ABC MA EICA APPLICATION
SECTION OVERVIEWS

Overall Presentation and Conformance to Entry Requirements - 5 Points

- Uploaded documents should be pleasing to the eye and legible. Points will be deducted for font that is too small to easily read.
- Points will be deducted for grammatical errors, spelling mistakes and other typographical errors.

Contracted Scope - 10 Points

- Include up to one full page, ensuring legibility when selecting font design and size.
- Provide a description of your scope for this project including the following information:
  - Type of construction
  - Size of project
  - Contract value
  - Length of project
  - Percentage of labor that is self-performed
  - Any subcontracted work performed by fellow ABC members, suppliers or associates/industry Professionals, if applicable
- Describe the opportunities you provided to the construction community to participate based on merit.

Project Narrative - 30 Points

- Include up to four pages, ensuring legibility when selecting font design and size. Four pages are highly recommended and photos/images may be incorporated.
- Provide a written narrative indicating why this project is special and why it qualifies for a national award. The focus of the narrative should be the construction (i.e. erection, installation, modification, grade footprint, etc.) of the project. Be sure to include the following items:
  - Describe any innovative programs relating to quality control.
  - Describe any innovative programs relating to scheduling.
  - Describe any value analysis/engineering process used on the project.
  - Indicate any special obstacles you overcame in completing the project.
  - Describe any difficulties or extenuating circumstances encountered in completing the project.
  - Describe any innovative programs or methods related to productivity.
- Projects entered into the Community/Public Service categories may include one additional page (for a total of five pages) dedicated to describing why the project qualifies for the category. Include a detailed description of the resources donated by your company.

Photographs - 8 Points

- Submit up to ten high-quality photographs (jpg format only) of the project. Ten photos are highly recommended.
- To obtain maximum points, all projects should include “in progress” photos in addition to the completed project. Restoration and Renovation projects should include “before and after” images.
- It is recommended to include photos that are relevant to the challenges and solutions outlined in the narrative.

- Provide a short descriptive caption for each photograph in the text box provided, but keep the electronic images clear of any labels or captions.
- Single jpg files may include up to two photographs, but no more than four files should include split images.
- Ensure the photographs do not include any safety violations.
- The photographs must be a minimum of 300 dpi resolution.
- The photographs must not be submitted within a software program such as PowerPoint or Acrobat and must not include any text or framing that affects the photo.
- Photographer's Use Authorization: If any photos being submitted were taken by a third-party photographer, the photographer's written authorization to use the photos is required. There are two ways to comply: (1) the photographer can sign and date the licensing agreement included in this document, or (2) the applicant must submit a letter from the photographer giving ABC authorization to use the photos, which must follow the licensing agreement in this document. No changes are allowed to this document. The letter may be emailed to eic@abc.org.

Project Safety - 31 Points

- No project that involves a prime, multi-prime, subcontractor or any trade-related work (regardless of the type of contract) with a safety-related fatality is eligible for an Excellence in Construction Award.
- No company that experiences a safety-related fatality of a direct employee within the current program year (Oct. 16, 2018-Oct. 15, 2018) is eligible to submit a project. Additional details follow on the Safety Form.
- Complete the separate Project Safety section on pages 10 and 11 of this application.
- You must include your company's OSHA Form 300A (project specific, if available) for the year(s) the project was under construction.
- You must also include your company's OSHA Form 300 (project specific, if available) for the year(s) the project was under construction, with personal information redacted.
- Include the additional documents requested on the Project Safety Form.
- In order to be eligible to win an award, the company must sign the Drug- and Alcohol-Free pledge found at drugfreeconstruction.org.
- In order to be eligible to win an award, the company must have a written Safety and Health Policy Manual.

References - 10 Points

- Include letters of recommendation from third parties involved with the project, such as the owner and design team. If the owner is unable to provide a letter of recommendation due to company policy, include a letter from the owner on its letterhead stating it is unable to provide a reference (this letter will qualify for only 5 points).
- General contractors must submit letters from at least the owner (or the general contractor's prime contracting entity, if not the owner) and the architect. If submitting in an industrial category, general contractors must submit letters from at least the owner (or the general contractor's prime contracting entity).
- Specialty contractors must submit a letter from at least the general contractor, if working under a general contractor. If not working under a general contractor, specialty contractors must submit a letter from at least the owner. Second- and third-tier subcontractors must at least submit a letter from their prime contracting entity.

- Letters will be assessed for their level of quality (content and position of author). In some cases, a single letter could earn the maximum number of points; however, additional letters are highly recommended.
- Provide a short description in the text box provided of how the author of each letter was involved in the project.

Supplemental Materials - 2 Points

- Up to five pages.
- Provide any miscellaneous supporting materials such as diagrams and other graphics, media coverage, awards and promotion.

AQC Contractor (optional) - 2 Points

- If your company is designated as an ABC 2018 Accredited Quality Contractor (AQC) member, include a copy of the company certificate. AQC status is not required to submit a project for an Excellence in Construction award. If necessary, a copy of the certificate may be requested by emailing aqc@abc.org.
- The certificate must indicate the chapter through which you are submitting your project because AQC membership is chapter specific.

For more information about AQC and to download an application, visit abc.org/aqc

STEP Participants (optional) - 2 Points

- If your company is a Safety Training and Evaluation Process (STEP) participant, include a copy of the company certificate from the year(s) the project was performed or from the current year. STEP participation is not required to submit a project for an Excellence in Construction award. If you do not have a copy of your certificate, contact your chapter, or email safety@abc.org.
- The certificate must indicate the chapter through which you are submitting your project because STEP participation is chapter specific.

Social Media & Entry Samples

Social Media

- ABC promotes EIC winners on social media (e.g. Facebook, LinkedIn, Instagram and Twitter). A photo from the entry is typically included, with the company name, project name and category. The projects are generally featured after the awards gala and throughout the program year. If your project is awarded, would you like for your company and project to be featured on ABC's social media accounts?

Entry Sample Release

- Members often request samples of EIC applications. In order to assist those applying for the first time in future years, we would like to have winning samples available. If your project is awarded, can ABC share your project narrative and/or contracted scope with future year applicants and on the EIC chapter webpage?
- If you indicated the use of innovative safety programs and your project was awarded, may these programs be included in a list of best practices posted on the EIC chapter webpage?

Project Entry Qualifications, Rights and Agreement

*All applicants are required to sign off on the following releases.

Property

- All entries become the property of Associated Builders and Contractors (ABC).

Entry Category Reassignment

- ABC reserves the right to change an entry's original category if it determines that a project's opportunity to win will be enhanced with a different category. ABC also reserves the right to redistribute the contract volume levels within a category.

Grant of Rights

- The applicant hereby grants to ABC the following non-exclusive rights: the right to reproduce and distribute copies of the work throughout the year as part of the competition materials described above, including the right to reprint the work, or any part thereof, whenever necessary and to license the use of the work, or any part thereof, in any medium or form of communication; and the right to use the applicant's name, photographs and biography in connection with the work. The applicant reserves all rights not specifically granted herein.

Safety Provision

- No project that involves a prime, multi-prime, subcontractor or any trade-related work (regardless of the type of contract) with a safety-related fatality is eligible for an award.

Warranty

- The applicant warrants that the work is original, that its publication will not infringe on the rights of others, and that it has the full power to make this grant.

Notification and News Releases

- ABC Excellence in Construction award winners will be notified within weeks of the judging process. News releases will be held until after the awards ceremony takes place. Until that time, the winners' information is embargoed.

Applicant Agreement

- I understand the application fee must be received by my ABC chapter no later than the submission deadline in order to be eligible for judging.
- I hereby give permission to Associated Builders and Contractors (ABC) to use the photographs and any information submitted to the ABC National Excellence in Construction Awards competition in ABC awards materials, including presentations and printed matter, as well as promotional materials and news releases.

* In the following pages you will find three examples of the "Contracted Scope" highlighted earlier in this handout.

Please contact Dan Gearin with any questions that you have at Dan@abcma.org or 781-273-0123.

Contracted Scope

Chippewa Nature Center of Midland, Michigan

"Chippewa Nature Center is a private nature center, open to the public year-round. Its mission is to help people enjoy and learn about the environment, as well as to inspire and teach them how to be responsible stewards of the land, water and air."

Provided by CNC

As Mechanical Contractor for the Chippewa Nature Center of Midland, Michigan, Answer Heating & Cooling, Inc. (AHC) provided complete Mechanical Installation and post-construction system optimization.

The scope of work included:

- The *ClimateMaster*-TMW170 water to water 10-ton geothermal heat pump achieves a 12.5 EER rating, exceeding the 11.3 EER required by design. Unit has a COP of 3.52 and a 50 degree EWT. The TMW170 maintains a 500 gallon storage tank at 105 degrees for heating and 45 degrees for cooling.
- Loop field, located outside the north side of the pre-school consists of 16 vertical bores that are 150' deep. Each bore contains 300' of 3/4" black plastic water line, for a total 4800' of pipe.
- 13 Variable frequency drive pumps, installed in the mechanical room and the mezzanine, that provide increased energy savings that result in additional electrical savings.
- Air handler located in the mezzanine distributes air from the energy recovery unit.
- Energy recovery unit located in the mezzanine preheats outside air with air being exhausted from building.
- Underground duct work, is a plastic "*Blue*" duct work system that is durable, non-corrosive, water- and air-tight with a R-10 insulation value.
- In-floor heating & cooling system located in the concrete consists of 3400' of 5/8" *Wirsbo* tubing. The tubing is stapled to 4" foam insulation and the system is sectioned into 13 zones.
- 5 *CHROMAGEN* all-copper solar collectors are located on the roof that provide hot water via a drain back system filled only with distilled water.
- 48 electric photovoltaic solar panels to generate up to 10kw of energy. During unoccupied times it puts the excess electricity back into the existing electrical grid to be used at a later time.
- Custom built Temperature Control System by *Honeywell*, that is operated by computer featuring full integration with remote access.

Type of construction / New Construction
Physical size of project / 5,753 sq. ft.
Contract value / $538,585
Calendar length of project / 17 months
Percentage of labor that is self-performed / 36%

Evaluation of Trade Contractors:
AHC evaluated competitive sealed proposals from trade contractors based upon past experiences and the ability to meet project specifications.

Merit Shop / ABC Members Involved in the Project:
Fisher Contracting; G.E. Insulation; Helger Construction; Metal Arts; Rockford Construction; SPACE, Inc.

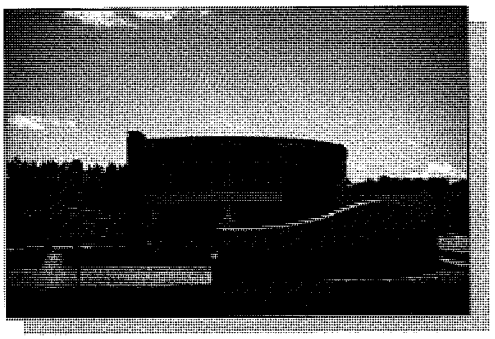
GREYSTONE
CONSTRUCTION COMPANY

VILLAGE COMMERCE BUILDING

CONTRACTED SCOPE OF WORK: 10 POINTS

TYPE OF CONSTRUCTION:

- Design/Build, Class A, multi-tenant, 2-story office building
- Post and beam construction with steel stud infill, bar joist, metal deck floor and roof structure
- Substantial glass and glazing
- Brick and stone veneer
- Permeable paver storm sewer system



BUILDING FEATURES:

- Large common entry space with a decorative 2-story atrium and open staircase
- Full glass front entry curtain wall and sunscreen entry canopy
- Pre-engineered full glass railing system at main lobby stair with stainless steel handrails
- Suspended Cherry wood ceiling at atrium and executive conference room
- Multi-user restrooms featuring solid surface vanity tops, glass tile wall accents & decorative hanging pendant lights
- Interior stone veneer accents at elevator lobbies
- Radiused glass curtain wall
- Elevator upgrades
- Vinyl wallcovering throughout
- Multiple heat/cool rooftop units for maximum comfort and flexibility
- Recessed lighting and large hanging pendant light fixtures in atrium
- Fireplace in Bank space
- Two drive-thru lanes for Bank featuring remote camera access
- Fountain at storm water retention pond

SIZE OF PROJECT:

- 22,364 square feet - Contract included shell construction, finishing of common areas and tenant build-outs

CONTRACT VALUE:

SHELL: $2.8 Million

Shell plus Tenant Build-outs to date: $3.3 million

LENGTH OF CONSTRUCTION PROJECT:

Building shell –5 1/2 months (late October and was completed early-April 2007)

PERCENTAGE OF WORK SELF-PERFORMED:

Greystone crews completed approximately 15% of the work including cabinets, wood doors and hardware, casings, wood accent trim, winter enclosures, misc concrete work, bathroom accessories and miscellaneous finish carpentry and site housekeeping.

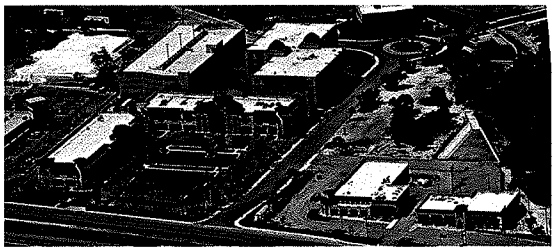
MERIT SHOP PARTICIPATION:

Greystone solicited bids from over 100 union and non-union subcontractors for this project. Three of the successful low bidders were ABC members. Seven additional Merit Shop Vendors/Suppliers and Associate Members participated in the success of this project.

CONTRACTED SCOPE

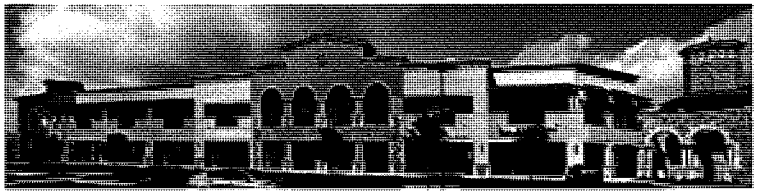
As San Antonio continues to grab national attention by snaring major corporate relocations and posts a solid economic growth forecast, local developers are finding ways to capitalize on the trend. Corporate relocations coming to San Antonio have selected to take their campuses to the suburbs where their employees live thus reducing their travel time. Developers, like REOC Partners, Ltd., are finding ways to infiltrate the limited travel distance people are willing to go by introducing mixed-use developments like La Arcata.

Middleman Construction Company entered into an agreement with REOC Partners, Ltd. to provide pre-construction, preliminary estimating, project management, and construction services for the La Arcata Development.



(Aerial view of 10 acre development)

The project, situated on a 10 acre site, consisted of a three story office building (100,000 sq.ft.) with a five story parking garage (168,000 sq.ft./ 500 space), two story retail center (92,000 sq.ft.), and two out-parcel retail buildings (25,000 sq.ft.) located across a newly constructed 60' public roadway. The development is tied together by a pair of La Arcata landmarks placed directly on the corner of Tuscany Stone and Loop 1604 and built to resemble an ancient Roman aqueduct system in disrepair but providing a gateway to the development. Construction began in September 2005 and was completed September 2007.



(Section of the 2 story retail center features architectural effects such as stone archways and columns to enhance the Tuscan theme)

To incorporate a Tuscan architectural theme, clay tile roofing, Lampasas sandstone masonry, brick pavers, ornamental railing, EIFS accents, and architectural features such as stone archways and cantera columns were used on the exterior. The interior of the office building has travertine tile floors custom quarried in Spain and handcrafted light fixtures. Also, the office has a state of the art computerized 42" touch-screen directory, mechanical energy management, building automation system, and a controlled-access system to facilitate off-site property management.

(3 story office building features architectural domes, decorative canopies, Viracon reflective glass, cast stone and brick veneer)

In conclusion, Middleman's $20.3 million contract included approximately 20% of self-performed work related to carpentry, concrete, and interior finishes; and 29 ABC members assisted in the project's success. Middleman Construction Company was honored when REOC chose our firm to be a part of their team to create this unique, Class A, Tuscan themed mixed-use development. We are pleased to submit this project for consideration in this year's ABC Excellence in Construction Award program.

MIDDLEMAN
CONSTRUCTION COMPANY

CB&I Office Building and Parking Garage Narrative

The CB&I Office Building and Parking Garage project was an exercise in efficiency. A partial list of the job constraints included:

- Aggressive schedule
- Stringent safety requirements
- No parking onsite for the workers
- No lay down area for materials near the work areas
- Limited delivery times and areas
- Noise restrictions due to the proximity of residential properties
- Minimize interruptions to the adjacent occupied facilities and CB&I employees
- Road closures and traffic control
- Very intense coordination between trades and the owner
- Large scope additions without schedule extensions
- Significant changes in location of the emergency power generator
- Minimal outage to the existing working data center
- Phasing of work
- Periods of trade stacking
- Changes in the utility standards for electrical service
- Sequencing of activities to fast-track the schedule and maintain critical path flow.

Expediting the schedule required multiple tools, techniques, and strategies. One strategy which kept Trio moving in the right direction was quality management. Using phase completions to avoid over run was also a component to help avoid the “final” polishing and error correction that sometimes derails schedules. Delivering finished components in phases allows for the quality problems or issues that exist to be identified early on and rectified before impacting the schedule. The proper use of critical path scheduling and the execution of critical path items were also keys to the success of this project.

One of the key goals outlined in the construction documents for Chicago Bridge and Iron was delivering a high quality product. Balfour Beatty and Trio set a quality control plan (“QCP”) in motion at the outset of the project by implementing inspections, tracking, checklists, and correction reporting. Trio took initiative to correct deficiencies in response to internal inspections by project management and field supervision teams before these became global project issues. Designated Trio representatives who had authority to identify QC problems and provide corrective solutions were responsible for the QCP success. Through teamwork, planning, communication, cooperation, and commitment; Trio completed a quality, safe project.

Software was one of the ways quality was managed. BIM 360 was used to monitor, report, follow up, and maintain records of the QC issues on the job.

Chicago Bridge and Iron Office & Garage — **Issue List** — Balfour Beatty Construction

Trio Electric, LTD (10 issues)

Office Building (1 issues)

Issue ID	Description	Location Detail	Status	Type	Date Created	Due Date
VB-00005	J-box access blocked by cable tray	2nd Floor south of elevator lobby	Open	Issue	06 May 2014	13 May 2014

Office Building>Level 2>Data Center 22030 (1 issues)

TK-00057	Finish fire caulk penetrations.		Open	Issue	20 Jul 2014	22 Jul 2014

CF Industries approached Cajun in June 2014 requesting a lump sum competitive price to install foundations for the U1300 Cooling Tower, U1410 MCC, U1320 Chemical Dosing Station, U1512 Piperack, and U1510 Piperack. All work served a part in CF's Capacity Expansion Project in Donaldsonville, LA. The subject work was already included in the major civil scope of the project being performed on a T&M basis by another contractor; however after over a year into construction these foundations became critical milestones to complete in order to maintain CF's overall project schedule. Major emphasis was put on the U1300 Cooling Tower foundation since the cooling tower installation contractor was already onsite erecting another cooling tower and plans for mobilization to the U1300 Cooling Tower were to be seamless. The same scenario was true for the U1410 MCC as the building contractor was already on site as well. The MCC also served as the master control center for the entire AM6 unit and major internal electrical and instrumentation work still needing to be executed in order to commission the unit after the building was complete.

CF's milestone date for the Cooling Tower and MCC was October 31, 2014, leaving Cajun with limited time to generate a lump sum proposal, develop an execution plan, and complete the scope. After multiple site visits and contractual negotiations, Cajun was awarded the U1300 Cooling Tower and U1510 Piperack on July 15, 2014, with mobilization on July 21, 2014. Following this initial contract the U1410 MCC, U1320 Chemical Dosing Station, and U1512 Piperack were awarded on August 1, 2015, with mobilization on August 11, 2014. Cajun was faced with a tall task to complete the challenging Cooling Tower and MCC foundation scopes in 15 weeks and 12 weeks respectively, while working in the middle of a very large and busy construction site alongside multiple contractors executing their work on a T&M basis.

U1300 Cooling Tower

This multi-leveled cooling tower foundation proved to be an extraordinary challenge to execute in the time frame CF had requested. The cooling tower consisted of an existing grade 530' x 61-6" x 2'-4" thick base slab whose northern edge sat on top of the corbel shelf of the trough south wall. The trough walls ranged from 6'-7" tall to 20'-10" tall and sat on a sloped 530' x 10'-4" foundation. The trough opened up to a 56' x 50'-6" sump with 20' tall walls and an elevated deck that was adjacent to a 56' x 26' pump deck that rested on 18' tall columns. All of these components tied into each other and were located at vastly different elevations.

Design drawings included an excavation plan that called for the cooling tower to be open excavated with 2 to 1 sloping sides, followed by the installation of the deeper foundation components, and finishing with the base slab and elevated decks. This plan was originally designed with the thought process that the cooling tower would be executed well before it actually started and the surrounding area would be available. Due to current conditions, this was not the case. The sump and pump deck were located only 15 feet to the south of the site's main access road that was used by all contractors and needed to be kept in service. Also, other civil work had begun in the area that the designed excavation was to occupy. Therefore, meeting CF's desired end date would not be possible per this design. Cajun had to get innovative while developing a plan to work all of the cooling tower areas simultaneously. Cajun's plan began with the design and engineering of a permanent sheet pile wall that separated the base slab from the trough and sump areas. The sump area also needed to be sheeted in order for the site access road to stay operational. Cajun's design included a permanent 300 LF x 50' deep sheet pile wall, supported by a structural waler, and tied back to H-piles driven below the base slab to separate the base slab and trough area. The sump and pump deck foundations were shored using a three sided sheet pile box with wing walls that was 450 LF overall and independent from the other sheet pile wall. The wing walls extended 115 LF in both direction of the sump box running parallel to and along the north side of the trough to a point where the trough excavation could be sloped and not interfere with the north access road.

Not only did the permanent sheet pile wall expedite the schedule by being able to work multiple areas simultaneously, it also expedited the installation of the south trough wall. Cajun's sheet pile design took into account pouring the trough's south wall up against the permanent sheet piles, requiring only one side of wall forms. This required the sheets be driven exactly on location and a special one sided wall form system. Cajun contracted RMD (ABC Member) to design and engineer a one-sided MEVA

Imperial gang form system for the trough walls. This form system was designed with all bracing being located inside the trough itself with no wall ties required to be tied back to the sheet piles and could withstand the concrete liquid pressures during pouring of such tall walls.

Due to the height of the trough and sump walls, one concern in regards to quality was the proper concrete consolidation around the foundation and wall waterstop. To address this concern, Cajun requested to pour the first 6”-8” of the walls with a grout mix, followed by the structural concrete. This method was accepted by CF engineering and insured that the watertop was incased in concrete correctly. Coordination between the pouring of the grout mix and pouring of the structural concrete was important to make sure the grout mix did not set up before the placement of structural concrete. Improper timing would have restricted the mixing of the structural concrete aggregate with the grout mix. Proper planning between the concrete batch plant and Cajun were vital, and all the wall pours were made with no logistic or quality issues.

Due to engineering’s unique design of having the north side of the base slab sit on top of the corbel shelf of the south trough wall, another plan had to be devised to work both the base slab and south trough wall productively. This was solved by Cajun submitting a RFI to allow for a construction joint to be added the entire 530’ length of the base slab, 15’ away from the south trough wall. This allowed 45’ of the base slab to be installed the entire 530’ length while the south trough wall was simultaneously installed. Two crews worked on the trough slab and south walls from the east and west directions, meeting in the middle while the base slab crew worked the 45’ sections. As the south trough wall sections were complete, the gang forms were flown to the next section and the base slab crew was able to move in to cap the walls with the base slab.

During construction, Cajun lost a total of 15 documented days related to weather events which included rain and dewatering operations of the major trough and sump excavation. Due to these delays, completion of the complete cooling tower foundation by CF’s desired date came into jeopardy. Cajun met with CF and it was determined that the only critical portion of the cooling tower that was needed by the October 31st date in order for the cooling tower contractor to begin work was the base slab, where the main cooling tower structure is located. Cajun made adjustments midway through construction allocating the majority of our resources to the south trough walls and base slab. Cajun’s permanent sheet pile wall, south trough wall form design, and base slab construction joint RFI proved to be critical value engineering and were crucial in Cajun meeting CF’s desired completion date. Despite all the factors mentioned, Cajun poured the last section of the base slab on November 4, 2014, only 3 working days past the original milestone completion date, allowing the cooling tower contractor to make a seamless transition to the U1300 Cooling Tower per CF’s plan.

As Cajun was finishing the base slab, work continued on the other components of the cooling tower. These areas were completed as the cooling tower contractor began erection of the cooling tower. As backfill and sheet pile removal dates began getting close, another obstacle became apparent. The site civil contractor was scheduled to install an 80” cooling water pipe that was located only 3’-6” away from the pump deck columns and above the finish grade of the pump deck foundation. From the beginning, Cajun’s plan was based on this pipe being installed when the cooling water line was tied into the pumps that sat on the cooling tower pump deck, long after we were complete. However, due to multiple site changes, CF requested this pipe installation to be completed before the site civil T&M contractor demobilized. The excavation required for this large bore pipe was going to shut down Cajun’s pump deck form shoring system from being erected, delaying the pouring of the pump deck which was the final pour of the cooling tower. CF approached Cajun to develop a plan to allow the pump deck to be installed and not be interrupted by the pipe excavation and installation. Cajun’s proposed plan was to backfill the entire sheet pile area around the pump deck columns with flowfill in lieu of sand prior to sheet piles being removed. This block of flowfill eliminated any concerns with sand backfill sloughing into the pipe excavation causing undermining and collapse of the form shoring system. The second part of the plan was to have the pipe fabricated as one 100’ long spool piece at another location on site and flown into place with one pick rather than be fabricated in the excavation in multiple pieces, thus leaving the excavation open for a long period of time. This plan was accepted and allowed Cajun to proceed with installing the elevated deck shoring and rebar while the pipe was

being fabricated and leaving the shoring system in place during pipe excavation and installation. Only four days of delay time was encountered during the pipe installation process rather than multiple weeks.

U1410 MCC

Cajun inherited the 31,500 SF footprinton very short notice from another contractor on site whom had already completed the hog out excavation and installation of the seal slab of the foundation foot print. The first challenge became the transfer of previously procured pile cap rebar material to Cajun. Cajun was required to go through and identify what rebar was accounted for and what rebar was missing all while starting the installation of the 60 pile cap foundations. Cajun ended up having to purchase approximately 75% of the pile cap rebar that was either missing, incomplete, or fabricated incorrectly. The next obstacle was the inaccuracy of the concrete pile installed prior to our mobilization. Numerous piles were driven outside of the designed pile cap footprints that required multiple RFI's to be generated and additional rebar to be designed, purchased, and expedited to maintain productivity, all while expending a lot of time and resources that were already stretched thin.

Because of the issues listed above along with the same weather events mentioned earlier, Cajun had immediately fallen behind schedule. Once again, innovative thinking was required to help get back on schedule. This included Cajun devising a new plan to install the 2,650 LF of grade beams that sat on top of the pile caps. In lieu of installing bulkheads and bushing the grade beams at construction joints, Cajun planned and gained RFI approval to install Stayform at grade beam construction joints. The Stayform allowed for the multiple rebar runs extending past the construction joints to be installed much easier and quicker compared to wooden bulkheads. It also resulted in greater than 20% more of the specified ¼" amplitude required for concrete bonding by bushing after the grade beams were poured. By eliminating the use of bulkheads with multiple rebar penetrations and post pour bushing, the time frame and effort it took to get ready for the next pour was greatly reduced while also producing a more quality product.

As grade beams were being poured, the next step in the process was to backfill the 42 cells in between the web of grade beams before the main slab rebar could be installed. Looking ahead, Cajun recognized a potential issue with backfilling the 2'-8" deep cells with sand in 8" lifts due to weather concerns. The cells were locked in by concrete on all sides, seal slab below and grade beams all around, and any potential rain water would have nowhere to drain. Cajun's concern was achieving and maintaining moisture density requirements for the backfilled sand which could have had a negative effect on the project schedule if backfill had to be re-worked after rain events to achieve installation quality standards. In order to avoid this scenario, Cajun proposed and received approval to backfill the cells with concrete flowfill in lieu of sand, eliminating any weather related concerns with backfill. This method saved a tremendous amount time on the already behind schedule foundation.

The final obstacle that Cajun faced was the pouring of the main building slab. The overall square footage of the main slab was over 20,000 SF and included different floor finishes. A decision needed to be made if the slab would be poured in multiple smaller pours or one major pour. As CF's desired completion date approached, it was decided that the best option in regards to schedule was to pour the main slab as one pour. Despite the many obstacles related to weather, material procurement, and execution, Cajun poured the main MCC building slab in one 16 hour shift on November 3, 2014, only 2 working days past the desired milestone date. Some minor piers, walls, and entrance aprons still required completion as part of the MCC building foundation; however the building contractor was able to mobilize to the U1410 MCC building with no further delays or interruptions.

U1510 Piperack

The U1510 piperack started as the south Cooling Tower base slab walls were completed and before the Cooling Tower contractor was mobilized. The piperack consisted of 13 sleeper foundations and 11 piperack foundations that ran the length of the 530' Cooling Tower. As the cooling tower contractor started to mobilize and begin initial work on the base slab, it came to a surprise to them that the piperack was being installed prior to their arrival. On the cooling tower they had just completed, a similar rack was left out and was being installed after they were complete, giving them complete access to set their crane along the length of the cooling tower. The installation of the piperack

foundations would not be an issue for the initial cooling tower structure erection and pipe, but would be an issue when their crane arrived to set the upper level pipe and cells of the cooling tower.

When the Cooling Tower contractor arrived on site the 13 sleeper foundations were ready to be poured and 4 of the piperack foundations were formed and rebar was being installed. When Cajun learned of the size of the crane that would be used, it was recognized that due to the spacing between the sleepers and piperack foundations, there would be no room for the crane to gain close enough access to the Cooling Tower base slab to make the required lifts. A bigger crane then planned would have to be used and would have had to sit in the heavy haul road located to the south of the piperack. The blocking of this road was not acceptable due to the amount of equipment that was scheduled to arrive and be transported during the time of the cooling tower installation. Cajun approached CF and proposed to stop work on the remaining piperack foundations, removing the forms and rebar of the 4 piperack foundations already started, and returning to site at a later date to complete these foundations once the cooling tower erection was complete. The sleeper foundations were to be poured as planned. CF agreed that this plan was the best path forward to avoid any additional cost related to bringing in a larger crane than planned, and preventing any interruption of the heavy haul road.

Bringing this to CF's attention and the resulting decision also caused work stoppage for the site civil T&M contractor on the stormwater piping system that ran between the U1510 piperack and the heavy haul road. As a result, Cajun was awarded the completion of the stormwater piping system when we returned to complete the U1510 pipe rack foundations. In March 2015, Cajun returned to the site completing the 11 piperack foundations, installing 8 catch basins, and installing 500 LF of 12" HDPE stormwater pipe.

U1320 Chemical Dosing Station and U1512 Piperack

Both the U1320 Chemical Dosing Station Foundation and U1512 Piperack foundations were located directly north of the U1300 Cooling Tower. These foundations could not begin until the temporary sheets were removed around the Cooling Tower sump and trough areas.

The U1320 Chemical Dosing station consisted of a 33' x 115' slab and was installed with no major issues. The biggest challenges were the installation of small sumps and trenches that were embedded in the main slab. Numerous sloping slab blockouts were required to be pre-fabricated and installed along with trench and sump grating embed angle steel.

The 27 each U1512 Piperack foundations ran the entire 530' length of the Cooling Tower, being separated in the middle by the sump. Each piperack foundation was attached by 2 grade beams that ran 19'-8" between each foundation. Cajun utilized the same Stayform method used at the U1410 MCC in regards to rebar penetration bulkheads and bushing between pours. This method again proved to be useful with constructability and schedule savings. The biggest challenge was coordinating with the stormwater pipe contractor, whose pipe line crossed under a couple of the piperack bents and grade beams. A total of 216 anchor bolts were installed in the foundation pedestals, which received the piperack structural steel with no issues.

Summary

Overall the project was successful in the eyes of both Cajun and CF with regard to safety, quality, schedule, and cost. Cajun installed 300 LF of permanent 50' deep sheet piles, installed and removed 450 LF of 50' deep sheet piles, excavated and hauled 16,575 CY of dirt, grouted 758 sets of concrete pile uplift bars, installed 1,125 tons of rebar, 9,625 CY of structural concrete, 10,035 CY of sand backfill, 3,385 CY of flowfill backfill, 8 catch basins, and 500 LF of 12" HDPE pipe while working a total of 92,338 incident and injury free direct man-hours and 19,626 sub-contractor man-hours to meet CF's desired critical milestone dates. All structural steel was subsequently erected, and pumps and pipes installed with zero re-work required.

Big D Metalworks
Dallas Arboretum's Rory Meyers Children's Adventure Garden

Narrative

Rory Meyers Children's Adventure Garden at the Dallas Arboretum is a rambling adventure set on 27 acres of natural wonder in the middle of Dallas. This garden is a wonderful opportunity for children of all ages to explore, play and learn about our Earth. With over 150 individual kid friendly activities tucked within 22 unique galleries of learning, the garden provides fun and adventure for the whole family and is one of the best family friendly attractions in Dallas. With topography as diverse as the galleries themselves, this project provided a back drop for Big D Metalworks (Big D) to showcase its ability to bring alive the architect's design and install one-of-a-kind structures and artisan pieces throughout the Garden.

Complexity of the Project

Big D was contracted to assist with design, fabrication and installation of unique architectural metals throughout a complex learning garden for children. The project was, in fact, 22 smaller complex projects each with its own unique challenges, designs and delivery schedule. The 22 galleries take a guest through the multi-faceted terrain of the Earth. From flat lands to winding hilly paths, then over water and swamp, and up to an observation deck overlooking the Garden, this project required over 4,400 lineal feet of handrails and guardrail systems to keep all patrons safe and secure as they journey through the adventure. A few highlights of this complex project are: the Entry Gate, the Texas Skyway, the Cattail Fence, the Discovery Center Trellis, the Arbor Frames, the Reed Fence, and the Entry Arbor.

The Entry Gate welcomes visitors through a lit archway of undulating forged metal ribbon showcasing the name of the Garden. The wavy band of aluminum is attached to an intricate structure of twisted metal vines with 60 hand forged metal leaves of differing shapes, sizes and types of attachment angles. Big D designed and forged the archway, vine and leaves of metal and artistically hand attached each leaf in place to give the archway the appearance of natural vine.

The entry gate is six panels with an elaborate design throughout each panel. The gate design mimics a natural wind pattern made of thin individually made, bent and attached metal tines. Attached to this intricate metal configuration, at the bottom of the gate, are 32 handmade glass bluebonnet flowers of varying sizes and shapes with 10 butterflies in various stages of flight hovering above the bluebonnets. Big D's artisanship is showcased in the complexity of the design and fabrication of the pieces throughout.

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As a child runs through the welcoming Entry Gate, they are drawn to the striking Texas Skyway to their left. The Texas Skyway is a lighted elevated walkway throughout half the Garden. It continuously changes elevation as it traverses overland to water with the changing radii of curvature throughout the structure. The configuration has guardrails for fall protection.

The Cattail Fence provides an enclosure for a beautiful sitting area that seems to come to life. The fence is located near water and is set in to an area which changes elevation throughout. The design was water jet cut, assembled and then galvanized to minimize corrosion from the elements.

The Discovery Center is near the center of the Garden and provides an enclosed space for all the classroom programs and provided another opportunity for Big D to utilize their artisan touch and creative problem solving in the field. The architect made best use of all the space by designing a garden and seating area on the roof of the structure. Attached to the edge of the rippling roof line is an intricate and elaborate trellis system, which adds to the natural look of the Discovery Center by providing a structure to support the vines, which will eventually cover it. The whimsical looking trellis appears to be a simple ornamental structure attached to the building. In reality the ever changing angle of the roofline provided a need for each of the 53 support blades to be unique in shape, size and pitch. The only two identical blades are double supports evenly spaced throughout the structure. Each blade was required to be attached at an entirely different angle around the roof circumference. The final product appears as a perfectly spaced splay of gleaming metal blades with a simple metal runway of separate metal rods within. The stainless steel rods that mount to the top of the supports are rolled to match the curvature of the building as they flow from end to end.

The Entry Arbor, Reed Fence and Arbor Frames create an organic look to the park with creatively forged artisan metalwork. The Entry Arbor is four arches of rolled steel rods, which appear as stacked wheat. Once through this arbor the children run alongside the Reed Fence. This fence gives the impression of delicate reeds lining the walkways and water features, rolling over rock structures yet remaining sturdy enough to handle weather and maintenance issues. Along the Incredible Edible Gallery is a meandering set of bent steel Arbor Frames creating a structure for vines to crawl over and create a seemingly endless wall of nature as it winds its way to the next learning gallery.

The Reed Fence was created to be decidedly random and appear as reeds appear in nature. The terrain throughout the fence was widely varied. Big D created a specialized three-dimensional template system to use in the field to set the mounting system throughout the fence. The plans did not take into account a stair step in the layout so the reeds had to be lengthened in the field. However when the reeds were lengthened the fence didn't look natural. Using an artistic eye and some patience, a welder stood at the fence while another crew member stood back to point out where the reeds needed to be modified. The welder marked the reeds and made the modifications to make them appear natural.

Maximizing Teamwork

With a schedule of only 18 months to completion and several weeks of rain, ice and snow delays, effective time and schedule management was critical to the success of this project.

The Entry Gate design and installation took a coordinated effort working with the artist who handmade each blue bonnet and butterfly from cake glass. To compress the schedule for the Entry Gate process, Big D fabricated one template for each sized flower and butterfly that was to be incorporated in the gate structure. These templates were shipped to the glass artisan's shop and were used to manufacture each glass piece incorporated in the gate. While the glass artist used the templates that Big D provided to him to make the glass, Big D Metalworks fabricated the gate using identically sized templates. This innovative process allowed us to simultaneously fabricate the gate while the glass was being fabricated. After the gates were installed and all of the welding was completed, the glass artisan was able to install his glass. Simultaneously fabricating the glass and gates allowed us to compress the schedule by approximately 12 weeks.

Throughout the Garden, the concrete work is ever changing. From stamped concrete appearing as dinosaur tracks to hand-inlaid pebbles creating the look of a babbling brook bed, the concrete vendor and Big D coordinated their work throughout each of the 22 galleries. The Texas Skyway, the Cattail Fence, the Arbor Frames, the Reed Fence, and the Entry Arbor each required large poured concrete pylons before Big D could install any of their complex architectural metal structures. The majority of the barrier rails and handrails on the project were set in concrete piers, steps and ramps that were poured in place by the concrete contractor. Adding to the complexity of the Texas Skywalk was the involvement of 10 different subcontractors in this portion of the work. Between cold weather delays not allowing for concrete pours, and the lack of materials to pour concrete, Big D remained flexible in our skilled labor scheduling and resource management. Big D stayed ahead of schedule and met all deadlines and contract obligations.

Another area which required significant teamwork was the Discovery Center Trellis. The trellis was not only a challenge to design, fabricate and install, but also demanded significant coordination with the electrical contractor. The architectural design of the Trellis has integrated lighting. The stainless metals needed raceways and holes in the imbeds for wires. Ongoing teamwork between Big D and the electrical contractor brought the installation to completion.

Creative Delivery Systems

As the schedule complexity and weather issues began to delay Big D's work, it became evident we were going to need to significantly and quickly compress our planned schedule through effective collaboration and creative problem solving. We identified three main target areas: maximum preparedness and flexibility in the field, a mechanism to compress the lead time on the Manufacturer's delivery on the custom woven wire mesh, and the need to save labor hours on the Walkway.

To maximize field flexibility, our team quickly identified and produced all those products which could be produced without field measurements and delivered products as various pieces of the project became available for installation. Our Assistant Project Manager worked daily with the concrete contractor to adjust as necessary to keep the field personnel productive and the project progressing.

At the beginning of the project, the selected mesh supplier for all the woven stainless throughout the Garden indicated that custom-sized mesh would require approximately eight weeks for production and delivery to the site from Germany. To eliminate this lead time, we ordered the material in standard sizes and then conducted specialized training from the supplier to enable us to modify the mesh in the field and further compress the revised schedule durations.

Finding ways to compress the schedule on the Texas Skyway pushed us to design specialized equipment to use on the ever changing project site terrain. (The Texas Skyway is 700 feet of stainless steel guardrail with a stainless steel mesh infill and a 7" X 3" stainless steel custom fabricated edge angle along both edges of the entire length of the wood and steel walkway structure.) This walkway begins near ground level; however, the ground quickly slopes away with the walkway now suspended above the surface approximately 20 feet at its highest point. Since the ground elevation and walkway curvature changes throughout the Skyway, installation of the rail and the stainless edge angle was a challenge, especially when contending with the mud and inclement conditions of the terrain.

To bolster productivity and provide a safe process for installing the rails and edge angle, Big D designed and built a specialized cart system with guide rollers to stage materials for installation. This cart rolled along on the steel structure of the walkway like a railroad maintenance trolley and provided a safe and time-saving method for moving materials along the walkway. In addition, Big D also built a suspended rolling ladder with a platform that the craftsman could easily access for attaching the custom edge angle and the base of the post to the edge angle. By tying off to the structure, the craftsmen were protected from falls and had excellent access to attach the edge angle and posts.

Big D became well known among the other contractors for their creative approach to problem solving. We were asked to help one contractor with a beautiful metal fabricated tree whose canopy was too short for adults to walk under. Big D designed, forged and helped install a metal piece to elevate the trunk to raise the structure enough for the "Big Kids" to safely walk under. Big D also helped determine where extra barriers could be added to keep patrons on a safe path. One month before opening, Big D was asked to install more stainless steel mesh to be part of the exhibit. Unfortunately the mesh delivery from the specialty supplier was 30 days after the requested install date. Big D had extra mesh in their shop, but not the correct kind for the area. After brain storming they came up with a creative way to modify the available mesh since the specified mesh would take 60 days to deliver. As a result, the added work was completed before the opening date.

Crafting a showpiece project for the City of Dallas and the Rory Meyers family, the General Contractor hired an artisan architectural metal company. What they received was a creative, problem solving subcontractor and trusted advisor for the duration of the project who helped bring the work in on time and on budget. Throughout this large complex garden exhibit, comprised of 22 individually unique projects, Big D utilized creative resource management, problem solving, and delivery systems while working within the confines of multiple subcontractor's schedules and evolving challenges.

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Project Description:

Haley-Greer, Inc. was contracted by Anslow Bryant Construction, LTD to erect this two-story, 14,700 square-foot Double Platinum LEED and Design Build structure. Glass handrails, curtain wall glass, metal panels and wood make up this extraordinary architectural design which functions as the owner's office and meeting space.

Why Is This Project Special and Why Does It Qualify For An Award?

This geometric- shaped building was designed to resemble a modern day Treehouse. It has sloped curtain walls, patterned silkscreen glass, a rooftop garden and even a "monkey bridge" which connects this structure to the adjacent office building.

The Treehouse was the result of the owner's dedication to quality design and their sustainable building practices. The building is currently listed as the #1 Ranked Double Platinum LEED building in Texas, and in the top 3 nationally.

Haley-Greer, Inc. partnered early to engineer the curtain wall in order to meet the owner and architects design intent while ensuring a water-tight building. The unique blend of pattern silkscreen glass made it very difficult to install because each piece was specifically designed to fit its proper place. There was no room for error during the installation process. The weight of the glass ranged from 300-550 lbs. per unit. A 10,000 lb. all terrain forklift with an engineered steel boom extension and power cups were needed to set the glass at the sloped curtain wall. All glass had to be set from the exterior making the task even more difficult.

The Treehouse deserves an Excellence in Construction Award due to the unique design, complex installation and challenges we overcame for a successful and safe completion.

Innovation Programs Relating to Quality Control:

Prior to mobilization, field pre-planning was done with the entire design team to meticulously review the sloped curtain wall installation and the fitting of the crucial, multi-pieced glass. There were 8-10 different patterned silkscreen glass types that had to perfectly match the triangular and trapezoidal shapes. There was zero room for errors with material fabrications.

Haley-Greer, Inc. also performed thorough inspections of the glass prior to it ever shipping out to the jobsite. Our team ensured proper glass sizes and placement of silkscreen patterns for alignment.

In the field, daily inspections were also conducted on the internal caulk joints to prevent any water infiltration. Onsite water static testing was also conducted periodically during our installation, which is a standard operating procedure for Haley-Greer.

Innovative Programs Relating to Scheduling:

Scheduling was a challenge on this fast paced project.

Coordination was a key factor during the glazing process due to exterior ground work and concrete work being performed simultaneously due to the accelerated schedule. Material shipments had to be scheduled for early AM deliveries. Haley-Greer had 60 days to dry in. We had to work very closely with the steel subcontractor to ensure the sloped curtain walls and steel were properly coordinated. HGI worked 7 days a week, 10-12 hour days until dry in was achieved. Our employees were pushed to the limit, but our superintendent and foremen did a great job balancing the work schedules to keep our crews safe while maintaining quality installation.

"It takes a special team to build at the speed we have been asked to over the last few years. Haley-Greer is at the core of our team. As one of the four building envelope contractors used on the project, Haley-Greer is integral in the expedited completion of our projects. The Haley-Greer team is always ready to step up, move fast, find solutions, and work with us to deliver what the project stakeholder needs to begin generating revenue. We could not ask for a better partner." **Steve Thomas, Anslow Bryant Construction**

Value Analysis/Engineering Process Used on Project:

The Treehouse was a unique project for Haley-Greer, Inc. The owner wanted their vision brought to fruition so they were willing to invest the funds for the desired outcome. There was no VE used on this project for our scope of work.

Innovative Programs Related to Productivity:

As mentioned, Haley-Greer had to work all hours most days. We had two crews to maximize production. One crew focused on our metal installation while the other crew was dedicated to glass. We were able to ensure the crews could completely focus on the difficult installation of the sloped curtain wall and patterned multi-sized glass. Long hours, weekend work and lots of overtime were needed to complete our schedule. Haley-Greer put our most seasoned curtain wall erectors on this high profile project to ensure top quality installation and a safe working environment.

"Over the last nine years, I have worked with Haley-Greer's Houston team. The team is always ready to motivate and move their teams to complete the difficult projects. More frequently we have seen the project complexities increase and schedules decrease and HGI is always ready to step in and make it work." **Steve Thomas, Anslow Bryant**

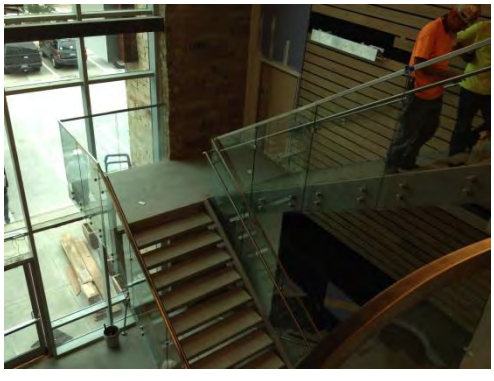
Special Obstacles/ Difficulties/ Challenges Overcome Completing the Project:

Glass: Multiple patterned silkscreen glass types had varying pie shapes and sizes. The glass patterns all had a "vine" silkscreen on them to go along with the look of the modern day version treehouse. Layout was crucial to matching all the pattern types. The other glass obstacle was the size of the glass (300-550 lbs.), which was all hand set in a very tight confined space. The triangular and trapezoidal shapes alternated from perpendicular to sloped glass walls.

Our job superintendent Joe Montoya commented that installing this glass was like working a jigsaw puzzle.

Sloped Curtain Wall: The curtain wall had 18 and 11 degree sloped walls along with straight walls right next to them. This made our layout extremely difficult due to the intricate corner joints that had to be installed perfectly in order for our glass patterns to match. The mullions were spliced and mitered which also hindered our layout and installation. We had to coordinate the curtain wall with the concrete structure for a proper fit.

Interior Staircase and Handrails: Our scope included the interior staircase and handrails. The staircase had three platforms going up the building. We encased the concrete stairway with glass and all connections had to be pre-measured before anchored. All glass was at an angle. The glass had to be field measured with notches to transition between each concrete platform level. All anchor points had to be lined up perfectly. This was extremely challenging with all the other trades working on the interiors along side us. The stainless steel handrails had to be field welded onsite.



Elliptical/Sloped Skylight: There is a skylight on the roof top garden that is made of pie shaped glass, metal trim and sealants. After the installation of glass, a special film was applied to the glass to decrease the amount of U.V. rays penetrating the office space below. All glass had to be set by hand in lieu of equipment. Exact layout and field measurements were required for error-free installation.

"Monkey Bridge": The project has a suspension bridge that connects the Treehouse to the corporate office in the building next door. Haley-Greer had to demo the existing curtain wall in order to access the area for the bridge to connect. We then had to engineer and install a modified curtain wall around the bridge penetration with a new glass door for access to and from the office building. All work had to be done at night since the office building was occupied along with the ongoing Treehouse schedule.

Conclusion: This is one of the most unique and prestigious projects we have had the honor to work on. The owner and design team helped create a Houston landmark that not only honors the environment but also demonstrates a beautiful and fully functional office and meeting space.

BIM was also used in the beginning of the project to coordinate work and eliminate QC and RFI issues. When closing out the project care was taken to test, inspect, and train and document all the above in a digital format including pdf and video records. Our team used BIM to complete baseline coordination, underground coordination, overhead coordination, and electrical specific shop drawings used for installation. To streamline the exchange of information between team members, Trio offered multi-option solutions for garage lighting, feeder routing, feeder materials, utility coordination, load analysis and field surveys.

Scheduling the critical path items and starting them as early as possible was a technique used at CB&I to ensure the schedule would be met. An early item in the critical path was completing the emergency power duct bank at the beginning of the project to enable the use the spare conduits in the bank for temporary power to the site. There is a balancing act between starting trade contractors too early and risking redesign versus starting too late and missing schedule milestones. Thus, utilization of the CPM played an important role in the success of the project. Some of the tools utilized to keep the project on schedule, effectuate communication between trades and achieve “buy in” for schedule dates and durations were: a six week look ahead based on the original fully man loaded schedule, weekly field updates from construction meetings, and a pull schedule. Our look-ahead schedule allowed us to be nimble and to grade ourselves on whether or not we were hitting the dates and durations. The pull planning addressed the schedule with the milestones in mind and worked backward to a work flow plan. See example illustration below. Subcontractors broke down their activities and durations on post-it(s) on the whiteboard grid and plotted their own look-ahead to achieve the desired milestones. This helped to visualize the needs and held the team accountable.

One not so friendly “sounding” technique, schedule compression, was also used with success. As the team got better at defining duration, we challenged each other to beat that duration as we progressed through the schedule. Crashing was used in a very limited fashion, when it had to be done the extra resource cost was balanced by the time savings of adding resources (manpower). Fast tracking was used often and basically allowed more parallel work activities that would normally be sequential. Prior to fast tracking we minimized risk by identifying any misses or changes that could potentially impact the schedule.

One other technique Trio used to stay on schedule and as efficient as possible was to encapsulate key parts of the project to be supervised separately. Dividing the work responsibilities this way and having the additional supervision allowed for more responsive teams that could move with an ever changing schedule and keep up with changes in the scope, impacts to the bottom line, and schedule. We established a desired hierarchy chart at the start of the project and tweaked it as the needs of the job changed with time.

Week Starting:
Week Ending:
Prepared By:__J.R.____

6 WEEK LOOK AHEAD

Estimated Ship Dates (CED)

JR Need on Site (TRIO)

1-3 PANEL CANS

1-3 floor panel cans

SERVICE GEAR

LOB 1-3 FIXT & LOB GEAR

1-3 Lighting Controls & Lobby, 4-6 Panel cans

##	Scheduled Activity/Task	Total Hours	WEEK ENDING 2/23/2014							WEEK ENDING 3/2/2014							WEEK ENDING 3/9/2014							WEEK ENDING
			2/17	2/18	2/19	2/20	2/21	2/22	2/23	2/24	2/25	2/26	2/27	2/28	3/1	3/2	3/3	3/4	3/5	3/6	3/7	3/8	3/9	3/10	3/11	3/12	3/13
			M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T
1	1st floor - wall rough-in	240																						3	3	3	3
2	1st floor - pull branch wire	208								2	2	2	2	3			3	3	3	3	3						
3	1st floor light fixture tails	0																									
4	1st floor - install fixtures	0																									
		0																									
5	Data Center overhead/underfloor work	600																									
6	roof electrical	0																									
7	Entergy yard - set gear/pull feeders	0																									
8	transformers/panels and one line diagram	1280	2	2	2	2	2			2	2	2	2	3			3	4	4	4	4			4	4	4	4
		0																									

Trio brought value engineering (VE) to the table starting on bid day. One of the VE items that survived and was implemented included large aluminum feeders used in lieu of copper. This was not without scrutiny and review and had to meet the spec put forth by the engineer. We adhered to specific feeder types, termination requirements, and preferred sizing for appropriate ampacity. Another item that helped save the owner money was reducing spare feeder conduits; especially in long and large duct banks. Trio identified where and how many conduits could be eliminated and worked with the engineer to remove them from the scope.

As the project took shape, Trio continued to look for opportunities to save the client money. Our team identified substantial savings in meeting the design requirements for the garage lighting. By utilizing new led technology in the new and existing garage; both emergency and lumen requirements were satisfied. This outperformed the original design of metal halide fixtures with arc keepers at less cost and also covered the cost of updating the existing garage. Our team helped the design team navigate the new utility requirements from Entergy by securing a custom power yard design approval. This significantly reduced the cost that would have been required to meet standards versus the original budgeted design. Trio also helped to coordinate the custom utility cabinets and approval from the local utility to use them. Most of this potential added cost came from the requirements necessary to add a 2000A data center midstream in our project. Trio also identified several ways to reroute large feeders to the

emergency power system that proved to be a savings. The emergency power generator and associated yard were moved after the initial location was already complete. Trio worked between the design team and the owner to come up with the most cost effective routing and mounting of the feeders and yard layout.

Continual phasing and re-phasing of work was necessary to maintain original schedule milestones and to achieve the level of quality desired with minimal corrections. Coordination efforts to meet our move in date included:

- Site traffic plans
- Rigid delivery schedule
- Hoisting schedules
- Method of procedures for outages
- Parking requirements
- Specific path to and from the site for the workers
- Staging materials with absence of laydown areas
- Traffic control planning
- Landing materials and getting to work areas with no buck hoists,
- Interiors consolidated framing sequences and completion requirements