MICHAEL BRADFORD, PE

Education

BS – Civil Engineering, Arizona State University, 2003

Professional Licenses

Registered Professional Engineer: Arkansas (No. 17690), Arizona (No. 47980), Florida (No. 92561), Nevada (No. 022230), New Mexico (No. 19240), North Carolina (No. 048135), Texas (No. 141156), Wyoming (No. 14118)

Specialty Certifications

CQA/CQC for Geosynthetic Materials Inspector

Professional Affiliations

Member – Solid Waste Association of North America (SWANA)

Professional Experience

Mr. Bradford is a Senior Professional Engineer with over 20 years of experience in civil engineering and project management. He has been the principal engineer and engineer of record for a wide range of public and private sector capital projects in Arizona and across the country for solid waste landfills and other public works civil projects. He has experience in civil site planning (landfill and industrial facilities); excavation and grading design; storm water management design; water and sewer infrastructure design; geosynthetic liner design; landfill gas (LFG) collection and control system design; leachate collection and recovery system design; landfill site life and volume analysis; and liquids distribution and wastewater recovery systems design. He has also developed extensive experience with regulatory relations, compliance, and permitting at the local, state, and federal levels inherent to managing and completing the range of civil engineering projects in the solid waste and water services industries presented below.

Mr. Bradford has performed construction management and administration duties (management, construction quality assurance [CQA] monitoring, inspections, and documentation) for numerous large-scale mass excavation and grading projects, landfill cell construction projects, pond liner projects, and landfill closure system installation projects, as well as water and sewer facility infrastructure projects.

As an experienced manager, Mr. Bradford has extensive administrative management experience associated with managing civil engineering projects. This experience includes proposal and Statement of Qualification (SOQ) preparation, budget and cost estimations, budget management, engineering staff management and coordination, interdisciplinary coordination, client management and relations, regulatory agency coordination and relations, and public relations.

Project experience, listed by state, is shown below.

Arkansas

Fort Smith MSW Landfill, City of Fort Smith, AR. Client Manager and Principal Engineer performing several years of engineering and state compliance for the facility. Notably, Mr. Bradford has prepared a major permit modification, including base grades and leachate drainage plan for the entire ~600-acre future MSW disposal cell footprint, including an alternative final cover demonstration for a soilless synthetic turf cover. Prepared a master development plan for ancillary areas of the facility, including feasibility studies for a Materials Recycling Facility (MRF) and City Fleet Maintenance Facility. Prepared a design and construction package for the 12-acre expansion for Cell A-6. Cell A-6 design includes the extensive subsurface characterization to maintain regulatory separation from groundwater and bedrock (Cell A- 6 awaits City Council approval to construct). Prepared several years of annual engineering reports and compliance audits. Mr. Bradford also acts as the City's "go-to" landfill engineering consultant for all engineering and regulatory compliance for their three industrial landfills. This includes routine compliance reporting and assistance on annual engineering reporting, landfill planning, permitting, and general landfill expert consulting.

Domtar Papermill Industrial Landfills (Paper Sludge Landfill, Lime Waste Landfill, Mill Trash Landfill), Ashdown, AR. Client Manager, Principal Engineer, and Construction Manager for the in-situ Phase 1 Closure and Partial Phase 2 closure of the Papermill's Paper Sludge Landfill. Mr. Bradford also acts as the Papermill's "go-to" landfill engineering consultant for all engineering and regulatory compliance for their three industrial landfills. This includes routine compliance reporting and assistance on annual engineering reporting, landfill planning, permitting, and general landfill expert consulting.

Little Rock MSW Landfill, City of Little Rock, AR. Client Manager and Principal Engineer for the closure of the eastern slope of Cell 4. Closure included a minor permit modification for an alternative final cover demonstration. Closure plan included cross coordination with the LFG engineering consultant and custom grading plan to meet existing conditions. Prepared and implemented a stormwater corrective action plan to mitigate elevated TSS levels in site stormwater discharges.

Republic Services, Saline County MSW Landfill On-Call Engineering and Regulatory Compliance, Bauxite, AR. Client Manager, Project Manager, and Engineer of Record for various on-call engineering and regulatory compliance services. Tasks have included regulatory annual engineering inspection reporting, quarterly waste density and operational efficiency studies, LFG system planning, borrow source planning, 5-year planning and design associated with and to assist client's internal financial planning, environmental compliance monitoring, and reporting.

Republic Services, Model Fill MSW Landfill, Little Rock, AR. Client Manager, Project Manager, and Engineer of Record for various on-call engineering and regulatory compliance services for post-closure care and maintenance of this closed MSW landfill.

Turk Power Plant CCR Landfill, Fulton, AR. Engineering Manager for the design, permitting, and construction of Phase 2 of the Plant's Coal Combustion Residual Landfill. Tasks included preparation of design of base grade layers (i.e., subgrade, top of clay, and protective cover), construction drawings, project manual, specifications, and contract documents. Also led design team for a major permit modification for an Alternative Final Cover demonstration for the use of an artificial grass liner system.

Arkansas Annual Engineering Inspection Reporting – Multiple MSW and Industrial Facilities in Arkansas. Mr. Bradford has been the Engineer of Record for numerous MSW and industrial waste landfills throughout Arkansas for regulatory-required Annual Engineering Inspection Reports. Reports include a full engineering inspection of each landfill, assessing landfill space consumed, site life, and remaining capacity.

Arizona

Durham Regional Landfill, Florence, AZ. Project Manager and Certification Engineer of Record. Mr. Bradford has overseen the design, installation, and certification of four LFG monitoring probes, and preparation of a slope stabilization and vegetation study for the 6-acre finished waste slope at the Durham Regional Landfill.

Salt River Landfill, Scottsdale, AZ. Designer, Engineer of Record, and Construction Manager for RD&D Permit for the Phase VI Bioreactor implementation project. For this project, responsibilities include preparing the design and construction plans for liquids collection, recirculation, injection, and monitoring system; performing the quarterly third-party review and inspections reports; and preparing the annual bioreactor compliance report. Also prepared financial assurance cost updates for closure and postclosure care, and soil stockpile/airspace usage and remaining capacity reports for this entire site. Also prepared a Vertical Expansion closure plan with a 60-foot lift for the entire site.

Rio Rico Sanitary Landfill, Santa Cruz County, AZ. Designer and Engineer of Record for on-call services for Santa Cruz County's Rio Rico Sanitary Landfill. Provides remaining site life and capacity reports and financial assurance updates, and designed and permitted a vertical expansion (including drainage improvements). Lead Designer, Engineer of Record, and Construction Manager for the construction of an earthen berm at the base of the slope, in order to support the increased side-slopes of the vertical expansion.

Pinto Valley Mine Gold Gulch 1A Impoundment Relining, Miami, AZ. Designer, Engineer of Record, Construction Manager, Liner Inspector, and Liner Certification Engineer for the replacement dual liner and underdrain system for the 16-acre Gold Gulch 1A pregnant copper solutions impoundment at the Pinto Valley Mine. This project included preparation of required regulatory permit documents, construction plans and specifications, CQA plan, design report, bid support, and final reporting.

Huachuca Landfill, Huachuca City, AZ. Designer and Engineer of Record for the design and permitting of a vertical and lateral expansion and drainage improvements of the Huachuca Landfill. Also performed financial assurance updates, site life analyses, and greenhouse gas (GHG) applicability for this site.

Town of Patagonia Landfill Closure and Expansion, Patagonia, AZ. Engineer of Record and CQA Manager for the Town of Patagonia's Landfill Phase 2 Expansion project. Responsibilities included providing oversight and engineering field support to the field monitor during the closure of the existing cell and excavation/construction of an expansion cell. This project required several field retrofit designs.

Graham County Regional Landfill, Safford, AZ. Chief Design Engineer and Engineer of Record on a facility planning feasibility study for the Graham County Landfill, owned and operated by the City of Safford.

Waste Management, Inc. Landfill Gas Collection and Control Systems (GCCS) – Arizona, New Mexico, and Colorado. Engineer of Record responsible for the design and implementation of numerous GCCS expansions and overall system build-out plans for multiple landfills owned and operated by Waste Management in Arizona, New Mexico, and Colorado. Mr. Bradford has designed and performed CQA for over 20+ vertical extraction wells and thousands of feet of large-diameter LFG header, laterals and condensate management systems.

Waste Management, Inc., Stormwater Pollution Prevention Plans (SWPPPs), Arizona. Project Engineer responsible for conducting site compliance reviews for the new Arizona DEQ 2010 MSGP with regard to and updating/preparing SWPPPs and NOI's, as needed, for over 30 Waste Management landfills, transfer stations, and MRFs.

Vincent Mullens LFG System Realignment, Tucson, AZ. Designer and Engineer of Record for the realignment of the Vincent Mullens LFG collection system header. This project includes design of 600 feet of LFG header, installation of two new pneumatic condensate sumps and one new vertical gas extraction well, and abandonment of a large portion of the existing gas collection system.

Florida

Sand Hill C&D Landfill Expansion Design and Certification, Yulee, FL. Client Manager and Engineering Manager for the construction certification for Cell B2 and the design permitting for the lateral expansion area at the Sand Hill C&D Landfill. Included the design of a synthetically lined cell and leachate collection and management system.

Kansas

Ford County MSW Landfill Phase 5 Expansion, Ford County, KS. Engineering Manager for the design and permitting of the Phase 5 Expansion for Ford County Municipal Waste Landfill. Design included connection to existing Phases 1 through 4, and provided future connections to Phases 6 and 8. Design was for a traditional composite geomembrane liner with sand leachate drainage layer. Also acted as engineering support during implementation and construction as-builts.

Grant County MSW Landfill Vertical Expansion, Grant County, KS. Engineering Manager for the vertical expansion design and permitting for the Grant County MSW Landfill. Vertical expansion raised final grades approximately 40 feet and increased design capacity and life expectancy.

Morton County C&D Landfill Phase H Lateral Expansion, Morton County, KS. Engineering Manager for lateral expansion design and permitting for the Morton County C&D Landfill. Lateral expansion increased site capacity by several million cubic yards and extended the site life by several decades.

Acme Sand Company Foundry Sand Landfill Phase 3 Expansion, Coffeyville, KS. Engineering Manager for design and permitting of the Phase 3 lateral expansion of the plant's foundry sand waste. Lateral Expansion included a ~10 acre expansion tripling the facility's design capacity and life expectancy.

Barber County C&D Landfill NE Cell 1 Lateral Expansion, Barber County, KS. Engineering Manager for the lateral expansion design and permitting for the Barber County MSW Landfill.

Louisiana

Louisiana Pigment Plant Hazardous Waste Landfill, Phase IV – Cell 3-5 Design and Construction, West Lake, LA. Engineering Manager for design, permitting, and construction of the South Landfill's (Phase IV) Cell 3-5. Tasks included preparation of design and construction drawings, project manual, and bidding documents. Landfill's engineering containment system includes a 2-foot thick compacted clay liner, geomembrane, geocomposite leachate drainage, and protective cover. In addition, facility is designed with an extensive underdrain system to account for local shallow groundwater table.

Louisiana Pigment Plant Hazardous Waste Landfill, Phase VI (North Expansion) Design and Permitting, West Lake, LA. Engineering Manager for design, permitting, and construction of the

Northside expansion (i.e., Phase VI) of the plant's hazardous waste landfill. Tasks included preparation of design of base grade layers (i.e., subgrade, top of clay, and protective cover) and final grade layers (i.e., top of waste, top of clay, and final cover grades). Landfill's engineering containment systems include a 2-foot thick compacted clay liner, geomembrane, geocomposite leachate drainage, and protective cover.

Louisiana Pigment Plant Hazardous Waste Landfill, Phase III Closure Design, West Lake, LA. Engineering Manager for design, permitting, and construction of the Phase III West slope closure of the plant's hazardous waste landfill. Tasks included preparation of final grade layers (i.e., top of waste, top of clay, and final cover grades). Landfill's final cover systems include a 2-foot thick compacted clay liner, geomembrane, geocomposite drainage, and protective cover.

New Mexico

NGL North Ranch E&P Waste Landfill, Lea County, NM. Client Manager and Principal Engineer for the greenfield siting, development, design and permitting of a greenfield landfill for oilfield waste. For this project, Mr. Bradford managed a team of professionals for a complete site characterization, operational and construction phasing and development plan, engineering design, and permitting for an undeveloped 303-acre tract in southeast New Mexico. This project has been approved and permitted by the State of New Mexico.

NGL North Ranch E&P Waste Landfill – Cell E-1 and Entrance Infrastructure Construction, Lea County, NM. Client Manager, Project Manager, and Principal Engineer for the design of the first cell, Cell E-1, of a new landfill for oilfield waste in Pecos, TX. Led the engineering and design team in preparation of construction documents (plans, specifications, and contract documents) for the grading and drainage for the entire landfill facility, access roadways and stormwater conveyance systems, and engineered containment system design. This project is awaiting client procurement of a contractor to complete the construction.

NGL South Ranch E&P Waste Landfill, Lea County, NM. Client Manager and Principal Engineer for the greenfield siting, development, design and permitting of a greenfield landfill for oilfield waste. Managed a team of professionals for a complete site characterization, operational and construction phasing and development plan, engineering design, and permitting for an undeveloped 182-acre tract in southeast New Mexico. This project has been approved by the State of New Mexico and is going through a public comment period.

North Carolina

Historic MSW Landfill Closures (Edgecombe Landfill, Littleton Landfill, Henderson Landfill, Gibsonville Landfill) – Various Locations, North Carolina. Principal Engineer for the closure of four historical "at-risk" landfills identified by the North Carolina Department of Environmental Quality (NCDEQ). Landfills identified by NCDEQ were assessed by Terracon for environmental impacts and found to be "at-risk" for long-term environmental impacts such as LFG migration and groundwater contamination. Mr. Bradford directly designed or oversaw design and construction of major regrading efforts and final cover installations at these landfills. Work effort included sediment and erosion control planning, design, and permitting through the NCDEQ.

Texas

Panola County E&P Waste Landfill, Panola County, TX. Client Manager, Project Manager, and Principal Engineer for the greenfield siting, development, design, and permitting of a landfill for oilfield waste. Managed a team of professionals for a complete site characterization, operational and construction phasing and development plan, engineering design, and permitting for an undeveloped

560-acre tract in East Texas. This project has been approved and permitted by the State of Texas Railroad Commission.

Pecos E&P Waste Landfill, Reeves County, TX. Client Manager and Principal Engineer for the greenfield siting, development, design, and permitting of a landfill for oilfield waste. Managed a team of professionals for a complete site characterization, operational and construction phasing and development plan, engineering design, and permitting for an undeveloped 640-acre tract in West Texas. This project has been approved and permitted by the State of Texas Railroad Commission.

Orla E&P Waste Landfill, Orla, TX. Engineering Manager for design, permitting, and facility planning of an 80-acre upstream oil and gas exploration waste landfill. Planning and design activities for an approximately 240-acre, 11 million-cubic-yard industrial waste disposal facility. Design included double-lined cells with leachate collection and leak detection systems, double-lined evaporation ponds with leak detection, storm water controls, concrete drying beds, and concrete truck washout stations. After permitting as approved through the regulators, Mr. Bradford was the Lead Designer for preparation of construction plans and specifications for Phase 1, Cell 1 of the facility, and provided construction support to the third-party construction management firm.

Department of Energy Pantex Facility Landfill 1 Closure, Amarillo, TX. Construction Manager for a ClosureTurf® synthetic cover/turf system at the Pantex Plant. Trihydro and subcontracted the construction. Mr. Bradford oversaw clearing and grubbing of the existing cover system; placement of clean fill and grading to provide positive drainage; anchor trench excavation and backfill; 50-mil LLDPE super-grip net geomembrane deployment, welding, and testing; synthetic grass deployment and seaming; and placement of sand ballast. Prepared construction documentation report and provided the liner certification.

Department of Energy Pantex Facility Landfill 3 (SWMU 54) Cap Repair, Amarillo, TX. Project Engineer and Lead Designer for a global geosynthetic and engineered hydromulch soil amendment cover system repair solution at the Pantex Plant's Landfill 3. The solution consists of clearing and grubbing of the existing cover system, and placement of a geosynthetic geocell slope stabilization mat and hydromulch project infused with engineered soil amendments to improve soil quality and ability to sustain vegetation.

Martin County E&P Waste Landfill – Cell N1 Construction, Martin County, TX. Client Manager, Project Manager, and Principal Engineer for design of the first cell, Cell N1, of a new landfill for oilfield waste in Martin County, TX. Led the engineering and design team in preparation of construction documents (plans, specifications, and contract documents) for the grading and drainage for the entire landfill facility, access roadways and stormwater conveyance systems, and engineered containment system design. This project is awaiting client procurement of a contractor to complete the construction.

Wyoming

Laramie Landfill Lifetime Permit, Ongoing Permitting, Planning and Environmental Compliance, Laramie, WY. Client Manager, Project Manager, and Engineer of Record for the complete facility planning design to support the preparation of a lifetime permit application for the MSW landfill serving the City of Laramie. The DEQ determined the application for the lifetime permit was complete and technically adequate after a single review. Since approval of the lifetime permit, Mr. Bradford has continued to assist the City with multiple minor permit amendments, annual reporting, leachate collection system reporting, and groundwater system sampling and reporting. Also assisted the City with planning for future Stage 2 expansions and major permit amendment to vertically expand Stage

1 of the facility for a construction and demolition (C&D) fill only and permit a water balance cover as an alternative final cover system over Stage 1.

Laramie Landfill Improvements Construction Management, Laramie, WY. Construction Manager, Liner Inspector, CQA Officer, and Liner Certification Engineer. Duties include responding to contractor requests for information, clarifications, and material submittals, organizing and conducting construction meetings, contractor relations, and construction inspections and supervision. Project scope includes construction of a new lined MSW cell, lined evaporation ponds, storm water control infrastructure, 25,000-square-foot baler warehouse, scale house, truck scale, approximately 1 mile of paved and unpaved roads, and on- and off-site utility infrastructure.

Rock River Landfill No. 2 Closure and Environmental Monitoring, Rock River, WY. Client Manager, Project Manager, Designer, Engineer of Record, Construction Manager, and Cover Certification Engineer for a 1.5-acre MSW landfill closure. Project included complete design, permitting, preparation of construction document, client bid support, construction management, and liner certification. Final closure liner system included a flexible membrane liner and composite passive gas ventilation system.

Sundance Landfill Closure, Sundance, WY. Project Engineer and Lead Designer for a 22-acre MSW landfill closure. Project included complete design and Wyoming Solid Waste Rules and Regulations Chapter 2 closure permit application. Final closure design system included a flexible membrane liner, composite passive gas ventilation system, and composite surface drainage layer.

Freemont County Solid Waste Disposal District Permitting, Planning, and Compliance, Multiple Landfills, Freemont County, WY. Project Engineer for the on-call engineering and design needs for the District's four MSW landfills. Tasks included closure/postclosure cost estimates, airspace utilization rate analyses, site planning and sequencing, expansion design, and closure design and permitting.

City of Cheyenne, Happy Jack Landfill Groundwater Monitoring and Leachate System Operation and Maintenance (O&M), Cheyenne, WY. Project Manager for on-call O&M services contract for the Happy Jack Landfill's groundwater monitoring well network and leachate collection and recovery systems. Tasks included groundwater well surface completion maintenance, groundwater well abandonments, groundwater well installation, groundwater well conversions, leachate pump upgrades, and maintenance.

Sinclair Refinery FCC-Asbestos Landfill Permitting, Sinclair, WY. Engineering Manager and Engineer of Record responsible for design and permitting for a private refinery-operated industrial landfill, which accepts only fluid cracking catalyst waste and asbestos waste. Permitting included vertical and lateral expansions of the asbestos waste cell. Permitting required a separate regulatory application to obtain a waiver to the Wyoming DEQ location standards for industrial waste disposal facilities, as the extent of lateral expansion was too close to the neighboring community. Ultimately, the expansion extended the life of the facility by approximately 30 years.

Sinclair Refinery Industrial Waste Landfill No. 2 Permitting, Sinclair, WY. Engineering Manager and Engineer of Record responsible for design and permitting for a private refinery-operated industrial waste landfill, which accepts industrial office and non-hazardous wastes from the refinery. Permitting included preparing a demonstration to allow the facility to accept petroleum-contaminated soils with higher total petroleum hydrocarbon concentrations, and preparing a permit application for a lateral expansion and a 100-foot vertical expansion of the permitted footprint. Ultimately, the expansions have extended the life of the facility by approximately 65 years.

Sinclair Refinery Corrective Action Management Unit (Landfill) and Residuum Storage Area 6B Closure, Sinclair, WY. Geosynthetic Liner System Engineering Lead, CQA plan preparation, and technical reviewer for design and permitting for the closure of a private refinery-operated corrective action management unit (CAMU) and residuum storage area (RSA 6B). The liner system consisted of an HDPE membrane/GCL geocomposite material. Closure area was approximately 10 acres and included design of stormwater controls. Upon permitting approval, Mr. Bradford provided bid and construction management services, as well as CQA of the liner installation over RSA 6B. Also assisted refinery with a redesign of the CAMU's permitted composite flexible membrane final cover system. This redesign employed value engineering to remove thick soil drainage layers to be replaced with less costly geonet composites.

Sinclair Wyoming Refining Company (SWRC) Refinery Wastewater Lagoon Permitting and Design, Sinclair, WY. Engineering Lead and Engineer of Record responsible for design, permitting, and construction management for a 2.5-acre engineered containment system to be used as a sewage treatment lagoon and approximately 1 mile of associated off-site gravity sewer main.

Department of Energy National Petroleum Reserve No. 3, Industrial Landfill No. 2 Closure Remediation, Natrona County, WY. Project Engineer and Lead Designer on the waste excavation and closure of Industrial Landfill No. 2 and associated landfarm facility at the DOE's National Petroleum Reserve No. 3. This project included preparation of excavation and grading plans, CQA plan, specifications, and bid documents. Waste characterization studies were also completed in coordination with the City of Casper for transfer of exhumed wastes to the Casper Landfill.

Miscellaneous

Republic Services Landfill Capital Improvements 5-Year Planning –Texas, Missouri, Arkansas, and Florida. Client Manager and Principal Engineer for the conceptual 5-year engineering and planning for 12 MSW landfills, spread across 4 states, that are owned and operated by Republic Services. This project includes preparing 5 years of conceptual fill sequencing plans and capital improvement plans (i.e., cell construction, roadway improvements, pipeline projects, etc.) to be utilized by Republic Services for budgetary planning purposes.

EPA GHG Rule Applicability and Reporting. In 2009, the EPA adopted new mandatory GHG reporting rules that directly affect most landfills. Mr. Bradford has assisted multiple landfill clients to determine if their landfill sites are subject to these rules by modeling LFG generation rates based on site-specific data. For sites found to be affected by the Rule, Mr. Bradford prepared numerous GHG Monitoring Plans as required by the regulations.

Miscellaneous CQA and Fieldwork. Chandler Landfill Gas Probe Set Installation (AZ), Painted Desert Landfill Gas Probe Set Installation (AZ), and Tier II sampling at the Washington County Landfill (St. George, UT).

Water and Wastewater Infrastructure Design Experience

Buckeye Parkway Center Off-site Water and Sewer Infrastructure, Buckeye, AZ. Project Engineer and Design Lead of 2.5 miles of large-diameter regional gravity sewer; 3 miles of regional-use water main; two groundwater wells stations; and a 4-acre, 2 million-gallon water storage/treatment and booster pump station facility. This project included storm water infrastructure design within the water facilities, and interdisciplinary coordination with the residential developer and transportation engineers.

Buckeye Industrial Park Off-site Water and Sewer Infrastructure, Buckeye, AZ. Project Engineer and Design Lead of 2.5 miles of pressure sewer main; 0.5 miles of water main; and a 0.5-acre, 650,000-gallon water campus and sewer lift station facility. This project included storm water infrastructure design within the water facilities, and interdisciplinary coordination with the residential developer and transportation engineers.

Northeast Buckeye Sewer Infrastructure, Buckeye, AZ. Project Engineer and Design Lead of 3.5 miles of pressure sewer main; 3 miles of gravity sewer; and a 9 million-gallon-per-day sewer pumping station facility. This project included storm water infrastructure design within the water facilities, and interdisciplinary coordination with the residential developer and transportation engineers.

Global Water Resources Company - Water System Infrastructure Improvements, Buckeye, AZ. Principal Engineer for design and construction of an inline booster pump station and upgrades to various water storage facilities throughout the Buckeye Global Water system.

Residential and Industrial Complex Conceptual/Permitting Master Plans – Water and Sewer Systems in Buckeye, Tolleson, Surprise, and Avondale, AZ. Project Engineer for conceptual-level design and permitting report preparation for the water and sewer systems for numerous private residential and industrial complex water distribution and sewer collection systems. These reports included the conceptual hydraulic modeling of the community, using GIS and AutoCAD-based software, by importing parcel and street layouts and applying local community loading standards. Hydraulic models were used to size piping networks for both water and sewer systems at a conceptual level, and summarized into reports for submittal to the local planning boards for approvals.

Municipal Capital Improvements Planning – Hydraulic Water Modeling. As an Engineering Intern and Entry Level Staff Engineer, Mr. Bradford was assigned to and assisted a hydraulic modeling team with the detailed hydraulic modeling of existing municipal water and sewer infrastructure systems using proprietary software. These models were used to predict operational and expansion needs to limit the age of water within the systems prior to end-user use. These models were also used to simulate the effects of proposed capital improvements to the existing systems. Mr. Bradford was a part of the team that modeled the networks for:

- City of Phoenix, AZ: water model.
- City of Yuma, AZ: water model.
- City of Corpus Christi, TX: water model.
- Town of Prescott Valley, AZ: sewer model.

Publications and Presentations

"Laramie Landfill Expansion," Wyoming Solid Waste Recycling Association – Annual Conference, 2014.

"Laramie Landfill Transition to a Modern Solid Waste Facility," Wyoming Solid Waste Recycling Association – Annual Conference, 2015.

"LFG Systems Design and Construction Considerations," Wyoming Solid Waste Recycling Association – Annual Conference, 2015.

Gardner, R. B., and Rogoff, M. J., "Trends in Solid Waste Collection Part I– What's the Future," MSW Management, March/April 2015.