction impacts for staging. The new bridge will have significant lighting on it, including pedestrian scale post top poles integral to half-walls between sidewalks and separated bike path, wall sconce lights along the sidewalks and sign lighting on the outside of the bridge to accentuate new decorative signage attached to the decorative bridge façade. Additionally, many ITS components are impacted by the outward construction, including a camera, microwave sensors, variable speed limit signs and their related equipment and service points. All existing equipment is being removed with new equipment being installed, along with proper documentation of line of sight for all equipment as well as new tie-ins to fiber and electrical. Joe is responsible for all lighting and ITS plans, including calculations and construction details.

Project Manager for Lighting for SR 365 at Howard Rd Roundabouts (GDOT) A new bridge is being constructed over SR 365 to eliminate a high-speed intersection, which is expected to have a significant traffic increase due to the construction of Lanier Technical College adjacent to the intersection. This new bridge are bookended by roundabouts which Wi-Skies is responsible for lighting. Each of these roundabouts requires full lighting, including both horizontal illuminance calculations for the roundabout area, but also vertical illuminance calculations along each of the crosswalks. Joe is leading the entire lighting design effort by overseeing the photometric calculations, coordinating service point locations, performing voltage drop calculations and developing plans.

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Project Manager for Lake Charles Regional Airport Electrical Rack Relocation in Lake Charles, LA Lake Charles Regional Airport main rack powering their parking lot lighting and FA helicopter building was destroyed after it was hit by a Hurricane in 2013. Joe is responsible for reviewing the current layout of the rack and updating the equipment and relocating the rack to a safer location well as building out an existing panel to accommodate the new loads. He is responsible for all aspects of the design including preparation of plans, load and voltage drop calculations, cost estimate and specifications within a very tight deadline.

Project Manager for Experimental Daytime Lighting at both I-85 at SR 237 and I-285 at SR 13 for GDOT. As part of ongoing high level research work with IES, GDOT and other agencies, Joe is leading the effort to overhaul the international standard for daytime lighting within short tunnels, which are considered to be under 400'. Measuring of over a dozen tunnels has led to the belief that the amount of daytime lighting recommended within short tunnels is excessive and Joe is leading the charge to provide only lighting which would be minimally necessary to ensure good visibility throughout the tunnel and nothing more. As part of this effort, GDOT has chosen two tunnels which certainly need some sort of daytime lighting and tasked him to provide what he believes will be the minimum amount of lighting necessary within them. Joe and his team is putting together full lighting plans to accomplish this and will verify the results in the field before it is ultimately accepted. From these tunnels and others, the hope is that GDOT can revise policy based on these findings, even before international policy is revised.

Project Manager for I-74 Danville Lighting Replacement, IDOT District 5, Contract 70A29 The District is making several traffic improvements along the corridor through three interchanges along I-74 – MLK Drive, N G St and US 150 in Danville, IL. This presented them the opportunity to retrofit the existing lighting to LED. All existing roadway lighting poles not affected by the roadway work, so a simple retrofit was done for a majority of the poles. An auxiliary lane was also added to a portion of I-74 near N G St. where several luminaires were required to be removed and reinstalled to accommodate the new lane. In the end three manufacturers were determined to meet the standards called out in the IDOT BDE manual. The District also combined two lighting controllers at the MLK interchange into one controller as the load LED luminaires requires is much lower than that of the existing HPS fixtures and one of the existing controllers was difficult to access. Joe was the engineer of record and managed the delivery of all photometric calculations, lighting plans, specifications, cost estimates, etc associated with the lighting retrofit and revisions.

Project Manager for Solar Lighting – SR 99 at SR 25 - GDOT. Deemed a high priority project by Management, a roundabout will be created in the place of an existing three-legged intersection. Without local support for paying the lighting bill, the Department will instead go to a completely solar lighting design. Due to the presence of overhead transmission lines, historical boundaries, and heavy forestry at the roundabout, finding a location for the solar array is challenging. Even after identifying a nominal location, a difficult decision was made to eliminate many very tall trees which would cast a shadow over the array during much of the day, hindering the design, which is to nominally create the system to be self-sufficient for up to ten days. Joe is designing all aspects of the electrical design, including the alternative energy solution and lighting design, consisting of photometric calculations, lighting plans and specifications.

Project Manager for Lighting, ITS and Signage for SR 400 Pedestrian Path Wi-Skies provided lighting, ITS and signage plans for a new pedestrian path which is being installed immediately adjacent to SR 400, one of the most heavily traveled roadways in the Atlanta area. The four-mile-long pedestrian path runs through several areas, including residential, commercial and even interstate sections of SR 400. At locations where the path crosses an existing roadway, which is at Lorida Dr, Windsor Pkwy and Northland Dr, double indicated lighted pedestrian crossing signage is being provided along with traffic warning beacons in advance to the drivers. This flashing warning system elevates the awareness of the busy pedestrian crossing. Existing lighting is impacted at several locations, both because the pedestrian path is immediately adjacent to SR 400 in several locations, but it also crosses over interchange ramps, which resulted in existing lighting to be relocated. Finally, much of the path was installed directly on top of the main DOT ITS trunk line, resulting in the need to address impacts as appropriate. Nearly a mile of new fiber backbone was provided as part of the project relocation, along with another mile of new drops to the many devices within the project area, all of which was challenging given the elevation differences between the devices at grade and the path, which varied in elevation. Joe was responsible for all lighting, signage and ITS plans, including several construction details.

Project Manager for Ozora Church Rd Roundabout (GDOT). An existing three-legged intersection in a rural area is being converted to a roundabout. As the area is also littered with many large trees and distribution lines which have minimum clearance requirements, light pole placement was limited. To save cost, approach lighting on some of the legs was recommended for removal where there was adequate visibility from an AASHTO safe stopping distance. Joe is responsible for the lighting on this project, including photometric calculations and plan preparation.

Project Manager for SR 42 at United and Skyhaven for GDOT. An existing four-way intersection is being expanded due to increased capacity demands. Full intersection lighting is being provided as well to combat an ongoing trend of increased pedestrian and vehicular strikes near the intersection. Joe is the engineer of record for performing photometric calculations, voltage drop, and quantity calculations for the lighting design for the intersection.

Project Manager for I-285 at SR 400 Interchange Lighting and ITS Power (GDOT) As part of the largest design-build effort the state has ever taken on, Joe designed the entire lighting and electrical ITS work for the interchange, comprising of several hundred devices. This interchange is the busiest and fastest-growing interchange in the Atlanta area, subject to traffic volumes of over 250,000 vehicles daily. The overall design intent is to provide collector-distributor (CD) lanes throughout the project limits for a total of 8.3 miles along both SR 400 and I-285, which will eliminate much of the congestion in the area. Throughout the design process, several lighting and ITS design alternatives were designed and considered. Due to the contract requirements, an extra nine amps (9A) was required at the end of each of the ITS branch circuits to allow for maintenance and future expansion. This design constraint required implementing a

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secondary transformer design for the entire ITS system. Joe also oversaw all electrical installation operations throughout construction by reviewing shop drawings, answering RFI's and making plan revisions as needed due to field changes and other on-the-fly revisions.

Project Manager for Lighting at I-77 and SC Hwy 9 Interchange. This existing interchange is adding lighting at the I-77 and Hwy 9 interchange along with tying into another project that is adding lighting along Hwy 9. This project is a combination of high mass towers and conventional roadway lighting. The use of high mast towers will cover the bridge over I-77 and conventional roadway poles will be used along the ramps. We are working with Duke Energy to make sure that this project ties directly to another lighting project along Hwy 9 to ensure full coverage throughout the corridor. Joe is responsible for the entire standalone lighting plan set, including development of plans and oversight of a Geotech sub-consultant, necessary to ensure proper high mast tower foundations are installed at each of the tower locations, based on actual soil conditions.

Project Manager for Allison Rd Pedestrian Sidewalk Lighting for City of Beaufort, SC. As part of the beautification of the city of Beaufort, SC, SCDOT added a sidewalk on one side of Allison Road between Cottage Farm Drive and Ribaut Road and wanted to add pedestrian lighting to this sidewalk. The City of Beaufort of a City Standard pedestrian luminaire on a decorative pole. It was Wi-Skies responsibility to provide the lighting design for the pedestrian sidewalk while also illuminating the street. With extremely close ROWs and numerous existing trees and electrical lines, this presented many interesting underground and overhead challenges throughout the project.

Project Manager for SR211 at CR1 County Line-Auburn Rd/Mulberry Rd Roundabout (GDOT). An existing interchange is being transformed into a roundabout. Wi-Skies is providing lighting for the roundabout as it is located on a state route. Mr. Marsh is responsible for the lighting design and providing full lighting plans at the roundabout.

Project Manager for SR 98 at SR164 Roundabout for GDOT. A new roundabout is being designed at this intersection. Joe is the lead lighting designer for the lighting at this new roundabout, performing photometric calculations, voltage drop, and quantity calculations for the lighting design for the intersection.

Project Manager I-85 at SR 42 Interchange for Georgia DOT Wi-Skies was engaged in designing the lighting at the interchange of I-85 and SR 42 in Druid Hills, GA, which featured a new L-cut crossover bridge in the middle of the existing interchange. This project also included many utility conflicts as multiple sets of power lines lined both sides of SR 42 in addition to limited access in a quadrant due to an existing children's hospital. Additionally, many of the light poles had to be mounted on the new bridge to light both the new and existing bridge, which was unaffected by the new construction. Joe was responsible for the entire set of electrical drawings, including assisting with development of the barrier wall mounted light pole foundations.

Project Manager for SR 92 at Demooney and Jones Roundabouts (GDOT). An existing project is transforming two existing intersections into two roundabouts in an expanding commercial area. The expansion is bookended by two roundabouts, of which Wi-Skies is providing lighting for. Joe is the lead lighting designer of this project which includes photometric calculations, voltage drop calculations, plan preparation and quantity calculations.

Project Manager for Bridgeway Pedestrian Bridge Lighting in Mauldin, South Carolina (SCDOT) Wi-Skies was engaged to design the decorative lighting for a pedestrian bridge in Mauldin, which expands the Swamp Rabbit Trail to the Golden Strip. The pedestrian bridge originated in a proposed lighted courtyard, proceeded over I-385 and concluded at Bridgeway Station. The designers of the bridge had detailed concepts of the decorative lighting they wanted to see on this project, which included façade lighting along the outside vertical posts of the bridge, decorative acorn pedestrian fixtures on the bridge, and lighted handrails. The design also featured a decorative arch structure in the middle of the bridge which was to be highlighted with floodlight fixtures mounted at various distances from the base of the structure and graze fixtures along the top ridge. All lighting had to be placed and considered so it didn't cause a glare issue with travelers on the interstate below. The main entrance courtyard was also planned with decorative acorn pedestrian fixtures and lighted handrails. Wi-Skies was able to model all these design elements in AGI32, meet RP-8 recommended lighting levels, and provide cost estimates for the client.

Project Manager for I-75 at Highway 151 Interchange Lighting – City of Ringgold, GA. Joe oversaw the design and permit application and approval for the installation of four high mast towers at the Highway 151 interchange at I-75 for the City of Ringgold, GA. There were originally four towers installed at the interchange before a tornado destroyed them a number of years ago. The interchange had been overhauled and expanded since that time and the lighting was missed. Joe oversaw the lighting design, which was submitted through GDOT's permit process (GUPS) and ultimately approved for installation.

Project Manager for Miami Gardens Lighting Evaluation – City of Miami Gardens, FL. The City of Miami Gardens recently went through an LED retrofit project and have been receiving complaints from the results from the residents ranging from dark spots, poor uniformity and glare, among others. It was determined that the luminaires chosen to retrofit old technologies were not evaluated properly before installation by the power company providing the retrofit. We have been brought in to assist with identifying the problem areas and develop solutions in the quickest and cheapest way possible, limited to using luminaires and poles from the power company's inventory. Joe is leading the team to ensure proper lighting design is done for typical sections within the City, which ranges from industrial, commercial and residential areas.

Project Manager for I-285 Eastbound Bridge Replacement DB (GDOT). As part of their ongoing MMIP program, GDOT plans on expanding I-285 in the coming years. The purpose of this project is to reconstruct three bridges which pass over I-285 to remove structural bridge support columns which would be in the way of constructing these additional lanes in the future project. This forward

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thinking will expedite the schedule of the eventual I-285 expansion project. Joe is leading the lighting design for all lighting on the bridges along with any other lighting impacted by the bridge or surrounding areas, including interchange ramp areas.

Project Manager for SR 400 Pedestrian Path in Sandy Springs, GA. The City of Sandy Springs is constructing multi-use path which runs parallel to SR 400 for 3.5 miles. This path meanders through both residential areas but is mostly in close approximation to the major corridor, leading to many impacts to the existing main GDOT ITS duct bank, as well as power feeds to ITS devices and lighting along the corridor. Joe is responsible for identifying all impacts to the existing electrical and fiber system and developing plans to ensure its operation during and after the path's construction. He is also responsible for developing pedestrian crossing (RRFB) plans at two locations.

Project Manager for Fred Nash Roundabout Lighting in Myrtle Beach, SC. SCDOT designed a roundabout just south of SC Hwy 17 at Harrelson Blvd and the entrance to the Coastal Grand Mall in Myrtle Beach, SC. One leg of the roundabout is the entrance to Coastal Grand Mall and one leg of the roundabout is the relocation of Fred Nash Blvd. This is a unique roundabout in that Harrelson Blvd enters and exits the roundabout both north and south but continues through the center of the roundabout, commonly referred to as a "hamburger" roundabout. Wi-Skies worked closely with the City of Myrtle Beach, SCDOT, the contractor and the local utility company while designing the lighting for this roundabout to install the lights based on a photometric design Wi-Skies provided to meet IES requirements. Since this roundabout is in a heavy traffic area with high roadway speeds, Joe approached the design as a partial interchange, making sure the area was well lit, both within the roundabout area, but also the approaches and departures.

Project Manager for Tucker Summit CID Lighting Evaluation – City of Tucker, GA. The Tucker Summit CID has been trying to retrofit their existing lighting system to LED for years, but have been having trouble making it happen with the power company. As they have also heard about LED retrofit design issues, they engaged Wi-Skies to assist them in assuring a proper lighting design is ultimately delivered on the streets within the CID. Our task is to work with the power company to either review their supplier's lighting design or provide a design in typical sections for the power company to install in specific corridors. In total, there are over 15 miles of roadways, both commercial and industrial, to be retrofitted. Wi-Skies will be reviewing the current installation areas along with adding lighting in desired areas within the CID.

Project Manager for SR 9 at AC Smith Roundabout for GDOT. A three-legged roundabout is being constructed at an existing intersection to reduce crash rates and severity at a rural roundabout. Proper lighting was designed for the roundabout to include the roundabout, crosswalk facilities, and the approaches within the roundabout area. However, recommendations were provided and ultimately accepted to remove transition lighting along the two approach legs on SR 9, as visibility of the roundabout was adequate at an AASTHO safe stopping distance. This transition lighting was not removed along the AC Smith approach leg due to roadway curvatures. Spill lighting was analyzed along all residential property lines to minimize undesirable impacts.

Project Manager for Buford Springs Connector at Peachtree St Roundabout Lighting. As part of a private development, the existing exit and entrance ramps from I-20 at the Buford Springs Connector to Peachtree St will be reconstructed to terminate into a roundabout before reaching Peachtree St. The roundabout also incorporates Inwood Drive and an adjacent parking lot into the design, culminating in four total legs. Joe's responsible for all aspects of the lighting design, consisting of photometric calculations, lighting plans, voltage drop calculations, and specifications. The lighting design will be optimized lighting within the roundabout, along with lighting on all approaches, including tie-ins to existing lighting on both the exit ramp and the entrance ramp to Buford Springs Connector. Lighting at the intersection of Peachtree St is also being evaluated due to the revised tie-in. Additionally, existing Service Points will be updated for the new lighting load.

Project Manager for SR 16 at Beulah Church Roundabout for GDOT. A four-legged roundabout is being constructed at an existing intersection to reduce crash rates and severity at a rural roundabout. Proper, but minimal, lighting was designed for the roundabout to include the roundabout and all crosswalk facilities within the roundabout area. However, recommendations were provided, and ultimately accepted to remove transition lighting along the two SR 16 legs, as visibility of the roundabout was adequate at an AASTHO safe stopping distance. This transition lighting was not removed along the Beulah Church legs due to roadway curvatures and heavy forest areas. Spill lighting was analyzed along all residential property lines to minimize undesirable impacts.

Project Manager for SR 8 at Conners Rd Roundabout for Georgia DOT. GDOT is revising an existing intersection, which comprises of two high speed approach legs along SR 8 with a lower speed, albeit heavy truck traffic, roadway which intersects at a high angle to a roundabout. Additionally, there is a feeder road for trucks immediately adjacent, along with a set of railroad tracks about 300' away. The roundabout location will be slightly offset from the original intersection location to lessen the angles along the approach legs, providing a better approach to drivers in all locations, while also slowing traffic along the approaches. Lighting was provided not only within the roundabout circle, but also along each of the approach legs to ensure adequate visibility for all drivers approaching and leaving the roundabout to ensure the new configuration is recognized, the railroad track crossing is seen, the heavy truck traffic is visible and to overcome the ambient lighting of the commercial establishments in the area.

Project Manager for SR 53BU at Dragon Dr Roundabout for GDOT. A three-legged roundabout is being constructed at an existing intersection to reduce crash rates and severity at a rural roundabout. This roundabout is at the entrance to a local high school. Proper lighting was designed for the roundabout to include the roundabout, crosswalk facilities, and the approaches within the roundabout area. However, recommendations were provided, and ultimately accepted to remove transition lighting along all three approach legs, as visibility of the roundabout was adequate at an AASTHO safe stopping distance.

Project Manager for City of Jesup Streetscape GA (GDOT) The City of Jesup is rehabilitating three street sections off of State Route 38 to match the existing areas that have already been updated previously. The scope is to provide lighting along the sidewalk areas

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only without negatively impacting the drivers along these roads, as is a Georgia DOT requirement. This is typically a challenge, as pedestrian scale light fixtures are designed to throw light in all directions with little or no cut-off features, especially with acorn style fixtures. To combat this, nominally lower lumen output fixtures are utilized and if possible, mounting height increased to get out of the driver's field of view when measuring the glare metric, the maximum veiling luminance ratio (MaxLv). Calculation of this ratio is necessary to ensure drivers are not blinded by the pedestrian scale light as they drive through this area. All of the lighting work is being done in accordance with Georgia DOT and IES design standards. Joe is designing the lighting layout, creating photometric plans along with quantities and voltage drop calculations.

Project Manager for Bridges Rd at Willow Lane Roundabout for Henry County, GA. The County is converting an existing four-legged intersection into a rural roundabout. Joe is overseeing the lighting design at the roundabout, consisting of lighting the roundabout circle, but recommends removing the lighting along the approaches for three of the four legs due to good visibility and a net reduction of associated costs along with the reduction of energy use and spill lighting to the surrounding areas. This SPLOST project was extremely fast-paced and was turned around in less than two weeks.

Project Manager for SR 247 at SR 247 Spur for Georgia DOT. An existing high-speed three-legged intersection is being reconstructed to a roundabout, of which lighting is to be provided. Because of the high-speed approach legs, there must be careful consideration for approach lighting along each leg to ensure drivers are aware of the upcoming roundabout so they slow down in time. Joe is overseeing all aspects of the design including preparation of lighting plans, photometric calculations, cost estimate and specifications.

Project Manager for Bell Rd at Old Homestead Trail Roundabout Lighting in Johns Creek, GA. The City of Johns Creek is building a 192 acre community park between Bell Road and the Chattahoochee River. A roundabout, which Wi-Skies is responsible for lighting, is being constructed on at this location on Bell Road with the south leg of the roundabout being the entrance to the park. The north leg of the roundabout is the entrance to the gated subdivision, Old Homestead Trail. Since this is an existing residential area, but also will become a busy pedestrian area as bikers and walkers will be entering the park, consideration had to be made to limit spill lighting for the residents while generating enough light within the roundabout and crosswalks for pedestrian safety. In addition to existing overhead distribution lines which have clearance requirements, limitations on right of way, and limitations with the entryway to the Old Homestead Trail subdivision, light pole placement presented a challenge. After discussion with the City of Johns Creek, the lighting design was developed for two scenarios: the initial design for before the park is built (with Low Pedestrian classification) using dimming for all of the luminaires and an increased light level after the park is constructed in the future, where the pedestrian classification will become Medium, where the luminaires will be adjusted to full lumen output. Joe oversaw all aspects of the design including preparation of lighting plans, photometric calculations, cost estimate and specifications.

Project Manager for SC 161 at US 321 Roundabout for South Carolina DOT. An existing high-speed three-legged intersection is being reconstructed to a roundabout, where lighting is being provided. Because of the high-speed approach legs and presence of an existing grocery store in one of the quadrants, approach lighting along each leg is being carefully considered to ensure drivers are aware of the upcoming roundabout. Joe is overseeing all aspects of the design including preparation of lighting plans, photometric calculations, cost estimate and specifications.

Project Manager for Hames Rd at Willowcreek Overlook Roundabout Lighting (Cherokee County, GA). An existing three-legged intersection in the middle of a residential area is being converted to a roundabout. As the area is also littered with many large trees and distribution lines which have minimum clearance requirements, light pole placement was limited. Additionally, the proximity of residences near the roundabout created concern over spill lighting. These areas of concern are carefully analyzed to ensure there was minimal or no impact to the residences in the area. To save cost, approach lighting on some of the legs was recommended for removal where adequate visibility would be present to drivers approaching in that leg from an AASHTO safe stopping distance. Joe oversaw all aspects of the design including preparation of lighting plans, photometric calculations, cost estimate and specifications.

Project Manager for North Ola Rd at Snapping Shoals Roundabout for Henry County, GA. The County is converting an existing four-legged intersection into a roundabout. The roundabout is in a rural area, but with several overhead power lines around and through it, which created several conflicts with the light pole locations. There is also a church on the north approach leg with multiple entrances and exits, creating several conflicts within the lighting transition zone, so the transition lighting along that leg was recommended to remain in the design. However, the transition lighting along the other three legs were recommended for removal due because of good visibility to and from the roundabout along those legs.

Project Manager for Seven Hills Blvd at Naturewalk Parkway Roundabout Lighting - Paulding County, GA. A large roundabout is being designed on Seven Hills Blvd at the entrance to two large housing complexes. Seven Hills Blvd is a heavily trafficked collector road with a multi-use trail on the south side. There are also sidewalks and multi-use trails going into each subdivision with crosswalks at each leg of the roundabout. Seven Hills Blvd is currently continuously lit, therefore Wi-Skies lighting design has to be implemented into the middle of the current roadway lighting design while not interrupting the uniformity along the roadway. Careful consideration was made with regard to the approach legs of the roundabout on Seven Hills Blvd to remove some of the existing lighting that would be redundant or excessive to the proposed roundabout lighting. Joe oversaw all aspects of the design including preparation of lighting plans, photometric calculations, cost estimate and specifications.

Project Manager for Sandy Springs Electronic Billboard Evaluation. Lamar Advertising received several complaints from residents of the Laurel Grove Condominium Complex regarding an existing electronic billboard, which is located near the I-285 at Roswell Rd interchange in Sandy Springs, GA. Wi-Skies was requested to provide a study to determine if raising the billboard 35' would eliminate

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the complaints. The height of Lamar's electronic digital billboard in relationship to the resident's windows of the condominium building was carefully studied and compared to the tilt and intensity of the billboard to determine if this would resolve the issue. In the existing configuration, the condo residents could easily see the billboard when they looked out their windows, as it was aimed directly at their windows. Extensive research went into how much light is actually being emitted by the electronic billboard and the angles at which the light is being emitted, both at its current height and when raised 35'. An extensive report was developed providing detailed information about the location of the billboard in relationship to the location of the condos and how the light is being transmitted towards the complex and the resident's windows, as well as the relationship of the condo owner's visibility out of their windows as they looked out the window. As the report indicated, raising the billboard 35' would substantially reduce the amount of complaints as all other lighting reaching the condo windows would be minimal and indirect lighting. Joe was responsible for much of the content of the report, which included many diagrams and exhibits, as well as an in-depth write-up which was all presented to the City for approval.

Project Manager for I-20 EB at Maynard Terrace Roundabout Lighting (GDOT). The existing exit ramp from I-20 onto Maynard Terrace is being reconstructed to terminate into a roundabout, which is a residential, wooded and historical area. Because of this, lighting the roundabout is of critical importance as is limiting the spill lighting outside of the roundabout area. Further complicating this is the presence of a multi-use path which crosses the roundabout on one of the approach legs. The lighting design optimized lighting within the roundabout, along with the approaches along all four legs, while tying into existing continuous lighting along the bridge as well as incorporated lighting along multi-purpose walkway and crosswalks in the roundabout. Joe oversaw all aspects of the design including preparation of lighting plans, photometric calculations, cost estimate and specifications.

Project Manager for Pedestrian Bridge over Northside Dr at Mercedes-Benz Stadium in Atlanta, GA. As part of a design-build project, Wi-Skies designed the lighting for a pedestrian bridge to safely allow pedestrians to cross the busy six-lane roadway immediately adjacent to the new Atlanta Falcons stadium (Northside Dr). The bridge spans a total of almost 1000' of walkable path, including a 140' long covered portion as it crosses Northside Drive. All of the pathway is being lit to high pedestrian traffic lighting design criteria, including vertical illuminance design criteria, which is being accomplished with a combination of pedestrian scale LED fixtures for outside of the covered portion and architectural ceiling mounted fixtures inside the covered portion. The sidewalk areas along the perimeter of the west loop are also being lit to ensure good visibility of fellow pedestrians while not providing a glare concern to the drivers along Northside Dr. In addition to the pedestrian lighting, Wi-Skies was also responsible for designing the impressive architectural lighting features on, in and around the bridge. Both sides of the bridge have continuous multi-color rope lights which span a total of over 2000'. Additionally, accent lights are provided at crucial areas, such as the bridge decorative columns and outer aluminum skin of the bridge as it crosses Northside Dr. All of the decorative features are centrally controlled for the client to have the ability to change the colors freely, depending on the venue. While the architectural features of this bridge will mesh well with the new stadium's architectural features, as it is immediately adjacent to the new stadium which will be aerially viewed often to show off both the stadium's architectural features, the lighting on the bridge really sets the bridge and its features apart from the stadium. Joe led the entire electrical design effort, including providing photometric calculations, plans and detailed layouts for all electrical features as well as inspected the site throughout construction.

Project Manager for Lighting Evaluation for Baldwin Paving Co, Cherokee County, GA. Baldwin Paving Co is building a new asphalt plant in Cherokee County GA, where we were charged to evaluate the lighting layout proposed by Baldwin Paving to ensure it met all criteria put forth by the Cherokee County Article 25 (Outdoor Lighting and Roadway Glare Ordinance). Joe oversaw the research to ensure the lighting design was in compliance with the Ordinance. The lighting system was modeled in AGI32 to ensure there was no light trespass outside of the property, no roadway glare to an adjacent roadway and that no uplight was being provided. A concise report was created, outlining each requirement and how each item was met for the County to approve.

Electrical Engineer for Three Mile Bridge over Pensacola Bay (FDOT) Construction issues arose during the construction of the new three mile long bridge over Pensacola Bay Bridge in which Joe was asked to provide a third party opinion on behalf of the design-build team to supersede the design engineers recommendation of installing pull boxes throughout the bridge which would be exposed to the elements. Seeing that these junction boxes would create not only a construction issue, but would also create the need for splice points which would break down over time due to the exposure to high heat, humidity and air salinity. The concern was that the cables would be damaged by the long cable pulls, which were sometimes in excess of 2800'. After reviewing all of the information provided by the contractor and manufacturer and after witnessing the cables being pulled and tested via HiPot test, Joe's recommendation was to remove the pull boxes, which was ultimately accepted. During construction, several segments of the new bridge were destroyed by a hurricane, which resulted in the need to inspect the integrity of several cable runs, resulting in the need to re-pull some segments.

Project Manager for I-85 at SR 18 Interchange Lighting (GDOT) The existing slip-diamond interchange intersection is being reconstructed to terminate into a roundabout at each ramp terminal and an additional roundabout is being constructed a half mile away for which Mr. Marsh is responsible for the complete lighting plans, specifications, voltage drop and photometric calculations. The existing high mast lighting at the interchange will be salvaged as much as possible, however, several of the towers will be retrofitted to LED fixtures to optimize the lighting both to the I-85 mainline, but also to the crosswalks within the roundabouts. While these tower locations will not change, the cable and conduit feeding the towers will be destroyed during the roadway reconstruction, meaning circuits must be traced and re-routed where necessary to ensure all existing lighting remains in operation after construction.

Project Manager for Exchange Blvd Extension from Harry McCarty Rd to SR 11 (GDOT). An existing road in Barrow County is being extended through an existing forested area to provide an alternative corridor along US 29 due to an expanding commercial area. The expansion is bookended by two roundabouts, of which Wi-Skies is providing lighting for. As there is existing lighting along Exchange Blvd and the new portion of the extension will be lit using decorative roadway fixtures by the County, the poles used in the roundabouts

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must match to maintain the commercial look the County is looking for. Joe is the lead designer responsible for the lighting design, voltage drop calculations, conduit routing, and service point coordination.

Project Manager for Woodstock Rd at Victory Dr Roundabout for Cherokee County, GA. Cherokee County is revising an existing three-legged intersection to a roundabout and Wi-Skies is designing the lighting it. Because the roundabout is in an area with many residences, the lighting design is being done with minimal spill lighting and using the lowest light levels recommended. Additionally, approach lighting on some of the legs is being removed, provided there is good visibility along that leg from a safe sight stopping distance (SSSD). This is critical due to the presence of pedestrian facilities at each roundabout leg. Joe is the lead designer responsible for the lighting design, voltage drop calculations, conduit routing, and service point coordination.

Project Manager for Governors Lake Parkway Lighting for City of Peachtree Corners, GA. The City is renovating 1500' of the existing parkway to include sidewalk and pedestrian facilities, which will include roadway and pedestrian lighting, for which Wi-Skies is providing. The presence of many tall and well-developed trees along with utilities will create a number of aesthetic and functional conflicts which we will need to work through with the City.

Project Manager for Pedestrian Bridge over Castleberry Rd in Cumming, GA. The City of Cumming is constructing an elevated pedestrian bridge to the City Fairgrounds from the parking lot across Castleberry Rd. Ramps will tie into the existing sidewalk and lead up to a covered portion of the bridge over Castleberry and tie into an existing elevation difference on the other side. All of the ramps, adjacent sidewalks and covered portion of the bridge all require pedestrian lighting, accomplished by several light fixture types. Additionally, there are variable message signs on both sides of the pedestrian bridge to alert drivers along Castleberry of pertinent information. Joe is overseeing all electrical design elements of the bridge including all lighting design, photometric calculations, voltage drop calculations, conduit routing, including sign powering.

Project Manager for Roundabout Lighting at Rosebud Rd at Brushy Fork (Gwinnett County, GA) Joe provided a lighting design, including photometric calculations, plans, specifications and quantities, to a three-legged roundabout at the rural intersection of Rosebud Rd at Brushy Fork in Gwinnett County, GA. The existing intersection is being revised to a roundabout due several high speed accidents and poor sight distance on one of the approach legs. The addition of lighting to the roundabout will greatly improve the safety and performance of the roundabout, especially given the prominence of residential homes and trees near the roundabout.

Project Manager for Solar Lighting at CR 238 at Industrial Drive/Cool Springs Rd Roundabout for GDOT. The existing intersection is being converted to a four-legged roundabout, which requires lighting. Due to the limited power options in the rural area, power for this lighting must be accomplished by other means, namely solar as well as potentially wind energy. Finding the square footage of land necessary for the solar panels which will not become shadowed is a challenge within itself due to wetlands, trees and potential businesses in the future. The objective to create the first completely off-grid lighting project within the state which would be self-autonomous for ten days or more. Mr. Marsh is designing the alternative energy solution along with overseeing the lighting design, consisting of photometric calculations, lighting plans and specifications.

Project Manager for Roundabout Lighting at Wiley Bridge Rd/Cox Rd (Cherokee County, GA.) An existing three-legged intersection in the middle of a residential area is being converted to a roundabout. As the area is also littered with many large trees and distribution lines which have decent clearances, light pole placement is an extreme challenge. Additionally, the tight proximity of residences near the roundabout creates more complication to the design in the form of minimizing spill lighting. These areas of concern are carefully analyzed to ensure there is minimal or no impact to the residences in the area. Approach lighting on some of the legs is being removed where good visibility exists to the drivers approaching in that leg from a safe sight stopping distance (SSSD). Joe is the lead designer responsible for the lighting design, voltage drop calculations, conduit routing, and service point coordination.

Project Manager for Roundabout Lighting at SR 9 at Dawson Forest Rd for Georgia DOT. Two new roundabouts will replace two high speed three-way intersections in a rural part of Dawson County, GA. The roundabouts and the roadway between them are designed to be properly, but minimally lit to meet rural lighting standards for the roundabouts. Additionally, due to the presence of bats in the area, vertical illuminance had to be analyzed along the ROW line along the entire project limits. These vertical calculations were done every 10' to ensure there were no concerns whatsoever along the ROW line, as this is an FHWA requirement. Joe oversaw all design aspects of the lighting design including all of the photometric analysis, coordination with the environmental office and FHWA, lighting plans, voltage drop calculations and specifications.

Project Manager for Daytime Lighting along both SR 11 and SR 53 under SR 316 (GDOT). These two separate projects involved replacing existing at-grade intersections and converting them to interchanges, under which both required daytime lighting analysis. By running a daytime lighting study, the SR 11 tunnel was determined to have enough natural light penetrating under the tunnel during the day, provided the vertical profile of the bridge was modified to increase the vertical clearance by about a foot. This modification was accepted by the Bridge Office and implemented. This bridge modification was not possible at the SR 53 tunnel, however, so Wi-Skies provided experimental daytime lighting design, which was both practical and significantly less expensive, but ultimately provided minimally safe driving conditions under the tunnel.

Project Manager for Lighting at I-75 and I-16 Interchange – Georgia DOT This existing interchange is being overhauled as part of a multi-phase construction project totaling six miles of interstate, all of which will be continuously lit. There are three smaller interchanges, all of which require complete lighting or modifications to complete lighting. Additionally, five total tunnels will require supplemental daytime lighting. There is a lot of pedestrian lighting going in this area as well as the City continues its beautification approach, especially near the River. However, there are also several locations which are sensitive to light pollution, such as residences or other environmental concerns, all of which are being analyzed to verify there is minimal concern. Mr. Marsh is overseeing all of the

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lighting design including photometric calculations, voltage drop and quantity calculations and the development of several design details. The north end of the I-75 portion of this project will tie into the south end of a previously designed section of I-75 by Mr. Marsh himself.

Project Manager for Stand-alone Lighting SR 166 at SR 5 Roundabout (GDOT) This stand-alone lighting project provided lighting at an existing roundabout with a history of problems. The roundabout is located in a rural area, but is the intersection between two major high-speed routes in the area. When the original roundabout was constructed, it had a single high mast tower placed in the middle of the roundabout. This high mast tower was subsequently struck down by a vehicle, thus proving providing lighting in the middle of a roundabout is not an effective solution as it does not afford the driver enough advanced warning of the upcoming roundabout. Therefore, a more effective design using several 40' poles placed around the outside and in advance of the roundabout is the solution developed and deployed. As there is no other roadway work as part of this lighting improvement, Joe was responsible for overseeing a survey and utility investigation and a myriad of other construction issues, especially dealing with the many distribution lines present at the roundabout. Joe oversaw all of these design aspects along with the lighting design, consisting of photometric calculations, lighting plans, specifications and cost estimates for the corridor.

Project Manager for SR 212 at CR 594 Roundabout Lighting for Georgia Department of Transportation An existing four way intersection is being converted to a roundabout near a local water park and park area, which provides a lot of pedestrian traffic. Mr. Marsh is providing all photometric calculations, voltage drops, specifications and quantities for the lighting design for the roundabout.

Project Manager for Jeffersonville Rd and Millerfield Rd Lighting (City of Macon/Bibb County) As part of a large-scale area of urban improvement, Joe is leading the lighting design for two segments which encompass a total of 1.8 miles of urban collector roadway. The five-lane roadway cross-section consists of dual lanes in each direction with a middle turn lane throughout. To complicate the design, there are several smaller roadways and driveways littered throughout the project, a continuous multi-use path along one side with a sidewalk on the other of the roadway throughout. This created a challenge of providing good uniformity throughout a wide area using a large setback. Especially challenging is meeting vertical illuminance requirements along the multi-use path, sidewalk and at the many crosswalks throughout the project while also providing recommended average luminance and uniformity in the center dual turn lane. This is all being accomplished by using LED fixtures mounted at a maximum mounting height of 45', due to Macon-Bibb's maintenance limitations. In the end, Mr. Marsh provided a complete lighting design which met all lighting design criteria along with complete lighting plans including voltage drop calculations, plans and specifications.

Project Manager for SR 12 at Cove Lake Road Intersection Lighting for Georgia Department of Transportation An existing four-way intersection was expanded due to increased capacity demands. Full intersection lighting was provided as well to combat an ongoing trend of increased pedestrian and vehicular strikes near the intersection due to a bus stop at the intersection. Mr. Marsh oversaw the design of all photometric calculations, voltage drops, specifications and quantities for the lighting design for the intersection.

Project Manager for Streetlight Evaluation for City of Augusta, GA. The City of Augusta's lighting program is operating in the red and has brought Joe in to review and analyze the program to make determinations and recommendations on how to bring the program back into the positive. There are many complicated factors involved as there are several thousand fixtures throughout the City, at least sixteen different varieties, two different utility companies, each with metered and flat rate billing methods, and several complicated methods of billing clients. In order to properly analyze the system, each pole type, wattage, quantity and billing method must be identified. Despite the complicated nature of this project, Joe quickly identified several critical issues with the program and is engaged with City personnel to make several high-level revisions.

Project Manager on I-285 WB at SR 6 DDI (GDOT) The Department reconstructed an existing slip diamond interchange to a diverging diamond interchange (DDI) in an effort to greatly reduce traffic concerns at the interchange. Due to the proximity to the Atlanta airport, the use of high mast towers was not possible. Further, the City's desire to use decorative fixtures not intended for roadway use put the onus on Joe to work with multiple lighting manufacturers to develop fixtures and poles which will meet photometric requirements for the busy roadway as well as meet the City's decorative desires. The existing bridge over I-285 was not reconstructed as part of the project, which made lighting the 260' bridge area span challenging. This was especially critical in the area where drivers are on the opposite side of the roadway between crossovers. Additionally, there was a concurrent project consisting of many decorative lighting features which Mr. Marsh is responsible for providing power to. To complicate matters, luminaires which were proprietary to the project, were discontinued during the bid process, leaving the team to scramble at the last minute to develop alternative designs. In the end the City of Aerotropolis, GDOT and everyone else involved was happy with the final product.

Project Manager – SR 9 at SR 60 Roundabout Lighting for Georgia DOT An existing four-legged high speed divergent intersection was revised to a roundabout, the center of which will be an ancient burial site, known as Stone Pile. This unique design constraint provided a myriad of challenges to all designers involved in the project. Because of the presence of the rock pile in the middle of the roundabout, the significance of adequate advanced lighting is critical to the safety of the roundabout's operation. At the same time, the area is sensitive to light pollution due to the adjacent residences and historical boundaries. To overcome the spill light concern while also providing adequate lighting, the design utilized low lumen output fixtures at a low mounting height and the limits of lighting were extended as much as possible to ensure as much advanced visibility to the driver approaching in any direction. Joe oversaw all design aspects of the lighting plans including photometric calculations and plan development.

Project Manager for City of East Point Main St Streetscape. The City of East Point rehabilitated a mile segment of sidewalk along the west side of Main St (State Route 14 & 139, US 29), of which Wi-Skies designed the lighting installed. The scope was to provide lighting along the sidewalk areas only without negatively impacting the drivers along the State Route, as is a Georgia DOT requirement.

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This is typically a challenge, as pedestrian scale light fixtures are designed to throw light in all directions with little or no cut-off features, especially with acorn style fixtures, often resulting in glare to the drivers along the roadway. To combat this, we used lower lumen output fixtures nominally and use different distribution patterns, which are nominally aimed away from the roadway. We also try to increase mounting height to get out of the driver's field of view when measuring the glare metric, the maximum veiling luminance ratio (MaxLv). Calculation of this ratio is necessary to ensure drivers are not blinded by the pedestrian scale light as they drive through the corridor. All of the lighting work was done in accordance with Georgia DOT standards, of which Joe led.

Project Manager for Stand-alone Lighting I-75 from Pierce Ave to Arkwright Rd (GDOT) This stand-alone lighting project provided 3.5 miles of mainly high mast lighting along I-75 from Pierce Ave to Arkwright Rd. As the area had been recently constructed without lighting in mind, several construction issues arose such as drainage and other utility conflicts, impacts of environmental documents and other complications, all of which had to be avoided. The project includes survey, geotechnical studies, reconstruction of new walls and guardrail installation along certain areas. Joe oversaw all of these design aspects along with the lighting design, consisting of photometric calculations, lighting plans, specifications and cost estimates for the corridor, including three interchanges, four underpasses, daytime lighting for one tunnel, horizontal and vertical illuminance calculations at historical ROW, as well as the development of several unique installation details.

Project Manager for US 278 at Yacht Cove Drive Intersection Lighting – City of Hilton Head Island, SC Mr. Marsh provided the design and construction oversight for a standalone lighting system to be installed at the existing three-way intersection. The need for lighting at the intersection was due to an abundance of pedestrian traffic at the intersection, as well as subsequent pedestrian related accidents. The lighting system was developed to optimize the visibility of the pedestrian crosswalk on the west side of the intersection as well as the entrances and exits of the local businesses at the intersection. Transition lighting was also provided to ensure drivers were aware of the upcoming intersection as well as assisting their eyes to adapt from light to dark areas.

Project Manager for SR 53 at SR 183 Roundabout Lighting for Georgia Department of Transportation GDOT revise a three-legged intersection to a roundabout due several high-speed accidents. SR 183 terminates into SR 53 at the intersection while SR 53 continues east to west, all of which are rural roads with speed limits of 55 MPH, with only yield signs at each leg, creating a dangerous situation. Add in that drivers along westbound SR 53 experience a blind curve entering the intersection without the need to yield makes it treacherous. The new roundabout will force traffic in all directions to slow down to at least a crawl before proceeding. The addition of lighting in the rural and very dark area will also assist visibility and therefore safety to the roundabout's performance. Both horizontal illuminance requirements for the roundabout and vertical illuminance requirements at each crosswalk can be reached by using an LED fixture with a lower lumen package mounted at 30', which saves energy costs to the locals while also minimizing light pollution to the adjacent residences.

Project Manager – SR 347 at New Bethany Rd Roundabout Lighting for Georgia DOT SR 347 is located directly south of Lake Lanier and serves many of the lakefront businesses along the lake, and is being re-aligned and expanded. As part of the project, the intersection of SR 347 with New Bethany Rd was converted to a roundabout and moving several hundred feet north. As the area near the lake, it is sensitive to light pollution and hence a low lumen LED fixture is being utilized at 30' to minimize light pollution concerns while also meeting horizontal illuminance requirements for the roundabout and vertical illuminance requirements at each crosswalk.

Project Manager for Roundabout Lighting at SR 52 at SR 183 Roundabout (GDOT) Joe provided a lighting design, including photometric calculations, plans, specifications and quantities, to a three legged roundabout at the rural intersection of SR 52 at SR 183 in Dawson County, GA. The existing intersection is being revised to a roundabout due several high speed accidents, for which the roundabout will force traffic in all directions to slow down to at least a crawl before proceeding. The addition of lighting in the rural and very dark area will also assist visibility and therefore safety to the roundabout's performance.

Project Manager for Lighting along SR 30/90/US 280/16th St from I-75 to Midway Rd in Cordele, GA for Georgia DOT Due to the heavy volume of truck and other traffic at the interchange due to the large commercial presence, the Department widened the roadway from the northbound interchange ramp intersection to the Midway Rd intersection, where a Pilot exists. Due to the high pedestrian traffic in the area, lighting was extended from the interchange to Midway. As the existing lighting system was HPS, all existing lighting through the corridor was upgraded to LED simultaneously. In addition to the roadway being analyzed for proper luminance through this half mile segment, new sidewalk facilities will be analyzed, including both horizontal and vertical illuminance requirements. The intersection at Midway has transmission lines running along the west side of the road, creating a large area where light poles cannot be installed and therefore, creating uniformity issues within the intersection. Mr. Marsh was the lead lighting designer for this project, providing final photometric calculations, voltage drop calculations, specifications and quantities for the new lighting system.

Project Manager for Roundabout Lighting at US 278 at SR 142 (GDOT) Joe was the responsible electrical engineer for lighting plans for a roundabout in Covington, GA. This roundabout set out to slow down the traffic in a high speed rural area while also providing continuous flow to the US 278 traffic by including dual lanes for three of the four legs. These additional lanes create additional setback, coupled with the City of Covington's preference of a maximum mounting height of 30', posed challenges to meet vertical illuminance recommendations in the middle roundabout lane. However, in using a Type IV LED, these challenges were met.

Project Manager for SR 16 at SR 54 Roundabout Lighting for GDOT An existing four way stop sign intersection in Coweta County was reconstructed to be a roundabout, which re-aligned both roads several hundred feet in each direction and include a bridge reconstruction north of the roundabout along SR 54. Many of the movements within the roundabout have dual lanes, creating the challenge of achieving recommended vertical illuminance values at all of the crosswalks. Approach legs from SR 54 both also have dedicated right turn lanes, further complicating the roundabout's design. To complicate the design further, the maximum mounting

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height the locals can maintain is 30', meaning the light from the luminaires will not travel as far. To combat the design issues, while maximizing the vertical illuminance in these crosswalks, Type IV LED luminaires were used on poles placed optimally before the crosswalk. Mr. Marsh is responsible for the complete lighting plans, specifications, voltage drop and photometric calculations.

Project Manager for Roundabout Lighting - SR 195 at Smithville Rd and 2nd St for GDOT Two legs of an existing six leg intersection are being cul-de-sac'd, leaving the remaining four legs in an extended roundabout design. This configuration brings about unique challenges in providing lighting uniformly to all of the internal segment and crosswalks. The engineer of record, Mr. Marsh is responsible for the complete lighting plans, specifications, voltage drop and photometric calculations.

Project Manager for Roundabout Lighting at SR 144 at Captain Mathew Freeman Dr and Belfast River Rd - GDOT The existing intersection is being reconstructed to be a roundabout, for which Mr. Marsh was responsible for the complete lighting plans, specifications, voltage drop and photometric calculations. The roundabout has dual lanes for SR 144, along with a large splitter island, creating a challenge to provide lighting to the center lane crosswalk. To maximize the vertical illuminance in these crosswalks, Type IV LED luminaires are mounted at 40', placed optimally before the crosswalk.

Project Manager for SR 26 Bridge over the Ocmulgee River for Georgia DOT SR 26 crosses over the Ocmulgee via two separate eastbound and westbound bridges, both of which were being replaced due to age. Continuous lighting along both bridges was provided as part of the project, for which Joe is responsible for photometric plans, voltage drops, lighting plans, quantities, and specifications.

Project Manager for Swainsboro Streetscape Lighting – City of Swainsboro, GA The City of Swainsboro rehabilitated six locations of their downtown streetscape, including sidewalks and pedestrian scale lighting. Responsible for the lighting design, Joe provided photometric calculations, voltage drop calculations and cabling plans tying into three existing service cabinets across the City. As with all pedestrian scale projects, a primary concern was to verify a glare concern was not being introduced to drivers along the road by the low mounted poles along the sidewalk. Several different fixtures were evaluated to minimize this concern while also best matching the existing fixtures used throughout the City.

Project Manager for SR400 @ SR53 Continuous Flow Intersection for Georgia DOT. Mr. Marsh prepared photometric calculations, full lighting plans, specifications and cost estimates for an existing intersection which is being changed to a Continuous Flow Intersection (CFI). The basis of a CFI is to eliminate the need for a dedicated left turn arrow at a normal signalized intersection. In order to accomplish this, the left turn movement must be done several hundred feet prior to the main intersection by creating a small crossover intersection. For lighting purposes, these smaller adjacent intersections must be well lit, as well as the main intersection. This creates a very large area which must be continuously well lit with good uniformity. Since these intersections are generally very busy, the main challenge is providing enough light across the entire intersection when the width of the intersection is so large. Additionally, this intersection had several crosswalks which had to be analyzed to alleviate any pedestrian conflicts.

Senior Electrical Engineer for Installation of new Fertilizer Storage Facility in Theodore, AL (VAA). Joe was the responsible electrical engineer for a new fertilizer storage facility being installed in Theodore, AL by Maritime Marina. He was responsible for assisting his prime consultant, VAA, with the electrical distribution of all electrical components within the facility. All powered from a 250KVA transformer, all electrical components including cable, conduit, breakers within the facility including the MCC, switchboards, motors, distribution panels, receptacle layout and lighting were designed, verified and ultimately approved.

Project Manager for the I-95 Interchange with SR 251 (GDOT). The I-95 interchange with SR 251 was reconstructed with ramp geometrics revised with longer tapers, necessitating the need for complete interchange lighting and increased lighting limits from the existing high mast system. The existing high mast system was removed and replaced with a new high mast system which had to be carefully installed to avoid live oak trees and other environmental issues. Mr. Marsh provided photometric and voltage drop calculations, plans, specifications and cost estimates for the project.

Project Manager for ITS and Lighting for I-55 Reconstruction from Tank Rd to Siwell Rd for MDOT Mississippi DOT is reconstructing a 5.5 mile section of Interstate 55 from Tank Rd to Siwell Rd. MDOT wants full ITS coverage throughout the project, which includes complete camera coverage, variable message signs and remote traffic monitoring systems. All of this equipment will be tied to the fiber backbone, which was recently installed throughout the corridor and will need to be tied into using proper MDOT standards. Mr. Marsh is directly responsible for the design of all of these systems and to make sure a biddable and constructible set of plans is provided to ensure the components operate properly. This ITS system must tie into an existing system at the north section and a system being designed by MDOT tying to the south portion. Additionally, there are two interchanges which have partial lighting systems, which will be upgraded to complete lighting using a combination of high mast towers and standard fixtures. Joe is also in charge of providing, photometric calculations, lighting plans, specifications and estimates for all lighting coverage areas.

Project Manager for the Upgrade of the City of Chattanooga Pump Station SCADA System (City of Chattanooga, TN). The City of Chattanooga is in the process of upgrading their SCADA system to current supported equipment due to age and performance. Over the last several years, inconsistent communication with the City's one hundred sites has resulted in the testing of several difference technologies to supplement the SCADA system, resulting in a conglomerate of communication methods to the main pump station. These technologies, ranging from cellular, wireless and 2.4GHz, in addition to the original SCADA system have all failed to maintain consistent communication. Through testing, the City decided to upgrade the SCADA system and repeater equipment on Lookout Mountain to service all of the remote sites, along with upgrading all of the outdated SCADA equipment at each of the hundred sites. Nearly all of the equipment at each site will be upgraded, which includes a new Yagi antenna, heliix cable, cabinets and new Motorola 3640 radios with proper input/output cards for each site. All sub-standard conditions including floating cabinets, inadequate grounding,

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communication problems and fiber backup systems at select sites are being installed at each of the remote sites, for which Mr. Marsh is responsible for specifying and providing plans and estimates for about a hundred sites.

Project Manager for Traffic Management System Upgrades (FDOT). The Florida Department of Transportation is upgrading eighteen existing traffic signal cabinets to ATMS cabinets, which will all be tied to three traffic centers – City of Pensacola, Santa Rosa County and Escambia County. In order to make the new traffic system interconnected, several miles of new fiber will be installed throughout the City to tie them together. New cameras, complete with H.264 encoding, will be mounted on the existing traffic signal poles to monitor traffic at eight intersections. There are many existing utility, drainage and environmental conflicts throughout the City to contend with during the fiber layout and installation. Mr. Marsh is the lead designer for this design-build project and is responsible for the fiber layout design, camera system design and integration, plans, specifications and cost estimates. He is also responsible for optimizing the placement of the camera at each intersection as well as providing a wireless link between two sites.

Project Manager for the I-75 at Carbondale Rd Interchange for Georgia DOT. The Department reconstructed the interchange at the I-75 interchange with Carbondale such that the exit and entrance ramps terminate at roundabouts, along with an additional roundabout at a nearby intersection. Initially, the option of using high mast lighting for the interchange was evaluated, but not recommended since vertical illuminance requirements were not met at the roundabouts. Therefore, conventional poles were recommended and ultimately settled on for the full interchange lighting design. Much coordination was necessary during this project with the local power company was necessary due to upgrades to their power lines for a nearby facility. Mr. Marsh provided photometric and voltage drop calculations, plans, specifications and cost estimates for the project.

Project Manager for PI0001817 - Grant Parkway, Conley Road and Old Dixie Highway Realignments in Clayton County for GDOT. This project realigned the three roadways and surrounding areas near their merge points, including the construction of a bridge under a nearby NS RR line. A total of two miles of metal halide lighting was provided along Grant Parkway and Old Dixie Highway as part of the improvement to provide the County with a more appealing finish to an area of renewal. As part of this project, significant utility coordination was necessary including close coordination with Georgia Power. Joe was instrumental in coordinating the transmission and distribution line re-design which runs throughout the area in order to provide proper OSHA/NESC clearance requirements between the lines and the new poles. Per Georgia Power and the County's request, LED was also evaluated for the project, but failed to provide enough lighting at the intersections of the extremely large roadways at the time. In addition to the extensive utility coordination, Mr. Marsh provided photometric and voltage drop calculations, plans, specifications and cost estimates for the corridor's lighting improvement.

Senior Electrical Engineer for McGregor Roundabout (City of Springhill, Alabama) The City of Springhill is renovating an existing complex intersection to a roundabout, for which Mr. Marsh is providing plans, specifications and cost estimates for the lighting. The major design concerns are providing adequate lighting to the roundabout and crosswalks using decorative fixtures to match the style of other existing fixtures used in the city while also avoiding many utility conflicts in the area, including overhead transmission, distribution and telephone lines.

Electrical Engineer SR 30 (US 98) at SR 368 (23rd Street) in Panama City, Florida for the Florida Department of Transportation. The design is approximately a mile in length and runs from the west end of the Hathaway Bridge to Brown Avenue and 23rd Street from US 98 to 20th Street. It includes 4-lane, urban, grade-separated structures that will take US 98 over 23rd Street, provide for a grade separation over a railroad, and provide at-grade local intersections for access to the Port of Panama City and Gulf Coast Community College. Continuous roadway lighting is provided throughout the entire design area, using conventional high pressure sodium lights. Due to multiple plan sets, close coordination and value engineering is required as the design is worked toward the ultimate build. Mr. Marsh is providing photometric and voltage drop calculations, plans, specifications and cost estimates for the ultimate design as well as the iterative projects in between.

Project Manager for I-10 Design Build from Seigen Lane to Highland Ave (LADOTD) Interstate 10 was reconstructed as part of a design-build construction project from Seigen Lane to Highland Ave. The design called for complete interchange lighting at Highland Ave, done using high mast towers and conventional lighting throughout the remainder of the three mile long corridor of I-10, as well as lighting for railroad lighting photometrics and design. Joe provided construction support and as-built drawings for lighting plans, photometric and voltage drop calculations for several revisions, for the project.

Senior Electrical Engineer for Fairhope Municipal Wastewater Upgrade – City of Fairhope, AL Due to the its growth and age of existing equipment, the existing wastewater facility in Fairhope, AL had to be upgraded. Most of the existing facilities were affected by the upgrade, significantly impacting the existing electrical demand. The existing 1200 amp motor control center (MCC) was no longer going to be able to handle the additional electrical load being introduced. Therefore, a value engineering exercise was done and it was recommended to sub-feed the existing MCC from a new 1800 amp MCC. The recommendation was to put much of the new equipment was put into new buckets on the new MCC, rather than installing new equipment on the dated and un-supported MCC, and future installations could be migrated to the new MCC and the old MCC could be phased out. Additionally, the existing 1000kW generator had to be removed and upgraded to a new standalone generator, which had to be moved outside due to the placement of the new MCC. Finally, the existing service transformer had to be upgraded to handle the new load. Joe was responsible for overseeing, coordinating, providing QC and ultimately stamping the fast-tracked design.

Senior Electrical Engineer for Baldwin Beach Expressway (Baldwin County, AL) Baldwin County is constructing a new expressway from Interstate 65 south to the existing Foley Beach Expressway to provide better service to the beaches. Joe provided full lighting plans, photometric calculations, specifications and estimates for a high mast design for the I-65 interchange with the new expressway.

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Careful coordination had to be done with the three utility companies in the rural area to determine jurisdiction and potential route to provide electrical service to the project site.

Project Manager for Marco Island Bridge Lighting – City of Marco Island, FL A small island community located in the southwest corner of Florida, Marco Island is a retirement boating paradise nestled along the Gulf of Mexico. As many of the residents of this community are boat owners, most bridges are designed to accommodate the traffic, including providing provisions for navigational lights, for which Joe was responsible for providing a design for and service to. Additionally, he was responsible for providing small LED pedestrian lights for the sidewalks along the bridge over the waterway.

Senior Electrical Engineer for the I-59/20 Bridge Deck Replacement through Downtown Birmingham for the Alabama Department of Transportation. This project was originally slated to replace the bridge superstructure for I-59/I-20 in the Birmingham Central Business District. The existing bridge, which extends from just east of the I-59/I-20 and I-65 route interchange to US 31, was constructed in the 1970s. Current traffic demand is twice as much as the bridge was designed for and has fatigued the bridge deck and girders, hastening the need to provide maintenance to this important link in the Alabama transportation network. Many electrical utilities are currently attached to the bridge deck through the 1.3 mile corridor, including roadway lighting conduit and both ALDOT and the City's fiber backbone, all of which were designed to be relocated underground below the bridge, which required close coordination with all agencies and utilities through the downtown area. The project encompassed twelve underpasses, all of which require lighting that blends with the high mast tower design through the corridor. Additionally, a half mile of the area under the underpass is currently being used by the City for parking, which has additional lighting and security cameras attached to the bridge and will be revamped and upgraded to LED to provide lower maintenance costs and better lighting for the cameras. Mr. Marsh generated photometric and voltage drop calculations, plans, specifications and cost estimates for all lighting and ITS work. The scope of this project was ultimately expanded and this project was shelved.

Senior Electrical Engineer for the I-59/20 Bridge Replacement, 11th St, I-65 and 31st St Interchanges Through Downtown Birmingham ALDOT. The original bridge deck replacement project was scrapped and replaced by a larger project which greatly expanded the scope to include the complete replacement of the I-59/20 bridge in order to increase the number of lanes and capacity. The project also includes revisions to all of the interchange ramps with I-65, US31 and the 31st St interchange. To assist in alleviating traffic during the I-59/20 bridge construction, an existing side road, 11th St, will be expanded from two lanes to five. The vast majority of the project will be lit using high mast towers. Careful coordination is required for the placement of the high mast towers through the downtown corridor along the I-59/20 bridge as the expansion of the bridge will force the existing towers to move outward from the bridge, but is pinched by the buildings and businesses of the downtown district. Many ramp revisions are necessary as part of this project, affecting much of the existing lighting system. All ramp revisions require photometric calculations, which take into account careful consideration of the many ramps and resulting elevation differences. Additionally, there are dozens of underpasses which have to be photometrically analyzed as well. Mr. Marsh is responsible for providing final plans for the project, which includes photometric and voltage drop calculations, plans, specifications and cost estimates.

Project Manager for Dawes/Grelof/Airport Terminal Roundabout Lighting Re-evaluation for Mobile County Due to quality work provided with another project for Mobile County, Mr. Marsh was charged with evaluating and providing recommendations for improving an existing lighting installation recently installed in a roundabout designed by another firm. After evaluating the existing conditions, it was determined it was well over-designed for the necessary lighting levels for a roundabout, which was consistent with the complaints from the local residents. Joe provided revised photometric calculations and plans for the removal of several lighting units while retrofitting the remaining units with lower wattage fixtures.

Project Manager for CR2297 Bridge over Laird Bayou for Bay County, Florida The bridge of CR2297 going over Laird Bayou is being reconstructed due to damage from previous storms. Lighting is being added over the bridge portion due to fishing demands. Therefore, a white lighting source (induction) was selected by the County to use. The lighting was mainly for the bridge roadway with "spill lighting" servicing the pull-off fishing areas.

Project Manager for SR16/CR496/Hollonville Rd Roundabout for the Georgia Department of Transportation Mr. Marsh is providing full lighting plans, photometric calculations, specifications and estimates for a new roundabout lighting design.

Project Manager for Backup Emergency Generators in St. Gabriel Parish, Louisiana Joe provided full plans, specifications and estimates for three sites which required backup generators in St. Gabriel Parish in Louisiana. These pump and lift stations required full site survey and generator load calculations along with interface with the existing infrastructure.

Project Manager for SR12/US278 @ SR 142 Roundabout (GDOT) Joe is providing full lighting plans, photometric calculations, specifications and estimates for a new roundabout lighting design. This roundabout has two lanes in half of the roundabout, creating an interesting wrinkle in the design.

Project Electrical Engineer for the Multi-use Path at University of Florida (FDOT). The University of Florida is installing a new paved path that spans the length of the campus for the use of bikes and runners for which was lit in the interest of safety. A night time walk-through with University Police and other personnel was performed to determine the areas that required special attention. The University selected metal halide as the lighting source for the project and requested that any existing HPS roadway fixtures along the path's route be upgraded to metal halide. Since the University services its own entities, careful coordination was necessary with both UF and FDOT, as the project had to be constructed using University standards yet FDOT pay items. Mr. Marsh provided photometric and voltage drop calculations, plans, specifications and cost estimates for the project.

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Senior Electrical Engineer for Nelson Ave Bridge (VDOT) Joe provided construction support for a lighting project for a new bridge reconstruction on Nelson Avenue Bridge. The lighting system encompassed decorative Colonial style lighting for both the bridge overpass, but also for underneath. The fixtures were modified in the field as the fixtures used were too large for the allowable clearance between the minimum mounting height of the fixture and the bottom of the bridge beams.

Electrical Inspector for Bascule Bridge Number 460053, Beach Drive over Massalina Bayou (FDOT). Mr. Marsh is responsible for inspecting all electrical items of a bascule bridge as part of an ongoing annual inspection. The electrical items included the motor control center, backup generator, several motors, junction boxes, navigational lights and traffic control gates. This complete inspection includes verification of proper operation of all components both on normal and standby power. All conditions, including changes from the previous year, whether they are discrepancies or corrections, are compiled into a final report which is submitted to the Department.

Project Manager for the Rehabilitation and Upgrade of the Lighting System of I-85 SB entrance ramp tunnel from SR13 (GDOT). The existing tunnel lighting system from SR 13 as it passes under and later connects to I-85 southbound currently does not work and is deemed inadequate to current daytime lighting standards. As a result, Mr. Marsh was been charged with researching possible lighting options for the tunnel, including HPS, CMH, LED and induction, among others. Ultimately, HPS was found to be the only feasible option for this tunnel. Additionally, the existing electrical system was designed to be repaired and replaced to power the new lighting system.

Project Manager for the I-295/Dunn Ave Interchange (FDOT). Geometric improvements were made at the I-295 interchange with Dunn Ave in Jacksonville, which resulted in revisions to the existing high mast lighting system. The photometrics of the proposed ramps with the existing high mast tower fixtures were evaluated and determined to be adequate. However, due to the ramp reconstruction at a few areas, several conduit/cable runs were affected and replaced.

Project Manager for the I-295 Interchange with Wilson Blvd (FDOT). Several conduit runs were replaced due to revised geometric improvements made at the I-295 interchange with Wilson Blvd interchange in Jacksonville. The proposed ramp photometrics were evaluated based on the existing high mast tower fixtures and determined to be adequate. The existing lighting service for the interchange was affected by the new ramp termini geometrics and was coordinated to be relocated.

Runway 24 Reconstruction at the Birmingham International Airport Due to poor construction methods, a five hundred foot portion of the newly reconstructed runway had to be reconstructed again. This reconstruction impacted several lighting elements including centerline lights, touchdown lights (MALSR), and taxiway and runway edge lighting. The staging of the construction involved relocating the threshold to keep the runway open, which meant temporary threshold lighting had to be provided in addition to swapping out centerline and runway edge light lenses to maintain FAA requirements. Mr. Marsh provided full lighting plans, specifications and construction cost estimates for the project and construction support during the installation.

Project Manager for Robert Miller Rd, Gulfstream in Chatham County for GDOT. Robert Miller Rd, located within the Savannah/Hilton Head Island airport, is being reconstructed between two service roads, which will encompass two roundabouts and a three way intersection. Continuous roadway lighting is being provided in both roundabouts as well as the roadway between. Coordination with the airport for interface with the existing lighting system and sensitivity to the airports cosmetics is required. Mr. Marsh is provided photometric and voltage drop calculations, plans, specifications and cost estimates for the project.

Project Manager for SR154/Cedar Grove/Ridge Rd Roundabout (GDOT) Joe provided quality control for lighting plans, photometric calculations, specifications and estimates for a roundabout lighting design provide by another engineering firm.

Electrical Engineer for I-10 at I-110 Interchange in Biloxi, MS (MDOT) MDOT re-vamped the I-10 interchange with I-110 to include both eastbound and westbound CD lanes and new interchanges at three adjacent crossroads. As a result of the revisions, the existing high mast lighting systems in place were modified and for the most part, replaced. The lighting systems encompassed several construction phases, including temporary ramps, as well as multiple design phases, all of which must have continuous lighting operational. Mr. Marsh provided photometric and voltage drop calculations, plans, specifications and cost estimates for the project as well as construction support throughout the installation of the new lighting systems.

Electrical Engineer for Staffordborough Commuter Parking Lot for Virginia Department of Transportation (VDOT). An existing train commuter parking lot located north of Stafford, Virginia was expanded to significantly increase capacity. Lighting was required throughout the new parking lot area to match the existing lighting. Mr. Marsh provided photometric and voltage drop calculations, plans, specifications and cost estimates for the project.

Project Manager for McFarland Roundabout for Mobile County, AL Mr. Marsh provided full lighting plans including photometric calculations, specifications and estimates for a new roundabout construction in Mobile County.

Project Manager for I-75/85 and I-285 Tunnel Lighting Projects for GDOT. This project consisted of re-designing six existing tunnel lighting systems through the downtown Atlanta area due to age and neglect. A variety of daytime lighting solutions were evaluated for these tunnels to determine initial cost, maintenance costs to deliver the best value and design for each underpass. Several luminaire types were modeled at different locations to demonstrate their capability including LED, induction, ceramic metal halide and high pressure sodium. Many discussions involving the mounting configuration to the existing structures were had, resulting in many out of the box construction details. Additionally, much coordination had to be done with local power companies to provide the large electrical load being introduced at three of the sites. Mr. Marsh prepared plans, specifications and cost estimates for these tunnel locations,

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including photometric calculations, in accordance with the recommendations put forth by RP-22 of the Illuminating Engineering Society (IES).

Electrical Engineer for backup generators in West Baton Rouge, Louisiana for the West Baton Rouge Parish. The project consists of a CDBG disaster recovery program for the design and installation of thirty (30) emergency generators at numerous sewage lift stations and sewage treatment facilities. During Hurricanes Gustav/Ike many of these lift stations and treatment facilities lost electrical service due to downed lines and poles from the high winds. This resulted in overflows and sewage spills. The emergency generators will keep this from happening in the future, when power is lost. The project includes preparation of bid documents, including application services, basic design and bidding services, construction administration, and periodic construction observation services. Mr. Marsh was responsible for the preparation of preliminary and final engineering design services and preparation of plan for the installation of selected generators. These services will include topographic surveys, and construction plans and specifications preparation. These natural gas generator systems vary from 25KW to 125KW on various single-phase and three phase medium voltage systems. Mr. Marsh is responsible for preliminary and final design of 30 backup generators for sewage lift stations and sewage treatment facilities in West Baton Rouge Parish. The natural gas generator systems vary from 25KW to 125KW on single-phase and three phase medium voltage systems.

Project Manager for Electrical Engineer for SR 96 (Moody Road) Realignment and Interchange with US 129 (SR 247) for GDOT. The interchange is being constructed as part of a traffic congestion problem at the existing SR 96/US 129 intersection, which is partially caused by frequent train crossings at a nearby crossing. To circumvent this problem, GDOT will relocate SR 96 and create a new interchange with SR 247 several hundred feet north of the existing intersection, for which lighting is being provided. Both high mast lighting and conventional options were considered for this interchange, for which Mr. Marsh provided photometric and voltage drop calculations, plans, specifications and cost estimates. Additionally, an LED alternative study for the interchange was evaluated, but was ultimately found it would be more expensive.

Rehabilitation of Taxiway H at Birmingham International Airport A portion of Taxiway H at the Birmingham Airport had to be reconstructed due to drainage issues, which impacted several taxiway edge lights as well as airport obstruction lights near a pair of adjacent hangars. Close coordination with the operators of these hangars was necessary to determine how the existing obstruction lights were fed as they were ultimately removed.

Senior Electrical Engineer of General Services Contract for Mobile Regional Airport in Mobile, Alabama. Mr. Marsh is responsible for lighting and electrical design components for various projects through the general services contract. These projects range from airfield lighting, apron lighting and parking lot lighting, along with their respective service equipment.

Project Electrical Engineer for LA-1 Connector Roadway Between LA-988 (Beaulieu Lane) and I-10 at the LA-415 Interchange in West Baton Rouge Parish, LA for the West Baton Rouge Transit Authority. The project's scope was to provide 30% plans and feasibility to construct a new roadway through an existing field which would connect I-10 to LA 415, spanning nearly a mile. The design would have continuous roadway lighting through the connector roadway using conventional lighting units. Mr. Marsh provided photometric calculations, voltage drop calculations and plan sheets on a Phase 1 feasibility study for the 0.9 mile long corridor. Additionally, maritime lighting was provided for the bridge over the intracoastal waterway.

Senior Electrical Engineer for Runway Lighting Project at Winnsboro Airport, Louisiana. Mr. Marsh is providing design services, preparation of plans, specifications, cost estimates and construction phase services to install runway edge lighting and PAPI systems for an existing runway in Winnsboro, Louisiana. This includes the installation of a new lighting vault building which will include all necessary constant-current regulators and controls necessary. This vault building will be backed up by an onsite generator, complete with an automatic transfer switch.

Senior Electrical Engineer for Reconstruction of Taxiway A and Installation of Runway Guard Lights at Greater Baton Rouge Airport, Baton Rouge, LA. The project involved engineering design services for reconstruction of Taxiway A; and installation of runway guard lights. Taxiway A serves as the primary taxiway to Runway 4L/22R. Drainage improvements and lighting adjustments were also included as required. Mr. Marsh is responsible for electrical support for the electrical system along Taxiway A at Baton Rouge Metropolitan Airport. Additionally, a new runway guard light system is being installed along 4L/22R, for which he is also providing construction support.

Project Manager for US 80 at Holley Road Roundabout for GDOT. Mr. Marsh provided photometric calculations, voltage drop calculations, plans, specifications and cost estimate for the lighting at a new roundabout being constructed at the intersection.

Electrical Engineer for construction plan development for the new Gonzales Police Station in Gonzales, Louisiana for the Gonzales Police Department as a sub-consultant to Grace & Hebert Architects. The scope of work consisted of performing electrical engineering services for developing construction plans and specifications for the new Police Station located in Gonzales, Louisiana at the corner of S. Bullion and Cornerview Road. Electrical design services included power, lighting, communication, fire alarm systems, security systems, and an emergency generator. The lighting design included interior lighting of the building with accent lighting on designated areas. Exterior lighting included parking lot, walkways, and accent lighting on selected portions of the building and roadway. Mr. Marsh is providing construction support and inspection for the new police station in Gonzales, Louisiana.

Senior Electrical Engineer for the Runway 10/28 Levee & Lights at New Orleans International Airport, New Orleans, LA. Mr. Marsh provided design services, preparation of plans and construction phase services to install a conduit bridge for cables for relocated approach lights, electrical service and control conduits at the west end of Runway 10/28 due to construction of a new higher levee by

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the US Army Corps of Engineers. Mr. Marsh is assisting in designing and inspecting a conduit bridge over a levee near Runway 10/28 at New Orleans International Airport. He is also responsible for the electrical inspection of the installation of the relocation of approach lighting to this runway.

Electrical Engineer Extension of SW 40th Blvd. to SW 47th Avenue in Gainesville, Florida for the City of Gainesville. Mr. Marsh designed a high pressure sodium lighting system for the three-quarter mile long extension of SW 40th Blvd., which included a roundabout. The design involved extensive coordination and clearance requirements from several power distribution and transmission pole lines through the corridor. He prepared photometric calculations, plans, specifications and cost estimate using Gainesville Regional Utility's poles.

Electrical Engineer for I-57 at I-294 Tri-State Tollway Interchange, Illinois Department of Transportation, Cook County, Illinois. This project involved complete permanent and temporary lighting design of the new interchange at I-57 and I-294. Mr. Marsh prepared plans and specifications for high mast and conventional lighting along I-57 as well as multiple intersections and underpass lighting layouts, both varying in size and complexity, within the project scope. Lighting design included collector/ distributor lanes and complex ramp designs. Mr. Marsh's additional responsibilities included redesign of lighting along 147th Street, from Kedzie Avenue to Western Avenue, and new ramps from 147th Street to I-294. He coordinated with multiple agencies, including IDOT, ISTHA and several Villages to facilitate services.

Electrical QA/QC for I-80 at Brisbin Road, Illinois Department of Transportation. Mr. Marsh performed quality control for designed plans, specifications and estimates for the lighting of I-80 as part of a project to construct the interchange at I-80 and Brisbin Road. The design effort included interchange lighting, intersection and transition lighting at US Route 6 and Brisbin Road.

Electrical Engineer for Wacker Drive Reconstruction, Chicago Department of Transportation. Mr. Marsh designed plans, specifications and estimates for the lighting, both nighttime and daytime, of both upper and lower Wacker Drive from Van Buren Street to Randolph Street. His responsibilities also included designing the electrical distribution system through the corridor including bascule bridge power, traffic signal service locations and fire alarm systems for bridges over the Chicago River at Randolph Street, Washington Street, and Madison Street.

Electrical Engineer for the I-294 Rehabilitation from 95th Street to I-55 for the Illinois State Toll Highway Authority (ISTHA). Mr. Marsh was responsible for developing ITS plans as part of a rehabilitation project for a segment of the Middle Tri-State (I-294) project. Ramp queue detectors (RQD) were placed to help monitor the southbound I-294 exit ramp to westbound 95th, which was regularly backed up. Eighteen additional wireless RQDs were needed for the I-294 interchange with I-55. A median mounted DMS was designed to provide information to drivers in both directions through this crowded corridor. Two additional cameras were placed in this area to provide coverage in areas previously omitted by an existing system. All locations were carefully placed based on traffic concerns and interaction with existing ITS components. Mr. Marsh provided high level ITS plans, specifications and estimates for this project.

Electrical Project Engineer for I-90 Resurfacing and ITS Installation for the Illinois State Toll Highway Authority (ISTHA). In order to provide better camera coverage and driver information through heavily traveled I-90 corridor near the IL 53/I-290 interchange, ITS was added to a resurfacing project. Wireless traffic sensors were installed on all eight legs of the cloverleaf interchange, which all fed back to a main access point, where it dropped to an existing fiber tie-in. Extensive wireless analysis was required to ensure quality line of site through the interchange, but overall saved money. This traffic data helped provide better information to the drivers in the area, such as a median mounted dynamic message sign (DMS), also provided in this project. While there was a tower mounted on a tower in the middle of the interchange, there were visibility restrictions due to roadway curvature and other outside interferences. Therefore, two cameras were added in the corridor to enable viewing of a large gap to help monitor the often-congested traffic, one on either side of the interchange, which were both selected to maximize view ability in either direction. The west camera also doubled as the DMS monitoring camera. Mr. Marsh was responsible for developing plans, including integration with the existing system, specifications and cost estimates for the corridor.

Electrical Engineer for Commonwealth Edison Duct Bank Installation, O'Hare Modernization Project. Mr. Marsh prepared plans, specifications and estimates for a length of ComEd duct bank, including ComEd vaulted manholes and other equipment being installed as part of the O'Hare Modernization Project. This design required a complete duct bank layout, including calculating slopes and elevations for strict ComEd requirements. Due to the large number of design engineers involved in this project, continuous coordination with several firms was necessary.

Electrical Engineer for ITS Engineering Support, Illinois State Toll Highway Authority (ISTHA). Mr. Marsh worked as an extension of Tollway staff as an ITS engineer working with devices such as cameras; vehicle detectors; weigh-in-motion devices; ramp queue and loop detectors; dynamic message signs; and road weather information systems. Work included all phases of the engineering process, from planning and design to installation support to configuration of inspection. His responsibilities also included debugging and modifying existing installations and working with multiple aspects of ITS, including both wireless and fiber applications. Mr. Marsh coordinated with other technical personnel, contractors and organizations for proper operation.

Project Manager for RTMS Calibration Support, Illinois State Toll Highway Authority (ISTHA). Mr. Marsh was responsible for verifying proper calibration of all system-wide Tollway owned Remote Traffic Monitoring Sensors, comprising of almost a hundred devices. This involved supervising vehicle counts and speed checks performed by another engineering firm's field crew and directing changes as deemed necessary to calibrate the sensor within Tollway specification. This also included debugging sites that were not

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fully operational and making repairs, if possible, or creating a work list for a Contractor to make repairs and subsequent supervision and approval of the work performed. This project ultimately led to many lessons learned on the design side, which led to the development of new RTMS deployment strategies, which Joe compiled within the Illinois Tollway ITS Deployment Guide.

Electrical Engineer for Taxiway Reconstruction, Midway Airport, Cook County, Illinois. Mr. Marsh prepared plans, specifications and estimates for reconstruction of one taxiway and construction of another new taxiway at Midway Airport. Taxiway edge, guidance sign and wind cone lights were all designed around several airport and Chicago regulations. This job required much field work to trace series circuits to determine the paths and create solutions for re-routing, which led to the impact of runway circuits as well.

Electrical Engineer for the William J. Donovan Bridge Rehabilitation in Batavia, Illinois for the Village of Batavia. Mr. Marsh was responsible for conceptual and final design for lighting and electrical systems on the new William J. Donovan Bridge, located on Wilson Avenue over the Fox River. His responsibilities included design of roadway, pedestrian, and specialty lighting for a new bridge. Scope included development of lighting concepts, including evaluation of decorative lighting approaches as well as development of final plans, specifications, and estimates.

Electrical Engineer for the Jackson Drive Bridge in Chicago, Illinois for the Chicago Department of Transportation (CDOT). Mr. Marsh designed and prepared lighting plans and specifications for the Jackson Drive Bridge reconstruction over the Metra tracks east of Michigan Avenue. The project involved design of special power and lighting facilities for use during events, such as the Taste of Chicago. These included electrical service for use by food carts, entertainment stages, and loudspeakers. The project required significant coordination with city departments and the Chicago Park District.

Electrical Engineer for the Rehabilitation of Lighting System at Iroquois Landing in Chicago, Illinois for the Port of Illinois. Mr. Marsh prepared plans and estimates for rehabilitation of existing high mast lighting for a port facility. His effort included retrofitting deteriorated and non-functional equipment, including controller and circuitry with new high mast lighting and floodlights.

Electrical Engineer for the State Street Sidewalk Replacement in Chicago, Illinois for the Chicago Department of Transportation (CDOT). Mr. Marsh developed plans and specifications for a sidewalk rehabilitation project involving ornamental city lighting on State Street, between Ohio Street and Ontario Street. He provided plans for private decorative lighting units, recessed in the sidewalk, for Tree Studios building at this location.

Electrical Engineer for improvements to the Robert Archer Parking Lot in Long Grove, Illinois for the Village of Long Grove. Mr. Marsh designed and prepared plans, estimates and specifications for permanent lighting for both a parking lot and a local arterial street. The lighting was done using both overhead and pedestrian decorative fixtures with specialty equipment, which all needed to be coordinated with the village as well as the architect. LED lighting was evaluated as an alternative for this job.

Electrical Engineer for widening I-94 the Tri-State Tollway from Half Day Road to IL 176, in Lake County, Illinois for the Illinois State Toll Highway Authority (ISTHA). Mr. Marsh designed, prepared, and coordinated lighting plans, specifications, master plan, and cost estimates for a project to widen five miles of the north Tri-State Tollway from IL 22 (Half Day Road) to IL 176 (Rockland Road).

Electrical Engineer for plans and specifications for the ramp and underpass lighting for I-94 at Foster Avenue in Chicago, Illinois for the Illinois Department of Transportation. Mr. Marsh prepared plans and specifications for ramp and underpass lighting on I-94 at the Foster Avenue exit and City of Chicago street lighting replacement on Foster Avenue as part of a project to replace the Foster Avenue bridge over I-94. He was also responsible for developing a plan to remove and reinstall an IDOT variable message sign located on the bridge.

Electrical Engineer for the reconstruction of IL Route 60 over I-94 Bridge in Lake County, Illinois for the Illinois Department of Transportation. Mr. Marsh designed and prepared plans, specifications, and cost estimates for lighting associated with the complete reconstruction of IL 60 over I-94. The design included full lighting for the interchange and four intersections as well as continuous lighting throughout, ending in transition lighting from all directions. The project also included coordination with Illinois State Toll Highway Authority (ISTHA) for ramp and underpass lighting, and required extensive coordination with Lake County and with utilities.

Electrical Engineer to widen I-94 Tri-State Tollway from IL 176 to Wisconsin Border in Lake County, Illinois for the Illinois State Toll Highway Authority (ISTHA). Mr. Marsh designed, prepared, and coordinated lighting plans, specifications, master plan and cost estimates for a project to widen fifteen miles of the north Tri-State Tollway from IL 176 (Rockland Road) to Wisconsin State Line.

Electrical Engineer for improvements to Racine Avenue/37th Street in Chicago, Illinois for the Chicago Department of Transportation (CDOT). Mr. Marsh designed, prepared, and coordinated plans and specifications for lighting as part of a project for Racine Avenue improvements from Pershing Road to 35th Street, as well as 37th Street from Racine Avenue to Morgan Street.

Electrical Engineer for improvements to I-88 East-West Tollway in DuPage County, Illinois for the Illinois State Toll Highway Authority (ISTHA). Mr. Marsh designed, prepared, and coordinated plans, specifications, and cost estimates for lighting and electrical improvements as part of the widening of the Reagan Expressway from Illinois Route 59 to Winfield Road, as well as corresponding interchanges.

Project Electrical Engineer I-90 at Rockton Road for the Illinois State Toll Highway Authority (ISTHA). A weigh-in-motion (WIM) enforcement pad was installed as part of the I-90 reconstruction in this area, which included a security camera. The purpose of the

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camera was to not only help monitor traffic in the area but also to help monitor the truck weighing process for protection and record for those involved. Mr. Marsh provided plans, specifications and estimates for this installation.

Electrical Engineer to rehabilitate the I-294 Tri-State Tollway from Dundee Road to Lake-Cook Road in Cook County, Illinois for the Illinois State Toll Highway Authority (ISTHA). Mr. Marsh designed, prepared, and coordinated lighting and plaza power plans, specifications, and cost estimates for the rehabilitation of the heavily traveled I-294 junction at the Eden's Spur.

Electrical Engineer for rehabilitation of I-94 Tri-State Tollway from Grand Avenue to Mill Creek in Lake County, Illinois for the Illinois State Toll Highway Authority (ISTHA). Mr. Marsh provided roadway lighting consultant services including providing calculations, identifying problematic areas, details, and standards for a lane rehabilitation project.

Electrical Engineer to widen I-90 Northwest Tollway in Kane County, Illinois for the Illinois State Toll Highway Authority (ISTHA). Mr. Marsh designed, prepared, and coordinated plans, specifications, and cost estimates for the lighting and electrical work as part of the widening of the Northwest Tollway near Sleepy Hollow Road.

Electrical Engineer to reconstruct and widen I-90 Northwest Tollway from Kennedy Expressway to Oakton Street in Cook County, Illinois for the Illinois State Toll Highway Authority (ISTHA). Mr. Marsh prepared conceptual-level lighting for master plan for the reconstruction and widening of five miles of I-90 from the Kennedy Expressway to Oakton Street, including two interchanges, two plazas, and access ramps to the Des Plaines Oasis.

Electrical Engineer for the IL 92 Underpasses for the Illinois Department of Transportation. Mr. Marsh designed and prepared plans, specifications, estimates, and photometrics for underpass lighting at two locations on IL 92.

Electrical Engineer to modernize I-55 at IL Route 53 in Will County, Illinois for the Illinois Department of Transportation (IDOT). Mr. Marsh designed and prepared plans, specifications, and cost estimates for the electrical and lighting work as part of the modernization of the I-55 exchange at IL Route 53.

Electrical Engineer for interchange improvements at I-94 and IL Route 22 for the Illinois Department of Transportation (IDOT). Mr. Marsh designed and prepared plans, specifications, and cost estimates for the electrical and lighting work associated with the improvement of the I-94 interchange at IL Route 22 (Half Day Road).

Electrical Engineer for improvements to the I-94 Dan Ryan Expressway at 111th Street /112th Street in Cook County, Illinois for the Illinois Department of Transportation (IDOT). Mr. Marsh designed and prepared lighting plans, specifications, and cost estimates for improvements to the 111th Street and 112th Street bridges over I-94.

Electrical Engineer for the rehabilitation of I-94 the Dan Ryan Expressway for the Illinois Department of Transportation (IDOT). Mr. Marsh designed and prepared lighting and electrical plans, specifications, and cost estimates for the complete rehabilitation of the I-90/94 Dan Ryan Expressway from 31st Street to 47th Street.